



TOON BOOM

HARMONY

NETWORK ANIMATION SOLUTION

Stage User Guide

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Chapter 1

Introduction

Toon Boom Harmony is an easy solution with advanced features for all your animation projects.

No matter what your animation workstyles are, Harmony takes care of your entire project, from importing your assets and creating your content, all the way to animation and compositing. Harmony combines vector, bitmap, Symbols and pegs for maximum freedom and performance. Harmony's features and shortcut sets fit so neatly into your circle of Adobe® products and your animation techniques that you will feel at home in minutes.

To learn all about the features available in Toon Boom Harmony Stage and how to use them in a production context, read the following chapters:

- Getting Started, on page 21
- Discovering the Interface, on page 37
- Drawing and Animating, on page 73
- Adding Colour, on page 165
- Layers and Timing, on page 217
- Morphing Drawings, on page 283
- Gathering Content, on page 317
- Libraries, Symbols and Templates, on page 347
- Building a Character, on page 375
- Setting Up the Scene, on page 445
- Working in a True 3D Space, on page 507
- Working With Sound, on page 533
- Creating Animation Paths, on page 551
- Animating Your Puppets, on page 609
- Enhancing With Effects, on page 665
- Exporting Your Movie, on page 743



In all Harmony Stage documentation, the default keyboard shortcuts that are used are the Adobe Flash set.



In this guide, you will learn about the different features and functionalities available in Toon Boom Harmony Stage as a stand-alone application. More functionalities become available when working connected to the Harmony database.



Refer to the Harmony Network User Guide to learn how to work with Harmony Stage connected to the Harmony database.

Chapter 2

Getting Started

Once the software is installed, you are ready to launch the application and animate!

In this chapter, you will learn about:

- Launching Toon Boom Harmony Stage, on page 22
- Preference Styles, on page 23
- Welcome Screen, on page 24
- Creating and Opening a Scene, on page 25
- Setting the Scene Length, on page 28
- Scene Settings, on page 28
- Adding a Drawing Layer, on page 31
- Verifying Project Integrity, on page 32
- Basic Commands, on page 33




In this guide, you will learn the different features and functionalities available in Toon Boom Harmony Stage as a stand-alone application. More functionalities become available when working connected to the Harmony database.

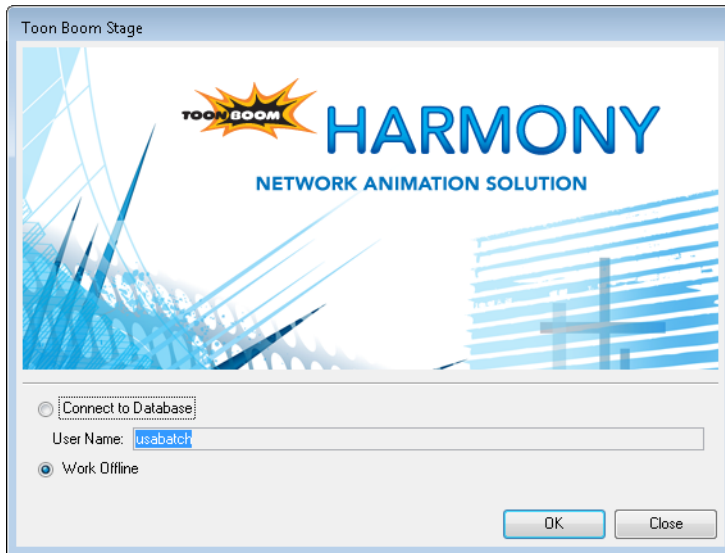
Launching Toon Boom Harmony Stage

Before using Harmony Stage, you have to start the program. You can run the software on Mac OS X or Windows/Linux operating systems.

To open Harmony Stage, do one of the following:

1. Launch Harmony Stage:
 - ▶ Mac OS X: Select **Applications > Toon Boom Harmony 7.8 > Stage**.
 - ▶ Windows: Double-click on the Toon Boom Stage  icon on the desktop or select **Start > Programs/All Programs > Toon Boom Harmony 7.8 > Stage**.
 - ▶ Linux: Select **Applications > ToonBoom-Harmony 7.8 > Stage**.

Toon Boom Harmony Stage opens, displaying the **Welcome Screen**.



Two choices are available to you:

- **Connect to Database**
Enable this option to work on Harmony Stage connected to the database. When you are connected to the database, you gain access to the scenes stored in the central database of Toon Boom Server and exclusive options becomes available in the different menus. However, you will not be able to create new scenes directly from Harmony Stage and the available scenes will be the ones that were previously created using the Control Center.



Refer to the *Harmony Network User Guide* to learn about working on Harmony Stage connected to the database.

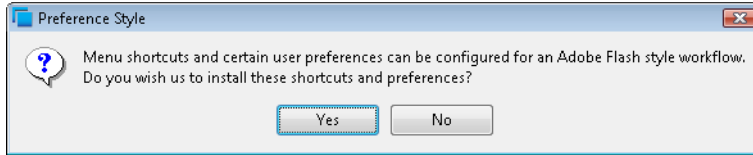
- **Work Offline**
The Work Offline mode is enabled by default when you launch Harmony Stage for the first time. Using this mode let's you create new scenes and work locally on your machine on independent projects as you would normally.
However, the following limitations apply:
 - ⇒ Options exclusive to the Harmony Solution will not be available in the different menus
 - ⇒ You will not have access to any projects stored in the central database of Toon Boom Server.

2. Enable the Work Offline option.
3. Click on OK.

The **Welcome Screen** opens.

Preference Styles

When you start Harmony Stage for the first time the **Preference Styles** dialog box will open. This is the only time you will see this dialog box, however, you can change the styles later on if you like.



You have two choices, click on the one which fits your work style:

- **Yes**
Sets Harmony Stage's default shortcut scheme and preferences to fit the Adobe Flash software workflow style.
The Select tool is set to Marquee Selection mode.
When using the [F6] keyboard shortcut to create a keyframe, a positioning keyframe is created and the selected drawing is duplicated.
- **No**
Sets Harmony Stage's default shortcut scheme and preferences to fit the Toon Boom professional products workflow style.
The Select tool will be set in Lasso selection mode.
Using the [F6] keyboard shortcut to create a keyframe, a positioning keyframe is created but the selected drawing is not duplicated.

You can always return to the Preferences panel later on to change the shortcuts and preferences settings.



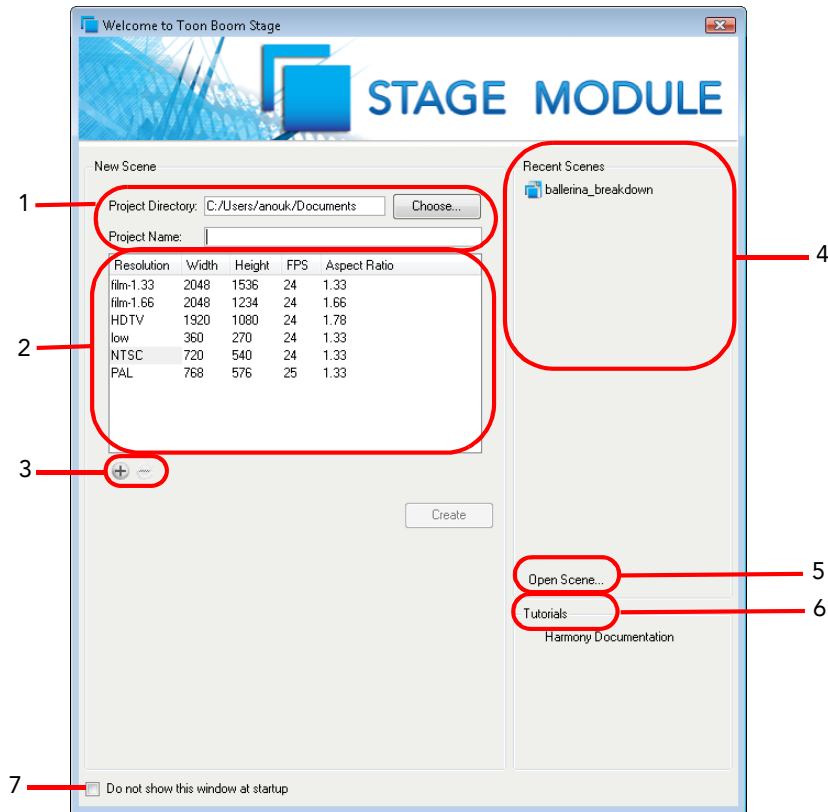
*Refer to the following topics in the *Discovering the Interface* chapter to learn more about preferences and customizing the shortcuts:*

- Preferences, on page 67
- Keyboard Shortcuts, on page 70
- Preference Highlights, on page 68

Once your choice is made, the **Welcome Screen** will be displayed.

Welcome Screen

When you open Toon Boom Harmony Stage, the Welcome Screen appears. If a scene is already open, you can display the Welcome Screen by selecting **Help > Show Welcome Screen**.



The Welcome Screen allows you to:

1. Create scenes
2. Choose the scene resolution
3. Add or Delete a custom scene resolution
4. Open recent scenes from a list
5. Open scenes by browsing
6. Open the help documentation
7. Enable this option to open Harmony directly without opening the Welcome Screen first.

To display the Welcome Screen later on, go to the top menu and select **Help > Show Welcome Screen**.

Creating and Opening a Scene

All scenes created via Harmony Stage, are independent and local to the computer.

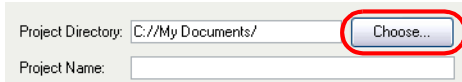
There are two ways to create a new scene:

- Welcome Screen, on page 24
- Using the File Menu, on page 26

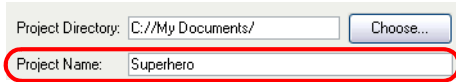
Using the Welcome Screen

To create a scene from the Welcome Screen:

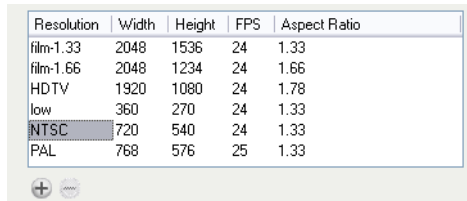
1. To select the scene's location, in the Project Directory section, browse the files by clicking on the Choose button.



2. In the Project Name field, type the scene's name.

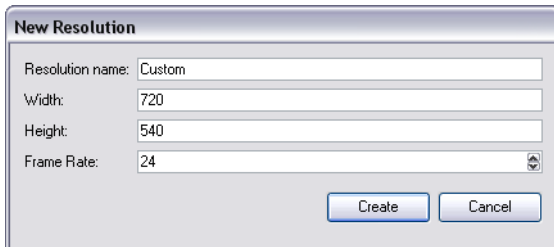


3. In the Resolution window, select the scene's resolution or move on to the following step to create a new one.




4. You can click on the Add  button to add a new resolution to the list.

The **New Resolution** dialog box opens.



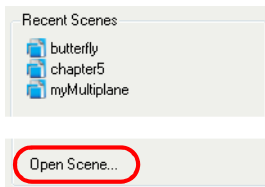
- ▶ In the Resolution Name field, name your new resolution.
- ▶ In the Width field, type the resolution width in pixels.
- ▶ In the Height field, type the resolution height in pixels.
- ▶ In the Frame Rate field, type the scene's frame rate per second.
- ▶ Click on the Create button.



You can delete a custom resolution from the Resolution List by selecting it and clicking on the Delete  button under the Resolution window.

To open a scene from the Welcome Screen:

1. In the Recent Scenes section, click on the **Open Scene** option.

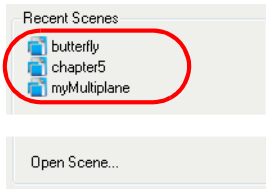


The **Open Scene** browser opens.

2. Browse and select the desired *.digital file.
3. Click on the Open button to open the scene.

To open a recent scene from the Welcome Screen:

- ▶ In the Recent Scenes section, select a scene from the list.



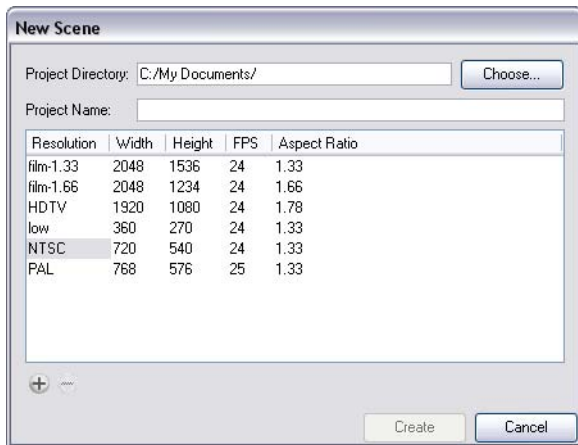
Using the File Menu

If a scene is already open and you want to create a new one, you can use the File menu.

To create a scene from the File menu:

1. Select **File > New**. You can also click on the New  button in the File toolbar or use the default keyboard shortcut [Ctrl]+[N] (Windows/Linux) or [⌘]+[N] (Mac OS X).

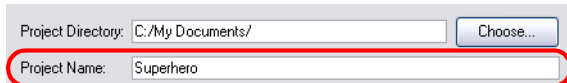
The **New Scene** dialog box opens.



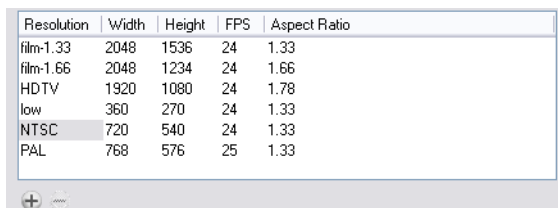
2. Select a scene directory by clicking on the Choose button.



3. In the Project Name field, name the new project or move on to the following step to create a new one.

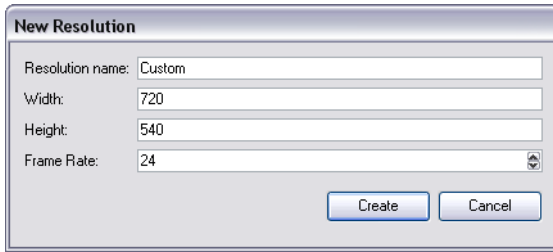


4. In the Resolution window, select the scene's resolution or click on the Add  button to add a new resolution to the list.




5. You can click on the Add  button to add a new resolution to the list.

The **New Resolution** dialog box opens.




- ▶ In the Resolution Name field, name your new resolution.
 - ▶ In the Width field, type the resolution width in pixels.
 - ▶ In the Height field, type the resolution height in pixels.
 - ▶ In the Frame Rate field, type the scene's frame rate per second.
6. Click on the Create button.



You can delete a custom resolution from the Resolution List by selecting it and clicking on the Delete  button under the Resolution window.

To open a scene from the File menu:

1. Select **File > Open**. You can also click on the Open  button in the File toolbar or use the default keyboard shortcut [Ctrl]+[O] (Windows/Linux) or [⌘]+[O] (Mac OS X).
The **Open Scene** browser opens.
2. Browse and select the desired *.digital file.
3. Click on the Open button to open the scene.

New Scene Startup Script

When you create a new scene, the `TB_sceneCreated` script will automatically set the scene length to 60 frames, add one of each of these modules: drawing element, composite, display and write.

You can customize this script to fit your current project needs. This way, you can set the default scene length to any number of frames you want or even decide which types of elements and modules you wish to be in your scene when you create it.



Refer to *Toon Boom Harmony Scripting Guide* to learn more about using, creating and customizing scripts.

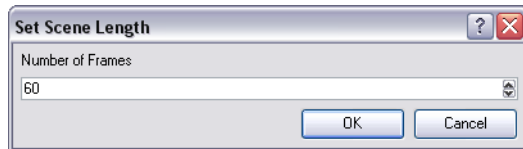
Setting the Scene Length

Once you created your scene, you can set its length.

To set the scene length from the top menu:

1. Select **Scene > Scene Length**.

The **Set Scene Length** dialog box opens.



2. In the Number of Frames field, type the number of frames needed, you can also use the up and down arrows to set the number of frames.
3. Click on the OK button.



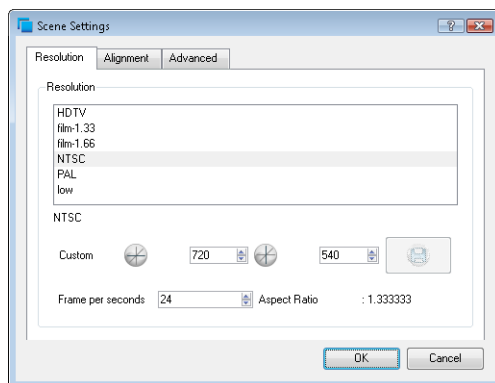
Refer to the following topics in the *Layers and Timing* chapter to learn more about adding and removing frames and extending the scene's length:

- Adding Frames, on page 225
- Deleting Frames, on page 226

Scene Settings

When you created your new scene, you set up the resolution and the alignment, however, if you want to change these initial settings later, you can. You can do this by going to the top menu and selecting **Scene > Scene Settings**.

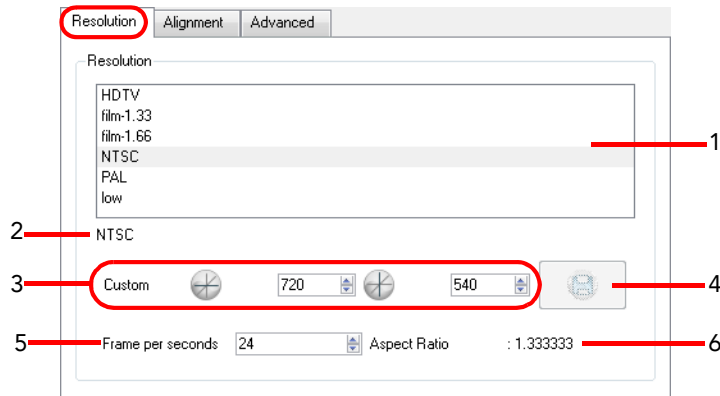
The **Scene Settings** dialog box opens.



The different Scene Settings options are separated into three tabs:

- Resolution Tab
- Alignment Tab
- Advanced Tab

Resolution Tab



1. Project Resolution Type

You can select your project's resolution type from this area so it matches your intended output.

▶ **HDTV**

High definition television delivers a higher quality image than standard television does, because it has a greater number of lines of resolution. To take advantage of the superior quality your output device must be compatible with HDTV technology to make this resolution setting useful.

▶ **film-1.33**

Use this resolution setting for the widescreen film format conforming to the standard 4:3 pixel aspect ratio.

▶ **film-1.66**

Use this resolution setting for the widescreen film format that conforms to the 16:9 pixel aspect ratio, (the pixels are wider than they are high).

▶ **NTSC**

This is the standard analogue television broadcasting system used in North America and conforms to the North American standards on how rectangular pixels are displayed for computer and television screens.

▶ **PAL**

This resolution works best with the European format for television and computer screens, as the rectangular pixels are displayed at a different orientation.

▶ **low**

This format is ideal for videos destined for the web, where size and fast download of a video file might take precedence over quality.

2. Scene Resolution Setting

Displays the scene resolution setting selection.

3. Pixel Dimensions

Displays the pixel dimensions for your resolution selection.

If you decide to type in the pixel dimensions, or use the up and down arrows to change the pixel increments, you will have to save your custom selection in order to make it active (4). It will then appear in the resolution selection list (1).

4. Save Custom Resolution

Click on the Save button to save and create your custom resolution as a setting. This button becomes active when you create a custom resolution type (3).

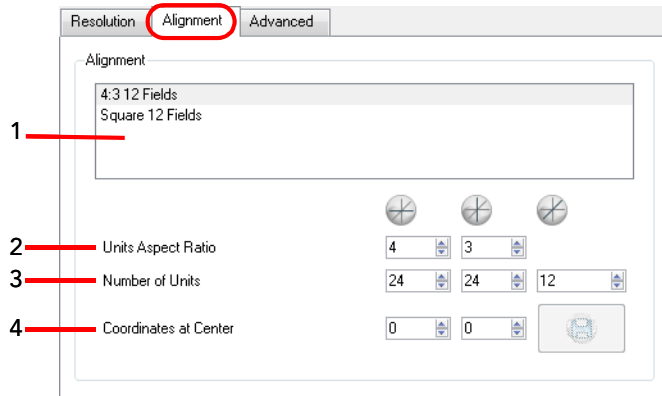
5. Project Frame Rate

Select the frame rate for your project. The higher the frame rate, for example 30 fps, the smoother your animation will look, but the heavier it will become, the lower the frame rate, for example 12 fps, the choppy your animation may look, but the lighter it will be.

6. Aspect Ratio

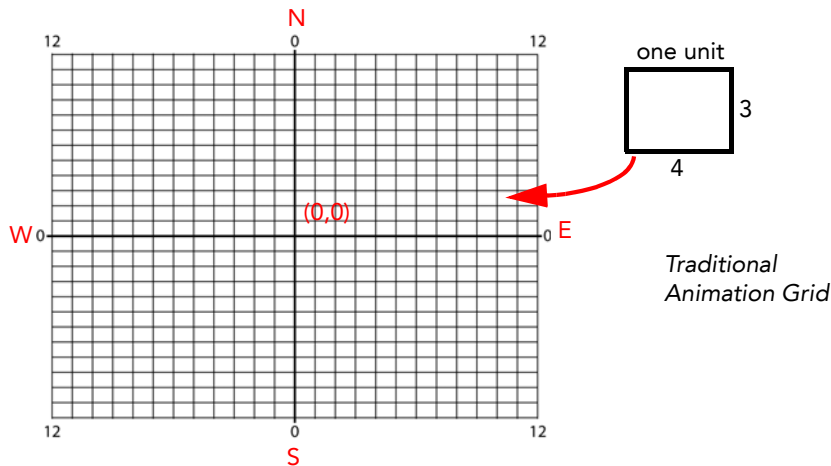
The aspect ratio describes the shape of the pixel. A square pixel would have the ratio 1:1, where as a pixel of aspect ratio 4:3 is a unit with one side 1.33 times as big as the other side. Each resolution setting has a preset aspect ratio that can not be changed.

Alignment Tab



1. Alignment Presets
2. Units Aspect Ratio
3. Number of Units
4. Coordinates at Centre

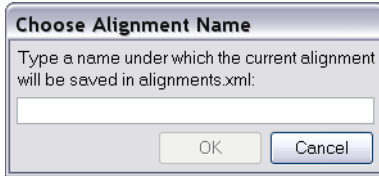
Alignment Rules



1. The Alignment Presets give you two preset options to choose from.
2. In the Units Aspect Ratio fields, enter the aspect ratio of the grid you will use. The aspect ratio describes the shape of the grid unit. A square grid unit would have the ratio 1:1, where as a grid unit of aspect ratio 4:3 is a unit with one side 1.33 times as big as the other side.
 - ▶ If the aspect ratio you want to use is 1:1, enter 1 in the Left/Right field (X-axis) and 1 in the Up/Down field (Y-axis). The default Aspect Ratio is set to 4:3 as it is the one used by traditional animators, who are accustomed to working with the grid system described above.
3. In the Number of Units fields, enter the number of horizontal, vertical and depth units for your scene's grid. Animators who prefer to work traditionally will understand the default setting of 24 units horizontal by 24 units vertical as it, once again, corresponds to the grid above. Twelve is a common setting for the field depth. Those who prefer to work in pixels should enter the pixel dimensions (3) of their project. This way if you want to move something over 600 pixels you just need to type in 600 units.
4. In the Coordinates at Centre, you can enter a new coordinate for the centre of your scene. By default, the (0,0) centre is set in the middle of the grid as shown in the grid above. If you want to change the centre of your grid, for example to the upper left corner, you would enter (-12, 12), -12 units across and 12 units up. That is of course unless you changed the number of units to match the pixel dimensions of your scene. Then you would enter negative half the width and positive half the height.

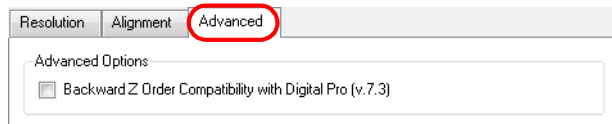
- Click on the Save button to save your current Alignment settings and be able to select them later from the list.

The **Choose Alignment Name** dialog box opens



Type in a name for your new alignment settings and press on the OK button.

Advanced Tab




- Backward Z Order Compatibility with Digital Pro (v.7.3)**
 This refers to Digital Pro release 7.3 and Harmony release 7.3. In version 7.8, the method in which Z-Ordering is calculated has been optimized, enable this option if you want to use the version 7.3 system. Toon Boom Digital Pro and Toon Boom Harmony 7.3 allowed smaller values on the Z axis such as 0.0001. In the new version 7.8, the Z-ordering calculation is now optimized and allows only bigger values such as 0.001.

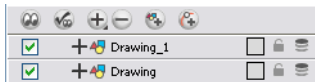
Adding a Drawing Layer

Now that your scene is set up, you can add drawing layers.

To add a drawing layer from the Timeline view:

- In the Timeline view, click on the Add Drawing Layer  button.

A new drawing layer is added to the Timeline view.



Refer to the following topics in the *Layers and Timing* chapter to learn more about Layers and how to add them.

- Layers, on page 228
- Layer Concepts, on page 228
- Adding New Drawing Layers, on page 233
- Deleting Layers, on page 236
- Modifying Layers, on page 237
- Duplicating Layers, on page 243
- Cloning Layers, on page 243

Verifying Project Integrity

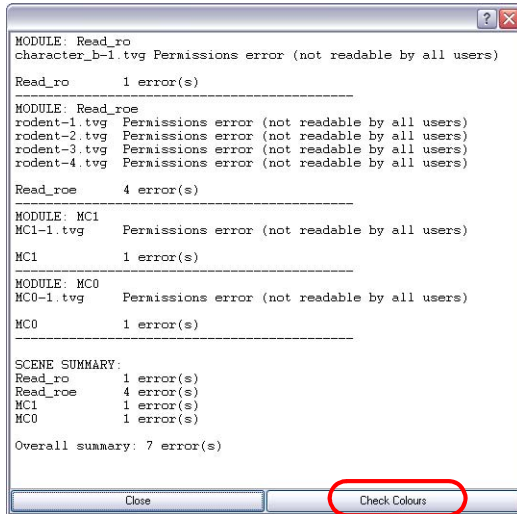
The Check Files command verifies the integrity of the drawing and palette files in your project.

To open the Check Files dialog box:

- ▶ In the top menu, select **File > Check Files**.

Check Files

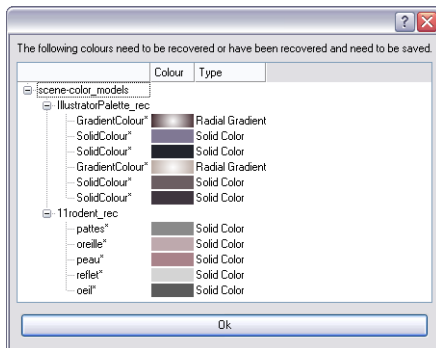
Use the **Check Files** dialog box to verify that the data is consistent, correct, and accessible.



- **Check Colours** button:
Click on the Check Colours button to open the Check Colours dialog box.

Check Colours

The **Check Colours** dialog box checks the palette integrity and displays the colour recovery data.




Basic Commands

This table lists the most common commands used in Harmony Stage.

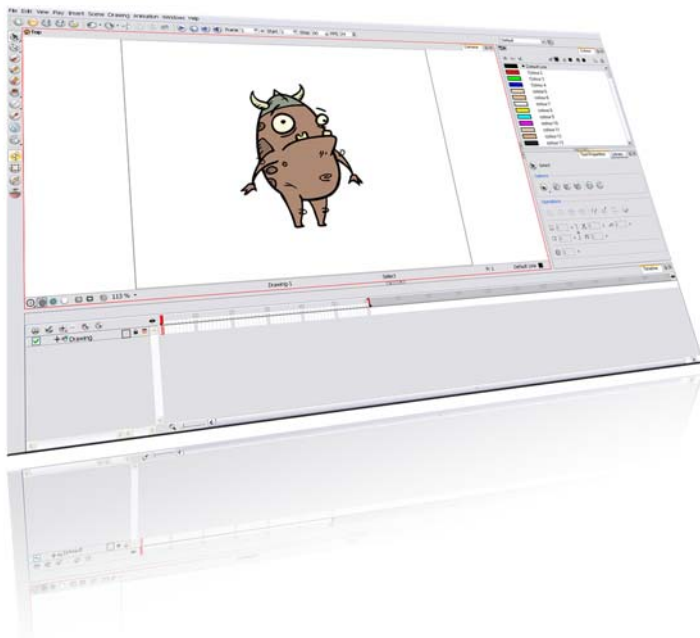
Command	Action	Access Methods
New	Starts a new scene while closing any scene already open. The New Scene dialog box appears, asking for directory, name and resolution information.	File > New [Ctrl]+[N] (Windows/Linux) [⌘]+[N] (Mac OS X)
Open	Use the Open command to bring up the Open Scene file dialog. Browse your file system for a scene file. The Open command is not disabled when a scene is opened. You can open a new scene from the current one and the previous scene will be closed.	File > Open [Ctrl]+[O] (Windows/Linux) [⌘]+[O] (Mac OS X)
Open Recent	Displays a quick access list to view and open recently used Harmony files.	File > Open Recent
Open Recent > Clear	Clears the recently opened Harmony files list.	File > Open Recent > Clear
Close	Use the Close command to close the scene that is currently opened, but does not close the Harmony Stage application.	File > Close
Save	Use the Save command to save all changes made to the opened scene, drawings, palettes, and palette lists.	File > Save [Ctrl]+[S] (Windows/Linux) [⌘]+[S] (Mac OS X)
Save As	Use the Save As command to save the current state of a scene as another scene. The Save As window prompts you to give a new name and choose a different location to this scene before saving it. This will create a complete scene directory for the new scene.	File > Save As
Save As New Version	Use the Save As New Version command to save the current scene as another version. The Save Version window prompts you to give a name for this new version. This will create a new .digital file in your current project directory.	File > Save As New Version
Quit	Use the Quit command to close Toon Boom Harmony Stage. If the current scene has changes, it asks if you want to save them before closing.	Windows/Linux: File > Quit Mac OS X: Stage > Quit
Show Scan Information	Use the Show Scan Information command to display a status bar showing scanning information at the bottom of the Drawing and Camera view.	Drawing View Menu > View > Show > Show Scan Information
Cut	Use the Cut command to remove selected objects. You can then paste the object or its properties to another object.	Edit > Cut [Ctrl]+[X] (Windows/Linux) [⌘]+[X] (Mac OS X)

Command	Action	Access Methods
Copy	Use the Copy command to copy selected objects and properties.	Edit > Copy [Ctrl]+[C] (Windows/Linux) [⌘]+[C] (Mac OS X)
Paste	Use the Paste command to place an object you cut or copied into the location you select in the Camera , Drawing and Timeline View .	Edit > Paste [Ctrl]+[V] (Windows/Linux) [⌘]+[V] (Mac OS X)
Delete	Use the Delete command to remove selected objects.	Edit > Delete [Delete]
Select All	Use the Select All command to select all drawing objects in the current drawing window in the Drawing, Timeline and Camera View. This helps you manage the objects as one body when moving them.	Edit > Select All [Ctrl]+[A] (Windows/Linux) [⌘]+[A] (Mac OS X)
Deselect All	Use the Deselect All command to remove the selection from the selected objects in the Drawing and Camera View .	Edit > Deselect All [Esc]
Undo	Use the Undo command to remove the last change made to your animation project. Harmony Stage supports multiple undo, so you can revert changes you have made in the order you made them.	Edit > Undo [Ctrl]+[Z] (Windows/Linux) [⌘]+[Z] (Mac OS X)
Redo	Use the Redo command when you have undone an operation that you decide to keep. The Redo command becomes active only after you use the Undo command.	Edit > Redo [Ctrl]+[Y] (Windows/Linux) [⌘]+[Y] (Mac OS X)
Select Child	Use the Select Child command to select the first element parented to the selected peg element in the Timeline View.	Edit > Select Child [Shift]+[B]
Select Children	Use the Select Children command to select all elements parented to the selected peg element in the Timeline view.	Animation > Select Children
Select Parent	Use the Select Parent command to select parent of the selected element in the Timeline view.	Animation > Select Parent [B]
Select Previous Brother	Use the Select Previous Brother command to select the next element (above current element) in the Timeline view.	Animation > Select Previous Brother [/]
Select Next Brother	Use the Select Next Brother command to select the next element (below current element) in the Timeline View.	Animation > Select Next Brother [?]
Auto Render Write	Use the Auto Render Write command to render a frame each time the current frame is changed. You must have a Write module in your network to use this command.	Scene > Render >Auto Render Write

Command	Action	Access Methods
Message Log	The Message log view displays information gathered during a render task, like which frames and at what time they were each rendered.	Windows > Message Log
Debug Mode	Enable the Debug Mode option to gather and display precise information about each rendering frame such as the modules encountered and action taken.	Help > Debug Mode
Help	Launches the Toon Boom Harmony Help System PDF, complete with instructions on how to use the system.	Help > Help
Toon Boom Harmony on the Web	Launches the Toon Boom Harmony website, which features a Support and Community > Forum section.	Help > Toon Boom Harmony on the Web
About	Use the About command to access general information about the software.	Windows/Linux: Help > About Mac OS X: Stage > About
Show Welcome Screen	Brings back the Welcome screen.  <i>Refer to the Welcome Screen section for further details.</i>	Help > Show Welcome Screen

Chapter 3

Discovering the Interface



Knowing how to manage the Harmony Stage interface helps you to work efficiently and organize your workspace conveniently. There are a series of views and toolbars you can use as you perform different operations. Each user has a preferred way of working in the interface and which views and toolbars they will use. In this chapter, you will learn about the main elements of the interface and how to manage them.

In this chapter, you will learn about the following topics:

- User Interface, on page 38
- Managing the Views, on page 58
- Managing the Toolbars, on page 60
- Managing the Workspace, on page 62
- Interface Navigation, on page 66
- Preferences, on page 67

User Interface

This section takes you through the most common elements of the user interface. Throughout the user guide, you will learn about each view and toolbar and how and where to use them.

Views and Toolbars

Toon Boom Harmony Stage has several views and toolbars. The Top toolbars are available at the top of the interface and the View toolbars are in individual windows. View toolbars are only shown if the particular view is displayed in the workspace.

This is a complete list of the views and toolbars available in Harmony Stage.

Views

- Camera View
- Colour View
- Coordinates and Control Points View
- Drawing View
- Function View
- Layer Properties View
- Library View
- Model View
- Perspective View
- Side View
- Timeline View
- Tool Properties View
- Top View
- Xsheet View
- Message Log
- Module Library View
- Network View

Top Toolbars

- Advanced Animation Toolbar
- Control Point Toolbar
- Coordinate Toolbar
- Edit Toolbar
- File Toolbar
- Playback Toolbar
- Scripting Toolbar
- Tools Toolbar
- Workspace Toolbar
- Display Toolbar
- Easy Flipping Toolbar
- Flip Toolbar
- Onion Skin Toolbar

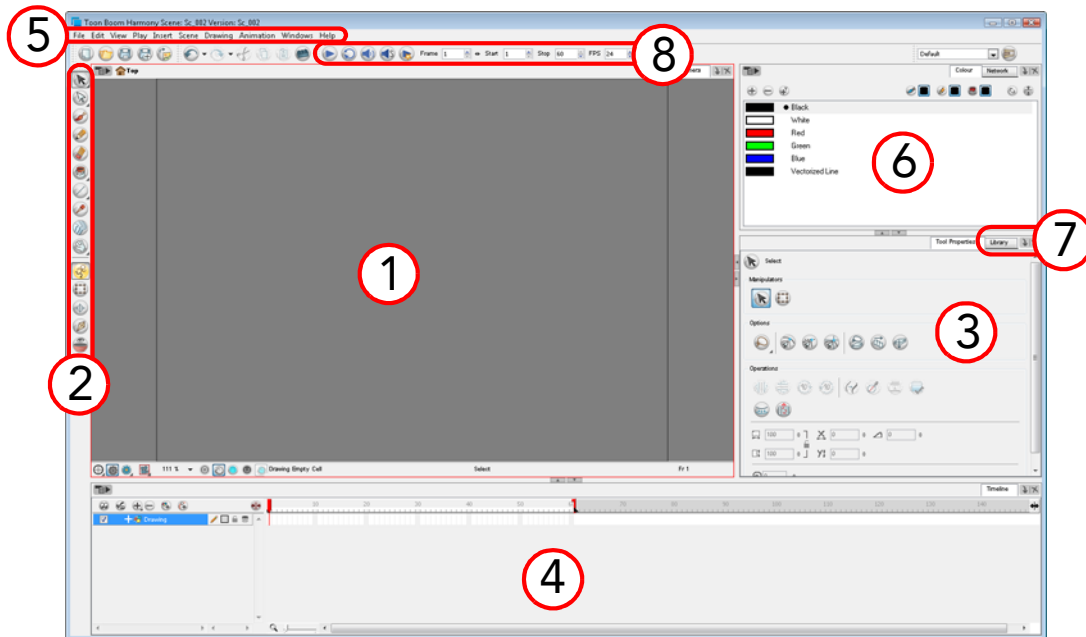
View Toolbars

- Camera View Toolbar
- Drawing View Toolbar
- Model View Toolbar
- Side View Toolbar
- Timeline View Toolbar
- Top View Toolbar
- Xsheet View Toolbar
- Network View Toolbar

Interface Highlights

It's important that you become familiar with the following elements of the user interface, this will help you to start using Harmony Stage. You can learn more about the highlights described here, and how to use them in a production context, throughout this guide.

When you start Harmony Stage for the first time, the default workspace is displayed. It contains all of the main elements you need to use.



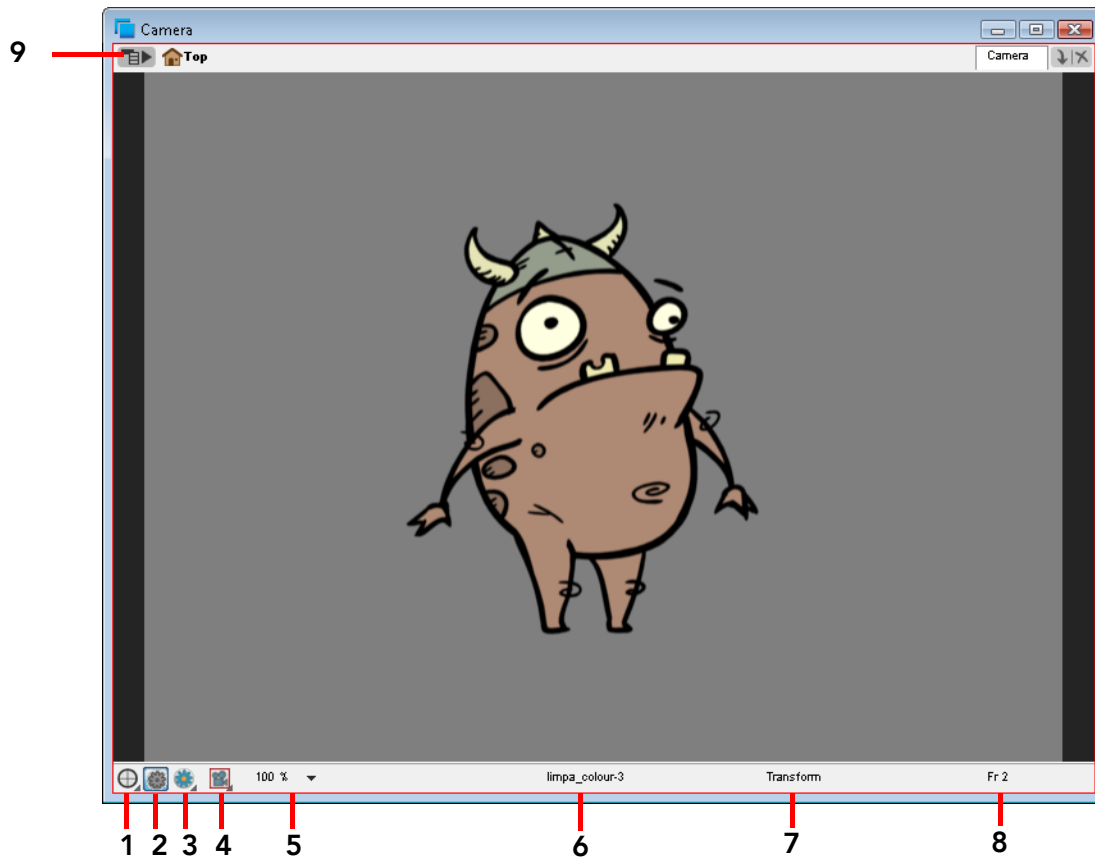
1. Camera View, on page 40
2. Tools Toolbar, on page 43
3. Tool Properties View, on page 43
4. Timeline View, on page 44
5. Menus, on page 51
6. Colour View, on page 52
7. Library View, on page 55
8. Playback Toolbar, on page 56



Refer to the following sections in this chapter to learn how to modify the workspace and add more views and toolbars:

- Managing the Workspace, on page 62
- Managing the Views, on page 58

Camera View



- | | |
|-------------------------------------|-----------------------|
| 1. Update Preview | 6. Drawing Name |
| 2. OpenGL View Mode | 7. Tool Name |
| 3. Render View Mode/Matte View Mode | 8. Frame Number |
| 4. Camera View Options Menu | 9. Editing Stack Menu |
| 5. Zoom Drop-down Menu | |

The Camera view is the centre of operations in Harmony Stage. It is in this view that you will draw, paint, animate, create animation paths and see your results. You can also move through your Symbol's hierarchy.

The Camera view has a top and bottom toolbar that you can use to either navigate in the view, change the display mode or go back up your Symbols hierarchy.

Update Preview

The Update Preview button lets you check the final look of your effects and fully antialiased image. When you click the button, Harmony Stage calculates the current frame final image. It displays the result in the Render View Mode of the Camera view, it does not output an image.

OpenGL View Mode



The OpenGL View Mode button switches the Camera view to fast display, letting you see your animation play in real time. The OpenGL display requires less memory. The final look of your effects is not shown in the OpenGL View Mode. Switch to the Render View Mode to see your effects.



Refer to Render View Mode for more details.

Render View Mode




The Render View Mode button switches the Camera view to a fully rendered display showing the final image of the current frame. If a modification is done to your current frame or if you move to a different frame, click on the Update Preview button to update the display.

Use the Render View Mode display to see the final look of your frames including effects and antialiasing. You cannot playback your scene in Render View Mode. To see your scene fully rendered and play it back, you must select **File > Export > Render Network** and enable the Preview option in the **Render Network** dialog box.

Matte View Mode



The Matte View Mode button switches the Camera view to a matte display showing the alpha channel of the elements in your scene. The transparency level ranges from 0 to 100 percent. Zero percent is completely transparent and represented by black and 100 percent is completely opaque and represented by white. Everything in between these extremes has a transparency level somewhere between 1 and 99 percent and is represented in various shades of grey.

▶ To access the Matte mode, click on the Render View  Mode button and select **Matte View** from the drop-down menu.

Camera View Options Menu

This menu contains several options related to the camera view display modes. Here are the options contained in the menu:

-  Safe Area



The Safe Area button shows or hides the TV safety zone and the centre of the camera frame.

The Safe Area will adapt to the scene resolution as well as the safety zone and frame's centre.

You can also access this feature from the top menu by selecting **View > Show > Safe Area**.

-  Camera Mask





The Camera Mask button shows or hides a black mask around the scene's frame to avoid seeing the unnecessary artwork.

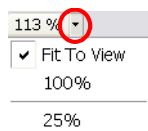
This option is handy when you are animating and setting up the scene. It allows you to see your scene's composition better.

You can also access this feature from the top menu by selecting **View > Show > Camera Mask**.

- **BBox Selection Style**
Once an object is selected in the Camera view, a bounding box will show around the object rather than being coloured in fuchsia, red or yellow.
- **Outline Locked Drawings**
Drawings that are locked in the Timeline view (cannot be selected in the Camera view) will be displayed as wire frames.
- **Current Drawing On Top**
If this option is enabled, the drawing that is being currently edited with a drawing tool will be temporarily displayed in front of all the other elements. The actual scene is not modified by this option.

- **Show Strokes**
When drawing with invisible lines such as with the Pencil tool and a line thickness with a value of "0", the invisible strokes will be displayed as thin blue lines and the tips of the strokes will be displayed as yellow squares which helps indicating where there are gaps in the outline.
- **Show Strokes with Colour Wash**
When drawing with invisible lines such as with the Pencil tool and a line thickness with a value of "0", the invisible strokes will be displayed as thin blue lines and the tips of the strokes will be displayed as yellow squares which helps indicating where there are gaps in the outline. The drawing colours will also be washed out to make the invisible lines stick out better.
- **Light Table**
By default, while using a drawing tool in the Camera view, the layers that are not being edited are washed out. If the Light Table option is disabled, the drawings will all be displayed in normal colours even though they are not being edited.
-  **Reset View**
The Reset View button will reset any panning, zooming or rotation done in the Camera view and return the display to the initial settings. You can also use the default keyboard shortcut [Shift]+[M].
-  **Reset Rotation**
The Reset Rotation button will reset any rotation done in the Camera view and return the display to the initial rotation settings. You can also use the default keyboard shortcut [Shift]+[X].

Zoom Drop-down Menu



The Zoom Drop-down menu is used to enlarge or reduce the Camera view display. If you want the camera frame size to always match the size of your Camera view, select the Fit to View option. Click on the drop-down arrow and select a zoom level. You can also use the default keyboard shortcuts [Ctrl]+[-] (Windows/Linux) or [⌘]+[-] (Mac OS X) to zoom out and [Ctrl]=[] (Windows/Linux) or [⌘]=[] (Mac OS X) to zoom in.

Drawing Name

The Drawing Name field displays the name of the selected drawing as well as the layer containing it. If the cell does not contain any drawing, an Empty Cell text is shown in the field.

Tool Name

The Tool Name field displays the name of the selected tool. If you override a tool using an overriding keyboard shortcut, the tool's name will be highlighted in red letters.



Refer to *Drawing and Animating > Override Tool*, on page 130 to learn how to temporarily override a tool.

Frame Number

The Frame Number field displays the number of the current frame.

Editing Stack Menu



The Editing Stack Menu displays the names of the Symbols and their hierarchy when you are editing a Symbol. You can click on the different names to go back up to the different parent Symbols or the top/current project.

Tools Toolbar



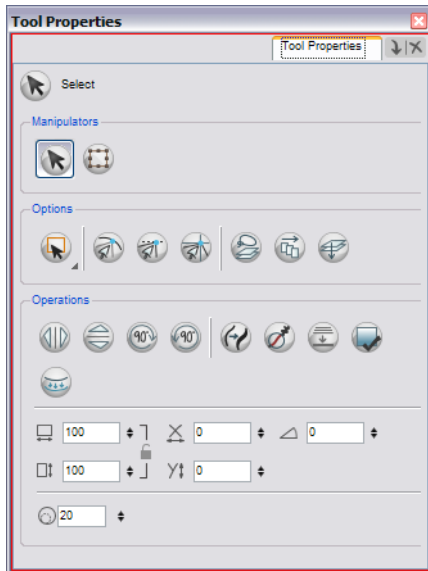
The Tools toolbar contains all of the main tools you will use while working in Harmony Stage. In the default workspace, you will find this toolbar on the left-most side of the interface.




Each tool is explained in detail in the following chapters:

- Drawing and Animating, on page 73
- Adding Colour, on page 165
- Morphing Drawings, on page 283
- Building a Character, on page 375
- Setting Up the Scene, on page 445
- Creating Animation Paths, on page 551
- Animating Your Puppets, on page 609

Tool Properties View



The contextual Properties View contains the most common options and operations related to the currently selected tool. As soon as you select a tool from the Tools toolbar, the Tool Properties view will be updated.

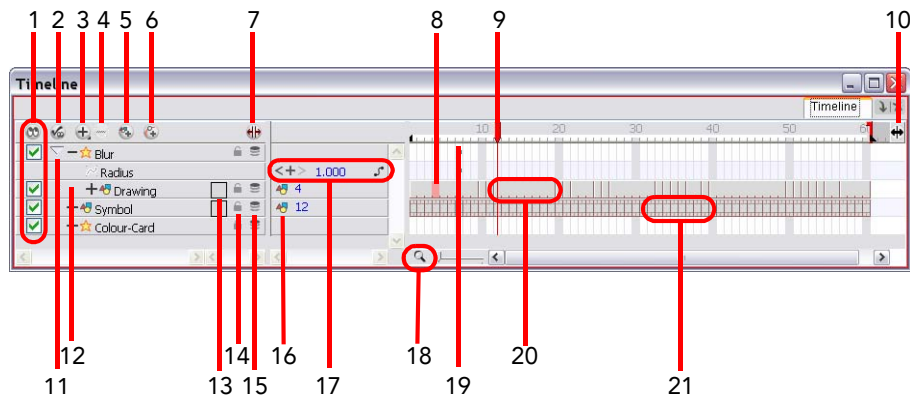
For example, if you choose the Select  tool in the Tools toolbar, the Tool Properties view will display the options and operations related to the Select tool such as Snap to Contour, Apply to All Drawings, Flip Horizontal and Flatten.



The content of the Tool Properties view is explained in detail in the following chapters:

- Drawing and Animating, on page 73
- Adding Colour, on page 165
- Setting Up the Scene, on page 445
- Animating Your Puppets, on page 609

Timeline View



These are described later in this section.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Enable/Disable All 2. Show Selection and Hide All Others 3. Add Layers 4. Delete Layers 5. Add Drawing Layer 6. Add Peg 7. Show/Hide Data View 8. Current Drawing Displayed in the Drawing View 9. Current Frame | <ol style="list-style-type: none"> 10. Split 11. Show/Hide Children 12. Show/Hide Functions 13. Change Track Colour 14. Lock/Unlock Layer 15. Onion Skin 16. Drawing Substitution 17. Keyframe Value 18. Zoom 19. Keyframe 20. Drawing Exposure 21. Symbol Exposure |
|---|---|

The Timeline view is the main view used when adjusting the timing of your drawings, connect effects and order your layers. The Timeline view displays the following:

- Layers
- Effects
- Sounds
- Keyframe Values
- Scene Length
- Layer Names
- Drawings
- Keyframes
- Timing
- Frames



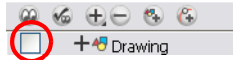
Refer to the following chapters for more information about using the Timeline view:

- Layers and Timing, on page 217
- Building a Character, on page 375
- Setting Up the Scene, on page 445
- Creating Animation Paths, on page 551
- Animating Your Puppets, on page 609
- Enhancing With Effects, on page 665

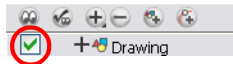
Enable/Disable All

The Enable/Disable All button is used to show or hide all your layers simultaneously.

To disable a particular layer, uncheck the layer's checkbox. The default keyboard shortcut is [D].



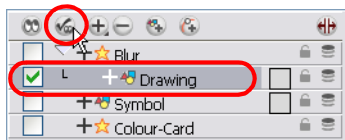
To enable a particular layer, place a checkmark (tick) the layer's checkbox. The default keyboard shortcut is [A].



NOTE:

When you disable a layer in the Timeline view, the corresponding column is hidden in the Xsheet view. When a column is hidden in the Xsheet view, the corresponding layer is disabled in the Timeline view.








Show Selection and Hide All Others



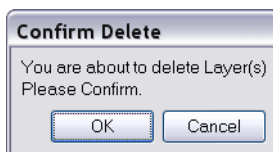
The Show Selection and Hide All Others button is used to show only the currently selected layer in the Timeline view and disable all the other layers.

Add Layers

The Add Layers button is used to add new layers to the timeline. When you click on the Add Layers button, a drop-down menu will appear displaying the layer types available. You can add several different types of layers:

-  Drawing
-  Peg
-  Mask
-  Camera
-  Effect
-  Sound
-  Bitmap

Delete Layers



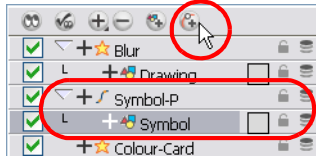
The Delete Layers button is used to delete the currently selected layers in the Timeline view. When you click on the Delete Layers button, a Confirm Delete dialog box appears. Click OK to delete the layers or Cancel to stop the operation.

Add Drawing Layer

The Add Drawing Layer button is used to automatically add a new Drawing layer to your timeline. By default, the layer is named **Drawing**.

Add Peg

The Add Peg button is used to add a Peg layer to your timeline. There are several ways to use the Add Peg button.



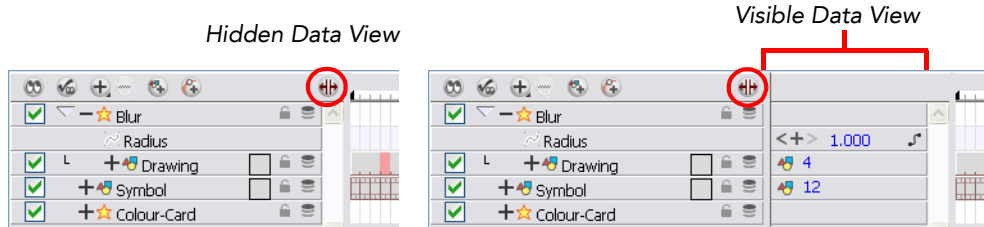
- If there is no layer selected in the Timeline view, the Peg is added at the bottom of the timeline.
- If there is a layer selected, the Peg is added as a parent of the selected layer. It will also be named the same way as the layer plus the -P mention.
- If several layers are selected, an individual peg will be added to each layer selected.



Refer to the following sections in the *Creating Animation Paths* chapter for more information what are pegs and how to use them:

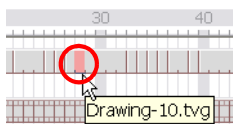
- Differences Between Pegs and Animated Layers, on page 554
- Pegs, on page 555
- Why Use a Peg Layer?, on page 555
- The Origins of the Peg, on page 555
- Adding a Peg to the Timeline, on page 556
- Adding a Peg to the Network, on page 556
- Peg Selection Mode, on page 557
- Layer Parameters, on page 558
- Displaying a Path in the Camera View, on page 570

Show/Hide Data View



The Show/Hide Data View button is used to display the current frame's drawing exposure and keyframe values corresponding to each individual layer.

Current Drawing Displayed in the Drawing View

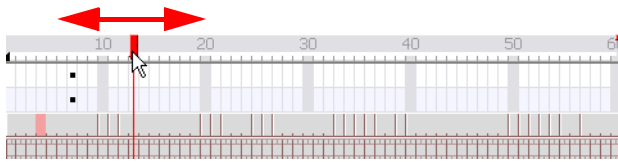


The drawing selected in red represents the drawing currently displayed in the Drawing view. The Drawing view's current drawing does not correspond to the current frame displayed in the Camera view.



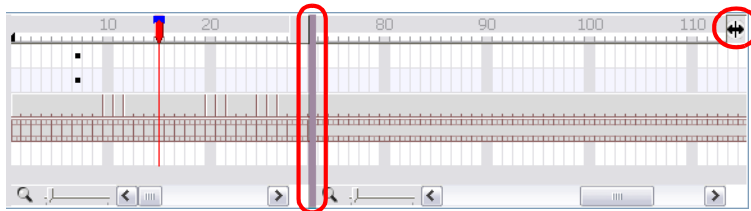
Refer to *Drawing and Animating > Drawing in the Camera or Drawing View*, on page 76 for more information about the differences between the Camera and Drawing views.

Current Frame



The red play head represents the current frame displayed in the Camera view and marked in the Playback toolbar. If you slide the play head to the left or the right it will scrub through your frames and update the Camera view display.

Split



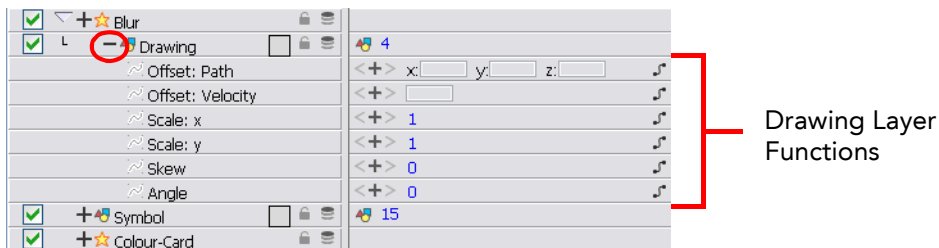
The Split button is used to split the Timeline in two sections allowing you to see two different portions of your Timeline view. This way, if your scene length is very long, you can see the beginning and the end at once.

Show/Hide Children



The Show/Hide Children button is used to display the children layers of a parent layer. Once a layer is parented to another layer, it is indented to the right and the Show/Hide Children button appears on the parent layer allowing you to show or hide the child layer.

Show/Hide Functions



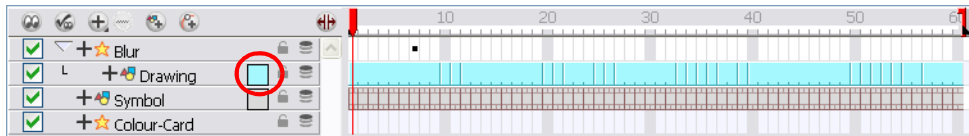
The Show/Hide Functions button is used to display the functions embedded in each layer. The Functions are the different position and intensity information used to remember a layer's position, scale or rotation as well as an effect's look on each frame. This information is stored on the function curves using keyframes.



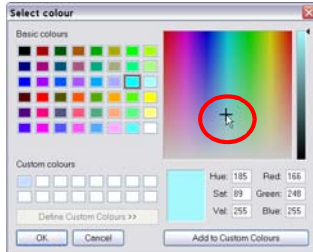
Refer to the following sections in the *Creating Animation Paths* chapter for more information about the function layers:

- Adding and Deleting Keyframes, on page 562
- Stop-Motion and Motion Keyframes, on page 564
- Modifying a Path in the Function View, on page 580
- Function Curves, on page 586
- Adjusting the Velocity, on page 598

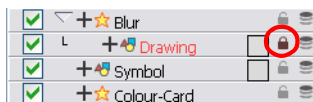
Change Track Colour



The Change Track Colour button is used to change the colour of the exposed frames, this helps you to quickly locate a layer in the Timeline view. Double-click on the swatch to open the picking window and choose a new colour.








Lock/Unlock Layer



The Lock/Unlock Layer button is used to prevent the selection or editing of a layer in the Camera view. To select only some of the layers without selecting other ones, in the Timeline view, lock the layers you do not want to select.

In the top menu, you there are a series of locking options.

In the top menu select **Animation > Lock > select one of the following actions:**

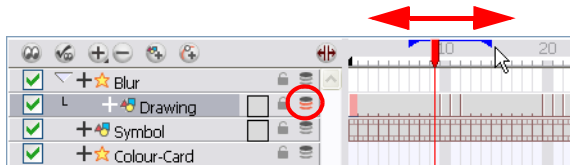
-  Lock
This option locks the currently selected element.
-  Unlock
This option unlocks the currently selected element.
-  Lock All
This option locks all the elements in the Camera view.
-  Unlock All
This option unlocks all the elements in the Camera view.
-  Lock All Others
This option locks all the elements in the Camera view except the currently selected one.



You can display the locked drawings as outlines in the Camera view if you want to quickly find out which drawings are locked.

1. In the top menu, select **Edit > Preferences (Windows/Linux)** or **Stage > Preferences (Mac OS X)**.
2. In the Preferences panel, go to the Camera tab.
3. In the Tools section, enable the Show Locked Drawings As Outlines option.

Onion Skin



The Onion Skin button is used to enable the Onion Skin option on a particular layer. If you want to see the previous and next frames of a specific layer, go to the Timeline view and click on the Onion Skin button for that particular layer. Blue arrows appear on both sides of the play head. Pull on these blue arrows to add more frames to the onion skin display.

To activate the general Onion Skin preview, in the Tools toolbar, click on the Onion Skin  button.




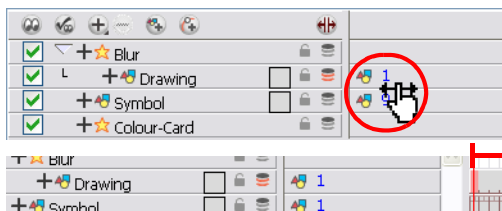
Refer to the following chapters and topics for more information about the Onion Skin:


- Drawing and Animating, on page 73
 - ⇒ Onion Skin, on page 136
 - ⇒ Onion Skin Toolbar, on page 148
 - ⇒ Drawing Tab Preferences, on page 163
- Animating Your Puppets, on page 609
 - ⇒ Using the Onion Skin in Cut-out Animation, on page 643



Drawing Substitution

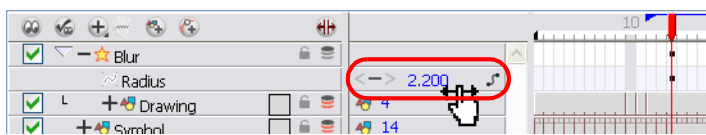
The Drawing Substitution field is used to change the drawing exposed at the current frame. To access the Drawing Substitution field, you must first expand the Data view by clicking on the Show/Hide Data View  button.







To change the current drawing, you can either click and slide your cursor left or right when you see the hand  cursor, or you can double-click on the drawing name and type a new value.




The drawing exposure will be changed for the entire block it is exposed, not just the current frame.

Keyframe Value



The Keyframe Value field is used to add, remove or modify a keyframe at the current frame. To access the Keyframe Value field, you must first expand the Data view by clicking on the Show/Hide Data View  button.

- To add a keyframe at the current frame, click on the Add Keyframe  button.
- To remove an existing keyframe at the current frame, click on the Delete Keyframe  button.
- To change the current keyframe, you can either click and slide your cursor left or right when you see the hand  cursor or you can double-click on the keyframe value and directly type a new value.

- To navigate through the existing keyframes, click on the Previous Keyframe  and the Next Keyframe  buttons.
- To link your layer to an existing function or to create a new function, click on the Show Function Menu  button to display the drop-down Function menu.



Refer to the following topics in the *Creating Animation Paths* to learn more about using the Data view and the Keyframe Value field:

- Modifying a Path in the Timeline View, on page 577
- Adding and Deleting Keyframes in the Timeline View, on page 578
- Changing Keyframe Values, on page 578
- Flipping Between Keyframes, on page 579

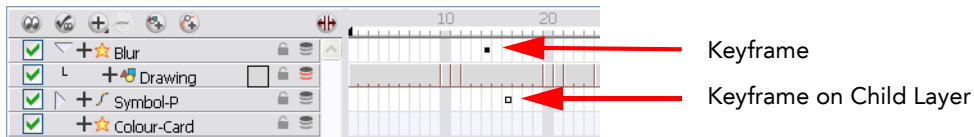
Zoom



The Zoom tool is used to increase or reduce the width of the frames in the Timeline view. Drag the cursor to the right to increase the width or to the left to reduce it. You can also use the default keyboard shortcuts:

[Ctrl]+[-] (Windows/Linux) or [⌘]+[-] (Mac OS X) to zoom out and
[Ctrl]=[+] (Windows/Linux) or [⌘]=[+] (Mac OS X) to zoom in.

Keyframe



A black square is displayed in the Timeline view when a keyframe exists. You are able to select these keyframes and drag them wherever you want on the timeline. You can also copy, cut and delete them.

- To delete a keyframe without deleting the drawing exposure, go to the Timeline view and select the keyframe to be deleted and then select **Animation > Delete Keyframes** from the top menu.


When a parent layer is collapsed and a child layer contains a keyframe, a white square will be displayed.

Drawing Exposure



In the Timeline view, when a drawing is exposed, it is represented as a grey block. If the drawing is exposed for several frames, the block is extended. When a second drawing is exposed, a new grey block is displayed.



The exposure's colour can be changed to any colour. Double-click on the Change Track Colour  button in the corresponding layer and pick a new colour.

Symbol Exposure



In the Timeline view, when a Symbol is exposed it is represented as a small film frame. If the Symbol is exposed for several frames, the film frame is extended. When a second Symbol's frame is exposed, a new film frame is displayed.

Menus

You can access the commands from the following three menus:

- Top Menu, on page 51
- View Menu, on page 51
- Quick Access Menu, on page 52

Top Menu

File Edit View Play Insert Scene Drawing Animation Windows Help

🍏 Stage File Edit View Play Insert Scene Drawing Animation Windows Help

The top menu contains most of the commands. Depending on the view you are working in and the element, some commands are available and others not. The top menu is always located at the very top of the user interface.

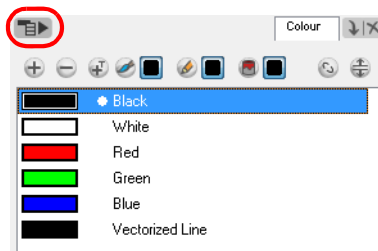
The top menu contains the following categories:

- File
- Edit
- View
- Play
- Insert
- Scene
- Drawing
- Animation
- Windows
- Help

In the Mac OS X version, there is a Stage category containing the following commands:

- Preferences
- About
- Quit


View Menu



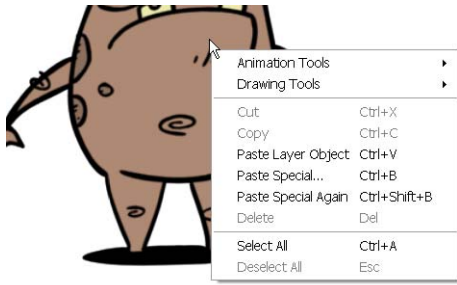
Some views have their own menu. These menus contain commands specifically related to that view.

You can find a View Menu in the following views:

- ▶ Colour View
- ▶ Library View
- ▶ Model View
- ▶ Camera View
- ▶ Drawing View
- ▶ Function View
- ▶ Module Library View
- ▶ Network View
- ▶ Perspective View
- ▶ Side View
- ▶ Top View
- ▶ Xsheet View

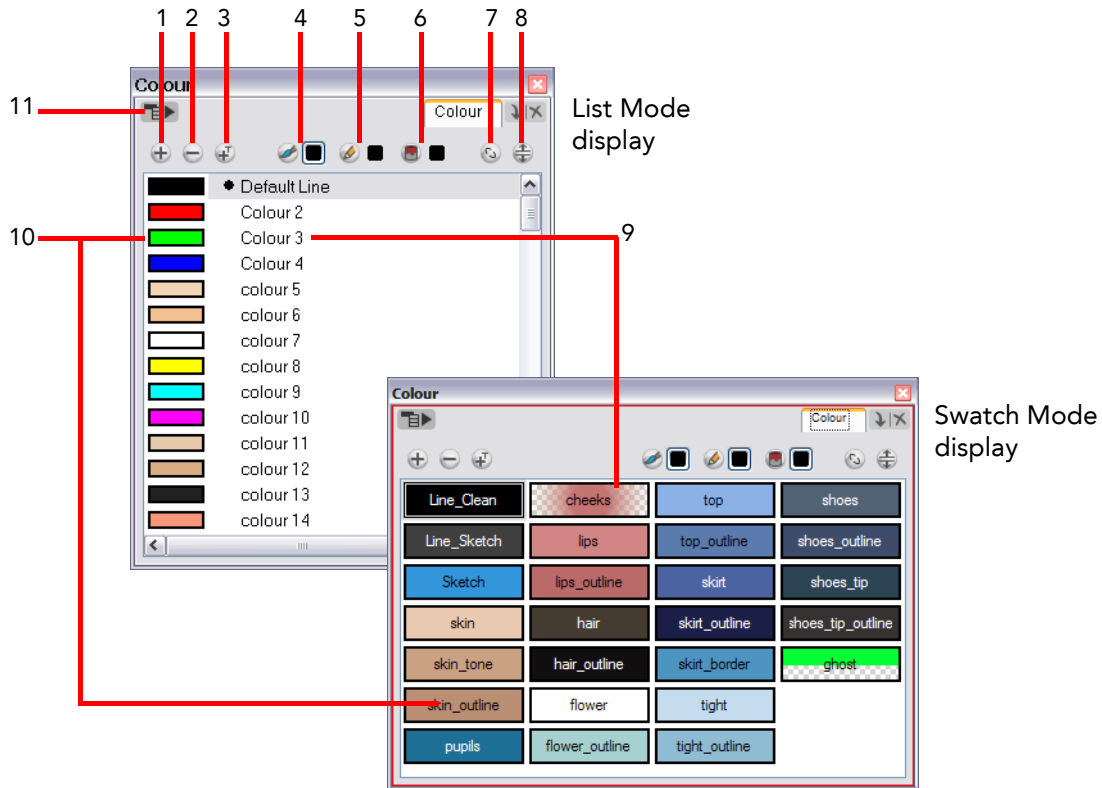
To access the view menu, click on the Menu  button in the view's top left corner.

Quick Access Menu



Each view has a Quick Access Menu containing recurring actions. This menu is accessed by right-clicking (Windows/Linux) or [Ctrl]+Click (Mac OS X) anywhere in the view.

Colour View



- | | |
|------------------------------|--------------------------------|
| 1. Add Colour | 7. Link/Unlink Three Colours |
| 2. Remove Colour | 8. Show/Hide Palette List View |
| 3. Add Texture | 9. Colour Swatch Name |
| 4. Set Current Brush Colour | 10. Colour Swatch |
| 5. Set Current Pencil Colour | 11. Colour View Menu |
| 6. Set Current Paint Colour | |
- These are described later in this section.*

The Colour View is where you create colours and palettes and import existing palettes into your project. The Colour View is also necessary for drawing, painting and creating colour styling.

The Colour view has two display modes:

- List Mode
- Swatch Mode

To toggle between the display modes:

1. In the Colour View menu, select **Colours > Swatch Mode**.
 - ▶ Enable the option to display the swatches.
 - ▶ Disable the option to display the colour list.

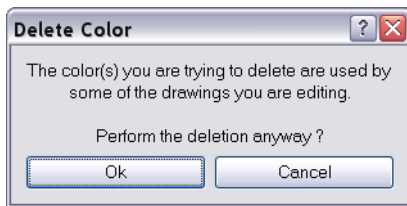
The Colour View has its own toolbar. Refer to the list below to learn more about its basic functionality.



Refer to *Adding Colour > Colours*, on page 167 to get more information about the Colour view and its advanced features.

**Add Colour**

The Add Colour button is used to add a colour swatch to your palette. Click on the Add Colour button to add a new swatch to the bottom of your colour list.

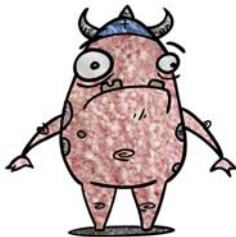
**Remove Colour**

The Remove Colour button is used to delete the currently selected colour swatches. If the colour swatch is used in your project, the **Delete Colour** dialog box will pop and will ask you to confirm the operation.

Click OK to confirm the operation or Cancel to cancel it.




Zones painted with colour swatches which have been deleted will turn red, easily identifying them so you can repaint them with another colour swatch.

**Add Texture**

The Add Texture button is used to add a bitmap colour swatch to your palette. Use this to load photos and textures and paint your drawings with it. The bitmap image must be a TGA or PSD file format.

**Set Current Brush Colour**

The Set Current Brush Colour button is used to set the currently selected colour swatch as the colour used by the

Brush  tool. If you select a new colour in the Colour view while using the Brush tool, the Set Current Brush Colour swatch will be updated.

**Set Current Pencil Colour**

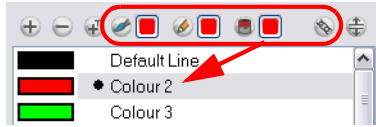
The Set Current Pencil Colour button is used to set the currently selected colour swatch as the colour used by the

Pencil , Polyline , Ellipse , Rectangle  and Line  tools. If you select a new colour in the Colour view while using any of these tools, the Set Current Pencil Colour swatch will be updated.

 **Set Current Paint Colour**

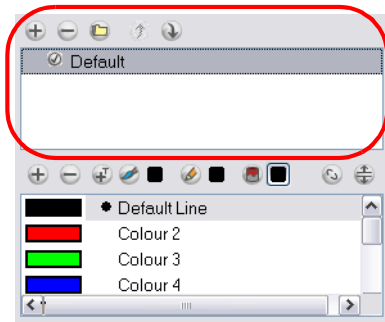
The Set Current Paint Colour button is used to set the currently selected colour swatch as the colour used by the Brush tool. If you select a new colour in the Colour view while using the Paint tool, the Set Current Paint Colour swatch will be updated.

 **Link/Unlink Three Colours**



The Link/Unlink Three Colours button is used to link the Set Current Brush Colour, Set Current Pencil Colour and Set Current Paint Colour swatches to the currently selected colour swatches in the Colour view.

 **Show/Hide Palette List View**



The Show/Hide Palette List View button is used to display the Palette List view in the Colour view. This option is for the advanced user who wants to create colour palettes for their props and characters.



Refer to *Adding Colour > Palettes*, on page 199 to learn more about the Palette List view and creating palettes.

Colour Swatch Name



Each colour swatch available in the Colour view can have its own name, making it easy to identify which colour is used to paint what part of your character or background.

NOTE: Two colours can have the same name.

Colour Swatch

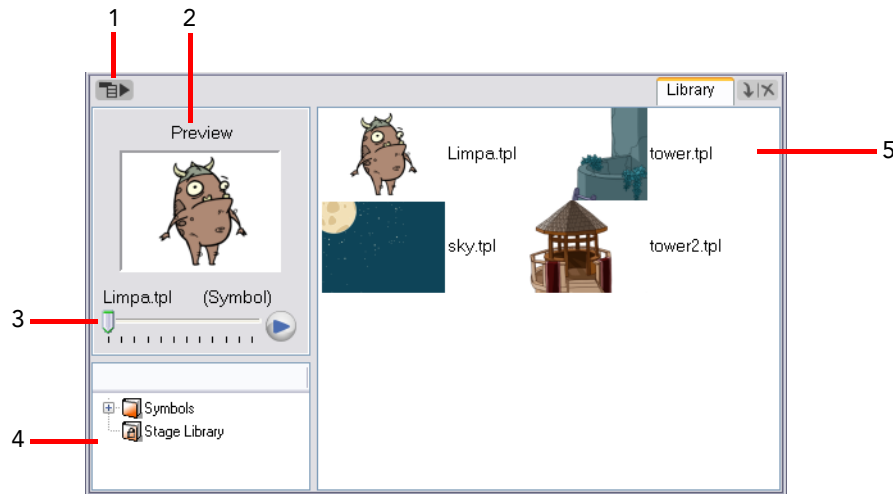


A colour swatch is a specific colour used to paint a certain zone of a character or background. Colour palettes are composed of colour swatches. They can also be called colour pots. When you paint a zone with a colour swatch, the zone is linked to the swatch. So if you update the swatch's tint, the zone will be updated along with it. This allows you to modify your animation colours even after it is completely painted.

 **Colour View Menu**

The Colour View menu allows you to access commands that are specifically related to the Colour view such as creating new palettes, adding new colour swatches and displaying the Tint panel.

Library View



- | | |
|----------------------|---|
| 1. Library View Menu | 4. Library Folder List |
| 2. Preview Window | 5. Template/Symbol List |
| 3. Preview Playback | <i>These are described later in this section.</i> |

The Library view is used to store elements such as animation, drawings, backgrounds and puppets to reuse them in your different projects. You also use the Library view to create and store your Symbols.

To reuse an element in another project, you must create a template out of your drawings. A template is a mini scene that you import in your other project. A template has no link to the original scene. When you create a template, the full content of your selection is copied in the template.

When you are creating a series of layers all using the same drawings or building puppets, you will create Symbols. Symbols can be used as drawing containers when you are creating puppets so that you can store different mouth shapes or hands to use while animating. You can also use Symbols when you are building props, such as a skateboard and you want to use the same wheel drawing for the four skateboard wheels.



Refer to the Libraries, Symbols and Templates chapter to learn more about using the Library, Symbols and templates in context.




Library View Menu

The Library View menu allows you to access commands that are specifically related to the Library view such as importing SWF movies and Illustrator files, adding a new folder and refreshing the library's content.

Preview Window

The Preview window is used to see the content of the currently selected template or Symbol in the Template/Symbol list.

Preview Playback

The Preview Playback button is used to playback the content of the selected Template/Symbol if it contains more than one frame. Press the Play  button to playback the preview.

Library Folder List

The Library Folder List displays all of the folders linked to the Library view. There are two default folders:

- **Symbols**
The Symbols folder is the only folder containing Symbols. The user can organize it by adding subfolders inside.
- **Stage Library**
The Stage Library folder is a default library found on the hard drive in the user's documents. This folder can contain templates, but no Symbols.

The user can link new library folders to his Library view and organize them with subfolders.



Refer to the following topics in the Libraries, Symbols and Templates chapter to learn more adding new libraries and subfolders:

- Creating a Library, on page 352
- Creating a Folder, on page 353






Template/Symbol List

The Template/Symbol List displays the templates or Symbols contained in the selected library folder. If you right-click (Windows/Linux) or [Ctrl]+click (Mac OS X), you can display the templates and Symbols' thumbnails by selecting **View > Thumbnails**.

Playback Toolbar

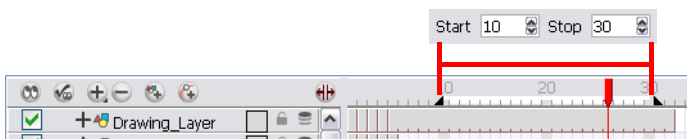


Use it to playback your animation and sound. Use it to scrub your sound to create your lip-sync, looping your playback, navigating through your frames, change the playback range and speed.

- Click on the Play  button to play and stop the animation. You can also do this from the top menu by selecting **Play > Play Scene Forward** or **Stop**.
- Click on the Loop  button to repeat your playback indefinitely. Or do this from the top menu by selecting **Play > Loop**.
- Click on the Sound  button to enable sound in the playback. Or do this from the top menu by selecting **Play > Enable Sound**.
- Click on the Sound Scrubbing  button to enable sound scrubbing in the playback. Or do this from the top menu by selecting **Play > Enable Sound Scrubbing**.
- Click on the Render and Play  button to create a render of your scene to playback the final result including the effects.
- Scroll through the playback's frames using the Jog Frames right and left arrows.



- To change the playback frame range enter new values in the Start and Stop fields.




- Enter a new value in the fps field to change the speed of the playback.



Play Menu

Select any of the following from the top menu **Play** heading:

- **First Frame** or use the shortcut [Home] to jump to and play the first frame.
- **Next Frame** or use the shortcut [.] to play the frame after the currently selected frame in the Timeline View.
- **Last Frame** or use the shortcut [End] to jump to and play the last frame animation.
- **Previous Frame** or use the shortcut [,] to play the frame before the frame currently selected in the Timeline View
- **Go to Frame** or use the Go  button, which can be added to the Timeline View Toolbar through the Toolbar Manager. Opens the **Go to Frame** dialog box so you can type in the frame number to jump to.
- **Enable Playback** view your playback from either the **Top, Side** or **Perspective Views**.

Managing the Views

The Harmony Stage user interface is composed of different views, each one designed for a specific purpose. This section explains how you can modify the location and accessibility of the views by adding a new view as a tab or as a window, you can also swap the view locations around.

This section covers the following topics:

- Adding a New View, on page 58
- Closing a View, on page 59
- Swapping Views, on page 59
- Resizing a View, on page 59

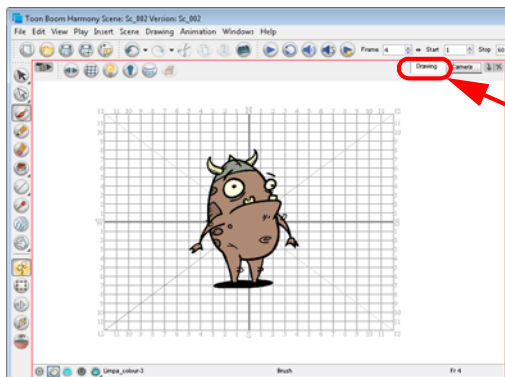


Workspace modifications are automatically saved when you exit the application unless you disabled the Automatically Save Workspace preference in the Preferences panel.

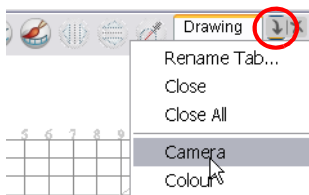
Adding a New View

To add a view:

1. Select the view you want to add from **Window** > *The desired view*.



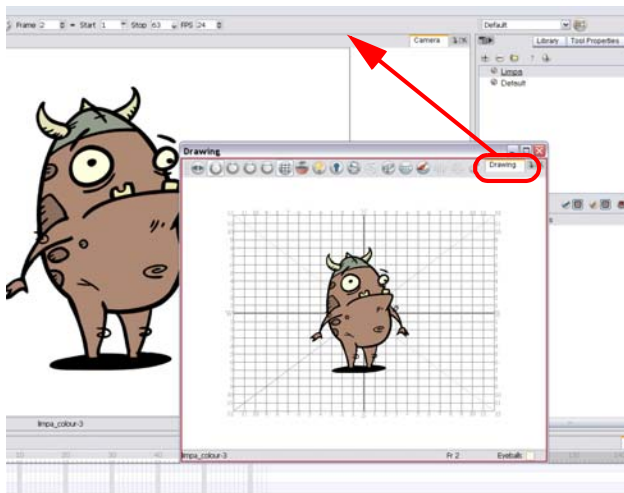
By default, the new view appears tabbed.



You can also use the Window drop-down menu button included in each view already available in the workspace. Click on the button and select a view from the list.



You can open several instances of a same view except for the Timeline, Tool Properties, Colour and Drawing views.

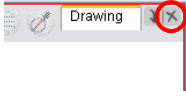
2. To dock a floating window in your workspace, drag the window's tab onto one of the workspace's views.



Closing a View

To close a view:

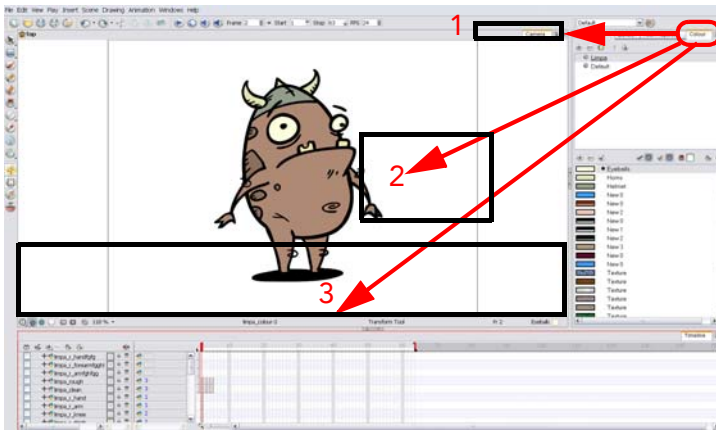
1. In the view to close, click on the Close View  button.
 - ▶ If you have several tabs in the same window, hold [Shift] down and click on the Close View  button to close all tabs together.



Swapping Views

To swap views around:

1. Select the view tab and drag it onto one of the view's separators, top area or onto another view's tab.
2. When a rectangle outline appears showing an available location for the view, release the mouse button and drop the view tab into position. One of three things will happen:




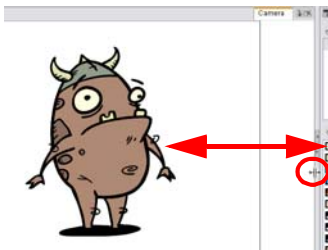
- ⇒ 1. The view becomes a tabbed window.
- ⇒ 2. The view becomes a floating window.
- ⇒ 3. The view becomes a new docked window.

Resizing a View

To change the width and height of the views in the workspace, drag the side of the view.

To resize a view:

1. In the interface, position your cursor on the edge of the view you want to resize.
2. When you see the Resizing  cursor, click and drag the side of the window to the desired width or height.



You can also temporarily hide a view to get more working space.

To temporarily hide a view:

1. On the edge of the window you want to hide click on the Collapse/Expand button. The view is compressed and only the Collapse/Expand button is visible.
2. Click on the same Collapse/Expand button to display the view again.

Managing the Toolbars

The Harmony Stage user interface contains toolbars which, by default, are located at the top of the interface. Some of the workspace's views also have their own toolbars. These toolbars can be moved around. You can reposition the toolbars to suit your work style or hide unused ones.

This section covers the following topics:

- Showing or Hiding Toolbars, on page 60
- Moving Toolbars, on page 60
- Toolbar Manager, on page 60

Showing or Hiding Toolbars


To show or hide a toolbar:

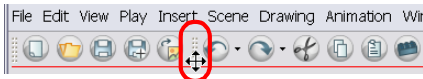
1. Select **Windows > Toolbars > the desired toolbar**.
2. Select **Windows > Toolbars > Line Up** to align all of your toolbars.

NOTE: The Toolbar menu only contains the View toolbars of the views contained in the workspace. As you show or hide views in your workspace, the Toolbar menu will update.

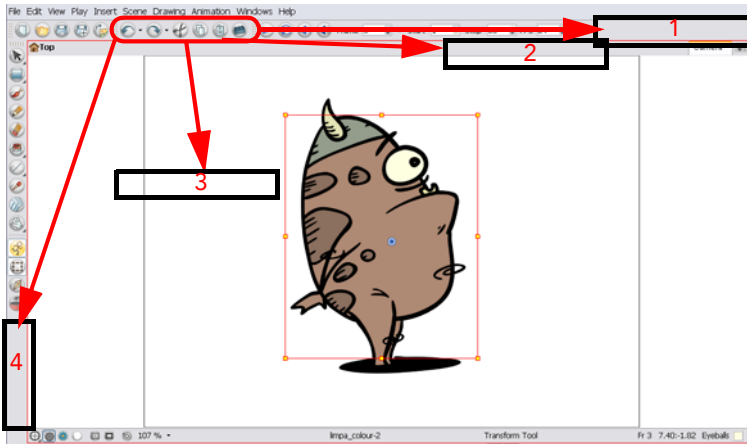
Moving Toolbars

To move a toolbar:

1. Select the toolbar you want to move by clicking on its anchor point  and dragging it into a view toolbar area or another position in the top or side interface toolbar area.




2. When a rectangle outline appears showing an available location for the toolbar, release the mouse button and drop the toolbar into position.



Toolbar Manager

The View toolbars can be customized to contain your favourite tools and options. Use the Toolbar Manager window to organize your different toolbars to suit your working preferences.

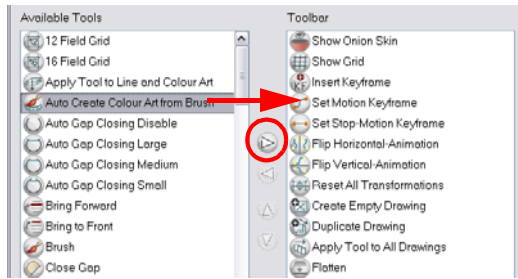
To customize your toolbars:


1. In the chosen view, click on the Toolbar Manager  button.

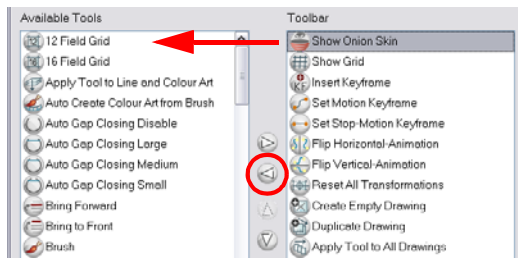
The **Toolbar Manager** window opens

- To add a new icon to your toolbar, select the tool or command from the Available Tools list and click on the Right



 Arrow button to switch it to the Toolbar list.

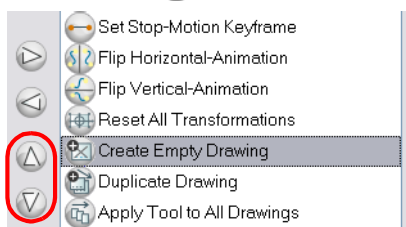


- To remove an icon from your toolbar, select the tool or command in the Toolbar list and click on the Left  Arrow button to switch to the Available Tools list.



- To reorder your icons in your Toolbar, select the command to be moved in the Toolbar list and click on the Up

 or Down  Arrow buttons to move it to the correct location.



- Click on the OK button when you are finished.

Managing the Workspace

Harmony Stage's user interface is composed of several views. You can customize your workspace to suit your working preferences, save it as a new workspace, and load it from the Workspace toolbar.

This section covers the following topics:

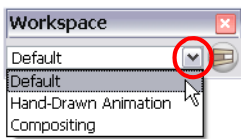
- Loading a Workspace, on page 62
- Workspace Manager, on page 62
- Restoring the Default Workspaces, on page 65

Loading a Workspace

The first time you open Harmony Stage, the default workspace is loaded. Others are available such as the Hand-Drawn Animation and the Compositing workspaces, these display different views and toolbars. You can access these workspaces and any you create, from the Windows menu and the Workspace toolbar.

To load a workspace:

1. In the top menu, select **Windows > Workspace > Workspace** or click on the drop-down arrow in the Workspace toolbar and select a workspace from the list.



Workspace Manager

The Workspace Manager allows you to modify, create, delete, rename and reorder you workspaces.

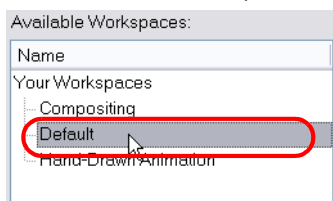
To open the Workspace Manager:


- ▶ In the Workspace Tools toolbar, click on the Workspace Manager  button.
- ▶ In the top menu select **Windows > Workspace > Workspace Manager**.

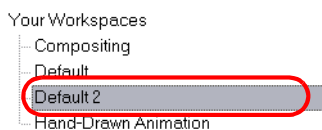
Creating a New Workspace

To create a new workspace:

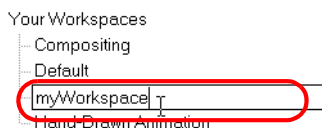
1. Open the Workspace Manager.
2. In the Available Workspaces list, select an existing workspace.




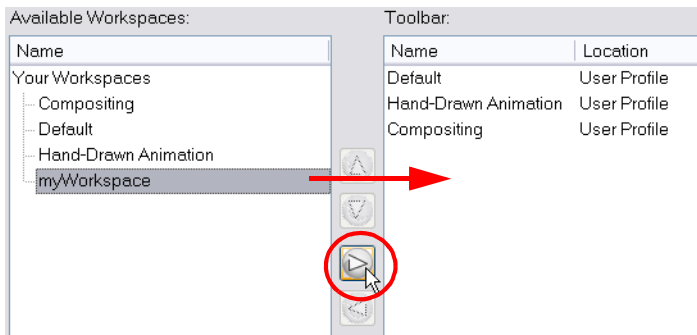
3. At the bottom of the Available Workspaces list, click on the Add  button to add a workspace.



4. Double-click on the new workspace or click on the Rename button and give it a new name.



5. Select the new workspace and click on the Right Arrow  button to send it to the Workspace Toolbar.

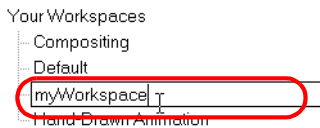


6. Click on the OK button.

Renaming a Workspace

To rename a workspace:

1. Open the Workspace Manager.
2. Choose the workspace to be renamed from the list.
3. Double-click on the workspace to be renamed or click on the Rename button. This allows you to edit the name.



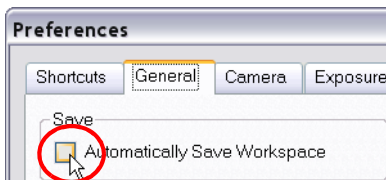
4. Type in the new name of the workspace.
5. Press the [Return] key to validate the name.
6. Click on the OK button.

Saving a Workspace


By default, when you modify the look of a workspace, it is automatically saved. If you prefer to keep your workspaces as they are and only save the modifications when you really want to, you have to disable the Automatically Save Workspace preference.

To disable the Automatically Save Workspace preference:


1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X) to open the Preferences panel.
2. Go to the General tab.
3. In the Save section, disable the Automatically Save Workspace preference.



4. Press the OK button.

The Save Workspace  button appears in the Workspace toolbar.

To save a workspace manually:

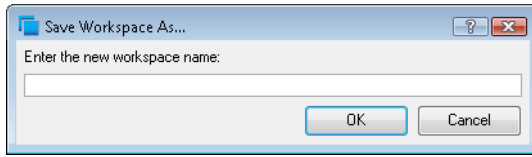
1. In the Workspace toolbar, click on the Save Workspace  button.
You can also select **Windows > Workspace > Save Workspace**.

You can save your workspace as a new version to avoid over-writing the current one.

To save your workspace as a new version:

1. Select **Windows > Workspace > Save Workspace As**.

The **Save Workspace As** dialog box opens.

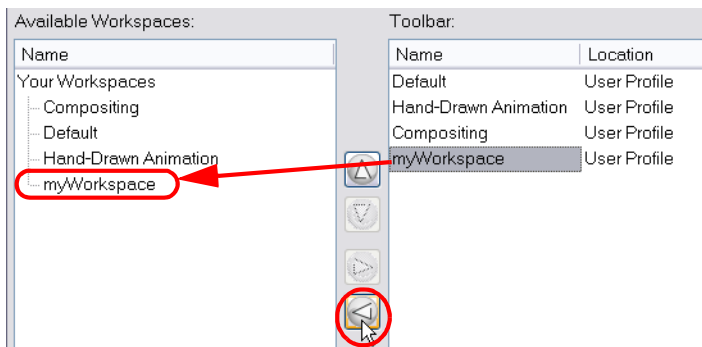


2. In the text field, enter the new workspace name.
3. Click OK button to validate.

Deleting a Workspace

To delete a workspace:

1. Open the Workspace Manager.
2. In the Workspace Manager, select the workspace to be deleted and click on the Left Arrow button to send it to the Available Workspaces list.



3. Select the workspace in the Available Workspaces list then click on the Delete button to delete the workspace.
4. Click on the OK button.

Showing and Hiding a Workspace

To show a workspace:

1. Open the Workspace Manager.
2. In the Available Workspaces list, select the workspace to be displayed and click on the Right Arrow button to send it to the Workspace Toolbar.
3. Click on the OK button.



To hide a workspace:

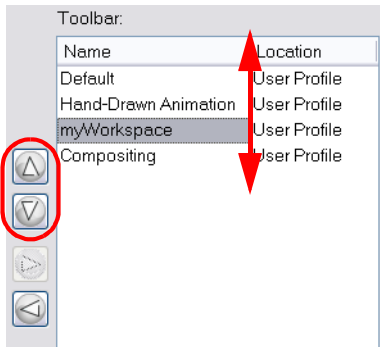
1. Open the Workspace Manager.
2. In the Workspace Manager, select the workspace to be hidden and click on the Left Arrow button to send it to the Available Workspaces List.
3. Click on the OK button.

If you do not want to modify the current workspace, use the Workspace Manager to create another one and then modify that one.

Reordering the Workspace List

To reorder workspaces:

1. Open the Workspace Manager.
2. In the Workspace Toolbar, select the workspace to be reordered and click on the Up  or Down  Arrow buttons to move it up or down.



3. Click on the OK button.

Restoring the Default Workspaces

You can restore modified workspaces to their original default layout.

To restore the default workspaces:

- ▶ In the top menu select **Windows > Workspace > Restore Default Workspace**.

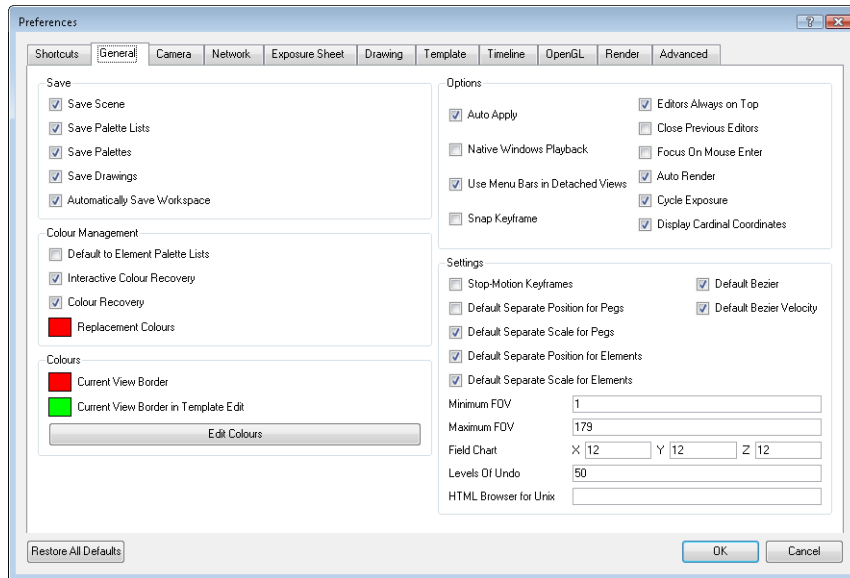
Interface Navigation

Harmony Stage supports Zoom In, Zoom Out, Rotate, Pan and Reset View Position for easy interface navigation.

- **Zoom In:** Zooms into the view. Use the keyboard shortcut [Ctrl]=[] (Windows/Linux) or [⌘]=[] (Mac OS X) or from the top menu, select **View > Zoom In**.
- **Zoom Out:** Zooms out of the view. Use the keyboard shortcut [Ctrl]+[-] (Windows/Linux) or [⌘]+[-] (Mac OS X) or from the top menu, select **View > Zoom Out**.
- **To Zoom In and Zoom Out:** Hold down [Spacebar] and your middle mouse button while moving the mouse up or down.
- **To Pan the view:** Hold down the keyboard shortcut [Spacebar] and drag your mouse in the direction you want to pan the view.
- **To Recentre the view:** Click on the keyboard shortcut [F12] to recentre the view on your mouse cursor.
- **Reset View:** Resets the view to its default position. Use the keyboard shortcut [Shift]+[M] or from the top menu, select **View > Reset View**.
- **Reset Rotation:** Resets the view's rotation to its default position. Use the keyboard shortcut [Shift]+[X] or from the top menu, select **View > Reset Rotation**.
- **Reset Pan:** Resets the view's pan to its default position. Use the keyboard shortcut [Shift]+[N] or from the top menu, select **View > Reset Pan**.
- **Reset Zoom:** Resets the view's zoom to its default position. Use the keyboard shortcut [Shift]+[Z] or from the top menu, select **View > Reset Zoom**.
- **Toggle Full Screen:** Enlarges the selected view to full screen. The full screen process is done in three stages. Use the keyboard shortcut [Ctrl]+[F] (Windows/Linux) or [⌘]+[F] (Mac OS X) or from the top menu, select **View > Toggle**.
 - ⇒ First, the selected view enlarges to the maximum width or height, but keeps the tool views such as Colour or Pen.
 - ⇒ Second, the view enlarges to full screen.
 - ⇒ Third, the view returns to its original size.
- **Rotate 90 CW:** Rotates the Camera View, like an animation table, 90 degrees clockwise. From the top menu, select **View > Rotate 90 CW**.
- **Rotate 90 CCW:** Rotates the Camera View, like an animation table, 90 degrees counter-clockwise. From the top menu, select **View > Rotate 90 CCW**.

Preferences

An important feature of Toon Boom Harmony Stage is the Preferences panel. From here you can customize your interface, tool behaviour and shortcuts. Throughout this guide, you are often required to go to the Preferences panel to set parameters and options.



In this section you will learn how to access the Preferences panel and also find a general description of its functionality.



To learn about the different preferences available, refer to the following chapters:

- Drawing and Animating > Drawing and Traditional Animation Preferences, on page 162
- Adding Colour > Preferences, on page 214
- Layers and Timing > Preferences, on page 279
- Gathering Content > Preferences, on page 345
- Libraries, Symbols and Templates > Preferences, on page 373
- Setting Up the Scene > Scene Setup Preferences, on page 499
- Creating Animation Paths > Preferences, on page 605
- Animating Your Puppets > Preferences, on page 664
- Enhancing With Effects > Preferences, on page 740

This section covers the following topics:

- Preference Highlights, on page 68
- Keyboard Shortcuts, on page 70

Preference Highlights

You can set over 80 preferences in the Preferences panel. You will learn about them as you read through this guide.

The Preferences panel is divided into the following tabbed sections:

- Shortcuts
- General
- Camera
- Network
- Exposure Sheet
- Drawing
- Template
- Timeline
- OpenGL
- Render
- Advanced



Some preferences require you to exit and restart the application or to close a view and reopen it.

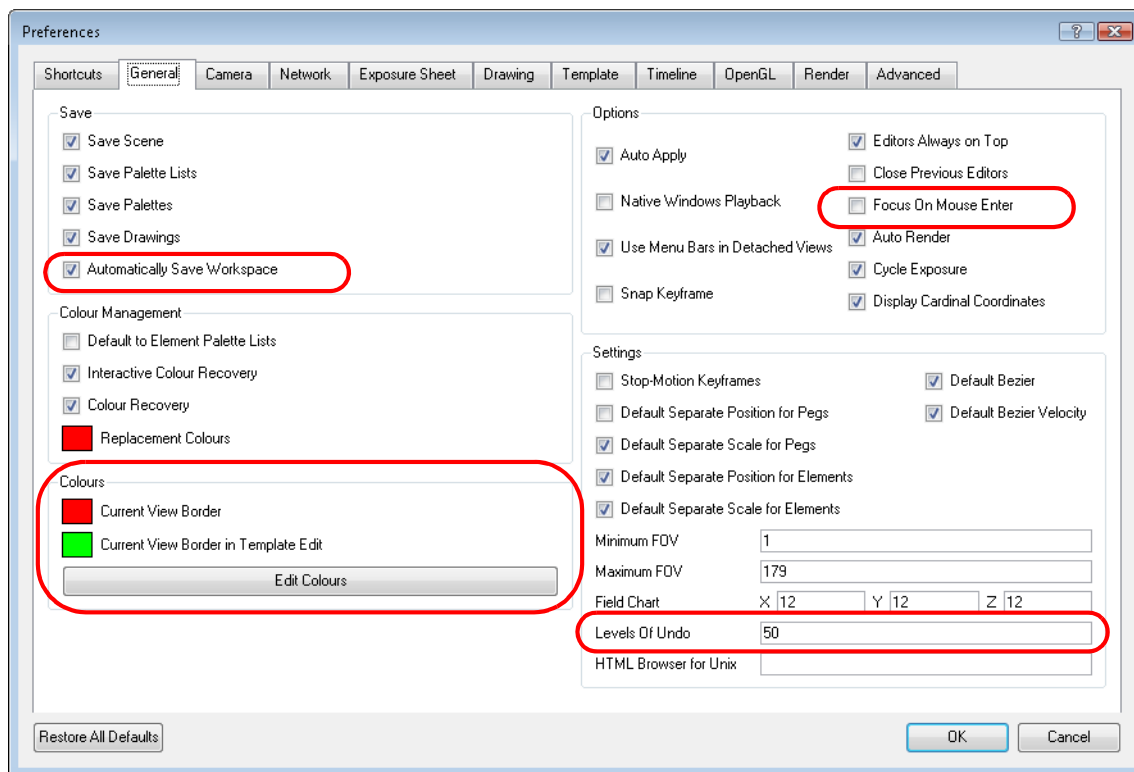
Accessing the Preferences Panel

To access the Preferences panel:

1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X). You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

User Interface Preferences

To customize your interface, you will use some of the preferences located in the General category.



Automatically Save Workspace

The Automatically Save Workspace preference is enabled by default. Every time you add a view to your workspace, remove a toolbar or change a view's width, these modifications are saved when you quit the application. If you do not want the system to save these modifications, disable the preference.

This preference does not require you to restart the application.



Refer to the Saving a Workspace section to learn more about this preference.

Focus On Mouse Enter

The Focus On Mouse Enter preference is disabled by default.

In Harmony Stage, for the operations or keyboard shortcuts to work in the view in which you are working, the focus must be in that view. When the focus is on a particular view, a red rectangle appears around its frame. You must click in the view or on the view's header for the focus to be done.

If you enable the Focus on Mouse Enter preference, you will not need to click in the view to get the focus. It will be done as soon as your mouse enters the view.

This preference does not require you to restart the application.

NOTE:

If you enable the Focus On Mouse Enter preference, certain operations from the top menu may not be available since the view focus may change as you make your way to the top menu. In this case use keyboard shortcuts and quick access menus (right-click menus (Windows/Linux) or [Ctrl]+click menus (Mac OS X)).

Levels Of Undo

The Levels Of Undo preference determines the number of actions retained by the Undo List. By default, the system stores 50 actions in the list. You can alter the number if you want to.

This preference does not require you to restart the application.

Colours

The Colours preference allows you to modify the colours of the different User Interface views and elements. For example, you can change the Camera view's background colour from grey to white.

Altering these preferences require you to restart the application or to close a view and reopen it for the modifications to be applied.

Current View Border

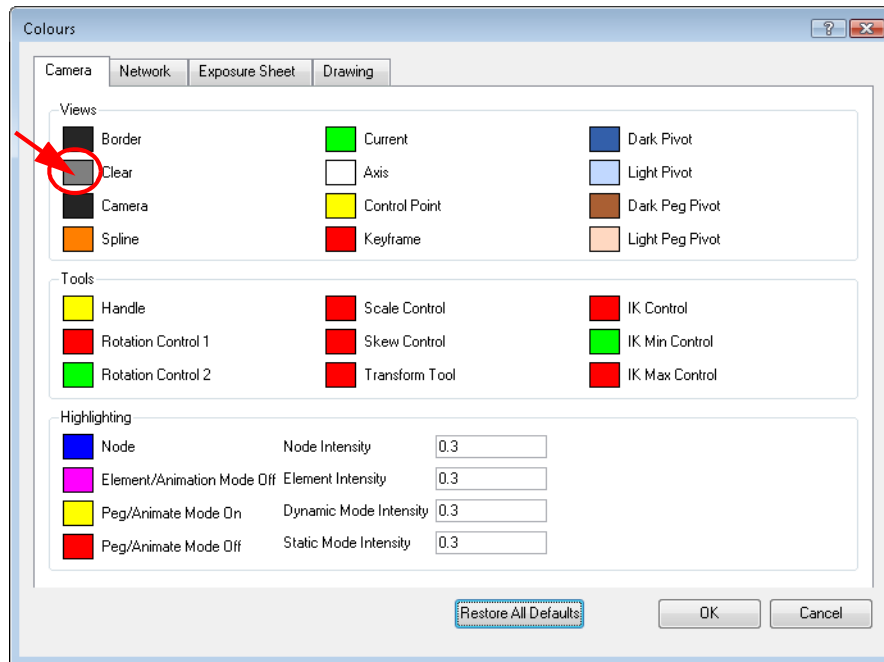
The Current View Border preference sets the colour of the frame around the workspace view you are currently using, also known as focus. By default, the colour is red. Click on the red colour swatch to select a new colour in the Colour Picker window.

Current View Border in Template Edit

The Current View Border preference sets the colour of the frame around the workspace view you are currently using when editing a template from your library view. By default, the colour is green. Click on the green colour swatch to select a new colour in the Colour Picker window.

Edit Colours Button

Click on the Edit Colours button to open the **Colours** window.



In the Colours window, you can modify any of the colours from the list. Most of the modifications will require you to restart the application or close the view and reopen it to see them.

- To restore all of the default interface's colours, click on the Restore All Defaults button.

The Colours window is divided into the following categories:

- Camera
- Network
- Exposure Sheet
- Drawing

Click on any of the colour swatches and select a new colour from the Colour Picker window.

Keyboard Shortcuts

To speed up your work, all of Toon Boom Harmony Stage's keyboard shortcuts can be customized and you can even choose other software keyboard shortcut sets.

This section covers the following topics:

- Selecting a Keyboard Shortcut Set, on page 70
- Customizing a Keyboard Shortcut, on page 71

Selecting a Keyboard Shortcut Set

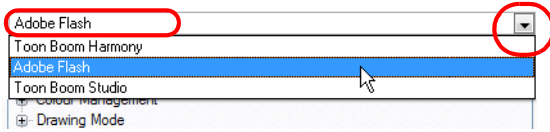
In Harmony Stage, you can choose a set of default keyboard shortcuts you are familiar with. You can choose between the following:

- Adobe Flash (Default)
- Toon Boom Harmony
- Toon Boom Studio

To switch keyboard shortcut sets:

1. Open the Preferences panel.
Use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
2. In the Preferences panel, go to the Shortcuts tab.

- In the Shortcut Set drop-down menu, select the desired set.

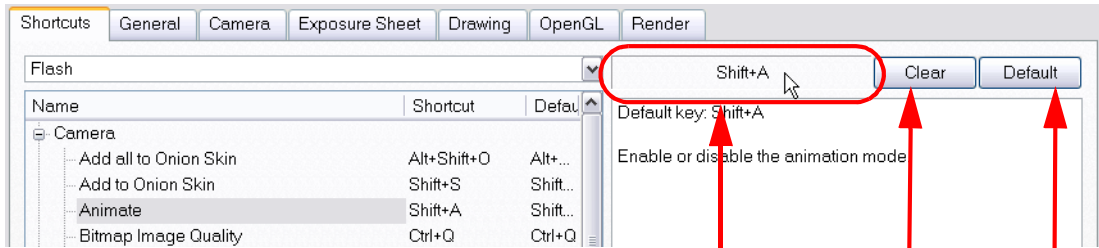


Customizing a Keyboard Shortcut

You can also customize most of the shortcuts by opening the Preferences panel and going to the Shortcuts tab.

To set a shortcut:

- Open the Preferences panel.
Use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
- In the Preferences panel, go to the Shortcuts tab.
- In the left window, select the command to modify.
- Click on the shortcut rectangle (above the right window).



Current keyboard shortcut.

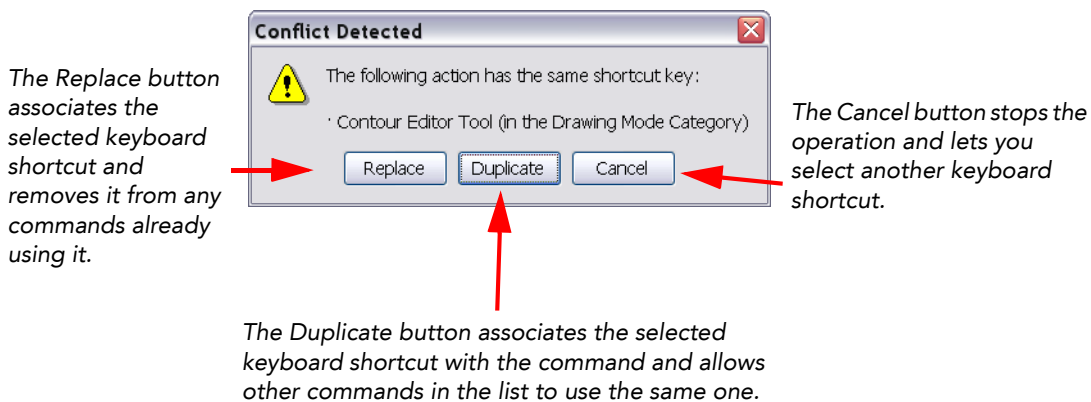
Clears the current keyboard shortcut.

Resets the keyboard shortcut to its default value.

- On your keyboard, click on the desired shortcut.
 - To reset a command's default keyboard shortcut, click on the Default button.
 - To remove any keyboard shortcut associated to a command, click on the Clear button.
- Click on the OK button.

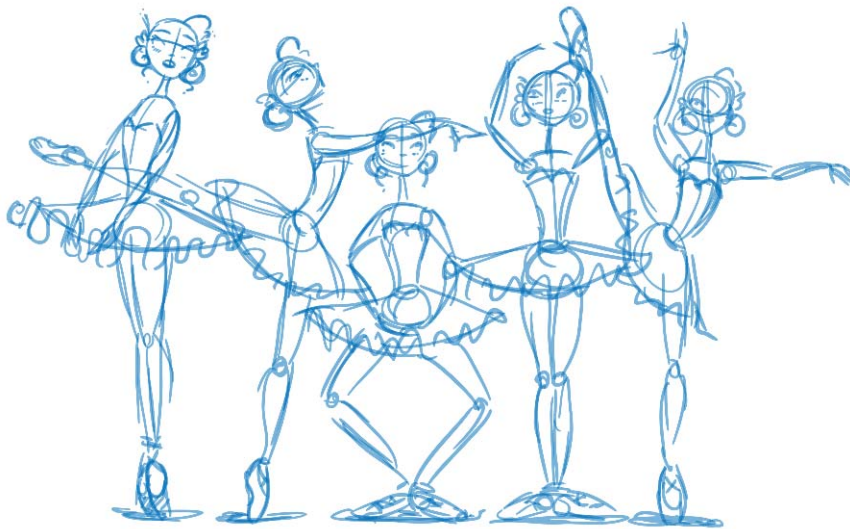
NOTE:

If a keyboard shortcut is already in use, the **Conflict Detected** dialog box will appear notifying you of the command to which it is already associated. You can continue to associate the shortcut or cancel the operation and choose another command.



Chapter 4

Drawing and Animating



In Toon Boom Harmony Stage, many powerful tools, views and features are available so you can design, draw and animate with ease. This chapter explains the main assets needed when drawing and animating in the software as well as tips on how to start and use these tools efficiently.

In this chapter, you will learn about the following:

- How to Draw, on page 74
- Tool Properties View, on page 75
- Drawing in the Camera or Drawing View, on page 76
- Drawing with the Brush or the Pencil, on page 81
- Viewing the Final Lines as you Draw, on page 82
- Drawing with the Brush Tool, on page 84
- Drawing with Line Texture, on page 89
- Drawing using the Pencil Tool, on page 95
- Drawing using Invisible Lines, on page 98
- Erasing Parts of a Drawing, on page 100
- Reshaping a Drawing Using the Contour Editor Tool, on page 103
- Selecting Drawing Objects, on page 108
- Drawing With Shapes, on page 116
- Drawing Using the Polyline Tool, on page 121
- Deforming a Drawing using the Perspective Tool, on page 124
- Cutting Drawing Parts, on page 126
- Smoothing-out Lines, on page 128
- Override Tool, on page 130
- More Drawing Tools, on page 131
- Traditional Animation Tools, on page 136
- Basic Traditional Animation, on page 142
- Advanced Traditional Animation, on page 147
- Cleaning Scanned Drawings, on page 158
- Drawing and Traditional Animation Preferences, on page 162


How to Draw

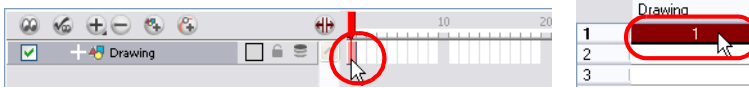
As soon as Harmony Stage is launched, you can start to draw straight away using the default Drawing layer.



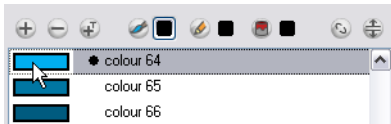
If you need to add a new drawing layer, refer to *Layers and Timing > Adding New Drawing Layers*, on page 233.

How to draw:

1. In the Tools toolbar, select the Brush  tool, you can also use the default keyboard shortcut [Alt]+[B].
2. In the Timeline or Xsheet view, click in the first cell of the drawing layer.



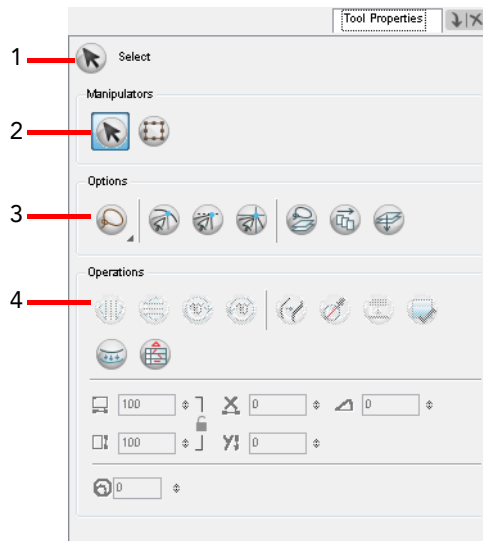
3. In the Drawing or Camera view, start drawing.
4. You can change the colour of the Brush in the Colour view, using the default colour palette swatches. Click on the desired colour.



Refer to *Adding Colour > Adding a Colour Swatch*, on page 168 if you want to use more colours.

Tool Properties View

The Tool Properties view is where you can customize the currently selected tool. The options and operations displayed changes according to each tool you select.



1. The icon displayed here shows the currently selected tool.
2. The Manipulators section contains shortcuts to similar tools.
3. The Options section contains the possible actions for the current tool.
4. The Operations section contains the possible operations for the current tool.

Manipulators

Manipulators are buttons which let you to switch quickly between similar tools such as the Select tool and the Transform tool or the Line, Rectangle and Ellipse tools.

Options

Options are different modes you can apply to a selected tool to modify its behaviour to fit the current task's needs.

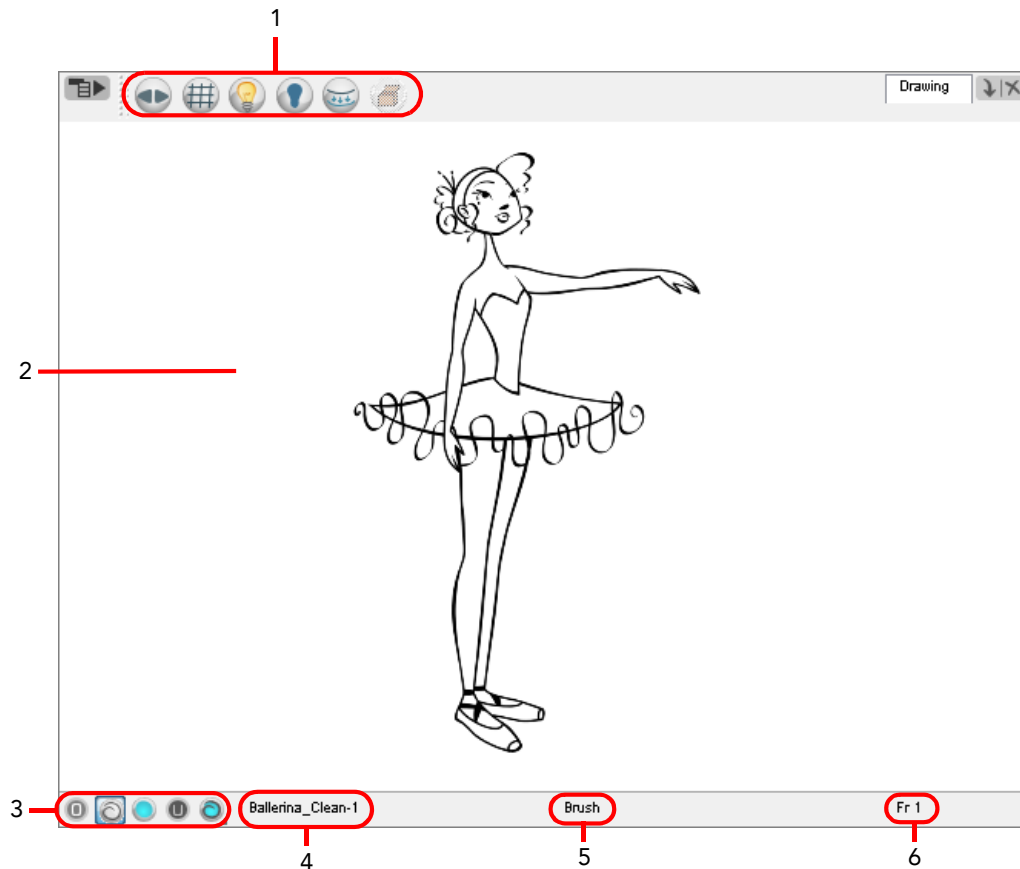
Operations

Operations are actual actions you can perform while using the selected tool.

Drawing in the Camera or Drawing View

In Toon Boom Harmony Stage, you can draw in either the Drawing view or the Camera view. Even though the two views are similar, when it comes to drawing, there are some differences.

Drawing View



- | | |
|--|---|
| 1. Drawing View Toolbar | 5. Tool Name |
| 2. Drawing Area | 6. Current Frame |
| 3. Overlay, Line Art, Colour Art,
Underlay and Preview Mode | <i>These are described later in this section.</i> |
| 4. Drawing Name | |

Only the selected drawing is displayed by default in the Drawing view. Use features such as the Light Table, which displays the current frame drawing of all the enabled layers of your scene in washed-out colours, or the Onion Skin which displays the previous and next drawings of the currently selected drawing layer.

Drawing View Toolbar

This toolbar gives you a fast access to many features that are helpful when using the Drawing view. You can customize this toolbar to display your favourite commands.








Refer to *Discovering the Interface > Toolbar Manager*, on page 60 to learn more about customizing the toolbars.

Drawing Area

This is the Drawing view's main space, it is where you draw, and where the drawings are displayed.

Overlay, Line Art, Colour Art, Underlay and Preview Mode

These buttons are only displayed when the Use Advanced Art Mode preference is enabled, **Edit > Preferences > General** (you will need to restart the computer for this option to work)

- ▶  **Overlay:**
Click on this button to switch to the drawing's Overlay layer. This layer is located above the Line Art layer. You can also use the default keyboard shortcut [:].
- ▶  **Line Art:**
Click on this button to switch to the Line Art layer of the drawing. You can also use the default keyboard shortcut [L].
- ▶  **Colour Art:**
Click on this button to switch to the Colour Art layer of the drawing. You can also use the default keyboard shortcut [L].
- ▶  **Preview mode:**
Click on this button to switch to Preview mode, this will let you see both Line Art and Colour Art layers simultaneously. You can also use the default keyboard shortcut [Shift]+[P].
- ▶  **Underlay:**
Click on this button to switch to the drawing's Underlay layer. This layer is located under the Colour Art layer. You can also use the default keyboard shortcut [:].

Drawing Name

This field displays the name of the layer and the drawing name you are currently working on.

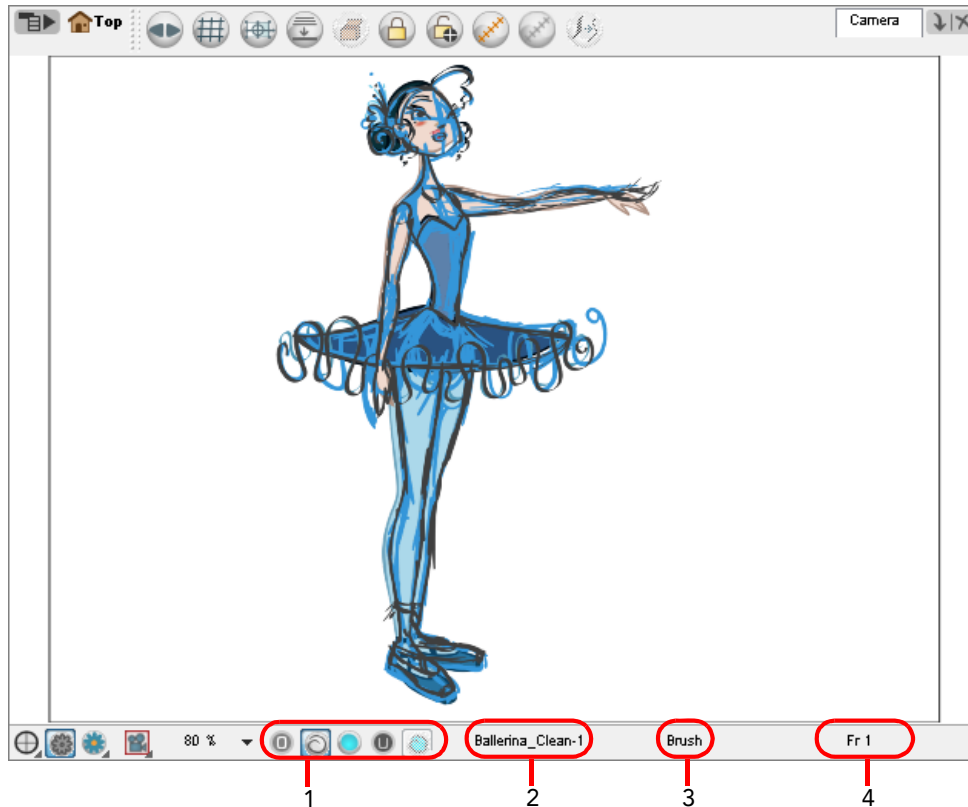
Tool Name

This field displays the current tool selected.

Current Frame

This field displays the current frame of the animation you are working on.

Camera View



1. Overlay, Line Art, Colour Art, Underlay and Preview Mode
2. Drawing Name
3. Tool Name
4. Current Frame

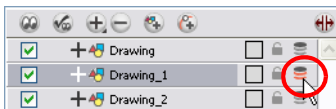
In the Camera view, you can also use the Onion Skin feature to display previous and next drawings. By default, all the enabled drawing layers in the selected frame are displayed, letting you edit them together. This way, you can use the

Select  tool to select many objects from individual layers at once.

From the Timeline view, you can avoid making mistakes by locking the layers containing the drawings you don't want to modify, while keeping the drawing visible as a reference and disabling the layers you don't want to display in the Camera view.

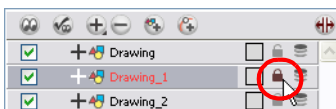
To enable the onion skin from the Timeline view:

- ▶ In the Timeline view, click on the Onion Skin  icon of the desired layer.



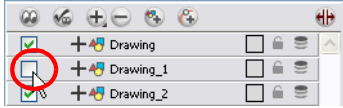
To lock a drawing layer:

- ▶ In the Timeline view, click on the Lock  icon of the layer you don't want to edit.



To hide a drawing layer:

1. In the Timeline view, click in the check box corresponding to the layer you want to hide.








Refer to the *Selecting Drawing Objects* topic to learn more on how to use the *Select Tool*.



Refer to the *More Drawing Tools* topic to learn more about the *Onion Skin* and *Light Table* features.

Overlay, Line Art, Colour Art, Underlay and Preview Mode

These buttons are only displayed when the Use Advanced Art Mode preference is enabled, **Edit > Preferences > General** (By default, this preference is enabled. If you disabled it and wish to enable it again, you will need to restart the computer for this option to work)

- ▶  **Overlay:**
Click on this button to switch to the drawing's Overlay layer. This layer is located above the Line Art layer. You can also use the default keyboard shortcut [:].
- ▶  **Line Art:**
Click on this button to switch to the Line Art layer of the drawing. You can also use the default keyboard shortcut [L].
- ▶  **Colour Art:**
Click on this button to switch to the Colour Art layer of the drawing. You can also use the default keyboard shortcut [L].
- ▶  **Preview mode:**
Click on this button to switch to Preview mode, this will let you see both Line Art and Colour Art layers simultaneously. You can also use the default keyboard shortcut [Shift]+[P].
- ▶  **Underlay:**
Click on this button to switch to the drawing's Underlay layer. This layer is located under the Colour Art layer. You can also use the default keyboard shortcut [:].

Drawing Name

This field displays the name of the layer and the name of the drawing currently selected in the Timeline or Xsheet view.

Tool Name

This field displays the current tool selected.

Current Frame

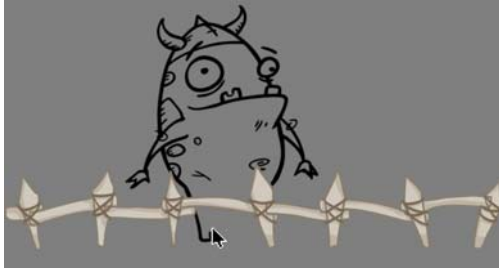
This field displays the current displayed frame of the animation.



Refer to *Discovering the Interface > Camera View*, on page 40 to learn more about the *Camera view*.

Show Current Drawing on Top

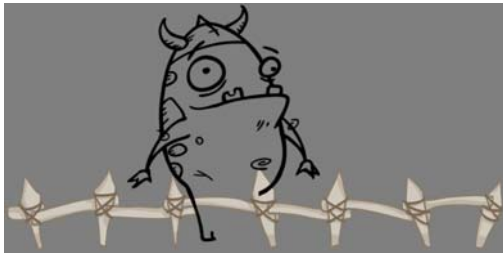
In Harmony Stage, when you draw on a layer, the artwork is displayed in the correct order, for example, if the layer on which you are drawing is located behind an object on another layer, the lines you are drawing will be hidden behind that object.



This option lets you display the selected drawing on top of everything while your draw. By enabling this option, each time you select a drawing tool, the selected drawing will be displayed in front of everything in your Camera view. Note: the Timeline and Network view ordering will not be changed.

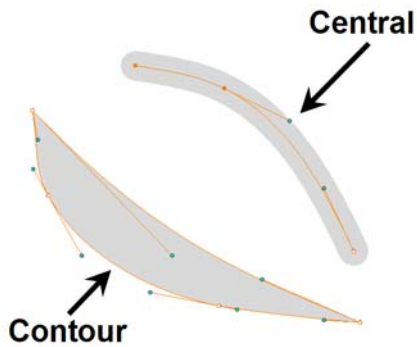
To display your drawing on top:



1. In the top menu, select **View > Show > Current Drawing on Top**.
2. In the Tools toolbar, select a drawing tool.
3. In the Camera view, start drawing.





NOTE: you only need to enable this option once, it is not necessary to do it each time you select a drawing tool.

Drawing with the Brush or the Pencil



The Brush  and Pencil  tools are used to draw and sketch with.

The Brush tool has pressure sensitivity, allowing you to create lines with variable thicknesses. The Pencil and Shape tools produce a uniform thickness as they use a central vector. If you draw with the Pencil tool and want to modify the thickness you can convert the pencil to a Brush with the Pencil Lines to Brush option.

To adjust the thickness, use the Contour Editor  tool. You can also convert a brush zone into a pencil line with the Brush to Pencil  option. The brush line will lose its thick and thin characteristics as it changes from a contour vector to a central vector type.



Refer to the *Reshaping a Drawing Using the Contour Editor Tool* topic to learn more about adjusting the Brush line's thickness.



Refer to the *Selecting Drawing Objects* topic to learn more about the Brush line to Pencil Line option.

Viewing the Final Lines as you Draw



Real-Time Antialiasing **Disabled**

Real-Time Antialiasing **Enabled**

Everything you draw in Harmony Stage is vector-based. Although, when you draw in the Camera or Drawing view, you will notice that your lines are antialiased. If you zoom in more than 100% in the Camera view, pixels will start to appear. Your drawings are antialiased to the scene's resolution. Antialiasing is a preference you can turn on and off.

By default, the Antialiasing preference is enabled. This option lets you see the final result of your scene as you draw. You can change the value of the Antialiasing via the Preferences dialog box, to fit the current zoom level used in the Camera or Drawing view or to disable it.

NOTE:

Real-Time Antialiasing parameters are only valid while you work in your scene. The scene will be rendered out to 100% of its resolution regardless of your settings in the Preferences panel.

To customize the antialiasing parameters:

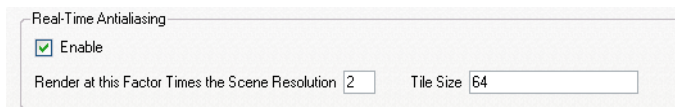
1. Select **Edit > Preferences** (Windows/Linux)

or **Stage > Preferences** (Mac OS X)

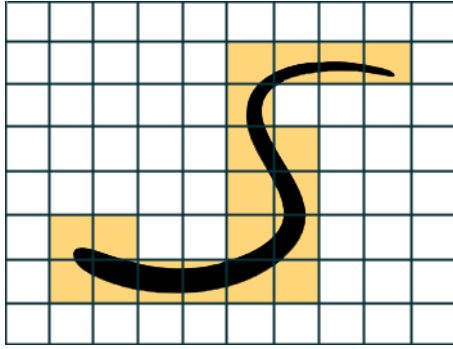
You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

The **Preferences** dialog box opens.

2. In the OpenGL tab, Real-Time Antialiasing section.



- ▶ **Enable** check box: Click on the Enable check box to enable or disable the Real-Time Antialiasing. You can also use the keyboard shortcut [Ctrl]+[Shift]+[Alt]+[A] (Windows/Linux) or [⌘]+[Shift]+[Alt]+[A] (Mac OS X) to enable and disable the Antialiasing while working in the Camera or Drawing view.
- ▶ **Render at this Factor Times the Scene Resolution:** The default value is 1. This value corresponds to how many times larger than the scene's resolution you want your drawings to be antialiased. If you zoom into your drawings to 200% you should set the value to 2.
- ▶ **Tile Size:** When the drawing is antialiased, the whole is broken into small tiles to make the process faster. Only the tiles with artwork on are rendered out. When you modify a zone on your drawing, only the modified tiles are updated.



- Making the tiles too small results in sending more tiles to be rendered out, which makes the process longer.
- Making the tiles too large results in sending bigger tiles out to be rendered out which is more of a strain on the video card. Since the tiles are larger, they get updated more often because the artwork you modify may be one of these tiles.

Drawing with the Brush Tool



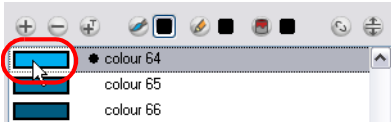
The Brush tool is pressure sensitive and can create a contour shape which gives a thick and thin line effect, as if the drawing was made with a brush.

To draw with the Brush tool:

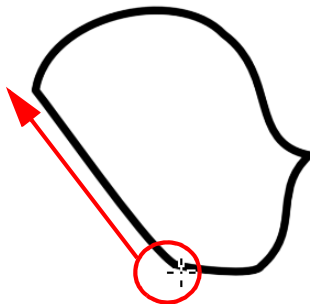
1. In the Timeline or Xsheet view, select the cell where you want to draw.



2. In the Tools toolbar, select the Brush tool, you can also use the default keyboard shortcut [Alt]+[B].
3. In the Colour View, click on a colour swatch to select a colour.



4. In the Drawing or Camera view, start drawing.
 - ▶ Hold [Ctrl] (Windows/Linux) or [⌘] (Mac OS X) to force a line to join the end and start of your shape while drawing.



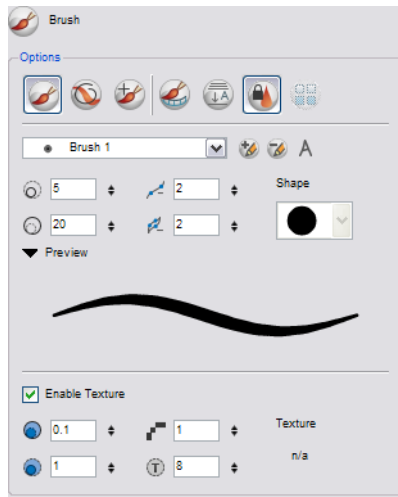
[Ctrl] (Windows)

[⌘] (Mac OS X)

NOTE: The last colour you select while using the Brush tool is recalled the next time you select the Brush tool.

Brush Tool Options

When you select the Brush tool, its properties and options appears in the Tool Properties view.



Regular Brush Mode

The Regular Brush tool creates contour lines as you draw, adding each brush lines on top of the last ones.

Draw Behind Mode

The Draw Behind mode is used to paint behind the existing art.




Repaint Brush Mode



The Repaint Brush is used to repaint zones that have already been painted, it will not affect empty zones or pencil lines. It also automatically flattens each of its brush lines so it does not add new brush lines on top of existing ones. You can use this mode to paint tones or highlights onto your character.

Use Stored Colour Gradient

The Use Stored Colour Gradient option makes the Brush tool use the previously stored gradient position. This way, every new brush line fits with the stored gradient position.

 Refer to *Selecting Drawing Objects* to learn how to use the Store Colour Gradient option.

Auto-Flatten Mode

When enabled, the Auto-Flatten mode will automatically flatten the new brush lines created with the existing artwork as you draw in the Drawing or Camera view.

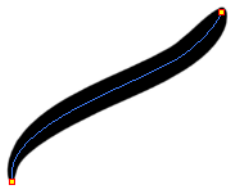
Respect Protected Colour

The Respect Protected Colour option prevent the colours you marked as protected in the Colour view to be repainted using the Repaint Brush mode.



Refer to *Adding Colour > Protecting Colours*, on page 194 to learn how to use the Protect Colour feature.

Create Colour Art Automatically

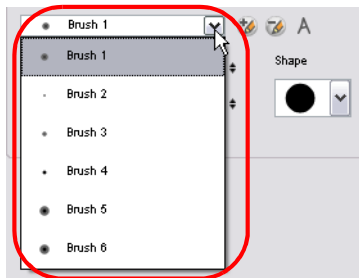


The Create Colour Art Automatically option is only available in Advanced Art Mode because it uses the Line and Colour Art concepts. As you draw in Line Art, this option automatically creates the corresponding strokes in Colour Art.

Brush Styles

A variety of brush styles are provided allowing you to create and save your own. This way you can create brushes with precise sizes and parameters and save them so you can draw and design.

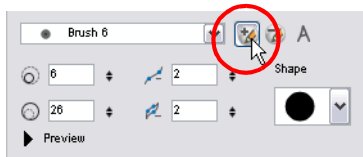
Selecting a Brush Style




To select a brush style:

1. Click on the arrow button to get the Brush Style drop-down menu.
2. Select a brush style from the list.

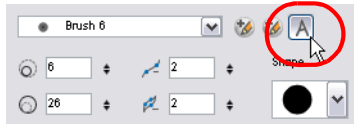
Adding a Brush Style



To add a Brush Style:

- ▶ Click on the Add Brush Style  button.
The new brush style will appear at the end of the Brush Styles drop-down menu list.

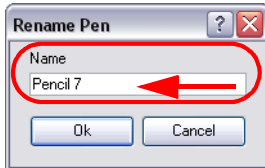
Renaming a Brush Style



To rename a brush style:

1. Click on the arrow button of the Brush Style drop-down menu.
2. Select the brush style you want to rename.
3. Click on the Rename Brush Style **A** button.

The **Rename Pen** dialog box opens.




4. Type in a name for the selected Brush Style.
5. Click on the OK button.

Deleting a Brush Style

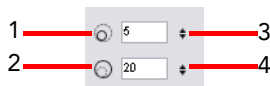


To delete a brush style:

1. Click on the arrow button of the Brush Style drop-down menu.
2. Select the brush style you want to delete from the Brush Style list.
3. Click on the Delete Brush Style  button.

Minimum and Maximum Size

This is where you set the minimum and maximum sizes of the Brush tool which will produce the thick and thin effect on your brush line. This works with the pressure sensitivity of a pen tablet. You can see a preview of this effect in the Preview space.



1. **Minimum Size** field: Type a value in this field to set the minimum width of the brush.
2. **Maximum Size** field: Type a value in this field to set the maximum width of the brush.
3. **Up/Down arrows**: Use the up and down arrows to set the minimum size value.
4. **Up/Down arrows**: Use the up and down arrows to set the maximum size value.

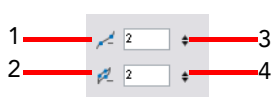
Smoothness and Contour Optimization

Smoothness

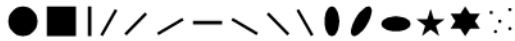
You can modify the central line smoothness of your line using this option. This parameter smoothes the initial movement of your line. Increasing the value will result in a smoother line with less control points.

Contour Optimization

You can optimize the contour line smoothness of you brush line using this option. This parameter will smooth the contour of your line once the line has been traced, the higher the value the less control points will compose your line.

- 
1. **Smoothness** field: Type a value to set the smoothness of the line.
 2. **Contour Optimization** field: Type a value to set the contour optimization of the line.
 3. **Up/Down arrows**: Use the up and down arrows to set smoothness value.
 4. **Up/Down arrows**: Use the up and down arrows to set the contour optimization value.

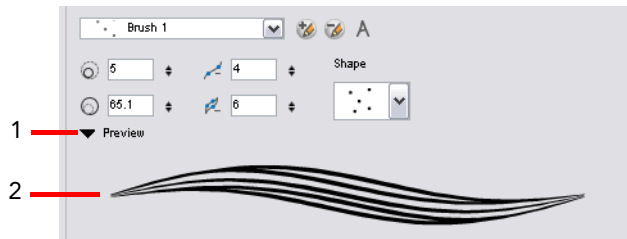
Brush Tips



In this drop-down menu, you can find a variety of brush shapes from round and square ones to star shaped, select the one you need.

Preview

The Preview field lets you see a preview of the brush line that will be produced after you customize the different parameters in the Tool Properties view.



1. The Arrow button lets you show or hide the Preview.
2. The Preview field is where the brush line is displayed.

Line Texture


In Harmony Stage, you can draw with a textured line. Textured lines are a mixed bitmap image contained in a vector frame. This allows you to sketch as if you are drawing on paper.



Refer to the *Drawing with Line Texture* topic to learn everything about line texture and its parameters.

Drawing with Line Texture



In Harmony Stage, using the Brush  tool, you can enable the texture option and draw with bitmap textured lines.

In the Brush Tool Properties view, you will find a series of default textured brushes but you can also create your own collection by importing either PSD or TGA files in the Pen list.



NOTE: *the textured brush only work with the Brush tool. It does not work with the Pencil, Line, Ellipse, Polyline or Rectangle tools.*


This topic is divided as follows:

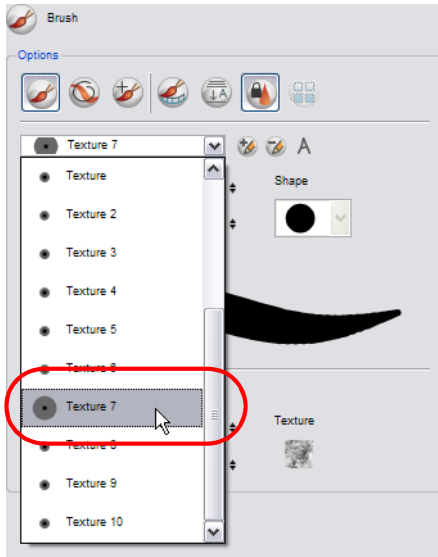
- How to Draw with Texture, on page 90
- Adjusting the Line Texture Parameters, on page 91
- Creating Texture Brushes, on page 92
- Erasing Textured Lines, on page 92
- Hiding the Line Texture, on page 93
- Adjusting the Line Texture Opacity, on page 94

How to Draw with Texture

To draw with textured lines, use the Brush tool and the correct pen in the list.

To draw with textured lines:

1. In the Tool toolbar, select the Brush  tool. The default keyboard shortcut is [Alt]+[B].
2. In the Tool Properties view, select a textured brush from the Pen drop-down list.



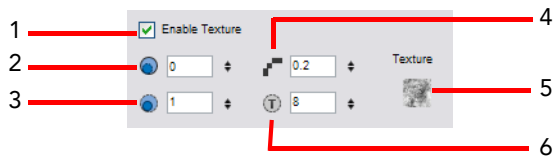
3. In the Camera or Drawing view, start drawing



Refer to the *Drawing with the Brush Tool* section to learn more about drawing with the Brush tool.

Adjusting the Line Texture Parameters

In the Brush Tool Properties view, there are a number of parameters you can use to adjust the look and feel of your textured brush.



- **1. Enable Texture:**
Enable this option to allow your brush to draw with texture. If you disable this option, the brush will trace fully vector based lines.
- **2. Minimum Opacity:**
This value corresponds to the opacity of the brush when the pressure is very light. The closer to zero the value is, the more transparent the line will be.



- **3. Maximum Opacity:**
This value corresponds to the opacity of the brush when the pressure is heavy. The closer to 1 the value is the more opaque the line will be.
- **4. Hardness:**
The hardness value corresponds to the smoothness of the line edge. The lower the value, the more blurry and smooth the line edge will be. The higher the value, the sharper the line edge will be.



- **5. Texture File:**
The Texture File button displays the texture currently in use or allows you to browse for a texture file to import. Browsing for a texture file in a brush already using texture will replace the file currently in use, although it will not replace the texture in the lines already drawn.



- **6. Texture Scale:**
The Texture Scale value changes the size of the texture file in the line. If you are using a plaid texture, the

squares will be larger if you increase the value and smaller if you decrease it.





Creating Texture Brushes

To create your own texture brush, you must prepare your texture file in a third-party software such as Adobe Photoshop. If your image has transparency in it, it will be supported. The texture file must be either a PSD or TGA file.



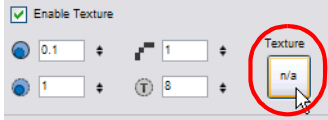
It is recommended to maintain your texture resolution between 100x100 pixels and 400x400 pixels.

To create your own texture brush:

1. In the Tools toolbar, select the Brush  tool. The default keyboard shortcut is [Alt]+[B].
2. In the Tool Properties view, click on the New Brush  button to add a new brush to your list.
3. In the Texture section, check the Enable Texture option.




4. Click on the Texture File button and browse for your bitmap texture file. Note: the image colour will not be used, only the pattern in it.




5. In the Camera view, draw some lines and adjust the parameters to fit the style you are looking for. Note: your pen list will be automatically saved.

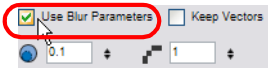
Erasing Textured Lines

When you use the Eraser tool to erase a portion of a textured line, the vector frame is cut straight and you lose the feather created while drawing with the Brush tool.

In Harmony Stage, a special option in the Eraser  tool lets you create a soft edge on your textured lines. You can also cut or keep the vector frame as is.

To erase textured lines:

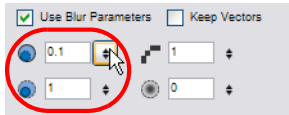
1. In the Tools toolbar, select the Eraser  tool. The default keyboard shortcut is [Alt]+[E].
2. In the Tool Properties view, enable the Use Blur Parameters option.



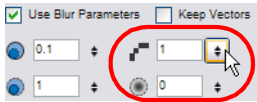
3. While erasing, enable the Keep Vectors option to keep your vector frames and not cut them.



- You can adjust Minimum Opacity and Maximum Opacity parameters of the eraser to change the transparency of the erasing trail as you press harder on the pen tablet.



- You can adjust the Hardness and Eraser Saturation parameters of the eraser to control the amount of smoothness and the size of the feather edge.



- In the Camera or Drawing view, erase your textures lines.



Erased with the Blur parameters



Erased without the Blur parameters

Hiding the Line Texture



Sometimes you need to hide the line texture to see the complete vector frame around your lines. This command is useful to help you see any dirt floating around your drawing.




To hide the line texture, you must disable the Real-Time Antialiasing option. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X) and in the OpenGL tab, uncheck the Enable option in the Real-Time Antialiasing section. The default keyboard shortcut is [Ctrl]+[Alt]+[Shift]+[A] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[A] (Mac OS X).



To be able to hide the line texture in the Camera view, you must enable the Show Drawing on Top option. In the top menu, select **View > Show > Current Drawing on Top**. Refer to the Show Current Drawing on Top section to learn more about this option.

To hide the line texture:

1. Make sure the real-time antialiasing is disabled and if you are in Camera view, enable the Show Current Drawing on Top option.
2. In the Camera or Drawing View  menu, select **View > Show > Hide Line Texture**. The default keyboard shortcut is [Ctrl]+[Alt]+[H] (Windows/Linux) or [⌘]+[Alt]+[H] (Mac OS X).

Adjusting the Line Texture Opacity



At some point, you may want to modify the look of a textured drawing. Maybe you find that your line is too smooth or too faint. You can adjust those parameters by using the Adjust Line Texture Opacity command.



To be able to adjust the line texture, you must disable the Real-Time Antialiasing option. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X) and in the OpenGL tab, uncheck the Enable option in the Real-Time Antialiasing section. The default keyboard shortcut is [Ctrl]+[Alt]+[Shift]+[A] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[A] (Mac OS X).



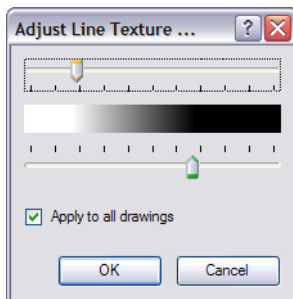
To be able to adjust the line texture in the Camera view, you must enable the Show Drawing on Top option. In the top menu, select **View > Show > Current Drawing on Top**.

Refer to the Show Current Drawing on Top section to learn more about this option.

To adjust the line texture opacity:

1. Make sure the real-time antialiasing is disabled and if you are in Camera view, enable the Show Current Drawing on Top option.
2. In the Timeline or Xsheet view, select the drawing you want to adjust the opacity for.
3. In the Camera or Drawing view menu, select **Drawing > Adjust Line Texture Opacity**.

The **Adjust Line Texture Opacity** dialog box opens.



4. Drag the sliders toward the middle to increase the contrast and opacity of the textured lines.
5. If you want to apply the changes to all drawings exposed on the layer, enable the Apply to All Drawings option.
6. Click on the OK button.

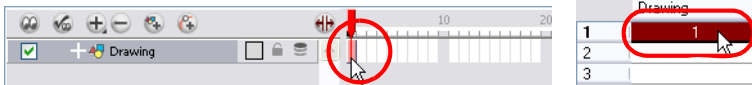
Drawing using the Pencil Tool




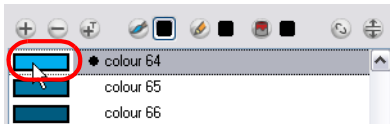
The Pencil tool creates a centreline shape of constant width, making a clean line.

To draw with the Pencil tool:

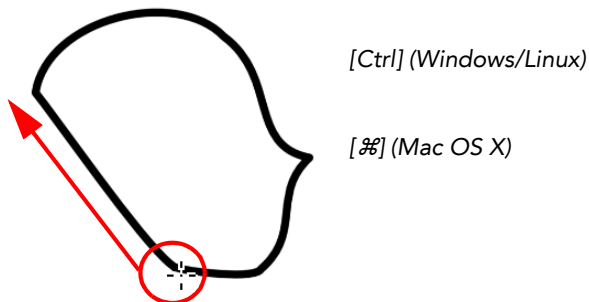
1. In the Timeline or Xsheet view, select the cell where you want to draw.



2. In the Tools toolbar, select the Pencil  tool, you can also use the default keyboard shortcut [Alt]+[Y].
3. In the Colour View, click on a colour swatch to select a colour.



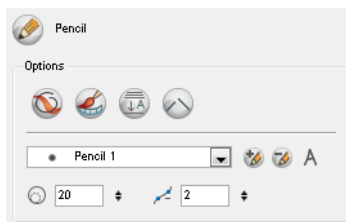
4. In the Drawing or Camera view, start drawing.
 - ▶ Hold [Alt] to draw a straight line.
 - ▶ Hold [Ctrl] (Windows/Linux) or [⌘] (Mac OS X) to keep a line joining the end and start of your shape while drawing.



NOTE: The last colour you selected while using the Pencil tool will be remembered the next time you select it.

Pencil Tool Options

When you select the Pencil tool, its properties and options appears in the Tool Properties view.



Draw Behind



When the Draw Behind mode is enabled, the lines you draw will appear behind the art that already exists.

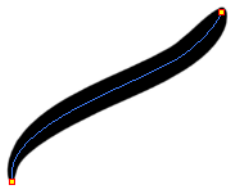
Auto-Close Gap

When enabled, the Auto-Close Gap mode will automatically connect with an invisible stroke, the pencil lines you draw close one to another in the Camera or Drawing view.

Auto-Flatten Mode

When enabled, the Auto-Flatten mode will automatically flatten the pencil lines created with the existing ones as you draw in the Drawing or Camera view.

Create Colour Art Automatically

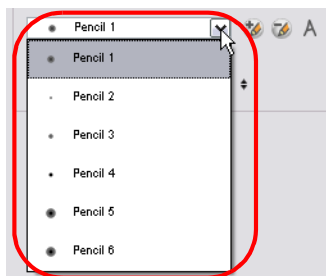


The Create Colour Art Automatically option is only available in Advanced Art Mode because it uses the Line and Colour Art concepts. As you draw in Line Art, this option automatically creates the corresponding strokes in Colour Art.

Pencil Styles

Harmony Stage provides a variety of pencil styles and also lets you create and save your own. It is a good idea to create and save pencils with precise sizes and parameters when you draw and design.

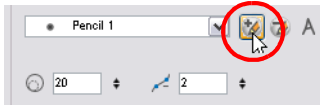
Selecting a Pen Style




To select a pen style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select a pen style from the list.

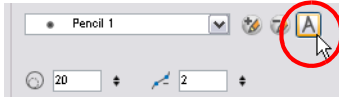
Adding a Pen Style




To add a Pen Style:

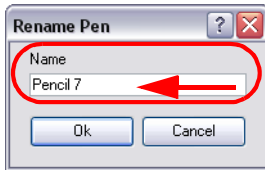
- ▶ Click on the Add Pen Style  button. The new pen style will appear in the Pen Styles drop-down menu list.

Renaming a Pen Style



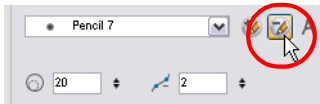
To rename a pen style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the pen style you want to rename.
3. Click on the Rename Pen Style  button. The Rename Pen dialog box opens.




4. Type in a name for the selected pen style.
5. Click on the OK button.

Deleting a Pen Style




To delete a pen style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the pen style you want to delete from the Pen Style list.
3. Click on the Delete Pen Style  button.


Pen Size

This is where you set the pencil size value. The Pencil tool is not pressure sensitive, it creates a line of constant width with no thick and thin effect.

- 
1. **Size:** Type a value in this field to set the Shape's line size.
 2. **Up/Down arrows:** Use the up and down arrows to modify the value contained in the Thickness value field.

Smoothness

You can modify the central line smoothness of your line using this option. This parameter smoothes the initial movement of your line. Increasing the value will result in a smoother line with less control points.



- 
1. **Size:** Type a value in this field to set the smoothness of the line.
 2. **Up/Down arrows:** Use the up and down arrows to modify the value in the Smoothness value field.

Drawing using Invisible Lines




Using the Pencil Tool, you can also draw as strokes only, meaning that the line will be invisible. This can be useful to draw tones and highlights directly on the character.

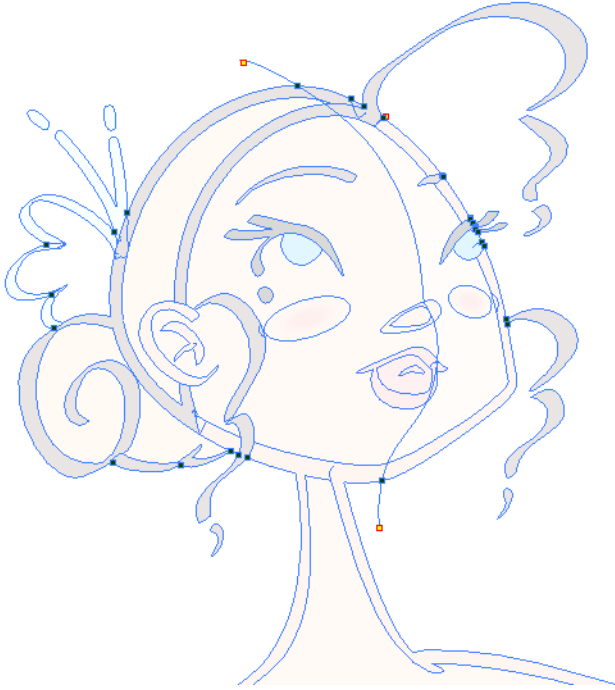
To draw invisible lines with the Pencil tool:

1. In the Timeline or Xsheet view, select the cell where you want to draw.
2. In the Tools toolbar, select the Pencil  tool, you can also use the default keyboard shortcut [Alt]+[Y].
3. In the Top menu, select **View > Drawing > Show Strokes** . The default keyboard shortcut is [D].
4. In the Tool Properties view, set the Pen Style size to "0". You can also adjust the smoothness.
5. In the Camera or Drawing view, start drawing.
 - ▶ If you forgot to enable the Show Strokes option before drawing, as soon as you draw a first stroke, a Message dialog box opens.



- ▶ Enable the Don't Show This Message Again check box if you don't want the dialog box to pop up and notify you about the Show Strokes option.
 - ▶ Click on the OK button to close the dialog box.
6. You can modify the stroke shape with the Contour Editor  tool.

Show Strokes as Washed-out Colours



Sometimes, it may be difficult to see your strokes, especially if your colours are similar to the blue stroke colour. In Harmony Stage, you can display the strokes and wash-out the colours of your drawings so that the invisible lines stand out.

To show the strokes with washed-out colours:

- ▶ In the top menu, select **View > Show > Show Stroke With Colour Wash**.

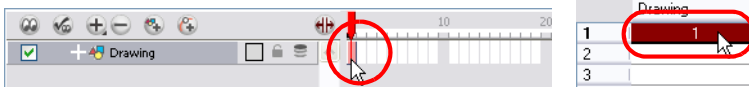
Erasing Parts of a Drawing




The Eraser tool is pressure sensitive, like the Brush tool, giving you more precision when erasing parts of a drawing.

To erase with the Eraser tool:

1. In the Timeline or Xsheet view, select the cell where you want to erase.



2. In the Tools toolbar, select the Eraser  tool, you can also use the default keyboard shortcut [Alt]+[E].
3. In the Camera or Drawing view, start erasing.

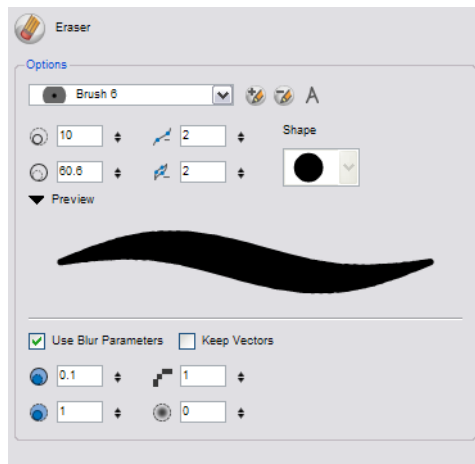


You can also use the select tool to select drawing objects and delete them instead of erasing.



Eraser Tool Options

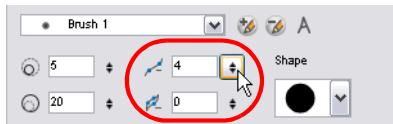
When you select the Eraser tool, its properties and options appears in the Tool Properties view.



Minimum and Maximum Size

This is where you set the minimum and maximum sizes of the Eraser tool which will produce the thick and thin effect when you erase. This works with the pressure sensitivity of a pen tablet.

Smoothness and Contour Optimization



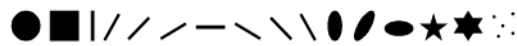
Smoothness

You can modify the central line smoothness of your Eraser line using this option. This parameter smooths the initial movement of your line. Increasing the value will result in a smoother line with less control points.

Contour Optimization

You can modify the contour line smoothness of your eraser line using this option. This parameter will smooth the contour of your line once the line has been traced, the higher the value the less control points will compose your line.

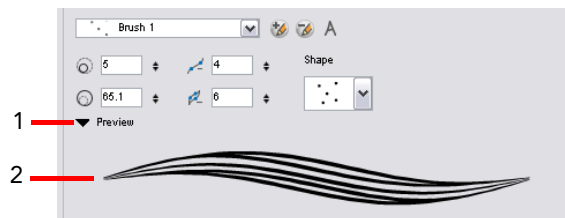
Eraser Tips



In this drop-down menu, you can find a variety of eraser shapes from round and square ones to star shaped, select the one you need.

Preview

The Preview field lets you see a preview of the eraser line that will be produced after you customized the different parameters in the Tool Properties view.

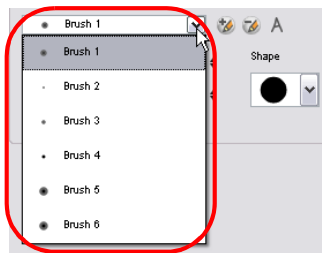


- ⇒ 1. The Arrow button lets you show or hide the Preview.
- ⇒ 2. The Preview field displays the eraser style.

Eraser Styles

The Eraser tool uses the same Brush Styles as the Brush tool. Harmony Stage provides a variety of eraser styles and allows you to create and save your own. It is a good idea to create and save eraser brushes with precise sizes and parameters to draw and design.

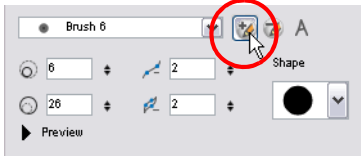
Selecting a Brush Style




To select a brush style:

1. Click on the arrow button of the Brush Style drop-down menu.
2. Select a brush style from the list.

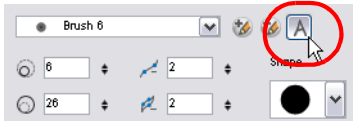
Adding a Brush Style




To add a Brush Style:

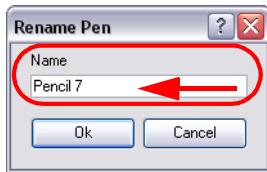
- ▶ Click on the Add Brush Style  button.
The new brush style will appear at the end of the Brush Styles drop-down menu list.

Renaming a Brush Style



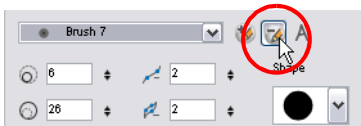
To rename a brush style:

1. Click on the arrow button of the Brush Style drop-down menu.
2. Select the brush style you want to rename.
3. Click on the Rename Brush Style  button.
The Rename Pen dialog box opens.




4. Type in a name for the selected Brush Style.
5. Click on the OK button.

Deleting a Brush Style



To delete a brush style:

1. Click on the arrow button of the Brush Style drop-down menu.
2. Select the brush style you want to delete from the Brush Style list.
3. Click on the Delete Brush Style  button.

Eraser Blur Parameters

Since Harmony Stage lets you draw with textured lines and create feathered edges on them, you may also want to erase with smooth edges instead of the solid vector based eraser. The Eraser Blur Parameters allow you to adjust the smoothness of your eraser for the textured lines.



Refer to the *Erasing Textured Lines* topic to learn more about using the blur eraser.






Reshaping a Drawing Using the Contour Editor Tool




The Contour Editor Tool is powerful, it allows you to add, remove or modify points on a vector line and to control them with Bezier handles. It is used to correct line shapes and to modify a single part of a colour zone. If a line is too thin or has a gap in it, you can be modify and correct it with the Contour Editor tool. This tool can also be used to create elaborate shapes.

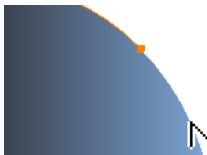
The Contour Editor displays vector points around a shape and the central vector points in a pencil line. Pulling or pushing on these points adjusts the brush's line thickness. Points can be selected and deleted. Each point has two Bezier handles used to correct the curves between two points. Shapes can be modified by pulling and pushing directly on the segment between the points. You can use it to perfect a central shape pencil line, a contour shape brush line or even create an elaborate shape from a basic ellipse, or square.

To reshape with the Contour Editor tool:

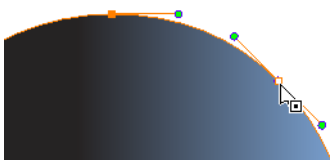
1. In the Timeline or Xsheet view, select the cell in which you want to draw.
2. In the Tools toolbar, select a Shape    tool.
3. In the Tool Properties view, click on the Ellipse mode  button, click on the Auto Fill mode  button and set the pencil size to 0.
4. In the Drawing or Camera view, draw a circle.



5. In the Tools toolbar, select the Contour Editor  tool, you can also use the default keyboard shortcut [Alt]+[A].
6. In the Drawing or Camera view, click on the line to reshape it.

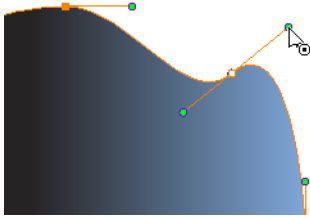


7. Select one or several points by clicking on them or circling around.

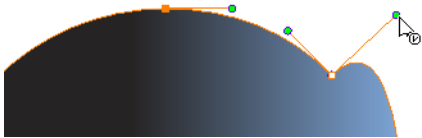


8. To modify the shape, you can:

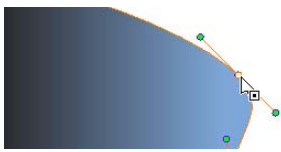
- ▶ Pull on the Bezier handle. Both point's handles will move as one.



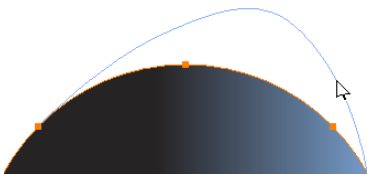
- ▶ Hold [Alt] down and pull on one of the Bezier handles. The point's handle will move independently from the other one.



- ▶ Move the selected points to a new area.



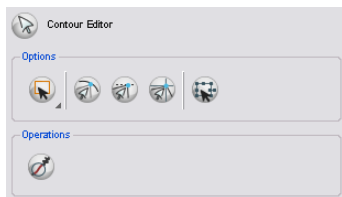
- ▶ Pull directly on the line in-between two points. No selection is necessary.



- ▶ If an anchor point has no visible bezier, hold down the [Alt] key to get them.

Contour Editor Tool Properties

When you select the Contour Editor tool, its properties and options appears in the Tool Properties view.



Lasso and Marquee

Choose between the Lasso and the Marquee, to change the style of the Select tool.

- Click and hold [Alt] to temporarily switch from the current mode to the other.

Show Contour Editor Controls



Use the Show Contour Editor Controls option to show the contour editor controls. You can use these controls to scale, reposition and rotate the selected anchor points.

Snap Options



When reshaping your drawings using the Contour Editor tool, you can enable different snap modes to help you fine tune your shape.

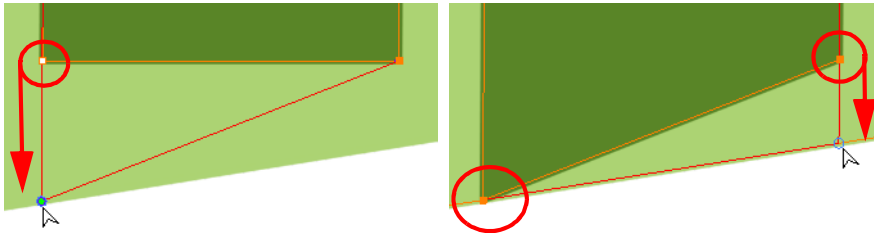
Snap to Contour




The Snap to Contour option will snap the selected anchor point on any line you position it on.

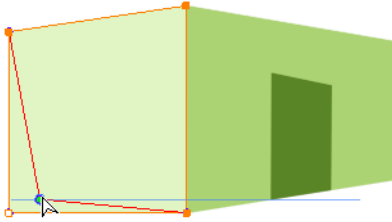
To snap two shapes together:

1. In the Tools toolbar, select the Contour Editor  tool, you can also use the default keyboard shortcut [Alt]+[A].
2. In the Contour Editor Tool Properties view, click on the Snap to Contour  button.
3. In the Camera or Drawing view, click on an anchor point you want to snap to the other shape, drag it on top of the contour line area and release it.








Snap and Align



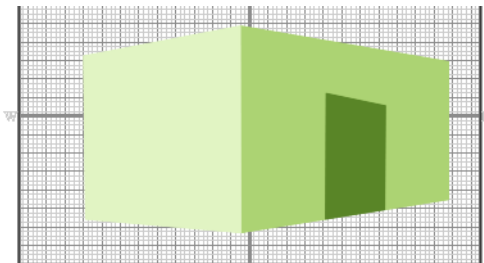
The Snap and Align option lets you snap the selected anchor point to any existing line while displaying temporary rulers as a guide that you can also snap your anchor point to.

To snap and align:

1. In the Tools toolbar, select the Contour Editor  tool, you can also use the default keyboard shortcut [Alt]+[A].
2. In the Contour Editor Tool Properties view, click on the Snap and Align  button.
3. In the Camera or Drawing view, click on an anchor point you want to snap, drag it until a ruler is displayed, position it on the ruler or on the contour line and release.






Snap to Grid

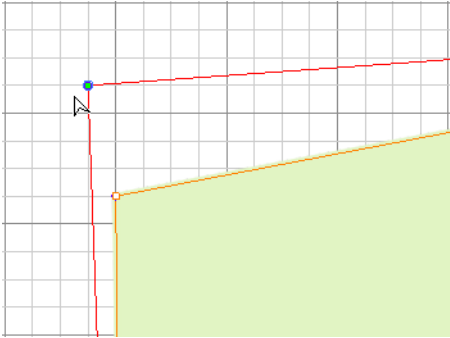


The Snap to Grid will snap your selection following the currently enabled grid.

To snap to grid:

- Select **View > Grid > Show Grid** to display the grid in the Camera or Drawing view.
 - Select **View > Grid > Square Grid, 12 Field Grid** or **16 Grid Field** for your current needs.
1. In the Tools toolbar, select the Contour Editor  tool, you can also use the default keyboard shortcut [Alt]+[A].
 2. In the Contour Editor Tool Properties view, click on the Snap to Grid  button.

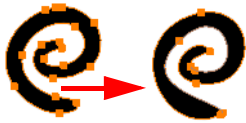
3. In the Camera or Drawing view, click on an anchor point you want to snap following the grid, drag it to the desired position and release.



Refer to the [Show Grid](#) topic to learn more about the Grid feature.

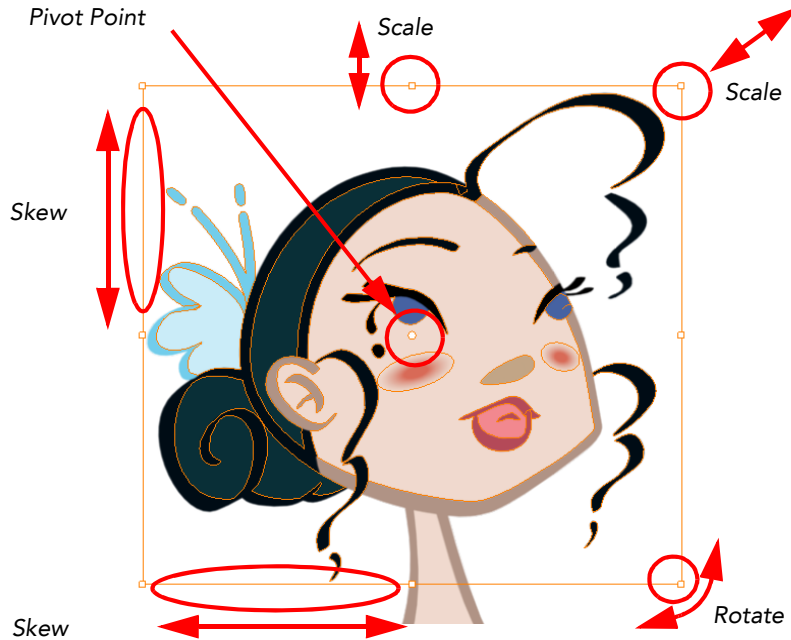


Smooth Selection




The Smooth Selection operation is used to smooth out selected drawing strokes and remove extra points. Smoothing is applied on the entire stroke.

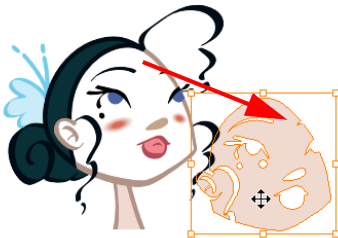
Selecting Drawing Objects



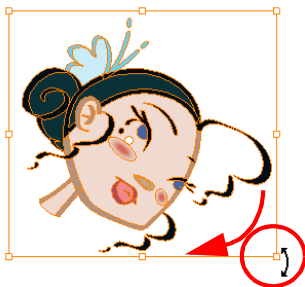
This is used to select drawing strokes in both the Drawing view and Camera view, and apply basic transformations such as repositioning, rotating, scaling or skewing, using the different handles of the bounding box.

To select with the Select tool:

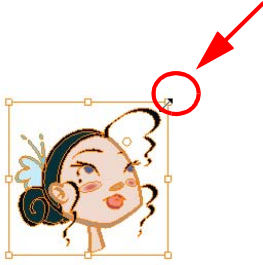
1. In the Timeline view, select the cell where you want to select drawing objects.
2. In the Tools toolbar, select the Select  tool, you can also use the default keyboard shortcut [Alt]+[V].
3. In the Camera or Drawing view, select the drawing objects.
 - ▶ You can select all the drawing objects in a drawing by using the default keyboard shortcut [Ctrl]+[A] on (Windows/Linux) or [⌘]+[A] on (Mac OS X).
4. To deform or reposition a selection:
 - ▶ To reposition, click on the selected drawing object and drag the selection to a new area.



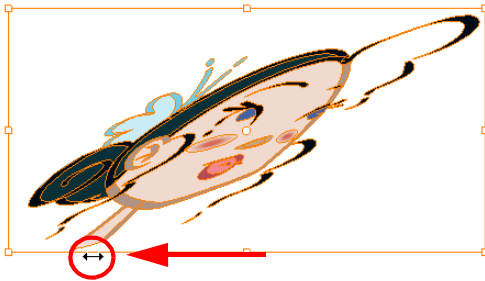
- ▶ To rotate, rotate the selection box handle.



- ▶ To scale, pull or push either on the size, top or corner control point. Hold down [Shift] to lock the selection's ratio.




- ▶ To skew, drag sideways or up and down the sides or top and bottom segments, between the control points.



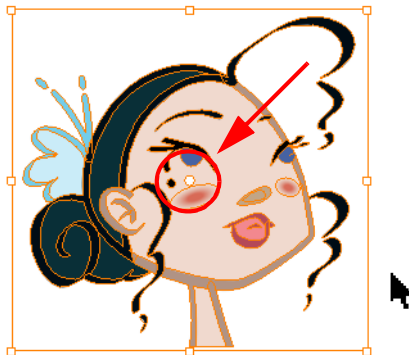
Repositioning a Pivot Point

Some of the transformations such as rotation, scale, skew and flip, are done relative to the position of the pivot point.

You can temporarily reposition this pivot point for a transformation using the Select  tool.

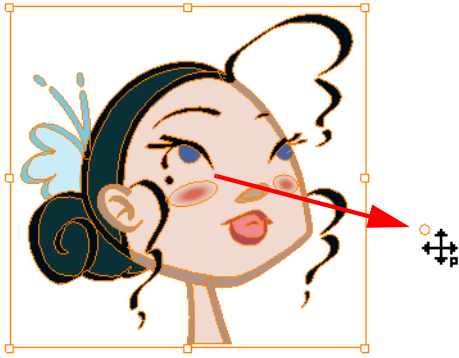
To temporarily reposition the pivot point:

1. In the Camera or Drawing view, select the drawing object you want to transform.
The pivot point will appear in the middle of your selection.

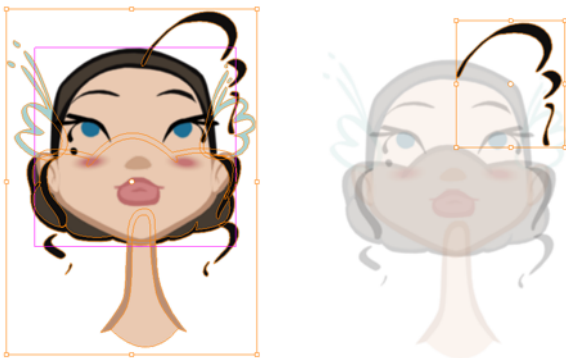


2. Click on the pivot point and drag it to a new position.

This becomes the new position of the pivot point for the current transformation and will remain there until you make a new selection.




Selection on Single or Multiple Layers



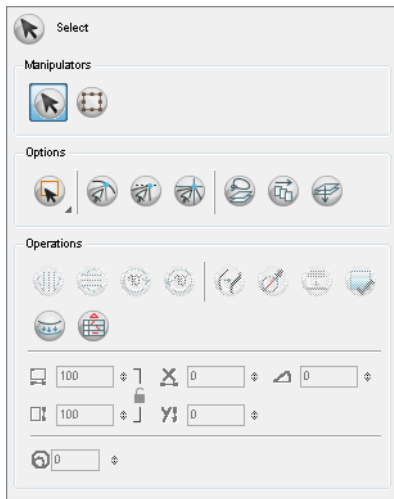
By default, when you draw a selection box in the Camera view, the Select tool will select all the drawing strokes and Symbols in its path. If you would prefer the Select tool to only select the current drawing and not the other visible drawings, you can enable the Select Tool Works on Single Drawing preference.

To enable the Select Tool Works on Single Drawing preference:

1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X).
The Preferences panel opens.
2. In the Camera tab, go to the Camera section and enable the Select Tool Works on Single Drawing preference.
3. Click on the OK button.
4. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
5. In the Camera view, select your drawing.

Select Tool Properties

When you choose the Select tool, its properties and options appear in the Tool Properties view.



Manipulators

Choose between the Select tool and the Transform tool. This is a fast way to switch between the Select tool and Transform tool selection mode.

Lasso and Marquee

Choose between the Lasso and the Marquee, to change the style of the Select tool.

- Click and hold [Alt] to temporarily switch from the current mode to the other.

Snap Options

You can enable different snapping modes to help you when repositioning your drawings using the Select tool.

Snap to Contour

The Snap to Contour option will snap your selection on any line you position it on.

Snap and Align

The Snap and Align option lets you snap the selected anchor point to any existing line while displaying temporary rulers as a guide that you can also snap your anchor point to.

Snap to Grid

The Snap to Grid will snap your selection following the currently enabled grid.

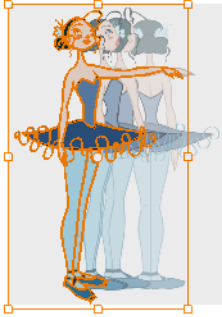


Refer to the Show Grid topic to learn more about the Grid feature.



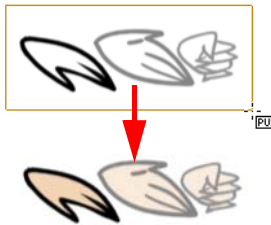
Refer to the Reshaping a Drawing Using the Contour Editor Tool topic to learn more about the Snap Options utility.

Permanent Selection



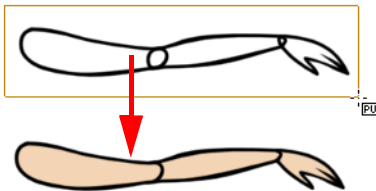
The Permanent Selection option is used to maintain a selection over multiple drawings. Once this option is enabled, the selection zone made using the Select tool will remain as you navigate through drawings from a layer and drawings from other drawing layers. This option can be used to simultaneously delete artwork inside or outside of the selection on several drawings when combined with the Apply To Multiple Drawings option.

Apply to All Drawings in Layer



The Apply to All Drawings in Layer option is used to perform an action on all the drawings contained in a layer. For example, you could enable the option to paint a section on all the drawings simultaneously. The Apply Tool to All Drawings option must be activated before performing the action and will stay enabled only for the next action.

Apply to All Visible Drawings



The Apply to All Visible Drawings option is used to perform an action on all the visible drawings in the Camera view. This option is not available in the Drawing view.

Flip Horizontal and Vertical



The Flip Horizontal and Flip Vertical operations flip the current selection Horizontally or Vertically.

From the top menu, select **Drawing > Transform > Flip Horizontal** and **Flip Vertical**. You can also use the default keyboard shortcuts [4] and [5].

Rotate 90 Degrees CW and CCW



The Rotate 90 Degrees CW and Rotate 90 Degrees CCW operations rotate the current selection 90 degrees clockwise or counter-clockwise.

From the top menu, select **Drawing > Transform > Rotate 90 Degrees CW** and **Rotate 90 Degrees CCW**.

You can also use the default keyboard shortcuts [Ctrl]+[9] and [Ctrl]+ [7] (Windows) or [⌘]+[9] and [⌘]+[7] (Mac OS X).

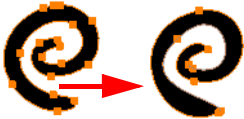
Pencil to Brush



The Pencil to Brush operation converts the selected centreline pencil strokes into contour strokes brush lines.

From the top menu, select **Drawing > Convert > Pencil Lines to Brush**. You can also use the default keyboard shortcut [&].

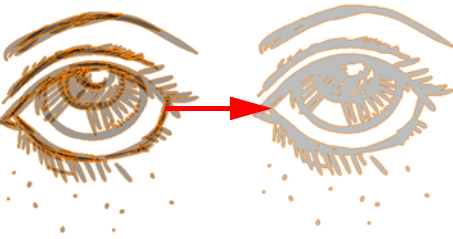
Smooth



The Smooth operation is used to smooth out selected drawing strokes and remove extra points.

You can also access this feature through the top menu, by selecting **Drawing > Optimize > Smooth** or by using the keyboard shortcut [Alt]+[Shift]+[S].


Flatten



The Flatten operation is used to merge drawing objects and brush strokes into a single layer. If you draw new lines to fix a drawing or a line with many brush strokes, it can be useful to flatten them all into a single shape. By default, lines are drawn one on top of each other, if you intend repainting the lines or modifying their shape, it will be easier if they are flattened.

You can also access this feature through the top menu, by selecting **Drawing > Optimize > Flatten** or by using the default keyboard shortcut [Alt]+[Shift]+[F].

Store Colour Gradient

Use the Store Colour Gradient operation to record the selected gradient's position. This reuses the stored position of the gradient when drawing new brush lines or painting colour zones. Enable the Use Stored Colour Gradient  option in the Paint or Brush tools Tool Properties view to do this.



Refer to the *Drawing with the Brush Tool* or *Painting Using the Paint Tool* topics to learn how to use the Use Stored Colour Gradient option.

Apply to Line and Colour Art

The Apply to Line and Colour Art option uses the concept of Line and Colour Art layers. Use this option to apply an action such as selecting or resizing a drawing on both Line and Colour Art layers.

Create Colour Art from Line Art

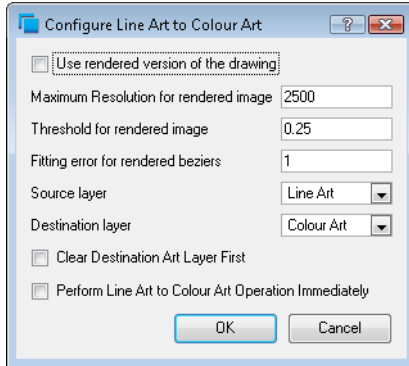
The Create Colour Art from Line Art option can only be enabled in Advance Art mode; it uses the concept of Line and Colour Art layers. Use this option to create invisible lines in the Colour Art based on the selected artwork in the Line Art layer.

You can configure the Colour Art from Line Art option to suit your requirements.

To configure the Create Colour Art from Line Art option:

1. In the Select tool Tool Properties view, [Shift]+Click on the Create Colour Art from Line Art  button.

The **Configure Line Art to Colour Art** dialog box opens.



- **Use rendered version of the drawing:** This option will render the drawing and vectorize it to calculate the position of the centreline that will produce the colour art stroke.
- **Maximum Resolution for rendered image:** This is the size of the rendered image.
- **Threshold for rendered image:** The value of grey processed to create the rendered vectorized arts.
- **Fitting error for rendered beziers:** This value represents how precise the fitting of the colour art zone in relation of the line art will be.
- **Source layer:** Select the layer (Line Art, Colour Art, Underlay or Overlay) you want the colour art to be created from.
- **Destination layer:** Select the layer (Line Art, Colour Art, Underlay or Overlay) you want the colour art to be created on.
- **Clear Destination Art Layer First:** Enable this option if you already have artwork on the destination layer and you want the content to be deleted before the colour art is added into it.
- **Perform Line Art to Colour Art Operation Immediately:** Enable this check box to perform the Create Colour Art from Line Art command when you click on the Ok button of this dialog box.



2. Click on OK.



Refer to *Adding Colour > Line Art and Colour Art Layers*, on page 195 to learn more about the Line Art and Colour Art concept.

Distribute to Layer

The Distribute to Layer option is used to separate the selected art strokes and send them to new drawing layers. In the Camera view, once you have drawn your artwork, you can select the strokes you want to distribute using the

Select  tool and click on the Distribute to Layer  button. A new layer is created for each selected stroke and the strokes will be removed from the original drawing. You can also select **Drawing > Distribute to Layer**.

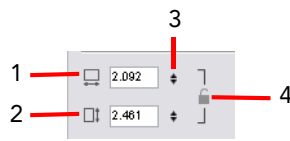
If your strokes are grouped, a new layer will be created for each group.



Refer to *Building a Character > Break Down: Distribute to Layer*, on page 428 to learn more about the Distribute to Layer option.

Width and Height

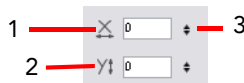
Use the Width and Height operation fields to enter specific values to resize the selected shape with precision.



1. **Width:** Type a width value in this field to resize the width of your selection.
2. **Height:** Type a height value in this field to resize the height of your selection.
3. **Up/Down arrows:** Use the up and down arrows to modify the value contained in either the Width or Height value field.
4. **Lock icon:** Click on the lock icon to lock or unlock the ratio between the width and height values.

Offset X and Y

Use the Offset X and Offset Y operation fields to enter specific values and precisely reposition the selected shape.



1. **X:** Type an offset value in this field to reposition your selection along the X-axis.
2. **Y:** Type an offset value in this field to reposition your selection along the Y-axis.
3. **Up/Down arrows:** Use the up and down arrows to modify the value contained in either the X or Y value field.

Angle

Use the Angle operation fields to enter specific values and accurately rotate the selected shape.



1. **Angle:** Type a degree value in this field to rotate your selection.
2. **Up/Down arrows:** Use the up and down arrows to modify the value contained in the Angle value field.

Adjusting the Pencil Line Thickness

Use the Adjusting the Pencil Line Thickness operation field to resize the size of selected centreline strokes. This operation is not permitted on contour line shapes such as brush strokes or shape fills.



1. **Thickness:** Type a value in this field to increase or decrease the thickness of the selected centreline stroke.
2. **Up/Down arrows:** Use the up and down arrows to modify the value contained in the Thickness value field.

Drawing With Shapes








In Harmony Stage, you can use the Shape tool to draw with circles, lines and squares. You can also easily reshape a square or circle into a much more complex drawing such as these butterfly wings.




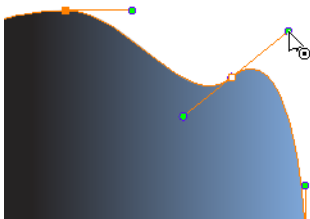
Refer to *Reshaping a Drawing Using the Contour Editor Tool* topic to learn more about the Contour Editor tool.

To draw with a Shape tool:

1. In the Timeline or Xsheet view, select the cell where you want to draw.
2. In the Tools toolbar, select a Shape    tool or the keyboard shortcuts [Alt]+[N] (Line Tool), [Alt]+[O] (Ellipse Tool), [Alt]+[R] (Rectangle Tool).
3. In the Shape Tool Properties view, you can switch between the different shapes mode. Select either the Ellipse  or Square  tool.
4. In the Camera view, click and drag your mouse to draw the shape.



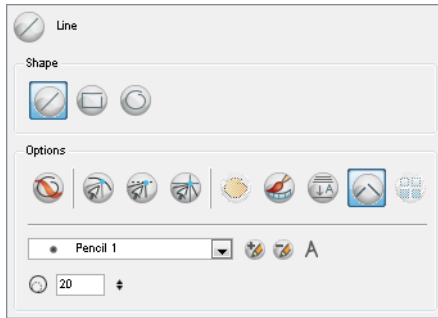
5.
 - ▶ Hold down [Shift] to lock the rectangle or the ellipse ratio to 1:1.
 - ▶ Hold down [Alt] to draw the rectangle or ellipse from its centre.
 - ▶ Hold down [Shift] to snap the line every 15 degrees.
 - ▶ Hold down [Alt] to snap the starting or end point of the line to a close by stroke.
6. Use the Contour Editor  tool to deform your shape and create your drawing.



Refer to the *Reshaping a Drawing Using the Contour Editor Tool* topic to learn more about using the Contour Editor to deform a shape.

Shape Tool Options

When you select the Shape tool, its properties and options appear in the Tool Properties view.



Line, Rectangle and Ellipse



Click on the button corresponding to the shape you want. The shape tool will create centreline art representing a line, a rectangle or an ellipse.

Using the Ellipse or Rectangle option, press [Shift] to create a perfect round or a perfect square and press [Alt] to create the shape from its centre.

Using the Line option, press [Shift] to create a line which snaps-to every 15 degrees and then press [Alt] to connect the start or end point of that line to another nearby line.

Draw Behind



When the Draw Behind mode is enabled, whichever shape you draw appears behind existing art.

Snap options

When drawing a shape, you can enable different snap modes to help you create your shape.

Snap to Contour

The Snap to Contour option snaps your shape onto any line you position it on to.

Snap and Align

The Snap and Align option snaps the selected anchor point to any existing line, while displaying temporary rulers as a guide that you can also snap your anchor point to.

Snap to Grid

The Snap to Grid snaps your shape to the currently enabled grid.



Refer to the Show Grid topic to learn more about the Grid feature.



Refer to the Reshaping a Drawing Using the Contour Editor Tool topic to learn more about the Snapping options utilities.



Automatic Filling



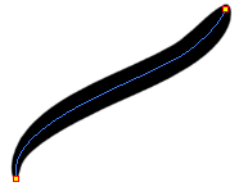
Use the Automatic Filling option to automatically fill your shape with the selected colour as you draw it. By default the Shape tool creates the contour of an empty shape that you can later fill using the Paint tool.



Refer to *Adding Colour > Selecting the Current Colour of a Tool*, on page 176 to learn more about selecting a fill colour.



Create Colour Art Automatically



The Create Colour Art Automatically option, which makes use of Line and Colour Art concepts, is only available in Advanced Art Mode. As you draw in the Line Art, corresponding strokes are automatically created in the Colour Art.



Auto-Flatten Mode

When enabled, the Auto-Flatten mode automatically flattens the created shape with the existing artwork in the Drawing or Camera view.



Auto-Close Gap

When enabled, the Auto-Close Gap mode will automatically connect with an invisible stroke, the lines you draw close one to another in the Camera or Drawing view.



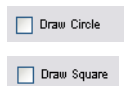
Use Stored Colour Gradient

The Use Stored Colour Gradient option forces the Brush tool to use previously the stored gradient position. This way, every new brush line fits with the stored gradient position.



Refer to *Selecting Drawing Objects* to learn how to use the Store Colour Gradient option.

Keep Proportion

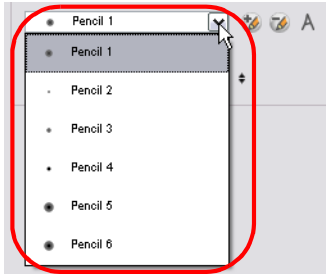


When the Ellipse or Square mode is enabled in the Shape tool's Tool Properties view, the Draw Circle or Draw Square check box appears. When enabling these check boxes, the shape produced will either be a circle or a square. Holding down the [Shift] key as you create your shape will maintain proportion.

Pencil Styles

Harmony Stage provides a variety of pencil styles and allows you to create and save your own. This way, you can create and save pencils with precise sizes and parameters to draw and design. The Pencil Styles of the Pencil and Shape tools are interconnected.

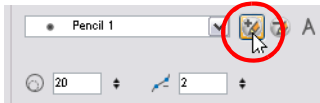
Selecting a Pen Style




To select a pen style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select a pen style from the list.

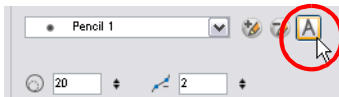
Adding a Pen Style




To add a Pen Style:

- ▶ Click on the Add Pen Style  button. The new pen style will appear in the Pen Styles drop-down menu list.

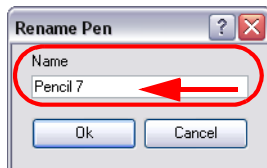
Renaming a Pen Style



To rename a pen style:

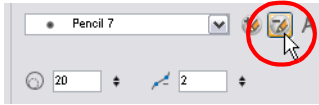
1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the pen style you want to rename.
3. Click on the Rename Pen Style  button.

The Rename Pen dialog box opens.




4. Type in a name for the selected pen style.
5. Click on the OK button.

Deleting a Pen Style




To delete a pen style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the pen style you want to delete from the Pen Style list.
3. Click on the Delete Pen Style  button.

Size Adjustment

Use the Size Adjustment field to set the size of the shape's line.


- 1  2 **1.Size:** Type a value in this field to set the Shape's line size.
- 2 **2.Up/Down arrows:** Use the up and down arrows to modify the value contained in the Thickness value field.

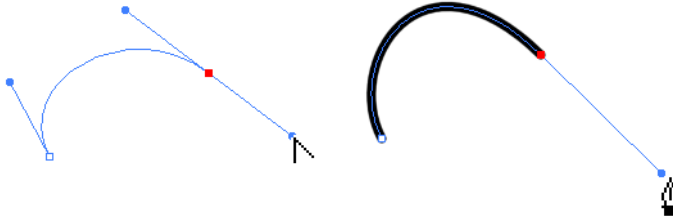
Drawing Using the Polyline Tool




The Polyline tool is used to draw shapes. It is a central vector type of line. To form a shape, the user needs to click to add a point and then, without releasing the mouse, pull the handle in the desired direction before adding the next point and repeating the same operation. The Contour Editor tool can be used later to correct the shape if need be.

To draw with the Polyline tool:

1. In the Timeline view, select the cell where you want to draw.
2. In the Tools toolbar, select the Polyline  tool, you can also use the default keyboard shortcut [Alt]+[P].
3. In the Camera view, click and drag your mouse to create a point and a Bezier handle to shape your line.
 - ▶ Press [Alt] to pull only one handle, instead of two.
 - ▶ Press [Shift] to snap the handles to 45, 90, or 180 degrees.
4. Click again into a new area and drag the mouse to create a second point and Bezier handle.



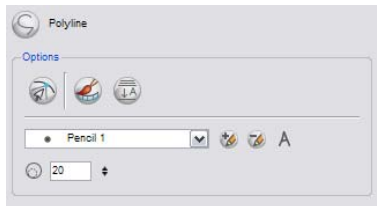
5. Repeat the previous step until your shape is completed.
6. If necessary, reshape the lines using the Contour Editor  tool.



Refer to *Reshaping a Drawing Using the Contour Editor Tool* to learn more about the Contour Editor tool.

Polyline Tool Options

When you select the Polyline tool, its properties and options appears in the Tool Properties view.



Draw Behind

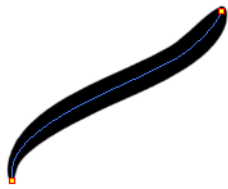
When the Draw Behind mode is enabled, the lines you draw appear behind existing art.



Snap to Contour

The Snap to Contour option snaps your polyline point on to any line you position it on.

Create Colour Art Automatically

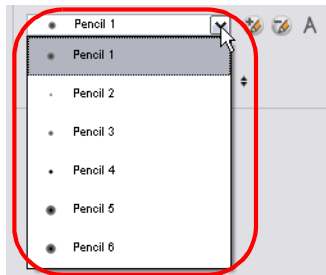


The Create Colour Art Automatically option is only available in Advanced Art Mode because it uses the Line and Colour Art concepts. As you draw in Line Art, this option automatically creates the corresponding strokes in Colour Art.

Pencil Styles

Harmony Stage provides a variety of pencil styles and allows you to create and save your own. This way, you can create and save pencils with precise sizes and parameters to draw and design.

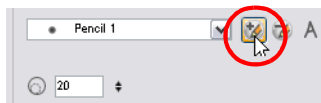
Selecting a Pen Style




To select a Pen Style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select a Pen Style from the list.

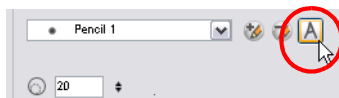
Adding a Pen Style




To add a Pen Style:

- ▶ Click on the Add Pen Style  button.
- The new pen style will appear at the end of the Pen Styles drop-down menu list.

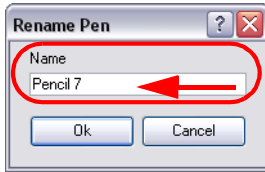
Renaming a Pen Style



To rename a Pen Style:

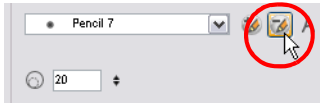
1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the Pen Style you want to rename.
3. Click on the Rename Pen Style  button.

The Rename Pen dialog box opens.




4. Type in a name for the selected Pen Style.
5. Click on the OK button.

Deleting a Pen Style



To delete a Pen Style:

1. Click on the arrow button of the Pen Style drop-down menu.
2. Select the pen style you want to delete from the Pen Style list.
3. Click on the Delete Pen Style  button.

Size Adjustment

This is where you set the size value. The Polyline tool is not pressure sensitive, it creates a centreline of constant width with no thick and thin effect.




1. **Size:** Type a value in this field to set the shape's line size.
2. **Up/Down arrows:** Use these to modify the value contained in the Thickness value field.

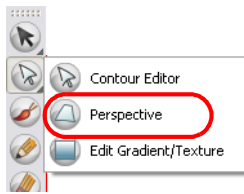
Deforming a Drawing using the Perspective Tool



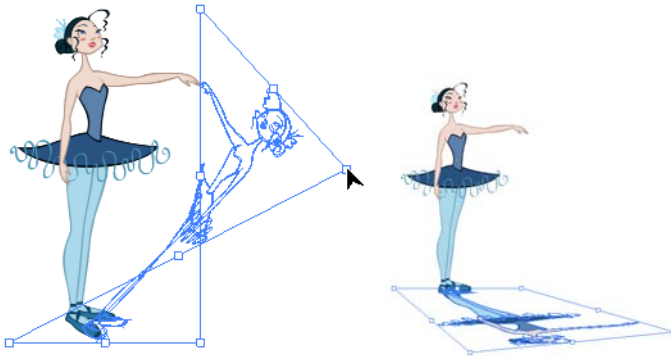
The Perspective tool is used to deform a drawing selection and alter its perspective.

To deform a drawing with the Perspective tool:

1. In the Tools toolbar, select the Perspective  tool, you can also use the default keyboard shortcut [Alt]+[0].

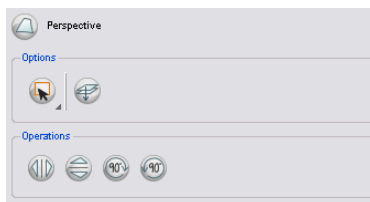


2. In the Camera or Drawing view, select the drawing you want to deform.
3. Click and drag the different anchor points to deform the shape.



Perspective Tool Properties


Select the Perspective tool, displays its properties and options in the Tool Properties view.



Lasso and Marquee

Select the desired mode between the Lasso and the Marquee, to change the selection style of the Perspective tool.

- Click and hold [Alt] to temporarily switch from the current selected mode to the other.

 **Apply to Line and Colour Art**

The Apply to Line and Colour Art option can only be enabled in Advance Art mode because it uses the concept of Line and Colour Art layers. This option is used to apply the Cutter tool's action on both Line and Colour Art layers of the drawing.

 **Flip Horizontal and Vertical**

The Flip Horizontal and Flip Vertical operations flip the current selection Horizontally or Vertically.

From the top menu, select **Drawing > Transform > Flip Horizontal** and **Flip Vertical**. You can also use the default keyboard shortcuts [4] and [5.]

 **Rotate 90 Degrees CW and CCW**

The Rotate 90 Degrees CW and Rotate 90 Degrees CCW operations rotate the current selection 90 degrees clockwise or counter-clockwise.

From the top menu, select **Drawing > Transform > Rotate 90 Degrees CW** and **Rotate 90 Degrees CCW**.


You can also use the default keyboard shortcuts [Ctrl]+[9] and [Ctrl]+ [7] (Windows) or [⌘]+[9] and [⌘]+[7] (Mac OS X).

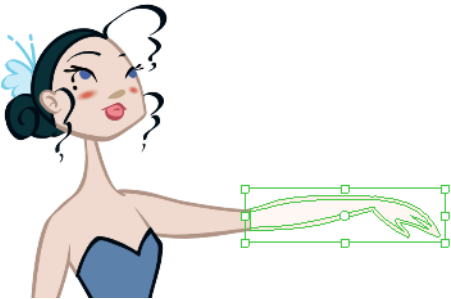
Cutting Drawing Parts



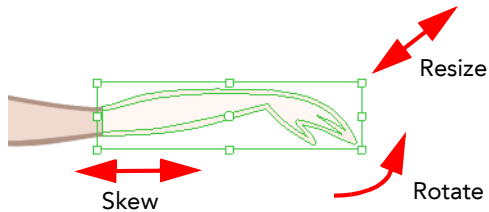
The Cutter tool is used to cut a drawing area to move, copy, cut or delete it.

To cut with the Cutter tool:

1. In the Tools toolbar, select the Cutter  tool, you can also use the default keyboard shortcut [Alt]+[T].
2. In the Camera view, trace a selection around the part to cut away.

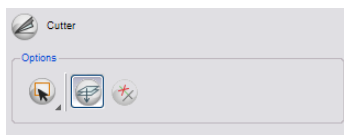


- ▶ To delete the selected zone, press [Delete].
- ▶ To move the selection, click on the selection and drag it to a new area.
- ▶ Use the bounding box controls to scale, skew or rotate the cut piece.



Cutter Tool Options

When you select the Cutter tool, its properties and options appears in the Tool Properties view.

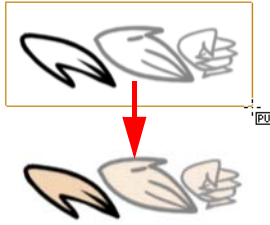


Lasso and Marquee

Select Lasso or Marquee mode to change the selection style of the Cutter tool.

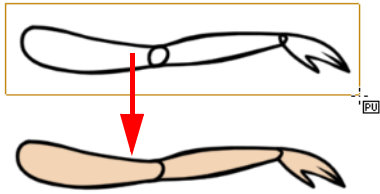
- Click and hold [Alt] to temporarily switch from the selected mode to the other.

Apply to All Drawings in Layer




The Apply to Multiple Drawings option is used to perform an action on all the drawings contained in a layer. The Apply Tool to All Drawings option must be activated before performing the action and will stay enabled only for the next action.

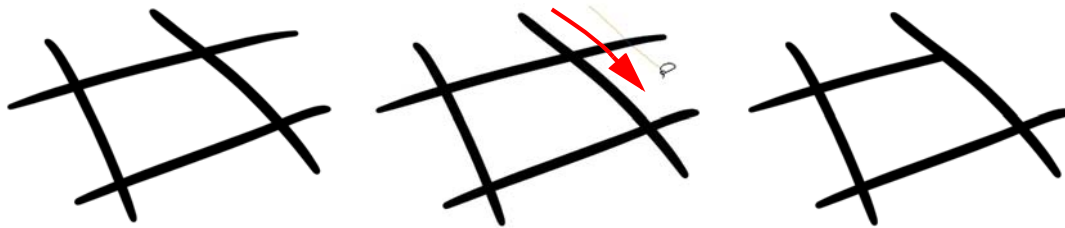
Apply to All Visible Drawings



The Apply to All Visible Drawings option is used to perform an action on all the visible drawings in the Camera view. This option is not available in the Drawing view.

Use Mouse Gesture

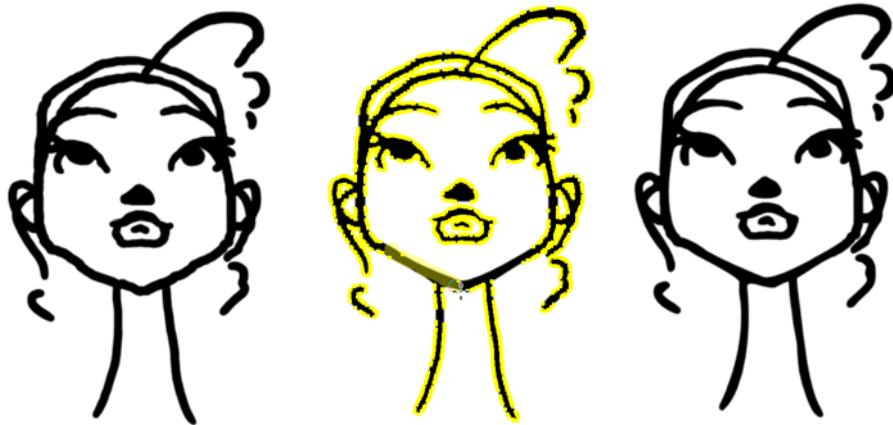
When using the Lasso  selection type, the Use Mouse Gesture option lets you automatically delete any extra sections of line in your artwork by simply dragging your mouse over it.
NOTE For this operation to work, you lines can not be flattened.



Apply to Line and Colour Art

The Apply to Line and Colour Art option can only be enabled in Advance Art mode because it uses the concept of Line and Colour Art layers. This option is used to apply the Cutter tool's action on both Line and Colour Art layers of the drawing.

Smoothing-out Lines




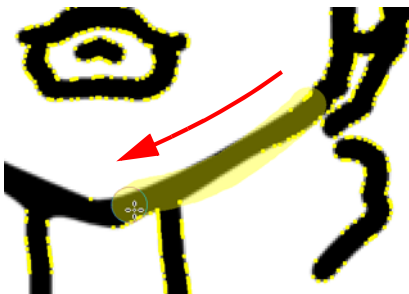
When drawing in a digital application, it is not like drawing on a sheet of paper, sometimes the lines you draw may look as if they were drawn with an unsteady hand. When this occurs you may need to correct the look of your lines.

Harmony Stage has a very powerful tool you can use to optimize your contours and reduce the number of points on the lines.

Harmony Stage provides you with the Smooth  tool to perform these tasks.

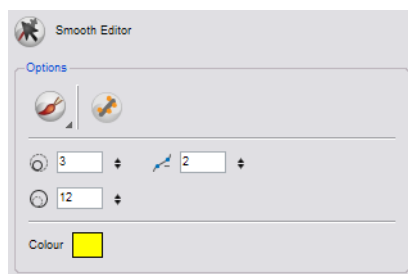
To optimize your lines with the Smooth tool:

1. In the Tools toolbar, select the Smooth  tool. You can also select it in the top menu under **Drawing > Tools > Smooth**.
2. In the Camera or Drawing view, move your cursor over the lines to smooth out. You may need to pass over the same line several times to remove more points and make the line smoother.



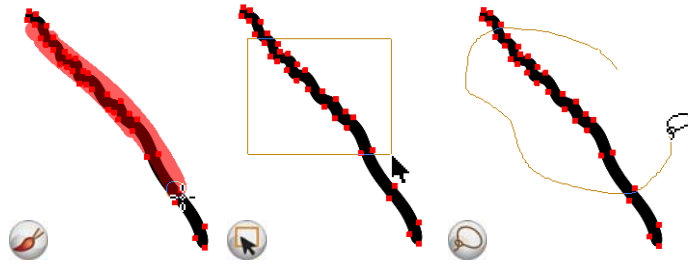
Smooth Tool Options

When you select the Smooth tool, its properties and options appears in the Tool Properties view.



Brush, Marquee, Lasso Smoothing Style


The Smoothing Style options allows you to smooth a portion of your drawing either by tracing a smoothing stroke over the zone to optimize or by selecting an area of the drawing with the Marquee or the Lasso.



Show Control Points

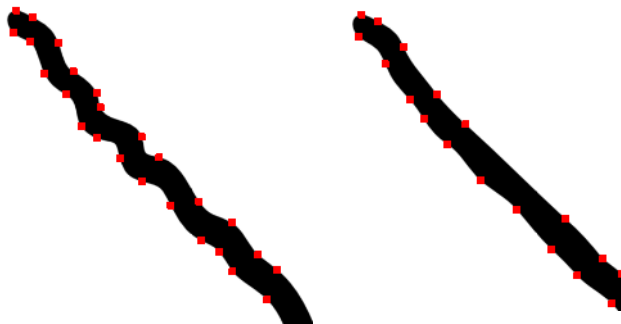
The Show Control Points option allows you to show or hide the Bezier points around your lines. When the Bezier points are displayed, you can see the result of your smoothing and the number of points left on your curve. When it is turned off, you will only see the original artwork.

Minimum Size and Maximum Size

The Minimum Size and Maximum Size option lets you control the thickness of your smoothing stroke while using the  Smoothing style.

Smoothness

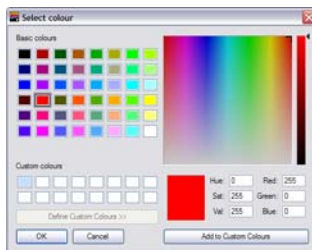
The Smoothness value impacts the strength of the smoothing result. The higher the value, the more points are removed and the smoother the curve is.



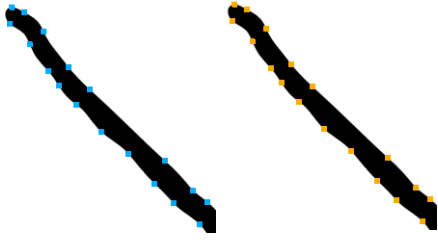
Smoothness = 2

Smoothness = 10

Colour

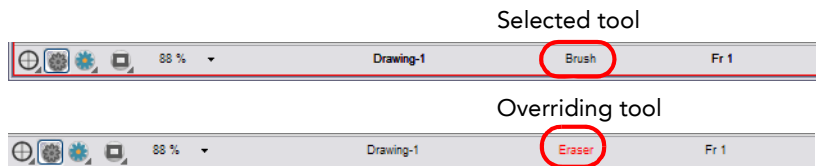


You can modify the colour of the control points displayed on the artwork while working with the Smooth tool by double-clicking on the Colour swatch.



Override Tool

The Override Tool feature allows you to increase productivity by rapidly switching between tools used for short tasks and your previous tool. Most drawing tool shortcuts are accessed using the [Alt] key followed by another key, such as the Eraser tool which is accessed by pressing [Alt]+[E]. If you are drawing with the Brush tool and need to briefly switch to the Eraser before continuing, hold down the [E] key while you are erasing. Once done, release [E] to return to the previous tool, in this case, the Brush. You can do the same for most drawing tools that have a shortcut composed of [Alt] followed by another key.







More Drawing Tools

- Arrange
- Convert
- Optimize
- Show Grid
- Group/Ungroup
- Hand
- Rotate View
- Zoom

Arrange

Use the different Arrange options to reorder drawing objects inside a single layer in the Drawing or Camera view.

-  Bring to Front button or from the top menu, select **Drawing > Arrange > Bring to Front** or the keyboard shortcut [Ctrl]+[Shift]+[Up] (Windows/Linux) or [⌘]+[Shift]+[Up] (Mac OS X). Using this option brings the selected art on top.
-  Bring Forward button or from the top menu, select **Drawing > Arrange > Bring Forward** or the keyboard shortcut [Ctrl]+[Up] (Windows/Linux) or [⌘]+[Up] (Mac OS X). Using this option brings the selected art one level higher.
-  Send Backward button or from the top menu, select **Drawing > Arrange > Send Backward** or the keyboard shortcut [Ctrl]+[Down] (Windows/Linux) or [⌘]+[Down] (Mac OS X). Using this option sends the selected art one level lower.
-  Send to Back button or from the top menu, select **Drawing > Arrange > Send to Back** or the keyboard shortcut [Ctrl]+[Shift]+[Down] (Windows/Linux) or [⌘]+[Shift]+[Down] (Mac OS X). Using this option sends the selected art to the bottom.

Convert

Brush Strokes to Pencil Lines



The Brushes Strokes to Pencil Lines operation converts the selected contour strokes brush lines into centreline pencil strokes. This command is only available from the top menu.

Select **Drawing > Convert > Brushes to Pencil Lines**. You can also use the default keyboard shortcut [^].

Pencil to Brush

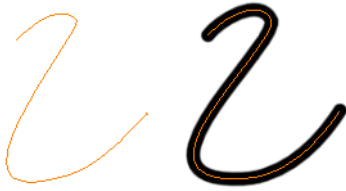


The Pencil to Brush operation converts the selected centreline pencil strokes into contour strokes brush lines.

From the top menu, select **Drawing > Convert > Pencil Lines to Brush**. You can also use the default keyboard shortcut [&].

Strokes to Pencil Lines

The Strokes to Pencil Lines operation converts the selected invisible line to a Pencil Line.

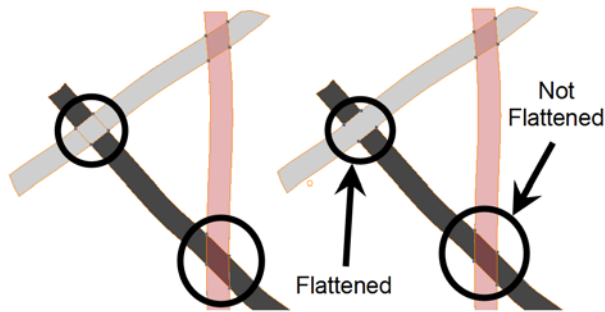


In the Drawing view, right-click (Windows/Linux) or [Ctrl]+Click (Mac OS X) and select **Convert > Strokes to Pencil Lines**.

You can also use the default keyboard shortcut [Shift]+[F12].

Optimize

Optimize



The **Optimize** command reduces the number of layers, such as overlapping brush strokes, in the selected drawing objects. Drawing objects will only be flattened and optimized if the selected objects will not change the appearance of the final image when they are merged.

For example, if you have selected a number of partially transparent objects, which you layered to create an additive colour effect, the selected transparent drawing objects will not be merged. This is because merging the transparent drawing objects will cause them to lose the effect of the layered transparent colours.

- Use the Select tool to select the drawing objects you want to optimize.
- Select **Drawing > Optimize > Optimize**.

Remove Extra Strokes

The Remove Extra Strokes option is used to remove the invisible lines in your selection.

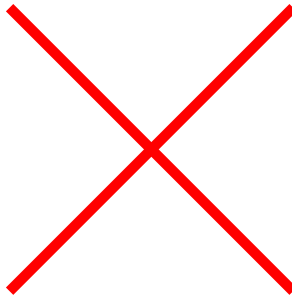
- Use the Select tool to select the drawing objects you want to remove invisible lines from.
- Select **Drawing > Optimize > Remove Extra Strokes**.

Create Contour Stroke

Before Unpainting






Unpainting Without Strokes



Unpainting With Contour Strokes



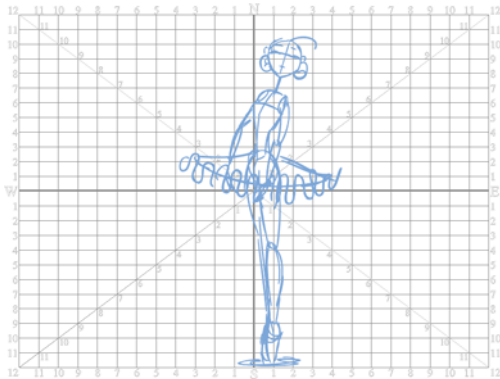
The Create Contour Stroke  option is used to add a permanent invisible line around a shape that was drawn directly in the application. This allows you to unpaint your lines with the Paint  tool but to maintain the shape of the lines should you need to repaint the lines later.

This command is useful when inking and painting and using the Apply to All Drawings in Layer  option.







Remove Contour Stroke

The Remove Contour Stroke option is used to remove any permanent invisible lines that were either created while scanning and vectorizing drawings or manually adding contour strokes. This is useful if you want to remove the intersection triangles created during vectorization.

Show Grid



Use the Show Grid option to display a grid into the Drawing or Camera view.

-  Select **View > Grid > Show Grid**. You can also press the keyboard shortcut [Ctrl]+[*] (Windows/Linux) or [⌘]+[*] (Mac OS X).
-  Select **View > Grid > Square** to display a standard square grid.
-  Select **View > Grid > 12 Field Grid** to display a 12 field size grid.
-  Select **View > Grid > 16 Field Grid** to display a 16 field size grid.
-  Select **View > Grid > Underlay** to display the grid behind the drawing elements.
-  Select **View > Grid > Overlay** to display the grid over the drawing elements.

Group/Ungroup

Use the Group option to group the current selected objects composing a drawing. This can help in the selection, repositioning, re-scaling and other transformations to be applied to multiple objects of a drawing.

- Select **Edit > Group > Group** or **Edit > Group > Ungroup**.
- You can also use the keyboard shortcuts [Ctrl]+[G] and [Shift]+[Ctrl]+[G] (Windows/Linux) or [⌘]+[G] and [Shift]+[⌘]+[G] (Mac OS X).


Rotate 180

Use this option to accurately flip a drawing object in your scene by rotating it 180 degrees. Use this to produce a mirror-image of the effect.

- Select **Drawing > Transform > Rotate 180**.

Hand

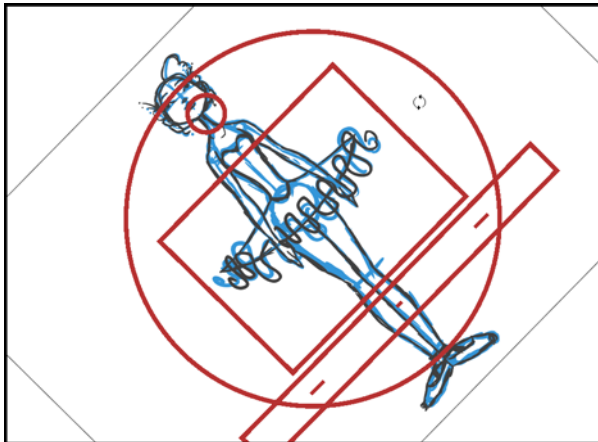
Use the Hand tool to pan through the Drawing and Camera view.

- In the Tools toolbar, select the Hand  tool, click in the Drawing or Camera view and drag your cursor.
- You can also Hold down the keyboard shortcut [Spacebar], click in the Drawing or Camera view and move your mouse in the direction you want to pan the view.

Rotate View

Use the Rotate View tool to rotate the Drawing or Camera view, the same way as you would do with a real animation disc.

- Select **Drawing > Tools > Rotate View**.
- You can also hold down the keyboard shortcut [Ctrl]+[Alt] (Windows) or [⌘]+[Alt] (Mac OS X).



NOTE:

This tool can also be used in the Perspective view.

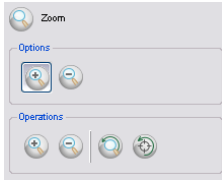
Zoom

Use the Zoom tool to zoom in and zoom out in the Camera or Drawing view.

- The default keyboard shortcut is [Ctrl]+[=] (Windows/Linux) or [⌘]+[=] (Mac OS X) and [Ctrl]+[-] (Windows/Linux) or [⌘]+[-] (Mac OS X).
- When the Zoom In mode is selected, hold [Alt] as you click to zoom out.

Zoom Tool Properties

When you select the Zoom tool, its properties are displayed in the Tool Properties view.



Zoom In

Enable the Zoom In mode in the Options field to zoom in when using the Zoom tool.

Zoom Out

Enable the Zoom Out mode in the Options field to zoom out when using the Zoom tool.

Perform Zoom In

Use the Zoom In operation to perform a Zoom in the Camera or Drawing view.

- The default keyboard shortcut [Ctrl]+[=] (Windows/Linux) or [⌘]+[=] (Mac OS X).

Perform Zoom Out

Use the Zoom Out operation to perform a Zoom out in the Camera or Drawing view.

- The default keyboard shortcut [Ctrl]+[-] (Windows/Linux) or [⌘]+[-] (Mac OS X).

Reset Zoom

Use the Reset Zoom operation to restore the current zoom level to 100%.

- You can also use the default keyboard shortcut [Shift]+[Z].

Reset View

The Reset View restores the original display by resetting pan, rotation or zoom actions.

Traditional Animation Tools

When you animate digitally using traditional techniques, there are certain tools you require in order to work efficiently, as you would do with an animation table, paper and pencils. These tools are described in this section:

- Onion Skin
- Light Table
- Drawing Identification
- Create Empty Drawing
- Reposition All Drawings

Onion Skin





The Onion Skin is used to preview the previous and subsequent drawings. When designing or animating, it is useful to be able to see your previous drawings. By default, the previous drawings will appear with a shade of red and the next drawings will be displayed with a shade of green but you can change the display options in the Preferences panel.



Refer to the [Drawing and Traditional Animation Preferences](#) topic to learn about the Onion Skin preferences.

To use the Onion Skin feature:

1. Enable the Onion Skin feature:









- ▶ In the Tools toolbar, click on the Show Onion Skin  button.
- ▶ In the Timeline view, click on the Onion Skin  icon. When enabled, the icon will turn red .



- ▶ You can also use the default keyboard shortcut [Ctrl]+[Alt]+[0] (Windows/Linux) or [⌘]+[Alt]+[0] (Mac OS X) or from the top menu, select **View > Onion Skin > Show Onion Skin**.

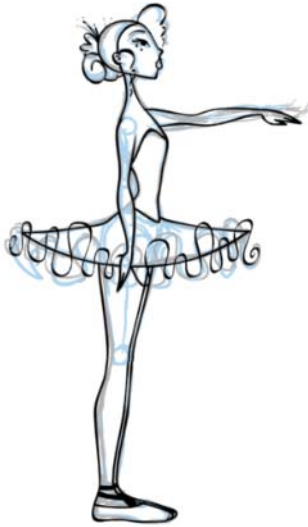
2. You can select the number of previous and next drawings you want to show:
 - ▶ In the Timeline view, click and drag the Onion Skin blue markers to choose how many previous and next drawings will be displayed.



- ▶  Select **View > Onion Skin > No Previous Drawing**
The default keyboard shortcut is [~].
 - ▶  Select **View > Onion Skin > Previous Drawing**
The default keyboard shortcut is [!].
 - ▶  Select **View > Onion Skin > Previous Two Drawings**
The default keyboard shortcut is [@].
 - ▶  Select **View > Onion Skin > Previous Three Drawings**
The default keyboard shortcut is [#].
 - ▶  Select **View > Onion Skin > No Next Drawing**
The default keyboard shortcut is [Ctrl]+' (Windows/Linux) or [⌘]+' (Mac OS X).
 - ▶  Select **View > Onion Skin > Next Drawing**
The default keyboard shortcut is [Ctrl]+[1] (Windows/Linux) or [⌘]+[1] (Mac OS X).
 - ▶  Select **View > Onion Skin > Next Two Drawings**
The default keyboard shortcut is [Ctrl]+[2] (Windows/Linux) or [⌘]+[2] (Mac OS X).
 - ▶  Select **View > Onion Skin > Next Three Drawings**
The default keyboard shortcut is [Ctrl]+[3] (Windows/Linux) or [⌘]+[3] (Mac OS X).
3. The previous and next drawings will appear in both the Camera and Drawing view.



Light Table




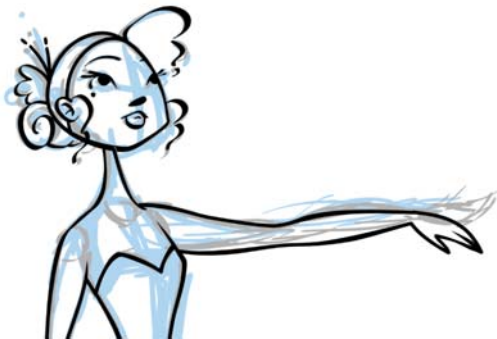
The Light Table is used to preview the previous and subsequent active layers in washed-out colours. It is useful to be able to see the other layers when designing, animating or cleaning up your animation.

In the Camera view, when the Light Table is activated all layers apart from the currently selected one are shown washed-out. The display returns to the normal mode when the Select tool or a Scene Setup tool is selected.

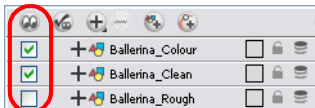
Only the currently selected drawing is displayed by default in the Drawing view. When enabling the Light Table, the other layers appear as a washed-out display and are used as a reference. You can not select or manipulate them.

To use the Light Table feature:

1. Enable the Light Table feature:
 - ▶ In the top menu, select **View > Light Table**.
 - ▶ In the Drawing View toolbar, click on the Light Table  button.
 - ▶ You can also use the default keyboard shortcut [Shift]+[L].
2. The drawings for the other layers are displayed as washed-out colours in the Camera and Drawing view.



3. In the Timeline view, you can disable the layers you wish to hide from the Light Table.






Refer to the *Drawing and Traditional Animation Preferences* topic to learn about the Light Table preferences.

Drawing Identification

In the Xsheet view, you can identify your drawings as Key, Breakdown or In-between. This helps to keep your Xsheet well organized while animating.

To mark a drawing as Key, Breakdown or In-between:


1. In the Xsheet view, select the cell you want to identify.
2. In the Xsheet Tools toolbar, press on the Mark as Key Drawing , Mark as Breakdown Drawing  or Mark as In-between Drawing  buttons. You can also select **Drawing > Mark Drawing As > Key Drawing, Breakdown Drawing and In-between Drawing.**
 - ▶ If you select Mark as Key Drawing, a **K** icon appears in the cell.
 - ▶ If you select Mark as Breakdown Drawing, a **B** icon appears in the cell.
 - ▶ If you select the Mark as In-between Drawing option there is no icon is displayed in the cell, as it is used to remove a Key or Breakdown an identified drawing to a normal in-between drawing.

Drawing	
1	1 K
2	2 B
3	
4	4 K
5	

Create Empty Drawing

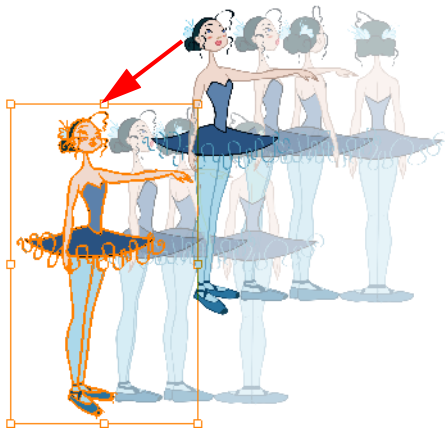
The Create Empty Drawing command automatically creates a drawing in the selected cell of the Timeline and Xsheet view, replacing any drawing that may already be exposed in that cell and the following ones until it meets another drawing.

To create an Empty Drawing:

1. In the Timeline or Xsheet view, select the cell you want to create an empty drawing in.
2. In the Xsheet View toolbar, click on the Create Empty Drawing  button or select **Animation > Create Empty Drawing.** You can also use the default keyboard shortcut [Alt]+[Shift]+[R].
3. The new drawing will be created in the Xsheet and Timeline views.


1	1 K
2	2
3	
4	4 K

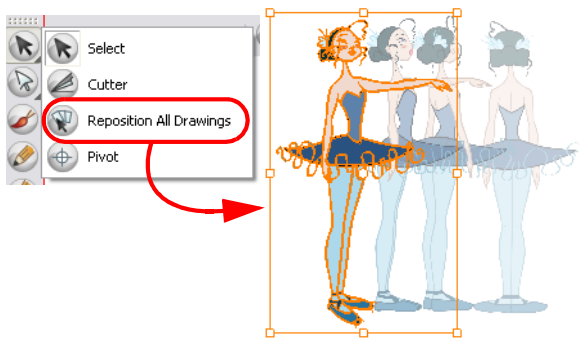
Reposition All Drawings



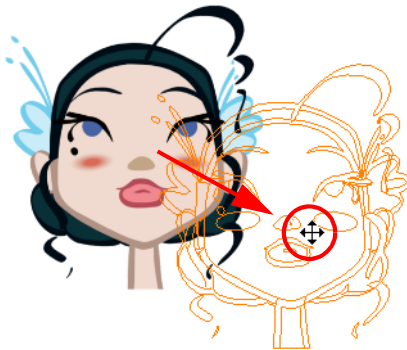
The Reposition All Drawings option is used to reposition, scale, rotate or skew all drawing strokes on every drawing included in a layer.

To reposition all drawings:

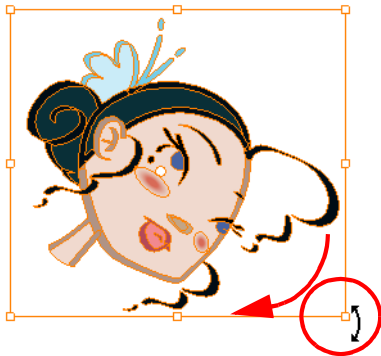
1. In the Tools toolbar, select the Reposition All Drawings  tool. This also automatically selects every stroke composing your drawing in the Drawing view.



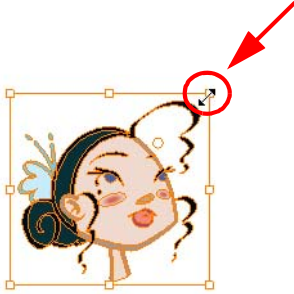
2. To deform or reposition a selection:
 - ▶ To reposition, click and drag your selection to a new area.



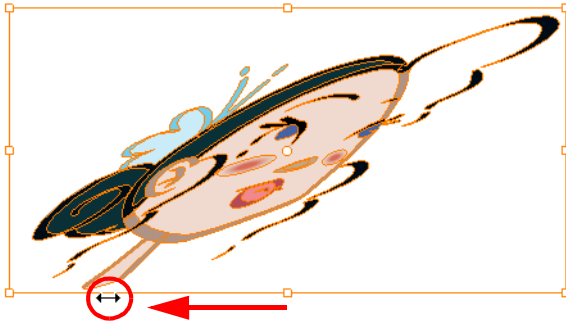
- ▶ To rotate, rotate the selection box handle.



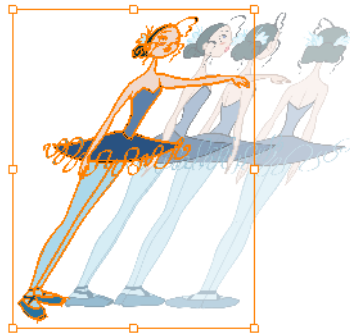
- ▶ To scale, pull or push either on the size, top or corner control points. Hold down [Shift] to lock the selection's ratio.



- ▶ To skew, drag the sides or top and bottom segments, between the control points.



3. When you release your cursor, every drawing contained in the drawing layer you repositioned, scaled, rotated or skewed will follow the same transformation.



Basic Traditional Animation

Harmony Stage lets you animate traditionally, but work entirely digitally. Many tools and features are supplied to help you achieve that traditional animation look easily and efficiently.

Animating




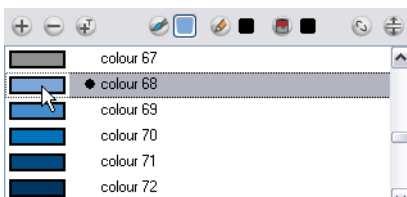
Now that you know about the existing tools, you can start your animation.

The first step to complete is the rough animation, which is the skeleton of your animation. You would usually start with the main action. For example, to animate a walk-cycle, you will start with the torso moves and the legs. Head, arms and clothes will be added later, during the secondary animation.

For a satisfactory animation, complete the main action before adding all of the details. If you start animating all of the details right away, you will lose a lot of time if you have to do corrections, and your animation will often look too rigid.

To animate:

1. In the Preferences panel, you can set your Preferences to Use Current Frame as Drawing Name. Refer to the Current Frame as Drawing Name topic to learn more about this preference.
2. In the Tools toolbar, select the Brush  tool, you can also use the default keyboard shortcut [Alt]+[B].
3. In the Colour view, select the colour you will use to draw. It is a good idea to choose a light colour for your rough animation to help for the following task, the Clean Up process.




4. In the Timeline or Xsheet view, select the cell where the first drawing will appear.
5. In the Camera view, draw the first key drawing.



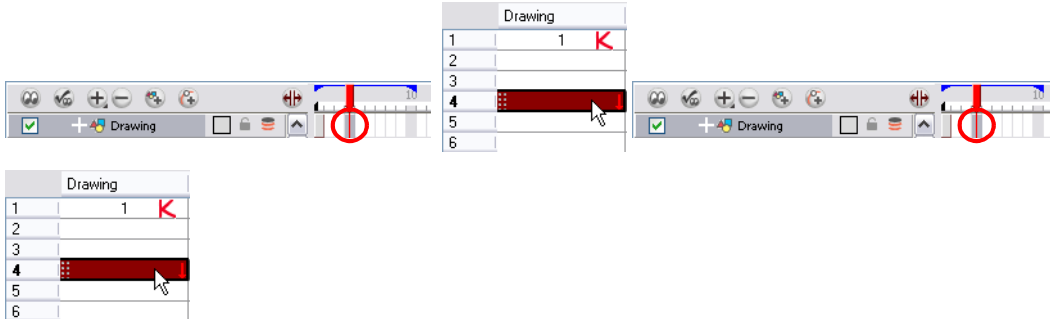
6. Make sure your first key drawing is still selected in the Xsheet view and select **Animation > Mark Drawing As > Key Drawing** to identify your drawing.

Drawing	
1	1 K
2	
3	
4	
5	

7. In the Tools toolbar, click on the Enable Onion Skin  button.
8. In the Timeline view, click and drag the onion skin blue markers to extend the number of previous and next visible drawings to fit your need.



9. In the Timeline or Xsheet view, select the cell where your next key drawing will appear.



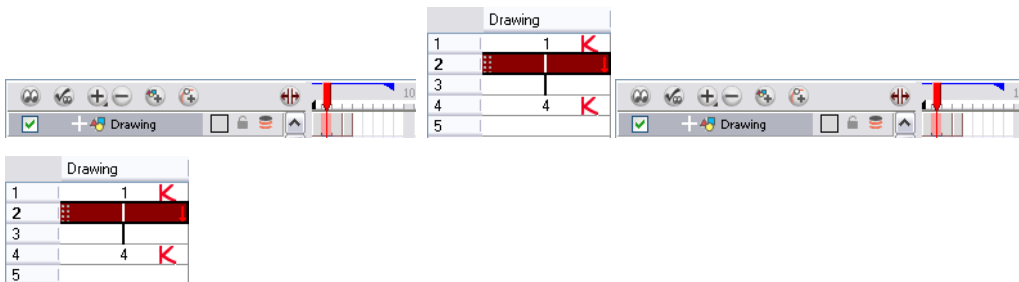
10. In the Camera view, draw your second key drawing.



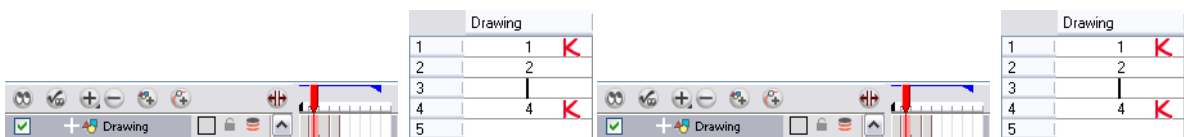
11. In the Xsheet view, identify the drawing as a key drawing.

Drawing	
1	1 K
2	
3	
4	4 K
5	

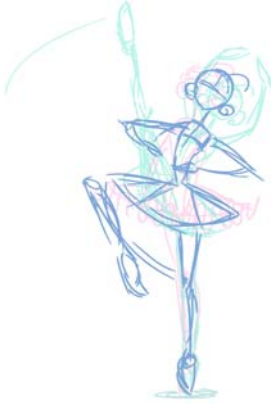
12. In the Xsheet View, select a cell between your two key drawings.



13. In the Timeline or Xsheet view, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) and select Create Empty Drawing or use the keyboard shortcut [Alt]+[Shift]+[R].



14. Draw your new drawing.



15. If necessary, in the Xsheet view, identify the new drawing as a Key, Breakdown or In-between drawing.

Drawing		
1	1	K
2	2	B
3		
4	4	K
5		

16. In the Timeline or Xsheet view, select a new cell and repeat Step 13 to Step 15 for each new drawing.

Cleaning Up




When your rough animation is ready, it is time to clean it up and ink it. The clean-up is also called tracing. It consists of tracing solid and clean lines over the rough animation to get closed zones. This is the final paperless animation step before the ink and paint step.

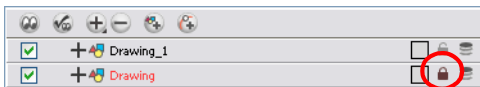
You will need to add a new drawing layer to draw your clean. This is the equivalent of adding a sheet of paper and tracing the rough using the animation disk.

NOTE:

If you plan on tracing your animation in the Drawing view, you will need to enable the Light Table feature in order to display all the layers of your project.

To trace your animation in a new layer:


1. In the Timeline view toolbar, click on the Add Drawing Layer  button.
2. In the Timeline view, click on the lock icon of the layer containing your rough animation to prevent any accidental changes.



3. In the Timeline or Xsheet view, select the new layer's cell corresponding to the first key drawing of your rough animation.
4. In the Tools toolbar, select the drawing tool of your choice.
5. In the Colour view, select the colour you will use to trace your animation. Pick a dark bold colour such as black to make sure it contrasts well with the light colour of your rough animation.

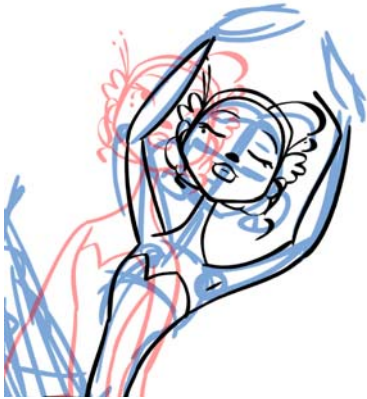
- In the Camera view, start tracing the first key drawing.



- If you have some other layers in the way, you can disable them temporarily from the Timeline view so that only your rough animation and your clean up layer are displayed in the Camera view.
- In the Tools toolbar, click on the Enable Onion Skin button  and extend the Onion Skin in the Timeline view.



- In the Timeline or Xsheet view, select the next cell corresponding to a rough drawing.
- In the Camera view, trace your next drawing.



- Repeat Step 9 and Step 10 for each drawing.

NOTE:

This method allows you to keep the roughs and the cleans intact. You only need to disable the rough layer to prevent it from appearing in the scene.

Setting the Timing





Refer to the following topics in the *Layers and Timing* chapter to learn how to set the timing of your animation:

- Filling Exposure, on page 248
- Filling Exposure Mode, on page 248
- Typing Exposure, on page 249
- Holding Exposure, on page 250
- Extending a Single Exposure, on page 251
- Extending an Exposure Sequence, on page 251
- Dragging Cells, on page 252
- Deleting Exposure, on page 256
- Inserting Blank Cells, on page 256
- Setting the Exposure, on page 258
- Filling a Selection with a Single Exposure, on page 259
- Filling a Selection with a Sequence, on page 259
- Filling a Selection Randomly, on page 261
- Creating Cycles, on page 262

Playing Back Your Animation

You can playback your animation in the Camera view using the Playback toolbar.

To play back your animation:

1. Be sure you are currently using the Camera view, as this feature is not available in the Drawing view.
2. In the Timeline view, disable the layers you do not want to show during playback.
3. In the Playback toolbar, click on the Loop  button if you want the playback to loop.
4. In the Playback toolbar, click on the Play  button to start the animation.

Advanced Traditional Animation

Harmony Stage has even more animation tools. There are many useful features such as the Flipping tool, enhanced Onion Skin, extra drawing layers, automated matte and more.

This topic is divided as follows:

- Flip and Easy Flipping Toolbars, on page 147
- Onion Skin Toolbar, on page 148
- Shift and Trace, on page 148
- More Drawing Layers, on page 152
- Multiple Drawings in the Drawing View, on page 156
- Preview Selected Drawings, on page 157

Flip and Easy Flipping Toolbars

Harmony Stage provides a Flip feature which allows the animator to rapidly flip through the drawings as one would with paper drawings. The animator can flip through the Key, Breakdown or In-between drawings individually, or view a combination.



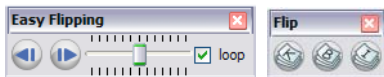
NOTE: the flipping features only work in the Drawing view.





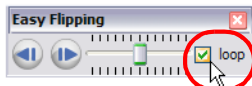
Refer to the Drawing Identification topic above to learn about the Key, Breakdown and In-between drawings.

To flip through your drawings:

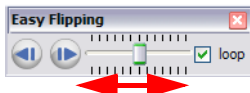
1. In the top menu, select **Window > Toolbars > Easy Flipping and Flip**.



2. In the Easy Flipping toolbar, click on the Previous  or Next  button to see the previous or next drawing of your animation.
3. Enable the Loop option to loop your animation during the flip. This way, when you reach the end of your animation, the first drawings will show up again.

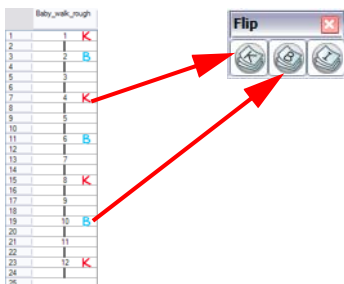


4. Move the slider to the right to flip forward and to the left to flip backward through your drawings.



► The more that you move the slider to the left or the right, the faster the drawings will flip.

5. If you marked some of your drawings as Key, Breakdown or In-between, you can flip through the markers and avoid seeing all the in-betweens. enable the Flip Key, Breakdown or In-between option in the Flip toolbar, to see only one type or a combination.



Onion Skin Toolbar



You can setup your onion skin to display only the marked drawings, in the same way that you flip through your drawings marked as Key, Breakdown or Inbetween drawings.



NOTE that this Onion Skin feature only operates in the Drawing view.




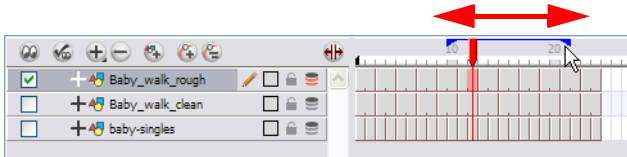
Refer to the *Drawing Identification* topic to learn about the Key, Breakdown and In-between drawings.

To display the marked drawings in the onion skin:

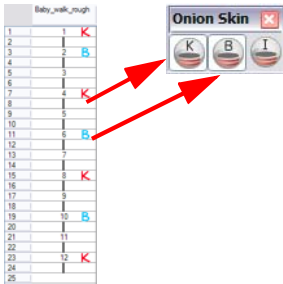
1. In the top menu, select **Window > Toolbars > Onion Skin**.



2. In the Tools toolbar, enable the Onion Skin  feature.
3. In the Timeline view, pull on the blue arrows to extend the number of drawings displayed in the onion skin preview.



4. In the Onion Skin toolbar, enable the markers you want to see in your Onion Skin preview.



Shift and Trace

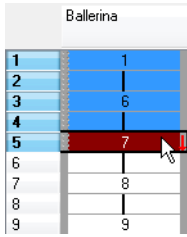
When animating traditionally, it is very important to stay on model. Losing the proportions or features of a character is easy to do. The Shift and Trace feature makes it possible to temporarily move a drawing so that you can trace it on another one. This is similar to animators working on an animation light table and using cut-out pieces of a character to move it underneath the new drawing and trace it.


The Shift and Trace option will not modify your drawing, it will only allow it to be moved, rotated or scaled in the Shift and Trace mode. As soon as you disable the Shift and Trace option, the repositioned drawing returns to its normal state.

To shift and trace:

1. Open a Drawing view.


- In the Xsheet view, select the range of drawings you need to shift and trace. This selection should include at least the layer containing the piece you need to trace and the new drawing in which you will trace.




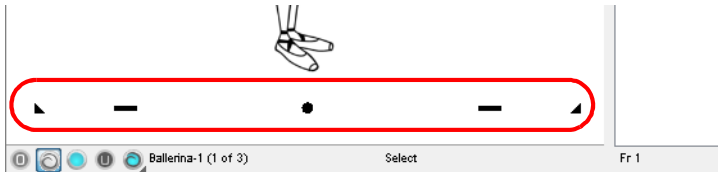
- In the Xsheet View  menu, select **Drawings > Send to Drawing view**.


The selected drawings are sent to the Thumbnail view which appears in the Drawing view.

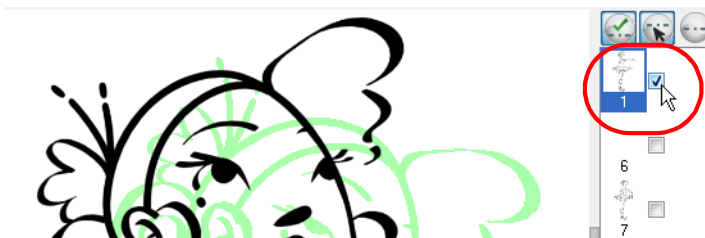


 The Thumbnail view is situated by default on the right side of the Camera view. You can change its positioning via the Preferences panel. Refer to the *Drawing and Traditional Animation Preferences* topic to learn how.

- Press on the Shift and Trace Enable  button to enable the option. Registration holes appears at the bottom of your drawings.



- Select the Shift and Trace  tool.
- Enable the onion skin. Select **View > Onion Skin > Show Onion Skin**. The default keyboard shortcut is [Alt]+[O].
- Enable the check box corresponding to the drawing you want to allow to be transformed temporarily.



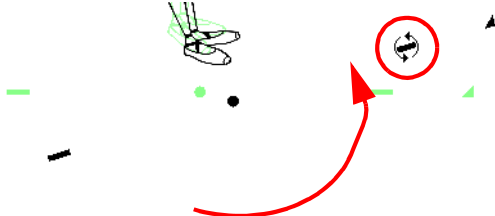
- Select the drawing you want to move.



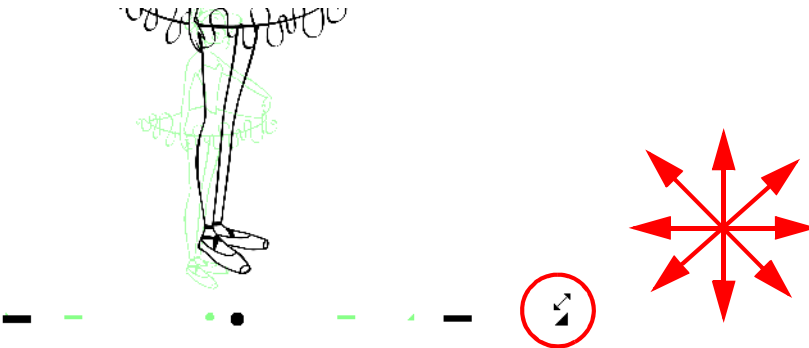
- 9. In the Drawing view, transform the drawing as needed, to position it inbetween you two key poses:
 - ▶ To reposition, click and drag the drawing to a new area.



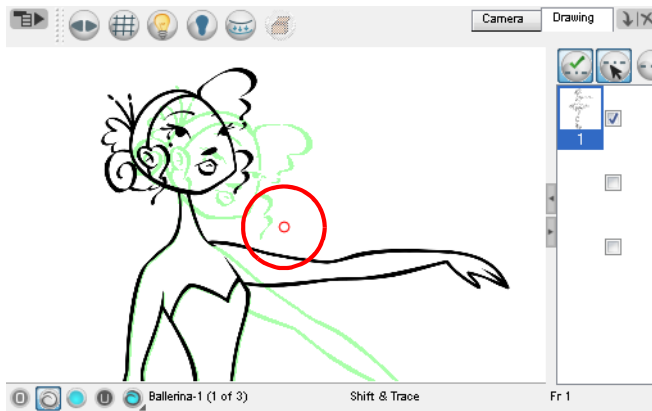
- ▶ To rotate from the centre peg, click on the flat peg hole and rotate.



- ▶ To scale, pull or push on the triangle control.



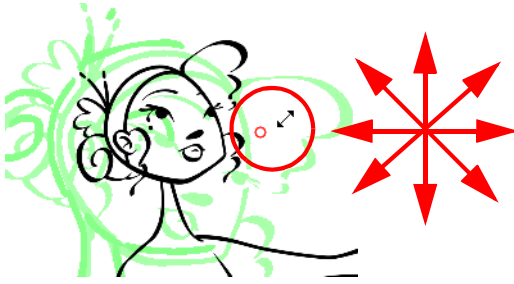
- ▶ Hold [Alt] to show the pivot point. The pivot point is situated in the middle of your current drawing view.



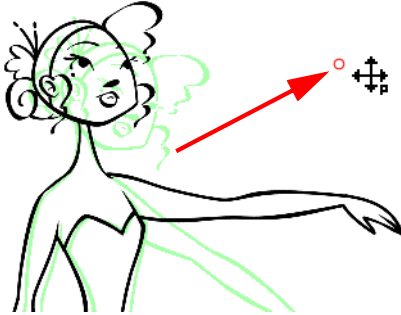
- ▶ To rotate from the pivot point. Hold [Alt] and rotate.



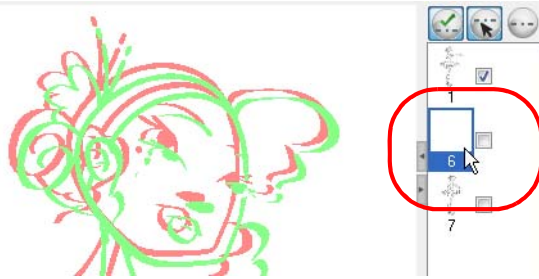
- ▶ To scale from the pivot point, hold [Shift] and move your cursor.



- ▶ Click and drag the pivot point to move it to a new position. Once the pivot point have been moved, you need to hold [Alt] and move your drawing in order to show it again.



10. Once your drawing is repositioned, select the drawing in which you want to trace.

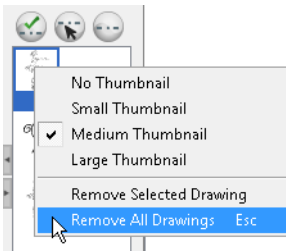


11. Select the drawing tool of your choice.
12. In the Drawing view, trace your drawing.

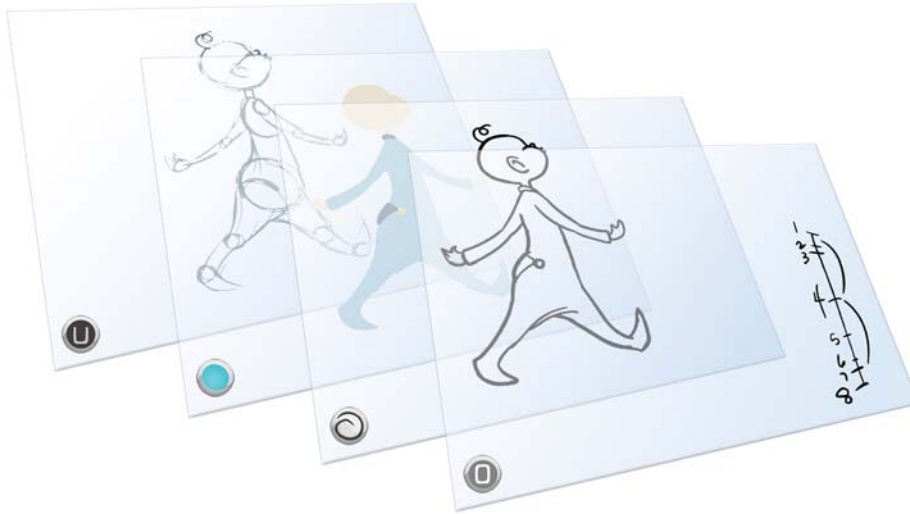


13. If necessary, click on the Shift and Trace Reset  button to reset the position of the modified drawing.

14. Right-click (Windows/Linux) or [Ctrl]+Click (Mac OS X) in the drawing list column and select **Remove All Drawings** to close the drawing list. The default keyboard shortcut is [Esc].



More Drawing Layers








Harmony Stage has four layers included in its drawings:

-  Overlay
-  Line Art
-  Colour Art
-  Underlay

Each layer can be used for a traditional animation task, this helps to organize your work and make things easier.

To switch between the drawing layers:

1. In the Camera or Drawing view bottom toolbar, click on either the Overlay , Line Art , Colour Art  or Underlay  buttons. You can also use the toggle keyboard shortcuts [L] and [:].
2. Click on the Preview  button to display all the layers together. Select **Overlay** and **Underlay**, in the Preview button's drop-down menu, to display all four layers.



Refer to [Adding Colour > Line Art and Colour Art Layers](#), on page 195 to learn more about this topic.

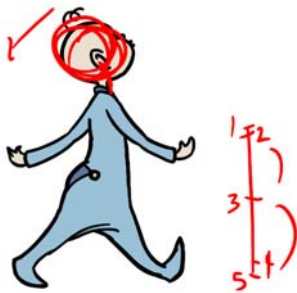
Overlay

The Overlay layer can be used for a lot of different things:

Highlights and Tones



Annotations and Corrections



Sketching



You can also simply draw in the Overlay layer, it is a regular layer.

Line Art

In traditional animation, you mainly use the Line Art layer to trace and clean up your animation. The outline is drawn in the Line Art layer and you paint in the Colour Art layer.



Refer to *Adding Colour > Line Art and Colour Art Layers*, on page 195 to learn more about inking and painting your drawings on different drawing layers.

Colour Art

In traditional animation, you use the Colour Art layer to paint your animation. The outline is drawn in the Line Art layer and you paint in the Colour Art layer. You need to generate invisible lines out of your Line Art to be able to do so.



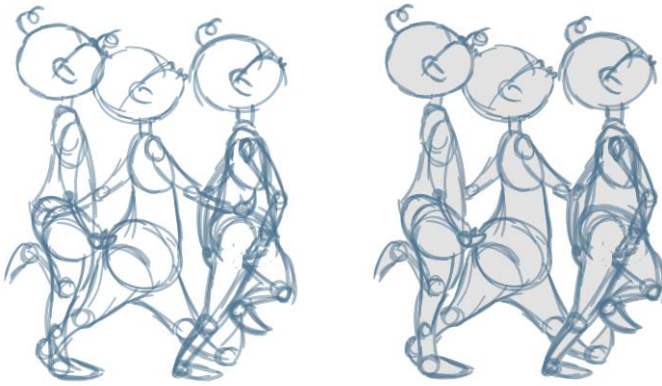
Refer to *Adding Colour > Creating Strokes to Paint Your Drawings on a Separated Layer*, on page 196 to learn more about creating invisible lines in the Colour Art layer.

Underlay




The Underlay layer can be used for several things but mainly for sketching your rough animation or generating a matte colour when doing line testing.

Generating a Matte for Your Animation

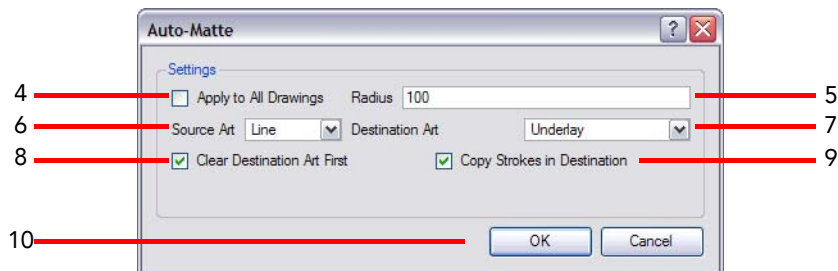


When you are doing rough animation, you may want to send a clip to somebody for feedback or approval before carrying on with your work. If you have several characters in your project that are overlapping, it may be difficult to understand what is going on as you can see through the characters. Harmony Stage can generate a matte automatically in the Underlay, or even in the Colour Art layer, and fill all the zones inside your characters making them opaque. This process is fast and easy and allows you to send easy to understand movies.

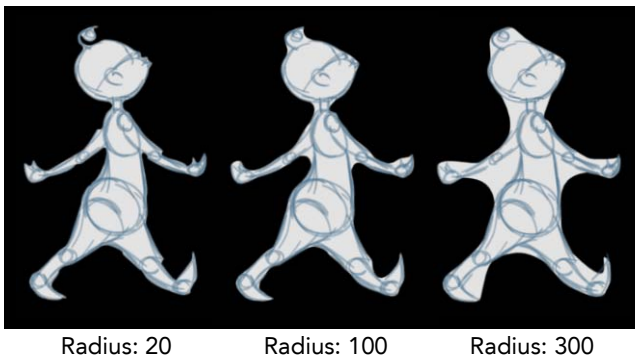
To generate a matte:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
2. In the Camera or Drawing view, select the drawing you want to create a matte for. Note: you will also be able to apply the operation to all the drawings in the layer at the same time.
3. In the top menu, select **Drawing > Generate Auto-Matte**. You can also select the option in the Camera or Drawing view menu under **Drawing > Generate Auto-Matte**.

The **Auto-Matte** dialog box opens.



4. If you want to create a matte for all the drawings included in your layer, enable the Apply to All Drawings option.
5. Depending on how precise or rough your line is, you will need to increase or decrease the radius value. The lower the value is, the closer to your lines' contours the matte will be shaped and the higher the value is, the looser the matte will be shaped.



6. In the Source Art drop-down menu, select the layer (Line Art, Colour Art, Underlay or Overlay) you want the matte to be created from.

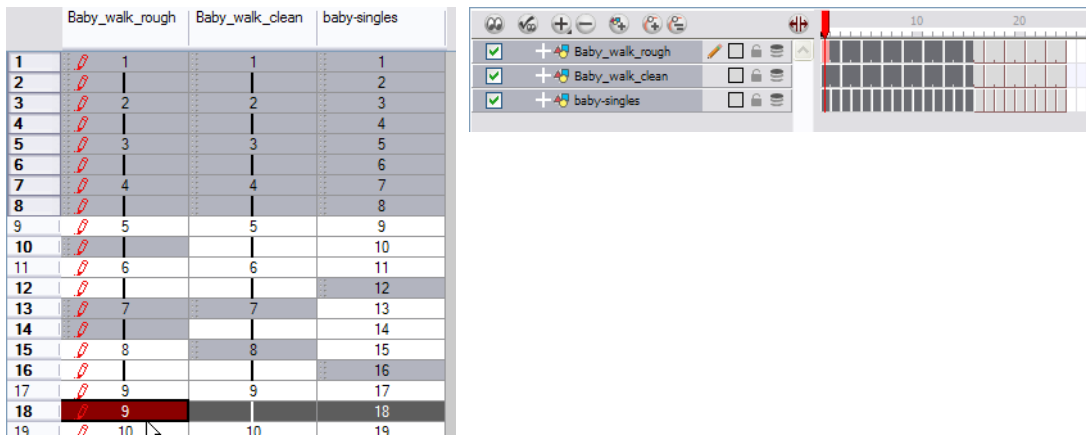
7. In the Destination Art drop-down menu, select the layer (Line Art, Colour Art, Underlay or Overlay) you want the matte to be created on.
8. If you already have artwork on the destination layer and you want the content to be deleted before the matte is added into it, enable the Clear Destination Art First option.
9. If you want the contour of your lines to be also copied as invisible lines in your matte drawing in case you ever need to keep them for later, enable the Copy Stroke in Destination option.
10. Click on the OK button to validate the operation.

Multiple Drawings in the Drawing View

If you only want to work on a portion of an animation sequence or many drawings from different layers, you can. To do this, select the segment needed in one or more layers in the Xsheet or Timeline view and then, use the Send to Drawing View and Add Drawings to Drawing View options to send the selection to the Drawing and allow you to work only on these drawings.

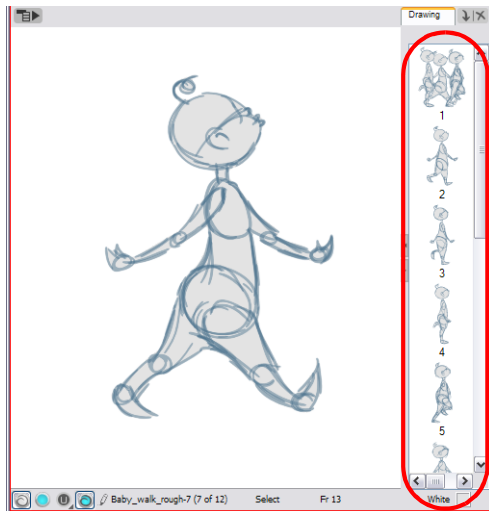
To send several drawings to the Drawing View:

1. In the Xsheet or Timeline view, select a consecutive cell range from one or several layers. In the Xsheet view, using the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X), you can click on any cell to add it on the selection, even if it is not consecutive.



2. In the Timeline View or Xsheet View menu, select **Drawings > Send to Drawing View**. In the Xsheet view, you can also hold down the [Alt] key and click on the selection.

The drawings appear at the side of the Drawing view.



3. If the Drawing view side panel is hidden, click on the Arrow button, located to the right side of the view.





4. If you want to add some extra drawings to the Drawing view without having to start over, in the Xsheet view, select the desired drawings to be added.
5. In the Xsheet View menu, select **Drawings > Add Drawings to Drawing View**. The default keyboard shortcut is [Alt]+click.
6. If you want to send a new drawing selection to the Drawing view and remove the current one, select a new range of drawings in the Timeline or Xsheet view.
7. In the Timeline View or Xsheet View menu, select **Drawings > Send to Drawing View**.
8. To change the size of the thumbnails displayed in the side panel, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) in the side panel and select **No Thumbnail**, **Small Thumbnail**, **Medium Thumbnail** or **Large Thumbnail**.
9. To empty the drawing list accumulated in the Drawing view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) in the side panel and select **Remove Selected Drawings** or **Remove All Drawings**. The default keyboard shortcut is [Esc].

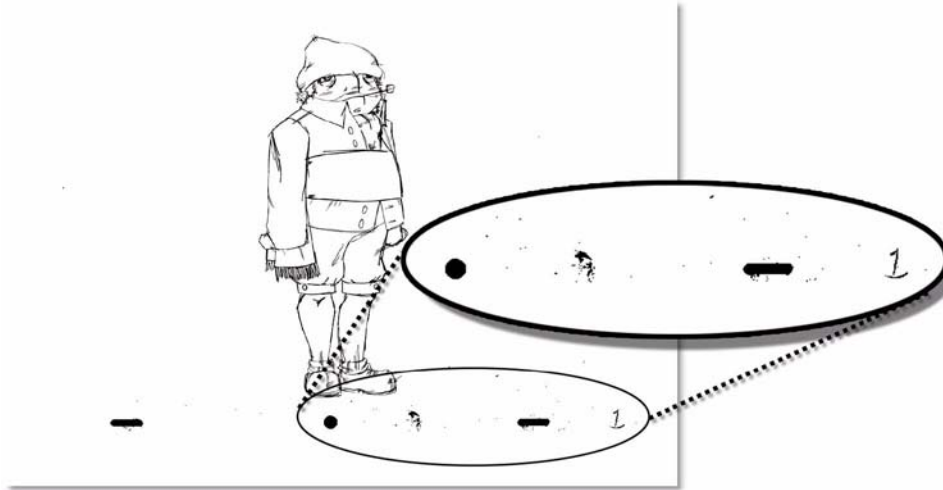
Preview Selected Drawings

To check your animation ink and paint, go through all of your drawings and verify that there are no colour mistakes or to see everything in real time, you can use the [F] and [G] keyboard shortcuts to scroll through your drawings or you can use the Preview option available in the Xsheet view.

To preview drawings from the Xsheet view:

1. Save your scene. In the top menu select **File > Save** or click on the Save  button. The default keyboard shortcut is [Ctrl]+[S] (Windows) or [⌘]+[S] (Mac OS X).
2. In the Xsheet view, select the range of drawings or the whole column to preview.
3. In the Xsheet View menu, select **View > Preview Selected Drawings**.
The Play window opens.
4. In the Play window, press the Play  button to playback your drawings.
5. Enable the Preroll option to see blank frames at the beginning and at the end of the animation sequence while looping the playback.

Cleaning Scanned Drawings

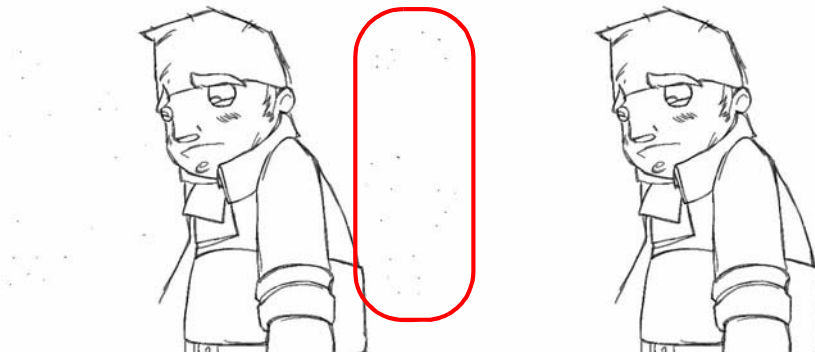


As paper drawings are passed through a scanner they may pick up dirt, hairs or dust. These foreign bodies register as part of the drawing and will appear as unwanted marks on the scanned drawing. These marks need to be cleaned. Harmony Stage provides different features to remove them quickly.

Each of the removal features are described in the following sections:

- Remove Dirt, on page 158
- Remove Art Outside Selection, on page 159
- Remove Art Inside Selection, on page 160
- Remove Hair, on page 161

Remove Dirt

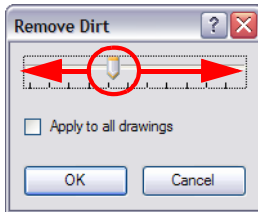


The Remove Dirt tool selects small dots and hairs on the drawing. Increasing the Remove Dirt level selects larger dots for removal, but be careful not to lose small details like pupils and nostrils. Once the removal level is chosen, you can apply it to either the current drawing or to the whole animation sequence.

This is a fast way to get rid of most dirt and dust.

To use the Remove Dirt tool:

1. In the Timeline or Xsheet view, select the drawing to clean.
2. In the top menu, select **Drawing > Clean Up > Remove Dirt**. The default keyboard shortcut is [Shift]+[D].
The Remove Dirt dialog box opens.



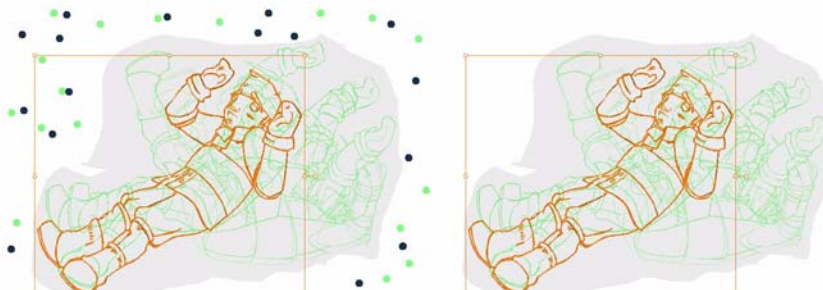
3. Increase the Remove Dirt value by moving the slider to the right.
4. Enable the Apply to All Drawings option if you want to apply the operation on all the drawings in the layer.
5. Click on the OK button.

Remove Art Outside Selection





The Remove Art Outside Selection option is used to delete any art existing outside a selection.

Also clean your Colour Art level as well. If you have a stroke accumulation in your Colour Art, it can result in large output files, especially if you work in high definition resolution. Simultaneously apply this operation to all of your drawings in the layer by using the Remove Art Outside Selection On All Drawings command.



To clean dirt with Remove Art Outside Selection:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
2. If you want to apply the action on your entire animation, enable the Permanent Selection  option in the Tool Properties view.
3. In the Camera or Drawing view, draw a selection around the animation. (Make the area large enough to include the whole animation sequence).
4. In the top menu, select **Drawing > Clean up > Remove Art Outside Selection** option to delete artwork outside your selection on one single drawing. The default keyboard shortcut is [Shift]+[Del].
 - ▶ To apply the action to all the drawings contained in the layer, select the **Drawing > Clean up > Remove Art Outside Selection on All Drawings** option from the top menu. The default keyboard shortcut is [Ctrl]+[Shift]+[Del] (Windows/Linux).

Remove Art Inside Selection





The Remove Art Inside Selection option is used to delete any art inside a selection.

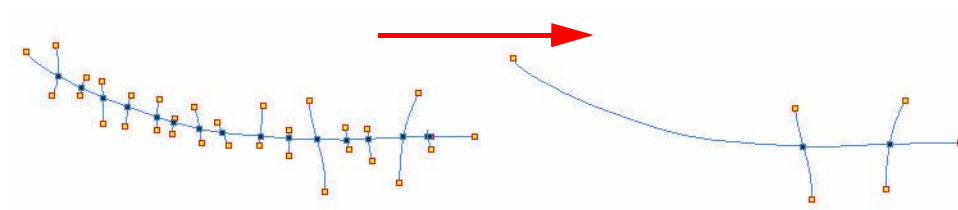
We recommend that you clean your Colour Art level as well. If you have a stroke accumulation in your Colour Art, it can result in large output files, especially if you work in high definition resolutions.

You can simultaneously apply this operation to all of your drawings in the layer by using the Remove Art Inside Selection On All Drawings command.

To clean dirt with Remove Art Inside Selection:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
2. If you want to apply the action on your entire animation, in the Tool Properties view, enable the Permanent Selection  option in the Tool Properties view.
3. In the Camera or Drawing view, draw a selection around the animation. (Make sure to make the area large enough to include all the zones to be cleaned up on all drawings).
4. In the top menu, select **Drawing > Clean up > Remove Art Inside Selection** option to delete artwork inside your selection on one single drawing. The default keyboard shortcut is [Del].
 - ▶ To apply the action on all your drawings contained in the layer, in the top menu, select **Drawing > Clean up > Remove Art Inside Selection on All Drawings** option to delete artwork inside your selection on all the drawings.

Remove Hair



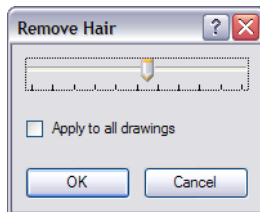
The Remove Hair command is used to remove any small strokes created in the Colour Art from very thick lines or filled zones.

Increasing the Remove Hair level value will select larger strokes for removal from the drawing. You can also select the Apply to All Drawings option to remove them on all drawings.

To use the Remove Hair tool:

1. In the Timeline or Xsheet view, select the drawing containing the drawing to clean.
2. In the top menu, select **View > Show > Show Strokes** to display the invisible lines. The default keyboard shortcut is [D].
3. In the top menu, select **Drawing > Clean Up > Remove Hair**.

The Remove Hair dialog box opens.



4. Move the Hair Selection slider to the right to increase the number and length of hairs to be selected.
5. Enable the Apply to All Drawings option if you want to apply the operation to all the drawings in the layer.
6. Click on the OK button.

Drawing and Traditional Animation Preferences

When drawing or animating traditionally in Harmony Stage, there are preferences you can set to help you work more efficiently.

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

Real-Time Antialiasing

By default, the Antialiasing preference is enabled. This option lets you see the final result of your scene as you draw. You can change the value of the Antialiasing using the Preferences dialog box, to fit the current level used in the Camera or Drawing view.

The Real-Time Antialiasing preference can be found in the Preferences panel under the OpenGL tab.



Refer to the [Viewing the Final Lines as you Draw](#) to learn more about the Real-Time Antialiasing preference.

Current Frame as Drawing Name

The Current Frame as Drawing Name option can be enabled in the Preferences panel, under the Xsheet tab. Use this preference to automatically name the drawing corresponding to the frame position, this avoids numbering conflicts while animating.

The screenshot shows the 'New Element' section with 'Bitmap Format' set to 'SCAN' and 'Scan Type' set to '2'. Below it, the 'Drawing Creation' section has a checkbox labeled 'Use Current Frame as Drawing Name' which is checked and highlighted with a red oval.

Drawing	
1	1
2	9
3	4
4	6
5	3
6	8
7	5
8	7
9	10
10	2

For example, using the default preferences, an animator starts with the first drawing on frame 1, this drawing is called 1. The animator then draws the extreme position drawing on frame 10, this drawing is called 2. Next, the inbetween pose is drawn on frame 5, this drawing is called 3 and so on.

At the end, the animator has a sequence like this: 1-9-4-6-3-8-5-7-10-2.

Drawing	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Instead, using the Use Current Frame as Drawing Name preference, each drawing is automatically named by its frame number and the sequence looks like: 1-2-3-4-5-6-7-8-9-10.

Drawing Tab Preferences

These are the preferences you can find in the Drawing tab.

The screenshot shows the Drawing Tab Preferences dialog box. The 'Light Table' section is highlighted with a red circle. It contains the following settings:

- OnionSkin Render Style: Enable Shade (dropdown)
- Light Table: Enable Shade
- Light Table: Shade in Camera View
- Enable Onion-Skin for Other Elements
- Onion Skin: Maximum Wash Value (0.0-1.0): 0.8
- Onion Skin: Minimum Wash Value (0.0-1.0): 0.4
- Onion Skin: Maximum Opacity (0.0-1.0): 0.8
- Onion Skin: Minimum Opacity (0.0-1.0): 0.2
- Light Table: Wash (0.0-1.0): 0.2
- Light Table: Opacity (0.0-1.0): 0.5

The 'Options' section has the following settings:

- Grid On By Default
- Select Tool Is Lasso
- Brush Size Cursor
- Default Multiwheel Colour Picker
- Auto Save Pen Styles
- Thumbnail View location: Right (dropdown)
- Sticky Eye Dropper

The 'New Colour Pots' section has the following setting:

- Create New Colour Pots Using Default Colour

The 'Settings' section has the following setting:

- Auto Gap Closing: 0
- Save modified drawing as a new version

Light Table

- **Onion Skin Render Style:**
 - ⇒ **Normal:** The onion skinned drawings is displayed in washed out colours.
 - ⇒ **Enable Shade:** The previous onion skinned drawings are displayed in washed out red shades and the next onion skinned drawings are displayed in washed out green shades.
 - ⇒ **Outlines Only:** The onion skinned drawings are displayed as outlines only.
- **Light Table: Enable Shade:** When enabled, the drawings appearing in the Light Table are displayed in washed out colours in the Drawing view. When this option is disabled, the drawings appearing in the Light Table are displayed using normal colours. This option is for the Drawing view only.
- **Light Table: Shade in Camera View:** When enabled, the drawings appearing on other layers are displayed in washed-out colours in the Camera view. When this option is disabled, the drawings appearing on other layers are displayed using normal colours. This option is for the Camera view only.
- **Enable Onion Skin for Other Layers:** When both Onion Skin and Light Table options are enabled, the drawings appearing in the Light Table also display their previous and next onion skinned drawings. This option is for the Drawing view only.
- **Onion Skin: Maximum Wash Value (0,0-1,0):** The maximum washed-out value for onion skinned drawings.
- **Onion Skin: Minimum Wash Value (0,0-1,0):** The minimum washed-out value for onion skinned drawings.
- **Onion Skin: Maximum Opacity (0,0-1,0):** The maximum opacity value for onion skinned drawings. (0 = transparent).
- **Onion Skin: Minimum Opacity (0,0-1,0):** The minimum opacity value for onion skinned drawings. (0 = transparent).
- **Light Table: Wash (0,0-1,0):** The washed-out value for the light table display.
- **Light Table: Opacity (0,0-1,0):** The opacity value for the light table display. (0 = transparent).

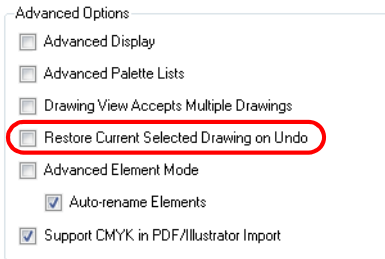
Options

- **Grid On By Default:** When opening the Drawing View, the grid displays automatically.
- **Select Tool is Lasso:** When this option is enabled, the Select tool behaves as a lasso selector. When this option is disabled, the Select tool behaves as a rectangle selector.
- **Brush Size Cursor:** When this option is enabled, the brush tool displays the brush size as a circle around the cursor.
- **Auto Save Pen Styles:** When this option is enabled, new pens and pen styles are automatically saved.
- **Thumbnails View location:** When sending a series of drawings to the Drawing view, the drawing list appears in a Side panel. This preference changes the location of the Side panel in the Drawing view. By

default, the panel is displayed on the right-hand side of the Drawing view. You must restart the application for this change to be applied.

Advanced Tab Preferences

These are the preferences you can find in the Advanced tab.



Advanced Options

- **Restore Current Selected Drawing On Undo:** If a drawing other than the current one is being affected by an Undo command, the system will display the affected drawing when this is enabled.

Chapter 5

Adding Colour



With Harmony Stage, you can add colour to your projects and even create sets of colours for your characters. With Harmony Stage's colour palette concept, painting and colour styling has never been easier!


In this chapter, you will learn about the following:

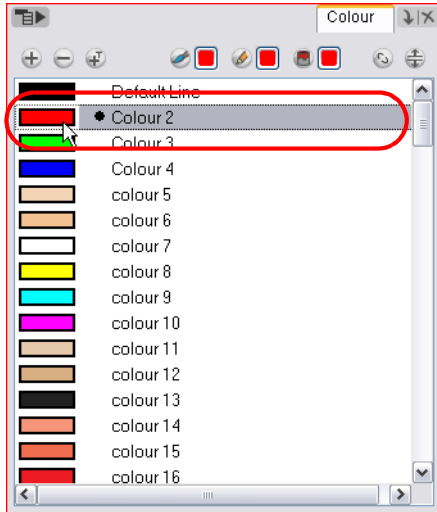
- How to Paint, on page 166
- Colours, on page 167
- Colour Display Modes, on page 175
- Selecting the Current Colour of a Tool, on page 176
- Painting Using the Paint Tool, on page 178
- Selecting a Colour in a Drawing, on page 189
- Editing Gradients and Textures, on page 190
- Closing Gaps Manually, on page 192
- Protecting Colours, on page 194
- Highlighting the Selected Colour, on page 194
- Line Art and Colour Art Layers, on page 195
- Underlay and Overlay Layers, on page 197
- Verifying Zones are Painted, on page 198
- Palettes, on page 199
- Colour Model, on page 213
- Preferences, on page 214

How to Paint

Learn how to paint your drawings by following these instructions.

To paint your drawings:

1. In the Tools toolbar, select the Paint  tool. The default keyboard shortcut is [Alt]+[K]. You can also select the Paint tool using **Drawing > Tools > Paint** in the top menu.
2. In the Colour view, select a colour from the palette.



3. In the Camera or Drawing view, start painting the colours on your drawing.

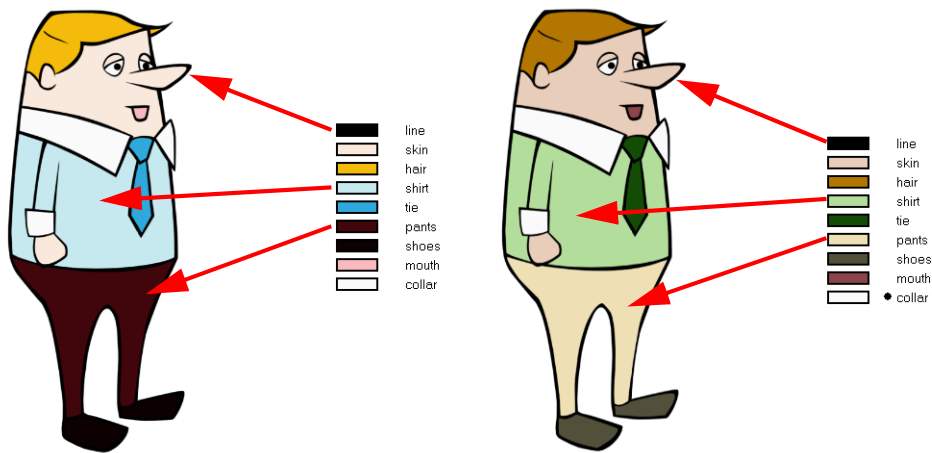


Colours

Harmony Stage is very powerful when it comes to painting. To paint your drawings, you use different colour swatches, not just one swatch that you modify the tint of each time you want to paint a zone with a different colour.



In the Colour view, you choose a different colour swatch for each colour you want to paint in your drawing. You can add as many swatches as you want. You can also rename them and modify existing ones.



When you modify the colour of an existing swatch it automatically updates all the zones painted with this swatch throughout the entire project. The colour swatch has a unique ID number that associates it with the painted zones. This way, you can change the look of your character at anytime without having to repaint it!

This topic is divided as follows:

- Adding a Colour Swatch, on page 168
- Deleting a Colour Swatch, on page 173

Adding a Colour Swatch


You can use three different types of colour swatches, these are described in the following sections:

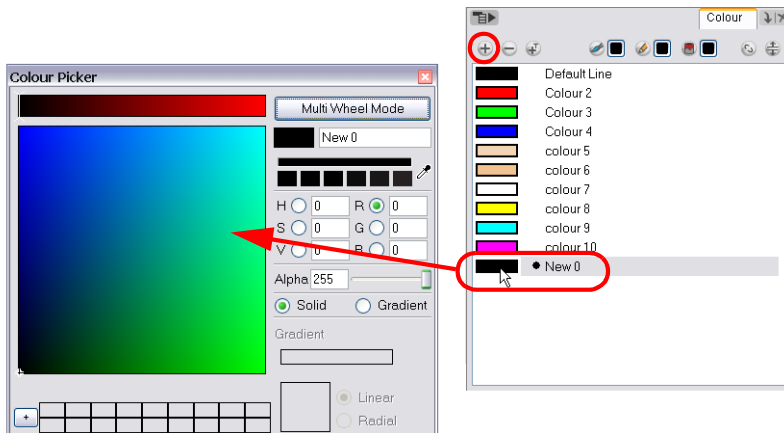
- Solid Colour Swatch, on page 168
- Gradient Colour Swatch, on page 170
- Bitmap Texture Swatch, on page 172

Solid Colour Swatch



To add or modify a solid colour swatch:


1. In the Colour view, click on the New Colour  button.
2. In the Colour View menu, select **Colours > Edit**. You can also double-click on the colour pot. The **Colour Picker** window opens.

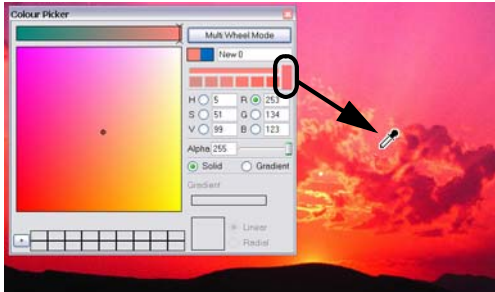


3. To set your colour:
 - ▶ In the colour wheel, select the desired colour.
 OR
 - ▶ Type in the HSV or RGB values in the corresponding fields. Click on the R,G,B,H,S or V radio buttons to change the look of the colour picking area.

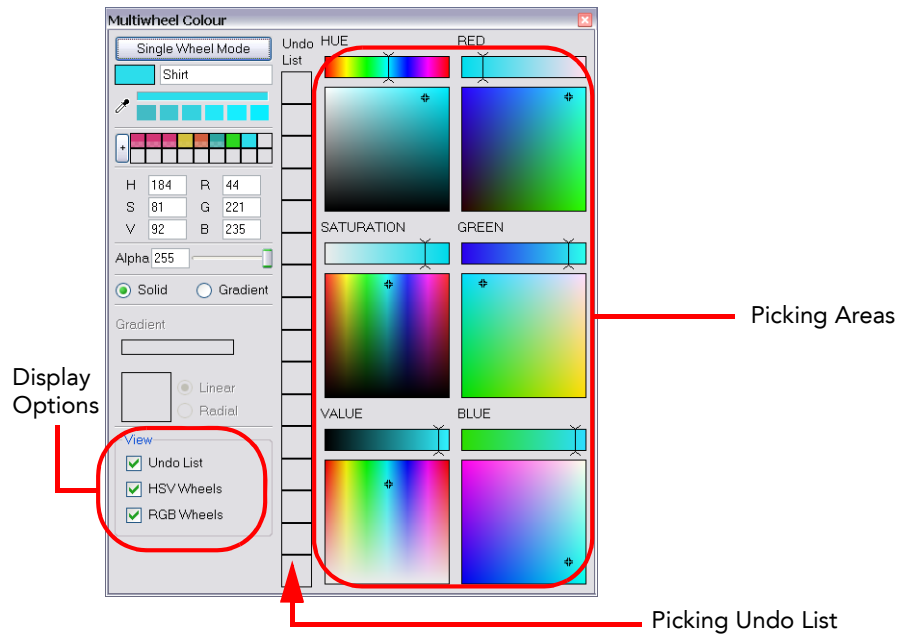
H	<input type="text" value="207"/>	R	<input checked="" type="radio"/>	<input type="text" value="0"/>
S	<input type="text" value="100"/>	G	<input type="radio"/>	<input type="text" value="107"/>
V	<input type="text" value="76"/>	B	<input type="radio"/>	<input type="text" value="194"/>

OR

- ▶ Click on the Dropper  button to select any colour on your screen. It can be from the Harmony Stage's interface, your Operating System or any other open application.



You can also click on the Multi Wheel Mode button to open the **Multiwheel Colour** dialog box. This displays all the picking area styles together and also contains a picking undo list. Click on the Single Wheel Mode button to go back to the regular Colour Picker window.



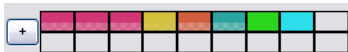
4. If needed, click on the Shade Scale's switches to modify the shade of the selected colour.



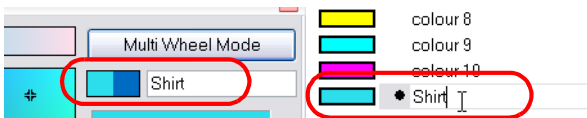
5. If necessary, adjust the desired level of transparency with the Alpha slider, or type the value directly in the Alpha field.



6. If necessary, click on the Add button to add the current selected colour to the Colour Storage Library, so you can quickly access it later.

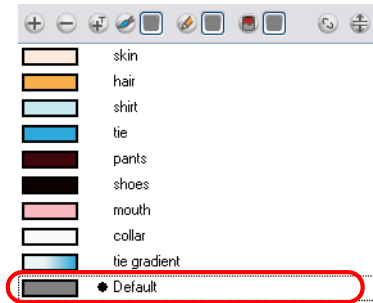


7. You can rename the colour swatch in the Colour Picker window or directly in the colour list by double-clicking on its name.



Adding Default Colour Swatch

In Harmony Stage, you can use the default colour you previously set in your preferences and add a new colour swatch, without having to enable and disable the Create New Colour Pot Using The Default Colour option in the Preferences panel.



To add a new colour swatch using the default colour:

1. In the Colour View menu, select **Colours >New Default Colour**.

A new swatch will be added to your palette using the default colour pot colour. The new swatch created with the New Default Colour command will be named **Default**.



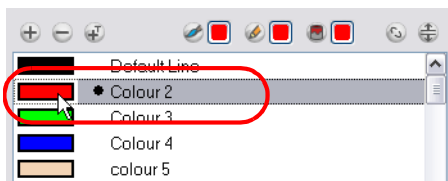
Refer to the Preferences topic to learn more on the Create New Colour Pot Using The Default Colour preference and how to customize the default colour pot colour.

Gradient Colour Swatch

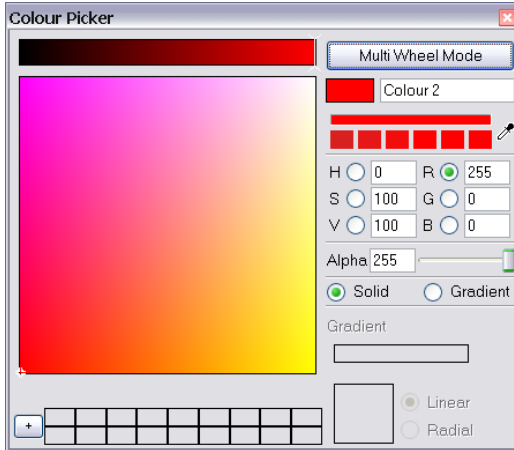


To create a gradient colour swatch:

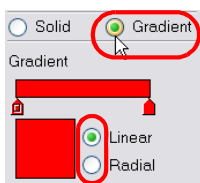
1. In the Colour View, select the colour to be modified.



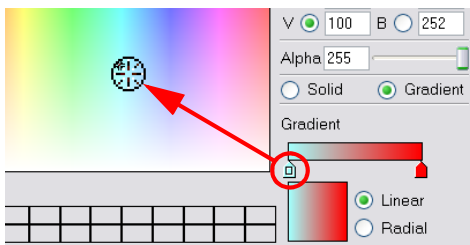
- In the Colour View menu, select **Colours > Edit**. You can also double-click on the colour pot. The **Colour Picker** window opens.



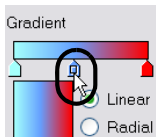
- Enable the **Gradient** option.



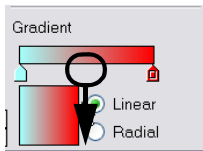
- Select the **Linear** or **Radial** option.
- Select the Gradient arrows to modify the colours.



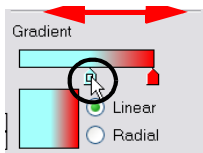
- Click between the arrows to add extra colours.



- Pull down the arrows to remove them.



- Move the arrows left and right to modify the gradient distance.




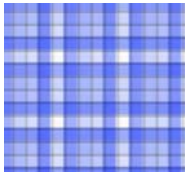
Refer to the *Editing Gradients and Textures* topic to learn how to reposition your gradient zones in your drawings.

Bitmap Texture Swatch

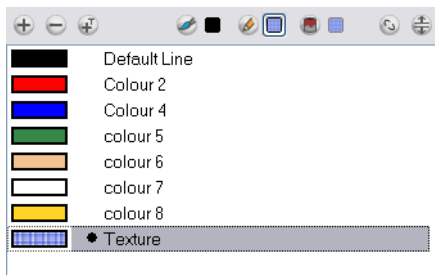


To create a texture colour:

1. In the Colour View menu, select **Colours > New Texture** or click on the New Texture  button.
The **Browser** window opens.
2. Browse for a PSD or TGA bitmap file created in a third party software.

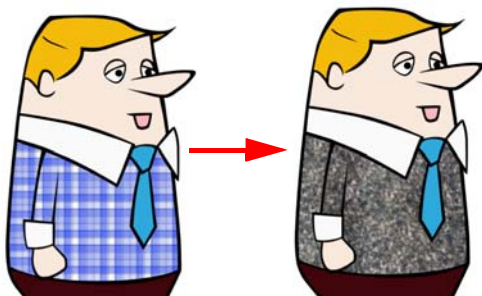


3. Click on the Open button to create the colour swatch.



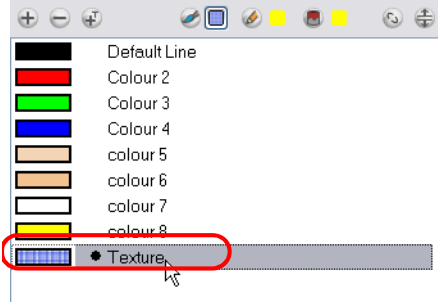
Refer to the *Editing Gradients and Textures* topic to learn how to reposition your textured zones in your drawings.

You can also replace a texture once it is painted. If you decide to make the character's shirt wool instead of plaid, just update the texture file in the swatch and the entire project updates. Any transformation previously applied to the texture's position in your drawings will be kept.



To replace a texture swatch:

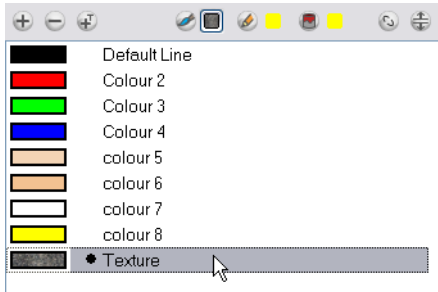
1. In the Colour view, select the texture swatch you want to change the embedded bitmap texture file in.



2. In the Colour View menu, select **Colours > Edit Texture**. You can also double-click on the swatch. The **Browser** window opens.
3. Browse for the new PSD or TGA bitmap file created in a third party software.



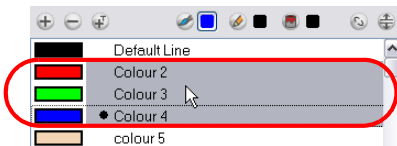
4. Click on the Open button to update the colour swatch.




Deleting a Colour Swatch

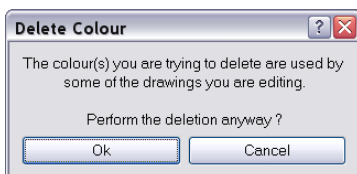
To delete a colour swatch:

1. In the Colour view, select the colour swatches to delete.



2. In the Colour View menu, select **Colours > Delete**. You can also click on the Delete Colour  button. The default keyboard shortcut is [Delete].

If the colour swatch is used in a drawing, the **Delete Colour** dialog box opens.



3. Click on the OK button to delete the colours or click on the Cancel button to abort the operation.
 - ▶ If you delete colour swatches already in use, the zones painted with them turn red so you can easily identify them.



Colour Display Modes

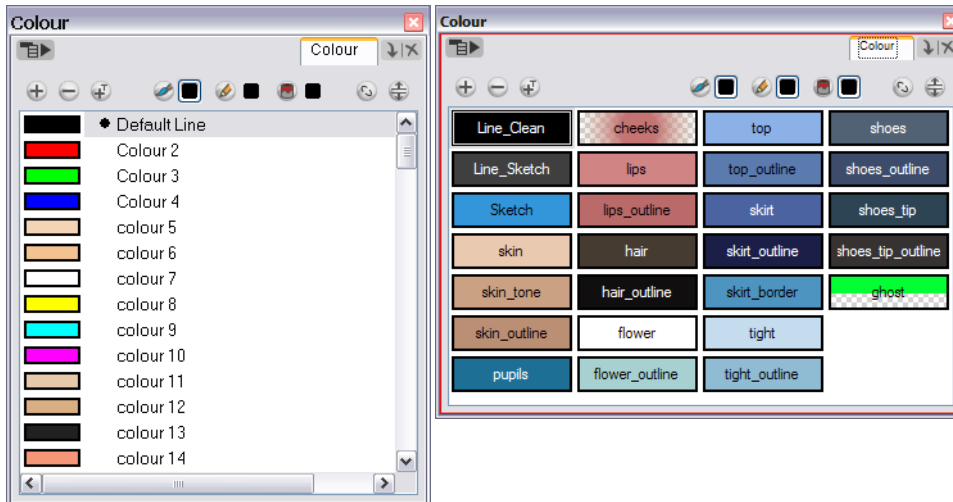
Switching Between Thumbnails and List Display modes

The Colour view has two display modes:

- List Mode
- Swatch Mode

To toggle between the display modes:

1. In the Colour View menu, select **Colours > Swatch Mode**.
 - ▶ Enable the option to display the swatches.
 - ▶ Disable the option to display the colour list.



List Mode

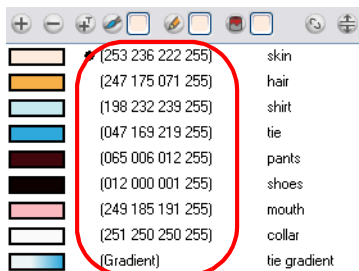
Swatch Mode

Displaying Colour Values

When using Harmony Stage, you can display the RGB values and names of your solid colour swatches.



Note: This option is not available when displaying the colours in Swatch mode.

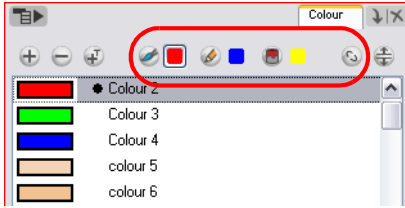


To display the swatch colour values:

- ▶ In the Colour View menu, select **Palettes > Display Colour Values**.




The solid colour swatches' RGB values will be displayed between the colour swatch and its name. The gradient colour swatches will be identified as (gradient).

Selecting the Current Colour of a Tool




While drawing and painting, you can let Harmony Stage retain the last colour you selected for each one of the following tools:


- Brush
- Paint
- Pencil, Ellipse, Line, Rectangle, Polylines

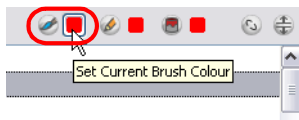
The Colour view has three swatches where you can set a colour for the Brush , Paint  and Pencil  tools.

To unlink the storage swatches:

1. In the Colour view, if the storage swatches are linked, click on the Linking  button to unlink them.

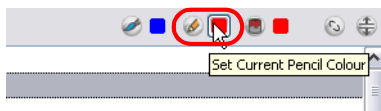


2. Click on the Brush  storage swatch.



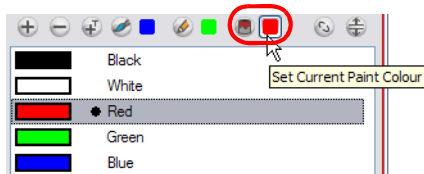
3. In the Colour list, select the desired colour.

4. Click on the Pencil  storage swatch.

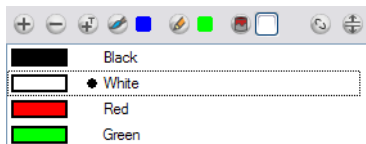


5. In the Colour list, select the desired colour.

6. Click on the Paint  storage swatch.










7. In the Colour list, select the desired colour.




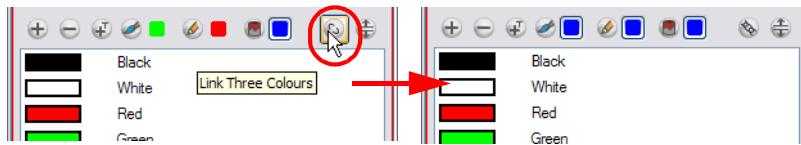
If you prefer not to use this behaviour and have Harmony Stage use the same colour swatches regardless of the selected tool, you can link the three swatches together.

To link the storage swatches:

1. In the Tools toolbar, select one of the following tool:

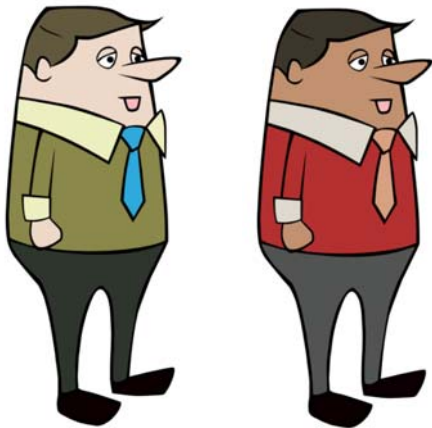
- ▶  Brush tool
- ▶  Paint tool
- ▶ Pencil tools:
 - ⇒  Pencil tool
 - ⇒  Polyline tool
 - ⇒  Line tool
 - ⇒  Ellipse tool
 - ⇒  Rectangle tool


2. In the Colour view, if the storage swatches are linked, click on the Linking  button to link them.



Each time you select a new colour for your current tool, all the storage swatches are updated.

Painting Using the Paint Tool

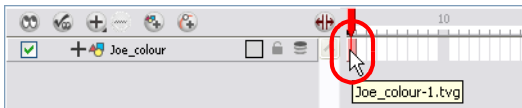



The main tool you will use to paint your drawings with is the Paint  tool. The Paint tool can be used in several different modes, these can be customized in the Tool Properties view.

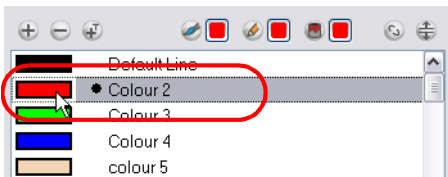
The Paint tool only paints closed zones. If you have gaps in your lines, you will have to close them using either the Brush, Pencil, Close Gap tools or the Automatic Close Gap option.

To paint with the Paint tool:

1. In the Timeline or Xsheet view, select the cell where you want to paint.



2. In the Tools toolbar, click on the Paint  tool. The default keyboard shortcut is [Alt]+[K]. You can also select the Paint tool in the top menu under **Drawing > Tools > Paint**.
3. In the Colour view, select a colour.



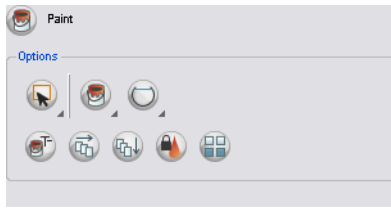
4. In the Camera view, start painting. You can either point and click to paint a zone or trace a lasso or marquee selection to paint several zones at once.

NOTE:

The last colour you select while using the Paint tool will be remembered the next time you select the Paint tool.

Paint Tool Properties

When you select the Paint tool, its properties and options appears in the Tools Properties view.



Lasso and Marquee

The Lasso and Marquee options let you choose what type of selection the Paint tool will do when you will click and drag your cursor to paint your drawings. The default selection mode is Marquee.



The Marquee option makes a rectangle selection box. Everything inside the selection will be painted according to the painting mode you selected.



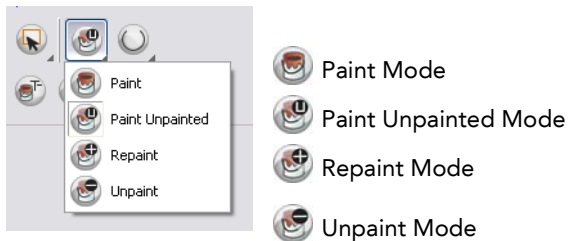
The Lasso option lets you draw a custom selection box around the zones to be painted. Everything inside the selection will be painted according to the painting mode you selected.

Hold down the [Alt] key to switch to the opposite mode of your selection.



Painting Mode

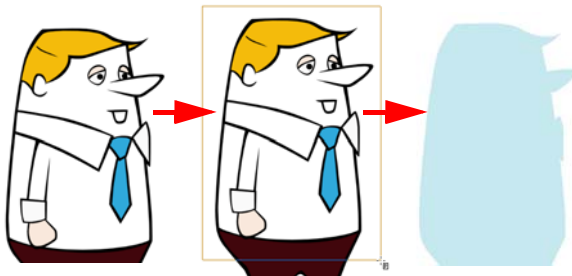
The Paint tool has four different modes available:



You can also find these tools directly in the Drawing Tools toolbar and in the Drawing Tools menu.

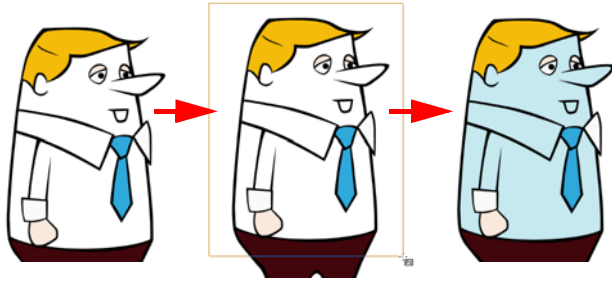


Paint Mode



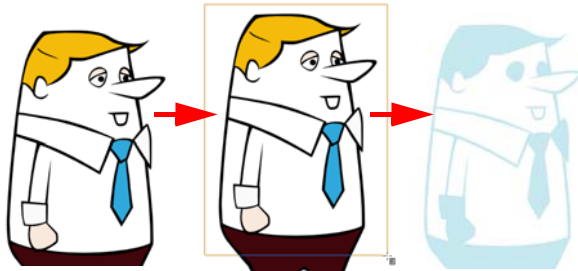
The Paint mode paints everything it touches, including empty and filled zones.

 Paint Unpainted Mode



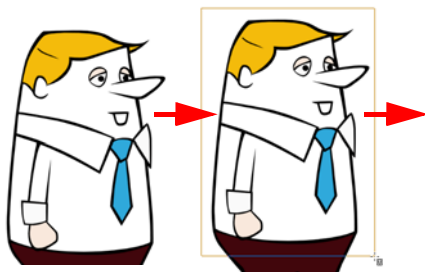
The Paint Unpainted mode paints only empty zones. Any line or filled zone will remain unchanged.

 Repaint Mode



The Repaint mode paints everything it touches except empty zones. Any zone that is not painted will remain intact.

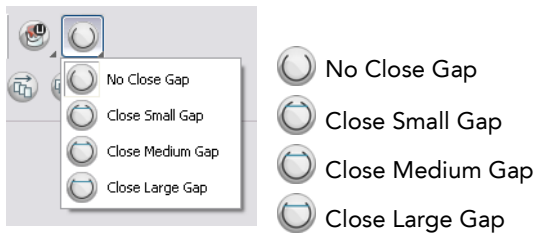
 Unpaint Mode



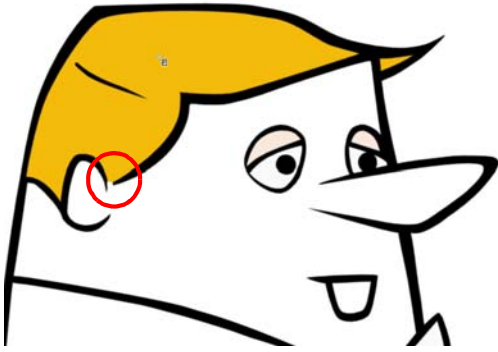
The Unpaint mode unpaints everything it touches, including empty and filled zones.

 Automatic Close Gap

The Automatic Close Gap option has four modes available:

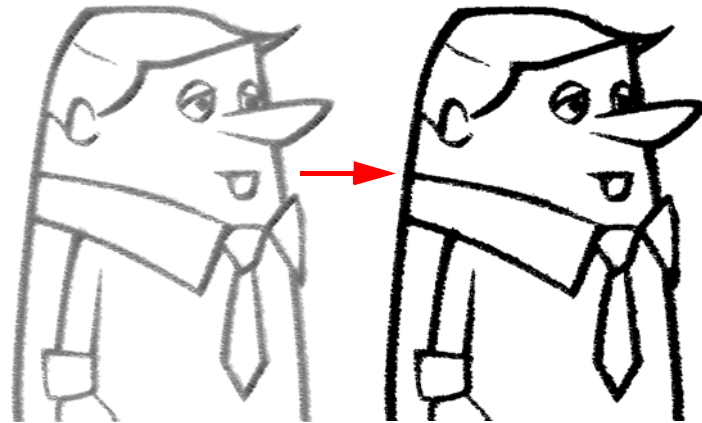


The Automatic Close Gap option is used while painting drawings with small gaps. Instead of having to close them manually either with the Brush tool or Close Gap tool, Harmony Stage will analyze the drawing and close the gaps while you paint according to the selected mode.



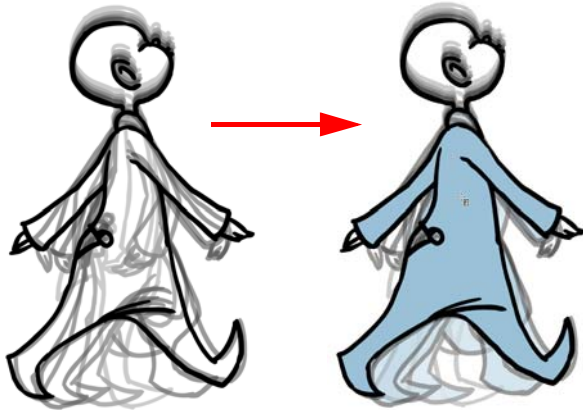
The automated gap closing should be done using the zoom function setting of your Camera or Drawing view. If your eye does not see the gap, Harmony Stage won't either.

Paint and Remove Texture



The Paint and Remove Texture option is used when you vectorized some images as greyscale texture style. An image vectorized as textures is a mix of bitmap filling encapsulated in a vector based frame. Painting a textured zones with the Paint tool will change the tint of the textured lines. Painting the textured zones using the Paint and Remove Texture option transforms the bitmap filling into a 100% vector based zone and fills it with a solid colour.

Apply to Multiple Drawings

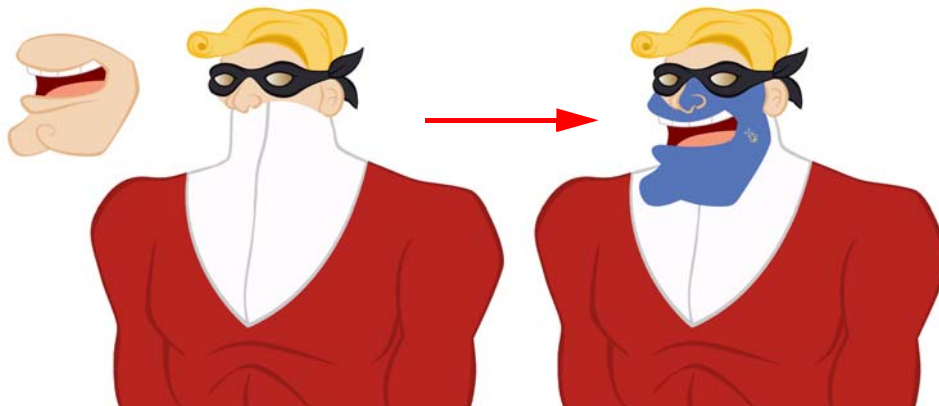


The Apply to Multiple Drawings option is used for hand-drawn animation fast painting. When you want to paint several drawings in a same layer at once, such as a walk cycle, you can enable this option and make a selection in your Camera or Drawing view. All the closed zones located within your Paint tool selection are painted with the selected colour swatch.

You do not need to enable the Onion Skin preview to use this option. The option will stay enabled only for the next action. If you want to use it again, you must click on the Apply to Multiple Drawings button again.

The default keyboard shortcut to use this option is:
[Ctrl]+[Alt]+[A] for (Windows/Linux) or [⌘]+[Alt]+[A] for (Mac OS X).

Apply to All Visible Drawings



The Apply to All Visible Drawings option is used to paint several drawings on separated layers on the current frames. If you have a character broken in several layers, you can enable this option to paint all your layers at once. The operation is only applied on the current frame.

The option will stay enabled only for the next action. If you want to use it again, you must click on the Apply to All Visible Drawings button again.

This option is only available in the Camera view and does not affect Symbols.

Respect Protected Colour

The Respect Protected Colour option is enabled by default. In your Colour view, you can protect some colour swatches to avoid repainting or unpainting the zones linked to that swatch.

If you disable this option the Paint tool will not follow the protect colour rule and will repaint or unpaint the protected colours on your drawings until you enable the option again.




Refer to the Protecting Colours topic to learn how to lock your colours.



Use Stored Colour Gradient



When you paint a zone with a gradient or textured colour swatch, the gradient or texture's position is set relative to the size of the zone you are painting. If you want the Paint tool to use a particular size and position, you must first store your desired position and size using the Select  tool and then enable the Use Stored Colour Gradient option in the Paint Tool Properties view.



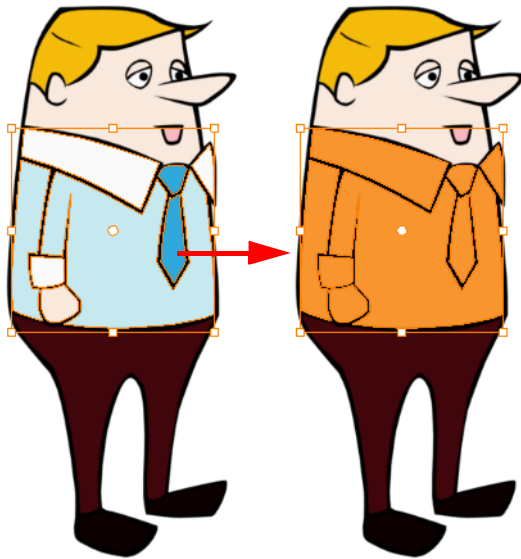
Refer to the Storing your Favourite Gradient or Texture Settings topics to learn how to store your gradient or texture position.


Advanced Painting Features

The following advanced painting features are available in Harmony Stage and are described in this section:

- Repaint Selection, on page 184
- Repaint Selection On All Drawings, on page 185
- Repaint Outside Selection, on page 185
- Repaint Outside Selection On All Drawings, on page 186
- Unpaint Selection, on page 186
- Unpaint Selection On All Drawings, on page 187
- Unpaint Outside Selection, on page 187
- Unpaint Outside Selection On All Drawings, on page 188

Repaint Selection



The Repaint Selection command is used to repaint any art inside a selection. You must first draw a selection using the Select  tool in order for this command to be available.

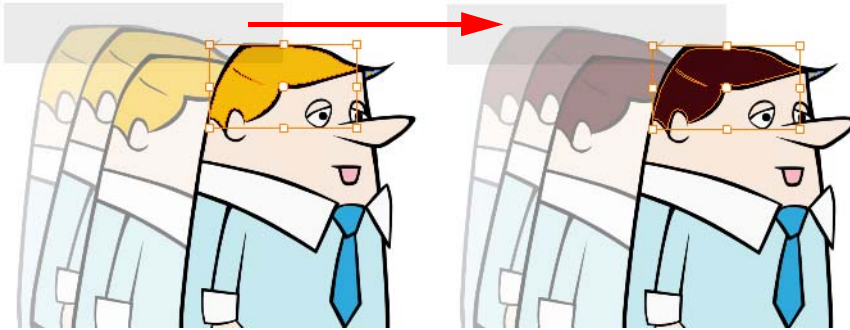
To use the Repaint Selection command:


- ▶ Select **Drawing > Paint > Repaint Selection**.




Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 topic in the to learn more about selecting drawing objects.

Repaint Selection On All Drawings



The Repaint Selection On All Drawings command is used to repaint any art inside a selection on all the drawings contained within the same layer. You must enable the Permanent Selection  option in the Select tool Tool

Properties view and then draw a selection in your drawing using the Select  tool in order for this command to be available. The Permanent Selection option is used to maintain the same selection throughout the drawings of a same layer.

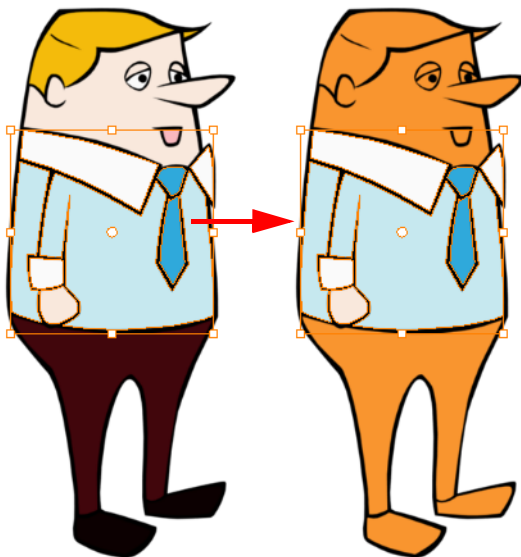
To use the Repaint Selection On All Drawings command:


- ▶ Select Drawing > Paint > Repaint Selection On All Drawings.



Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects and using the Permanent Selection option.

Repaint Outside Selection



The Repaint Outside Selection command is used to repaint any art outside a selection. If no selection has been drawn using the Select  tool, the entire drawing will be repainted.

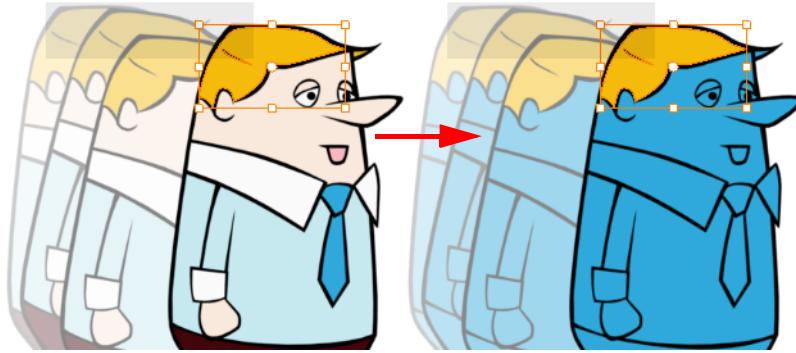
To use the Repaint Outside Selection command:


- ▶ Select Drawing > Paint > Repaint Outside Selection.




Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects.

Repaint Outside Selection On All Drawings



The Repaint Outside Selection On All Drawings command is used to repaint any art outside a selection on all the drawings contained within the same layer. You must enable the Permanent Selection  option in the Select tool Tool

Properties view and then draw a selection in your drawing using the Select  tool in order for this command to be available. The Permanent Selection option is used to maintain the same selection throughout the drawings of a same layer.

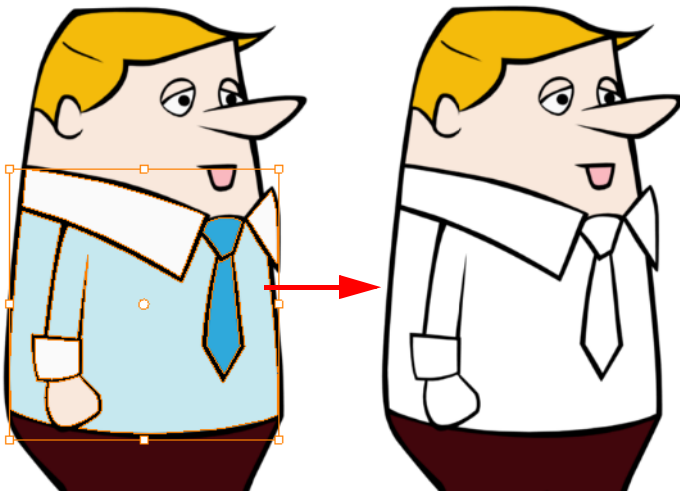
To use the Repaint Outside Selection On All Drawings command:


- ▶ Select Drawing > Paint > Repaint Outside Selection On All Drawings.



Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects and using the Permanent Selection option.

Unpaint Selection



The Unpaint Selection command is used to unpaint any art existing inside a selection. You must first draw a selection using the Select  tool in order for this command to be available.

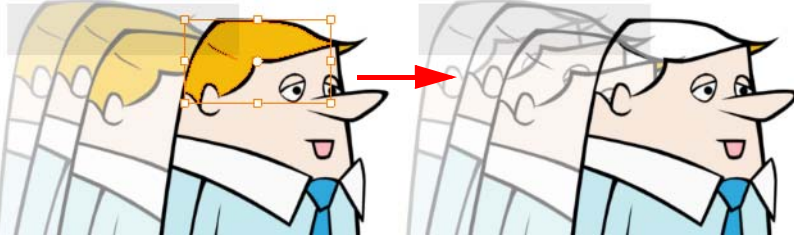
To use the Unpaint Selection command:



- ▶ Select Drawing > Paint > Unpaint Selection.



Refer to the *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects.

Unpaint Selection On All Drawings



The Unpaint Selection on All Drawings command is used to unpaint all art contained inside a selection on all the drawings within the same layer. You must enable the Permanent Selection  option in the Select tool Tool Properties view and then draw a selection in your drawing using the Select  tool in order for this command to be available. The Permanent Selection option is used to maintain the same selection throughout the drawings of a same layer.

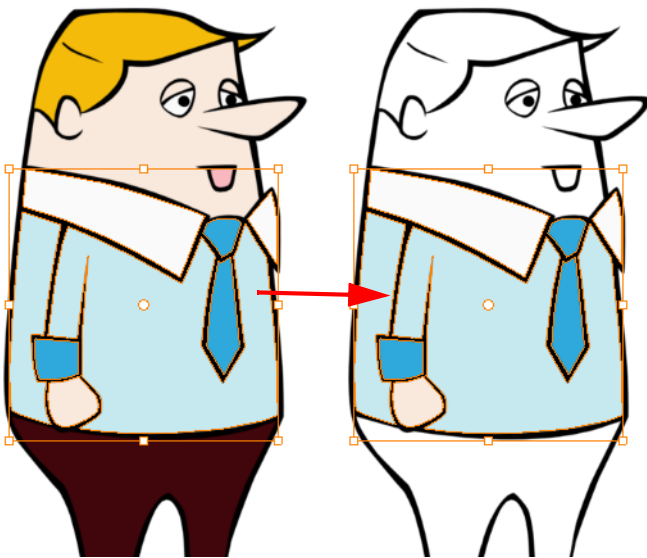
To use the Unpaint Selection On All Drawings command:


- ▶ Select Drawing > Paint > Unpaint Selection On All Drawings.



Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects and using the Permanent Selection option.

Unpaint Outside Selection



The Unpaint Outside Selection command is used to unpaint any art existing outside a selection. If no selection have been drawn using the Select  tool, the entire drawing will be unpainted.

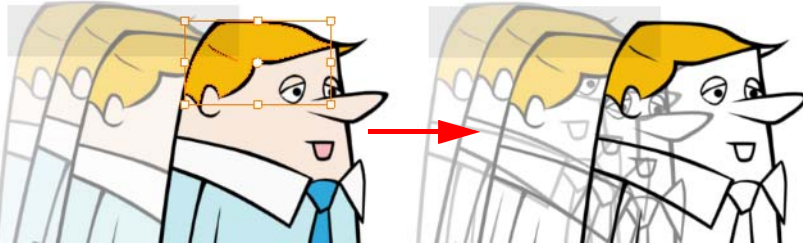
To use the Unpaint Selection command:



- ▶ Select Drawing > Paint > Unpaint Outside Selection.



Refer to *Drawing and Animating > Selecting Drawing Objects*, on page 108 to learn more about selecting drawing objects.

Unpaint Outside Selection On All Drawings



The Unpaint Outside Selection on All Drawings command is used to unpaint all art outside a selection on all the drawings within the same layer. You must enable the Permanent Selection  option in the Select tool Tool Properties view and then draw a selection in your drawing using the Select  tool in order for this command to be available. The Permanent Selection option is used to maintain the same selection throughout the drawings of a same layer.

To use the Unpaint Outside Selection On All Drawings command:


- ▶ **Select Drawing > Paint > Unpaint Outside Selection On All Drawings.**




Refer to Drawing and Animating > Selecting Drawing Objects, on page 108 to learn more about selecting drawing objects and using the Permanent Selection option.

Selecting a Colour in a Drawing



While working in your Camera or Drawing view, you can use the Dropper  tool to pick a colour from your drawing without going to the Colour view.

To use the Dropper tool:

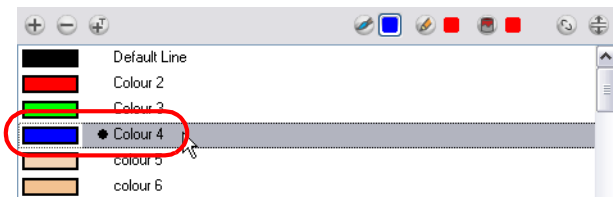
1. In the Tools toolbar, select the Dropper  tool. The default keyboard shortcut is [Alt]+[I]. You can also select the Dropper tool from **Drawing > Tools > Dropper** in the top menu.
2. In the Camera or Drawing view, click on the desired colour.
 - ▶ If you are using another drawing tool such as the Paint tool, you can temporarily hold down the [I] key and click in your drawing before releasing the key to pick your colour. Once you let go the hot key, Harmony Stage will go back to your previous tool.

You may also want to select the zones painted with the colour currently selected in the Colour view. This can be useful to remove rough lines from a clean drawing.



To select the zones painted with the current colour:


1. In the Colour view, select the colour you want to select the corresponding zones from.




2. Select **Drawing > Select Strokes with Current Colour**. The default keyboard shortcut is [Ctrl]+[Shift]+[A] for (Windows/Linux) or [⌘]+[Shift]+[A] for (Mac OS X).

Editing Gradients and Textures



If you paint a zone with a gradient or texture colour you can use the Edit Gradient/Texture  tool to modify its position in the zone. You can move, scale, rotate and skew. If you have to match the colour to the animation, you can set the first texture position and copy the Edit Gradient/Texture position. When moving to the next drawing, you can select the next texture and paste the previous position to continue the modifications.

To use Edit Gradient/Texture tool:

1. In the Tools toolbar, select the Edit Gradient/Texture  tool. You can also select this tool from the top menu under **Drawing > Tools > Edit Gradient/Texture**. The default keyboard shortcut is [Shift]+[F].
2. Click on the Gradient or Texture zone to be modified.



Linear Gradient



Radial Gradient

- ▶ If you want to modify several areas at once, hold down the [Shift] key and click in the zones to be modified.



3. Move the edit texture's anchor points to the desired result.
 - ▶ If the same modification needs to be applied to another gradient in another drawing or texture zone, you can select the modified zone and select **Edit > Copy**. Select the zone to be modified in the other drawing and select **Edit > Paste**.


Storing your Favourite Gradient or Texture Settings

If you are painting a hand-drawn animation or if you want the Brush tool and Paint tool to use your gradient's position, angle and scale settings instead of the default ones, you can store your own settings and reuse them afterward.




To store your gradient and texture settings:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
2. In the Camera or Drawing view, select the Gradient or Texture zone to store.

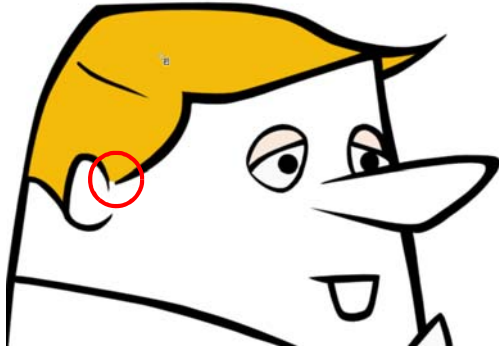



3. In the Tool Properties view, click on the Store Colour Gradient  button.

To use the stored gradient and texture settings:

1. In the Tools toolbar, select the Brush  or Paint  tool.
2. In the Tool Properties view enable the Use Stored Colour Gradient  button.
3. In the Camera or drawing view, draw and paint.



Closing Gaps Manually



When painting, you will notice that some of your drawing areas are not closed. To close the zone you can either draw the missing line with the Brush or Pencil tool, but you can also close the gap with an invisible line. To do so, you will use the Close Gap  tool.

The Close Gap tool is used to close small gaps in a drawing. The Paint tool only paints closed areas. The Close Gap tool will create a small, invisible stroke between the two closest points to close the colour zone. You do not need to trace directly over the gap. You can draw it a few millimetres away and the Close Gap will automatically choose the two closest points and close the gap.

To use the Close Gap tool:

- In the Tools toolbar, select the Close Gap  tool. You can also select the Close Gap tool from the top menu under **Drawing > Tools > Close Gap**. The default keyboard shortcut is [Alt]+[C].
 - ▶ Enable the Auto-Flatten  option in the Tool Properties view if you want the stroke you will draw to be flattened in your drawing instead to be on top.
 - ▶ You can display the invisible lines with the **Show Strokes** option under **View > Show Strokes**. The default shortcut is [D].
 - ▶ If you do not display the strokes, a Message dialog box will appear.



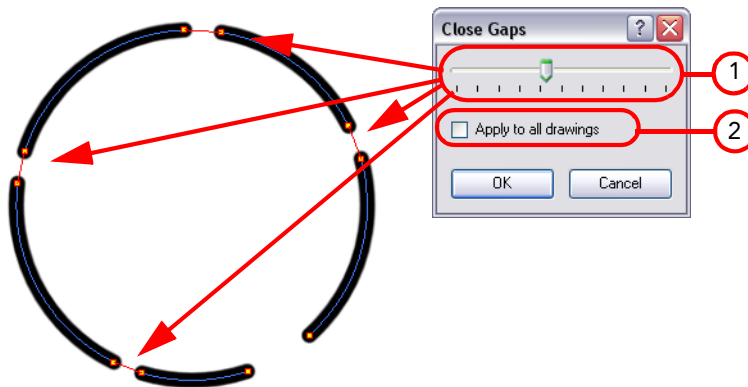
Enabling the *Don't Show This Message Again* option prevents this Message dialog box from appearing.

- In the Camera or Drawing view, trace an invisible line near to the gap to be closed. The gap will automatically close.



Close Gaps

When you have too many gaps in your drawings you can use the Close Gaps feature in Harmony Stage.



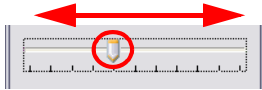
- **1. Close Gaps slider:** Use this slider to determine the size of the gap you want to be closed. Move the slider to the left for smaller gaps and move it to the right for bigger gaps.
- **2. Apply to all drawings:** Enable this option so that the Close Gaps feature is applied to all the drawings of the selected layer.

To use the Close Gaps feature:

1. Enable the Show Strokes option so that you can view a preview of the result as you select the Close Gaps settings, select **View > Show Strokes** or use the default keyboard shortcut [D].
2. Select **Drawing > Clean Up > Close Gaps** or use the default keyboard shortcut [Shift]+[F10].

The **Close Gaps** dialog box opens.

3. Move the slider until you reach the desired result.



4. Enable the **Apply to all drawings** option if need be.



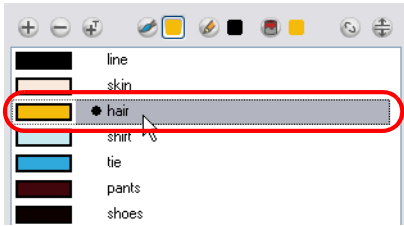
5. Click on the OK button.

Protecting Colours

When you are finished painting some zones, you can protect the colour swatch they are associated with so the work cannot be accidentally painted over.

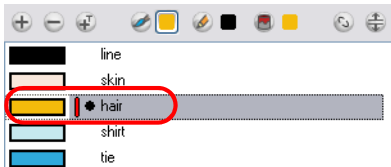
To use Protect Colour:

1. In the Colour view, select the colour to be protected.



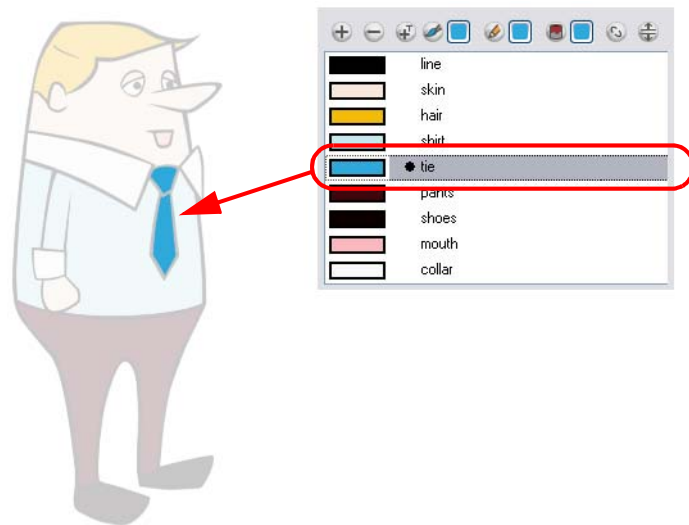
2. In the Colour View menu, select **Colours > Protect Colour**. You can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selected colour and select **Protect Colour**.

A red bar will appear on the side of the colour, notifying you that it is locked.



Highlighting the Selected Colour

The Highlight Selected Colour option is used to identify colour pots used in a drawing. For example, if you have unnamed colours in your palette and you want to find out if a particular colour pot was used on the current model or drawing, you can select the colour pot and use the Highlight Selected Colour option. The system will wash out all the colours in the drawing except the selected one so that it stands out and can be identified. You can rename it accordingly.



To use the Highlight Selected Colour option:

1. In the Colour view, select the colour you want to highlight.
2. In the Drawing or Camera View menu, select **View > Show > Highlight Selected Colour**.

Line Art and Colour Art Layers

Harmony Stage has an option allowing you to paint the lines and the colour fills separately.

In Harmony Stage, a drawing is composed of four embedded layers:

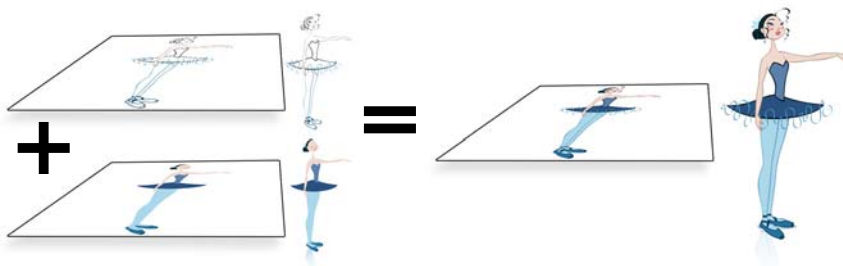
- Overlay Layer
- Line Art Layer
- Colour Art Layer
- Underlay Layer

By default, you draw on the Line Art layer. The colour layer is always placed under the Line Art layer. These layers are accessible in the Drawing or Camera View (using drawing tools). When you look at your final drawing in the Timeline, Xsheet or Network view, you will not see four layers; instead you will see the final composition of the lines and colours.

In general, you will use the Line Art and Colour Art layers. The Underlay and Overlay layers are used for advanced purposes.




Refer to the *Underlay and Overlay Layers* topic to learn more about these layers.






You can draw and paint in all layers, but if you prefer working in a single layer, you can do everything in Line Art.

The main advantage of using the Line Art and Colour Art option is so you can repaint the lines easily. If your colour fills are separated from the lines, it allows you to use the repaint tool and paint the lines without affecting the colour zones. Also, it allows you to paint tones and highlights in line art and then add some transparency to see the Colour Art through it.




In order to paint in the Colour Art, you must first use the *Create Colour Art from Line Art*  option to create colour zones in the Colour Art.

To toggle between Line Art and Colour Art and enable the Preview mode:

1. To toggle between Line Art and Colour Art:
 - ▶ In the Drawing view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Switch to Colour Art/Switch to Line Art**. The default keyboard shortcut is [L].
 - ▶ In the Drawing or Camera bottom toolbar, click on the Colour Art  button.
 - ▶ In the Drawing or Camera bottom toolbar, click on the Line Art  button.
2. To preview the Line and Colour Art at the same time:
 - ▶ In the Drawing view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Preview Line Art and Colour Art**. While using the Preview mode, you still edit one mode at a time. The default keyboard shortcut is [Shift]+[P].
 - ▶ In the Drawing or Camera bottom toolbar, click on the Preview  button. To be able to see only one of the layers at a time in the Camera view, you must enable the *Current Drawing on Top* option, available from the Camera bottom toolbar drop-down menu. If this option is not enabled, you will see the final composition of all four layers.




In order to edit both Line Art and Colour Art at the same time, you must enable the *Apply to Line Art and Colour Art*  button in the *Tool Properties* of the tools supporting the operation.

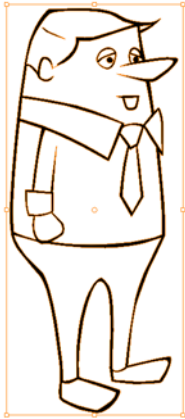
Creating Strokes to Paint Your Drawings on a Separated Layer

You can use the outline you traced on one of the four embedded layers and create invisible strokes to paint your drawings on separate layers, this provides more inking and painting flexibility.

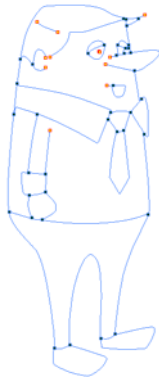
To do so, you must use the Create Colour Art from Line Art option. You can also configure the option to create the invisible strokes on any of the four embedded layers.

To create Colour Art zones out of the Line Art content:



1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt] + [V].
2. In the Camera or Drawing view, select the artwork to transfer to the Colour Art.



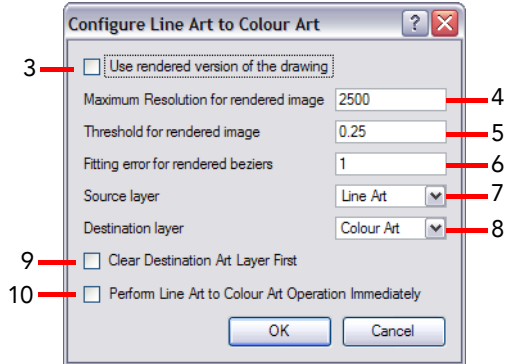
3. In the Drawing View toolbar, click on the Create Colour Art from Line Art  button. The default keyboard shortcut is [*].



To Configure the Line Art to Colour Art command settings:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt] + [V].
2. In the Tool Properties view, hold down the [Shift] key and click on the Create Colour Art from Line Art  button to open the Configure Line Art to Colour Art dialog box and modify the default settings of this command.

The **Configure Line Art to Colour Art** dialog box opens.



3. **Use rendered version of the drawing:** This option will render the drawing and vectorize it to calculate the position of the centreline that will produce the colour art stroke.
4. **Maximum Resolution for rendered image:** This is the size of the rendered image.
5. **Threshold for rendered image:** The value of grey processed to create the rendered vectorized arts.
6. **Fitting error for generated Beziers:** This value represents how precise the fitting of the colour art zone in relation of the line art will be.
7. **Source Layer:** In the Source Layer drop-down menu, select the layer (Line Art, Colour Art, Underlay or Overlay) you want the strokes to be created from.
8. **Destination Layer:** In the Destination Layer drop-down menu, select the layer (Line Art, Colour Art, Underlay or Overlay) you want the strokes to be created on.
9. **Clear Destination Art Layer First:** If you already have artwork on the destination layer and you want the content to be deleted before the strokes are added into it, enable this option.
10. **Perform Line Art to Colour Art Operation Immediately:** Enable this check box to perform the Create Colour Art from Line Art command when you click on the Ok button of this window.

Underlay and Overlay Layers

In Harmony Stage, you have two extra art layers available beside the Line Art and the Colour Art, the Underlay and the Overlay layers. The Underlay is situated at the very bottom and the Overlay at the very top.



Refer to *Drawing and Animating > More Drawing Layers*, on page 152 to learn more about the Underlay and Overlay layers and the Auto-Matte feature.



Underlay

The Underlay layer can be used like any other of the art layers available in the drawing, but since it is situated behind everything else, you can use it to create a matte for a quick line-test, write notes or store your rough animation.



Overlay

The Overlay layer can be used as any other of the art layers available in the drawing, but since it is situated on top of every other, it can be useful for writing notes about the colour model or animation or to draw the highlight and tone shapes.

Verifying Zones are Painted


When the painting process is completed, you should verify that each zone was painted correctly.

The Backlight feature produces a silhouette effect by changing the drawing's coloured areas into a single dark, solid colour use this to verify the completeness of the ink and paint process. Any unpainted zones can be seen as the light shows through the unpainted areas of the silhouetted drawing.

To use the Backlight:

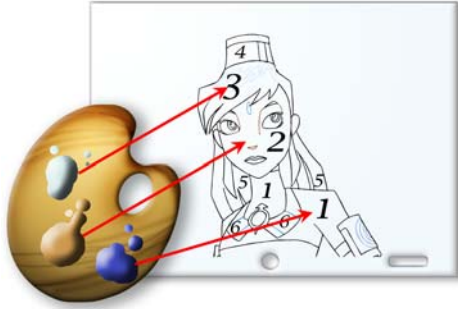


This feature is only available in the Drawing View.

1. In the top menu, select **View > Backlight**. The default keyboard shortcut is [Ctrl]+[Shift]+[C] (Windows/Linux) or [⌘]+[Shift]+[C] (Mac OS X). You can also click on the Backlight  button available in the Drawing View toolbar.
2. Verify the drawings in the Drawing view.



Palettes



In colour animation, specific colours are used to paint each particular character. In order to maintain absolute consistency, a colour palette is created for each character, prop and effect throughout the production. These are referred to as master palettes.

Master palettes contain a colour pot for each zone to colour with a precise RGBA colour value.

Using a master colour palette has many benefits, including:

- Each character consistently retains their dedicated colours.
- You cannot accidentally use a colour which is not in the master palette.
- Standardization and colour consistency throughout the production
- Multiple artists can use the same colour palette and produce the same results.

Harmony Stage uses palettes to hold all of the colours needed to paint your elements, allowing complete control and consistency in your painting process.

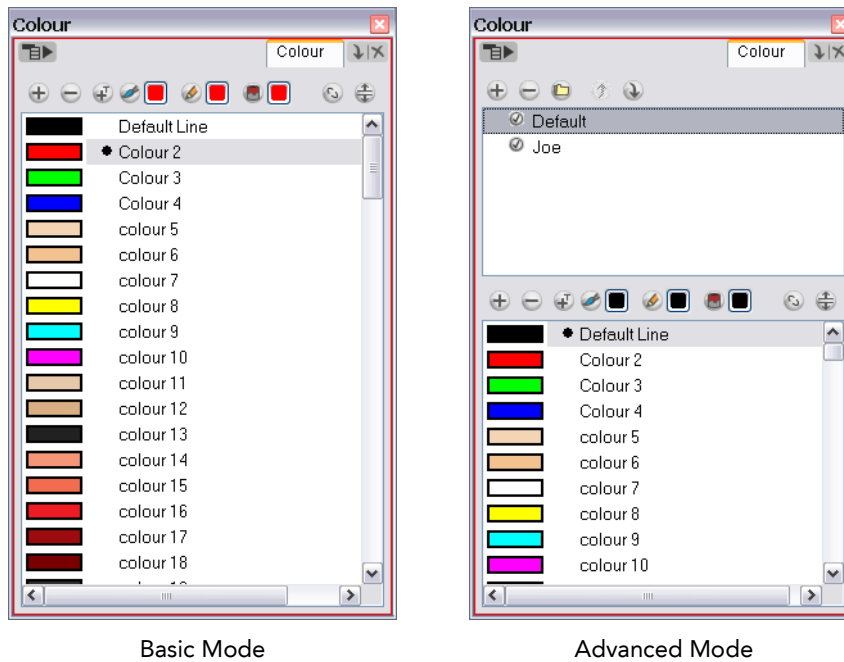
A palette is created by assigning a set of colours to each character, prop or effect. You will create a new palette and add a new colour, known as a colour swatch, for each zone of the character, such as the skin, hair, tongue, shirt, pants, etc.

This topic is divided as follows:

- Displaying the Palette List, on page 200
- Creating a Colour Palette, on page 203
- Copying and Pasting Colours, on page 205
- Removing a Colour Palette, on page 205
- Duplicating a Colour Palette, on page 206
- Cloning a Colour Palette, on page 206
- Mixing the Colours, on page 208
- Importing a Colour Palette, on page 209
- Linking a Colour Palette, on page 209
- Linking your Master Palette, on page 210
- Ordering the Palette List, on page 212

Displaying the Palette List

The Colour view has two modes: basic and advanced.



Basic Mode

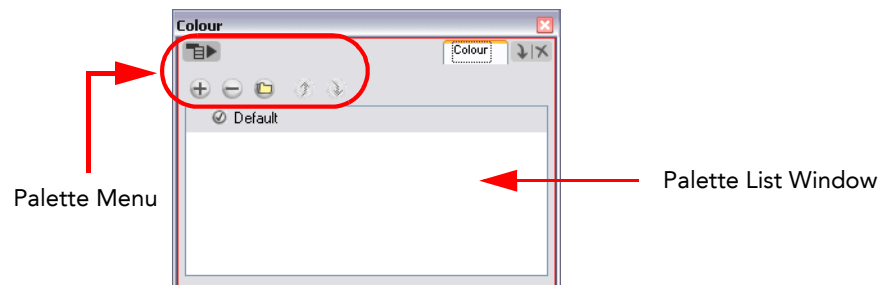
The Colour view's basic mode only shows the Colour list. When you open Harmony Stage, you only see the colours available in the default palette. This default palette contains six basic colour swatches and is automatically named the same as your scene. For simple projects, you can manage with the default palette, but for movies, series or shorts it is recommended that you create palettes for your characters. To create a palette, you have to switch to the advanced display of the Colour view and show the Palette list.

Advanced Mode

To create palettes for your characters, you must display the Palette list. Once you display the Palette list area, a series of new buttons appear.

To show or hide the Palette List area:

1. In the Colour view, click on the Show/Hide Palette List View  button to expand or collapse the Palette List area.



- Each palette you add in your scene will appear in the Palette list.
- You can add, delete, import and order palettes in your scene using the Palette menu buttons.

Palette File Storage

In Harmony Stage, palettes are individual *.plt files that can be copied, transferred and stored. When a palette is created, it needs to be stored somewhere. Harmony Stage is set on **Basic Palette Lists mode** which saves the palette at the Scene level.

The palette file is always saved in the scene directory and stored in a Palette Library folder. There are four locations where you can find Palette Library folders: Element, Scene, Job and Environment folders.

- **Element:** The Palette Library folder is stored directly in the Drawing Element (Layer) folder.
- **Scene:** The Palette Library folder is stored directly in the Scene folder.
- **Job:** If you are working with Harmony Stage as a stand alone version, the Palette Library folder is stored in a Job folder contained within the Scene folder.
- **Environment:** If you are working with Harmony Stage as a stand alone version, the Palette Library folder is stored in an Environment folder contained in the Scene folder.

This existing structure is compatible with Toon Boom Harmony Server. Toon Boom Harmony's database has a leveled structure starting from the Environment down to the Element. They have a client-server configuration that allows all data, such as palettes and scenes, to be shared between a series of client machines.

In Harmony Stage, you can switch from Basic Palette Lists Mode to Advanced Palette Lists Mode and choose the folder level you want to save your palette files to.



Refer to the Harmony Network User Guide to get more information about where to store your palettes and what are the advantages and disadvantages of each storage level.

Element Level

Working with Harmony Stage stand alone, the Element level is very useful when there are a lot of different palettes. When a colour model drawing is created, it is stored in its element folder. By storing the corresponding palette file with the colour model, the colourist is able to load them both from the same location. This also creates a more organized structure.

Scene Level

Working with Harmony Stage stand alone, a palette file can also be saved at the scene level so that all of the palettes from the scene are stored together. The palette naming will have to be structured so that the colourist or character builders can find the correct one. Saving the palettes at the scene level makes it very easy to backup the palettes and retrieve their location.

The scene level can also be useful for Cut-out animation. Instead of creating a colour model scene that includes all of the characters, props, effects, and location, the colour palette or model will often be directly imported to, or created in, the character building scene. Just as with a Cut-out character building scene, each element uses the same palette so it would not be efficient to save the palette inside one element. Instead, it is saved at the scene level. This prevents a palette overload because all of the models are in different scenes. It also allows each scene its own set of palettes corresponding to its model.

When working on a cut-out animation production, it is highly recommended to work with the Scene level.

Drawing Element (Layer) Palette List

Each Drawing Element (Layer) has a palette list.

Each Drawing Element can contain several characters; some may have props. To paint these, the colourist will need the characters' and props' palettes. Instead of copying the required palette each time it is needed, you can simply link it to the appropriate Drawing elements. The palette list is the connection between the Drawing element and the different palettes.

Scene Palette List and Element Palette List

There are two types of palette lists:

- Scene Palette List
- Element Palette List



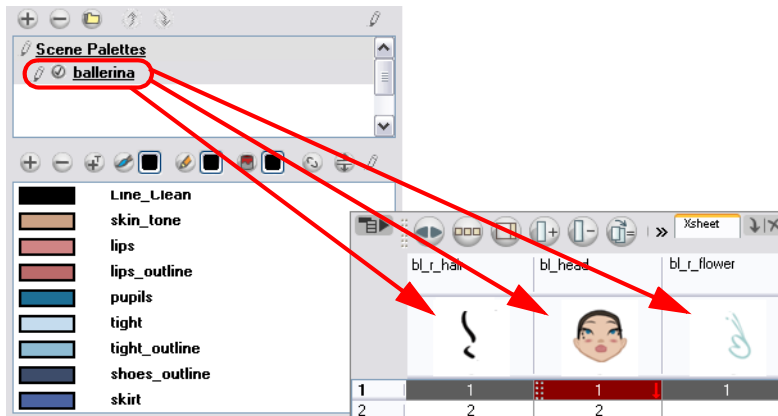
Refer to the *Preferences* topic in this chapter to learn how to enable and disable the *Element Palette List mode*.

Scene Palette List

The Scene Palette List is mainly used with Cut-out animation. A cut-out character will often be divided in twenty to thirty different drawing elements that use the character's master palette.

The palette list is stored at the scene level instead of the Element directory. This way, all palettes linked to this list will appear in every drawing element created in the scene. There is no need to manually load the palette in each element.

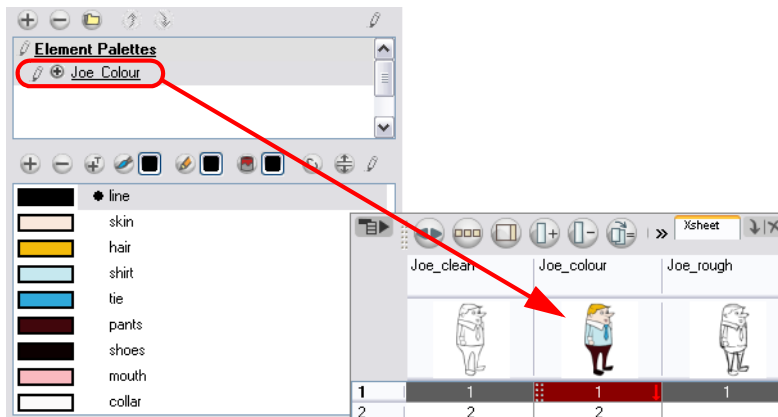
The Scene Palette List is the simplest one to use. By default, Harmony Stage is set to use only Scene Palette Lists.



Element Palette List

In Harmony Stage, you can switch to Advanced Palette Lists mode and choose to save your Palette at an element's level. The Element Palette List is mainly used with Traditional and Paperless animation. Unlike Cut-out animation, all columns (drawing elements) contain different characters, props, backgrounds and effects. The Element Palette List is used because you do not necessarily want all of the palettes for all of your elements linked in every column.

The palette list is stored in the drawing element's directory instead of directly in the Scene level. This ensures that the links to the palettes appear only in the appropriate element. If you prefer to access a global palette list, link your palettes to the Scene Palette List.



Refer to the *Creating a Colour Palette* topic to learn how to create an element palette using the *Advanced Palette Lists mode*.

Creating a Colour Palette


You can create a palette in either basic or advanced mode:

- Basic Palette Lists Mode
- Advanced Palette Lists Mode

By default, Harmony Stage is set on basic mode. For simple productions, it is recommended to use the basic mode. For more advanced productions, it is a good idea to explore the possibilities of the advanced mode.

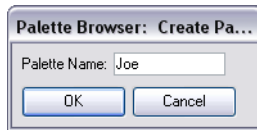
Basic Palette Lists Mode

To create a new palette (Basic Palette Lists mode):

1. In the Colour View menu, select **Palettes > New** or click on the New Palette  button.

The **Create Palette** window opens.

2. Enter the Palette Name according to the model.



3. Click on the OK button.

The palette appears in the drawing element's palette list.

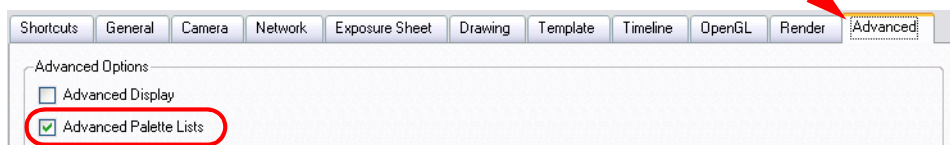


Advanced Palette Lists Mode

To use this method, you first need to set your preferences to Advanced Palette Lists mode in the Preferences Panel.


To set the **Advanced Palette Lists mode**:

1. Select **Edit > Preferences** (Windows/Linux) or **Harmony Stage > Preferences** (Mac OS X) to open the Preferences panel. You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
2. In the Advanced tab, enable the Advanced Palette Lists option.

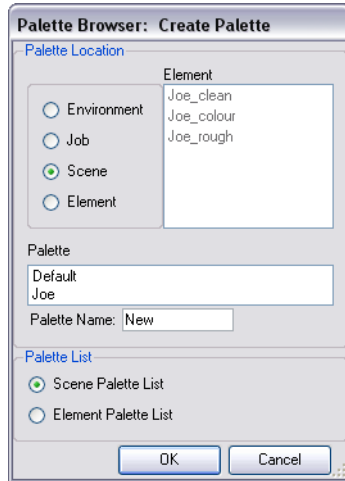


3. Click on the OK button.

To create a new palette (Advanced Palette Lists mode):

1. In the Timeline or Xsheet View, select the drawing that requires the palette.
2. In the Colour View menu, select **Palettes > New** or click on the Create Palette  button.

The Palette Browser: Create Palette window opens.



- ▶ **Palette Location:** Select which location to store the palette file to.
 - ▶ **Element:** Displays the drawing layers in your scene.
 - ▶ **Palette:** Displays the palettes available in the currently chosen storage folder.
 - ▶ **Palette Name:** Name the new palette.
 - ▶ **Palette List:** Select either Scene or Element Palette List.
3. Click on the OK button.
The palette is created.



Refer to the *Palette File Storage and Drawing Element (Layer) Palette List* topics to learn more about palette storage location as well as scene and element palette lists. You can also read more about this in the *Harmony Network User Guide*.

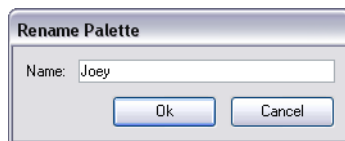
Renaming a Colour Palette

To rename a palette:

1. In the Colour view, select the palette to rename.



2. In the Colour View menu, select **Palettes > Rename**.
3. In the Rename dialog box, rename the palette.



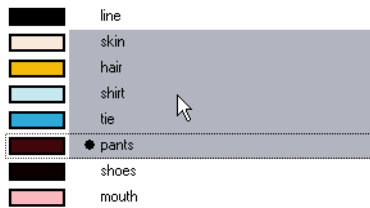
4. Click on the OK button.

Copying and Pasting Colours

When you are creating palettes, you may want to copy colour swatches or their values and paste them in other palettes to save time.

To copy and paste colours

1. In the Colour view, select the colour to copy.



2. In the Colour View menu, select **Colours > Copy**. The default keyboard shortcut is [Ctrl]+[C] (Windows/Linux) or [⌘]+[V] (Mac OS X).
3. In the Palette list, select the palette in which you want to paste the colours.
 - A screenshot of the Palette list showing four palettes: Default, Joey, Mike, and Joe. The 'Mike' palette is selected, indicated by a dashed border.
4. In the Colour View menu, select **Colours > Paste as New Colours**. The default keyboard shortcut is [Ctrl]+[V] (Windows/Linux) or [⌘]+[V] (Mac OS X).
 - ▶ If you want to paste the colour values of the copied swatch over an existing colour swatch, select **Colours > Paste as Values**.

Copying Colours from Another Palette

In Harmony Stage you can quickly copy a colour value from a palette in your scene to a selected colour swatch in a different palette.

To use Copy Colour From:

1. In the Colour view, select the colour swatch you want to copy the colour into.
2. In the Colour View menu, select **Colour > Copy Colour From**, then select the palette where the colour you want to copy is listed and finally select the colour.

The selected colour swatch will immediately change to this new colour.


Removing a Colour Palette

You can remove palettes from your Palette list if they are not needed in your scene. The actual palette file will not be deleted and you will be able to reimport it in your Palette list later on.

To remove a palette:

1. In the Colour view, select the palette to remove.



2. In the Colour View menu, select **Palettes > Remove** or click on the Remove Palette  button.
 - ▶ If the palette was in use in your scene, the zones painted with its colours will turn red.



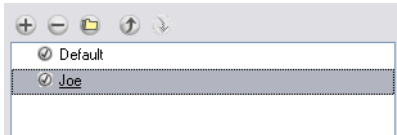
Duplicating a Colour Palette

A duplicate palette uses the same names, colour values, but has a different ID and is independent from the original palette. This ensures that both palettes are completely independent.

This option is used when there are similar models and you want to avoid recreating and naming all of the colours. You can change the values and the names afterward. You can also keep some RGBA values, such as the eyes, teeth, tongue, inside mouth, etc.

To duplicate a palette:

1. In the Colour view, select the palette to be duplicated.



2. In the Colour View menu, select **Palettes > Duplicate**.

The **Palette Browser: Duplicate Palette** window opens.

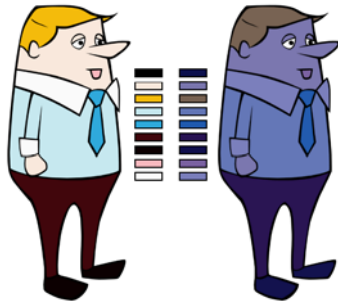


3. Name the palette appropriately.
4. Click on the OK button to create the palette.

The palette appears in the palette list.



Cloning a Colour Palette

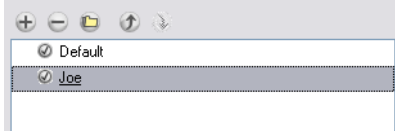


A character usually has only one master palette, although there are times when the characters are placed in different lighting conditions and require a different colour shading. The night palette is a popular choice when a scene or sequence changes from day to night. It can be difficult and time-consuming to repaint everything and creating two independent palettes can be quite complex. As an alternative, Harmony Stage provides Clone palettes.

The clone palette is a copy of the master palette. The colours in each palette have the same properties. The colours have the same identification number pointing to the same colour zones, but they can have different names and RGBA values. Depending on the activated palette (night or day), the painted drawing will update. So there is no need to repaint the animation, but to create or import a clone palette (palette style).

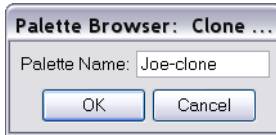
To clone a palette:

1. In the Colour view, select the palette to be cloned.



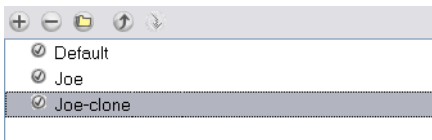
2. In the Colour View menu, select **Palettes > Clone**.

The **Palette Browser: Clone Palette** window opens.



3. Name the palette. *(It is recommended to keep the suffix "-clone" in the name.)*
4. Click on the OK button to create the palette.

The clone appears in the palette list.



In the Colour View, you can also modify the colours individually by using the Colour Picker window or all at once using the Tint Panel window.



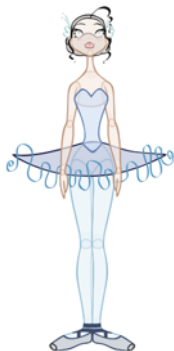
Refer to the [Mixing the Colours](#) topic to learn how to offset your cloned palette's colours.



If there is more than one clone palette loaded, the system will use the one highest in the palette list.



When you want to see through painted drawings, but still see the outlines, you can create a clone palette where you set a lower alpha value on all of the filling colours. This trick can be handy when setting pivot points on cut-out puppets.



Cloning a Colour Swatch

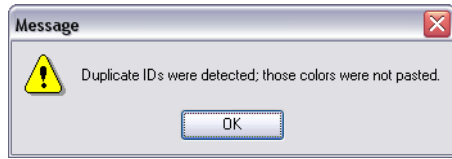
In Harmony Stage, you can copy a selected colour swatch and paste it as a clone.

To clone a colour swatch:

1. In the Colour view, select the colour swatch you want to clone.
2. In the Colour View menu, select **Colours > Copy**. You can also use the default keyboard shortcut [Ctrl]+[C] (Windows/Linux) or [⌘]+[C] (Mac OS X).
3. In the Colour view, select the colour palette you want to paste the clone into, or create a new palette.
4. In the Colour View menu, select **Colours > Paste as Clone**.

The cloned colour swatch appears in the palette.

Since it produces a clone colour swatch, it is impossible to use the Paste as Clone command in the same palette as you copied the original colour swatch from. If you try to do it, a **Message** dialog box will open as a reminder.

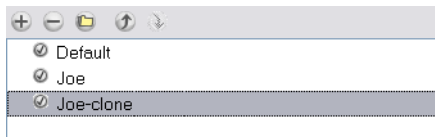


Mixing the Colours

If you want to modify a series of colour at once to blend a tint in them or offset their RGBA values, you can use the Tint panel. The Tint panel is quite useful when creating palette styles such as night and day styles.

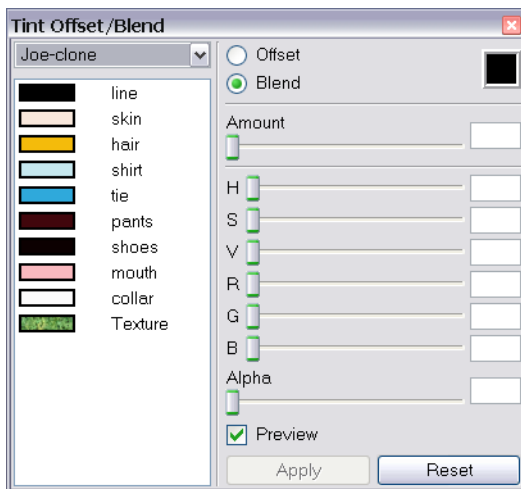
To mix colours:

1. In the palette list, select the palette to offset or blend colours in it.



2. In the Colour View menu, select **Palettes > Tint Panel**.

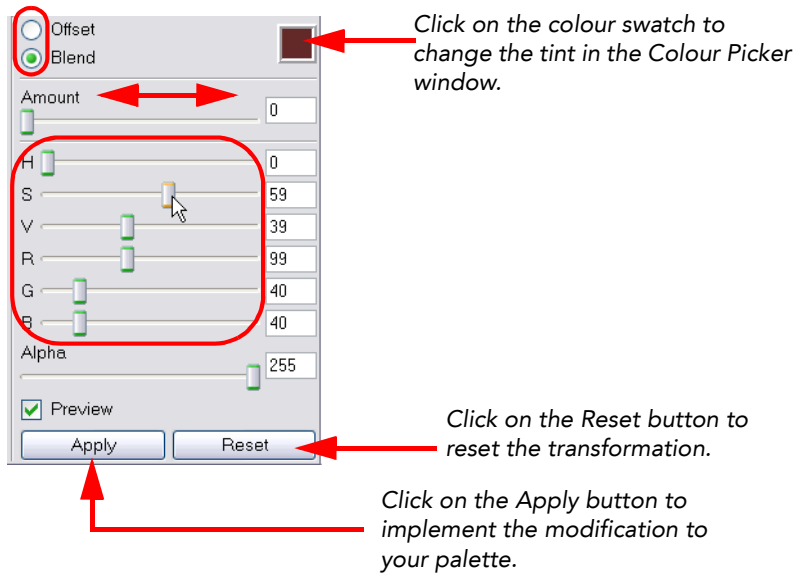
The **Blend/Offset Tint** panel opens.



3. Select one or more colours to be modified in the colour list. You can select all your colours by pressing [Ctrl]+[A] (Windows/Linux) or [⌘]+[A] (Mac OS X).



- Offset or Blend the colours using the sliders and increase the amount.



- Click on the Apply button.
- Close the Tint Panel window.

Importing a Colour Palette

If you created a palette in another project and you would like to import it in your current project, you can browse for the palette file on your computer and add it to your project. When the palette is imported in your scene, the file is copied in the project's directory. It is not linked to the original file.

To import a palette into your project:

- In the Colour View menu, select **Palettes > Import** or click on the Import Palette  button.

The **Browser** window opens.

- Browse for a palette file located on your hard-drive. You will generally find the palettes in your projects' Palette-Library directory.
- Click on the Open button.

The palette appears in the Palette list.



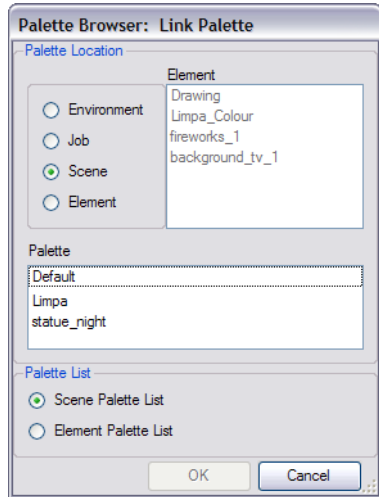
Linking a Colour Palette

You can link your palette list to a palette file stored within the Harmony structure.

To link a colour palette:

- In the Colour View menu, select **Palette > Link**.

The Palette Browser window opens.



2. Select the level where the palette file is stored. (Usually Scene or Element)
3. Select the Scene or Element palette List. See Scene Palette List and Element Palette List topic for more information.

The palette appears in the Colour view.

Linking your Master Palette



Since Harmony Stage is a stand-alone application, every scene is local to the machine. This means that all of the scene's data is only accessible from that particular scene. Palettes are also local to the scene: they can be shared between all drawing layers, but not between scenes.

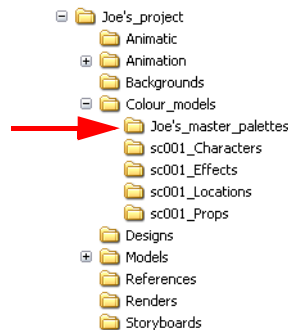
However, some users may want to share their palettes across a whole project. Harmony Stage offers that possibility.

By default, a palette is an independent file stored in your Harmony Stage scene. This file can be copied, moved or deleted.

To fully link a palette throughout an entire project, you need to create a central directory where you can copy all of the palettes you have created. Every time you link a palette in an element, it is linked to this folder. If you modify the palette, it will be updated throughout the whole project.

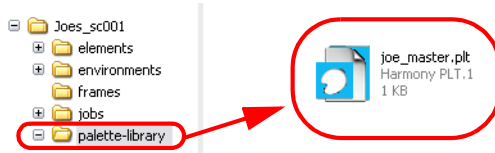
To link your master palette:

1. In the Colour view, click on the Create Palette  button to create your master palette.
2. Save your scene by selecting **File > Save** from the top menu or by clicking on the Save  button. The default keyboard shortcut is [Ctrl] +[S] (Windows/Linux) or [⌘]+[S] (Mac OS X).
3. In your operating system, create a master directory. Ideally, this should be created in your Root folder to keep it within the project directory. You could also place it inside your Colour Model's subdirectory.

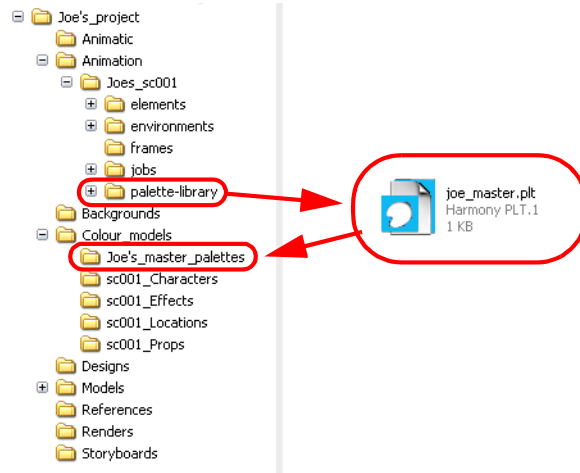


4. Name the folder appropriately, for example: **Joe's_master_palettes**.

- From your operating system, browse to your Harmony Stage scene and open the palette-library folder.



- Select and copy your palette.plt file to copy it to the master palette directory.

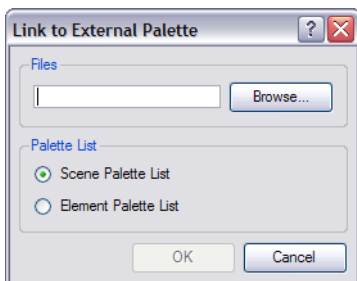


- Create a new Harmony Stage scene or open the scene where you will link this palette.
- In the Timeline or Xsheet view, select the element to link the palette to.



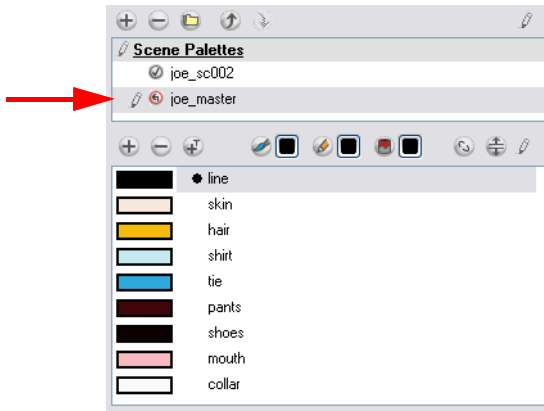
- In the Colour View menu, select **Palettes > Link to External**.

The **Link to External Palette** dialog box opens.



- ▶ **Files:** Click on the button to browse to your master palettes folder and select the palette.plt file you want to link.
 - ▶ **Palette List:** Select either you want to load this palette at scene or element level.
- Click on the OK button.

The linked palette appears in your Colour view.







If a palette is outside the scene, the External  icon appears beside the palette name.



To link an element (such as a colour model) to the palette that is stored in the external Palette directory, you must remove the original palette from the element's palette list. You will then load the duplicated palette into the palette list using the Link to External command, like you did for the other elements.

Palette Linkage Status Icons


You will also notice that when you create or link a palette, a small icon will appear on its left. These icons represent the palette linkage status.

-  Indicates a potentially dangerous situation. Problems may occur when trying to export or link to the palette file. For example, a palette file is stored into the element folder and is linked to the Scene Palette list. The issue in this case is that if you decide to delete the layer containing the palette, you will lose it from your scene.
-  Indicates that the palette is safe. There won't be any trouble once the scene will be exported. For example, the palette file is stored in the scene folder and is linked to the Scene Palette List.
-  Indicates that the palette file is stored in a directory external to the scene's structure. The palette file is probably stored in a Master Palette directory on a hard drive external to the palette-libraries planned for the palette storage. The warning in this case is that if you move your Master Palette directory to another location, you may lose the palette in your scene.
-  Indicates that a palette file stored in a level such as Element, Scene, Job or Environment is linked to a Palette list that is not on the same level. For example, a palette file is stored into the Environment folder and is linked to the Element Palette list. The palette is shared.

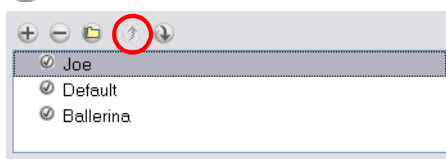
Ordering the Palette List

When you are using several cloned palettes that are related to the same original palette, Harmony Stage uses the highest palette in the list to determine the colour of the painted zones.

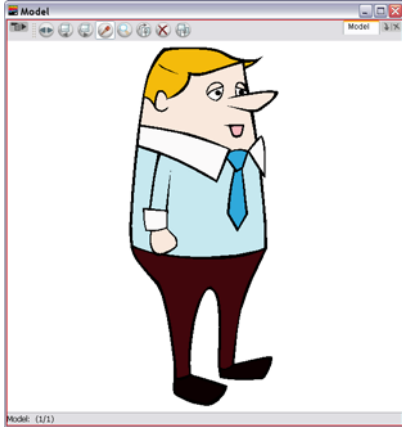
To reorder palettes in the Palette list:

1. In the Colour View menu, select **Palettes > Move Up** or **Move Down**. You can also use the Up  and Down

 icons.



Colour Model



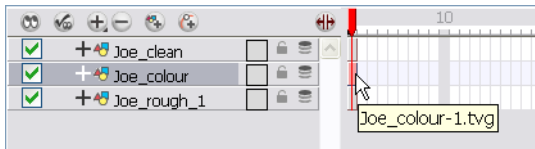
Once you have a fully painted drawing, you are able to use it as a colour model and load it in the Model view. That drawing can be used and loaded in any of your Harmony Stage scenes. You can also load drawings that were created in Toon Boom Digital Pro, Toon Boom Pencil Check Pro, Toon Boom Animate Pro or Toon Boom Animate. As long as the drawing is a TVG format, you can load it in Harmony Stage.


Once a drawing is loaded in the Model view, you can click on the colours and directly paint in your Camera or Drawing view without having to pick the colours in the Colour view.

Loading a Colour Model


To load a colour model from your Timeline or Xsheet view:

1. In the Timeline or Xsheet view, select the desired drawing.




2. In the Model View menu, select **Use Current Drawing**. You can also click on the Use Current Drawing  button available in the Model View toolbar's extra buttons. The model appears in the Model view.

To browse for a colour model drawing on your hard drive:

1. In the Model View menu, select **Import**. You can also click on the Import Model  button or from the top menu, select **File > Import > Model**.
2. In the Browser window, browse for any *.tvg drawing file available on your hard drive.
3. Click on the Open button. The model appears in the Model view.

To load the Default models:

1. In your scene's folder, create a new folder and name it `models`.
2. On your hard drive copy the *.tvg drawing file you want to use as colour models in your scene.
3. In the Model View menu, select **Load Default Model**. You can also click on the Load Default Model  button.

To load a model from the Library view:

1. In the Library view, click on the template containing the drawing to import in the Model view.
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the template and select **Open As Folder**.
3. In the Library view's left side, select the template's folder.
4. In the Library view's right side, select the TVG drawing to import and drag it into the Model view.

To clear a colour model:

1. In the Model View menu, select **Clear Model** or use the keyboard shortcut [Delete].

Preferences

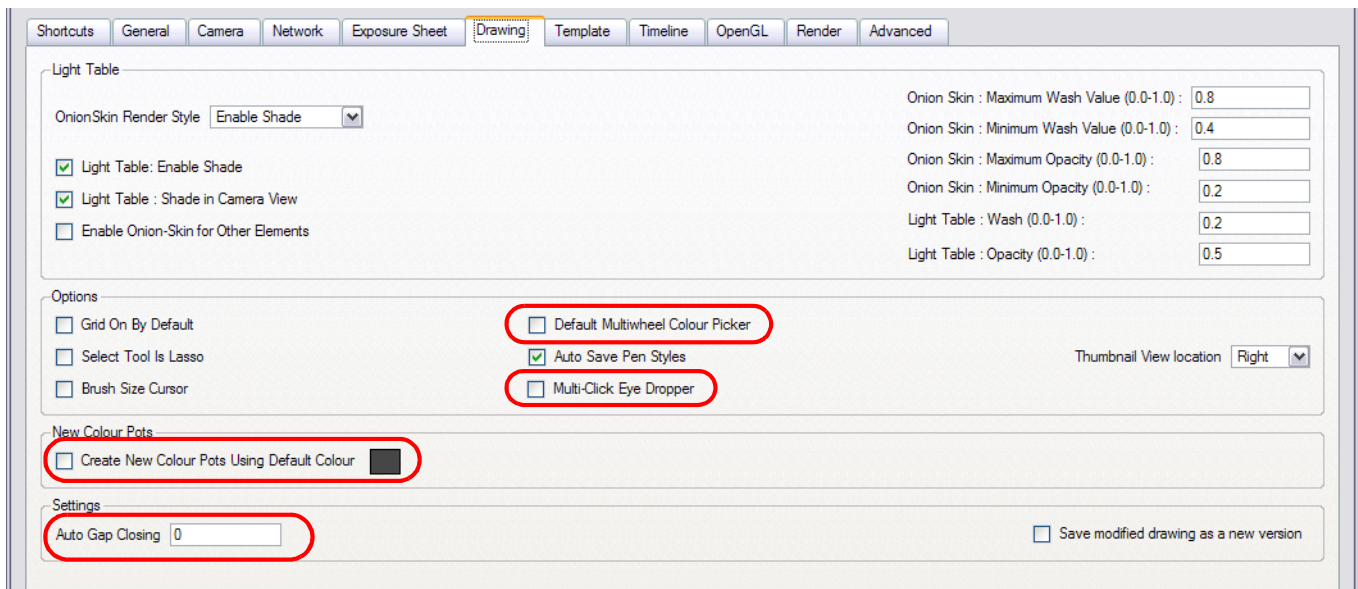
Adjusting preferences to suit your techniques allows you to paint your drawings more efficiently.

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Harmony Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

In the Preferences panel, you will find the following preferences that are related to adding colours to your project.

Drawing Tab



Default Multiwheel Colour Picker

Enable this option to display the Mutliwheel Colour Picker window instead of the regular Colour Picker.

Multi-Click Eye Dropper

Enable this option to keep the Colour Picker's Dropper tool active until it is released by clicking on the Dropper icon again.

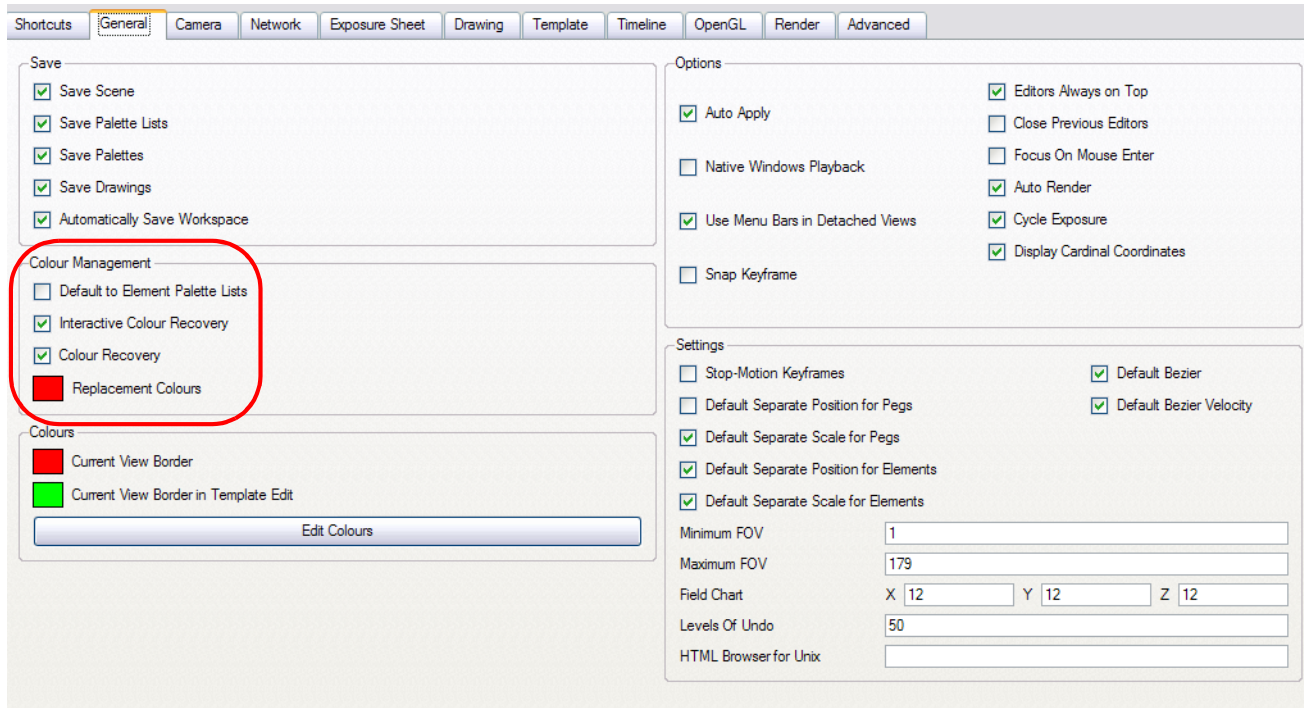
Create New Colour Pots Using Default Colour

Set the default colour for creating a new colour swatch and enable the option to use this default colour each time you add a new colour swatch in your palettes.

Auto Gap Closing

The values for automatic gap closing while painting drawings are:
0 = Disabled, 1 = Small, 2 = Medium and 3 = Big.

General Tab

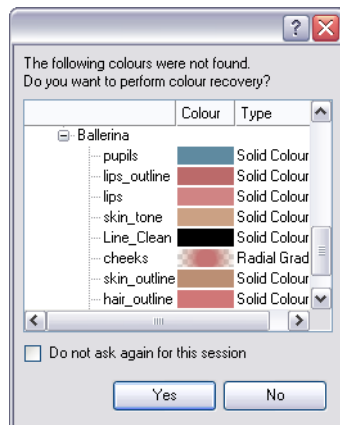


These preferences are the preferences available in the Harmony Stage stand-alone version.

Colour Management

In the General tab of the Preference panel, you will find the following options:

- **Default to Element Palette Lists:** When this option is enabled the new, cloned, duplicated, imported and linked palettes will be stored in the Element Palette list instead of the Scene Palette List.
- **Interactive Colour Recovery:** If a colour palette for your scene is deleted or cannot be found, you will be asked if you want to recover colours from the program's memory. If this option is unchecked, the program recovers missing colours without displaying a dialog box for your input.



- **Colour Recovery:** If this option is unchecked, colour recovery will not occur.
- **Replacement Colours:** If colours are no longer available for your scene, these colours are automatically replaced with the ones indicated by the Replacement Colour swatch. The default colour is red, as it acts as a missing colour warning device.

Advanced Tab

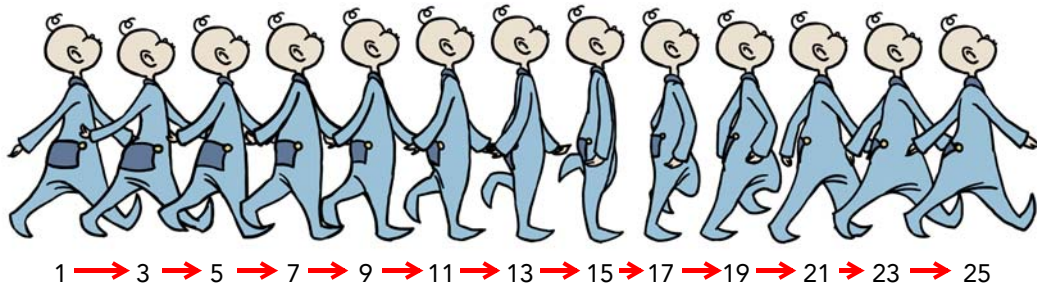


These preferences are the preferences available in the Harmony Stage stand-alone version.

Advanced Palette Lists

In the Advanced section, you will find the Advanced Palette Lists option. Enable this feature to switch your palette list to advanced mode. The Advanced Palette Lists mode is used to create and store palettes in the Scene or Element Palette List.

Chapter 6 Layers and Timing



When you create hand-drawn animation, it is important to know how to set and modify the timing of your drawings. You can adjust the timing in both the Timeline and Xsheet views, depending on which technique you are used to working with. If you are a digital animator, you will probably use the Timeline view, if you are more of a traditional animator, you will probably work with the Xsheet view (exposure sheet). Harmony Stage offers you both.

In this chapter, you will learn how to work on your drawing's exposure and length. The exposure and animation paths for Symbols are covered in separate chapters.

This chapter covers the following topics:

- Understanding the Timeline and Xsheet View, on page 218
- Frames, on page 225
- Layers, on page 228
- Filling Exposure, on page 248
- Navigating Between Frames and Columns, on page 265
- Managing Drawings, on page 267
- Tempo Markers, on page 271
- Annotation Columns, on page 272
- Printing the Xsheet, on page 276
- Element Manager, on page 278
- Preferences, on page 279



Refer to the following topics in the *Creating Animation Paths* chapter to animate with motion paths (pegs) and keyframes:

- Animating a Layer, on page 552
- Adding and Deleting Keyframes, on page 562
- Stop-Motion and Motion Keyframes, on page 564



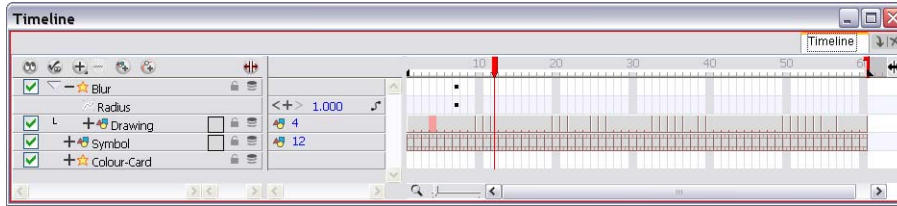
Refer to the following topics in the *Libraries, Symbols and Templates* chapter to change or duplicate a Symbol's timing:

- Editing a Symbol, on page 360
- Duplicating a Symbol, on page 361
- Using Paste Special, on page 369
- Expanding a Symbol, on page 372
- Paste/Drag and Drop, on page 373

Understanding the Timeline and Xsheet View

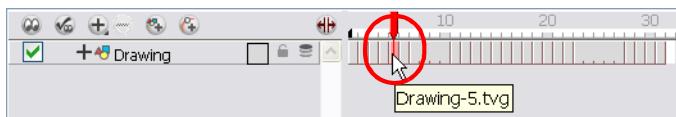
To set your animation timing, you will mostly work with the Timeline and Xsheet views. This section will help you become familiar with these views, how they work and the differences between them.

Timeline View

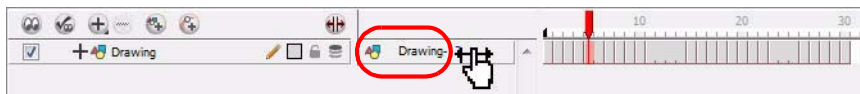


The Timeline view allows you to read your timing from left to right. It represents the scene's elements in their simplest form.

In the Timeline view you can see your layers and their names as well as the drawing's exposure. The drawing name is displayed when you place your cursor above the drawing's exposure.



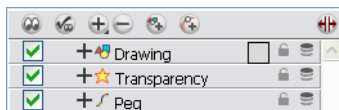
You can also see the drawing name once you display the Data view.



The Timeline view has three main sections:

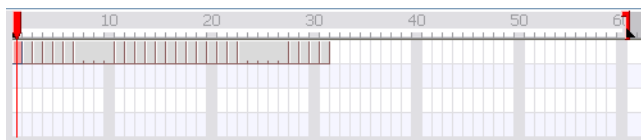
- Layer Section, on page 218
- Timing Section, on page 218
- Data View Section, on page 219

Layer Section



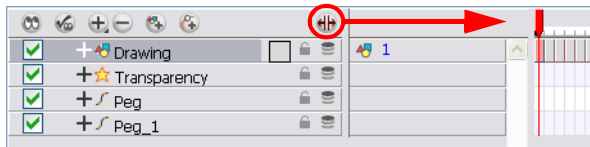
The Layer section is located to the left of the Timeline view. This is where you can add, delete, rename, reorder and parent layers. Any operation you do that affects the layer globally is done in this section.


Timing Section




The Timing section is located on the right side of the Timeline view. This is where you can increase and decrease a drawing's exposure, duplicate drawings, add blank cells, etc. Any operation you do that affects a drawing or its timing is done in this section.

Data View Section



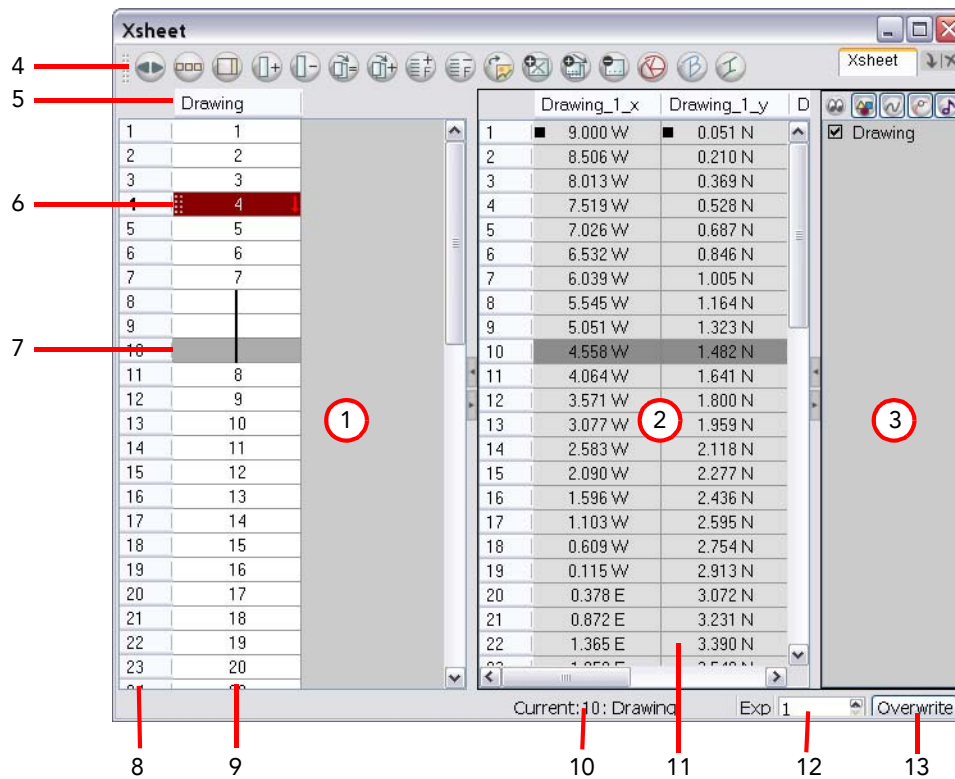
The Data View section is part of the Layer section. By default, the Data view is hidden. You need to press the Show Data View  button to display it.

The Data view allows you create new drawings by typing a new name in the Drawing Substitution field. You can also swap between existing drawings by sliding your cursor  to the left or right.



Refer to *Animating Your Puppets > Swapping Images*, on page 654 to learn more of the Drawing Substitution's functionality.

Xsheet View



- | | |
|------------------------|--------------------------------|
| 1. Xsheet Main Section | 8. Frame Numbers |
| 2. Functions Section | 9. Drawing Exposure |
| 3. Column List Section | 10. Current Frame Display |
| 4. Xsheet View Toolbar | 11. Function Column |
| 5. Column Header | 12. Increase/Decrease Exposure |
| 6. Current Drawing | 13. Overwrite/Insert Modes |
| 7. Current Frame | |
- These are described later in this section.*

In Harmony Stage, you will also find the Xsheet View menu  button in the top left corner. This button allows you to access commands related to the Xsheet view.

The Xsheet view lets you read your timing vertically, displays the drawing layers as columns and shows the drawing's name. You also see the functions and keyframes of the motion paths in the Xsheet's function columns. The value of

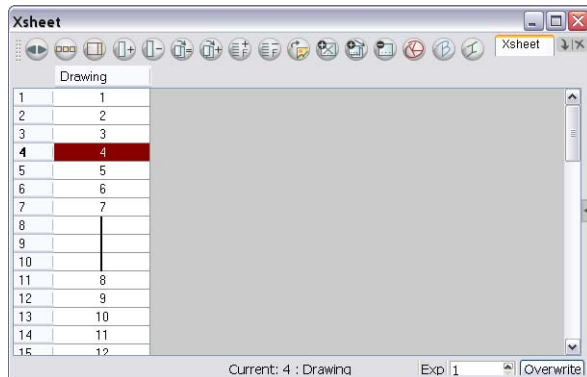
each keyframe is shown in the Xsheet view, these are black squares in the Timeline view. The Xsheet view has more details than the Timeline view, which is faster and easier to read.



Refer to the following topics in the *Creating Animation Paths* chapter to learn about keyframes and function columns:

- Adding and Deleting Keyframes, on page 562
- Stop-Motion and Motion Keyframes, on page 564
- Function Curves, on page 586
- Adjusting the Velocity, on page 598

Xsheet Main Section



The Xsheet view has three sections. By default, only the main section is visible. It displays the drawing layers, also known as drawing columns.

When using advanced compositing and animation techniques, unconnected functions (motion paths) also appear in the main section. Unconnected functions mean that some motion paths are not attached to any particular layer.

Drawing	Peg_x	Peg_y	Peg_z	Peg_velo
1	1	0.000	0.000	1.000
2	2			
3	3			
4	4			
5	5			
6	6			
7	7			
8				
9				
10				
11	8			
12	9			
13	10			
14	11			
15	12			

NOTE:

When you reconnect functions to a layer they are still visible in the main section.



Refer to *Creating Animation Paths > Sharing Functions*, on page 587 to learn about the unconnected functions.



Refer to the *Show and Hide Layers* topic to learn how to temporarily hide unconnected functions from the main section.


Functions Section

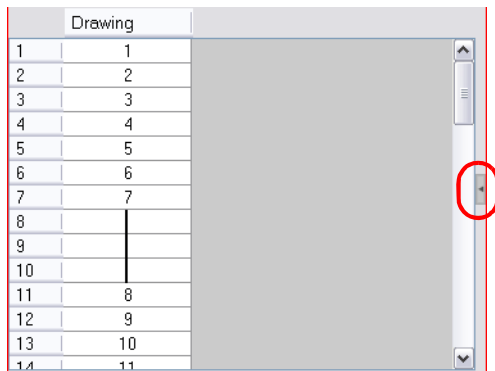
Drawing		Drawing_1_x	Drawing_1_y	Drawing_1_z	Drawing_1
1	1	9.000 W	0.051 N	0.000	0.0
2	2	8.506 W	0.210 N		0.0
3	3	8.013 W	0.369 N		0.0
4	4	7.519 W	0.528 N		0.0
5	5	7.026 W	0.687 N		0.0
6	6	6.532 W	0.846 N		0.0
7	7	6.039 W	1.005 N		0.0
8		5.545 W	1.164 N		0.0
9		5.051 W	1.323 N		0.0
10		4.558 W	1.482 N		0.0
11	8	4.064 W	1.641 N		0.0
12	9	3.571 W	1.800 N		0.0
13	10	3.077 W	1.959 N		0.0
14	11	2.583 W	2.118 N		0.0
15	12	2.090 W	2.277 N		0.0
16	13	1.596 W	2.436 N		0.0
17	14	1.103 W	2.595 N		0.0
18	15	0.609 W	2.754 N		0.0

The Functions section is used for more advanced techniques. This section displays the functions (paths) related to the selected layer in the Timeline view.

By default, the Functions section is hidden.

To display the Functions section:

1. In the Xsheet view, click on the Expand button located on the right side of the main section. Click on the same button to collapse it. You can also use the Show Column List  button in the Xsheet View toolbar.



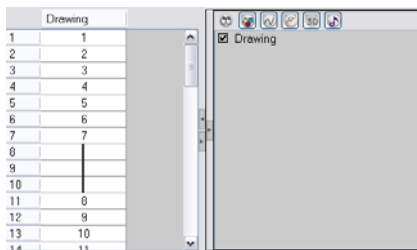
NOTE:

If you select a drawing column in the main section of the Xsheet view, the function columns will not be displayed. You must select the layer from the Timeline view.



Refer to the *Creating Animation Paths* chapter to learn more about the Functions section and function columns.


Column List Section

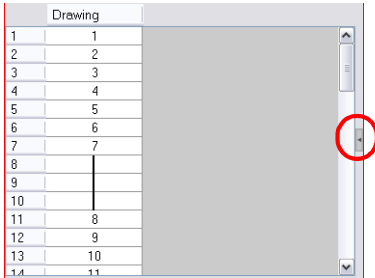


The Column List section allows you to show and hide columns from your Xsheet view. When you hide a layer using your Xsheet view, it is also disabled in the Timeline view.

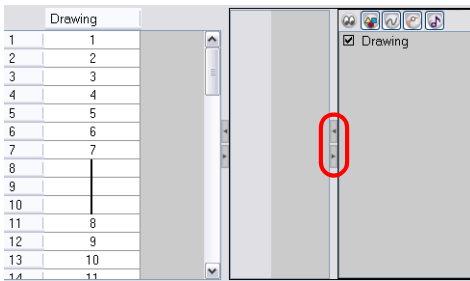
You can use the Column List to hide individual columns or hide an entire column type (drawing or function) from your Xsheet view. By default, the Functions section is hidden.

To display the Column List section:

1. In the Xsheet view, click on the Expand button located on the right side of the main section to show the Functions section. Click on the same button to collapse it. You can also use the Show Column List  button in the Xsheet View toolbar.
 ▶ In Harmony Stage, you can also go to the Xsheet View menu and select **View > Show Column List**.



2. Click on the Expand button on the right side of the Functions section to display the Column List section.



Refer to the *Show and Hide Layers* topic to learn to show and hide columns and layers.

Xsheet View Toolbar

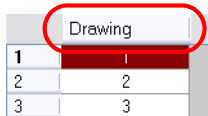


The Xsheet view has its own toolbar where you can find the most common features. This toolbar is displayed by default. If you do not see it, select **Windows > Toolbars > Xsheet View**. The Xsheet view must be part of your workspace in order to display its toolbar.



Refer to *Discovering the Interface > Toolbar Manager*, on page 60 to learn how to organize the buttons available in the Xsheet View toolbar.

Column Header



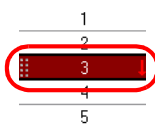
Each column available in the Xsheet view has a header displaying the column's name. The column's name is the same as the corresponding timeline layer. If you rename one or the other, they will both be renamed.

A quick access menu is available when you right-click (Windows/Linux) or [Ctrl]+click (Mac OS X). This menu contains the command affecting an entire column such as renaming, changing the default colour or deleting a column.

In Harmony Stage, the Column header shows the layer's name and the name of the drawing folder to which it is linked. If the name of the layer is the same as the drawing folder, the drawing folder's name will not be displayed. An example would be when you link a Timing Column to a certain Element (and thereby the Element's folder).

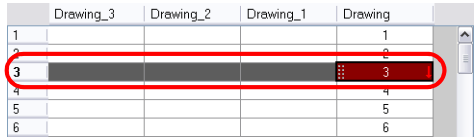
	Drawing	Character Drawing
1		
2		
3		
4		

Current Drawing



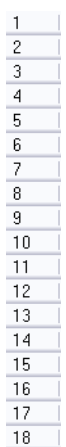
A drawing selected in dark red indicates that the drawing is currently displayed in the Drawing view. The current drawing selection is not linked to the drawing displayed in the Camera view since drawings from each visible layer are displayed at once.

Current Frame



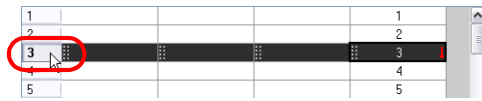
The darker frame appearing in the Xsheet view represents the current frame displayed in the Camera view. It does not necessarily correspond to the current drawing displayed in the Drawing view.

Frame Numbers

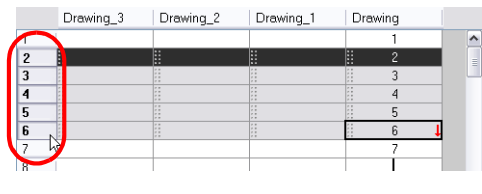


On the left side of the Xsheet view, the frame numbers are shown indicating where you are. They read vertically instead of left to right, as in the Timeline view.

- To go to a particular frame, you can click on the frame number.



- If you click and drag a selection downwards, you will select an entire frame range.



Drawing Exposure

	Drawing
1	1
2	1
3	2
4	3
5	4
6	4
7	4
8	5
9	6
10	7
11	
12	

← Drawing Exposure

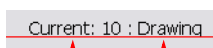
← Drawing exposed over 3 cells

← Blank cell

In the drawing columns (layers), you can see your drawing names and their exposure. You can use any alphanumeric Symbol to name your drawing.

When a drawing is exposed over more than one cell, a vertical black line is displayed to indicate the continuity of the exposure. When there is no drawing in a cell, the cell will be blank.

Current Frame Display



↑ Current Frame

↑ Current Drawing Column



Refer to *Current Drawing* topic to learn more about the current drawing.

Function Column

	Transparency_1
1	50.000
2	62.500
3	75.000
4	87.500
5	100.000
6	87.500
7	75.000
8	62.500
9	50.000
10	
11	
12	
13	
14	
15	

The function columns are displayed in the Functions section of the Xsheet view. They represent the motion and rotation you applied to your drawing layer. Only the function columns related to the selected layer are displayed.

A function column can also be related to an effect. Selecting your effect layer shows you the corresponding function column in the Xsheet view.


The function columns display the position value or effect value on each cell. If there is a keyframe on a cell, a black square is displayed.

Holding the same value for several frames displays a vertical black line.



Refer to the *Creating Animation Paths* chapter to learn more about the Functions section and function columns.

Increase/Decrease Exposure

 You can quickly increase or decrease the exposure of the selected cell by clicking on the up and down arrows in the Increase/Decrease Exposure field.



Refer to the *Increase/Decrease Exposure Field* topic to learn more about this feature.

Overwrite/Insert Modes

The Overwrite/Insert button allows you to decide the way the values are inserted into your Xsheet.



Refer to the *Filling Exposure Mode* topic to learn more about this feature.

Frames

One of the first things that you have to learn in Harmony Stage is how to add or delete frames in your scene.

This topic is divided as follows:

- Adding Frames, on page 225
- Deleting Frames, on page 226

Adding Frames

There are several ways to add frames to your scene:

- Setting the Scene Length, on page 225
- Extending the Timeline View, on page 225
- Adding Frames Before or After a Selection, on page 225
- Adding Frames to the Beginning or at the End of a Scene, on page 226

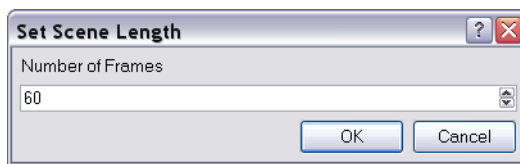
Setting the Scene Length

You can set the global scene length from the top menu.

To set the set scene length:

1. Select **Scene > Set Scene Length**.

The **Set Scene Length** dialog box opens.



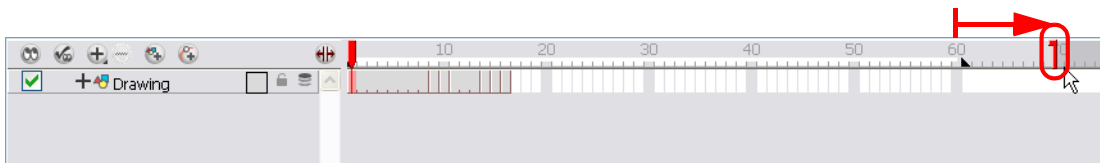
2. In the Number of Frames field, type how many frames are needed.
3. Click on the OK button.

Extending the Timeline View

You can quickly extend your scene length in the Timeline view.

To extend your scene in the Timeline view:

1. In the Timeline view, drag the scene length bracket to the right to add more frames to your scene.



Adding Frames Before or After a Selection

You can add frames anywhere in the middle of the scene. If you select a frame row in the Xsheet view, the system will add the new frames before or after the selection, depending on your choice.

To add frames before or after selection:

1. In the Xsheet view, select a frame row.

	Drawing_3	Drawing_2	Drawing_1	Drawing
1	13	15	1	1
2	14		2	
3	1		3	
4			4	
5		1	5	
6		2		
7		3		
8	2	4		

2. Select **Scene > Frame > Add Frames Before Selection** or **Add Frames After Selection**. The default keyboard shortcuts are [Ctrl]+[G] and [Ctrl]+[H] (Windows/Linux) or [⌘]+[G] and [Ctrl]+[H] (Mac OS X).

The **Add Frames** dialog box opens.



3. In the Number of Frames to Add field, enter the amount of frames needed in the scene.
4. Click on the OK button.

Adding Frames to the Beginning or at the End of a Scene

You can add some frames to the beginning or at the end of the scene.


To add frames at start or at end:

1. Select **Scene > Frame > Add Frames at Start** or **Add Frames at End**.

The **Add Frames** dialog box opens.



2. In the Number of Frames to Add field, enter the number of frames needed in the scene.
3. Click on the OK button.

To add new frames at the end of your scene, you can also use the Add Frames  button found in the Xsheet View toolbar.

Deleting Frames

There are three ways to delete frames from your scene:

- Reducing the Timeline Length, on page 226
- Remove Frames Button, on page 226
- Delete Selected Frame Range, on page 227

NOTE:

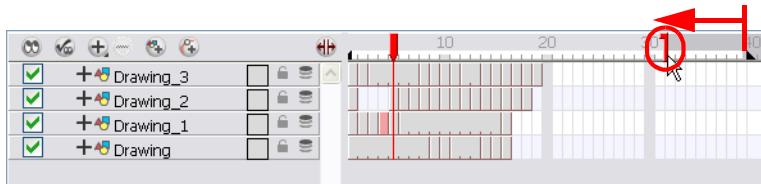
When you remove frames from the end of your scene, the exposed drawings and Symbols are not deleted. If you extend your scene afterwards, these drawings and Symbols are still available.

Reducing the Timeline Length

You can quickly reduce your scene length in the Timeline view.

To reduce your scene in the Timeline view:


1. In the Timeline view, drag the scene length bracket to the left to remove frames from your scene.



Remove Frames Button

You can remove the last frame of your scene by clicking on the Remove Frames button in your Xsheet view.

To remove the last frame of your scene:

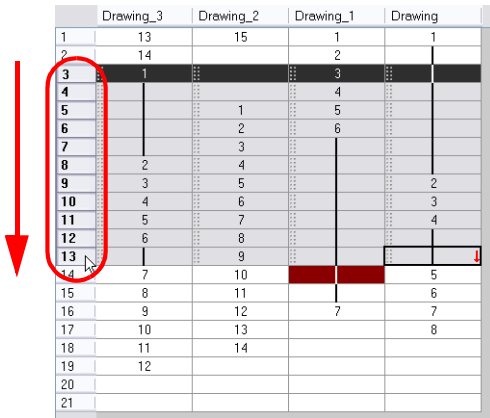
1. In the Xsheet View toolbar, select the last frame in a given column, then click on the Remove Frames  button.
 - ▶ Click on the button repeatedly to remove several frames.

Delete Selected Frame Range

In the Xsheet view, you can remove any selected frame range by pressing the [Delete] key.

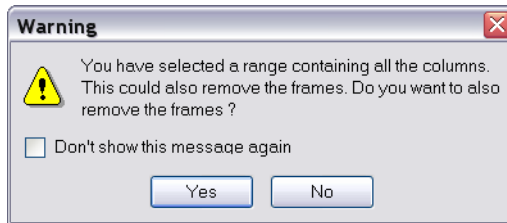
To delete a frame range:

1. In the Xsheet view, select a frame range by clicking on the first frame's number and then by dragging the selection highlight down to the last frame to delete.



2. Press the keyboard shortcut [Delete] to delete the selection or from the top menu, go to **Scene > Frames > Remove Selected Keyframes**.

The **Warning** dialog box opens.



The warning states:

You have selected a range containing all of the columns. This could also remove the frames. Do you also want to remove these frames?

3. To complete the operation:
 - ▶ Press the Yes button to delete the selection.
 - ▶ Press the No button to only delete the exposure in the cell and not the frames.
 - ▶ Enable the Don't Show This Message Again option to prevent the warning message from being displayed each time you delete a frame range.

Layers

In Toon Boom Animate there are two ways to see your layers:

- As horizontal layers in the Timeline view
- As vertical columns in the Xsheet view.

In Harmony Stage, you can also see your layers displayed in the Network view as modules.

Whether you work in the Timeline or Xsheet view, they are the same and any modification you do to one or the other will be applied to both.

This topic is divided as follows:

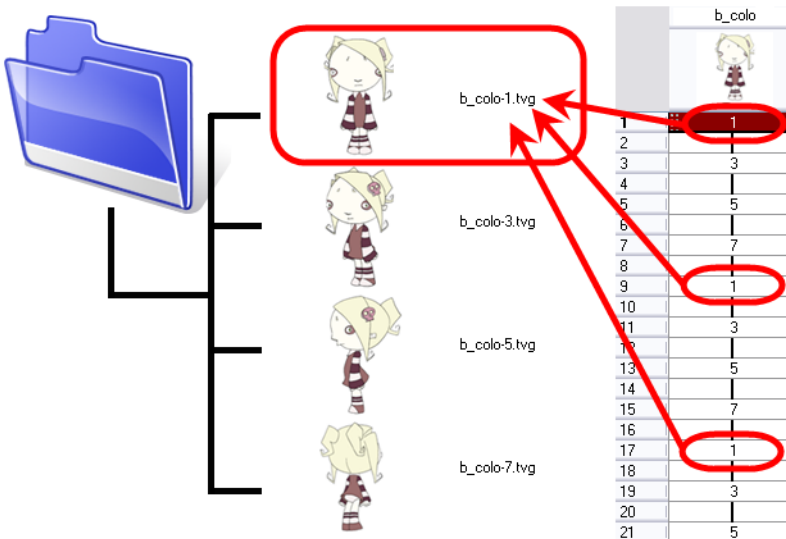
- Layer Concepts, on page 228
- Adding New Drawing Layers, on page 233
- Deleting Layers, on page 236
- Modifying Layers, on page 237
- Duplicating Layers, on page 243
- Cloning Layers, on page 243
- Xsheet Thumbnails, on page 244
- Changing the Colour of a Column or Layer, on page 244
- Expanding and Collapsing Layers, on page 245

Layer Concepts

In order to understand what happens when you duplicate a drawing, extend an exposure, create cycles or delete a drawing, it is important to know how a layer works.

Each layer is linked to a directory where all of the drawings created in it are saved. This directory has the same name as the layer. When a value or drawing name is typed in a layer's cell, the system looks in the layer's directory for the corresponding drawing to display. If there is no corresponding drawing, a new one is created.

The layer's cells are not used for storage, but are linked to the drawings contained in the layer's directory. If you remove a drawing from the layer exposure, it is not deleted, but is simply not displayed.



When you create a drawing cycle, all of the repeated drawings are linked to the same original files. This means that when you modify, repaint or correct a drawing named "1," all drawings named "1" are updated simultaneously. In order to modify a drawing independently from its other exposures, you must duplicate the drawing.



Refer to the *Duplicating a Drawing* topic to learn how to duplicate a drawing.


Layer Types

There are several types of layers that you can add in the Timeline view. Some layers are not represented the same way in the Xsheet view.

Drawing Layer

The most common layer type is the Drawing layer. Anytime you need to create a vector drawing or import a Symbol use a Drawing layer.


NOTE: bitmap images are contained in Bitmap layers.

In the Timeline view, the drawing layer is tagged with the Drawing  icon.

Bitmap Layer

If you import picture or bitmap images in your project, they are inserted in a Bitmap layer. If you choose to vectorize your image when you import, the Bitmap object will be placed on a Drawing layer. This way you can have bitmap images mixed with vector drawings on a Drawing layer.

In Harmony Stage, when importing a bitmap image, you have the option of encapsulating the image in a Symbol. If you place a non-vectorized bitmap into a symbol, you still will not be able to mix vector drawings with it on the same layer. If you place a vectorized bitmap in a symbol, you must enter the symbol to be able to mix it with vector artwork.

In the Timeline view, the Bitmap layer is tagged with the Bitmap  icon.




Refer to *Gathering Content > Importing a Bitmap Image without Vectorization*, on page 318 to learn how to import images.



Camera Layer

You can only have one Camera layer at a time in your timeline. By default, there is no Camera layer when you create a scene. You need to add a Camera layer when you want to create a camera motion.

In the Timeline view, the camera layer is tagged with the Camera  icon.

The Camera layer is not visible in the Xsheet view.

If you want to have several cameras with different settings, you can keep adding Camera layers in your Timeline view (however, only one will ever be visible at a time as you can only have one Camera at a time in your timeline). To switch between the camera available, select **Scene > Camera > select the desired camera**.




Refer to *Creating Animation Paths > Animating the Camera*, on page 567 to learn how to animate the camera.



Effect Layer

To enhance the look of your scene, you can add effect layers and attach your drawings to them. In Harmony Stage, there is a series of effect modules in the Module Library view.

In the Timeline view, the Effect layer is tagged with the Effect  icon.

In the Xsheet view, you can see the Effect's parameter columns in the Functions section when you select the Effect layer in the Timeline view.



Refer to the *Functions Section* topic to learn about the Functions section and function columns.



Refer to *Enhancing With Effects > Adding Effects*, on page 666 to learn how to add effects to your project.

★ Colour-Card Layer

The Colour-Card layer is used to add plain colour background to your scene. By default, your scene has no background colour and if you render it out as a QuickTime movie or image sequence it will have a black background.

In the Timeline view, the effect layer is tagged with the Effect ★ icon.

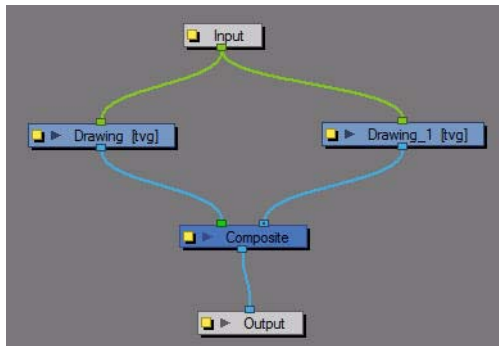
The Colour-Card layer is not visible in the Xsheet view.



Group Layer

A Group layer can be used to better organize both the Timeline and Network views. You can drag and drop other layers onto a Group layer and then collapse the Group layer to hide these other layers from view.

If you create the Group layer in the Timeline, a corresponding module will appear in the Network view. Any layers that you hook to the Group layer will appear in Group module hooked to an Input and Output port.



Peg Layer

A Peg layer can be described as a trajectory or motion path layer that does not contain drawings. This can be attached to any drawing layer, cut-out puppet or other peg layers, they will all follow the trajectory you set in the Peg layer.

In the Timeline view, the Peg layer is tagged with the Peg icon.

In the Xsheet view, you can see the Peg's function columns in the Functions section when you select the Peg layer in the Timeline view.



Refer to *Creating Animation Paths > Differences Between Pegs and Animated Layers*, on page 554 to learn more about pegs.

★ Quadmap Layer

A Quadmap layer can be described as a deformation transformation layer that does not contain drawings. This can be attached to any drawing layer, cut-out puppet or even other peg layers they will all follow the deformation you set in the Quadmap layer.

In the Timeline view, the Quadmap layer is tagged with the Quadmap ★ icon.


In the Xsheet view, you can see the Quadmap's function columns in the Functions section when you select the Quadmap layer in the Timeline view.



Refer to *Enhancing With Effects > Quadmap*, on page 728 to learn more about quadmaps.

Sound Layer

You can import sound files to add dialog and sound effects to your project. The sound layer will be added to your Timeline and Xsheet view when you import a sound file in your scene.

In the Timeline view, the Sound layer is tagged with the Sound  icon.

In the Xsheet view, the Sound layer is a dark grey colour.



Refer to the Working With Sound chapter to learn how to import and play sound.

Advanced Column Types

In the Xsheet view, you can add several advanced column types:

- Timing Column
- 3D Path Column
- 3D Rotation Column
- Bezier Curve Column
- Ease Curve Column
- Expression Column
- Annotation Column

These columns are used to create particular animation paths. When you create those columns, they are not linked to any particular drawing layer. You can create a motion path using these column and then attach several drawing or peg layers to it.



Refer to the following topics in the Creating Animation Paths chapter to learn more about these columns:

- Layer Parameters, on page 558
- Function Curves, on page 586
- Creating Function Curves, on page 586
- Function Drop-down Menu, on page 590
- Function Types, on page 591
- Expression Columns, on page 601




Refer to the Annotation Columns section to learn about annotation columns.

Timing Columns

Timing columns are unique in that they can reference a source folder outside of the project folder to bring images into the project. An example of how this feature can be used is if you have many background scenes created in a third party software that you might need to update in the future. By using Timing columns, you can dynamically link your backgrounds, expose different backgrounds at different times, and have live, automatic updating capabilities.

The danger with this type of dynamic linking is that if the project file is moved, or the folder that the column is linked to is moved, then the link is broken and the images that were in that folder will disappear in Harmony Stage.

To use a Timing column:

1. In the Xsheet, click on the Add Columns  button.
2. In the Add Column dialog box that appears, type in the name of the new column, then from the Type drop-down menu select Timing.
3. Click OK if you are finished, or on the Apply button if you want to continue adding more columns and column types.

A peach coloured column appears in your Xsheet with the name that you typed in, and for the moment, <unused>.

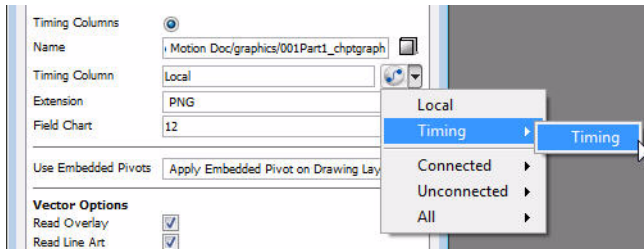
	Drawing	<unused> Timing
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		

4. In the Network view, add a new element module.
5. Open the Layer Properties editor by clicking on the yellow square.
6. In the Drawing tab, select the Timing Columns option.
7. In the Name field, enter the path of the folder you want to access. If you use the Browse button to locate a folder, you will have to select a file in the folder you want and then delete the dash and the suffix (for example, **background-01** should be renamed to **background**) from the file name in the field. If you leave the full file name selected, Stage will display that file for the entire duration of the scene, regardless of the contents of the Timing Column field.

Note: This means that all the images in the folder that you are linking to are named using the naming convention described above.

If for some reason you are unable to access a certain directory, type the directory extension directly in the path extension field at the top of the Browser window.

8. In the Timing Column field, click the Arrow button to create a new timing column, or select the name of the column from the drop-down list. If you have an element directory selected in the Name field, the Timing Column will indicate which files are called up from that element directory. Remember that the file displayed at each frame is based on the element name, the cell label, and the extension. If the element is **toto**, the timing column is labeled 1, 2, and 3, and the extension is **TVG**, Stage will display drawings **totobody-1.tvg**, **totobody-2.tvg**, and **totobody-3.tvg** at the selected frames.



In the Xsheet, the <unused> should now have changed to the name of your module in the Network view.

9. From the Extension drop-down list, select the extension of the files you want to display.
10. Click OK when you are done.
11. In the Xsheet, in your Timing Column, type in the number that corresponds to the suffix of the drawing file that you wish to expose to make it appear in the Camera view.



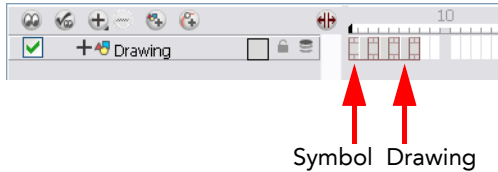
Refer to *Gathering Content > Linking Your Layer To an External Image*, on page 323 to learn more about Timing columns.

Layer Content

There are two types of element that can be inserted in a drawing layer's cell:

- Vector drawings
- Symbols

A layer can contain the two different elements, but only in different cells. You cannot put two Symbols or a drawing and a Symbol into the same cell.



If you want to mix bitmap images in your Drawing layers, you must first import your Bitmap image as a symbol or turn it into a symbol and insert it in your Drawing layer by dragging the symbol cell there through the Timeline.



Refer to *Libraries, Symbols and Templates > What is a Symbol?*, on page 348 to learn more about Symbols.

Adding New Drawing Layers

In this section you will learn the different ways to add a drawing layer to your project. By default, when you create a new scene there is one Drawing layer included in your Timeline view.


This topic is divided as follows:

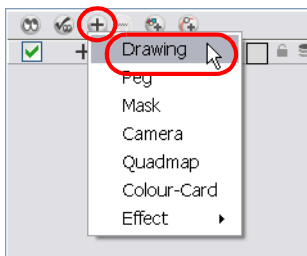
- Adding Drawing Layers in the Timeline View, on page 233
- Adding a Drawing Layer From the Top Menu, on page 234
- Adding Drawing Columns in the Xsheet View, on page 234

Adding Drawing Layers in the Timeline View

You can add a new layer in the Timeline view in three different ways: using the Layer toolbar, using the Add Layers dialog box, or by simply going to the Timeline view menu and selecting **Insert > Drawing**.


To add a Drawing layer using the Timeline's Layer toolbar:

1. In the Timeline's Layer toolbar, click on the Add Layers  button. The default keyboard shortcut is [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).
2. In the drop-down menu, select the Drawing option.



A new layer appears in the Timeline and Xsheet view.

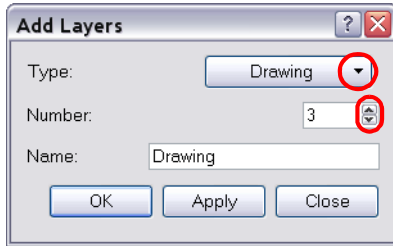


You can also click on the Add Drawing Layer  button in the Timeline's Layer toolbar. The default keyboard shortcut is [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).

To add Drawing layers using the Add Layers dialog box:

1. In the Timeline view's layer section, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Add > Add Layer(s)**.

The **Add Layers** dialog box opens.



2. In the Type drop-down menu, select the Drawing option.
3. In the Number field, use the up and down arrows or type the number of layers you want to add at once.
4. In the Name field, type the name of the layer you want to add. If you are adding more than one layer at once, all of the layers use that name with a numerical suffix added.
5. To complete the operation:
 - ▶ Click on the OK button to add your new layers and close the dialog box.
 - ▶ Click on the Apply button to add your new layers and keep the dialog box open to add another layer.
 - ▶ Click on the Close button to cancel the operation.

Adding a Drawing Layer From the Top Menu

You can add a new layer from the top menu.


To add a new layer from the top menu:

1. In the top menu, select **Insert > Drawing**.

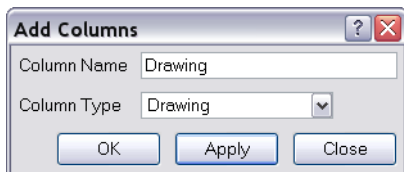
A new layer appears in the Timeline and Xsheet view.

Adding Drawing Columns in the Xsheet View

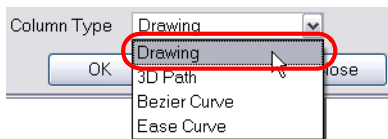
To add a Drawing column:

1. In the Xsheet view, right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) and select **Columns > Add Column** or you can click on the Add Columns  button in the Xsheet View toolbar. The default keyboard shortcut is [Shift]+[C].
To quickly add a Drawing column, use the default keyboard shortcut [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).

The **Add Columns** dialog box opens.



2. In the Column Name field, name your column appropriately.
3. In the Column Type field, select Drawing.



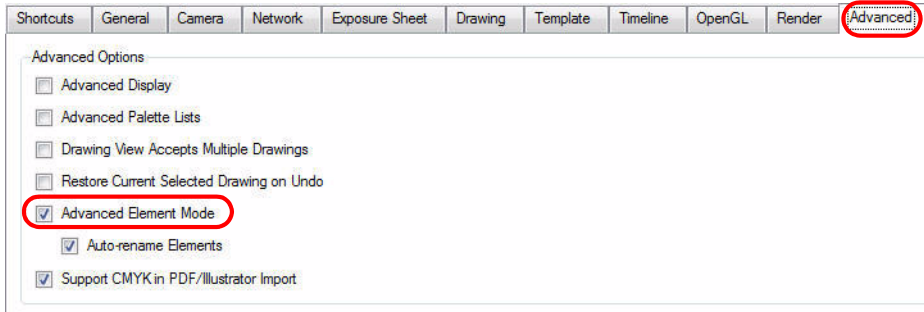
Refer to the [Layer Types](#) topic to know more about the different column types available.

4. To complete the operation:
 - ▶ Click on the OK button to add your new column and close the dialog box.
 - ▶ Click on the Apply button to add your new column and keep the dialog box open to add another column.
 - ▶ Click on the Close button to cancel the operation.

In Harmony Stage, you can use the basic Add Column dialog box or the advanced Add Column dialog box, with more file format and field size options, to insert the column.

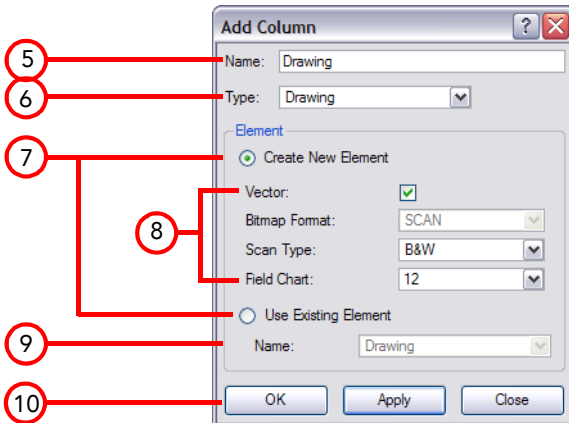
To create a column in Harmony Stage using the advanced Add Column dialog box:

1. Select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X) and go to the Advanced tab.
2. In the Advanced Options section, enable the Advanced Element Mode to access the advanced Add Column dialog box.



3. Click on the OK button.
4. In the Xsheet View menu, select **Columns > Add Column**. The default keyboard shortcut is [Shift]+[C].

The Add Column dialog box opens.



5. In the Name field, type the new column's name.
6. In the Type drop-down menu, select the Drawing type.
7. In the Element section select if you either want to create a new column or link the new column to an existing one:
 - ▶ **Create New Element:** Select this option if you want your column to be an independent column with its own drawing folder.
 - ▶ **Use Existing Element:** Select this option if you want your column to be using drawings from an existing column. Both columns will be attached to the same set of drawings but their timing will be independent one from the other. If you modify one of the drawings, it will be modified in both columns. This is the same principle as the Clone column.
8. If you select the Create New Element option:
 - ▶ Disable the Vector option if you want your layer to contain bitmap images or enable it if you want the layer to contain vector drawings. Most of the time, the Vector option will be enabled.
 - ▶ If you disabled the Vector option, from the Bitmap Format drop-down list, select which type of bitmap image you wish to insert in the column. Select the SCAN type if you are planning to scan drawings using Toon Boom Harmony's scan module.
 - ▶ If you disabled the Vector option and you chose the SCAN type, from the Scan Type drop-down, select what kind of scanning you wish to achieve.
 - ▶ In the Field Chart field, when importing traditional animation, indicate the size of paper on which the animation or background was drawn. If you are not using perforated animation paper, leave the 12 field default value as is.

- If you selected the Use Existing Element option, in the Name drop-down field select the column to which you want to link your new column.

	Drawing_1	Drawing
1		
2		
3		
4		
5		

When a column is linked to an existing layer


- Click on the OK button to create the new column and close the dialog box or click on the Apply button to create the new column but keep the dialog box opened to create other new columns.

Deleting Layers

You can delete layers from your projects in two different locations:

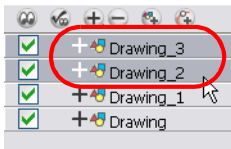
- Deleting a Layer From the Timeline View, on page 236
- Deleting a Layer from the Xsheet View, on page 237


Deleting a Layer From the Timeline View

There are two ways to delete a layer in the Timeline view, using the Delete Layers  button and via the quick access menu. This will also delete the associated modules from the Network view.

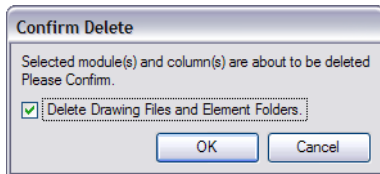
To delete layers in the Timeline view:

- In the Timeline view, select the layers to be deleted.




- In the Timeline's Layer toolbar, click on the Delete Layers  button. You can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Delete**.

The **Confirm Delete** dialog box opens.



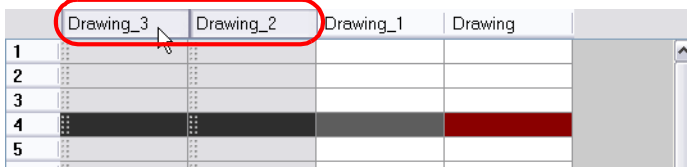
- ▶ Enable the Delete Drawing Files and Element Folders option to delete all drawings and folder linked to this layer.
- Enable the Delete Xsheet Columns option if you also want to delete the existing column in the Xsheet view. To complete the operation:
 - ▶ Click on the OK button to delete the selected layers.
 - ▶ Click on the Cancel button to cancel the operation.

Deleting a Layer from the Xsheet View

There are two ways to delete a layer in the Xsheet view, using the Delete Columns  button and via the quick access menu.

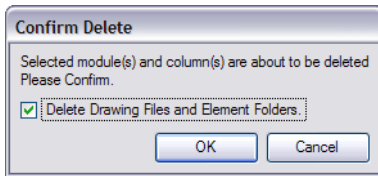
To delete layers in the Xsheet view:

1. In the Xsheet view, select the columns to be deleted by clicking on their header.



2. In the Xsheet View toolbar, click on the Delete Columns  button. You can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Delete Columns**. The default keyboard shortcut is [Delete].

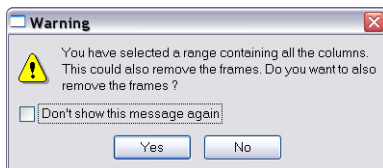
The **Confirm Delete** dialog box opens.



- ▶ Enable the Delete Drawing Files and Element Folder option if you want to delete the drawings and folders linked to the selected column.
3. To complete the operation:
 - ▶ Click on the OK button to delete the selected layers.
 - ▶ Click on the Cancel button to cancel the operation.



NOTE: if you delete the last column of your Xsheet using the [Delete] shortcut, a Warning dialog box opens asking you if you also want to delete the selected frames.



- ▶ Click on the Yes button if you also want to delete all the frames from your scene.
- ▶ Click on the No button if you want to keep the frames in your scene.
- ▶ Enable the Don't Show This Message Again option if you do not want the dialog box to pop again in the future.

Modifying Layers

Once you added layers to your project, you can modify their properties, name or ordering.

This topic is divided as follows:

- Ordering Layers, on page 238
- Show and Hide Layers, on page 238
- Layer Properties, on page 241
- Renaming a Layer, on page 242

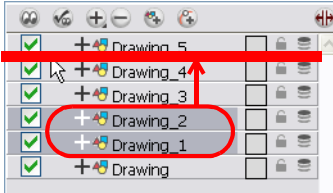
Ordering Layers

You can change the order of your layers in the Timeline and Xsheet view. When you change the order of your layers in one of these views, the other one is updated.

Reordering Layers in the Timeline View

To reorder layers in the Timeline view:

1. In the Timeline view, select the layers to move.
2. Drag the selection to the new location and drop it in between the existing layers. Dropping the selection on an existing layer would create a hierarchy. Layers located on top of the Timeline view are displayed in front of the other ones. Layers located at the bottom are displayed behind.

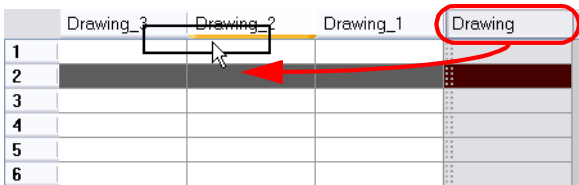


Reordering Layers in the Xsheet View

You can reorder columns in the Xsheet view using the mouse's middle button.

To reorder columns in the Xsheet view:

1. In the Xsheet view, click on the column's header with the **middle mouse button** and drag the column to its new position.



Show and Hide Layers

As you work in the Drawing or Camera view, some layers may be in the way or are used as references. You can hide these layers to make your work area easier and less cluttered.

Showing and Hiding Layers From the Timeline View


You can show and hide layers in the Timeline view in several different ways.

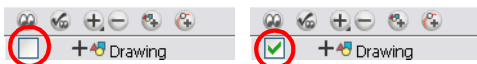
To show or hide all layers at once in the Timeline view:

- ▶ In the Timeline's Layer toolbar, click on the Enable/Disable All  button to show or hide all your layers at once.

You can also click on the Enable All  button located in the Timeline View toolbar's extra buttons.



To show or hide individual layers in the Timeline view:

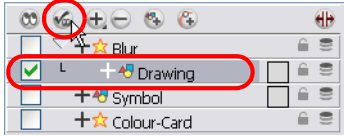
- ▶ In the Timeline's Layer toolbar, uncheck the layer's checkbox to disable a particular layer. Check the layer's checkbox to enable a particular layer. You can also click on the Enable/Disable  button located in the Timeline View toolbar's extra buttons.



When you disable a layer in the Timeline view, the corresponding column is hidden in the Xsheet view.

To disable all layers but the selected one:

- ▶ In the Timeline's Layer toolbar, click on the Show Selection and Hide All Others  button to show only the currently selected layer and disable all the other layers. You can also click on the Disable All Others  button located in the Timeline View toolbar's extra buttons.

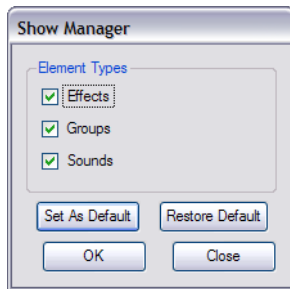


In Harmony Stage's Timeline view, you can hide or show certain types of layers such as Group and Effect.

To show and hide layer types in the Timeline view:

1. In the Timeline View menu, select **View > Show > Show Manager**.
 - ▶ You can also select **View > Show > Show Sounds**, **Show Effects** or **Show Groups** to immediately show or hide the selected type. This option will remain only for the current session. Once the application is closed and reopened, the default settings will return.

The **Show Manager** dialog box opens.



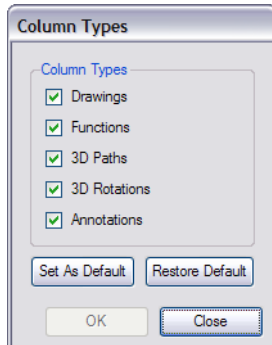
2. Select the types of layers you want to display and disable the ones you don't.
3. Click on the Set As Default button to make these new settings the default ones that will be used each time to start the application. Click on the Restore Default to restore the settings used when installing the application.
4. Click on the OK button to apply the new settings or on the Close button to cancel the changes.

In Harmony Stage's Xsheet view, you have the choice of hiding or showing certain types of columns such as Annotation and Functions.

To show and hide layer types in the Timeline view:

1. In the Xsheet View menu, select **View > Column Types Manager**.

The **Column Types** dialog box opens.



2. Select the types of columns you want to display and disable the ones you want to hide.
3. Click on the Set As Default button to make these new settings the default ones that will be used each time to start the application. Click on the Restore Default to restore the settings used when installing the application.
4. Click on the OK button to apply the new settings or on the Close button to cancel the changes.

Showing and Hiding Columns From the Xsheet View




The Xsheet view has a Column List section that shows all the columns contained in the exposure sheet. It can be used to hide individual columns.

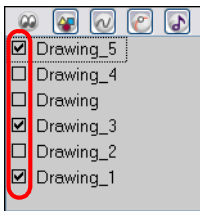
If you need to see a column after it has been hidden, you can display it directly from the Xsheet view without using the Column List section.

You can also hide an entire column type such as Drawing or Sound.

When a column is hidden in the Xsheet view, the corresponding layer is disabled in the Timeline view.

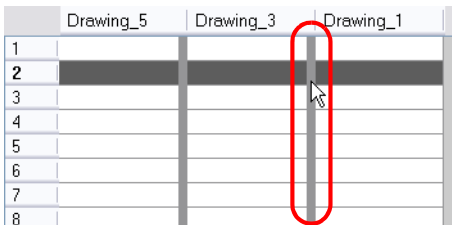
To show and hide columns in the Xsheet view:

1. In the Xsheet View toolbar, click on the Show Column List  button.
2. Click on the Expand  button located on the right side of the Functions section to display the Column List section.
3. In the Column List section, show or hide the columns by clicking in the column checkbox to add or remove the check mark. You can also click on the Hide Selected Column  button located in the Xsheet View toolbar's extra buttons.

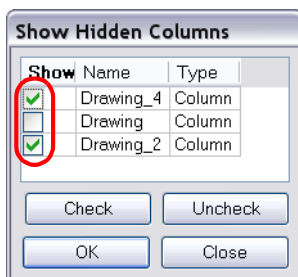


To show a hidden column from the Xsheet view:

1. In the Xsheet view, click on the thick grey line that appeared in place of the hidden column. You can also right-click (Windows) or [Ctrl] + Click (Mac OS X) on the column header and select **Show Hidden Columns**.



The **Show Hidden Columns** dialog box opens.

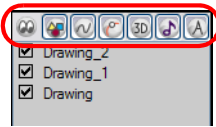









2. In the Show column, enable the hidden columns you want to display in the Xsheet view.
 - ▶ Click on the Check button to check all the selected columns.
 - ▶ Click on the Uncheck button to uncheck all the selected columns.
 - ▶ Click on the Close button to cancel the operation.
 - ▶ Click on the OK button to complete the operation.

In Harmony Stage, in the Xsheet view menu, you can select **View > Unhide All Columns**.

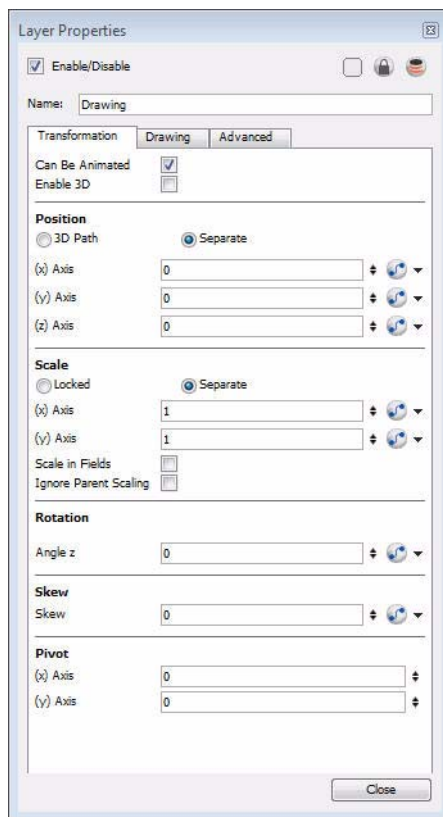
To hide and entire column type:

1. In the Column List section, click on the Column Type button corresponding to the type you want to show or hide.



- ▶ The Show/Hide All Columns  button shows or hides every column available in the Xsheet view.
- ▶ The Show Drawing Columns  button shows the Drawing columns.
- ▶ The Show Function Columns  button shows the Bezier and Ease function columns.
- ▶ The Show 3D Path Columns  button shows the 3D Path function columns.
- ▶ The Show Sound Columns  button shows the Drawing columns.
- ▶ The Show 3D Rotation Columns  button shows the 3D Rotation columns.
- ▶ The Show Annotation Columns  button shows the Annotation columns.

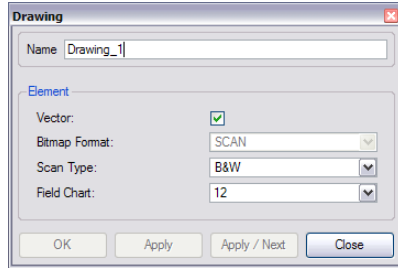
Layer Properties



Each layer has its own set of properties that can be modified, including effect and peg layers.

Display the Layer Properties editor if you want to modify some of the layer's properties such as the name or the antialiasing quality. You can display the editor from the Timeline or Network view or open the Layer Properties as a view of its own.

The Xsheet column will not open the Layer Properties dialog box, it will show the Column Properties allowing you to modify settings related to the Xsheet column.



Refer to the Adding New Drawing Layers section and Setting Up the Scene > Positioning an Element Using the Layer Properties, on page 461 to learn more about these parameters.

The Drawing Layer Properties editor allows you to:

- Rename the layer
- Enable or disable the layer
- Lock the layer
- Change the track colour
- Activate the onion skin preview
- Adjust the positioning and animation parameters
- Adjust many other advanced parameters



Refer to the following chapters to learn more about the parameters available in the Layer Properties editor:

- Setting Up the Scene, on page 445
- Creating Animation Paths, on page 551
- Enhancing With Effects, on page 665

To display the Layer Properties Editor from the Timeline view:

- ▶ In the Timeline view, double-click on the layer you want to edit the parameters of. You can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Editor**. The default keyboard shortcut is [Shift]+[E].

To display the Layer Properties Editor in the Network view:

- ▶ In the Network view, click on the module's yellow properties button.

To display the Layer Properties Editor in the Layer Properties view:

1. In the top menu, select **Windows > Layer Properties**.
2. In the Timeline or Xsheet view, select the layer you want to see the properties of.

To display the Column Properties Editor from the Xsheet view:

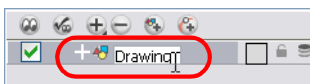
In the Xsheet view, double-click on the column's header you want to edit the parameters of. The default keyboard shortcut is [Shift]+[E].

Renaming a Layer

You can rename a layer in two different ways; in the Layer Properties editor or directly on the Timeline's layer.

To rename a layer in the Timeline view:

1. In the Timeline view, double-click on the name of the layer to rename.
2. In the Name field rename the layer and press [Return] to validate the modifications.

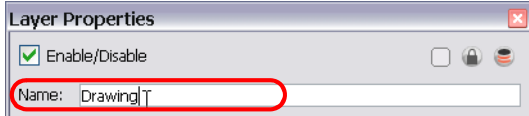


To rename a layer in the Layer Properties editor:

1. In the Timeline view, double-click on the layer to rename.

The **Layer Properties** editor opens.

2. In the Name field, rename the layer.



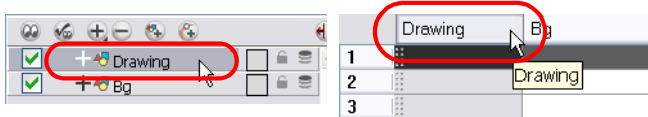
3. Click on the Close button.


Duplicating Layers

Duplicating a layer provides you with an independent copy of the drawings and their exposure. You can modify anything you want in the duplicated layer without affecting the original one. In the Network view, you can duplicate the selected modules in the same way.

To duplicate a layer:

1. In the Timeline or Xsheet view, click on the layer you want to duplicate.



2. Select **Edit > Duplicate**. You can also click on the Duplicate Layer  button situated in the Xsheet View toolbar and Timeline View toolbar. The default keyboard shortcut is [Ctrl]+[D] (Windows/Linux) or [⌘]+[D] (Mac OS X).

The new duplicated layer appears.

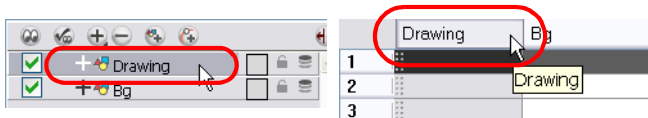
Cloning Layers


Cloning a layer provides you with a copy of the selected layer that uses the same drawings as the original. If you modify a drawing in the cloned or original layer it is updated in both layers. You can modify the layers' timing independently one from the other, but the drawings remain linked. You can clone selected modules from the Network view in the same way.

This feature is useful when you want to reuse a hand-drawn animation but have different timings.

To clone a layer:

1. In the Timeline or Xsheet view, click on the layer you want to clone.




2. Select **Edit > Clone**. You can also click on the Clone Layer  button situated in the Xsheet View toolbar and Timeline View toolbar.

The new cloned layer appears.

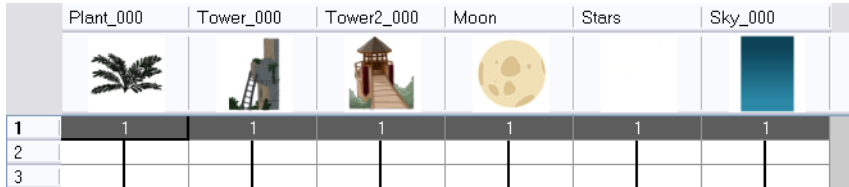
Xsheet Thumbnails

When there are a large number of columns in the exposure sheet, it is not always easy to quickly identify a particular column. Displaying the column thumbnails makes this easier. This option displays a small thumbnail picture of the current frame below the column header.

To display the thumbnails:

1. In the Xsheet view, click on the Show Thumbnails  button.


The thumbnails appear.

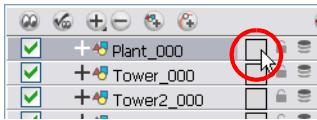


Changing the Colour of a Column or Layer

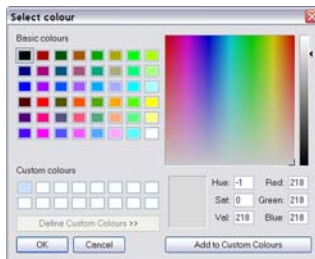
To easily identify layers in your Timeline and Xsheet view you can change their colour.

To change the layer's colour in the Timeline view:

1. In the Timeline view, click on the colour swatch of the layer you want to modify. You can also select the layer and click on the Change Track Colour  button located in the Timeline View toolbar's extra buttons.

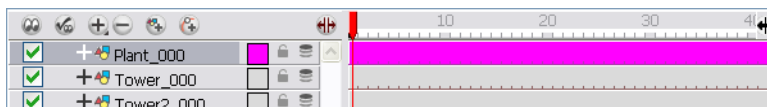


2. In the Colour Picker window, select the new colour for your layer.




3. Close the Colour Picker window.

The layer's colour is updated.



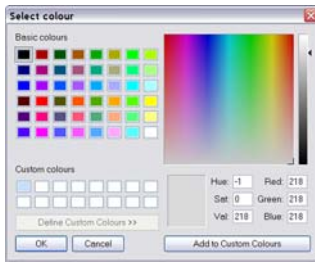
To reset a layer's colour in the Timeline view:

1. In the Timeline view, select the layers to reset and click on the Default Track Colour  button located in the Timeline View toolbar's extra buttons.

To change a column's colour in the Xsheet view:

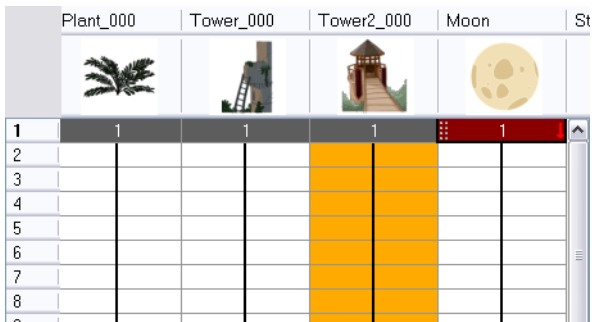
1. In the Xsheet view, select one or more columns to modify.
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the column's header and select **Colour > Change Columns Colour**.

- In the Colour Picker window, select the new colour for your columns.



- Close the Colour Picker window.

The column's colour is updated.





To reset the column's colour in the Xsheet view:

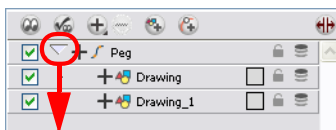
- In the Xsheet view, select the columns to reset and right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the column's header and select **Colour > Default Columns Colour**.

Expanding and Collapsing Layers



To simplify the look of your Timeline and Xsheet view, you can collapse and expand your layers. If some layers are parented to other ones, you can collapse the parent layer to hide all of its children. You can also collapse 3D Path columns in the Xsheet view.

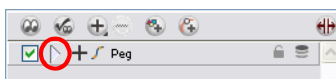
To collapse a layer selection in the Timeline view:

- In the Timeline view, select the layers to collapse.
- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Collapse/Expand > Collapse/Expand**. You can also click on the Expand Children Arrow  located on the parent layer.
 - The default keyboard shortcut is [Ctrl]+[I] (Windows/Linux) or [⌘]+[I] (Mac OS X).
 - You can click on the Collapse/Expand  button available in the Timeline View toolbar's extra buttons.



To expand a layer selection in the Timeline view:

- In the Timeline view, select the layer to expand.
- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Collapse/Expand > Collapse/Expand**. You can also click on the Expand Children Arrow  located on the parent layer.
 - The default keyboard shortcut is [Ctrl]+[I] (Windows/Linux) or [⌘]+[I] (Mac OS X).
 - You can click on the Collapse/Expand  button available in the Timeline View toolbar's extra buttons.






To collapse or expand all layers in the Timeline view:

1. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the layers and select **Collapse/Expand > Expand All** or **Collapse All**.
 - ▶ The default keyboard shortcuts are [0] to collapse and [9] to expand.

You can click on the Collapse All  or Expand All  buttons available in the Timeline View toolbar's extra buttons.

To collapse and expand 3D Path columns in the Xsheet view:

1. In the Xsheet view, display the Functions section by clicking on the Show Column List  button.
2. In the Functions section, select the header of the 3D Path column to collapse.
3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the column's header and select **Expand/Collapse > Collapse Selection**.
 - ▶ To expand a collapsed column, select the column's header, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Expand/Collapse > Expand Selection**.

You can click on the Collapse Selection  or Expand Selection  buttons available in the Xsheet View toolbar's extra buttons.

To collapse or expand all 3D Path columns in the Xsheet view:

1. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on any column's header and select **Collapse/Expand > Expand All** or **Collapse All**.
 - ▶ The default keyboard shortcuts are [0] to collapse and [9] to expand.

You can click on the Collapse All  or Expand All  buttons available in the Xsheet View toolbar's extra buttons.



Refer to *Creating Animation Paths > 3D Path*, on page 560 to learn how to use 3D Path columns.

Modifying the Look of the Column

In Harmony Stage, you can modify the way the column displays drawings, empty cells and the column width.

You can modify the following elements:

- Empty Cells
- Row Units
- Held Exposure
- Column Width

To modify the look of an empty cells:

- ▶ In the Xsheet View menu, select **View > Empty Cells > With an "X"** or **Blank**.

	Drawing
1	
2	
3	
4	
5	
6	
7	

Blank

	Drawing
1	X
2	X
3	X
4	X
5	X
6	X
7	X

With An "X"

To modify the row units:

- ▶ In the Xsheet View menu, select **View > Row Units > Frames** or **Feet**.

	Drawing
1	
2	
3	
4	
5	
6	
7	

Frames

	Drawing
0:1	
0:2	
0:3	
0:4	
0:5	
0:6	
0:7	

Feet

To modify the held exposure's look:

- ▶ In the Xsheet View menu, select **View > Held Exposures > Line** or **Value**.

Drawing	
1	1
2	1
3	1
4	1
5	2
6	2
7	3

Line

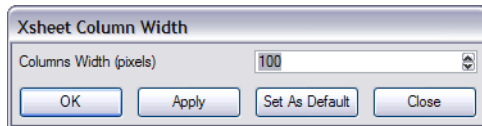
Drawing	
1	1
2	1
3	1
4	1
5	2
6	2
7	3

Value

To modify the column's width:

1. In the Xsheet view, select any column to modify the width.
2. In the Xsheet view menu, select **View > Set Columns Width**.

The **Xsheet Column Width** dialog box opens.



3. In the Column Width field, type the desired width in pixel.
4. To end the operation:
 - ▶ Click on the OK button to validate and close the dialog box.
 - ▶ Click on the Apply button to validate the operation and keep the dialog box opened to adjust the next column's width.
 - ▶ Click on the Set As Default to create all the new columns to this width.
 - ▶ Click on the Close button to cancel the operation.
5. To restore all columns to the default value, in the Xsheet view menu, select **All Columns to Default Width**.

Filling Exposure

Harmony Stage provides different tools to fill-in exposures and values, create cycles, set increments.

This topic is divided as follows:

- Filling Exposure Mode, on page 248
- Typing Exposure, on page 249
- Holding Exposure, on page 250
- Extending a Single Exposure, on page 251
- Extending an Exposure Sequence, on page 251
- Dragging Cells, on page 252
- Increasing and Decreasing Exposure, on page 254
- Inserting Blank Cells, on page 256
- Setting the Exposure, on page 258
- Filling a Selection with a Single Exposure, on page 259
- Filling a Selection with a Sequence, on page 259
- Filling a Selection Randomly, on page 261
- Creating Cycles, on page 262

Filling Exposure Mode

In the Xsheet view, you can fill columns using two different filling modes: Overwrite or Insert. These modes control the filling behaviour. The Timeline view only uses the Overwrite mode.

To toggle between Overwrite and Insert modes:

- ▶ In the Xsheet view's right bottom corner, click on the Overwrite/Insert button. The default keyboard shortcut is [I].



This section is divided as follows:

- Overwrite Mode, on page 248
- Insert Mode, on page 249

Overwrite Mode

By default, the Xsheet view is set to Overwrite mode. Add a new value or a new value sequence overwrites existing ones. The existing timing sequence remains in the same place and is not be pushed further down the column.

Drawing		Drawing	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	100
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	
10	10	10	10
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	

Insert Mode

The Insert mode acts in reverse to the Overwrite mode. When you add a new value or a new value sequence over existing ones, the new values are inserted between the old ones. The existing timing sequence is pushed down the column.

Drawing		Drawing	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	100
5	5	5	
6	6	6	
7	7	7	
8	8	8	
9	9	9	4
10	10	10	5
11		11	6
12		12	7
13		13	8
14		14	9
15		15	10
16		16	
17		17	

Typing Exposure

To fill in your exposure, you can directly type the values in the Xsheet and Timeline view.

This section is divided as follows:

- Typing a Value in the Timeline View, on page 249
- Typing a Value in the Xsheet View, on page 249


Typing a Value in the Timeline View

If you want to type a precise drawing name or value in the Timeline view, you must use the Data view section of the Timeline.

NOTE:

You can only use alphanumeric values. (0-9, a-z, **underscore** (_) and **dash** (-)).

To type a value in the Timeline view:

1. In the Timeline view, click on the Show Data View  button.



2. In the Drawing Substitution field, type the name of the drawing you want to create.



3. Press [Return] to validate the entry

Typing a Value in the Xsheet View

To enter a value in a column's cell, double-click in the cell and type in the numbers or letters.

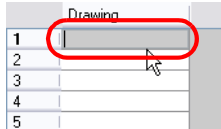
NOTE:

You can only use alphanumeric values. (0-9, a-z, **underscore** (_) and **dash** (-)).

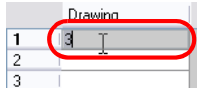
- If you press the keyboard shortcut [Return], you move on to the next cell.
- If you press the keyboard shortcut [ESC], you exit the typing mode to return to normal mode.

To type values in the Xsheet view:

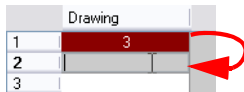
1. In an Xsheet column, double-click on one cell.



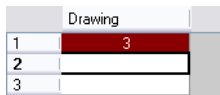
2. Type a value or drawing name in the cell.



3. Press [Return] to move on to the next cell.



4. Press [ESC] to quit the typing mode.



Holding Exposure

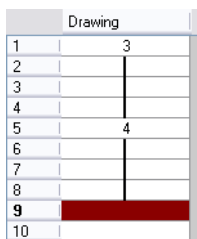
An animation is not always done in single frame. Drawings are often exposed on double exposure, or double frame, meaning each drawing is exposed on two cells. It can also be exposed on three, four, five cells and so on. To prevent mistakes and to save time, Animate lets you hold your cells automatically as you type.

The Xsheet's Hold Exposure option allows you to choose how many frames you want to hold your exposure for.

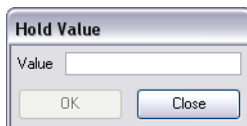
NOTE: This option is only available in the Xsheet view.

To hold exposure:

1. In the top menu, select **Animation > Cell > Hold Exposure > Hold 2 Cells**.
2. Type a value or drawing name in the cell.
 - ▶ Press [Return] to move on to the next cell.
 - ▶ Press [ESC] to quit the typing mode.
3. Try the same action with **Hold 3 Cells**, **Hold 4 Cells** and **hold**.



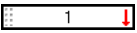

- ▶ The **Hold Value** dialog box opens when you select the Hold option and allows you to hold as many cells as needed. You can type in any amount.

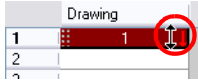


Extending a Single Exposure

The Extend Exposure feature allows you to select an Xsheet's cell containing a value and to pull it down to the desired frame.

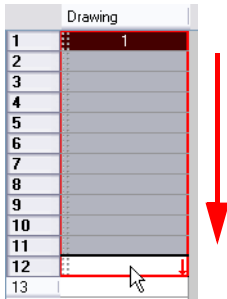
To extend a cell exposure:

1. In the Xsheet view, select the red arrow  in the cell's right side. Make sure to see the drag down  cursor.



2. Pull down the selected cell to the desired frame.

NOTE: The red selection box must be visible when releasing the mouse button. If it is not visible, the action is considered cancelled.

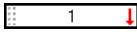



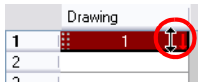
Extending an Exposure Sequence

You can extend and create a sequence using almost the same procedure as you would when you extend a single exposure. The only differences being that the selected cell must only contain numbers and that you need to press the [Shift] key while pulling down on the selection.

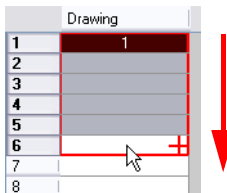
NOTE: The creation of the sequence only works with numbers in the selected cell, not letters.

To create a sequence:

1. In the Xsheet view, select a cell containing a number.
2. In the selected cell, click on the red arrow  on the cell's right-hand side. Make sure to see the drag down  cursor.

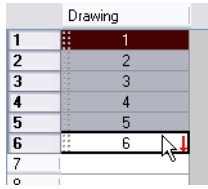


3. Press the [Shift] key and hold it down. Make sure a [+] sign appears.
4. Pull down the selection box to the desired frame.



NOTE: The red selection box must be visible when releasing the mouse button. If it is not visible, the action is considered as cancelled.

5. First release the [Shift] key, then release the mouse button.



NOTE: You can also select a cell and select **Animation > Cell > Extend Exposure**. In the dialog box, type the frame number you want to extend the cell to. The default keyboard shortcut is [F5].

Dragging Cells

To readjust your timing, you can drag one or several cells to a new location in both Timeline and Xsheet view.

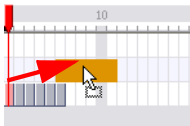
You can drag a cell to any other frame in the same column or into another column.

To drag a cell to another location in the Timeline view:

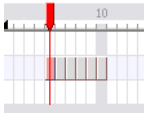
1. In the Timeline view, select one or several cells to move.



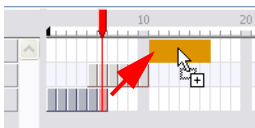
2. Click on the cells selection and drag it to the new location.



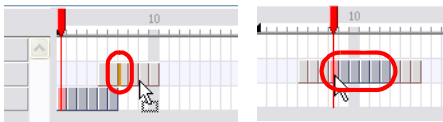
- ▶ If you drop the selection, it overwrites the existing cells.



- ▶ If you hold [Ctrl] (Windows/Linux) or [⌘] (Mac OS X) while dropping the selection, the cells are copied and not moved.

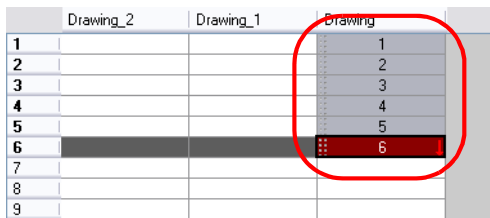


- ▶ If your press [Shift] while dropping, the selection is inserted between the existing frames.

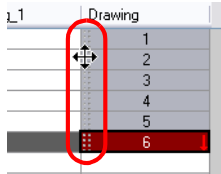


To drag a cell to another location in the Xsheet view:

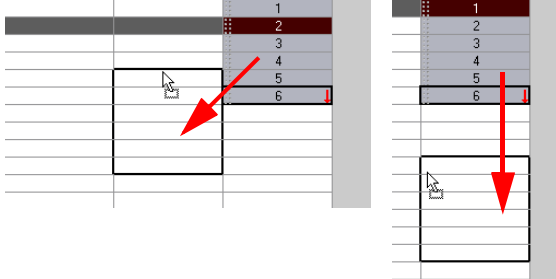
1. In the Xsheet view, select one or more cells.



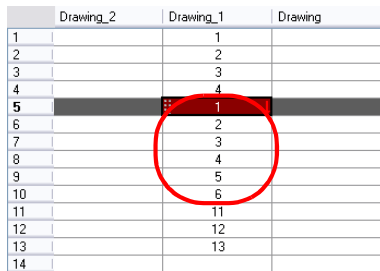
2. In the Xsheet view, select the small dotted area ☰ on the left-hand side of the selected cells.



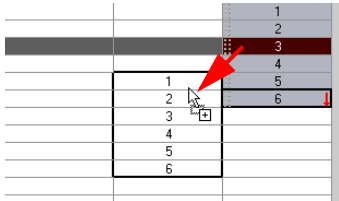
3. Drag the selection to any other cell in the same column or in another column.



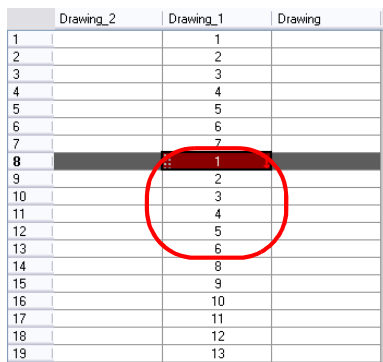
- If you drop the selection, it overwrites the existing cells.



- If you hold [Ctrl] (Windows/Linux) or [⌘] (Mac OS X) while dropping the selection, the cells are copied and not moved.



- If you press [Shift] while dropping, the selection is inserted between the existing frames.



Increasing and Decreasing Exposure

Once a value is entered in the Timeline or Xsheet view, you can increase and decrease its exposure.

This topic is divided as follows:

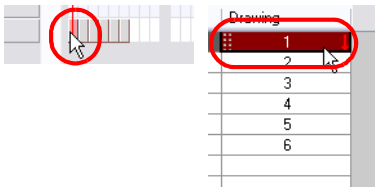
- Increase Exposure, on page 254
- Decrease Exposure, on page 254
- Increase/Decrease Exposure Field, on page 255
- Clear Exposure and Pull, on page 255

Increase Exposure


Increasing the exposure adds one more exposure to a selected cell, repeating this action adds an extra cell every time. This is a quick way of extending a drawing exposure and is always set in the Insert mode. Increasing an exposure always pushes the existing exposure down.

To use Increase Exposure:

1. In the Timeline or Xsheet view, select a cell.



2. In the top menu, select **Animation > Cell > Increase Exposure**. You can also right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected cell and select **Exposure > Increase Exposure**. The default keyboard shortcut is [+].

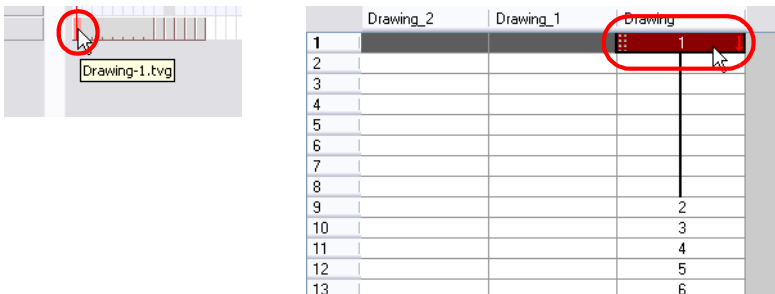
- ▶ You can click on the Increase Exposure  button available in the Xsheet View and Timeline View toolbars' extra buttons.
- ▶ Repeat this action to add more cell to your drawing's exposure.

Decrease Exposure


Decreasing the exposure removes one exposure from a selected cell, repeating this action removes an extra cell every time. This is a rapid way to reduce a drawing exposure and remove the exposed drawing.

To use Decrease Exposure:

1. In the Timeline or Xsheet view, select a cell.



2. In the top menu, select **Animation > Cell > Decrease Exposure**. You can also right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected cell and select **Exposure > Decrease Exposure**. The default keyboard shortcut is [-].

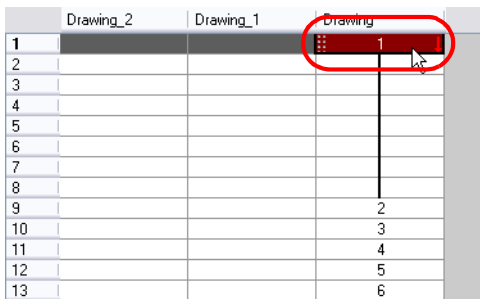
- ▶ You can click on the Increase Exposure  button available in the Timeline View toolbar's extra buttons.
- ▶ Repeat this action to add more cell to your drawing's exposure.

Increase/Decrease Exposure Field

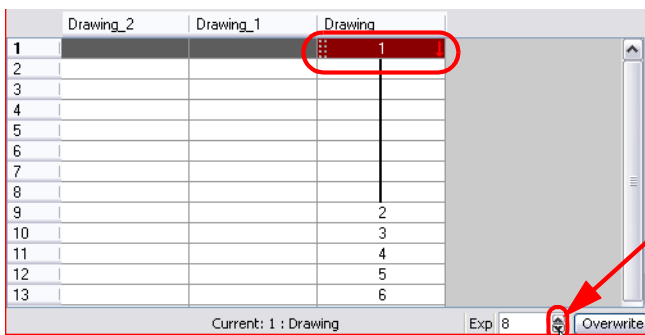
Another technique you can use to quickly increase or decrease the exposure of a selected drawing is by making use of the Increase/Decrease Exposure field available in the Xsheet view.

To increase and decrease exposure using the Increase/Decrease Exposure field:

1. In the Xsheet view, select the cell to modify.



2. In the Xsheet's bottom right-hand corner, increase or decrease the drawing's exposure by clicking on the up or down arrows.



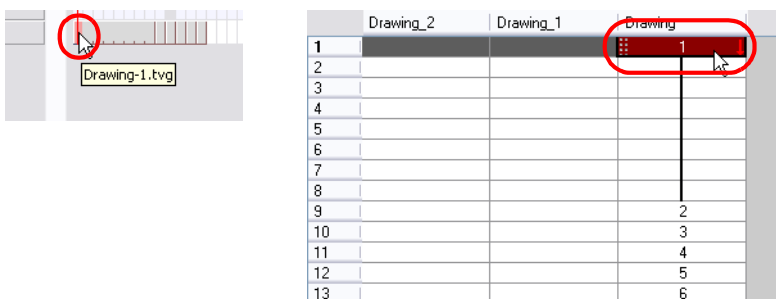
Click on the small arrows here to increase or decrease the drawing's exposure

Clear Exposure and Pull


You can reduce a drawing's exposure using the Clear Exposure and Pull option.

To use the Clear Exposure and Pull feature:

1. In the Timeline or Xsheet view, select a cell.



2. In the top menu, select **Animation > Cell > Clear Exposure and Pull**. You can also right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected cell and select **Exposure > Clear Exposure and Pull**.

- ▶ You can click on the Clear Exposure  button available in the Xsheet View and Timeline View toolbars' extra buttons.
- ▶ The default keyboard shortcut is [Z].

Deleting Exposure

You can delete a drawing's exposure in several simple ways. Note that when you delete a drawing's exposure from the Timeline or Xsheet view, you are not deleting the actual drawing file. You can always bring it back by typing its name again in a cell.

You can delete the exposure contained in a selected cell range or delete the entire exposure of a drawing exposed over several cells.




Refer to the *Layer Concepts* topic to learn more about the drawing concept.

To delete selected exposures:

1. In the Timeline or Xsheet view, select the exposure you want to delete.
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Delete**. The default keyboard shortcut is [Delete].

To entirely clear the exposure of a drawing:

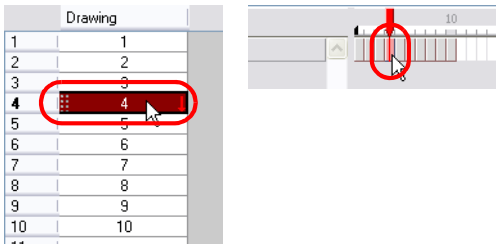
1. In the Timeline or Xsheet view, select a cell of a drawing exposed over several cells.
2. In the top menu, select **Animation > Cell > Clear Exposure**.
 - ▶ In the Timeline view, you can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Exposure > Clear Exposure**.
 - ▶ You can click on the Clear Exposure  button available in the Timeline View toolbar's extra buttons.


Inserting Blank Cells

Use the Insert Blank Cell option to place an empty cell between other cells. This is always done in Insert mode and pushes down existing exposure, even if you are set to Overwrite mode.

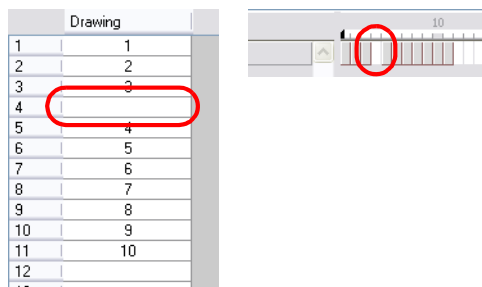
To use Insert Blank Cell:

1. In the Xsheet or Timeline view, select the cell where you want to insert a blank cell.



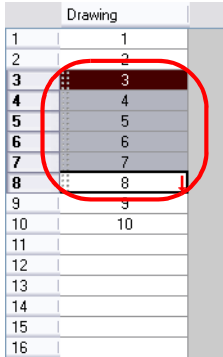
2. In the top menu, select **Animation > Cell > Insert Blank Cell**. You can also right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected cell and select **Exposure > Insert Blank Cell**.
 - ▶ The default keyboard shortcut is [X].
 - ▶ You can click on the Insert Blank Cell  button available in the Timeline View and Xsheet toolbars' extra buttons.

The blank cell is inserted.



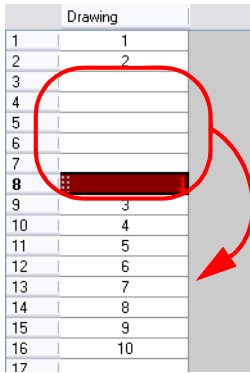
To clear a selected cell range without deleting the exposure:

1. In the Xsheet view, select the frame range to clear.



Drawing	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	
12	
13	
14	
15	
16	

2. Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected cells and select **Clear**.



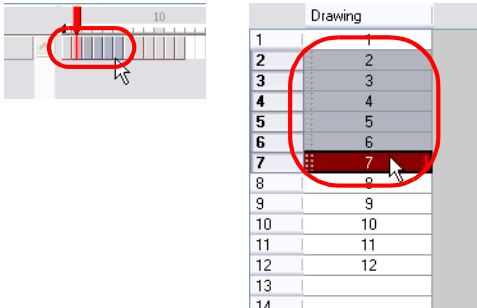
Drawing	
1	1
2	2
3	
4	
5	
6	
7	
8	
9	3
10	4
11	5
12	6
13	7
14	8
15	9
16	10
17	

Setting the Exposure

You can easily increase or decrease the exposure for a selected cell range by using the Set Exposure options.

To use the Set Exposure options:

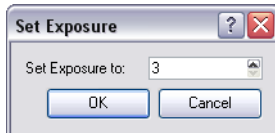
1. In the Timeline or Xsheet view, select the cell range that you want to set the exposure for.



2. In the top menu, select one of the following:

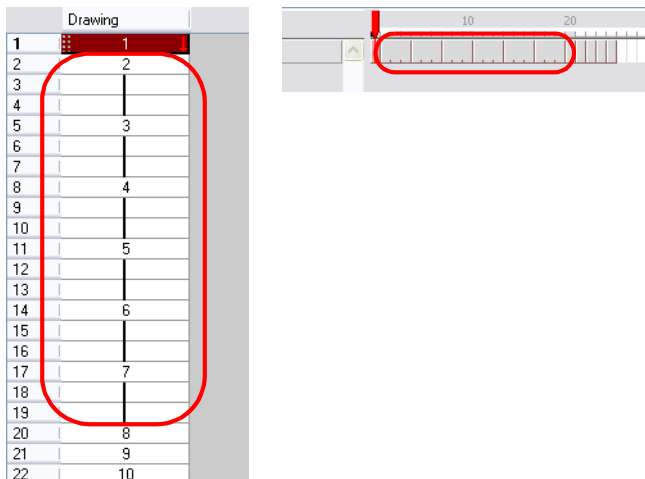
- **Animation > Cell > Set Exposure > Set Exposure to 1**
- **Animation > Cell > Set Exposure > Set Exposure to 2**
- **Animation > Cell > Set Exposure > Set Exposure to 3**
- **Animation > Cell > Set Exposure**

- ▶ You can also click on the Set Exposure     buttons located in the Timeline View toolbar's extra buttons.
- ▶ If you choose the Set Exposure option, the **Set Exposure** dialog box opens.



- ▶ Type the amount of frames you want the drawings to be displayed.
- ▶ Click on the OK button

The new timing is displayed in the Xsheet view.

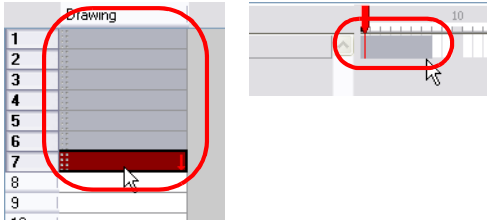


Filling a Selection with a Single Exposure


The Fill Selection option is used to fill the same value all over a selection. The selection can be over one cell, a cell range in one column, a cell range over many columns, an entire column or many entire columns. You can use numbers, words, letters or any alphanumeric value.

To use Fill Selection:

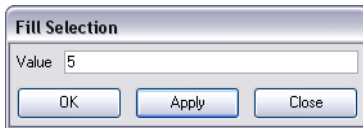
1. In the Xsheet or Timeline view, select a cell range.



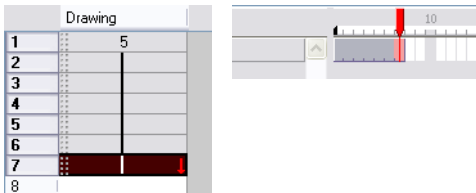
2. Select **Animation > Cell > Fill Selection**. The default keyboard shortcut is [Ctrl]+[T] (Windows/Linux) or [⌘]+[T] (Mac OS X).

- ▶ You can also click on the Fill Selection  button available in the Xsheet View and Timeline View toolbars' extra buttons.

The **Fill Selection** dialog box opens.



3. In the Value field, type the desired value.
4. Click on the OK button.

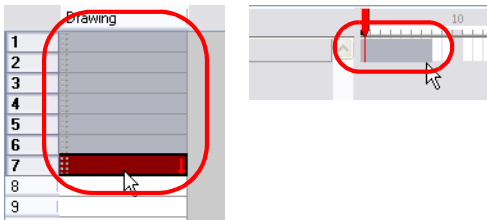


Filling a Selection with a Sequence


The Sequence Fill option is used to create a number sequence over a selection. The number sequence can be upward, downward, single, double or higher increment, as a cycle, etc. The selection can be over one cell, a cell range in one column, a cell range over many columns, an entire column or several entire columns.

To use Sequence Fill:

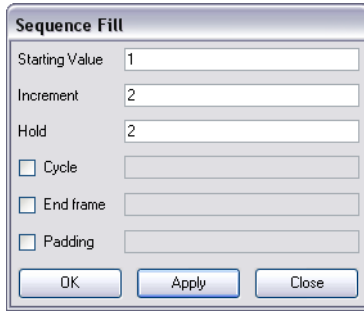
1. In the Xsheet, select a cell range.



2. Select **Animation > Cell > Sequence Fill**. The default keyboard shortcut is [Ctrl]+[M] (Windows/Linux) or [⌘]+[M] (Mac OS X).

- ▶ You can also click on the Sequence Fill  button available in the Xsheet View and Timeline View toolbars' extra buttons.

The **Sequence Fill** dialog box opens.



3. In the Starting Value field, type the starting number for the number sequence.
4. In the Increment field, choose an increment from the name changing range (1-2-3-4, 1-3-5-7, 10-9-8-7-6-5-4-3-2-1). The value can be positive or negative.
5. In the Hold field, choose an exposure holding value.
6. Enable the Cycle option if you want a cycle; type the number of cells for this cycle's duration.



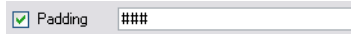
NOTE:

If you choose a two cell hold, a cycle of three drawings lasts six cells

7. If you selected a larger range than the amount of frame needed, enable the End Frame and type the last frame needed.



8. If you want to have more than one digit in your numbers such as "001" instead of "1", enable the Padding option and add as many pound signs "#" as digits needed. Also, you can type a letter or word in the field for it to be added in front of the drawing number.



9. Click on the OK button.

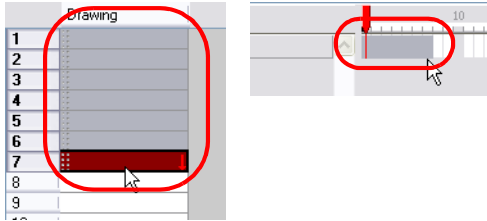
Drawing	
1	mouth1
2	
3	mouth3
4	
5	mouth5
6	
7	mouth1
8	
9	mouth3
10	
11	mouth5
12	
13	mouth1
14	
15	mouth3
16	
17	mouth5
18	
19	mouth1
20	
21	
--	

Filling a Selection Randomly


The Fill Cells Randomly option is used to fill in random values over a selection. You can give a maximum and a minimum value and create a range for the system to choose the random values from. The selection can be over one cell, a cell range in one column, a cell range over many columns or an entire column or several entire columns.

To use Fill Cells Randomly:

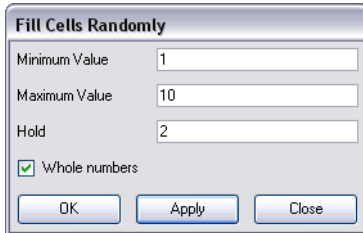
1. In the Xsheet view, select a cell range.



2. Select **Animation > Cell > Fill Cells Randomly**.

- ▶ You can also click on the Fill Cells Randomly  button available in the Xsheet View and Timeline View toolbars' extra buttons.

The **Fill Cells Randomly** dialog box opens.



3. In the Minimum Value field, type a minimum value.
4. In the Maximum Value field, type a maximum value.
5. In the Hold field, choose an exposure holding value.
6. If you are applying this option to a drawing column, enable the Whole Numbers option to avoid decimal points.
7. Click on the OK button.

	Drawing
1	5
2	1
3	3
4	1
5	9
6	1
7	2
8	1
9	1
10	1
11	1

Creating Cycles

Once you have entered a series of drawings and exposures, you can create cycles out of them in several ways.

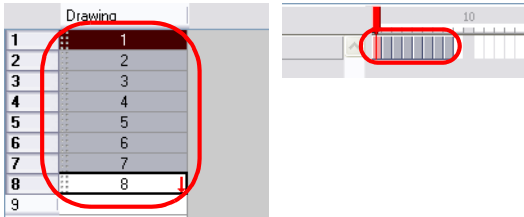
You can loop your drawings using the following commands:

- Paste Cycle
- Paste Reverse
- Create Cycle

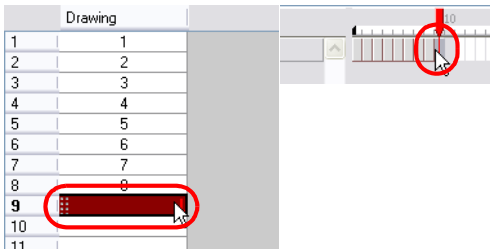
When you paste your selection, you are not duplicating the drawings. If you have a drawing "1" in your cycle, when you modify third drawing, it is updated in all the cycles at once.

To use the Paste Cycle command:

1. In the Xsheet or Timeline view, select the cell range to loop.

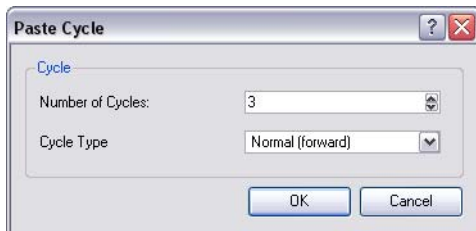


2. In the top menu, select **Edit > Copy**.
3. In the Xsheet or Timeline view, select the cell where you want your cycles to start.

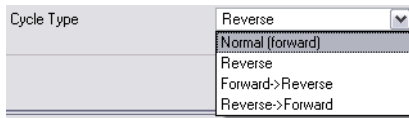


4. In the top menu, select **Edit > Paste Cycle**. The default keyboard shortcut is [Ctrl]+[/] (Windows/Linux) or [⌘]+[/] (Mac OS X).

The **Paste Cycle** dialog box opens.

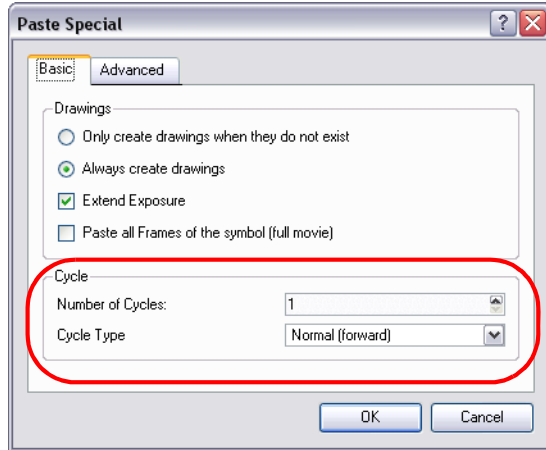


5. In the Number of Cycles field, use the up and down arrow to increase or decrease the amount of cycles you want to paste. You can also directly type the value.
6. In the Cycle Type drop-down menu, select the type of cycle you want to paste.



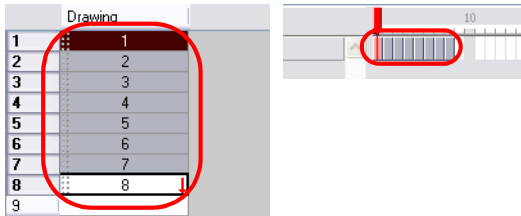
- ▶ **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - ▶ **Reverse:** This pastes your selection reversed, starting with the last cell and ending with the first one.
 - ▶ **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - ▶ **Reverse -> Forward:** This pastes your selection as a reversed yo-yo, starting with the last cell, going to the first one and ending with the last cell.
7. Click on the OK button to paste your cycles.

NOTE: You can do the same operation using the Paste Special dialog box. To open the Paste Special dialog box, select **Edit > Paste Special**.

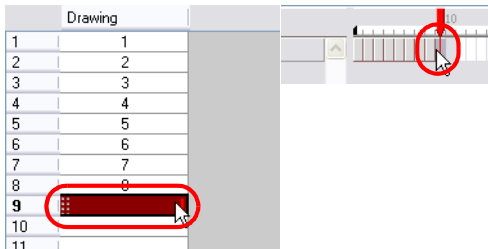


To use the Paste Reverse command:

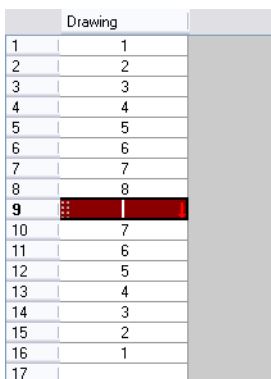
1. In the Xsheet or Timeline view, select the cell range to paste inverted.



2. In the top menu, select **Edit > Copy**.
3. In the Xsheet or Timeline view, select the cell where you want your cycles to start.

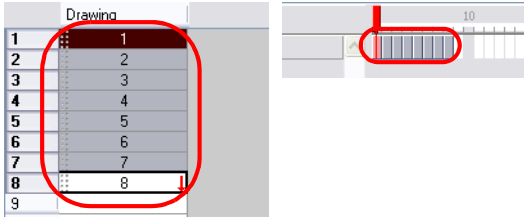



4. In the top menu, select **Edit > Paste Reverse**. The default keyboard shortcut is [Ctrl]+[?] (Windows/Linux) or [⌘]+[?] (Mac OS X).

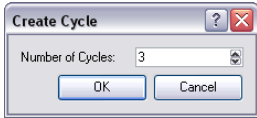


To use the Create Cycle command:

1. In the Timeline view, select the cell range to loop.



2. In the Timeline View toolbar, click on the Create Cycle  button located in the toolbar's extra buttons. The **Create Cycle** dialog box opens.



3. Enter the number of cycles you want, including the current selection.
4. Click on the OK button.

Navigating Between Frames and Columns

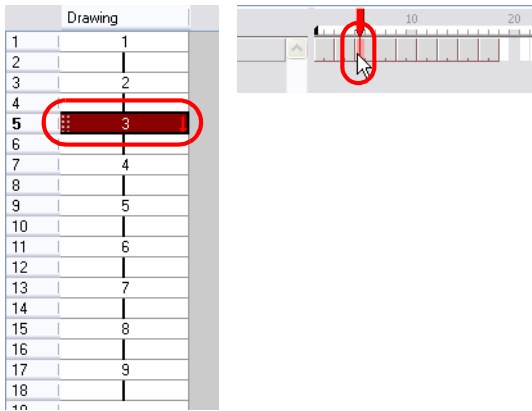
Once a cell is selected in the Timeline or Xsheet view, you can navigate between the layers, frames and drawings using keyboard shortcuts that are effective in the Camera, Drawing, Timeline and Xsheet view.

You can navigate through:

- Columns
- Drawings
- Frames

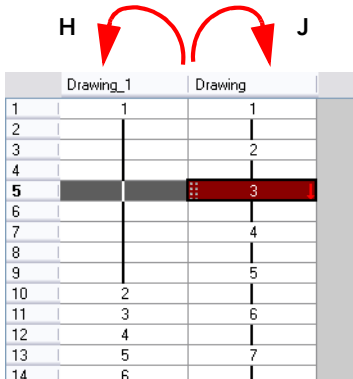
To navigate through the drawings, frames and columns:

1. In the Timeline or Xsheet view, select a cell.

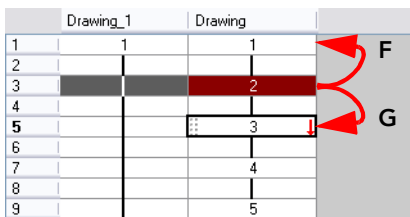


2. Once the cell is selected, you can navigate between:

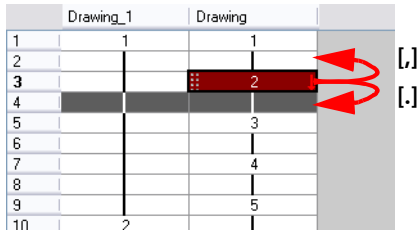
- ▶ Previous and next layers using the keyboard shortcut [H] and [J] or from the top menu, you can select **Edit > Previous Layer** and **Next Layer**.



- ▶ Previous and next drawings using the keyboard shortcut [F] and [G] or from the top menu, select **Edit > Previous Drawing** and **Next Drawing** or **Drawing > Previous Drawing** and **Next Drawing**.



- ▶ Previous and next frames using the keyboard shortcut [,] and [.] or from the top menu, select **Play > Previous Frame and Next Frame.**



	Drawing_1	Drawing	
1		1	
2			← [,]
3		2	→ [.]
4			
5		3	
6			
7		4	
8			
9		5	
10	2		

Managing Drawings

Drawings that are created in Animate are not encapsulated in their cells. They are actual files stored in the project's folder. If you want to rename a drawing or delete a drawing from your project, you need to edit the file and not the cells.

This topic is divided as follows:

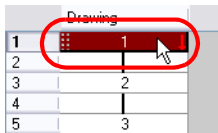
- Renaming a Drawing, on page 267
- Renaming Drawings by Frame Position, on page 267
- Deleting a Drawing, on page 268
- Duplicating a Drawing, on page 268
- Copying and Pasting Drawings, on page 269

Renaming a Drawing

To rename a drawing, you do not type the new name in the cell. You need to select the cell containing the drawing and use the Rename Drawing command.

To rename a drawing:

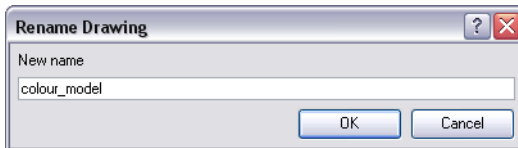
1. In the Timeline or Xsheet view, select the drawing to rename.



2. In the top menu, select **Drawing > Rename Drawing**. The default keyboard shortcut is [Ctrl]+[Alt]+[Shift]+[D] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[D] (Mac OS X).

- ▶ You can also use the Rename Drawing  button located in the Timeline View or Xsheet View toolbars' extra buttons.

The **Rename Drawing** dialog box opens.



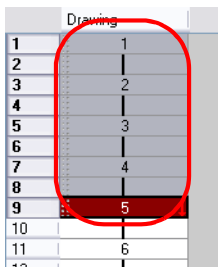
3. In the New Name field, type the new drawing name.
4. Click on the OK button.

Renaming Drawings by Frame Position

You can rename a series of drawings relative to their frame position. This is useful in hand-drawn animation.

To rename drawings by their frame position:

1. In the Xsheet or Timeline view, select the drawing sequence to be renamed.



- In the top menu, select **Drawing > Rename by Frame**.

Drawing	
1	1
2	
3	3
4	
5	5
6	
7	7
8	
9	9
10	

Deleting a Drawing

To permanently delete a drawing file, select the drawing you want to delete and use the Delete Selected Drawings command.



Delete a drawing file is an operation that cannot be undone.

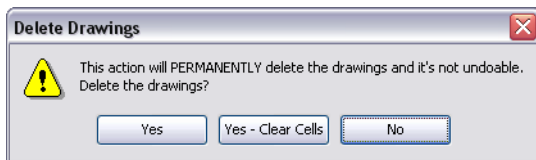
To delete a drawing:

- In the Timeline or Xsheet view, select the drawings to delete.

Drawing	
1	1
2	
3	2
4	
5	3
6	
7	4
8	
9	5
10	

- In the top menu, select **Drawing > Delete Selected Drawings**.

The **Delete Drawings** dialog box opens.



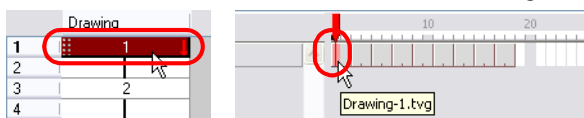
- ▶ Click on the Yes button to delete the drawing files from the project but retain the values in the cells.
- ▶ Click on the Yes - Clear Cells button to delete the drawing files from the project and delete the values from the selected cells.
- ▶ Click on the No button to cancel the operation.

Duplicating a Drawing

If you want to modify a drawing that already exists, but keep the original drawing intact, you can duplicate the drawing and work on the copy. When duplicating a drawing, the selected cell is replaced with the new drawing. The exposure of the original drawing that was on the current cell is removed. The drawing is not deleted.

To duplicate a drawing:

- In the Timeline or Xsheet view, select the drawing to duplicate.



- In the top menu, select **Drawing > Duplicate Drawing** or use the keyboard shortcut [Alt]+[Shift]+[D].

Drawing	
1	14
2	
3	2
4	

With Animate you can create a keyframe at the same time as you duplicate your drawing. This way you can modify and reposition your drawings without affecting the original drawing.

Copying and Pasting Drawings

When you copy and paste a selection in the Timeline or Xsheet view, you are not copying and pasting the actual drawings, you are pasting the exposure.

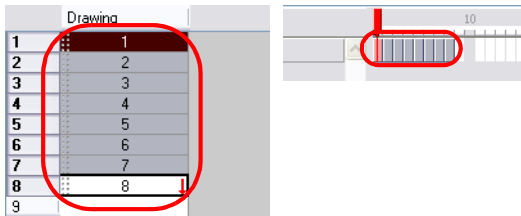
If you want to copy and paste the selected drawings into a different layer or paste the selection in the same layer to duplicate the drawings, you must use the Paste Special feature.

There are two main ways to paste your selected drawings with the Paste Special dialog box:

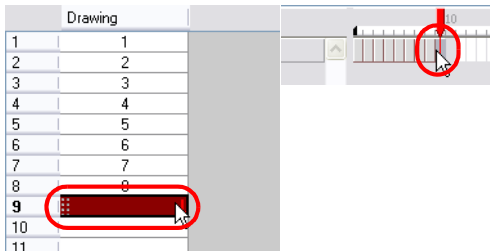
- **Always Create Drawings**
This option pastes all of your drawings as they are. If a drawing has the same name as an existing one, it is renamed and duplicated.
- **Only Create Drawings When They Do Not Exist**
This option pastes only the drawings that are not named the same way as any of existing drawings. If a drawing as the same name as an existing one, it is ignored and not pasted. This way you avoid duplicating drawings in your layers.
This option is useful when you are pasting cut-out character templates containing drawings you may already have in your scene and some new one. Using this option, you only paste the new drawings and are not duplicating all of the other parts you already have.


To paste drawings with the Paste Special command:

1. In the Timeline or Xsheet view, select the drawings to copy.

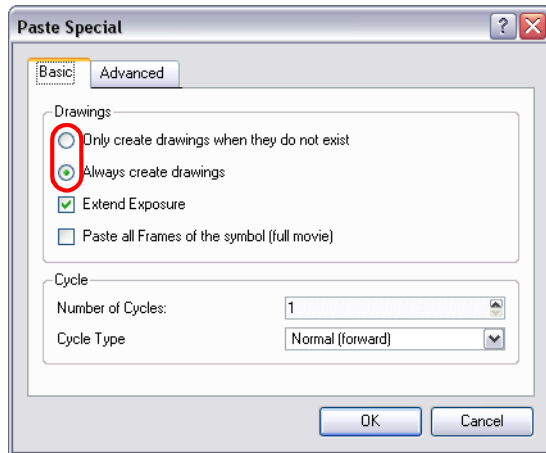


2. In the Timeline or Xsheet view, select the cell where you want your pasted selection to start.



3. In the top menu, select **Edit > Paste Special**. The default keyboard shortcut is [Ctrl]+[Shift]+[B] (Windows/Linux) or [⌘]+[Shift]+[B] (Mac OS X). You can also click on the Paste Special  button located in the Timeline View and Xsheet View toolbars' extra buttons.

The **Paste Special** dialog box opens.




4. Go to the Basic tab.
5. In the Drawings section, enable the Always Create Drawings or the Only Create Drawings When They Do Not Exist option depending on what you need.
6. Click on the OK button.



If you want to perform another paste special operation using the same settings you used previously, you can use the **Paste Special Again** command instead of the **Paste Special** command. This feature paste your selection using the same settings you used in your last paste special without opening the **Paste Special** dialog box.

To use the **Paste Special Again** command, select **Edit > Paste Special Again**. The default keyboard shortcut is **[Ctrl]+[Alt]+[B]** (Windows/Linux) or **[⌘]+[Alt]+[B]** (Mac OS X).

You can also click on the **Paste Special Again**  button located in the **Timeline View** and **Xsheet View** toolbars' extra buttons.

Tempo Markers

Tempo markers are used to synchronise your animation with a musical score. Using this feature, you can reproduce the FPB (Frame Per Beat) and the tempo signature as Tempo markers. The Xsheet view allows you to pace your animation according to the tempo or beat of your soundtrack music or to any rhythmical sound such as the ticking of a clock or water leaking from a spout.

	Drawing	Limpa_Colour	01_Next_Exit
1	1	1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17	2	17	
18	3	18	
19	4	19	
20	5	20	
21	6	21	
22	7	22	
23	8	23	
24	9	24	
25	10	25	
26	11	26	
27	12	27	
28	13		
29	14		
30	15		
31	16		
32	17		
33	18		

To set the Tempo Markers:

1. In the Xsheet view menu, select **View > Set Tempo Marker**.

The **Set Tempo Marker** dialog box opens.

2. Reproduce the tempo and beat value of your music or sound for the Xsheet view marker display.
 - ▶ **Starting Frame:**
Type the number of the frame where you want the tempo markers to begin.
 - ▶ **Frames/Beat:**
Set the Frame Per Beat value. This will determine the frequency (in frames) a beat marker will appear. Keep in mind that, by default, 24 frames represent 1 second.
 - ▶ **Beat/Bar:**
Set the Tempo of your music or sound. This will determine the frequency (in beats) a tempo marker will appear in the Xsheet view.
3. Click on the OK button.

Annotation Columns


The Annotation Columns are a more than just a useful tool. They allow you to mark actions, corrections or any other information related to your animation that you would like to draw or write. This way, you can print your Xsheet, take it back to your animation table and work with the annotations.

This section is divided in the following topics:

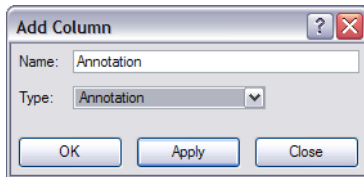
- Adding an Annotation Column, on page 272
- Drawing and Typing in the Annotation Column, on page 272
- Changing the Drawing Settings, on page 274
- Importing an Annotation File, on page 275

Adding an Annotation Column

To add an annotation column:

1. In the Xsheet View menu, select **Columns > Add Columns** or you can click on the Add Columns  button in the Xsheet View toolbar. The default keyboard shortcut is [Shift]+[C].

The **Add Columns** dialog box opens.



2. In the Column Name field, name your column appropriately.
3. In the Column Type field, select Annotation.
4. Click on the OK button.

The new column appears.

Drawing and Typing in the Annotation Column

In the annotation column, you can not only type in your notes and relevant information but also draw sketches and ideas which will be useful in producing your animation.



Drawing in the Annotation Column

Before you can draw in the annotation column, you must first activate the Enable Drawing option. Once this is done, you can start drawing using the mouse or the pen tablet.

NOTE:

Pen tablet pressure sensitivity is not supported in the annotation column.

To enable drawing in the annotation column:

1. In the Xsheet View menu, select **Annotation > Enable Drawing**. You can also click on the column's header icon to toggle the Drawing mode.
 - ▶ The Select  icon indicates that the Drawing mode is disabled.
 - ▶ The Brush  icon indicates that the Drawing mode is enabled.

To draw in the annotation column:

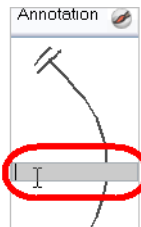
- ▶ To draw in an annotation column, simply use your mouse or pen tablet.

**Typing in the Annotation Column**

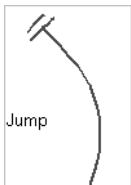
Typing in an annotation column is independent from the Drawing mode. You can be in either mode and the typing will work.

To type in an annotation column:

1. In the annotation column, double-click on the cell where you want to write.



2. In the selected cell, type the desired text.



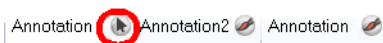
Refer to the *Typing Exposure* section to get more information about typing values in the Xsheet.

Erasing Annotation Column Content

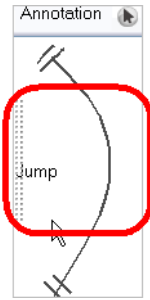
You can erase part or all of the annotation column's content.

To erase the annotation content:

1. In the Xsheet view, disable the Drawing mode.



- In the Xsheet view, select the cell range you want to clear from text or images. Do not select any cells if you plan to clear everything.



- In the Xsheet view, right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) in the annotation column and select:
 - ▶ **Annotation > Erase All** to erase completely the content of the column.
 - ▶ **Annotation > Erase Selected Images** to erase the images contained in the selected cell range. Make sure to disable the Drawing mode to do so.
 - ▶ **Annotation > Erase Selected Texts** to erase the text contained in the selected cell range. Make sure to disable the Drawing mode to do so.

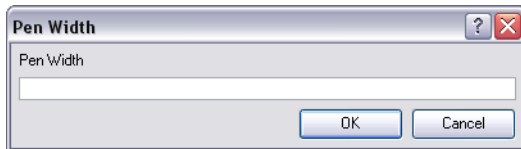
Changing the Drawing Settings

You can change the pen size and colour when you draw in the annotation column.

To change the pen width:

- In the Xsheet View menu, select **Annotation > Change Pen Width > 1, 2, 3, 4 or Custom**.

If you selected the Custom option, the **Pen Width** dialog box opens.

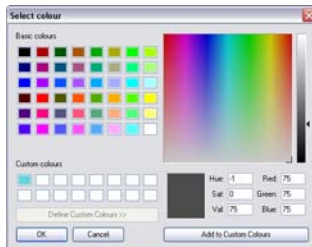


- In the Pen Width field, type the amount of pixel you want the pen size to be.
- Click on the OK button.

To change the pen colour:

- In the Xsheet View menu, select **Annotation > Change Pen Colour**.

The **Select Colour** dialog box opens.



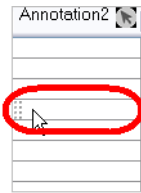
- Choose the new colour.
- Click on the OK button.

Importing an Annotation File

If you scanned your paper exposure sheet's annotations or if you need to place some pictures or drawings in your annotation columns, you can easily import them.

To import annotation files:

1. In the Xsheet view, select the first cell in the annotation column where you want the imported image to start.



2. In the Xsheet View menu, select **Annotation > Import Files**.
3. Browse for the bitmap image to import.
4. Click on the Open button.

The image appears in the annotation column.



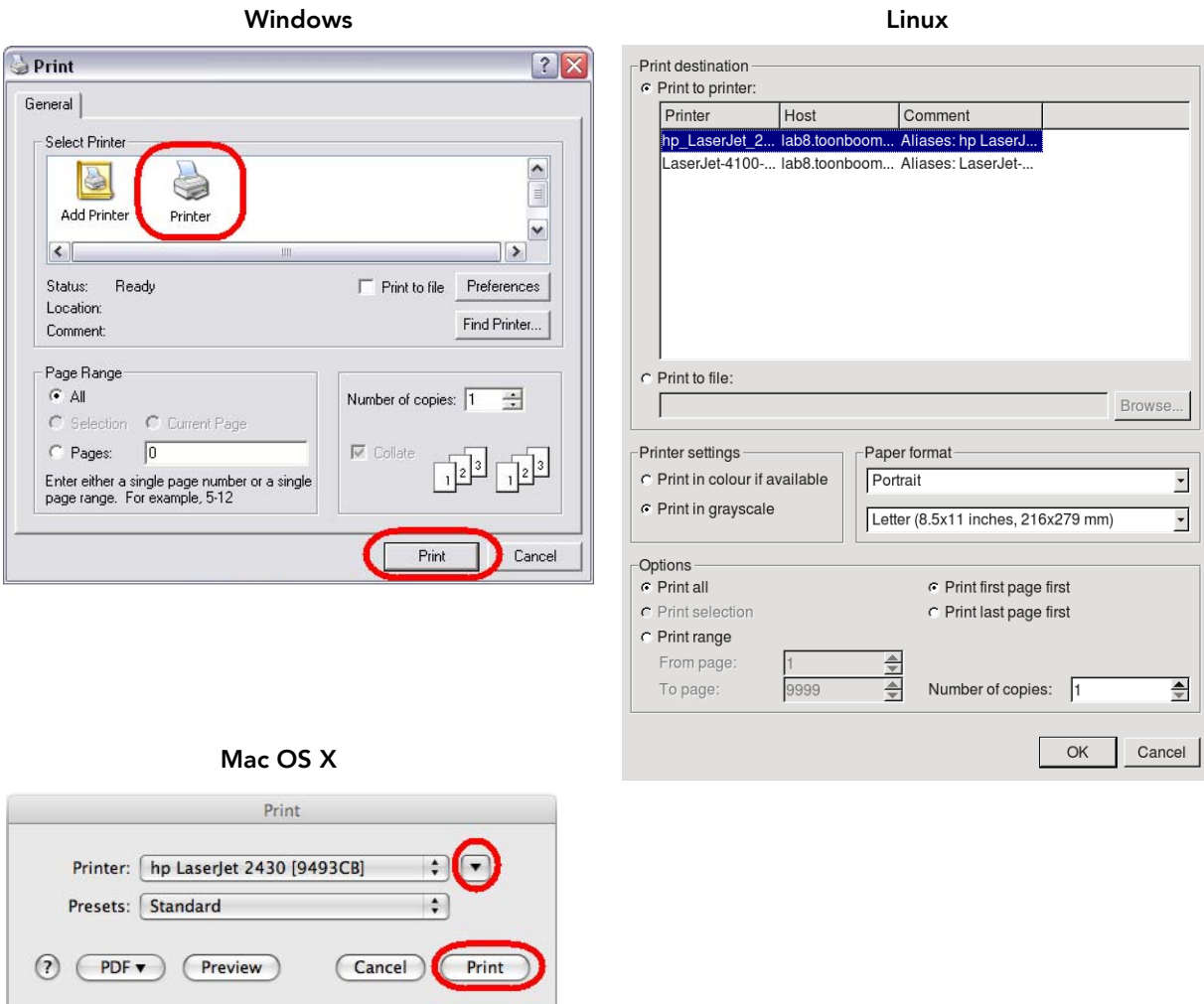
Printing the Xsheet


Once your line test is completed and you have marked all the information, corrections and timing you want in your Xsheet view, you can print out your exposure sheet. Printing out the Xsheet allows you to take it with you to your animation table or to give a copy to the animator. You can also use it to create your Xsheet skeleton directly in Harmony Stage.

To print your exposure sheet:

1. Select **File > Print > Xsheet**.

The Print dialog box opens.



2. To setup your print:
 - ▶ **Windows:** In the Select Printer section, select your printer and adjust the rest of the printing settings. Refer to the printer user guide to learn more about its options.
 - ▶ **Linux:** In the Print Destination section, select your printer and adjust the rest of the printing settings. Refer to the printer user guide to learn more about its options.
 - ▶ **Mac OS X:** In the Printer section, select your printer and adjust the rest of the settings by clicking on the Parameters  button. You can also click on the PDF button and select an option from the drop-down menu if you want to save a PDF version of your exposure sheet. Refer to the printer user guide to learn more about its options.

3. Click on the Print button.

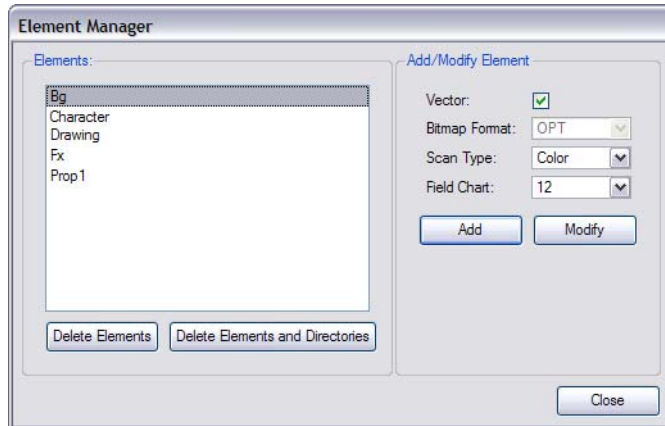
	A	B	C	D	Annotation
1	1	001	6	1	
2	2	001	6	1	
3	3	001	9	1	
4	4	001	9	1	
5	5	001	9	1	
6	6	001	9	1	
7	7	001	1	1	
8	8	001	1	1	
9	9	001	3	1	
10	10	001	3	1	
11	11	001	1	1	
12	12	001	1	1	
13	13	001	5	1	
14	14	001	5	1	
15	15	001	2	1	
16	16	001	2	1	
17	17	001	7	1	
18	18	001	7	1	
19	19	001	2	1	
20	20	001	2	1	
21	21	001	7	2	
22	22	001	7	3	
23	23	001	4	4	
24	24	001	4	5	
25	25	001	9	6	
26	26	001	9	7	
27	27	001	2	8	
28	28	001	2	9	
29	29	001	4	10	

Element Manager

Use the Element Manager to add, delete or modify elements (drawing folders) in your scene. If you have drawing folders that are not linked to a column in your scene, use the Element Manager to delete them if need be.

To open the Element Manager dialog box:

- ▶ Select Scene > Element Manager.



- **Elements for:** Displays a list of the elements already contained in your scene.
- **Delete Elements:** Press this button to delete the selected elements.
- **Delete Elements and Directories:** Press this button to delete the selected layer, as well as its directories (drawing folder).
- **Add/Modify Element:** Use the options contained in this area to add or modify an element.
 - ⇒ **Name:** Type a New name in this field to create an element or to rename the selected element.
 - ⇒ **Vector:** Check this box if the new element to be is a vector drawing or if you want to modify this parameters on a selected element already existing.
 - ⇒ **Bitmap Format:** Select the file format of the bitmap layer from the drop-down list.
 - ⇒ **Scan Type:** If you are planning to scan elements with Toon Boom Harmony's Scan module, select the scan type from the drop-down list.
 - ⇒ **Field Chart:** If you are importing traditional animation, select the size of the paper on which the animation was drawn.
- **Add:** Press this button to create a new element with the current parameters entered in the Add/Modify Element section.
- **Modify:** Press this button to apply the parameter changes made to the selected element.

Preferences

When adjusting your timing in the Timeline and Xsheet view, you may want to set some preferences.

This section covers the preferences related to the timing, Timeline and Xsheet view.

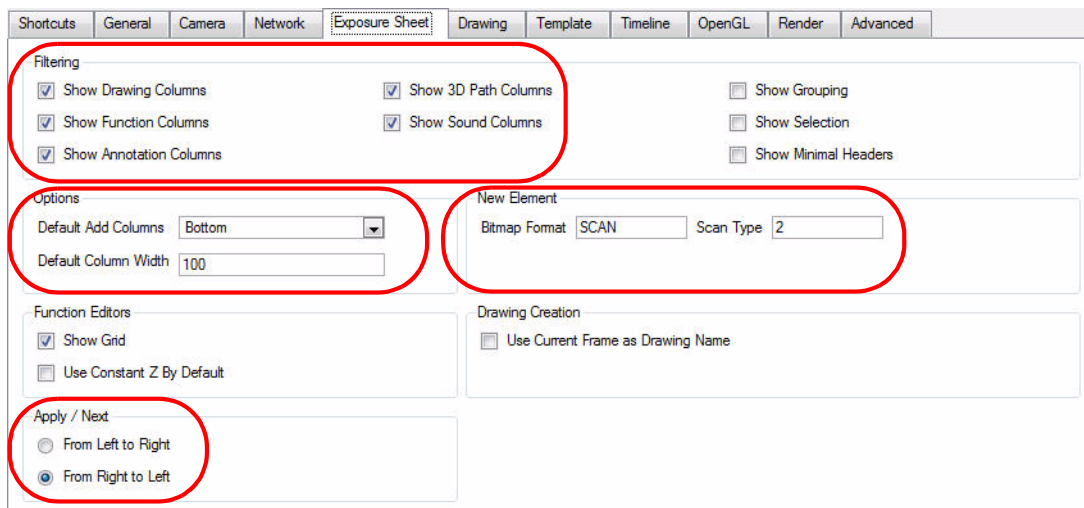
You will find the preferences listed under the following tabs:

- Exposure Sheet
- Timeline Preferences
- Advanced Preferences

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Toon Boom Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

Exposure Sheet



This section is divided as follows:

- Filtering, on page 279
- Options, on page 280
- New Element, on page 272
- Apply/Next, on page 280

Filtering

These preferences are used to display or hide certain layer types in the Xsheet view.

- Show Drawing Columns
If enabled, the Xsheet view displays the Drawing layers.
- Show Function Columns
If enabled, the Xsheet view displays the Function columns.
- Show Annotation Columns
If enabled, the Xsheet view displays the Annotation columns.
- Show 3D Path Columns
If enabled, the Xsheet view displays the 3D Path columns.
- Show Sound Columns
If enabled, the Xsheet view displays the Sound columns.

Options

- **Default Add Columns**
The default position where the new column will be added.
- **Default Column Width**
The default width value for the new column being created.

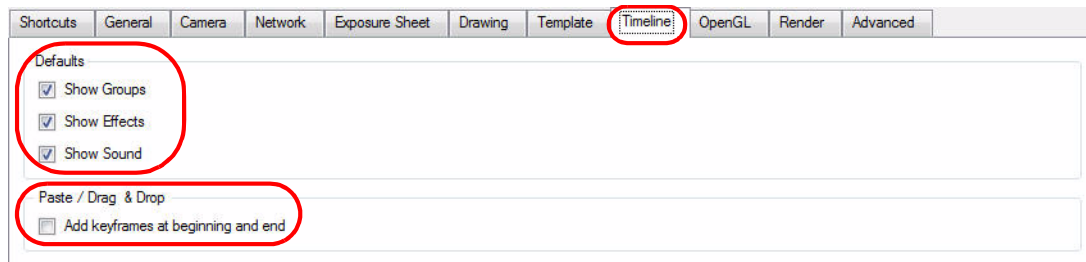
New Element

- **Bitmap Format:**
By default, when you create a new empty bitmap column, it will use the file format indicated in the field as the new column format. The default value is SCAN, which means that it is set for scanned-in drawings.
- **Scan Type:** By default, the Scan Type is set to 2 which equals vector import. This means that the imported bitmap images will be placed into a Drawing layer. Scan type 1 is bitmap import.

Apply/Next

- **From Left to Right:** When clicking on the Apply/Next button in the Xsheet view Column Properties, the next column to be displayed in the Column Properties will be the one on the right.
- **From Right to Left:** When clicking on the Apply/Next button in the Xsheet view Column Properties, the next column to be displayed in the Column Properties will be the one on the left.

Timeline Preferences



This section is divided as follows:

- Defaults, on page 280
- Paste/Drag & Drop, on page 280

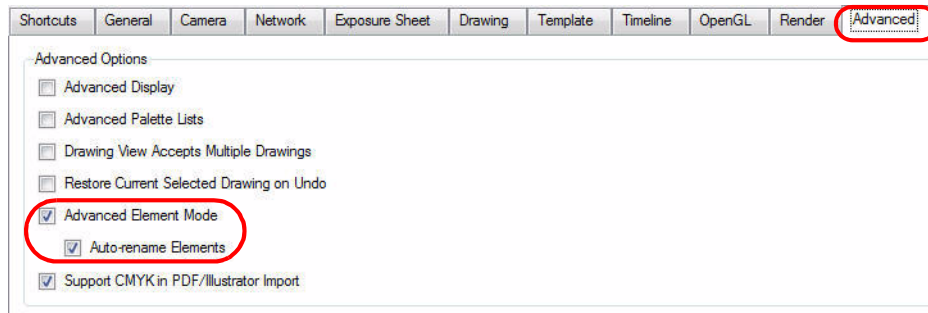
Defaults

- **Show Groups:** If enabled, the Timeline view will show the Group layers.
- **Show Effects:** If enabled, the Timeline view will show the Effect layers.
- **Show Sound:** If enabled, the Timeline view will show the Sound layers.

Paste/Drag & Drop

- **Add keyframes at beginning and end:** if you want to copy a set of frames that include keyframes from one place in the Timeline to another, but need to extract a section that will cut either the beginning or ending key frame, you should activate this option. Using this option will cap the partial function with a new keyframe when you preform the paste.

Advanced Preferences



- **Advanced Element Mode:** This preference is used to display more options in the Add Column dialog box and the Column Properties dialog box.
 - ⇒ **Auto-rename Elements:** this controls whether to rename the element whenever the corresponding module name in the Network view or layer name in the Timeline view is changed.

Chapter 7

Morphing Drawings



Hand-drawn animation requires you to spend a lot of time tracing in-between drawings. Harmony Stage speeds up the process using its helpful Morphing feature. This powerful and useful feature creates computer generated drawings and places them between vector drawings to save time and increase quality. Animation created with the Morphing feature can be reused in different projects. You can easily modify the timing and velocity (ease in and ease out).

One of the main uses of the Morphing feature is in effect animation. For example, animating smoke or water can be time-consuming because these types of effects are usually slow moving requiring a large number of closely placed in-betweens.

In this chapter, you will learn about the following:

- Understanding Morphing, on page 284
- Source and Destination Drawings, on page 284
- Morphing Rules, on page 285
- Creating a Basic Morphing Sequence, on page 288
- Tool Properties View, on page 291
- Adjusting the Velocity and Timing, on page 294
- Morphing Tool and Hints, on page 298
- Morphing Layers, on page 305
- Morphing Two Sequences in a Row, on page 310
- Inserting a Morphing Key Drawing, on page 311
- Converting Morphing In-betweens to Drawings, on page 312
- Morphing Holes and Transparencies, on page 313
- Adjusting the Morphing Quality, on page 315
- Tips and Tricks, on page 316

Understanding Morphing

The Morphing feature is used to animate similar and simple shapes such as hair or smoke. It helps you by saving time when you are working on tedious in-betweening and tracing tasks. This, in turn, provides you with more time to spend on complex animation tasks such as walk-cycles or acrobatic sequences.

Ideas Behind Morphing

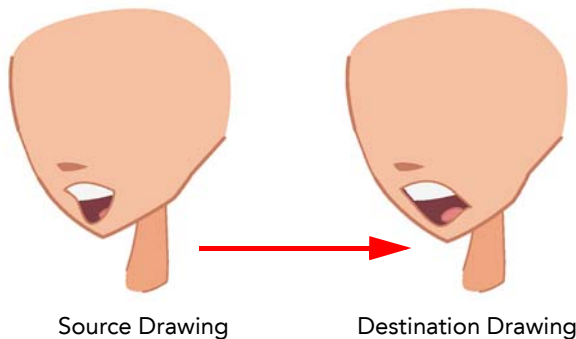
To learn how to morph drawings, it is better to start with basic shapes such as circles and rectangles. Once you are more familiar with the tool, you can increase your knowledge and expertise. In a very short time you will be producing some remarkable effects.

It is helpful to know the pros and cons of morphing before you start. Understanding what you can do and which drawing lines can give you a problem will enable you to design your key drawings so they morph efficiently.



The more complex the shape is, the longer it takes to morph. If it takes more time to morph a drawing than to hand draw it, then it is better to animate it instead of morphing. However, if you spot an occasion when you can morph your drawings, do it! It allows you to fix your timing and velocity in no time without having to create any extra drawings!

Source and Destination Drawings



The Morphing feature matches similar shapes in two drawings. These are the source and destination drawings. Harmony Stage evaluates the source's shape properties and matches them to the most similar one in the destination drawing.

Morphing works between similar shapes, which are drawings that have the same palette, colours and number of shapes. You can even change a rabbit into an elephant, as long as source and destination keep the same colours and number of shapes.

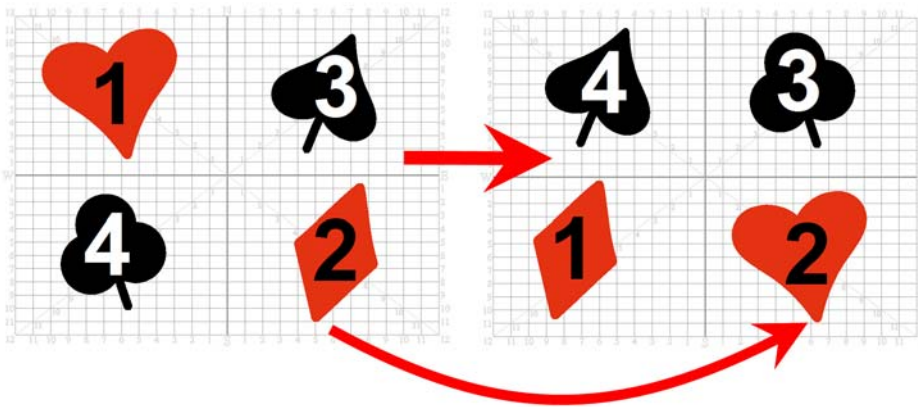
Morphing Rules

Harmony Stage follows a set of rules as it evaluates the shapes. Familiarize yourself with these basic morphing rules before you start morphing.

- Closest Similar Shape, on page 285
- Pencil Line to Pencil Line, on page 285
- Fill Shape to Fill Shape, on page 286
- Colour Swatch to Same Colour Swatch, on page 286
- Vanishing and Appearing, on page 287
- Colour Art to Colour Art and Line Art to Line Art, on page 287






Closest Similar Shape

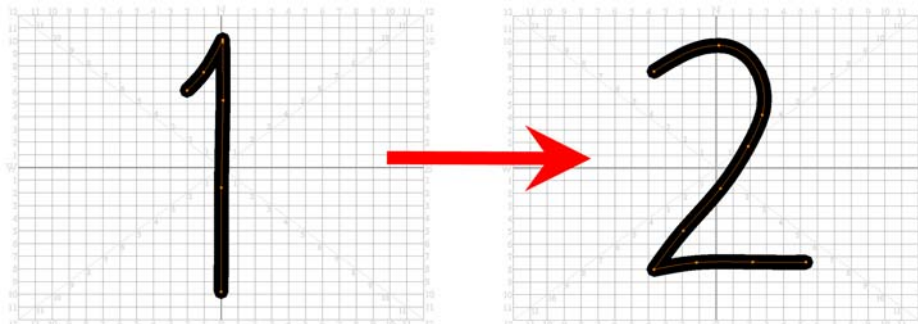
A colour, line shape or zone will morph with the closest similar one in the destination drawing. This means it will morph with the zone nearest to it, as long as that zone uses the same palette's colour swatch (Colour ID) and has the same vector properties (Central or Contour).



Refer to *Drawing and Animating > Drawing with the Brush or the Pencil*, on page 81 to learn more about the difference between central and contour lines.

Pencil Line to Pencil Line

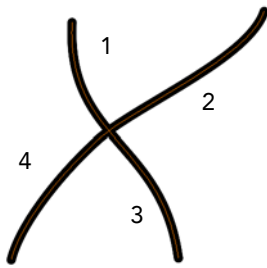
If you trace a shape using a pencil line such as the Ellipse , Rectangle , Polyline , Line  or Pencil  tool, you have to morph it with another pencil line. Make sure that both drawings are pencil shapes (central vector).



A pencil line will never morph with a brush stroke.



If you have pencil lines in your source drawing, the same number of pencil lines must be present in the destination drawings. A pencil line will appear if it is not found in the destination drawing. It will pop out on the last frame.



If two pencil lines cross one another, they are considered to be four lines and not two lines anymore. In this case, you must have four pencil lines in your destination drawing for your morphing to work correctly.



Refer to *Drawing and Animating > Drawing with the Brush or the Pencil*, on page 81 to learn more about the pencil (central) lines.

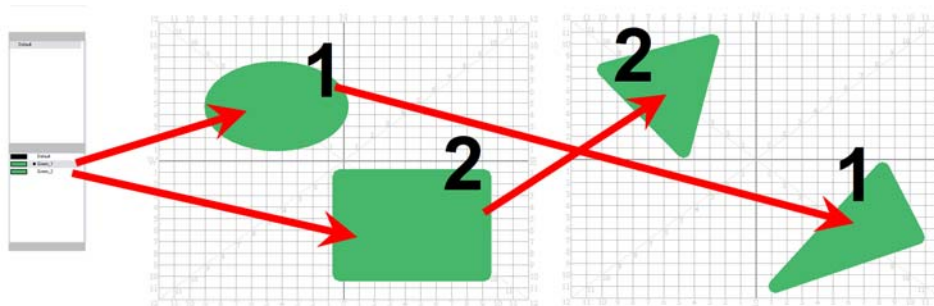
Fill Shape to Fill Shape

If you have a Brush line or a Colour fill zone which are contour vectors, make sure that you morph it with another Fill or Brush line. Contour vectors will not morph with pencil lines (central vectors). A Brush line can morph into a colour fill zone and vice versa.



Colour Swatch to Same Colour Swatch

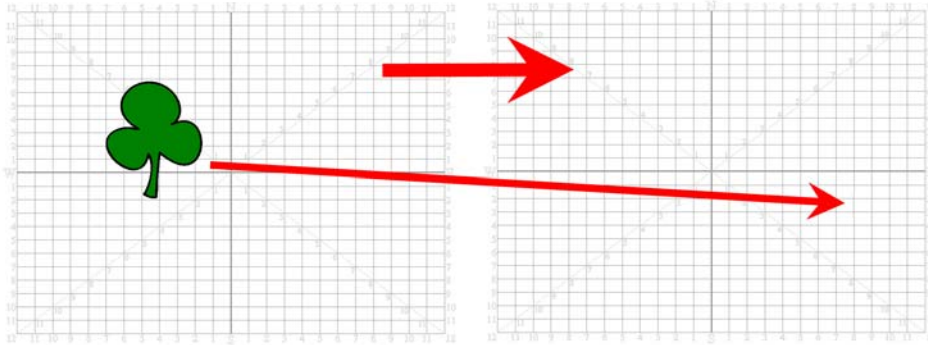
Harmony Stage does not morph colours. If you want to perform a colour transition, you have to create the effect at the compositing level. A colour palette is composed of colour swatches. Each colour swatch has its own unique identification number, even if two colours pots are the same shade of red, they are identified independently. A colour zone or shape will morph with another one painted with the same colour swatch.



Refer to *Adding Colour > Colours*, on page 167 to learn more about colour swatches.

Vanishing and Appearing

If a colour zone does not find a match in the first or the second drawing, it will progressively appear or disappear.



Colour Art to Colour Art and Line Art to Line Art

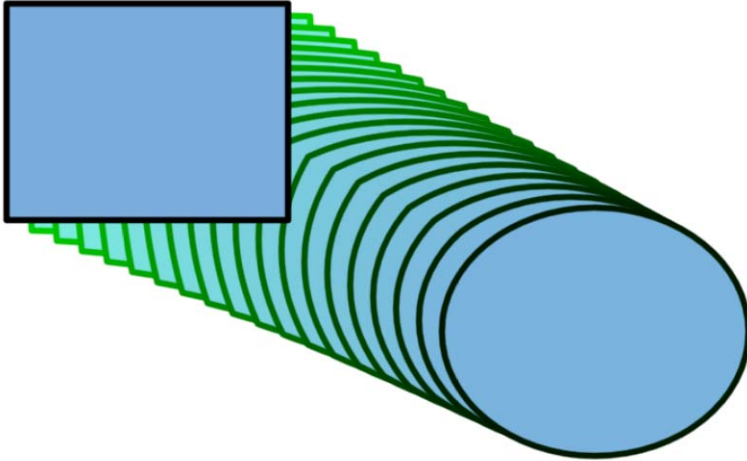
In Harmony Stage, there is an advanced concept for painting your drawings called Line Art and Colour Art. Basically, an extra layer is added in your drawings so that you can fill the colour zones on a separate layer. The regular layer on which you are drawing is called Line Art and the extra layer under the Line Art is the Colour Art.

- A shape drawn in Colour Art can only be morphed with another shape existing in the Colour Art.
- A shape drawn in Line Art can only be morphed with another shape existing in the Line Art.
- A shape created in Colour Art can never morph with a shape created in Line Art.




Refer to *Adding Colour > Line Art and Colour Art Layers*, on page 195 to learn more about Line Art and Colour Art.

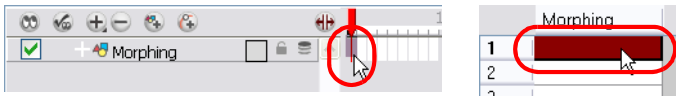
Creating a Basic Morphing Sequence



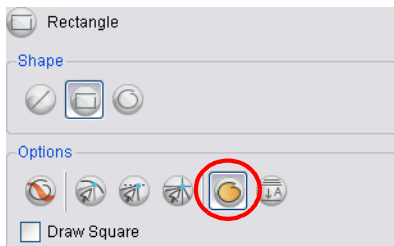
Once you are familiar with the basic rules, you can start creating morphing sequences. You need to practice and become at ease with the Morphing feature. To begin, start with simple elements, once you become confident with the morphing process you can move on to complex and advanced morphing techniques, such as head rotation or full characters.


To create a basic morphing:

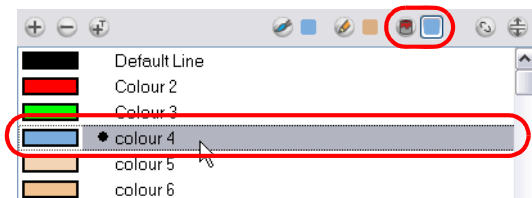
1. In the Timeline view, click on the Add Drawing Layer  button to add a new layer to your project. Rename the new layer **Morphing**.
2. In the Timeline or Xsheet View, select the first cell in your layer.



3. In the Tools toolbar, select the Rectangle  tool. The default keyboard shortcut is [Alt]+[R].
4. In the Tool Properties view, enable the Auto Fill  option.

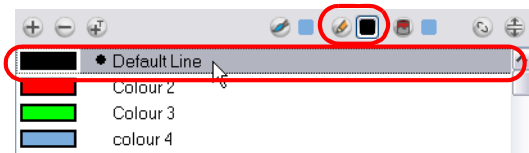


5. In the Colour view, click on the Set Paint Current Colour  button.
6. In the Colour list, select a colour to fill your rectangle with.



7. In the Colour view, click on the Set Pencil Current Colour  button.

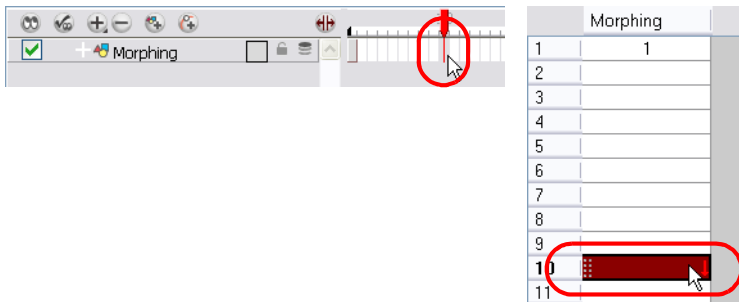
8. In the Colour list, select a colour to trace your rectangle's outline with.



9. In the Camera or Drawing View, draw a rectangle.
- ▶ Hold down the [Shift] key if you want to draw a square.
 - ▶ Hold down the [Alt] key if you want to draw the rectangle from its centre.

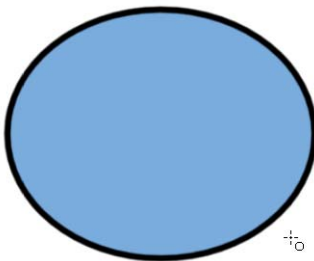


10. In the Xsheet or Timeline View, select the last cell.

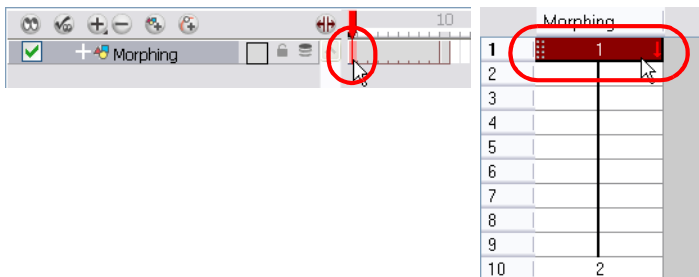


11. Repeat Step 5 to Step 10 using the Ellipse tool instead of the Rectangle tool. The default keyboard shortcut is [Alt]+[O].

- ▶ Draw an ellipse using the same outline colour as the rectangle ("Outline"). Paint the ellipse with the same fill colour as the rectangle ("Fill").



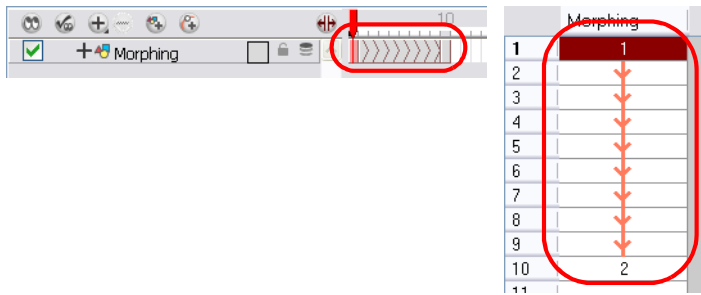
12. In the Xsheet or Timeline View, select your first drawing's cell, the rectangle drawing.



13. In the Xsheet or Timeline View, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) on the selection and select **Morphing > Create Morphing**. The default keyboard shortcut is [Alt]+[M].

- ▶ In the top menu, you can also select **Animation > Morphing > Create Morphing**

Arrows appear between the two key drawings to show they are computer generated.



14. Use the Playback toolbar to play the morphing sequence. You can also use the [,] and [.] keyboard shortcuts to flip through the in-betweens. The [F4] keyboard shortcut will toggle between the two key drawings.

Deleting a Morphing Sequence

There are two reasons why you may want to delete a morphing sequence:

- To remove part of a morphing sequence if you want to adjust it manually.
- To delete the entire sequence enabling you to redo the sequence from scratch.

To Remove part of a Morphing sequence:

- ▶ In the Xsheet or Timeline View, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) on the cell from where you would like to start removing the sequence and select **Morphing > Delete Morphing** or from the top menu, select **Animation > Morphing > Delete Morphing**.

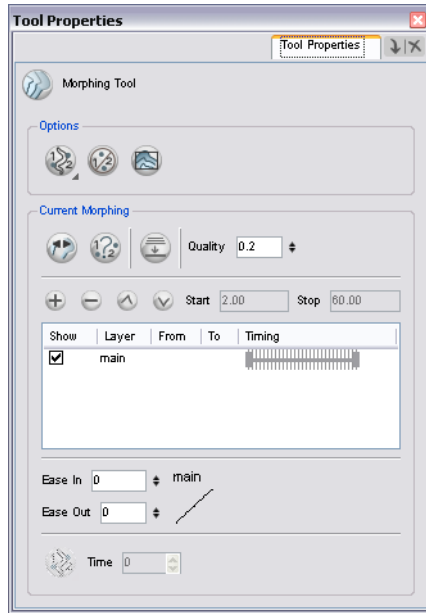
The sequence between the selected cell and the next keyframe is removed.

To Delete an entire Morphing sequence:


- ▶ In the Xsheet or Timeline View, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) on a cell between two keyframes and select **Morphing > Delete Morphing** or from the top menu, select **Animation > Morphing > Delete Morphing**.

The entire sequence between the two keyframes is removed.

Tool Properties View



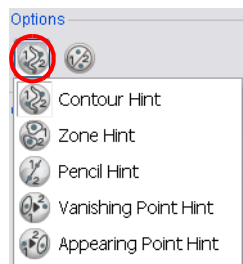
As you create and adjust your morphing sequences, you will often use the Tool Properties view. Using this view allows you do things such as toggling between your key drawings, adjusting the easing or selecting a hint type.

To access the content of the Tool Properties view, you must select the Morphing  tool in the Tools toolbar. The default keyboard shortcut is [F3].

Refer to the following list to learn more about the options available in the Tool Properties view:

- Hint Type, on page 292
- Hide Hints, on page 292
- Show Morphing in Place, on page 292
- Suggest Hints, on page 292
- Switch Between Drawings, on page 292
- Flatten, on page 292
- Quality, on page 293
- Morphing Layers, on page 293
- Easing, on page 293
- Convert Hints, on page 293
- Time, on page 293

Hint Type



The Hint Type drop-down menu allows you to select the correct hint to remedy any problem areas in your drawing.

NOTE:

You can have more than one hint type in your drawings. You can mix all of the hint types in your morphing sequence.

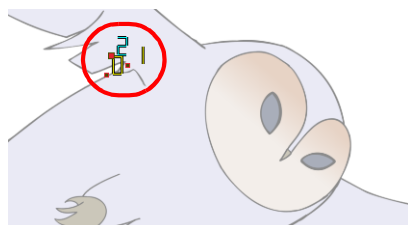


Refer to the [Morphing Tool and Hints](#) topic to learn more about hint types.

The types of hints available in the menu are:

- Contour Hint, on page 301
- Zone Hint, on page 302
- Pencil Hint, on page 302
- Appearing Point Hint, on page 303
- Vanishing Point Hint, on page 303

Hide Hints



The Hide Hints button temporarily hides the hint points from the key drawings.

Use this option when you have a series of hint points hiding some lines you would like to see.

Show Morphing in Place

The Show Morphing In Place option is used with Morphing Layers. Enabling this option prevents the currently selected morphing layer from being shown on top of the others and maintains the correct layer ordering.



Refer to the [Morphing Layers](#) topic to learn more.

Suggest Hints

The Suggest Hints option is used to automatically set hint points on your key drawings as a help tool. If you are not sure where to set your hints, you can use this option. It will set the main hints which you can then fine tune.

Switch Between Drawings

The Switch Between Drawings button is used to toggle between the two key drawings in your morphing sequence. This option is useful while setting hints.

The default keyboard shortcut is [F4].

Flatten

The Flatten option is used when you have to morph a sequence with a semi-transparent or transparent colour in it.



Refer to the [Morphing Holes and Transparencies](#) topic to know more about this option.

Quality

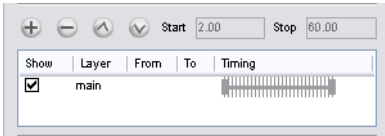
Quality

The Quality setting is used to make the lines of the morphed drawings smoother. Adjust this parameter when you are doing an extreme close up of your animation.



Refer to the *Adjusting the Morphing Quality* topic to learn more.

Morphing Layers



The Morphing Layers option is used when working with Morphing Layers. You can add, remove and manage your different morphing layers in this space.



Refer to the *Morphing Layers* topic to learn more.

Easing

Ease In main
Ease Out

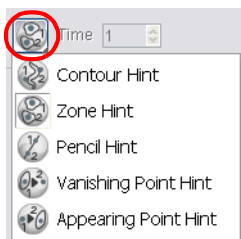
The Easing option is used to adjust the starting and ending velocity of your morphing sequence so that the motion is smooth and not mechanical.

You can adjust the Ease In and Ease Out value by dragging your cursor up and down or typing a new value. The values go from -1.0 to 1.0.



Refer to the *Adjusting the Velocity and Timing* topic to learn more.

Convert Hints



The Convert Hints option is used to switch the type of the current selecting hint points. This option is useful when you position hints and then realize they are not the right type. You can select them and convert them to the correct type instead of deleting them and setting new ones.

Use the Morphing tool to select the hints and then convert them by going to the Tool Properties and selecting the new hint type from the Convert Hints drop-down menu.

Time

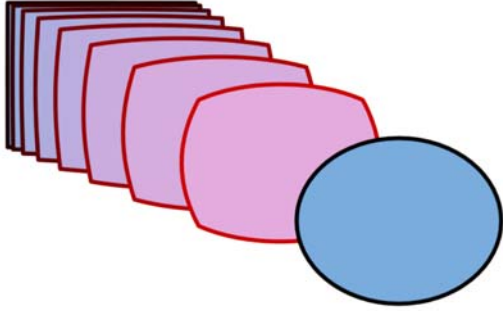
Time

The Time parameter is used to set the timing on Appearing Point and Vanishing Point hints. These hints are used to set the trajectory of appearing and vanishing objects, they do not have to appear or disappear from the first frame to the last frame of the morphing sequence. With the Time parameter, select your Appearing Point or Vanishing Point hint and type the frame number on which the object will start its animation.



Refer to the *Appearing Point Hint* topic to learn more.

Adjusting the Velocity and Timing



Once you have established a morphing sequence, you can control its timing and velocity. When you look at your animation you will notice that the morphing motion is constant. To produce a less mechanical motion, you will probably want to create some ease in or ease out.

If you did not place your source and destination drawings on the correct frames you may need to extend or shrink the sequence length.

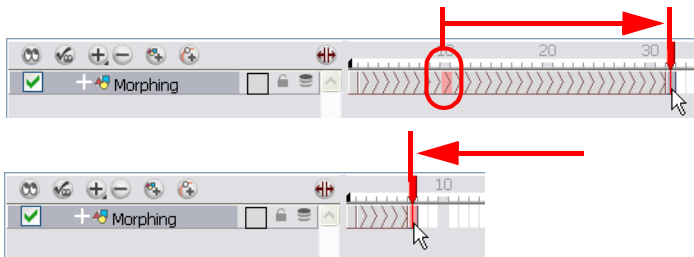
This section covers the following topics:

- Changing the Morphing Sequence Length, on page 294
- Adjusting the Velocity, on page 294

Changing the Morphing Sequence Length

To extend or shrink a morphing sequence length:

1. In the Timeline View, select the source or destination drawing.
2. Click on your selection and drag the drawing to its new frame.



Adjusting the Velocity

Once the morphing length is correct, you can adjust the velocity in the Tool Properties view or in the layer's editor.

This section is divided as follows:

- Adjusting the Velocity in the Tool Properties View, on page 294
- Adjusting the Velocity in the Layer Properties Editor, on page 295

Adjusting the Velocity in the Tool Properties View

To adjust the velocity in the Tool Properties view, you must first select the Morphing  tool.

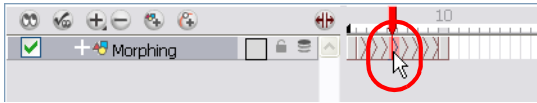


Refer to the Morphing Tool and Hints topic to learn more.

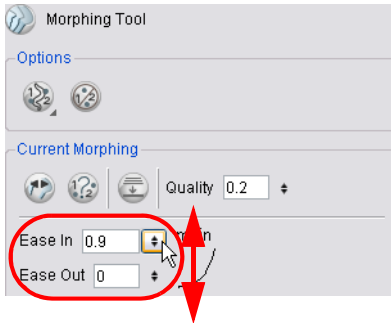
To adjust the velocity in the Tool Properties View:

1. In the Tools toolbar, select the Morphing  tool. The default keyboard shortcut is [F3].

- In the Timeline view, select one cell in your morphing sequence.



- In the Tool Properties view, click on the Ease In or Ease Out up or down arrows to adjust the velocity. You can also enter values from -1.0 to 1.0 in the corresponding text field.



A real-time representation of the ease curve velocity is shown beside the text fields displaying the ease in and ease out.



- In the Playback toolbar, click on the Play button to preview the result.

Adjusting the Velocity in the Layer Properties Editor

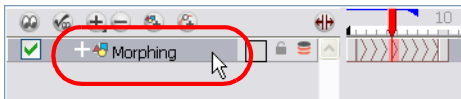
If you have several morphing sequences on a single layer, you may find it easier to adjust their velocities on one function curve rather than several separate ones. Having all of your velocity parameters in one place is more efficient and easier to modify.


Adjusting the velocity in the Layer Properties Editor also allows you to reverse a section of the morphing sequence. The sequence will always start with the source drawing and end at the destination. You can play the morphing sequence backwards or forwards during the animation.

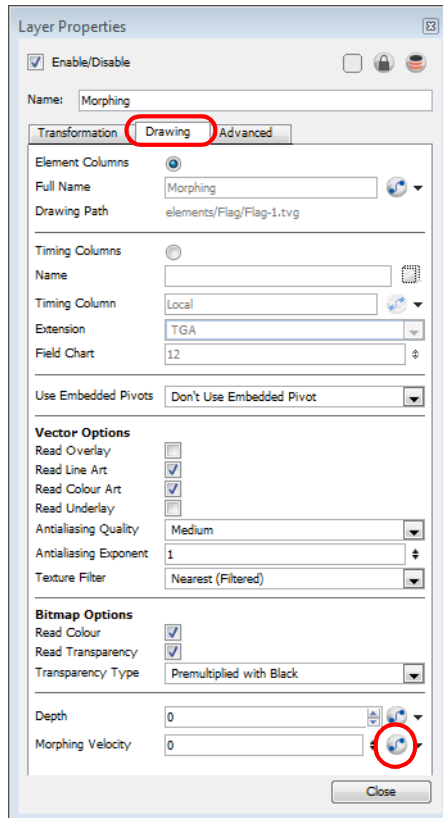
You can have two levels of easing. It is possible to adjust the velocity of each sequence in your layer independently using the Tool Properties view and then adjust the morphing velocity function in the Layer Properties Editor to control the entire layer's easing.

To adjust the velocity in the layer's editor:


- In the Timeline View, double-click on the drawing element module to open the Layer Properties Editor.




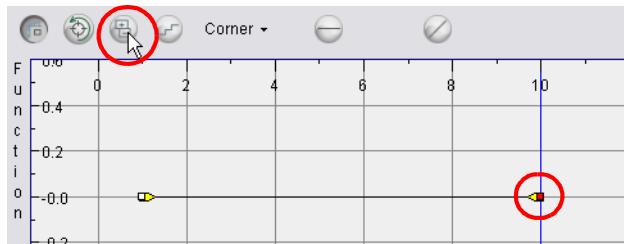
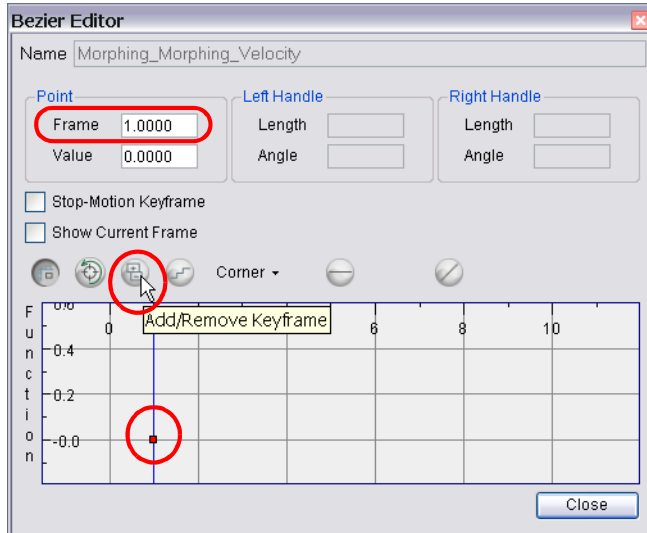
2. In the Layer Properties Editor, go to the Drawing tab and click on the Function  button to create a function curve.



Refer to the following sections in the *Creating Animation Paths* chapter to learn more about creating functions and the Function menu:

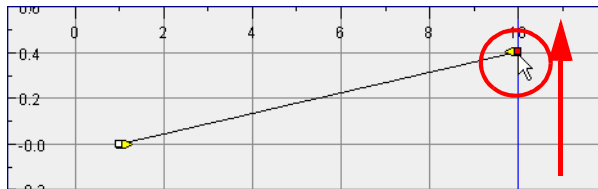
- ▶ Function Curves, on page 586
 - ▶ Creating Function Curves, on page 586
 - ▶ Sharing Functions, on page 587
 - ▶ Function Drop-down Menu, on page 590
 - ▶ Function Types, on page 591
3. In the Layer Properties editor, click on the Function  button once more to open the velocity curve.

4. Add a keyframe at the first frame of the morphing (Source) and one at the end (Destination) by clicking on the Add/Remove Keyframe  button.

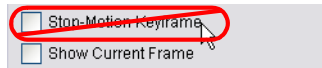


5. Move the end keyframe up.

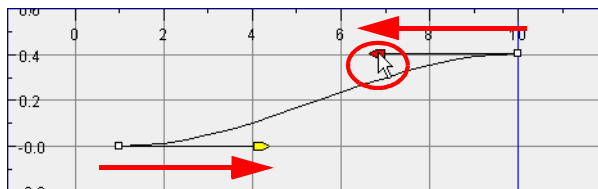
NOTE: It is important that the last keyframe remains above the first one.



6. Make sure that the first keyframe is NOT a Stop-Motion keyframe. To do this, uncheck the Stop-Motion keyframe option to disable it.




7. Click on the keyframes and pull the Bezier handles to create Ease in and Ease out. If you make the curve go downward instead of upward, the animation will play backward until the curve starts to go upward again.



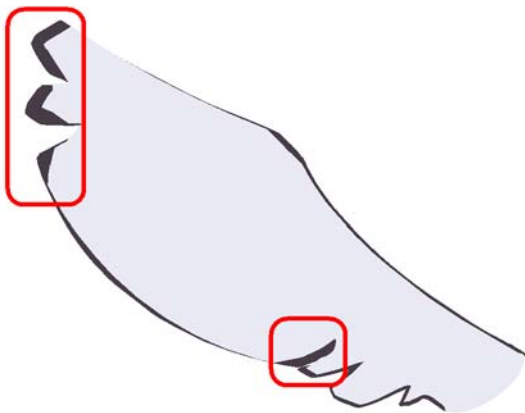
If you have more than one morphing sequence in the same layer, you need to add a keyframe on the velocity curve for each source and destination drawings.

Morphing Tool and Hints



Harmony Stage provides the Morphing  tool to control your morphing sequence, this works by placing different types of hints to help the system morph the animation the way that you want it.

Hints are points which are placed in both the source and destination drawings, they associate zones and lines between the two drawings. Hints are used to fix problem zones, such as a line that is not following the colour fill zone.



Corners and points generally give the most problems. The software does not necessarily understand the animation curves and may be unable to match corners. It will generally associate a corner with the nearest one, this is not always correct and it is why we use hint points to determine what goes with what.

This topic is divided as follows:

- Using the Morphing Tool, on page 299
- Contour Hint, on page 301
- Zone Hint, on page 302
- Pencil Hint, on page 302
- Appearing Point Hint, on page 303
- Vanishing Point Hint, on page 303
- Copying Hint Points from One Drawing to Another, on page 303

Using the Morphing Tool

Hints are identification points existing in both the source and destination drawings to create associations between the two of them.

To correct morphing distortions, Stage has different types of hints available for controlling different types of problems:

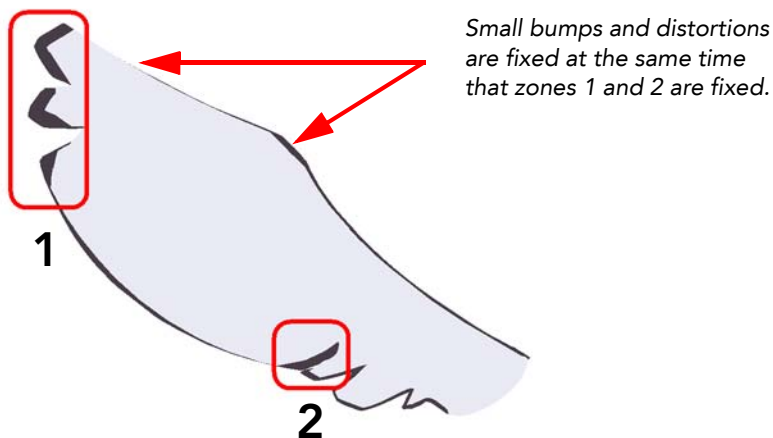
- Contour Hint
- Zone Hint
- Pencil Hint
- Appearing Point Hint
- Vanishing Point Hint

Each type of hint has a different purpose and they can all be used in the same drawing.

Use the Morphing tool to add hints to your morphing sequences. You can add different hints to your source and destination drawings and combine all types of hints in the same drawing.

A hint will automatically appear in both the source and destination drawings when it is added. A hint cannot exist in a single drawing. If you delete a hint from one drawing, it will be also deleted from the other.

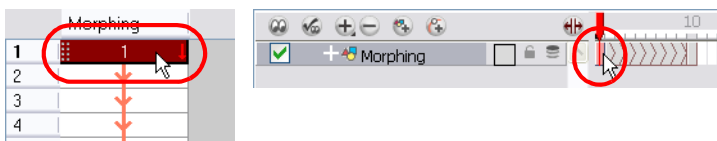
The key to placing your hints is to put them where the biggest problem is. Fix the largest distortions first, this may also fix the smaller ones at the same time.



Do not add too many hints, this is a common mistake when morphing, it takes some practice to learn how to correctly use and place hints.

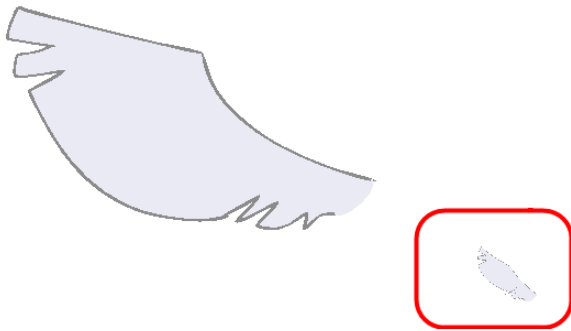
To add and remove hints:

1. In the Timeline or Xsheet View, select the source or destination drawing of your morphing sequence.

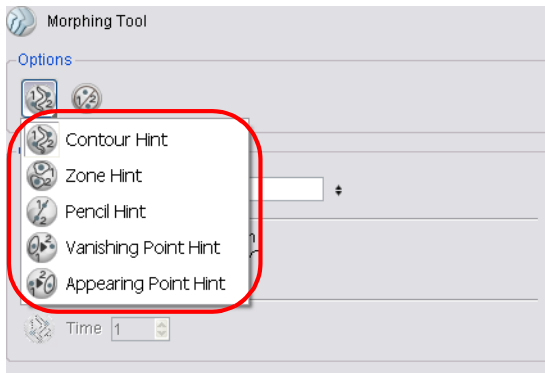


2. In the Tools toolbar, select the Morphing  tool. The default keyboard shortcut is [F3].

Use your other morphing key drawing, shown in the Drawing view's bottom right corner, as a reference.



3. In the Tool Properties view, select the type of hint you want to use.



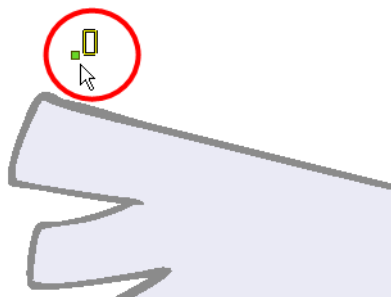
- ▶ Select **Contour Hint** to correct a brush line or colour zone's contour (Contour vector).
- ▶ Select **Pencil Hint** to correct a pencil line (Central vector).
- ▶ Select **Zone Hint** to correct a colour zone morphing match.
- ▶ Select **Vanishing Point Hint** to correct a vanishing shape's trajectory.
- ▶ Select **Appearing Point Hint** to correct an appearing shape's trajectory.



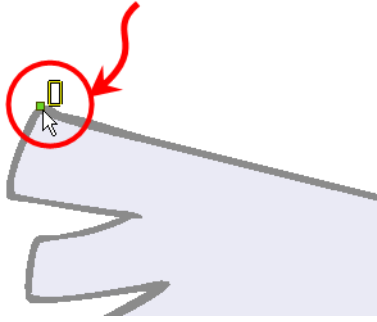
Refer to the following topics to learn more about hint points:

- ▶ Contour Hint, on page 301
- ▶ Zone Hint, on page 302
- ▶ Pencil Hint, on page 302
- ▶ Appearing Point Hint, on page 303
- ▶ Vanishing Point Hint, on page 303

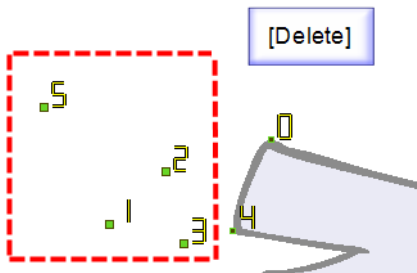
4. In the Camera or Drawing View, click on the drawing near the area to add a hint.




5. Select the hint's point and move it to its correct position.

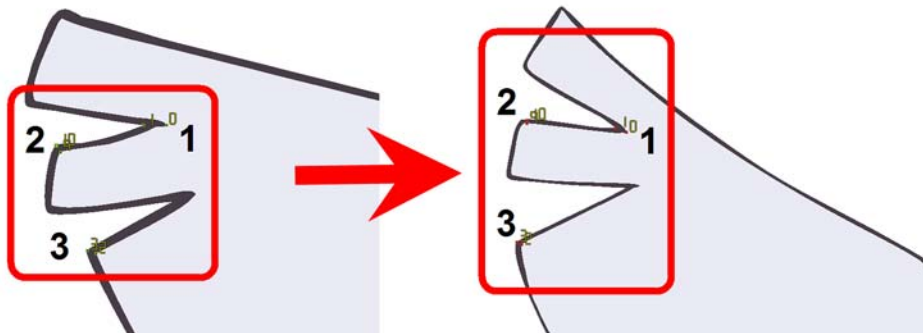


6. Select one or many hints and press [Delete] to remove extra or unused hints.
 - ▶ To delete all of the hint points at once, use the default keyboard shortcut [Shift]+[Delete].



7. In the Playback toolbar, press the Play  button to see the result.

Contour Hint



The Contour Hint is used on the colour fill zone and brush lines; in other words, on Contour vectors. It allows the control of line thickness and contour position. Also, if a contour is not animated the way that it should be you can use hints to correct the animation. For example, if a flag is not waving properly.

When adding a Contour Hint, make sure that you place it far enough away from the contour so that you can see it snap to the contour.

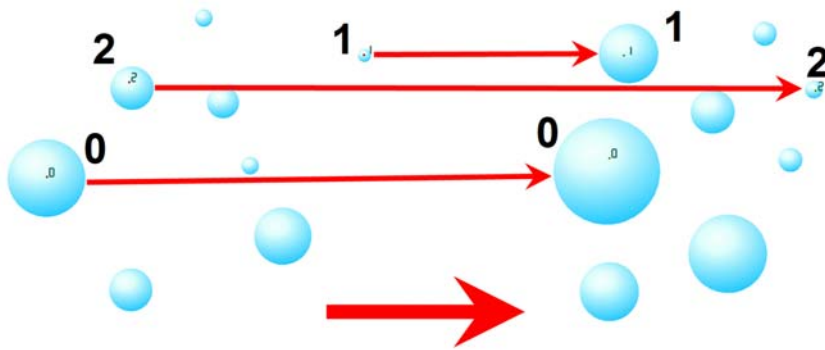
NOTE: Do not place the Contour Hint directly on the line as it may look like it has snapped to the contour, when in fact, it has not and the morphing will remain unchanged.

The Contour Hint points are yellow.



To correct a brush stroke, place a hint on both sides of the line to indicate its thickness variations over time.

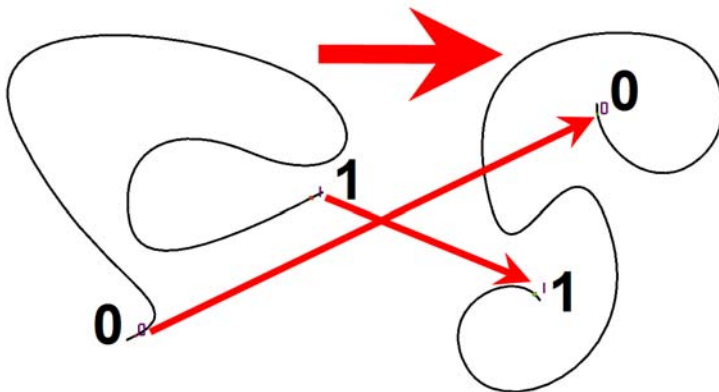
Zone Hint



The Zone Hint is used on a colour zone to control the proximity rule. The Zone Hint is placed in the centre of the colour zone. Sometimes a colour zone is not associated with the corresponding one by default. For example, in a splash animation there are many water droplets that are the same colour. The system automatically morphs the droplet to the nearest one. This is not always correct. A Zone Hint will force a colour zone to morph with another one.

Zone Hint points are cyan in colour so you can easily see them.

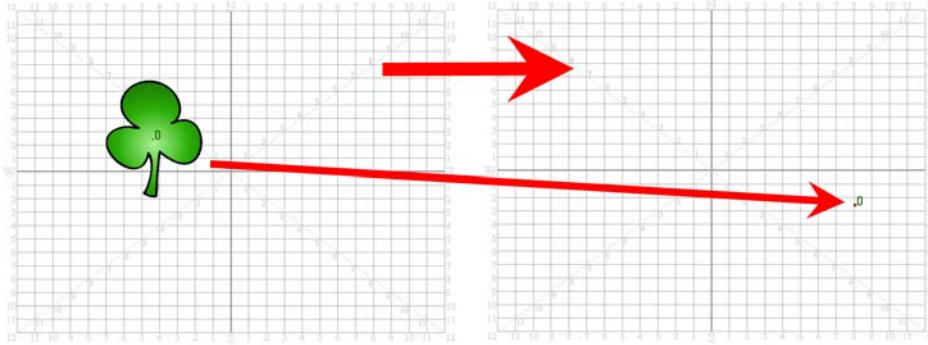
Pencil Hint



A Pencil Hint is used to control a pencil line, also known as central vector. It can be used on drawings that were done using the Pencil, Polyline, Ellipse, Line and Rectangle tools. Like the Contour Hint, the Pencil Hint snaps to the central vector. Make sure to place it far enough away from the line so you will see it snap when you move it.

Pencil Hint points are magenta in colour so you can easily see them.

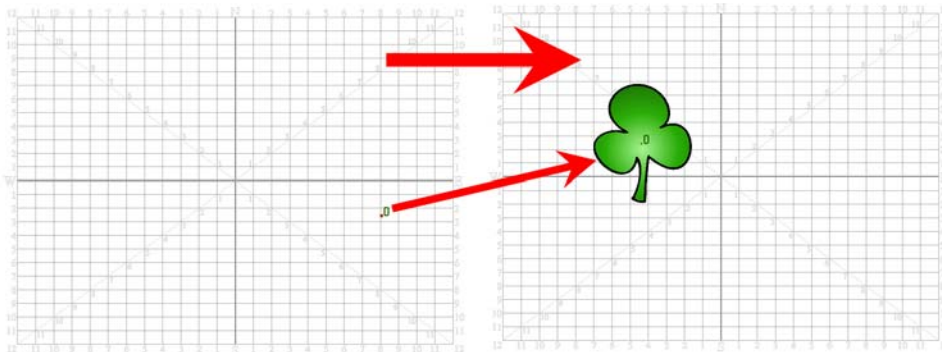
Vanishing Point Hint



A Vanishing Point Hint is used to control the trajectory of a vanishing shape. A shape will vanish from the source drawing when there is no corresponding shape in the destination drawing. If you do not place a Vanishing Hint to control the point of disappearance, the shape will vanish into its centre.

Vanishing Hint points are green in colour so you can easily see them.

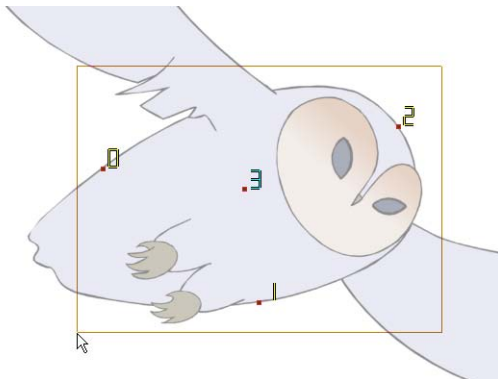
Appearing Point Hint



An Appearing Point Hint is used to control the trajectory of an appearing shape. A shape will appear in the destination drawing when there is no corresponding shape in the source drawing. If you do not place an Appearing Hint to control the point of appearance, the shape will appear from its centre and expand outwards.


Appearing Hint points are violet in colour so you can easily see them.

Copying Hint Points from One Drawing to Another



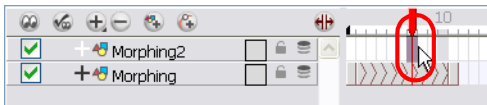
If you have two morphing sequences that use the same drawing and you would like to copy it and its hint points, you can do so in the Drawing view.

To copy a drawing and its hints:

1. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
2. In the Drawing view, select the drawing you will reuse in your second morphing sequence. In the top menu, select **Edit > Copy**.
The default keyboard shortcut is [Ctrl]+[C] (Windows/Linux) or [⌘]+[C] (Mac OS X).



3. In the Timeline view, select the cell where the new drawing will be.



4. In the Drawing view, paste your selection. In the top menu, select **Edit > Paste**. The default keyboard shortcut is [Ctrl]+[V] (Windows/Linux) or [⌘]+[V] (Mac OS X).
5. In the Timeline view, select the cell where the second drawing will be.



6. In the Drawing or Camera view, draw your second drawing.



7. In the Timeline view, create the morphing sequence for the new drawings. The default keyboard shortcut is [Alt]+[M].



8. In the Tools toolbar, select the Morphing  tool. The default keyboard shortcut is [F3].
9. In the Drawing or Camera view, position your hint points.

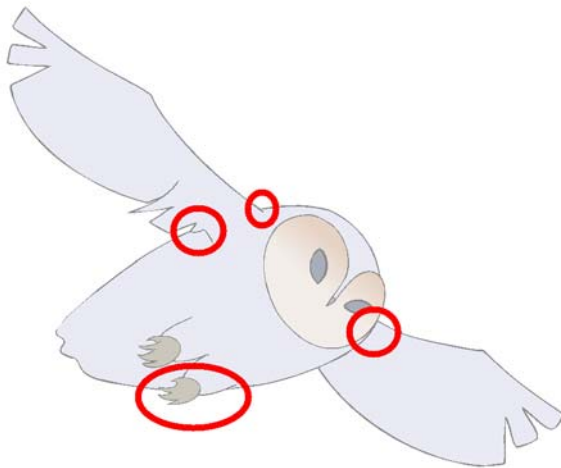
Morphing Layers

Morphing layers simplify the morphing animation. Complex shapes are often too difficult to control and may not work properly, by dividing the drawings into Morphing layers, the task becomes much easier.

The major points used in controlling a morphing sequence are the intersections. If there are many lines intersecting within a drawing, the system will require more control. (Refer to the Morphing Hints section.)

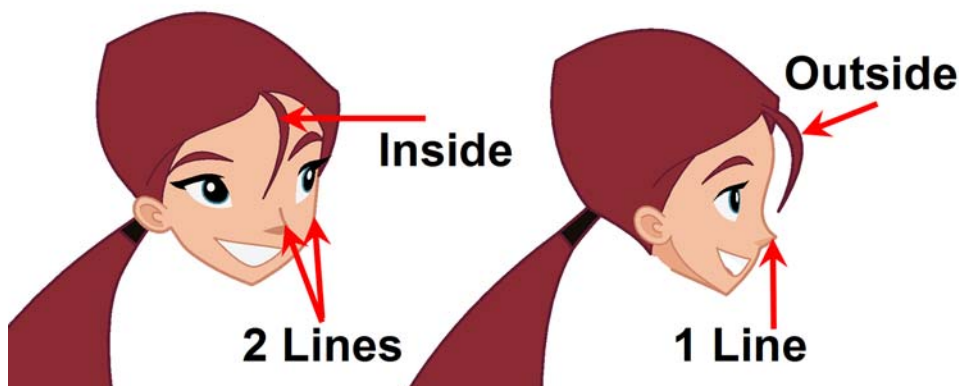
An important aspect of morphing is to identify possible problem zones in order to fix them and avoid potentially frustrating situations.

Identifying Problem Zones



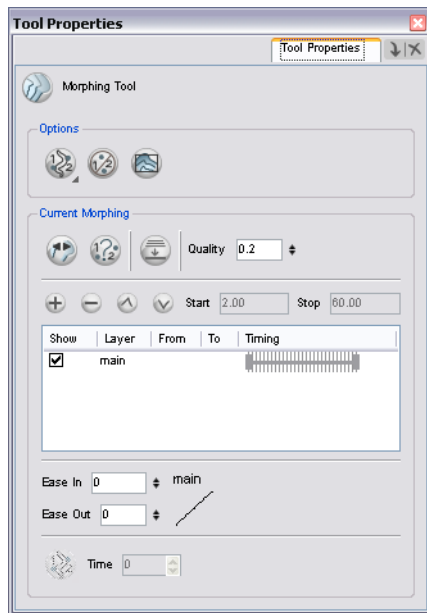
Simple details that look easy to morph can sometimes be more difficult than they may initially appear to be. For example, you may find that the nose becomes a problem when performing a head rotation. As explained earlier, the drawings need to be similar in their amount of shapes. Generally, on a head rotation, the source nose is in the center of the face, but on the destination, the nose line is part of the face outline. This means that on the source drawing, the nose and the face outline are two separate shapes, whereas they are combined into one shape on the destination drawing.

Morphing a full face as demonstrated on the figure below will cause the source nose to slowly vanish as the destination nose grows from the character's cheek.



Any shape that is contained inside another one and has to morph out of that shape will be a problem for the same reasons as the nose is. At some point during the morphing sequence, the shape contained inside the face will merge with the face outline, and then become a separate shape again.

Morphing Layer Properties



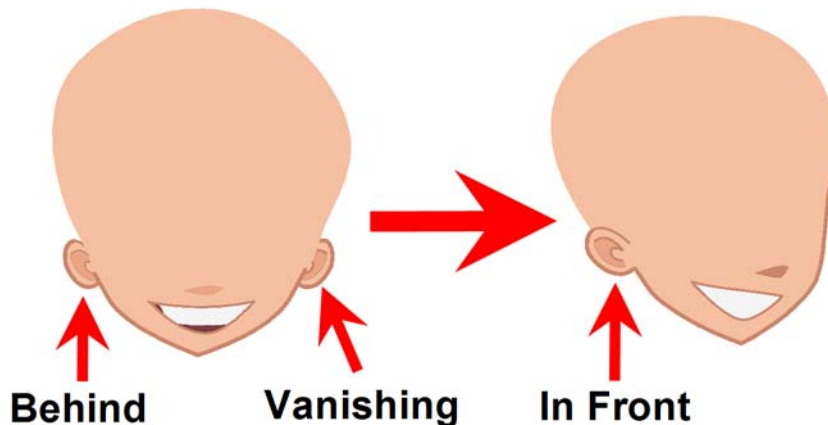
It is because of these reasons, explained in the Identifying Problem Zones section, that Morphing layers exist. Morphing layers are all contained in the same Drawing layer. It is like having a mini Timeline within a Timeline layer, or a mini Xsheet within an Xsheet column.

Each Morphing layer can have its own duration and velocity. Also, because you only have a single element to handle in your Timeline or Xsheet View, it will be treated as one element for the Compositing process, making the compositors work easier.


You could separate all of your elements into different actual drawing elements and have many layers, but you would have to create a large number of morphing sequences and make sure that you modify all of their timings properly.

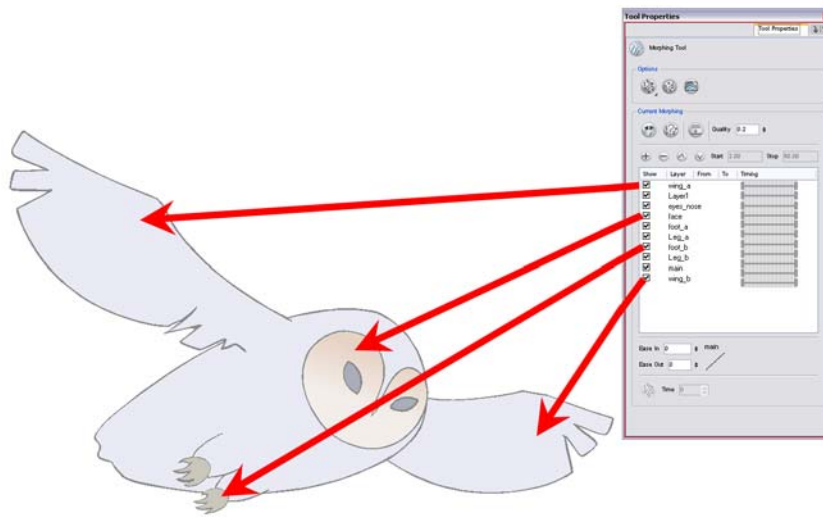


Both solutions are correct, but morphing layers makes it easier to handle and does not change the scene structure by adding more elements which can be very important for Cut-out animation puppets. For example if you need to morph a front head to a three-quarter head where the ear needs to be separated, you do not want to add a new ear layer at the same time and have to worry about connecting it inside the puppet's construction. Instead, simply create an ear morphing layer within the head layer.



Creating a Morph with Morphing Layers

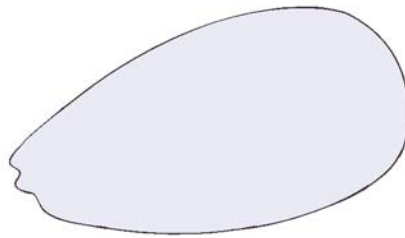
When you click on a Morphing layer drawing, it automatically appears on top of the other ones. If you want it to stay in place, for example the wing behind the body, enable the Show Morphing in Place  option in the Morphing tool Properties view.



Use a naming convention for each morphing layer such as *ear_1*, *ear_2* or *head_1*, *head_2*. You can also use the numbers 1 to 9 for the first layer, 10 to 19 for the second one, 20 to 29 for the third one and so on. This technique is useful if you plan to do more than one morphing sequence in the same column. For example, front head to three-quarter head to side head. The three-quarter drawings will be used in both morphing sequences.

To create a morph with morphing layers:

1. In the Timeline, add a new drawing element and name it properly.
2. In the first cell, draw the main source shape such as the head shape or body shape. Do not add details like eyes.



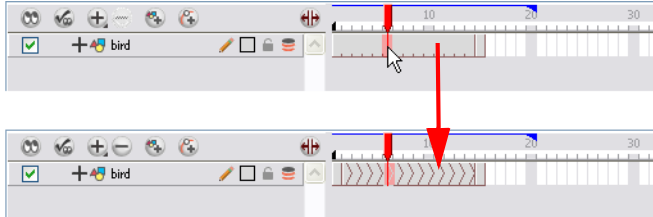
3. In the Timeline View, select the destination cell, then enable and extend the Onion Skin.





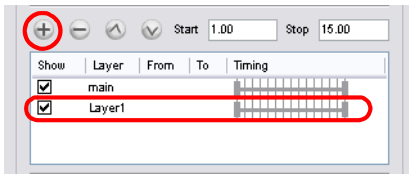
- In the destination cell, draw the second drawing.



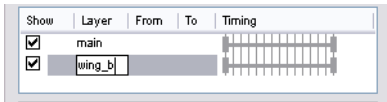
- In the Timeline view, select the in-between cells, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) and select **Morphing > Create Morphing**. You can also use the keyboard shortcut [Alt]+[M],





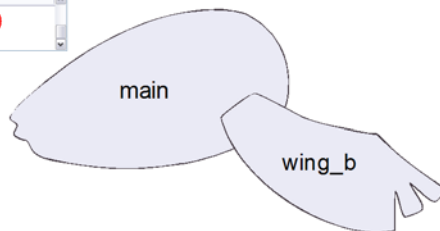
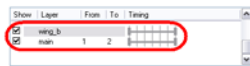
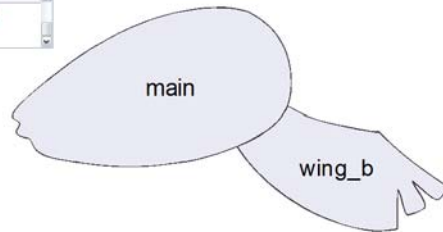
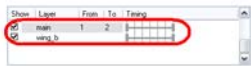
- Select the Morphing  tool from the Animation tools toolbar.
- In the Morphing Tools Properties view, click on the Add Layer  button to add a new morphing layer.



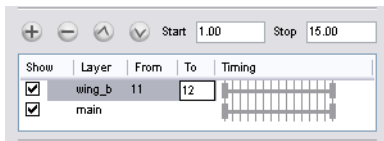
- Double-click on the new layer's name and name it appropriately. Press [Enter].



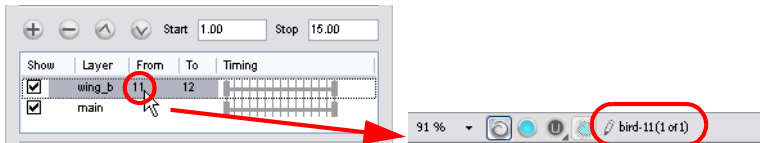
- Use the Up  and Down  arrow buttons to move the new layer above or below the Main layer.
 - If placed above the Main layer, it will be displayed in front. If it is placed below, it will be displayed behind.



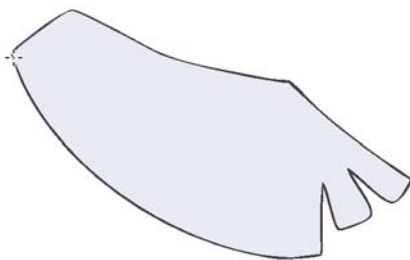
10. To create new drawings, double-click on the blank area under the From section to create the Source drawing and the To section for the Destination drawing and type a value different than the ones used for the main layer. Press [Enter].
- ▶ You do not need to type any value for the Main layer as it uses the one from the Xsheet column.



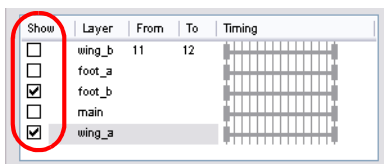
11. Click on the new Source drawing to start drawing the new part. (Make sure that you are working on the proper drawing by verifying the name in the Camera or Drawing View's bottom left corner.)



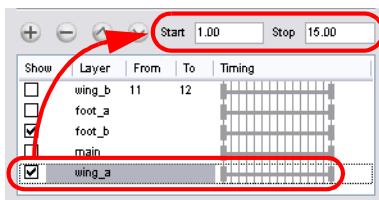
12. In the Camera or Drawing View, draw the Source drawing.



13. Once the Source drawing is done, use the Morphing tool Properties view and click on the Destination drawing's name and draw it in the Camera or Drawing View.
14. Repeat steps Step 7 to Step 13 for each layer needed. You can add as many layers as you want.
15. Enable or disable the layers that you want to display or hide while drawing.

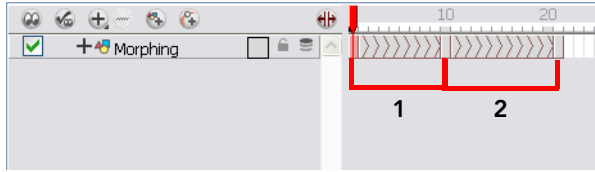


16. If you want to change the layer duration, click on the layer and change the start and stop numbers.

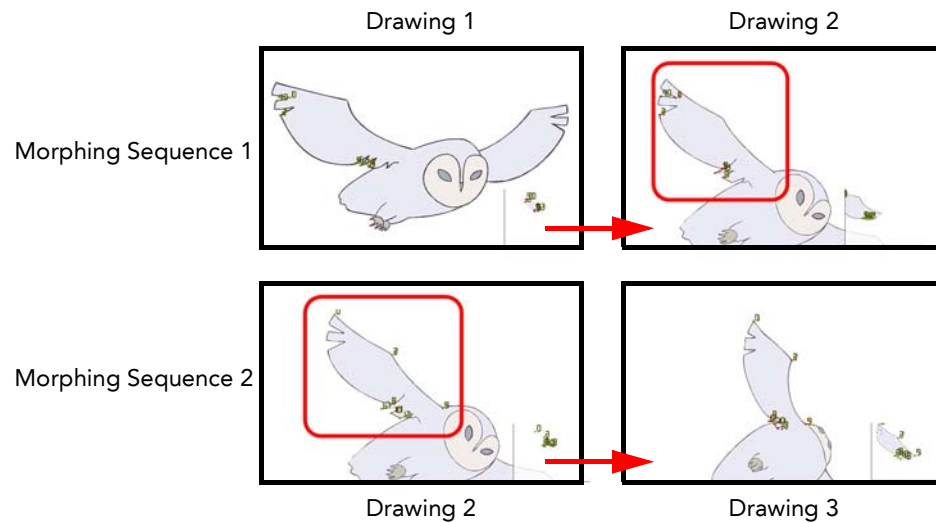


The length indicator changes according to the new values.

Morphing Two Sequences in a Row



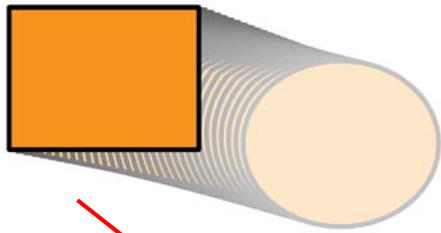
If you are morphing two sequences in a row, you will have to create a different set of hint points for each sequence. Morphing two sequences in a row requires three drawings: 1, 2 and 3. Using these three drawings you create two morphing sequences; one sequence between drawings 1 and 2, and a second sequence between drawings 2 and 3.



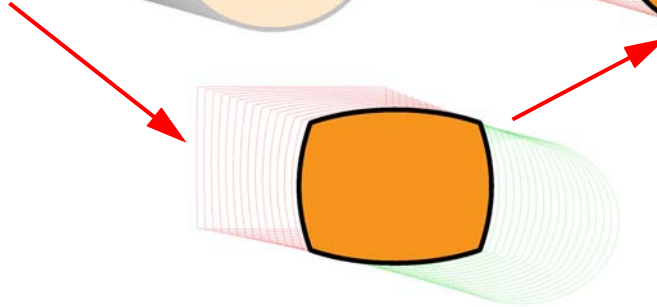
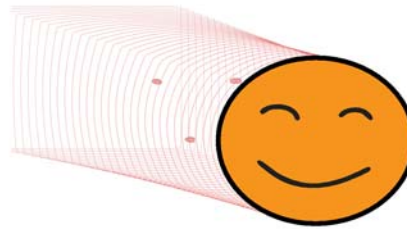
NOTE: Each morphing sequence has its own set of parameters and hints. This means that Drawing 2 will have a set of hints for the first sequence and another set for the second sequence. The two sets of hints will not show at the same time. Each set of hints that appears always corresponds to the morphing sequence you are working on.

Inserting a Morphing Key Drawing

Original Morphing Sequence



Details are added on the second morphing sequence



In-between drawing transformed as a Key Drawing

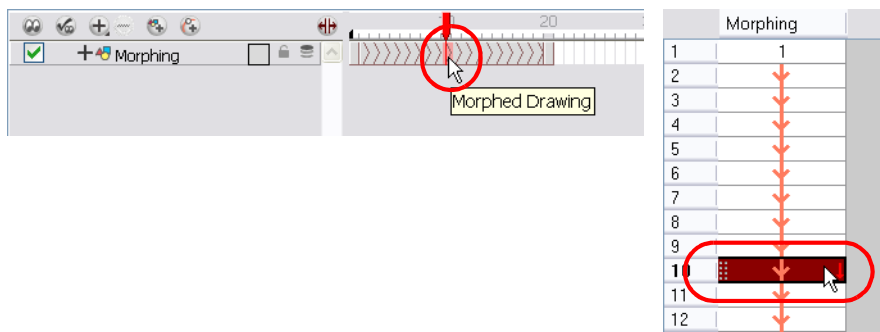
Once you have a morphing sequence, you can add a Morphing Key Drawing.

A Morphing Key Drawing allows you to insert extra details into a morphing sequence. For example, during a morphing sequence you may need to insert a detail such as teeth or a mouth, this is easy to do when you use a Morphing Key Drawing. Instead of creating an entirely new drawing, convert a computer generated in-between to a Morphing Key Drawing and add your extra details to it and the next key drawing.

A Morphing Key Drawing converts a computer generated morphing frame into a real drawing that you can edit. It splits the morphing sequence into two sequences, keeping your previous modifications.

To insert a morphing key drawing:

1. In the Timeline or Xsheet View, select the morphing frame you want to transform into a morphing keyframe.



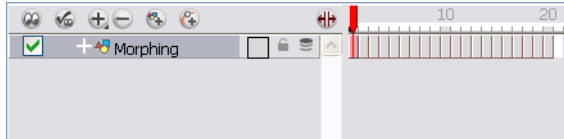
2. Right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) on your selection and select **Morphing > Insert Morphing Key Drawing**.
 - ▶ In the top menu, you can also select **Animation > Morphing > Insert Morphing Key Drawing**.

The new Morphing Key Drawing appears.



3. In the Drawing or Camera View, draw your new details on the Morphing Key Drawing.
4. In the Playback toolbar, press the Play button to see the result.

Converting Morphing In-betweens to Drawings

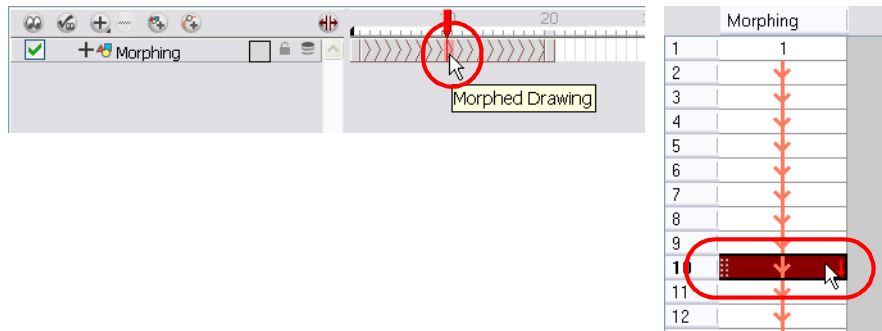


Harmony Stage lets you convert your morphing in-betweens to real drawings that you can edit.

This is useful when you manually edit your morphing sequence or if you prefer to have your animation timing in double frame instead of single frame.

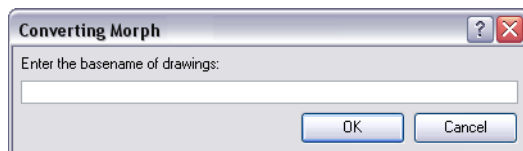
To convert morphing in-betweens to drawings

1. In the Timeline or Xsheet View, select a morphed drawing in the morphing sequence you want to convert to real drawing.

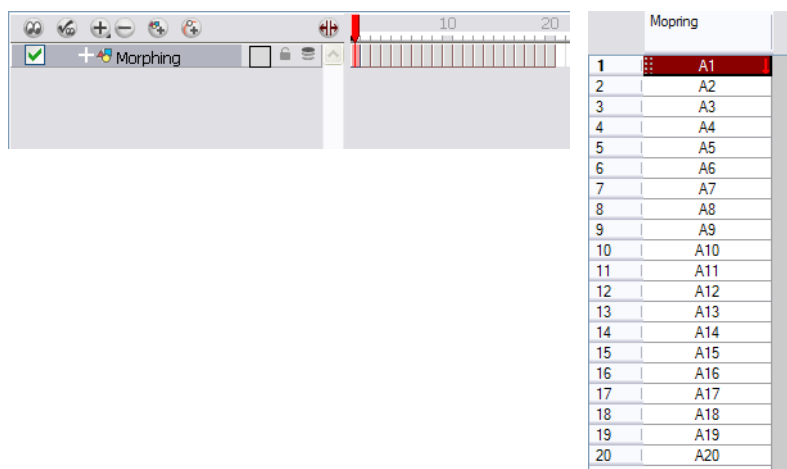


2. Right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) on your selection and select **Morphing > Convert Morphing to Drawings**.
 - ▶ In the top menu, you can also select **Animation > Morphing > Convert Morphing to Drawings**.

The **Converting Morph** dialog box opens.

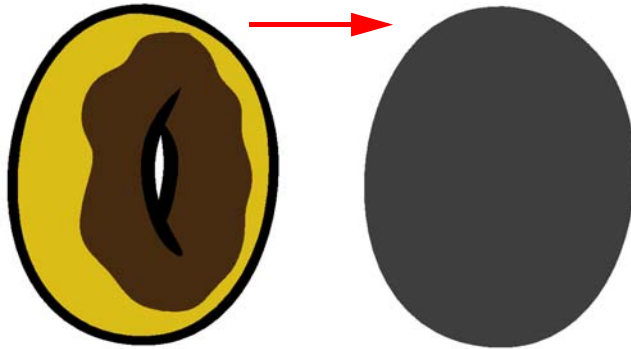


3. Type the drawing basename you want to give to your new drawings. In this case, you could type `circle`.
4. Click on the OK button.

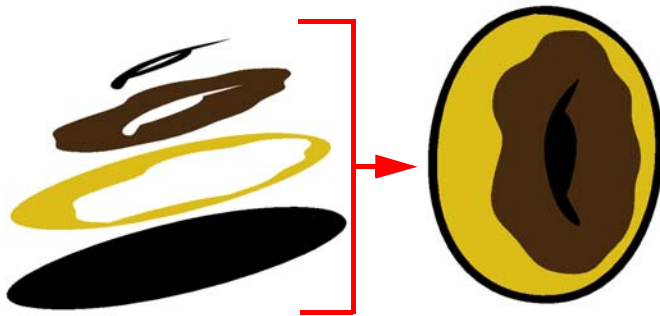


Morphing Holes and Transparencies

To be able to morph shapes with holes or transparent colours, it is important to understand the process of analyzing and morphing a shape. Harmony Stage begins the process by reading the exterior outline of the entire shape. So if you are morphing a doughnut, it will first read the entire circular shape and ignore the central hole.



Once the general morphing shape is analyzed, the system will carry on analyzing the interior details such as colour zones and holes.

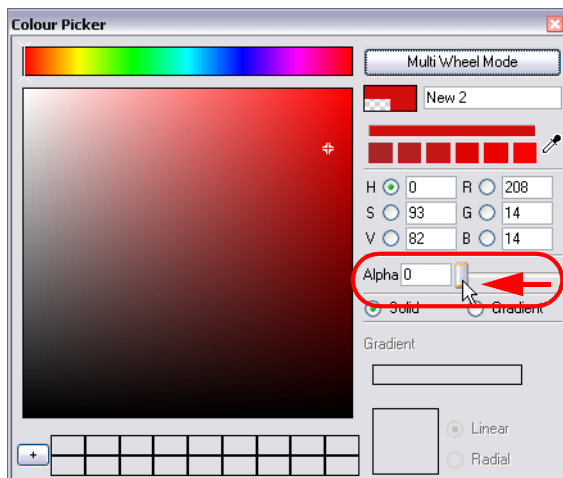


As you can see, because the hole was placed on top after the main shape was morphed, the centre is filled with an opaque brown colour. In order to avoid opaque holes, you have to paint the zone with a transparent colour so that you can control it and flatten the transparency to cut a hole through the main shape.

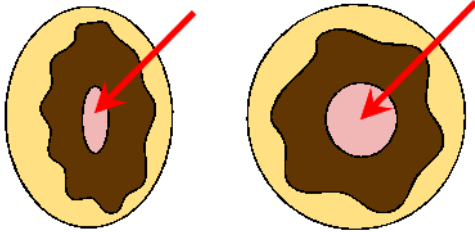
The same thing happens when you have holes painted with semi-transparent colours. To see through your shapes, you have to follow the same process as morphing shapes with holes.

To morph a shape with a hole:

1. In your Colour View, select an unused colour swatch and set its alpha (transparency) to 0.



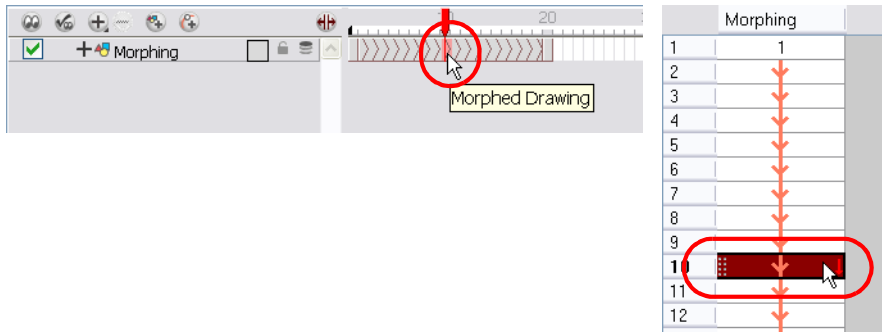
- Paint both holes on the source and destination drawings.




Drawing 1

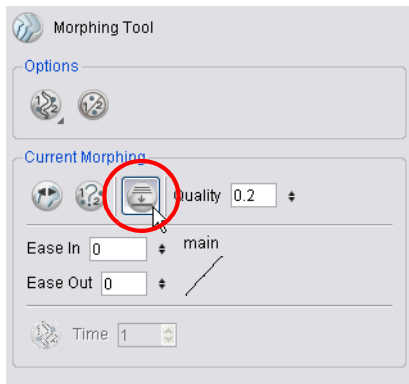
Drawing 2

- In the Timeline or Xsheet View, click on a cell in your morphing sequence.

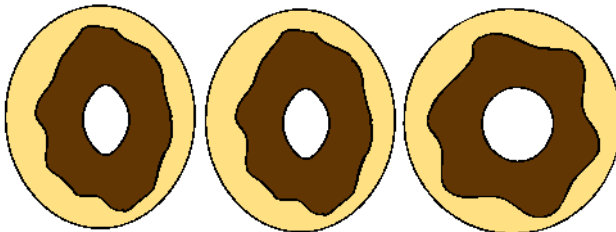


- In the Tools toolbar, select the Morphing  tool. The default keyboard shortcut is [F3].

- In the Tool Properties view, enable the Flatten  option.

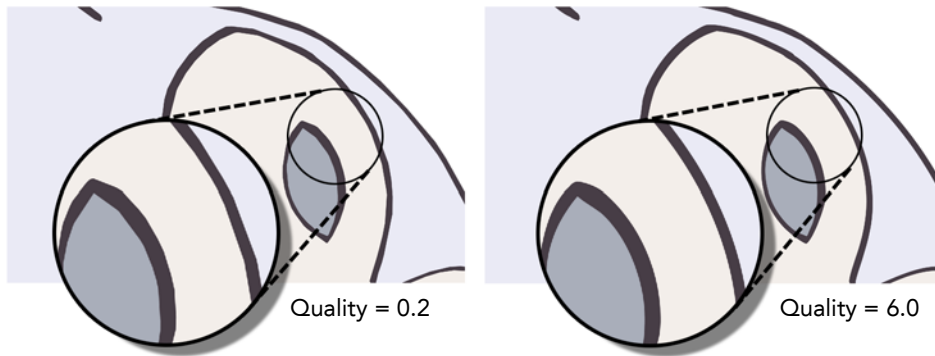


A hole appears in the shape.



Adjusting the Morphing Quality

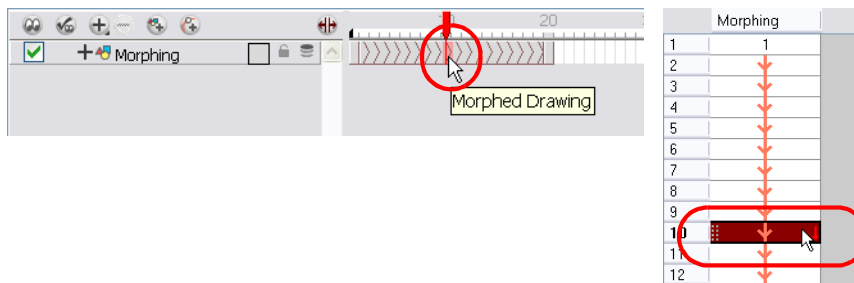
To improve the morphing quality, zoom in close to a morphing animation when compositing,.




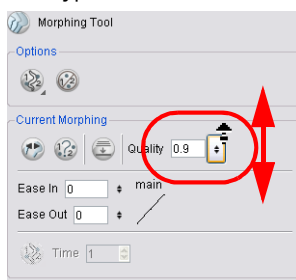
Increasing the quality improves the line shape between vector points. It also creates a larger file, so only increase quality when you are zooming in close.

To set a morphing sequence's quality level:

1. In the Timeline or Xsheet View, click on a cell in your morphing sequence.



2. In the Tools toolbar, select the Morphing  tool. The default keyboard shortcut is [F3].
3. In the Tool Properties view, increase or decrease the quality level by dragging your cursor up or down. You can also type a new value directly in the text field.



Tips and Tricks

This section provides a list of easy tips and tricks to help you morph your drawings more efficiently.

This section is divided as follows:

- Morphing Similar Shapes, on page 316
- Avoiding Crossing Zones During Morphing, on page 316
- Using the Brush Tool as a beginner, on page 316
- Using the Contour Hint on Pencil Lines, on page 316
- Flattening Drawings, on page 316
- Cleaning-up your Drawings, on page 316
- Using the Same Colour Swatch, on page 316

Morphing Similar Shapes

Similar shapes have the same number of colour zones. This only applies to the number of zones and lines and not the number of points on a curve.

Avoiding Crossing Zones During Morphing

If a zone inside a larger zone on the source drawing ends up outside on the destination drawing, the morphing will fail.

A line cannot cross another line during a morphing sequence.

For example, if you are morphing a face so it turns from the front to the side, the nose is located in the middle of the face on the source drawing. However if after morphing, the nose ends up outside or merged with the face profile line on the destination drawing, this will give undesirable results. You can avoid this by using morphing layers and splitting the nose on a separate layer.

Using the Brush Tool as a beginner

When learning morphing, it is recommended that you use the brush tool. You can use the pencil line for simple closed shapes.

Using the Contour Hint on Pencil Lines

If you are using pencil lines, use the Contour Hints instead of the Pencil Hints. Use the Pencil Hint if you want the Pencil line to switch direction such as upside-down.

Flattening Drawings

Flatten your drawing before starting a morphing sequence.

Cleaning-up your Drawings

If you leave a dot, even the smallest one, it is possible that your morphing will create odd shapes. If the source line is closer to the dot than the destination line, the source line will morph into the dot and the destination line will disappear.

Using the Same Colour Swatch

Use the same colour swatch between two drawings. You cannot morph between two different colour swatches even if they have the same RGB values. This can be turned to your advantage for complex morphings.

Chapter 8

Gathering Content



Harmony Stage allows you to import external content as well as being able to draw directly in the software. This means that characters, backgrounds and videos created in other drawing, painting and multi-media programs can be brought in and animated. You can import QuickTime videos, pictures, multi-layered PSD files, as well as AI, SWF and PDF files. Also, with Harmony Stage, you are able to scan your images in from a TWAIN device and either import them as bitmap or vectorize them.

In this chapter, you will learn about the following:

- Importing Bitmap Images, on page 318
- Importing PSD Files as Separate Layers, on page 325
- Importing AI and PDF Files, on page 330
- Scanning Images, on page 327
- Importing from Adobe Flash, on page 332
- Importing QuickTime Movies, on page 334
- Custom Vectorization Parameters, on page 335
- Preferences, on page 345



For sound import, refer to Working With Sound > Importing a Sound File, on page 534.

Importing Bitmap Images



Images can come in many different file formats and are usually saved in a format that retains the original specifications set by the image creator. Some formats are able to preserve transparency or transparent layers, while others are not resolution dependent due to their vector nature. Harmony Stage supports the following formats: JPEG, BMP, PNG, TGA, PSD, IFF, SGI, TVG, OMF, PAL, SCAN.


In this section, you will cover the following topics:

- Importing a Bitmap Image without Vectorization, on page 318
- Importing and Vectorizing Images, on page 322
- Linking Your Layer To an External Image, on page 323

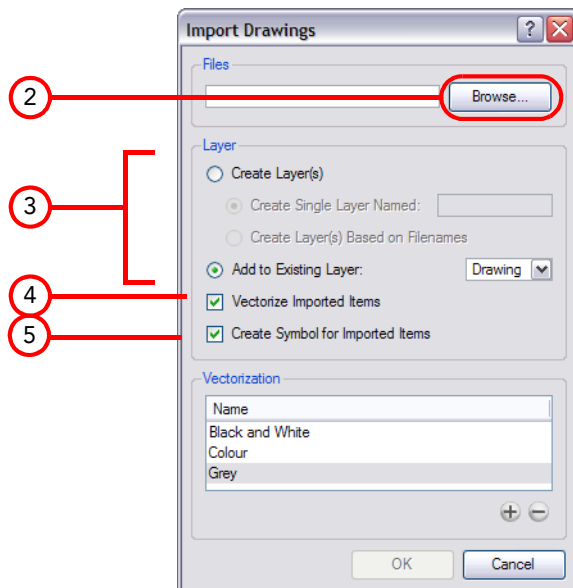
Importing a Bitmap Image without Vectorization

A bitmap image is an image composed of pixels that is both size and resolution-dependant.

To import a bitmap image:

1. From the top menu select **File > Import > Images**. You can also click on the Import Images  button in the File toolbar.
 - ▶ In the Xsheet view, you can right-click (Windows/Linux) or [Ctrl]+ click (Mac OS X) anywhere in the frame area and select **Import > Drawings**.

The **Import Drawings** dialog box opens.



2. Click on the **Browse** button to find and select one or several images on your computer.

3. You now have the option of creating a whole new layer for your image or adding the image to an existing layer.
 - ▶ To create a new layer, select **Layer > Create Layer(s) > Create Single Layer Named** and name your layer accordingly.

OR

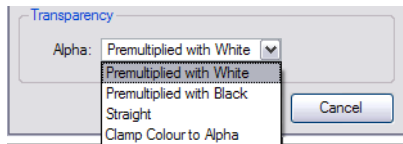
 - ▶ To create a new layer using the file name, select **Layer > Create Layer(s) > Create Layer(s) Based on Filenames**.

OR

 - ▶ To add the image to an existing layer, select **Layer > Add to Existing Layer** and select the layer already created in your Harmony Stage file from the drop-down menu.

4. Uncheck the **Vectorize Imported Items** option.

The Vectorization options are hidden and the Transparency section appears.



5. In Harmony Stage, if you want your bitmap images to be encapsulated in a Symbol, enable the **Create Symbol for Imported Items** option. If not, disable the option.



To learn more about Symbols, refer to the *Libraries, Symbols and Templates* chapter.

6. Next, you must decide on the size and placement of your image within the camera frame. Depending on the Scene Settings (the height and width in pixels that you chose for your project), your image may become blurry or sharper when imported.

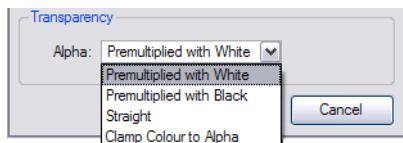
The following three options are available:

- ▶ **Alignment > Rules > Fit**
 - ⇒ If your image orientation is portrait, this selection will stretch or shrink (but not distort) your image to match the full height of your project and therefore the camera frame.
 - ⇒ If your image orientation is landscape, this selection will stretch your image to the full width of the camera frame.
 - ▶ **Alignment > Rules > Pan**

This choice will perform the opposite operation of the **Fit** command.

 - ⇒ If your image orientation is portrait, its width will be made to match the width of the frame. As a result, part of the image will extend beyond the height of the frame.
 - ⇒ If your image orientation is landscape, the image will extend beyond the width of the camera frame. This can be useful if you want to make your background move up and down, or from left to right to make it appear as if the camera is panning, or to actually perform a camera pan.
 - ▶ **Alignment > Rules > Project Resolution**

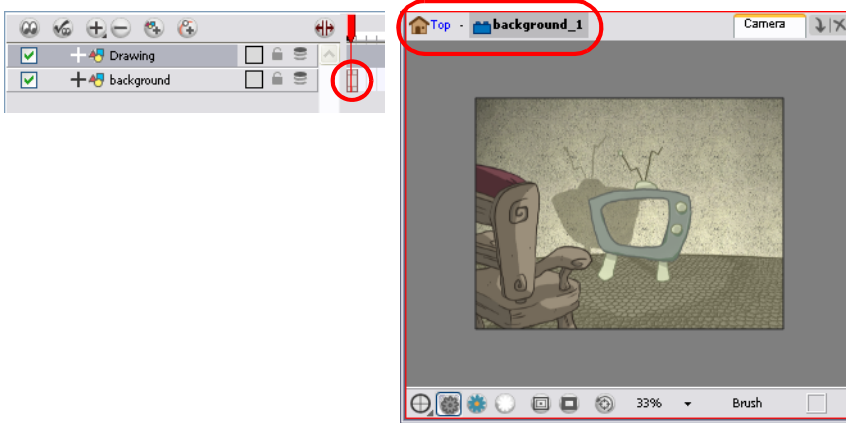
This option will match your project's resolution and centre your image in the frame. One pixel of your image will equal one pixel of the scene resolution. If your image is smaller than the scene resolution, it will appear smaller in the camera frame. If the image is bigger than the scene resolution, it will be bigger than the camera frame.
7. The last step is to decide on the image's transparency. For this, there are four options available. These options deal with the way that the bitmap image has been antialiased; in other words, the edge blending that has been used to transitions between RGBA (red, green, blue, alpha (transparent)) channels.



The options are:

- ▶ **Premultiplied with White**
Individual pixels at the edge of an image are blended with white.
- ▶ **Premultiplied with Black**
Pixels at the edge of an image are blended with black.
- ▶ **Straight**
Pixels at the edge of an image are blended with black, white and greys.
- ▶ **Clamp Colour to Alpha**
Select this option when you want to premultiply the colour value with the alpha value. When the colour is clamped to the alpha, the colour value cannot be higher than the alpha value. It calculates the real colour value faster. When the RGB values are multiplied with the alpha value, that is to say, if you have a pixel of value R=247, G=188, B=29 and the alpha is 50% or the image has a 50% transparency, then the actual RGB values output would be half of the amounts listed above.

8. Click on the OK button.

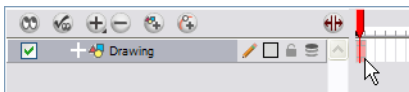



NOTE: To mix bitmap images with vector drawings on the same layer, the bitmap image must be encapsulated in a Symbol.

Adding Images to a Bitmap Layer

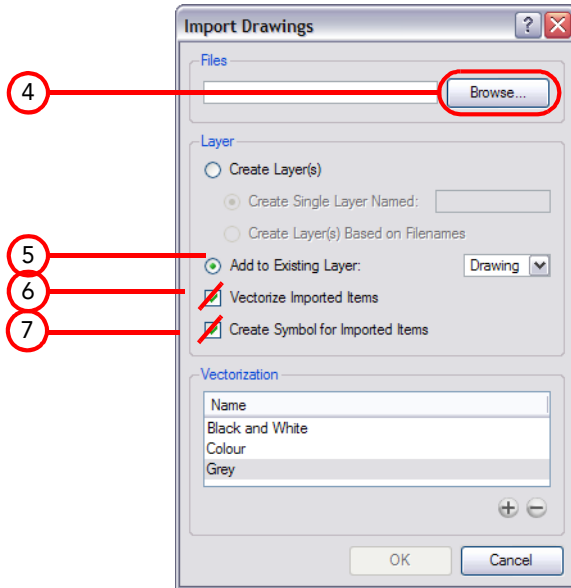
If you want to add more bitmap images to an already existing bitmap layer:

1. In the Timeline view, if the bitmap image is contained in a Symbol, double-click on the bitmap Symbol cell to edit the Symbol.



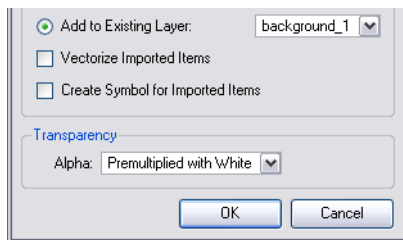
2. If necessary, in the Timeline view, pull on the red bracket to extend the exposure.
3. From the top menu, select **File > Import > Images**. You can also click on the Import Image  button.

The **Import Drawings** dialog box opens.



4. Click on the **Browse** button to find and select one or several images on your computer.
5. In the Layer section, choose **Layer > Add to Existing Layer** and select the bitmap layer already created in your Harmony Stage file from the drop-down menu.
6. Uncheck the Vectorize Imported Items option.

The Create Symbol for Imported Items option appears.



7. Disable the Create Symbol for Imported Items option.
8. Click on the **OK** button.

Bitmap Image Quality

If the bitmap images that you have imported look blurry or slightly pixelated, follow the steps below to clean-up the image.

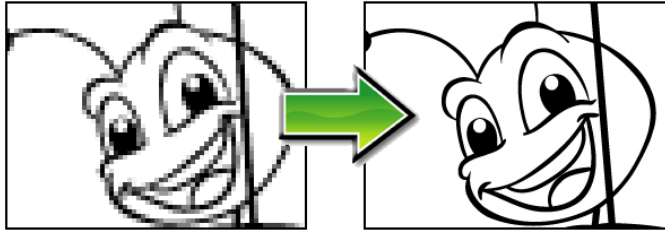
1. In the Camera view, double-click on the bitmap image to enter its Symbol if the image is encapsulated or simply select the bitmap image if it isn't.
2. In the top menu, select **View > Bitmap Image Quality** or use the keyboard shortcut [Ctrl]+[Q] (Windows/Linux) or [^]+[Q] (Mac OS X).
3. The **Bitmap Image Quality** dialog box opens.



4. Click and drag the Bitmap Image Quality slider to the right to improve the quality.
5. Click on the **OK** button.


- If you are inside a Symbol, go to the top of the Camera View and click on "Top" to exit the Symbol and return to your scene.

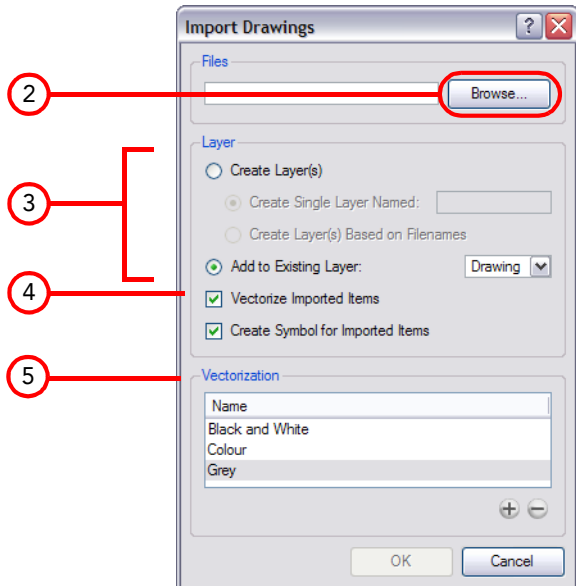
Importing and Vectorizing Images



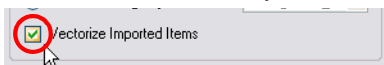
You can turn your images into 100% vector drawings, while the Harmony Stage option lets you keep a bitmap fill and the sketchiness of a pencil line, both of which can add life to an animation.

To import and vectorize a bitmap image:

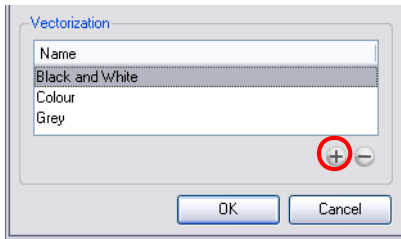
- In the top menu, select **File > Import > Images**. Or click on the Import Image  button in the File toolbar. The **Import Drawings** dialog box opens.



- Click on the **Browse** button to find and select one or several images on your computer.
- You now have the option of creating a whole new layer for your image or adding the image to an existing layer.
 - To create a new layer, select **Layer > Create Layer(s) > Create Single Layer Named** and name your layer accordingly.
 - OR
 - To create a new layer using the file name, select **Layer > Create Layer(s) > Create Layer(s) Based on Filenames**.
 - OR
 - To add the image to an existing layer, select **Layer > Add to Existing Layer** and select the layer already created in your Harmony Stage file from the drop-down menu.
- Enable the **Vectorize Imported Items** option.



5. Under the **Vectorization** section, decide whether you would like to import your image in colour, grey scale or black and white, or if you would like to add a new preset.



- ▶ **Black and White:** this style vectorizes your drawings as a solid black line. This creates a 100% vector-based drawing.
- ▶ **Grey:** this style vectorizes your drawings as a mix of vector contour and greyscale bitmap filling.
- ▶ **Colour:** this style vectorizes your image as a colourful bitmap texture within a vector frame.
- ▶ **+ New Preset:** the New Preset button allows you to create your own custom vectorization parameters via the Vectorization Parameters interface. The **Vectorization Parameters** dialog box will open automatically once you click on this button.
- ▶ **- Delete Preset:** the Delete Preset button allows you to delete any preset available in the list.

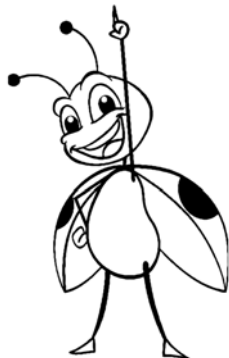


The vectorized images are painted with the Vectorize Line colour swatch.



Refer to the Custom Vectorization Parameters section to learn more about the custom parameters.

6. Click on the OK button.



Black and White Preset



Greyscale Preset



Colour Preset

You should now have a Symbol or new layer that contains the vector drawing. If your image is contained into a Symbol, in order to edit the image, you must double-click on the image's first cell in the Timeline view to enter the Symbol.

Linking Your Layer To an External Image

When working on a large production, you may want to centralize your backgrounds into one directory instead of duplicating your background several times in different scenes. As backgrounds are generally reused in many scenes, some studios like to save space on the server and link the different scenes to the background directory. Also, if they modify one background, it is modified everywhere at the same time without having to reimport it. To do so, you must use the Timing columns.

Timing columns are Exposure Sheet columns linking to files that are outside the scene's structure. Because of these external links, care must be taken not to break the links by moving the scene's location or the background directory's location. Breaking a link will result in images not appearing in your scene.



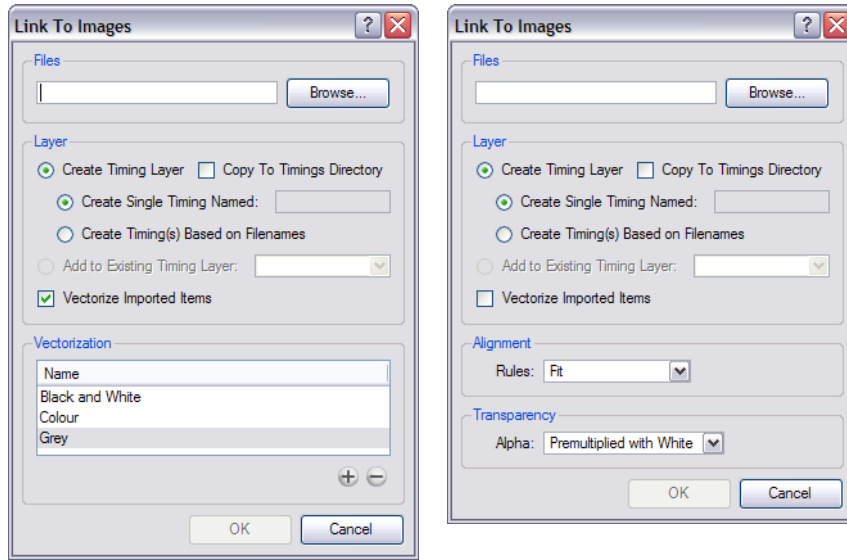
Refer to the Layers and Timing chapter to learn more about using Timing columns.

If you are working with Toon Boom Harmony Server and all your scenes are located on a centralized server, you can also use the Link to Images option.

To link the scene to an external image (Harmony Server only):

1. In the top menu, select **File > Import > Link to Images**.

The **Link to Images** dialog box opens.



2. Click on the Browse button to select the image you want to link your scene to.
3. Select the Create Timing Layer option if you want to create a new Timing column in your Xsheet view.
 - ▶ Enable the Create Single Timing Named option and type the new column name in the text field.
OR
 - ▶ Enable the Timing(s) Based on Filenames option if you want the new column to be named like the selected file.
4. Enable the Add to Existing Timing Layer option if you want to insert the file into an existing Timing column rather than creating a new one.
5. Enable the Copy to Timing Directory option if you want to copy the selected file into the Timing folder located in the scene directory. Note that the Timing column will link to the Timing folder.
6. Enable the Vectorize Importer Items option to vectorize the image you want to link to. The original image will not be modified. A vectorized copy will be placed in the same folder.
7. If you are vectorizing the image, select the vectorization parameters desired.



Refer to the Custom Vectorization Parameters section to learn more about the custom parameters.

8. If you are linking to the original bitmap image, select the Alignment and Transparency options you want.

The following options are available:

- ▶ **Alignment > Rules > Fit**
 - ⇒ If your image orientation is portrait, this selection will stretch or shrink (but not distort) your image to match the full height of your project and therefore the camera frame.
 - ⇒ If your image orientation is landscape, this selection will stretch your image to the full width of the camera frame.
- ▶ **Alignment > Rules > Pan**

This choice will perform the opposite operation of the **Fit** command.

 - ⇒ If your image orientation is portrait, its width will be made to match the width of the frame. As a result, part of the image will extend beyond the height of the frame.
 - ⇒ If your image orientation is landscape, the image will extend beyond the width of the camera frame. This can be useful if you want to make your background move up and down, or from left to right to make it appear as if the camera is panning, or to actually perform a camera pan.
- ▶ **Alignment > Rules > Project Resolution**
 - ⇒ This option will match your project's resolution and centre your image in the frame. If your image resolution is smaller than that of your project, such as a 720 x 540 resolution and 640 x 480 image, the image will become blurry after being imported. Make sure that the size of your image matches, or is greater than, your scene resolution.

9. Click on the OK button.

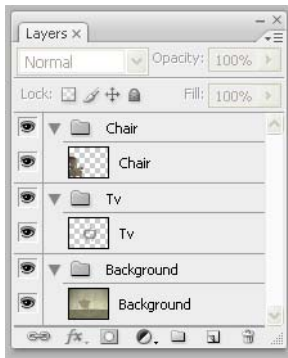
Importing PSD Files as Separate Layers



PSD files (a format exportable exclusively from Adobe Photoshop) are unique in that they are able to retain multiple layers. This is advantageous as the image remains fully editable in terms of any colour correction, effects, masking, transparency or compositing that were made to the PSD file in Adobe Photoshop.

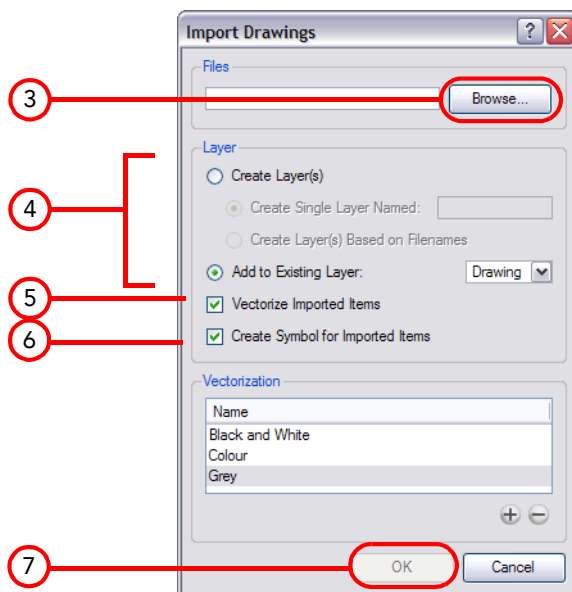
To import the separated layers of a PSD file:

1. Organize your Photoshop file so that all your layers are grouped into folders, or that each layer that you want to import as a separate layer in Harmony Stage is in a different folder.



2. In Harmony Stage, go to the top menu and select **File > Import > Images**. You can also click on the Import Image  button.

The **Import Drawings** dialog box opens.



3. Click on the **Browse** button to find and select the image on your computer.
4. Select **Layer > Create Layer(s) > Create Single Layer Named** or **Create Layer(s) Based on Filenames**.
5. Decide whether to check or uncheck the Vectorize Imported Items option.
6. In Harmony Stage, enable or disable the Create Symbol for Imported Items if you want your layers to be contained in Symbols or not.
7. Click on the **OK** button.

The **Multilayer Image Import Settings** dialog box opens.



8. In the Image to Load field, select
 - ▶ **Composite Image** to flatten your layers.
 - ▶ **All Layers Image** to keep your layers separated.
9. Select the Transparency Type if applicable. Refer to the Importing a Bitmap Image without Vectorization section to learn more the different Transparency Type options.
10. Click on the **OK** button.

Your image should appear as separate layers in the Timeline view, corresponding to the PSD layer group folders.

Scanning Images



Harmony Stage receives images from any TWAIN device, such as; scanners or digital cameras. These images can either be loaded as bitmaps into your scene or converted into vector based images that can be edited using Harmony Stage. You must install a TWAIN driver for your device in order to access its contents. See the manufacturer of your device to get a TWAIN driver.

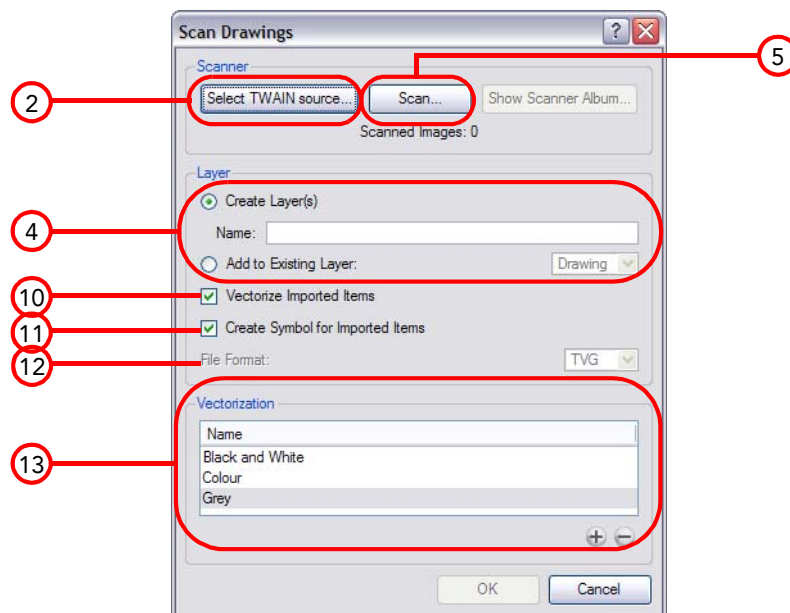
Once all the animation layers are scanned in, you can proceed to set the timing in the Timeline or Xsheet view.

There is no need to create a new layer in the Xsheet or Timeline view before you scan from a TWAIN device. The scan interface allows you to create a new layer or to integrate the drawings in an existing one. Before you can begin scanning, you need to open the scan interface and set the parameters.

To scan drawings from a TWAIN device:

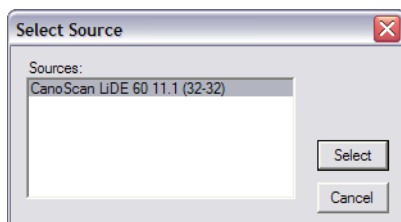
1. In the Top Menu, select **File > Import > From Scanner**.

The **Scan Drawings** window opens.

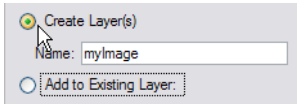


2. Click on the **Select TWAIN Source** button.

The **Select Source** window opens.

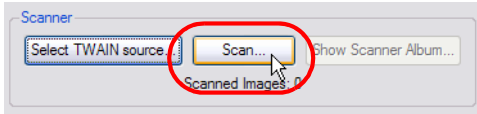


3. Select your scanner or other supported TWAIN device from the dialog box and click on the Select button.
4. You can import the images to scan into an existing layer or create a new one.



- ▶ To import the image into a new layer, enable the Create Layer(s) option. In the Name field, type a name for the layer.
- ▶ To import the image into an existing layer, select Add to Existing Layer and select the layer from the drop-down list.

5. In the Scanner section, click on the Scan button to open the scanning dialog box for your scanner.

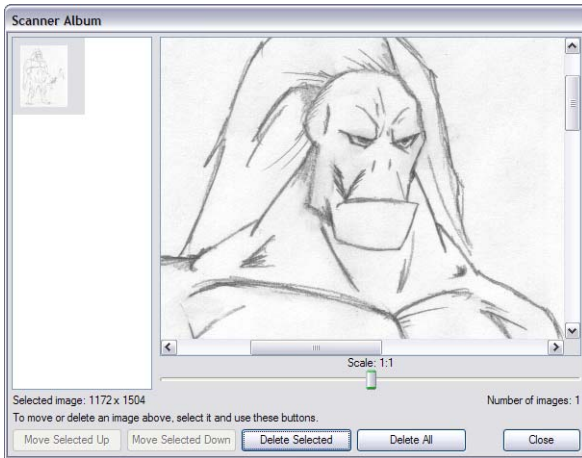


6. Use the settings from your scanner to scan your drawings. You must scan in greyscale if you want to preserve the unique qualities of your line in a line texture, in colour if you want to import your images as vectorized texture (mix of vector and bitmap) and in black and white if you want a solid black outline.

You can scan multiple drawings with your scanner before returning to the Scan Drawings dialog box.

7. Close the scanner dialog box when you are done.

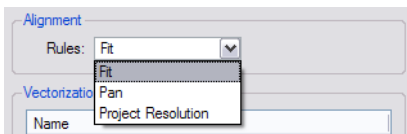
The **Scanner Album** opens.



8. Use the Scanner Album to preview the scanned drawings, remove drawings from the list or change their order. Harmony Stage will load the drawings based on their order in the Scanner Album.
9. Click on the Close button to close the Scanner Album when you are done.

You will return to the Scan Drawings dialog box.

10. If you want to vectorize the images you import, select the Vectorize Imported Items option.
11. If you want the imported images to be encapsulated in a Symbol, enable the Create Symbol for Imported Items option.
12. In the File Format drop-down list, select the file format in which you want to scan your drawings. If you will vectorize the images as black and white, SCAN is the best file format to choose.
13. If you are not vectorizing your images, you must decide on the size and placement of your image within the camera frame. Depending on the Scene Settings (the height and width in pixels that you chose for your project), your image may become blurry or sharper when imported.



The following options are available:

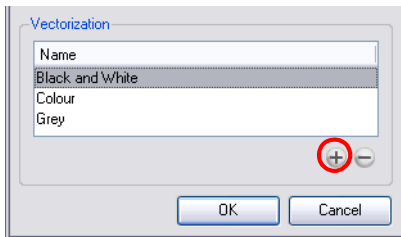
- ▶ **Alignment > Rules > Fit**
 - ⇒ If your image orientation is portrait, this selection will stretch or shrink (but not distort) your image to match the full height of your project and therefore the camera frame.
 - ⇒ If your image orientation is landscape, this selection will stretch your image to the full width of the camera frame.
- ▶ **Alignment > Rules > Pan**

This choice will perform the opposite operation of the **Fit** command.

 - ⇒ If your image orientation is portrait, its width will be made to match the width of the frame. As a result, part of the image will extend beyond the height of the frame.
 - ⇒ If your image orientation is landscape, the image will extend beyond the width of the camera frame. This can be useful if you want to make your background move up and down, or from left to right to make it appear as if the camera is panning, or to actually perform a camera pan.
- ▶ **Alignment > Rules > Project Resolution**

This option will match your project's resolution and centre your image in the frame. If your image resolution is smaller than that of your project, such as a 720x540 resolution and 640x480 image, the image will become blurry after being imported. Make sure that the size of your image matches, or is greater than, your scene resolution.

14. In the **Vectorization** section, decide whether you would like to import your image in colour, grey scale or black and white, or if you would like to add a new preset.



- ▶ **Black and White:** this style vectorizes your drawings as a solid black line. This creates a 100% vector-based drawing.
- ▶ **Grey:** this style vectorizes your drawings as a mix of vector contour and greyscale bitmap filling.
- ▶ **Colour:** this style vectorizes your image as a colourful bitmap texture within a vector frame.
- ▶ **+ New Preset:** the New Preset button allows you to create your own custom vectorization parameters via the **Vectorization Parameters** interface. The **Vectorization Parameters** dialog box will open automatically once you click on this button.
- ▶ **- Delete Preset:** the Delete Preset button allows you to delete any preset available in the list.



Refer to the *Custom Vectorization Parameters* section to learn more about the custom parameters.

15. Click on the OK button to import the images into your scene.



Refer to *Drawing and Animating > Cleaning Scanned Drawings*, on page 158 to learn more about cleaning scanned drawings.

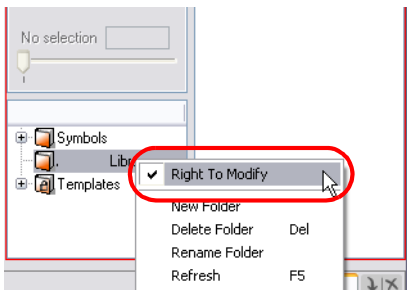
Importing AI and PDF Files



You can import AI and PDF files into Harmony Stage, it will convert your files to the Toon Boom format (TVG) and create a colour palette based on the colour settings of the original file. If you have several layers in your original files, they will be retained once imported into Harmony Stage.

To import an AI or PDF file:

1. Go to the Library view and right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Stage Library folder. Choose **Right to Modify** to unlock the library folder. Make sure the Lock icon disappears from the folder to unlock it, otherwise your library is locked and not editable.



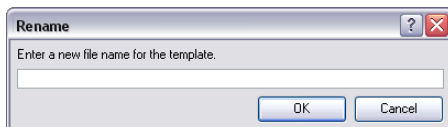
For more information about the Library, see the *Libraries, Symbols and Templates* chapter.

2. In the top menu, select **File > Import > SWF, Illustrator Files to Library**. Or right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on any unlocked folder and select **Import Files**.


The browser window opens.

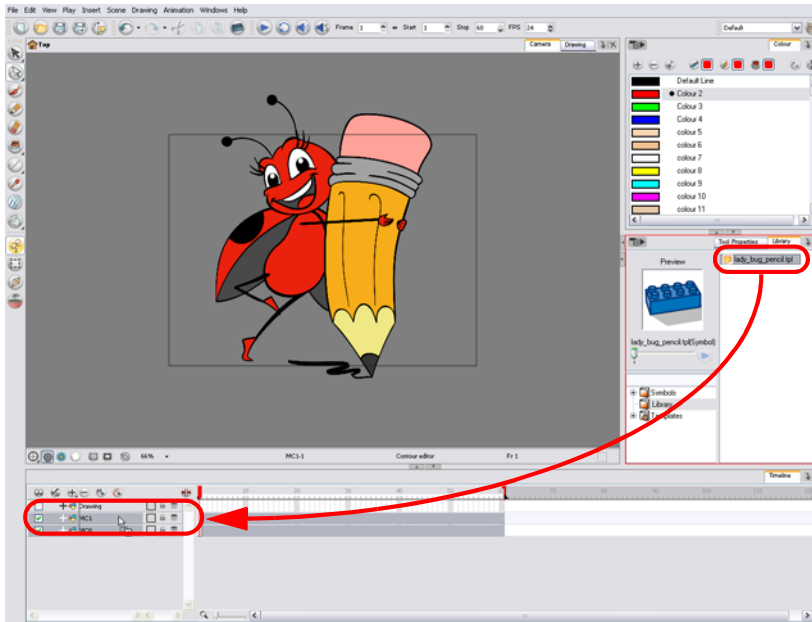
3. Find and select your AI file in the **Import Files** dialog box and click on Open.

The **Rename** dialog box opens.

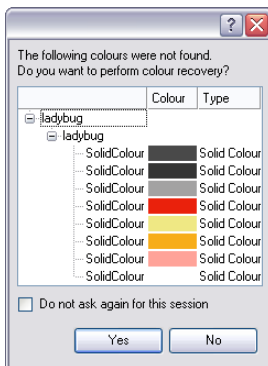


4. Enter a name for the new template or keep the name of the original AI or PDF file.
5. Click on the OK button.

- Click and drag the new template folder from the Library view to the left side of the Timeline view; wait until the Copy cursor  appears before releasing the mouse button.



- The colour recovery dialog box appears, requesting that a colour recovery should occur. Before clicking on the Yes button, you have the option to select the Do Not Ask Again For This Session option. This might be useful if you plan to import multiple AI drawings.



This process will import the colour palette used to create the Illustrator file and create a new palette in Harmony Stage under the imported file's name.

The Illustrator file layers should now appear in the timeline as separate layers, with the sub-layers collapsed into their corresponding parent layer. If, for example, you created your line art on one layer and your fill colours on another, these layers should remain editable as they were in the original Illustrator file.



Refer to the Preferences section to learn about the Support CMYK in PDF/Illustrator Import preferences.

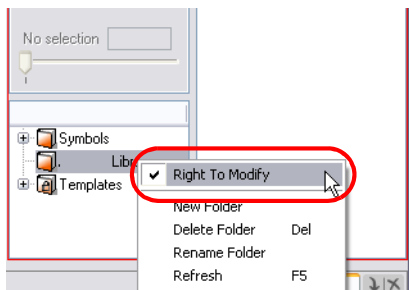
Importing from Adobe Flash



Projects started in Flash that might need a more professional boost, such as camera movements or multiplaning, can easily be imported into Harmony Stage. The actual *.fla file is not supportable, so you have to export your project to an *.swf movie.

To import a Flash file:

1. Go to the Library view and right-click (Windows/Linux) or [Ctrl]+ click (Mac OS X) on the Stage Library folder. Choose **Right to Modify** to unlock the library folder. Make sure the Lock icon disappears from the folder to unlock it, otherwise your library is locked and not editable.



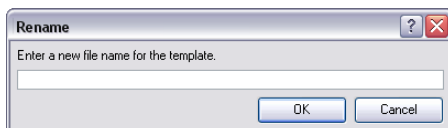
For more information about the Library, see the *Libraries, Symbols and Templates* chapter.

2. In the top menu, select **File > Import > SWF, Illustrator Files to Library**. You can also right-click (Windows/Linux) or [Ctrl]+ click (Mac OS X) on any unlocked folder and select **Import Files**.


The browser window opens.

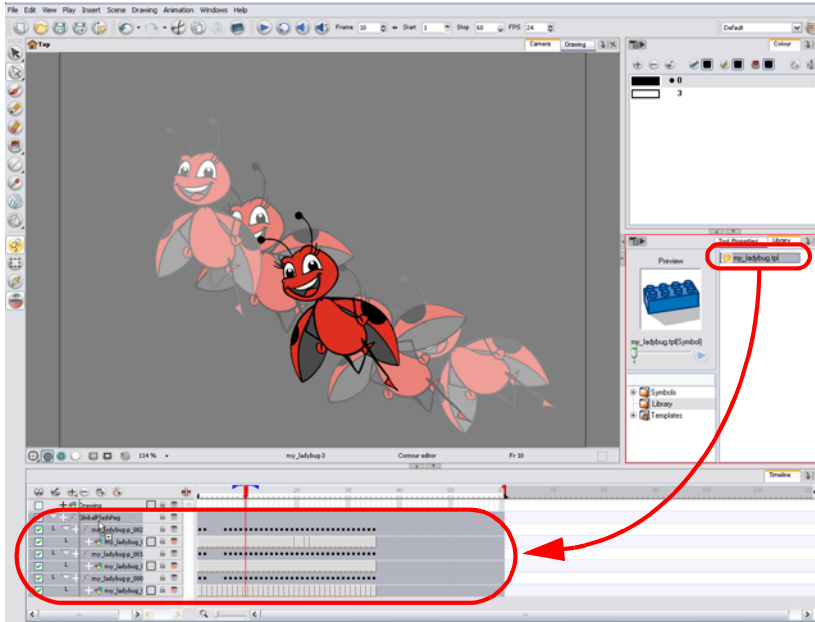
3. Find and select your *.swf file in the **Import Files** dialog box and click on Open.

The **Rename** dialog box opens.

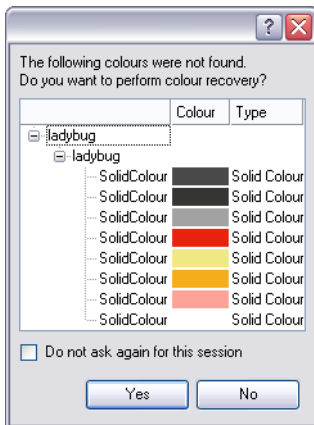


4. Enter a name for the new template or keep the name of the original *.swf file.
5. Click on the **OK** button.

6. Click and drag the new template folder from the Library view to the left side of the Timeline view; wait until the Copy cursor  appears before releasing the mouse button.



7. The colour recovery dialog box appears, requesting that a colour recovery should occur. Before clicking on the Yes button, you have the option of selecting the Do Not Ask Again For This Session option. This might be useful if you plan to import multiple *.swf movies.



This process will import the colour palette used to create the Flash file and create a new palette in Harmony Stage under the imported file's name.

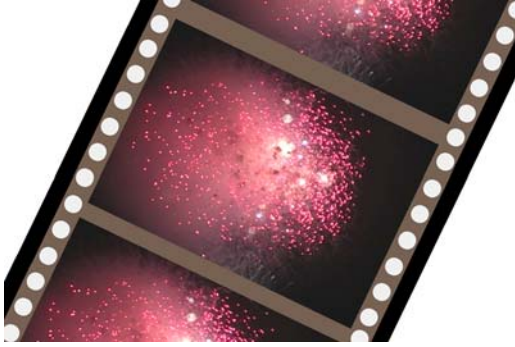


NOTE: All the Flash layers are automatically attached to a parent peg called `GlobalFlashPeg`. **DO NOT DELETE THIS PEG.** To maintain the look of your movie, it is important that this peg is not deleted, nor its children layers detached.

The layers of your Flash file should now appear in the Timeline view as separate layers. Symbols that were created in Flash become regular drawing layers, but can be reconverted into Symbols in Harmony Stage. Symbols within Symbols or drawings within Symbols collapse into their corresponding parent Symbol.

In addition, all drawing elements that are dynamically linked to the Harmony Stage file are grouped together in one folder. This means that when you scroll through the Drawing Substitution preview in the Library view, the different hand, leg, torso and facial positions are all organized together.

Importing QuickTime Movies

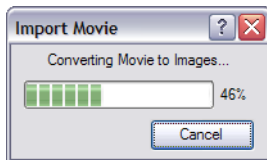


When creating an animation, it is not unusual to embed moving elements saved as videos within the animation. Harmony Stage allows you to import QuickTime movies into your project.

To Import a QuickTime movie:

1. In the top menu, select **File > Import > Movie**.
2. Browse for the QuickTime movie to import and click on the Open button.

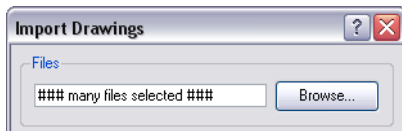
A progress bar appears.



The **Import Drawings** dialog box opens.



Do not browse for the movie file again; leave the default setting many files selected.



3. Make your decisions for the Layer, Alignment and Transparency.



*Refer to the [Importing a Bitmap Image without Vectorization](#) section for further details about the *Import Drawings* dialog box.*

4. Click on the **OK** button.


The QuickTime video appears on its own layer in the Timeline view as an image sequence inside a Symbol. You should be able to scroll through the film frame-by-frame, just as you would scroll through your animation drawing-by-drawing.

Custom Vectorization Parameters

You can create your own vectorization settings with Toon Boom Harmony. The vectorization parameters you will create here can be saved, shared and also inserted into the `VectOptions.conf` file used by the Toon Boom Harmony Scan and Control Center modules when scanning or vectorizing a series of drawings.

You can use an interface to select and test the different options and you can also type in some advanced settings.

To open the Vectorization Parameters dialog box:

1. Select **File > Import > Images**.
You can also open it from any other Import option that allows you customization of the vectorization parameters (i.e. From Scanner).
2. Browse for and select your file and decide on your Layer options.
3. In the **Vectorization** section, click on the  **Add New Preset** button.

The **Vectorization Parameters** dialog box appears.



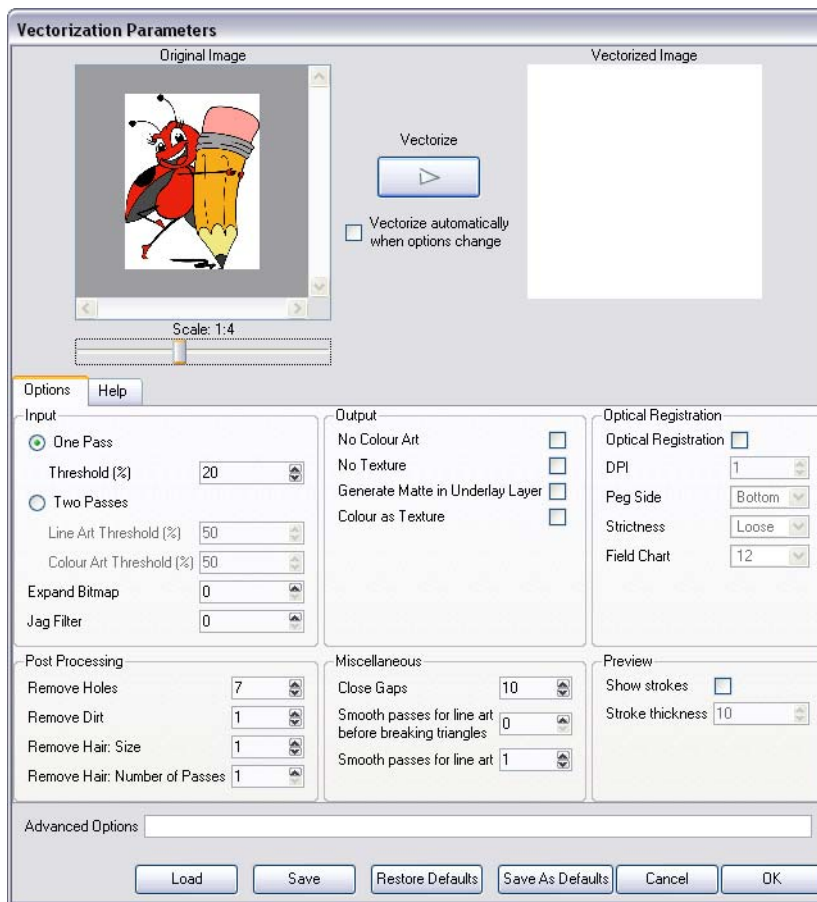
Refer to the *Options Tab and Help Tab* sections to find out more about the settings contained in this window.



Refer to the *Creating a Vectorization Style* section to learn more about creating a style with this window.



Refer to the *Setting the VectOptions.conf File* section to discover how to create a new style for the Toon Boom Server batch processing.



Options Tab

The options tab contains the main vectorization settings. More settings are available in the Help tab.

Input

The input filters are applied to the bitmap image before it is vectorized.

- **One Pass and Two Passes:**
 - ⇒ If you select **one pass**, one threshold value will be applied to both the Line and Colour Art.
 - For drawings with distinct vector-style lines of mattes, you only need one pass.
 - ⇒ If you select **two passes**, you can apply a different threshold value to each layer.
 - For greyscale drawings, you may want to pass through the vectorization process twice to apply different threshold values to the Line and Colour Art layers.
- **Threshold:** Determines which values in the scanned image are considered part of the Line or Colour Art layer and what will be eliminated from the vectorized drawing, 0% (zero) is white and 100% is black. The threshold is between those two values.
- **Expand Bitmap:** Enter a value to scale the bitmap to detect small variations in the line. Use this option if you scanned a greyscale image and want to preserve small variations in the texture that will be applied to the line art.
- **Jag Filter:** Enter a value to scale back the bitmap to remove some of the line's roughness. If you have a drawing that appears quite rough, use the jag filter to eliminate excess strokes in the final drawing.

Output

The output filters are applied during the vectorization process.

- **No Colour Art:** Does not generate filling zones in the Colour Art layer.
- **No Texture:** Does not generate texture in the Line Art in the final images. Select this option to create solid lines in the final Line Art.
- **Generate Matte in Underlay Layer:** Creates an opaque zone behind your drawing's lines to avoid seeing through the layers.
- **Colour as Texture:** Converts colour values into a texture layer.

Optical Registration

The optical registration options are used to automatically align drawings based on the position of peg holes on the animation paper. The peg holes must appear in the scanned drawings for the optical registration to work.

- **Optical Registration:** Use peg holes to align drawings optically.
- **DPI:** Type the dots-per-inch value of your image.
- **Peg Side:** Select the position of the peg holes on your drawings. Identify whether they are on the top, bottom, left or right.
- **Strictness:** Determine how exact the location of the peg holes must be for the software to recognize them. You have two values to choose from:
 - ⇒ **Strict:** The peg holes must be in a tightly defined area to be recognized.
 - ⇒ **Loose:** The peg holes can be recognized somewhere in a larger area. This is the recommended setting.
- **Field Chart:** Select 12 or 16 to indicate the size of your animation paper.

Post Processing

The Post Processing filters are applied to the final vector images.

- **Remove Holes:** Removes holes of a specified value that might make painting difficult.
- **Remove Dirt:** Removes stray marks and dirt of a specified value. Try a value around 500.
- **Remove Hair:** Removes small strokes that have no line art.
- **Remove Hair: Number of Passes:** The number of times the drawing will be analyzed to identify hair marks.

Miscellaneous

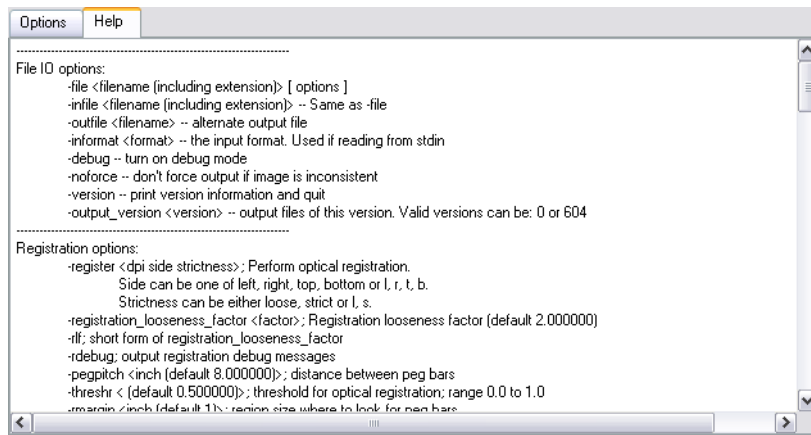
- **Close gaps:** Closes gaps in the Colour Art so that you can paint it.
- **Smooth passes for Line Art before breaking triangles:** The number of times the smoothing operation runs before creating the triangles that break lines in your drawing. If unnecessary triangles are appearing in your drawing, increase this value.
- **Smooth passes for Line Art:** The number of times the smoothing operation is performed after the triangles have been created. This further smooths the Line Art.

Preview

- **Show strokes:** Shows the strokes in the Vectorized Image panel.
- **Stroke thickness:** Shows the size of the strokes.

Help Tab

The Help tab contains the most advanced vectorization settings. You must type those in the Advanced Option fields located at the bottom of the Options tab.



File IO Options

- file <filename (including extension)> [options]
 - infile <filename (including extension)>; same as -file
 - outfile <filename>; alternate output file
 - informat <format>; the input format. Used if reading from stdin
 - debug; turn on debug mode
 - noforce; don't force output if image is inconsistent
 - version; print version information and quit
 - output_version <version>; output files of this version. Valid versions can be: 0 or 604
-

Registration Options

-register <dpi side strictness>; perform optical registration.

- Side can be one of left, right, top, bottom or l, r, t, b.
- Strictness can be either loose, strict or l, s.

-registration_looseness_factor <factor>; registration looseness factor (default 2.000000)

-rlf; short form of registration_looseness_factor

-rdebug; output registration debug messages

-pegpitch <inch (default 8.000000)>; distance between peg bars

-threshr < (default 0.500000)>; threshold for optical registration; range 0.0 to 1.0

-rmargin <inch (default 1)>; region size where to look for peg bars

-peg_distance_from_center <inch (default 5.25)>; peg distance from centre of the image

-pdfc; short form of -peg_distance_from_center

-out_peg_position <side (default same)>; wanted position of the peg on the drawing.

- Can be one of right, left, top, bottom (or r, l, t, b) or same.
- A rotation will be performed if it is different from the side passed to -register.

-output_peg_matrix; output the peg transformation matrix on standard output.

-scanner_calibrate; < (default 1.0000 1.0000) > x and y scale factors to be applied to scanner image.

Filtering Options

-pixel <pixel_shape (default '4x3')>; Valid values: 4x3

-gap <worldUnits (default 10)>; close gaps up to this big

-pencil; generate line art only

-keep_dirt; don't filter out dirt

-thresh <threshold (default 0.2)>; range 0.0 to 1.0

-rmv_hairs <worldUnits (default 1)> <passes (default 1)>

- remove hairs of size smaller than "size" in "passes" passes

-rmv_holes <area (default 7)>; remove holes smaller than "area"

-rmv_dirt <area (default 1)>; remove dirt smaller than "area"

- try values between 100 and 500 for rmv_holes and rmv_dirt. The area is in world units squared

-rmv_triangles <worldUnits (default 30.000000)>; remove triangles at "pixels"

- distance from each other. Use -no_break to remove all triangles

-no_texture; don't generate textured strokes

-color_as_texture; will vectorize the alpha channel and put the RGB colour in a textured colour

-noclosegap; disable all gap closing algorithms

-no_break; disable the breaking of line art

-jag_filter <pixels (default 0)>; expand the pixels in the vectorization bitmap

-expand_bitmap <pixels (default 0)>; expand the pixels in the vectorization bitmap

-fit_errorc <error (default 1.000000)>; fitting error for the colour art

-fit_errorl <error (default 1.000000)>; fitting error for the line art

-smoothl <passes (default 1)>; number of smooth passes for line art

-smoothc <passes (default 1)>; number of smooth passes for colour art

-first_smooth <passes (default 0)>; number of smooth passes for line art before breaking triangles

-first_smoothl <passes (default 0)>; number of smooth passes for line art before breaking triangles

-first_smoothc <passes (default 0)>; number of smooth passes for line art in colour art pass (needs -2pass)
-2pass; specify two sets of parameters; one for line art "l", one for colour art "c"
 (-thresh, -rmv_holes and -rmv_dirt will be overridden by -threshl, threshc, -rmv_holesl, -rmv_holesc, -rmv_dirtl and -rmv_dirtc)
-threshl <threshold for line art (default 0.5)>; range 0.0 to 1.0
-threshc <threshold for color art (default 0.5)>; range 0.0 to 1.0
-jag_filterl <pixels (default 0)>; expand the pixels in the vectorization bitmap for line art
-jag_filterc <pixels (default 0)>; expand the pixels in the vectorization bitmap for colour art
-expand_bitmapl <pixels (default 0)>; expand the pixels in the vectorization bitmap for line art
-expand_bitmapc <pixels (default 0)>; expand the pixels in the vectorization bitmap for colour art
-rmv_holesl <area (default 7)>; remove line art holes smaller than "area"
-rmv_holesc <area (default 7)>; remove colour art holes smaller than "area"
-rmv_dirtl <area (default 1)>; remove line art dirt smaller than "area"
-rmv_dirtc <area (default 1)>; remove colour art dirt smaller than "area"

- try values between 100 and 500 for rmv_holesl, rmv_holesc, rmv_dirtl and rmv_dirtc. The values are in world units squared

-margins <inch (default 0.25)>; remove margin around bitmap
-top_margin <inch (default 0.25)>; remove margin at top of bitmap
-bottom_margin <inch (default 0.25)>; remove margin at bottom of bitmap
-left_margin <inch (default 0.25)>; remove margin at left of bitmap
-right_margin <inch (default 0.25)>; remove margin at right of bitmap
-remove_peg_bars; remove the peg bar holes
-field_size <fields (default 12 or use value in scan file)>; set the drawing to this field size
-fs; short hand for -field_size
-peg_bar_size <inch (default 1)>; the size of the peg bar region
-noframe; do not put a frame around the colour art
-frame_fields <default -1.000000>; put a frame of the specified dimension around the colour art
-downscale_input <default 1>; downscale the raw input by this integer factor
-downscale_texture <default 1>; downscale the output texture by this integer factor
-buildmatte; generate a matte on underlay for line test
-buildmatte_colourart; generate a matte on colour art for line test
 Note: -buildmatte and -buildmatte_colourart are mutually exclusive
-copystrokes; copy original strokes when building matte.

Options for bitmap that has no registration information

-pixel_margins <inch (default 0)>; remove margin around bitmap
-top_pixel_margin <inch (default 0)>; remove margin at top of bitmap
-bottom_pixel_margin <inch (default 0)>; remove margin at bottom of bitmap
-left_pixel_margin <inch (default 0)>; remove margin at left of bitmap
-right_pixel_margin <inch (default 0)>; remove margin at right of bitmap
-dpi <(default -1)>; dpi information of input bitmap

RGB Keying Options

-rgb; generate separate zones for red, green and blue lines
-rgb_alpha <value (default 255)>; generate red, green and blue colour with alpha of this value
-no_red; ignore red colour in vectorization
-no_green; ignore green colour in vectorization
-no_blue; ignore blue colour in vectorization
-flatten; flatten the drawing after generating colours
-rmv_rgb_dirt <threshold area default 0.0>;
remove red, green and blue regions smaller than area
-expand_bitmap_rgb <pixels (default 0)>; expand the pixels in the vectorization bitmap for rgb
-threshrgb <value> <threshold for rgb vectorization default 0.200000>;
-thresv <saturation threshold default 0.500000> <value threshold default 0.500000>;
thresholds on saturation and value to consider a pixel to be grey

Colour Vectorization Options

-color_vectorize; perform a colour vectorization
-file2 <colour art filename>; specify the colour art bitmap
-penstyle <center alpha (0.0-20.0)> <edge alpha (0.0-20.0)> <gamma (0-10)>
<centre pressure effect (0.0-1.0)> <edge pressure effect (0.0-1.0)>
<texture bitmap downscaling (0.2-20)> <texture bitmap file (valid filename or "" if no file)>;

- generate brush texture for the line art

-pressure_variation <strategy (0, 1 or 2)> <min pressure (0.0-1.0)> <max pressure (0.0-1.0)> <max variation (0.0-1.0)>;

- specify a pressure strategy for the centre line.

-blur_radius <pixels (default 0)>; blur the penstyle texture generated
-color_contour_smooth_passes <times (default 3)>; perform number of smooth passes on contour before computing texture
-ccsp <times (default 3)>; short for -color_contour_smooth_passes
-color_rmv_holesl <world units (default 0.000000)>; remove holes of this size when computing texture
-color_fill_holesl <world units (default 0.000000)>; fill holes of this size for colour line art

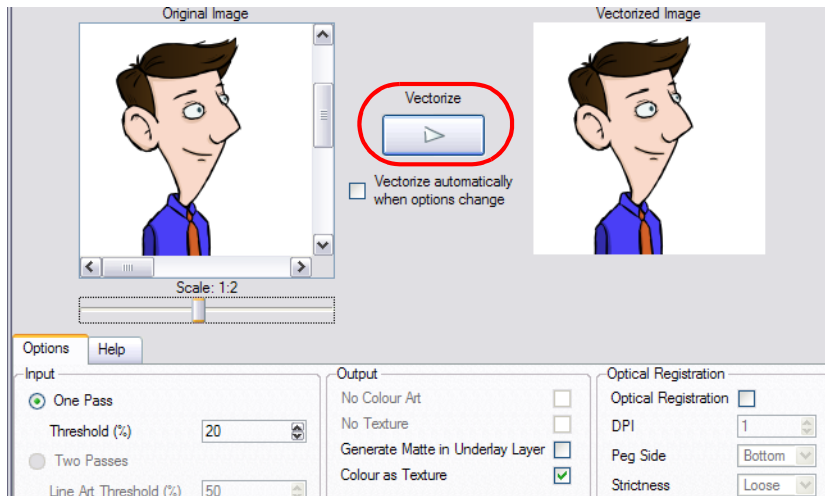
Bubble Usage (implemented only for colour vectorization's line art)


-create_bubbles; add bubbles into the LineArt. Implemented for colour vectorization only
-bubble_gap <value (default 3)>; max number of colour art points between 2 bubbles
-bubble_length <value (default 10)>; max number of circles in a bubble
-min_radius <value (default 1.5000)>; min radius of a circle in a bubble relative to the line thickness (must be ≥ 1.0)
-max_radius <value (default 3.5000)>; max radius of a circle in a bubble relative to the line thickness (must be ≥ 1.0)
-uniform_gap; the space between bubbles is constant

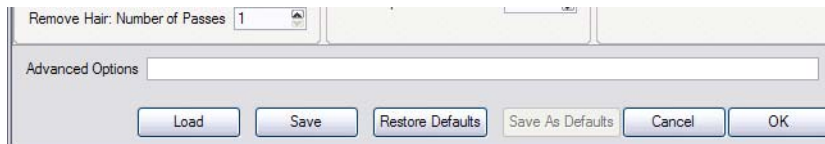
Creating a Vectorization Style

To create or modify the vectorization parameters:

1. Enable or disable the different options available in the Vectorization Parameters interface.



2. Click on the Vectorize  button to update the Vectorized Image preview. The vectorized image is just a preview. The actual vectorization occurs when you click on the **OK** button in the **Import Drawings** dialog box. There are a number of options to try in the **Vectorization Options** dialog box. These are applied during the vectorization process.
3. If you want to set advanced parameters, read the information located in the Help tab, then type in the Advanced Options field located at the bottom of the Options tab.
4. If you want to save your vectorization parameters to either reuse them later, share them or use them to set your Scan module vectorization style list, click on the Save button. In the Browser window, name and save the file.



5. If you want to save the current settings as your Default settings, click on the Save As Default button.
 - ▶ If you want to restore the original Toon Boom Harmony's default settings, click on the Restore Defaults button.
6. If you want to load a vectorization style, click on the Load button and locate the existing *.vof file.
7. Click on the OK button to finish the vectorization setup.

Setting the VectOptions.conf File

Toon Boom Harmony Server uses a file called VectOptions.conf to get the vectorization style when batch vectorizing a series of drawings. A series of default styles are available in this file, but you will certainly want to create your own to fit your production style.

This section deals with setting the VectOptions.conf file on:

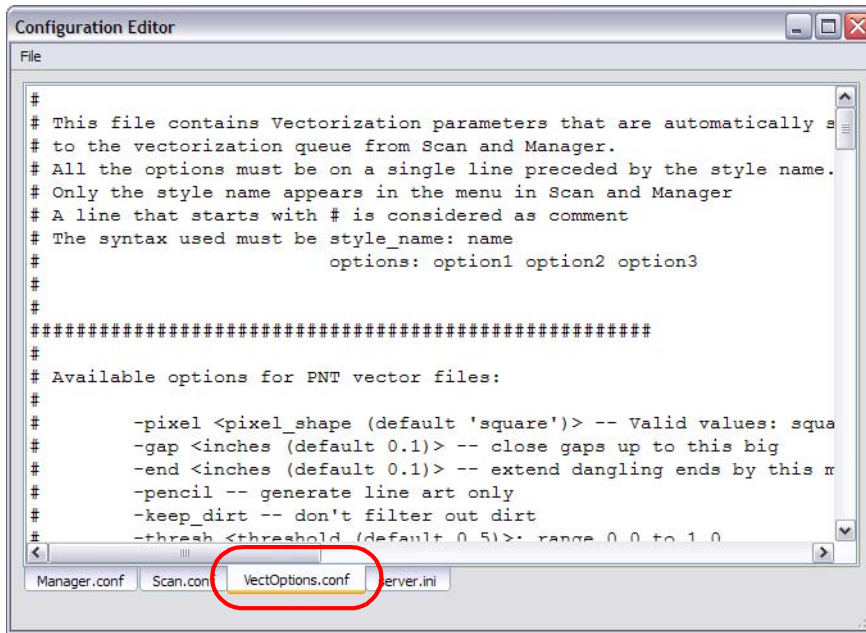
- Setting the VectOptions.conf File on Windows and Mac OS X
- Setting the VectOptions.conf File on Linux

Setting the VectOptions.conf File on Windows and Mac OS X

To set your VectOptions.conf file on Windows or Mac OS X:

1. Open the vectOptions.conf file:
 - ▶ Windows: Select **Programs / All Programs > Toon Boom Harmony 7.8 > Tools > Configuration Editor**.
 - ▶ Mac OS X: Select **Applications > Toon Boom Harmony 7.8 > Tools > Configuration Editor**.

The **Configuration Editor** window opens.

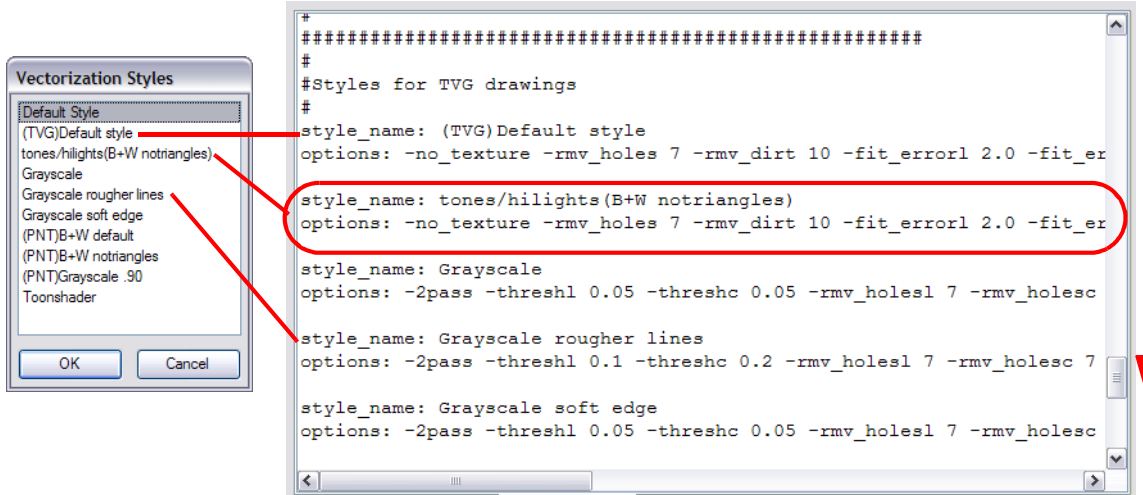


2. In the bottom section of the window, select the VectOptions.conf tab.
3. Scroll down the VectOptions.conf file. You will see all the different options available to create your custom vectorization style. These options are the same as in the Vectorization Parameters dialog box. It is recommended to create your vectorization style using Harmony Stage and the Vectorization Parameters window and copy the result parameters in this file.



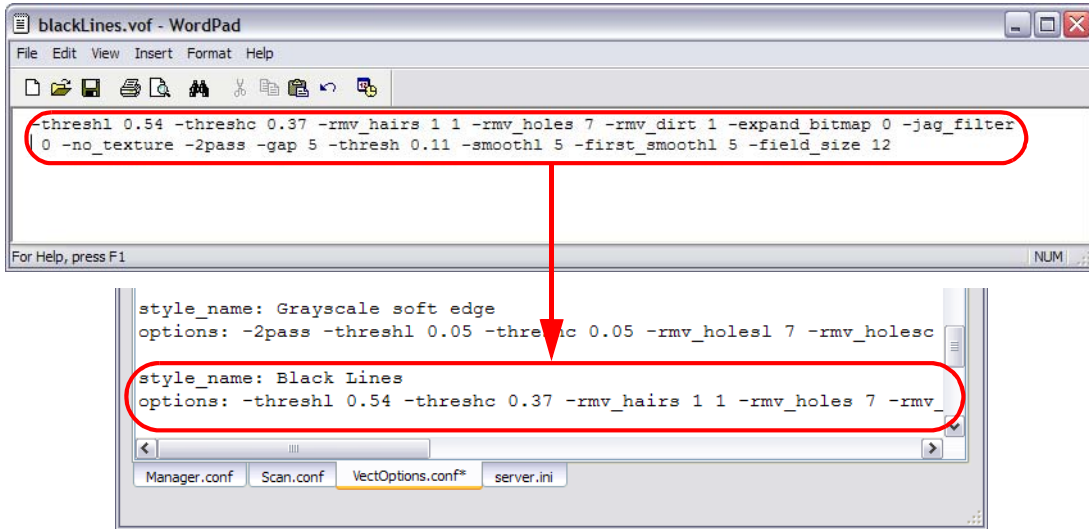
Refer to the *Creating a Vectorization Style* topic to learn more about creating a style using the Vectorization Parameters dialog box.

4. Scroll down toward the bottom of the file to see the default styles. You can modify them or add new ones to the list using the parameters you got using the Vectorization Parameters window. You will notice that some of the lines have a “#” sign at the beginning. This means that the line is a comment and will not appear in your style list. The lines that have no sign at the beginning appear in the style list.



5. To create a new style, below the existing ones, type **style_name:** and the name of your new style, for example: **style_name: Black Lines**.

- Under the style name line, type **options:** and copy and paste the information you got in your *.vof file when saving your settings in the Vectorization Parameters window.
 - To open the *.vof file, use any plain text editor application.

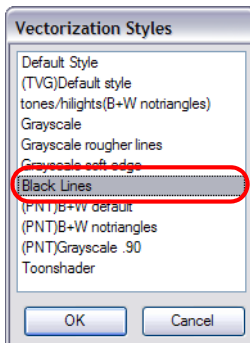


- In the Configuration Editor's top menu, select **File > Save**.
- If you have Toon Boom Harmony Scan on your computer, you can launch the application and verify that the new style appears in the Vectorization Style list under **Edit > Vectorization Style**.

Note: If you are using the batch processing method available with Toon Boom Harmony Server to scan and vectorize your drawings, the select style must be available on all the machines included in the batch processing list.



Refer to the Harmony Server User Guide to learn more about setting up and using batch processing.



Setting the VectOptions.conf File on Linux

These are the two methods used to edit the VectOptions.conf file on Linux.

- Using the "vi" text editor
- Using the "gedit" text editor

To set your VectOptions.conf file on Linux using the "vi" text editor:

- Open a Terminal window:
Menu: **Applications > System Tools > Terminal**
- Open the etc folder inside the installation directory:
\$ cd /usr/local/ToonBoomAnimation/harmony_7.8/etc
- Change your user to "root":
\$ su
 - If your user is part of the sudoers list, enter the following command and go to step 5:
\$ sudo vi VectOptions.conf
- Enter the "root" password.

5. Open the 'VectOptions.conf using the "vi" text editor:

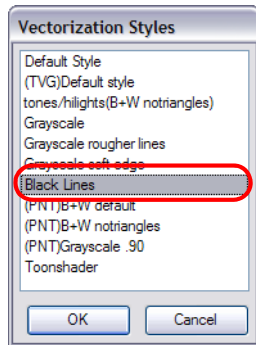
```
$ vi VectOptions.conf
```
6. To start editing, press the [i] key on your keyboard to enter Insert mode.
7. Once you're done editing the file, press the escape [Esc] key to exit Insert mode.
8. To save the changes made to the file, type the following and press [Enter]:

```
$ :w!
```
9. To exit the "vi" editor and return to the Terminal, type the following and press [Enter]:

```
$ :q
```
10. If you have Toon Boom Harmony Scan on your computer, you can launch the application and verify that the new style appears in the Vectorization Style list under **Edit > Vectorization Style**.
 Note that if you are using the batch processing method available with Toon Boom Harmony Server to scan and vectorize your drawings, the select style must be available on all the machines included in the batch processing list.



Refer to the Harmony Server User Guide to learn more about setting up and using batch processing.



To set your VectOptions.conf file on Linux using the "vi" text editor:

1. Open a Terminal window:
 Menu: **Applications > System Tools > Terminal**
2. Open the etc folder inside the installation directory:

```
$ cd /usr/local/ToonBoomAnimation/harmony_7.8/etc
```
3. Change your user to "root":

```
$ su
```

 - ▶ If your user is part of the sudoers list, enter the following command and go to step 5:

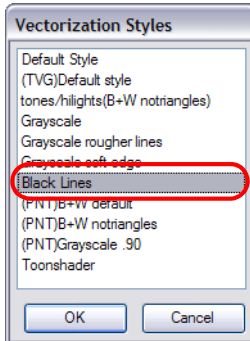
```
$ sudo gedit VectOptions.conf
```
4. Enter the "root" password.
5. Open the 'VectorOptions.conf using the "gedit" text editor:

```
$ gedit VectOptions.conf
```
6. Edit the parameters of the VectOptions.conf file like you would do in most text editor application.
7. To save your changes, select **File > Save**.
8. To exit the editor, select **File > Quit**.

9. If you have Toon Boom Harmony Scan on your computer, you can launch the application and verify that the new style appears in the Vectorization Style list under **Edit > Vectorization Style**.
Note: that if you are using the batch processing method available with Toon Boom Harmony Server to scan and vectorize your drawings, the select style must be available on all the machines included in the batch processing list.

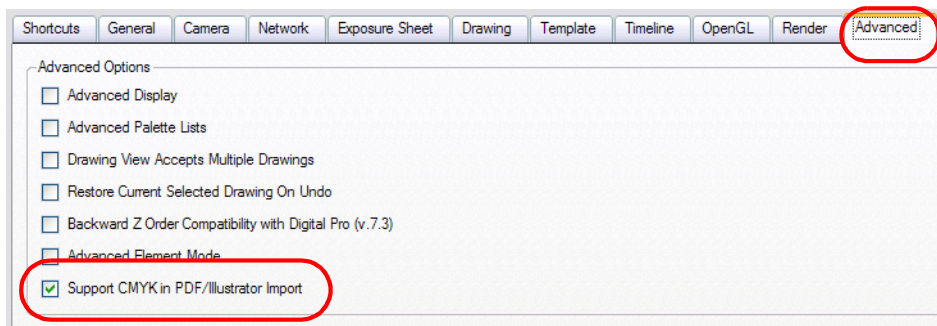


Refer to the Harmony Server User Guide to learn more about setting up and using batch processing.



Preferences

In the Preferences panel, you will find the following preference that is related to importing PDF and Illustrator files in your project.

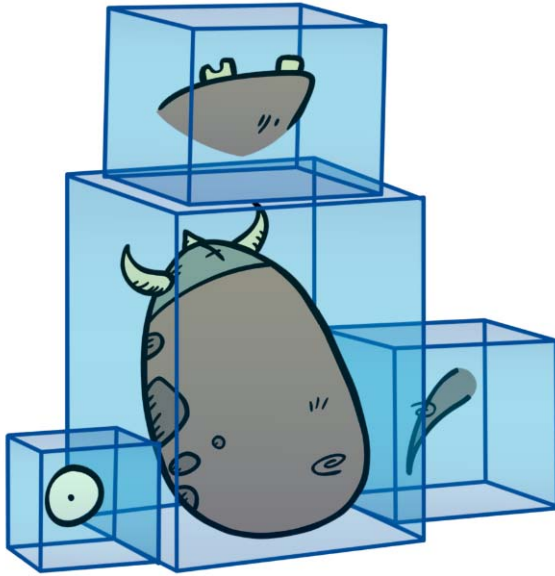


Advanced Option

- **Support CMYK in PDF/Illustrator Import:** When this preference is enabled, the import of PDF and AI files in CMYK mode will be successful. Although, the colour conversion to RGB will not be balanced. Results may not look correct. It is recommended to convert the file as a RGB image before importing in into Harmony Stage. Disabling this function will import the image but will display all colours as red to indicate to the user that he did not balance the colours and convert the image to a RBG file prior to the import.

Chapter 9

Libraries, Symbols and Templates



You can share and reuse any elements you create in Toon Boom Harmony Stage using Symbols and Templates. Harmony Stage has a library where you can store several different elements such as puppets, backgrounds, animations and keyposes. In fact, anything you create in Stage can be stored in the library.

In this chapter, you will learn about the following:

- Understanding the Library Concept, on page 348
- Library View, on page 350
- Structuring the Library, on page 352
- Symbols, on page 356
- Templates, on page 363
- Importing Symbols and Templates, on page 366
- Preferences, on page 373

Understanding the Library Concept

Use the Library view to reuse your artwork and animation in other scenes or to build props and puppets.

This topic is divided as follows:

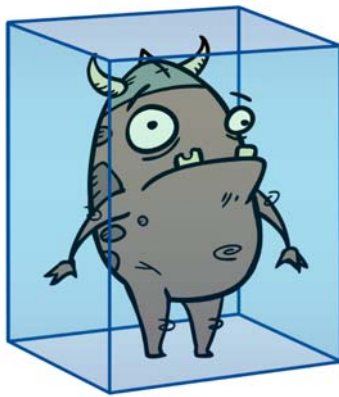
- What is a Library?, on page 348
- What is a Symbol?, on page 348
- What is a Template?, on page 349

What is a Library?

A library is a folder where you store your Templates and Symbols. You can access these folders from different projects. Using the library is easy, just drag the content into the library to store your artwork and then drag it into your Timeline or Camera view when you want to reuse it.

Organize your library using subfolders. You can keep several different library folders on your hard drive or network.

What is a Symbol?



A Symbol is a container or construction block used to build your props, puppets and looping clips. Use Symbols to contain artwork and animation, to manipulate them as a single object, or as a case holder where you will put a series of different drawings for each body part of your puppets.

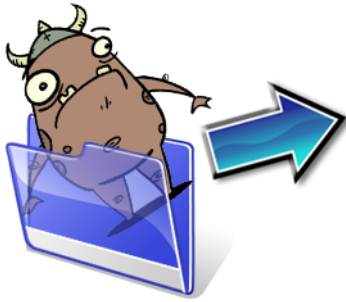
To create a Symbol, drag your artwork to the Symbol library. When you drag a Symbol from the Symbol Library into your scene, it will be linked to the original one. If you drag a Symbol into your scene several times in the Timeline view, they will all be linked to the original one. If you modify one, they will all be modified.

A Symbol is local to the project and cannot be accessed directly from other scenes. To reuse a Symbol's content into another scene, you must create a template out of it.

When a Symbol is exposed in the Timeline view, the Symbol's cells are represented as a movie strip.

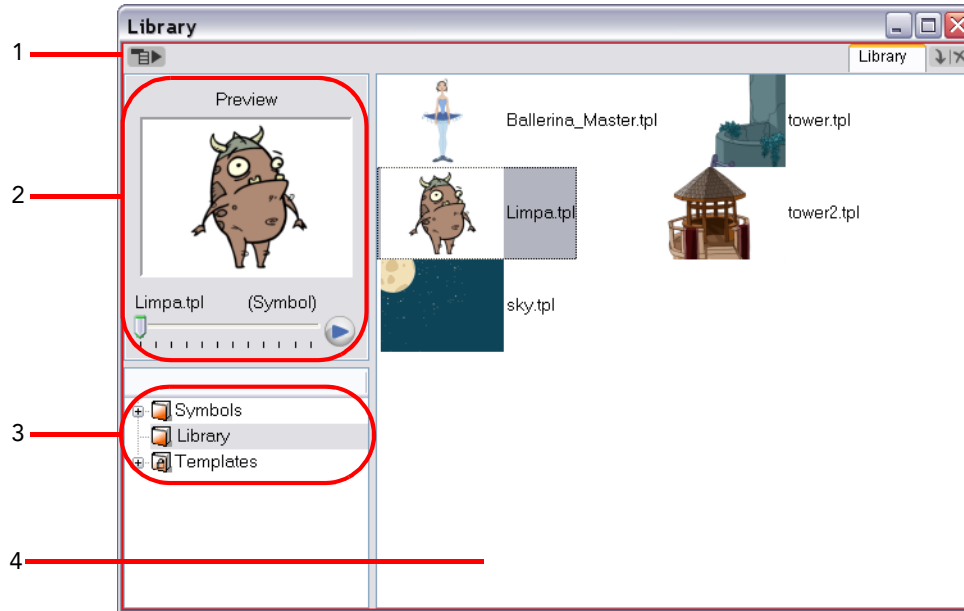


What is a Template?



A template is an individual copy of the artwork stored in the library, this package can be reused in different scenes. Once a template is stored in the library it can be accessed from any project. Dragging a template into your scene copies the content in your Timeline and does not link it to the original. This individual copy can be modified at will.

Library View



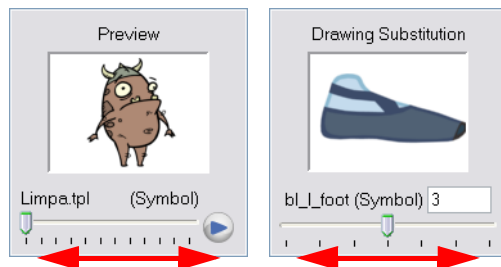
You use the Library view to create and manage your Symbols and templates, display the folders and manage and all of the content.

1. Library View Menu
2. Preview and Drawing Substitution
3. Library List
4. Templates and Symbols List

Library View Menu

The Library View menu lets you access commands specific to the Library view such as opening a Library or getting the rights to modify a library folder.

Preview and Drawing Substitution

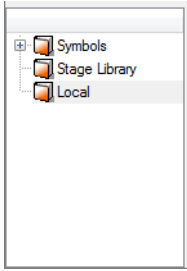


The Preview window, allows you to preview the content of a Symbol or template and to swap between drawings and Symbol cells in your Timeline view. This window is also used as the Drawing Substitution window.

To preview a template or Symbol's content:

1. In the Library view's right side, click on double-click on the Symbol or template to preview.
2. In the Preview window, click on the Play  button or drag the slider to scrub through the frames.

Library List

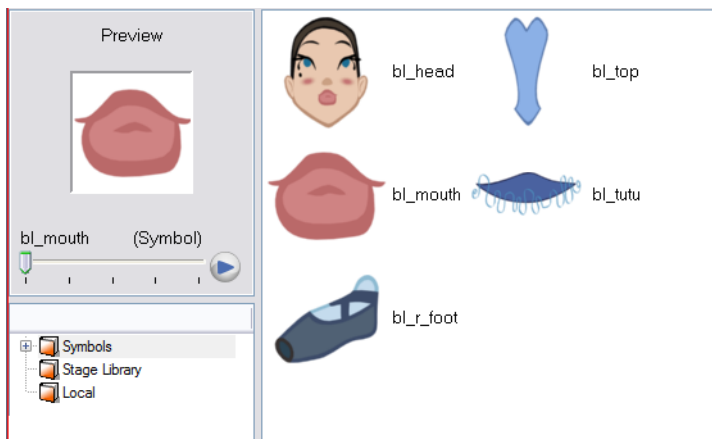


The Library List is used to navigate through the different libraries and subfolders. You can also open, close and create new libraries from here.

The Library folders have three default Libraries:

- **Symbols**
The only library folder containing Symbols for your project. You can organize the Symbols library folder using subfolders, but you cannot create a second Library for your Symbols. This library is local to your project.
- **Stage Library**
This folder contains templates and is stored on your hard drive. You can share the contents of this Library between different projects. You can organize the Stage library folder using subfolders. This folder does not contain Symbols.
- **Local**
Any templates stored in this library folder are only available to the project in which they were first saved to the Library. The name Local indicates that these templates are being stored in the Library folder in that current project's overall file folder and not on your hard drive.

Templates and Symbols List



The Symbols and templates contained in the selected Library list are displayed on the right side of the Library view as thumbnails, in a list or as details.

To change the templates and Symbols list display:

- ▶ In the Library view's right side, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **View > List, Thumbnails** or **Details**.

Structuring the Library

As you will probably create a large number of Symbols and templates you will soon realize that they need to be organized. You can create different libraries and subfolders so that you can gain easy access to your assets. For example, create a different library for each project and divide it into several categories, such as:

- Characters
- Props
- Backgrounds

Although you can only have one Symbol library folder, you can organize it by creating subfolders.

This topic is divided as follows:

- Creating a Library, on page 352
- Opening a Library, on page 353
- Closing a Library, on page 353
- Creating a Folder, on page 353
- Refreshing the Library, on page 354

Creating a Library

There are two ways to create Library folders.

- Using Stage's interface.
- Directly through your operating system.

To create a library using your operating system, create a new folder with a relevant name in the location where you want the library to be stored. This can be opened in Stage when you require it, see *Opening a Library*, on page 353 to find out how.

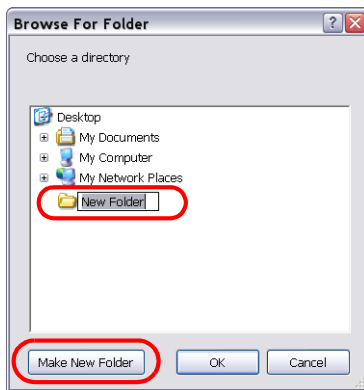
To create a library from Stage:

1. In the Library view click on the Menu  button and select **Folders > Open Library**.

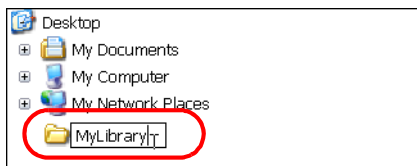
The **Browser** window opens.

2. Browse for the location where you want to store your new library.
3. Click on the Make New Folder button.

The new folder appears.

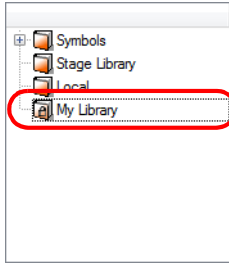


4. Name the new library with a relevant name.



5. Click on the OK button.

The new library appears in the Library List section.



Opening a Library

You can open any folder on your hard drive or network as a library. Opening a library means linking the folder to your Library view. You only need to open the library once. The library folder is available every time you open the application until you decide to close the library and unlink it.

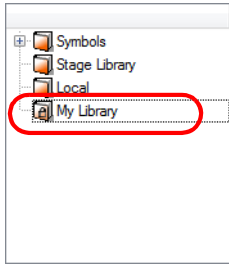
To open a library:

1. In the Library View menu, select **Folders > Open Library**.

The **Browser** window opens.

2. Browse to the location of the library folder.
3. Select the folder
4. Click on the OK button.

The new library appears in the Library Folders section.



Closing a Library

You may not always require all of the library folders in the Library List, if this is the case you can close the ones you do not need. Closing it does not delete the folder, it only unlinks it from the Library view. If you want to reopen in later, you only need to locate it on your hard drive or network and open it in the Library view.

To close a library:

1. In the Library view's right side, select the library folder to close.
2. In the Library View menu, select **Folders > Close Library**.

The library closes.

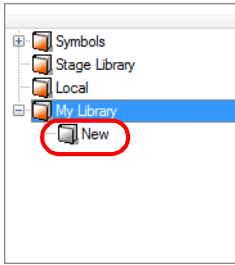
Creating a Folder

Symbols and templates libraries need to be organized, you can create different subfolders on your hard drive or in the Library view so that you can gain easy access to your assets. By default, any new library you link to your Library view is locked, this prevents the accidental deletion or modification of templates and Symbols. You must obtain the right to modify it before being able to add a new folder to it.

To create a folder:

1. In the Library view's left side, select the library folder to which you want to add a subfolder.
2. In the Library View menu, select **Edit > Right to Modify**.
3. In the Library View menu, select **Folders > New Folder**.

The new folder appears in the Library. Click on the library containing the new folder and click on the [+] sign to expand it.



Deleting a Folder

You can delete a folder from the library if its contents are no longer needed.



WARNING: ALL THE TEMPLATES OR SYMBOLS CONTAINED IN THE FOLDER WILL BE DELETED FROM YOUR HARD DRIVE. ONCE DELETED THE DATA CAN NOT BE RETRIEVED.

To delete a folder:

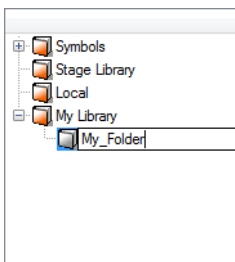
1. In the Library view's left side, select the folder to delete.
2. In the Library View menu, select **Edit > Right to Modify**.
3. In the Library View menu, select **Folders > Delete Folder**. The default keyboard shortcut is [Delete].

Renaming a Folder

Once you add a folder, you can rename it, this also renames the folder on your hard drive.

To rename a folder:

1. In the Library view's left side, select the folder to rename.
2. In the Library View menu, select **Edit > Right to Modify**.
3. In the Library View menu, select **Folders > Rename Folder**.
4. Rename the selected folder.



5. Press [Return] to validate the operation.

Refreshing the Library

If you update the content of your libraries through your operating system, you will need to refresh you library folders in the Library view.

To refresh a library:

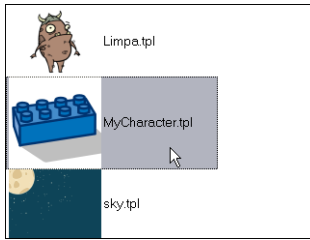
1. In the Library view's left side, select the folder to refresh.
2. In the Library View menu, select **Edit > Refresh**. The default keyboard shortcut is [F5]. The library should now display the new content.

Generating Thumbnails

When you display thumbnails in the Library view, the system generates a series of small images (thumbnails) for you. You can generate template thumbnails yourself, if they do not display or if the process has been stopped.

To generate thumbnails:

1. In the Library view's right side, select the template you want to generate thumbnails for.



2. In the Library View menu, select **Edit > Generate Thumbnails**.

The progress bar appears.

You can also delete thumbnails if you want to send a template to another user or studio and keep your packages small.

To delete thumbnails:

1. In the Library View menu, select **Edit > Delete Thumbnails**.
All the thumbnails contained in the library are removed.

Symbols

A Symbol combines animation, artwork or layers into a single object that you can control in one layer. You can also create Symbols out of each body part in your cut-out puppets.

This topic is divided as follows:

- Creating a Symbol, on page 356
- Deleting a Symbol, on page 359
- Editing a Symbol, on page 360
- Duplicating a Symbol, on page 361
- Sharing a Symbol, on page 362

Creating a Symbol

You can create Symbols in several ways:



- Creating a Symbol from a Drawing Selection, on page 356
- Creating a Symbol from the Timeline View, on page 357
- Creating a Symbol from the Network View, on page 358
- Creating an Empty Symbol, on page 358

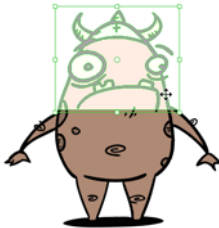



Refer to the *Importing Symbols and Templates* topic to learn how to import a Symbol in your scene.

Creating a Symbol from a Drawing Selection

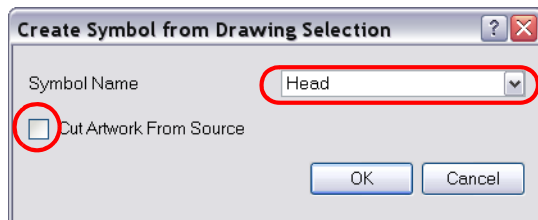
To create a Symbol from a drawing selection:

1. In the Tools toolbar, select the Select  or Cutter  tool.
2. In the Camera view, select the drawing objects you want to create a Symbol out of.

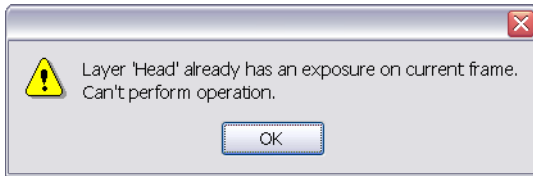


3. In the top menu, select **Edit > Create Symbol**. The default keyboard shortcut is [F8]. You can also click on the Create Symbol  button in the Edit toolbar.

The **Create Symbol from Drawing Selection** dialog box opens

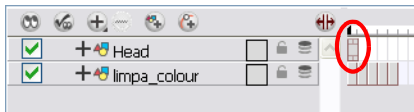


4. In the Symbol Name field, type the name of the Symbol.
 - ▶ You can also select an existing layer from the Symbol Name drop-down menu. It will add your Symbol on the layer's current cell. If there is already an exposure on that cell a warning message will appear stating, "Layer Head already has an exposure on current frame. Can't perform operation."



- ▶ If you want to rename a Symbol, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol and select **Rename**.
5. You can choose to leave the current selected artwork in the drawing or not:
 - ▶ To remove currently selected artwork from the drawing and leave it in the new Symbol, **enable** (place a checkmark in the checkbox) the Cut Artwork From Source Drawing option.
 - ▶ To keep currently selected artwork in both the drawing and in the new Symbol, **disable** (remove the checkmark from the checkbox) the Cut Artwork From Source Drawing option.
 6. Click on the OK button.

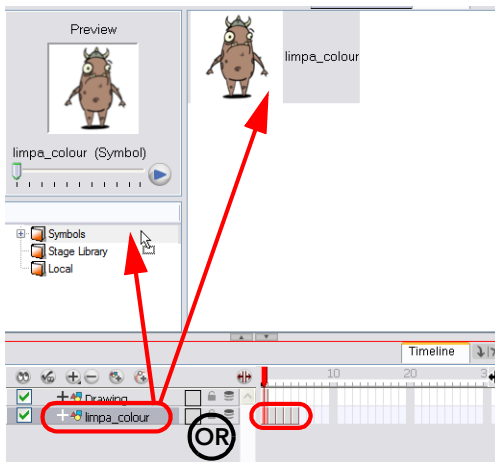
The new Symbol appears in the Library view's Symbol folder and in the Timeline view as a new layer.



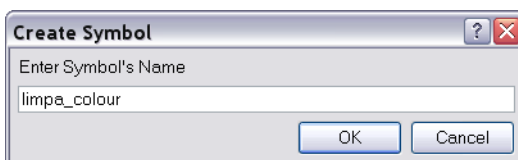
Creating a Symbol from the Timeline View

To create a Symbol from the Timeline view:

1. In the Timeline view, select the layer or the cells from which you want to create a Symbol.
2. In the top menu, select **Edit > Create Symbol**. The default keyboard shortcut is [F8]. You can also click on the Create Symbol button in the Edit toolbar.
 - ▶ Another way to create a Symbol is to select the layer or cells from the Timeline view and to drag them on the Symbol folder in the Library view.



The Create Symbol dialog box opens



3. In the Enter Symbol's Name field, type the new Symbol's name.
 - ▶ To rename a Symbol once it is created, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol and select **Rename**.
4. Click on the OK button.

The new Symbol appears in the Library view's Symbol folder.




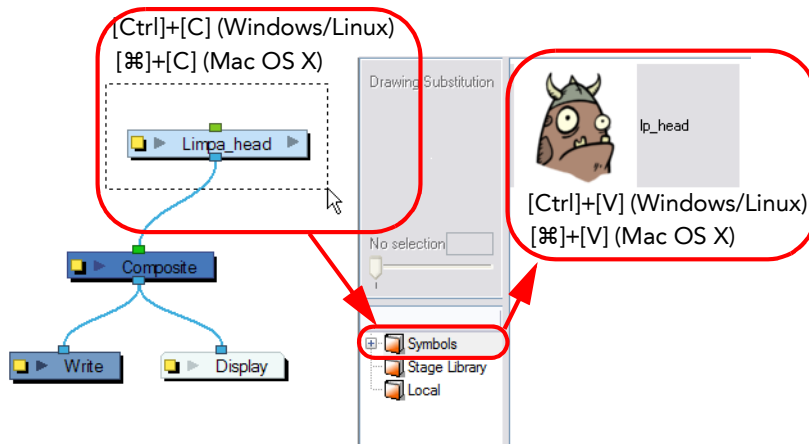
NOTE: The current selection is not replaced by the new Symbol. The new Symbol only appears in the library. You must drag it into your scene to use it.

Creating a Symbol from the Network View

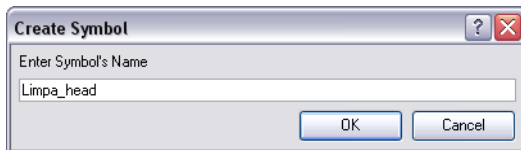
In Harmony Stage, you can create symbols from the Network view.

To create a symbol from the Network view:

1. In the Network view, select the modules from which you want to create a Symbol.
2. In the top menu, select **Edit > Create Symbol**. The default keyboard shortcut is [F8]. You can also click on the Create Symbol  button in the Edit toolbar.
 - ▶ Another way to create a Symbol is to select the modules from the Network view and copy and paste them inside the Symbol folder in the Library view using the keyboard shortcuts [Ctrl]+[C] and [Ctrl]+[V] (Windows/Linux) or [⌘]+[C] and [⌘]+[V] (Mac OS X).



The **Create Symbol** dialog box opens



3. In the Enter Symbol's Name field, type the new Symbol's name.
 - ▶ To rename a Symbol once it is created, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol and select **Rename**.
4. Click on the OK button.

The new Symbol appears in the Library view's Symbol folder.



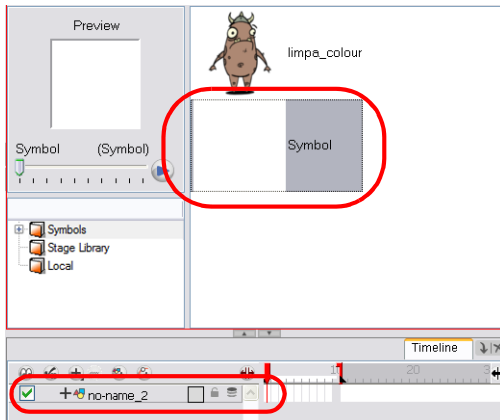
NOTE: The current selection is not replaced by the new Symbol. The new Symbol only appears in the library. You must drag it into your scene to use it.


Creating an Empty Symbol

To create an Empty Symbol:

1. In the Library view, select the Symbol folder.
2. In the Library view's right side, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **New Symbol**. You can also select **Insert > Create Empty Symbol in Library** from the top menu.

The new empty Symbol appears in the Library view.



- ▶ The Symbol is ready for you to edit (add content to). To go back to the root timeline, click on the Top  button in the Camera view.
- ▶ To rename a Symbol once it is created, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol and select **Rename**.

Deleting a Symbol

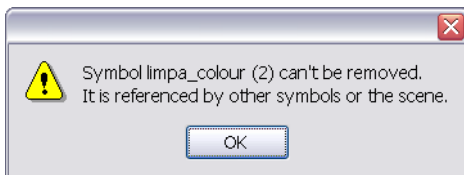
Deleting a Symbol is easy.



WARNING: THE SYMBOL WILL BE DELETED FROM YOUR HARD DRIVE. USE UNDO TO RETRIEVE THE DATA. THE DATA CANNOT BE RETRIEVED ONCE YOU CLOSE THE APPLICATION.

To delete a Symbol:

1. In the Library, select the Symbols to be deleted.
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Delete**. The default keyboard shortcut is [Delete].
 - ▶ If the Symbol is currently in use in the scene, a warning message will pop up and the Symbol will not be deleted.



Editing a Symbol

When you import a Symbol from the library to the Timeline view it is linked to the original Symbol in the library. If you import a Symbol into your scene several times in the Timeline view, they will all be linked to the original Symbol. If you modify one, they will all be modified.

If you want to edit a Symbol without modifying the other instances, you must duplicate the Symbol first, see *Duplicating a Symbol*, on page 361 to find out how.

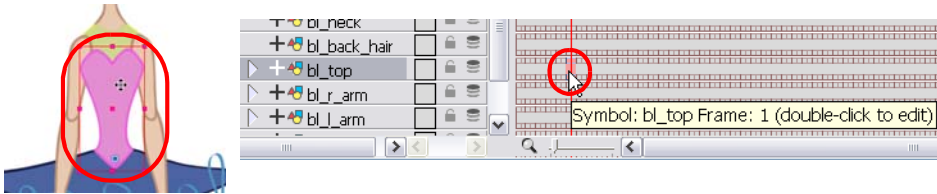
You can either edit a Symbol from the Timeline view or from the Library view.

When you edit a Symbol, the drawings contained in it are not placed at the centre of the stage, but are located in the position where they were created. The pivot is translated at the centre of the Symbol.

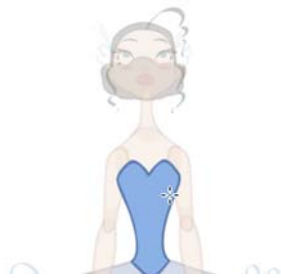
To edit a Symbol from the Timeline view:


1. In the Timeline view, double-click on the Symbol's cell to edit the Symbol. You can also double-click on the Symbol in the Camera view. The default keyboard shortcut is [Ctrl]+[E] (Windows/Linux) or [⌘]+[E] (Mac OS X).

You can also click on the Edit Symbol  button available in the Camera View toolbar's extra buttons.



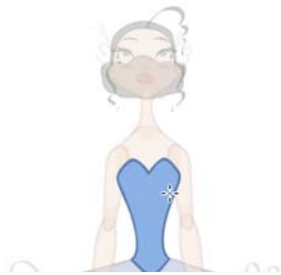
You are now inside the Symbol and you are able to edit it.




2. Click on the Top  button in the Camera view's top left corner to return to the project's timeline. The default keyboard shortcut to go back up one level is [Ctrl]+[Shift]+[E] (Windows/Linux) or [⌘]+[Shift]+[E] (Mac OS X). In the Timeline view's right side, right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) and select **Symbols > Leave Current Symbol**.

To edit a Symbol from the Library view:

1. In the Library view, select the Symbol to edit.
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Edit**. You can also double-click on the Symbol. You are now inside the Symbol and you are able to edit it.



3. Click on the Top  button in the Camera view's top left corner to go back to the project's timeline. The default keyboard shortcut is [Ctrl]+[Shift]+[E] (Windows/Linux) or [⌘]+[Shift]+[E] (Mac OS X).

Symbol Hierarchy

When you enter a Symbol to edit it, you are entering another scene where you have an independent timeline for your Symbol. You can nest many Symbols one inside the other. To help you follow the hierarchy of your nested Symbols, enter a Symbol and the Camera view Editing stack shows you the Symbol path. You can click on the Symbols' name to move up the chain.

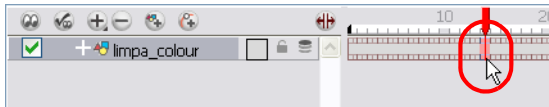


Duplicating a Symbol

You must duplicate a Symbol if you want to modify a copy of it without altering the original Symbol and the other copies.

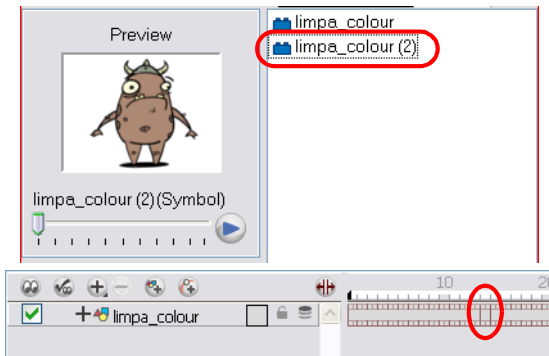
To duplicate a Symbol:

1. In the Timeline view, go to the frame where you want to duplicate the Symbol.
2. Select the Symbol's cell.



3. In the top menu, select **Edit > Duplicate Selected Symbol**.

In the Library view, the Symbol is duplicated and in the Timeline view, the current cell is replaced with the new Symbol. You can now modify the Symbol's content.



NOTE: If other Symbols are nested inside the new Symbol, those ones are not duplicated. If you modify them, the original and other instances will also be modified.

Sharing a Symbol

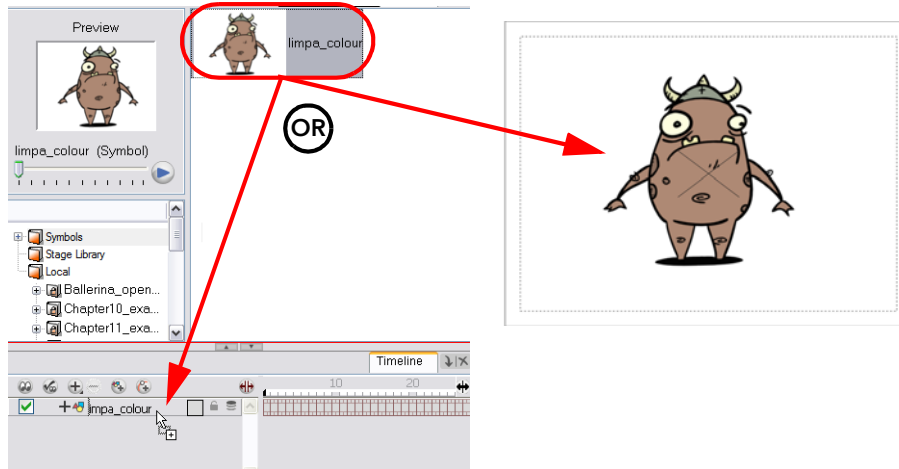
You can share a Symbol and use its content in another scene by first converting your Symbol into a template, this breaks the links with the original scene and Symbol. It then becomes a separate entity that you can import into your other projects.

To convert a Symbol into a template:

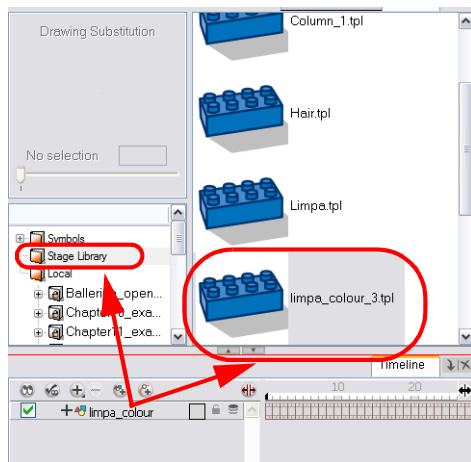
1. From the Library view, select the Symbol to convert into a template and drag it to the Camera or Timeline view.



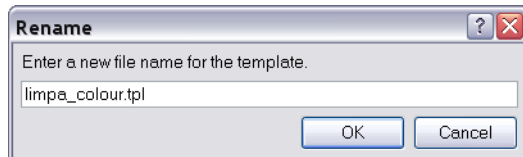
NOTE: If you drop your Symbol into the Camera view instead of the Timeline, it will not be placed in the centre of your Camera frame, but rather wherever your cursor drops it within the Camera frame.



2. In the Timeline view, select the Symbol's cells or layer and drag it to the Stage Library folder or to any other library folder. Make sure you have the right to modify the library folder.



3. In the Rename dialog box, rename the new template.



4. Click on the OK button.

Templates

If you want to reuse artwork and animation from your project into other scenes, you need to create a template out of it. A template can be seen as a portable scene or package you can drag inside your project.

This topic is divided as follows:

- Creating a Template from the Timeline View, on page 363
- Creating a Template from the Network View, on page 364
- Deleting a Template, on page 365
- Editing a Template, on page 365
- Pasting Without Using Drawing Files, on page 365

Creating a Template from the Timeline View

You can create a template out of a layer or cells. You can store anything available in the Timeline view as a template.

Timeline Template

Timeline templates are designed to allow you to reuse animations, key poses and part of an animation. For example, you can reuse head positions or a leg animation from a walk-cycle and place them inside other animations. An Animation template, also known as an Action template, is created from the Timeline View. This template mainly contains keyframes and drawing exposures.



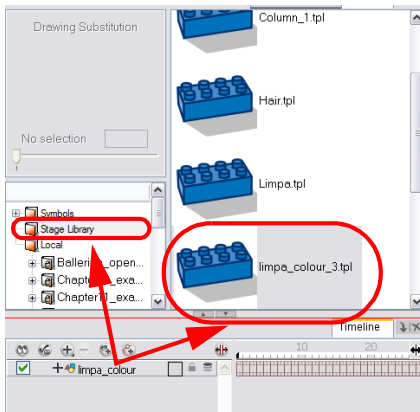
NOTE: When creating a template from the Timeline View, it will lose the extra connections, effects and groupings from the Network View.



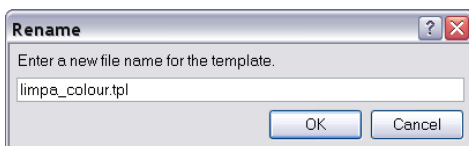
Refer to the *Importing Symbols and Templates* topic to learn how to import a template in your scene.

To create a template from the Timeline view:

1. In the Timeline view, select some cells or layers.
2. In the Library view, select the folder in which you want to store the template.
3. If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Right to Modify**.
4. Drag the selection to the Stage Library folder or to any other library folder.



5. In the Rename dialog box, rename the new template.



If you want to rename a template once it is created, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol to rename and select **Rename**.

6. Click on the OK button.

Creating a Template from the Network View

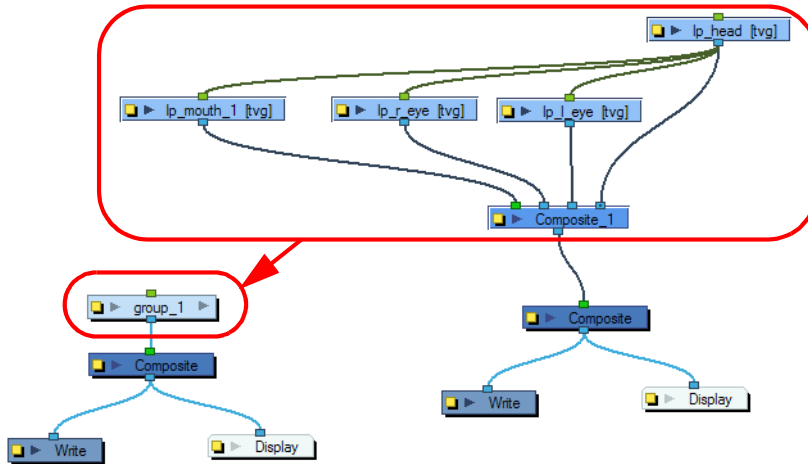
The Timeline and the Network Views have different ways to display the scene, each view displaying different information.

Network Template

A main character's template can be created from the Network View. This template contains all of the connections, effects, composites, modules, pegs, advanced groupings, function columns, scene lengths, drawings, timings, etc. This kind of template must be imported first in your scene, in the Network view or in the left side of the Timeline view.

To create a template from the Network view:

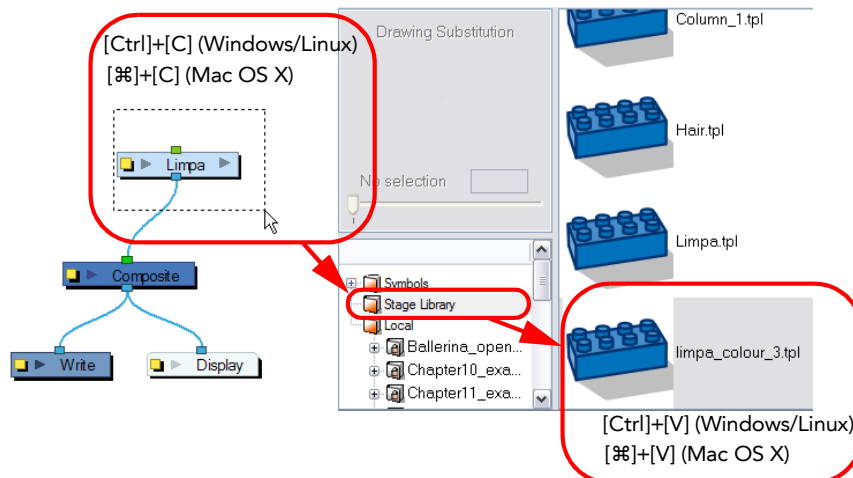
1. In the Library view, select the folder in which you want to store the template.
2. If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Right to Modify**.
3. In the Network view, select the modules you want to create a template with and group them. Select **Edit > Group > Group Selected Layers** or use the default keyboard shortcut [Ctrl]+[G] (Windows/Linux) or [⌘]+[G] (Mac OS X).



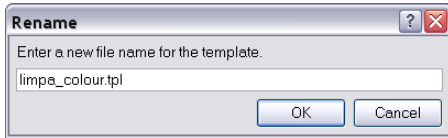
4. In the Network view, click on the group module's yellow button to rename it. The Layer Properties dialog box opens.



5. In the Network view, select your group module and copy and paste it inside the Template folder in the Library view using the keyboard shortcuts [Ctrl]+[C] and [Ctrl]+[V] (Windows/Linux) or [⌘]+[C] and [⌘]+[V] (Mac OS X).



- In the Rename dialog box, rename the new template.



To rename a template, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the Symbol to rename and select **Rename**.

- Click on the OK button.



Refer to the *Importing Symbols and Templates* topic to learn how to import a Network template in your scene.

Deleting a Template

To delete templates from your library, use the Library view. Harmony Stage lets you undo the action if necessary. **Do not delete them using the operating system.**

To delete a template:

- In the Library view, select the folder containing the template to delete.
 - If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the folder and select **Right to Modify**.
- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Delete**. The default keyboard shortcut is [Delete].

Editing a Template

A template is like a scene, you can open it and edit it as any regular project. If you want to do some modifications in your templates, you can edit them using the Edit Template command.

To edit a template

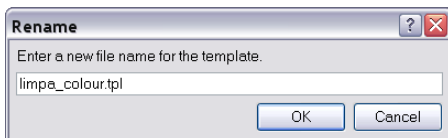
- In the Library view, select the folder containing the template to edit.
 - If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the folder and select **Right to Modify**.
- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Edit Template**. A new Harmony Stage application opens.
- Edit the template.
- In the top menu, select **File > Save**.
- In the top menu, select **File > Quit** (Windows/Linux) or **Stage > Quit** (Mac OS X).

Pasting Without Using Drawing Files

You may want to create a template containing the structure and effects you created in the Timeline view, but without the actual drawing files. You could do this if you want to create reusable effects or puppet templates.

To create a template without the selected drawings:

- In the Library view, select the folder in which you want to store the template.
- If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Right to Modify**.
- In the Timeline view, select some cells or layers.
- In the top menu, select **Edit > Copy**.
- In the Library view's right side, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Paste No Files**. The default keyboard shortcut is [Ctrl]+[Shift]+[B] (Windows/Linux) or [⌘]+[Shift]+[B] (Mac OS X).
- In the Rename dialog box, rename the new template.



- Click on the OK button. You now have an empty reusable template containing you layers structure and names.

Importing Symbols and Templates

There are several ways you can import templates and Symbols in your scene.

- Importing a Template, on page 366
- Importing a Symbol, on page 367
- Importing a Network Template, on page 368
- Previewing a Symbol in the Network View, on page 368
- Opening a Template as a Folder, on page 369
- Using Paste Special, on page 369
- Expanding a Symbol, on page 372

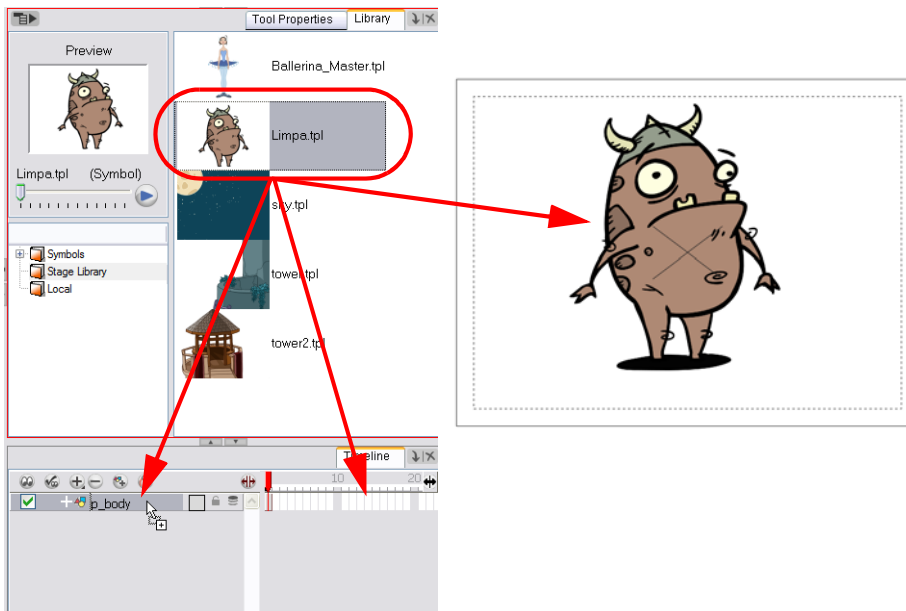


Refer to *Animating Your Puppets > Animating Using Symbols*, on page 646 to learn how to cycle and manipulate a Symbol's timing.

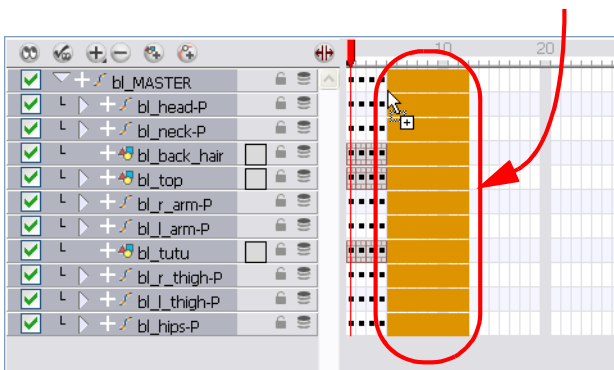
Importing a Template

To import a template in the Timeline view:

1. In the Library view, select the template you want to import.
2. Drag the selected template to the Camera view or Timeline view's left side.



- You can also drag a template to the Timeline view's right side into existing layers if the layer structure is the same as the existing one.



Importing a Symbol

To import a Symbol in the Timeline view:

1. In the Library view, select the Symbol you want to import.
2. Drag the selected Symbol to:
 - ▶ The Timeline view's left side if you want to import it into the centre of the Camera frame.

OR

- ▶ The Camera view if you want to place it where ever your mouse releases it.

This may be useful if you have saved a character's body parts as separate symbols. If you dropped them into the timeline then they would all appear in the centre, one on top of the other, like a big mess! It would be more efficient to arrange them into their proper places as you bring them into the scene.

Importing a Template with Symbols

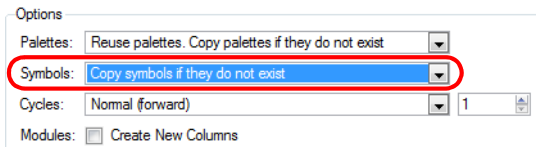
Sometimes a character's rig is not a cut and dry matter. Rigs, which are usually saved as templates, can contain Symbols, such as a leg that was made with a patch. However, a Symbol does not work in the same way as an Action template; when brought into the right side of the Timeline layer to a Symbol of the exact same structure, instead of adding itself on to the previous Symbol, the new Symbol becomes a copy.

To take more control of how the Action template will behave when brought into the Timeline, bring it in using a Paste Special.

To import a template with Symbols:

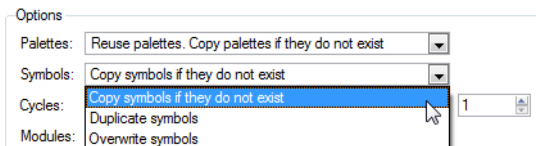
1. Select the Action template containing Symbols from the right side of the Library.
2. As you drag it from the Library to the right side of the Timeline to drop it next to a template with the exact same rig, hold down the [Alt] button (Windows/Linux) or the [Option] button (Mac).

The Paste Special window appears. Note that the window looks identical to the regular Paste Special window, except for the Symbol drop-down menu in the Options section.



Refer to the *Using Paste Special* section to learn more about the *Paste Special* options.

3. Select one of the following options from the Symbols drop-down menu:

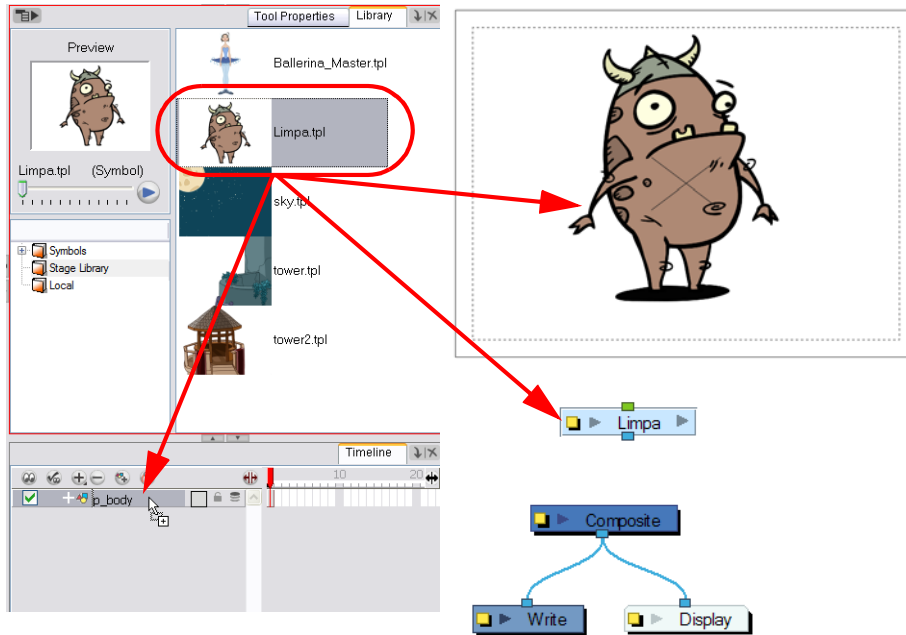


- ▶ **Copy symbols if they do not exist:** This is the default setting for this operation and will prevent symbols in a Action template from being copied.
- ▶ **Duplicate symbols:** Select this option if you wish to make copies of the Symbols in your template.
- ▶ **Overwrite symbols:** If for some reason, a modification was made to a Symbol in the Action template that does not exist in the basic rig template for a character, select this option to overwrite the previous symbol.

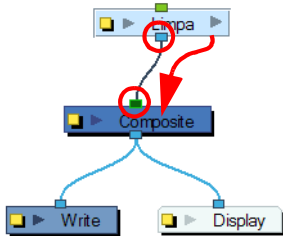
Importing a Network Template

To import a network template:

1. In the Library view, select the template or Symbol you want to import.
2. Drag the selected template to the Network, Camera or Timeline view's left side.



3. If necessary, in the Network view, connect your template into the Composite module. Do this by clicking its Out Port and dragging the connection to the Composite module until an In Port appears.



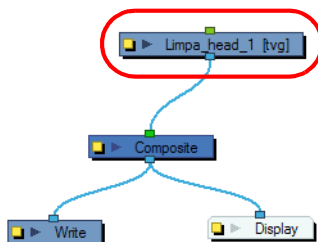
If the template you are importing was created in the Network view, make sure to import it first and to drop it in the Network view or in the Timeline left side or some network connections could be broken.

Previewing a Symbol in the Network View

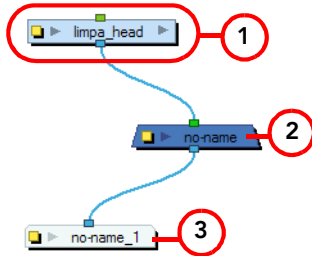
In Harmony Stage, when you import a symbol in your scene, you can navigate through it in the Network view.


To navigate in your symbol:

1. In the Network view, select the symbol you want to open and press the default keyboard shortcut [Ctrl]+[E] (Windows/Linux) or [⌘]+[E] (Mac OS X) to use the **Edit Selected Symbol** command.



- In the Network view, inside the symbol's top module you will find the composition of your symbol. In this example, a group module was turned into a symbol.



- ⇒ 1. Symbol Content Modules
 - ⇒ 2. Composite Module set on pass through
 - ⇒ 3. Display Module
- Click on the Top  button in the Network view's top left corner to return to the top module. You can also use the **Leave Current Symbol** command's default keyboard shortcut [Ctrl]+[Shift]+[E] (Windows/Linux) or [⌘]+[Shift]+[E] (Mac OS X).

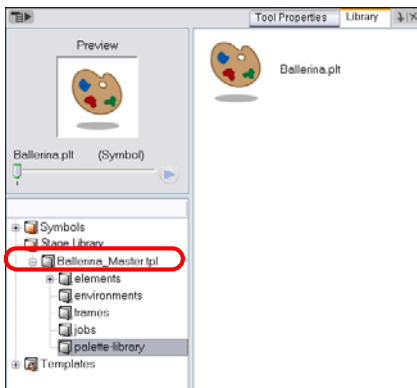
Opening a Template as a Folder

Since a template is like a scene, you can open the template's folder and select elements inside it such as drawings. You may want to only import a few drawings or a palette instead of importing the entire contents of a template, in this case use the Open As Folder command to import the items you want.

If you want to import a palette, drag the palette file into the Palette List of the Colour view.

To open a template as a folder:

- In the Library view, select the folder containing the template to open.
 - ▶ If the Library folder is locked, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the folder and select **Right to Modify**.
- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Open As Folder**.
- In the Library list, click on the template's folder to display its content.



- Drag the content to the Timeline or Colour view.

Using Paste Special

When you import a Symbol in your scene, by default its full length is exposed. If you import your Symbol in the Timeline view's left side all the frames will be exposed, but if you import it into an existing layer, you can use the Paste Special command to adjust the import behaviour to fit your requirements.

When you import a template in the Timeline view, all layers are created as well as drawings and keyframes. It is possible that you will want to import only the keyframes without the drawings or import only the drawings that are not already in your layers. You can adjust the behaviour using the Paste Special command.

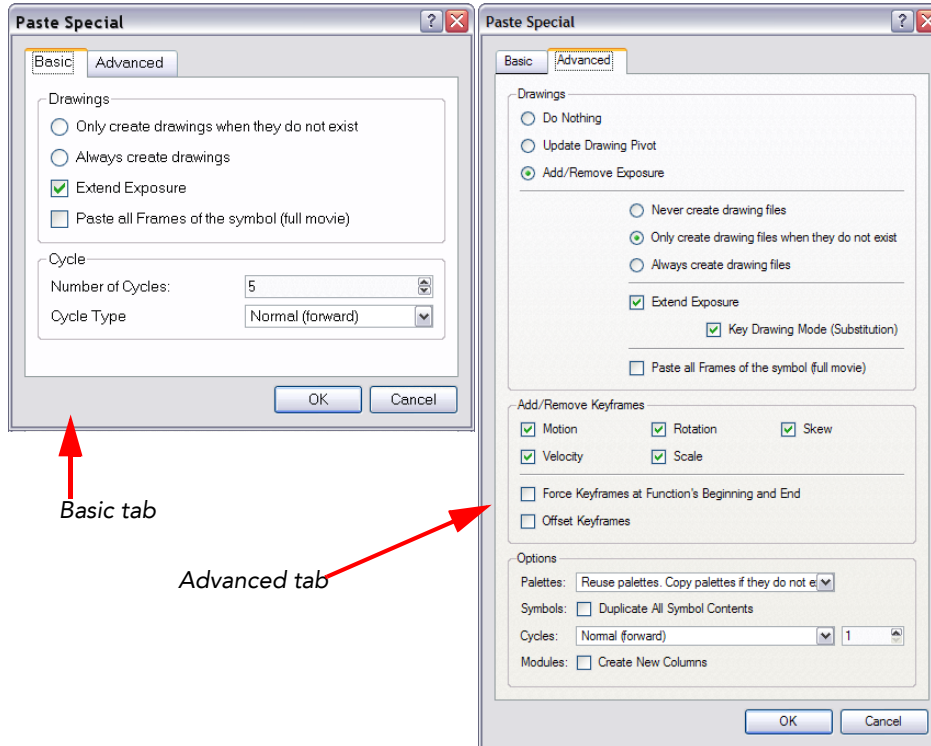
Once you set the parameters, Stage will reuse them each time you import a Symbol in the Timeline view's right side until you set new parameters.

To open the Paste Special dialog box:

1. In the Library view, select the Symbol or template to import.
2. While dragging the selection to the Timeline view, hold down the [Alt] key (Windows/Linux) or [Ctrl] key (Mac OS X). Note: Drop the selection in the Timeline view before releasing the hot key.

The Paste Special window opens.

3. Set the parameters.
4. Click on the OK button.



Paste Special - Basic Tab

Drawings

- **Only create drawing files when they do not exist:** When adding exposures to a drawing layer, new drawings will be created only when drawings with the same name do not already exist in the destination.
- **Always create drawing files:** When adding exposures to a drawing layer, new drawings will always be created. If drawing files with the same name already exist, Harmony Stage will create a new name for the drawing.
- **Extend Exposure:** Extends the exposure of drawings to fill the range of cells to the destination frame.
- **Paste all Frames of the Symbols (full movie):** When enabled, the Paste Special command will expose all the Symbol's frames instead of the first one only.

Cycle

- **Number of Cycles:** Use the up and down arrows to increase or decrease the number of cycles you want to paste. You can also type the value directly in the field.
- **Cycle Type**
 - ⇒ **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - ⇒ **Reverse:** This pastes your selection in reverse, starting with the last cell and ending with the first one.
 - ⇒ **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - ⇒ **Reverse -> Forward:** This pastes your selection as a reverse yo-yo, starting with the last cell, going to the first one and ending with the last cell.

Paste Special - Advanced Tab

Drawings

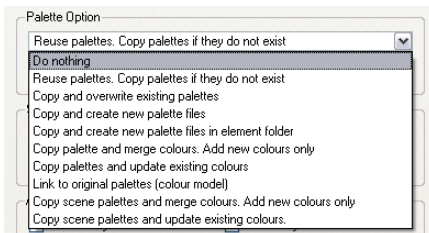
- **Do Nothing:** Does not create or overwrite drawings.
- **Add/Remove Exposure:** Creates/deletes exposure values in the selected layer.
You have the following choices as to how to treat drawings that will be created when adding an exposure:
 - ⇒ **Never create drawing files:** When adding exposures to a drawing layer, drawing files will not be created.
 - ⇒ **Only create drawing files when they do not exist:** When adding exposures to a drawing layer, new drawings will be created only when drawings with the same name do not already exist in the destination.
 - ⇒ **Always create drawing files:** When adding exposures to a drawing layer, new drawings will always be created. If drawing files with the same name already exist, Harmony Stage will create a new name for the drawing.
 - ⇒ **Extend Exposure:** Extends the exposure of drawings to fill the range of cells to the destination frame.
 - ⇒ **Key Drawing Mode (Substitution):** Pasting an exposure value replaces the cell value in the current frame and in all frames following in sequence with the original cell value.
- **Paste all Frames of the Symbols (full movie):** When enabled, the Paste Special command exposes all the Symbol's frames instead of only the first one.
- **Update Drawing Pivot:** Revises the drawing pivot in the destination to use the same drawing pivot as the first drawing in the template. If you have a range of drawings selected in the destination, the pivot points of all selected drawings will be updated.

Add/Remove Keyframes

- **Motion:** Copies the properties of the selected motion keyframe to the new frame.
- **Velocity:** Copies the properties of the selected velocity keyframe to the new frame.
- **Rotation:** Copies the properties of the selected rotation keyframe to the new frame.
- **Skew:** Copies the properties of the selected skew keyframe to the new frame.
- **Scaling:** Copies the properties of the selected scale keyframe to the new frame.
- **Force Keyframes at Function's Beginning and End:** Adds a keyframe to the beginning and end of the pasted function, reproducing the source function.
- **Offset Keyframes:** When pasting functions, this option offsets the keyframes from the function's last value by the values in the pasted function. This will continue the progression of a function rather than repeat the values.
- **Replace Expression Columns:** Replaces the destination function with the formula from the source column.

Option

- **Palette Option**



- ⇒ **Do nothing:** Does not create, overwrite, merge or link palettes.
- ⇒ **Reuse palettes. Copy palettes if they do not exist:** Palettes in the destination drawings are left as they are.
- ⇒ **Copy and overwrite existing palettes:** Overwrites destination palettes with the palettes from the source drawings.
- ⇒ **Copy and create new palette files:** Creates new palette files, placing them at the same relative environment and scene level as the source. If the palettes in the templates were stored at the environment level of the source scene, the paste operation will place the palettes in the environment level of the destination scene.

- ⇒ **Copy and create new palette files in element folder:** Creates new palette files in the element folders of the destination scene, rather than in the same relative job or environment.
- ⇒ **Copy palette and merge colours. Add new colours only:** Adds new colours to the destination palettes and ignores colours that are the same in the two palettes.
- ⇒ **Copy palette and update existing colours only:** Adds new colours to the destination palette and updates duplicate colours in the destination with colour values from the source.
- ⇒ **Link to original palettes (colour model):** Links the colour palettes in the destination scene to the palettes in the source. Use this to link drawings to the palettes in a colour model.
- ⇒ **Copy scene palettes and merge colours. Add new colours only:** Adds new colours to the destination scene palettes and ignores colours that are the same in the two palettes.
- ⇒ **Copy scene palettes and update existing colours:** Adds new colours to the destination scene palette and updates duplicate colours in the destination with the colour values from the source.
- **Duplicate All Symbol Content:** Instead of linking the Symbol instance to the original one, the Symbol will be duplicated. A new Symbol is created in the Library.
- **Cycles:**
 - ⇒ Cycle Type
 - **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - **Reverse:** This pastes your selection reversed, starting with the last cell and ending with the first one.
 - **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - **Reverse -> Forward:** This pastes your selection as a reverse yo-yo, starting with the last cell, going to the first one and ending with the last cell.
 - ⇒ Number of Cycles: Use the up and down arrows to increase or decrease the number of cycles you want to paste. You can also type the value directly in the field.
- **Modules: Create New Columns:** If you enable this option a new column will be created when you copy and paste modules from the Network view or Layer in the Timeline view. If the layers are linked to function curves, the function curves, the drawings and the timing will be duplicated.

Expanding a Symbol

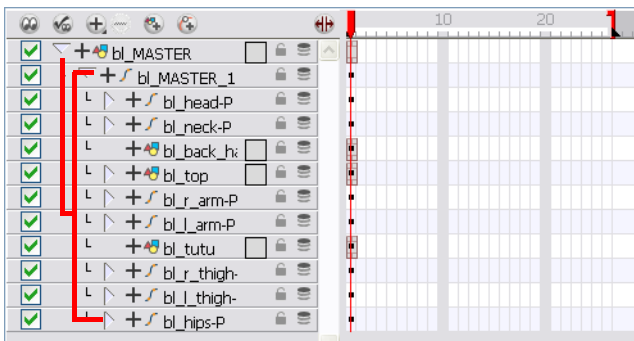
You can use the Expand Symbol command to extract a Symbol's content and place it on the root timeline. The Symbol will not be removed from the Timeline view. Its content will be copied and inserted into the root timeline. The Symbol's layers will be parented to it in case you created motions and transformation on the drawing layer that is containing the Symbol. Breaking the hierarchy could result in losing any scaling and animation you may have done.

To expand a Symbol:

1. In the Timeline view, select the Symbol to expand.



2. In the top menu, select **Edit > Expand Symbol**. The default keyboard shortcut is [Ctrl]+[B] (Windows/Linux) or [⌘]+[B] (Mac OS X).



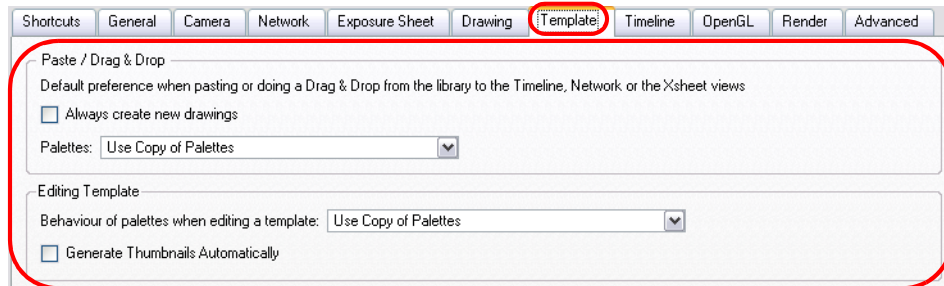
Preferences

Adjusting preferences to suit your workflow allows you to work more efficiently.

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

In the Preferences panel Template tab you will find the following preferences that are related to managing templates and symbols.



Paste/Drag and Drop

- **Always Create New Drawings:** By default, when you import timeline templates in the right section of the Timeline view, to stack them, the system will analyze and create only the non-existing drawings and only expose the already existing ones. When enabled, this option will automatically create new drawings for every one of them that is exposed.
- **Palettes:**
 - ⇒ **Ask User:** When dropping a template into a scene, the system will ask if you want to link the palette to the original or create a local copy in the scene.
 - ⇒ **Use Original Palette:** The system will automatically link drawing elements to the original palette file. If the original palette is not encountered a local copy will be created.
 - ⇒ **Use Copy of Palettes:** The system will automatically create a local copy of the palette in the scene.

Editing a Template

- **Behaviour of palettes when editing a template:**
 - ⇒ **Ask User:** When opening the Edit Template mode, the system asks if you want to keep the link to the original palette or use the palette copy stored in the template.
 - ⇒ **Use Original Palette:** The system will automatically maintain the link to the original palette file. If the original palette is not found, a local copy will be created.
 - ⇒ **Use Copy of Palettes:** The system will automatically use the palette copy stored in the template.
- **Generate Thumbnails Automatically:** When this option is enabled, the system will automatically create thumbnails for the template when the user wants to see the thumbnails in the Template Library or when saving a template modification.

Chapter 10

Building a Character



Toon Boom Harmony Stage is a great tool for building your characters. You can make use of different techniques and features to break down your puppets.

In this chapter, you will learn about:

- Importing a Model, on page 376
- Relative Sizes, on page 378
- Studying the Model, on page 380
- Setting the Default Separate Position Preference, on page 383
- Breaking Down, on page 384
- Rigging, on page 400
- Adding the Main Extra Drawings, on page 413
- Setting the Pivots, on page 415
- Skeleton Optimization, on page 420
- Storing the Character in the Library, on page 424
- Appendix, on page 427

Importing a Model



To begin breaking down your puppet, you must first import your character into a new project.

You can import your character in several different formats:

- Library Template
- Bitmap Image or Picture
- External Vector Format



If you previously created a template out of your character model, refer to *Libraries, Symbols and Templates > Importing a Template*, on page 366 to learn how to import your character's template into your building scene.



If your character model is a bitmap image or picture, refer to *Gathering Content > Importing Bitmap Images*, on page 318 to learn how to import your image into your building scene.



If your character model is an AI, PDF or SWF file, refer to the following sections in the *Gathering Content* chapter to learn how to import your vector based image:

- Importing AI and PDF Files, on page 330
- Importing from Adobe Flash, on page 332



Refer to *Gathering Content > Importing PSD Files as Separate Layers*, on page 325 to learn how to import your bitmap images and multi-layered PSD files.

Model Alignment



When setting your character's model in your scene, we recommend that you to centre it in the Camera view and scale it to fit inside the Safe Area's frame.

If you have several views of your character, place each view in a separate cell and centre them one on top of another. This will facilitate the break down process and will ensure that all of your puppets are aligned and the same size.

Photo Puppets



If you are creating a cut-out puppet out of photos, break down the different parts in a bitmap editing software. Then, import your parts and vectorize them as textured images.

A good way to set and import your bitmap parts is to organize them in a multi-layered PSD file.



Refer to *Gathering Content > Importing PSD Files as Separate Layers*, on page 325 to learn more about importing bitmap images and multi-layered PSD files.

Relative Sizes

It is important to understand the relative size of every character and prop in order to maintain consistency and structure throughout the project.

A production may contain many characters and props. It is not unusual for these to have been created by different people. If there is no size control implemented, the characters and elements created by different artists can vary greatly in size. When this occurs, the characters that are put together in a scene will be out of proportion. The animator or person doing the scene setup will then have to scale them to the correct size.

When a character or a prop is scaled down, the outline will get increasingly thinner. By the time that the element is scaled to its proper size, the outline may be so thin that the difference between one character's outline and another's will not look very good.

These tips can be used to create a determine the correct relative sizes for each puppet:

- Line Up, on page 378
- Field Chart, on page 379
- Brush Size, on page 379

Line Up



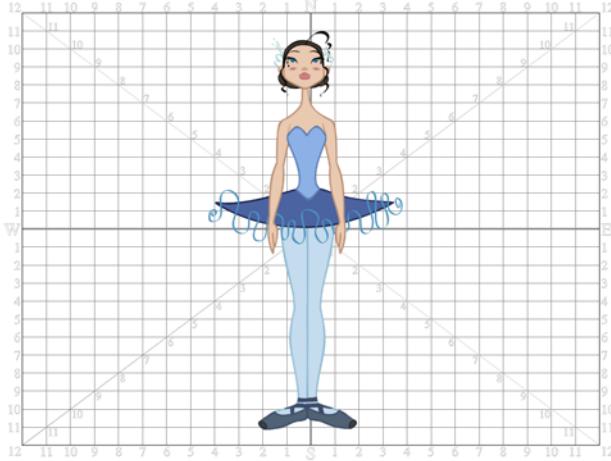
A line up consists of copying and pasting all of your character designs into the same drawing and then scaling them so they are in proportion with each other. This line up is very important and should be handed to any animator, layout and posing artist, or scene set up person working on the project.

For the prop design, it is recommended that you paste one of the main character's hands or even the full body beside the prop. This enables the animator to know what size to draw or set the prop.




In your character design scene, it is a good idea to create a column for the character line up. The line up is usually done during the Character Design step. When the character builder imports the model to the break down scene, the size relation should be correct.

Field Chart



Harmony Stage has a field chart included in its Camera and Drawing views. This tool is very useful in setting the characters' and props' heights. You can display the field chart using the Show Grid option.

To display the field chart:

- ▶ In the top menu, select **View > Grid > Show Grid**. The default keyboard shortcut is [Ctrl]+['] (Windows/Linux) or [⌘]+['] (Mac OS X). You can also click on the Show Grid  button available in the Camera view and Drawing view toolbars.

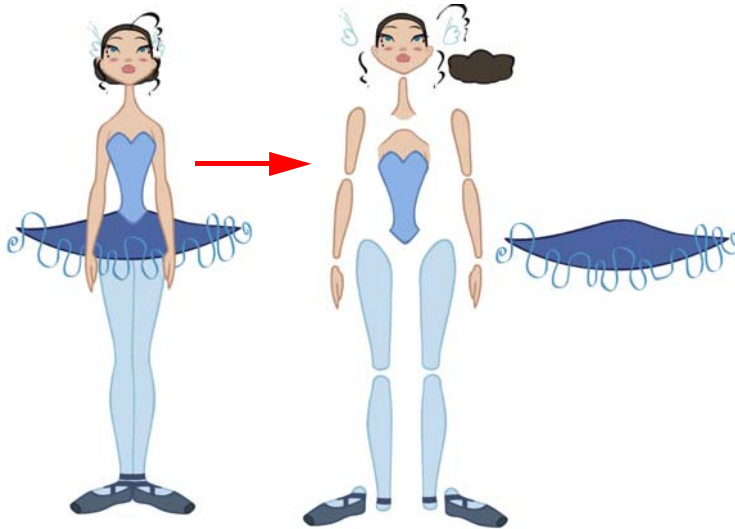
Brush Size

Stage provides a variety of pens and brushes and also allows you to create and save your own. It is a good idea to create and save pens with precise sizes and parameters to trace and design your models and break downs.



Refer to *Drawing and Animating > Brush Styles*, on page 86 to learn more about creating and saving brushes.

Studying the Model

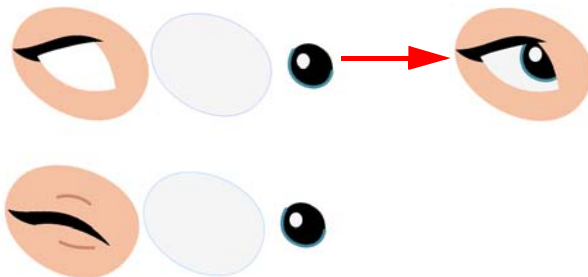


Now that you have imported or designed your colour model, the next step is to observe the model. This is done to determine what parts will be broken apart and how they will be divided. Will the hair be separated into one, two or three sections? Will the hand be separated from the sleeve? To determine what is best for your character, observe the model in the Camera or Drawing view.

To help you improve the quality of your break down, here are some tips and tricks taken from “*Grossology*” a production by Nelvana Limited:

- Eyelids and Pupils, on page 380
- Creating Mouth Shapes Directly on the Head, on page 381
- Keeping Fingers Attached to the Hand, on page 381
- Mixing Hand-Drawn Animation, on page 381
- Flipping Logos, on page 382
- Complete and Overlapping Pieces, on page 382

Eyelids and Pupils



For increased flexibility when animating the eyes, you can split them into three layers: the eyeball, the pupil and the eyelid. The eyelid layer is used for the blink and to cut the pupil when it gets too close to the side of the eyeball. For a more advanced break down, the two eyes are separated on their own individual three-layer sets.

Creating Mouth Shapes Directly on the Head



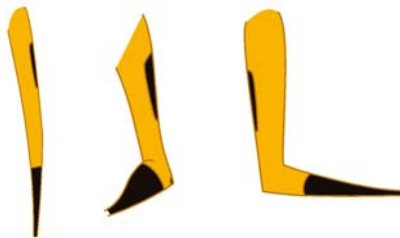
To animate more realistic lip syncing and facial expressions, you can create the mouth shapes on the head layer. Just deform the jaw to match the mouth opening.

Keeping Fingers Attached to the Hand

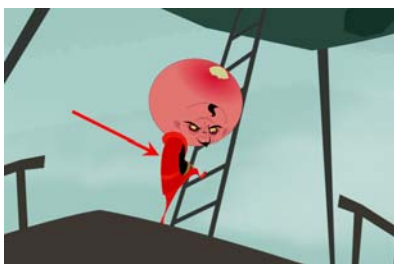


To avoid needlessly complicating the break down, the fingers are not usually separated from the hand. The full hand is a single layer with a bank of different hands stored inside. This technique is easy to work with and produces a less mechanical effect.

Mixing Hand-Drawn Animation



For more advanced cut-out animation and a more traditional animation look, some users will keep full arms and full legs. This means that only hands and feet are separated from the limbs. The animator will create extra drawing shapes and substitute them during the animation.



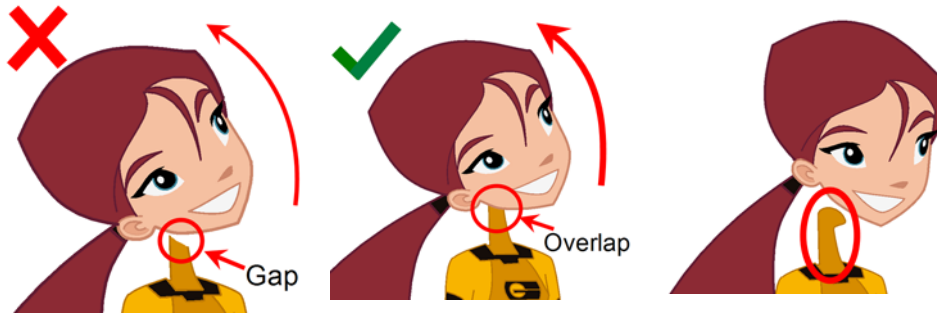
The animator may temporarily combine some parts to facilitate the work and produce a higher quality animation. For example, combining both full legs and hips into a single drawing to create poses that would be difficult using cut-out pieces. Both full legs could be drawn on the hip level and legs and feet exposure removed. This technique is a mix of cut-out and hand-drawn animation.

Flipping Logos



You can separate logos and letters that appear on a character or a prop. This allows you to flip and reuse a character's puppet.

Complete and Overlapping Pieces

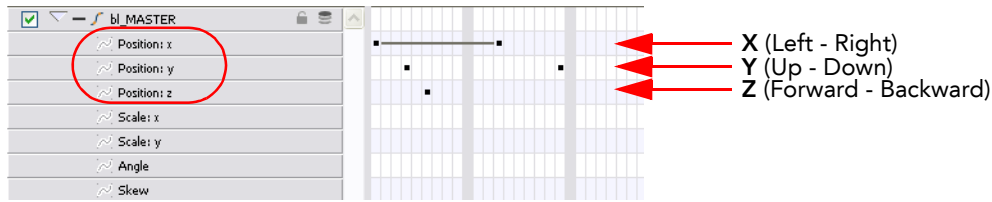


For a better result with animated parts, it is important to understand that they have to be properly overlapping and complete. A common mistake is to trace the part just as it appears on the model.

Setting the Default Separate Position Preference

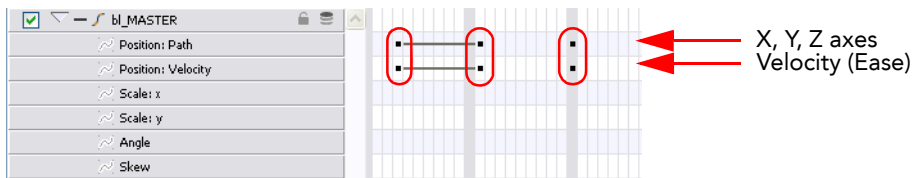
Before you start adding layers to your puppets, there is a preference you should adjust:

- Default Separate Positions

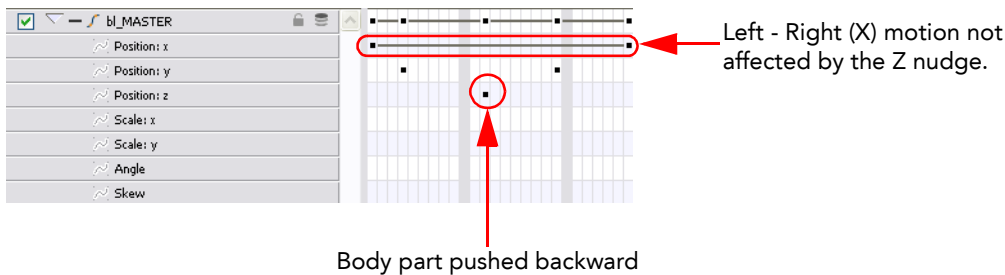


If you enable the Default Separate Positions preference, when you create new layers, their X, Y and Z axes will be independent one from the other.

By default, this preference is disabled, so when you animate your layers, the three directions are locked together to form long and smooth trajectories controlled by a single easing parameter. However, when you do cut-out animation, you will probably prefer to have three independent axes so that you can control them individually.



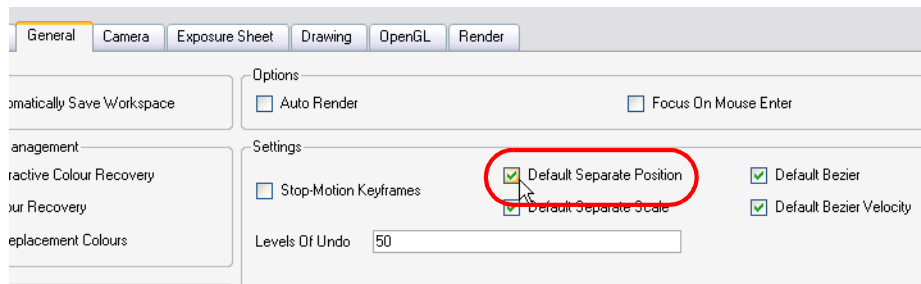
When you lock the three positions together, each time you add a keyframe, it is added on all three positions at once.



When you separate the three positions, when you add a keyframe on one axis, it is not added on the other two. This gives you more freedom when animating with Motion keyframes and nudging parts forward and backward over time.

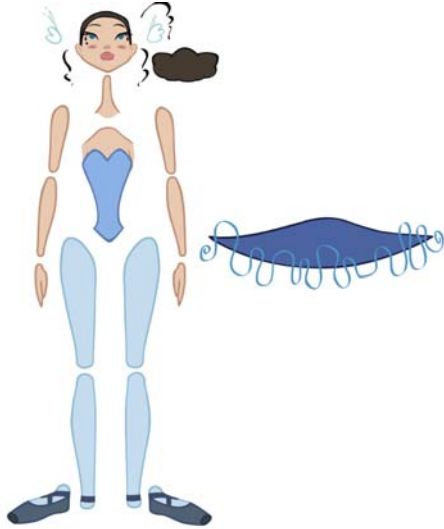
To enable the Default Separate Positions preference:

1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X). The default keyboard shortcut is [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
2. In the Preferences panel, go to the General tab.
3. In the Settings section, enable the Default Separate Positions option.



4. Click on the OK button.

Breaking Down



There are many techniques you can use to break down a puppet. In this section, you will learn about one of the most common methods. For your first character break down, follow these instructions so that you can get an idea of the way Harmony Stage works. Once you are used to the software and understand its basic functions and commands, you will be able to create your own techniques to satisfy the needs of your production.

If your drawing is not a vector based format or a bitmap photo puppet, you will need to use the Tracing Over the Model technique to break down your character, available in the Appendix section.

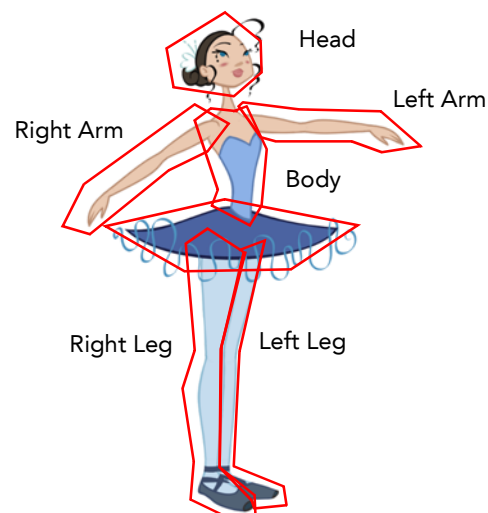


Refer to the Appendix section at the end of the chapter for alternate technique tips.

This topic is divided as follows:

- Selecting and Creating a New Layer, on page 384
- Selecting and Incorporating an Existing Layer, on page 390
- Completing the Parts and Articulation, on page 392
- Creating Ghost Drawings (Optional), on page 397

Selecting and Creating a New Layer



The first step in breaking down your character is to do a rough cut down of the main parts such as the body, arms, legs and head. Use the Create Drawing from Drawing Selection feature to automatically create your layers and copy your selection in it.



Refer to the Appendix section at the end of the chapter to learn about the Break Down: Tracing the Model technique and the Break Down: Distribute to Layer, on page 428.

This section is divided as follows:

- Naming Conventions, on page 385
- Breaking Down the Main Parts, on page 385
- Breaking Down the Secondary Parts, on page 387

Naming Conventions

Before breaking down your pieces, you should think of a naming convention for your layers in order to keep your work organized.

When naming your layers, you should include the following information:

- Character's name
- Right or left side
- Part's name



An example of that naming convention for a character named Mark is:

- `mk_r_arm`
This would be the layer name for his right arm.

Breaking Down the Main Parts

To break down the main body parts, you will use the Create Drawing From Drawing Selection feature. There is no need to create any layers prior to this process, you need to have your model well centred and sized in the Camera view.

You do not need to make clean cuts around your parts; a rough one is quite sufficient as long as it includes all of the artwork of the part you want to break down. You will clean the extra bits and pieces later.

You will use the Cutter  tool to roughly cut the main sections. You can also use the Select  tool to select precise lines and colour zones.

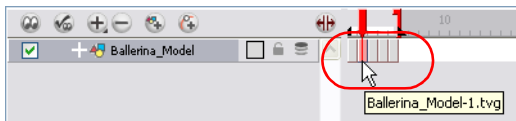





Refer to the following sections in the Drawing and Animating chapter to learn how to use the Cutter and Select tools:

- Cutting Drawing Parts, on page 126
- Selecting Drawing Objects, on page 108

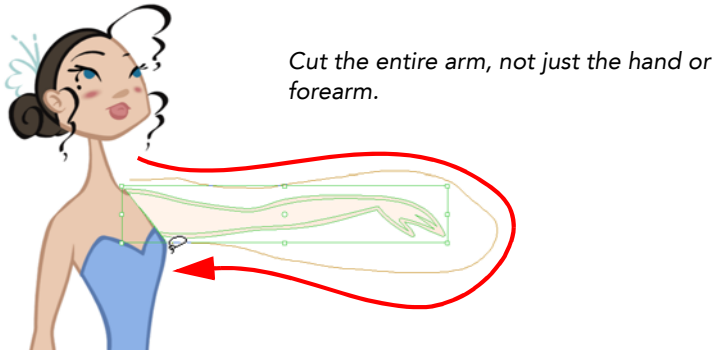
To break down the main parts:

1. In the Timeline view, select the model's cell that corresponds to the first view to break down.



2. In the Tools toolbar, select the Cutter  tool. The default keyboard shortcut is [Alt]+[T].
 - ▶ If you prefer to use the Select  tool, choose the Select tool from the Tools toolbar. The default keyboard shortcut is [Alt]+[V].
 - ▶ In the Cutter's Tool Properties view, you can switch to the Lasso  selection mode.

3. In the Camera view, create a selection around the first part to break down. If you click on a zone, the Cutter tool will select the zone. It will end the selection at the first point of intersection that it meets.



- ▶ If you hold down [Shift], you can create a new lasso selection around another zone and add it to your previous selection.

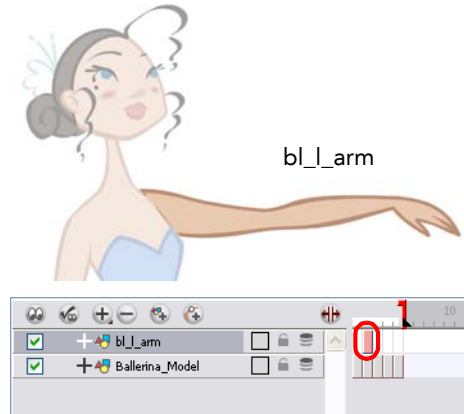


4. In the top menu, select **Edit > Create Drawing From Drawing Selection**. The default keyboard shortcut is [F9]. The **Create Drawing From Drawing Selection** dialog box opens.

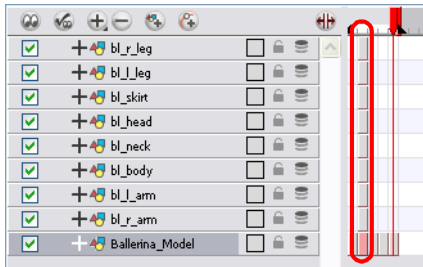


5. In the Layer Name field, type the name of the layer you want to create following the naming convention you established previously.
6. Make sure to disable the Cut Artwork From Source option in order to keep the selected artwork on your original drawing. You do not want to cut the artwork from your colour model.
7. Click on the OK button to complete the operation.

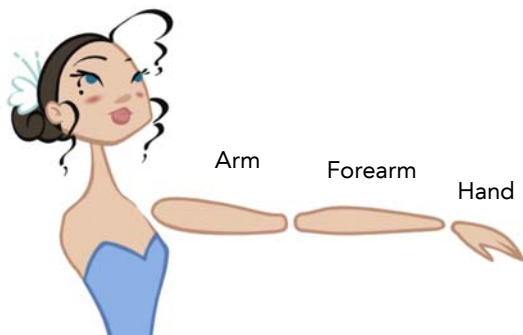
The new layer is created and your selection is copied in it. The drawing is created in the same frame number as the cell it was taken from.



8. Repeat Step 1 to Step 7 for each main body part.



Breaking Down the Secondary Parts

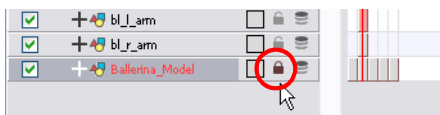


You should now have a layer for each main part of the character for the first view to break down. You are now ready to break down those main pieces into smaller ones.

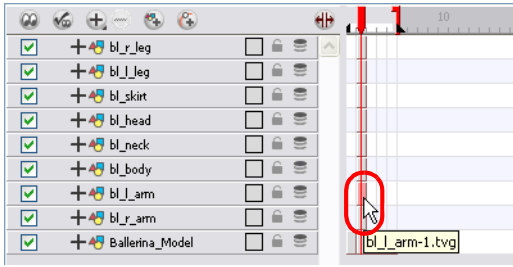
Breaking down the secondary parts is similar to the main part break down process except that this time you will cut away the artwork from the layer it has been selected from.



To break down the secondary parts:

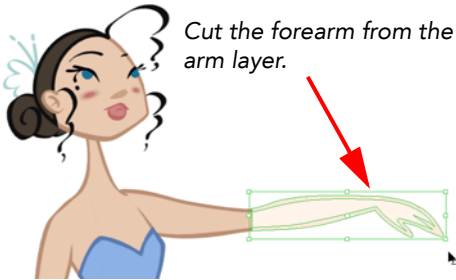
1. In the Timeline view, lock your model layer by clicking on its Lock  button.




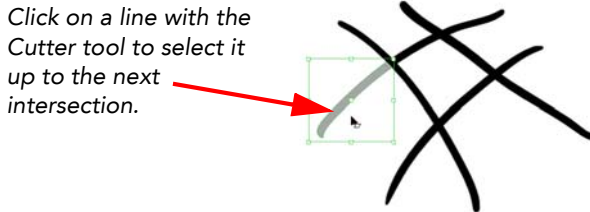
- In the Timeline view, select the cell that corresponds to the main part you want to break down.



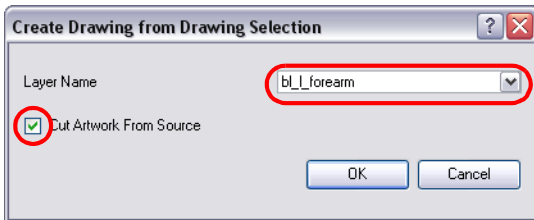
- In the Tools toolbar, select the Cutter  tool. The default keyboard shortcut is [Alt]+[T].
 - If you prefer to use the Select  tool, choose the Select tool from the Tools toolbar. The default keyboard shortcut is [Alt]+[V].
- In the Camera view, create a selection around the part to break down.



- If you click on a zone, the Cutter  tool will select the zone. It will end the selection at the first point of intersection that it meets.

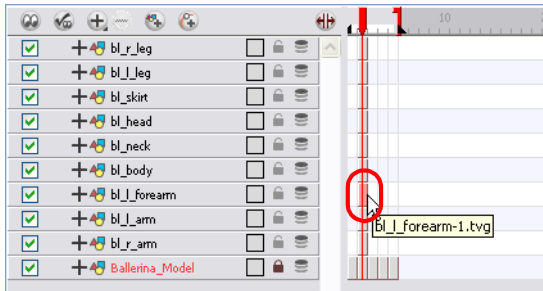


- In the top menu, select **Edit > Create Drawing From Drawing Selection**. The default keyboard shortcut is [F9]. The **Create Drawing From Drawing Selection** dialog box opens.

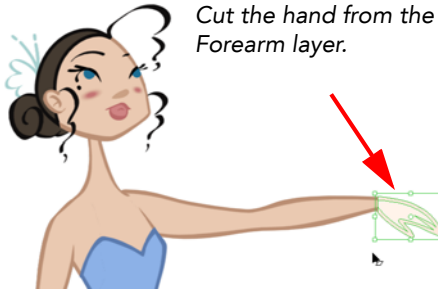


- In the Layer Name field, enter the name of the layer you want to create, following the naming convention you established previously.
- Enable the Cut Artwork From Source option in order to remove the selected artwork from your original drawing. In this case, you want to cut the artwork from your colour model.
- Click on the OK button to complete the operation.

The new layer is created and your selection is copied in it. The drawing is created in the same frame number as the cell it was taken from.

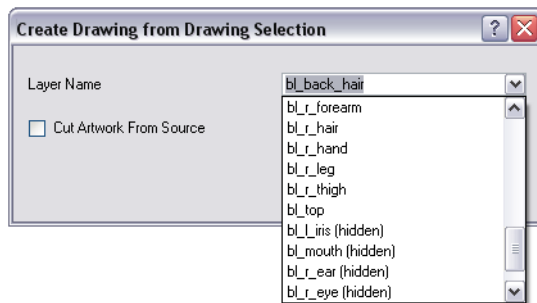


9. Repeat Step 2 to Step 8 for each body part.



If you forgot to add some artwork to a layer you previously created, you can always add it later.

In the Camera view, select the artwork to send to the existing layer and press [F9] to open the Create Drawing from Drawing Selection dialog box. In the dialog box, select an existing layer from the drop-down list instead of typing a new name. When you click on the OK button, the artwork will be added to the existing drawing in the layer you selected.



Selecting and Incorporating an Existing Layer

Your first view should now be completely broken down. If your articulations are still rough and bits and pieces are missing you will fix those in the next step.

If your character model has more than one view, now is the time to break them down. The process is very similar to breaking down the first view, except that you do not have to create layers this time.

If your layers are not in the correct order, you can reorder them later. Simply add the part that you are breaking down to the layer you previously created for the same body part.

Start by breaking down the main pieces, as you did before. The secondary parts will be broken down later on.

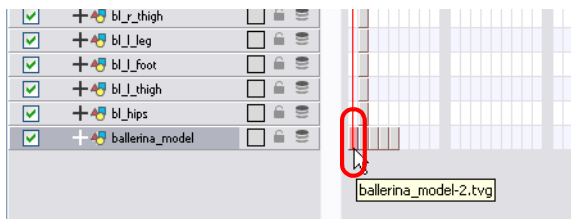
- Breaking Down the Extra View Main Parts, on page 390
- Breaking Down Secondary Parts in the Extra Views, on page 391



Breaking Down the Extra View Main Parts

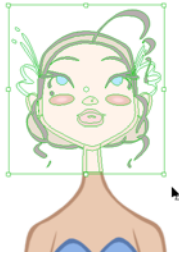
Repeat the following steps for each extra view you have to break down.

To break down the other views:

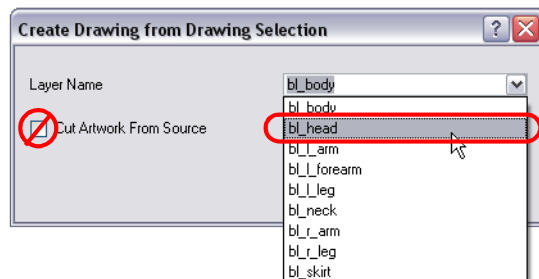
1. In the Timeline view, selected the model's cell corresponding to the view to break down.



2. In the Tools toolbar, select the Cutter  tool. The default keyboard shortcut is [Alt]+[T].
 - ▶ If you prefer to use the Select  tool, in the Tools toolbar select the Select tool. The default keyboard shortcut is [Alt]+[V].
3. In the Camera view, create a selection around the first part to break down.

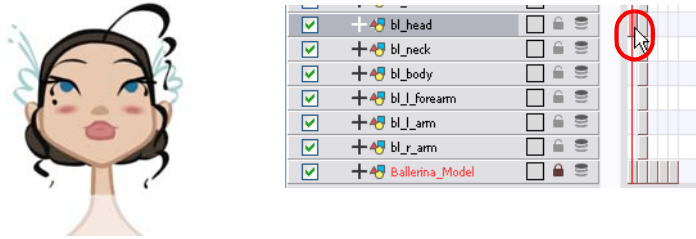


4. In the top menu, select **Edit > Create Drawing From Drawing Selection**. The default keyboard shortcut is [F9]. The **Create Drawing From Drawing Selection** dialog box opens.



5. In the Layer Name field, select the corresponding layer from the drop-down list.
6. Make sure to disable the Cut Artwork From Source option in order to keep the selected artwork on your original drawing. You do not want to cut the artwork from your colour model.
7. Click on the OK button to complete the operation.

The artwork is inserted into the existing layer. The drawing is created in the same frame number as the cell it was taken from. It is not incorporated in the other view's drawings.



8. Repeat Step 1 to Step 7 for each main body part.

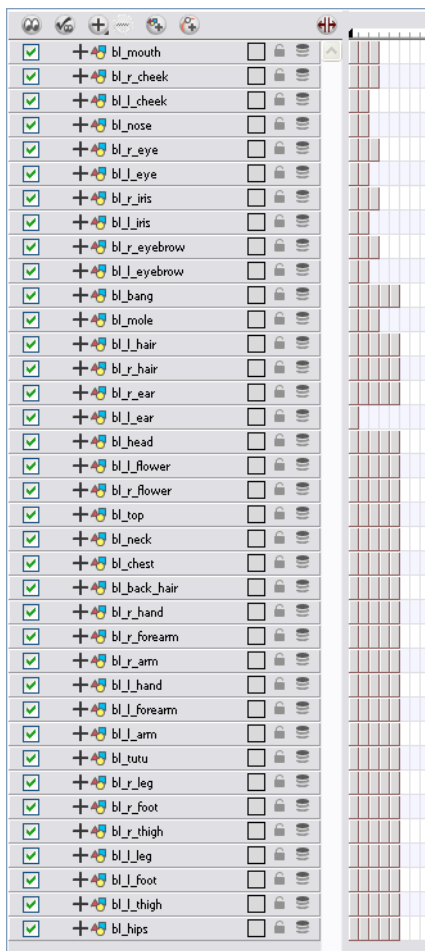
Breaking Down Secondary Parts in the Extra Views

To break down the secondary parts for your extra views you will follow the exact same process as you did for the first view you broke down, but you will incorporate the new parts in the already existing layers.



Refer to [Breaking Down the Secondary Parts](#) topic to repeat the secondary part break down process.

This is an example of how your timeline should look at this stage:



Completing the Parts and Articulation










Now that all of your layers are created and your parts are basically broken down, it is time to clean up your parts and complete the articulation.

This topic is divided as follows:

- Cleaning the Parts, on page 392
- Fixing the Articulations, on page 395

Cleaning the Parts

You will need to use a series of drawing tools to clean the parts:

-  Brush Tool
-  Eraser Tool
-  Select Tool
-  Cutter Tool
-  Contour Editor Tool
-  Paint Tool
-  Close Gap Tool



Refer to the following sections to learn how to use these drawing tools to fix your drawings:

- Drawing and Animating
 - ⇒ Drawing with the Brush Tool, on page 84
 - ⇒ Erasing Parts of a Drawing, on page 100
 - ⇒ Selecting Drawing Objects, on page 108
 - ⇒ Cutting Drawing Parts, on page 126
 - ⇒ Reshaping a Drawing Using the Contour Editor Tool, on page 103
 - ⇒ Drawing using Invisible Lines, on page 98
- Adding Colour
 - ⇒ Painting Using the Paint Tool, on page 178

To clean your drawings:

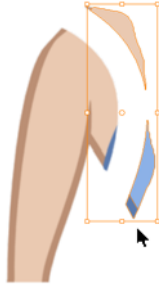
1. In the Tools toolbar, select the drawing tool you need to fix your drawings.




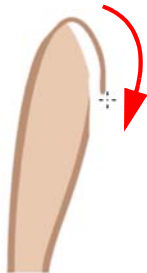
2. In the Timeline or Xsheet view, select the cell containing the drawing to fix.



3. In the Camera view, delete the extra bits using the Select or Cutter tool. You can also use the Eraser tool.



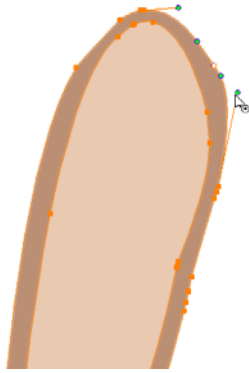
4. Draw the missing lines using the Brush tool. If you use the Brush tool, it is recommended that you enable the Auto-Flatten  option in the Tool Properties view.




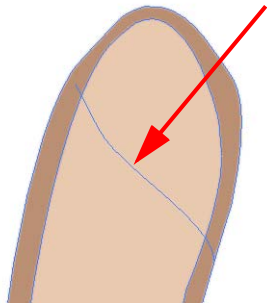
5. Using the Paint tool, paint the gaps. You can close some gaps with invisible lines using the Close Gap tool.



6. Reshape your lines using the Contour Editor tool.



7. Using the Select tool, select your entire drawing and click on the Flatten  button in the Tool Properties view to flatten your drawings.
8. In the top menu, select **View > Show > Show Strokes** to display the invisible lines that could be present in your drawing. The default keyboard shortcut is [D].



9. In the top menu, select **Drawing > Optimize > Remove Extra Strokes**. This operation will remove any unnecessary invisible lines in your drawing.
10. Repeat this entire process for each drawing to fix.

Fixing the Articulations



Once your pieces are cleaned up, you can proceed to the completion of the articulations.

Articulations are an important aspect of any cut-out break down, without them a puppet cannot move properly and will not look good.

Harmony Stage offers two different ways of completing articulations:

- Classical Articulation
- Patch Articulation

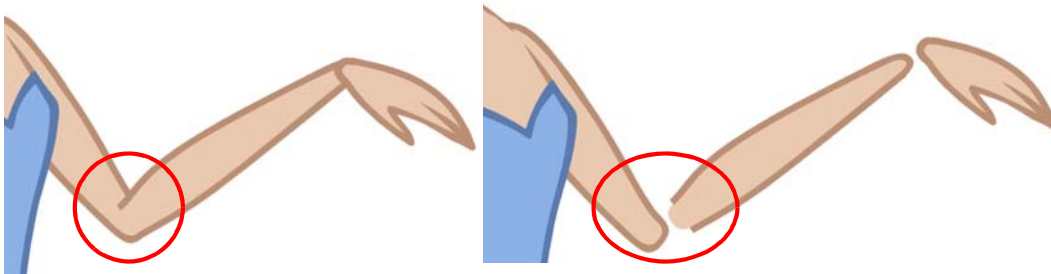


Refer to the Appendix section at the end of the chapter to learn about Patch Articulation.

Classical Articulation

In this section, you will learn about classical articulation.

The classical articulation is the most popular technique. It is quite simple and produces excellent results, but it is not the most efficient method. In many instances, it causes limitations and extra drawing corrections. For example, there may be a gap in the articulation if the part is bent too far. Joint design is usually designed as a circle; the overlapping part cannot be sent behind without showing the joint.



The classical articulation is done by erasing a part of the line from the overlay layer, leaving the colour overlapping the bottom one.

Repeat the following instructions for all the articulations on your puppet.

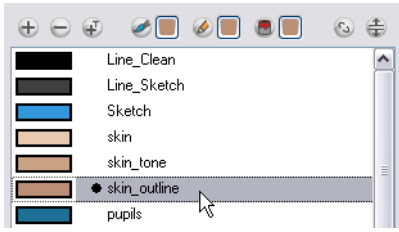
To create a classical articulation:

1. In the Xsheet or Timeline view, select the cell containing the first part to modify, such as the arm.

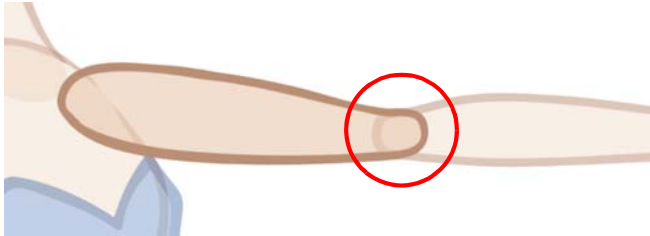




2. In the Tools toolbar, select the Polyline, Brush, Pencil, Ellipse, or Contour Editor tool.

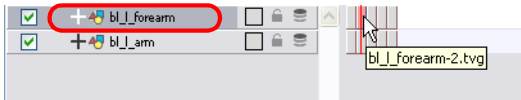
3. In the Colour view, select the outline colour.



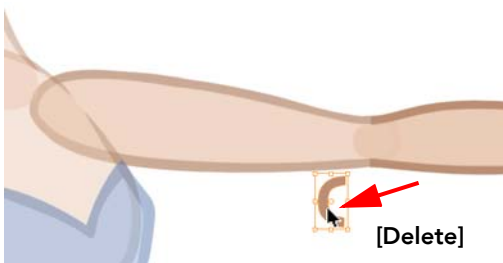
4. In the Drawing or Camera view, use your drawing tool to make sure that the joint is overlapping the other part in a half-circle shape.



- ▶ If you are working in the Drawing view, click on the Light Table  button located in the Drawing View toolbar. The default keyboard shortcut is [Shift]+[L].
5. Using the Select tool, select your entire drawing and click on the Flatten  button in the Tool Properties view to flatten your drawings.
 6. In the top menu, select **View > Show > Show Strokes** to display the invisible lines that could be present in your drawing. The default keyboard shortcut is [D].
 7. In the top menu, select **Drawing > Optimize > Remove Extra Strokes**. This operation will remove any unnecessary invisible lines in your drawing.
 8. Repeat Step 1 to Step 7 for the other part of the joint.
 9. In the Timeline or Xsheet view, select the cell of the part that will be on top of the joint.



10. In the Tools toolbar, choose the Select, Cutter or Eraser tool.
11. In the Drawing or Camera view, remove a part of the overlapping outline in order to have only the filling colour overlapping the joint.



NOTE: When placing rotation pivots later on, make sure they are positioned at the centre of the articulation.

Creating Ghost Drawings (Optional)

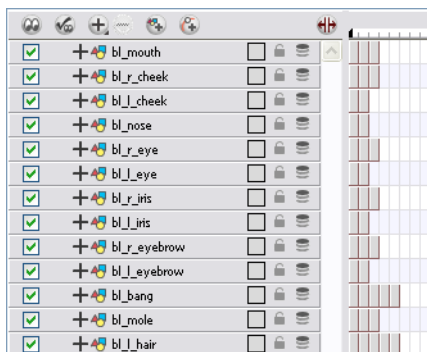


At this point your basic break down should be almost complete. There is one optional step you can do before moving on, adding extra drawings and expressions to your character:

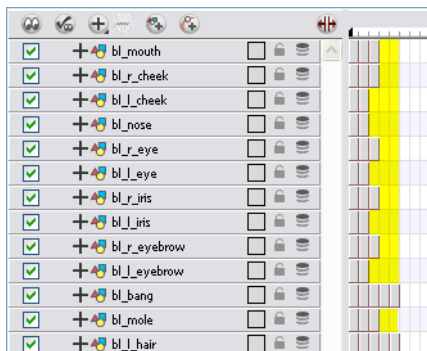
- Adding Ghost Drawings

Adding Ghost Drawing

Right now, your timeline looks like this:



Some parts have no drawings in certain views. For example, the left eye has no drawing available for the Side view. To make your puppet more efficient when you will animate, a good trick is too add invisible drawings that you can select even when no image is necessary.

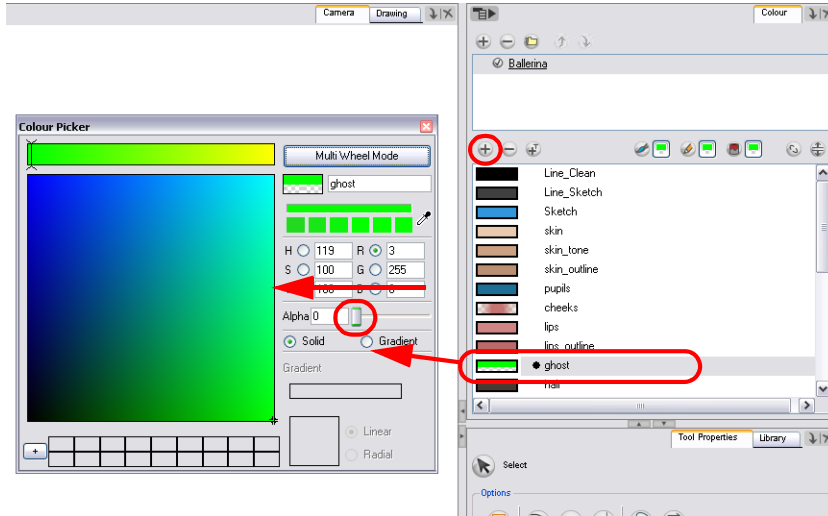


If you need to select a part of your character to use the Drawing Substitution feature or Inverse Kinematics tool, or to avoid having the system automatically fill in the exposure gaps when swapping images, then creating ghost or invisible drawings can be very useful.

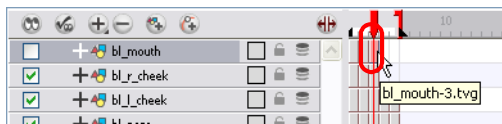
To create ghost drawings, copy one of the existing drawings, paste it in the empty cell and repaint it with a fully transparent colour.

To create ghost drawings:

1. In the Colour view, add a fully transparent colour to your character's palette.



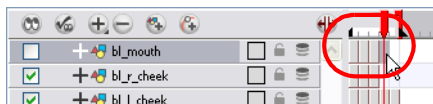
2. In the Timeline or Xsheet view, select the cell containing the drawing you want to copy to create your invisible drawing.



3. In the Tools toolbar, select the Select tool. The default keyboard shortcut is [Alt]+[V].
4. In the Camera or Drawing view, select the drawing to copy.

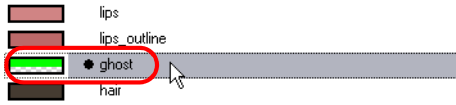


5. In the top menu, select **Edit > Copy**. The default keyboard shortcut is [Ctrl]+[C] (Windows/Linux) or [⌘]+[C] (Mac OS X).
6. In the Timeline or Xsheet view, select the empty cell where you want to create your ghost.



7. Click on the Camera or Drawing view and in the top menu select **Edit > Paste**. The default keyboard shortcut is [Ctrl]+[V] (Windows/Linux) or [⌘]+[V] (Mac OS X).

8. In the Colour view, select the transparent colour.



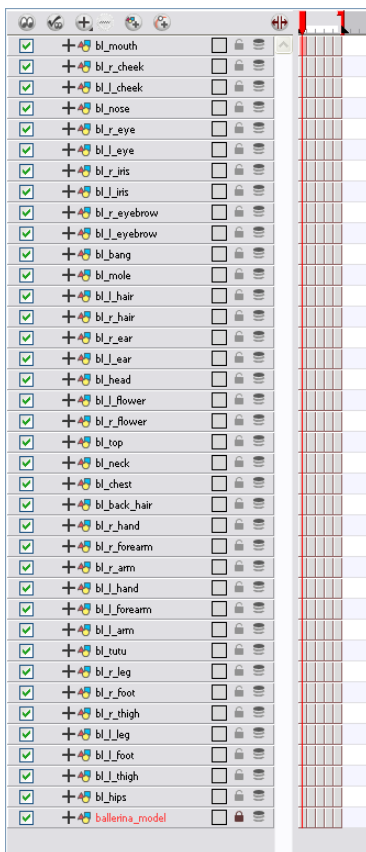
9. In the Tools toolbar, select the Select  tool and offset the drawing outside the body's area.

10. In the Tools toolbar, select the Paint  tool. The default keyboard shortcut is [Alt]+[K].

11. In the Camera or Drawing view, repaint the drawing to make it invisible.

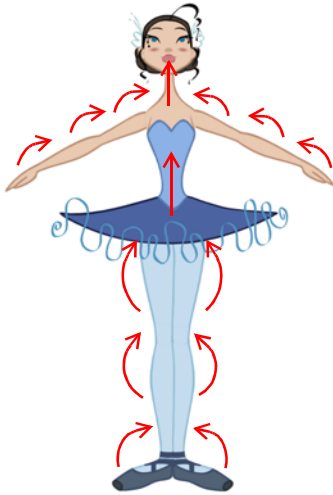


At this point, your timeline should look like this:



At this point, you could decide to convert your layers to symbols. Refer to the Appendix section to learn about this alternate technique.

Rigging



The rigging process is where building a puppet can take several different directions.

In this section, you will learn how to create a simple rig. Afterward, you will learn how to add pegs and create a hierarchy. You can also see more advanced tricks in the Appendix section of this chapter.

This section is divided as follows:

- Rigging Basics, on page 400
- Rigging the Head, on page 403
- Rigging the Body, on page 405
- Creating Hierarchy, on page 407
- Ordering the Layers, on page 408
- Adding the Master Peg, on page 411
- Creating the Keyframes, on page 412

Rigging Basics

The Rigging Basics topic is divided as follows:

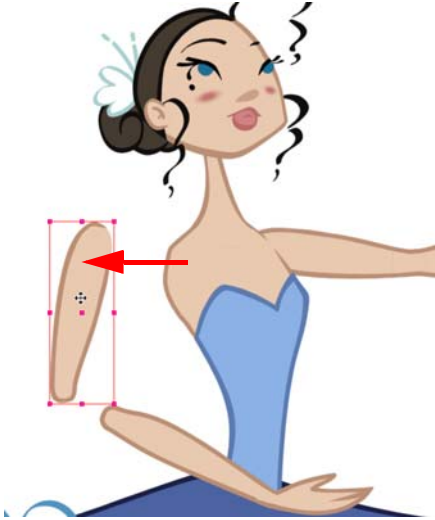
- Simple Rigging, on page 400
- Parenting Layers, on page 401
- Rigging using Pegs, on page 403
- Rigging the Head, on page 403

Simple Rigging

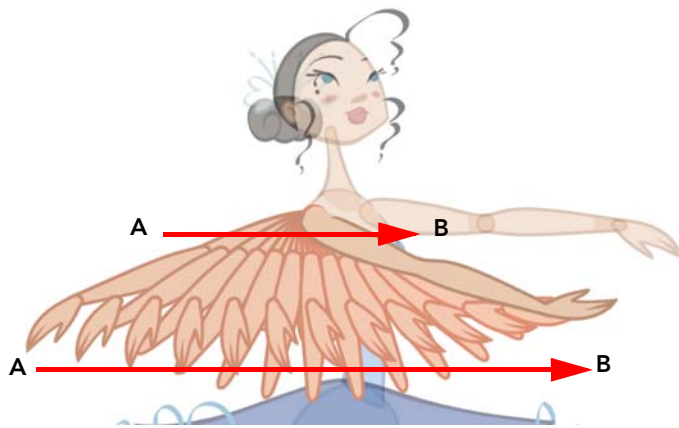
Simple rigging is very fast and easy to do. It is built as follows:

- All the body parts are independent
- All the timeline's layers are attached to a master peg layer (trajectory layer)

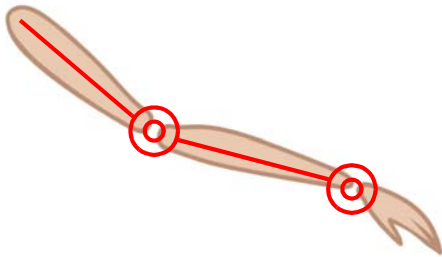
The advantage of using this technique is that you are free to move any part around without being influenced by any parent layer.



However, since the parts are not parented to each other, the parts will move from point A to point B along a straight trajectory. The hand will not follow the arm's rotation. You will have to set more keyframes for the hand to move along a curved path.

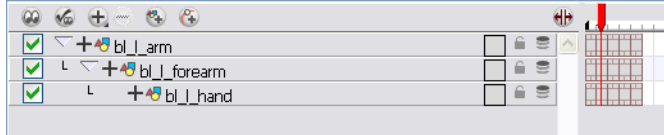


Parenting Layers

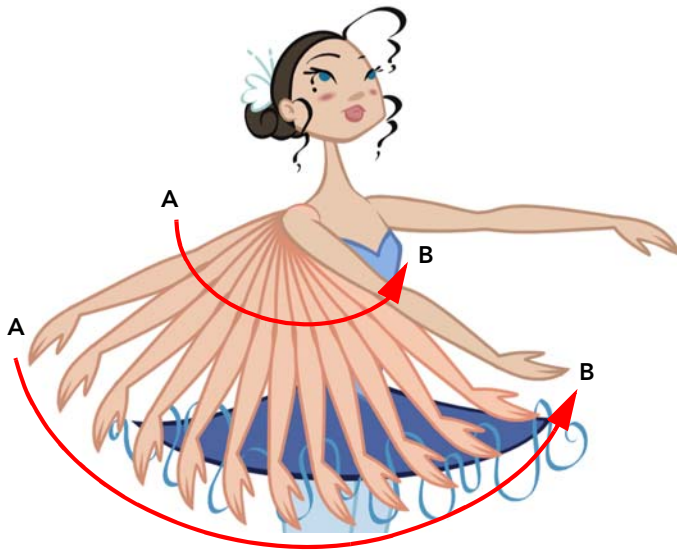


When you want a part to follow another one, such as the forearm following the arm, you can attach the layers one to the other. For example, you can attach the forearm layer to the arm layer without having to encapsulate the forearm

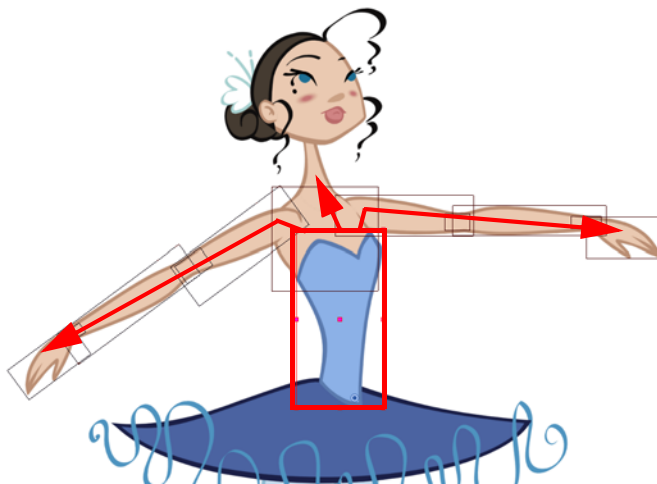
into the arm layer. They will still be parented, but you will be able to access the forearm directly without having to enter the arm layer.



The advantage of parenting layers is that the child layers will follow the parent smoothly without having to select them or create a series of keyframes.



The disadvantage of parenting layers is that you are not able to move the parent independently of its children, since the child layers receive all the transformation information from their parent.

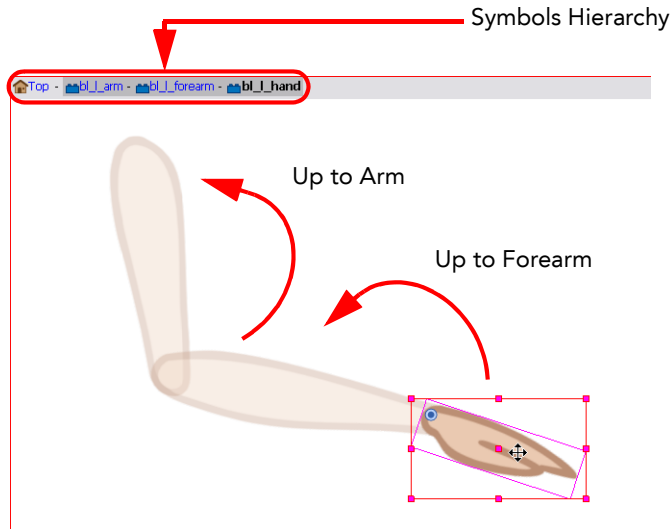


Parenting layers such as the arms and legs and letting the torso and hips independent from those is often a good solution.

To attach one layer to another, you have to drag the desired layer onto the other one in the Timeline view.

Harmony Stage offers powerful techniques to create hierarchies between your layers without having to encapsulate Symbols into each other. These techniques are a great improvement over the less efficient and time consuming

method of creating parenting between your layers by inserting Symbols into other Symbols. Therefore, rigging with Symbols inside Symbols is NOT recommended.



This method is not recommended. For efficiency in your production, do not encapsulate symbols inside symbols.

Rigging using Pegs

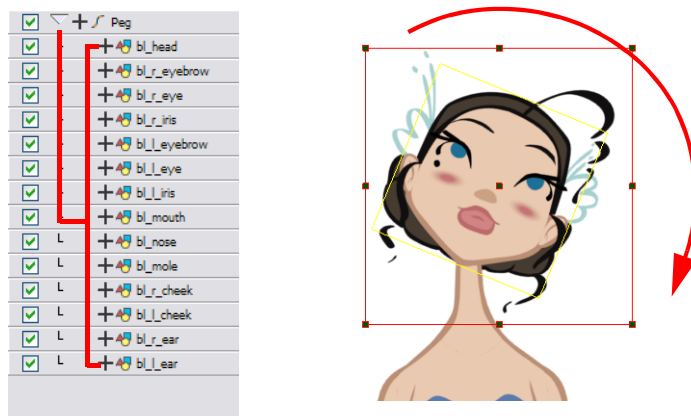
When you are doing more advanced puppet rigging, you can use peg layers. Peg layers are trajectory layers that do not contain drawings. They are motion paths that you can use to control your entire puppet or advanced hierarchies.

Parenting a drawing layer to a peg layer allows you to divide your motions on two separated levels. You can scale your body part directly on the drawing layer. This way, you do not affect any child layers that could be attached to that part. Then, you can perform your translation and rotation on the peg layer so that all the parts attached to that peg layer will follow the same trajectory.

Rigging the Head

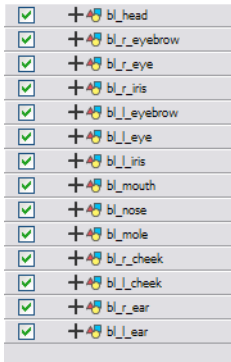
You will start by attaching the facial features to the head.


The advantage of parenting the features to the head layer is that you can easily animate each facial feature, and they will all follow the head motion.

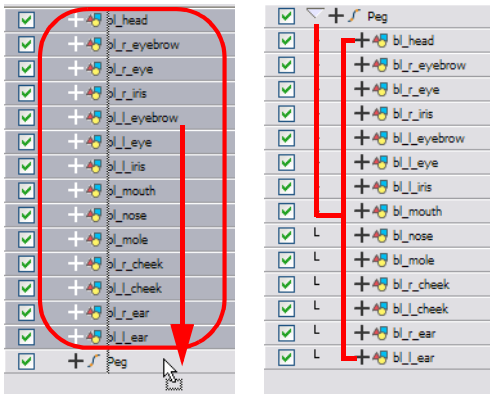


To parent the facial features to the head:

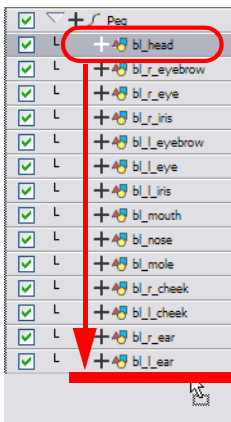
1. In the Timeline view, undo the parenting to the Head layer to have all of your head layers at the same parenting level.



2. In the Timeline view, unselect any layer that could be selected.
3. In the Timeline View Layer toolbar, click on the Add Peg  button to add a new peg layer to your timeline. You can rename the Peg to keep your work organized.
4. Select all the head and facial features layer and drag them ONTO the peg layer to parent them.



5. Select the Head layer and drag it below all the facial feature layers. Make sure it stays connected to the peg.



Changing the Layer Order in the Network View

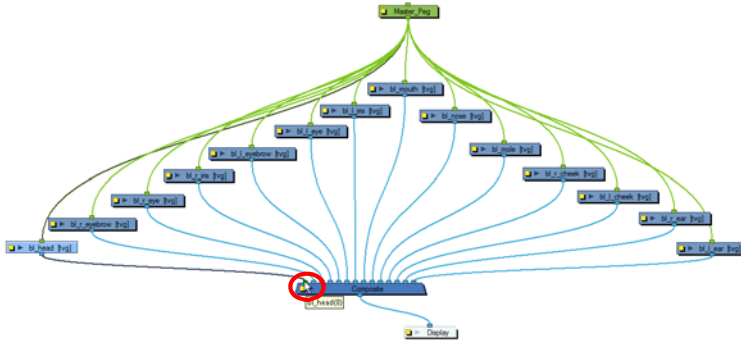
You can help yourself with the Network view which is useful when it is time to do advanced ordering and hierarchy.



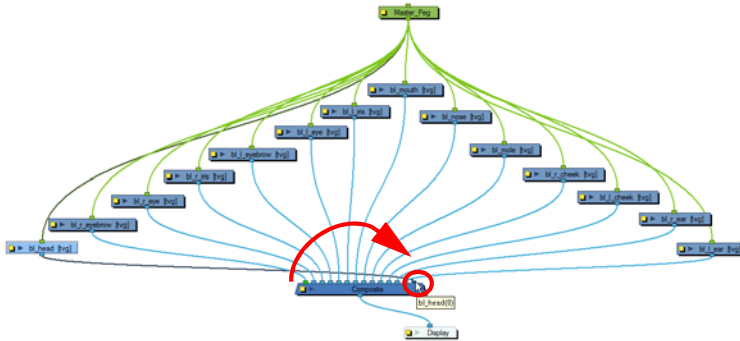
If your modules are not connected to a Composite module, refer to the section Connecting Modules to a Composite Module to learn how to automatically do it.

To order your head layers in the Network view:

1. In the Network view, select the Head module's connection connected to the Composite module located at the left of all your facial feature modules.



2. Drag the connection to the right of all your facial feature modules' connections.



Rigging the Body

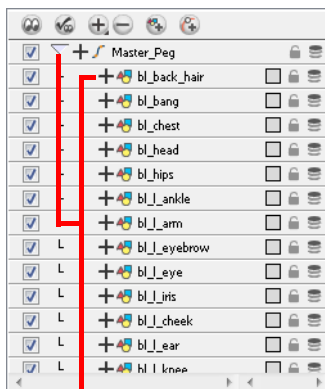
Now that the character's head is ready, you can move on to the body. You can do a simple rigging where all of the body parts are independent one from the other, or create some parenting between some of the layers.

Simple Body Rigging

Simple rigging consists of leaving the layers in the Timeline view without doing any kind of parenting. Later on, you will attach those layers to a master peg and organize them in the correct order.

Your drawings must be connected to a Composite module. A Composite module takes all the drawing layers connected in it and flattens them into a single image which allows you to organize your network and manipulate your puppet easily. It also allows you to apply effects on your complete character. The Composite module is useful when you have to deal with a lot of modules in the Network view.

If you import your layers into the Timeline view, they will automatically be connected to the Composite module available in the Network view.

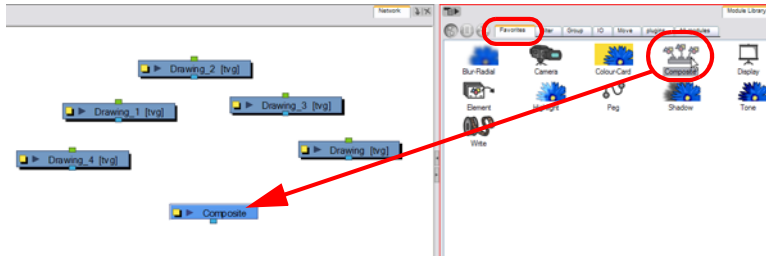


Connecting Modules to a Composite Module

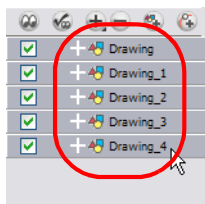
In Harmony Stage, if your modules are not connected to your Composite module in the Network view, you can connect them all at once following the Timeline order.

To connect your modules to a Composite module:

1. If you do not have a Composite module, open a Module Library view. In the top menu, select **Window > Module Library**.
2. In the Module Library view, go to the Favorites tab and select a Composite module.
3. Drag the Composite module to the Network view. You can also use the keyboard shortcut [Ctrl]+[H].

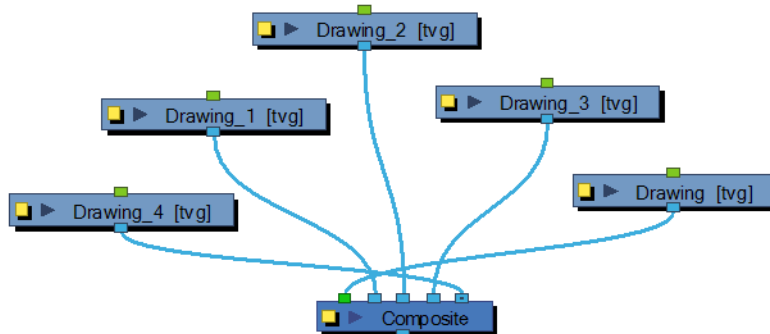


4. In the Timeline view, select all the modules you can connect to your Composite module.



5. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on your selection and select **Connect To Composite > select the desired Composite module**.

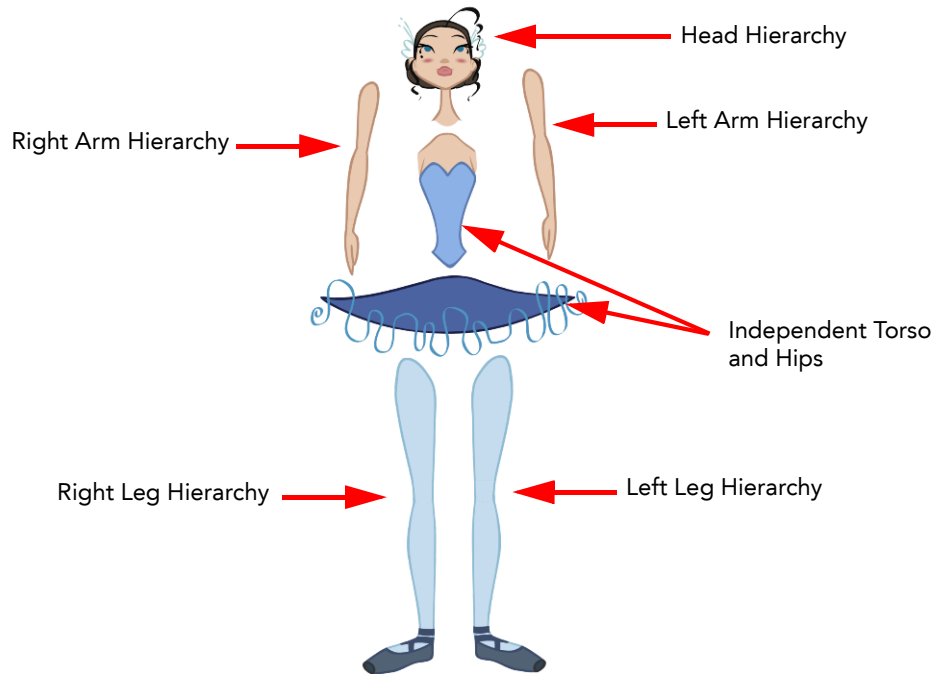
You modules are now connected to your Composite module in the same order as the Timeline.



Creating Hierarchy

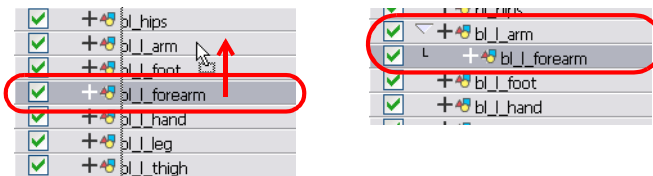
Harmony Stage lets you extend your rigging techniques beyond normal boundaries and sets new standards. You can create hierarchies without encapsulating your Symbols inside each other by creating a linked structure between your layers.

You should create a hierarchy on your arms and legs and keep the arms and legs separated from the body. This gives you more animation freedom. This way, when you need to scale or skew the torso, it will not affect the entire body.



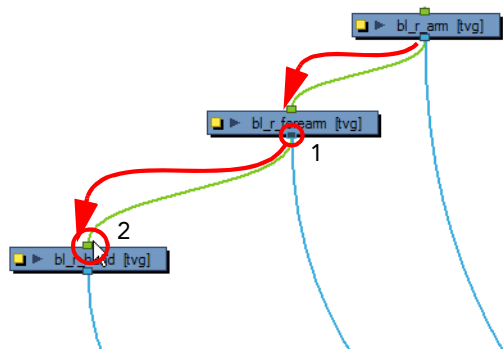
To create a hierarchy in the Timeline view:

- ▶ Drag the child piece (hand) and drop it ON the parent piece (forearm). Then, you can drag the parent (forearm) piece onto another parent piece (arm).

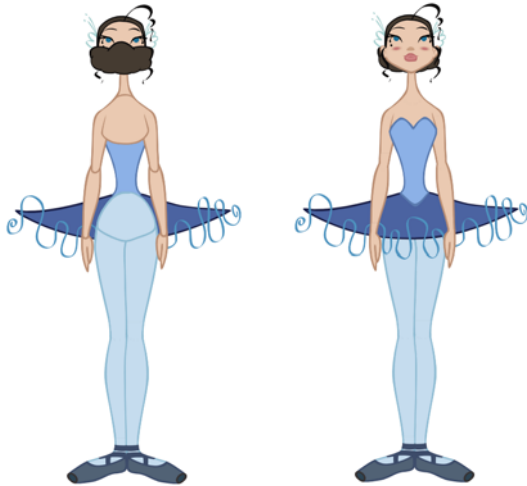


To create a hierarchy in the Network view:

- ▶ From the Parent part, drag a new cable connection out of the module's Output port (bottom) and connect it to the child part module's Input port (top).



Ordering the Layers



At this point, it is possible that your character's pieces may show up in the wrong order.

There are two ways to fix this. First, you can reorder your layers by dragging them to a higher or lower level in the Timeline view. The top layer is displayed in front of the others and the bottom one is displayed behind. Second, you can use the Z-axis nudging (forward and backward) for the extra views.

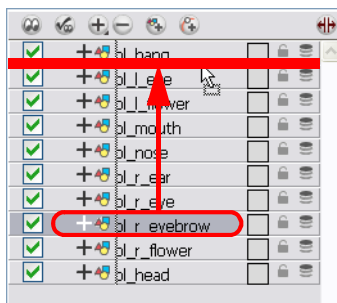
- Ordering the Timeline Layers, on page 408
- Ordering the Layers, on page 408
- Nudging Parts Backwards and Forwards, on page 410

Ordering the Timeline Layers

The layers should be ordered to match the view you will use the most often, generally the three-quarter front. Do not worry if the other views are still in the wrong order, you will order them in the next step. Do not move the drawings to other layers.

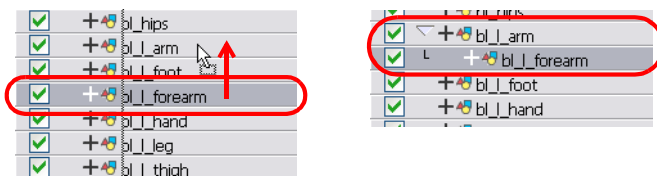
To order the layers:

- ▶ In the Timeline view, drag a layer to reorder it and drop it between the other layers.

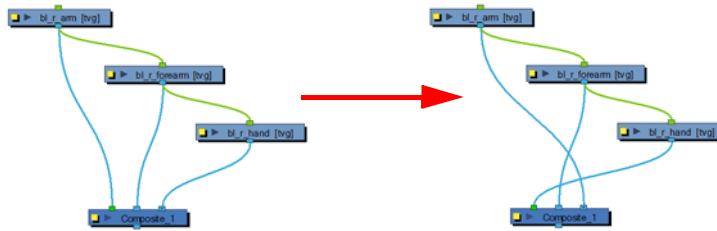


NOTE:

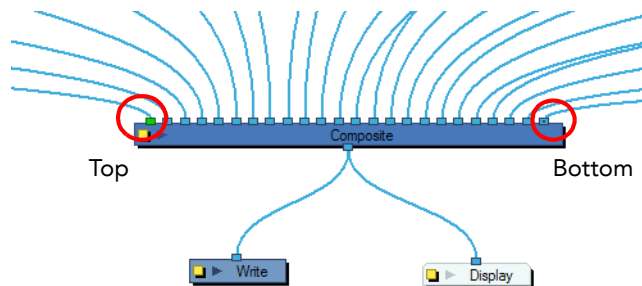
If you drop it on a layer, it will create a parent hierarchy, so make sure to drop it between layers.



Ordering Layers in the Network View



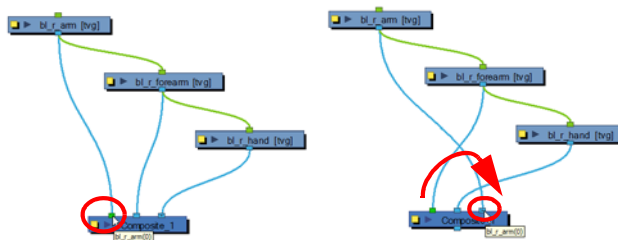
The Network view allows you to reorder your layers without breaking any hierarchy. For example, if you want the Head layer to appear behind all of the facial features, in the Timeline view, you cannot simply move the layer down because you will break the parenting between the head layers. In the Network view, since you have a set of flexible connections, you can change the Composite module ordering without breaking the parenting between the modules.



The Composite module ordering corresponds to your Timeline ordering unless the Network view's organization is too complex to be displayed in a simple layout such as the Timeline's one. The element connect in the left-most port in the Composite module is displayed in front in the Camera view as the one connected in the right-most port is displayed behind.

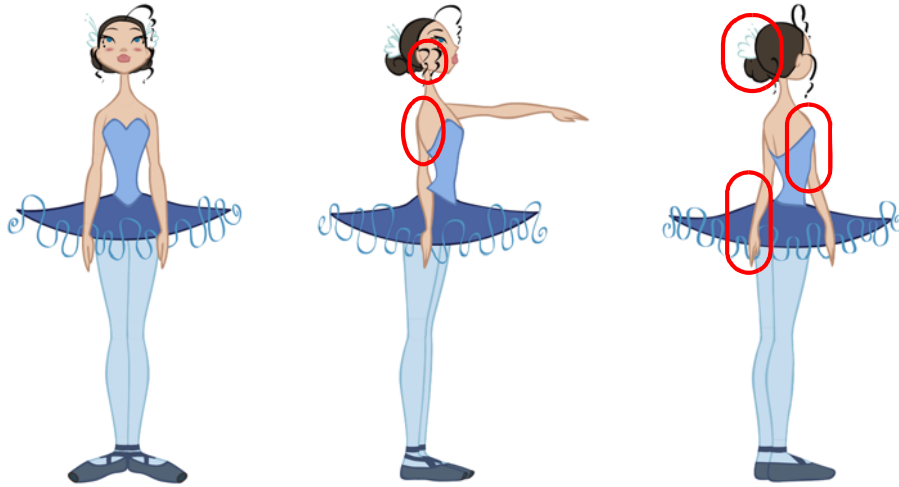
To order your layers in the Network view:

1. In the Network view, select the module's output cable connected to the Composite module and drag it to its new position.



Nudging Parts Backwards and Forwards

If you created a hierarchy on your arms, legs or other body parts, it is possible that you will want a part, such as the hand, to appear in front of its parent. Yet, if you move the hand layer above the arm layer, you will break the hierarchy. To reorder a layer rigged in a hierarchy, nudge it backwards or forwards.



You will do the same for the layers that are not in the right order on the extra views. Do not place the drawing on another layer. You want to keep all your drawings of the body parts in the same layers like a box containing all of the hands or all of the shoes.



Stage allows you to move your elements in three dimensions:

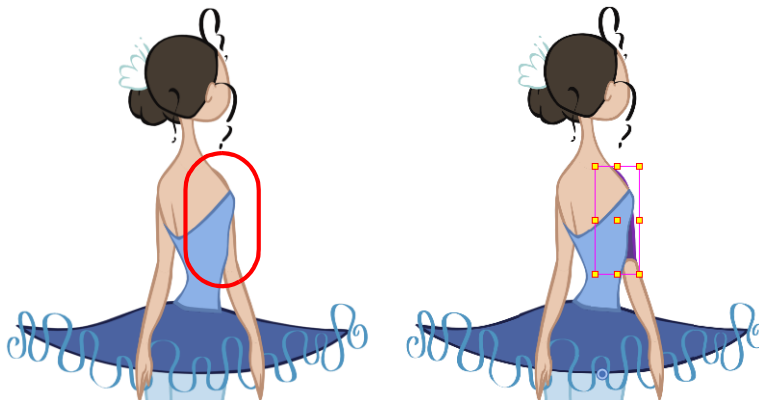
- Up and Down (Y-axis)
- Left and Right (X-axis)
- Backwards and Forwards (Z-axis)

In the same way you create multiplane backgrounds (depth), you can do a micro nudge of the part to be reordered and see it in front of the other elements, even if its layer is actually behind the other ones in the Timeline view. The Forward-Backward position can also be animated over time.

Repeat the following instructions for all the views.

To nudge your parts backward and forward:

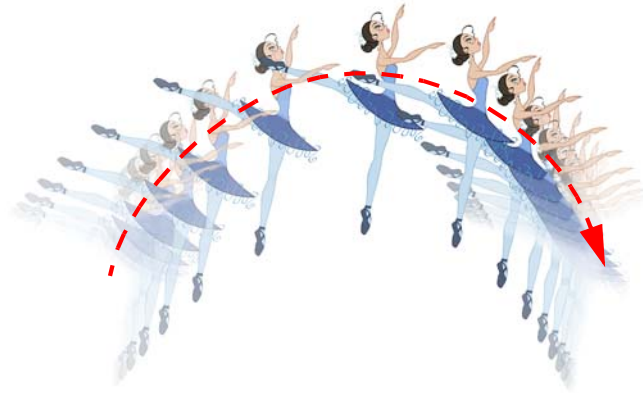
1. In the Tools toolbar, select the Transform  tool. Make sure to enable the Animate  mode.
2. In the Camera view, select the element that you want to reorder.



- To move the element forward, use the default keyboard shortcut [Alt]+[Down Arrow] and to move the element backward, use the default keyboard shortcut [Alt]+[Up Arrow].




Adding the Master Peg

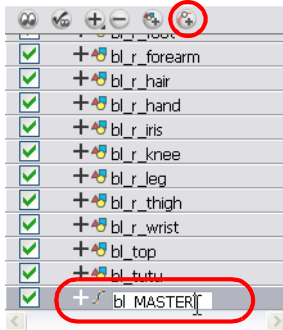


When you animate your character, you will probably need to resize and reposition it to fit your scene. When you need to scale down or move your character, it is a good idea to hook (attach) the whole puppet to a trajectory.

Attaching your puppet to a peg will allow you to scale it and reposition it without having to do this to your different parts and pieces. Only one layer will contain the position information, this makes your animation easier to modify and control.

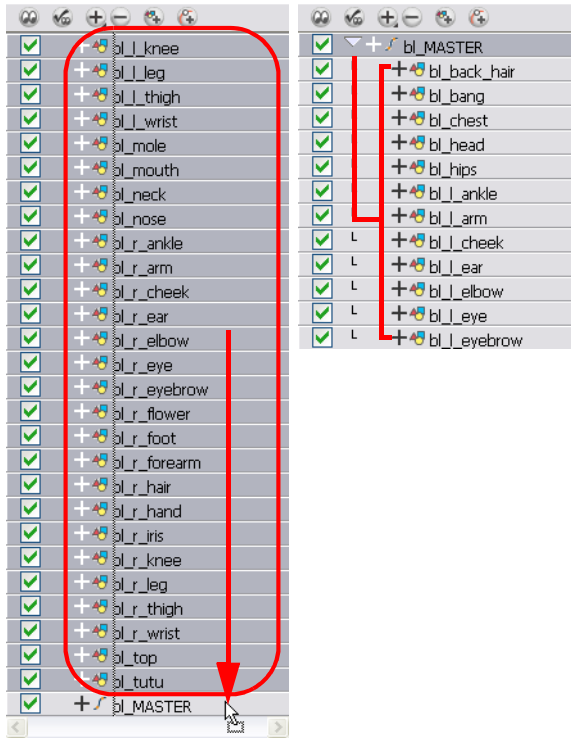
To add a Master peg:

- In the Timeline view, click on the Add Peg  button. Name the new peg **Master** plus the character's name.



- In the Timeline view, select all of the layers you want to attach to your new peg.

3. Drag your selection ON the peg layer to parent all your character's pieces to the peg.

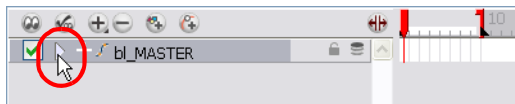


Creating the Keyframes

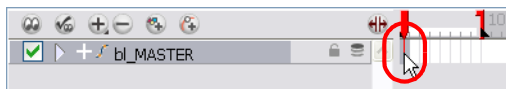
Once all of your drawings are ordered and your master peg is added, you need to insert keyframes on each cell to create all of the function curves and block your pose in place.

To create the keyframes:

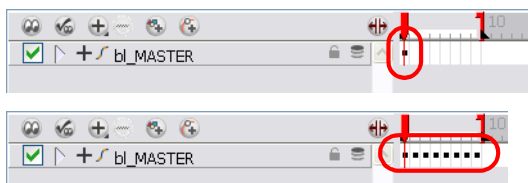
1. In the Timeline view, collapse the master peg by clicking on the Expand  arrow.



2. In the Timeline view, select the first cell.



3. In the top menu, select **Insert > Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac). You can also click on the Add Keyframe  button located in the Timeline view toolbar. Note: If you use the [F6] shortcut when working the Flash keyboard shortcuts, this not only creates a keyframe but also duplicates a drawing.



Adding the Main Extra Drawings



Your break down is now complete. You can move on to adding the main extra drawings your character needs, such as principal hand positions and mouth shapes.

If ever you forget to add extra drawings in your main character's template, you will easily be able to add them later.



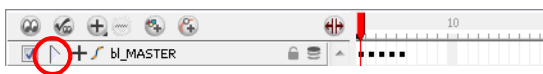
Add your extra drawings in the layer corresponding to the part which you are drawing. You should see the layers as containers for the different pieces. Each part of the body has its own container where you can add more drawings of the same part.



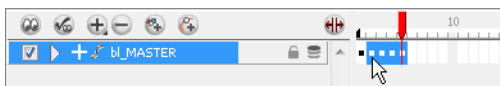
Refer to the Working With Sound chapter to learn how to create mouth shapes for your character and use the Auto Lip-Sync Detection feature.

To add the main extra drawings:

1. In the Timeline view, collapse the master peg by clicking on the Expand  arrow.



2. In the Timeline view, select all the keyposes following the one you need to extend.



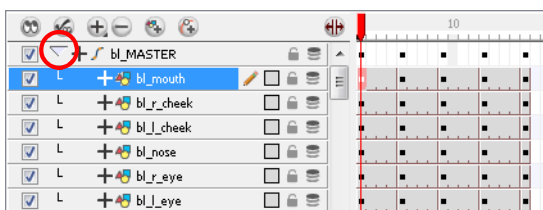
3. Click and drag your selection to extend the keypose.



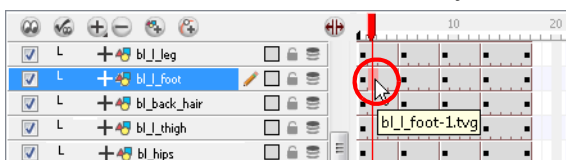
4. Repeat the last operation for each keypose.



5. Click on the Expand  arrow to expand the master peg.



6. In the Timeline view, select the cell where you want to add your new drawing



7. Select **Drawing > Duplicate Drawings**, you can also use the keyboard shortcut [Alt]+[Shift]+[D].

This creates a new drawing in the selected cell, automatically extended to the next one. This new drawing is a duplicate of the one that was selected so it contains a duplicate of the art. You can modify it to create your new drawing or delete its contents in the Camera or Drawing view and start from scratch.





8. In the Tools toolbar, select the drawing tool you need to draw your extra part.

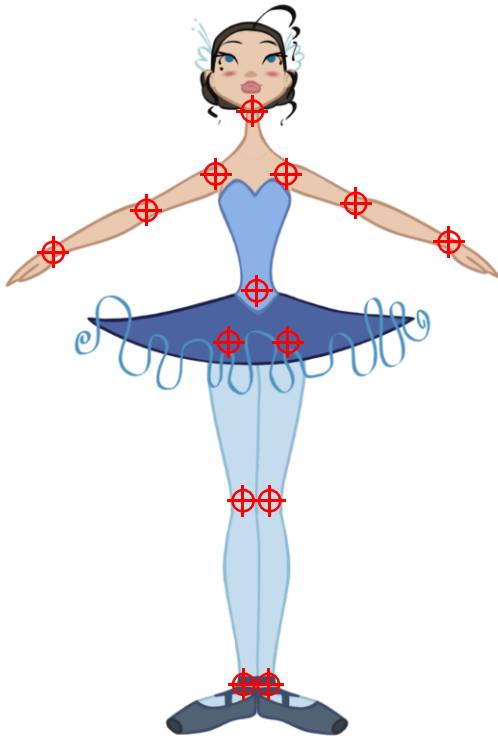


9. In the Camera or Drawing view, draw your new drawing.



10. Using the Select  tool, select your drawing and flatten your lines by clicking on the Flatten  button located in the Tool Properties view.

Setting the Pivots

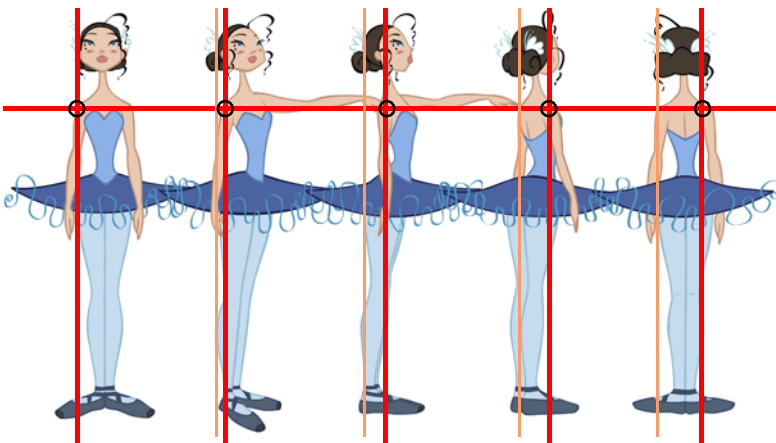


The last step before storing the character in the library is to set the pivots for the different parts.

Stage has two types of pivots:

- Drawing Pivot
- Symbol Pivot


You can set a different pivot for each one of your drawings. For example, if you have a series of drawings from different views, they are not likely to rotate from the same location. In that case, you can set a different pivot for these drawings.



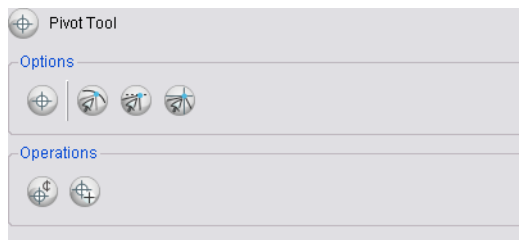
This topic is divided as follows:

- Pivot Tool, on page 416
- Setting the Pivots, on page 417
- Setting Pivots on a Frame Range, on page 417
- Setting the Master Peg's Pivot, on page 419

Pivot Tool

Use the Pivot  tool to set the pivots on your character. This can be used to set the pivots on the drawings and Symbols.

In the Pivot's Tool Properties view, you will find a series of options.



Set the Pivot for Symbol on All Frames

This option is enabled by default. When you set a pivot on a Symbol, all of its cells will use the same pivot. This means you do not have to set a pivot on all frames. You set it once, and it is done.

If you prefer to set a different pivot for a series of cells, you can disable the option and set your pivots on each cell or cell range.



If you have already set several different pivots on your Symbol's cells and enabled the Set the Pivot for Symbol on All Frames option, once you set a new pivot on the same Symbol, all of its pivots will be reset and will use your new pivot.

Snapping



When you drag the pivot around, you can enable a snap option when the pivot is released it either snaps to the reference grid, drawing's contour or aligns with an existing drawing stroke.



Refer to Drawing and Animating > Snap Options, on page 105 to learn more about the snapping options.

Reset Pivot

When you click on the Reset Pivot option, the pivot of the selected drawing or Symbol is reset to the centre of the Camera view (stage).

Copying Pivot on Parent Symbol

When you import new extra drawings such as hands and mouths, use the pivot that was set on your drawings and report them to the Symbol's cells. Use the Copy Pivot to Parent Symbol command for this.

NOTE:

When you copy your pivots to the parent Symbol, there is no link between the drawings' pivots and the Symbol's pivots. If you modify the drawing pivot later, it will not link to the Symbol. You would need to do the operation again. If you need to modify the Symbol's pivots, do it directly on the Symbol's cells.




Refer to the Animating Your Puppets chapter to learn more about this tool.

Setting the Pivots

If you want your puppet's pieces to rotate correctly, you need to set the pivot points right in the middle of an articulation such as an elbow or a knee.

Do the following steps for each layer in the Timeline view.

To set the pivots:

1. In the Tools toolbar, select the Pivot  tool.
2. In the Camera or Timeline view, select the drawing you want to set the pivot for.



3. In the Camera view, click where you want the pivot to be. You can also drag the pivot marker to the desired location.



4. If you want to set a different pivot for another drawing, select the drawing or cell and in the Camera view, set the new pivot.



Refer to the *Setting Pivots on a Frame Range* topic to learn how to set a pivot for a frame range selection all at once.

Setting Pivots on a Frame Range

If some elements need the same drawing pivot, such as all of the three-quarter hands, you can select all of these hands cells and set the pivot all at once. If your pivot is already correctly set on your first drawing, copy and paste that pivot onto the other drawings in the Timeline or Xsheet view.



You must have the same drawing pivots on the extra parts from the same angle. If you substitute a drawing while the part is rotating, the animation risks popping out of place if the pivot is uneven.

To set the pivot on a frame range:

1. In the Timeline view, select the cell where you want to set the same pivot. The cells have to be part of the same layer.

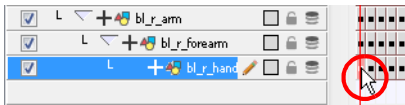


2. In the Camera view, click where you want the pivot to be. You can also drag the pivot marker to the desired location.



To copy and paste drawing pivots:

1. In the Drawing or Camera view, set the first drawing pivot of the series. For example, set it on hand-1.
2. In the Timeline view, select the cell that contains the correct pivot.

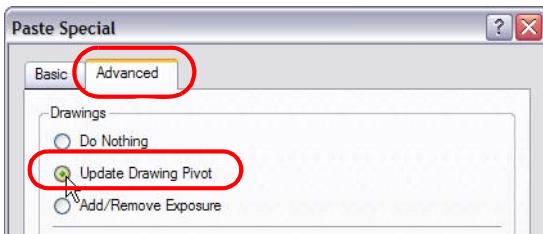


3. In the top menu, select **Edit > Copy**.
4. In the Timeline view, select the cell range that requires the same pivot.



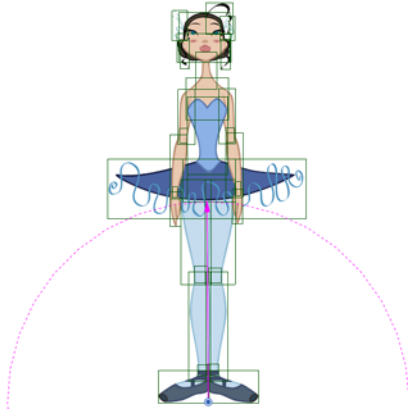
5. In the top menu, select **Edit > Paste Special**. The default keyboard shortcut is [Ctrl]+[Shift]+[B] (Windows/Linux) or [⌘]+[Shift]+[B] (Mac OS X).

The **Paste Special** dialog box opens.



6. In the Paste Special dialog box, go to the Advanced tab.
7. In the Drawings section, enable the Update Drawing Pivot option.
8. Click on the OK button.

Setting the Master Peg's Pivot





By default, your Master peg pivot is placed at the centre of the Camera view, which generally equates to your character's hips. A good way to set your peg's pivot is to move it between your character's feet.

To permanently move a peg pivot, use the Rotation or Scale tool. While animating, the animator is easily able to temporarily move this pivot to another location with the Transform tool.

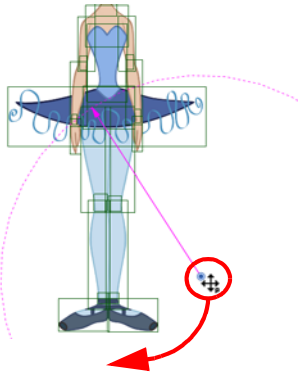
The Transform tool is designed to move the pivot temporarily during the animation process. It also permits you to select multiple pegs and apply a common temporary pivot.

To set the peg pivot:

1. In the Advanced Animation toolbar, select the Rotate  or Scale  tool. The default keyboard shortcuts are [Alt]+[3] and [Alt]+[4].
2. In the Timeline view, select the Master peg layer.



3. In the Camera view, click on the peg pivot and move it to its new location.



If you added other pegs to your rig, you must set their pivot following the same method.

Skeleton Optimization

In the Network view, you can add extra modules, such as a Display, and group all of your modules to keep your work organized.

There are four steps to make sure your puppet can be reused efficiently:

- Deleting the Write Module, on page 420
- Renaming the Display Module, on page 420
- Changing the Composite Type, on page 421
- Grouping your Modules, on page 422

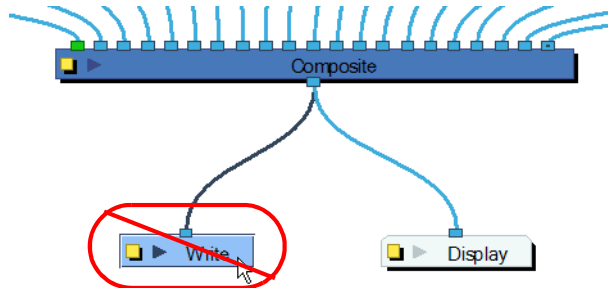
Deleting the Write Module

The first step in optimizing your network is to delete the Write module. The Write module is used to render certain portions of your Network view.

If you have three or four characters in your scene and they each have a Write module in their skeleton, when you will render out your scene, it will create a render for each one of them and they will all overwrite each other.

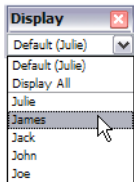
To delete your Write module:

1. In the Network view, select your Write module.



2. In the top menu, select **Edit > Delete**. The default keyboard shortcut is [Delete].

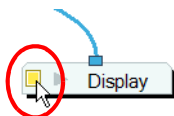
Renaming the Display Module



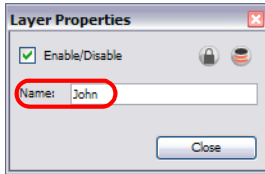
A Display module allows you to see a section of your Network in your Camera view. By renaming your Display module with your character's name, you will be able to quickly identify its Display in the Global Display toolbar and isolate your character to see it better while working on it.

To rename your Display module:

1. In the Network view, click on the Display module's Properties button to open the editor.



- In the Layer Properties window, rename the Display module with your character's name.

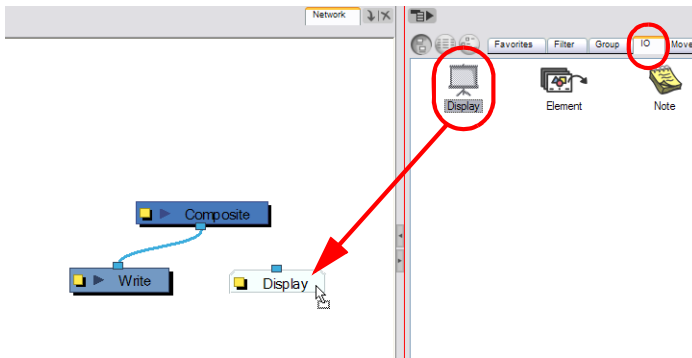


- Click on the Close button.

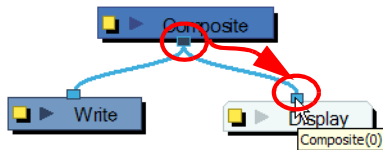
If you do not have a Display module in your network, you can add one by selecting one from the Module Library view and dragging it into your Network view.

To add a Display module:

- If you do not have a Module Library view opened, in the top menu, select **Window > Module Library**.
- In the Module Library, go to the IO tab and select the Display module.
- Drag the module to your Network view.



- Connect the Composite module's Output port into the Display module's Input port.



Changing the Composite Type

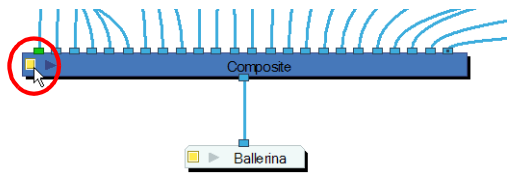
When you create a character with Harmony Stage, you have to connect all your modules in the Composite module. The Composite module takes all the different images coming out of your drawing modules and flattens them into one single image.

This comes quite handy when it is time to apply an effect to your entire character or group your layers for a more organized network.

The regular Composite module will flatten all the pieces into one image preventing interaction with props or characters connected to a different Composite module. That is why you have to change the Composite module's type to a special one that will still output one single image but will not flatten the drawings together. This will allow you to nudge your drawings on the Z-axis so that parts of you characters can pass in front and behind other characters and objects. This Composite type is called Pass Through.

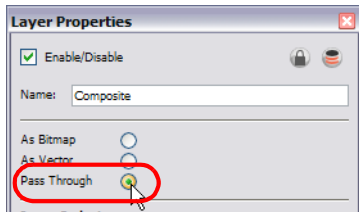
To change your Composite module to a Pass Through type:

1. In the Network view, click on your Composite module's properties button.

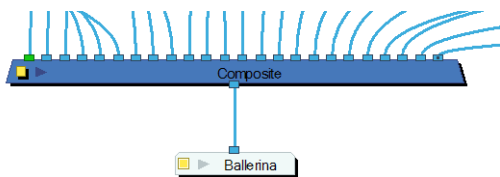


The **Composite Layer Properties** dialog box opens.

2. Select the Pass Through type.

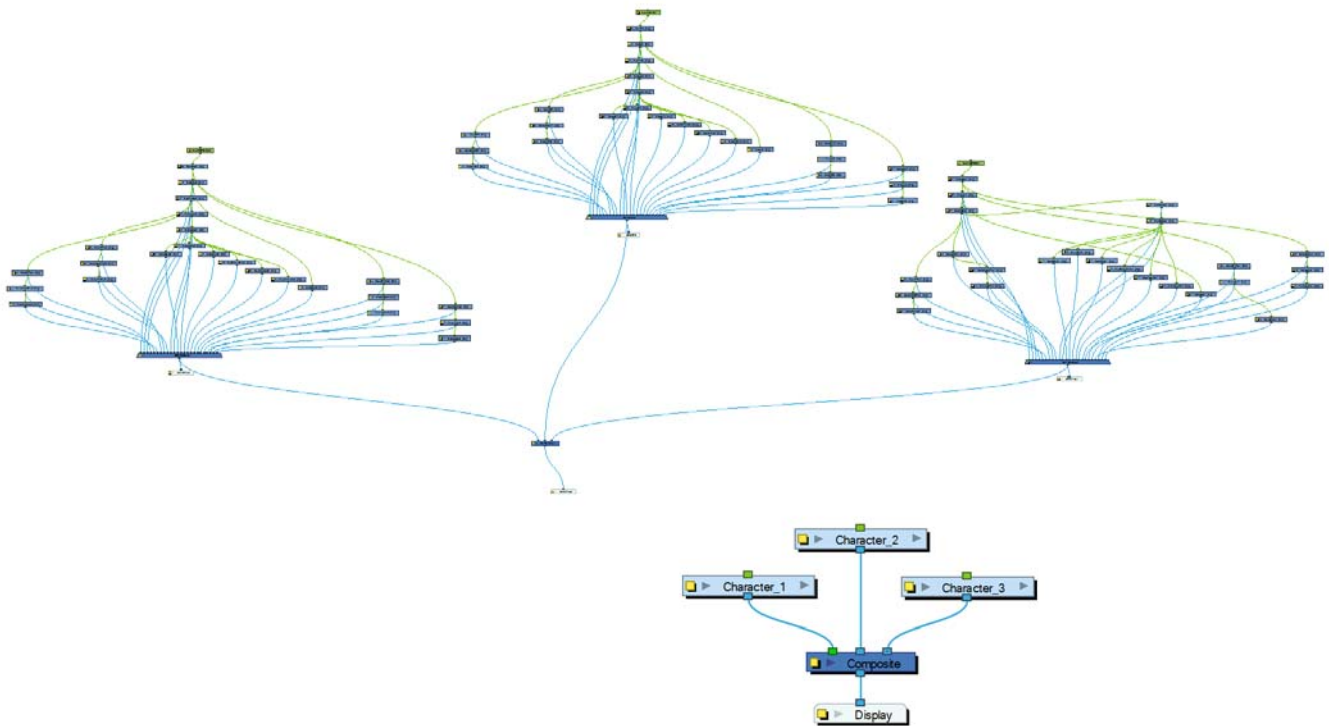


3. Click on the Close button.



Grouping your Modules

Once your rigging is completed, you must group the puppet's skeleton. This helps you to organize large and complex networks. This way, once the animator has imported two or three puppets into the scene, three Group modules will be displayed instead of all of the rigging connections of three puppets.

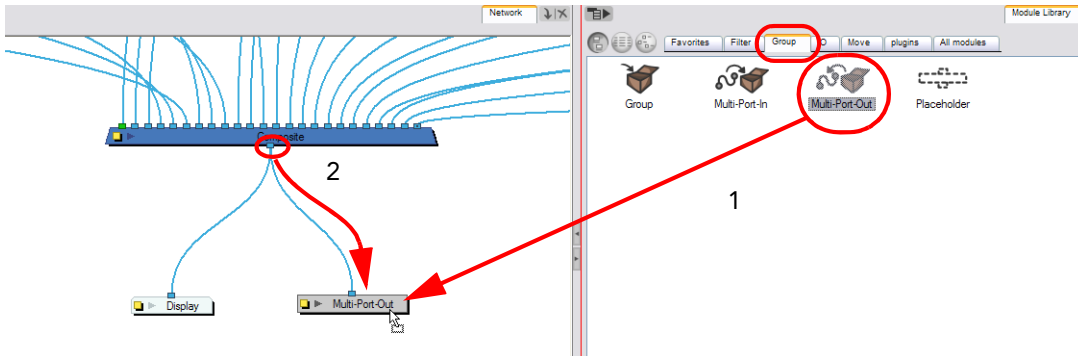


To group your modules:

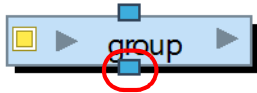
1. In the Network view, select all your modules.
2. In the top menu, select **Edit > Group > Group**. The default keyboard shortcut is [Ctrl]+[G] (Windows/Linux) or [⌘]+[G] (Mac OS X).
Your modules are now grouped.
3. Click on the Group module's right arrow to enter the group.



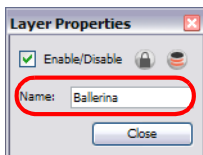
4. In the Module Library, go to the Group tab and select a Multi-Port Out module.



5. Drag the Multi-Port to the Network view.
6. Connect the Composite module's Output port into the Multi-Port Out module. This creates an output port on your Group module.
7. In the bottom left corner of the Network view, click on the Top word to go back to your network's root. You should now see an output port on your Group module.



8. Click on the Group's properties button to open the Editor.



9. In the Layer Properties window, rename your Group module with your character's name.
10. Click on the Close button.



Storing the Character in the Library

To be able to reuse your character in different scenes, you have to store a template in the Library. You can create different kinds of templates. You can create templates with all the views included, a template for each view or even some containing only the head.

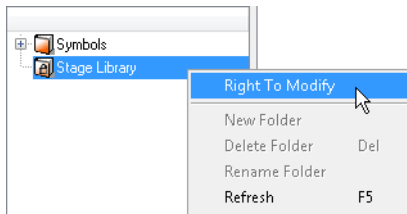
Stage has a Timeline and a Network view. The Timeline view represents the layers in a linear and simple way. The Network view allows you to create all sorts of complex connections that the Timeline view cannot display.

The result of this is that:

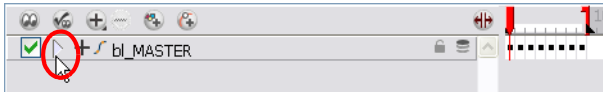
- Any template created from the Timeline view has to be imported in the Timeline view
- Any template created from the Network view has to be imported in the Network view.
- A cut-out puppet's main template always has to be created from the Network view since it contains advanced connections, Display modules and Composite modules.

To create a template containing all the character's views:

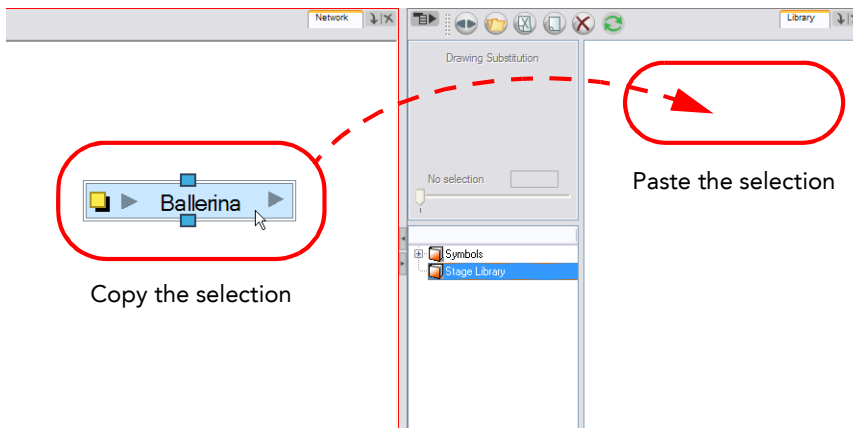
1. In the Library view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the desired library folder and select **Right To Modify**.



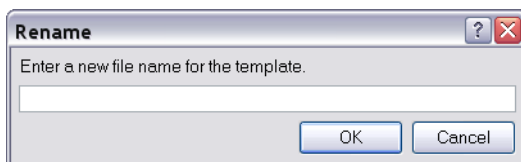
2. In the Timeline view, collapse the Master peg layer.



3. If your scene has a series of blank cells, they will also be included in the template if you drag the layer to the library. Reduce the scene length to have no empty cells before creating your template.
4. In the Network view, select your character's group and in the top menu, select **Edit > Copy**. In the Library view, select the folder where you want to store the template and in the top menu, select **Edit > Paste**.



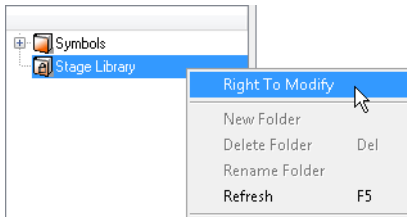
The **Rename** dialog box opens.



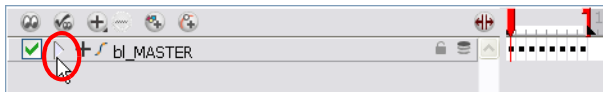
5. In the Name field, name the new template.
6. Click on the OK button.

To create a template containing a single character's views:

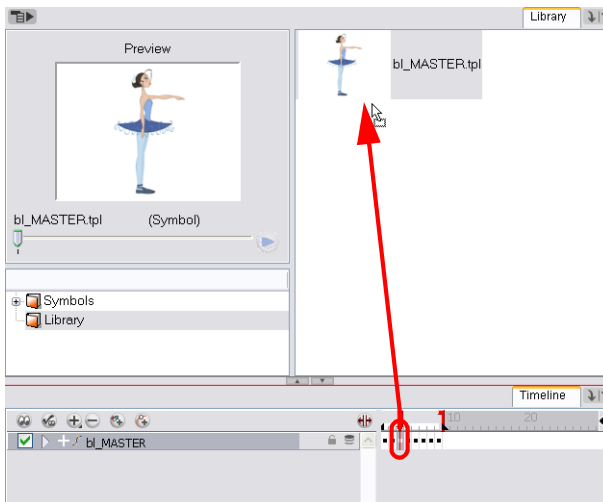
1. In the Library view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the desired library folder and select **Right To Modify**.



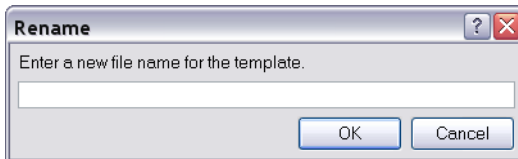
2. In the Timeline view, collapse the Master peg layer.



3. Select the cell containing the desired view and drag it into the desired library folder.



The **Rename** dialog box opens.



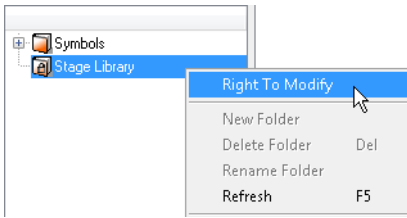
4. In the Name field, name the new template.
5. Click on the OK button.



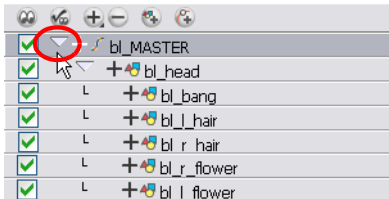
*When you create a template from the Timeline view, for everything to work properly when you reimport it into a scene, you must first import your template created from the Network view. Once the Network template is imported, you can import the Timeline template's content into the right hand side of the Timeline view. Refer to the *Animating Your Puppets* chapter to learn more on this subject.*

To create a template containing only the character's head:

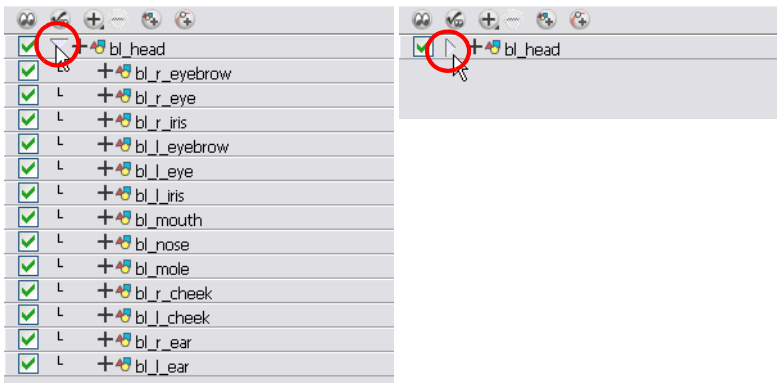
1. In the Library view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the desired library folder and select **Right To Modify**.



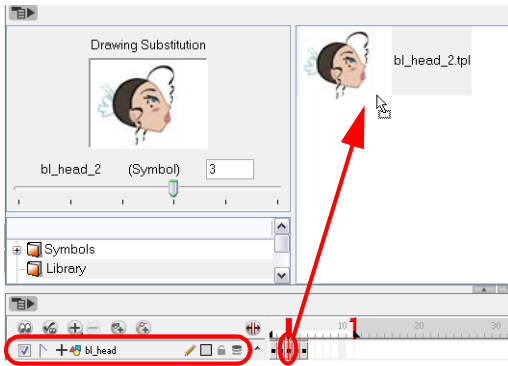
2. In the Timeline view, expand the Master peg layer.



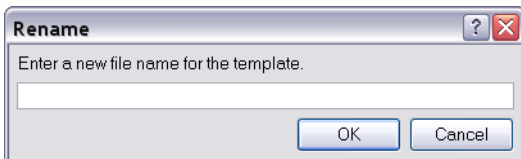
3. In the Timeline view, collapse the head layer if it has any child layers.



4. Select the head cell containing the desired view and drag it into the desired library folder.



The **Rename** dialog box opens.



5. In the Name field, name the new template.
6. Click on the OK button.



Refer to the Libraries, Symbols and Templates chapter to learn more about libraries and templates.

Appendix

There are many options and animation techniques available when building a puppet, it is impossible to determine only one method to break down a character. Here are some advanced tips on breaking down puppets. As you become more familiar with the software, you will find more ways to improve your puppet builds.

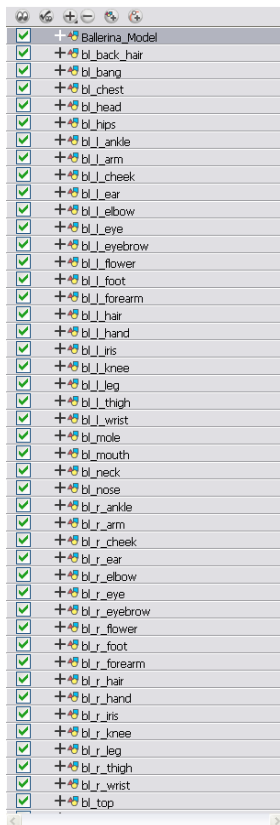
This section is divided as follows:

- Break Down: Tracing the Model, on page 427
- Break Down: Distribute to Layer, on page 428
- Converting the Layers into Symbols (Optional), on page 429
- Patch Articulation, on page 431
- Prefix and Suffix Script, on page 436
- Setting the Symbols Pivot, on page 436
- Inserting Facial Features Inside the Head Symbol, on page 437
- Creating Facial Expressions and Extra Drawings, on page 439

Break Down: Tracing the Model

The main break down technique shown here is to cut away your model, complete the missing parts and fill the gaps. If your character model is a bitmap image or if it is faster to trace over your character, you can use the Tracing Over the Model technique instead of the main method

To trace over your model:



1. In the Xsheet or Timeline view, add a new drawing layer for each body part to separate. The default keyboard shortcut is [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).


2. In the Xsheet or Timeline view, select the layer's cell in which you want to draw the part.

3. In the Tools toolbar, select the drawing tool needed.


4. In the Colour view, select the desired colour swatch.

5. In the Camera or Drawing view, draw the new part.



► If you are working in the Drawing view, click on the Light Table  button located in the Drawing view toolbar to display the other layers as washed out colours. The default keyboard shortcut is [Shift]+[L].

6. Using the Select tool, select your drawing and flatten your lines by clicking on the

Flatten  button located in the Tool Properties view.

7. Repeat the entire process until the breakdown is completed.

Break Down: Distribute to Layer

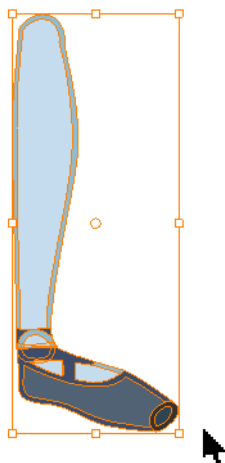
When breaking down your character, you can use the Distribute to Layer option to distribute the selected art strokes to a new layer each.




*This feature will automatically take each strokes from the drawing selection made in the Camera view and separate them into a different layer each. If one of your part is composed of several strokes, you must group them using **Edit > Group > Group** before using the Distribute to Layer option. This option cannot be done from the Drawing view.*

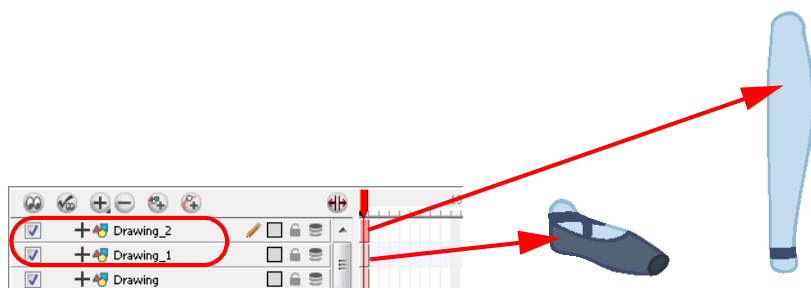
To distribute to layer:

1. In the Tools toolbar, click on the Select  tool.
1. In the Camera view, select the art strokes you want to distribute to different layers.



2. Select **Drawing > Distribute to Layer**. You can also click on the Distribute to Layer  button in the Select tool Tool Properties view.

The number of drawing layers corresponding to different strokes or groups of strokes are created in the Timeline view.



- ▶ The selected strokes in the original drawing layer will be removed.
- ▶ Each stroke or group of strokes will be distributed into each new Drawing layer.

Converting the Layers into Symbols (Optional)

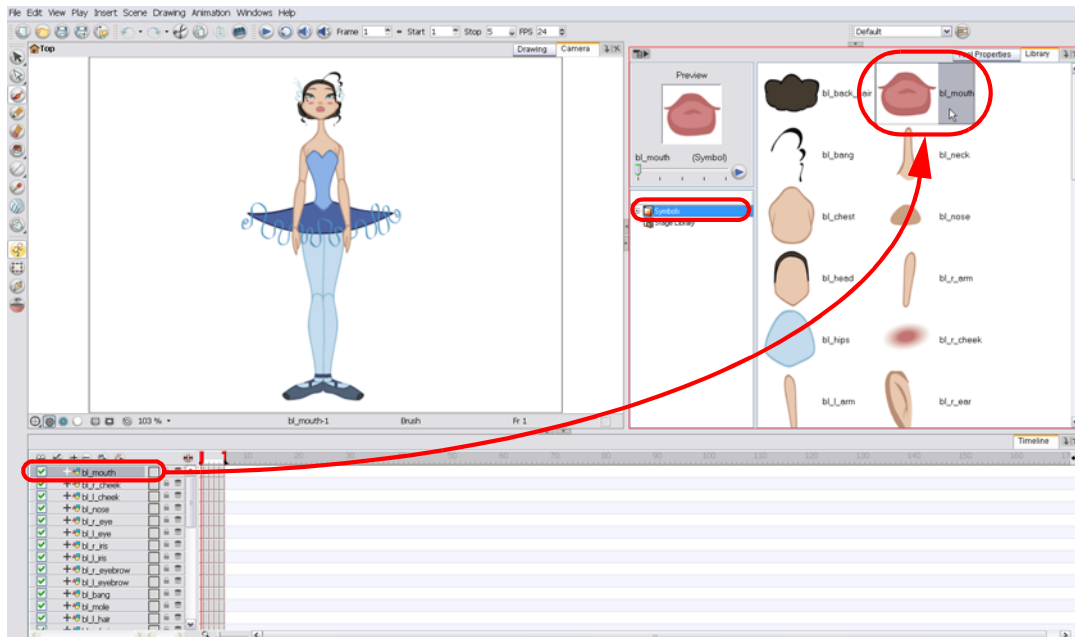


Converting your layers into Symbols is optional. When animating, you will need to enter the symbol to create a new drawing. If you want to use morphing when animating, it is recommended that you keep your layers as drawings and do NOT use symbols.


Once the breakdown is completed, you can create Symbols out of each drawing. The Symbol will encapsulate each drawing of the layer. Later on, even if you only expose the first frame, such as the front head, you will still have access to all of the head drawings you placed in the Symbol. This will also allow you to add more drawings, as your characters' master templates will evolve throughout the production of your movie or series.

To create a Symbol:

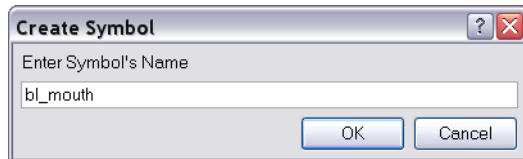
- To create a Symbol:
 - From the Timeline view, drag the layer to the Symbol library.



OR

- In the Timeline view, select the layer to convert to Symbol and in the top menu select **Edit > Create Symbol**. The default keyboard shortcut is [F8]. You can also click on the Create Symbol  button available in the Edit toolbar.

The **Create Symbol** dialog box opens.



2. In the Enter Symbol's Name field, type the new Symbol's name. It is recommended that you keep your original layer's name.
3. Click on the OK button.
4. Repeat this process for each layer in your Timeline view.



NOTE: Make sure that all of your layers are stored in the Symbol library.

Clearing the Main Timeline

At this point, all your layers should be stored in the library as Symbols. Before building your puppet, you will need to remove all of the current layers in your scene. All of your work is saved in the library.

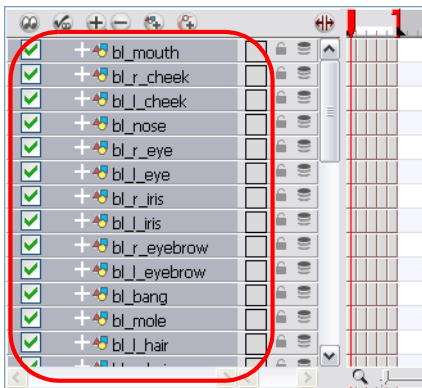
If you are not sure that you put everything in your library, you can always perform a Save As on your scene and work on a new version.


To save your scene as a new version:

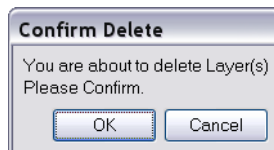
- ▶ In the top menu, select **File > Save As**. You can also click on the Save As  button available in the File toolbar.

To clean your Timeline:

1. In the Timeline view, select all of your layers.



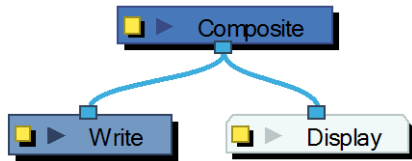
2. In the Timeline's Layer toolbar, click on the Delete Layers  button.
3. In the Confirm Delete dialog box, click on the OK button to complete the operation.



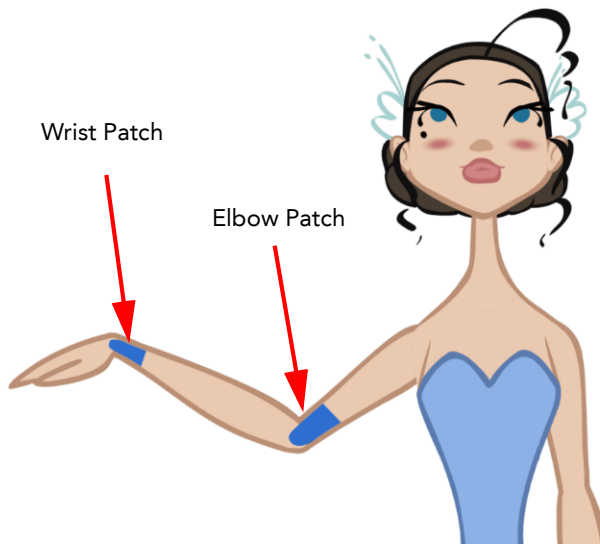
Your timeline is now ready to receive the body part Symbols for the rigging process.



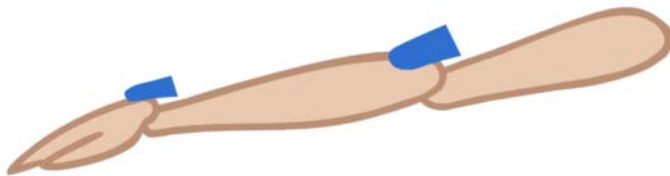
Your Network view should look like this:



Patch Articulation



Harmony Stage's advanced rigging can employ an articulation fixing technique called Patch Articulation. Patch articulation is a colour fill patch that is drawn onto a third layer and is used to cover the joint lines. It is a simple and powerful technique.

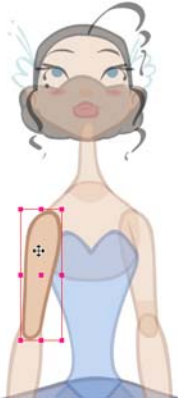



With this technique, you avoid having to create a correction layer at the end of the animation to fill the gaps in the joints. You do not need to worry about the articulations at all. Once a patch is set, the articulation is fixed for the entire length of the animation.

The main technique to create patches is done using Symbols but you can also use the advanced connections in the Network view.

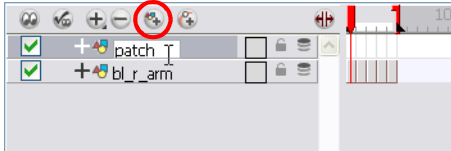
To create a patch articulation with Symbols:

1. In the Camera view, double-click on the part you want to create a patch for. For example, if you are fixing the elbow articulation, double-click on the arm or forearm Symbol to edit it. You have to edit the Symbol of the part that will be behind. For example, if the forearm is placed under the arm layer, edit the forearm Symbol.

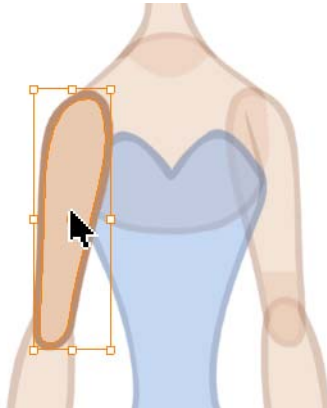


2. In the Timeline view, add a new drawing layer by clicking on the Add Drawing Layer  button. The default keyboard shortcut is [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).

3. Rename the new layer **patch**.

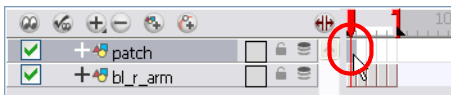


4. In the Camera view, select the fill zone of the part's drawing.




5. In the Camera view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Copy**.

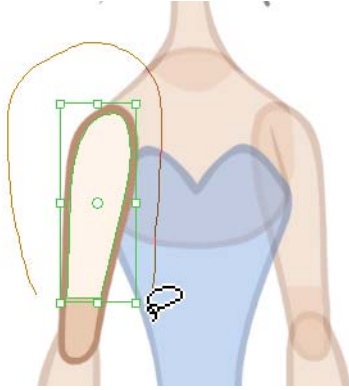
6. In the Timeline view, select the cell in which you want to create the patch.




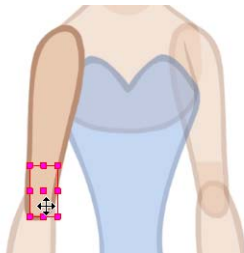
7. In the Camera view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Paste**.


8. In the Tools toolbar, select the Cutter  tool.

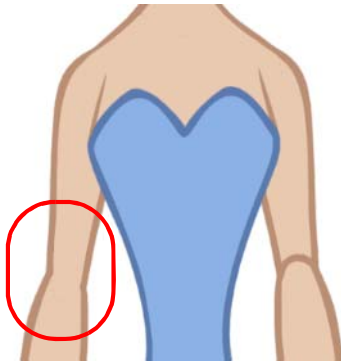
9. In the Camera view, make a selection around the pasted zone to cut everything out but a small overlapping zone to cover the articulation.



10. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
11. In the Camera view, select the patch drawing.



12. Nudge the patch forward using the default keyboard shortcut [Alt]+[Down Arrow] to slightly move it on the Z-axis. One or two nudges should be sufficient.
13. In the Camera view's top area, click on the Top  button to go back up to the root's timeline.





14. Repeat the process for each articulation which requires fixing.



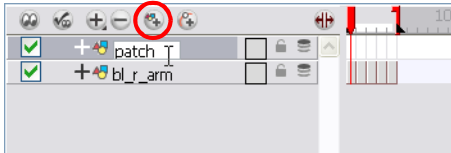
Refer to the Classical Articulation section in this chapter to learn more about joints and articulations.

If your drawings are not encapsulated in Symbols, you can use the Network view to create your patches.

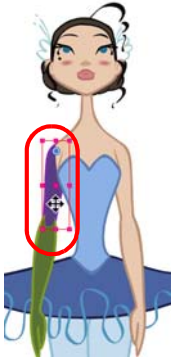
To create a patch joint using the Network view:


1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Timeline view, add a new drawing layer by clicking on the Add Drawing Layer  button. The default keyboard shortcut is [Ctrl]+[R] (Windows/Linux) or [⌘]+[R] (Mac OS X).

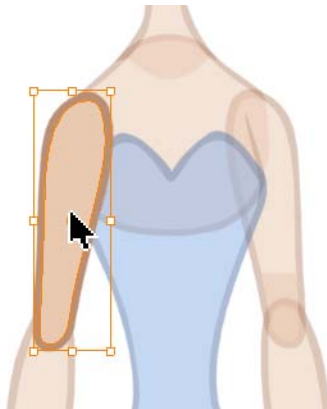
3. Rename the new layer **patch** or **elbow**.



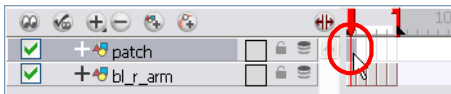
4. In the Camera view, select the part you want to create a patch for. For example, if you are fixing the elbow articulation, select the arm or forearm drawing to edit it.




5. In the Tools toolbar, select the Select  tool. The default keyboard shortcut is [Alt]+[V].
6. In the Camera view, select the fill zone of the part's drawing.

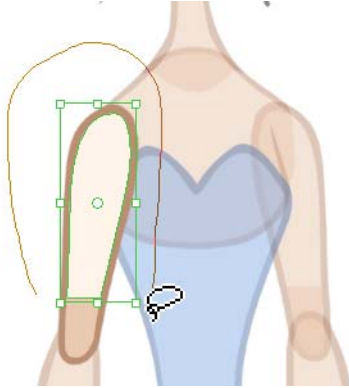


7. In the Camera view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Copy**.
8. In the Timeline view, select the cell in which you want to create the patch.

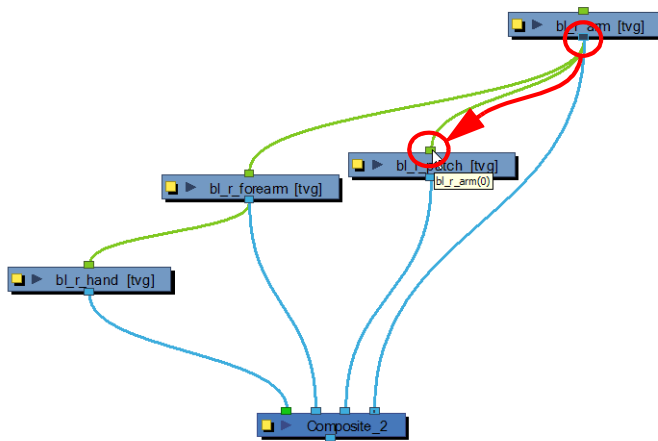


9. In the Camera view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Paste**.
10. In the Tools toolbar, select the Cutter  tool.

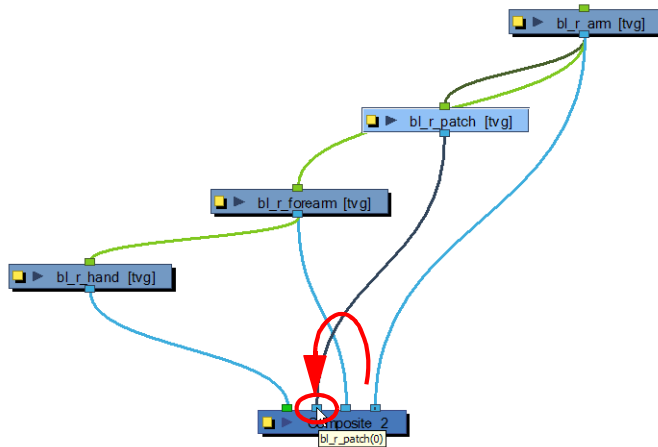
11. In the Camera view, make a selection around the pasted zone to cut everything out but a small overlapping zone to cover the articulation.



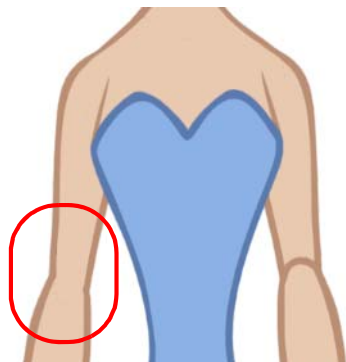
12. In the Network view, connect the main part you create the patch from and parent it to the patch module.



13. Select the patch module's connection to the Composite module and drag it in front of the piece to be covered. In this case, the elbow patch is parented to the arm and connected in front of the forearm.



- Repeat the process for each articulation which requires fixing.



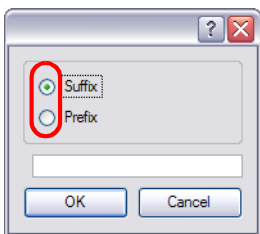
Prefix and Suffix Script

Toon Boom Harmony Stage provides you with a script called Add Prefix or Suffix that allows you to simultaneously add a prefix or a suffix to a series of selected modules.

To add a prefix to a series of modules:

- In the Timeline View, select all of the layers. The default keyboard shortcut is [Ctrl]+[A] (Windows/Linux) or [⌘]+[A] (Mac OS X).
- In the Scripting toolbar, click on the Add Prefix or Suffix script button.

The Add Prefix or Suffix dialog box opens.



- Enable the Prefix or Suffix option, depending on what you want to add to the element's name.
- Type the prefix or suffix information to be added to the module name.
- Click on the OK button.

Setting the Symbols Pivot

If you want your puppet's pieces to rotate correctly, you need to set the pivot points onto the articulations. By default, when you create your Symbols, the pivot is located at the centre of your drawing. You will need to move it onto the shoulder or elbow.

You will set the pivot on the Symbol's cells, not directly on the drawings. To set your pivots, you have to be at the Top level of your character building scene and not inside the Symbols.

By default, when you set your pivot onto your Symbol, all the cells use the same pivot. If you need different pivots for your different cells, refer to the following procedure.


NOTE:

If you are rigging your character without using any Symbols, set your pivots directly on the drawings instead of the Symbol's cells. You need to set a pivot for each individual drawing.

To do this, follow the same process as setting the pivots on the Symbol's cells but select the drawing cells directly instead.

Do the following steps for each layer in the Timeline view.

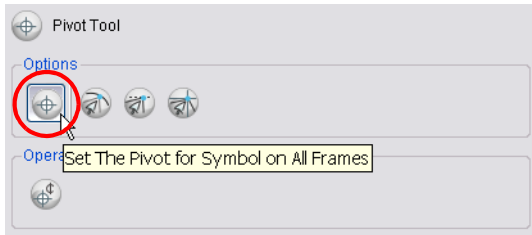
To set the pivots for the Body parts:

- In the Tools toolbar, select the Pivot  tool.

- In the Camera or Timeline view, select the Symbol you want to set the pivot for.



- In the Pivot's Tool Properties view, make sure the Set the Pivot for Symbol on All Frames option is enable if you only want to set one pivot for your Symbol.



- ▶ Disable this option if you want to set a series of different pivots for your Symbol's cells.
- In the Camera view, click where you want the pivot to be. You can also drag the pivot marker to the desired location.



- If you want to set a different pivot for another drawing or Symbol cell, select the drawing or cell and in the Camera view, set the new pivot. Make sure that the Set the Pivot for Symbol on All Frames option is disabled.



Refer to the *Setting Pivots on a Frame Range* topic to learn how to set a pivot for a frame range selection all at once.

Inserting Facial Features Inside the Head Symbol

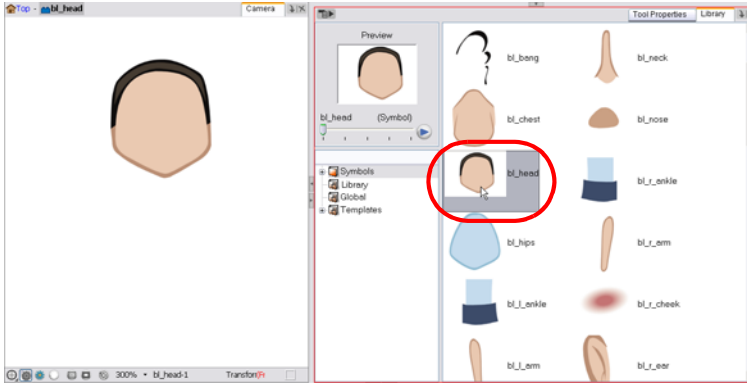


The advantage of inserting the features inside the head Symbol is that you can create facial expressions as separate templates, import them in your scene and quickly alternate between them. This technique is mainly used for the eyes as they are often composed of many pieces.

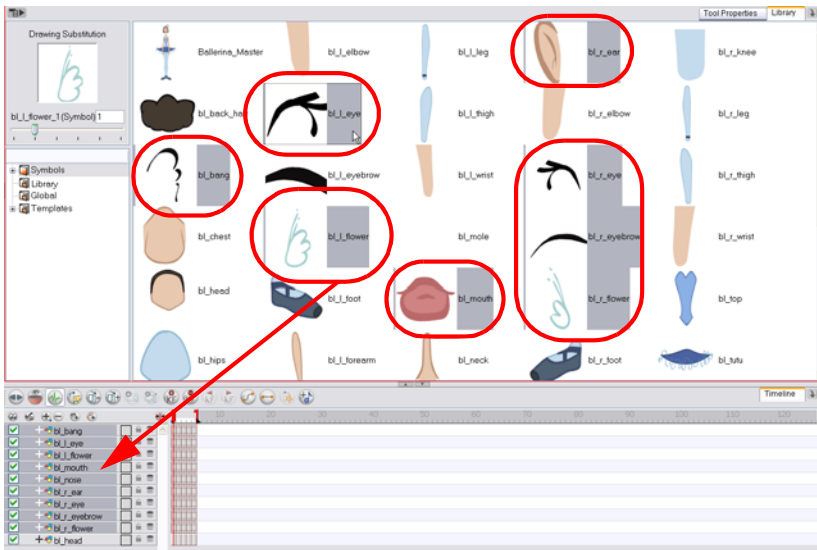
However, if you want to animate the facial features, you need to enter the head Symbol, create the animation and finally expose it in the main timeline. This makes the animation slightly more complicated than parenting the facial features to the head layer in the main timeline.



To insert the facial features inside the head Symbol:

1. In the Library, double-click on your head Symbol to edit it.

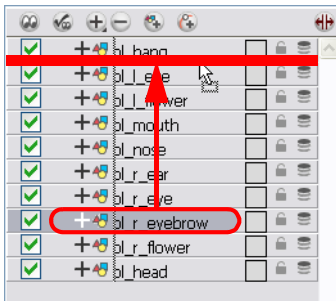


2. From the Library, drag all the head element Symbols to the Camera view or Timeline view's left side.



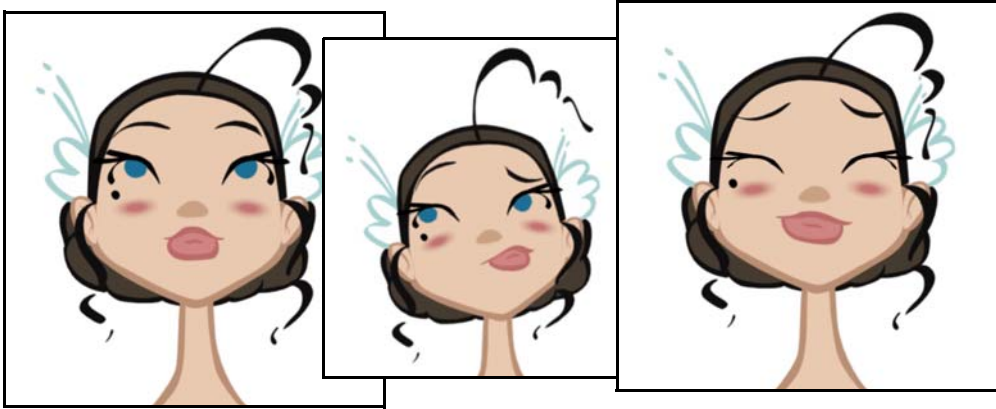
- ▶ When you import a Symbol from the library, the drawings will be positioned at the same location they were when the Symbol was created. In the Camera view, you can reposition your facial features using the Transform  tool. Make sure to disable the Animate  mode.

3. Order your layers by dragging them to a lower or higher level in the Timeline view.



4. In the Camera view top area, click on the Top  button to go back to the scene's root.

Creating Facial Expressions and Extra Drawings



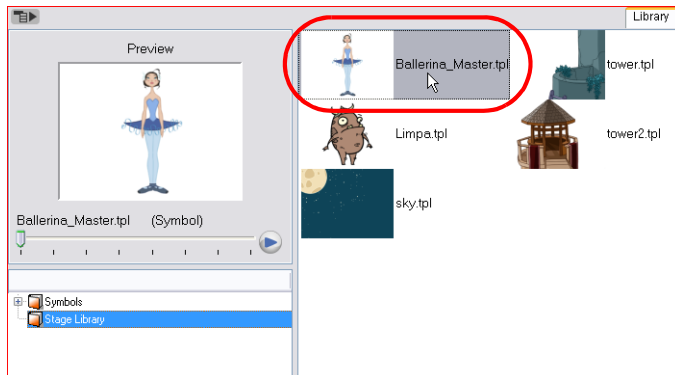
If you want to add extra facial expressions and drawings, you should store them as separate templates in the library. This way, the animator can easily scroll through them and import them in his scene. Also, it avoids overloading the master template.

To create facial expressions and be able to swap them without having to switch each facial feature one by one, your head elements need to be integrated in one Symbol. If they are parented to the head layer, you will have to swap one element at the time.

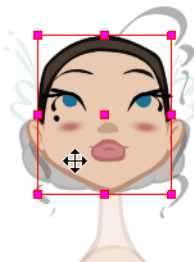
To add your new drawings, create a temporary scene where you will import the master template and work from there. Do not work directly in the master template since you do not want to add them to the drawings in it.

To create extra facial expressions:

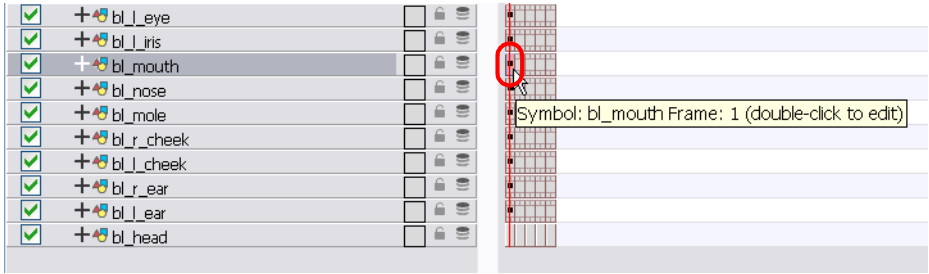
1. Create a new project that you will use as a working scene to create extra drawings.
2. In the Library view, browse and select your character's master template.



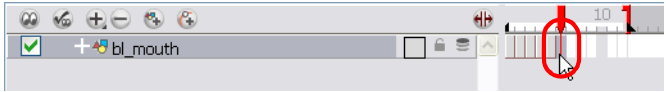
3. Drag the master template to the Timeline view's left side or the Network view.
4. In the Camera view, double-click on the character's head Symbol to edit it.



- In the Timeline view, double-click on the cell of the facial feature you want to add a new drawing for.



- In the Tools toolbar, select the desired drawing tool to draw your new piece.
- In the Colour view, select the colour needed.
- In the Timeline view, select the cell where you want to add the new drawing.

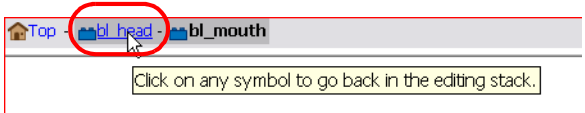


NOTE: When you add an extra drawing, the pivot used by the last cell of your Symbol will be kept in the new drawing. You do not need to set a new pivot for your drawing unless it needs a different one.

- In the Camera view, draw the new piece.



- In the Camera view's top area, go back up to the head Symbol.



- In the Timeline view, select the first empty cell in the layer corresponding to the part you just edited.

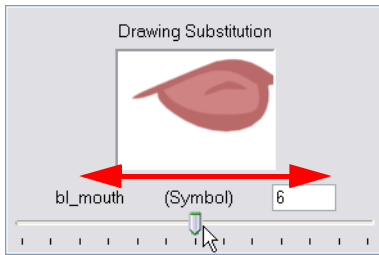



- If necessary, extend the scene length by pulling on the red scene length bracket.

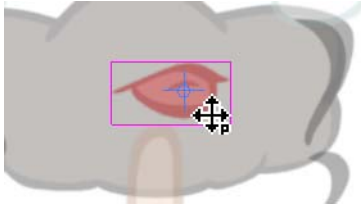


- In the Library view, go to the Drawing Substitution area.

13. Drag the swapping slider until you find the new drawing you created and expose it in the Timeline view.

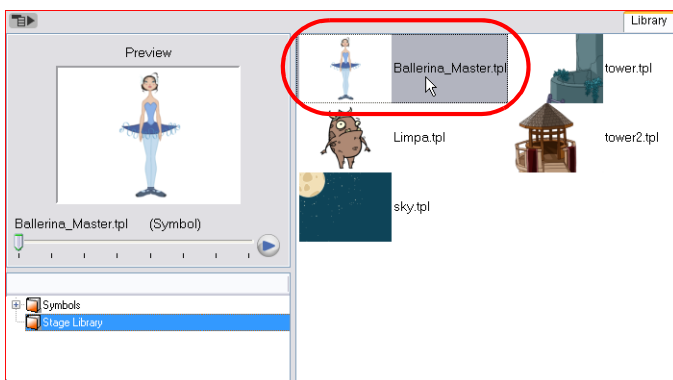


14. If the new drawing requires a different pivot than the current one, in the Tools toolbar, select the Pivot  tool. Then, in the Tool Properties view, disable the Set the Pivot for Symbol on All Frames option. In the Camera view, set the pivot for this new Symbol cell.



Repeat this process for each new facial feature you want to add. **To create extra drawings for your parts:**

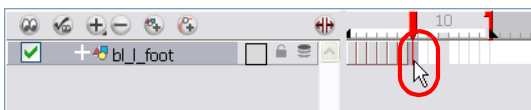
1. Create a new project that you will use as a working scene to create extra drawings.
2. In the Library view, browse and select your character's master template.



3. Drag the master template to the Timeline view's left side.
4. In the Camera view, double-click on the character's desired part Symbol to edit it.



5. In the Tools toolbar, select the desired drawing tool to draw your new piece.
6. In the Colour view, select the colour needed.
7. In the Timeline view, select the cell where you want to add the new drawing.



- ▶ If necessary, extend the scene length by pulling on the red scene length bracket.

- In the Camera view, draw the new drawings you want to add to the body part.



- In the Tools toolbar, select the Pivot tool and in the Camera view, set the pivot directly on the new drawing's cell. In this case, you will not set the pivot on the Symbol's cell.



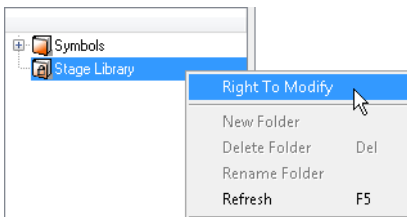
Later on, once the new drawings are stored as a template in the Library, you will be able to add other new drawings directly in the existing template.

Storing Facial Expressions and Extra Drawings in the Library

To store the facial expressions and extra drawings in the Library, you will select the cells inside the body part Symbol and drag them to the Library view to create new templates.

To store facial expressions and extra drawings in the Library:

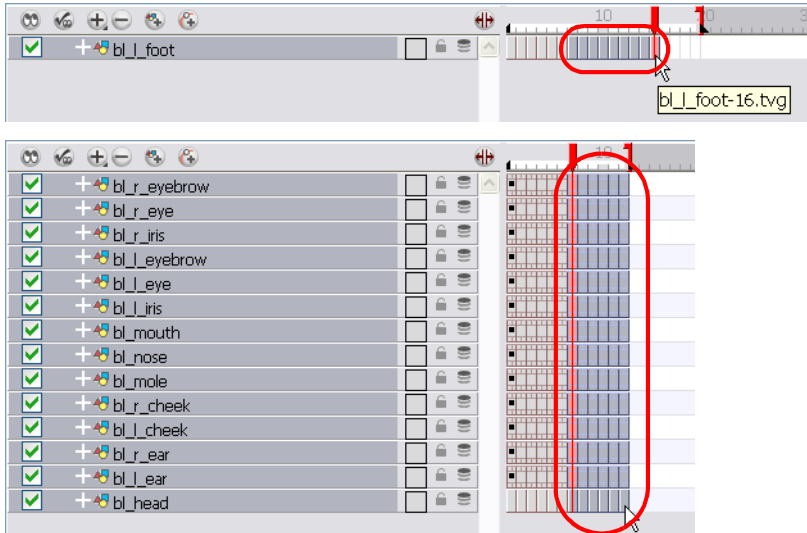
- In the Library view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the desired library folder and select **Right To Modify**.



- In the Camera view, double-click on the body part's Symbol.

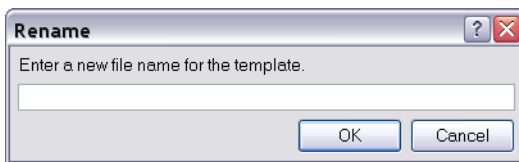


- In the Timeline view, select the cells containing the new facial expressions or extra drawings.



- Drag the selection onto the desired Library's folder.

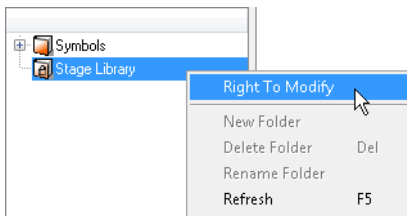
The **Rename** dialog box opens.



- In the Name field, name the new template.
- Click on the OK button.

To add new drawings to the facial expressions and extra drawing templates:

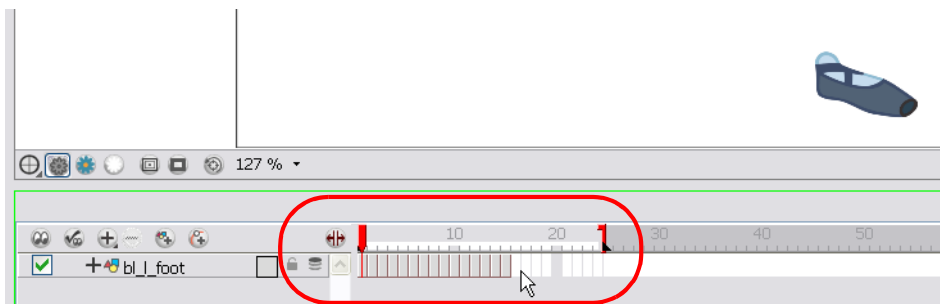
- In the Library view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the library folder containing the template to modify and select **Right To Modify**.



- In the Library view's right side, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the template to modify and select **Edit Template**.

A new **Stage** application opens.

- In the template's timeline, add the new drawings.



- In the Tools toolbar, select the Pivot tool and in the Camera view, set the pivot directly on the new drawing's cell. In this case, you do not set the pivot on the Symbol's cell.

5. In the top menu, select **File > Save**. The default keyboard shortcut is [Ctrl]+[S] (Windows/Linux) or [⌘]+[S] (Mac OS X).
6. In the top menu, select **File > Quit** (Windows/Linux) or **Stage > Quit Toon Boom Stage** (Mac OS X).



Refer to *Libraries, Symbols and Templates > Editing a Template*, on page 365 to learn more about editing templates.

Chapter 11

Setting Up the Scene



Setting up your scene can be compared to building a set for a television show. This is the point when you position each scene element such as the Camera frame, the background elements and the characters.

In this chapter, you will learn about the following:

- Importing the Scene Components, on page 446
- Setting the Camera Frame, on page 447
- Positioning the Scene Components, on page 451
- Cloning and Duplicating Layers, on page 470
- Setting Up the Network, on page 472
- Display Concepts, on page 491
- Creating a Multiplane, on page 494
- Scene Setup Preferences, on page 499

Importing the Scene Components

The first step in the scene set up task is gathering up the scene's different components and then importing them into your project.



Refer to the [Setting Up the Network and Display Concepts](#) sections to learn more about the Network view connections and display concepts.

Backgrounds, Sounds and Movie



Refer to the following sections of the [Gathering Content](#) chapter to learn more about importing backgrounds and movies:

- [Importing Bitmap Images](#), on page 318
- [Importing QuickTime Movies](#), on page 334



Refer to [Working With Sound](#) chapter > [Importing a Sound File](#), on page 534 to learn more.

Templates and Symbols



Refer to [Libraries, Symbols and Templates](#) > [Importing Symbols and Templates](#), on page 366 to learn more.

Setting the Camera Frame

The scene action occurs inside the camera frame, so it's really important to set it up correctly.

- Adding a Camera Layer, on page 447
- Setting the Camera Using the Translate and Rotate Tools, on page 447
- Setting the Camera using the Camera Layer Properties, on page 448
- Resetting the Camera Position, on page 450
- Camera List, on page 450

NOTE:

The Camera layer is static which means that if you need to animate it, you will have to add a peg.



Refer to the *Creating Animation Paths* chapter to learn how to animate layers using pegs.




Refer to *Working in a True 3D Space > 3D Camera Motion*, on page 526 to learn more about setting and moving the camera in the 3D space.

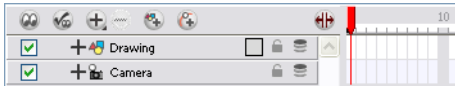
Adding a Camera Layer

To set the camera frame, you need to add a Camera layer into your scene so that you can edit the default camera frame.

To add a Camera layer in the Timeline view:



1. In the Timeline view, click on the Add Layer  button. You can also select **Insert > Camera** from the top menu.
2. Select Camera from the drop-down menu.

A new Camera layer will be added to your scene and will appear in the Timeline view.



NOTE: You cannot add a camera inside a Symbol. If you try to do so, a warning message will pop-up and inform you that this operation is not possible.

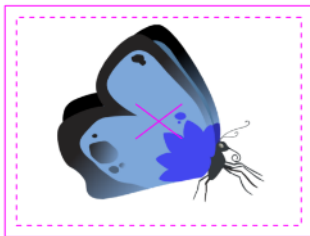
Setting the Camera Using the Translate and Rotate Tools

You can reposition your camera frame directly in the Camera view, using the Translate  and Rotate  tools.

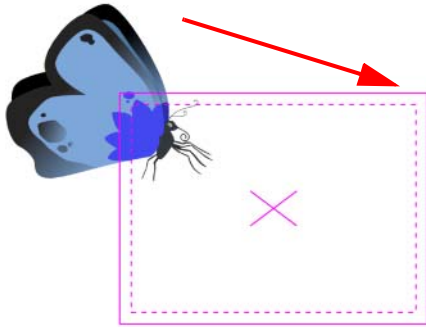
To reposition the camera frame directly in the Camera view:

1. Select **Animation > Tools > Translate**, or use the default keyboard shortcut [Alt]+[2].
2. In the Camera view, click on the camera frame to select it. You can also select the Camera layer from the Timeline view.

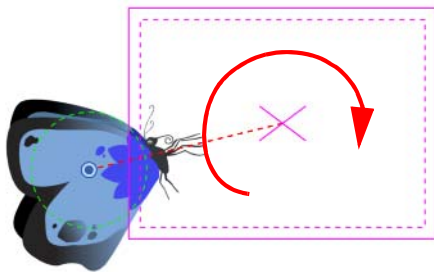
When selected, the camera frame will be highlighted in purple.



3. Drag the camera frame to a new position.



4. If you want to tilt the camera frame, select **Animation > Tools > Rotate**, you can also use the default keyboard shortcut [Alt]+[3].
5. In the Camera view, click on the camera frame to select it and rotate the camera frame until it reaches the desired rotation angle.



NOTE: The Translate and Rotate tools can also be found in the Advanced Animation toolbar.



Refer to the *Discovering the Interface > Managing the Toolbars*, on page 60 to learn how to display the Advanced Animation toolbar.

Setting the Camera using the Camera Layer Properties

One way to set up your camera frame is to type the coordinates directly in the Camera Properties dialog box. Doing this positions the camera precisely where you want it.

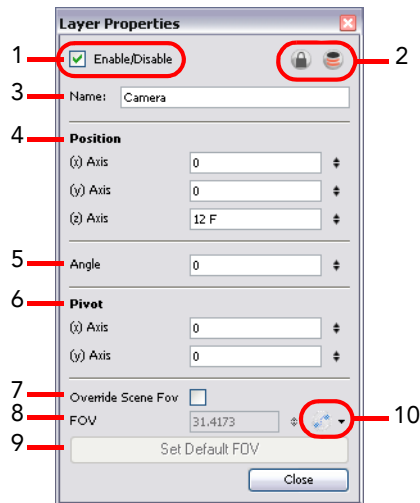


Refer to *Working in a True 3D Space > 3D Camera Motion*, on page 526 to learn more about setting the camera in the 3D space.





To set up the camera frame using the camera Layer Properties:

- ▶ In the Timeline view, double-click (Windows/Linux) or [Ctrl]+Click (Mac OS X) on the Camera layer.



The camera **Layer Properties** dialog box opens.




The legend below explains each of the Layer Properties:

1. Use the Enable/Disable check box to enable or disable the Camera layer.
2. The Lock  and Onion Skin  buttons.
 - ▶ Once you are satisfied of the camera frame position, you can use the Lock  button to lock the Camera layer and prevent changes on the Camera frame position.
 - ▶ The Onion Skin  button is used to enable the Onion Skin feature in the Camera and Drawing view.
3. The Name field displays the current layer name and is used to rename it. Type in the new layer name.
4. The Position section displays the current position of the Camera layer using X-axis (East, West), Y-axis (North, South) and Z-axis (Forward, Backward) coordinates. To reposition your camera frame, type in the new values corresponding to the desired position coordinates. You can also use the up and down arrows to set the value of each field.
5. The Angle field displays the current rotation value. To set a new rotation position, type in a new angle value. You can also use the up and down arrows to set the new angle value.
6. The Pivot field displays the current position of the rotation pivot of the Camera layer. The Camera will perform a rotation taking the position of the pivot as its angle centre. By default, the pivot is set at the centre of the camera frame. To reposition the pivot point, type in new X and Y coordinates values in the appropriate field. You can also use the up and down arrows to set the position values.
In order to see the pivot's position you will need to have the Rotate tool selected.
7. Enable the Override Scene FOV check box to enable the FOV field in which you can type in a new field-of-view value.
8. The FOV field displays the current field-of-view default value. When enabled, you can type in a new zoom value for your camera frame. You can also use the up and down arrows to set the new zoom value.
9. Use the Set Default FOV to reset the custom zoom value to its default value.
10. The Function button is used when animating the camera zoom value. Refer to the *Creating Animation Paths* chapter to learn more about creating functions.

Resetting the Camera Position

Once you set up your camera frame, you can always easily reset it to its original position. Use the Reset command to reset the value of the selected element to the initial value of the active tool. For example, if the Rotate  tool is active, the transformation angle will be reset to 0 and if the Transform  tool is active, then the entire transformation values will be reset.

To reset the camera position:

1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Timeline or directly in the Camera view, select the Camera layer.
3. Select **Animation > Reset**. You can also use the default keyboard shortcut [Ctrl]+[Shift]+[Z] (Windows/Linux) or [⌘]+[Shift]+[Z] (Mac OS X).

The camera will automatically return to its original position.

Camera List

You can only see one camera at the time in the Timeline view. If you add several cameras to your scene and you want different settings on each, you can use the Camera List to display each of them. You can use this feature if you are still working on your scene composition and you have different camera setups to choose from.

To select a camera from the Camera list:

1. In the top menu, select **Scene > Camera > *the desired camera***.
 - ▶ If you only add one camera to your scene, you will only see Default Camera in your list.

Positioning the Scene Components

Setting up the scene also involves positioning the different scene elements within the camera frame.

Animate Mode

When positioning elements, make sure that the Animate mode is disabled, or it will create a keyframe within the drawing layer.

To disable Animate Mode:

- ▶ In the Tools toolbar, click on the Animate Mode  button. The default keyboard shortcut is [Shift]+[A].
 - ▶ When the Animate Mode button looks pushed in and highlighted it means it is enabled.



- ▶ When the Animate Mode button looks popped up it means it is disabled.





Selecting a Layer

There are different ways of selecting the layers you want to reposition in the Camera view.



The topic is divided as follows:

- Selecting a Layer from the Camera View using the Transform Tool, on page 451
- Bounding Box Selection Style, on page 452
- Finding the Selected Layer in the Timeline View, on page 452
- Finding the Selected Layer in the Network View, on page 453
- Transform Tool Properties, on page 453



Selecting a Layer from the Camera View using the Transform Tool

You can select your elements directly in the Camera view using the Transform  tool. When you select the Transform  tool, its properties and options appear in the Tool Properties view.



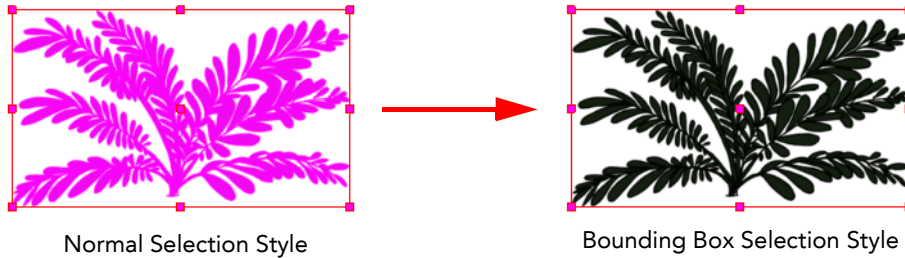
When using the Transform  tool to select element in the Camera view, always make sure that the Peg Selection Mode  option in the Transform Tool Properties view is disabled or else it will limit the selection to peg only.

To select from the Camera view:

1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the element to be repositioned. You can select more than one element at a time. The corresponding layers and columns will be highlighted in the Timeline and Xsheet views.

Bounding Box Selection Style

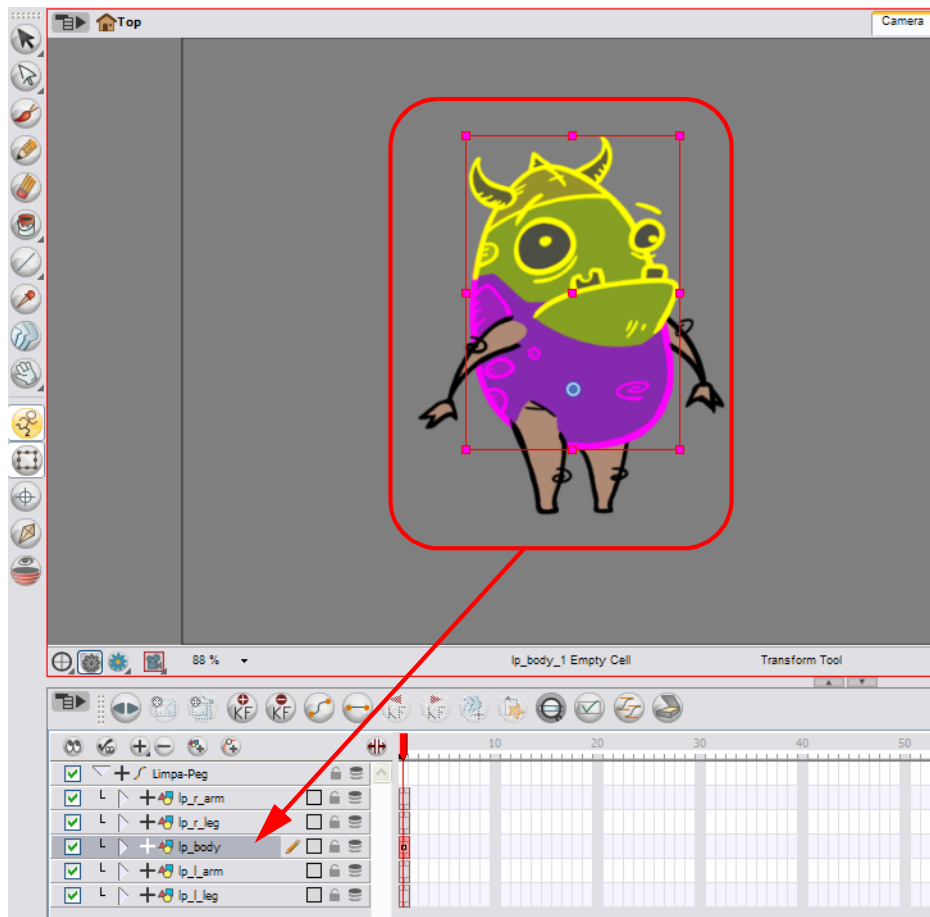
You can change the display style of selected elements to Bounding Box. This will remove the normal selection coloured highlight and leave only the bounding box around your selected element.



To set the bounding box selection style:

1. Select **View > Show > BBox Selection Style**. You can also use the default keyboard shortcut [Ctrl]+[Alt]+[Shift]+[B] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[B] (Mac OS X).


Finding the Selected Layer in the Timeline View



When you have several layers in your Timeline view, you may find it hard to locate which one is selected. Harmony Stage has an easy solution to this problem, you can use the Centre on Selection feature to display the selected layer in the Timeline view.

To centre on the selected layer:

1. In the Camera view, select the desired layer.
2. Make the Timeline view the current active view.

- Press the default keyboard shortcut [O] or press the Centre On Selection  button available in the Timeline View toolbar's extra button.




Refer to the *Discovering the Interface > Managing the Toolbars*, on page 60 to find out more about customizing the toolbars.

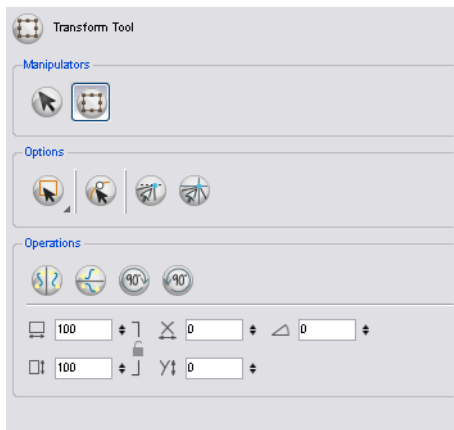
Finding the Selected Layer in the Network View

Just as with the Timeline view and the many layers contained in it, when you have several modules in your Network view, you may find it hard to locate which one is selected. You can also use the Centre on Selection feature to focus on the selected module in the Network view.

To centre on the selected layer:

- In the Camera view, select the desired layer.
- Enable the focus in the Network view.
- In the Network View menu, select **View > Centre on Selection**. You can also use the default keyboard shortcut [O] or press the Centre On Selection  button available in the Network View toolbar's extra button.

Transform Tool Properties



Select and Transform tool

Switch between the Transform and Select tools directly from the Transform or Select Tool Properties views.




Lasso and Marquee

Choose between the Lasso and the Marquee mode to change the selection style of the Transform tool.

- Click and hold [Alt] to temporarily switch from the current selected mode to the other.





Peg Selection Mode

Enable this option to limit the selection in the Camera view to pegs. When disabled, the Transform  tool selects the drawing layers.

Snap Option

When transforming or repositioning your layer using the Transform tool, you can enable different snap options to help you.

-  Snap and Align
Snaps the selected layer to any existing line, while automatically displaying temporary rulers that guide you and that you can also snap your object to.
-  Snap to Grid
Snaps your selection according to the currently enabled grid.



Refer to following topics from the *Drawing and Animating* chapter to learn more about the Snapping options utilities and the Grid feature:

- Reshaping a Drawing Using the Contour Editor Tool > Contour Editor Tool Properties > Snap Options, on page 111
- More Drawing Tools > Show Grid, on page 133



Flip Horizontal and Flip Vertical

Use these buttons to flip the selected element horizontally or vertically.

- You can also select **Animation > Flip > Flip Horizontal** and **Flip Vertical** or use the default keyboard shortcuts [4] and [5].



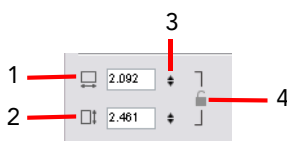
Rotate 90 Degrees Clockwise and Rotate 90 Degrees Counter-clockwise

Use these buttons to rotate the selected element 90 degrees clockwise or counter-clockwise.



Width and Height

Use these fields to enter specific values when you want to accurately resize the selected layer.

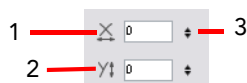


- Width: type a width value in this field to resize the width of your selection.
- Height: type a height value in this field to resize the height of your selection.
- Use the up and down arrows to modify the value contained in either the Width or Height value field.
- Lock icon: Click on the lock icon to either lock or unlock the ratio between the width and height values.



Offset X and Y

Use these fields to enter specific values to reposition the selected layer accurately.



- X: type an offset value in this field to reposition the selected layer along the X-axis.
- Y: type an offset value in this field to reposition the selected layer along the Y-axis.
- Use the up and down arrows to modify the value contained in either the X or Y value field.



Angle

Use this field to enter specific values to rotate the selected layer accurately. A positive value will rotate the layer counter-clockwise and a negative value will rotate the layer clockwise.



- Angle: type a degree value in this field to rotate the selected layer.
- Use the up and down arrows to modify the value contained in the Angle value field.

Locking Layers in the Timeline View

You can prevent correctly positioned layers from being selected by locking them in the Timeline view. Useful for making a multiple selection inside the Camera view and leaving them visible.

You can perform five types of locking actions on your layers:

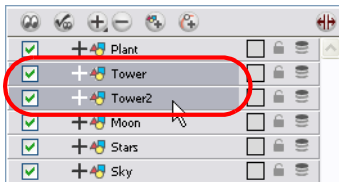
- Lock
- Unlock
- Lock All
- Unlock All
- Lock All Others


Lock

Use the Lock option to lock one or a multiple selection of layers.

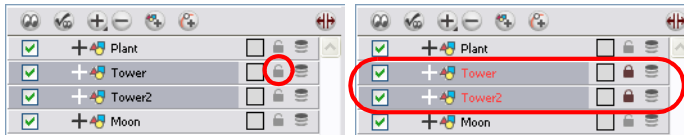
To lock a layer or a selection of layers:

1. In the Timeline view, select one or many layers.



2. In the top menu, select **Animation > Lock > Lock**. You can also click on one of the selected layer's Lock  icon or use the default keyboard shortcut [Ctrl]+[Alt]+[L] (Windows) or [⌘]+[Alt]+[L] (Mac OS X). Note that there is no Linux default keyboard shortcut for the Lock command.

This will automatically lock all the selected layers.

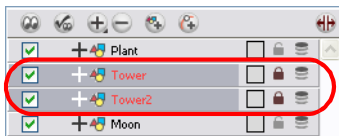



Unlock

Use the Unlock option to unlock one or a multiple selection of locked layers.

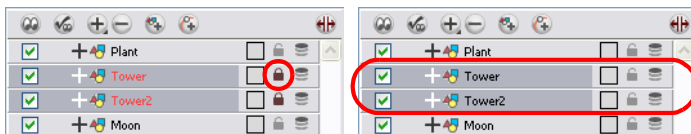
To unlock a locked layer or a selection of locked layers:

1. In the Timeline view, select one or many locked layers.



2. In the top menu, select **Animation > Lock > Unlock**. You can also click on one of the selected layer's Lock  icon or use the default keyboard shortcut [Ctrl]+[Shift]+[K] (Windows/Linux) or [⌘]+[Shift]+[K] (Mac OS X).


This will automatically unlock all the selected locked layers.



Lock All

Use the Lock All option to lock all the layers in the Timeline view at once.

To lock all layers:

- ▶ In the top menu, select **Animation > Lock > Lock All**. You can also click on one of the selected layer's Lock  icon or use the default keyboard shortcut [Ctrl]+[Shift]+[L] (Windows/Linux) or [⌘]+[Shift]+[L] (Mac OS X).

This will automatically lock all the layers.



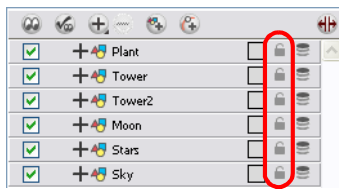
Unlock All

Use the Unlock All option to unlock all the layers in the Timeline view at once.

To unlock all layers:

- ▶ In the top menu, select **Animation > Lock > Unlock All**. You can also use the default keyboard shortcut [Ctrl]+[Alt]+[Shift]+[L] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[L] (Mac OS X).

This will automatically unlock all the layers.

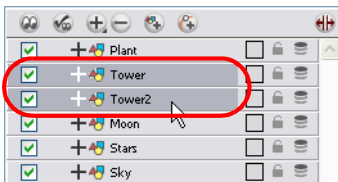


Lock All Others

Use the Lock All Others option to lock every layer except the selected ones.

To lock all other layers:

1. In the Timeline view, select the layers that you do not want to lock.



2. In the top menu, select **Animation > Lock > Lock All Others**. You can also use the default keyboard shortcut [Ctrl]+[Alt]+[Shift]+[O] (Windows/Linux) or [⌘]+[Alt]+[Shift]+[O] (Mac OS X).

This will automatically lock all the layers except the selected ones.



Selecting an Element from the Timeline or Xsheet View

You can also select your elements from the Timeline or Xsheet view. This can be useful when there are too many objects in the scene or when an object is hard to grab.

To select from the Timeline or Xsheet view:


- ▶ In the Timeline view, click on the layer corresponding to the element you want to reposition.
- ▶ In the Xsheet view, click on the column header corresponding to the element you want to reposition.

The selected element will be highlighted in the Camera view.

Positioning an Element using the Transform Tool

Using the Transform tool, you can easily reposition, scale, rotate and even skew the layers directly in the Camera view.




When positioning a drawing layer using the Transform tool, always make sure that the Peg Selection Mode  is disabled in the Transform Tool Properties view, or it will limit the selection to pegs in the Camera view.





Refer to *Working in a True 3D Space > Positioning the Scene Components*, on page 451 to learn about the 3D Transform tool and how to position your elements in the 3D space.

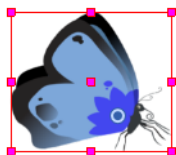
Repositioning the Pivot Point Temporarily

Some transformations, such as rotation, scale, skew and flip, are made relative to the pivot point position. You can temporarily reposition this pivot point for each transformation using the Transform  tool.

To temporarily reposition the pivot point:

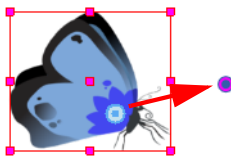
1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, click on your element to select it.


The pivot point will appear in the Camera view.



4. Click on the pivot point and drag it to a new position.

This will be the new position of the pivot point for the current transformation. It will remain in this new position as long as you do not deselect the drawing.

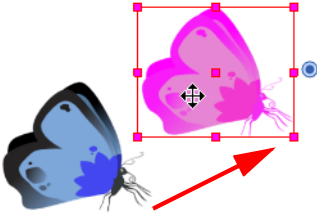


NOTE: Using the Transform  tool to reposition your pivot will temporarily override the existing pivot point position until you complete the current transformation, it then returns automatically to its original position.





When you translate the pivot using the Transform tool, the permanent pivot will appear as a ghost so you know where it is and also from where the animation will be interpolated when you create motion paths. The animation is always interpolated from the original pivot and not the temporary pivot.

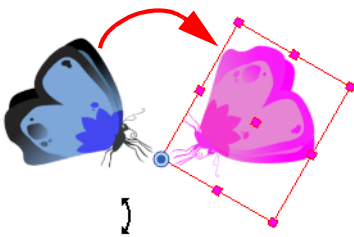
Panning a Drawing Layer





To pan a layer using the Transform tool:

1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select a drawing layer and drag the selection to a new area.

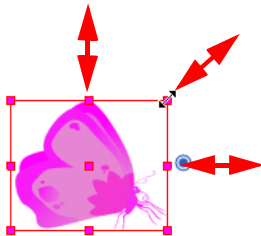
Rotating a Drawing Layer





To rotate a layer using the Transform tool:

1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the drawing layer and rotate the transform bounding box handle.

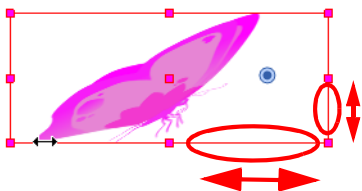
Scaling an Element





To scale a layer using the Transform tool:

1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the drawing layer and then pull or push either on the size, top or corner control point. Hold down [Shift] to lock the selection's ratio.

Skewing an Element



To skew a layer using the Transform tool:

1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the drawing layer and drag sideways or up and down the sides or top and bottom segments, between the control points.




Using Advanced Animation Tools to Position a Layer

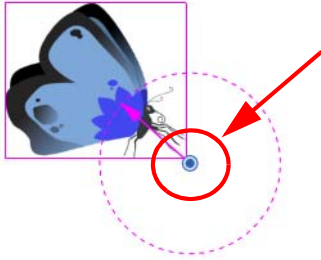
You can also use the advanced animation tools to position your layers.

Permanently Repositioning the Pivot Point

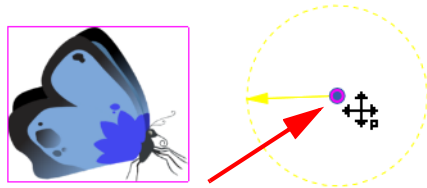
Some transformations, such as the rotation, scale, skew and flip, are made relative to the pivot point position. Reposition this pivot point anywhere using the current advanced animation tool.

To permanently reposition the pivot point:

1. In the Advanced Animation toolbar, select the Rotate , Scale  or Skew  tool.
2. In the Camera view, [Ctrl]+Click (Windows/Linux) or [⌘]+Click (Mac OS X) to select your element. The pivot point will appear in the Camera view.



3. Click on the pivot point and drag it to a new position.



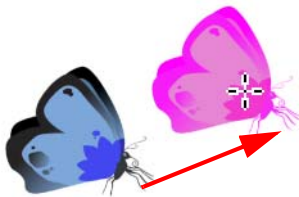
This is the new position of the pivot point for future transformations until you reposition it.

NOTE: Using the Advanced Animation tools to reposition your pivot permanently overrides the existing pivot point position until you change its position again.

Panning an Element using the Translate Tool

To pan a layer using the Translate tool:

1. Select **Animation > Tools > Translate**. You can also use the default keyboard shortcut [Alt]+[2].
2. In the Camera view, [Ctrl]+Click (Windows/Linux) or [⌘]+Click (Mac OS X) on the element to select it and drag the selection to a new area.

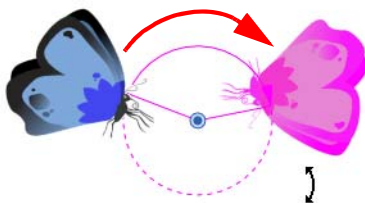


You can select multiple layers to reposition them together. Ctrl]+[Shift]+Click (Windows/Linux) or [⌘]+[Shift]+Click (Mac OS X) on each element to select them.

Rotating an Element using the Rotate Tool

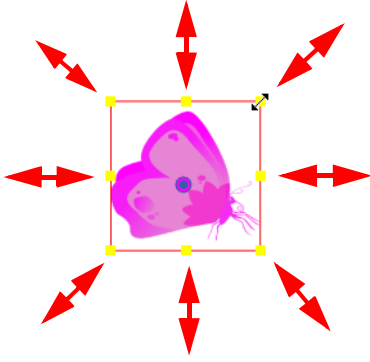
To rotate a layer using the Rotate tool:

1. Select **Animation > Tools > Rotate**. You can also use the default keyboard shortcut [Alt]+[3].
2. In the Camera view, [Ctrl]+Click (Windows/Linux) or [⌘]+Click (Mac OS X) on the element to select it and rotate the layer.



You can select multiple layers to rotate them at once. Ctrl]+[Shift]+Click (Windows/Linux) or [⌘]+[Shift]+Click (Mac OS X) on each element to select them.

Scaling an Element using the Scale Tool

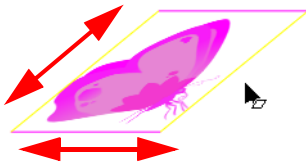


To scale a layer using the Scale tool:

1. Select **Animation > Tools > Scale**. You can also use the default keyboard shortcut [Alt]+[4].
2. In the Camera view, [Ctrl]+Click (Windows/Linux) or [⌘]+Click (Mac OS X) on the element to select it and pull or push either on the side, top or corner control point. Hold down [Shift] to lock the selection's ratio when using the corner control points.

You can select multiple layers to scale them at once. [Ctrl]+[Shift]+Click (Windows/Linux) or [⌘]+[Shift]+Click (Mac OS X) on each element to select them.

Skewing an Element using the Skew Tool



To scale a layer using the Skew tool:

1. Select **Animation > Tools > Skew**. You can also use the default keyboard shortcut [Alt]+[5].
2. In the Camera view, [Ctrl]+Click (Windows/Linux) or [⌘]+Click (Mac OS X) on the element to select it and drag a side of the bounding box up, down or sideways.

You can select multiple layers to skew them at once. [Ctrl]+[Shift]+Click (Windows/Linux) or [⌘]+[Shift]+Click (Mac OS X) on each element to select them.

NOTE: The Translate, Rotate, Scale and Skew tools can also be found in the Advanced Animation toolbar.



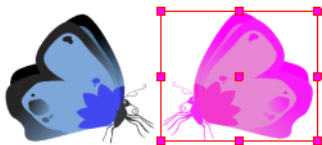
Refer to the *Discovering the Interface* chapter to learn how to display the Advanced Animation toolbar.

Flipping an Element



There are two different options you can use when you want to flip your element.

Flip Horizontal and Flip Vertical

The Flip Horizontal and Flip Vertical options flip your drawing layer along Camera view's horizontal and vertical axis.

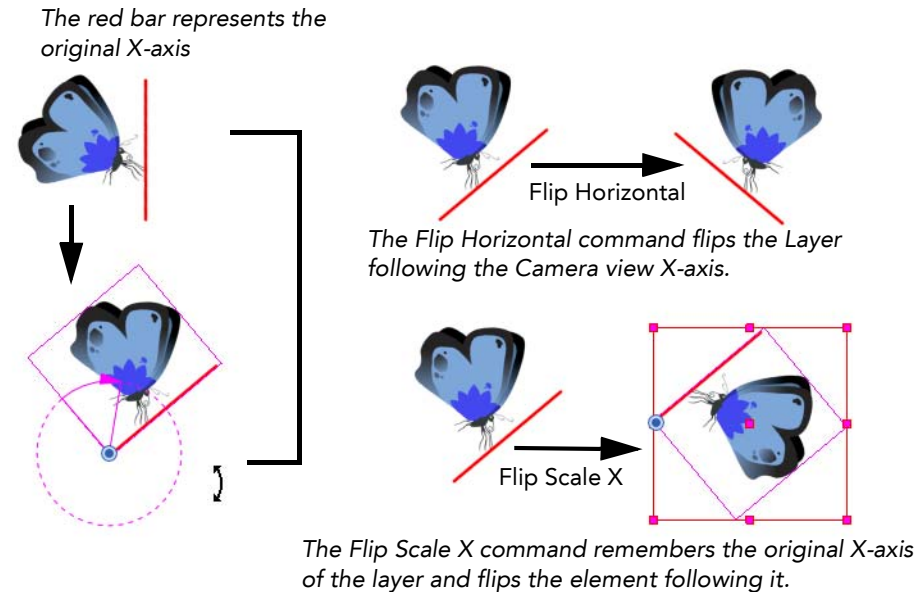


To flip a layer:



1. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
2. In the Camera view, select the drawing layer you want to flip using the Transform  tool.
3. Select **Animation > Flip > Flip Horizontal** or **Flip Vertical**. You can also use the keyboard shortcuts [4] and [5].

Flip Scale X and Flip Scale Y

Once your drawing layer has been rotated, the original horizontal and vertical axes change. The Flip Scale X and Flip Scale Y will perform a flip on your drawing layer following its original axis.



To flip an element following its original axis:

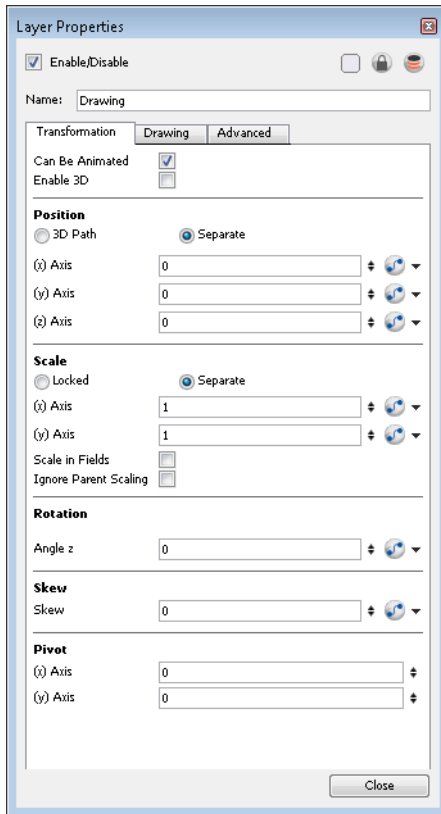
1. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
2. In the Camera view, using the Transform  tool, select your element that has already been transformed.
3. Select **Animation > Flip > Flip Scale X** or **Flip Scale Y**.

Positioning an Element Using the Layer Properties

To position an element using its Layer Properties dialog box:

1. In the Timeline view, right-click (Windows/Linux) or [Ctrl]+Click (Mac OS X) on the Drawing layer and select **Layer Properties**. The default keyboard shortcut is [Shift]+[E]. You can also double-click on the layer, or click once and see the properties in the Layer Properties view.
 - ▶ You can also open the **Layer Properties** dialog box from the Network view by clicking on the module's square yellow button.

The drawing **Layer Properties** dialog box opens.




- The Enable 3D check box displays the 3D parameters in the Layer Properties.



Refer to *Working in a True 3D Space > Positioning the Scene Components*, on page 451 to learn more about the 3D parameters and how to use them to position your element in the 3D space.

- In the Position section, type in the desired value of the new element position.

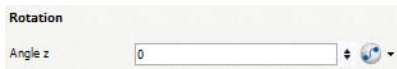


- ▶ Enable the Separate check box option to enable the edit of the different coordinate fields.
- ▶ Enable the 3D Path check box option to enable the use of a 3D path function when animating your element. Refer to the *Creating Animation Paths* chapter to learn more about 3D paths and Velocity.
 - ▶ In the (x) Axis field, type in a new East/West coordinate corresponding to the desired position.
 - ▶ In the (y) Axis field, type in a new North/South coordinate corresponding to the desired position.
 - ▶ In the (z) Axis field, type in a new Forward/Backward coordinate corresponding to the desired position. Refer to the *Creating a Multiplane* topic to learn more about positioning layers on the Z-axis.
- ▶ The Function  buttons are used to create function curves when animating.

4. In the Scale section, type in the desired value to set the new element size.



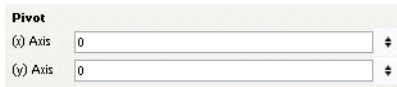
- ▶ Enable the Separate check box to be able to resize your element with independent X and Y scales. This allows you to squash and stretch.
 - ▶ (xy) Axis: Type in the horizontal and vertical scales value.
 - ▶ Enable the Locked check box to resize your element while keeping its ratio.
 - ▶ (x) Axis: Type in the horizontal scale value.
 - ▶ (y) Axis: Type in the vertical scale value.
5. In the Angle Z field, type in a degree value between -360 to 360 for the rotation angle.



6. In the Skew field, type in a degree value between -90 to 90 for the skew angle.



7. In the Pivot section, type in the desired coordinate value to reposition the transformation pivot. This will change the permanent position of the pivot.



- ▶ In the (x) Axis field, type in a new East/West coordinate corresponding to the desired position.
- ▶ In the (y) Axis field, type in a new North/South coordinate corresponding to the desired position.

As you type in the new values, the element's position is updated in the Camera view.



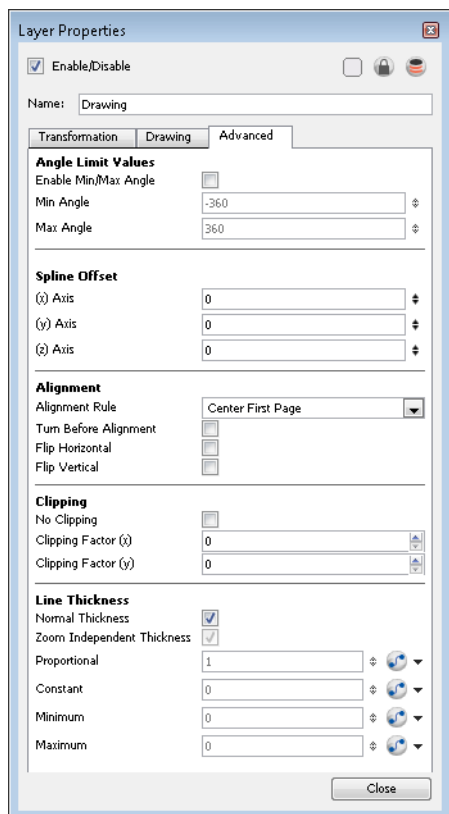
Refer to the *Creating Animation Paths* chapter to learn more about function curves and animating elements on pegs.



Refer to *Working in a True 3D Space > Positioning the Scene Components*, on page 451 to learn more about the 3D options in the *Layer Properties* view.

Drawing Layer Properties Advanced Tab

In the Drawing Layer Properties dialog box, you will find an advanced tab containing some very useful options:



Angle Limit Value

Use this section to set a maximum and minimum rotation angle for your drawing. You will mainly use the option for a cut-out character when you do not want an elbow to bend too far in or too far out.

- **Enable Min/Max Angle:** Enable this option if you want to activate the minimum and maximum angle constraints.
- **Min Angle:** Type the minimum angle you want the drawing to rotate too.
- **Max Angle:** Type the maximum angle you want the drawing to rotate too.

Spline Offset

In the X Y and Z axis fields, type the coordinated to where you want to offset the visual trajectory. By the default, the trajectory is displayed at the centre of the Camera view. If you want to move it so it corresponds better to your drawing, either type new coordinates or use the Spline Offset tool available in the Advanced Animation toolbar.

To display the trajectory in the Camera view, select your drawing and select **View > Show > Control**.

Alignment

- **Alignment Rule:** The alignment rule selections are intended to deal with drawings that were created on paper of a different size or orientation from the default alignment rule (set up in the Scene Setting dialog box). If you select Turn Before Alignment, the drawings are rotated and then scaled, based on the option selected from the drop-down list. The drawings are then scaled to match Harmony Stage alignment rectangle.
 - ⇒ **Left:** The default alignment for drawings; aligns the drawings on the left side of the scene's alignment rectangle. Stage scales the drawings to match their height to the alignment rectangle of the scene.
 - ⇒ **Right:** Aligns the drawings on the right side of the alignment rectangle. Harmony Stage scales the drawings to match their height to the height of the alignment rectangle of the scene.

- ⇒ **Top:** Aligns the drawings on the top of the alignment rectangle. Stage scales the drawings to match their widths to the width of the alignment rectangle of the scene.
- ⇒ **Bottom:** Aligns the drawings on the bottom of the alignment rectangle. Harmony Stage scales the drawings to match their widths to the width of the alignment rectangle of the scene.
- ⇒ **Centre Fit:** Centres the drawings.
- ⇒ **Centre Fill:** Centres the drawings and then scales them so that the width or height fills the available space.
- ⇒ **Centre LR:** Aligns the drawings in the left-right centre of the alignment rectangle. Harmony Stage scales the drawings to match their height to the height of the alignment rectangle of the scene.
- ⇒ **Centre TB:** Aligns the drawings in the top-bottom centre of the alignment rectangle. Stage scales the drawings to match their widths to the width of the alignment rectangle of the scene.
- ⇒ **Stretch:** Scales the drawings so that they fit within the alignment rectangle of the scene. This is particularly useful for images that you will manipulate with a Quadmap Module. If the drawings in the Quadmap Module do not have the same aspect ratio as the alignment rectangle of the scene (from the Scene Settings dialog box), the handles on the quadmap will not appear on the corners of the image, making it difficult to manipulate the quadmap. In this case, you would set the Drawing Layer of the quadmap images to "Stretch" so that the handles appear on the corner of the image. This can have the effect of distorting the images, but this is not an issue with images that will be distorted through the Quadmap Module anyway.
- ⇒ **As Is:** Leaves the drawings aligned as they are.
- ⇒ **Centre First Page:** Aligns the centre of the first part of a standard panel with the centre of the field chart.
- **Turn Before Alignment:** This option rotates the drawings in the selected element 90 degrees to the left before scaling and aligning them according to the alignment rule, and before performing any offset, rotation or scaling for the element or the peg. This and the Alignment Rule are intended for drawings that were created on paper of a different size or orientation than the other paper in the scene, and requires alignment so as to be able to accurately treat them.
- **Flip Horizontal:** Flips the drawing on the X-axis.
- **Flip Vertical:** Flips the drawing on the Y-axis.

Clipping

- **No Clipping:** Select this option if you do not want to clip the images in this module before an effect is applied to it.
- **Clipping Factor (X)/(Y):** This is an option for rendering images that are larger than the final frame. With this option enabled, images can be moved by a PApply Peg Transformation module without black entering into the composite as a result of early clipping. In addition, this option is useful for images that have a blur that should appear in the frame even though the image itself is not in frame.

Line Thickness

- **Normal Line Art Thickness:** Disables all overrides on the Line Art thickness.
- **Zoom Independent Line Art Thickness:** Select this if you do not want to display Line Art thickness in proportion the amount of zoom in the view window. Everything else will increase in size, but the Line Art thickness will stay the same.
- **Proportional:** Enter a multiple by which you want to increase the Line Art thickness. Entering 1 will result in no change; entering 0 (zero) will hide Line Art.
- **Constant:** Enter a value in pixels (based on a 740x540 screen resolution) at which to maintain the Line Art thickness.
- **Minimum:** Enter a value in pixels (based on a 74 x540 screen resolution) for the minimum Line Art thickness allowed.
- **Maximum:** Enter a value in pixels (based on a 740x540 screen resolution) for the maximum Line Art thickness allowed.

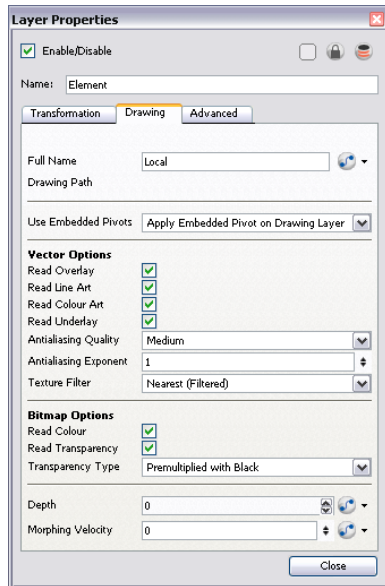
To modify the Line Art thickness:

- The Line Art must be created with a brush stroke (Select **Drawing > Convert > Convert Pencil Lines to Brush**).
- The Line Art must be converted to Colour Art (Select **Drawing > Convert > Create Colour Art from Line Art**).
- To view this feature in the Camera View windows, you must first activate the Enable Variable Line Thickness option, found in the OpenGL tab in the Preferences Panel. *Refer to the OpenGL Tab Preferences topic to learn more about this option.*



To learn about the Morphing Velocity option, refer to *Morphing Drawings > Adjusting the Velocity and Timing*, on page 294.

Drawing Layer Properties Drawing Tab



- **Full Name:** Select which element to connect to the module from the drop-down list of elements that already exist in your scene.
- **Drawing Path:** Displays the full path to the current drawing.
- **Use Embedded Pivots:** By default, this option is set to Apply Embedded Pivot on Drawing Layer.
 - ⇒ **Don't Use Embedded Pivot:** When this option is selected, the layer will not use the pivot set on the drawing or Symbol. The pivot will be located at the centre of the Camera view, meaning (0,0,0). If there is a transformation applied on the layer, the pivot will be offset following the transformation.
 - ⇒ **Apply Embedded Pivot on Parent Peg:** When this option is selected, the pivot set on the drawing or Symbol will automatically be applied to the first Peg layer the drawing layer is connected to. When selecting the element in the Camera view using the Transform tool, the Peg layer will be selected. Even when the Drawing layer is selected in the Camera view, the transformation will be applied on the parent Peg.
 - ⇒ **Apply Embedded Pivot on Drawing Layer:** This is the most common behavior a user will use. Automatically, the layer will use the pivot that was set on the drawing or Symbol's frame using the Pivot tool.



Refer to the *Building a Character > Setting the Pivots*, on page 415 to learn about using embedded pivots.

Vector Options

- **Read Overlay:** Enable this option to display and render the Overlay layer of this drawing layer in your scene and final export. Disabling it will hide it.
- **Read Line Art:** Enable this option to display and render the Line Art layer of this drawing layer in your scene and final export. Disabling it will hide it.
- **Read Colour Art:** Enable this option to display and render the Colour Art layer of this drawing layer in your scene and final export. Disabling it will hide it.
- **Read Underlay:** Enable this option to display and render the Underlay layer of this drawing layer in your scene and final export. Disabling it will hide it.
- **Anti-aliasing Quality:** Smoothness setting applied to Colour Art.
 - ⇒ **Low:** No antialiasing
 - ⇒ **Medium Low:** Some antialiasing
 - ⇒ **Medium:** Medium antialiasing
 - ⇒ **High:** Extensive antialiasing

The higher the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more system memory. Choose a lower quality if you are rendering a Pencil Test.
- **Anti-aliasing Exponent:** Controls the amount of area around the Line and Colour Art edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.
- **Texture Filter:** This option changes the way coloured pixels of TVG textures are calculated when rendered for different degrees of accuracy.
 - ⇒ **Bilinear:** This option takes the four pixels around each point and makes a bilinear interpolation between them. (Medium Quality)
 - ⇒ **Nearest:** This option chooses the colour of the closest pixel to a point. (Lower Quality)
 - ⇒ **Nearest (Filtered):** This option is an improved version of Bilinear and improves the quality when zooming on a texture. (Best Quality)

Bitmap Options

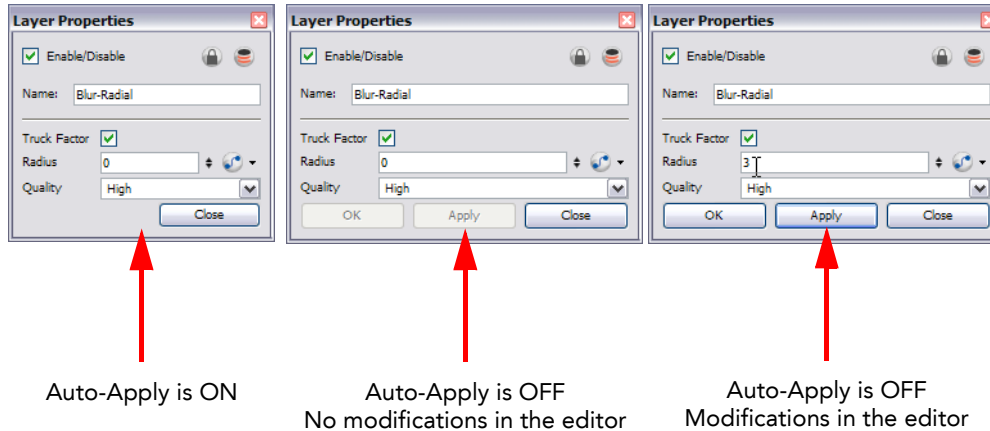
- **Read Colour:** Controls the production of colour information from bitmap images. If this module reads 3 or 4-channel bitmaps, this selection determines whether the colour should be read or ignored. If this module reads 1-channel bitmaps, this selection determines whether the channel should be read as colour. When this option is selected with 1-channel images, the resulting image will be a greyscale image.
- **Read Transparency:** Controls the production of alpha information from bitmap images. If this module reads a 1 or 3-channel image, this option will create a matte from the colour values in the image. If the module reads a 4-channel image and this option is not selected, the alpha information in the image will be ignored.
- **Transparency Type:**
 - ⇒ **Premultiplied with Black:** Pixels at the edge of an image are blended with black.
 - ⇒ **Premultiplied with White:** Pixels at the edge of an image are blended with white.
 - ⇒ **Straight:** Pixels at the edge of an image are blended with black, white and greys.
 - ⇒ **Clamp Colour to Alpha:** Select this option when you want to premultiply the colour value with the alpha value. When the colour is clamped to the alpha, the colour value cannot be higher than the alpha value. It calculates the real colour value faster. When the RGB values are multiplied with the alpha value, that is to say, if you have a pixel of value R=247, G=188, B=29 and the alpha is 50% or the image has a 50% transparency, then the actual RGB values output would be half of the amounts listed above.
- **Depth:** Overrides the order of cables in the network to determine how this element is rendered.
- **Morphing Velocity:** Attaches a function curve to interpolate the morphing velocity between two frames. The velocity of morphing at a specific frame is the ratio of the difference between the value at the current frame and first frame of the morphing and the difference between the final frame of the morphing and the current frame.

Auto-Apply Option

When you modify a parameter in a property dialog box, Harmony Stage calculates the modification automatically and displays the result immediately in the Camera view. If you do not want to immediately display every change made to your scene, you can turn off this default setting by disabling the Auto-Apply option. For example, when you are working on a very heavy scene.

Disabling this function will result in adding Apply and OK buttons at the bottom of your Layer Properties view and any other parameter dialog box.

- Click on the Apply button to apply the current change.
- Click on the OK button to apply the current change and close the Layer Properties.



To disable and enable the Auto-Apply option:

- ▶ In the top menu, select **Edit > Auto-Apply**.

If you wish to always work in Auto-Apply mode, you can disable the Auto-Apply preference.

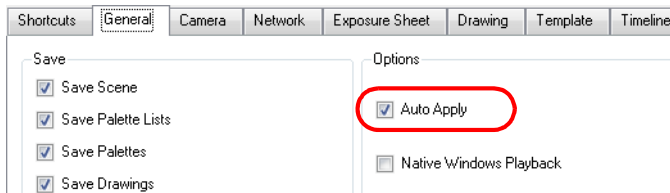
When the preference is disabled, each time you launch the application, your Auto-Apply mode will be set to OFF. You will need to click on the Apply button to see the modifications.

To disable and enable the Auto-Apply preference:

1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X).



The Preferences panel opens.




2. In the Preferences panel, go to the General tab.
3. In the Options section, disable or enable the Auto Apply preference.




Resetting a Transformation

Once your layers are positioned in the Camera view, you can easily reset them to their original position. Use the Select command to reset the value of the selected element to the initial value of the active tool. For example, if the Rotate


 tool is active, the transformation angle will be reset to 0 and if the Transform  tool is active, the entire transformation values will be reset.

 When using the Transform  tool to select element in the Camera view, always make sure that the Peg Selection Mode  option in the Transform Tool Properties view is disabled or else it will limit the selection to peg only.

To reset the layers position:

1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Timeline or directly in the Camera view, select the drawing layers you wish to reset. You can select more than one layer at a time.
3. Select **Animation > Reset**. You can also use the default keyboard shortcut [Ctrl]+[Shift]+[Z] (Windows/Linux) or [⌘]+[Shift]+[Z] (Mac OS X).

The selected layers will automatically return to their original position.

 In the Timeline view, you can also use the **Clear All Values** command to reset all transformation values on the selected layers. Right-click (Windows/Linux) or [Ctrl] + click (Mac OS X) on the selected layers and select **Layers > Clear All Values**.

Cloning and Duplicating Layers

You may need to clone or duplicate a layer during a production. This allows you to modify the layers's drawings or the timing independently from the original column.

Clone Layer

A cloned layer is linked to the original element directory. If a drawing is modified in the original or cloned layer, both will be updated. However, clone layers can have different timings.

For example, if you make a walk-cycle for a soldier and want to use it for a whole army, you may want to have fifty layers with fifty different drawing exposures to produce a slight difference in the timing. You don't necessarily want the same drawing fifty times. If you copy your layers and their drawings fifty times over, it will create a very heavy scene. It is better to clone the fifty layers from the same initial layer to have them all linked to the same walk cycle drawings, producing fifty layers but one drawing directory. This will also allow you to correct the drawings in one layer and have all of the other ones updated simultaneously.



When you clone a layer that is already linked to a function, the cloned layers are automatically linked to the same function, so if you reposition the layers while in Animate mode, they are all repositioned to the same place because a keyframe is added to this function. If you want the layers to move on a trajectory that is independent, make sure to unlink the function before cloning.

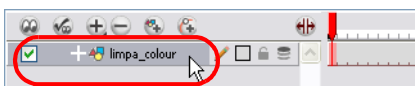


Refer to the *Creating Animation Paths* chapter to learn more about functions and trajectories.



To clone a layer:

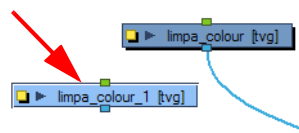
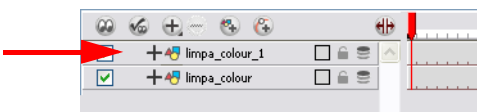
- In the Timeline view, select the layer to clone.
 - In the Network view, select the module you want to clone.



- In the Timeline View menu, select **Layers > Clone Selected Layers**.
 - In the Network View menu, select **Modules > Clone Selected Modules**.

The cloned layer appears in the Timeline view. Note that the module will not appear in the Timeline view if it is not connected to the Composite module or if the Display mode is not set on Display All.

The cloned module appears in the Network view



Refer to the *Setting Up the Network* topic to learn more about modules and network connections.

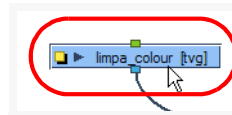
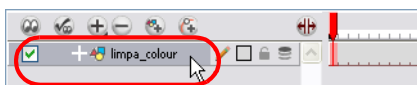
Duplicate Layer

You can duplicate a layer to have a copy of the drawings that are independent from the original column, as well as an independent timing (exposure). When you need the drawings to be modified independently, you will want to duplicate the layer instead of cloning it.



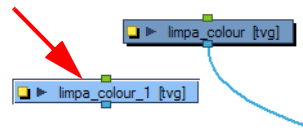
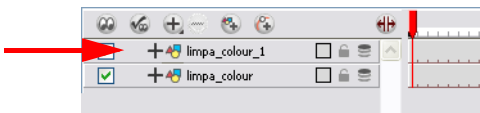
To duplicate a layer:

1. In the Timeline view, select the layer to duplicate.
 - ▶ In the Network view, select the module you want to duplicate.



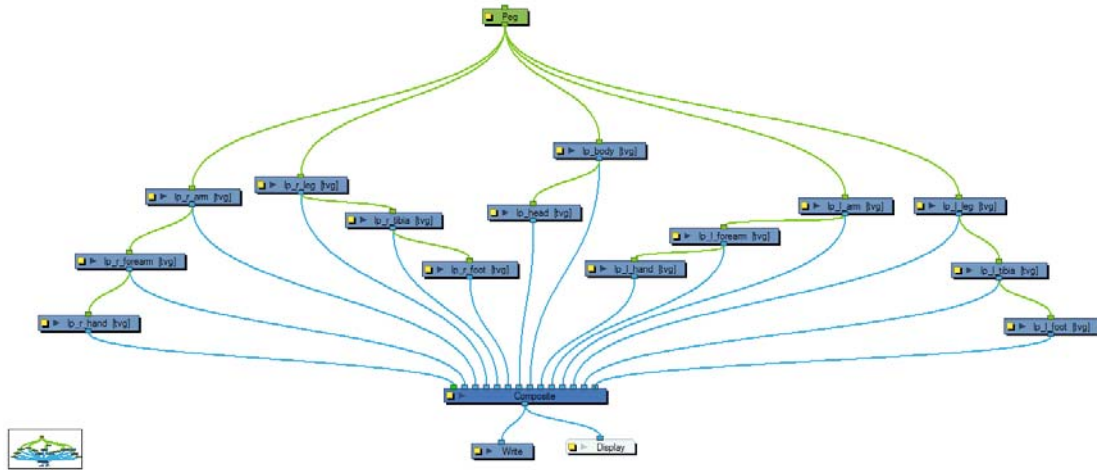
2. In the Timeline View menu, select **Layers > Duplicate Selected Layers**.
 - ▶ In the Network View menu, select **Modules > Duplicate Selected Modules**. If you duplicated a module, it will not automatically connect itself to the composite *module of your scene*.

The duplicated layer appears.



Refer to the *Setting Up the Network* topic to learn more about modules and network connections.

Setting Up the Network

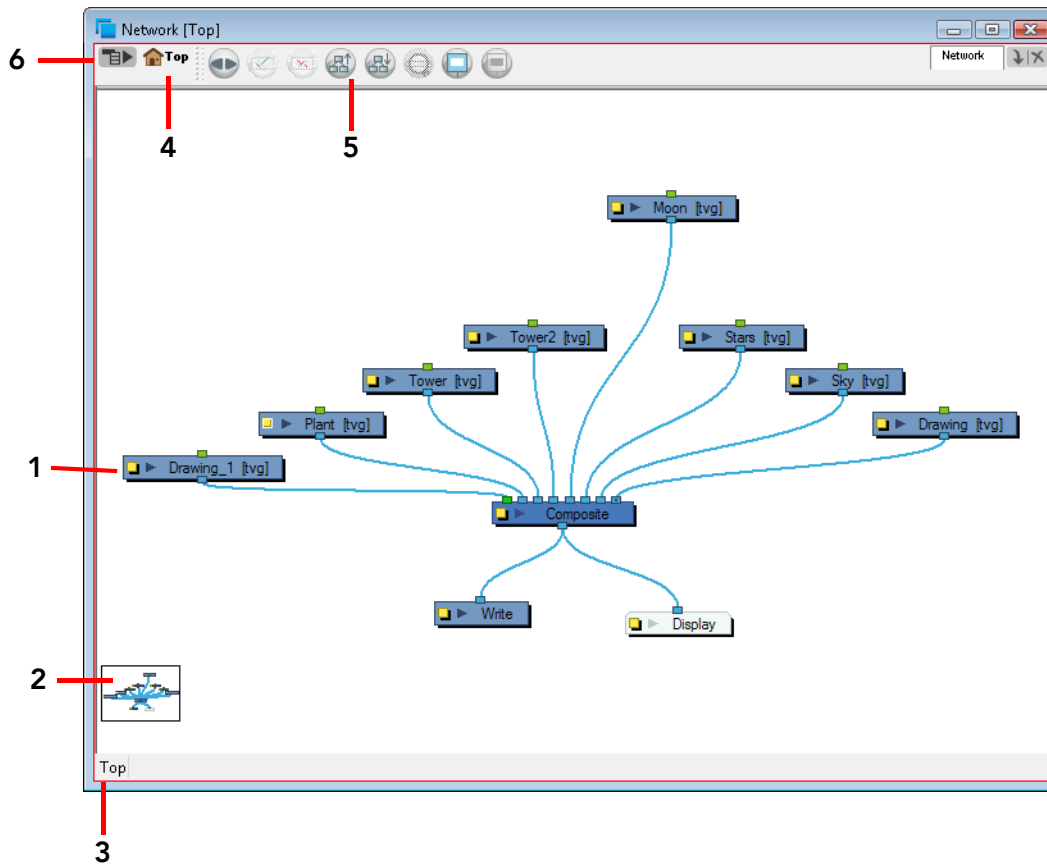


The Network view uses a visual set of connections to show how each element in the scene is brought to the final image. It allows you to add extra elements and effects, and to move beyond the possibilities offered by the Timeline and Xsheet capabilities.

The following topics are explained here:

- Network View
- Network Navigation and Basic Rules

Network View



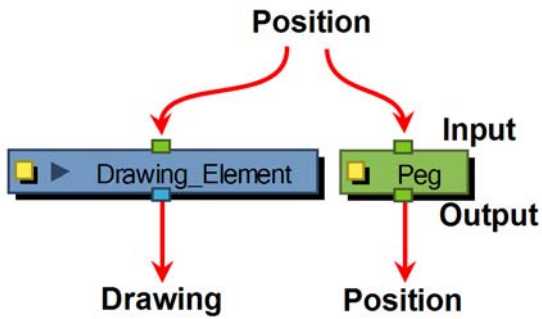
- | | |
|-------------------------|-------------------------|
| 1. Modules | 4. Editing Stack Menu |
| 2. Navigator | 5. Network View Toolbar |
| 3. Group Hierarchy Menu | 6. Network View Menu |

Network Navigation and Basic Rules

The basic rules of the Network View are quite simple. Once they are understood, a lot can be accomplished. In this section we discuss:

- Modules
- Input and Output Ports
- Modules: Adding
- Modules: Organizing
- Modules: Connecting and Disconnecting
- Modules: Grouping
- Modules: Enabling and Disabling
- Modules: Thumbnails
- Navigator Display
- Cable Styles

Modules



Each element in the Network View is called a module. There are different types of modules:

- Drawing Element Module
- Effect Modules
- Input/Output Modules
- Move Modules
- Compositing Modules.

This is what they look like:

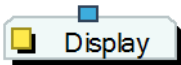
- **Drawing Element modules** transfer drawing information.



- **Effect modules** process effects on drawings and transfer drawing information.



- **Input/Output modules** are the interface between each module and network.



- **Move modules** control the camera and element transformations over time.



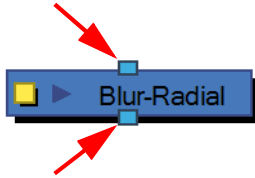
- **Composite modules** combine multiple source images.



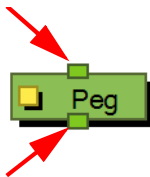
Input and Output Ports

Each module carries an Input port at the top and an Output port, placed at the bottom. Some are blue while others are light green or bright green.

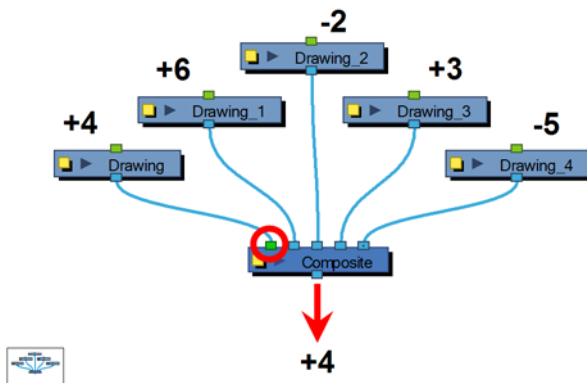
- Blue denotes drawing information



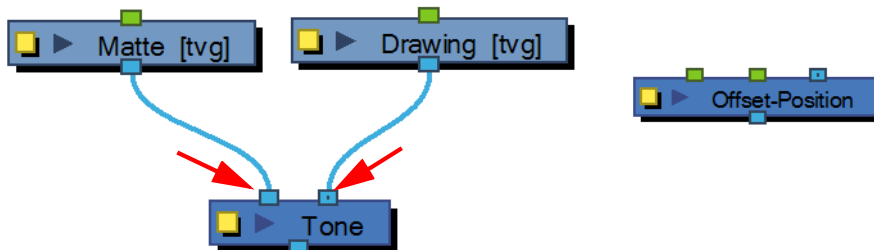
- Light Green denotes position and movement



- Bright Green shows the element on top of the composition and outputs that element's Z position to the Composite module. When many elements have different Z positions (multiplane, different distances from the camera) and are placed through a Composite module that flattens them together (producing one image with one Z value), the system needs to give a Z position to this new image. It uses the bright green port element information.



Finally, some modules contain more than one Input port. These are usually Effects modules needing different drawing or position information in order to perform their calculation. When the two ports are blue, the Drawing is on the right and Matte is on the left. If it is light green, the drawing needs extra position information.

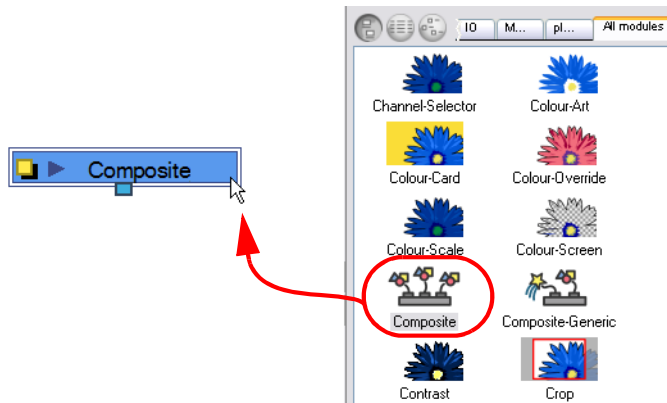


Modules: Adding

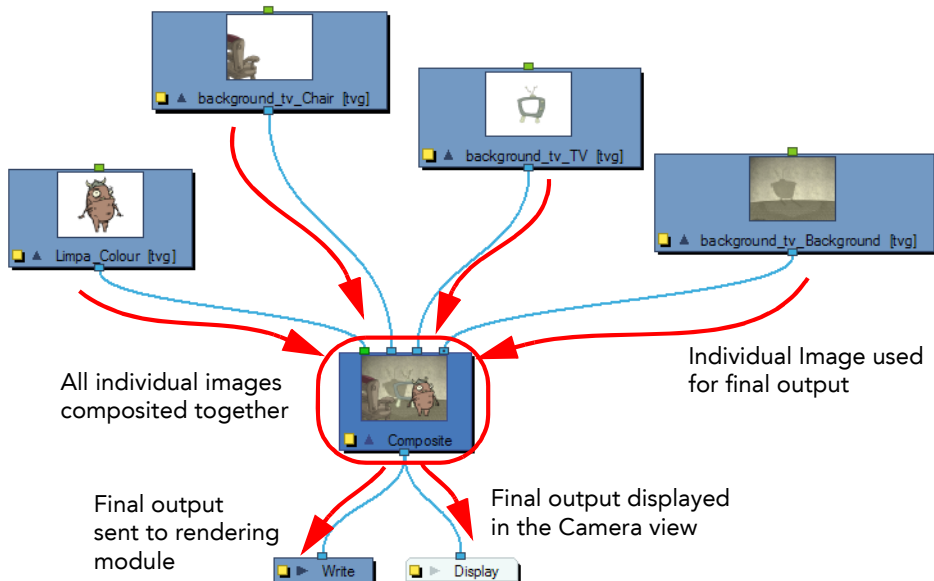
Each module used to build a network is available in the Module Library view. In addition, each time you create a layer from the Timeline or Xsheet views, the corresponding module is created in the Network view.

To import modules from the Module Library:

- ▶ In the Module Library, select the desired module and drag it in the Network View.



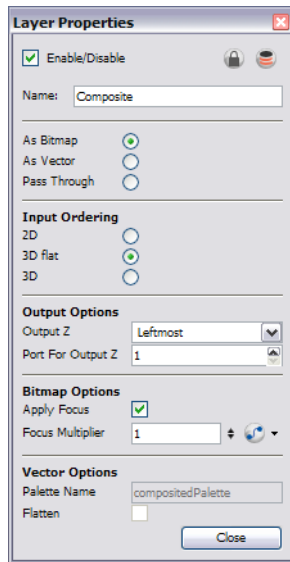
Modules: About the Composite Module



The Composite module is used to take several images and output a single image. You can compare that to doing pre-compositions in some editing software. You connect several drawing modules in your Composite module and one bitmap comes out of it.

By default, the image coming out of the Composite module is a bitmap. The layers are composited together depending on their position on the Z-axis (forward-backward) first, then their order in the Composite module. If two images are at the same position on the Z-axis, their order in the Composite will determine which one is displayed in front and which one is displayed behind.

Composite Layer Properties



For more information about the Composite module options in a 3D environment context, refer to *Working in a True 3D Space > Managing a Network with a 3D Scene Setup*, on page 530.

Composite Options

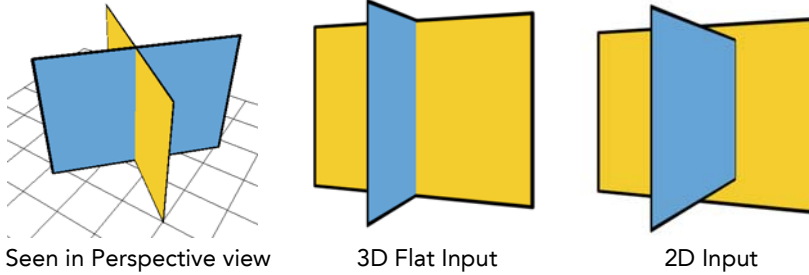
- **As Bitmap:** when selected, it composites all of the images into a single, flat bitmap image. The Z value of the final image will be based on the Output Z selection.
- **As Vector:** when selected, it composites all of the images as a single vector image. The Z value of the final image will be based on the Output Z selection.
- **Pass Through:** when selected, no compositing operations occur. No image will be merged or flattened. Each individual image will keep its own properties. The compositing operations will happen only in the next Composite module connected below. In this case, the Input Ordering options are ignored. If a Composite set to Pass Through it is the last one in the compositing chain, it will act the same as the As Bitmap option. At that point, the Input Ordering options will be considered.

Input Ordering Options

- **2D:** when selected, elements connected in the module are composited based on their port ordering. The Z-axis (forward-backward) values are ignored. The scaling value will be correct, but the actual position on the Z-axis will be ignored. You can use the 2D composite type to create effects such as a camera recording overlay on your scene. Since you always want this element to be in front regardless of the other elements Z-axis position, you can set the option to 2D.



- **3D Flat:** when selected, the Z-axis value of the elements connected in the composite module are considered, so the visual representation is correct in the Camera view. The output will be a flat image.



- **3D:** when selected, the Z-axis value of the elements connected in the composite module are considered, so the visual representation is correct in the Camera view. The image will not be flattened. The 3D aspect of the elements will be kept. For example, if you rotated elements on the three axes, the information will be retained and elements composited in lower levels will be able to intersect with the elements coming from a 3D composite module. The 3D Composite module should only be used in advanced cases. It is better to use a Pass Through composite type than a 3D composite type. This way, all the elements are composited together in the final Composite module.

Output Options

- **Output Z:** use this selection to identify which element's front-back value from the current composition will be applied to the entire composited image in the next operation. If you select Portnumber, identify the appropriate port by its position using the **Port For Output Z** menu. The port used appears in a bright green the other ports on the Composite module. By default, the leftmost port is displayed in front and the rightmost one is displayed behind.

Bitmap Options

These options are active when you select the As Bitmap option.

- **Apply Focus:** this activates the Focus effect for this module in the composite operation.
- **Focus Multiplier:** the value entered in this field is used as a multiplier for the radius value specified in the Focus or Focus-Multiplier modules.

Vector Options

These options are active when you select the As Vector option.

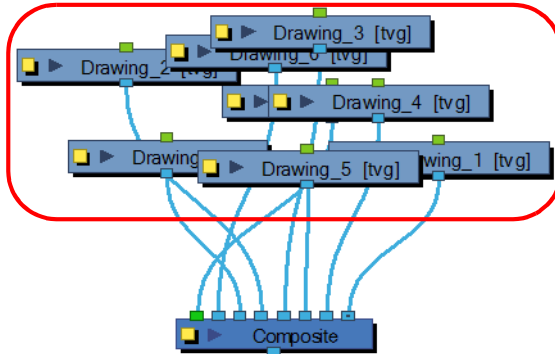
- **Palette Name:** when you render files, you can use this field to set the name of the palette files that Harmony Stage will create for them.
- **Flatten:** selecting this option will flatten the vector drawings into one vector drawing file. Any transparency will be lost in the process. This creates smaller vector files, but might increase the time required to composite the drawings. This can be useful when reusing drawings. Because they will be vector files, you will still be able to apply vector-based transformations and effects.



Modules: Organizing

When you are working in the Network view, and adding many modules, your scene might look a bit messy and be hard to follow. To fix this, Harmony Stage provides the Order Network script which organizes and displays the modules in a more orderly fashion.

To use the Order Network script to organize your network:

1. In the Network View, select some or all of your modules.



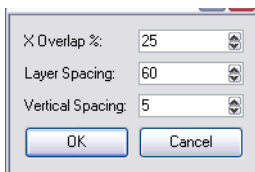
2. In the top menu, select **Window > Toolbars > Scripting** to display the Scripting toolbar and click on the TB_orderNetworkUp  or TB_orderNetworkDown  button.



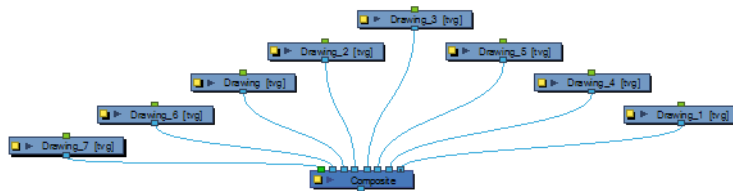
Refer to the following sections of the *Discovering the Interface* chapter to learn how to display toolbars and customize your workspace:

- ⇒ Managing the Views, on page 58
- ⇒ Managing the Toolbars, on page 60
- ⇒ Managing the Workspace, on page 62

The **Order Network** dialog box opens.



3. Set an X Overlap% value.
4. Set a Layer Spacing value.
5. Set a Vertical Spacing value.
6. Click on the OK button to reorder the network with the specified parameters.

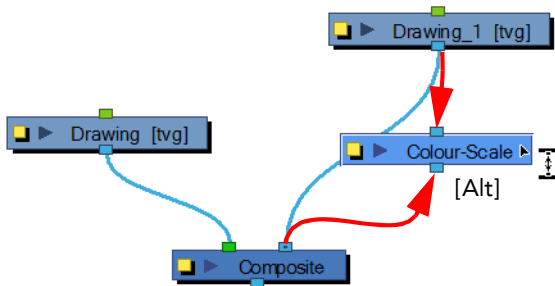


Modules: Connecting and Disconnecting

Making connections between the modules and removing these connections are as easy as a click and drag.

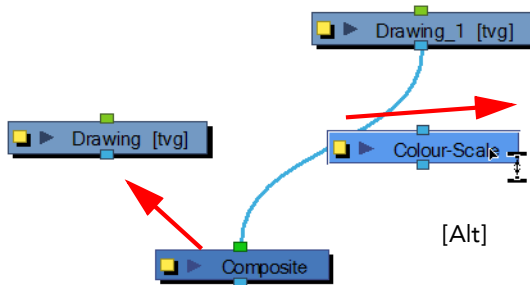
To connect modules:

- In the Network view, extend a cable from the first module's output port and connect it in the second module's input port.
 - You can also select the module to connect, hold down the [Alt] key and drag the module on an existing cable.



To disconnect modules:

- In the Network view, pull a cable away from the module's input port.
 - You can also select the module to disconnect, hold down the [Alt] key and drag the module away.



Modules: Grouping

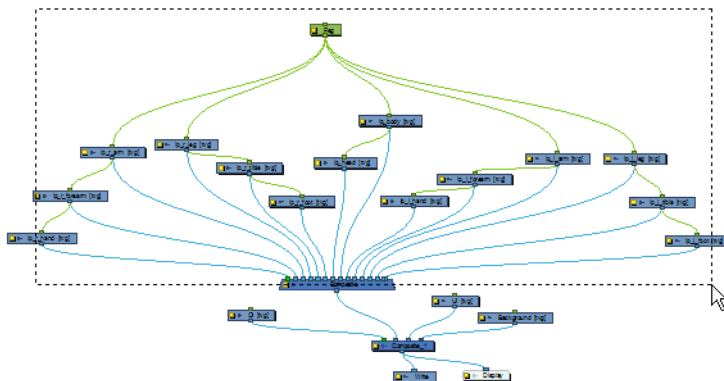
With so many connections and modules possible the network can quickly become crowded, a good trick to keep organized is to group your modules.



Grouping a Selection

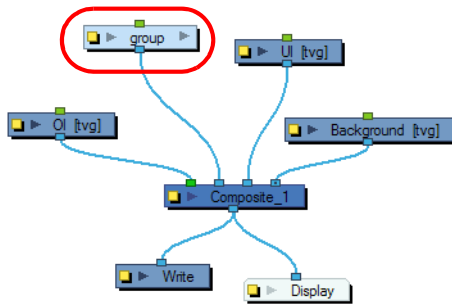
To group selected modules:

- In the Network view, drag a selection around the modules you want to group.



2. Select **Edit > Group > Group Selected Layers**. You can also use the default keyboard shortcut [Ctrl]+[G] (Windows/Linux) or [⌘]+[G] (Mac OS X).

Your modules are grouped.



To ensure that your group remains connected to the main Composite module through only one Output port it is recommended that you include a Composite module into your selection before grouping it.

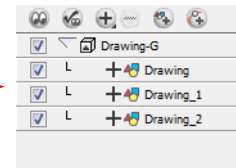
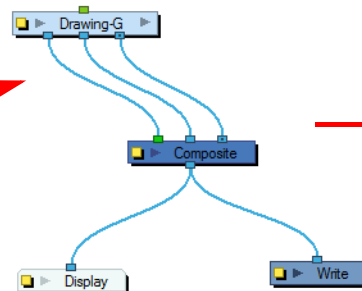
Grouping a Selection with Composite

There are several advantages to using the **Group Selection With Composite** command (only found through the Timeline) over the simple **Group Selection** (which references both the Group layer in the Timeline and the Group module in the Network view).

One of the advantages of using this command is that it groups all the selected elements into a neat module that has a nested composite. This means that there is only one connection coming out of the Group module. With the simple Group module or command, the Group displays the same number of connections as elements in the group. Both grouping commands display the same structure in the Timeline view.

Group Selection

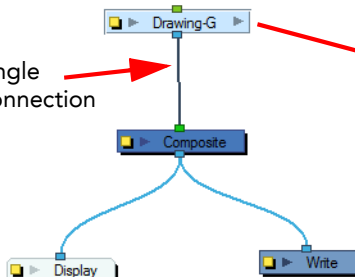
Each wire represents a connection to an element in the group



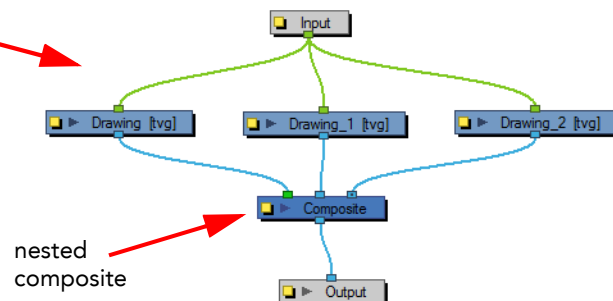
Timeline view Structure

Group Selection With Composite

single connection



Inside the Drawing-G module



nested composite

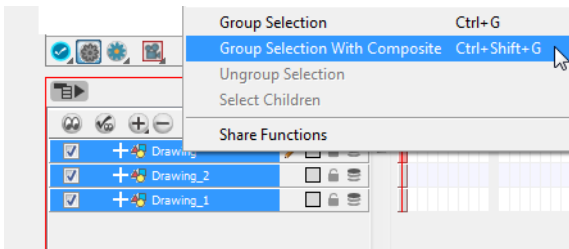
The **Group Selection With Composite** command should only be used before any work has been done in the Network view and it is recommended for objects whose stacking order is of no consequence.



NOTE: Using the Group Selection from Composite command on elements that have effects, have been tweaked in the Network view, or whose stacking order is of consequence, may cause the grouped elements to lose their properties once grouped in this way. In addition, though you may only select a few modules to group, if there are other layers in the timeline that exist between the selected layers, they will automatically be grouped, even if not selected.

To group selected elements using the Group Selection With Composite command:

1. In the Timeline view, in the layers section, select the elements that you wish to group.
Any layers between the selected layers will automatically get grouped as well, so if the stacking order is of no consequence, move extra layers either above or below the layers that you wish to group.
2. Right-click (Windows/Linux) or [Ctrl] + click (Mac OS X) on one of the highlighted layers and from the pop-up menu select **Group Selection With Composite**.



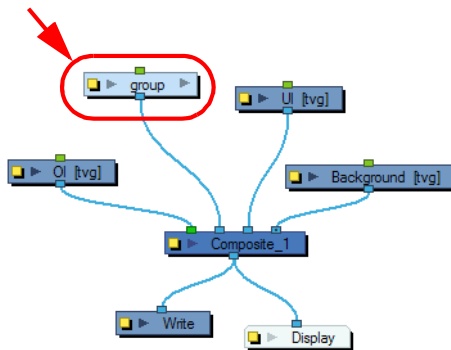
The layers appear indented under a new Group layer in the Timeline view and in a new Group module in the Network view.



Exploding a Selected Group

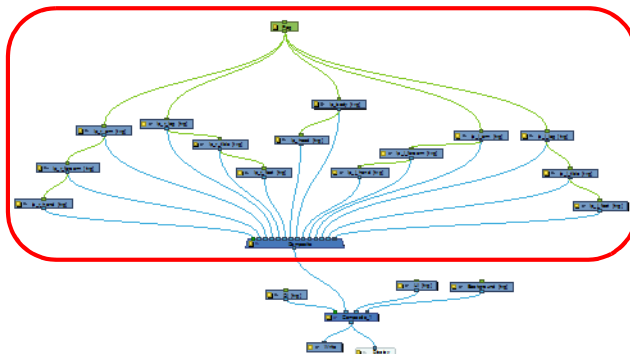
To explode a selected group:

1. In the Network view, select the group module you want to explode.



2. Select **Edit > Group > Ungroup**.

Your modules are ungrouped.



Entering and Exiting a Group Module

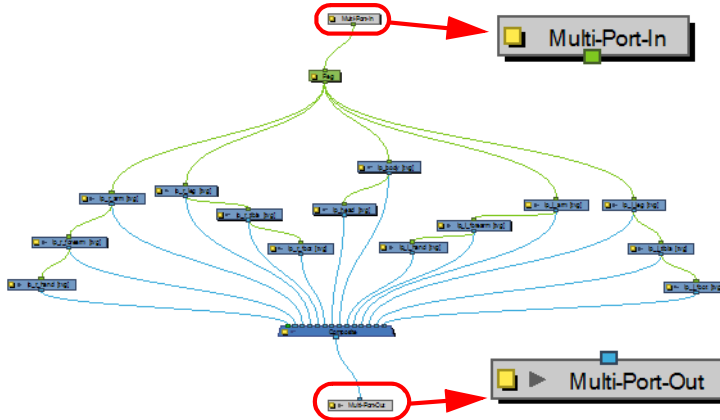
Once you create a group module, it is easy to enter into or exit from it.

To enter a Group module:

1. In the Network view, click on the dark arrow on the right-hand end of the group module you want to enter.



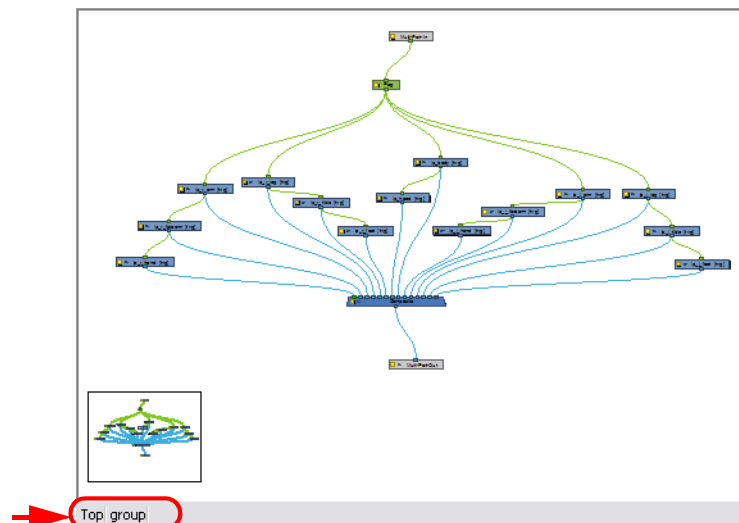
You will enter the group module.



- ▶ Inside the group module, the Multi-Port-In and Multi-Port-Out modules ensure that your connections continue beyond the group.

To exit a Group module:

1. In the Network view, click on the destination in the Group Hierarchy Menu at the bottom left corner of the Network view. You can also select **Modules > Exit Group** from the Network View menu or hold down the [Shift] key and click on the Multi-Port-Out module. The default keyboard shortcut is [Backspace].



- ▶ When you enter a group, the Group Hierarchy Menu displays the path to your current location within the network. In this particular example, the Network view displays the modules inside the group "group". To exit this group, click on Top.

Moving a Selected Module to its Parent Group

Using the Move to Parent Group command allows you to move the selected module to the parent level, maintaining all connections.

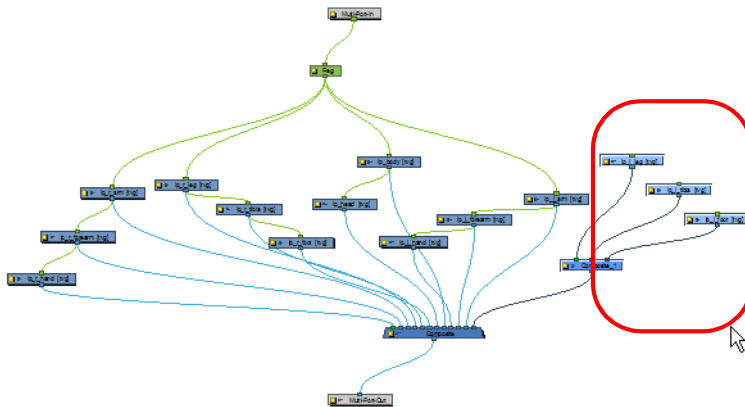


If the operation cannot maintain the connections between the modules, you will be notified and the operation will be terminated.



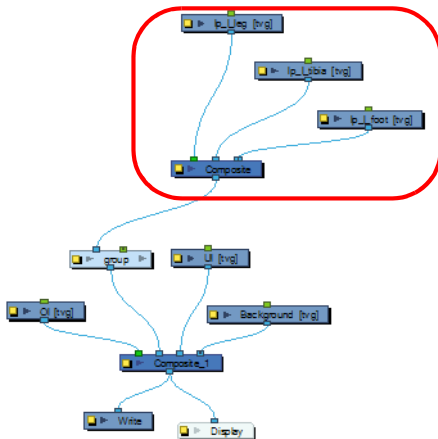
To move a selected module to its parent group:

1. In the Network view, go inside the group and select the modules you wish to move up to the parent group level.



2. In the Network View Menu, select **Modules > Move to Parent Group**. You can also use the default keyboard shortcut [Ctrl]+[Shift]+[U] (Windows/Linux) or [⌘]+[Shift]+[U] (Mac OS X).

The selected modules are moved to the parent group level.



Modules: Enabling and Disabling

As with the Timeline layers, you can enable and disable the Network view modules. Disabling a module in the Network view will also disable its corresponding layer in the Timeline view. Disabled modules are displayed in red.


Enabling a Module

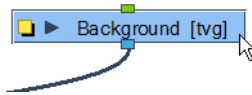
To enable modules:

1. In the Network view, select the disabled module(s) you want to enable.



2. In the Network View menu, select **Modules > Enable**. You can also use the default keyboard shortcut [A]. This keyboard shortcut is also valid in the Timeline view.

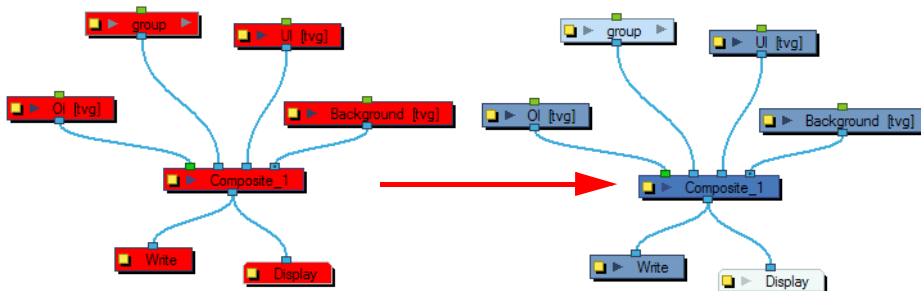
You can also select the module(s), right-click on it and select **Enable** from the menu or simply use the Enable  button in the Network View toolbar.



Enabling All Modules

To enable all modules:

1. In the Network View menu, select **Modules > Enable All**.

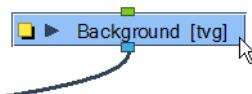



When enabling a group using **Modules > Enable All** only the parent group layer is enabled. The modules inside the group remain disabled. In the Timeline the nested modules also remain deselected.

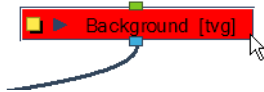
Disabling a Module

To disable modules:

1. In the Network view, select the module(s) you want to disable.



- In the Network View menu, select **Modules > Disable**. You can also click on the Disable  button from the Network View toolbar. The default keyboard shortcut [D]. This keyboard shortcut is also valid in the Timeline view.

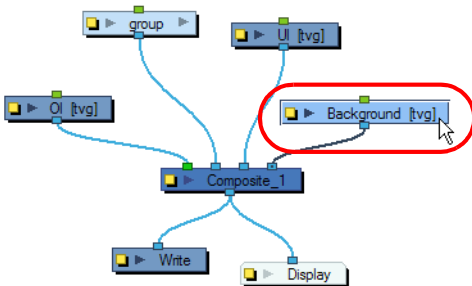


The Disable operation only affects the current level layer. It does not affect the nested modules within a group.

Disabling All Other Modules

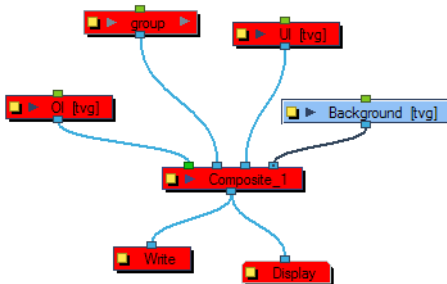
To disable all others:

- In the Network view, select the module(s) to remain enabled.



- In the Network View menu, select **Modules > Disable All Others**.

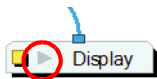
All modules are disabled except for those selected.



The Disable All Others operation only affects the current level layers. It does not affect the nested modules within a group.

Modules: Thumbnails

In the Network view, some modules have a thumbnail option, identified by an arrow next to the square yellow button.

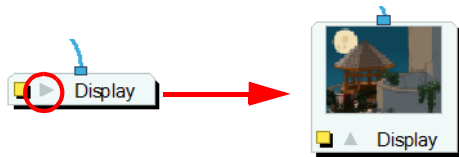


Show Thumbnails

To show a module's thumbnail:

- In the Network view, click on the arrow in the module.

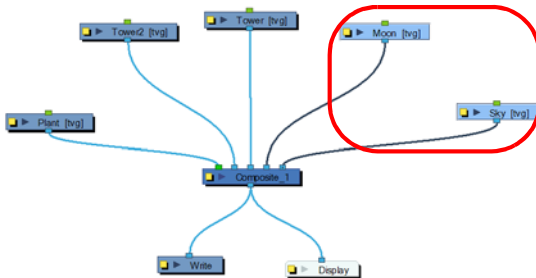
The thumbnail opens.



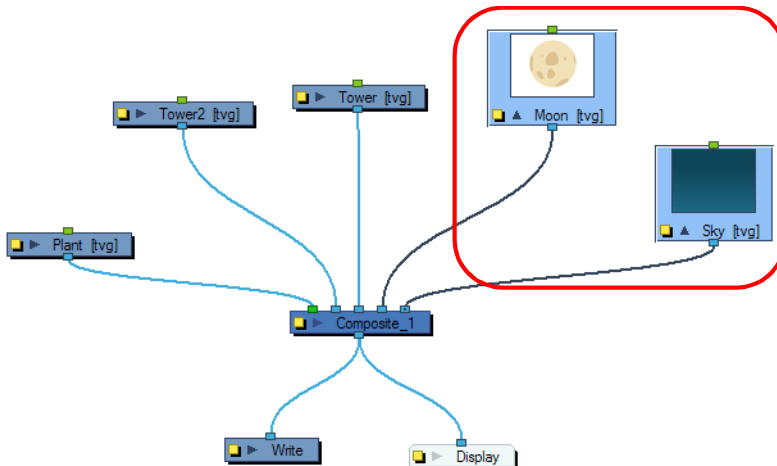
- ▶ If no thumbnail appears, click on the Render View Mode  button in the Camera view bottom toolbar to generate them.

To show thumbnails of selected modules:

1. In the Network view, select the module(s) you want to display the thumbnail for.



2. In the Network View menu, select **View > Show Selected Thumbnails**. The default keyboard shortcut is [T].



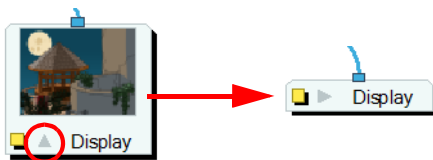
- ▶ If no thumbnail appears, click on the Render View Mode  button in the Camera view bottom toolbar to generate them.

Hide Thumbnails

To hide a module's thumbnail:

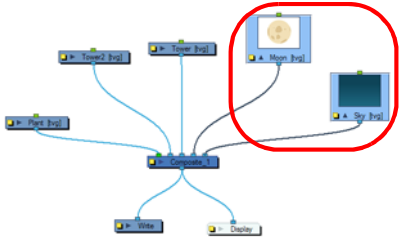
- ▶ In the Network view, click on the arrow in the module.

The thumbnail closes and the module returns to its closed state.

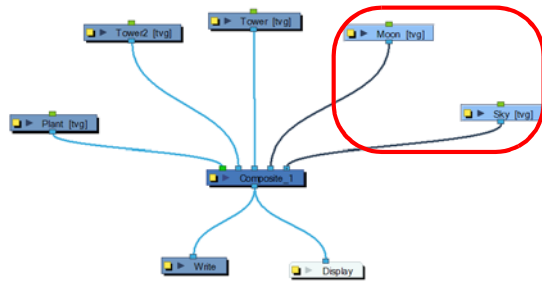


To hide thumbnails for the selected modules:

1. In the Network view, select the module(s) you want to hide the thumbnail display for.



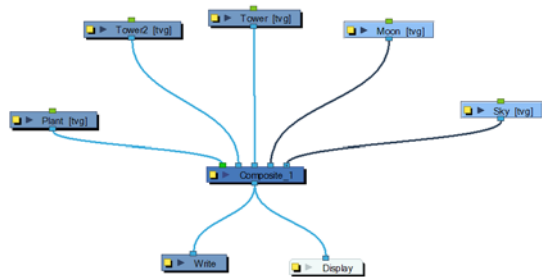
2. In the Network View menu, select **View > Hide Selected Thumbnails**. The default keyboard shortcut is [T].



Hide All Thumbnails.

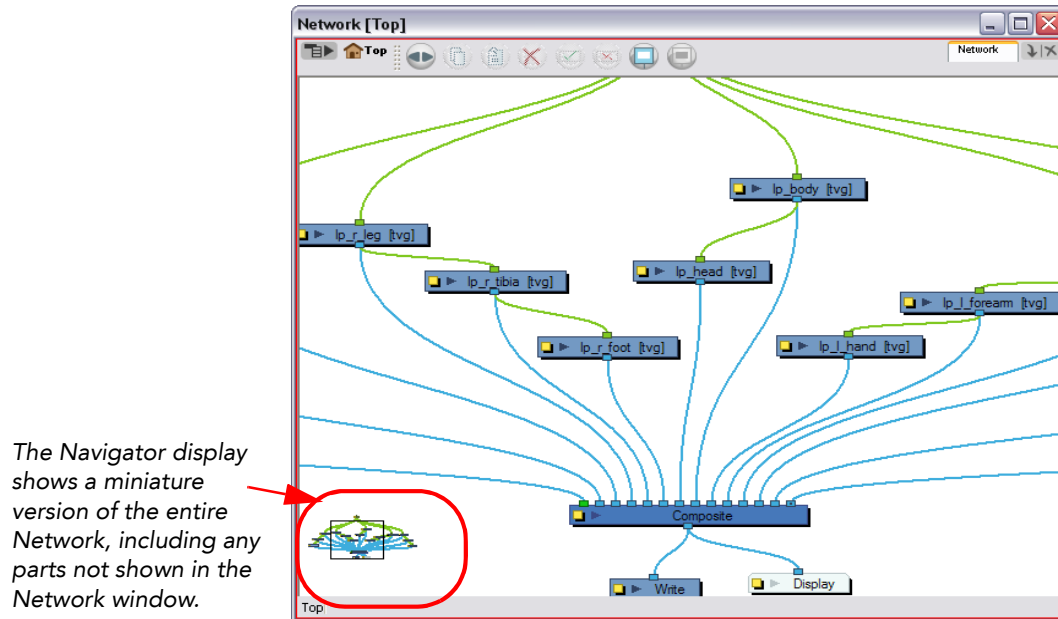
To hide all modules thumbnails:

1. In the Network View menu, select **View > Hide All Thumbnails**. This hides all the thumbnails.



Navigator Display

The Navigator is a small square window inside the Network view that displays a thumbnail of your current network. The current view displayed in the Network window is shown framed in the Navigator display. You can drag this frame to pan your current Network view display.



Showing and Hiding the Navigator

You can show or hide the Navigator from the Network view.

To show and hide the navigator:

- ▶ In the Network View menu, select **View > Navigator > Hide Navigator** or **Show Navigator**. You can also use the default keyboard shortcut [Ctrl]+[Shift]+[W] (Windows/Linux) or [⌘]+[Shift]+[W] (Mac OS X).

Positioning the Navigator

The Navigator display can be placed in any corner of the Network view.

To position the navigator:

- ▶ In the Network View menu, select **View > Navigator >** and choose from **Top Left**, **Top Right**, **Bottom Left**, **Bottom Right**.



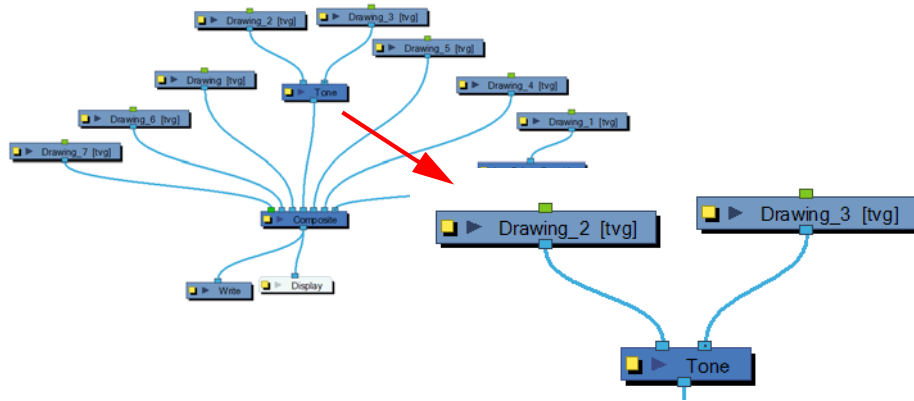
Refer to the *Scene Setup Preferences* topic to learn how to set the Navigator display options in the Preferences panel.

Cable Styles

You can customize the look of the cables in the Network view to fit your style of working.

Bezier

The Bezier cable style displays the cables as curved lines.

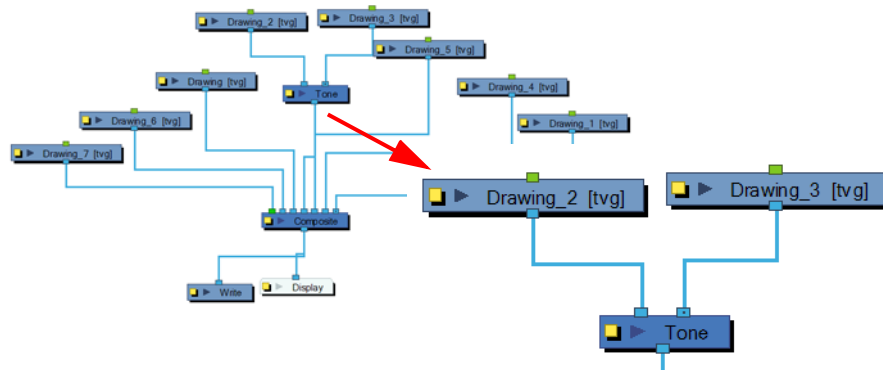


To switch to Bezier cable style:

- ▶ In the Network View menu, select **View > Cable Style > Bezier**.

Line

The Line cable style will display the cables as straight lines.



To switch to Line cable style:

- ▶ In the Network View menu, select **View > Cable Style > Line**.



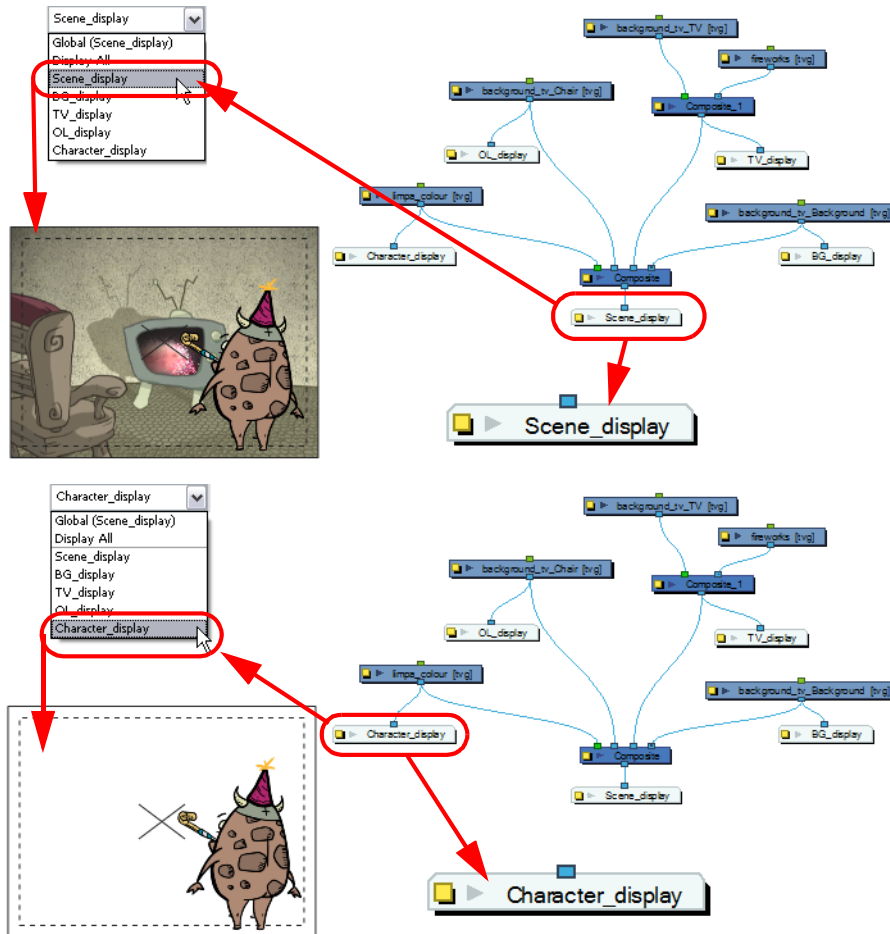
Refer to the [Scene Setup Preferences](#) topic to learn how to set the cable style in the Preferences panel.

Display Concepts

Display Modules

The Display Module is an important element as it displays its content in the other views, primarily the Camera, Timeline and Playback views. It is located in the Module Library and imported in the Network view and can be connected to any module that outputs drawing images, such as drawing elements, effects or composite modules. You can have more than one Display Module in a network allowing you to visualize different sections of the scenes without disabling or disconnecting elements that could be in the way. This technique is useful in Cut-out animation as it allows you to see one puppet without having all of the other characters in the way. It is also useful during compositing and helps you visualize effects individually.

You can add a Display to your Network view by dragging one from the Module Library view.



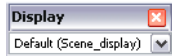
To use this display concept, you must first show the Display toolbar.



Refer to the following sections of the *Discovering the Interface* chapter to learn how to display toolbars and customize your workspace:

- Managing the Views, on page 58
- Managing the Toolbars, on page 60
- Managing the Workspace, on page 62

Global Display

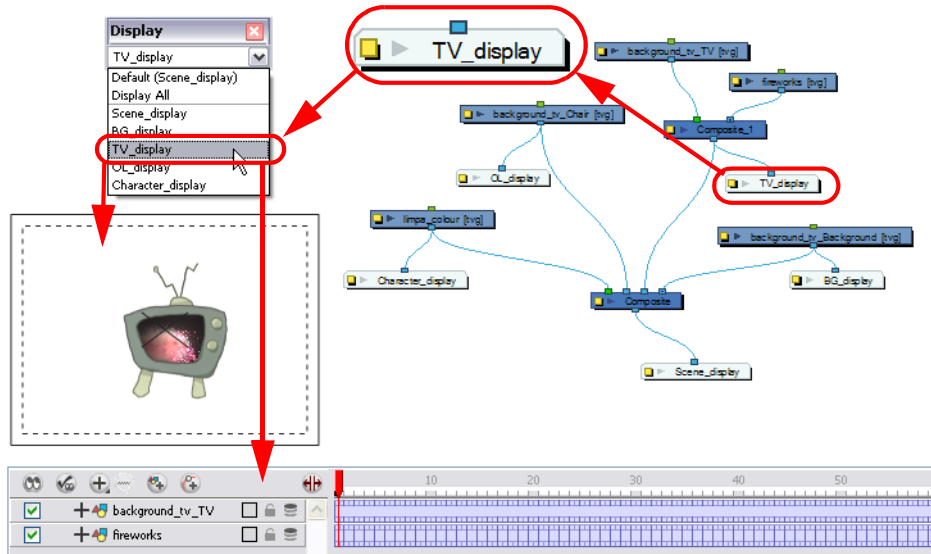


Stage uses a Display toolbar to select the different display modules available in the network.

When selecting a new display, all of the views will update to show the content of the new display module. The Display toolbar is called the Global Display.

To select a different display module as a global display:

- ▶ Open the Display toolbar drop down menu and select the desired display module from the list. Every view display will be updated in sequence.



Refer to the following sections of the *Discovering the Interface* chapter to learn how to display toolbars and customize your workspace:

- Managing the Views, on page 58
- Managing the Toolbars, on page 60
- Managing the Workspace, on page 62

Display All

When your scene does not have a Display module, it is automatically set to Display All. This mode will set the display to the same order as the Timeline view.

You can also set your display to Display All with the Display toolbar.



Refer to the following sections of the *Discovering the Interface* chapter to learn how to display toolbars and customize your workspace:

- Managing the Views, on page 58
- Managing the Toolbars, on page 60
- Managing the Workspace, on page 62

Display Modes

Harmony Stage has two display modes. By default, it is set on Basic Display mode.

- Basic Display
- Advanced Display

Basic Display

When creating a scene in Basic Display mode, a display module is automatically added to the network and connected to the final composite module. All of the views are set to display this module. This means that only the elements connected in that composite module will show in the Camera View.

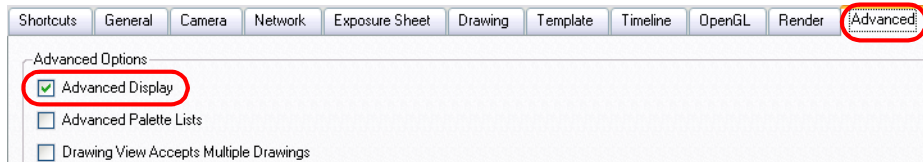
You can add and connect more display modules to your network and select the one you want using the Global Display drop-down menu. In Basic mode, every view is set to the same Display module.

Advanced Display

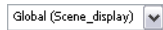
In Advanced Display mode, every view has its own Display drop down menu and each can be set to a different Display module. To switch from Basic to Advanced Display mode, you need to enable the Advanced Display preference.

To enable the Advanced Display preference:

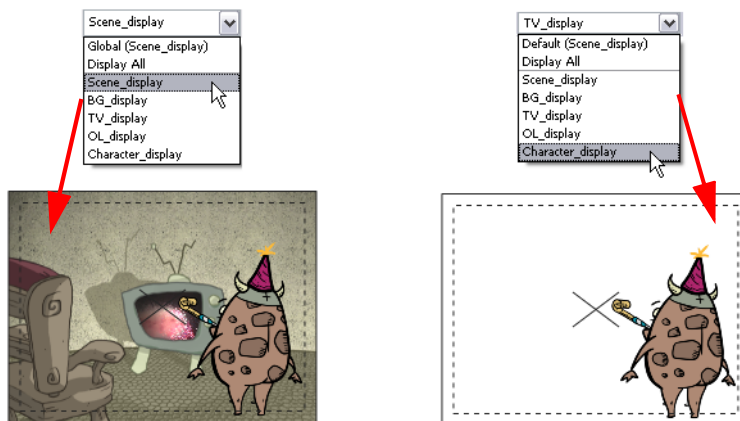
1. Select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X) to open the **Preferences** panel. You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
2. In the **Preferences** panel, under the Advanced tab, enable the Advanced Display option.



A Display drop down menu will appear in the top left corner of the Camera, Timeline, Perspective, Top and Side views.



When Stage is set on Advanced Display mode, a Display drop-down menu appears in each View. These menus allow you to set the views for different displays. By default, all views are set on Global Display to follow the Global Display toolbar selection. However, you may want different views set on different displays. For example, a user can have one Camera view to display the full scene and another Camera view to only display the character being animated. In this case, the user will set the first Camera view on the final display and the second on the character's display module.



If you want the views to follow the Global Display toolbar selection, set the view display menu to Global display.

Creating a Multiplane

One of the most exciting features in Harmony Stage is the Multiplane, or Z-depth. In the Multiplane you can create backgrounds in several layers, spread them on the Z-axis, add depth, and then move the camera through this environment to create an impressive perspective illusion. You can create backgrounds, use a layered PSD file or use a project from the sample material package.

The topics are:

- Top View and Side View
- Perspective View
- Setting Up the Multiplane
- Distributing Elements on the Z-Axis



Refer to the following sections of the Working in a True 3D Space chapter to learn more about positioning elements in 3D space and creating 3D Camera moves:

- Positioning Elements in 3D Space, on page 519
- 3D Camera Motion, on page 526

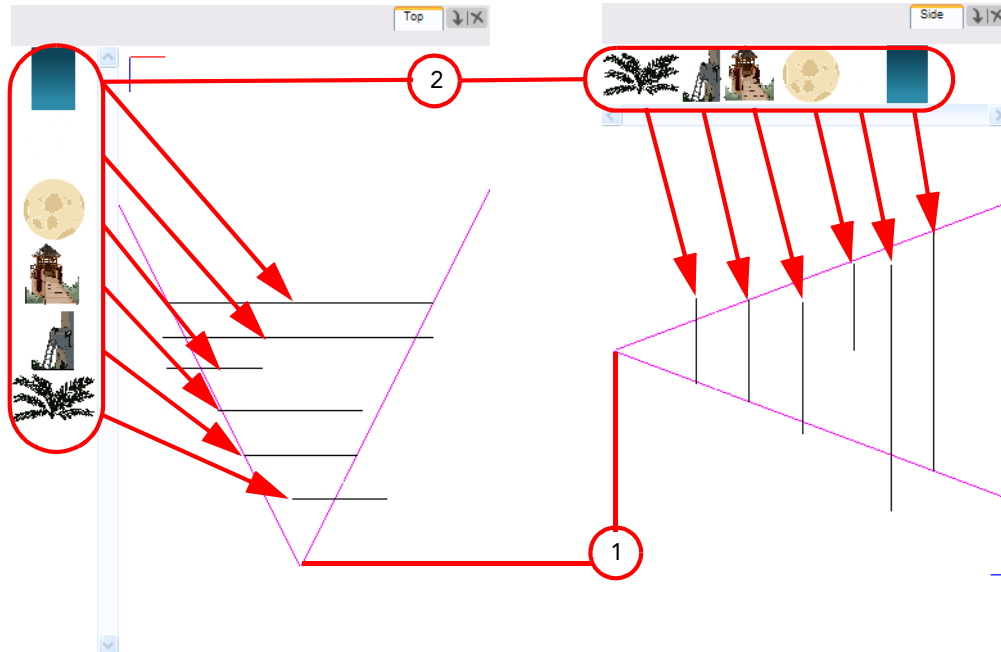
Top View and Side View

The Top and Side views are used mainly for multiplane scenes and to position elements in 3D Space. They allow the scene's stage to be seen from the top or the side. This allows the camera cone and the spacing between the different elements to be seen.



Refer to the following sections of the Working in a True 3D Space chapter to learn more about positioning elements in 3D space and creating 3D Camera moves:

- Positioning Elements in 3D Space, on page 519
- 3D Camera Motion, on page 526



1. The camera cone represents the camera's field-of-view (FOV).
2. A thumbnail of each drawing layer in your scene. The order of the thumbnail images is based on each element's FB position in the scene space. You can see a representation of the Forward Backward position of each layers within the camera cone.



Refer to the *Creating Animation Paths* chapter to learn more about keyframes, control points and animation paths.



Refer to the *Creating a Multiplane* topic to learn how to position your elements in the *Top* and *Side* view.

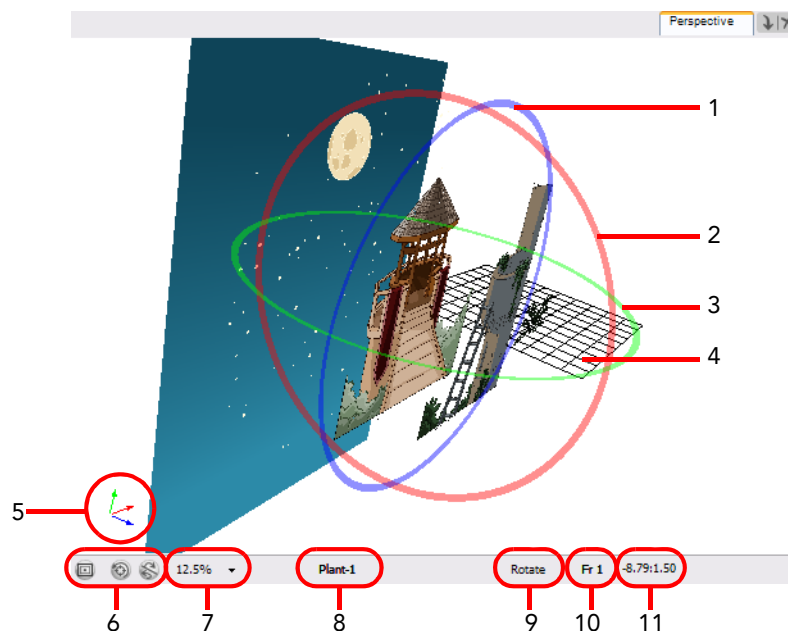
Perspective View

The Perspective view is used during scene setup. Its main use is to allow you to see your multiplane scene's orientation. The Perspective view is similar to a 3D display, as it lets you rotate your scene through all possible angles to understand the spacing between the elements. You can also position and rotate your layers and the camera inside the 3D display to achieve some 3D setup and camera moves.



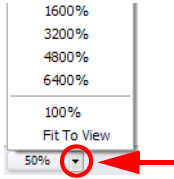
Refer to the following sections of the *Working in a True 3D Space* chapter to learn more about positioning elements in 3D space and creating 3D Camera moves:

- Positioning Elements in 3D Space, on page 519
- 3D Camera Motion, on page 526



1. The blue circle represents a rotation of the X and Y axis plane.
2. The red circle represents the rotation of the Y and Z axis plane.
3. The green circle represents the rotation of the X and Z axis plane.
4. This is a perspective grid reference.
5. The axis reference arrows let you maintain your orientation when navigating inside the Perspective view.
6. There are three view option buttons displayed in the lower left corner of the view.
 - ▶ **Show/Hide Camera:** Use this button to show or hide the camera frame in the Perspective view.
 - ▶ **Reset View:** Use this button to reset the Pan, Rotation and Zoom of the Perspective view.
 - ▶ **Reset Rotation:** Use this button to reset the rotation of the Perspective view.
7. This field displays the current zoom level in the Perspective view. You can use the Zoom level drop-down menu to select a specific zoom level from the list. Zoom levels from 2.5% to 6400% are available, you can also select

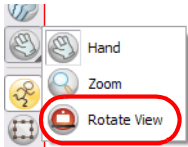
Fit To View to automatically use a zoom level that lets you see all of your scene layers and information in the Perspective view at once.



8. This field displays the currently selected layer and drawing name.
9. This field displays the currently selected tool.
10. This field displays the currently selected frame of your animation.
11. This field displays the current position of your cursor inside the Perspective view.

To rotate a scene in the Perspective view:

1. In the Tools toolbar, select the Rotate View  tool.

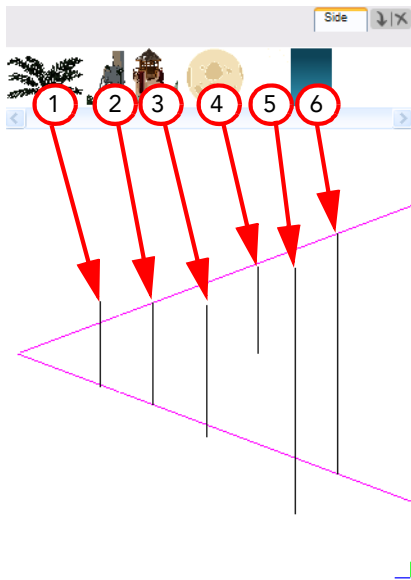


- ▶ Click in the view, and drag your cursor around to rotate the view.
- ▶ Press and hold [Alt]+[Shift] and click and drag to rotate the view one axis at a time.

Setting Up the Multiplane

To construct a multiplane, you must imagine what a real environment is like. Take a look at your background picture and imagine a camera moving across the space. You will notice that objects in the picture would move at different speeds depending on where they are in relation to the camera lens.

Building a multiplane requires an understanding of the scene's background as well as the positioning of the elements on different layers.



For example, in this background, the main objects to be separated are:


1. Fern
2. Front tower
3. Second tower
4. Moon
5. Stars
6. Sky



Although the bottom of the tower is hidden behind the plant and the ladder, each of your multiplane layers should be a complete drawing. This is because hidden portions may show up during a camera movement later on in the scene.

Distributing Elements on the Z-Axis

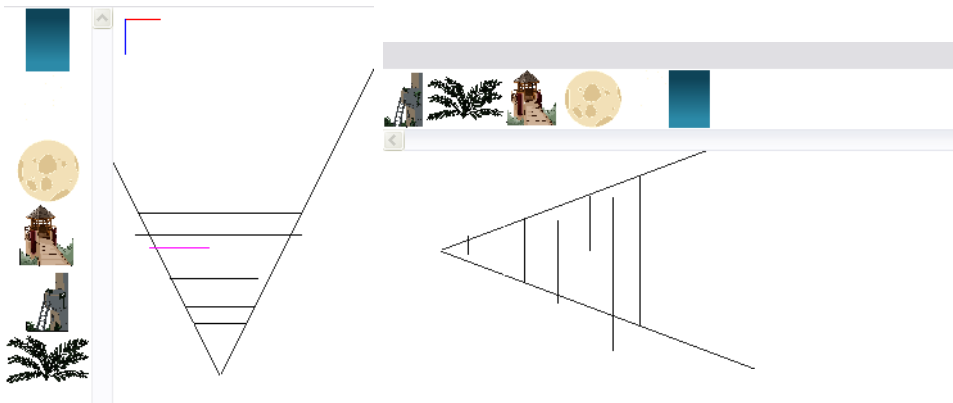
Now is the time to distribute the layers composing your multiplane along the Z-axis, maintaining their distance. You can position your layers on the Z-axis in the Side and Top view.

Positioning your element toward the camera will make your element bigger. Using the Maintain Size  tool, you will be able to drag your element toward the camera while keeping the same size aspect in the Camera view.

NOTE:


It is a good idea to keep a Camera view opened to see what your scene looks like while positioning your element in the Top or Side view.

Positioning Elements in the Top and Side Views

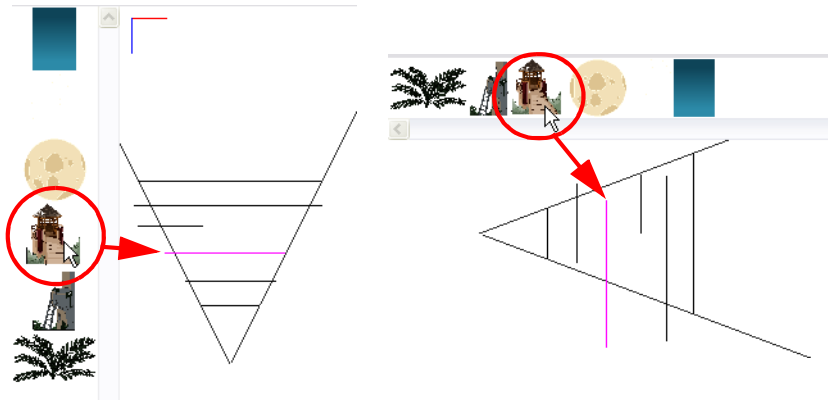


To be able to distribute the layers along the Z-axis using the Top and Side views, make sure that the No Z Dragging option is disabled.

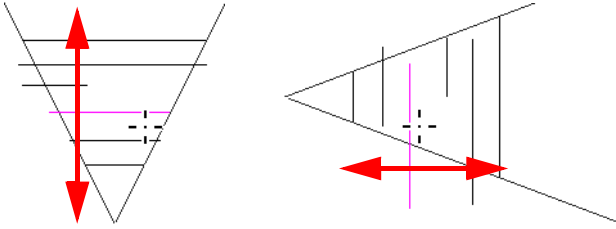
To position your element in the Top and Side views:





1. In the Advanced Animation toolbar, select the Maintain Size  tool. The default keyboard shortcut is [Alt]+[6].
2. In the Side view, select one of the layers in the thumbnails section of the Top or Side view. You can also select your layer from the Timeline view.

The selected layer will be highlighted in the camera cone.

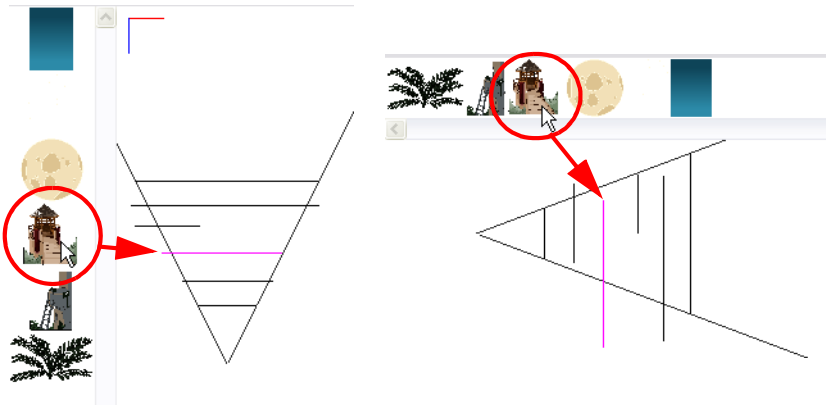


3. Click and drag the layer to the correct depth position in the camera cone. Your element aspect will remain the same in the Camera view.



4. In the Tools toolbar, select the Transform  tool, or select the Translate  tool in the Advanced Animation toolbar and select a layer from the thumbnails section of the Top or Side view. You can also select your layer from the Timeline view.
 - ▶ If you choose the Transform  tool, make sure that the Peg Selection Mode  option is disabled in the Transform Tool Properties view.

The selected layer will be highlighted in the camera cone.



5. In the Top view, drag the element sideways to position horizontally. You can press and hold [Shift] while dragging the element to make sure it only moves along the X-axis.
6. In the Side view, drag the selected element up or down to position it vertically. You can press and hold [Shift] while dragging the element to make sure it only moves along the Y-axis.

Scene Setup Preferences

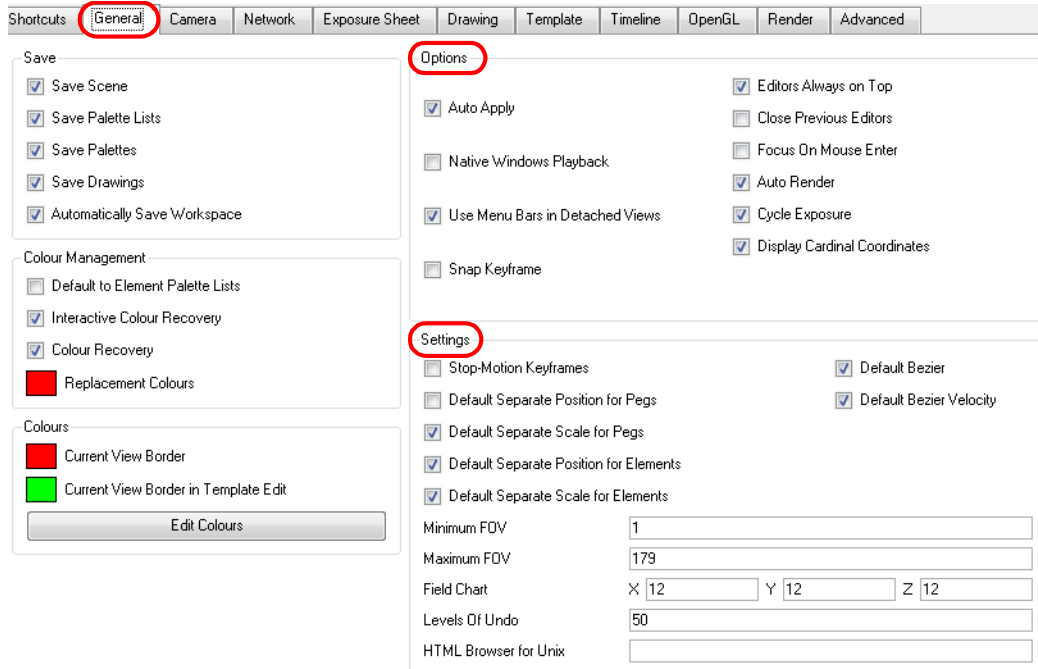
When setting up your scene in Stage, some preferences can help you work more efficiently.

Note: The following preferences refer to an offline session of Harmony Stage. When working connected to the database, available preferences may vary.

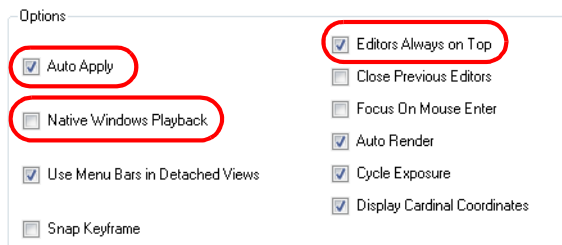
To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

General Tab Preferences



Options



- **Auto Apply:** When enabled, values entered or options selected in module editors are automatically applied to elements in your scene. The Apply and OK buttons are hidden in the Layer Properties when this feature is enabled.
- **Native Windows Playback:** When enabled, the native Windows functions are used for playback in Enable Cache mode.
- **Editor Always on Top:** When enabled, the Layers and Function Editors are on top of the main window.

Settings

Settings

Stop-Motion Keyframes Default Bezier

Default Separate Position for Pegs Default Bezier Velocity

Default Separate Scale for Pegs

Default Separate Position for Elements

Default Separate Scale for Elements

Minimum FOV

Maximum FOV

Field Chart X Y Z

Levels Of Undo

HTML Browser for Unix

- **Minimum FOV:** This is the minimum field-of-view value of the camera.
- **Maximum FOV:** This is the maximum field-of-view value of the camera.

Camera Tab Preferences

Shortcuts General **Camera** Network Exposure Sheet Drawing Template Timeline OpenGL Render Advanced

Tools

Initial Animation Mode

Show Locked Drawings As Outlines

Bounding Box Selection Style

Nudging Factor:

Set keyframes on all functions with the transform tool

Set keyframe at frame one with first application of the transform tool

Paste/Drag & Drop adds keyframes at beginning and end

Select tool works on single drawing

Zoom Settings

Camera View Default Zoom

Top/Side View Default Zoom

Settings

Thumbnail Size pixels

Small Bitmap Resolution pixels

TV Safety (ratio)

Control Size

Rotation Skew

Scale Min Max

Pivots and Control Points

Inverse Kinematics

Min/Max Angle Constraint Weight

Wash Background

Enable in Camera

Enable in Camera Drawing Mode

Wash Background Percentage

Control Points

Show Control Points On Selected Layers

Control Point Tension

Control Point Continuity

Control Point Bias

Tools

Tools

Initial Animation Mode

Show Locked Drawings As Outlines

Bounding Box Selection Style

Nudging Factor:

Set keyframes on all functions with the transform tool

Set keyframe at frame one with first application of the transform tool

Paste/Drag & Drop adds keyframes at beginning and end

Select tool works on single drawing

- **Show Locked Drawings As Outlines:** In the Camera view, locked elements are displayed as outlines only.
- **Bounding Box Selection Style:** In the Camera view, selected elements are not highlighted in colour but are displayed with the bounding box only.
- **Nudging Factor:** The nudging increment value.

Zoom Settings

Zoom Settings

Camera View Default Zoom: Fit to View

Top/Side View Default Zoom: 0.5

- **Camera View Default Zoom:** The default zoom value for the Camera view.
- **Top/Side View Default Zoom:** The default zoom value for the Top/Side views.

Settings

Settings

Thumbnail Size: 64 pixels

Small Bitmap Resolution: 512 pixels

TV Safety: 0.1 (ratio)

- **Thumbnail Size:** The thumbnail size, in pixels, that appears in the Top and Side views.
- **Small Bitmap Resolution:** The size, in pixels, of the smaller bitmap version of your image. When you import a bitmap image into a scene, a smaller version of it is created by the system in order to accelerate the compositing and playback processes.
- **TV Safety:** The ratio value for the TV Safety frame in proportion to the regular camera frame.

Control Size

Control Size

Rotation: 0.5 Skew: 0.5

Scale: 0.5 Min Max: 0.5

Pivots and Control Points: 12

- **Rotation:** The Rotation Bounding Box size.
- **Skew:** The Skew Bounding Box size.
- **Scale:** The Scale Bounding Box size.
- **Min. Max.:** The Bezier handle size.
- **Pivots and Control Points:** The Pivots and Control Points size.

Wash Background

Wash Background

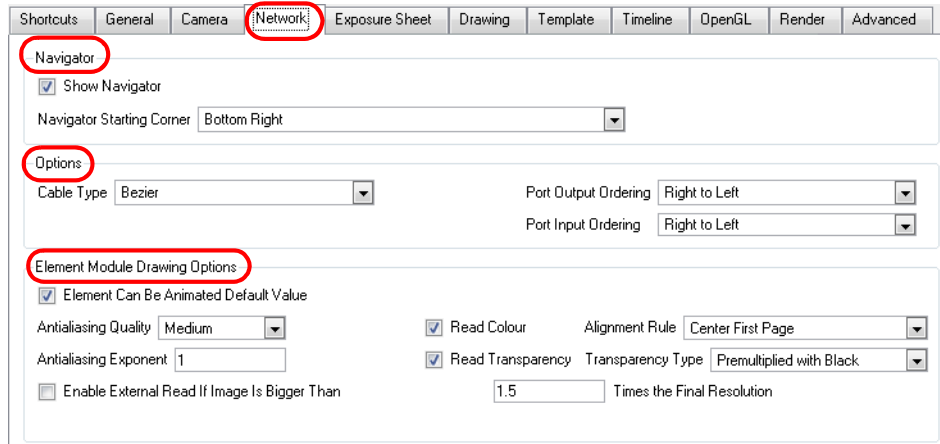
Enable in Camera

Enable in Camera Drawing Mode

Wash Background Percentage: 70

- **Enable in Camera:** Dulls background bitmaps in Camera view. This allows you to see other elements clearly, such as the ones that have not yet been painted.
- **Enable in Camera Drawing Mode:** Dulls background bitmaps in Camera view while using drawing tools. This allows you to see other elements clearly, such as the ones that have not yet been painted.
- **Wash Background Percentage:** The Wash Percentage value.

Network Tab Preferences



Navigator

- **Show Navigator:** Enable or disable the display of the Navigator in the Network view when starting up Harmony Stage.
- **Navigator Starting Corner:** Indicates which corner is the default Navigator's position.

Options

- **Cable Type:** Displays Network connections as **Lines** (straight) or **Beziers** (curves).
- **Image Caching:** Selects which module's image will be cached.
- **Port Output Ordering:** Orders the Output Port **Right to Left** or **Left to Right**.
- **Port Input Ordering:** Orders the Input Port **Right to Left** or **Left to Right**.

Element Module Drawing Options

- **Anti-aliasing Quality:** Smoothness setting applied to Colour Art.
 - ⇒ **Low:** No antialiasing
 - ⇒ **Medium Low:** Some antialiasing
 - ⇒ **Medium:** Medium antialiasing
 - ⇒ **High:** Extensive antialiasing

The higher the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more system memory. Choose a lower quality if you are rendering a Pencil Test.
- **Anti-aliasing Exponent:** Controls the amount of area around the Line and Colour Art edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.
- **Enable External Read If Image Is Bigger Than:** If the image to render out is larger than the value entered in the box, the system will create an external render for that special image. It will open a second copy of Harmony Stage in the background (not visible to the user), cut and set the image to the scene format and finally send it back to the original scene.
- **Read Colour:** Controls the production of colour information from bitmap images. If this module reads 3 or 4-channel bitmaps, this selection determines whether the colour should be read or ignored. If this module reads 1-channel bitmaps, this selection determines whether the channel should be read as colour. When this option is selected with 1-channel images, the result will be a greyscale image.
- **Read Transparency:** Controls the production of alpha information from bitmap images. If this module reads a 1 or 3-channel image, this option will create a matte from the colour values in the image. If the module reads a 4-channel image and this option is not selected, the alpha information in the image will be ignored.
- **Alignment Rule:** The Alignment position for the element module. The new element module will be created following this default rule of alignment.

- **Transparency Type:**

- ⇒ **Premultiplied with Black:** Pixels at the edge of an image are blended with black.

- ⇒ **Premultiplied with White:** Pixels at the edge of an image are blended with white.

- ⇒ **Straight:** Pixels at the edge of an image are blended with black, white and greys.

- ⇒ **Clamp Colour to Alpha:** Select this option when you want to premultiply the colour value with the alpha value.

When the colour is clamped to the alpha, the colour value cannot be higher than the alpha value. It calculates the real colour value faster.

When the RGB values are multiplied with the alpha value, that is to say, if you have a pixel of value R=247, G=188, B=29 and the alpha is 50% or the image has a 50% transparency, then the actual RGB values output would be half of the amounts listed above.

OpenGL Tab Preferences

Shortcuts General Camera Network Exposure Sheet Drawing Template Timeline **OpenGL** Render Advanced

Settings

Conservative Texture Management Maximum Texture Size: 2048
 Smooth Textures Texture Memory: 858343014
 Alternate Gradient and Cutter
 Use PBuffer for Picking
 Support Triple Buffer
 Disable Full Scene Anti-Aliasing

Real-Time Antialiasing

Enable
 Render at this Factor Times the Scene Resolution 1 Tile Size 64

Drawings

Enable Textures, Gradients in Drawings Enable Variable Line Thickness
 Enable Stencil Buffer in Pencil Lines (need to restart application)

Effects

Enable Tone and Highlight Enable Colour Override
 Enable Cutter Enable Glue Module

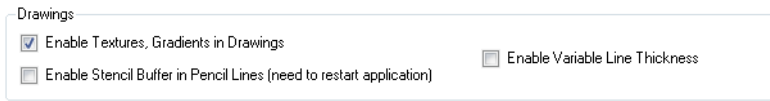
Settings

Settings

Conservative Texture Management Maximum Texture Size: 2048
 Smooth Textures Texture Memory: 858723123
 Alternate Gradient and Cutter
 Use PBuffer for Picking
 Support Triple Buffer
 Disable Full Scene Anti-Aliasing

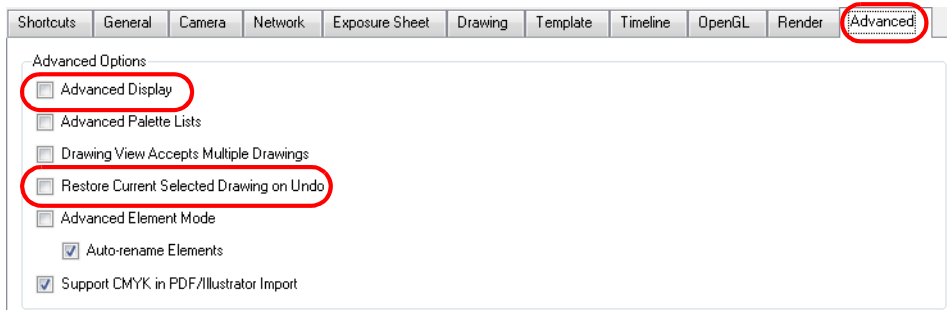
- **Conservative Texture Management:** Turns on and off conservative memory management for bitmap texture files. Performance will improve when this is enabled. If disabled, you will have a better on-screen rendering of bitmap files at the expense of slower performance.
- **Smooth Textures:** Smooths out the pixels of bitmap images when zooming in; this improves bitmap image quality.
- **Alternate Gradient and Cutter:** This is an alternative way to disable write in the OpenGL Backbuffer, required for some video cards (i.e. GeForce FX5200). Do not enable this option unless you are experiencing problems with gradients and cutters in OpenGL.
- **Use PBuffer for Picking:** This will use an off-screen buffer for picking, resulting in a quicker response. This option should not be enabled if using a small capacity video card (32MB).
- **Support Triple Buffer:** Enable this option for a better compatibility with Windows Vista if your video card driver does not allow to disable the triple buffering option. Not enabling this option may result in a dashing line when drawing a brush stroke.
- **Disable Full Scene Anti-Aliasing:** This option allows you to deactivate your video card's antialiasing settings directly from Stage. Disable this option if the Transform tool or Select tool selects the wrong object in the Camera view.
- **Maximum Texture Size:** The size that the bitmap file will be reduced to when using the Conservative Texture Management
- **Texture Memory:** The amount of temporary memory used to store bitmap texture files.

Drawings



- **Enable Textures, Gradients in Drawings:** Shows zones and lines painted with texture or gradient colour pots. When disabled, zones and lines painted with textures and gradients will be filled with solid colours. Textures and gradients require more time and memory to display, so enabling this effect module can slow the performance of Harmony Stage.
- **Enable Stencil Buffer in Pencil Lines:** When the option is enabled, the pencil lines are displayed normally. The lines will be opaque (unless there are transparencies). Disabling this option will reduce rendering times, but will display additive opacities for overlapping pencil lines and unevenly filled curved pencil lines.
- **Enable Variable Line Thickness:** Turns on and off the rendering of the variable line thickness option of the Element Module.

Advanced Tab Preferences



Advanced Options

- **Advanced Display:** Enable or disable the Advanced Display mode. Refer to the Display Concepts topic to learn more about the functionality of Advanced Display.
- **Restore Current Selected Drawing On Undo:** If a drawing other than the current one is being affected by an Undo command, the system will display the affected drawing when this is enabled.

Chapter 12

Working in a True 3D Space

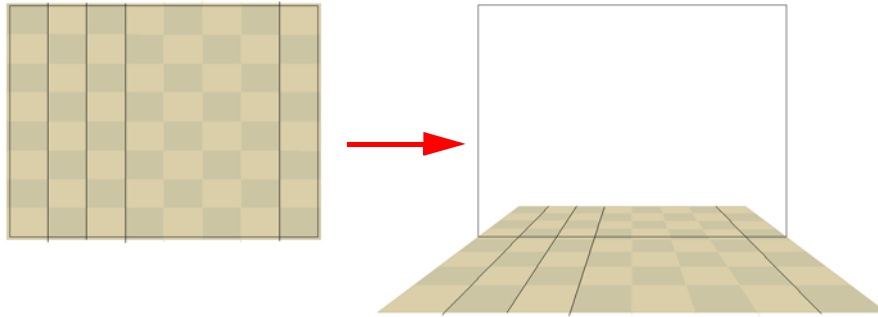


Toon Boom is well known for its multiplane space where you can move your layers forward and backward on the Z-axis. Harmony Stage now brings you a true three-dimensional space where you can actually rotate your camera and layers on all axes. This permits you to perform a 360 degree rotation around your elements, create a floor and even build sets!

This chapter is divided as follows:

- Enabling the 3D Option, on page 508
- 3D Tools, on page 513
- Positioning Elements in 3D Space, on page 519
- 3D Camera Motion, on page 526

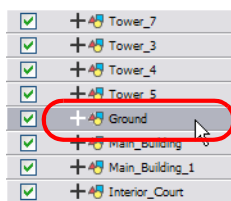
Enabling the 3D Option



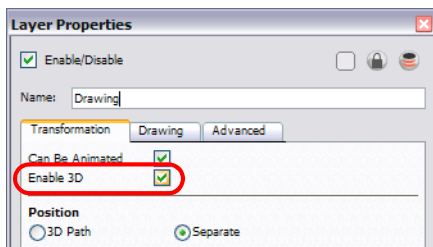
To rotate layers in three axes instead of two, you must enable the 3D option in the layer properties. By default, when you create layers in Harmony Stage, you can only move them as flat layers.

To enable the 3D option:

1. In the Timeline view, select the layer you want to move in the 3D space.



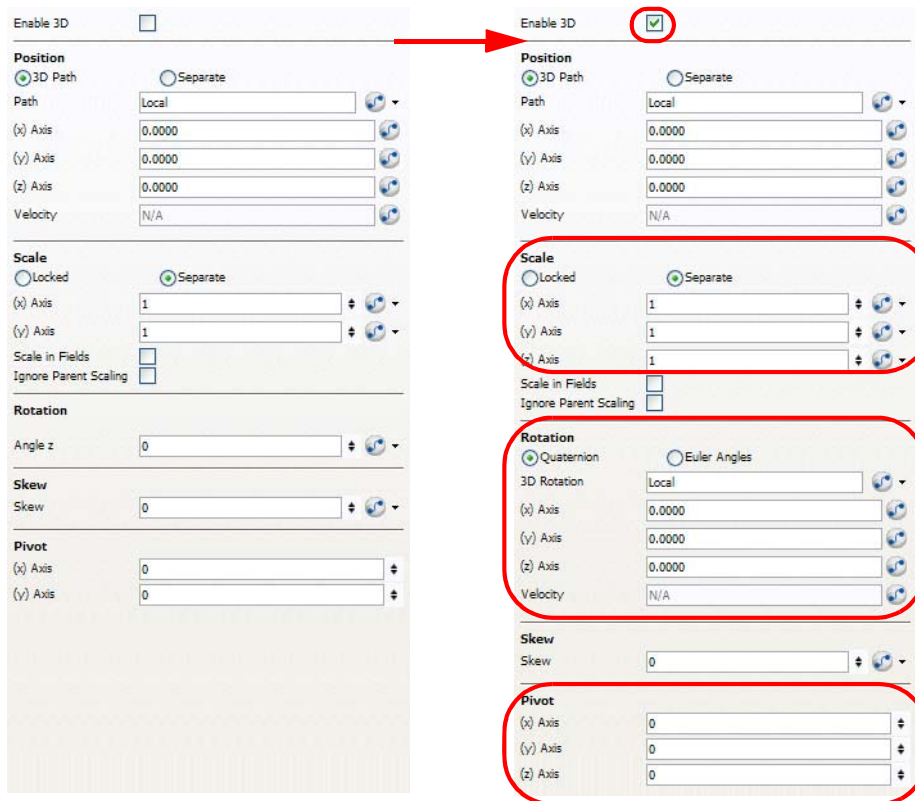
2. Click on the selected layer once to display its properties in the Layer Properties view or double-click on it to open properties in a dialog box.
3. In the Layer Properties dialog box, click on the Transform tab.



4. Click on the Enable 3D option checkbox to display the 3D parameters for that particular layer.
5. Click on the Close button.

New parameters appear in the Layer Properties window.

Layer Properties window showing the 3D parameters



3D Parameters

When you enable the 3D option, you will notice that three sets of parameters are modified:

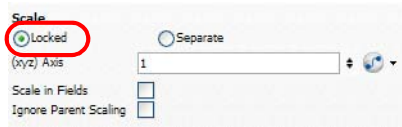
- Scale, on page 510
- Rotation, on page 511
- Pivot, on page 512



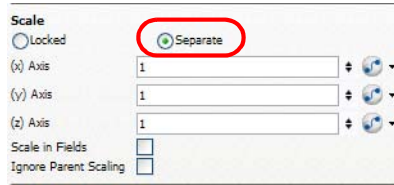
Refer to the following topics in the Creating Animation Paths chapter to learn more about managing, setting and animating parameters and function curves:

- Function Curves, on page 586
- Layer Parameters, on page 558
- Creating a Function, on page 577
- Function View, on page 580
- Creating Function Curves, on page 586
- Function Drop-down Menu, on page 590
- Function Types, on page 591

Scale



Locked 3D Scale

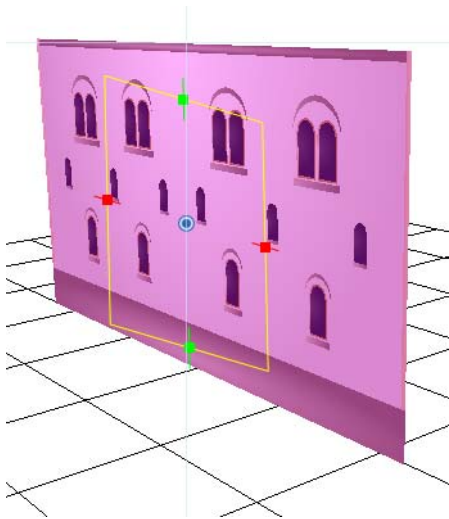


Separate 3D Scale

When the 3D option is enabled, the Z-axis parameter is added to the list of settings. You can either have the Scale to be locked or separated.

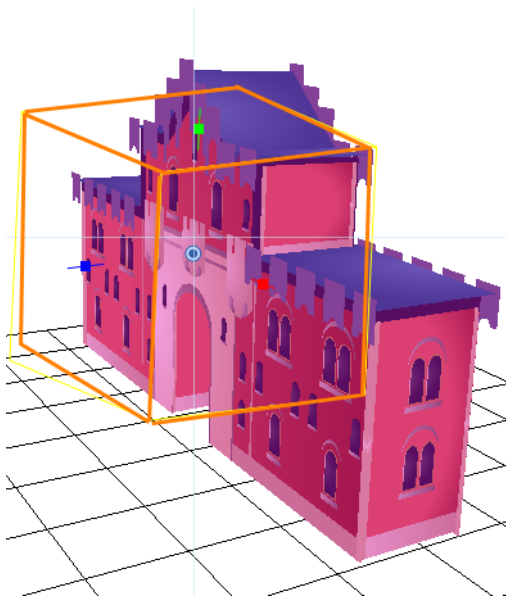
When the Scale is locked, the object you are scaling is uniformly resized in three directions.

When the Scale is separated, the object you are scaling can be squashed and stretched in any direction without affecting the other ones.



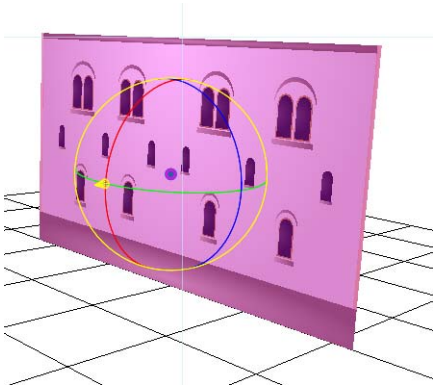
Two-dimensional Scale

Note: You cannot add thickness to an object by scaling it in the third dimension. Three-dimensional scaling is used to scale objects that were rotated on their axes or to scale a group of objects laid out in three-dimensions.



Three-dimensional Scale

Rotation



The main parameter you will use when working in three-dimensions is rotation. Without using the 3D rotation, you are simply working using the multiplane technique.

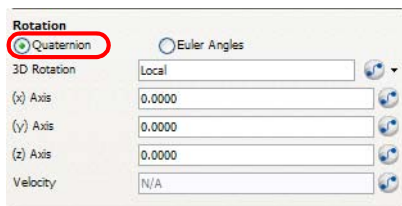
3D rotation can be used in two different ways:

- Quaternion Rotation
- Euler Angles Rotation



Refer to *Creating Animation Paths > 3D Path*, on page 560 and *Separate Positions*, on page 560 to learn more about 3D Paths and Separate Positions.

Quaternion Rotation

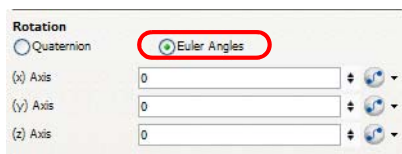


Quaternion Rotation is very similar to the 3D path position parameters. A Quaternion is composed of three rotation functions: X, Y and Z to control the rotation on three axes, and a velocity function to control the velocity of the three rotation functions simultaneously.

The X, Y and Z functions are linked together, when you add a keyframe on one of them, it also adds it on the two others.

If you are planning to animate an element such as the camera, you should use the Quaternion rather than the Euler Angles. Quaternion creates smooth trajectory and interpolation since the path is controlled by the same keyframes and a single velocity.

Euler Angles Rotation

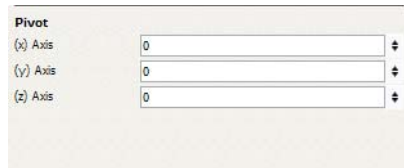


The Euler Angles Rotation is very similar to the Separate position parameters. The Euler Angles parameter is composed of three functions: X, Y and Z to control the rotation on three axes. These three functions are independent from one another, each having its own velocity.

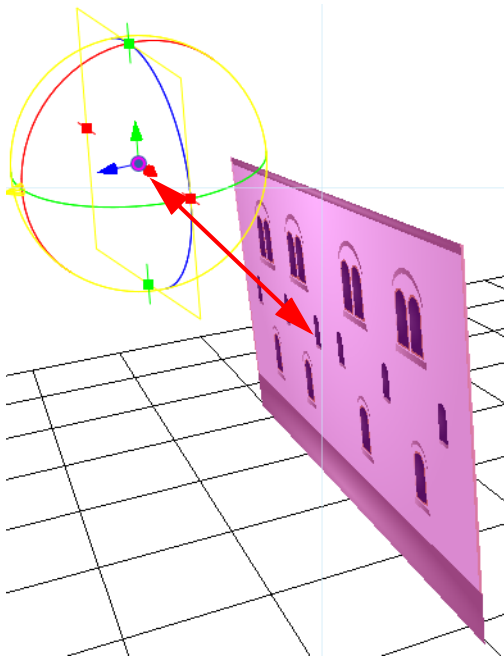
When you add a keyframe on one function, the other ones do not receive it, allowing you to control each axis independently.


Euler Angles are mainly used to position elements with exact coordinates and rotating elements on a single axis. The interpolation between the keyframes will not be as smooth as the Quaternion one since each function works individually.

Pivot

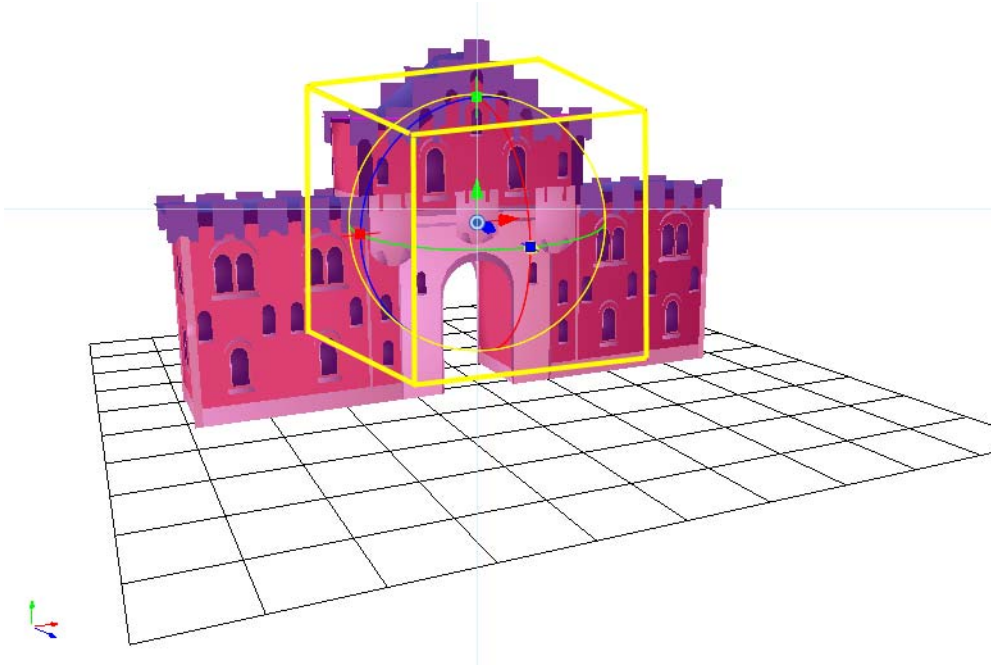



When you enable the 3D option, the drawing or layer pivot becomes a location that can move on three axes. When you work in two-dimensions, the pivot is mainly an anchor point somewhere in the drawing from where the transformations will be performed. Once you switch to the 3D mode, the transformations are made on three axes, so the centre of rotation and scaling also becomes three-dimensional.



By default, the pivot is positioned at the centre of the stage: (0,0,0). When you use the Pivot  tool to reposition the centre of transformation, the pivot position is changed on the X and Y axes, but the Z-axis remains at zero until you change it in the Top, Side or Perspective view using the transformation tools.

3D Tools



Once the 3D option is enabled, your transformation tools become 3D transformation tools. These tools are found in the Advanced Animation toolbars as well as the Transform  tool. Instead of letting you move elements only on the X and Y axes, you can also manipulate them on the Z-axis.



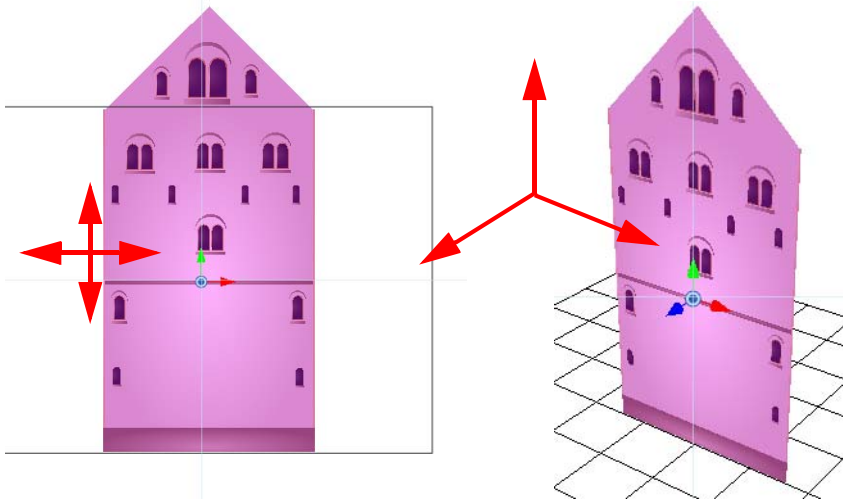
Refer to *Setting Up the Scene > Positioning the Scene Components*, on page 451 to learn more about transformation tools.

You will see here how the following tools behave in 3D mode:

- Translate Tool, on page 514
- Rotate Tool, on page 515
- Scale Tool, on page 516
- Transform Tool, on page 517

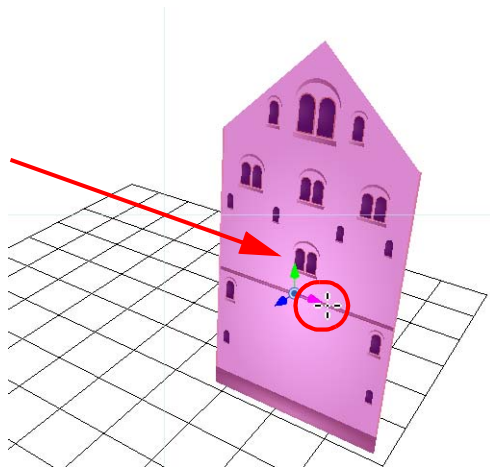
 **Translate Tool**

Once you enable the 3D option, the 3D Translate tool becomes available and you will see direction arrows appear around the pivot points to indicate the different axes.



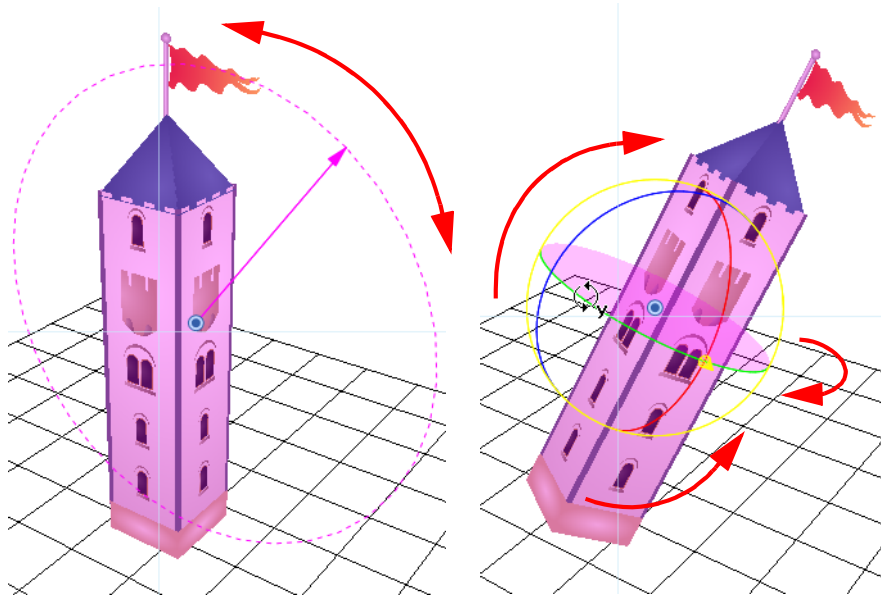
You can click on the direction arrows to move your layer on only one axis. If you click anywhere else, the layer can move freely on two axes at once. Once the arrow is selected, it will turn pink.

Note: If you move the layers in the Perspective view, it may be difficult to control the motion since you may not have the optimum point of view on your stage to understand the setup. In this case it is best to use the direction arrows.



Rotate Tool

Once you enable the 3D option, the 3D Rotate tool becomes available and you will see a rotation sphere appear around the pivot points indicating the different axes.



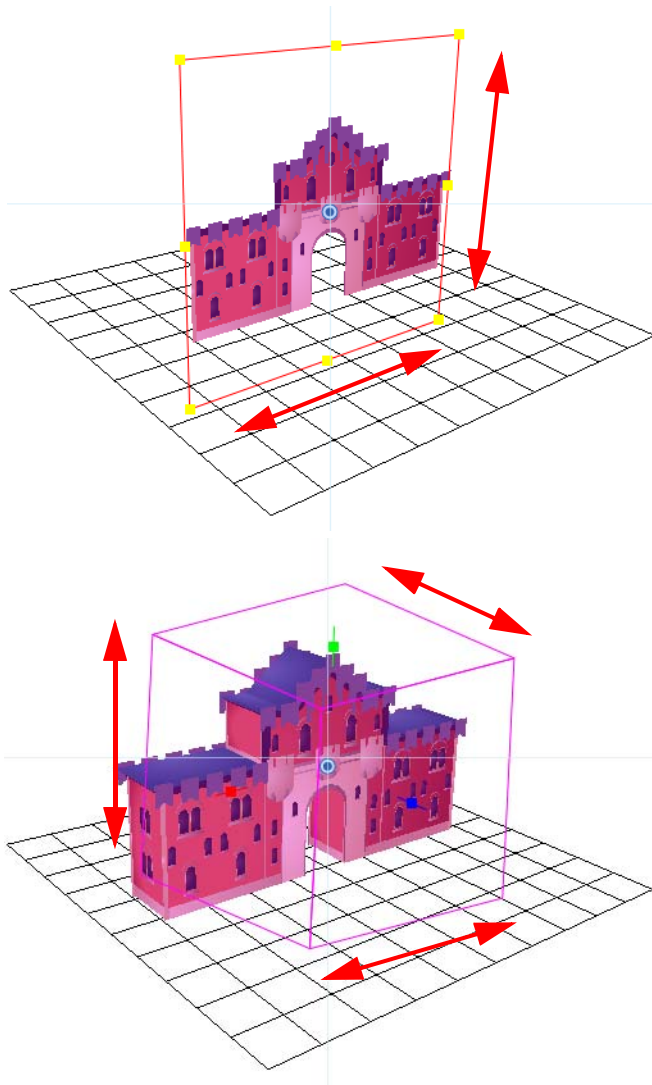
You can click on the direction ellipses to rotate your layer on one axis only. If you click anywhere else, the layer rotates freely on two axes at once. Once the ellipse is selected, it will turn pink.

Note: If you move the layers in the Perspective view, it may be difficult to control the motion since you may not have the optimum point of view on your stage to understand the setup. In this case it is best to use the direction ellipses.

Scale Tool

Once you enable the 3D option, the 3D Scale tool is available. You will see one of two things:

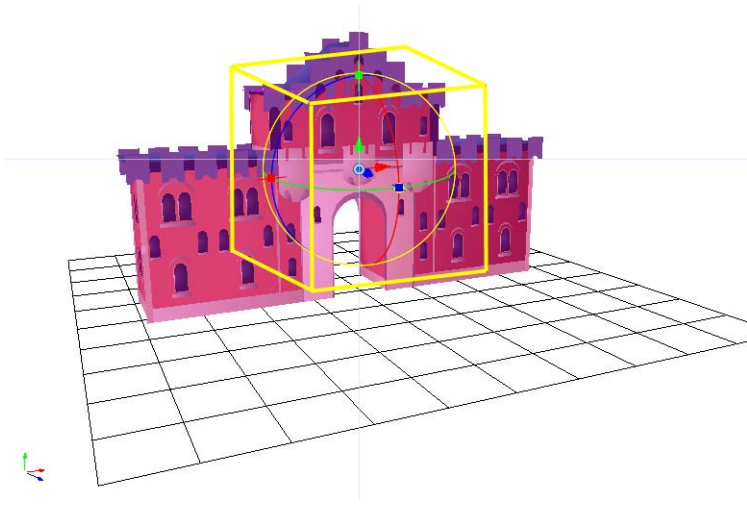
- A scaling rectangle that appears if your drawing is flat.
- A scaling cube that appears if your object has some rotated layers around the pivot points, indicating the different axes.




Click on one of the three control points to scale the shape on one axis. Hold down the [Shift] key to scale the object proportionally. Once the control point is selected, it will turn pink.

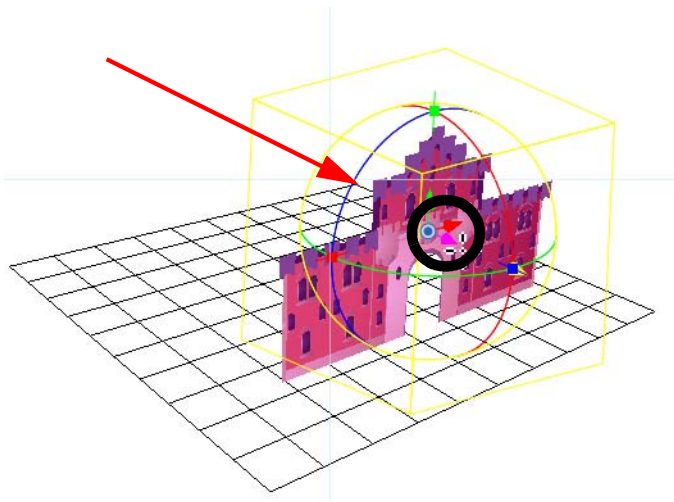
Note: If you move the layers in the Perspective view, it may be difficult to control the motion since you may not have the optimum point of view on your stage to understand the setup.


Transform Tool

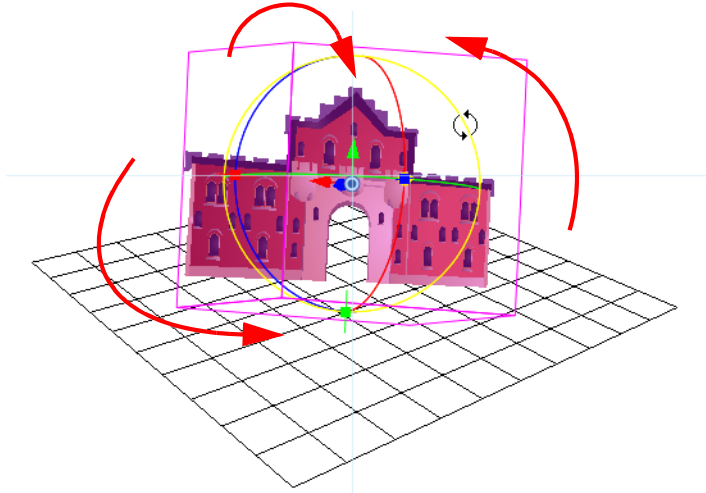



Once you enable the 3D option, the 3D Transform tool become available. This tool is a combination of the 3D Translate, 3D Rotate and 3D Scale tools.

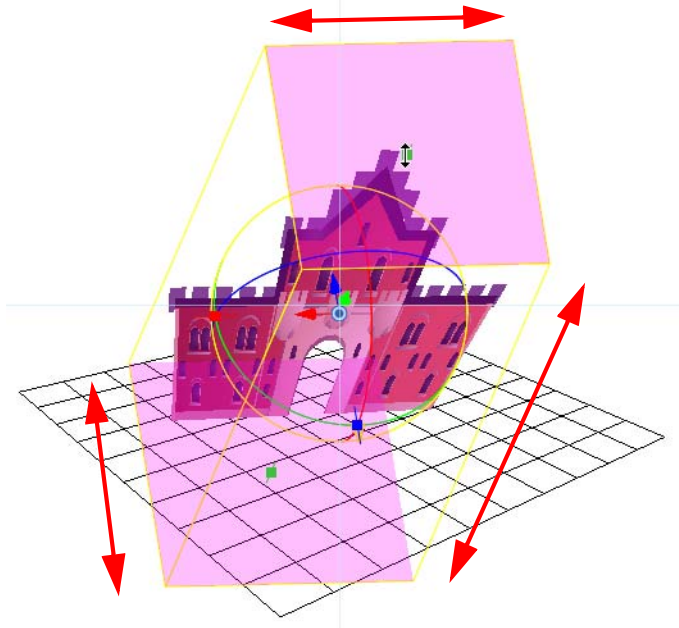
To translate an element, grab the direction arrows in the same way that you would with the Translate  tool.



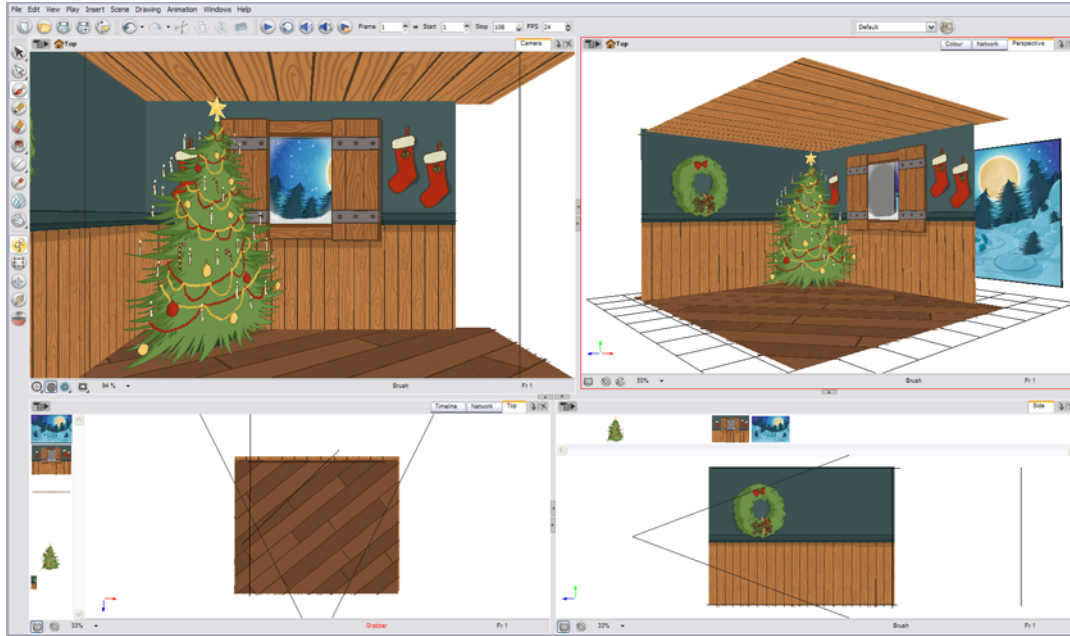
To rotate an element, grab the rotation ellipses in the same way that you would with the Rotate  tool.



To scale an element, grab the scaling control points in the same way that you would with the Scale  tool.

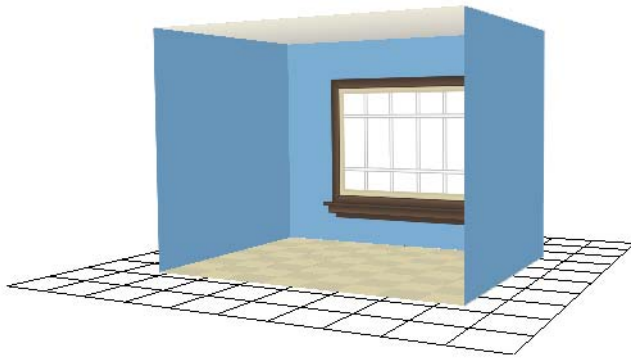


Positioning Elements in 3D Space



To position elements in 3D space, you need to understand what you want to build and what is involved in building it. Simple sets like the above one are easy to build, light to manage and probably what you will use 3D staging for most often.

If you have a project based in a room, it can be useful to build it in 3D. This saves you having to redraw the background for each scene and it will be entirely vector based.

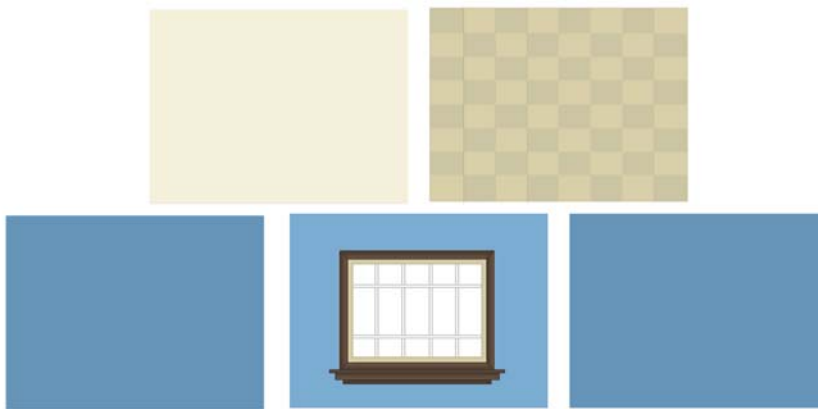


Here, you can see a couple of different backgrounds you can get in only three seconds from this set.



Planning Your Pieces

When you are building a room, there are only a few pieces to prepare. Before starting to build your set, map out the parts you need.



A complex set, that is more intricate in its design, will require more careful planning. Not only will you have to list the pieces you'll need, but you will also have to think about what can be reused. If you have a series of windows in your set, you would create a Symbol out of the drawing, rather than copy paste it several times all over your set. This way, if you need to make any correction to its design, you will only need to do it once and all the instances of your Symbol throughout your set will be corrected. The same can be done with for each pieces of your set.

Here is an example of all the source drawings required to build the castle.



Those are the only drawings required to build the entire castle. As you can see there are not that many considering the final result. The rest is constructed by assembling Symbols and through reuse. However, keep in mind that although you are using simple drawings and Symbols to optimize your set, the more you add to your project, the heavier the toll it takes on your machine's RAM. While the scene's package itself is really light, running the scene places heavy demands on your RAM and video card.

Using the drawings shown previously, here are a couple of pieces that were put together.



Here is the final result, a large and impressive fortress.



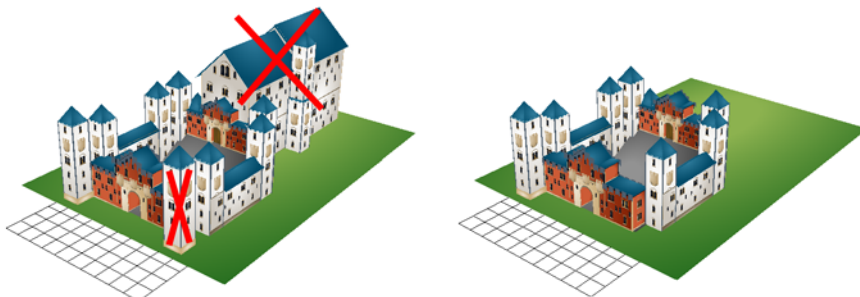
Refer to the following topics in the *Libraries, Symbols and Templates* chapter to learn more about creating and reusing Symbols:

- Creating a Symbol, on page 356
- Importing a Symbol, on page 367
- Sharing a Symbol, on page 362

Using Complex Sets in Production Scenes



When your main set is built, you will want to store it in the Library. It is important to know that when you import such a large structure in one of your production scenes, the set maybe slow to run. To avoid long rendering sessions or slow manipulation, remove all faces and planes that are not visible in your scene.



Positioning the Layers

Once you have your drawings and Symbols assembled, it is time to position them. This section explains how this is done using the simple room shown previously.

To position your layers, you require the following elements:

- Camera View
- Top View
- Side View
- Perspective View
- Library View
- Timeline View
- 3D Transformation Tools
- Layer Properties View or dialog box



Refer to the 3D Tools section to learn more about 3D transformation tools.

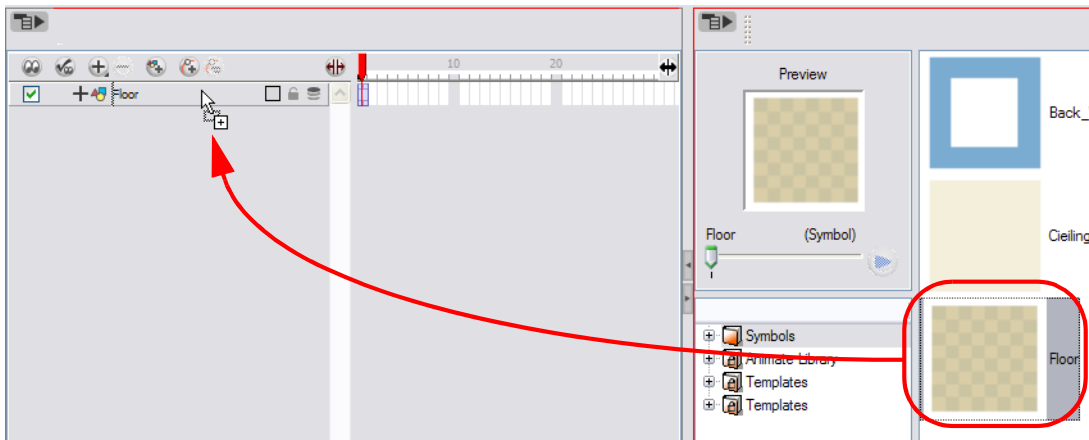


Refer to the following topics in the Setting Up the Scene chapter to learn more about the 3D scene setup views:

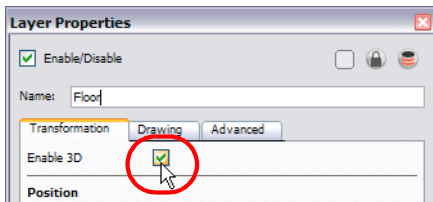
- Top View and Side View, on page 494
- Perspective View, on page 495

To position layers in the 3D space:

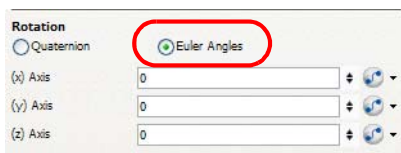
1. From the Library view, import the first Symbol to position into your Timeline view's left side.



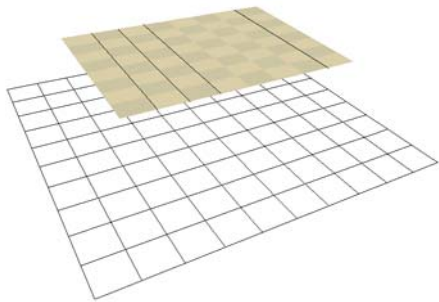
2. In the Timeline view, double-click on the new layer to open the Layer Properties dialog box.
3. In the Transformation tab, check the Enable 3D option.





4. In the Rotation section, enable the Euler Angle option.

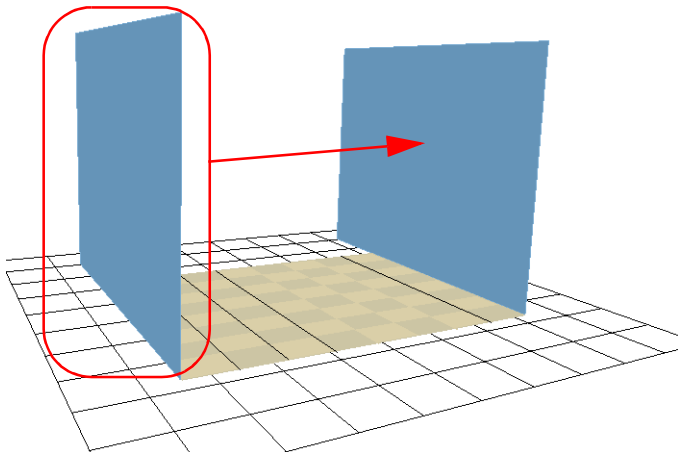


5. Type 90 in the Rotation's (x) Axis field to flip the floor so that it is flat on the ground.

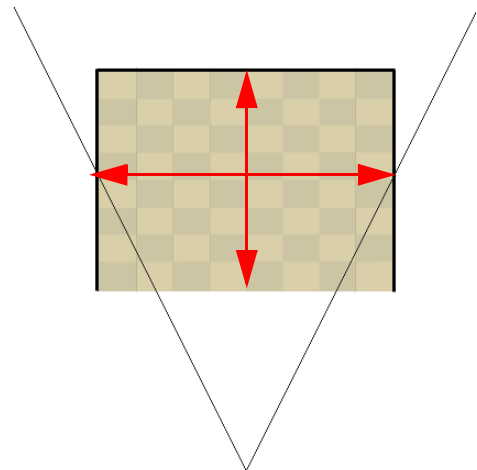


6. To position the height of the floor, you can either type values in the Position section of the Layer Properties, use the 3D Translate  tool or the 3D Transform  tool.
7. Repeat the process for the other pieces to import.
8. If you have parallel walls, once you have positioned one, select the Wall layer in the Timeline view.
9. In the top menu, select **Edit > Duplicate** to duplicate the layer.

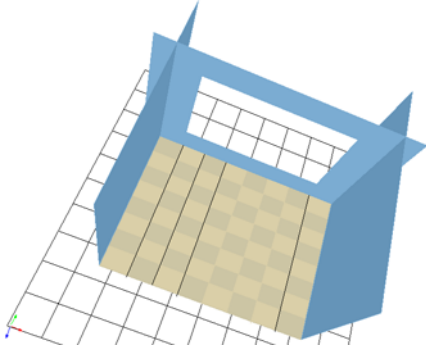
NOTE: If the drawing is contained inside a Symbol, the Symbol will not be duplicated, only the layer containing the Symbol. This way you are still using the same drawing.



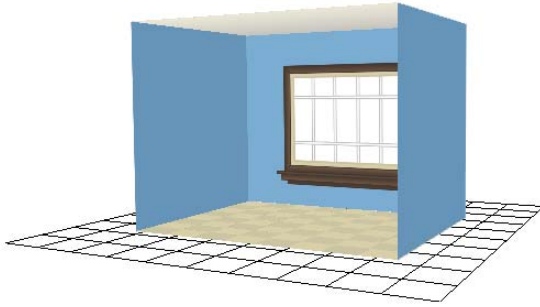
10. Once the layer is duplicated, use either the Layer Properties window to type the positioning values, or use the 3D transformation tools.
11. When you are using the transformation tools, use the Camera, Top or Side view to position the elements instead of the Perspective view to position your layers precisely.



12. If your walls are touching each others, you should have them intersect by extending one end of the wall through the other wall. This prevents seeing a small gap in-between them.



There you go, you now have a complete 3D room.



3D Camera Motion

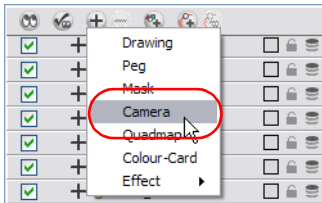
Once you have a 3D set, the exciting part is to do a camera motion in it. This section teaches you the main steps required to perform a 3D camera motion. Once you know how to do this you can enjoy the delights of working in 3D space and travelling through your creations!




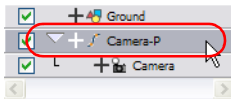
Refer to *Creating Animation Paths > Animating the Camera*, on page 567 to learn more about camera moves.

To create a 3D camera motion:

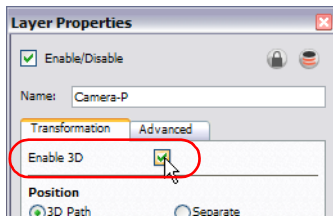
1. In the Tool toolbar, enable the Animate  mode.
2. In the Timeline view, click on the Add Layers  button and select **Camera** to add a camera to your scene.



3. In the Timeline view, select the new camera layer.
4. In the Timeline Layer toolbar, click on the Add Peg  button to add a parent peg to the camera.
5. In the Timeline view, double-click on the new Peg layer to open the Layer Properties dialog box.

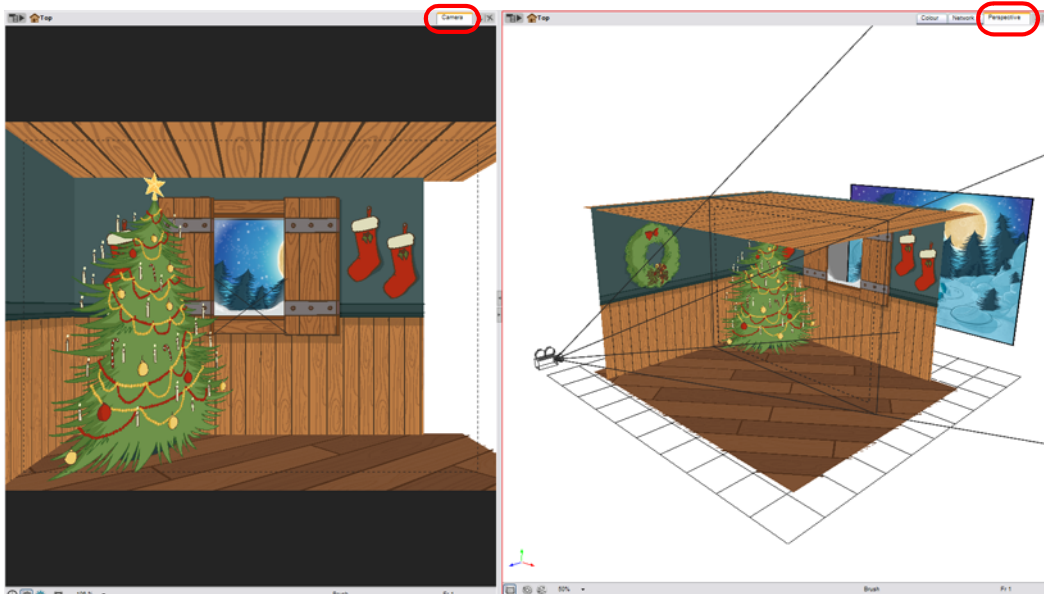



6. In the Layer Properties dialog box, go to the Transformation tab and check off the Enable 3D option.



7. In the Rotation section, enable the Quaternion option.
8. In the Perspective view, click on the Show/Hide Camera button to see your camera cone.

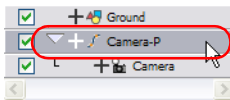
9. Setup your workspace to display the Camera view and Perspective view at the same time so you can compare the results.



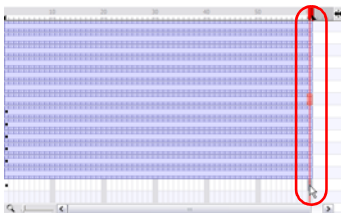
10. In the Tools toolbar, select the Transform  tool.
11. In the Timeline view, select the Camera-Peg layer first frame and select **Insert > Keyframe**.



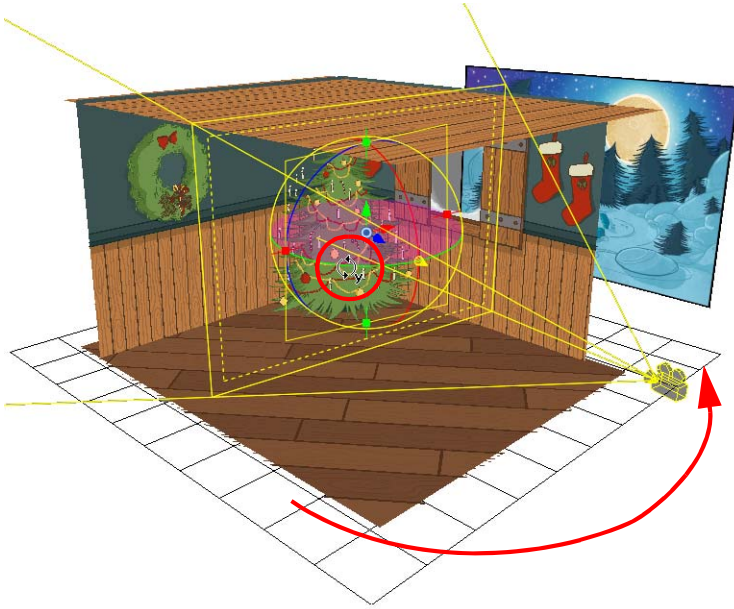
12. In the Timeline view, select the Camera-Peg layer.



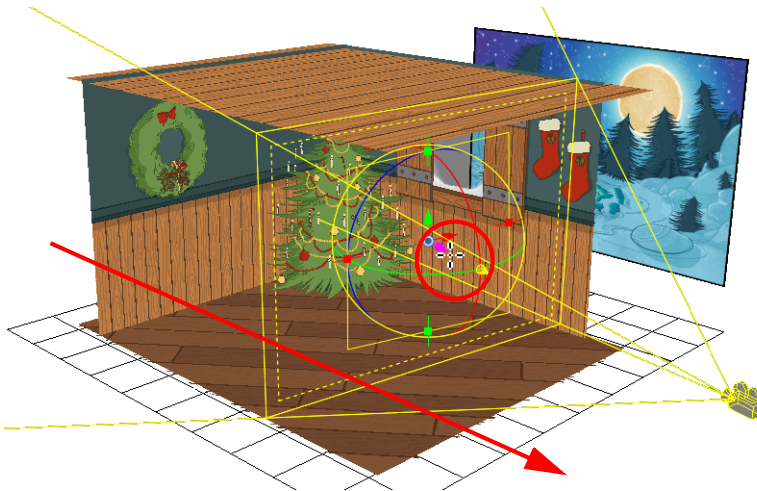
13. In the Timeline view, go to the last frame.




14. In the Perspective view, grab one of the rotation ellipses and rotate the camera on one axis only. Always do one axis at the time, this keeps control of the positioning.



15. Once the camera is rotated in the correct angle, grab one of the direction arrows to move the camera to the correct position.



16. In the Playback toolbar, press the Play  button to see the result.

Locking Flat Drawings to the Camera Angle



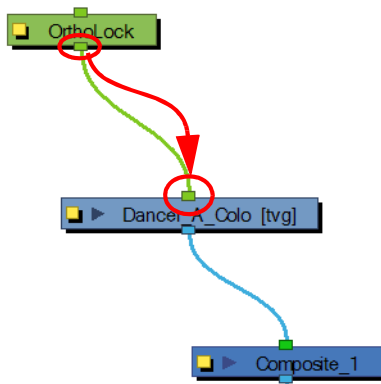
When you create a 3D camera motion in your scene, you will notice that layers are treated as flat objects, animation layers that are supposed to face the camera at all times will look like a flat sheet of rotating paper. Use the Ortholock layer when mixing flat animation layers with a set built in 3D. Ortholock forces your drawing layer to always follow the Camera angle. It does not follow its position or zooming level, only the rotation. This prevents drawings from being distorted by the camera motion.



Note: Adding an Ortholock layer in a Symbol will not give the correct result. The Ortholock contained inside a Symbol does not consider the position of the camera contained in the root scene. Keep your Ortholock layers in the root scene.

To add an Ortholock layer in Harmony Stage:

1. In the Module Library view, go to the Move tab.
2. Select an Ortholock module and drag it to the Network view.
3. In the Network view, drag an output cable from the Ortholock module and connect it to the module you want to keep facing the camera.

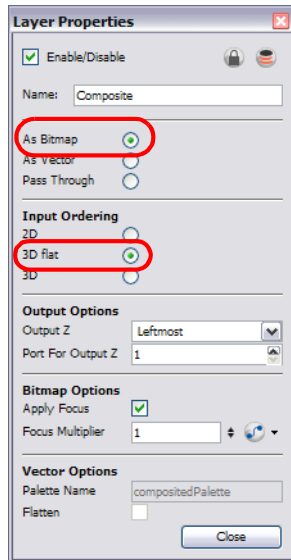


Managing a Network with a 3D Scene Setup

In Harmony Stage, you can create very advanced networks using effects, complex connections and multiple-level compositing.

The Composite module's main task takes all of your image's output and converts it into a single flat image that you can render out. You can alter it further by manipulating a three dimensional scene setup. You can also modify a Composite's behaviour as seen in the Setting Up the Scene chapter.

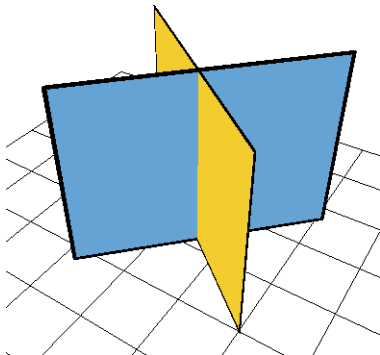
Input and Output Options



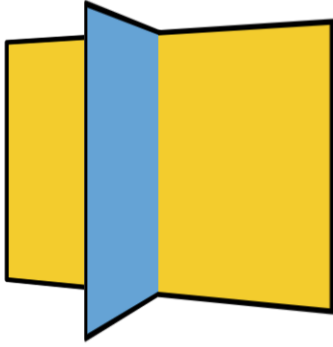
The default options combination is:

- As Bitmap, for the output behaviour
- 3D flat, for the input ordering

By default, a Composite module is set to output a flat bitmap image and to correctly composite elements positioned in the 3D space.



For example, if you have two intersecting walls, and use the default combination, you will see the following result:



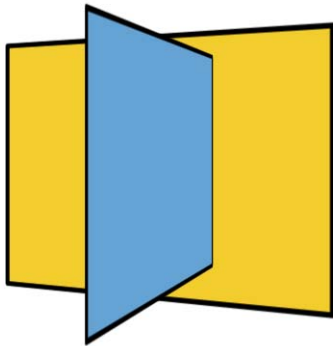
This image is correctly represented in the Camera view and is output from the Composite module as a flat drawing. The Z-axis value of your elements are not retained, it becomes an independent composition with only one forward-backward value.

3D Input Ordering option

The visual result for the 3D Input Ordering option is the same as the 3D Flat option. The visual result in the Camera view will be correct, but the elements will not be converted into a flat image. The 3D position of your images will be remembered until the next Composite module. This mode is quite advanced and should only be used in very advanced cases. Most of the time you will use the 3D Flat Input ordering option.

2D Input Ordering option

If you switch the Input Ordering option to 2D, the walls will be calculated as flat 2D objects and not as 3D objects. The perspective caused by the 3D rotation will be correctly represented, but the elements will not intersect. The result will be similar to the following:



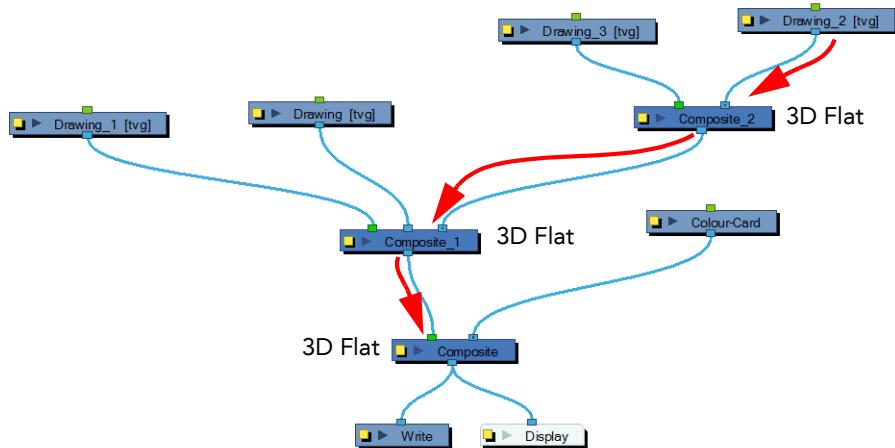
How to Organize Your 3D Composite Modules

If you start combining several composite modules in your Network view, you must understand the way they work if you want to get the desired result.

There is a specific order in which you should set your Composite modules.

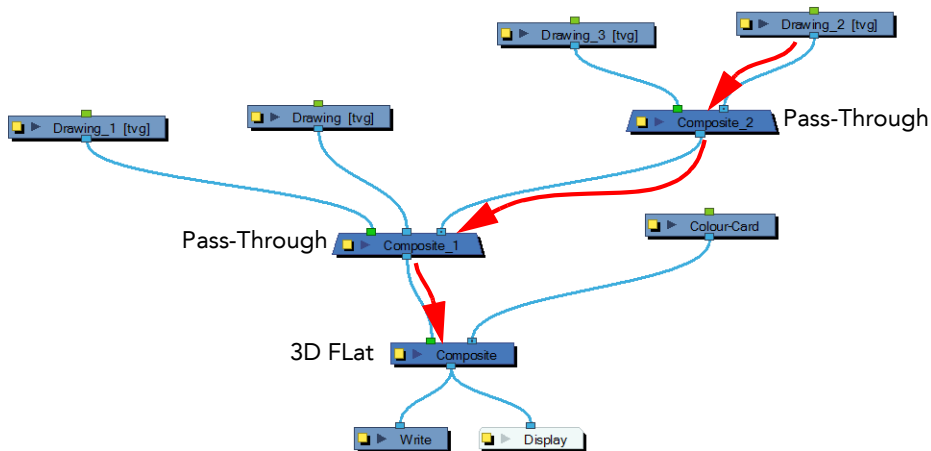
In most of the cases, you should use the 3D Flat Input Ordering option, which is the default setting. You can stack as many of them in a row as you want.

It is important to understand that each time you process images through a 3D Flat composite module, the images will be merged together and the 3D ordering will also become a flat image. Images processed in later Composite modules will not be inserted between the images of that previous composite since it is a flat image. Although, since the image coming out of a Composite module has a Z-axis value, it may happen that it will intersect with 3D objects processed in a lower Composite module.



If you place any Pass-Through type Composite modules in your network, the images will not be processed before the final Composite. It is important to keep your final Composite as a 3D Flat composite to read the layer ordering correctly.

The most efficient networking system to use so that you obtain the desired result is probably to use mainly Pass-Through type composite throughout the whole network and only set the last one as a 3D Flat composite. This way, your can create individual compositions to keep your network clean and organized, but process everything together at the end only. This way, all the 3D rotations and positions are calculated together. The drawback of this technique is that it may take longer to render out your frames when the project is completed.



Chapter 13

Working With Sound



With Toon Boom Harmony Stage, you can import soundtracks and dialogue into your animation to make it more engaging and entertaining. There are several sound editing features that can be used to synchronize sounds to individual frames or moments in time. You can also use them to trim unwanted seconds from the beginning and end of your sound files, as well as to loop sounds that you want to continue throughout your animation.

Your ability to add dialogue to animation is greatly enhanced with the Harmony Stage lip-sync tools. Stage can analyze voice tracks to determine which of the eight animation phonemes (lip positions) would best apply to each frame of sound. With the mouth chart that the software generates, you can easily draw lip positions for your character. Furthermore, Harmony Stage can automatically apply drawings of lip positions to each frame of your animation based on the mouth chart.

In this chapter, you will learn about the following:

- Importing a Sound File, on page 534
- Sound Displays, on page 536
- Sound Playback, on page 536
- Sound Scrubbing, on page 537
- Editing a Sound File, on page 537
- Add Empty Sound Layer, on page 543
- Lip-sync, on page 544



You can also synchronise your animation to a music score, refer to Layers and Timing > Tempo Markers, on page 271 to learn more.

Importing a Sound File

If you decide to add sound to your movie, you must first prepare this sound outside Harmony Stage. Then you must add a Sound element in Stage to organize sound files in your animation. A sound will play in the movie until it reaches the end of the file or a stop frame that you have created in the Sound Element Editor.

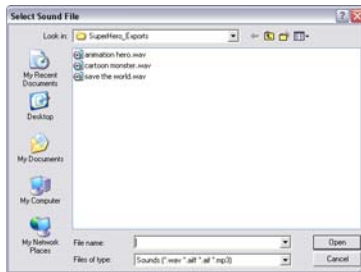
You can import WAV, AIFF or MP3 sound files using either the top menu or Xsheet View.

To import a sound file:

1. Select **File > Import > Sound**

- ▶ You can also right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) anywhere in the frame zone of the Xsheet View.

The **Select Sound File** dialog box opens.

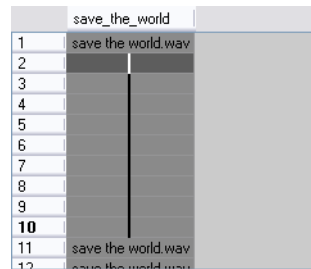


2. From the **Select Sound File** dialog box find and select your sound file from your computer.

Your sound file should now appear as a layer in both the Timeline and Xsheet View.



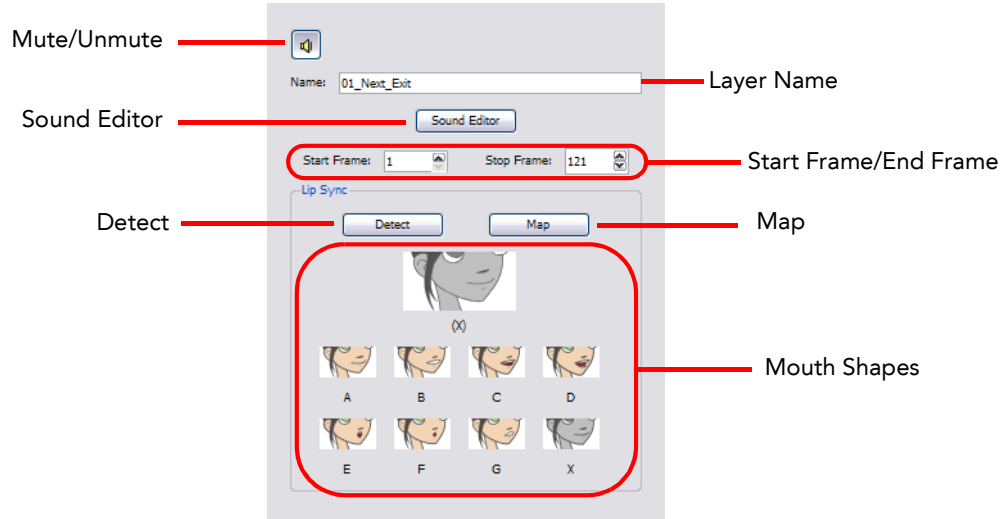
Timeline View



Xsheet View

Sound Layer Properties

When you select a Sound layer in the Timeline view, the options related to that layer appear in the Layer Properties view.



- **Mute/Unmute**
This button mutes and unmutes the sound layer during the scene playback.
- **Layer Name**
This field displays the layer's name.
- **Sound Editor**
This button opens the Sound editor.
- **Start Frame/End Frame**
These fields determine the start and end frame of the sound file.
- **Detect**
This button launches the automated lip-sync detection.
- **Map**
This button opens the Map Lip-sync dialog box.
- **Mouth Shapes**
This section shows the automated lip-sync detection during the scene playback. Click on the thumbnail of each mouth to change the phoneme assigned to the current frame.

Sound Displays

Within the Xsheet View, the sound file can be displayed in different ways, depending on your sound editing needs.

To change the sound display:


- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the sound column header, choose **Sound Display** > and one of the following:
 - Sound Name:** Shows the name of the sound file, as well as the file format. The line running vertically through the column frames between the same file name indicates a continuity of the same sound file in these frames.
 - Mouth Shapes:** Show the letter (or name depending on the way you named your character's different mouth positions) in the column's frames. There is only one mouth position allotted per frame and this position should correspond to the sound file after performing a lip-sync.
 - Waveform:** Shows a vertical display of the sound file's actual waveform.

	Sound_Name	Mouth_Shapes	Waveform
1	Sound_Name.wav	X	
2		X	
3		X	
4		X	
5		X	
6		X	
7		X	
8		X	
9		X	
10		X	
11	Sound_Name.wav	X	
12	Sound_Name.wav	X	




Refer to the Lip-sync section of this chapter for more details.



You can show/hide the waveform in the Timeline View by clicking the Waveform  button in the Timeline View toolbar.



Sound Playback


Before playing back any sound, click on the Enable Sound  button in the Playback toolbar or enable it through the Play menu in the top menu. This will make sure that you can hear the sound layers in your scene, even the ones included within symbols.

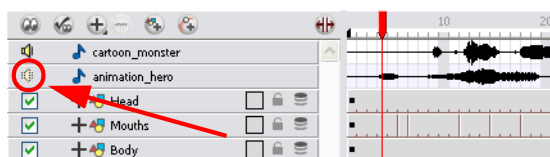
To playback your sound sample:

- To select a starting point:
 - In the Xsheet view, click on a cell in the sound column.
 - In the Timeline view, click on a cell in the sound layer. You can also slide the red playhead to the correct cell.



- Click on the Play  button in the Playback toolbar or in the top menu select **Play > Play Scene Forward** or click on the [Enter] key.
- If you would like to hear your sound sample played back again and again, click the Loop  button in the Playback toolbar or the **Loop** option from the Play menu.

If you have two or more sound layers and would like listen to them independently, you can disable the unwanted sound by clicking on the Mute Sound  icon located on the sound name layer in the Timeline View.

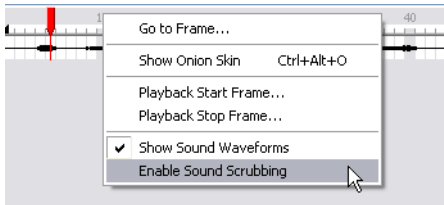


Sound Scrubbing

Harmony Stage uses a process known as Sound Scrubbing to let you hear sound in real-time while you move the playback pointer forward or backward. This is very useful for finely-tuned lip-synching. You can scrub sounds from the Timeline view.

To scrub a sound from the Timeline view:

1. In the Playback toolbar, click on the Sound Scrubbing  button or from the top menu, select **Play > Enable Sound Scrubbing**. You can also activate Sound Scrubbing by right-clicking in the Timeline view's frame bar.



2. At the top of the Timeline view, drag the red frame marker along to hear the sound at each frame.



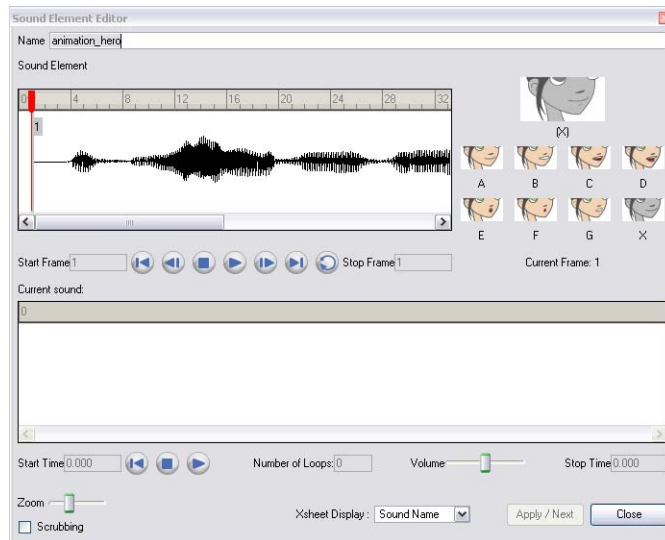
Editing a Sound File

Now that you have successfully imported your sound file into Harmony Stage, it is time to familiarize yourself with the sound editing interface. The Sound Element Editor makes it possible to edit sounds that were created outside of Harmony Stage and imported into your scene.

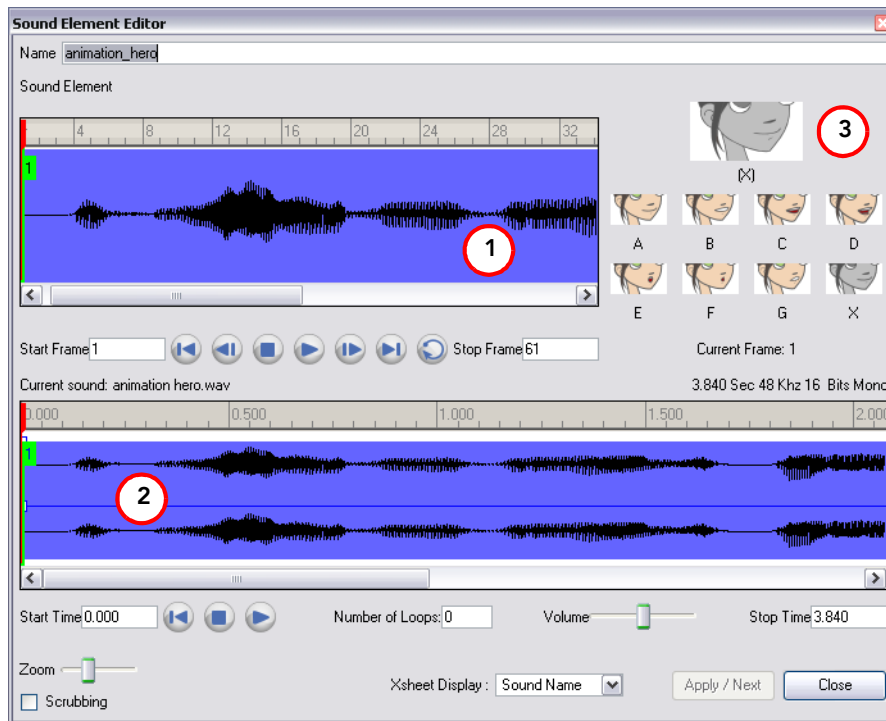
To open the Sound Element Editor:

1. Either double-click the sound layer name in the Timeline view or the sound column header in the Xsheet view.

The **Sound Element Editor** dialog box opens.



The Sound Element Editor consists of three main parts.



1. Sound Element - The wave form seen in the top Sound Element window is the actual sample that will be heard when the final movie is rendered. It may be shorter than the original sound sample due to length of the scene. If any edits are made to the sound sample, they can be heard here.

2. Current Sound - The Current Sound window displays the original sound file in its entirety and is where you can edit its properties. This window remains empty until you click inside the Sound Element window.

3. Lip-sync Preview - Is used to preview the automated detection and to manually insert different mouth positions to correspond with the sound sample.



To learn more about Lip-sync, refer to the Lip-sync section in this chapter.

You can accomplish the following in the Sound Element Editor:

- Changing the Start or End Frame of a Sound, on page 538
- Trimming the Start and End of a Sound File, on page 540
- Looping a Sound, on page 541
- Mixing the Sound Volume, on page 541
- Customizing the Playback Range, on page 542
- Recomputing the Mouth Chart, on page 548

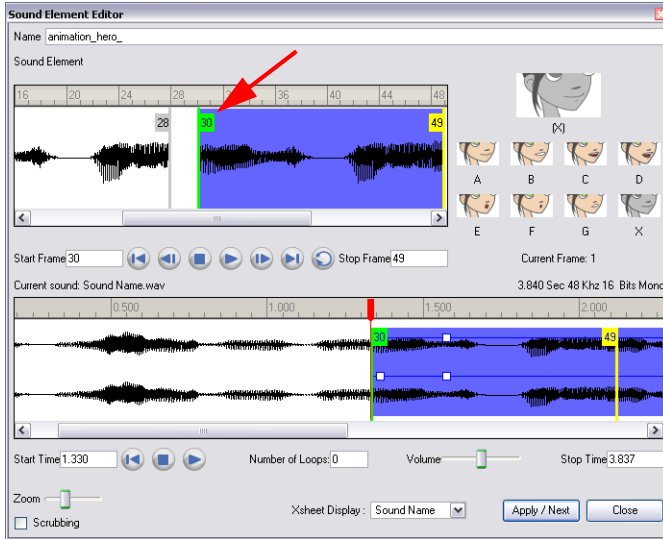
Changing the Start or End Frame of a Sound

To synchronize the sound with specific images in your scene, you must set a start frame for your sound. To make sure the sound ends by a certain frame, you must set an end frame.

To change start or end frame of a sound:

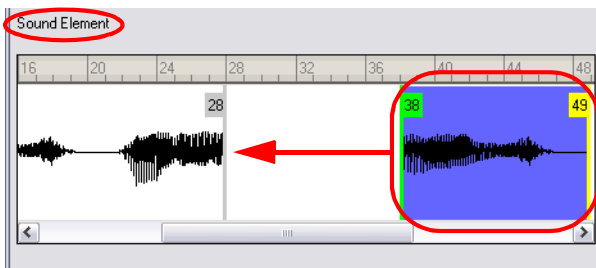
1. Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.

2. Select the sound sample you want from the Sound Element panel. To distinguish one sound section from another on the same sound layer, check the frame numbers that appear on tabs flanking the start and stop lines of each waveform section.



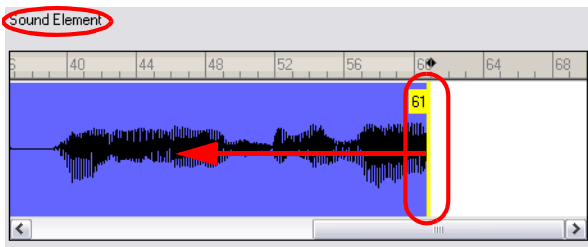
Click on the Play  button in the Current Sound panel (only the selected sound plays).


3. Within the Sound Element panel, click and drag the selected clip to the frame number where you want it to start playing.

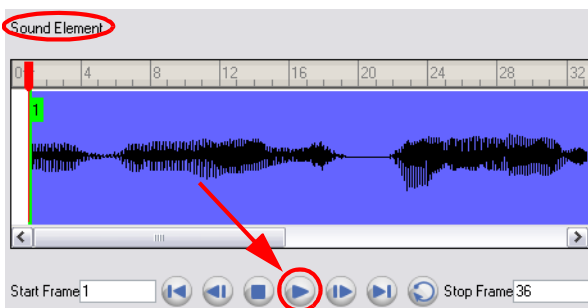



You can only move the clip to a section that does not already contain a clip; you cannot overlap two clips in the same element.

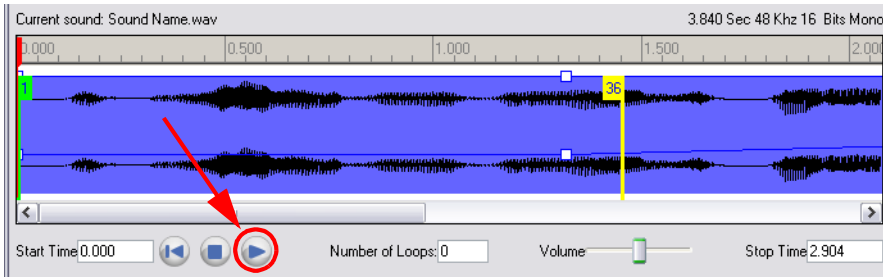
4. To change the end frame, drag the yellow marker at the end of the waveform to the frame position.



5. To hear how all of the clips fit together in the element, click on the Play button  in the Sound Element panel.



If you only want to hear the selected clip, click on the Play button  in the Current Sound panel.




6. Click Apply/Next when done. The Xsheet and Timeline View should now display the sound clip at the start frame you selected.

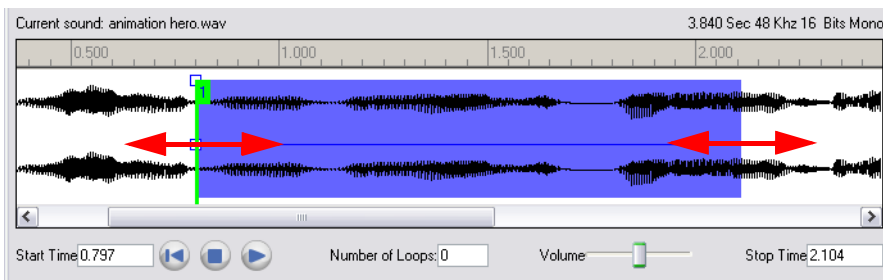
Trimming the Start and End of a Sound File


To play only a section of a sound file, use the Sound Element Editor to select the exact part you want to use. For example, if there is a bit of noise at the start of the sound, use the Sound Element Editor to cut the noise.

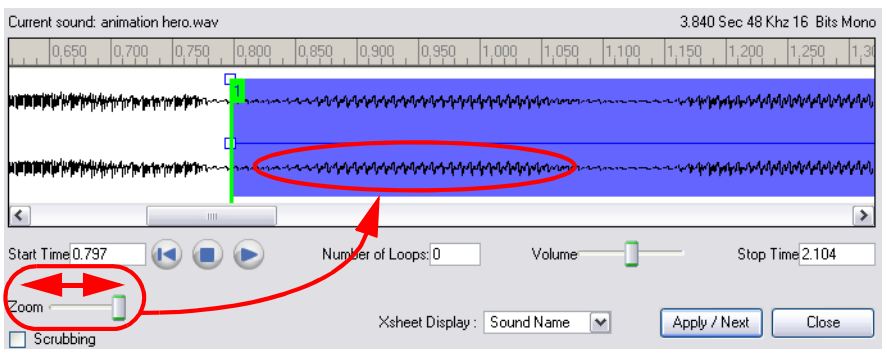
The Sound Element Editor does not change the original sound file; it only plays a section of it, ignoring the rest. This means that the entire sound file is included on export. If you need to be mindful of file size, it is better to edit sound files completely in a sound editor before bringing them into Harmony Stage.

To trim the start and end of a sound file:

1. Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
2. Select the sound you want to work on from the **Sound Element** panel.
3. Select the sound sample you want from the Sound Element panel. To distinguish one sound section from another on the same sound layer, check the frame numbers that appear on tabs flanking the start and stop lines of each waveform section. Or select a sound wave and click on the Play  button in the Current Sound panel (only the selected sound will play).
4. Using the Current Sound panel, you can decide which part of the file you want to play by dragging the left and right boundaries of the selection area.



5. Click on the Play  button in the Current Sound panel to check that you have trimmed the desired sections. Use the Zoom slider at the bottom of the panel to zoom in on the wave form so that you can trim it more accurately.



- Click on the Apply/Next button.

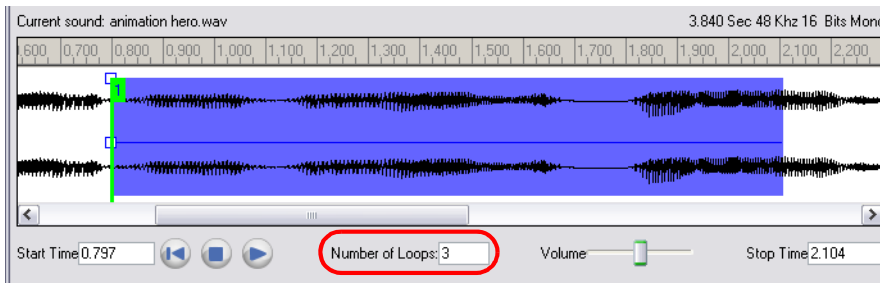
The trimmed sound sample should now appear in both the Timeline and Xsheet Views at the start and end positions that you selected.

Looping a Sound

To repeat a sound, specify the number of times that you want it to loop in the Sound Element Editor.

To loop a sound sample:

- Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
- From the Sound Element panel, select the sound section that you want to loop.
- In the Current Sound panel, type the number of times you want the sound to play in the **Number of Loops** field.



- Press on the [Return] key. The looped sound appears after the current sound. They are indicated by their grey waveforms, as opposed to black.

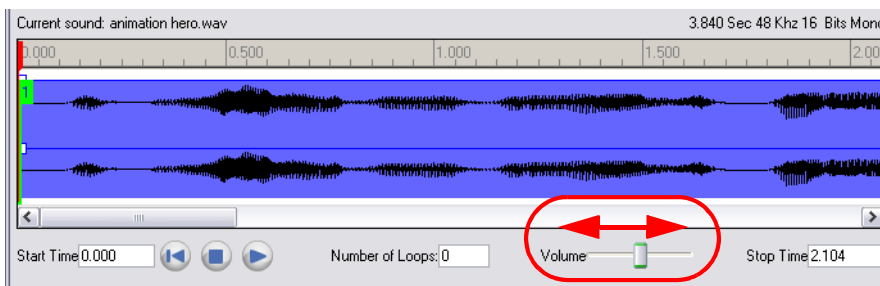
When you loop a sound, the looped sections fill the cells in the Sound element (column or layer) until the next sound sample starts or until the scene ends. This means that the looping could effectively get cut if the next sound sample starts too soon, or if the scene ends too quickly.

Mixing the Sound Volume

You can adjust the volume of an entire sound clip or modify the volume in increments by adjusting the fade-in and fade-out times, otherwise known as sound envelopes. The fade edit only affects the playback; the original sound file is not affected.

To adjust the overall volume of the entire sound clip:

- Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
- In the Sound Element panel, select the sound that you want to work on. A more detailed version of the selected sound appears in the Current Sound panel.
- In the Current Sound panel, use the Volume slider to adjust the volume.

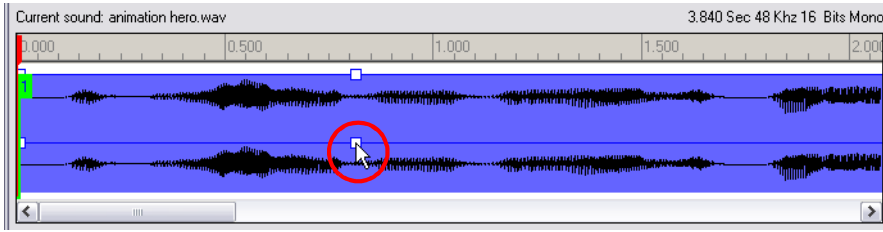


- Click on the Play button in the Current Sound panel to verify the volume.


To create the fade in/out effect on a sound clip:

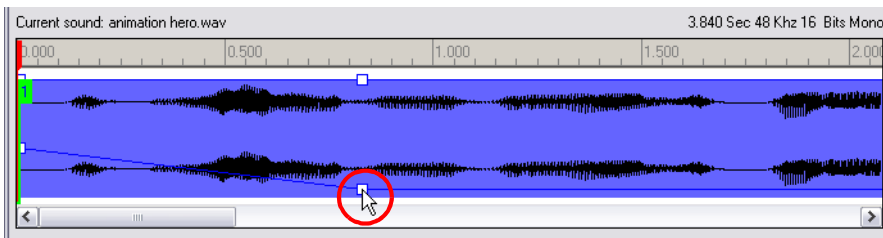
- Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
- In the Sound Element panel, select the sound you want to work on.


- In the Current Sound panel, click on the thin blue line above waveform to add an envelope marker.



- Drag the envelope markers to adjust the volume at that frame and to create the time of the transition. The line from the edge of the clip to the envelope marker identifies how the volume either increases (fades-in) or decreases (fades-out) over time.
 Dragging the marker to the bottom of the channel will mute the volume, while dragging it upwards will increase the volume.

 *To create an even effect, be sure to adjust the envelope markers uniformly in both the left and right (bottom and top) channels.*



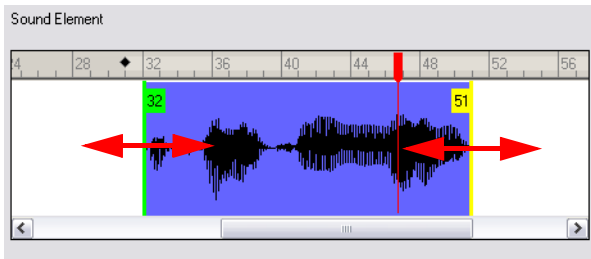
- Click on the Play  button in the Current Sound panel to check the fade envelopes.


Customizing the Playback Range

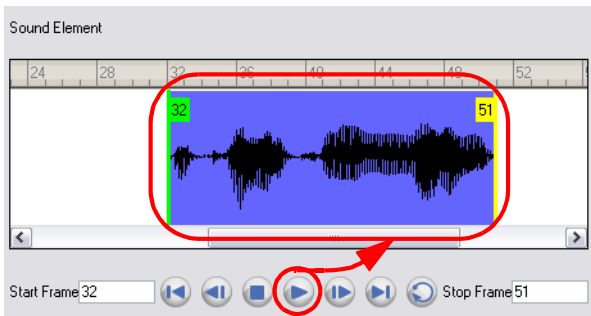
To hear a specific section of the sound element, adjust the playback range in the Sound Element Editor to start or stop at specific frames. This customized playback range does not affect the actual sound in the Sound element.

To change the playback range in the Sound Element Editor dialog box:

- Drag the start or end range markers in the **Sound Element** panel to the boundary frames you want.



- When you click on the Play  button to playback your sound in the **Sound Element Editor**, it only plays the sound existing between the two markers.



Add Empty Sound Layer


When performing sound editing tasks, it can be useful to chop up a sound sample into different layers. For example, when performing a lip-sync, only a single view of the various mouth positions for a character can exist on one layer. Therefore, if you would like to have your character turn its head from a profile view to a three-quarter view and have mouth position changes to fit with the sound sample from these two different views, you would need to cut-up the sound samples needed for the profile view mouth positions on one layer and the sound samples needed for the three-quarter view on another.

For this task, you will need an empty sound layer.

To add an empty sound layer:

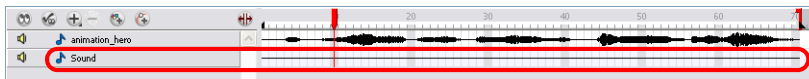
1. In the top menu, select **Windows > Toolbars > Timeline View**.
The Timeline View toolbar should appear at the top of the Timeline View.



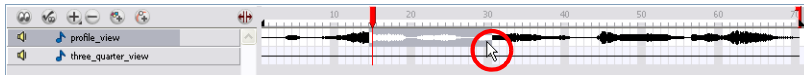
2. Click on the Add Sound  button.

 *If the Add Sound button does not appear in the Timeline View toolbar, refer to the Discovering the Interface chapter to add it.*

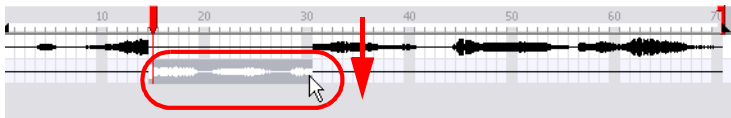
An empty (silent) sound layer should appear in both your Timeline and Xsheet View.





3. Rename your layers accordingly.
4. Click the cell where you wish to start the cut and [Shift]+[click] the final cell of the cut. The sample to be cut becomes highlighted.



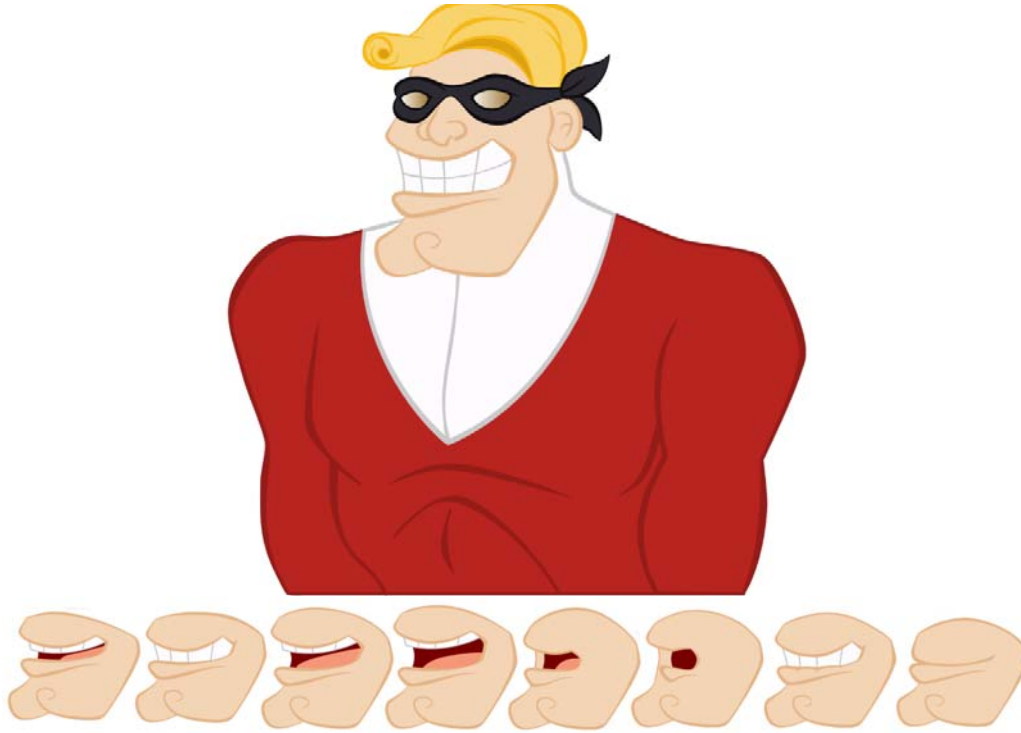
5. Drag the selection into the empty sound layer below.



6. You can now continue to cut-up and distribute the sound sample between the two layers or carry on to the lip-synching process for each layer and its corresponding facial view.

 *If you need to duplicate your sound layer to keep an unedited copy for safety, you can click on the Duplicate Selected Layers button , located in the Timeline View toolbar.*

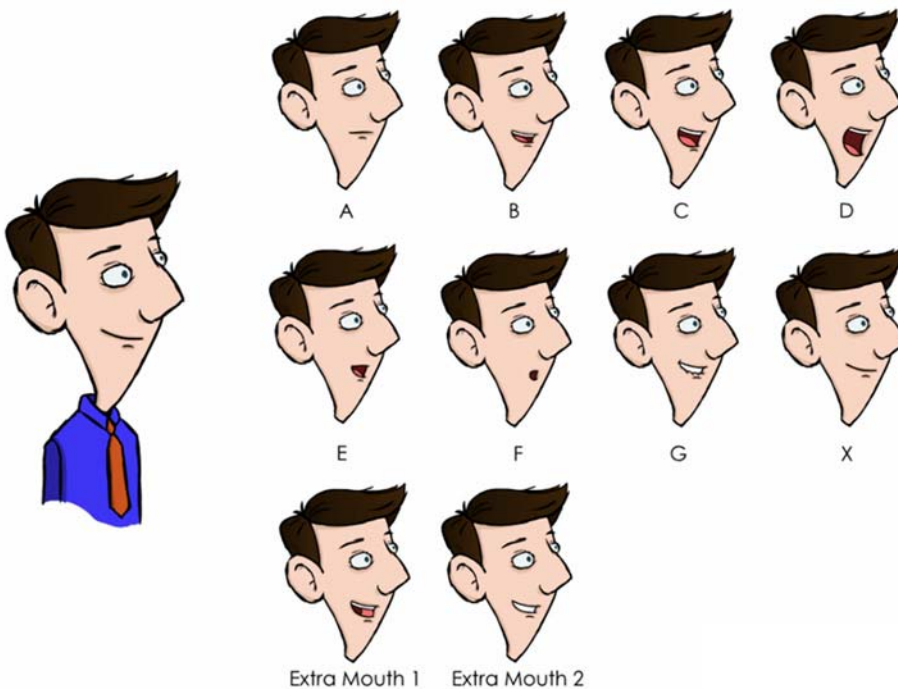
Lip-sync



Adding a lip-sync to a project can really enhance its quality and storytelling. However, it can be difficult to shape a character's mouth so that it matches the sound at the precise frame.

To solve this problem Stage provides a lip-sync feature which analyses the contents of a sound element and generates a mouth chart (see below) based on the eight animation phonemes (A, B, C, D, E, F, G, and X, which is used to represent silence).

You can lip-sync the traditional way or let the system automatically create the basic detection.



You can refer to the mouth chart positions as you draw the shape of your character's mouth.

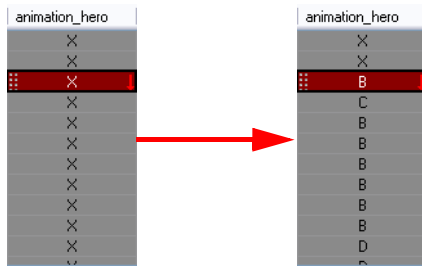
This section explains:

- Creating a Mouth Shapes Chart, on page 545
- Manual Lip-Sync Detection, on page 546
- Automatic Lip-sync Detection, on page 547
- Modifying the Lip-Sync Detection, on page 548

Creating a Mouth Shapes Chart

To generate a mouth shapes chart for a sound from in the Xsheet or Timeline view:

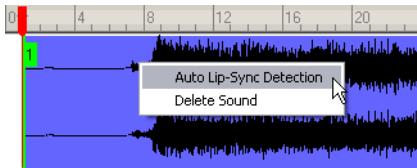
1. To show the mouth chart letters, if they are not already present in the Xsheet, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the sound column and select **Lip-Sync > Sound Display > Mouth Shapes** from the pop-up menu.
2. In the Xsheet view or Timeline view, right-click (Windows/Linux) or [Ctrl]-click (Mac OS X) the sound layer's cells and select **Lip-Sync > Auto Lip-Sync Detection** from the pop-up menu. You can also select **Animation > Lip-Sync > Auto Lip-Sync Detection** from the top menu.



Harmony Stage analyzes the selected sound clips and assigns a lip-sync letter to each frame. The X markers in the frame are replaced by these designated letters.

To generate a mouth shapes chart for a sound using the Sound Element Editor:

1. Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
2. In Sound Element panel, select the waveform you want to generate the mouth chart for.
3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the sound file and select **Auto Lip-Sync Detection** from the pop-up menu.



4. A progress bar appears while Harmony Stage analyzes the selected sound clips and assigns a lip-sync letter to each sound cell.




Manual Lip-Sync Detection

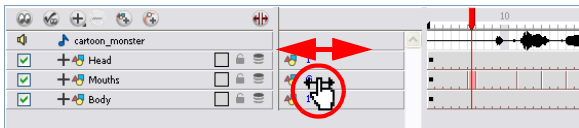
Harmony Stage allows for the manual swapping of mouth position drawings to match a voice track. For this process, both sound scrubbing (listening to a sound wave broken-up frame-by-frame) and drawing substitutions from the Library View are used.



Refer to *Libraries, Symbols and Templates > Preview and Drawing Substitution*, on page 350 and the *Sound Scrubbing* section in this chapter for more details.


To perform a manual lip-sync:

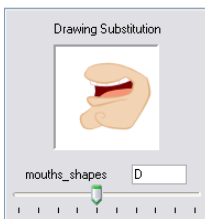
1. In the Playback toolbar, enable the Sound Scrubbing  button.
2. In the Timeline View, drag the red position indicator along the sound layer waveform.
3. When you reach a frame where a mouth position should go, for example, an open mouth with rounded lips for an "oh" sound, click on that frame on your mouth shapes layer.
4. In the Timeline view, click on the Expand  button to display the Data View.
5. Staying on your mouth shapes layer, place your cursor on top of the drawing name (often a letter) until it changes to the swapping pointer .
6. Pull the cursor to see the list of mouth shape names and choose the one you want. The current drawing automatically changes to the new selection.



You can also use the Timeline View to swap drawings:

To perform a manual lip-sync in the Timeline View:

1. In the Playback toolbar, enable the Sound Scrubbing  button.
2. In the Timeline View, drag the red playhead along the waveform of your sound layer.
3. When you reach a frame where a mouth position should go, for example, an open mouth with rounded lips for an "oh" sound, click on that frame on your mouth shapes layer.
4. In the Drawing Substitution window of the Library view, click and drag the slider to choose a mouth shape. The current drawing is swapped for the one in the preview window.



Automatic Lip-sync Detection

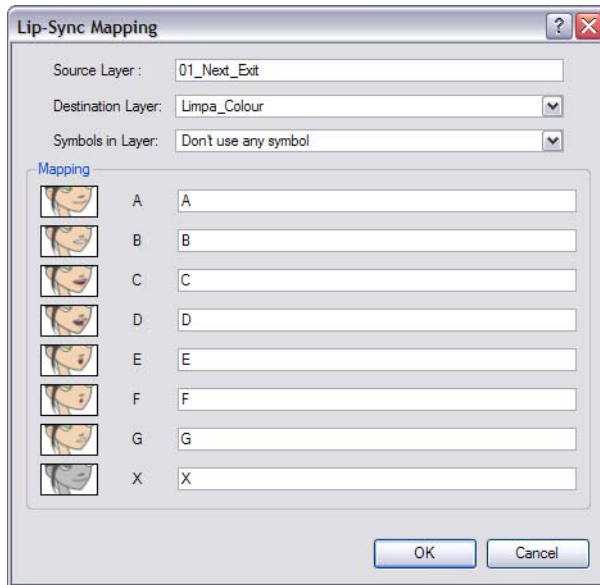
Harmony Stage can automatically map drawings in an element to the mouth chart you have generated for a sound. This can save time when you are lip-syncing a voice track.

In the Lip-Sync Mapping dialog box, you can identify each lip drawing of a character. Stage then automatically labels all of the cells in the character's element with the appropriate name.

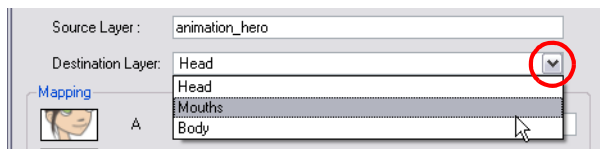
To automatically map lip-sync drawings to a mouth chart:


1. In the Timeline View, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on any cell in the sound sample layer.
2. From the pop-up menu, select **Lip-Sync > Map Lip-Sync**. You can also select **Animation > Lip-Sync > Map Lip-Sync** from the top menu.



The **Lip-Sync Mapping** dialog box opens.



3. From the Destination Layer drop-down list, select the layer that contains the mouth positions for the character's voice track.



4. If the selected layer contains Symbols, you can map the lip-sync using drawings located directly on the layer or use the Symbol's frames. In the Symbol Layer field select **Don't Use Any Symbol** if you want to use the drawings or select the desired Symbol from the drop-down menu.
5. In the Mapping section, type the drawing name or Symbol frames in the field to the right of the phoneme it represents. If your drawings are already named with the phoneme letters, you do not have to do anything.
6. Click on the OK button.
7. Press the Play  button in the Playback toolbar to see and hear the results in the camera view.

 To playback your scene with sound, enable the Sound  button in the Playback toolbar.

Modifying the Lip-Sync Detection

You can change the mouth position that has been assigned to a frame if you think that another position would be more appropriate.

For example, you may have a character who says nothing for ten frames, in between two speeches. Harmony Stage would normally assign an X image for the silence period. However, if you want your character's mouth to hang open in astonishment for these ten frames, you can change the lip assignment for these frames from an X to an F.

To change the lip assignment of a sound in the Xsheet:

1. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) in the cell that contains the mouth position that you want to change.
2. From the pop-up menu, select **Lip-Sync > Change Mouth Shape to** and choose the letter that reflects the mouth position that you want to use for that sound. You can also select **Animation > Lip-Sync > Lip-Sync > the desired mouth shape** from the top menu.

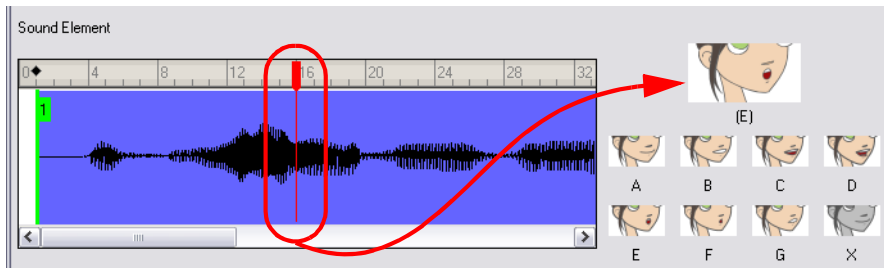
The drawing will automatically be updated in the Camera View.

You can also change the mouth assignment of a sound in the Sound Element Editor.

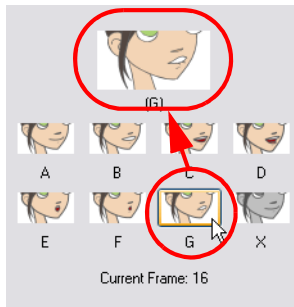
To change the mouth position assignment of a sound from the Sound Element Editor:

1. Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
2. In the Sound Element panel, drag the frame slider to the frame you want to change the mouth position assignment on.

In the Lip-sync image area, the image on top represents the lip position assigned to the current frame.



3. To change the image assigned to the frame, click on the image of the mouth position you want from below the preview image. The preview image changes to the mouth position image you select.



The position will also be updated in the Timeline and Xsheet Views.

Recomputing the Mouth Chart

When you generate the mouth chart for a sound in a sound element, you can either accept the mouth positions assigned by Harmony Stage or assign your own lip-sync images.

However, if you change the sound's start frame or reassign its mouth position, you must reanalyze the sound and regenerate the mouth chart for it. This erases any manual modifications you may have made to the mouth assignments in the mouth chart.

To recompute the mouth chart for a selected sound from the Sound column:

1. In a Sound column in the Xsheet or Timeline view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on a cell that contains the sound file you want to recompute the lip-sync for. Select **Lip-Sync > Auto Lip-Sync Detection**

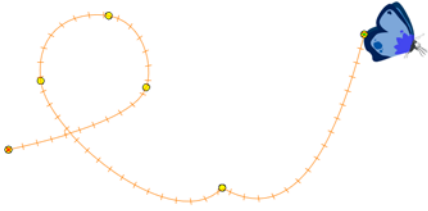
from the pop-up menu. The mouth position assignment for each frame is recomputed, erasing any modifications you have made.

To recompute the mouth chart for a selected sound from the Sound Element Editor:

1. Either double-click the sound layer name in the Timeline View or the sound column header in the Xsheet View to open the Sound Element Editor.
2. Click on the waveform in the Sound Element section in the Sound Element Editor.
3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Auto-Lip Sync Detection** from the pop-up menu.

Chapter 14

Creating Animation Paths



Movement is the essence of creating an animation; it is essentially what animation is: bringing drawings to life. Sometimes this movement comes from the characters or objects themselves, while other times, it is the camera moving through elements set-up on the camera “stage”. Often these movements can be complex, such as a helicopter moving across the screen with its rotor blades rotating, as the helicopter disappears into the distance, it appears to get smaller in size as it recedes in space. Although this seems like a simple motion, you must coordinate three movements to produce the correct effect.

The sophisticated systems integrated in Toon Boom Harmony Stage have been specifically developed to accommodate the animator’s complex motion needs. In this chapter the following topics will be covered:

- Animating a Layer, on page 552
- Differences Between Pegs and Animated Layers, on page 554
- Adding and Deleting Keyframes, on page 562
- Stop-Motion and Motion Keyframes, on page 564
- Animating the Camera, on page 567
- Modifying a Path in the Camera View, on page 570
- Modifying a Path in the Timeline View, on page 577
- Modifying a Path in the Function View, on page 580
- Modifying a Path in the Xsheet View, on page 584
- Function Curves, on page 586
- Copying and Pasting a Motion, on page 593
- Adjusting the Velocity, on page 598
- Preferences, on page 605

Animating a Layer

This section describes the basics of animating a layer. Harmony Stage's wide range of features will let you produce accurate trajectories. However, before reaching this level you must learn how to create a simple motion and practice everything you learn in this chapter.

In this topic, you will find out about the two key elements in creating a motion:

- Animate Mode
- Animating the layer

Animate Mode

If you enable this mode when you animate layers, Stage will apply a transformation to the current frame. If you don't, it will apply a transformation on the entire layer instead of only the current frame.

To enable the Animate Mode:

- ▶ In the Tools toolbar, click on the Animate Mode  button. The default keyboard shortcut is [Shift]+[A].
 - ▶ When the Animate Mode button looks pushed in and highlighted it is enabled.






- ▶ When the Animate Mode button is not highlighted it is disabled.

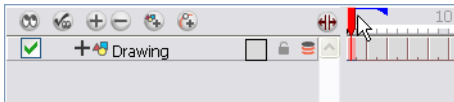


Animating a Layer

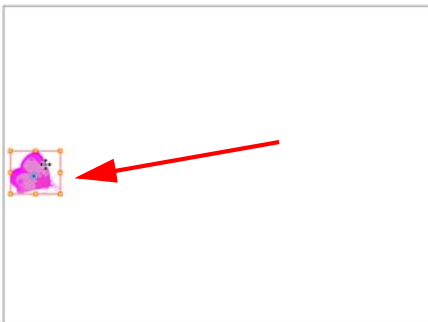
Follow these simple steps to perform a basic layer animation.

To animate a layer:

1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
 - ▶ In the Tool Properties view, make sure the Peg Selection Mode  button is disabled so you can select your drawing layer directly and not the pegs. Refer to the Peg Selection Mode section to learn more about this option.
2. In the Tools toolbar, enable the Animate Mode .
3. In the Timeline view, go to the first frame.



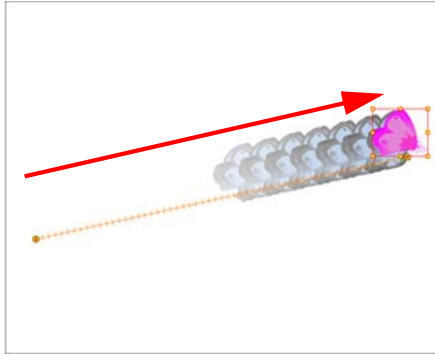
4. In the Camera view, select the element to animate and move it to its first position.




5. In the Timeline view, go to the frame where you would like to set the second position.



6. In the Camera view, move the selected element to its new position.



7. In the Playback toolbar, press on the Play  button to view your work.



Refer to *Setting Up the Scene > Positioning the Scene Components*, on page 451 to learn more about the repositioning tools.



Refer to the *Stop-Motion and Motion Keyframes* topic to learn how to have automated interpolation or do step keyframe animation.

Enabling the Playback

To see your motion animations in the Top, Side or Perspective views while you playback, you must enable the Playback option.

To enable the Playback option:

1. In the top menu, select **Play > Enable Playback > Top View, Side View or Perspective View**.

Differences Between Pegs and Animated Layers

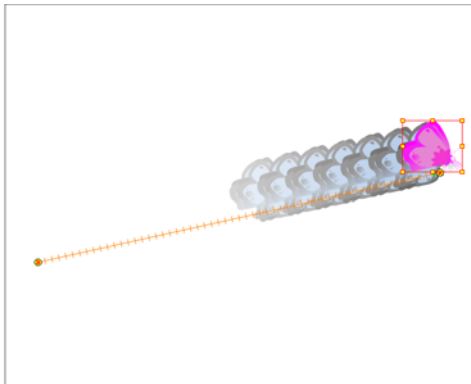
To animate the position of your drawings you need to create motion paths. Motion paths are trajectories on which you can hook your drawing objects to. You will use keyframes to record the key positions along this trajectory.

There are two ways in which to create motion paths:

- Animated Layers, on page 554
- Pegs, on page 555

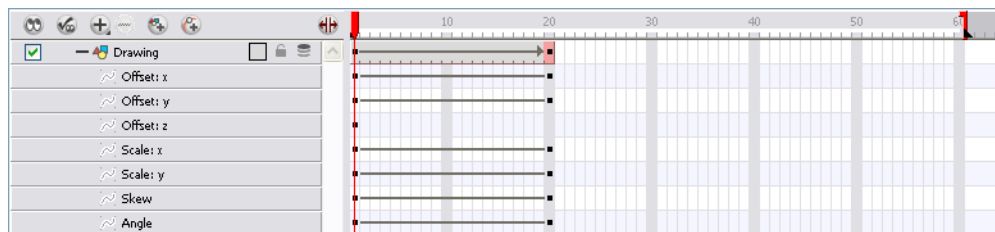
Animated drawing layers and pegs have different purposes which you will discover in the following topics.

Animated Layers



You can create your motion path directly on your layers.

Drawing layers can house drawings and Symbols. Also, in that same layer you can create a motion path using keyframes and all the artwork contained in the layer will follow.



You can control and define your trajectory using several different parameters. These parameters are:

- X, Y and Z positions
- Angle (rotation)
- Skew
- X and Y scales

Each parameter has its own function curve where you can add keyframes and control the easing.

Do not worry about using graphs and function curves if you are not familiar with this concept. Stage has a series of easy-to-use tools for visually controlling your trajectories in the Camera view.



Refer to the Layer Parameters section of this chapter to learn more about function curves.

To animate a simple object such as an arrow in flight or a wheel spinning, you will use the integrated trajectory. Also, each part of a cut-out puppet will be animated directly on the drawing layer.

Pegs

A Peg layer is a trajectory that contains no drawings, on which you can hook your drawings to.

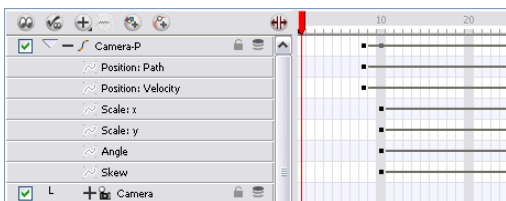
This topic is divided as follows:

- Why Use a Peg Layer?, on page 555
- The Origins of the Peg, on page 555
- Adding a Peg to the Timeline, on page 556
- Adding a Peg to the Network, on page 556
- Peg Selection Mode, on page 557

Why Use a Peg Layer?

A Peg is composed of many customizable parameters. These parameters are:

- X, Y and Z positions
- Angle (rotation)
- Skew
- X and Y scales
- 3D Rotation (When the 3D option is enabled)



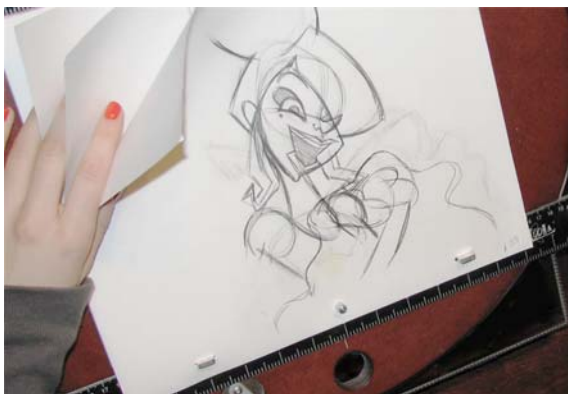
You can control a Peg's trajectory the same way as the animated drawing layer.



Refer to the Layer Parameters topic to learn more about the parameters.

Peg layers are mainly used to control a series of drawing layers together. If you have several drawing layers such as clouds or a character split into many parts, you can hook those to a peg layer and have them follow a trajectory as one unit. When building a puppet, most of the time you will add a master peg to control your puppet as one object.

The Origins of the Peg



Pegs have been used for a long time in the traditional animation process, mainly for registration purposes. Peg holes at the bottom (or top) of animation paper are used to keep all of the sheets even and at the same registration.

There are three peg holes in regular animation paper. The centre peg hole is circular while the the left and right ones are rectangular. These rectangular peg holes are situated, one on each side and four inches away from the centre peg hole.

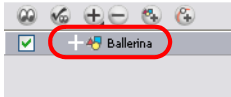
To keep the drawings together, the animator uses a peg bar. This peg bar has three pins corresponding to the shape and location of the peg holes. Peg bars are normally found at the bottom and top of animation discs.

Before digital compositing, the peg bars were also used to move levels under the camera stand. They were the equivalent of digital trajectories. Harmony Stage makes use of these concepts to create animation and camera moves.


Adding a Peg to the Timeline

To add a Peg:

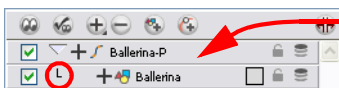
1. Select the layer which you intend to attach to the peg.



2. Add the peg in one of three ways:

- ▶ From the Timeline View layers' toolbar, click on the Add Peg  button.
- ▶ From the top menu, select **Insert > Peg**.
- ▶ Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the layer and from the pop-up menu, select **Add > Peg**.

3. The layer that was originally selected will become a child of the new parent Peg layer. The new Peg layer will automatically take the name of its child layer, with the addition of the suffix **-P**.



The indentation of the layer, along with the L-shaped line indicates hierarchy and that the layer is attached to the Peg layer. Their relationship is known as Parent-Child

If you intend adding multiple pegs, or if the layer name that was added to the Peg does not accurately represent the content of the Peg layer, you can rename it. You can do this by clicking on the layer name and typing in the editable field, or double-clicking on the layer and entering the new name into the dialog box.



If you didn't create your peg layer directly above the layer you intended on parenting it to, then click and drag the layer you want to attach to the peg and drop it directly below the Peg layer. The indentation of the layer below the Peg layer will be an indication of whether it was correctly attached or not.



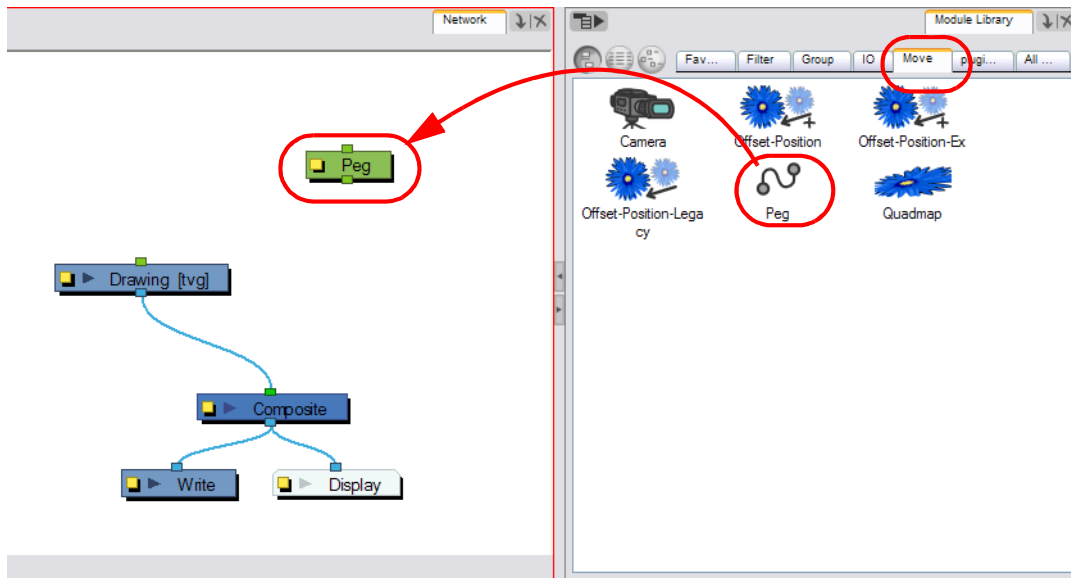
Adding a Peg to the Network

In Harmony Stage, you can add Pegs to your Network view using the Module Library and they will instantly appear in the Timeline view. The modules you add to your Network view will be synchronized with the ones appearing in the Timeline view.

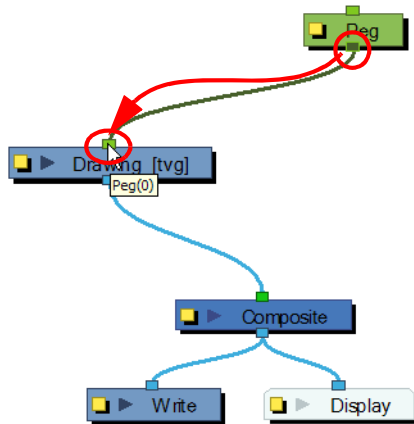
To add a peg in your Network view:

1. In the Module Library, go to the Move tab.

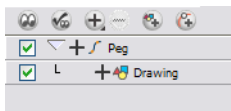
2. Select a Peg module and drag it to your Network view.




3. In the Network view, select the Peg module's Out Port and connect it to either a Drawing module or a Camera module.



The advanced connections in the Network view are shown in the Timeline view, unless they cannot be reproduced in a timeline layout.





Peg Selection Mode

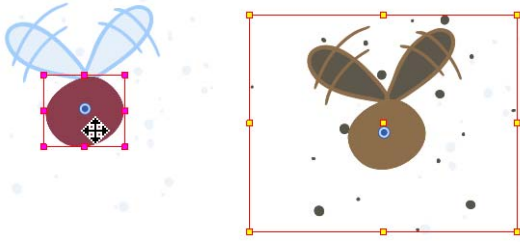
In the Transform Tool Properties view, there is the Peg Selection Mode  allowing you to automatically select the Peg layers in the Camera view instead of the drawing layers.

If you animate with Pegs instead of animating the Drawing layers directly, enable the Peg Selection Mode to avoid having to select in the Timeline view or use the Select Parent command.

To enable the Peg Selection Mode:

1. In the Tools toolbar, select the Transform  tool.
2. In the Tool Properties view, enable the Peg Selection Mode  button.

3. In the Camera view, select an element parented to a peg.



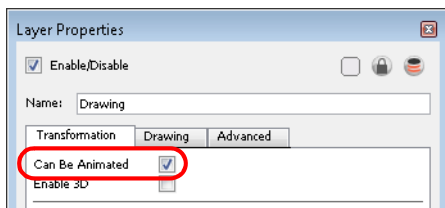
Prevent Drawing Layers from being Animated

By default, a Drawing layer can be animated but you can disable this feature and render a specific layer to be still. Being able to switch your drawings so they can be animated or not has certain advantages. When selecting the element in the Camera view, the actual Drawing layer is selected, but the motion you will create will automatically be transposed to the Peg layer, this means that you can have access to the drawing substitution feature for this Drawing layer, while being able to create keyframes on it's parent peg. This feature is also available for backward compatibility.

To disable the animation feature on a layer:

1. In the Timeline view, double-click on the layer that you want to set the parameter for.

The **Layer Properties** editor opens.



2. In the Transformation tab, disable the Can Be Animated option.

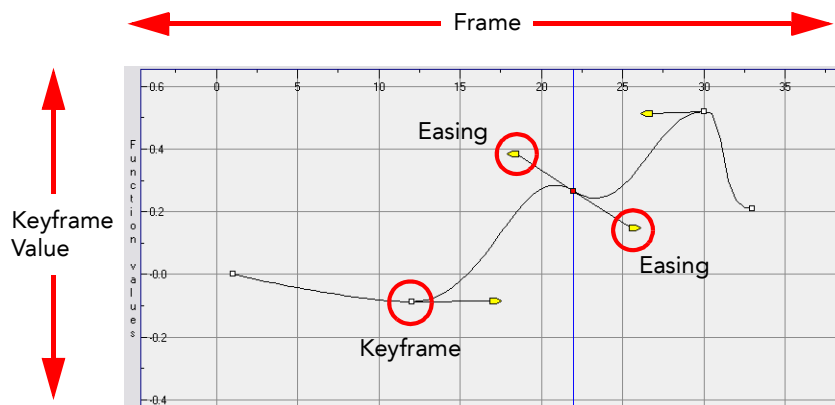


Refer to the following topics to learn more about the drawing substitution feature.

- Libraries, Symbols and Templates > Preview and Drawing Substitution, on page 350
- Animating Your Puppets > Swapping Images, on page 654

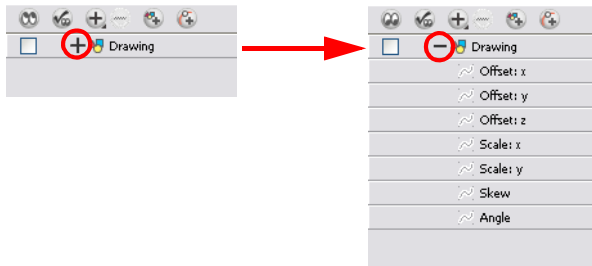
Layer Parameters

A layer is composed of many customizable parameters, such as the X, Y and Z positions, angle (rotation), skew and scales. Each parameter has its own function. A function is a mathematical formula expressing a relation between position values. You can view each function on a graph as a simple curve such as this one.

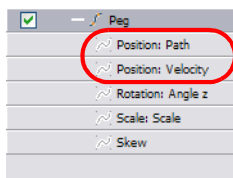


To display the Layer parameters in the Timeline View:

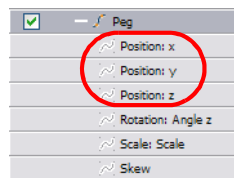
- ▶ In the Timeline's left-hand side, click on the Expand Function **+** button.
The default keyboard shortcut is [Alt]+[F].
- OR**
- ▶ You can select the layer you want to display the functions for, go to the Timeline View menu and select **View > Show Functions**.



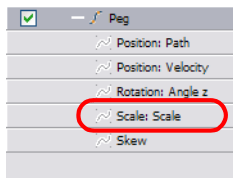
There are six options available for setting up your function parameters:



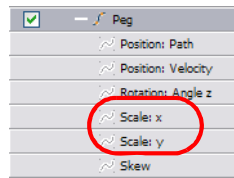
Locked Positions



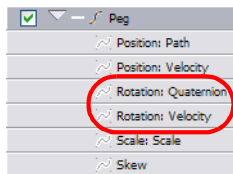
Separate Positions



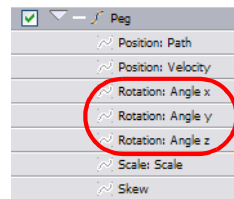
Locked Scale



Separate Scale



Quaternion
(Locked 3DRotation)



Euler Angles
(Separate 3D Rotation)

- Locked Positions (3D Path)
- Separate Positions
- Locked Scales
- Separate Scales
- Quaternion (3D Rotation)
- Euler Angles (3D Rotation)



You can set the preferences to suit your way of working. In your general preferences, enable **Default Separate Positions** to get separate X, Y and Z positions, or disable it to get a 3D path. The 3D path is set by default.

Enable the **Default Separate Scale** to get separate X and Y scales. It is highly recommended that you use default separate scales.



You have to lock or unlock your functions before starting the animation. When you lock or unlock parameters, this does not convert the functions from one to the other, but creates new ones.

This topic is divided as follows:

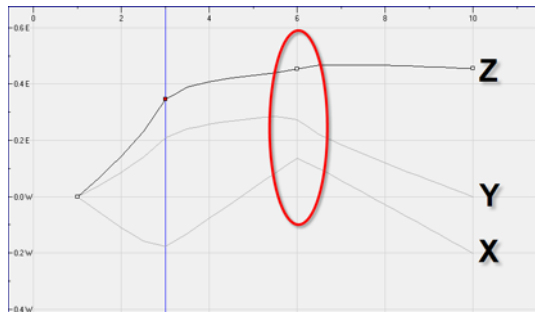
- 3D Path, on page 560
- Separate Positions, on page 560
- Locked Scales and Separated Scales, on page 560
- Setting the Parameters, on page 560



Refer to the *Working in a True 3D Space* chapter to learn about moving your elements in three dimensions.

3D Path

In a 3D Path, the X, Y and Z curves are locked together and controlled by a single velocity function. When you add a keyframe, it is added on all three trajectories at once, as is the velocity. This is very useful for long, smooth trajectories.



Separate Positions

When the Separate Positions option is used, the X, Y and Z curves are independent and have velocity controls directly on their function curve. This is useful when you want to set keyframes on one of the curves without affecting the others.



Locked Scales and Separated Scales

When using the scale function, you can have a single function curve controlling both the vertical and horizontal scale, or have the two scales separate. This means that when using the single function, the values will be the same for the X (horizontal) and the Y (vertical) axes, enabling a uniform size change without distortion. However, if you separate the scale functions, you will be able to squash, stretch and skew your elements.

Setting the Parameters

This topic will cover the 2D motion parameters.



Refer to the Working in a True 3D Space chapter to learn about moving your elements in three dimensions.

To set the parameters:

1. In the Timeline view, double-click on the layer that you want to set the parameter for.

The **Layer Properties** editor opens.



2. Go to the Transformation tab.
3. In the Position section, enable either the 3D Path or the Separate options.
4. In the Scale section, enable either the Locked or the Separate options.
5. Click on the close button.

Adding and Deleting Keyframes

You can create a keyframe in several different ways.

You can add a coordinate keyframe, position keyframe or a keyframe along with your drawing duplication.


- Coordinate Keyframe, on page 562
- Add Keyframe and Duplicate Drawing, on page 562
- Position Keyframe, on page 563
- Delete Keyframe, on page 563

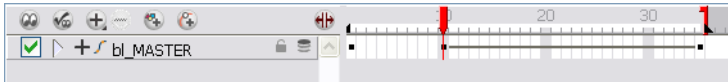
Coordinate Keyframe

To create keyframes:

1. In the Timeline view, select the cell where you want to add a keyframe.



2. Here are the different ways to add a keyframe to your timeline:
 - ▶ In the top menu, select **Insert > Keyframe**.
 - ▶ Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Add Keyframe**.
 - ▶ The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X).
 - ▶ You can also click on the Add Keyframe  button available in the Timeline View toolbar.
 - ▶ In the Camera view, if the Animate mode is enabled, as soon as you move the selected element, a keyframe will be automatically created on the current frame.

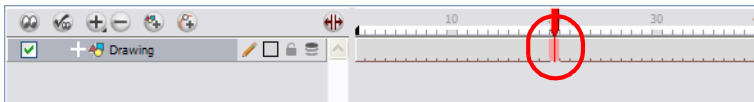


Add Keyframe and Duplicate Drawing

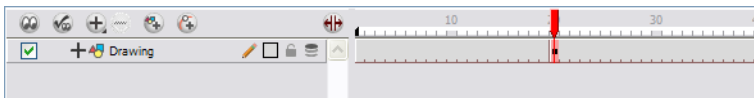
The method described previously only creates a keyframe without a drawing. It adds a new coordinate points but the drawing in the layer stays the same. You may want to duplicate your drawing at the same time if you need to modify it and do not want to modify the original one. In this case, you can use the Add Keyframe and Duplicate Drawing function.

To create a keyframe and duplicate your drawing at once:

1. In the Timeline view, select the cell containing the drawing where you want to add a keyframe and duplicate.



2. Here are the different ways to add a keyframe and duplicate:
 - ▶ In the top menu, select **Insert > Keyframe and Duplicate Drawing**.
 - ▶ Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Insert Keyframe and Duplicate Drawing**.
 - ▶ The default keyboard shortcut is [F6].

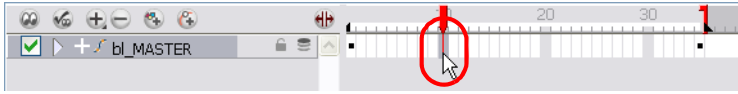


Position Keyframe

You can also add a Position Keyframe instead of a regular keyframe. When you add a Position keyframe, keyframes will only be added on the X, Y and Z parameters of the selected layer. Keyframes are not added on the Angle, Scale and Skew parameters.

To add a Position keyframe:

1. In the Timeline view, select the cell where you want to add a position keyframe.



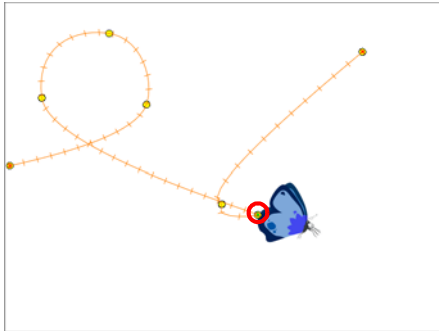
2. In the top menu, select **Insert > Position Keyframe**.

If you select a keyframe in the Timeline view and press the [Delete] key, you will also delete the drawing exposure. To only delete the keyframe, you must use the Delete Keyframe command.

Delete Keyframe

To delete a keyframe:

- ▶ With the Transform Tool  selected, choose the Keyframe to be deleted from the trajectory in the Camera View and press the [Delete] key.



OR

- ▶ In the Timeline view, click on the keyframe to be deleted, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Delete Keyframes**. The default shortcut is [Shift]+[F6]. You can also select **Animation > Delete Keyframe** from the top menu.



Refer to the following sections for more information about adding keyframes:

- Modifying a Path in the Camera View, on page 570
- Modifying a Path in the Timeline View, on page 577
- Modifying a Path in the Function View, on page 580

Stop-Motion and Motion Keyframes

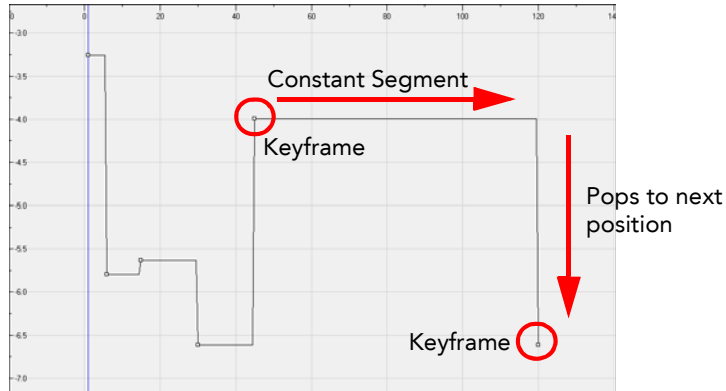
Interpolation is the computer-generated motion between two keyframes. Some animators and composers create their own inbetweens, others have the computer do it. Stage gives you Stop-Motion and Motion keyframes.

This topic is divided as follows:

- Stop-Motion Keyframes, on page 564
- Motion Keyframes, on page 564
- Toggling Between Motion and Stop-Motion Keyframes, on page 565

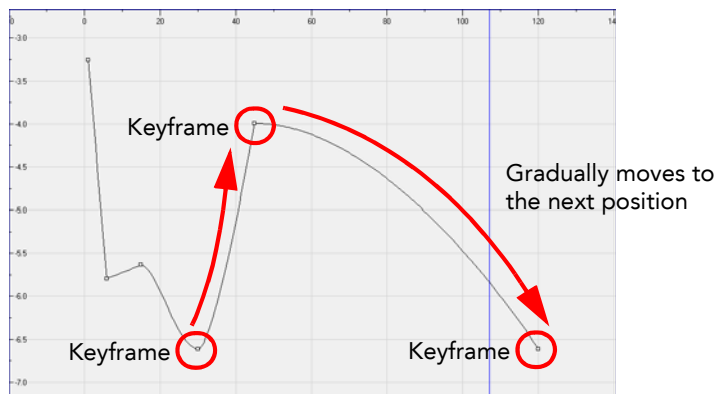
Stop-Motion Keyframes

A Stop-Motion keyframe means that there is no computer-generated motion between two keyframes. The segment is constant or flat.



Motion Keyframes

A Motion keyframe means that there is computer-generated motion between two keyframes. The segment has a variation over time.

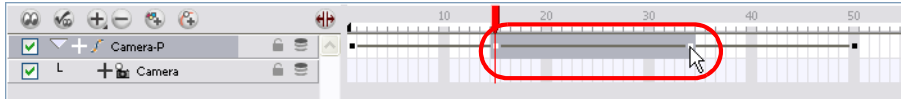




Toggle Between Motion and Stop-Motion Keyframes

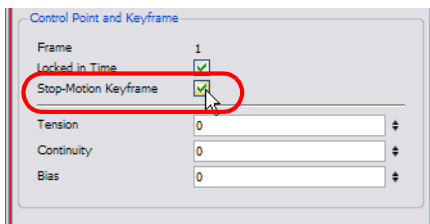
You can switch a keyframe between Stop-Motion and Motion at any time in the Timeline view and Function Editor.

To toggle between Motion and Stop-Motion in Timeline View:

1. On the right-hand side of the Timeline, select one or more keyframes to be modified.



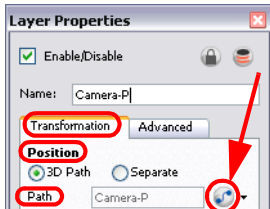
2. To toggle between Motion and Stop-Motion:
 - ▶ Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected keyframes and select **Set Motion Keyframes** or **Set Stop-Motion Keyframes**.
 - ▶ The default keyboard shortcuts are [Ctrl]+[K] (Windows/Linux) or [⌘]+[K] (Mac OS X) and [Ctrl]+[L] (Windows/Linux) or [⌘]+[L] (Mac OS X).
 - ▶ You can also click on the Motion Keyframe  and Stop-Motion Keyframe  buttons available in the Timeline View toolbar.
 - ▶ In the Camera view, select the keyframe to convert and in the Coordinates and Control Point view, enable or disable the Stop-Motion Keyframe option.



To toggle between Motion and Stop-Motion keyframes in the Function Editor:


1. Open the function editor:
 - ▶ In the Timeline view, double-click on the layer that contains the keyframes that you wish to convert.

The **Layer Properties** dialog box opens.

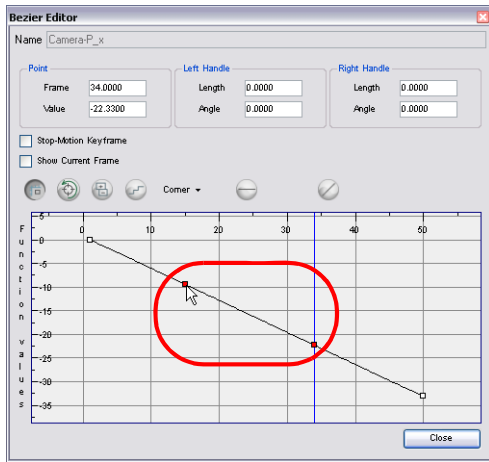


In the Transformation tab, click on the Function Editor  button to bring up the Editor Window.

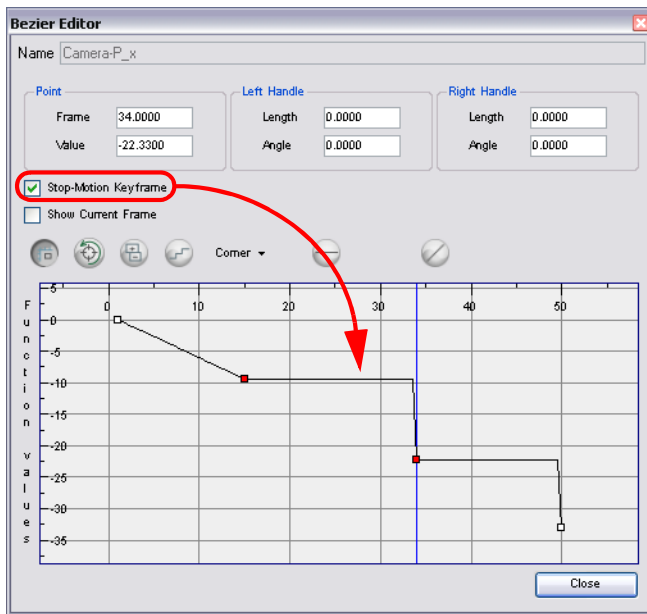
OR

- ▶ In the Timeline view, click on the Expand Function  button and double-click on the function to edit. The default keyboard shortcut is [Alt]+[F].

2. Select one or more keyframes to be modified on the Function Curve.



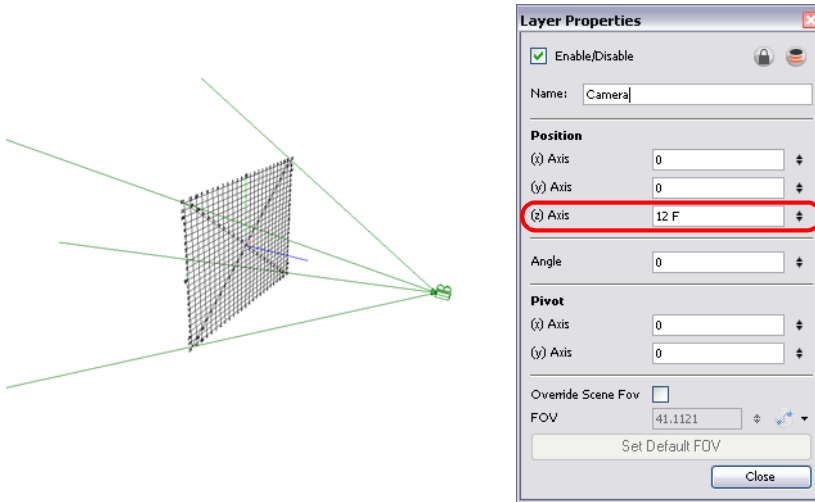
3. Enable or disable the **Stop-Motion Keyframe** option to set a Stop-Motion or Motion keyframe.



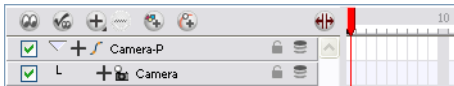
Animating the Camera

Just as in a live-action film, scenes are not only composed of characters moving around in a static camera field, but also of camera movements. Although it is not always something that we think about, often it is the exact opposite, the character is static while the camera moves through elements on the stage. Camera pans, jumps, cuts and zooms are as important to storytelling as the story itself.

Toon Boom Harmony Stage has a camera that can move along the X, Y and Z axes. Having the camera move on the Z-axis offers the possibility to create truck in and truck out, as well as multiplane camera moves. The default camera position is centred and backed up to 12 fields.



The camera is treated the same way as any other element. The same tools and selection modes are used to offset or animate it. To animate the camera, you need to connect it to a peg element.

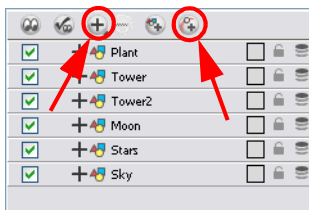


This means that you can animate the camera visually, with the function curve, or by typing values in the Xsheet column. To add a camera with a peg to your scene:

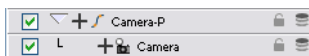
- If you do not already have a camera layer, add one in one of two ways:
 - From the top menu, select **Insert > Camera**
 - From the Timeline view layers toolbar, click on the Add Layers **+** button and select **Camera** from the menu that appears.
 - From the Library, select a Camera module and drag it to your Network view.

A new camera layer will be added to your scene and will appear in the Timeline view.


- From the Timeline View Layer toolbar, click on the Add Peg **+** button.

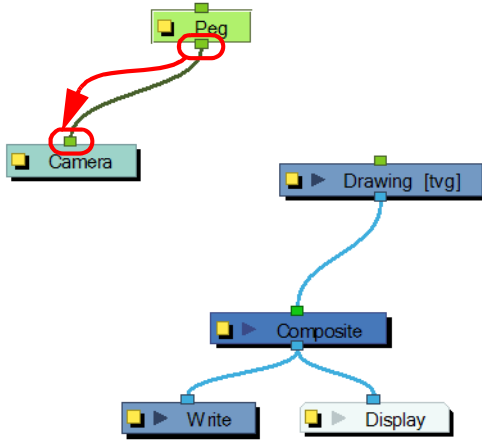


A Peg layer appears directly above the Camera layer so that the Camera layer is automatically attached to it. The Peg layer automatically takes on the name of the camera and adds the suffix **-P** to indicate that it is a peg layer, for example **Camera-P**.




If the new Peg layer did not appear directly above the camera, you may have clicked elsewhere in the scene, deactivating the layer you wanted to add the Peg layer to.

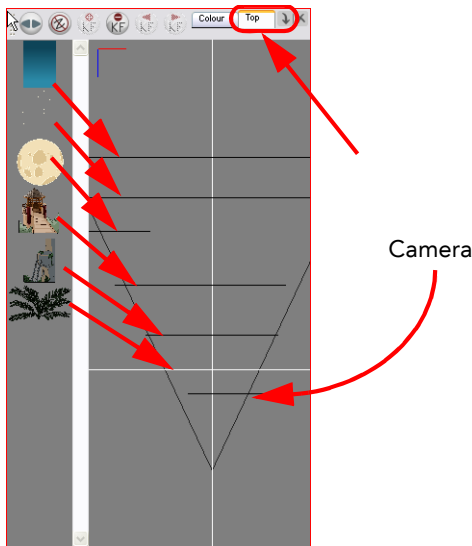
- Select the Camera layer and drag and drop in under the new Peg layer.
OR
- Delete the misplaced Peg layer, select the Camera layer and re-click on the Add Peg  button.
- ▶ Select a Peg module from the Library view and drag it to your Network view and then you can connect the Peg's Out Port to the Camera's Input port.




You are now ready to animate your camera.

It is recommended to use both the Top and Camera Views while making camera moves. You can open this view is one of two ways:

- From the top menu, select **Windows > Top**.
- From any existing window already open in your project, click on the Drop-Down Arrow  button from the top right-hand corner and select **Top** from the menu.
The Top view now appears as a tab in that view.

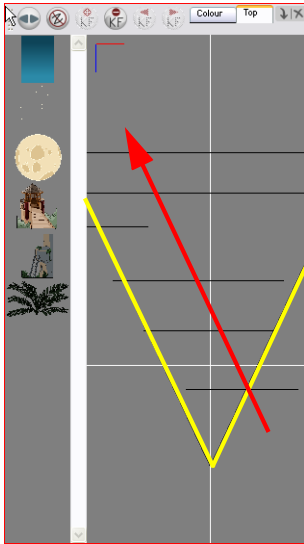


 Refer to the *Working in a True 3D Space* chapter to learn about moving your elements in three dimensions.

To animate your camera:

1. Make sure that both the Animate  button and the Transform Tool  are activated.

- In the Top view, select the camera (the large V-shape on the right-hand side) and move it to the desired position.

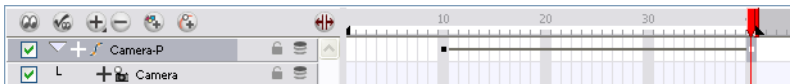


- In the Timeline view, click on a cell in the Camera Peg layer where you would like the camera move to begin.
- Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) and select **Insert Keyframe** from the menu that appears.





A keyframe now appears in that cell. Any frames preceding this keyframe cell will hold the same camera position as in this keyframe.

- Click on another cell, further down your scene's Timeline, where you would like the camera move to end.
- Select the camera in the Top View and move it to the position you desire.



A second keyframe appears and a line is created between the two frames to indicate that the subsequent motion between the frames will be calculated and rendered by the program.

- Playback  the camera move in the Camera view to watch the results.

 For further information concerning the Camera positioning tools, refer to *Setting Up the Scene > Setting the Camera Frame*, on page 447. For further information on animating with a Peg, refer to *Animating Your Puppets > Adding Pegs*, on page 661 chapter.

Modifying a Path in the Camera View

Although the example cited in the Animating the Camera section seems simple enough, camera moves and motion paths can become complex, especially with moves through 3D space. That is why Toon Boom has developed a way to view your camera's path and make adjustments to it from both a 2D and 3D perspective.

This topic is divided as follows:

- Displaying a Path in the Camera View, on page 570
- Shaping a Path, on page 571
- Offsetting a Trajectory, on page 576

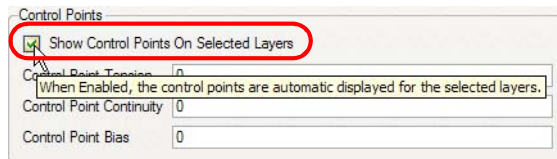
Displaying a Path in the Camera View

You can display the trajectory for your motion path when you select an object in the Timeline or Camera view.

If you want to see the trajectory, enable the Show Control Points on Selected Layers preference.

To enable the Show Control Points on Selected Layers preference:

1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X). The default keyboard shortcut is [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).
2. The Preferences panel opens.
3. Go to the Camera tab.
4. In the Control Points, section enable the Show Control Points on Selected Layers preference.

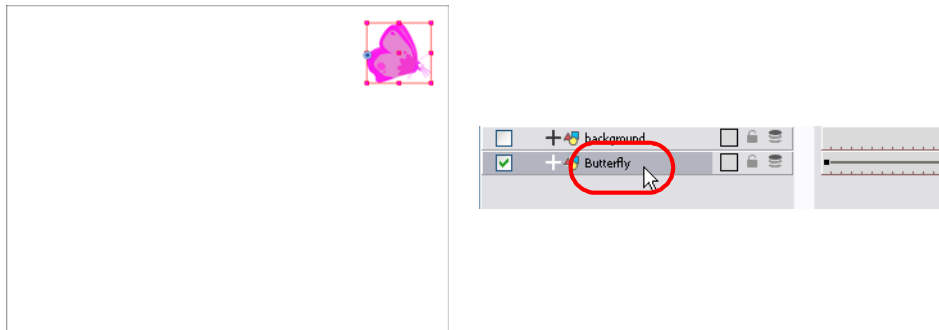


5. Click on the OK button.

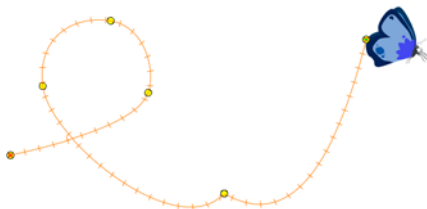
If your trajectory is hidden when you select an element, you may want to display it using the Control command.

To view your layer's trajectory using the Control command:

1. Verify that the Camera view (click on its tab) is selected and that the layer that you wish to display the trajectory of is selected in the Timeline view.



- ▶ From the Top menu, select **View > Show > Control**.
- ▶ The default keyboard shortcut is [Shift]+F11.

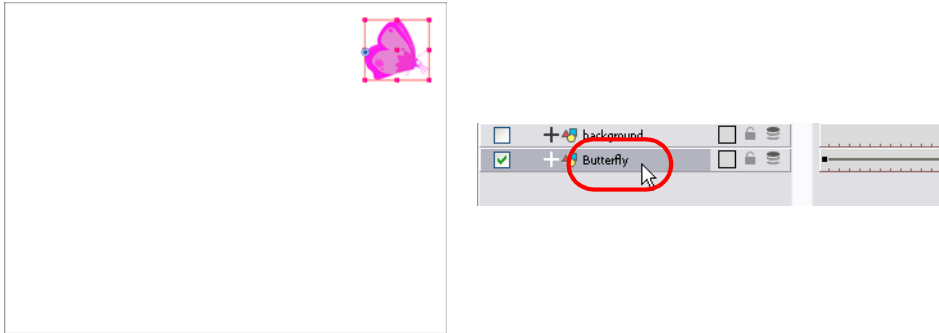




NOTE: If nothing appears in the Camera view, you may not have animated or selected the layer.

To hide your layer's trajectory:

1. Verify that the Camera view (click on its tab) is selected and that the layer that you wish to hide the trajectory of is selected in the Timeline or Camera view.



- ▶ From the top menu, select **View > Show > Control**.
- ▶ The default keyboard shortcut is [Shift]+F11.
- ▶ If you want to hide all of your trajectories at once without selecting any layer, select **View > Hide All Controls**. The default keyboard shortcut is [Shift]+[C].

Shaping a Path

A motion path is as easy to manipulate as shaping the vector points of a drawing layer in the Camera view. One important concept to understand is that a trajectory contains both Keyframes and Control points. Both can be used to shape a path, each have their own significance and behaviours, however only keyframes appear in the Timeline view. Their descriptions, in terms of their use along a path, are listed below:

- **Keyframe:** a marker that signifies a change (size, position, direction, etc.) along the normal of a path or function and has a precise position and frame.
- **Control Point:** has a position but no fixed frame or timing. It is mainly used to deform a trajectory. There are no velocity handles available on a control point. The velocity segments are set between keyframes only, making curves and trajectories much smoother. Control Points can only be added on 3D Path.



To resize an entire animation path so it fits into your scene's composition better, convert the animation into a Symbol, then resize the Symbol itself.

Refer to the *Libraries, Symbols and Templates* chapter to learn how to create and import Symbols.

Adding Control Points

A Control Point has a position but no fixed frame or timing. It is mainly used to deform a trajectory. There are no velocity handles available on a control point. The velocity segments are set between keyframes only, making curves and trajectories much smoother.

A Control Point will not show in the Timeline view because it has no precise frame to be displayed on. It will appear on the function curve and in the Camera view. There are different ways to add control points:

- Display the trajectory in the Camera view and pressing the keyboard shortcut [P].
- Add a keyframe on the function curve and disabling the Lock in Time option.

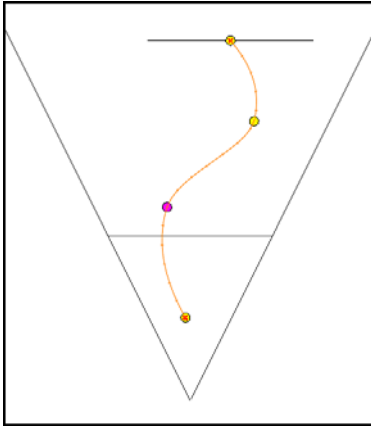
The Control Point is displayed as a circle.

You can display your trajectories in the Camera, Top and Side views to better understand the way that your elements move in your scene. This also makes it easier to modify them. You can display a peg or layer's control to be able to see where your elements are going, modify the curve and add keyframes and control points.

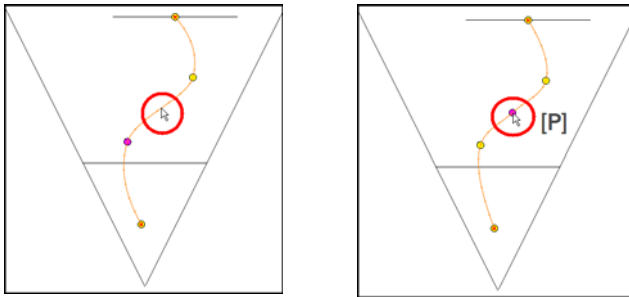
To add a Control Point on a trajectory:

1. In the Timeline or Camera view, select the peg or layer you want to add the control point on.
2. If the selected element's trajectory is not displayed, select **View > Show > Control** in the top menu. The default keyboard shortcut is [Shift]+[F11].

The Trajectory appears in the Camera, Top, Side and Perspective views.



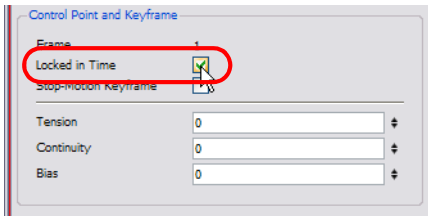
3. You can add control points on a 3D path trajectory by placing your mouse where you want to add the point and pressing the keyboard shortcut [P].




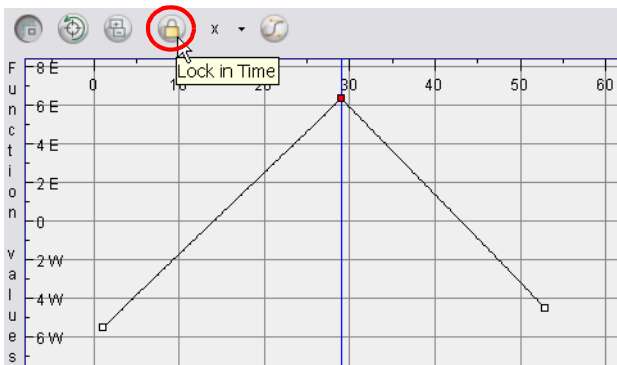
toggling Between Keyframe and Control Points

To toggle between Keyframe and Control Points:

1. In the Camera view, using the Transform tool select the point you want to convert.
2. To convert the point:
 - ▶ In the Coordinates and Control Point view, enable or disable the Locked in Time option.



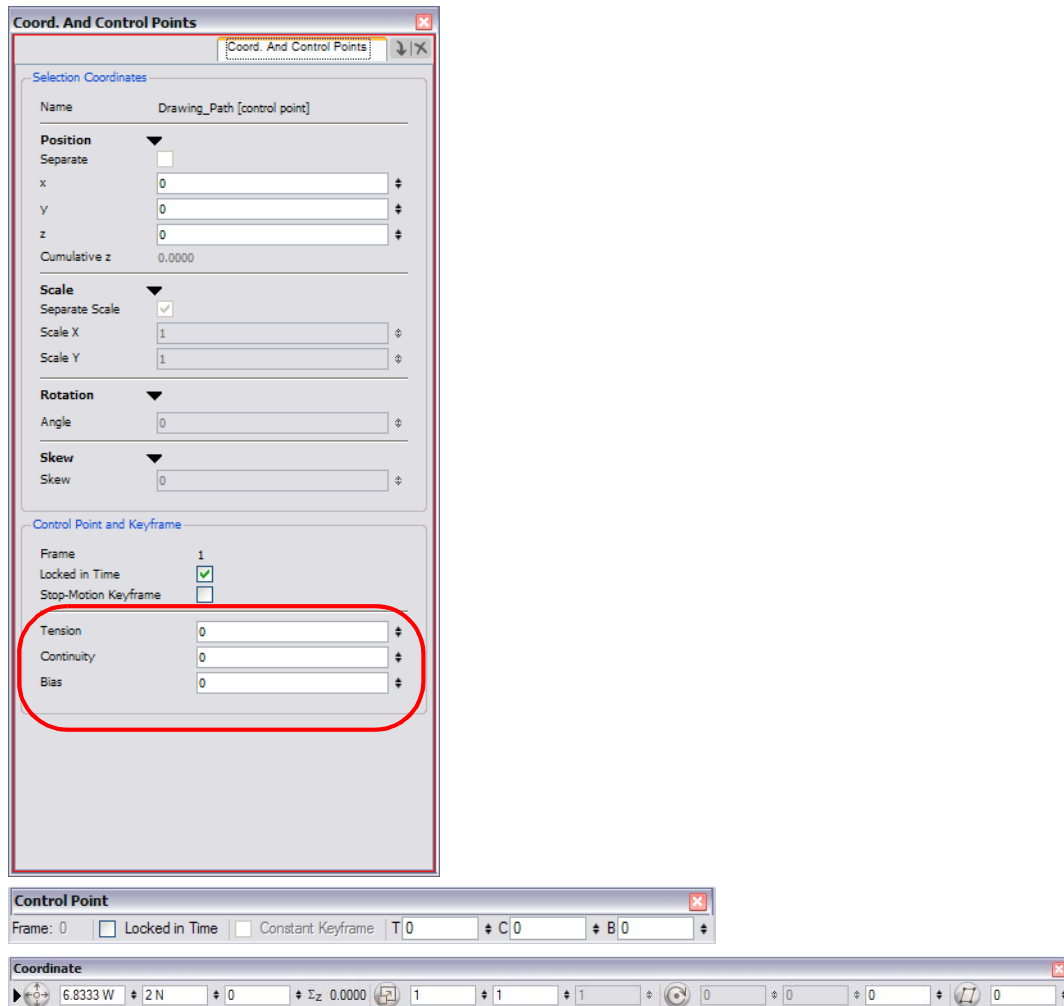
- ▶ In the top menu, select **Animation > Lock in Time**. The default keyboard shortcut is [Alt]+[L].
- ▶ In the Function view or Function editor, select the keyframe to convert and click on the Lock in Time  button.



Adjusting the Tension, Bias and Continuity

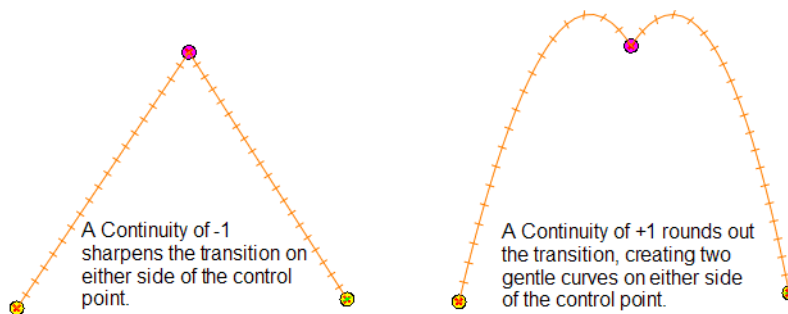
You can edit keyframes and control point parameters, such as the position, continuity, bias, tension and lock in time using the Coordinates and Control Point view.

Each time a keyframe or a control point is selected in the Camera, Timeline or Xsheet view, its parameters appear in the Coordinates and Control Point view. You can also see the same information in the Coordinate and Control Point toolbars.

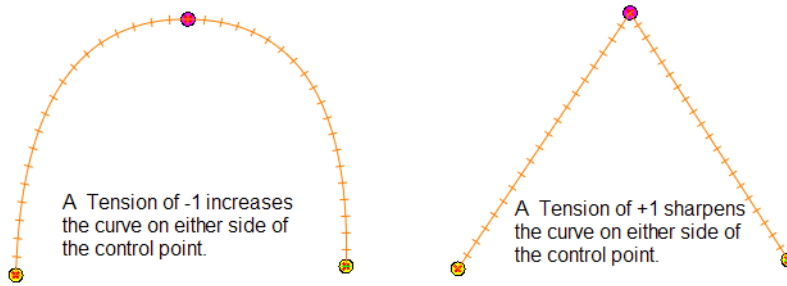


You can adjust these parameters on an already existing Control Points and Keyframes by selecting the point in the Camera View with the Transform Tool .

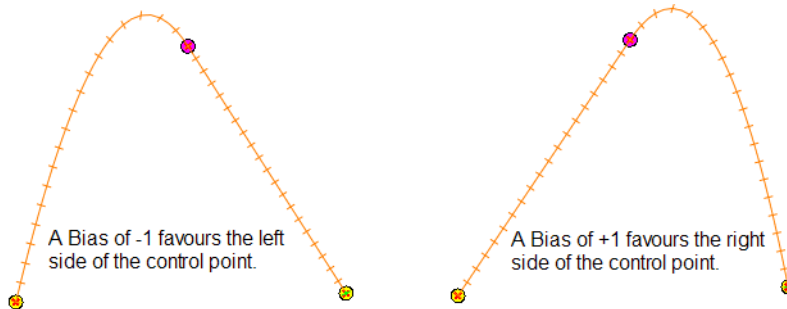
- **Continuity** controls the smoothness of a transition between the segments joined by a point.



- **Tension** controls how sharply the path bends as it passes through a control point or keyframe.



- **Bias** controls the slope of the path so that it flows towards one side of the motion point or the other.



If you find that you are using the same Continuity, Tension and Bias settings, you can set a preference to remember your settings.

To adjust the Point Setting Preferences:

1. From the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X).

The **Preferences** window opens.

2. From the top of the Preferences window, select the Camera tab and look to the entire right-hand section of that panel.



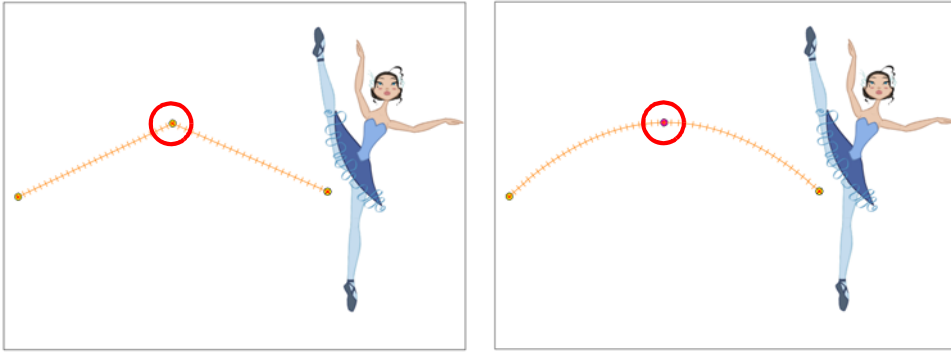
Toggle Between a Linear or Curved Motion

When you select a control point on a path, you can toggle between a rounded or square corner by using the Linear/ Curve command.

To toggle between a linear or curved corner:

1. In the Tools toolbar, select the Transform tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Camera view, select the point to convert.

3. In the top menu, select **Animation > Linear/Curve**. The default keyboard shortcut is [O].



Cumulative Z Value

You can see the cumulative Z Value information in the Coordinates and Control Points view. When you select a drawing cell including a keyframe, it will display the Cumulative Z value.

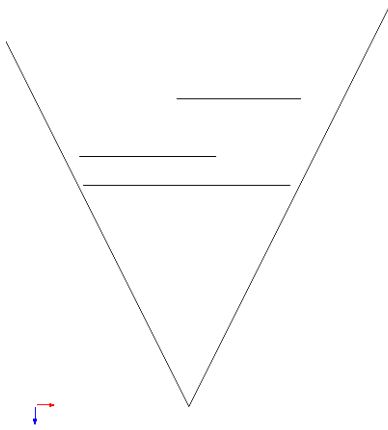
When a layer is parented to other layers that are moved forward or backward on the Z-axis, the currently selected layer's position Z value may not be accurate since its parent will also have an offset on the Z-axis. The Cumulative Z value is a compilation of all the Z-axis offsets to give the real Z-axis offset value related to the (0,0) centre.

Z = 2F →

Z = 4B →

Z = 6F →


Selection Coordinates	
Name	Drawing_2
Position	
Separate	<input type="checkbox"/>
x	0
y	0
z	6 F
Cumulative z	4,000

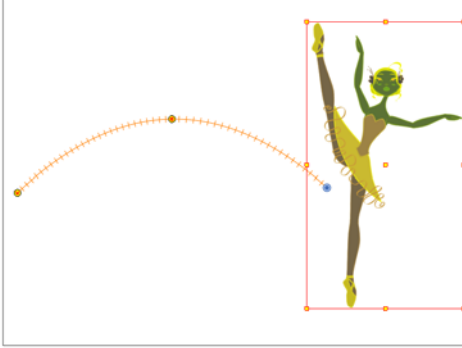


Offsetting a Trajectory

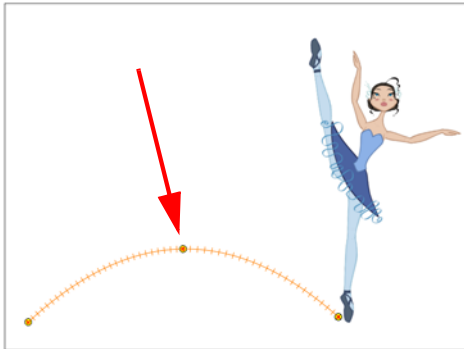
To reposition the visual trajectory to a more convenient location, you can use the Spline Offset tool. Offsetting your trajectory will not offset or modify your animation. It will facilitate your work.

To offset a spline/trajectory:

1. In your Animation Tools toolbar, select the Offset Spline  tool. The default keyboard shortcut is [Alt]+[9].
2. In the Camera or Timeline view, select the Peg layer to be offset.



3. In the Camera view, move the trajectory to the proper position. You can move it on the x and y axes, but also on the Z-axis using the Top and Side views.



Modifying a Path in the Timeline View

When you select a peg or drawing layer in the Camera view and move it around, Harmony Stage will automatically create the corresponding function curves.

If you would then like to modify these functions, you can always do it through the Peg's or Layer's parameters in the Timeline view.

This topic is divided as follows:

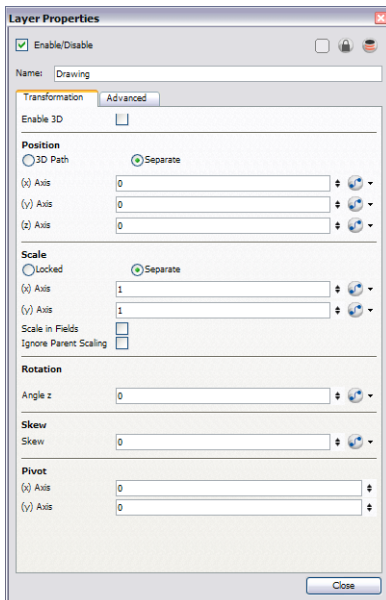
- Creating a Function, on page 577
- Adding and Deleting Keyframes in the Timeline View, on page 578
- Changing Keyframe Values, on page 578
- Flipping Between Keyframes, on page 579

Creating a Function

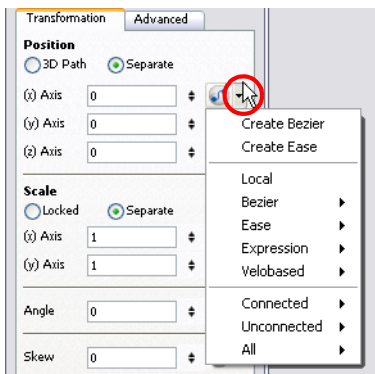
To create the function curve in the Timeline view:

1. Double-click on either a drawing or peg layer.

The **Layer Properties** dialog box appears.



2. Identify the section of the type of function that you want to create.
3. Click on the Function Arrow button at the end of the corresponding row.



4. Choose Create a Bezier or Ease curve from the menu.

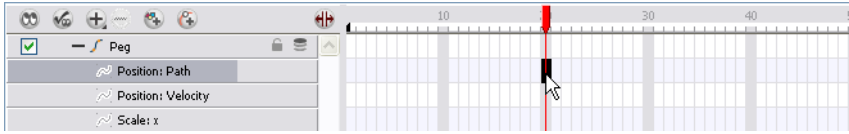


Refer to the *Function Types* section of this chapter to gain a greater understanding of this subject and the menu options listed above.

Adding and Deleting Keyframes in the Timeline View

To insert a Keyframe:

1. On the right-hand side of the Timeline, select a cell on the layer's function that you want to animate.



2. Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) the selected cell and select **Insert Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X).

To delete a Keyframe:

1. On the right-hand side of the Timeline, select a cell with the Keyframe that you want to delete.
2. Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selected Keyframe and select **Delete Keyframes** from the menu that appears.

You can [Shift] + Click on several keyframes to select a group before selected the **Delete Keyframes** option.

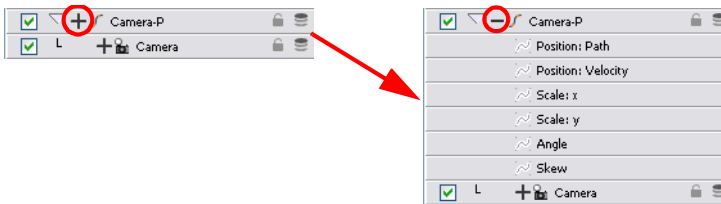



If you select a Keyframe or group of Keyframes and press [Delete], it will also delete the corresponding drawings on that cell.

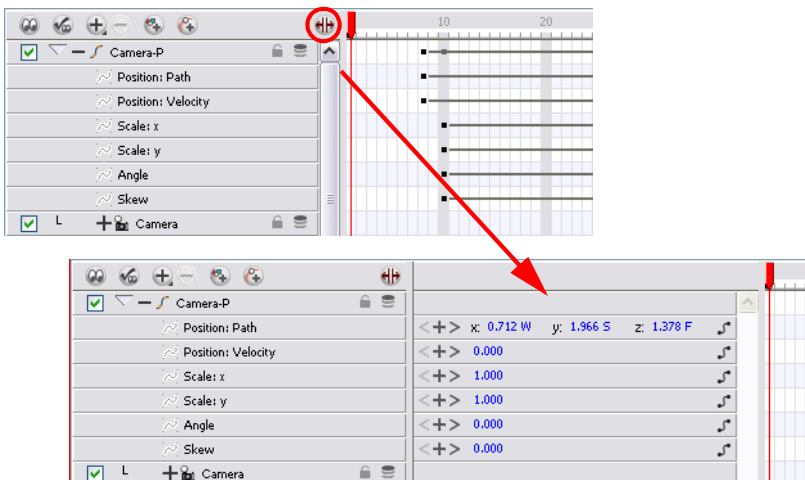
Changing Keyframe Values

To change the keyframe values in the Timeline:


1. Open the layer's parameters by clicking on the Expand Function **+** button next the layer's name. The default keyboard shortcut is [Alt]+[F].



2. Click on the Show/Hide Data View  button at the top of the Timeline view, between the layer names and the timeline fields.



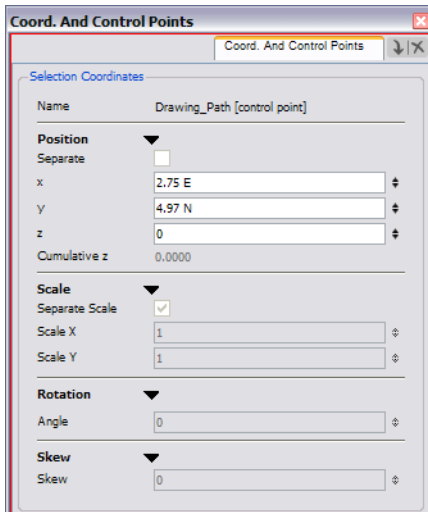
3. Select the parameter that you wish to create a function curve for: Path, Velocity, Scale: x or y, Angle or Skew. For this example we will use Velocity.

4. Pass the cursor over the blue number value of the parameter layer that you wish to modify.
 - ▶ Wait until the cursor becomes a white hand with a two-way arrow  and then click and drag the hand slightly to the left or right to decrease or increase the value.



OR

- ▶ Click directly on the blue number and enter a value into the white field that appears.
- ▶ If you selected the keyframe in the Camera view, you can modify the values in the Coordinate and Control Points view.



A function is automatically created as soon as the values change from zero.

You can see the same information in the Coordinates and Control Points view.

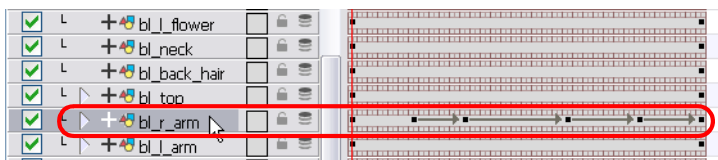
5. Press [Enter] or click on the Play  button to view the changes you have made in the Camera View.

Flipping Between Keyframes

Harmony Stage lets you flip between the selected layer's keyframes.

To flip through your poses:

1. In the Camera or Timeline view, select the layer you want to see the keyframes for.



2. In the top menu, select **Animation > Go to Previous Keyframe** or **Go to Next Keyframe**. The default keyboard shortcuts are [PgUp] and [PgDown].

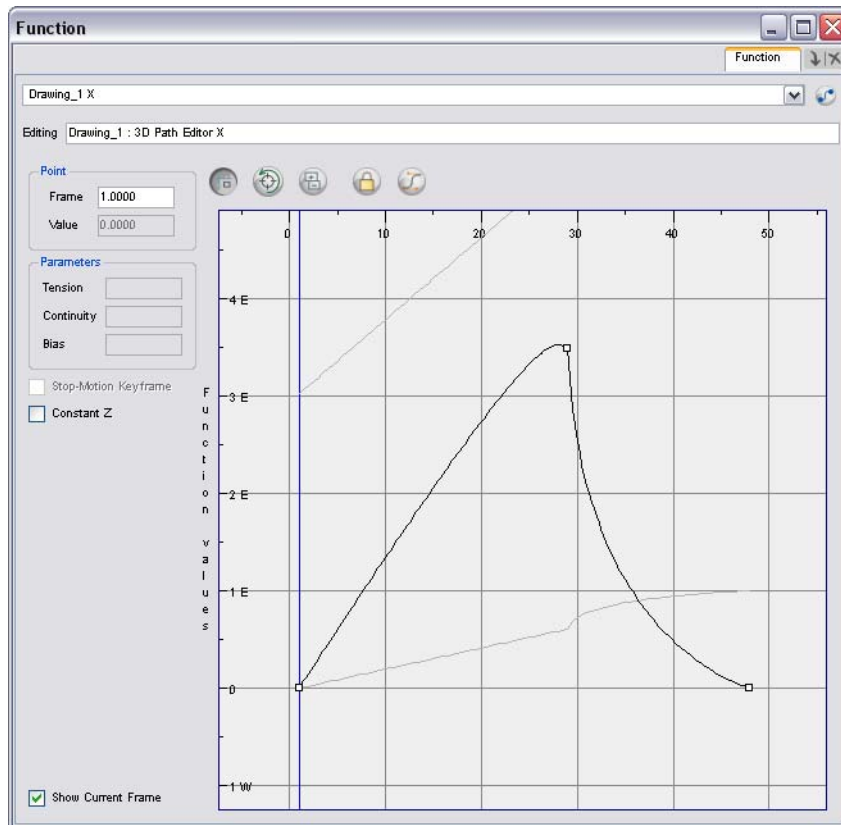
Modifying a Path in the Function View

If you are used to graphs and function curves, you can use the Function view to define your trajectories.

This topic is divided as follows:

- Function View, on page 580
- Editing a Function in the Function View, on page 581
- Adding and Deleting Keyframes in the Function View, on page 582
- Changing a Keyframe's Values, on page 583

Function View

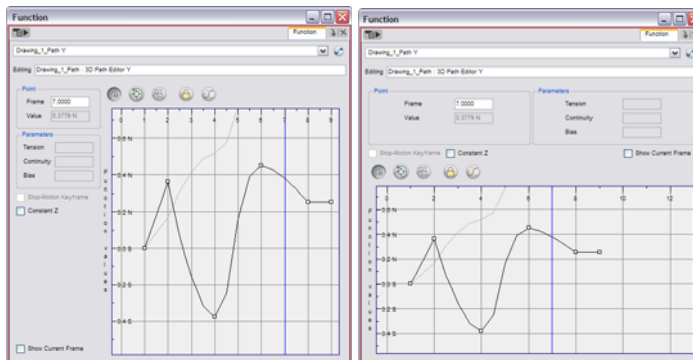


While editing the X function of this 3D motion path, you can see the graphs for the Y, Z and velocity.

The Function view allows you to display multiple functions in the background as a reference. While you are editing one function, you can see other selected functions, this helps you synchronize changes in one function with other functions.

You can set the orientation of the Function view to be vertical (portrait) or horizontal (landscape).

- In the Function View menu, select **View > Set Vertical Layout/Set Horizontal Layout**.




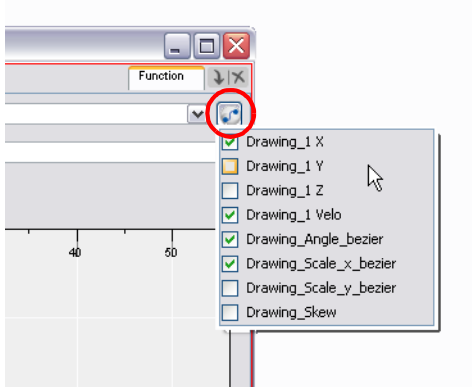
To display a function in the Function view, click its name in the Timeline view. You can also display several functions in the Function View.

To display functions in the Function view:

1. Open the Function view.

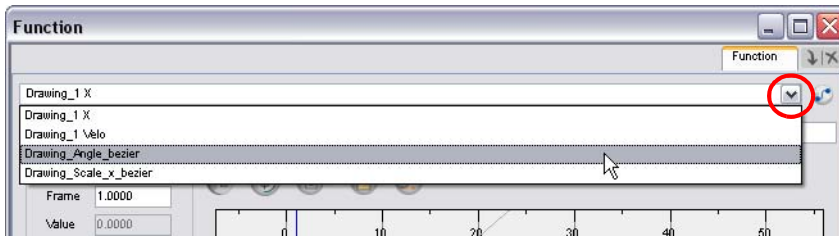
The Function view is blank until you select the functions you want to display.

2. Click on the Function  button and scroll down the list of available functions. Click the checkbox next to the function name to display it in the view.



► To display a function in the Function view, click its name in the Timeline view.

3. To select the function you want to edit, select its name from the function drop-list.

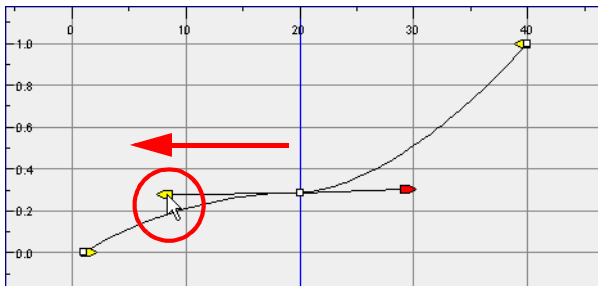


Editing a Function in the Function View

The graph displays the motion over the first and last keyframes set in the scene, as well as any keyframes created between. If the scene is 60 frames, but the character's motion ends at frame 40, then the editor will only display up to frame 40.

To edit a function in the Function view:

1. In the graph of the Parameter Editor, select one of the white keyframes. If selected properly, the keyframe turns red and displays a pointed yellow handle.
2. Click and drag the point either up or down or click and pull one of the handles to adjust the curve of the graph.



In this case, changing the Velocity from a straight line (constant velocity) to a curved one, changes the ease-in (where the curve shoots up and then flattens-out) and ease-out (where the curve flattens-out and then shoots up) values.

The centre keyframe can not be dragged up or down because the velocity is set. Theoretically dragging it downwards towards zero would put it back to a place of non-movement.

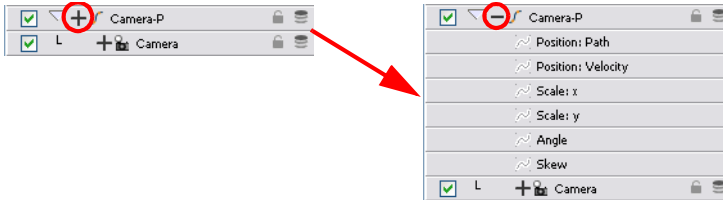
- Press the [Enter] key with the Parameter window still open to watch the result of your curve adjustment in the Camera view.

Adding and Deleting Keyframes in the Function View

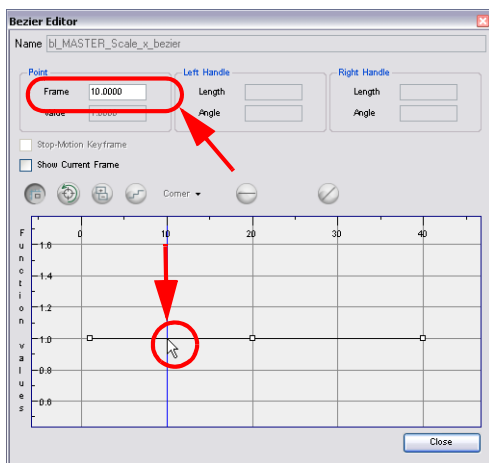
If you want to change a parameter between two Motion Keyframes in the Timeline View, such as the scale, you can do so by adding keyframes in the Scale Editor.

To add or remove keyframes in the parameter Editor:

- Open the layer parameters by clicking on the Expand Function **+** button next the layer's name.




- Select the parameter that you wish to create a function curve for: Path, Velocity, Scale: x or y, Angle or Skew. For this example we will use Scale: x.
- Double-click on the parameter layer name to open the Function editor window or click once on the parameter layer to display it in the Function view.




- In the graph section, click on the frame number where you would like to make changes or in the **Point** section, enter the frame number directly into the **Frame** field.

In the graph section, a vertical blue line will indicate the frame number selected.

- Click on the Add/Remove Keyframes  button.



- Click on the newly created keyframe and drag it up (to decrease the width of the object) or down (to increase the width of the object) or pull on the handles to create a smooth fluctuation of the drawing object's width.
- If you do not like the changes made, you can delete the new keyframe by selecting the keyframe, if it is not already selected, and press the [Delete] key, or by clicking on the Add/Remove Keyframes  button.

You can delete an already existing keyframe by using the same process.

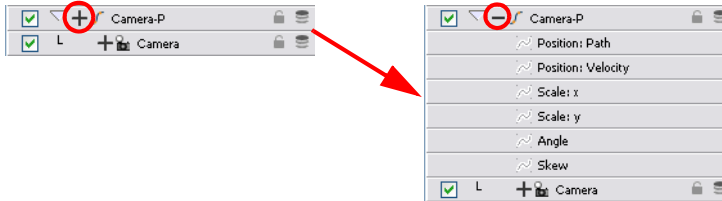
Changing a Keyframe's Values

In the example cited above, once a keyframe is created, it can be moved and its handles manipulated to change the shape of the curve. Once a keyframe is manipulated its value changes. This value is displayed in the **Value** field of the **Point** section in the Parameter Editor.

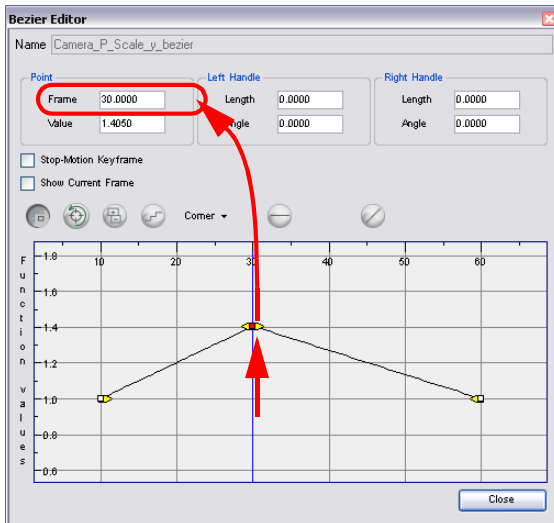
However, it is possible to work the other way around; it is possible to enter values into the Value field and watch the keyframe change position and the curve along with it


To change a keyframe's value:

1. Open the Peg element's parameters by clicking on the Plus **+** Sign next the Peg layer's name.



2. Select the parameter that you wish to create a function curve for: Path, Velocity, Scale: x or y, Angle or Skew. For this example we will use Scale: y.
3. Double-click on the parameter layer name to open the **Editor** window or click once on the parameter layer to display it in the Function view.



4. In the Point section, enter a value in the Value field.
5. Click [Enter] or click on the Play  button to view the changes made in the Camera View.
6. Keep adjusting your values accordingly, until you are satisfied with what you see.
7. Click on the Close button.

Modifying a Path in the Xsheet View

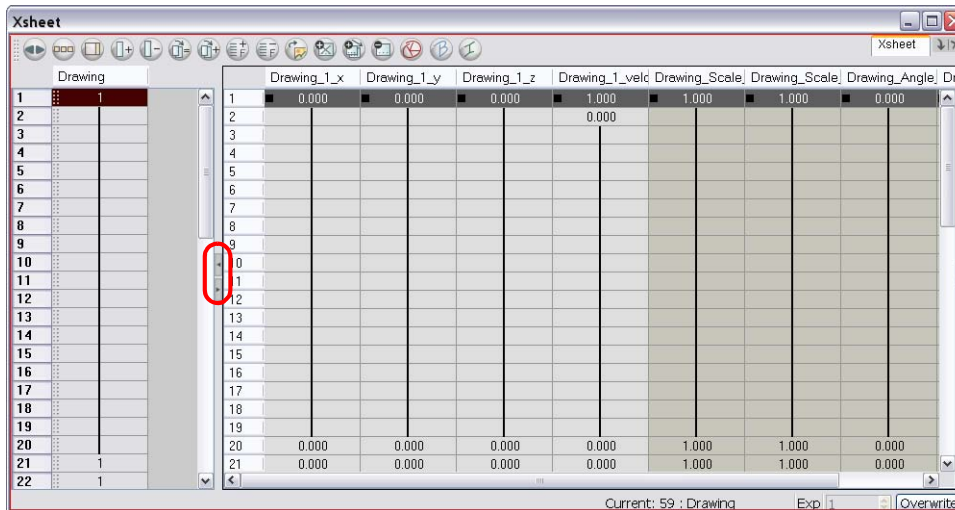
If you are used to working with the Exposure Sheet, you can also create keyframes and type values in the Xsheet view. You cannot create function curves directly in the Xsheet view. You must do this in either the Layer Properties editor or the Timeline view.

To edit a function column in the Xsheet view, you must first display the Functions section of the Xsheet view and then select the layer you want to modify.

To display the function columns in the Xsheet view:

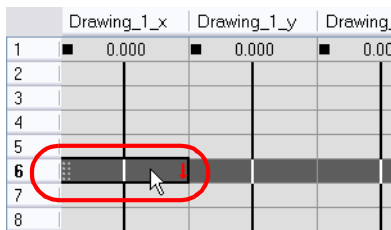
1. In the Xsheet view, click on the Expand Function Section button.
2. In the Timeline view, select the layer containing the parameters to modify.

The columns appear in the Xsheet view.

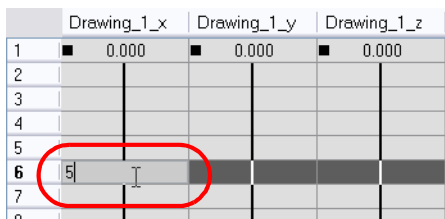


To add a keyframe in the Xsheet View:

1. In the Xsheet View, go to the function column where you want to add a keyframe.



2. Double-click on the cell where you want to add a keyframe and type a numeric value.



3. Click on [Return] to continue to the next cell.

- Click on [Esc] to exit the typing mode.

	Drawing_1_x	Drawing_1_y	Drawi
1	0.000	0.000	0
2	1.000 E		
3	2.000 E		
4	3.000 E		
5	4.000 E		
6	5.000 E	0.000	0
7			

To convert a cell into a keyframe:

- In the Xsheet View, go to the function column where you want to add a keyframe.
- Select the cell to convert.

	Drawing_1_x	Drawing_1_y	Drawing_1
1	0.000	0.000	0.000
2	1.000 E		
3	2.000 E		
4	3.000 E		
5	4.000 E		
6	5.000 E	0.000	0.000
7			

- Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the cell and select **Set Selection As Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X).

	Drawing_1_x	Drawing_1_y	Drawing_1_z	Drawing
1	0.000	0.000	0.000	0.00
2	1.000 E			0.20
3	2.000 E	0.000	0.000	0.40
4	3.000 E			0.60
5	4.000 E			0.80
6	5.000 E	0.000	0.000	1.00
7				0.00

- ▶ If you want to remove a keyframe, select the keyframe, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the cell and select **Clear Keyframe in Selection**. The default keyboard shortcut is [F7].

If you double-click on a function column's header, you will display the corresponding function curve in the Function editor.

Function Curves

By default, when a drawing or peg is added to the scene, no function curve is created. The animator will generally create the ones needed to avoid having an overload of useless functions.

When you select an element in the Camera View and move it around, it will automatically create the corresponding function curves.

If you need to create certain functions manually, you can always do it through the Layer Properties view or editor.

You can also link a layer's parameter to an existing function curve.

This topic is divided as follows:

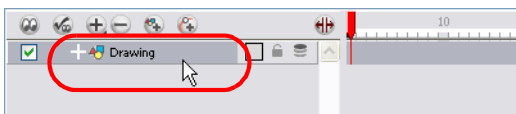
- Creating Function Curves, on page 586
- Sharing Functions, on page 587
- Function Drop-down Menu, on page 590
- Function Types, on page 591

Creating Function Curves

You can manually create a function in the Layer Properties View or the Layer Properties Editor. You can either share it with other layer's parameters or to set your keyframes directly on the function curve instead of the Timeline or Camera view.

To create the function curves for your project:

1. To open the Layer Properties editor, in the Timeline View, double-click on the layer or click once to display it in the Layer Properties view.

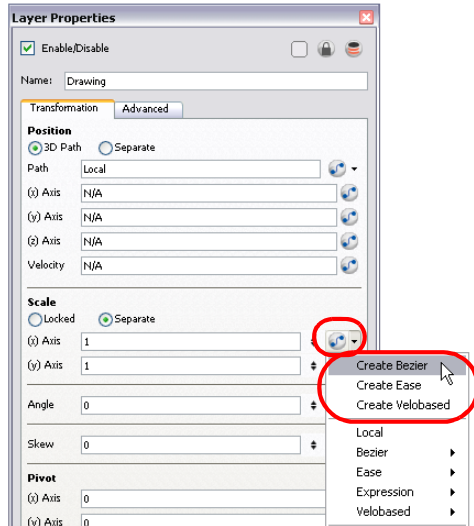



The Layer Properties editor opens.



2. Go to the Transformation tab.
3. Click on the Function Arrow  button beside the local function information.

4. Create a 3D Path, Bezier, Ease or Velobased curve.
 - ▶ You can also create an Expression column. Refer to the Expression Columns section to learn more.



 Refer to the *Function Types* topic to know more about function types.

You can click on the Function  button to open the Function Editor.

5. Click on the OK button.

Sharing Functions



You can hook several parameters to the same function curve. For example, if you have an aircraft performing loops between clouds, you may want the camera to follow the aircraft's motion path. If you attach the camera to the aircraft's layer, the camera will also loop, but this may produce undesirable results and even induce a feeling of motion sickness as you watch the final animation. Instead, what you can do is to share the X, Y and Z aircraft's position with the Camera's peg layer, but ignore the angle, scale and skew.

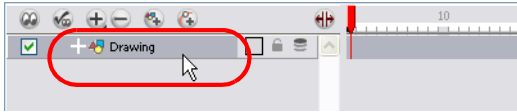
By default all the function curves you create are private. This means that the function curves can only be used and modified using their original parameter. If you want another layer or parameter to use the same function curve, you must make the function public.

There are two ways to share a function:

- Share Functions command
- Layer Properties Editor

To share a function using the Share Functions command:

1. In the Timeline view, select the function layer to share.



2. Right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the selection and select **Share Functions**.

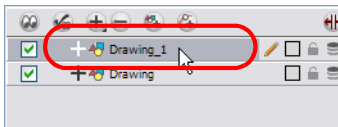
The function now becomes public to the other layers and parameters and can be shared.

Public functions are visible in the main section of the Xsheet view.


Xsheet

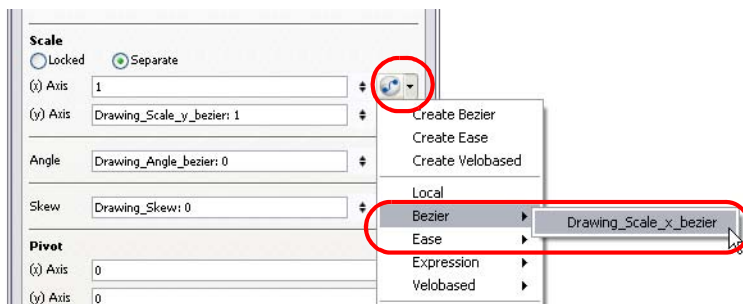
	Drawing	Drawing_1_x	Drawing_1_y	Drawing_1_z	Drawing_1_velc
1	1	0.000	0.000	0.000	0.000
2		1.000 E			0.200
3		2.000 E	0.000	0.000	0.400
4		3.000 E			0.600
5		4.000 E			0.800
6		5.000 E	0.000	0.000	1.000
7					0.000
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21	1	5.000 E	0.000	0.000	0.000
22	1	5.000 E	0.000	0.000	0.000

3. In the Timeline view, open the Layer Properties editor of the layer you want to link its parameter to the public function.
4. To open the Layer Properties editor, in the Timeline view, double-click on the layer containing the function to share or click once to display it in the Layer Properties view.



The **Layer Properties Editor** opens.

5. Go to the Transformation tab.
6. Click on the Function Arrow  button beside the function you want to link to the function column.
7. In the drop-down menu, select the function you just turned public from either, the 3D Path, Bezier, Ease, Velobased, Expression, 3D Path, Connected, Unconnected, All menu, and hook it to your parameter.



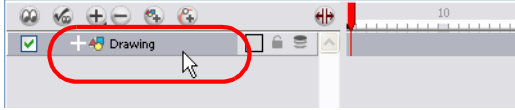


Refer to the Function Drop-down Menu topic to know more about the Function drop-down menu.

The two parameters are now both linked to the same function curve and should follow the same path. If you modify the curve, both parameters will update.

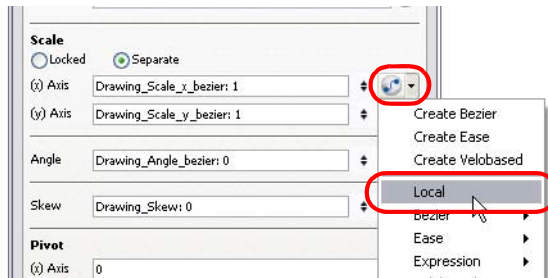
To share function curves:

1. To open the Layer Properties editor, in the Timeline View, double-click on the layer containing the function to share or click once to display it in the Layer Properties view.



The **Layer Properties Editor** opens.

2. Go to the Transformation tab.
3. Click on the Function Arrow button beside the function to share.
4. In the drop-down menu, select the Local option.
5. Click on the Function Arrow button beside the Function field and choose an existing function from the drop-down list.

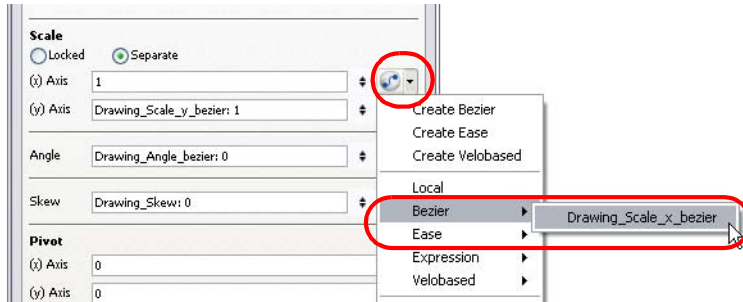


The function now becomes public to the other layers and parameters and can be shared.

Public functions are visible in the main section of the Xsheet view.

Xsheet					
	Drawing	Drawing_1_x	Drawing_1_y	Drawing_1_z	Drawing_1_velc
1	1	0.000	0.000	0.000	0.000
2		1.000 E			0.200
3		2.000 E	0.000	0.000	0.400
4		3.000 E			0.600
5		4.000 E			0.800
6		5.000 E	0.000	0.000	1.000
7					0.000
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21	1	5.000 E	0.000	0.000	0.000
22	1	5.000 E	0.000	0.000	0.000

- In the same drop-down menu, where you choose the Local option, select the function you just turned public from either the 3D Path, Bezier, Ease, Velobased, Expression, 3D Path, Connected, Unconnected, All menu and hook it to your parameter.



Refer to the [Function Drop-down Menu](#) topic to know more about the Function drop-down menu.

- In the Timeline view, open the Layer Properties editor of the other layer you want to link its parameter to the public function.
- In the Layer Properties editor or view, hook the parameter to the public function the same way you did for the first layer.

The two parameters are now both linked to the same function curve and should follow the same path. If you modify the curve, both parameters will update.

Function Drop-down Menu

When you create a function curve in the Layer Properties view or editor, you have several choices available:

- Create 3D Path**
 Creates a new 3D Path Column set.
- Create Bezier**
 Creates a new Bezier curve.
- Create Ease**
 Creates a new Ease curve.
- Local**
 Disconnects the parameter from any function and turns it public.
- 3D Path**
 Displays the list of every public 3D Path function available.
- Bezier**
 Displays the list of every public Bezier curve available.
- Ease**
 Displays the list of every public Ease curve available.
- Velobased**
 Displays the list of every public velocity based curve available.
- Expression**
 Displays the list of every public Expression function available.
- Connected**
 Displays the list of every public connected function curve.
- Unconnected**
 Displays the list of every public unconnected function curve.
- All**
 Displays the list of every public function curve.

The user has the choice of creating a new function curve or linking it to an already existing public one. This way, he can have two or more parameters following the same function.

Function Types

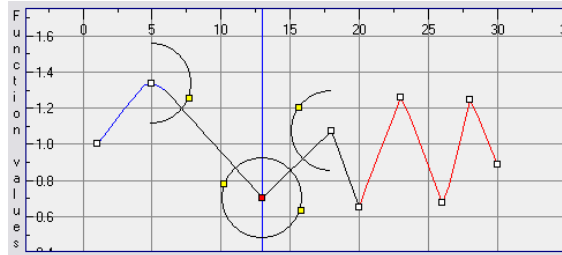
Depending of your favorite working method, you can create different types of function curves to suit your need.

You have several choices available:

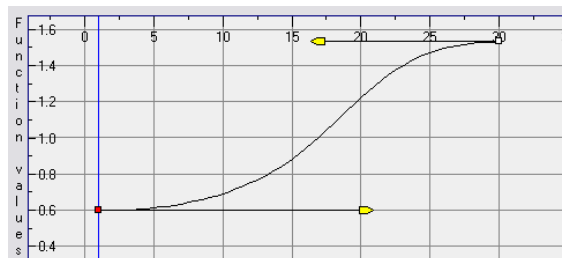
- Ease and Bezier Functions, on page 591
- Velobased Functions, on page 592

Ease and Bezier Functions

When you create a function to control a parameter over time (Scale, X, Y, Z, Rotate), you have the choice of an Ease or Bezier Function.



Ease Function



Bezier Function


These function editors present different ways of editing the values over time. The shape of the created graph indicates the velocity of the function, regardless of the chosen editor. The type of function that you choose is largely based on your own working preference.

With the Ease Editor, you can edit the shape of the function curves using the ease-in and ease-out controls. You may choose to use this type of function if you are used to working with ease-in and ease-out values.

Converting Ease and Bezier functions

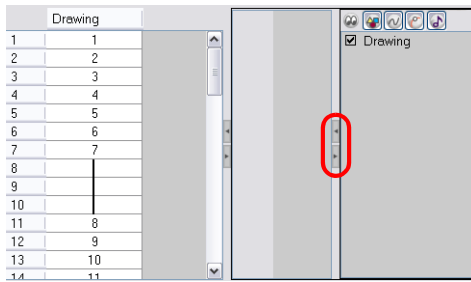
To convert Ease and Bezier functions so that you can edit them using the controls offered by that editor.

To convert Ease and Bezier functions:

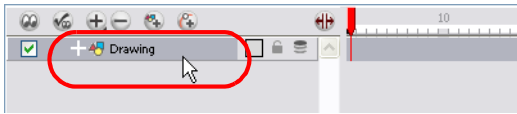
1. In the Xsheet View, if not done yet, show the function columns.
2. In the Xsheet view, click on the Expand button located on the right side of the main section to show the Functions section. Click on the same button to collapse it. You can also use the Show Column List  button in the Xsheet View toolbar.

Drawing	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	
9	
10	
11	8
12	9
13	10
14	11

- Click on the Expand button located on the right side of the Functions section to display the Column List section.



- In the Timeline view, click on the layer you want to display the function columns from.

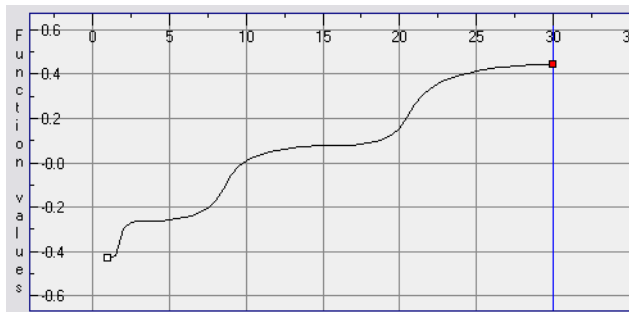


- In the Xsheet view, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) the column's header and select one of the following from the **Convert** menu:
 - ▶ **Convert the column:** the values of multiple effects may be linked to the original column. When you use the Convert the Column command, all links to the original column will transfer to the new converted column.
 - ▶ **Create a new column and update links:** creates a new function from the original. All links to the original column will transfer to the new column. The original function column will remain in the exposure sheet in case you decide you want to switch back to it.
 - ▶ **Create a new unused column:** creates a new column based on the values in the original column and leaves all links pointing to the original column. You can use this command to experiment with various functions and then link effect values to the new function curve column.

Velobased Functions

You can also create Velobased functions for certain effects, like changes in rotation or size over time. In these cases, the Velobased functions are linked to the velocity of a 3D path. You cannot change the shape of a Velobased function to control its velocity.

With Velobased functions, you can link changes in rotation or scaling to the velocity of a 3D path. This makes it possible for changes in rotation or scaling to progress at the same speed as changes to the position of an element.



Copying and Pasting a Motion

In the Timeline view, you can easily drag keyframes to change the animation timing, delete them, cycle them and even copy them.

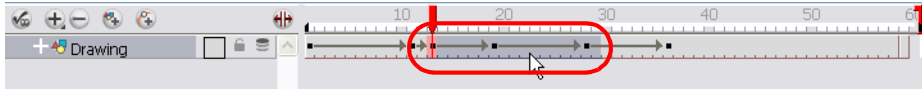
When you have position keyframes set in your drawing layer and you want to move them around with moving your drawing's timing, you can use the Paste Special feature to only move the keyframes selected.

You can also use the Paste Cycle and Paste Reverse feature to cycle your selection including keyframes and drawings.

Paste Special

To open the Paste Special dialog box:

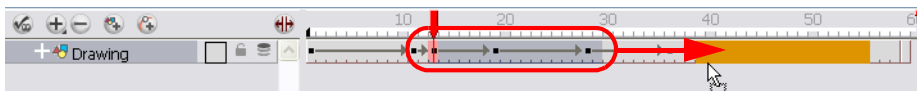
1. In the Timeline view, select the keyframes, to copy and paste. If you want to move the keyframes, move on to step 3.



2. In the top menu, select **Edit > Copy**.

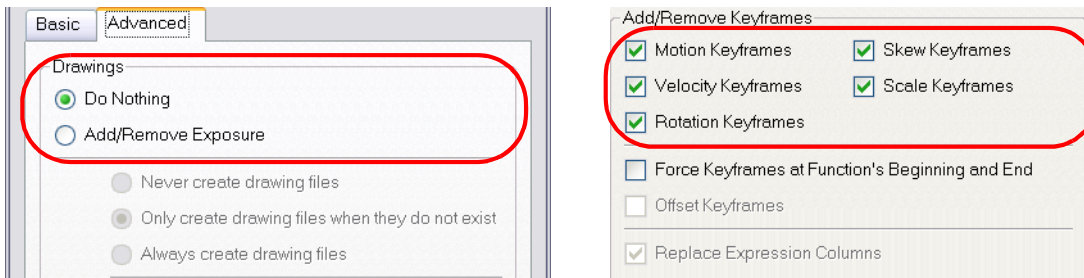
3. To edit your selection:

- ▶ To paste the selection, in the Timeline view, select the first cell where you want to paste your keyframes and in the top menu, select **Edit > Paste Special**.
- ▶ To move the selection, in the Timeline view, drag the selection and hold down the [Alt] key (Windows/Linux) or [⌘] key (Mac OS X). Drop the selection where you need it before releasing the hot key.

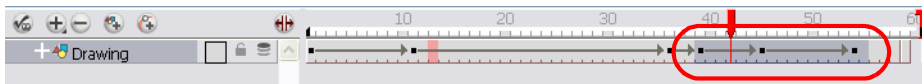


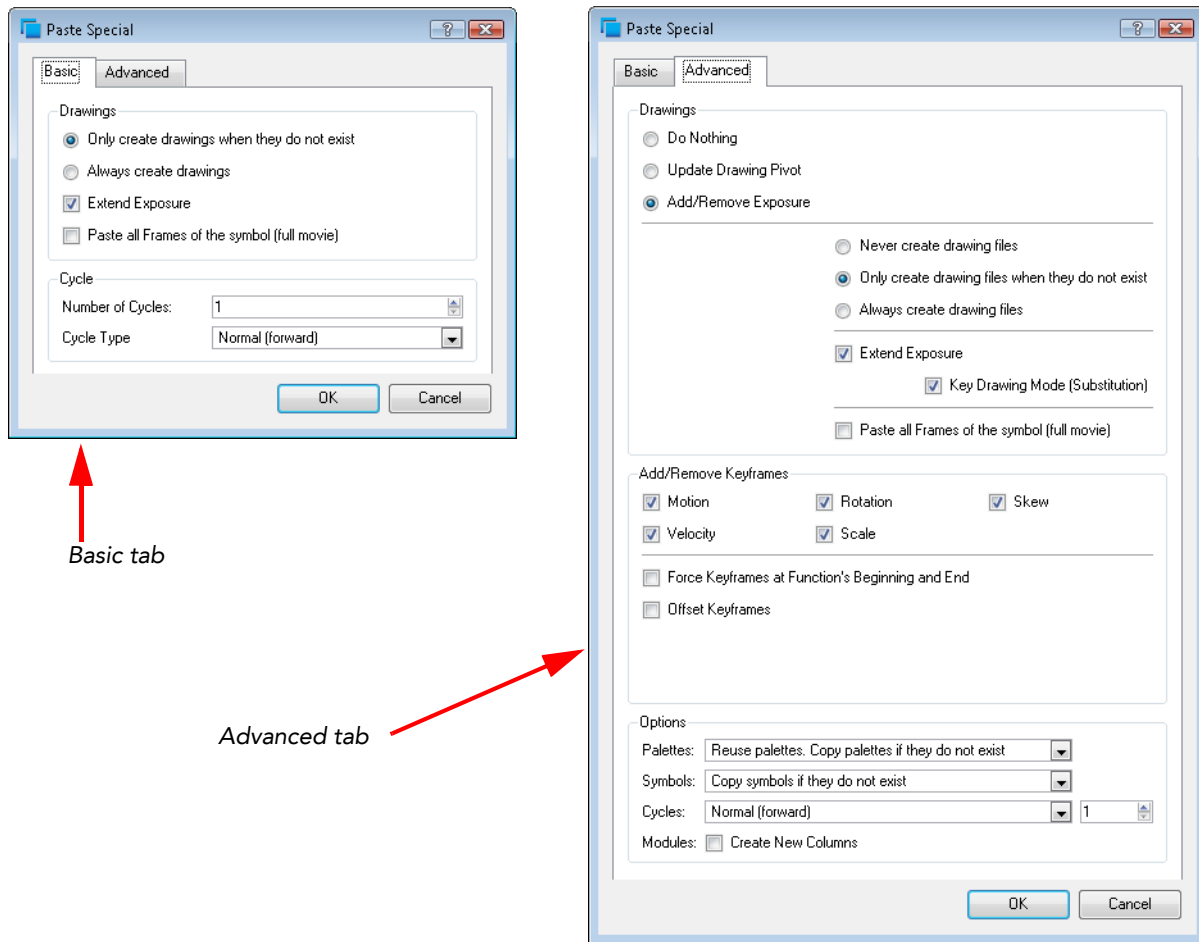
The Paste Special window opens.

4. Set the Drawing, Pegs and Functions, and Cycles parameters described below.



5. Click on the OK button.





Paste Special - Basic Tab

Drawings

- **Only create drawing files when they do not exist:** When adding exposures to a drawing layer, new drawings will be created only when drawings with the same name do not already exist in the destination.
- **Always create drawing files:** When adding exposures to a drawing layer, new drawings will always be created. If drawing files with the same name already exist, Stage will create a new name for the drawing.
- **Extend Exposure:** Extends the exposure of drawings to fill the range of cells to the destination frame.
- **Paste all Frames of the Symbols (full movie):** When enabled, the Paste Special command will expose all the Symbol's frames instead of the first one only.

Cycle

- **Number of Cycles:** Use the up and down arrows to increase or decrease the number of cycles you want to paste. You can also type the value directly in the field.
- **Cycle Type**
 - ⇒ **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - ⇒ **Reverse:** This pastes your selection in reverse, starting with the last cell and ending with the first one.
 - ⇒ **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - ⇒ **Reverse -> Forward:** This pastes your selection as a reverse yo-yo, starting with the last cell, going to the first one and ending with the last cell.

Paste Special - Advanced Tab

Drawings

- **Do Nothing:** Does not create or overwrite drawings.
- **Add/Remove Exposure:** Creates/deletes exposure values in the selected layer.
You have the following choices as to how to treat drawings that will be created when adding an exposure:
 - ⇒ **Never create drawing files:** When adding exposures to a drawing layer, drawing files will not be created.
 - ⇒ **Only create drawing files when they do not exist:** When adding exposures to a drawing layer, new drawings will be created only when drawings with the same name do not already exist in the destination.
 - ⇒ **Always create drawing files:** When adding exposures to a drawing layer, new drawings will always be created. If drawing files with the same name already exist, Stage will create a new name for the drawing.
 - ⇒ **Extend Exposure:** Extends the exposure of drawings to fill the range of cells to the destination frame.
 - ⇒ **Key Drawing Mode (Substitution):** Pasting an exposure value replaces the cell value in the current frame and in all frames following in sequence with the original cell value.
- **Paste all Frames of the Symbols (full movie):** When enabled, the Paste Special command exposes all the Symbol's frames instead of only the first one.
- **Update Drawing Pivot:** Revises the drawing pivot in the destination to use the same drawing pivot as the first drawing in the template. If you have a range of drawings selected in the destination, the pivot points of all selected drawings will be updated.

Pegs and Functions

- **Motion:** Copies the properties of the selected motion keyframe to the new frame.
- **Velocity:** Copies the properties of the selected velocity keyframe to the new frame.
- **Rotation:** Copies the properties of the selected rotation keyframe to the new frame.
- **Skew:** Copies the properties of the selected skew keyframe to the new frame.
- **Scaling:** Copies the properties of the selected scale keyframe to the new frame.
- **Force Keyframes at Function's Beginning and End:** Adds a keyframe to the beginning and end of the pasted function, reproducing the source function.
- **Offset Keyframes:** When pasting functions, this option offsets the keyframes from the function's last value by the values in the pasted function. This will continue the progression of a function rather than repeat the values.
- **Replace Expression Columns:** Replaces the destination function with the formula from the source column.

Option

- **Palette**
 - ⇒ **Do nothing:** Does not create, overwrite, merge or link palettes.
 - ⇒ **Reuse palettes. Copy palettes if they do not exist:** Palettes in the destination drawings are left as they are.
 - ⇒ **Copy and overwrite existing palettes:** Overwrites destination palettes with the palettes from the source drawings.
 - ⇒ **Copy and create new palette files:** Creates new palette files, placing them at the same relative environment and scene level as the source. If the palettes in the templates were stored at the environment level of the source scene, the paste operation will place the palettes in the environment level of the destination scene.
 - ⇒ **Copy and create new palette files in element folder:** Creates new palette files in the element folders of the destination scene, rather than in the same relative job or environment.
 - ⇒ **Copy palette and merge colours. Add new colours only:** Adds new colours to the destination palettes and ignores colours that are the same in the two palettes.
 - ⇒ **Copy palette and update existing colours only:** Adds new colours to the destination palette and updates duplicate colours in the destination with colour values from the source.
 - ⇒ **Link to original palettes (colour model):** Links the colour palettes in the destination to the palettes in the source. Use this to link drawings to the palettes in a colour model.
 - ⇒ **Copy scene palettes and merge colours. Add new colours only:** Adds new colours to the destination scene palettes and ignores colours that are the same in the two palettes.

- ⇒ **Copy scene palettes and update existing colours:** Adds new colours to the destination scene palette and updates duplicate colours in the destination with the colour values from the source.
- **Symbols**
 - ⇒ **Copy symbols if they do not exist:** This is the default setting for this operation and will prevent symbols in a Action template from being copied.
 - ⇒ **Duplicate symbols:** Creates a duplicate of the Symbol instead of linking the Symbol instance to the original one. The new Symbol is created in the Library.
 - ⇒ **Overwrite symbols:** If a modification was made to a Symbol that does not exist in the basic rig template for a character, select this option to overwrite the previous symbol.
- **Modules: Create New Columns:** When this option is enabled a new column is created when you copy and paste modules from the Network view or Layer in the Timeline view. If the layers are linked to function curves, the function curves, the drawings and the timing are duplicated.

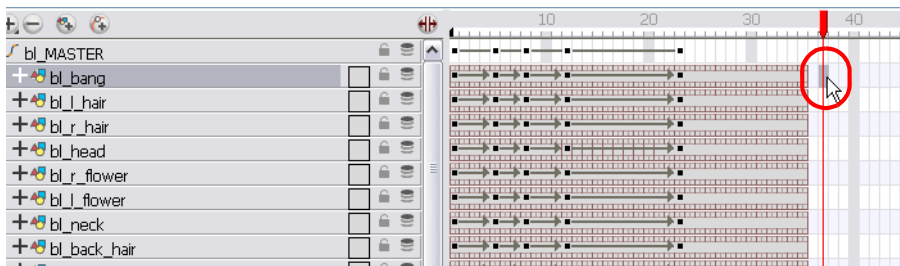
Cycle

- **Number of Cycles:** Use the up and down arrows to increase or decrease the number of cycles you want to paste. You can also type the value directly in the field.
- **Cycle Type**
 - ⇒ **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - ⇒ **Reverse:** This pastes your selection reversed, starting with the last cell and ending with the first one.
 - ⇒ **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - ⇒ **Reverse -> Forward:** This pastes your selection as a reverse yo-yo, starting with the last cell, going to the first one and ending with the last cell.

If you want to cycle a portion of your animation, you can use the Paste Cycle command. You can also use the Paste Reverse command to completely reverse the flow of your animation.

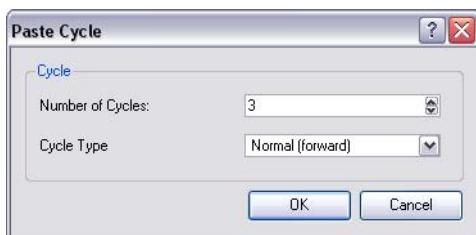
To use the Paste Cycle command:

1. In the Xsheet or Timeline view, select the cell range and keyframes to loop.
2. In the top menu, select **Edit > Copy**.
3. In the Xsheet or Timeline view, select the cell where you want your cycles to start.



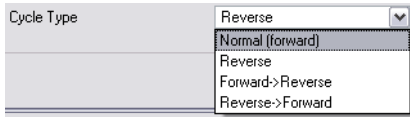
4. In the top menu, select **Edit > Paste Cycle**. The default keyboard shortcut is [Ctrl]+[/] (Windows/Linux) or [⌘]+[/] (Mac OS X).

The **Paste Cycle** dialog box opens.



5. In the Number of Cycles field, use the up and down arrow to increase or decrease the amount of cycles you want to paste. You can also directly type the value.

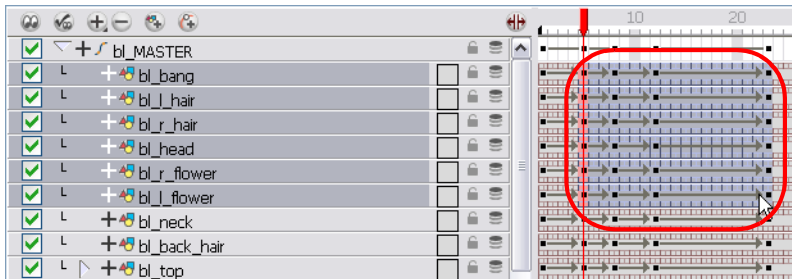
6. In the Cycle Type drop-down menu, select the type of cycle you want to paste.



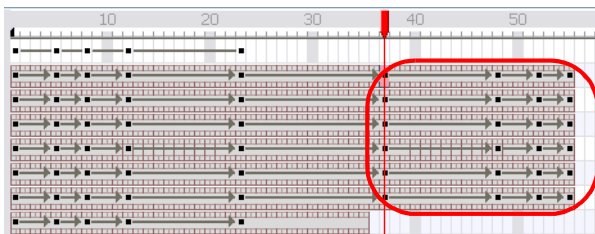
- ▶ **Normal (forward):** This pastes your selection as it is, starting with the first cell and ending with the last one.
 - ▶ **Reverse:** This pastes your selection reversed, starting with the last cell and ending with the first one.
 - ▶ **Forward -> Reverse:** This pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
 - ▶ **Reverse -> Forward:** This pastes your selection as a reversed yo-yo, starting with the last cell, going to the first one and ending with the last cell.
7. Click on the OK button to paste your cycles.

To use the Paste Reverse command:

1. In the Xsheet or Timeline view, select the cell range and keyframes to paste inverted.



2. In the top menu, select **Edit > Copy**.
3. In the Xsheet or Timeline view, select the cell where you want your cycles to start.
4. In the top menu, select **Edit > Paste Reverse**. The default keyboard shortcut is [Ctrl]+[?] (Windows/Linux) or [⌘]+[?] (Mac OS X).



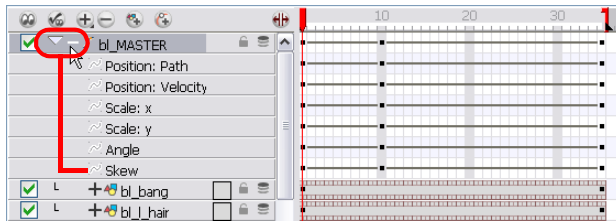
Adjusting the Velocity

To add ease in and ease out on your motion paths, you can display the function curve and modify the Bezier or Ease curve. To apply an ease to multiple functions and keyframes, you can use the Set Ease For Multiple Parameters script and set the amount desired.

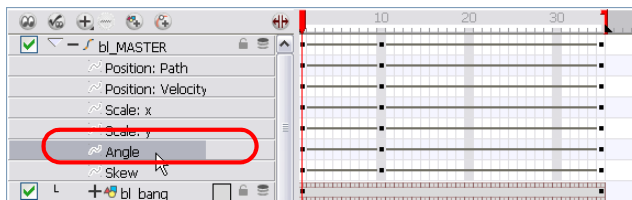
The Velocity, or ease, is used on motion keyframes. The Velocity has to be adjusted directly on the function curve in either the Function view or the Function editor. When a keyframe is selected, easing values appear in the right handle and left handle fields, as well as Bezier handle or Ease wheel controls on each selected keyframe. Pull on them to adjust the ease in and ease out, or type values in the fields.

To display the velocity curve:

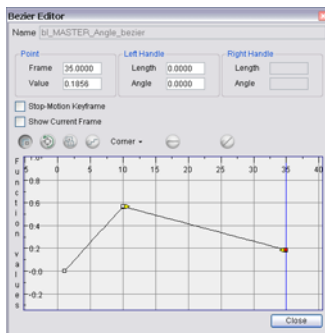
1. In the Timeline View, click on the Expand Function  button to display the layer's functions.



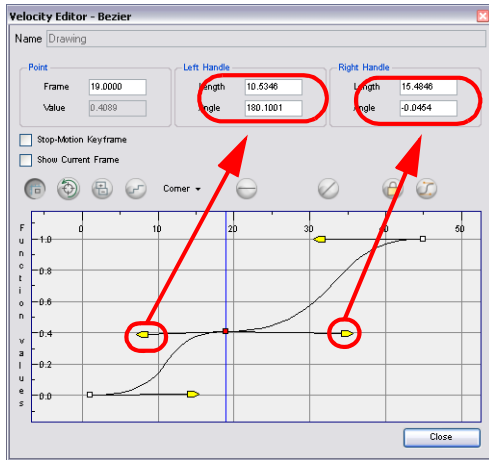
2. Double-click on the desired function.



The Function Editor opens.



The editor will not be displayed if the function does not already exist.



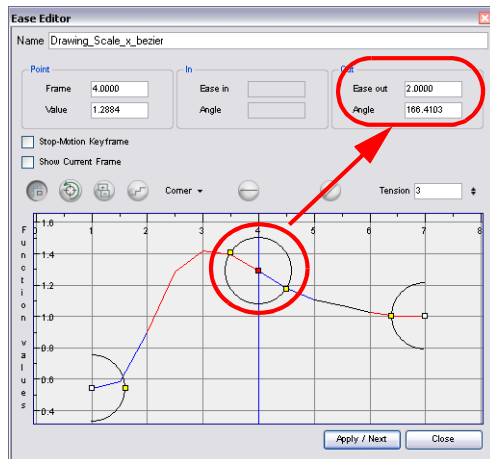
You can reshape the function using either the Bezier or Ease controls.

To reshape a function using Bezier controls:

1. Click on the keyframe to select it.
2. Drag the handles to modify the shape of the curve.

The Continuity options, Corner, Straight and Smooth, influence how you can move the handles.

- **Straight:** allows you to move the handles together, maintaining the same angle to the point.
- **Corner:** allows you to move the handles independently.
- **Smooth:** allows you to move the handles together, maintaining the same distance and angle to the point.



To reshape the function using Ease controls:

1. Click on the keyframe to select it.
2. To set the number of frames in the ease-in, press [Alt], click to the right of the keyframe and drag the green line. The ease in slope is indicated in blue.

As you change the values visually, the value in the Ease In field is updated. This value represents the number of frames in the ease-in.

3. To set the number of frames in the ease-out, press [Alt], click to the left of the keyframe and drag the green line. The ease out slope is indicated in red.

As you change the values visually, the value in the Ease Out field is updated. This value represents the number of frames in the ease-out.

4. To adjust the ease-in or ease-out, drag the handles around the keyframe.

The Continuity options, Corner and Straight, influence how you can move the handles:

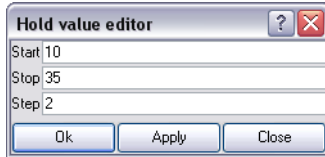
- **Straight:** allows you to move the handles together, maintaining the same angle to the point.
- **Corner:** allows you to move the handles independently.

You can create a stepped curve to hold the same value over a selected number of frames. This works well when you are animating drawings on 2's, for example, and you want to hold the same value for a function over those two frames.

To hold the same value over several frames:

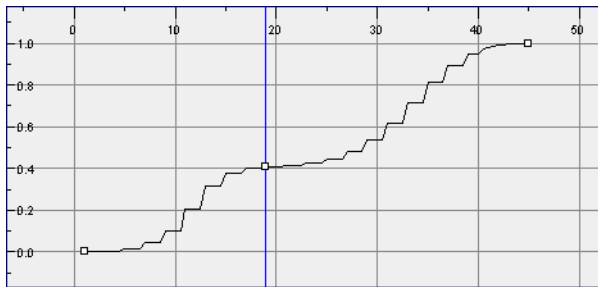
1. Click the **Hold Value Editor**  button.

The **Hold Value** editor opens.




2. In the Hold Value Editor, enter the following values:
 - ▶ In the Start field, enter the starting frame for the effect.
 - ▶ In the Stop field, enter the last frame for the effect.
 - ▶ In the Step field, enter the number of frames that you want to hold the value for.

The function curve is updated based on the values you entered.



You can reshape the curve to create a linear velocity so that the values are interpolated (tweened) consistently between keyframes (that is, there is no acceleration in the effect).

To create a linear velocity between two keyframes:


- ▶ Click the keyframe to select it and then click the Linear Velocity  button. This command resets the handles on the Ease or Bezier function so that the velocity is linear.

To set eases on multiple parameters:

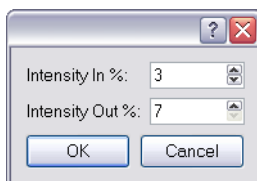
1. In the Timeline View, select a keyframe on one or many layers.



NOTE: only the first selected keyframe will be considered when using the Set Ease For Multiple Parameter script. If many keyframes are selected on a same layer, the ease values will be applied only to the first one and the rest will be ignored.

2. In the Scripting toolbar, click on the Set Ease For Multiple Parameters Script  button.

The **Set Eases** dialog box opens.



3. Set the ease-in and ease-out intensity. 1 corresponds to 10% and 10 corresponds to 100%. Click on the OK button.

Expression Columns



In Harmony Stage, you can use expressions to automate the calculation of effect values based on the values in another function. An expression is a mathematical formula that allows you to manipulate the value in the source function to create new values for the destination effect.

For example, if you take two characters and one is walking across the stage and the other is following the same path two steps behind. Without expressions, you would have to manually enter the values for the position of the peg so that it was one frame behind the original element. However, you can save time by building an expression that does this process for you. Then, if you change the position of the element in the original column, Stage automatically updates the Expression columns linked to it.

This topic is divided as follows:

- Operators and Operands, on page 601
- Creating an Expression for an Effect, on page 603

Operators and Operands

Expressions include operators and operands.

- Operators are symbols that represent an action, like + for addition.
- Operands are values that are manipulated by the operators.

In the expression (10 + 5), 10 and 5 are the operands and + is the operator.

In Harmony Stage, you build expressions with following operators:

- + (addition)
- - (subtraction)
You must include spaces around the minus sign when it is part of a mathematical expression because "-" is also a valid character in element names. Further, you can also use "-" as a unary minus sign, meaning that you can negate entire operations with the minus sign. For example, -(5-3) would result in the value -2.
- * (multiplication)
- / (division)
Multiplication and division are performed before addition and subtraction. You can use parentheses () to enclose discreet operations.

To refer to the values in a column, you use the column name and the frame number. If you do not state the frame number, then Stage assumes you want the value of the current frame. You can refer to the frame numbers in the following ways:

- **frame:** refers to the current frame number.
- **previous:** refers to the frame before the current frame.
You must provide an argument in parentheses () to get a value. The argument is the name of the column whose previous frame values you want to retrieve.
- **Nframe:** refers to the total number of frames in a scene.
- [], in the square brackets you can refer to specific frame numbers.
For example [frame - 2] refers to the frame before the previous frame. You must put space between frame, the minus sign and the number for the expression to be valid.

Consider the expression: `previous(peg_x)`

- This expression says that the current frame value will be the same as the previous frame value of the element `peg_x`.

Now consider this expression: `peg_angle[frame - 2] * 3`

- In this expression, we are telling the Stage Module to look two frames before the current frame in the column "peg_angle" and multiply the value by 3 to derive the value for the current frame of the Expression column.

There are also a number of predefined functions that you can use:

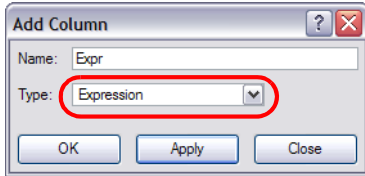
- **sum**: adds all previous frames to create the value at the current frame).
- **tan** (tangent), **cos** (cosine), **sin** (sine), **atan** (arc tangent), **acos** (arc cosine) and **asin** (arcsine). These functions are useful in calculating camera angles and angles of rotation.
- **round**: rounds a number with digits after the decimal to the nearest whole number.
- **int**: removes the values after the decimal point to make a whole number.
- **atan2(y, x)**: unlike the other arc tangent function (atan), this function gives you a value between -180 and 180. In the other arc tangent function you would lose the positive/negative signs that indicate which quadrant the value would be in. With the atan2 function, the resulting quadrant is preserved. You would use this function when working with a directional blur where the direction of the blur is important to preserve.
- **ceil**: rounds the value to the next integer. For example:
 - ⇒ If the value is 3.7, the ceil value is 4.
 - ⇒ If the value is 3, then the ceil value is 3.
- **floor**: rounds the value to the lower integer. For example:
 - ⇒ If the value is 3.7, the floor value is 3.
 - ⇒ If the value is 3, then the floor value is 3.
- **abs**: the absolute value of the number. For example:
 - ⇒ If the number is -2, then the result of this function would be 2.
 - ⇒ If the number is 2, the result of the function would be 2.
- **sqrt**: square root of the value.
- **Comparison functions** (`=`, `==`, `!=`, `<`, `<=`, `>`, `>=`): these functions compare arguments. When the function is true, the result is 1. When the function is false, the result of the function is 0 (zero). You can use these functions with the conditional (if) function.
 - ⇒ `=`, `==` : compares the two arguments to find out if they are equal
 - ⇒ `!=`: compares the two arguments to find out if they are NOT equal
 - ⇒ `<` : less than
 - ⇒ `<=` : less than or equal to
 - ⇒ `>` : greater than
 - ⇒ `>=` : greater than or equal to
- **exp**: indicates that the argument is an exponent of e (2.71828).
For example: `exp(5) = 2.718285`
- **In**: logarithm of a value
- **Conditional function (if, then, else)**: use this function to execute calculations conditionally. You can use conditional expressions with the comparison functions. The value 0, is considered false. Any value not 0 is considered true.
For example: `if (peg_x >= pegant_x) then (peg_x * 2) else pegant_x * 2`
This conditional expression says that if the `peg_x` column is greater than or equal to the value in the `pegant_x` column, then the value of the function is `peg_x` multiplied by 2, otherwise the value of the function is `pegant_x` multiplied by 2.

Creating an Expression for an Effect

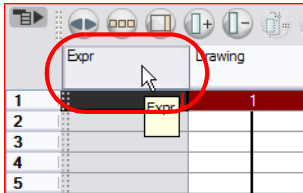
To create an expression for an effect, you must add an Expression column to the Xsheet view, build the expression and then link the Expression column to the parameter you want to control.

To build an expression for an effect:

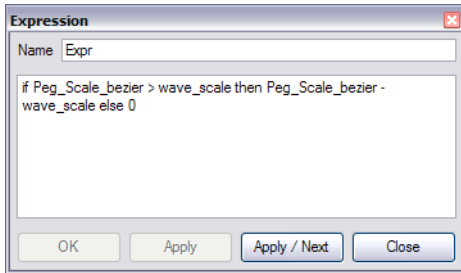
1. In the Xsheet View menu, select **Columns > Add Columns**. The default keyboard shortcut is [Shift]+[C].



2. In the Add Columns dialog box, type a name for the column and select Expression from the Column Type drop-down list.
3. Click on the OK button.
4. Double-click on the column's header to open the Expression dialog box.



5. Type the expression in the dialog box.

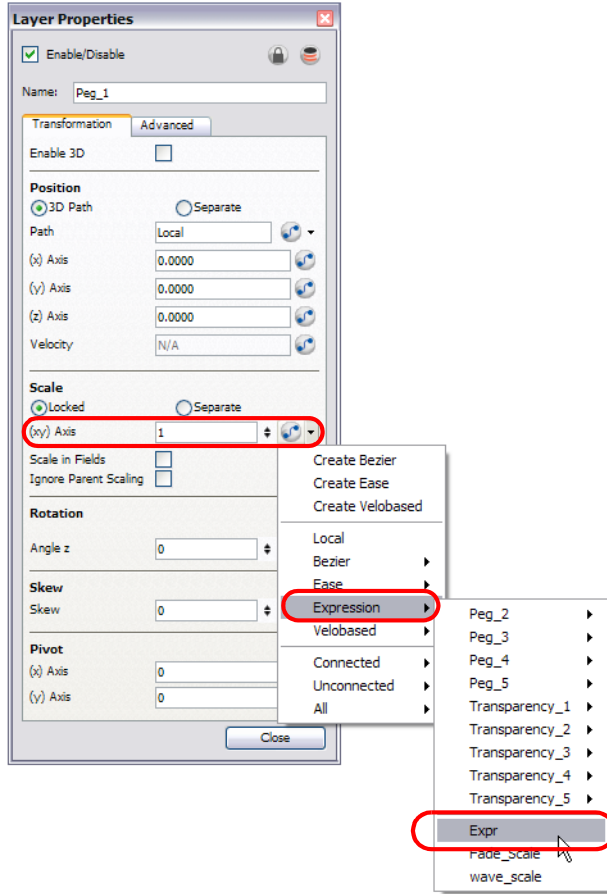


6. Click OK or Apply to activate the expression.

The cells in the Expression column are populated with values based on the expression you created.

	Peg_Scale_bezier	Ripple Ripple (1)	Transparency_Trans	Expr	Ripple_1 Ripple (1)
1	1.000		0.000	0.000	
2	1.343				
3	1.686				
4	2.029				
5	2.371				
6	2.714				
7	3.057				
8	3.400				
9	3.743				
10	4.086				
11	4.429				
12	4.771				
13	5.114			0.114	
14	5.457			0.457	
15	5.800			0.800	
16	6.143			1.143	
17	6.486			1.486	
18	6.829			1.829	
19	7.171			2.171	
20	7.514			2.514	
21	7.857			2.857	
22	8.200			3.200	
23	8.543			3.543	
24	8.886	1	0.000	3.886	1

- To apply the values in the Expression column to an effect, you must link the Expression column to the parameter values. In the Drawing layer's editor, link the function to the new Expression column.



Refer to the Sharing Functions section to learn more about linking parameters.



Preferences

While creating motion paths and setting up your scenes, there are preferences you can set to make your work more efficient.

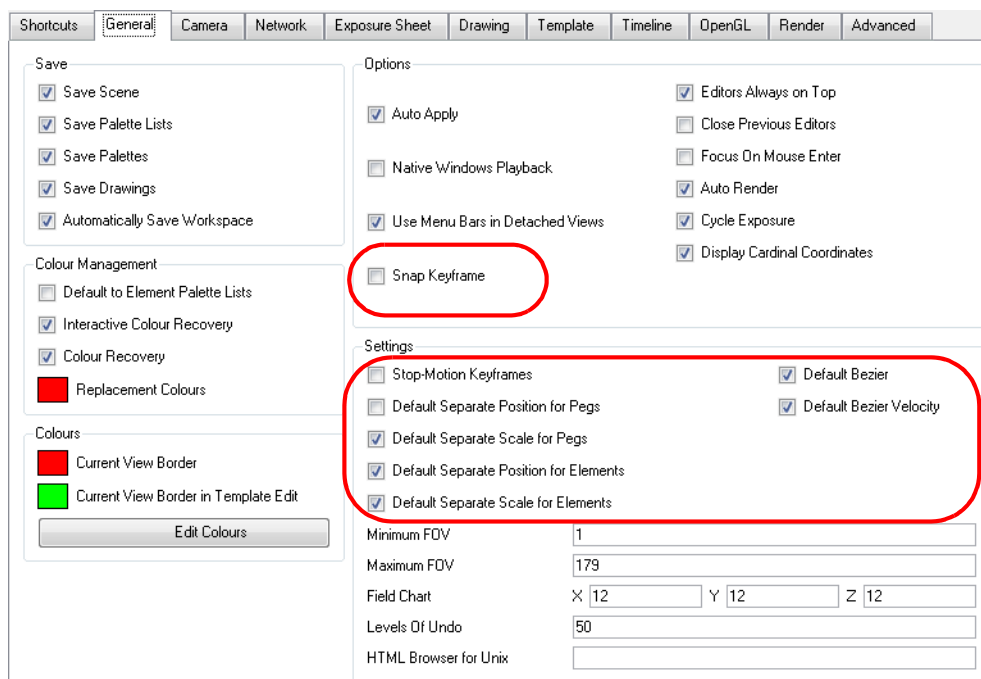
This topic is divided as follows:

- General Preferences, on page 605
- Camera Preferences, on page 606
- Exposure Sheet, on page 607

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

General Preferences



Settings

- **Stop-Motion Keyframes:** New keyframes are created as Stop-Motion keyframes.
- **Default Separate Positions for Pegs:** New pegs are created with separate position functions.
- **Default Separate Scale for Pegs:** New pegs are created with separate scale functions.
- **Default Separate Positions for Elements:** New elements are created with separate position functions.
- **Default Separate Scale for Elements:** New elements are created with separate scale functions.
- **Default Bezier:** New functions curves are created as Bezier Curves.
- **Default Bezier Velocity:** New velocity curves are created as Bezier Curves.

Options

- **Snap Keyframe:** If two keyframes have the same value, they will both update to the same new position when the first of the two keyframes is modified. The previous keyframe has to be a Stop-Motion keyframe.

Camera Preferences

Tools

- **Initial Animation Mode:** Determines which animation mode are enabled when the scene is opened.
- **Set Keyframes on All Functions With the Transform tool:** A keyframe is added by default on all the functions of the selected layer when you perform a transformation with the transform tool. Disable this option if you want the Transform tool to add a keyframe only on the transformation you are doing, such as a rotation or scale.
- **Set Keyframe At Frame One With First Application On the Transform Tool:** When this preference is enabled, wherever you set a keyframe on your layer, there will be a keyframe added on your frame 1. If the preference is disabled, there will be only a keyframe added to the current frame. If later on, you add a keyframe on your frame one, it may modify the first keyframe you added.

Control Points

- **Show Control Points On Selected Layer:** By default, when you select an element with the Transform tool, the motion path related to the object is displayed. Disable this option to turn off the behaviour.
- **Control Point Tension:** The default Tension value for new keyframes and Control Points.
- **Control Point Continuity:** The default Continuity value for new keyframes and Control Points.
- **Control Point Bias:** The default Bias value for new keyframes and Control Points.

Exposure Sheet

The screenshot shows the 'Exposure Sheet' preferences dialog box. The 'Function Editors' section is highlighted with a red oval. It contains two checkboxes: 'Show Grid' (checked) and 'Use Constant Z By Default' (unchecked). Other sections include 'Filtering' with several checked options, 'Options' with dropdown and input fields, 'New Element' with input fields for 'Bitmap Format' and 'Scan Type', and 'Drawing Creation' with an unchecked checkbox.

Function Editors

- **Show Grid:** When selected, the grid is displayed by default when opening the Function Editor.
- **Use Constant Z By Default:** When selected, the Constant Z option will be enabled by default in the Function Editor.
Constant Z means that even when creating Motion keyframes, the Z function will use Stop-Motion keyframes and will not be interpolated, this can be very useful for cut-out animation. The Constant Z feature only works with 3Dpaths.
You can also enable the Constant Z option directly in the Function Editor or Function view for specific functions.

Chapter 15

Animating Your Puppets



Harmony Stage provides you with some great tools to animate your puppets. You can create simple animation using the Transform tool and you can make advanced animation using both Forward and Inverse Kinematics! Harmony Stage has advanced onion skinning and image swapping features to help you animate efficiently and quickly. To give you animation freedom you are able to mix several different techniques of animation such as simple rigging, hierarchy and Symbol animation.

In this chapter, you will learn about the following:

- Getting the Character, on page 610
- Understanding Drawings and Keyframes, on page 614
- Creating a Simple Cut-out Animation, on page 616
- Selecting Layers to Animate or Position, on page 618
- Navigating the Hierarchy, on page 621
- Animating using the Transform Tool, on page 622
- Animating using Inverse Kinematics, on page 624
- Animating in Stop-Motion, on page 638
- Animating using Computer Generated Interpolation, on page 639
- Flipping Through Poses, on page 642
- Using the Onion Skin in Cut-out Animation, on page 643
- Flipping Parts, on page 645
- Animating Using Symbols, on page 646
- Reusing Extra Drawings, Poses and Facial Expressions, on page 651
- Swapping Images, on page 654
- Adding a New Drawing, on page 656
- Ordering Layers Over Time, on page 657
- Creating Cycles, on page 658
- Adding Pegs, on page 661
- Offsetting Part of an Animation, on page 663
- Preferences, on page 664

Getting the Character

The first step in animating your character is to import a master template from the library.

This topic is divided as follows:

- Importing a Character from the Library, on page 610
- Importing Network Templates, on page 611,
- Selecting the Pose, on page 612
- Extending the Exposure, on page 612

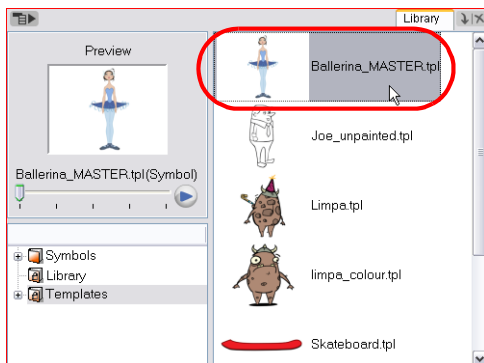


If the template you are importing was created in the Network view, make sure to import it first and to drop it into either the Network view or the left side of the Timeline view. If you don't do this you may break some network connections.

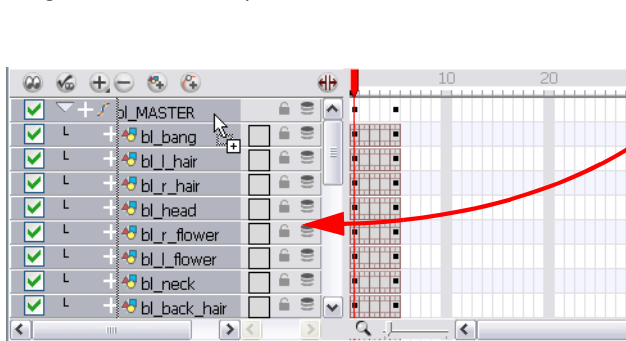
Importing a Character from the Library

To import your character from the library:

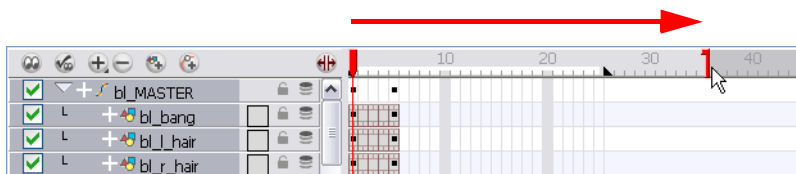
1. Create your new Harmony Stage project.
2. In the Library view, select the character's master template you want to animate.



3. Drag the selected template to the Camera or Timeline view's left side.



4. In the Timeline view, drag the scene length bracket to extend or shorten your scene length.

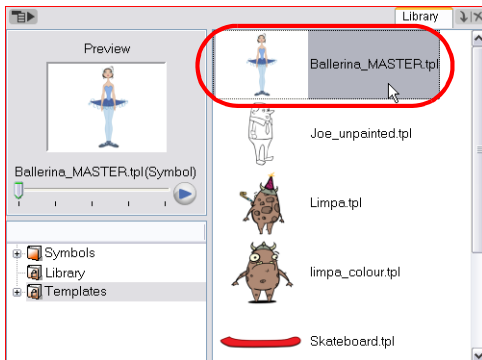


Importing Network Templates

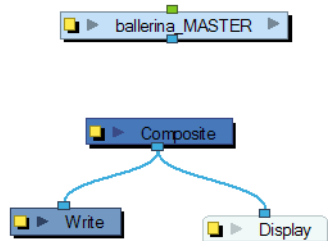
In Harmony Stage you can create your character template from the Network view.

To import a Network template:

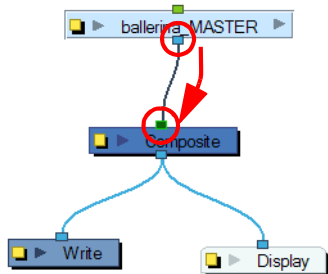
1. Create your new Harmony Stage project.
2. In the Library view, select the character's master template you want to animate.



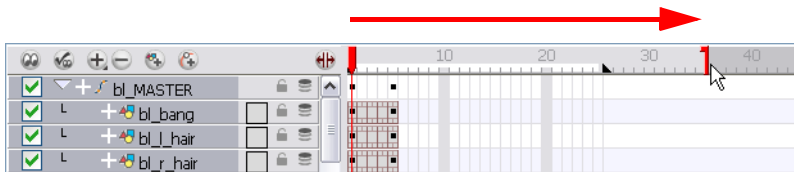
3. Drag the selected template to the Network, Camera or Timeline view's left side.



4. In the Network view, connect the template's Group module to the Composite module, by clicking its Out Port and dragging the connection to the Composite module until an In Port appears.



5. In the Timeline view, extend or shorten the scene length by dragging the scene length bracket.



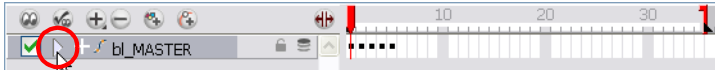
Selecting the Pose



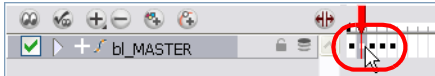
If the template you imported contains several poses, you must choose which pose you will use to start your animation and remove the other ones.

To select the character's pose:

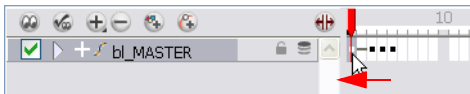
1. In the Timeline view, collapse your character's layers.



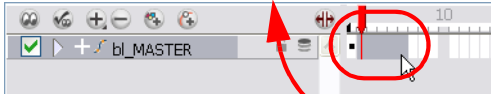
2. In the Timeline view's right side, select the keyframe corresponding to the pose you want to keep.



3. Drag the selected keyframe to the first frame.



4. Select all of the extra drawings and keyframes that you do not need and press the [Delete] key.

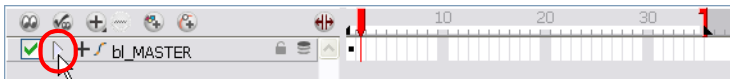


Extending the Exposure

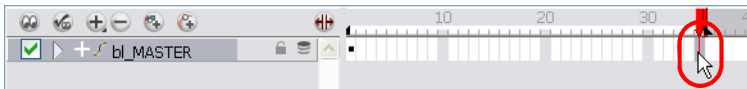
Once your pose is chosen, all that is left to do is to extend the exposure of your character to the end of your scene.

To extend the exposure of your character:

1. In the Timeline view, collapse your character.

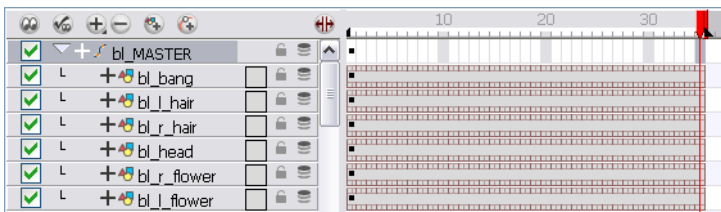


2. In the Timeline view's right side, select the last cell of your character.



3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the select and select **Extend Exposure**. The default keyboard shortcut is [F5]. You can also copy the first pose and paste it in the last cell.

The drawing exposure is extended to the end. You will not see any changes in your timeline while the master peg is collapsed.



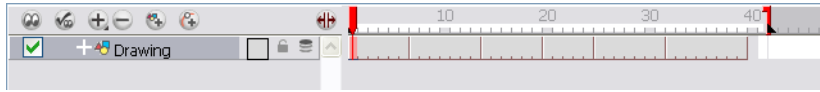
Understanding Drawings and Keyframes

In Harmony Stage, the drawings and keyframes are separate items. You can manipulate the exposure of the drawings independently from the position keyframes.

Keyframes and Drawing Blocks

When you extend the exposure of a drawing it is represented by a grey block in the Timeline view. When you expose a second drawing, a second grey block is displayed.

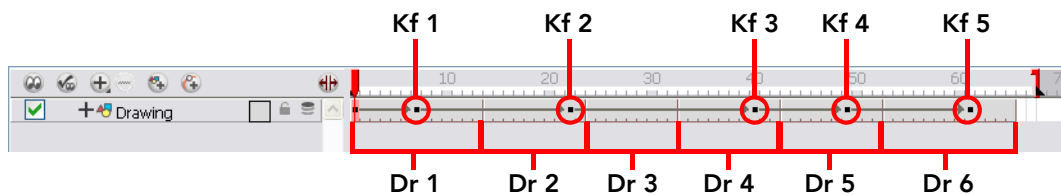
You can consider these blocks as Drawing Blocks.



To animate the position of a block over time, you do not need to create a second block, you simply need to add a position keyframe.

The position keyframes are coordinates indicating the position of your drawing on a particular frame. These appear as black squares in the Timeline view.

If you refer to the example below, you can see that the keyframes are positioned on frames independently from the beginning and end of each Drawing Block.




You can keyframe three different positions for your drawing in the same Drawing Block and create a motion path between them.

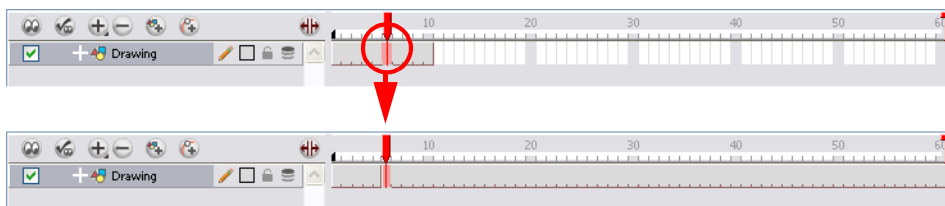
Timeline Behaviour

In the Timeline view, you can see how the Timeline behaves differently depending on whether you either create a new drawing, a new keyframe, or both at the same time.

Creating a Drawing in the Timeline view

You can use the Create Empty Drawing command to add a new drawing in the Timeline view. This will automatically insert a new drawing block.

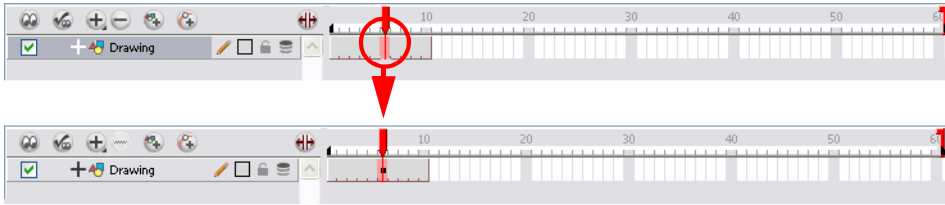
- Select **Drawing > Create Empty Drawing**.
- You can also use the Create Empty Drawing  button from the Timeline View toolbar.



Creating a Keyframe in the Timeline view

You can use the Add Keyframe command to add a new keyframe in the Timeline view. This will automatically create a keyframe in your layer.

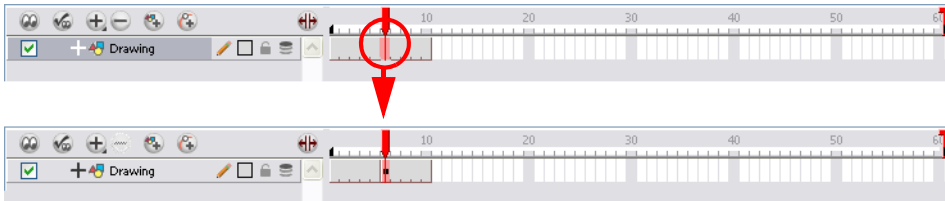
- Select **Insert > Keyframe** or use the default keyboard shortcut [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X).
- You can also use the Add Keyframe  button from the Timeline View toolbar.



Creating a Drawing and a Keyframe in the Timeline view at the same time

You can use the Insert Keyframe and Duplicate Drawing command to add a keyframe and a drawing at the same time. This will create a drawing block containing copies of the selected drawing and a keyframe.

- Select **Insert > Keyframe and Duplicate Drawing** or use the default keyboard shortcut [F6].



Creating a Simple Cut-out Animation



To create a simple cut-out animation, follow these steps so you can try out the animation tools you will learn in the next topics.




By default, when you select an object in the Timeline or Camera view, the trajectory for your motion path is displayed.

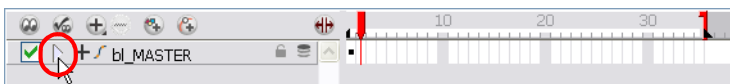
If you do not want to see the trajectory by default, you can disable the Show Control Points on Selected Layers preference.

To disable the Show Control Points on Selected Layers preference:

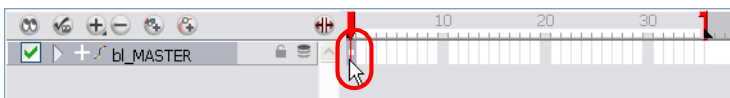
1. In the top menu, select **Edit > Preferences** (Windows/Linux) or **Stage > Preferences** (Mac OS X). The default keyboard shortcut is [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X). The Preferences panel opens.
2. Go to the Camera tab in the Preferences panel.
3. In the Control Points section disable the Show Control Points on Selected Layers preference.
4. Click on the OK button.

To create a simple cut-out animation:

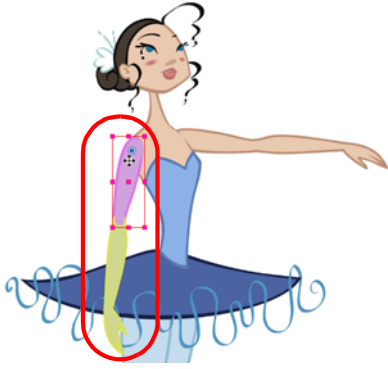
1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Transform tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Tools toolbar, enable the Animation  mode so that everything you move will be keyframed automatically.
4. In the top menu, select **Animation > Stop-Motion Keyframe** so that the interpolation is not created automatically between your keyframes.
5. In the Timeline view, collapse your character.




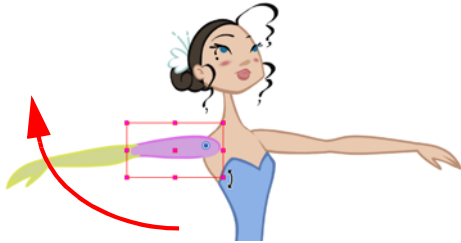
6. In the Timeline view, go to the frame where you want to set your first pose.



7. In the Camera view, select the parts to animate.



8. Using the Transform  tool, rotate, skew, scale or translate the selection to its new position.



A new keyframe appears in the Timeline view.

9. If you want to make sure that nothing will move on your new pose, in the Timeline view, select the frame corresponding to the pose, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **Add Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X).
10. In the Tools toolbar, enable the Onion Skin  feature.
11. In the Timeline view, go to the frame you want to set your second keyframe.



12. In the Camera view, animate your character.



13. Repeat this process until all your poses are done.



Refer to the following topics to get more information to learn about Motion Keyframes, Transform tool and learn more about the animation basics:

- Selecting Layers to Animate or Position, on page 618
- Animating using the Transform Tool, on page 622
- Animating using Computer Generated Interpolation, on page 639
- Using the Onion Skin in Cut-out Animation, on page 643

Selecting Layers to Animate or Position

When you are animating characters, it is important to understand how the Animate mode allows you to create keyframes on the current frame or to reposition the entire layer.

This topic is divided as follows:

- Animate Mode, on page 618
- Selecting Drawing Layers using the Transform Tool, on page 618

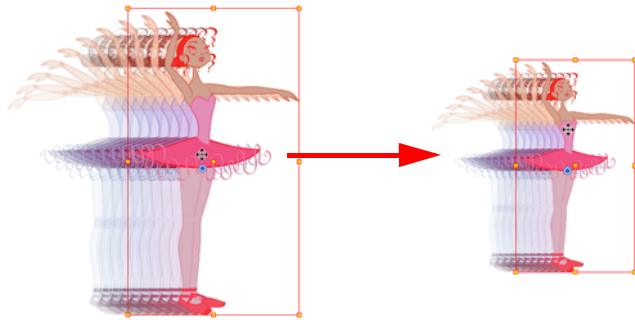
Animate Mode

The Animate  button, in the Tools toolbar, toggles the keyframing option on or off.

When you enable the Animate mode, as soon as you move an element in your Camera view, a keyframe is positioned on the current frame in the Timeline view to indicate the new position.




When you disable the Animate mode, and you select and move an element, the entire animation in the layer will be offset at once.




This means that when you are animating your character, you must enable the Animate mode.

If you are scaling down your puppet to fit the scene composition and want to resize the entire animation, you must disable the Animate mode.

To enable and disable the Animate mode:

- ▶ In the Tools toolbar, click on the Animate  button. The default keyboard shortcut is [Shift]+[A]. You can also enable and disable the Animate mode in the top menu under **Animation > Animate**.



Selecting Drawing Layers using the Transform Tool

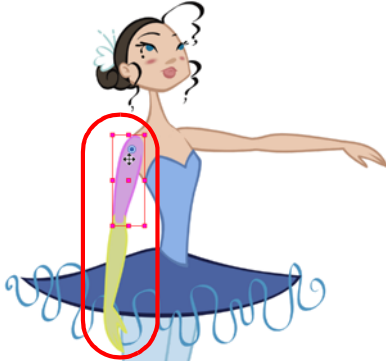
To manipulate your drawing layers in order to animate them, you must use the Transform  tool. The Select tool is used to modify the drawing strokes and not the actual drawing layer.





When selecting your drawing layers with the Transform tool, make sure that the Peg Selection Mode option is disabled in the Transform Tool Properties view. If this option is enabled it will limit the selection in the Camera view to pegs only.

To select using the Transform tool:

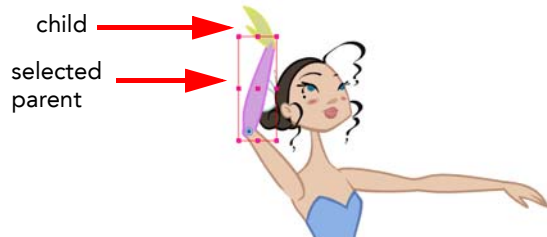
1. In the Tools toolbar, click on the Transform  tool. The default keyboard shortcut is [Alt]+[Q]. You can also select the Transform tool in the top menu under **Animation > Tools > Transform**.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the element to animate.

**Selecting an element in the Camera View using the Transform Tool**

When you select an element in the Camera view using the Transform tool, make sure that the Peg Selection Mode  is disabled in the Transform Tool Properties view, the element selected is the actual drawing layer corresponding to the selected element. If you have a peg parented to that layer, you must either use the keyboard shortcuts to go up the hierarchy chain, select it in the Timeline view, or enable the Peg Selection Mode  option in the Transform Tool Properties view, this will limit the selection in the Camera view to pegs only.



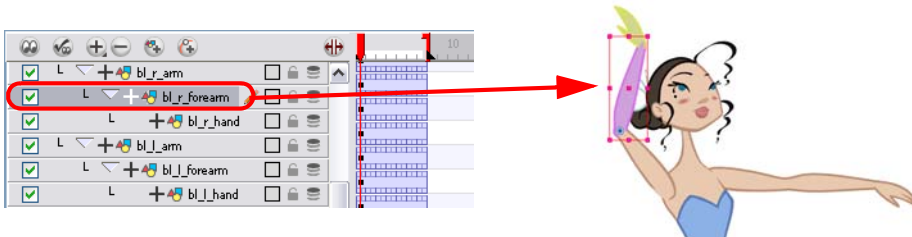
If the layer has child layers, they will also be highlighted.



Refer to the *Navigating the Hierarchy* topic to learn how to go up or down the layer hierarchy.

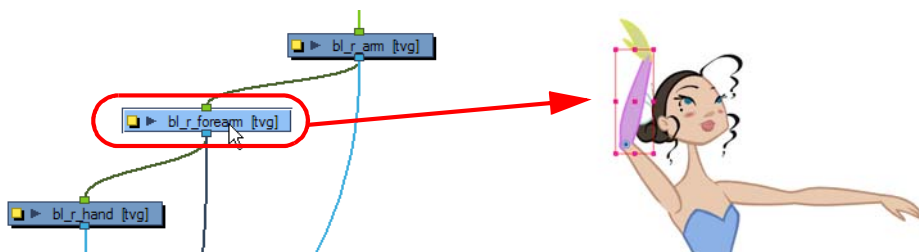
Selecting a Layer in the Timeline View

When you select a layer in the Timeline view, the corresponding element will be highlighted in the Camera view. If the selected layer has child layers, they will also be highlighted.



Selecting in the Network View



As with the Timeline view, when you select a module in the Network view, the corresponding element will be highlighted in the Camera view. If the selected module has child layers, they will also be highlighted.

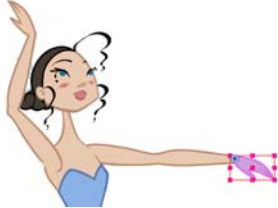


Navigating the Hierarchy

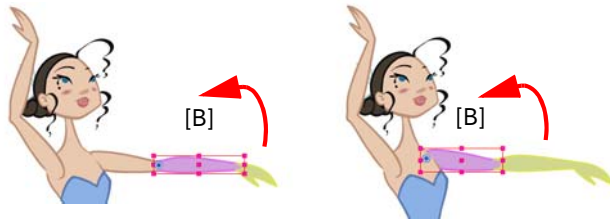
If you created a layer hierarchy when you built your puppet, you can use the keyboard shortcuts to travel up and down the parent-child chain. You can also travel between the children in a layer.

To select the parent or child layer:


1. In the Tools toolbar, select the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera or Timeline view, select a layer attached to a hierarchy.

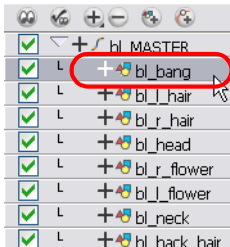


4. Select **Animation > Select Parent** or press the keyboard shortcut [B] to select the parent layer and select **Animation > Select Child** or press the keyboard shortcut [Shift]+[B] to select the child layer.

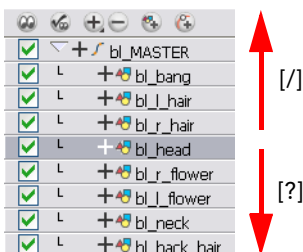


To select the children layers:

1. In the Tools toolbar, select the Transform  tool.
2. In the Camera or Timeline view, a layer attached to a parent layer with several children or not parented at all.

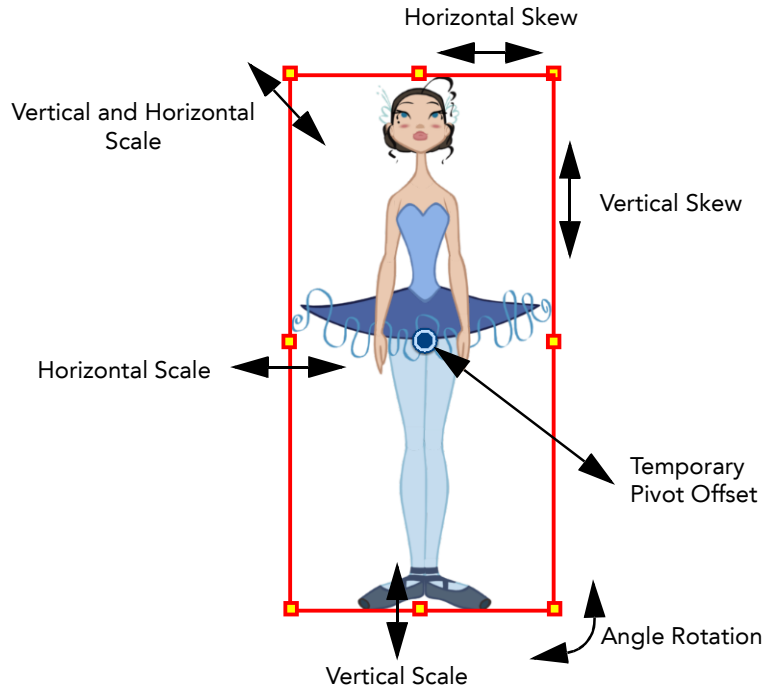


3. Select **Animation > Select Previous Brother** or press the keyboard shortcut [/] to select the previous child layer and select **Animation Select Next Brother** or press the keyboard shortcut [?] to select the next child layer. You can also select **Animation > Select Children**, to select all child layers at once.




Animating using the Transform Tool

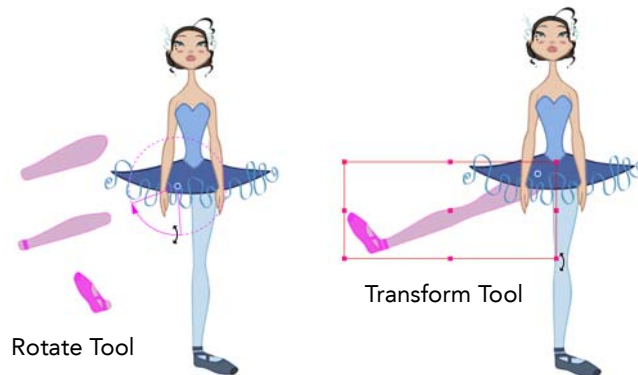
The transform tool is the main tool you use when working with a Cut-out character. The Transform tool has many useful functions:



Using the individual Rotate, Translate, Scale and Skew tools is not recommended, as they move each piece from their own pivot point. They are compositing tools. The Transform tool will create a global selection, so when many parts are selected, the Transform tool will move it as one. The Transform tool is highly recommended for Cut-out.



When animating with the Transform tool, make sure to select the right selection mode. In this example, make sure that the Peg Selection Mode  is disabled in the Transform Tool Properties view or it will limit the selection in the Camera view to pegs only.



If you have hierarchy connections in your cut-out character, the Transform tool will also be used as the Forward Kinematics equivalent.



The Transform tool can be used on any kind of rigging.

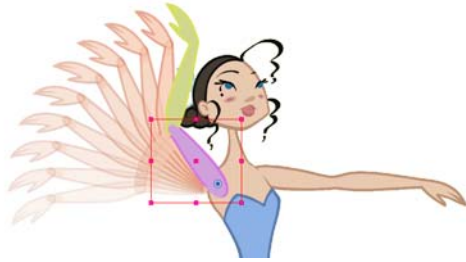
When many parts are selected with the Transform tool, the first selected part's pivot will be used as the global selection's pivot. This pivot can be moved temporarily for the animation. When you offset the pivot, the permanent pivot is displayed as a ghost.

NOTE:

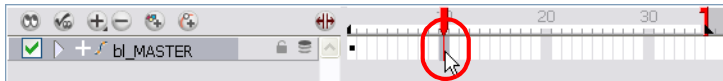
The interpolation of your animation poses is always calculated from the permanent pivot.

To use the Transform tool:

1. In the Tools toolbar, click on the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera view, select the element to animate and move it.



4. In the Timeline view, go to the frame where you want to set your next position.



5. In the Camera view, animate the character.



Refer to *Setting Up the Scene > Positioning an Element using the Transform Tool*, on page 457 to learn more about the Transform tool.

Animating using Inverse Kinematics



The Inverse Kinematics tool (IK) allows you to pull on your character's extremities, such as the hands and feet, and have the rest of the body follow.

The Inverse Kinematics tool will animate from an extremity and make the rest of the hierarchy follow (called the IK chain). It can be used on any piece connected in a hierarchy. However, you do not have to use IK every time that you have a hierarchy rig. This tool is useful when you want to bend a character's knees, make him sit and move the rest of the body, etc.

Inverse Kinematics helps a new animator to understand how a puppet should move. It will also help any animator create difficult moves easily. Inverse Kinematics will not work on basic rigs without hierarchy because there is no hierarchy chain present, IK only works on hierarchy parenting.

When animating a hierarchy puppet, an animator will use the Transform and Inverse Kinematics tools.

This topic is divided as follows:


- Where to Start with Inverse Kinematics?, on page 624
- Inverse Kinematics Tool Properties, on page 626
- Setting up the Character to use IK, on page 629
- Nails, on page 632
- Minimum and Maximum Angle, on page 633
- IK Keyframes, on page 634
- When to use the Inverse Kinematics Tool, on page 636

Where to Start with Inverse Kinematics?

This section explains the basics of the Inverse Kinematics tool. IK works best when you lock a part of the character to the spot, such as a foot on the floor, then select the entire body or another extremity and move it.

To lock a part in place, you use the IK Nail option.

To use the Inverse Kinematics tool:

1. In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
2. In the Camera view, hold down the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X) and click on a part of the body.

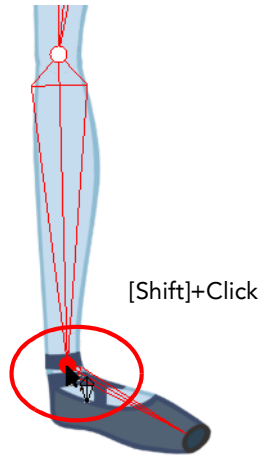
The entire IK skeleton appears.



3. Click on a part of the body and pull on it to move the character.

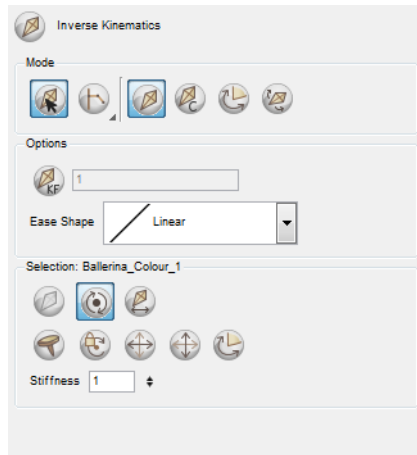


4. Hold down the [Shift] key and click on the pivot belonging to the part you want to lock in place.









5. Click on another part of the character and pull on it.

Inverse Kinematics Tool Properties



IK Modes

The IK tool has six different modes:

-  Bone Selection
-  Chain Type
-  IK Manipulation Mode
-  Apply IK Constraints Mode
-  Edit Min/Max Angle Mode
-  Bone Editing Mode

Bone Selection

The Bone Selection mode is enabled by default. This option allows you to click on any bone in your character and move it without having to select the actual layer.

Once you disable this option, you can not move any bone except the selected one. This allows you to grab and rotate the selected part from many angles and location. You can click completely outside the character and move the pieces.

Chain Type

The Chain Type mode allows you to select from one of three chain types:

- Simple chain mode: this is the default mode and will only allow for the movement of parts attached to single chain up to the point of intersection.
- Direct chain mode: this mode will allow the movement of parts up a simple secondary chain to a principle chain as long as translational movement is possible (the principle chain is attached to its own peg), but will ignore all secondary chains.
- All chain mode: this mode allows for the movement of all parts attached to all chains in the IK skeleton.

IK Manipulation Mode

The IK Manipulation mode is the main working mode for the Inverse Kinematics tool. Enable this mode when you want to animate and position your puppet.

Hold down the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X) and click on a body part to select it. You do not need to select a part to be able to move it.

Apply IK Constraints Mode

The Apply IK Constraints mode is used to correct a part's position on a series of frames. For example, if the character's foot seems to be sinking into the floor, you can correct its position and angle over a series of frames using the IK Constraints mode.



Refer to the Nails topic to learn how to use this mode.

Edit Min/Max Angle Mode

The Edit Min/Max Angle mode is used to set a rotation restriction on some of your parts, such as elbows, knees and ankles.



Refer to the Minimum and Maximum Angle topic to learn how to use this mode.

Bone Editing Mode

The Bone Editing mode is used to fix the bone orientation on extremities such as hands and feet.



Refer to the Setting Up the Bones for the Extremities topic to learn how to use this mode.

IK Tool Options

The IK tool has two special options:

- IK Keyframe
- Ease Shape

IK Keyframe

The IK keyframe option is used in combination with the IK Constraints mode. It determines the starting frame of the constraint you will apply.



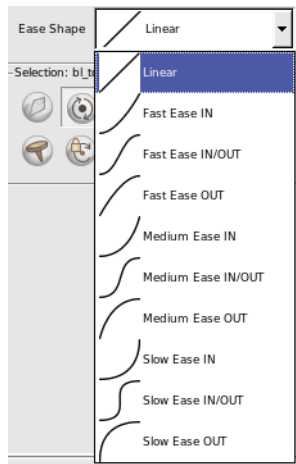
Refer to the Nails topic to learn how to use this option.

Ease Shape



While you animate with the IK tool, prior to doing a movement you can set an easing preset so that your motion is not so mechanical.




Before moving your part, select a preset from the list in the drop-down menu.



If you select a new preset in the list and move the part again on the same keyframe, the easing will be automatically updated.

Selection

With the IK tool, you are able to do the following:

-  Exclude From IK
-  Enable Rotation
-  Enable Translation If Top of Hierarchy
- IK Nails
- Stiffness

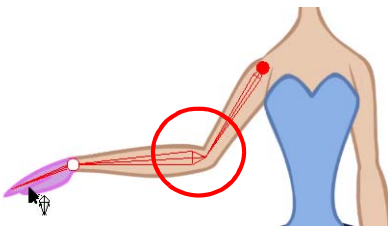
Exclude From IK

You can use the Exclude From IK option when you want certain parts of your puppet such as the eyes and mouth to be excluded from the IK influence.



Refer to the [Excluding Extra Elements from IK](#) topic to learn how to use this option.

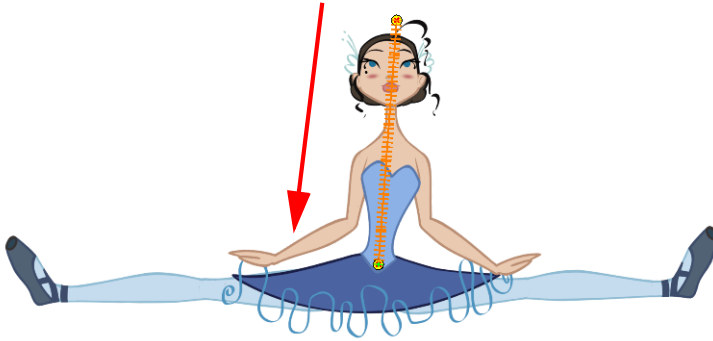
Enable Rotation



The Enable Rotation option is enabled by default. If you disable this option, the selected part will not be able to rotate anymore and will remain in the same position all the time. You can use this option to simulate an arm in a plaster cast.

When you enable this option, the pivot will disappear but you will still see the bone.

Enable Translation If Top of Hierarchy



This option is mainly used on master pegs. Since IK is all about rotation, when you pull on a foot to get the character to do a perfect split, at some point, the hip will need to translate and not just rotate on the spot. In this case, you would select the hip layer and enable the translation option.

IK Nails



The IK nails are used to temporarily fix a part of a character to a spot either in translation or rotation, or to enable maximum and minimum angle usage.



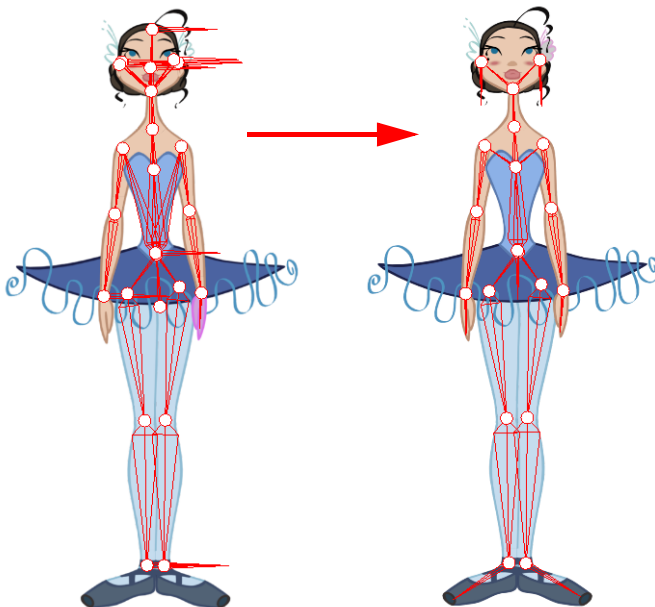
Refer to the Nails topic to learn how to use this option.

Stiffness

When a certain part is selected, you can apply a stiffness value to it. A different stiffness value can be set to each body part individually. The greater the Stiffness value applied, the more difficult it is to make that part rotate, thereby rendering it stiff while the other parts continue to move freely on their joints.

Setting up the Character to use IK

The first time you display the character's skeleton, you will notice a series of bones on the extremities which are out of place, and there may also be some elements that you would like to exclude from the Inverse Kinematics chain.



You should setup the skeleton before starting your animation. There are three things to do to setup the character:

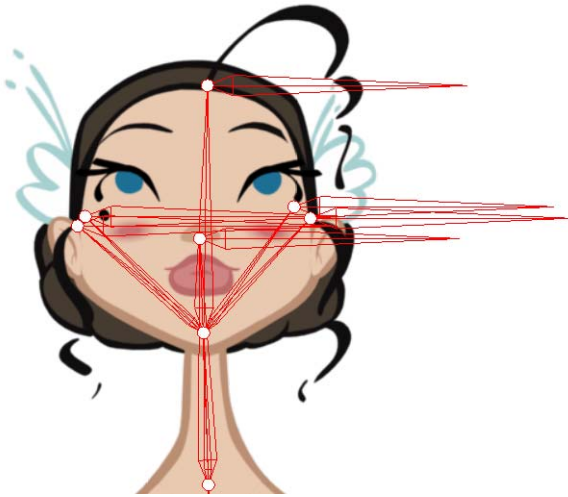
- Connecting any Hierarchy Chain, on page 630
- Excluding Extra Elements from IK, on page 630
- Setting Up the Bones for the Extremities, on page 631

Connecting any Hierarchy Chain

Before fixing any bones, or excluding layers from the IK, it is important that you make sure all the elements you want to be parented in a chain are setup.



You do not need to have a chain all over the body. It can be on the legs and arms. If the body is not completely rigged in hierarchy, the skeleton will look a bit more messy, but the IK tool will still work without any problem.

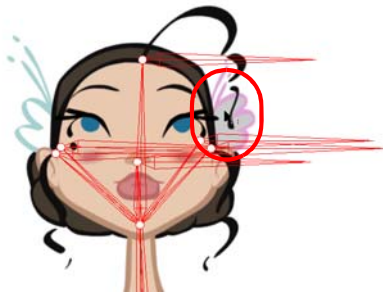
Excluding Extra Elements from IK




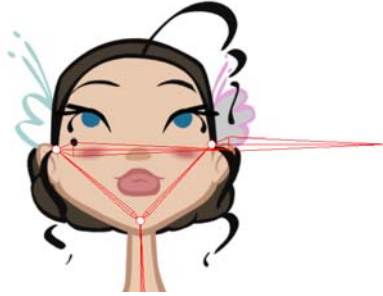
When working with the IK tool, you will probably want to move the main parts around, but not necessarily the small ones such as the nose or ears. In this case, you can select some elements on your character and exclude them from the skeleton.

To exclude elements from the skeleton:

1. In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
2. In the Tool Properties view, make sure the IK Manipulation Mode  is enabled.
3. In the Camera view, hold down the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X) and click on the part to exclude from the IK.



4. In the Tool Properties view, click on the Exclude from IK  button.





5. Repeat the process for every part to be excluded from the IK.

Setting Up the Bones for the Extremities

Once you remove the extra elements from your skeleton, you will want to set the bone orientation for the extremity parts. By default they are oriented horizontally towards the right. This orientation often works for the feet but not necessarily for the hair or hands,

To set the bone orientation:

1. In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
2. In the Tool Properties view, enable the Bone Editing  mode.
3. In the Camera view, click on the pivot belonging to the part you whose bone you want to reposition, then pull the pivot in the direction you want the bone to be.








4. Repeat this process for each bone you want to position. **NOTE:** this command will only work on the extremities.





Nails

Using the Inverse Kinematics tool, if you pull a hand the system will animate all of the parts included in the hierarchy chain, the torso, the hips and the legs, depending on your rig. Often, the animator will only want to animate a character's part, such as the arm and not the whole body. To do so, there are IK constraints such as IK nails that are used to temporarily cut or constrain the chain. IK nails can be used to cut an IK chain or to block a part on the spot. For example, you can fix a character's feet to the ground when he walks.

There are different types of constraints that can be placed on the chain:

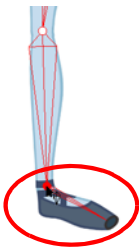
-  IK Nail
Blocks the X, Y and Z positions.
-  Hold Orientation
Blocks the angle
-  Hold X
Blocks only the X position
-  Hold Y
Blocks only the Y position
-  Enable Maximum and Minimum angle
Sets limitations on the angle parameter to prevent the puppet from bending too far.

To set an IK nail:

1. In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
2. In the Tool Properties view, make sure the IK Manipulation Mode  is enabled.
3. In the Camera view, hold down the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X) and click on the part to set a nail on.
4. In the Tool Properties view, click on the type of nail you will use.

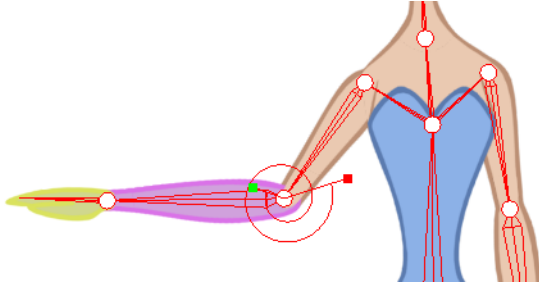


- ▶ You can also hold down the [Shift] key and click on any part's pivot to set a regular nail on it without having to select it.
- ▶ You can hold down the [Shift] key and click on the bone to set an Hold Orientation nail.
- ▶ You can select the nail type in the top menu by selecting **Animation > IK Constraints > the desired nail.**



- ▶ You can remove the nail at anytime using the same technique you did to place the nail. It will not affect the animation.
5. To remove every nail except the Enable Min/Max Angle ones, in the top menu select **Animation > IK Constraints > Remove All Constraints.**

Minimum and Maximum Angle



Harmony Stage allows you to set a minimum and maximum angle constraint on certain joints such as the knees or elbows.

When using the Inverse Kinematics tool or even the Forward Kinematics (Transform Tool), it is possible that some joints will bend in the wrong direction.





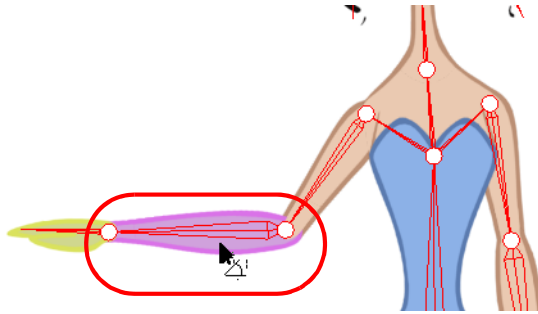
It is recommended to use the minimum and maximum angles only if the character does not change view. For example, if a character is facing the camera and has some angle limitations enabled, it could be problematic if the character switches to side or quarter view since the joints won't bend the same way.


You can use the minimum and maximum angle constraints if your character's views are in different templates or layers. If the character's views are in the same layers, you are better off not using the angle constraints.

If you plan to animate a lot with the Inverse Kinematics tool, it is a good idea to try the angle constraints. It is up to the animator's taste. The angle constraints can be set by the character builder or by the animator in some particular scenes where it is needed.

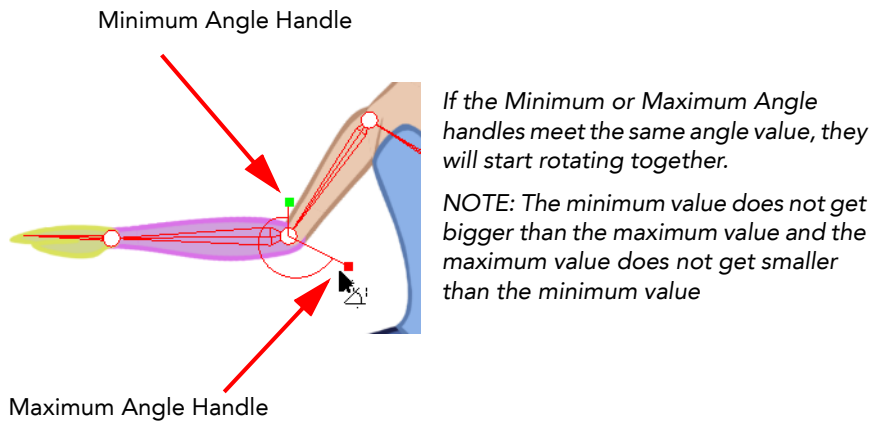
To set the minimum and maximum angles:


1. In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
2. In the Tool Properties view, make sure the Edit Min/Max Angle Mode  is enabled.
3. In the Camera view, hold down the [Ctrl] key (Windows/Linux) or [⌘] key (Mac OS X) and click on the piece to set the minimum and maximum angle for.



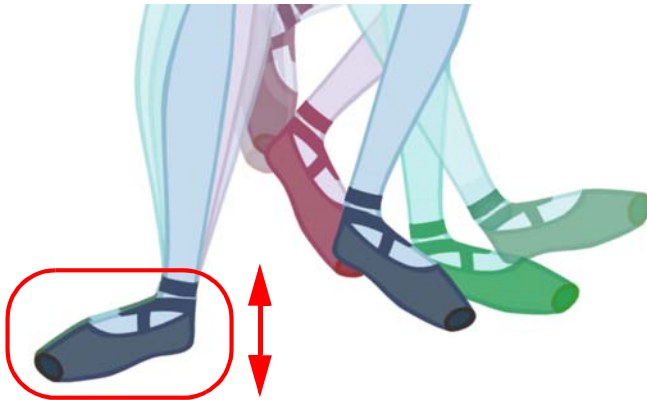
4. In the Tool Properties view, click on the Enable Min/Max Angle  option.

- In the Camera view, rotate the Minimum and Maximum handles to set the angle.



- Test your angles using the IK Manipulation Mode .
- For additional control over your Min/Max Angle go to **Edit > Preferences > Camera > Inverse Kinematics** (Windows/Linux) or **Stage > Preferences > Camera > Inverse Kinematics** (Mac OS X) and take a look at the Min/Max Angle Constraint Weight. Although the maximum value goes up to 1.0, in a production setting, the most practical value would be closer to 0.1. This value acts similar to the Stiffness setting in the Inverse Kinematics Properties panel. The greater the value, the more difficult it becomes to approach the minimum and maximum values.

IK Keyframes




When you animate a walking character and lock the feet down, the locked position will be perfect on the key poses. However, when you use the Motion keyframes to auto in-between the animation, you will notice a movement of feet. This motion is caused by the in-betweening of the rotations.

The nail holds in place the body part on the keyframe, but it will not hold it for the whole duration between keyframes.

If you place a nail on the shoulder to move just the arm, you do not necessarily want to keep the shoulder in the same place until the next key pose. You will probably want the shoulder, or any other part that is nailed, to have a slight, natural motion following the main body action. Of course, this is not the case when you fix a hand or a foot on the spot. If you have a fixed hand or foot, you will probably want it to stay exactly where you placed it. That is why you can apply an IK constraint on a frame range and on selected body parts.



To fix the part on the same spot requires an angle (rotation) correction on the parts that are moving too much. For example, to fix a foot that is moving too much, you will correct the angles on the foot, leg and thigh. To fix a hand, you will correct the angles on the hand, forearm and upper arm.

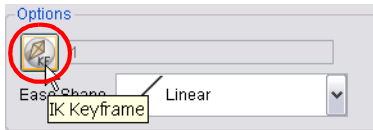
To apply IK constraints on a frame range:

- In the Tools toolbar, select the Inverse Kinematics  tool. The default keyboard shortcut is [Alt]+[8].
- In the Camera view, click on the part you want to apply the constraint to.

- In the Timeline View, set the cursor to the first frame where you want to start applying the constraint.



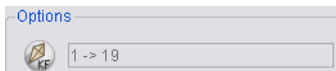
- In the Tool Properties view, enable the IK Constraints mode .
- In the Tool Properties view, click on the IK Keyframe  button to enter the first frame number.



- In the Timeline view, move the playhead to the last frame where you want to apply the constraint.





The IK Keyframe field should now look like this:

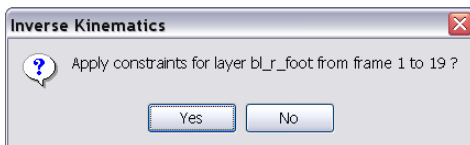


- In the Camera view, set a nail at the top of the limb you are correcting. In the case of a foot, set the nail on the thigh by holding down the [Shift] key and clicking in its pivot.



- In the Tool Properties, select the type of constraint you want to apply to your piece. The most common case is a combination of the regular nail  and Hold Orientation .
- In the Camera View, click on the bone of the part you want to apply a constraint to.

A warning message appears and requesting you to confirm that you want to add your constraint on that particular piece and for that frame duration.



- Click on the OK button.

Your constraint should now be applied

When to use the Inverse Kinematics Tool

This summarizes what you have read so far.

Harmony Stage provides different tools with which to animate cut-out characters and trajectories. The two main tools used to animate characters are the Transform and the Inverse Kinematics tools.

Here, we will compare the usage of these tools and explain the Inverse Kinematics philosophy.

- **The Transform Tool**

The Transform tool is also known as Forward Kinematics. This is the main tool to use for cut-out animation. The Transform tool rotates, scales, moves and skews all the elements selected as one global element. Forward Kinematics means that the element will be animated from the parent element down to the last child as a single piece. In other words, if the shoulder is animated, the arm, forearm and hand will follow as a complete arm drawing.

- **The Inverse Kinematics Tool**

The Inverse Kinematics tool (IK) is an assistance tool. This tool will help you to achieve complex motions such as sitting down or knee bending. The Inverse Kinematics tool will move and rotate every selected element as a chain.

Inverse Kinematics means that the element will be animated from the child element up to the parent element. In other words, if the hand is animated, the forearm, arm and shoulder will follow the hand in a fairly natural way in terms of the movement, rotation and bending.

Inverse Kinematics in Toon Boom Harmony

In most 3D animation software, Inverse Kinematics is implemented as a skeleton system. Harmony Stage uses the rigging hierarchy already created in the Timeline view, so there is no need to place bones in the character. Inverse Kinematics in Stage uses the connection between each of the parts' pivots.

IK Tool and Rigging

The IK tool can not be used on every type of cut-out character. It depends on the way the pieces and parts are attached to one another. In other words, it depends on the rigging type.

There are several ways to rig a puppet. These are the three main rigging techniques:

- The **Open Rig** technique is the simplest.
 - ⇒ There are no connections between the parts.
 - ⇒ They are free to move, rotate and scale independently one from the other.
 - ⇒ The Inverse Kinematics tool cannot be used on this type of rigging.
- The **Hierarchy Rig** technique is the most complex.
 - ⇒ All the parts are connected one to the other.
 - ⇒ As they move, rotate and scale, they will influence all the other parts.
 - ⇒ The Inverse Kinematics tool can be used on this type of rigging.
- The **Mix Rig** technique is the best of the Open and Hierarchy rig.
 - ⇒ Some parts are independent such as the torso.
 - ⇒ Some parts are setup into a hierarchy such as the arms and legs
 - ⇒ The Inverse Kinematics tool can be used on this type of rigging.

Animating with the Tools

Puppets are animated by using a combination of Transform and Inverse Kinematics tools.

You will mainly use the Transform tool (Forward Kinematics) as it has all the main motions; rotate, scale, skew, move and select. You can also control the exact position of the parts while using the Transform tool. As well, the Transform tool creates a temporary global pivot on the selection that can be moved around for the animation purpose.

To complete complex motions, such as bending the knees while keeping the feet on the ground, you will use Inverse Kinematics tool as an assistance tool. By adding IK Constraints (Nails), it is possible to lock the feet or any other parts on the spot and move the rest of the body, which will react to the constraints.

The Inverse Kinematics Philosophy

It is important to keep in mind that the Inverse Kinematics tool is an assistance tool. You won't use it to animate all the time.

Also, the Inverse Kinematics tool can be used to do the character's posing faster. Posing is a crucial part in the animation process. The IK tool can be used to pose the character more naturally, depending on your own preferences.

An IK Nail can be added anywhere on the character to animate only a small part of the hierarchy chain, such as an arm or a portion of the arm.

Tips and Tricks for Inverse Kinematics



Here are some tips and tricks to help you to use the Inverse Kinematics tool.

- **IK on Mix Rigging**

The Inverse Kinematics tool can be used on a full puppet's body even if it is connected as a mix rigging, meaning some parts are rigged in a hierarchy and others not. For example, you can add IK Nails on the puppet's feet, select the full body master peg and move the character as if it was connected in a full hierarchy rig. This technique works on most of the mix rigging.

- **IK Constraints**

It is important to remember that you can add and remove IK Constraints (Nails, Hold Orientation, etc.) at anytime during the animation. They hold a certain part on the spot while you animate the rest of the body. Because they are not constricting one part to another object, you can add or remove them without affecting any of the animation you have already done.

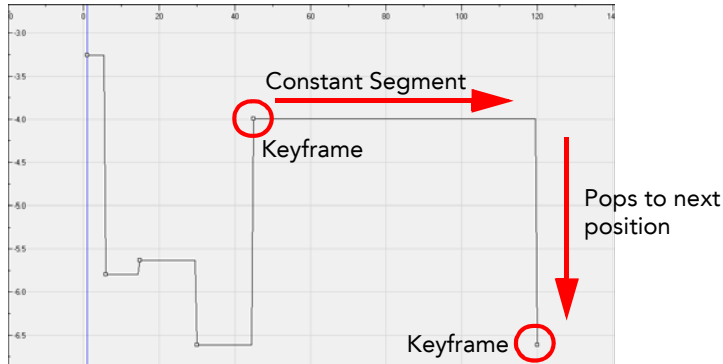
- **Useful Shortcuts**

- ⇒ While using the IK tool, you can hold down the [Ctrl] key to select any part.
- ⇒ You can hold down the [Alt] key to rotate the selected part without affecting the IK chain.
- ⇒ You can press the [Shift] key and click in a part's pivot to add or remove an IK Nail.
- ⇒ You can press the [Shift] key and click on a bone to add or remove and Hold Orientation constraint.

Animating in Stop-Motion

To start animating your character, start by doing your key poses. In fact, the major part of your time will be spent doing your key poses. It is better to work with Stop-Motion keyframes as Stage will not automatically create the interpolation between your keyframes.

When using Stop-Motion keyframes, also known as *Step* keyframes, the segment between two keyframes is constant. There is no animation generated by the computer between the poses. The drawing will remain in position until the next keyframe, then pops to its new position.

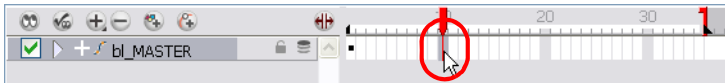


Creating a Stop-Motion Keyframe


You can create a Stop-Motion keyframe in several different ways. You can have Harmony Stage create it automatically, transform a Motion keyframe into a Stop-Motion keyframe, or even switch your preferences to get Stage to always create Stop-Motion keyframes by default.

To automatically create Stop-Motion keyframes:

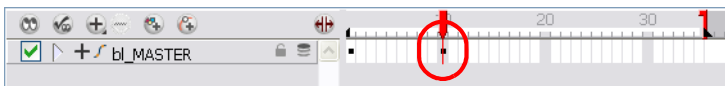
1. In the top menu, select **Animation > Stop-Motion Keyframe**. Make sure the option is enabled.
2. In the Timeline view, select the cell where you want to add a keyframe.



3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Add Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X). You can also click on the

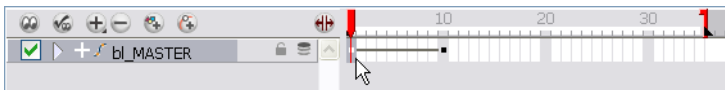
Add Keyframe  button available in the Timeline View toolbar.


- ▶ In the Camera view, if the Animate mode is enabled, as soon as you move the selected element, a keyframe is automatically created on the current frame.



To convert a Motion keyframe into a Stop-Motion keyframe:

1. In the Timeline view, select the Motion keyframes to convert into Stop-Motion keyframes.



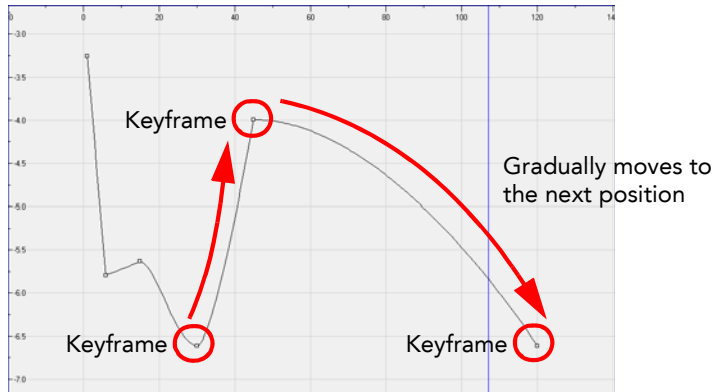
2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Set Stop-Motion Keyframes**. The default keyboard shortcut is [Ctrl]+[L] (Windows/Linux) or [⌘]+[L] (Mac OS X). You can also click on the Stop-Motion Keyframe  button available in the Timeline View toolbar.



Refer to [Creating Animation Paths > Stop-Motion and Motion Keyframes](#), on page 564 to learn more about Stop-Motion Keyframes.

Animating using Computer Generated Interpolation

After you have created the key poses you can animate the in-between poses yourself or let Harmony Stage do it using Motion keyframes. When you use Motion keyframes, your drawings will gradually move to the next position instead of staying on the spot until the next keyframe.



Creating a Motion Keyframe


You can create a Motion keyframe in several different ways. You can have Stage create it automatically, transform a Stop-Motion keyframe into a Motion keyframe and even switch your preferences to get Stage to always create Motion keyframes by default.

To automatically create Stop-Motion keyframes:

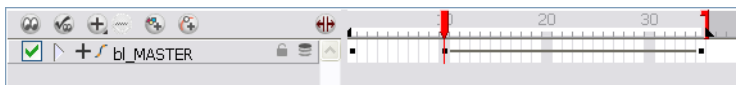
1. In the top menu, select **Animation > Stop-Motion Keyframe**. Make sure the option is disabled.
2. In the Timeline view, select the cell where you want to add a keyframe.



3. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Add Keyframe**. The default keyboard shortcut is [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X). You can also click on the

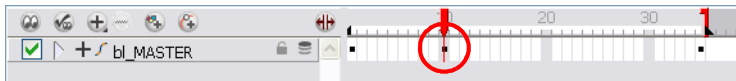
Add Keyframe  button available in the Timeline View toolbar.

- ▶ In the Camera view, if the Animate mode is enabled, as soon as you move the selected element, a keyframe will be automatically created on the current frame.




To convert a Stop-Motion keyframe into a Motion keyframe:

1. In the Timeline view, select the Stop-Motion keyframes to convert into Motion keyframes.



2. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Set Motion Keyframes**. The default keyboard shortcut is [Ctrl]+[K] (Windows/Linux) or [⌘]+[K] (Mac OS X). You can also click on the

Motion Keyframe  button available in the Timeline View toolbar



Refer to *Creating Animation Paths > Stop-Motion and Motion Keyframes*, on page 564 to learn more about Motion Keyframes.

Adjusting the Velocity




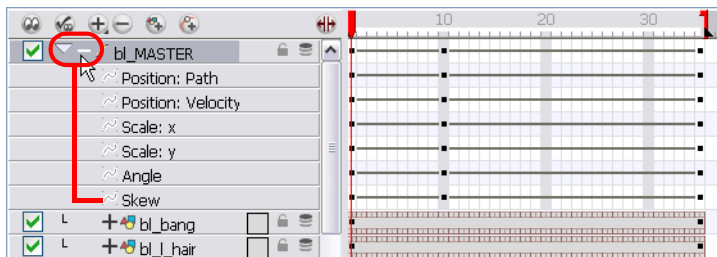
To add ease in and ease out on your motion paths, you can display the function curve and modify the Bezier or Ease curve. To apply an ease to multiple functions and keyframes, you can use the Set Ease For Multiple Parameters script and set the amount desired.

The Velocity, or ease, is used on motion keyframes. The Velocity has to be adjusted directly on the function curve in either the Function view or the Function editor. When a keyframe is selected, easing values appear in the right handle and left handle fields, as well as Bezier handle or Ease wheel controls on each selected keyframe. Pull on them to adjust the ease in and ease out, or type values in the fields.

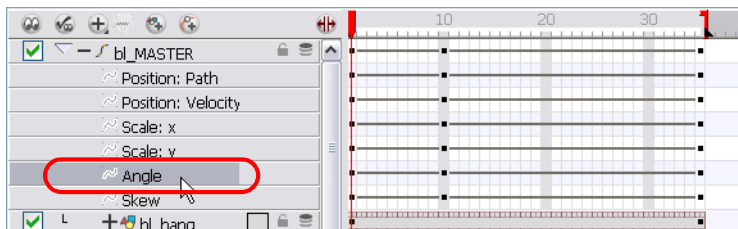
Adjusting the Velocity in the Function View

To adjust the velocity in the Function view:

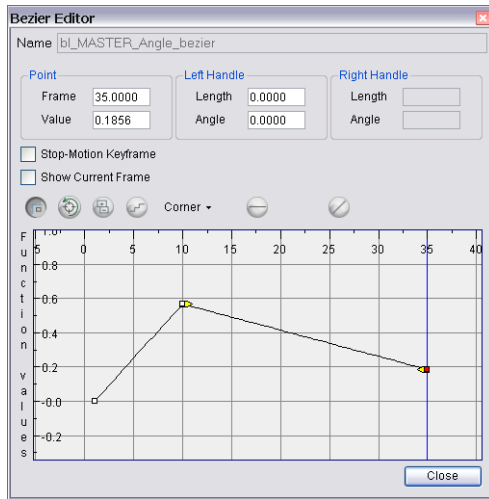
1. In the Timeline View, click on the Expand Function  button to display all of the layer's functions.



2. Double-click on the desired function.

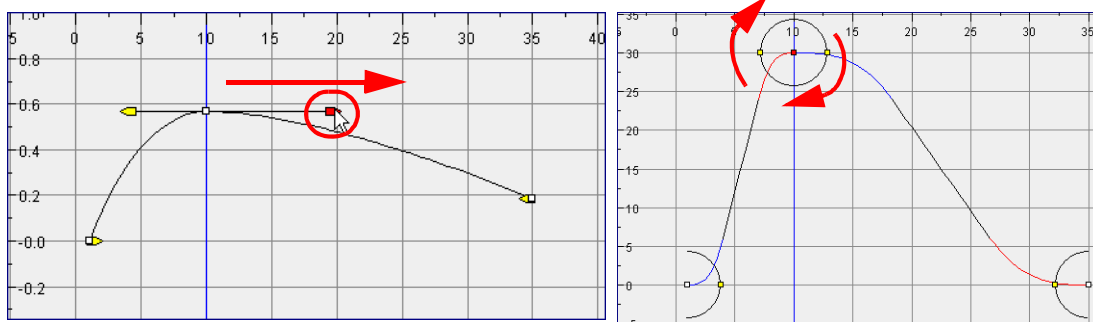


The **Function Editor** opens.



NOTE that the Function Editor will not be displayed if the function does not already exist.

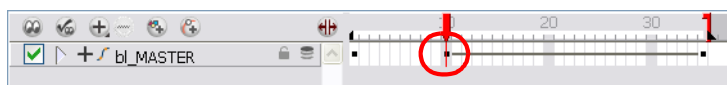
3. Select a keyframe and pull on its Bezier handles or Ease wheel to adjust the velocity.




Adjusting the Velocity using the Set Ease For Multiple Parameters Command

To set eases on multiple parameters:

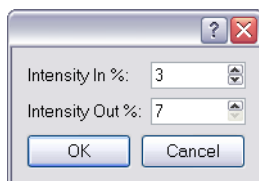
1. In the Timeline View, select a keyframe on one or many layers.



NOTE: Only the first selected keyframe is considered when using the Set Ease For Multiple Parameter script. If many keyframes are selected on a same layer, the ease values are only applied to the first one and the rest are ignored.

2. In the Scripting toolbar, click on the Set Ease For Multiple Parameters Script  button.

The **Set Eases** dialog box opens.



3. Set the ease-in and ease-out intensity. 1 corresponds to 10% and 10 corresponds to 100%.
4. Click on the OK button.

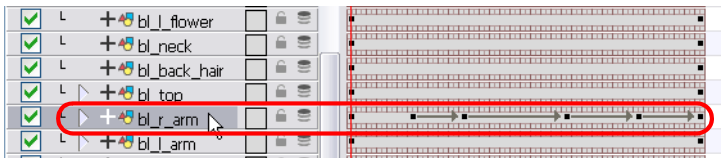
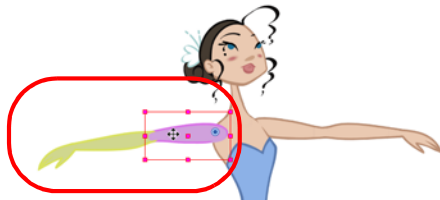
Flipping Through Poses



When animating, it is useful to flip through your poses to see the flow of your animation without going through each frame in your Timeline. Harmony Stage lets you flip between the selected element's keyframes.

To flip through your poses:

1. In the Camera or Timeline view, select the layer you want to see the poses for.



2. In the top menu, select **Animation > Go to Previous Keyframe** or **Go to Next Keyframe**. The default keyboard shortcuts are [PgUp] and [PgDown].


Using the Onion Skin in Cut-out Animation





When animating cut-out characters, it is useful to see the previous and next frames on the animation. However, it can sometimes be confusing to see the onion skin for every part of the character. The animator will often only want to see the onion skin on a single part or a few parts, such as the arm, that are currently being animated. Harmony Stage offers that possibility.

While animating in the Camera View, there are four different onion skin options:

- Add to Onion Skin, on page 643
- Remove from Onion Skin, on page 644
- Remove Unselected from Onion Skin, on page 644
- Add All to Onion Skin, on page 644
- Remove All from Onion Skin, on page 644

You can enable these options in the menu or manually in the Timeline view using the layer's Show Onion Skin  button. Unless you change the onion skin options when you display the onion skin, only the selected layers will be displayed in the onion skin preview.

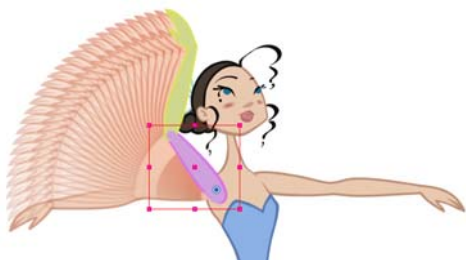
To use the onion skin options:

1. In the Tools toolbar, enable the Onion Skin  option. The default keyboard shortcut is [Ctrl]+[Alt]+[O] (Windows/Linux) or [⌘]+[Alt]+[O] (Mac OS X)
2. In the Tools toolbar, click on the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
3. In the Camera View, select one or many elements.



4. In the top menu, select **View > Onion Skin > Add to Onion Skin, Remove From Onion Skin, Remove Unselected from Onion Skin, Add All to Onion Skin** or **Remove All from Onion Skin**.

Add to Onion Skin



The Add to Onion Skin command is used to add a series of selected elements to the onion skin preview. The default keyboard shortcut is [Shift]+[S].

Remove from Onion Skin



The Remove From Onion Skin command is used to add a series of selected elements to the onion skin preview.

Remove Unselected from Onion Skin



The Remove All Others command is used to remove all elements except the ones selected from the onion skin preview.

Add All to Onion Skin



The Add All to Onion Skin command is used to add all of the scene's elements to the onion skin preview. The default keyboard shortcut is [Alt]+[Shift]+[O].

Remove All from Onion Skin





The Remove All Onion Skin command is used to remove all of the scene's elements from the onion skin preview. The default keyboard shortcut is [Ctrl]+[Shift]+[O] (Windows/Linux) or [⌘]+[Shift]+[O] (Mac OS X).

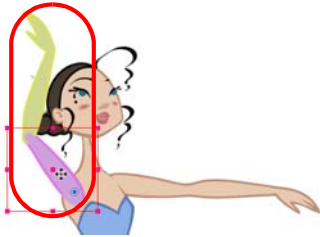
Flipping Parts



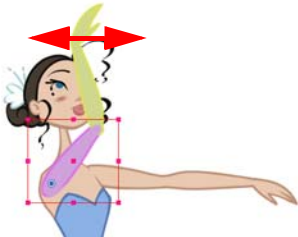
If you want to flip a part, a limb or a whole puppet, use the Transform tool and the **Flip Horizontal** and **Flip Vertical** options.

To flip a selection

1. In the Animation Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  is disabled.
3. In the Camera View, select the parts to be flipped.



4. In the Transform's Tool Properties view, click on the Flip Horizontal  or Flip Vertical  option. The default keyboard shortcut are [4] and [5].



*If the scaling parameter is not set to **Separate Scale**, the flip is not applied to the selection.*

Animating Using Symbols



You can use Symbols to animate your puppet. Symbols are boxes in which you can place whatever you feel like. You can use the Symbols to create reusable animations such as blinking.

A Symbol combines animation, artwork or layers into a single object that you can control in one layer. You can also create Symbols out of each body part in your cut-out puppets.

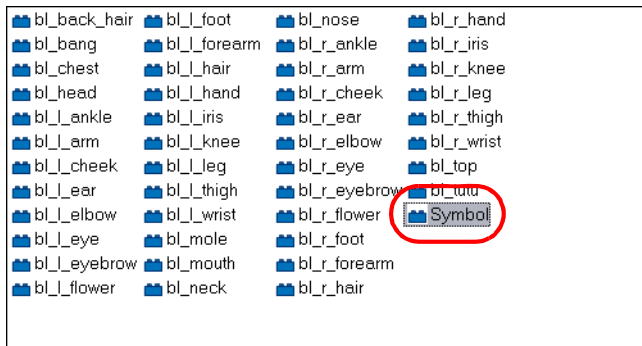
To do so, you can either duplicate an existing Symbol or create a new blank one in the Library. You can then drop the Symbol anywhere in your animation.

Creating a Blink Symbol

You can make an eye blink by creating a blink Symbol. Here is an example of a blinking animation created in a blink Symbol.

To create a blink Symbol:

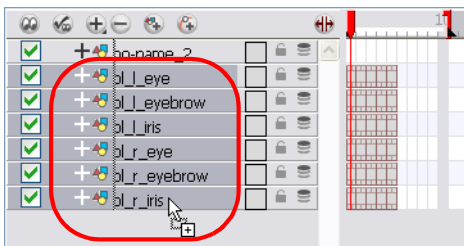
1. In the Library view's right side, right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) and select **New Symbol**.



The new Symbol appears in the Symbol library. Rename it **Blink**.




Harmony Stage then automatically enters the Symbol so you can edit it.

2. From the Library view, drag the eyes, pupils and eyebrows Symbols to the Timeline view's left side.



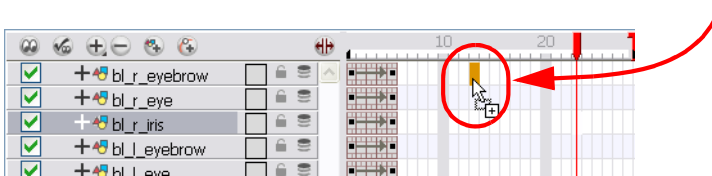
- In the Timeline and Camera view, animate the blink.



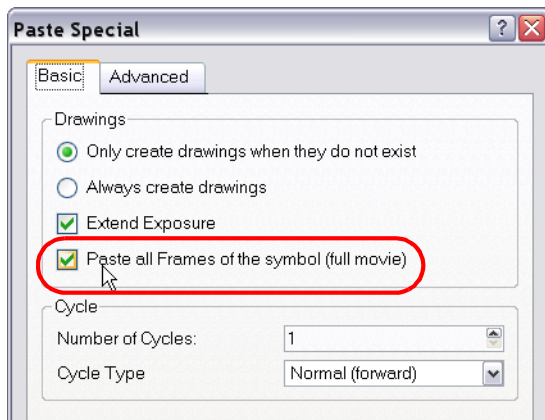
- ▶ If you enter the eyelid or eye Symbol to add more drawings, they will be added into each instance of that Symbol. If you modify the exposure of the eye Symbol within the Blink Symbol, it will not be modified in the other instances.
- In the top menu, select **File > Save**.
 - In the Camera view's top area, click on the Top  button to go back to the scene's timeline.
 - In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
 - In the Transform Tool Properties view, make sure that the Peg Selection Mode  option is disabled.
 - If your Head is a Symbol containing all the facial feature Symbols in the Camera view, double-click on the Head's Symbol to edit it.



- From the Library view, drag the new Blink Symbol and drop it into one of the eye feature layers. Before dropping the Symbol in the Timeline, hold down the [Alt] key (Windows/Linux) or [⌘] key (Mac OS X).
- Drop it into a series of blank frames. Do not drop it where there already is an exposure.

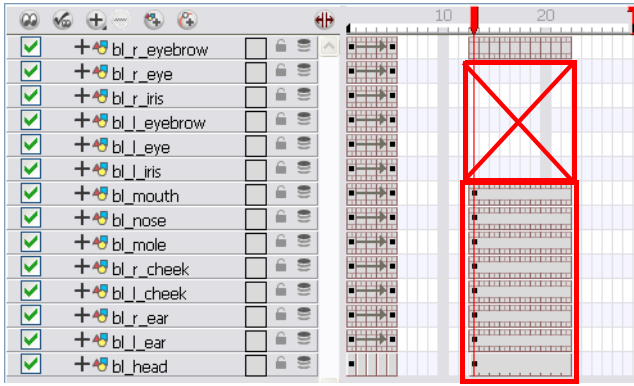



The Paste Special dialog box opens.

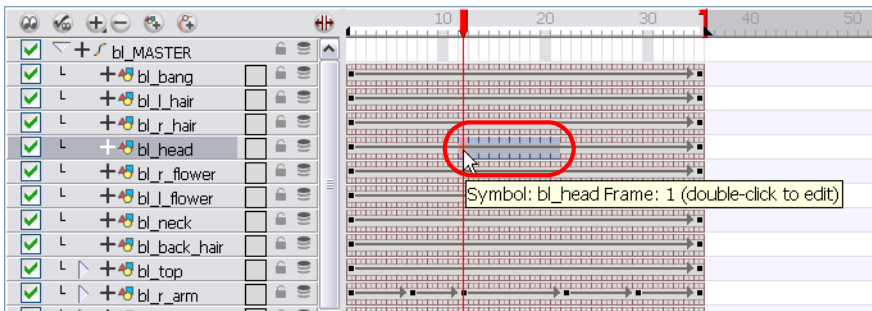


- In the Paste Special dialog box, enable the Paste All Frames of the Symbol (full movie) option.
- Click on the OK button.

13. In the Timeline view, expose the other facial features and head drawings.

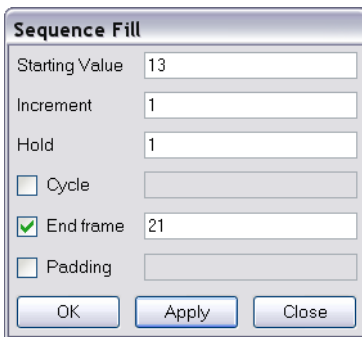


14. If you are editing the Head Symbol and not dropping the new Symbol into the main timeline, click on the Top  button to go back to the root timeline.
15. To expose the blink frames you just inserted inside the Head Symbol, in the Timeline view, select the Head layer's cell range where you want to expose the blink.



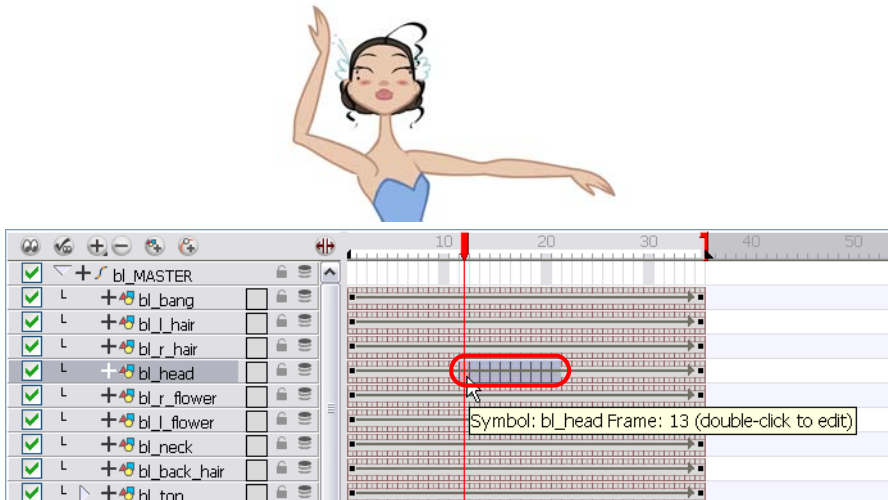
16. In the Top menu, select **Animation > Cell > Sequence Fill**. The default keyboard shortcut is [Ctrl]+[M] (Windows/Linux) or [⌘]+[M] (Mac OS X).

The **Sequence Fill** dialog box opens.



17. In the Starting Value field, type the fist frame number where you exposed your blink inside the Head Symbol.
18. In the Hold field and Increment field, type "1".
19. If necessary, type the frame number on which you want the system to stop exposing the Symbol.

20. Click on the OK button.



You can create walk cycle animation Symbols or Head turn animation Symbols and drop them directly into your main timeline in any drawing layer.

Importing a Template with Symbols

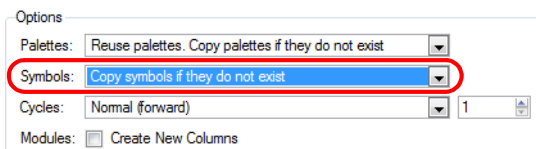
Sometimes a character's rig is not a cut and dry matter. Rigs, which are usually saved as templates, can contain Symbols, such as a leg that was made with a patch. However, a Symbol does not work in the same way as an Action template; when brought into the right side of the Timeline layer to a Symbol of the exact same structure, instead of adding itself on to the previous Symbol, the new Symbol becomes a copy.

To take more control of how the Action template will behave when brought into the Timeline, bring it in using a Paste Special.

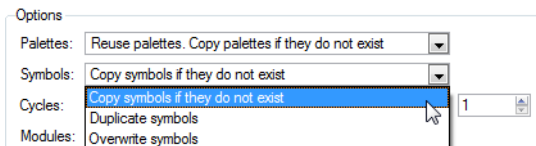
To import a template with Symbols:

1. Select the Action template containing Symbols from the right side of the Library.
2. As you drag it from the Library to the right side of the Timeline to drop it next to a template with the exact same rig, hold down the [Alt] button (Windows/Linux) or the [Ctrl] button (Mac).

The Paste Special window appears. Note that the window looks identical to the regular Paste Special window, except for the Symbol drop-down menu in the Options section.



3. Select one of the following options from the Symbols drop-down menu:



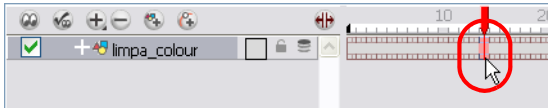
- ▶ **Copy symbols if they do not exist:** This is the default setting for this operation and will prevent symbols in a Action template from being copied.
- ▶ **Duplicate symbols:** Select this option if you wish to make copies of the Symbols in your template.
- ▶ **Overwrite symbols:** If for some reason, a modification was made to a Symbol in the Action template that does not exist in the basic rig template for a character, select this option to overwrite the previous symbol.

Duplicating a Symbol

You must duplicate a Symbol if you want to modify a copy of it without altering the original Symbol and the other copies.

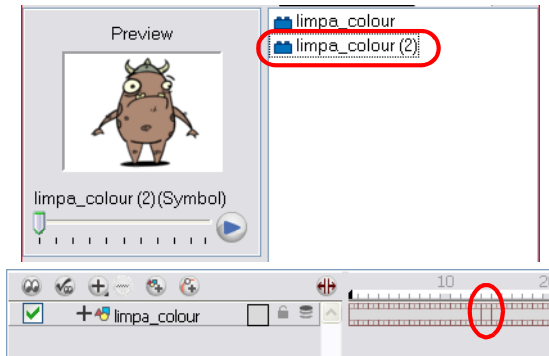
To duplicate a Symbol:

1. In the Timeline view, go to the frame where you want to duplicate the Symbol.
2. Select the Symbol's cell.



3. In the top menu, select **Edit > Duplicate Selected Symbol**.

In the Library view, the Symbol is duplicated and in the Timeline view, the current cell is replaced with the new Symbol. You can now modify the Symbol's content.



If other Symbols are nested inside the new Symbol, those ones are not duplicated. If you modify them the original and other instances will also be modified

If you created an animation inside the duplicated Symbol, you can expose it using the Fill Sequence command as shown previously in the new Symbol creation process.

Reusing Extra Drawings, Poses and Facial Expressions



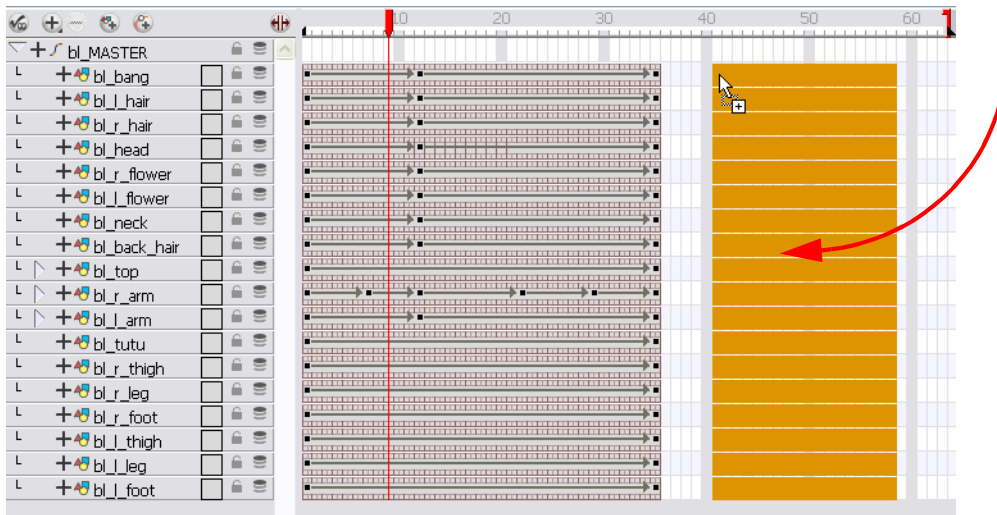
Reusing animation and assets is an important aspect of cut-out animation. This is why Harmony Stage offers a library to store all of the reusable information. At some point, the animator will not want to animate the same action twice, such as a walk-cycle or jump. The animator will store the initial animation in the Library view where it can be selected and dragged into a new scene as needed. The animator can import the template to the Timeline View.



Refer to *Libraries, Symbols and Templates > Templates*, on page 363 to learn more about creating and importing templates.

The animator can import a master template into his Timeline view and start animating with it, and later on, he can import an action template. The animator will import it to the Timeline view's right window where all the keyframes are located.

To insert a template into another one, the layer ordering has to be the same. If it is inconsistent, the system will indicate that they cannot be combined; the animator can then bring the action to the Timeline's left window to create a new set of layers or convert the action template into a Symbol and drop it into any layer.



The animator or the library manager can create action templates of a single keyframe of the different angles (front, three-quarter or side view). Then the animator can import and insert those action templates into the animation and the character will turn immediately. The same pattern can be created for a head, an arm, the full upper body, etc.



If the master template you are importing was created in the Network view, make sure to import it first and to drop it into either the Network view or the left side of the Timeline view. If you don't do this you may break some network connections.



Refer to *Importing Network Templates* section to learn how to import your templates created in the *Network* view without breaking the network connections.

If you created templates for different body parts you can reuse them in your scene by dragging them inside your Symbols. You can also open a template as a folder and select a particular drawing from it and drag it in your drawing layer.

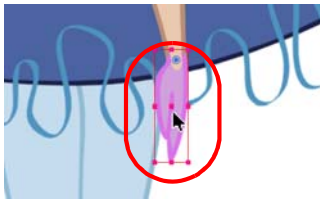
When you import new extra drawings such as hands and mouths, you will want to use the pivot that was set on your drawings and copies them to the Symbol's cells. You will do that using the Copy Pivot to Parent Symbol command.

NOTE:

When you copy your pivots to the parent Symbol, there is no link between the drawings' pivots and the Symbol's ones. It is simply a copying operation. If you modify the drawing pivot later, it will not be copied to the Symbol. You would need to do the operation again. If you need to modify the Symbol's pivots, do it directly on the Symbol's cells.

To import extra drawings and insert them into Symbols:

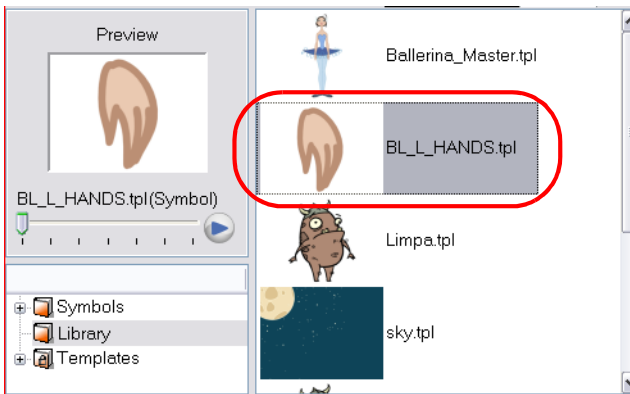
1. In the Camera or Timeline view, double-click on the Symbol you want to add new drawings in.



2. In the Symbol's timeline, extend the length if necessary.



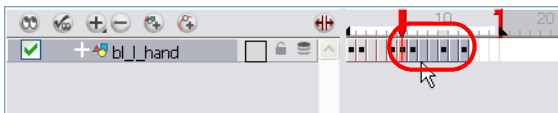
3. In the Library view, browse to the template containing the new drawings to import in your Symbol.





4. From the Library view, drag the select template and drop it into the Timeline view's right side into the corresponding layer.



5. In the Tools toolbar, select the Pivot tool.
6. In the Timeline view, select the new drawings you just imported.



7. In the Tool Properties view, click on the Copy Pivot to Parent Symbol  button.
- ▶ If the pivots were not set on your drawings, use the Pivot  tool to set them before performing the copy operation.



Refer to the following topics in the Libraries, Symbols and Templates chapter to learn more about importing templates and opening templates as folders:

- Importing a Template, on page 366
- Opening a Template as a Folder, on page 369

Swapping Images



Cut-out animation is not only about moving parts around, it's also about swapping drawings to give the animation a more traditional animation look.




You can add as many new drawings as you want in your character parts Symbols and use them in your current animation. You can also add new drawings directly in your scene or import them from the library.

You do not need to remember the frame on which you drew or imported the drawings as you will be able to see them in the Drawing Substitution's interface.

You cannot swap a Symbol for another one, only the Symbol's frames or layer's drawings.

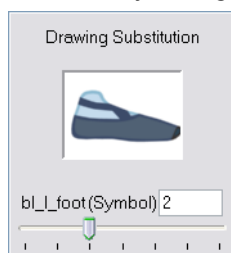
You can swap images in the Timeline or Library view. When you use the Drawing Substitution window in the Library view, you are not selecting drawings from the Library but from drawings contained in your scene's layers.

To swap images in the Library view:

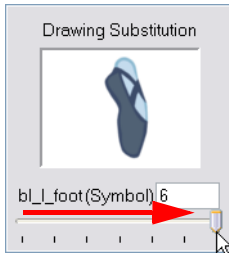
1. In the Camera view, with the Transform  tool.
2. In the Transform Tool Properties view, make sure that the Peg Selection Mode  option is disabled.
3. In the Camera view, select the part you want to swap using the Transform  tool.



4. In the Library view, go to the Drawing Substitution panel.




5. Move the substitution slider to the right or left to scroll through the Symbol's frames or drawings. You can also use the keyboard shortcuts [] and []. In the top menu you can also select **Animation > Substitute Drawing Previous** or **Substitute Drawing Next**.

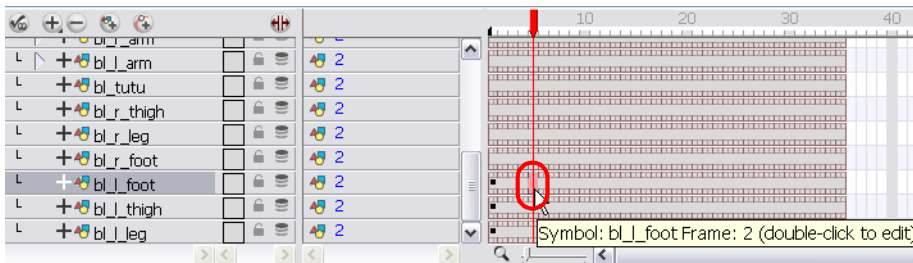


The drawing or Symbol's cell on the current frame is replaced by the selected one.

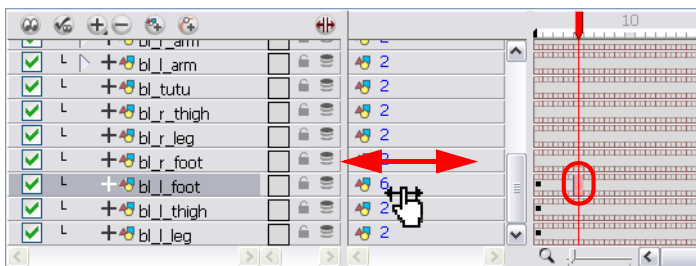


To swap images in the Timeline view:

1. In the Timeline view, click on the Show Data View  button to expand the Data view.
2. In the Timeline view's right side, select the cell containing the drawing or Symbol's cell to swap.



3. In the Data view, drag the pointer left or right to change the cell or drawing exposed for another one. You can also directly type the drawing name or Symbol's cell number if you know it.



Adding a New Drawing

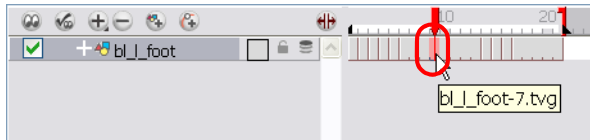
If you need to add a new drawing in your scene, you can either do it inside the body part's Symbol or, if you do not use Symbols, directly on the part's layer by duplicating the existing drawing on the current frame.

Duplicating a Drawing

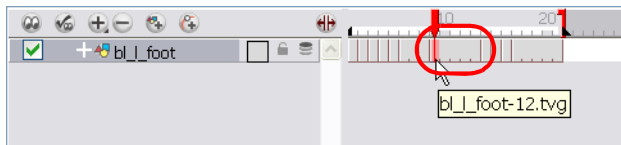
If your character does not use Symbols, you need to duplicate the drawing on the cell where you need to use a new drawing. You could also create a new blank drawing, but duplicating the existing drawing allows you to keep the pivot you previously set and you can also reuse a portion of the existing artwork. When you create a new drawing, you get a blank cell with a pivot set at the centre of the Camera view.

To duplicate a drawing:

1. In the Timeline or Camera view, select the drawing to duplicate.



2. In the top menu, select **Drawing > Duplicate Drawing**. The default keyboard shortcut is [Alt]+[Shift]+[D]. The new drawing appears in the currently selected cell.

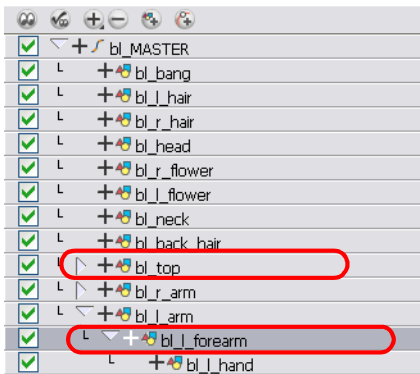


3. In the Camera view, draw the new piece.

Ordering Layers Over Time





The layer ordering provided in Harmony Stage saves time and simplifies the work. There is no need to create a new layer or to copy and paste artwork in other layers to change the order. The Z-axis (forward - backward) allows the user to create a multiplane and move elements closer or farther from the camera. This allows the puppet's pieces to be moved in front or behind the other ones without physically changing the layer position.

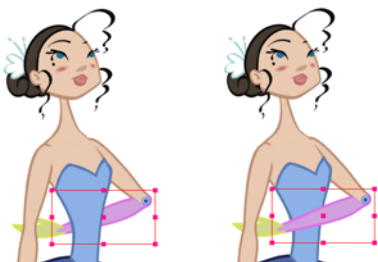


Stage allows the animator to use a shortcut and move the piece with a micro nudge on the Z-axis. The program creates a keyframe that can be moved at any time without having to change any drawing exposition or break any layer.

This means that the layer ordering is maintained throughout the whole scene. The animator is able to combine animation assets and the system can interpolate them.

To nudge elements on the Z-axis:

1. In the Tools toolbar, select the Transform  tool. The default keyboard shortcut is [Alt]+[Q].
2. In the Tools toolbar, enable the Animate  Mode.
3. In the Camera View, click on the part to be repositioned and hold down the [Alt] key. Using the [Up] or [Down] arrow keys, nudge the part until it moves to the desired position.

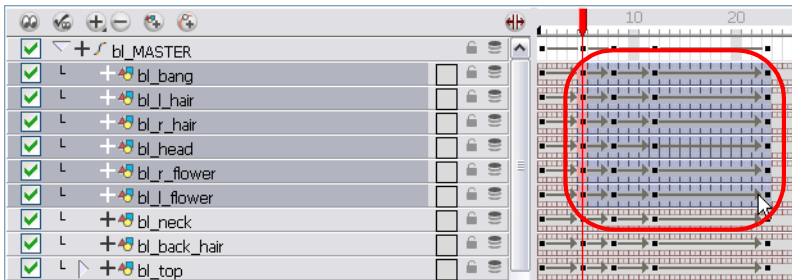


Creating Cycles

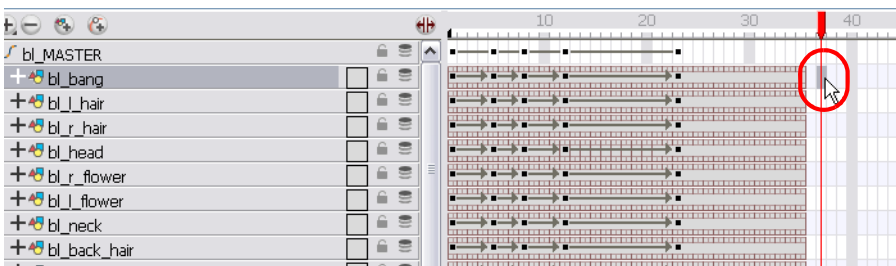
If you want to cycle a portion of your animation, you can use the Paste Cycle command. You can also use the Paste Reverse command to completely reverse the flow of your animation.

To use the Paste Cycle command:

1. In the Xsheet or Timeline view, select the cell range and keyframes to loop.

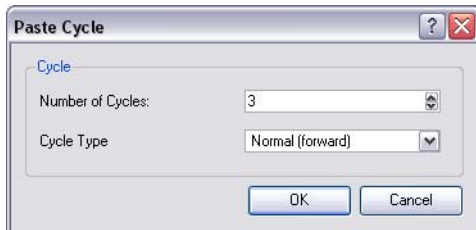


2. In the top menu, select **Edit > Copy**.
3. In the Xsheet or Timeline view, select the cell where you want your cycles to start.

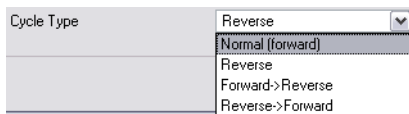


4. In the top menu, select **Edit > Paste Cycle**. The default keyboard shortcut is [Ctrl]+[/] (Windows/Linux) or [⌘]+[/] (Mac OS X).

The **Paste Cycle** dialog box opens.

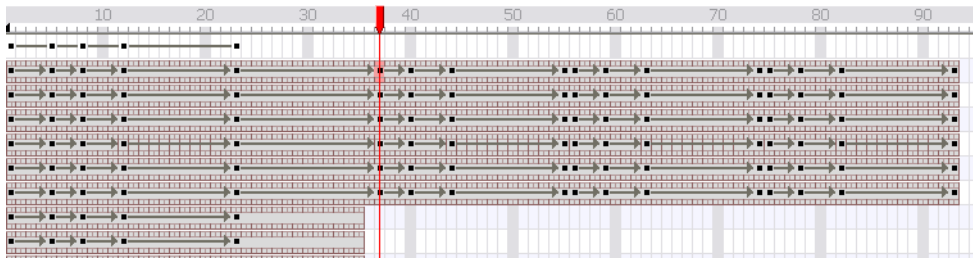


5. In the Number of Cycles field, use the up or down arrows to increase or decrease the number of cycles you want to paste. You can also type the value directly.
6. In the Cycle Type drop-down menu, select the type of cycle you want to paste.



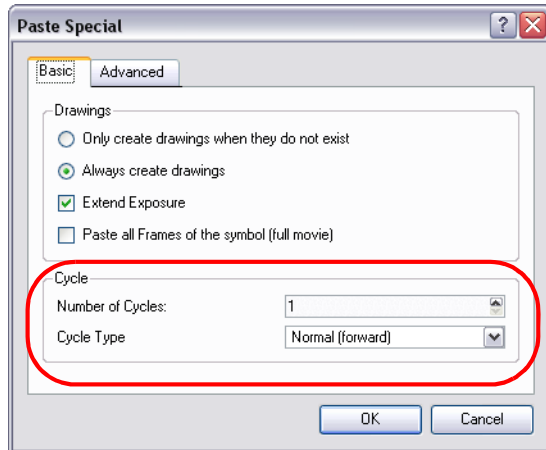
- ▶ **Normal (forward):** Pastes your selection as it is, starting with the first cell and ending with the last one.
- ▶ **Reverse:** Pastes your selection reversed, beginning with the last cell and ending with the first one.
- ▶ **Forward -> Reverse:** Pastes your selection as a yo-yo, starting with the first cell, going to the last one and ending with the first cell.
- ▶ **Reverse -> Forward:** Pastes your selection as a reversed yo-yo, starting with the last cell, going to the first one and ending with the last cell.

- Click on the OK button to paste your cycles.



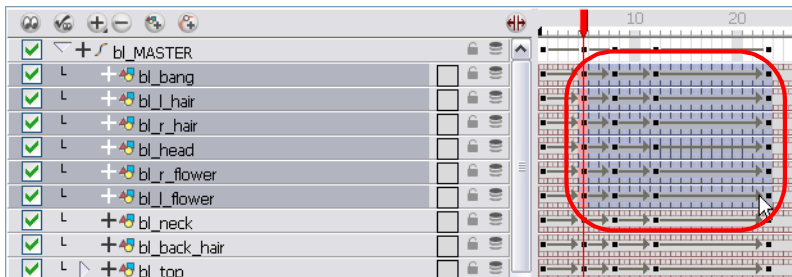
NOTE:

You can do the same operation using the Paste Special dialog box. To open the Paste Special dialog box, select **Edit > Paste Special**.

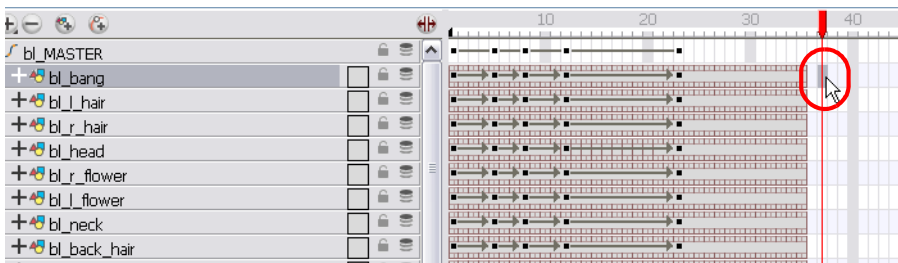


To use the Paste Reverse command:

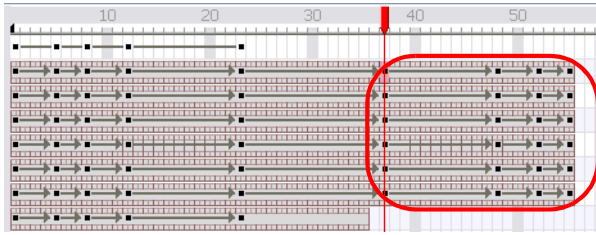
- In the Xsheet or Timeline view, select the cell range and keyframes to paste inverted.



- In the top menu, select **Edit > Copy**.
- In the Xsheet or Timeline view, select the cell where you want your cycles to start.



4. In the top menu, select **Edit > Paste Reverse**. The default keyboard shortcut is [Ctrl]+[?] (Windows/Linux) or [⌘]+[?] (Mac OS X).



Adding Pegs

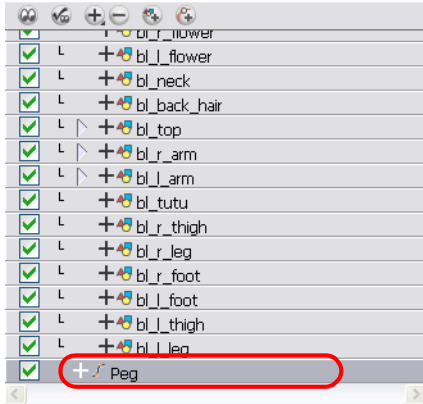
Now that you have your puppet on your stage, you probably need to resize and reposition it to fit your scene. When you need to scale down or move your character it's a good idea to hook (attach) the whole puppet to a trajectory.

In Harmony Stage, there is a type of layer you can add to your timeline allowing you to create a motion path or reposition drawings. This trajectory layer is called a Peg. Any drawing or layer you hook to a peg will follow the defined motion path, rotation, scaling and skewing information.

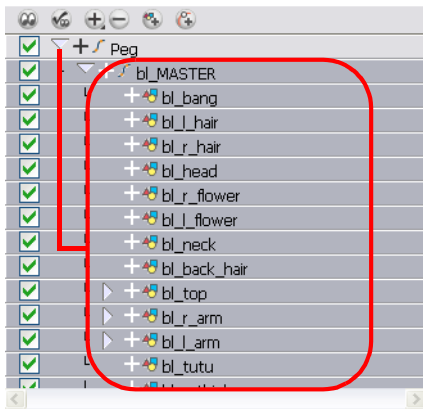
Attaching your puppet to a peg will allow you to scale it and reposition it without having to do it on all of your different parts and pieces. Only one layer will contain the position information, this makes your animation easier to modify and control.

To add a repositioning peg:

1. In the Timeline view, click on the Add Peg  button.



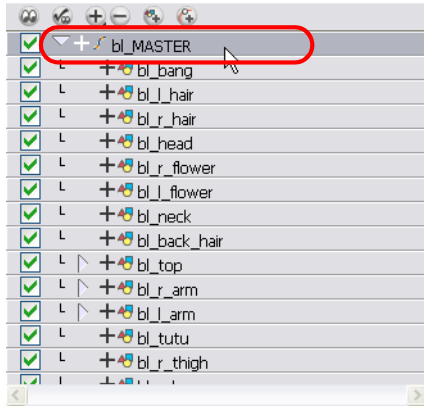
2. In the Timeline view, select all of the layers you want to attach to your new peg.
3. Drag your selection right on the peg layer to parent all your character's pieces to the peg.





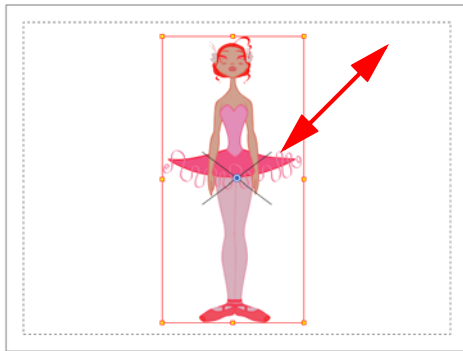
Next, you need to position your character on the stage by moving it and scaling it to the correct size. You will not scale each layer individually. You either want to do it on the top symbol or top peg layer.

To reposition the character:

1. In the Timeline view, select the top peg layer (master peg).



2. In the Tools toolbar, select the Transform  tool and disable the Animate  mode.
3. In the Camera view, position the character.

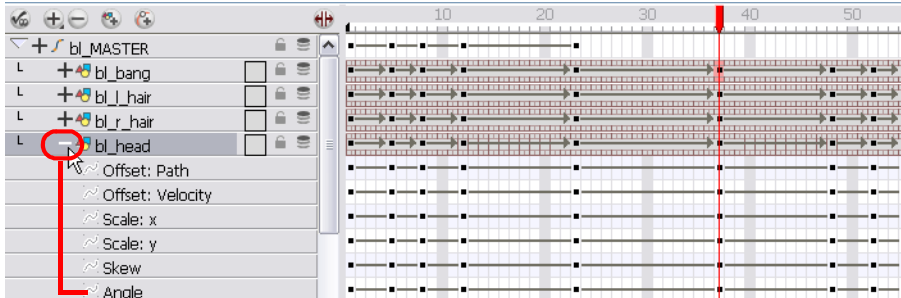


Offsetting Part of an Animation

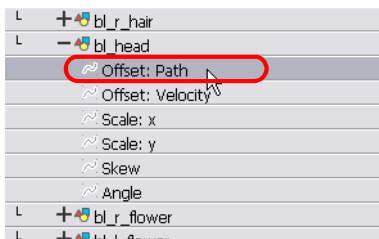
If there is a section of your animation you want to reposition such as the head's height or the puppet's position, you can do it using the function curve.

To reposition a portion of an animation:

1. In the Timeline view, click on the Expand Function **+** button of the body part layer to reposition. If you want to reposition the entire body, expand the master peg's parameters.

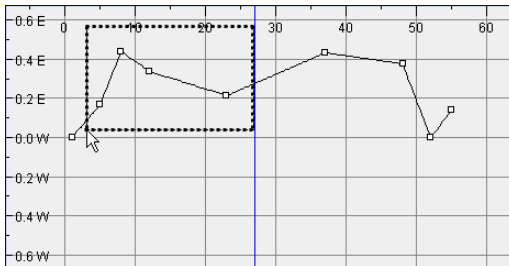


2. Double-click on the layer's parameter controlling the keyframes you want to reposition.

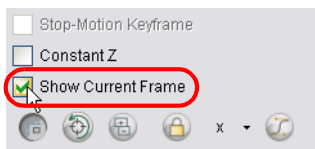


The **Function editor** opens.

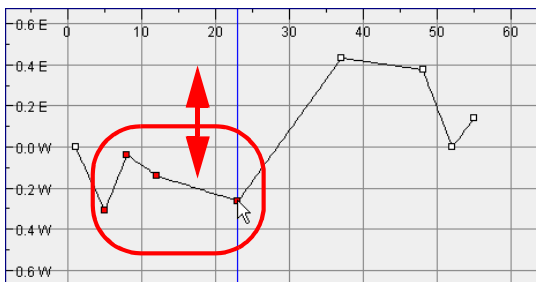
3. In the Function editor, select the keyframes you want to reposition by tracing a selection box.



4. Enable the Show Current Frame option view the transformation results in the Camera view as you do them.



5. Drag the keyframes selection up or down to reposition your sequence.



6. Close the Function editor.

Preferences

When looking for additional control over your Min/Max Angle when using Inverse Kinematics, you can find some help in the preference panel.

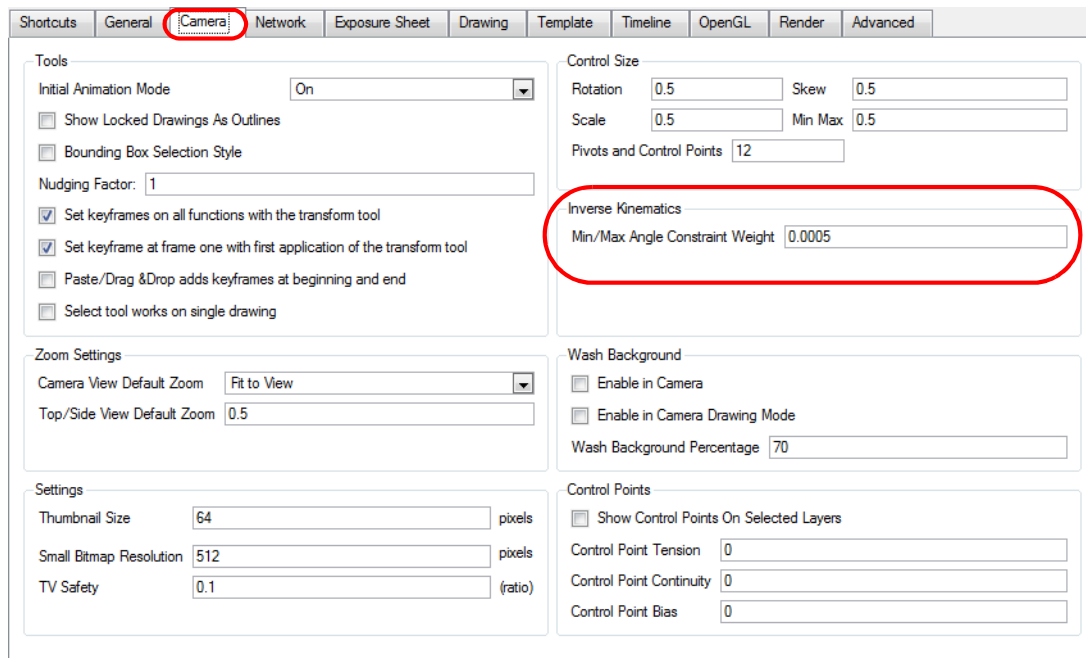
You will find the preferences listed under the following tab:

- Camera


To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

Camera



Inverse Kinematics

- **Min/Max Angle Constraint Weight:** This value acts similar to the Stiffness setting in the Inverse Kinematics Properties panel. This preference only affects the minimum and maximum angle values set using the Min/Max Angle Mode . The greater the value is, the stronger your need to move the body part to approach the minimum and maximum values set. Although the maximum value goes up to 1.0, in a production setting, the most practical value to use would be closer to 0.1.

Chapter 16

Enhancing With Effects



Once your animation is completed, you can add effects such as blurs and glows to make your project look even better! Harmony Stage provides you with a series of essential effects that you can add to your layers.

In this chapter, you will learn the following:

- Adding Effects, on page 666
- Animating an Effect Over Time, on page 673
- How Does An Effect Module Work?, on page 675
- Previewing and Playing Back Effects, on page 738
- Extra Commands, on page 739
- Preferences, on page 740

Adding Effects

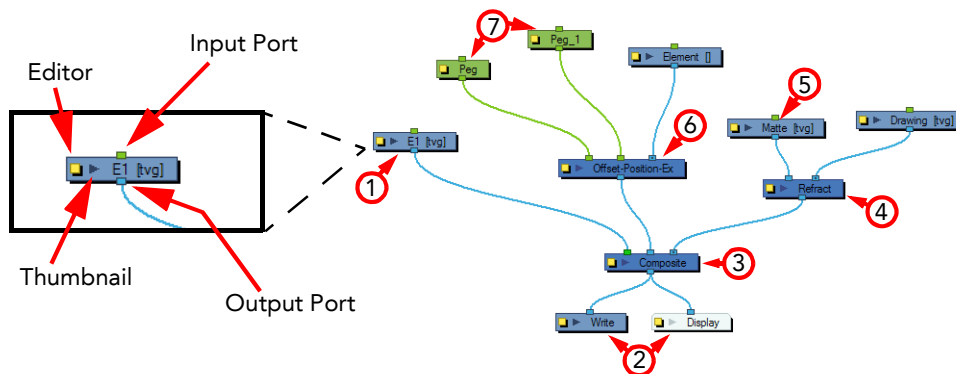
In Harmony Stage, to add an effect to your Timeline view (with the exception of a Colour Card or a Quadmap), you will have to use the Network view. It is as easy as adding an effect module to your network from the Module Library, connecting the associated drawing elements and adjusting the parameters of the effect to your taste.

This topic is divided as follows:

- About the Network View, on page 666
- About the Module Library, on page 668
- Importing a Module, on page 670
- Adding Effects through the Timeline, on page 670

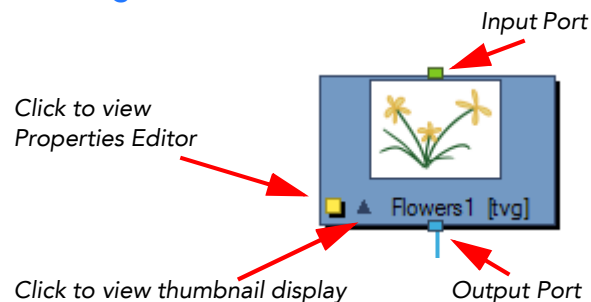
About the Network View

In the Network view, you can connect effects and compositing modules to form a network. The organization of modules determines the flow of data during the compositing process and how your animation elements will be composited.

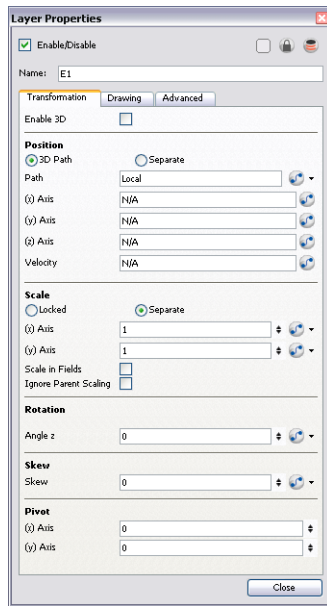


1. Drawing Module, on page 666
2. Write and Display Modules, on page 667
3. Composite Module, on page 667
4. Effect Module, on page 667
5. Matte Drawing, on page 667
6. Position Ports, on page 667
7. Peg Module, on page 668

Drawing Module



This is an example of an average module, in this case a simple drawing module that represents a layer in the Timeline view. This module has an **Input Port** (top) that allows information to flow through it. It has an **Output Port** (bottom) that exports its information in a downward flow. On the left side, there is a yellow box that brings up the module's **Properties Editor**, where all its available parameters can be adjusted. Lastly, there is a dark arrow that displays a **Thumbnail** of what the module contains.



Write and Display Modules

In this instance, both the Write and Display modules do not have output ports. This is because the information that flows into them can go no further in the network.

Composite Module

The Composite module combines multiple source images (Drawing modules), including all transformations and effects, into a single bitmap or vector image for each frame.

The Composite module layers the images based on the composition order rule. First, the Z-value of the elements are analyzed to determine depth. When multiple elements have the same Z-value, the Depth values in the Drawing modules are consulted. If the Depth values are also the same between elements, the composition order is determined by the cable order of modules on the Composite module. By default, modules connected to the right are rendered below those connected to the left. You can override this default in the Composite module editor. The Composite module is an example of a module that can have an infinite number of **Input Ports** that can take-in multiple, individual sources of information. The left most **Input Port** on the Composite module is always green. This lets the user know that, in terms of stacking order, whatever is plugged into this port will appear on top of the composite after the z-depth is taken into account.

Effect Module

An Effect module can often be found with two **Input Ports**. The right-most Input Port is for the drawing layer that is to be acted upon by this effect, while the left port is usually reserved for a matte. If an effect has a Matte port, it is required and not to be considered optional.

Matte Drawing

A matte, also called mask, is the shape that will be used by the effect module to modify the original image. The effect will only be applied where the matte overlaps with the original image. Sometimes the matte will act as a negative shape that the effect will exclude. This all depends on the nature and editing properties of the effect in question.

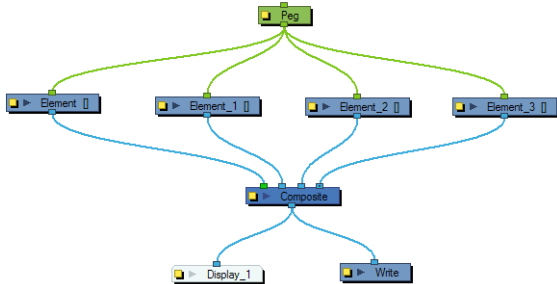
Position Ports

Some Effects contain three **Input Ports**. If the Input Ports are green, then they require a Peg module. In this case, the Effect can accommodate two pegs.

Peg Module

The Peg modules control the transformation of elements (position, scale, skewing and rotation) over time. The green ports at the top and bottom of the module indicate that it accepts position information and can then pass this information on.

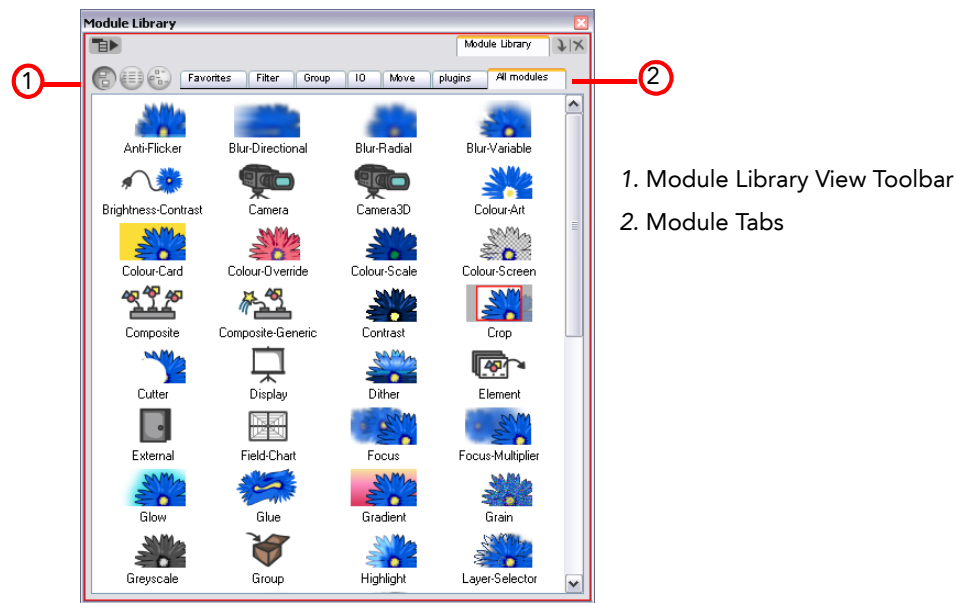
One Peg can be used to control many different module or one module can accept more than one Peg. In a situation like the latter, one Peg might be used to modify the rotation, while the other used to modify the position of the effect and then animated differently over time.



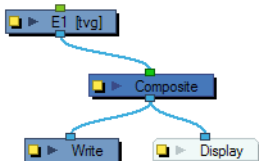
Refer to *Creating Animation Paths > Pegs*, on page 555 for further information about Pegs.

About the Module Library

If you need to add new modules to the Network view, you will need to get them from the Module Library.






When you create a new project in Harmony Stage, the default network that appears in the Network view looks similar to the diagram below.



Module Library View Toolbar

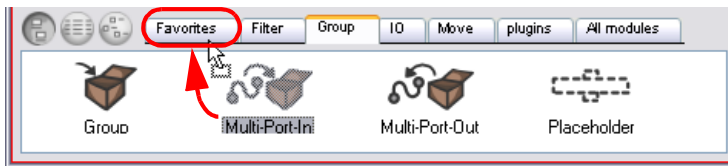
In the Module Library View toolbar, you can switch the display mode of the effect icons:

-  View as Icons
-  View as List
-  View as Icons with Names

Module Tabs

The Module Library is conveniently broken up into several sections or tabs:

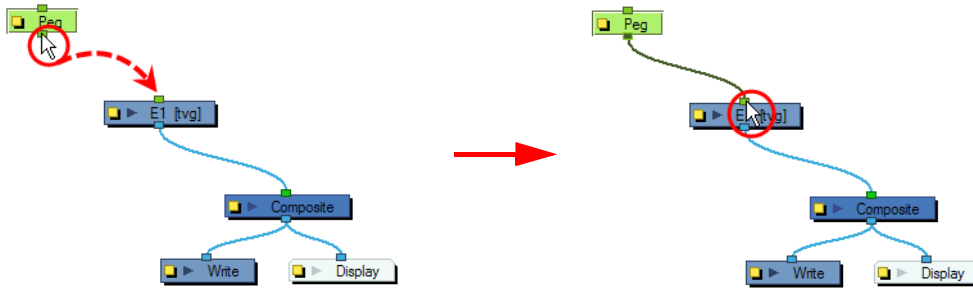
- **Favorites**
Includes the most common modules.
⇒ To add extra modules to the Favorites tab, select any module from any other section and drag it onto the Favorites tab.



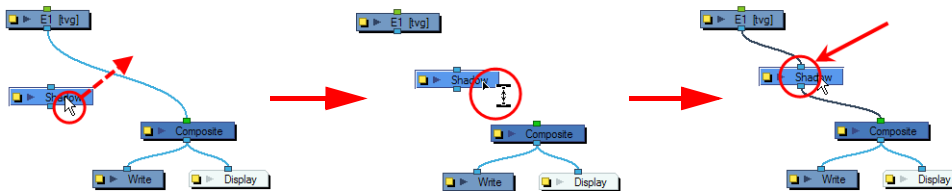
- **Filter**
Includes effect modules, such as blurs.
- **Group**
Includes modules used for grouping, like Group Modules and Port-Image-In and -Out Modules.
- **IO**
Includes Display, Drawing, Write and Note modules.
- **Move**
Includes modules used to change elements over time, like Peg modules, as well as certain transformations.
- **Plug-ins**
Includes plug-in modules.
- **All modules**
Lists all of the modules available.

Importing a Module

To bring a module into your Network view, just drag it from the Module Library and drop it into the Network view. Once in the Network view, you can click on either the Input Port or Output Port of a module and drag out a cable. You can then connect this cable to either the Output Port or Input Port of another module.



If you would like to connect a module between two connected modules, you can use the [Alt] key as you drag the new module over the existing cable connection. Using the same [Alt] key, you can also disconnect a module.



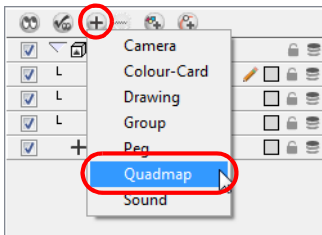
If you want to remove a module you can click on it to select it and press [Delete] to remove it from the Network view.

Adding Effects through the Timeline

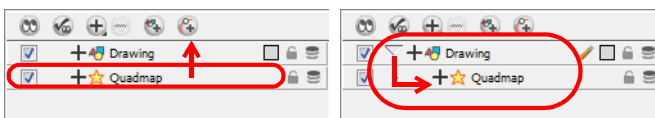
Although all Effects should be added through the Network view, there are two effects that can be quickly added through the Timeline view. These effects: Colour Card and Quadmap, can also be added through the Network view in the usual manner. In addition, there is a special way of grouping elements that can only be done through the Timeline view.

To add effects in the Timeline view:

1. In the Timeline view, click on the Add Layers  button and from the Layers drop-down menu select the desired effect that you would like to add.

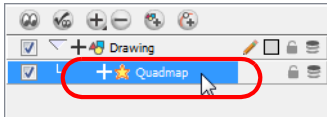


2. The effect appears in the Timeline view.
3. Drag the drawing layer to place the effect onto the new effect layer and parent them.

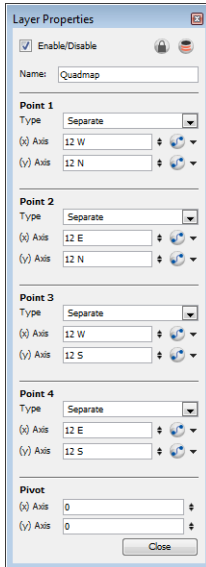


4. In the Camera view, click on the Render View Mode  button to see the result of rendering the scene's current frame and the effect.

- In the Timeline view, click on the effect layer.



- Open the Layer Properties view.
- In the Layer Properties view, adjust the effect's parameters.



- In the Camera view, click on the Update Preview  button to update the rendered preview.



NOTE: Once you have set the parameters for your effect, you can store it in the Library view as a template so you can quickly reuse it later on without having to set the parameters again. Refer to *Libraries, Symbols and Templates > Creating a Template from the Network View*, on page 364 to learn more about creating templates.

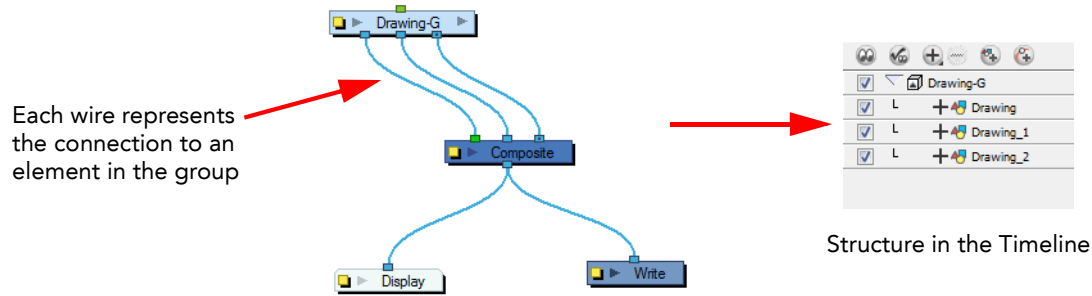
Grouping from the Timeline

There are several advantages to using the **Group Selection With Composite** command (only found through the Timeline) over the simple **Group Selection** (which references both the Group layer in the Timeline and the Group module in the Network view).

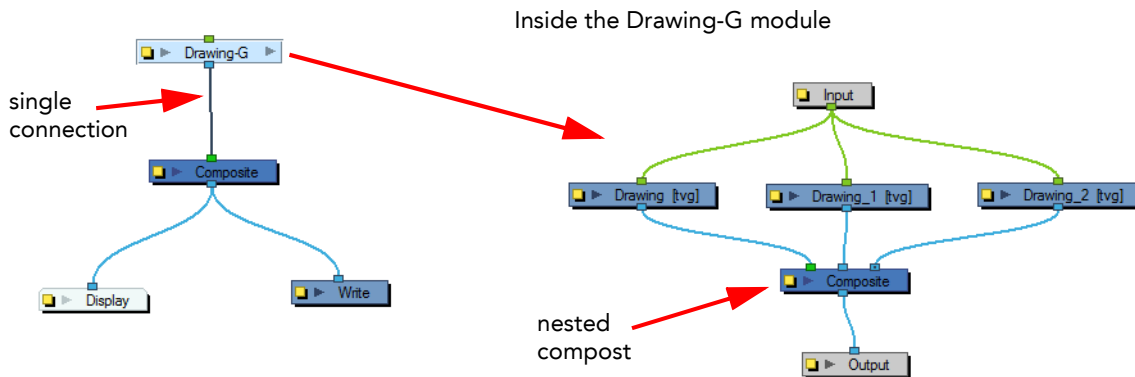
One of the advantages that this command has is that it groups all the selected elements into a neat module that has a nested composite. This means that there is only one connection coming out of the Group module. With the simple

Group module or command, the Group displays the same number of connections as elements in the group. Both grouping commands display the same structure in the Timeline view.

Group Selection



Group Selection With Composite

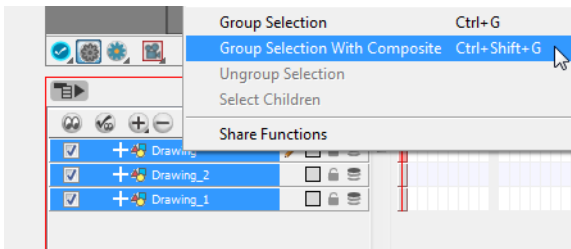


The **Group Selection With Composite** command should only be used before any work has been done in the Network view and it recommended for objects whose stacking order is of no consequence.

NOTE: Using the **Group Selection from Composite** command on elements that have effects, have been tweaked in the Network view, or whose stacking order is of consequence, may cause the grouped elements to lose their properties once grouped in this way. In addition, though you may only select a few modules to group, if there are other layers in the timeline that exist between the selected layers, they will automatically be grouped, even if not selected.

To group selected elements using the Group Selection With Composite command:

1. In the Timeline view, in the layers section, select the elements that you wish to group.
Any layers between the selected layers will automatically get grouped as well, so if the stacking order is of no consequence, move extra layers either above or below the layers that you wish to group.
2. Right-click (Windows/Linux) or [Ctrl] + click (Mac OS X) on one of the highlighted layers and from the pop-up menu select **Group Selection With Composite**.



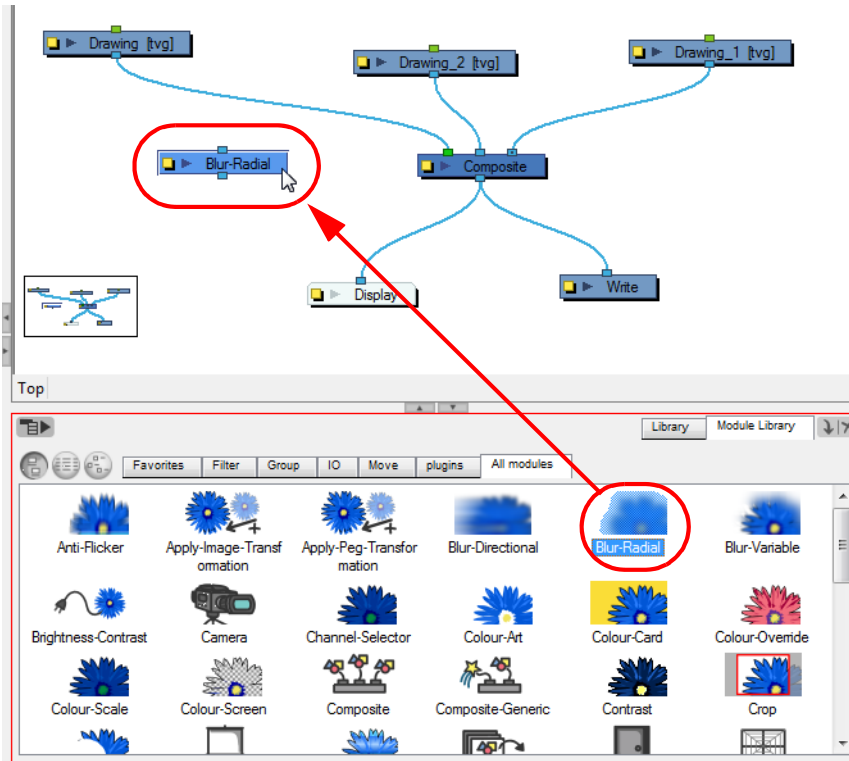
3. The layers appear indented under a new Group layer in the Timeline view and in a new Group module in the Network view.

Animating an Effect Over Time

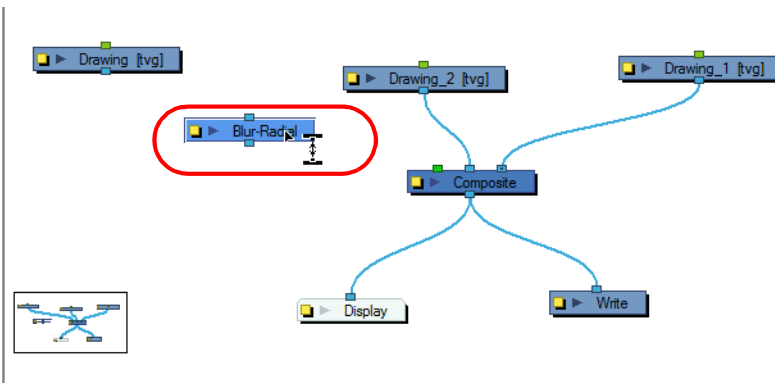
To animate an effect over time, create a function curve by adding keyframes to the parameters you want to animate. To do this, you will use the Layer Properties view, the Network view and the Timeline view. You can fine tune your animation using the Function view.

To animate an effect over time:

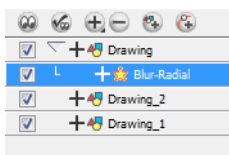
1. In the Network view, drag an Effect module from the Module Library and drop it into the Network view.



2. Plug the effect element between the drawing element that you would like to apply the effect to and a composite module. You can either do this manually by unplugging and plugging, or by holding down [Alt] as you drag it through a connection.



The Effect should also appear in the Timeline view as well.




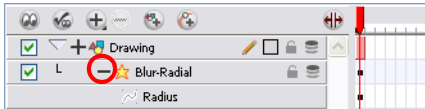
3. To create the function curve:


- ▶ In the Layer Properties view, click on the Function  button you want to animate to create a function curve.

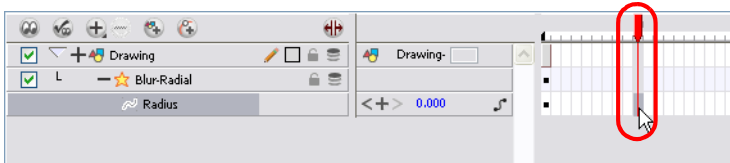



OR

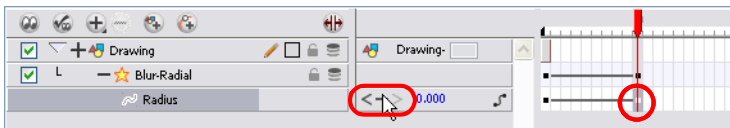
- ▶ You can also expand the effect layer's parameters in the Timeline view by clicking on the Expand Function  button and add a keyframe using the [Ctrl]+[F6] (Windows/Linux) or [⌘]+[F6] (Mac OS X) key to the parameter you want to animate.



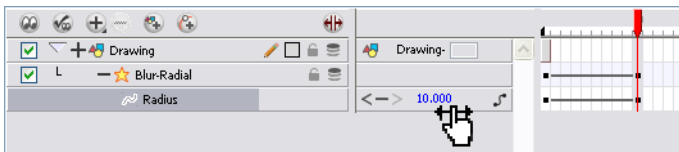
4. In the Timeline view, click on the Show Data  view button.
5. In the Timeline view, go to the frame where you want to start animating the effect.



6. In the Data view, click on the Add Keyframe  button.



7. In the Value field scroll to the keyframe value or type the value in the field.



- ▶ If your keyframes are Stop-Motion keyframes, In the Timeline view, select the new keyframes. Right-click (Windows/Linux) or [Ctrl]+click (Mac OS X) on the selection and select **Set Motion Keyframe**.

8. Repeat this process for each keyframe to be added.



Refer to the *Previewing and Playing Back Effects* topic to learn how to preview animated effects.

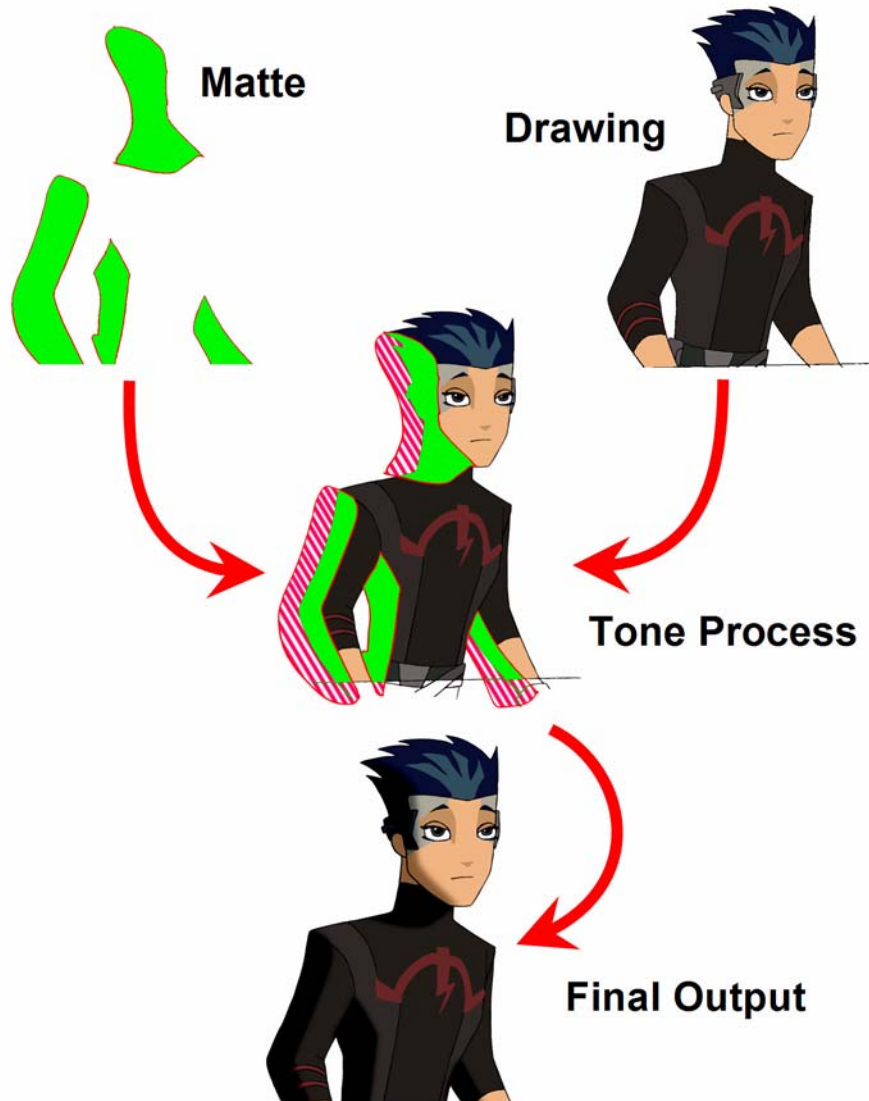


Refer to *Creating Animation Paths > Modifying a Path in the Function View*, on page 580 to learn how to adjust your function curves in the Function view.

How Does An Effect Module Work?

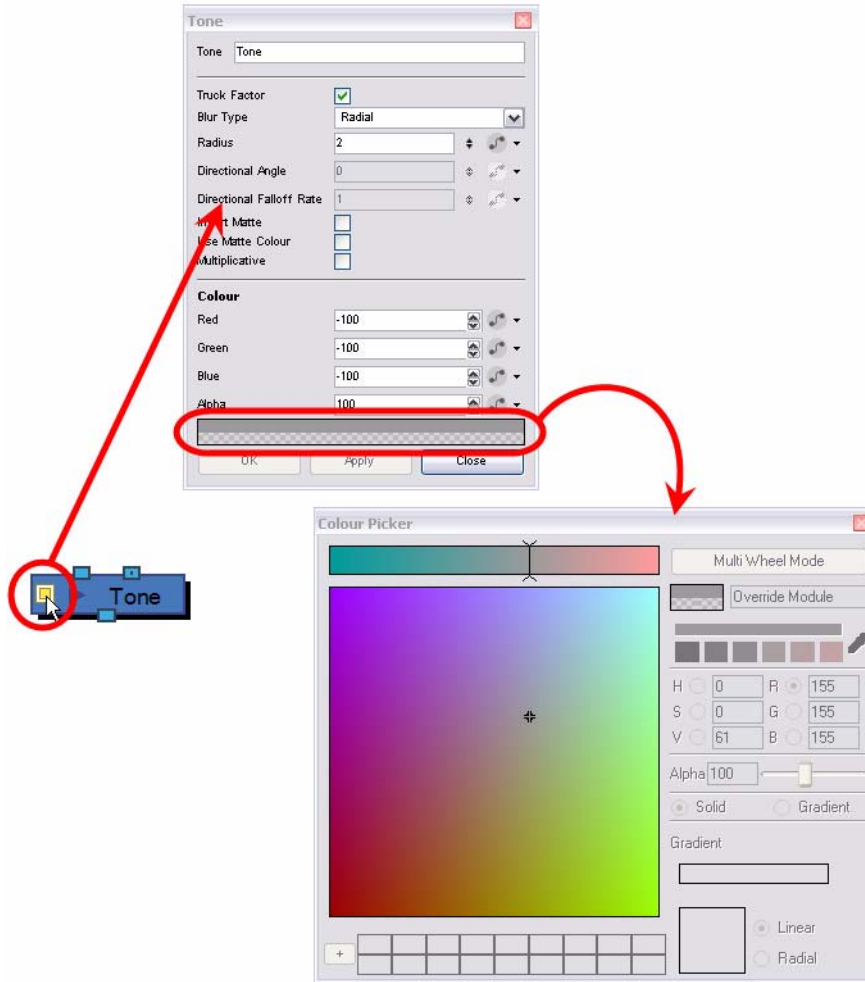
An effect module always needs a drawing connection and sometime a matte or shape connection. A matte provides drawing information that will be used to determine the area where the effect will be applied on the drawing. The details and colours within the matte drawing do not matter, as the system will only use the shape and transparencies in it. A matte is also known as mask.

The matte principle can be demonstrated on the Tone effect.



The drawing layer is connected in the right port of the effect module and the matte (mask) in the left port. The Tone effect then applies darker colours where the matte overlaps the image, blurs the tone edge, and finally clips out the extra tone zone outside of the drawing before outputting a final drawing with a tone.

The tone's parameters can be adjusted in the module editor and any of them can be linked to a function column to be animated over time. This means that all of the effects can be customized.



Using Effects

Here is the list of the effects available in Harmony Stage. Each effect and how to use it is described in the corresponding section.

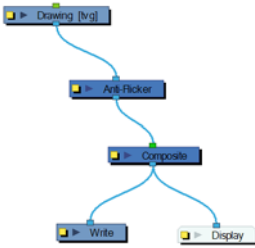
- Anti Flicker
- Apply Peg Transformation
- Apply Image Transformation
- Blur Directional
- Blur - Blur Radial
- Blur Variable
- Brightness and Contrast
- Channel Selector
- Colour Art
- Colour Card
- Colour Override
- Colour Scale
- Colour Screen
- Composite-Generic
- Contrast
- Mask-Cutter
- Dither
- Focus
- Focus Multiplier
- Glow
- Glue
- Gradient
- Grain
- Greyscale
- Highlight
- Layer Selector
- Line Art
- Matte Blur
- Matte Resize
- Motion Blur
- Multi-Port-Out
- Negate Module
- Note
- Overlay Layer
- Particle Effect, Crowd Simulation and More
- Pixelate
- Placeholder
- Quadmap
- Refract
- Remove Transparency
- Shadow
- Sparkle
- Tone
- Transparency
- Underlay Layer

Effect Modules

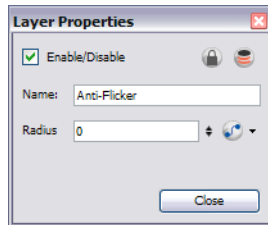
Anti Flicker



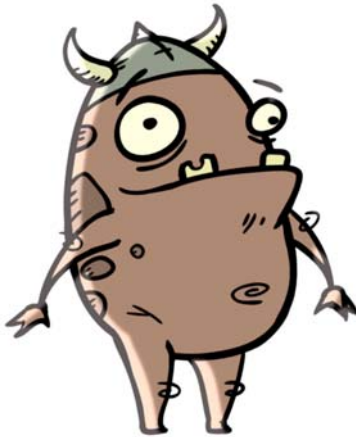
Use the Anti Flicker to compensate for flickering in your output to TV formats. The Anti Flicker effect applies a vertical blur to the rendered output. You should place the Anti Flicker before a Write module in the Network view.



Use the Anti Flicker editor to control the amount of blur that is applied to rendered output. In the Radius field, enter a value for the number of pixels to be considered in the blur.



Apply Peg Transformation



Use the Apply Peg Transformation module to apply a transformation coming from a Peg, Ortholock or Quadmap module on a single module or a group of modules. When using the drawing layer's No Clipping option, you can use this module to apply all Camera and Peg transformations once all of the effects and modules connected above the drawing module are calculated.

You can use this effect module to create a simple highlight on a cut-out puppet or use the No Clipping option available in the Drawing layer.

The No Clipping option, found under the Drawing Layer Properties' Advanced tab is used when you do not want to crop your images before all effects are applied to your drawing. No Camera motion or peg transformation will be applied to your drawing until you connect an Apply Peg Transformation.

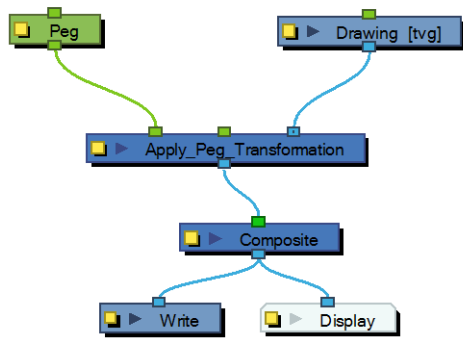


Refer to Setting Up the Scene > Positioning an Element Using the Layer Properties to learn more about the Drawing Layer's Advanced tab.

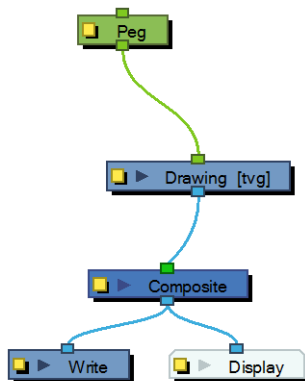
The advantage of this module is that you can create a second output of your image or puppet and offset it, scale it or apply any kind of transformation on it.

The transformations set in the Peg, Ortholock or Quadmap module connected to the Apply Peg Transformation module are applied BEFORE the image is composited.

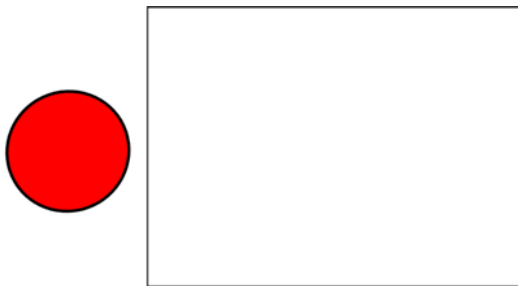
Here is an example of how to connect the Apply Peg Transformation module:



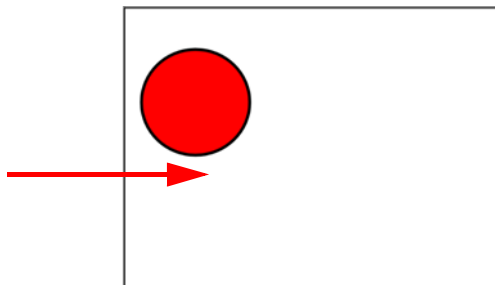
The transformation set in the Peg module from the example above is applied before the image is composited, which is the equivalent of the following network:



In the following images you can see the result of the transformation without the Apply Peg Transformation module and with it:



Original Drawing (Outside the Camera frame)
Without an Apply Peg Transformation

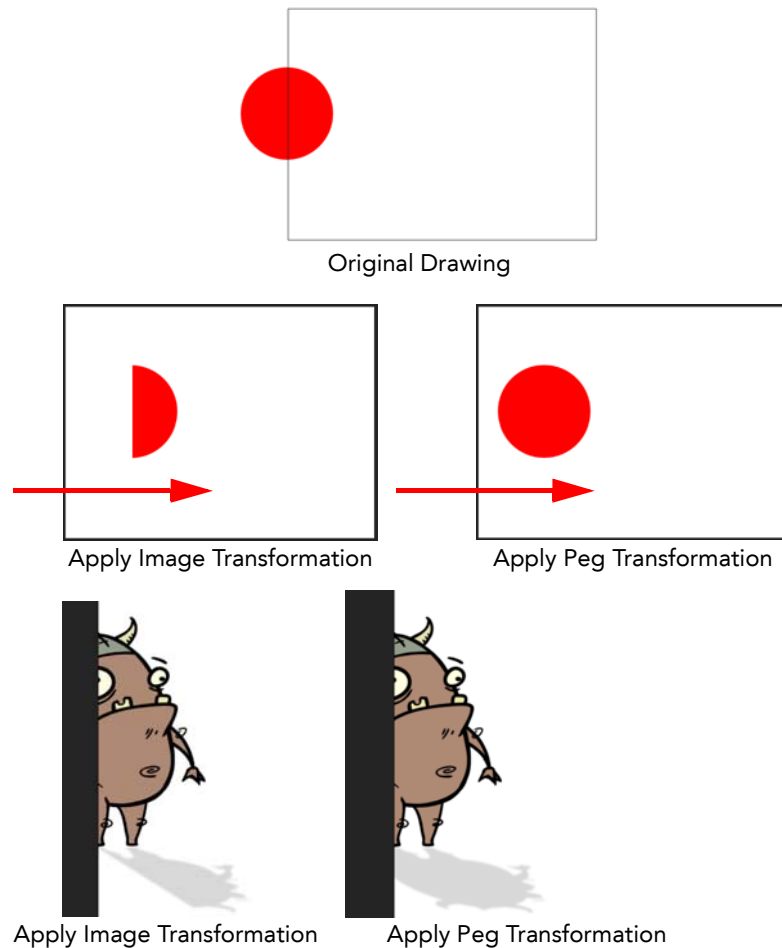


Drawing With an Apply Peg Transformation
(Appears within the Camera Frame)

Using the Apply Peg Transformation you can apply transformation on drawings that are outside the Camera frame and make them appear inside the frame.

If you are using the Apply Image Transformation module to create a drop-down shadow for a character, it will work correctly so long as the character is not going outside of the camera frame or that the drawing connected in it is a VECTOR drawing. The reason is the Apply Image Transformation module applies the transformation once the drawing is rendered, moved by its own set of Pegs, motion paths and quadmap and cropped to the camera frame size. This crop operation does not occur if the drawing is a vector drawing (*.TVG). Although, as soon as the drawing is passed through an effect module or a bitmap type Composite module, the drawing is turned into a bitmap image and gets cropped.

So, if you offset a bitmap half inside and half outside the camera frame, the outside part is cropped out and then moved by the Apply Image Transformation module. A part of the original drawing is cut. You need to use the Apply Peg Transformation module for the transformation to be applied before the image is processed and cropped.



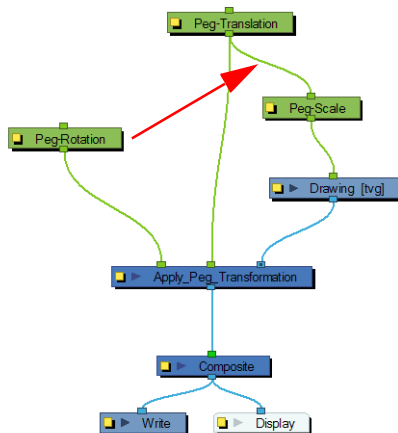
Refer to the [Apply Image Transformation](#) topic to learn more about that effect.

Advanced Apply Peg Transformation

You can use the Apply Peg Transformation's middle port to apply the transformation you connected to the module after one of the Peg or Quadmap connected above the drawing module.

In the following example, two pegs were added to control the different motions on independent trajectories:

- Peg-Translation
- Peg-Scale



When there is no Apply Peg Transformation module, the Peg-Translation is the first trajectory to affect the Drawing module. Then, once the translation is applied, the Scale trajectory affects the Drawing module.

When using an Apply Peg Transformation module without using the middle port, the Peg-Rotation connected in the APT module is applied at the top of everything. The order in which the trajectories are applied to the Drawing module is:

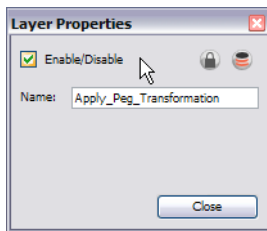
1. Peg-Rotation
2. Peg-Translation
3. Peg-Scale

When the Peg-Translation is connected in the Apply Peg Transformation's middle port, the Peg-Rotation is applied after the Peg-Translation and before the Peg-Scale. This means that the translation is done before the rotation instead of the rotation before the translation.

The order in which the trajectories are applied to the Drawing module is:

1. Peg-Translation
2. Peg-Rotation
3. Peg-Scale

Use the Apply Peg Transformation editor to rename the module.

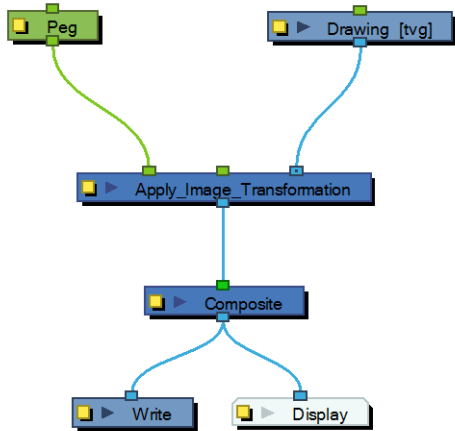


Apply Image Transformation

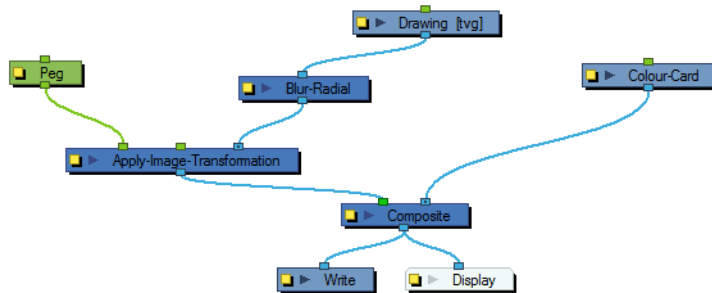
The Apply Image Transformation effect is mainly used when you want to pan an object out of the Camera frame and that object has an effect such as a Glow or a Blur on it. When you use a Peg or the Apply Peg Transformation module to translate an object such as the Sun out of the camera frame, as soon as the Sun starts to go outside of the camera frame, the Sun's circle is cropped and the blur is applied on the shape left over. This also means that when the Sun is completely out of the frame, the Blur is not calculated anymore and the Blur pops out.

To prevent this from happening, you must use the Apply Image Transformation module to pan the Sun out.

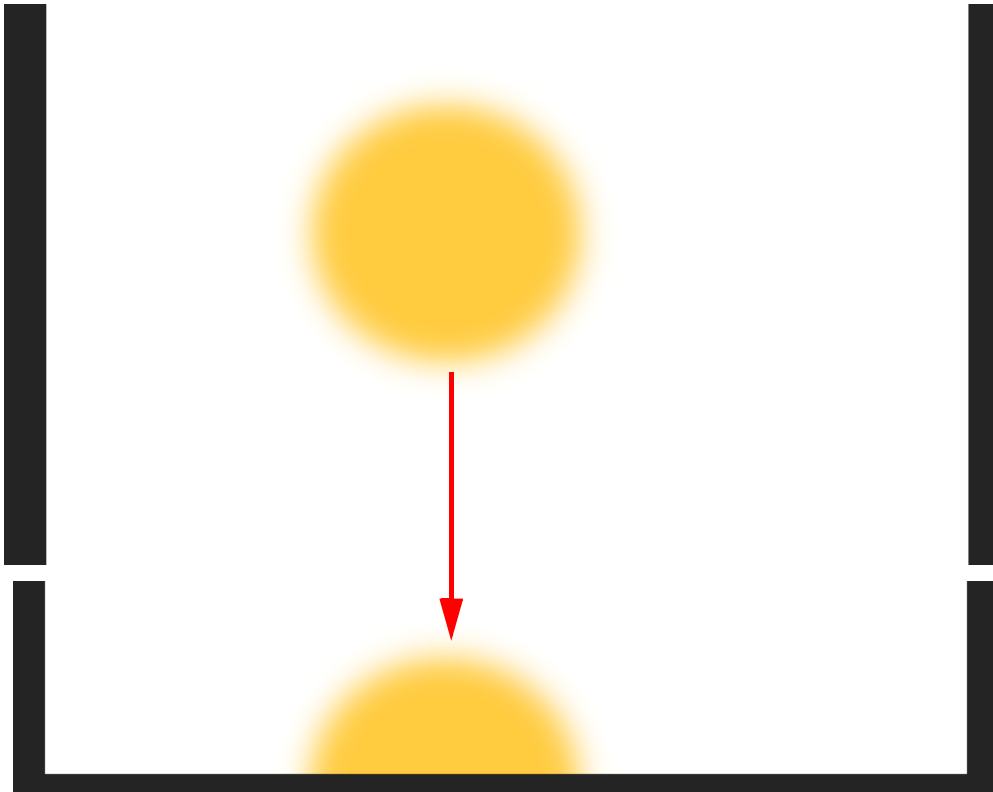
The Apply Image Transformation module applies the panning transformation once the full drawing of the Sun is blurred, once the image is composited. Here is an example of this network:



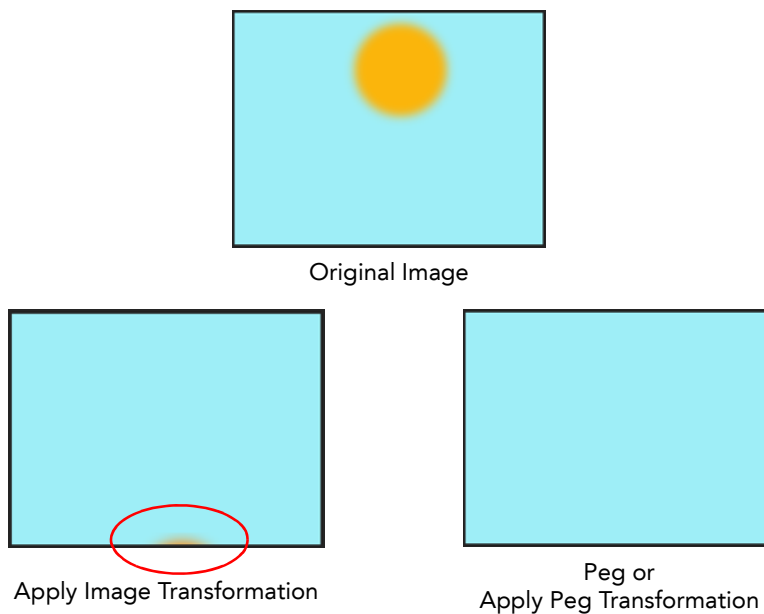
Here is how to connect the Blur effect for a Sun panning out:



Here is the visual result of the blurred Sun:



Look at the following example to understand better why using the Apply Image Transformation instead of a regular peg or the Apply Peg Transformation module.

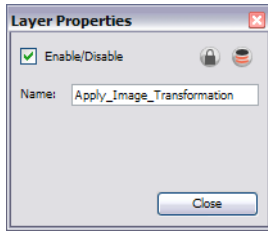


The normal rendering behaviour is to crop the image before applying the effects. When planning a sunset using either a Peg or the Apply Peg Transformation module, as soon as the drawing of the sun is out of the camera frame, the drawing is cropped and there is no image left to blur. This means that the glowing edge pops out of the camera instead of panning out gradually. Using the Apply Image Transformation module, the image is blurred before being panned out, so this means that even once the drawing is out of the camera frame, its glowing edge will still show until the drawing is far enough from the camera border. This way, there is no pop when panning out blurred objects.

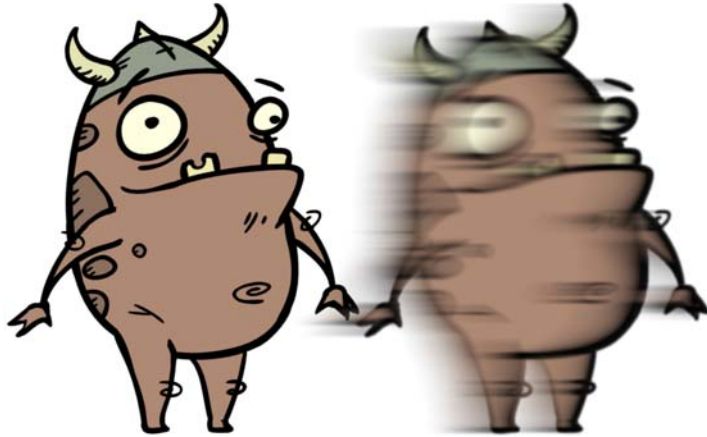


Refer to the *Apply Peg Transformation* topic to learn more.

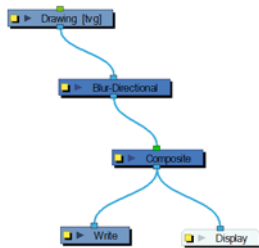
Use the Apply Image Transformation editor to change the name of the module.



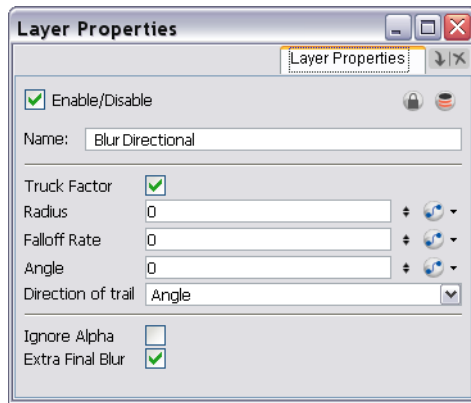
Blur Directional




The Blur Directional effect creates the effect of a motion blur that pulls and smears the image from one contour edge to a different direction or angle. This effect is useful in creating the impression of speed, such as the streaks of colour that follow a car traveling at high speed.

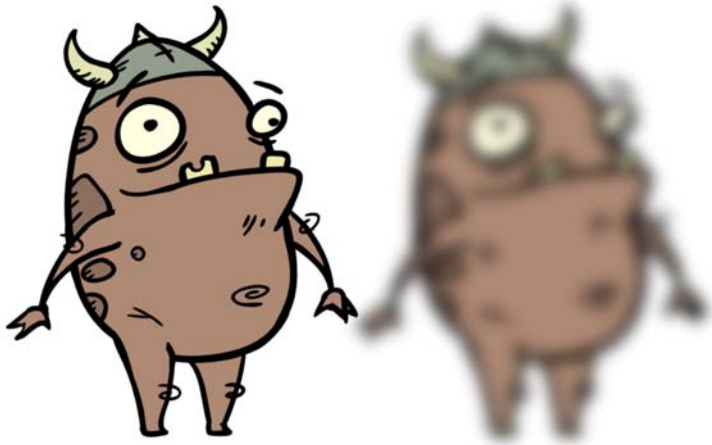


Use the Blur Directional editor to control the settings of the Blur Directional effect.

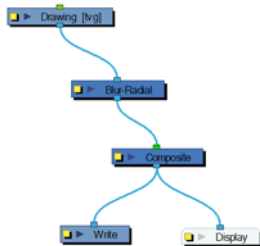


- **Truck Factor:** Activated by default, this option readjusts the blur when the elements undergo a change of depth or scale. When this option is disabled, the effect's values will remain unchanged regardless of any depth or scale changes. We recommended that this option be disabled when multiple drawings are composited and attached to this effect. You can attach these values to function curves  to change them over time.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Fall-off Rate:** The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Angle:** The direction of the blur. Enter a value from 0 to 360.
 - ⇒ **0:** blurs the image to the west.
 - ⇒ **90:** blurs the image to the south.
 - ⇒ **180:** blurs the image to the east.
 - ⇒ **270:** blurs the image to the north.
- **Direction of trail:** If you do not set an Angle for the direction of the blur, you can select a direction (north, south, east, or west) from this menu. The calculations for this feature are faster than the calculations for the Angle setting.
- **Ignore Alpha:** This option controls the leading edge of the blur. Deselect this option for a solid or hard leading edge on the blur.
- **Extra Final Blur:** This option causes the software to apply a second blur after the Blur Directional is created. If you have a Blur Directional that begins at 0 and gradually gets stronger, disable this option to ensure a smooth progression.

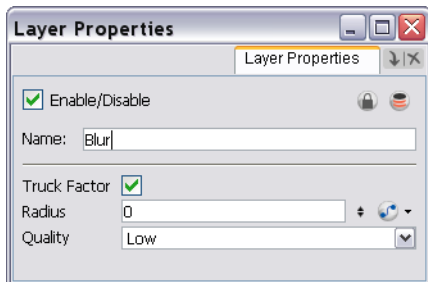
Blur - Blur Radial



The Blur effect creates an effect that softens, fogs or obscures the image evenly in all directions. This effect is useful when you want to make cloudy images not realistically seen in detail, such as a drawing object that is farther back or in the background of your scene, usually blurry due to the laws of atmospheric perspective. Other uses include the general softening of objects such as snow, stars and shadows that do not naturally have a hard outline.

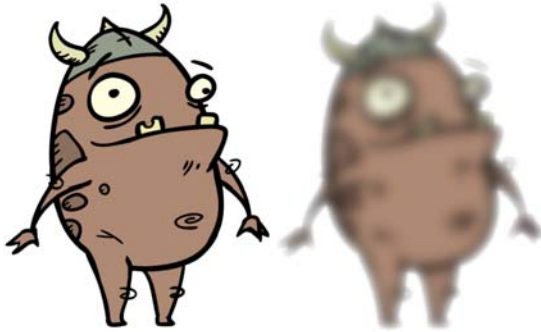


Use the Blur editor to change the values of the Blur effect.



- **Truck Factor:** Activated by default, this option reads only the blur when the elements undergo a change of depth or scale. When this option is disabled, the layer's values will remain unchanged regardless of any depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached to this effect.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Quality:** Select High for a slow and accurate operation or Low for a faster operation with a more raw look.

Blur Variable

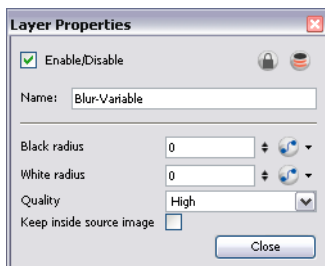


Use the Blur Variable to create a radial blur that varies within a single image based on the white and black values in the matte you supply. You can set one blur value for the black regions in the matte, and another blur value for the white regions. The blur value for each grey region is interpolated between your black and white blur settings.

The following example is a network for a variable blur effect. A black and white copy of the character was used to create the effect you see.

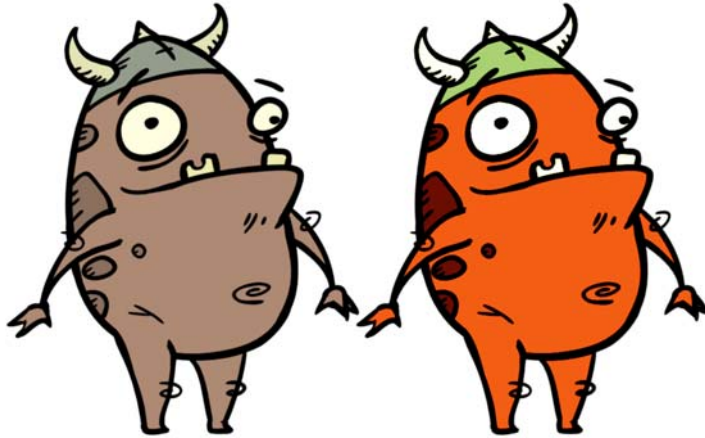


Use the Blur Variable editor to control the blur value for the white and black radius.

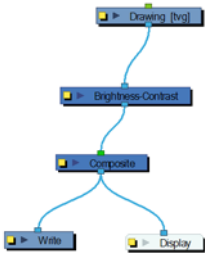


- **Black radius:** The amount of blur to apply to the black (transparent) values in the matte. Higher values create more blur in the colour image's regions that correspond to the black matte region.
- **White radius:** The amount of blur to apply to the white (opaque) values in the matte. Higher values create more blur in the colour image's regions that correspond to the white matte region.
- **Quality:** Select High for a slow and accurate operation or Low for a faster operation with a more raw look.
- **Keep inside source image:** This option confines the blur to the source image.

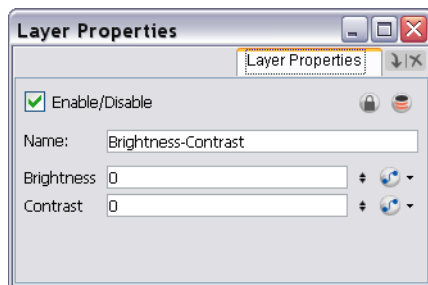
Brightness and Contrast



The Brightness and Contrast effect is used to modify the brilliance or dullness of an image or to create a greater difference between the lights and darks of an image by increasing their respective intensities. This effect can be used when an image appears to flat. Pumping up the brightness or contrast can give a drawing a more attractive and 3D quality. This can be useful if you want to push your background to the rear by making it look dull and flat and pulling your foreground elements to the front by giving them a higher contrast.



Use the Brightness and Contrast editor to change the values of the Brightness and Contrast effect.

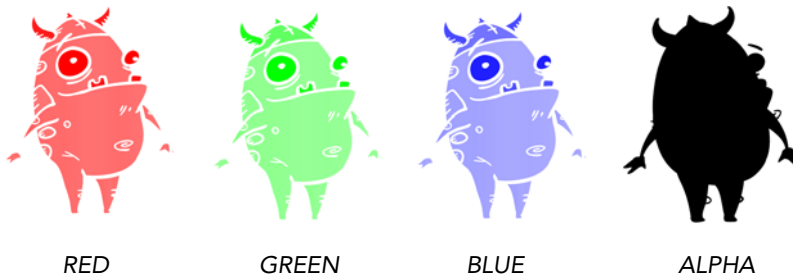


- **Brightness:** A value that is less than 0 will darken the image; a value greater than 0 will brighten it. Attach a Bezier or Ease function to change the brightness over time.
- **Contrast:** A value that is less than 0 will reduce contrast; a value greater than 0 will increase contrast. Attach a Bezier or Ease function to change the contrast over time.

Channel Selector



Use the Channel Selector effect to isolate one of the four colour channels of an image:

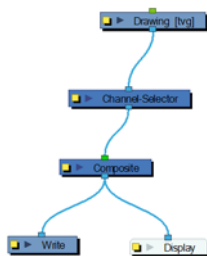


RED

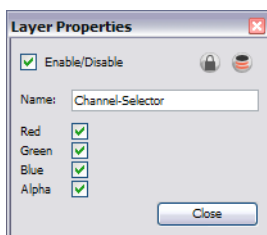
GREEN

BLUE

ALPHA



Use the Channel Selector editor to choose which channel to isolate.

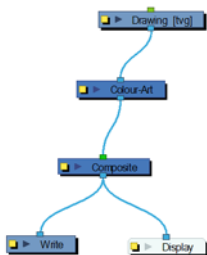


Colour Art

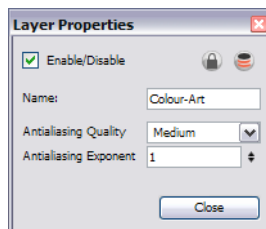


Use the Colour Art effect to isolate the Colour Art in a layer. Placing a Colour Art module after a Drawing module in the Network view only displays the Colour Art output. The Colour Art module can only be connected after a vector Drawing layer or a vector type Composite module. Any bitmap information will not be processed.

This effect will only work if the user drew or painted something into the Colour Art layer of the drawing.

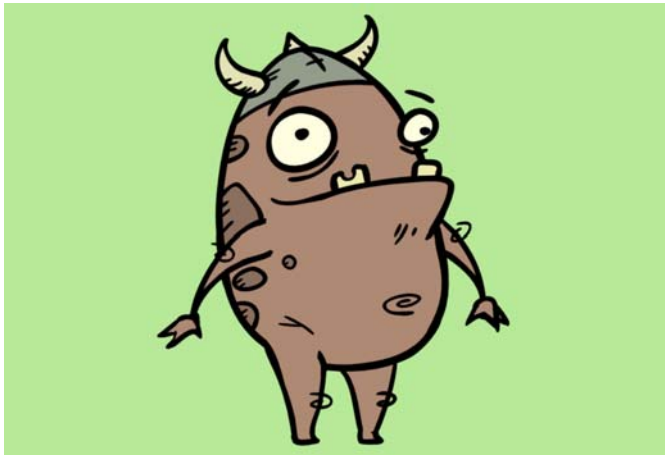


Use the Colour Art editor to control how the module renders the Colour Art.

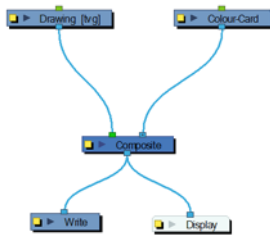


- **Antialiasing Quality:** Smoothness setting applied to Colour Art. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing). The higher the setting, the greater the amount of antialiasing applied. Higher quality images require more time to render and more memory from your system. Use a lower quality when rendering a pencil test.
- **Antialiasing Exponent:** Controls the extent of the area around the Colour Art edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.

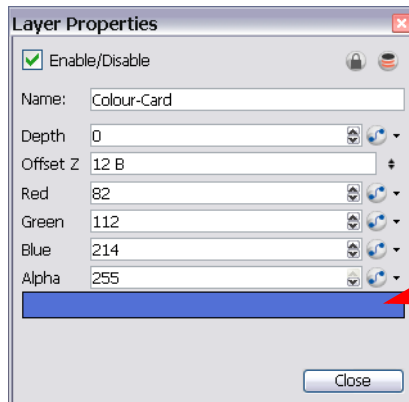
Colour Card



The Colour Card is a solid background the same size as the camera. The Colour Card can be used to fill the scene's background with a solid colour when there is no background image. If no background or colour card is added to the scene, the resulting export will appear with a black background.



Use the Colour Card editor to change the colour values.



This bar indicates the card colour. Click on the bar to change colour.

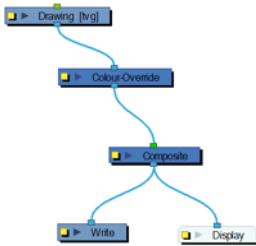
- **Depth:** Harmony Stage uses the Depth value to determine composition order when the Z value of two elements is the same.
- **Offset Z:** Enter the front-back position of the Colour Card layer in 3D space. This value can be verified in the Top view.
- **Red/Green/Blue/Alpha:** In these fields you can enter a static value for a colour and transparency of the Colour Card or you can attach these parameters to function columns to change their values over time.

Colour Override



The Colour Override processes the colours in a drawing layer. The drawings in this layer must be TVG files.

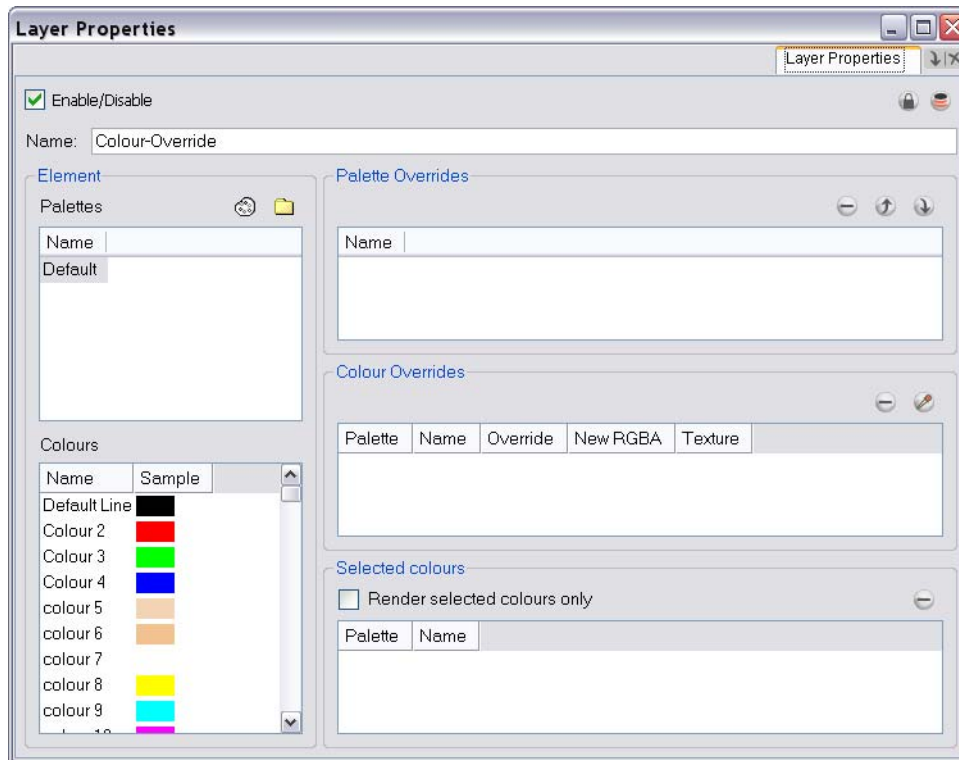
Using this effect you can change colours from the palette without affecting the actual palette, swap clone palettes, replace a specific colour zone with a bitmap texture or hide and display selected colours.








Use the Colour Override effect to:

- Change colour values in drawings during the compositing process.
- Use colour values from a specific colour palette in the palette list.
- Establish the priority of override palettes in the palette list. For example, you may have different clones of the same palette, for example a daytime and nighttime version.
- Isolate specific areas of a drawing by selecting certain colours. For example, using specific colours to generate a matte for a glow effect.
- Hide certain colours.

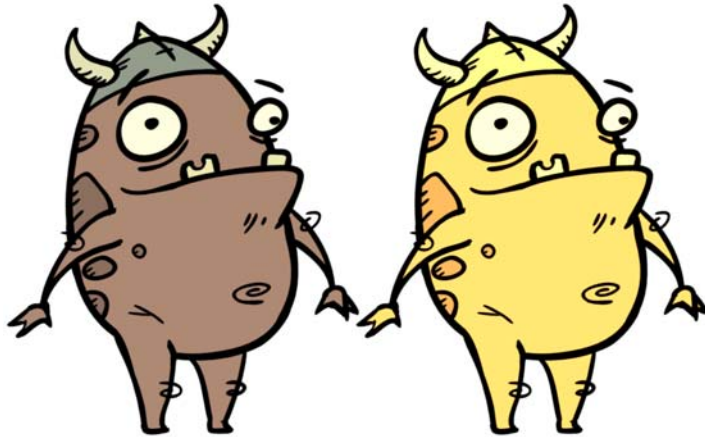
Use the Colour Override editor to set the colour override operations for TVG elements and their drawings.



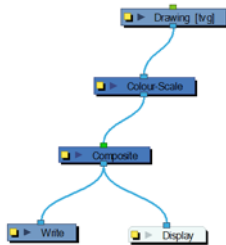
- **Palettes:** This section displays the palettes in the palette list of the selected layer. Drag these palettes into the Palette Overrides section to re-order them. You can load additional palettes in the palette list from either your project, by clicking on the Palette  button, or your computer by clicking on the Browse  button.
- **Colours:** This section displays the colours swatches of the selected palette. Drag a swatch into the Colour Overrides section to change its value or drag it into the Selected Colours section to render only that colour.
- **Palette Overrides:** This section forces the use of a particular palette or palette list order, during the composition process. You must drag palettes from the Palettes section to change their order. Harmony Stage searches the palettes in the order that they appear in the palette list to find the colour values associated with the colour IDs of each image. To apply a different version of a colour palette, for example to switch from a day to a night palette, use the override section to change the order of colour palettes (you must be working with cloned palettes).
- **Colour Overrides:** Drag a swatch from the Colours section to this section to override its value. You can also override a colour with a texture. Once the swatch appears in the Colour Overrides section, right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) on the Override Colour word and select one of the following option in the drop-down menu:
 - ⇒ **Colour not visible:** renders the selected colour invisible in the Camera view.
 - ⇒ **New RGB only:** Overrides the colour swatch while maintaining its original alpha value. You can select a new colour by pressing the eye dropper  button and choosing a new colour from the Colour Picker window. The new colour swatch will appear under the **newRGBA** column.
 - ⇒ **New alpha only:** Overrides the swatch's alpha channel while maintaining its original RGB values. You can select a new alpha value by pressing the eye dropper  button and choosing a value from the Colour Picker window. The new colour swatch will appear under the **newRGBA** column.
 - ⇒ **New RGBA:** Overrides the swatch's colour and alpha values and uses the eye dropper  button to pick a modified selection from the Colour Picker window.
 - ⇒ **Texture – original matrix:** Overrides the swatch's colour with a pattern or texture. You must right-click (Windows/Linux) or [Ctrl] + Click (Mac OS X) under the Texture header to bring up the Browser window to search for your texture. The texture's default matrix (fixed proportion and orientation) is mapped the full size of the bounding box of each colour area to be overridden.

- ⇒ **Texture – global bbox matrix:** Overrides the colour with a texture that is scaled non-proportionally to the size of the bounding box encompassing the colour areas to be overridden. With multiple objects, it will look as though their fills were all traced and cut from the same piece of stretched or squashed fabric.
- ⇒ **Texture – global bbox centred:** Overrides the colour with a texture that is scaled proportionally to the size of the bounding box encompassing all colour areas to be overridden. With multiple objects, it will look as though their fills were all traced and cut from the same piece of fabric.
- ⇒ **Texture – contour bbox matrix:** Overrides the colour with a disproportionately scaled texture for each individual colour area. In other words, each fill area will not only have the texture scaled to its individual proportions, but also stretched or squashed to fit within its contours.
- ⇒ **Texture – scale to screen:** Disproportionally scales the texture to the output resolution before applying it as an override.
- **Selected colours:** Use this section to select swatches to render.
 - ⇒ **Render selected only:** Use this option to render only the colours you select in this section.

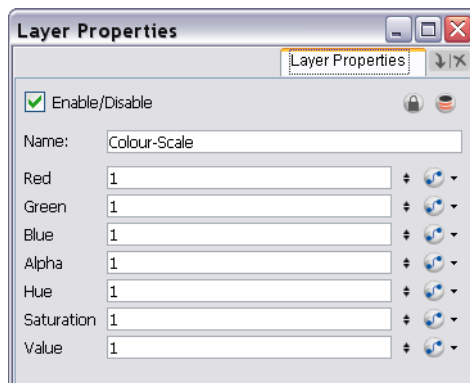
Colour Scale



The Colour Scale effect offsets an images colours. This effect is useful in creating ambient transitions, such as from daytime to nighttime.




Use the Colour Scale editor to set the colour scale effect by entering a value in the scale fields.



The actual colour values of the image are not changed; instead, the channels are multiplied by a selected amount. For example:

- If you enter a value of 1, the colour values do not change.
- If you enter a value greater than 1, you increase the colour channel value closer to 255 (or white).
- If you enter a value less than 1, you decrease the colour channel value closer to zero (0 or black).

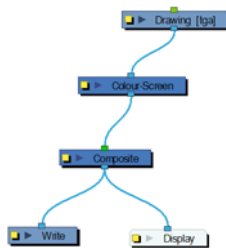
You can set the colour scale value by entering a value in the field. You can also change the values of the colour scale effect over time by attaching it to a Bezier or Ease function curve  and adding keyframes.

Colour Screen

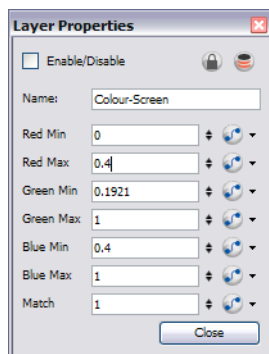


You can filter out specific colours from a bitmap image by using the Colour Screen effect. This module is usually used to matte out a particular colour from a three-channel image.

For example, use the module to make a blue screen background transparent behind a live-action element or to create transparency around an overlay. You will not use the Colour Screen module to screen out colours in vector images. The colours can be screened-out based on their colour palette values by using the Colour Override effect.



Use the Colour Screen editor to set the RGB of the colour to cut out.



In the Colour Screen editor, set the minimum and maximum values that will be screened out of each channel in a colour image. The minimum and maximum values range from 0 to 1.

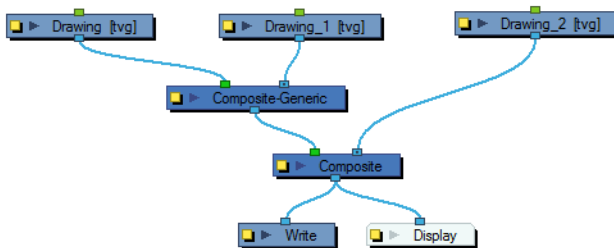
For values ranging from 0 to 255, divide the value by 255 to convert it to a value between 0 and 1. For example, to screen out the colour value 160, divide this by 255, resulting in a value of 0.6274.

Composite-Generic

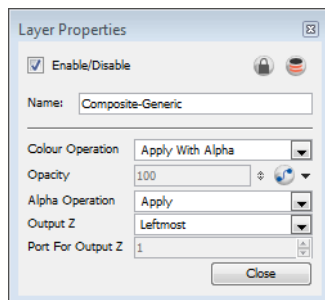
During the composition of images, colour and alpha values of an input image are combined with the image underneath to produce the output image.

Effects modules, like the **Tone Module** and **Highlight Module**, can control the colour and alpha composite operations for you. A **Composite Module** was created, in which the colour and alpha composite operation are pre-set to the standard, and more frequently used, composite operations.

You might, however, still want to control the colour and alpha composite operation between two images using the **Composite-Generic Module**. The **Composite-Generic Module** combines two images into one output image. The image linked to the left port of the module is layered on top of the image in the right port based on the selected colour and alpha composite operation.



Use the **Composite-Generic Module Editor** to control the calculation of colour and alpha values during the composition process.



The following abbreviations are used in the descriptions of composite operations:

- **ORGB**: RGB values of the Output Image
The Output Image is the resulting image from a composite operation. In the formulas for the composite operations, this image is also processed through a composite operation, representing the bottom layer in the composited image.
- **LRGB**: RGB values of the Left Image
- **RRGB**: RGB values of the Right Image
- **LA**: Alpha of the Left Image
- **RA**: Alpha of the Right Image
- **OA**: Alpha of the Output Image

Colour Operation

During this operation, the colour values of the output image are determined based on the alpha and colour values of the left and right image.

- **Left:** The colour values in the output image are derived from the image in the left port. Colour values in the right port are ignored.
- **Right:** The colour values in the output image are derived from the image in the right port. Colour values in the left port are ignored.
- **Apply Add:** $ORGB=RRGB+LRGB$. This operation uses the transparency and colour value of the left image to determine the output values. Effects such as shadows and glows are calculated in this manner. Unlike the Apply Tone Highlight operation, the result is not clipped to the matte (**RA**) of the output image.
- **Apply Matte For Overlay:** $ORGB=RRGB*(1-LA)$. This operation prepares the output image using the overlay's matte; the matte's RGB values are ignored. This operation prepares the output image to receive the colour portion of the overlay. It is typically used when an overlay and its matte are stored in separate images.
- **Apply Multiplicative Tone:** $ORGB=RRGB*(LRGB+1-LA)$. This operation multiplies the left and right images (see the Multiply colours selection), to be combined with the right image colour, creating a darker output colour. This effect created by this operation is identical to the Multiply Colour Blending effect in Photoshop.
- **Apply Overlay Into Matte:** $ORGB=RRGB+(LRGB*RA)$. This operation maps an overlay into an area prepared by a matte. It is typically used when an overlay and its matte are stored in separate images, and Apply Matte For Overlay has been used to prepare the output image to receive the RGB portion of the overlay.
- **Apply Tone Highlight:** $ORGB=RRGB+(LRGB*RA)$. This operation restricts the output of the tone to the region of the matte (**RA**), and uses the transparency and colour value of the input image to determine the colour values of the output. This is used to lighten or darken the output image. Darkening occurs when **RRGB** contains negative values.
- **Apply Transparency:** $ORGB=RRGB*(1-LA)$. This operation is used for a cutter matte to prepare the output image to receive the colour values of another image. It has the effect of increasing the transparency of **ORGB** (but not **OA**), based on the **LA**. This function is the equivalent to Apply Matte for Overlay. It is almost always used with Apply Transparency Matte, an Alpha Composite Operation.
- **Apply With Alpha:** $ORGB=[RRGB*(1-LA)]+LRGB$. This is a standard composite operation called "alpha blending". During this operation, colour values of the left and right images are combined based on the alpha value of the left image. Where the left image is completely opaque (**LA=1**), the **ORGB** will be replaced completely with **LRGB**. Where the left image is completely transparent (**LA=0**), the **ORGB** is unaffected. Where the left image is partially transparent, you get a blend of the **RRGB** and the **LRGB**, where the values are added together and clipped to 255. The **LA** is the opacity of the left image. This operation (**1-LA**) calculates the amount of opacity to retain in the output image. The operation $[RRGB*(1-LA)]$ removes as much of the output image as you are about to add from the left image. Remember that **LRGB** has been pre-multiplied by the **LA**, so the equation is really $ORGB=[RRGB*(1-LA)]+(LRGB*LA)$, which is simply the weighted average of L and R, with **LA** supplying the weight.
- **Multiply Colours:** $ORGB=RRGB*LRGB$. This operation multiplies the left and right image colours. Multiplying colours filters the colour values of the right image from the output image. For instance, to make the left image less blue, you can add a right image to this module with a blue colour value and select this option.
- **Divide Colours:** $ORGB=RRGB/LRGB$. This operation divides the right image colour values by the left colour values. The left image colour values are inverted, creating a negative image (**1/LRGB**). The negative's colour values are then multiplied by the right image colour values.
- **Lighten:** This operation looks at the colour information coming from both the images in the left and right ports and selects the base or blend colour—whichever is lighter—as the result colour. Pixels darker than the blend colour are replaced, and pixels lighter than the blend colour do not change.
- **Softlight:** This operation darkens or lightens the colours in a soft and diffuse way, depending on the blend colour (image in left port). If the blend colour is lighter than 50% grey, the image is lightened. If the blend colour is darker than 50% grey, the image is darkened. Painting with pure black or white produces a distinctly darker or lighter area, but does not result in pure black or white.
- **Hardlight:** This operation multiplies or screens the colours of the image in the left port with those of the image in the right port, depending on the blend colour. If the blend color (left port image) is lighter than 50% grey, the image is lightened, as if it were screened. This is useful for adding highlights to an image. If the blend colour is darker than 50% grey, the image is darkened, as if it were multiplied. This is useful for

adding shadows to an image. Painting with pure black or white results in pure black or white. Play with the Opacity value to create a subtler look.

- **Overlay:** This operation multiplies or screens the colours from the image connected to the left port, with those on the right, depending on the base colour. Colours from the left-port element overlay the colours of the drawing elements connected to the right, while preserving the highlights and shadows of the base colour. The base colour is not replaced, but mixed with the blend colour to reflect the lightness or darkness of the original colour.

Alpha Operation

- **Right:** The transparency of the output image is derived from the alpha values of the image in the right port. The values in the left port are ignored.
- **Left:** The transparency of the output image is derived from the alpha values of the image in the left port. The values in the right port are ignored.
- **Apply: $OA=[RA*(1-LA)]+LA$.** This operation computes the output alpha of the output image based on the alpha values of the left and right images. This is the standard method of combining alpha channels. Notice its similarity to the Apply With Alpha colour Composite Operation.
- **Add: $OA=RA+LA$.** This operation adds the alpha values of the two images to produce the alpha value of the output image.
- **Subtract: $OA=RA-LA$.** This operation subtracts the alpha values of the input image from the alpha values of the output image. It is useful in situations where two tone levels have been drawn with overlap, but a double-darkening in the overlap is not wanted. This operation will reduce the opacity of overlapping regions.
- **Apply Transparent Matte: $OA=RA*(1-LA)$.** This operation is used to increase the transparency of the output alpha in the final composited image.
- **Black: $OA=0$.** Sets the matte of the entire output image to black, so that it is transparent.
- **White: $OA=1$.** Sets the matte of the entire output image to white, so that it is opaque.

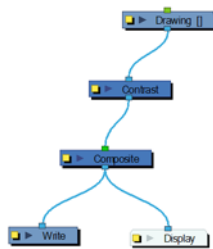
Output Z

- **Leftmost:** Indicates that the Z value for the output image will be taken from the module in the left port.
- **Rightmost:** Indicates that the Z value for the output image will be taken from the module in the right port.
- **Backmost:** Indicates that the Z value for the output image will be taken from the image that is the farthest back in the scene.
- **Frontmost:** Indicates that the Z value for the output image will be taken from the image that is closest to the front of the scene.
- **Portnumber:** Indicates that the Z value for the output image will be taken from the module in the selected port. Enter the appropriate port in the **Port For Output Z** field.

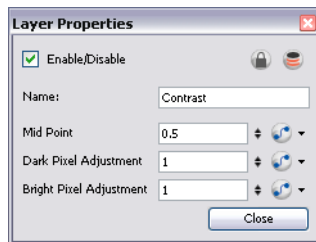
Contrast



Use the Contrast effect to increase or decrease the level of contrast in an image. This is done by changing the contrast in the dark and bright pixels and setting the transition point between dark and bright.



Use the Contrast editor to control the output of the module.



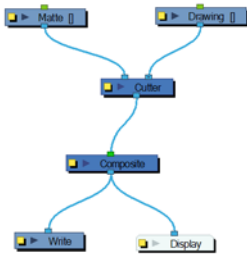
- **Mid Point:** The value that separates dark from bright colours. The midpoint is a value between 0 and 1 that represents the percentage of the 0 to 255 RGB channel range.
 - ⇒ **Pixels with colour values lower than the midpoint:** These are considered dark pixels.
 - ⇒ **Pixels with colour values higher than the midpoint:** These are considered bright pixels.
- **Dark Pixel Adjustment** and **Bright Pixel Adjustment:** The amount of contrast to be applied to pixels that fall on either side of the Mid Point value.
 - ⇒ **A value equal to 1:** No change
 - ⇒ **A value less than 1:** The module makes the pixel colours brighter
 - ⇒ **A value greater than 1:** The module makes the pixel colours darker

You can enter static values in the dialog box fields or you can attach these values to function curves to change over time.

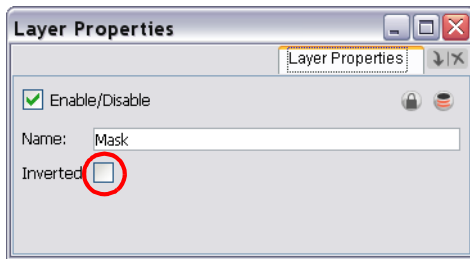
Mask-Cutter



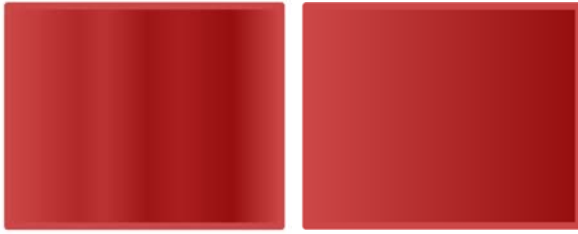
The Mask cuts out a portion of an image using a matte drawing. You can use the Mask to allow a character to disappear behind a background element or to cut a virtual hole into the layer itself. The Mask requires a matte input.



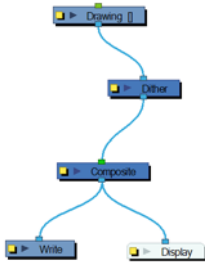
Use the Mask editor to invert the effect of the matte on an image. Instead of the object being hidden by the mask, it will only be visible where it intersects with the matte shape area.



Dither



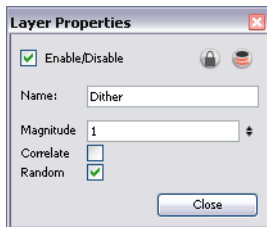
Dithering is the process of approximating a higher number of colours in a low bit-depth colour system. Use the Dither effect to give the appearance of greater colour variability in 8-bit per channel colour images.



The Dither effect is useful in the case of a gradient that varies between 100 and 105 in the blue channel, for example. Since the difference in the colour values is not great, banding might appear in the image. In this case, use the Dither module to give the impression of greater values of blue, decreasing the unwanted banding effect.

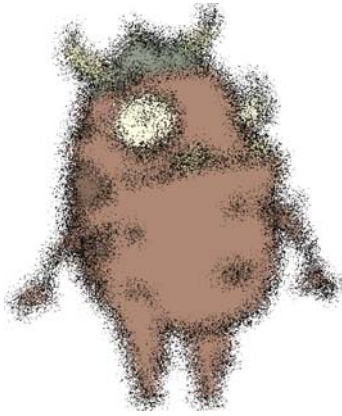
The results of the dither operation may be imperceptible.

Use the Dither editor to control the dithering effect.



- **Magnitude:** A magnitude of 1 performs a normal dithering operation, using all bands of colour. A magnitude greater than 1 introduces a bias towards brighter colours. A magnitude of less than 1 creates a faster transition between bands of colour, lessening the bias towards brighter colours.
- **Correlate:** When selected, the three colour channels (RGB) are changed simultaneously, for better colour accuracy. When this option is not selected, the three channels are dithered separately, resulting in smoother transitions.
- **Random:** The standard algorithm for the dithering operation.

External



Use the External module to process images through external programs and input the resulting images back into the network.



The External Module writes input files to temporary files on the system. It then calls the external program, which will process the input images. If two images are input into the module, the program must composite them together to produce one output image. Finally, the file produced by the external program is read back into the network.

The command is sent to the external program in the following format:

```
program_name file_1 file_2 output_file numerical_param extension
```

Use the External editor to control the program that is launched by the module, the files that it reads, and the file that it outputs into the network.

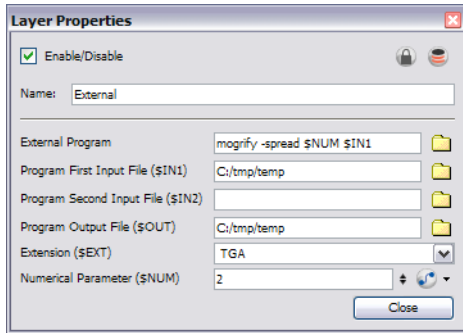
```

Version: ImageMagick 6.3.0 11/06/06 Q16 http://www.imagemagick.org
Copyright: Copyright (C) 1999-2006 ImageMagick Studio LLC
Usage: mogrify [options ...] file [options ...] file ...

Where options include:
-adaptive-blur geometry      adaptively blur pixels; decrease effect near edges
-adaptive-resize geometry   adaptively resize image with data dependent triangulation
-adaptive-sharpen geometry  adaptively sharpen pixels; increase effect near edges
-affine matrix               affine transform matrix
-annotate geometry text    annotate the image with text
-antialias                   remove pixel-aliasing
-authenticate value         decrypt image with this password
-auto-orient                 automatically orient image
-background color           background color
-bias value                  add bias when convolving an image
  
```

In this example, the ImageMagick 6.3 software was used without a matte connection.

Use the External editor to write down the parameters matching the chosen external program.



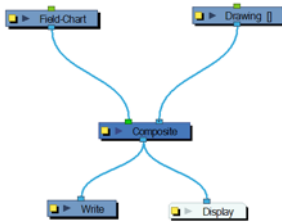
- **External Program:** The name of the program launched by the External module. This field can include a full or relative path to the executable file. If no path is entered, the user's path is searched to locate the program.
Enter the command directly into this field.
For example:
`mogrify -spread $NUM $IN1`
Where:

 - ⇒ **mogrify:** Is the name of the program,
 - ⇒ **spread:** Is the option to be applied,
 - ⇒ and **\$NUM** and **\$IN1**: Are the numerical parameter and first input file variable declared in the External module.
- **Program First Input File (\$IN1):** The name and location of the temporary file that Harmony Stage will write to the file system for the external program to read. It must not include the dot or the extension; the External module will add these based on the Extension field.
- **Program Second Input File (\$IN2):** When processing two files through this module (such as an image and a matte), this is the name and location of the second temporary file that Harmony Stage writes to the file system for the external program to read. It must not include the dot or the extension; the External module will add these based on the Extension field.
- **Program Output File (\$OUT):** The name and location of the temporary file that the external program will write to the file system so that Harmony Stage can read it back into the network.
- **Extension (\$EXT):** The file type that will be processed by the external program.
- **Numerical Parameter (\$NUM):** A value passed to the external program as a file processing option. It can be attached to a function curve to change over time.
The program files are temporary files that are overwritten at each frame as the module is executed. They are only meant to temporarily store the image that is being processed at each frame.

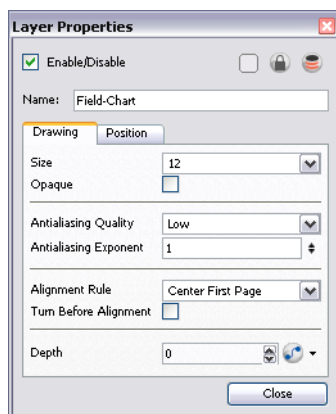
Field Chart



The Field Chart module displays a field chart which allows you to position elements in the Camera view windows.



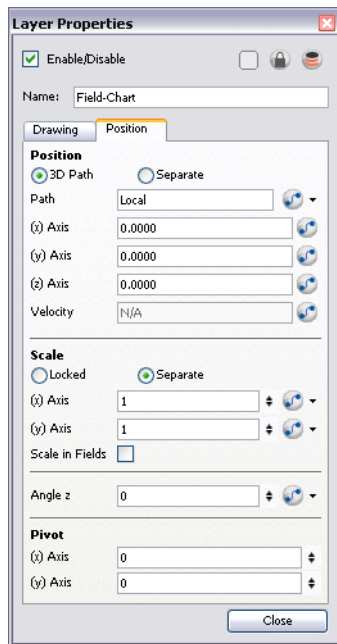
Use the Field Chart editor to control the quality and alignment of the field chart that appear in the Camera view.



Drawing

- **Size:** The size of the field chart. You can choose either 12 or 16 fields.
- **Opaque:** When selected, the field chart is not transparent. When not selected, the field chart is transparent.
- **Antialiasing Quality:** Smoothness of the field chart image. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing).
- **Antialiasing Exponent:** Controls the amount of area used in the antialiasing process. If the Antialiasing Quality is set to Low, this value is ignored.
- **Alignment Rule:** The alignment rule selections determine how the field chart is positioned. If you select Turn Before Alignment, the field chart is first rotated, then scaled based on the option selected from the drop-down list. The field chart is then scaled to match the alignment rectangle.
 - ⇒ **Left:** Aligns the field chart on the left side of the scene's alignment rectangle. Harmony Stage scales the field chart's height to match the height of the alignment rectangle of the scene.
 - ⇒ **Right:** Aligns the field chart on the right side of the alignment rectangle. Harmony Stage scales the field chart's height to match the height of the alignment rectangle of the scene.
 - ⇒ **Top:** Aligns The field chart on the top of the alignment rectangle. Harmony Stage scales the field chart's width to match the width of the alignment rectangle of the scene.
 - ⇒ **Bottom:** Aligns the field chart on the bottom of the alignment rectangle. Harmony Stage scales the field chart's width to match the width of the alignment rectangle of the scene.

- ⇒ **Centre Fit:** Centres the field chart.
- ⇒ **Centre Fill:** Centres the field chart and then scales it so that the width or height fills the available space.
- ⇒ **Centre LR:** Harmony Stage scales the field chart's height to match the height of the alignment rectangle of the scene.
- ⇒ **Centre TB:** Harmony Stage scales the field chart's width to match the width of the alignment rectangle of the scene.
- ⇒ **Stretch:** Scales the field chart so that it fits within the alignment rectangle of the scene. This setting may distort the field chart.
- ⇒ **As Is:** Leaves the field chart aligned as it is.
- ⇒ **Centre First Page:** Scales the field chart to match the centre of the first part of a standard panel with the centre of the field chart.
- **Turn Before Alignment:** Rotates the field chart 90 degrees to the left before scaling and aligning it according to the alignment rule, and before performing any offset, rotation or scaling on the field chart or the peg.
- **Depth:** Use this value to override the order of cables in the network to determine how this element is rendered.



The Position tab is used to position and animate the Field Chart. You can create a function curve and add keyframes on it to animate the grid over time.



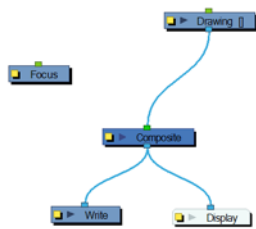
Refer to *Creating Animation Paths > Layer Parameters*, on page 558 to learn more about these parameters and how to animate your Field Chart.

Focus

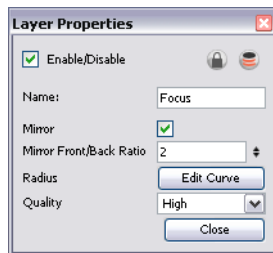


Use the Focus effect to set up depth-of-field effects for your scene. The Focus module is used to determine how much blur will be applied to images, based on their distance from the focal point.

The focal point can be the zero value of your scene or you can link the Focus module to another module, such as a Drawing or Peg layer, to retrieve the focal point from the module's Z-axis position.



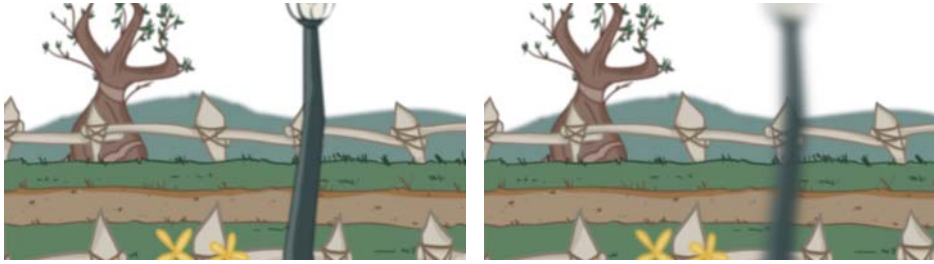
Use the Focus editor to determine how the focus will change as objects move farther from the focal point.



- **Mirror:** Select this option to also blur images in front of the focal point.
- **Mirror Front/Back Ratio:** When the Mirror option is selected, this ratio is applied to the calculation of the blur on images in front of the focal point. The default ratio of 1:2 produces realistic results. Experiment with different values to create customized effects.
- **Radius:** Controls the amount of blur applied to an element based on its distance from the focal point. Click on the Edit Curve button to change these values.
- **Quality:** Controls the quality of the blur. A higher quality will achieve better results but will be slower to render.

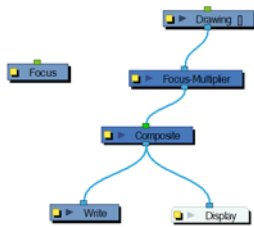
In the Side view window, you can see how the blur values change based on their distance from the focal point. Select the Focus module in the Network view, then right-click on the Side view window and select **Control** from the pop-up menu.

Focus Multiplier



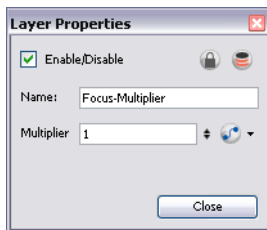
The Focus Multiplier effect works with the Focus effect. This module applies a blur to the selected layer, based on the blur radius in the Focus module.

Use the Focus Multiplier module when you want to apply the focus to selected elements or when you need to apply the focus before doing more effects in a composite operation.



You must disable the Apply Focus option in the Composite module in order to apply the focus effect to the selected module only. If you do not disable that option, the focus effect will be calculated twice on the selected module.

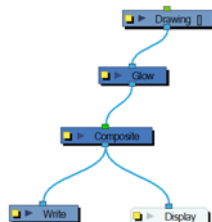
Use the Focus Multiplier editor to multiply the Focus Radius by a selected value. You can enter a static value in the Multiplier field or attach it to a function curve.



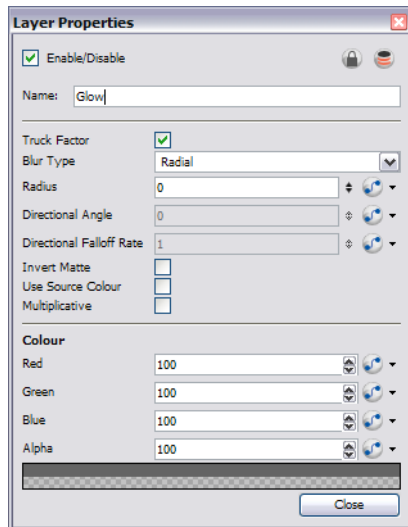
Glow




The Glow effect adds a bright soft-edged light or diffuse light region around an image. The Glow effect is useful in creating a shining rim around objects such as the sun or stars.



Use the Glow editor to control the direction of the blur that creates the glow, as well as its colour.



- **Truck Factor:** Activated by default, this option readjusts the blur when the elements undergo a change of depth or scale. When this option is disabled, the effect values remain unchanged regardless of any depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached to this effect.
- **Blur Type (Directional or Radial):**
 - ⇒ If Directional is selected, the software will blur the matte in the direction you select. For example, if a character is walking east, the blur may fall to the west.
 - ⇒ If Radial is selected, the software will blur the edges of the matte evenly around points that make up its edge.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Directional Angle:** If you select a Blur Directional Type, you can select the direction of the blur by entering a value from 0 to 360 in this field.
 - ⇒ **0:** blurs the image to the west.
 - ⇒ **90:** blurs the image to the south.
 - ⇒ **180:** blurs the image to the east.
 - ⇒ **270:** blurs the image to the north.
- **Directional Fall-off Rate:** The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of zero causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Invert Matte:** Activate this option to invert the matte used to create the glow. Your matte will become a black silhouette while the glow will fill the background space.
- **Use Source Colour:** Select this option to use the colours painted in the matte for the glow effect. If you deselect this option, select a colour and alpha values in the Colour section.
- **Multiplicative:** Select this option to create a more diffused glow.
- **Colour:** Where you can choose the colour and alpha values for the glow effect.

 **NOTE:** If this effect is connected below a Composite module set to Pass-Through, the effect will be applied to each element connected in the Composite individually. If some of these elements are overlapping, the effect will also overlap.

Glue



Use the Glue effect to repair the cracks that appear between joints during animation.

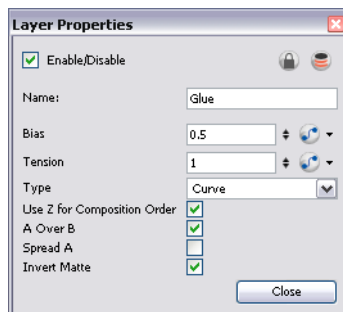


The Glue module has three ports:

- **Left Port (Matte):** Receives the matte.
- **Middle Port (Port A):** Receives the element that will not be used to fill the joint.
- **Right Port (Port B):** Receives the element that will be used to fill the joint.



For most effects with the Glue module, the default options are sufficient. However, you can modify these options using the Glue editor.



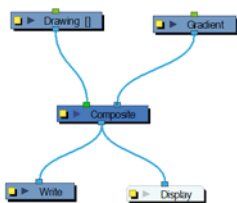
The Glue editor includes the following options:

- **Bias:** Indicates the tendency to favour the static or moving element. Set to 0, it favours element A; set to 1 it favours element B; set to 0.5 it is in between A and B.
- **Tension:** Indicates how tight the joint will be. Set to 1, the tension has no effect; set less than 1, the tension decreases; set greater than 1, the tension increases.
- **Type:** From this menu, select the type of joint to create. You can choose from among Curve (default), Line and Corner.
- **Use Z for Composition Order:** You can use this option to choose the drawing with the higher front-back value to create the joint.
- **A Over B:** Indicates which image is rendered on top in the final image. By default, A is rendered on top of B, which indicates that the image in the middle port (A) is rendered on top of the image in the right port (B).
- **Spread A:** By default, the image in port B is spread to fill the joint. You can use this option to choose the image in the A port to create the joint. If you select this option, the Drawing module must receive position information from the "B" element. Thus, you must connect the Drawing module of the "B" element to the Drawing module of the matte.
- **Invert Matte:** Activate this option to invert the matte used to fill the joint. If you want to use the "B" element as the matte, you must select this element.

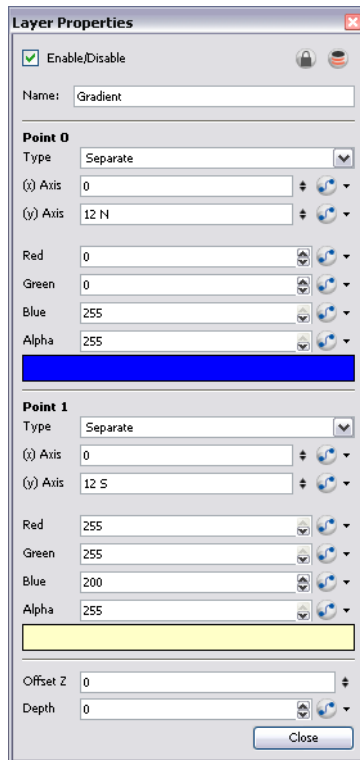
Gradient



Use a Gradient effect to create a transition of colour or alpha values between two areas of colours. Use two points to indicate where those two coloured areas are. You can then move these points to create the transition.

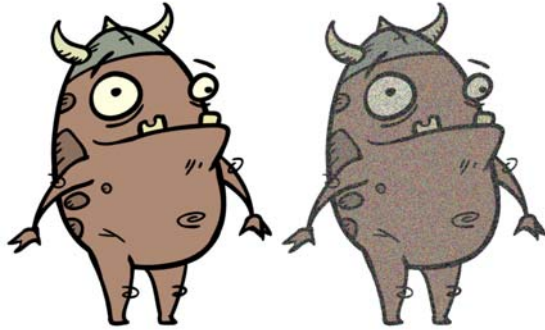


Use the Gradient editor to control the values of the gradient and the position of its output.

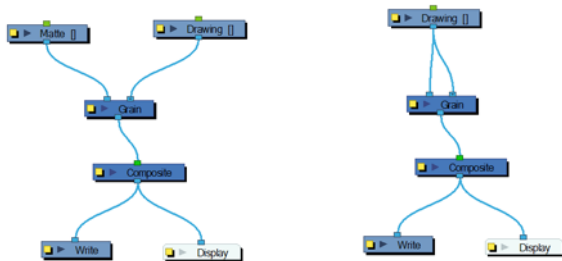


- **Point 0, Point 1:** These sections control the values of the first point (point 0) and the second point (point 1) in the gradient.
 - ⇒ **2D Path:** Change the position of the point by attaching it to a 2D path, which can also be used to affect how quickly the position of the point changes.
 - ⇒ **Separate:** Change the X and Y values of the point on independent function curves.
- **Red/Green/Blue/Alpha:** The colour and alpha values of the selected point.
- **Offset Z:** This value determines the position of the gradient on the Z-axis. Positive values will move the gradient forward and negative values will move it backward.
- **Depth:** Enter a value to control the composition order of the output.

Grain



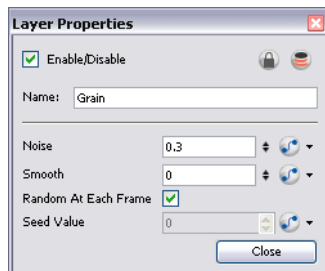
Use the Grain effect to add a film grain to an image; the film grain looks like video noise.



The Grain module has two input ports.

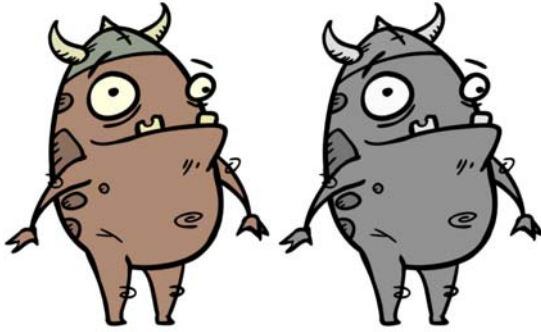
- On the left port, attach the element that will act as the matte defining the grain area.
- On the right port, attach the element on which you want to apply the grain effect.

Use the Grain editor to adjust the amount of grain to add to an image; you can also use it to adjust the sharpness or softness of the grain.

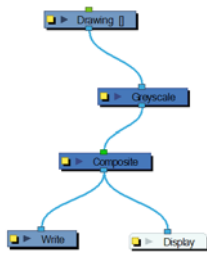


- **Noise:** The amount of grain to add to the image based on the percentage of pixels to alter. The larger the value, the coarser the grain. The smaller the value is to 0 (zero), the finer the grain.
- **Smooth:** The amount of blending to apply to the grain effect, based on the blur radius, to make the effect appear less pixelated. The larger the value, the greater the smoothing.
- **Random At Each Frame:** Computes the colour shift in the grain using a different value at each composite. This means that your images will look different each time you render them. Deselect this option and select a Seed Value to ensure the same result every time you composite the grain effect.
- **Seed Value:** This value corresponds to a unique pattern in the grain. If you want to retain this pattern in other frames, you can reuse this value.

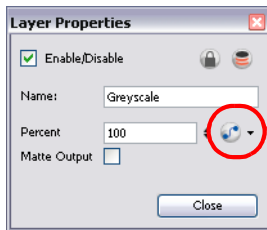
Greyscale



Use the Greyscale effect to convert a colour image to greyscale. This example demonstrates what happens when you set the greyscale to 100% using the Greyscale module. The Contrast module can also be used to adjust the darkness and lightness of the pixels in your element.



Use the Greyscale editor to enter the percentage of black and white to apply to the image. You can enter a static value in the Percentage field or attach the value to a function curve to change over time.



Use these menus to create a function curve and attach the Greyscale values to a function curve.

- **Matte Output:** When this option is activated, the colour values do not change. However, alpha values are read from the colours which you can see in the Camera view Matte View mode.

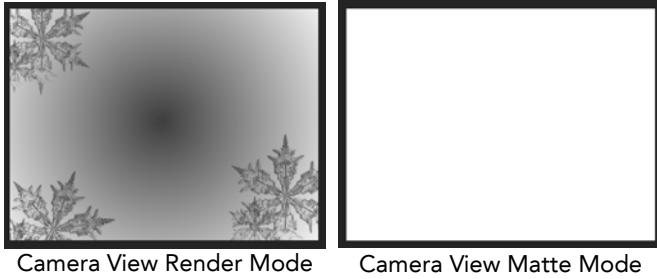
How to Use the Matte Output Option

You can see in this section a concrete example on how to use the Matte Output option of the Greyscale module. We created a frosted window using a snowflake image over a blue rectangle and a colourful background.

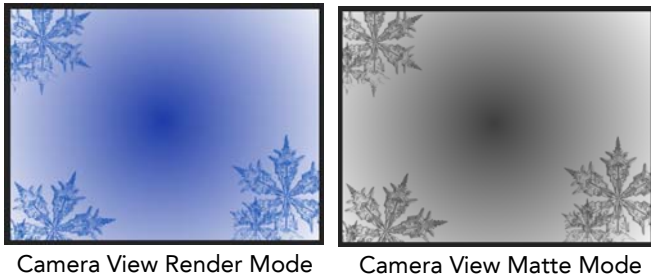
Here are the three drawings used for the example:



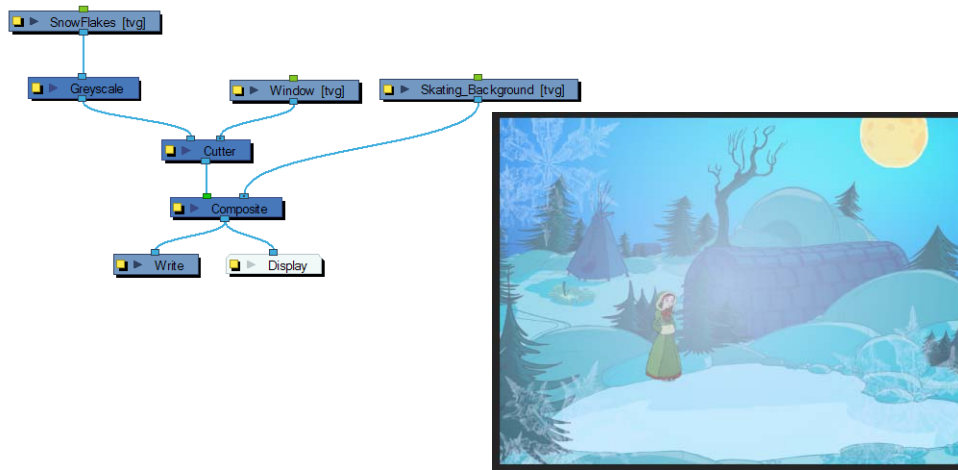
When the snowflake image is connected into the Greyscale module, it turns into a greyscale image. There is no transparency visible in the Camera view Matte View mode.



When the Matte Output option is enabled, the snowflake image colours are displayed as normal, but when the Matte View mode of the Camera view is enabled, you can see the transparency levels generated from the colour values.



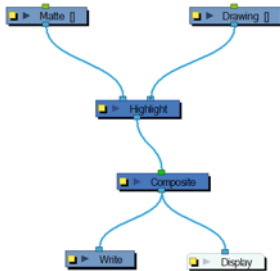
When you connect the Snowflake images into a Cutter effect's Matte port along with the Window images, the Window will be semi-transparent, matching the alpha (transparency) channel generated by the Greyscale module.



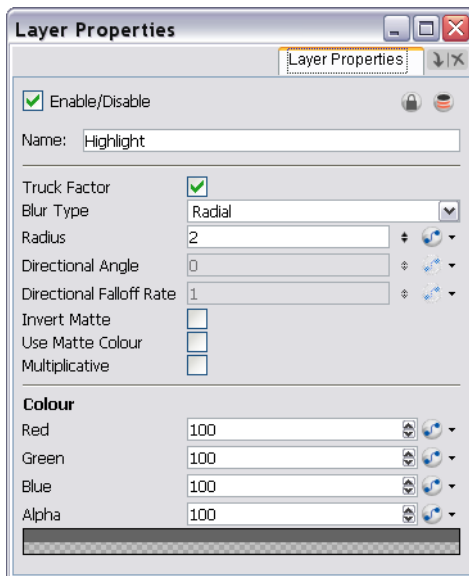
Highlight



Use the Highlight effect to turn a drawing's area lighter to simulate a light source. To produce the highlight effect, you must draw a shape to control where the highlight will appear on the original drawing.



The Highlight effect uses a matte to determine the shape and position of the highlight on another element and can blur the edges to create a softer effect. Use the Highlight editor to control the type and amount of blur, as well as the colour of the highlight effect.



- **Truck Factor:** Activated by default, this option readjusts the blur when the element undergoes a change of depth or scale. When this option is disabled, the effect's values remain unchanged regardless of depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached this effect.
- **Blur Type (Directional or Radial):**
 - ⇒ If Directional is selected, Harmony Stage will blur the matte in the direction you select.

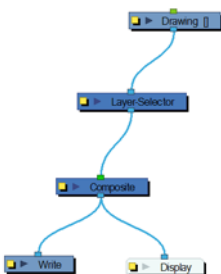
- ⇒ If Radial is selected, Harmony Stage will blur the edges of the matte evenly around points that make up the edge of it.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Directional Angle:** If you select a Blur Directional Type, you can select the direction of the blur by entering a value from 0 to 360 in this field.
 - ⇒ **0:** blurs the image to the west.
 - ⇒ **90:** blurs the image to the south.
 - ⇒ **180:** blurs the image to the east.
 - ⇒ **270:** blurs the image to the north.
- **Directional Fall-off Rate:** The distance where the directional blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Invert Matte:** Activate this option to invert the matte used to create the highlight.
- **Use Matte Colour:** Select this option to use the colours in the matte for the highlight effect. If you deselect it, use the Colour section to select colour and alpha values.
- **Multiplicative:** Select this option to create a more diffused highlight.
- **Red/Green/Blue/Alpha:** In the RGBA fields, enter the value that you want added to or subtracted from the colour channels in the drawings. Alternatively, you can attach these values to function columns to animate them over time.

Layer Selector

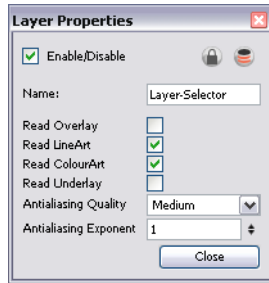


Use the Layer Selector effect to isolate and display one or several drawing layers:

- Overlay
- Line Art
- Colour Art
- Underlay

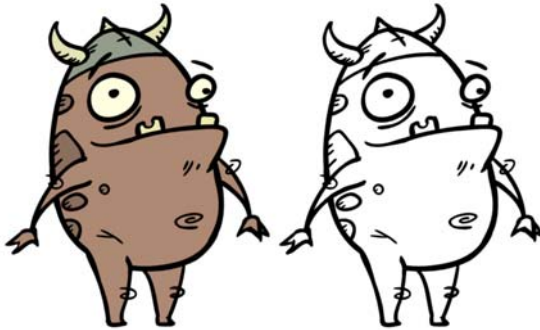


Use the Layer Selector editor to select the desired layers.



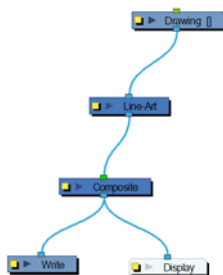
- **Antialiasing Quality:** Smoothness setting applied to the selected layers. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing). The higher the quality of the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more memory from your system.
- **Antialiasing Exponent:** Controls the amount of area around the selected layers edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.

Line Art

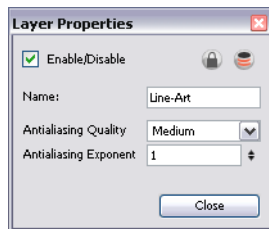


Use the Line Art effect to read only the Line Art in an element. Place a Line Art module after a Drawing module in the Network view to display only the module's Line Art output. The Line Art module can only be connected after a vector Drawing layer or a vector type Composite module. Any bitmap information will not be processed.

This effect will only work if the user drew or painted something into the Line Art layer of the drawing.

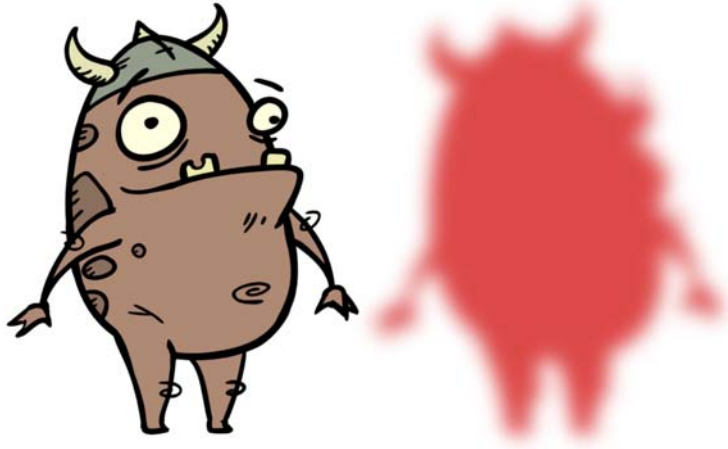


Use the Line Art editor to control how the Line Art is rendered by the module.

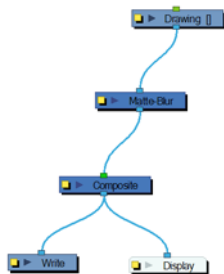


- **Antialiasing Quality:** Smoothness setting applied to Line Art. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing). The higher the quality of the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more memory from your system.
- **Antialiasing Exponent:** Controls the amount of area around the Line Art edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.

Matte Blur



Use the Matte Blur effect to blur a matte or change its colour. Here is an example of a network with the result of a Matte Blur effect.



Use the Matte Blur editor to control the output of the module.

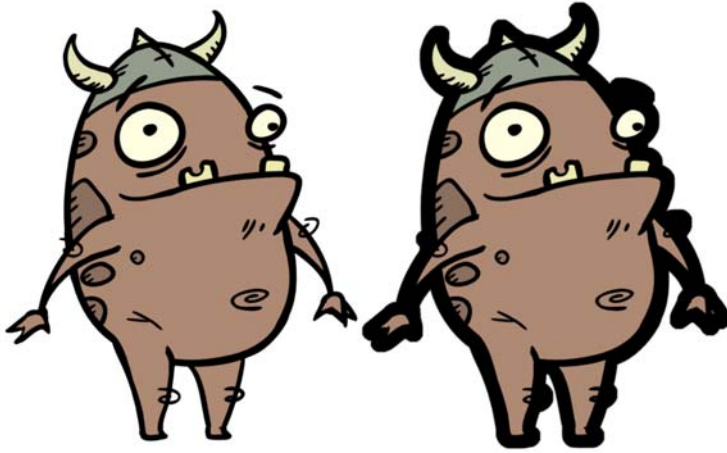


- **Truck Factor:** Activated by default, this option readjusts the blur when the element undergoes a change of depth or scale. When this option is disabled, the module's values remain unchanged regardless of depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached this module.
- **Blur Type** (Directional or Radial): If **Directional** is selected, Harmony Stage will blur the matte in the direction you select. If **Radial** is selected, Harmony Stage will blur the edges of the matte evenly around points that make up the edge of the matte.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Directional Angle:** If you select a Directional Blur Type, you can select the direction of the blur by entering a value from 0 to 360 in this field.
 - ⇒ **0:** blurs the image to the west.
 - ⇒ **90:** blurs the image to the south.
 - ⇒ **180:** blurs the image to the east.
 - ⇒ **270:** blurs the image to the north.
- **Directional Fall-off Rate:** The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Invert Matte:** Activate this option to invert the matte used to create the blur.
- **Red/Green/Blue/Alpha:** In the RGBA fields, you can enter the value you want added to or subtracted from the colour channels in the drawings. Alternatively, you can attach these values to function columns.

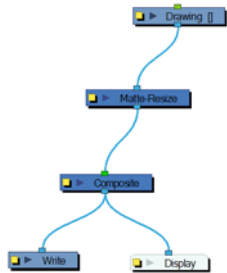


NOTE: If you select the *Pass Through* option in the Layer Properties of a Composite where this effect is connected, the effect will be multiplied in areas where the drawing elements that the effect is acting on overlap.

Matte Resize



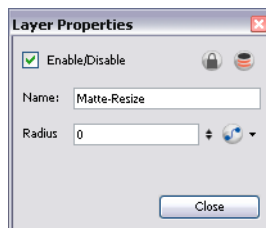
Use the Matte Resize effect to evenly expand a matte outward in all directions. The Matte Resize module increases the size of a matte from its centre. Here is an example of a network with the result of a Matte Resize effect.



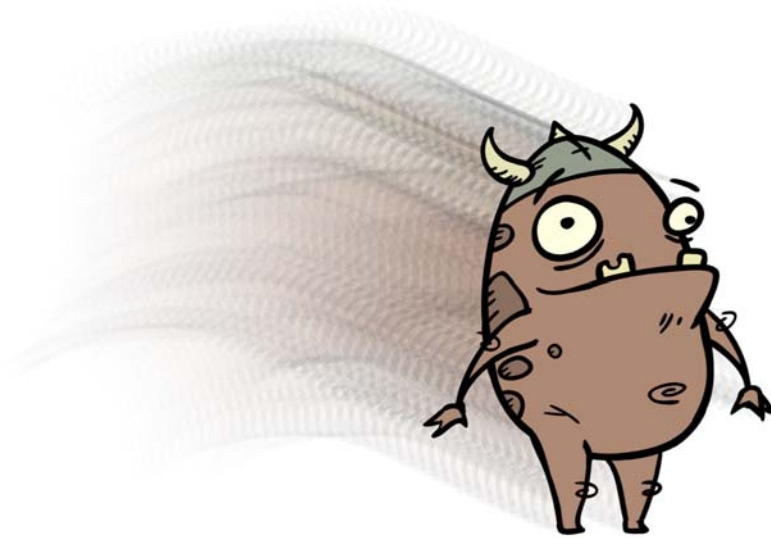
If you use the Matte-Resize module to create a pulsating glow you can enlarge the region without softening the edges. Using the Blur Radial effect, the effect may be softer than you intend. This module produces a limited antialiased matte, which can have slightly jagged edges. You could use this module in combination with other modules, such as:

- Tone
- Highlight
- Glow
- Shadow
- Matte Blur

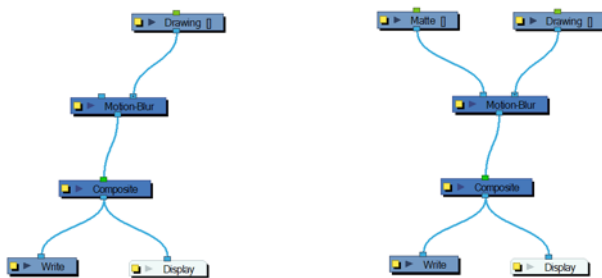
In the Matte Resize editor, you can enter a static value for the Radius of the resize operation. You can also attach the Radius value to a function column to change the value over time.



Motion Blur

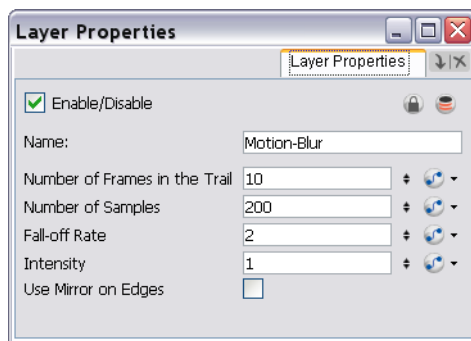


The Motion Blur effect is used to create a faded trail behind objects animated on a motion path. You cannot create a Motion-Blur on a hand-drawn animation. The layer must be moving along a trajectory (motion path) in order to work properly.



The Motion Blur effect automatically creates a matte for the Drawing layer attached to it, so it is not necessary to connect any matte into the Mask layer.

Use the Motion Blur editor to modify the motion blur, crowd simulation or particle system effect.

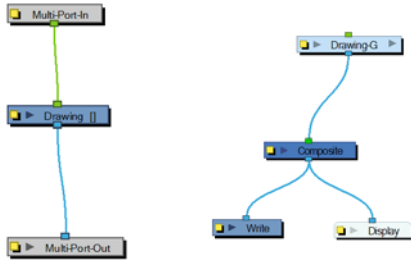


- **Number of Frames in Trail:** Number of frames before the current frame that will be used in the trail.
- **Number of Samples:** Number of copies of each drawing used in the trail. The higher the number, the more continuous the trail appears.
- **Fall-off Rate:** The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the trail to fade out slowly, distributing the colour evenly from the edge of the character to the farthest edge of the trail.
 - ⇒ A fall-off rate of 1 causes the trail to fade out quickly so that the trail is more opaque closer to the edge of the image and transparent at the end of the trail.

- **Intensity:** Select a value to define the opacity of the trail between 0 and 10. A value of 10 will make the trail very dark and almost opaque, where as a value of 0 will make the trail quite pale and ghostly transparent.
- **Use Mirror on Edges:** When enabled this option appear when the image is close to the edge of the camera frame. It forces the software to use a mirror of the image to calculate the blur so that it appears on both sides of the drawing object. Without this option once your drawing reaches the edge of the Camera frame, it gets cropped so does the trail.

Multi-Port-In

A Multi-Port-In module is added by default in a new Group module. Use it to add one or more input ports to the Group module so that you can process an image through the modules in the Group module.

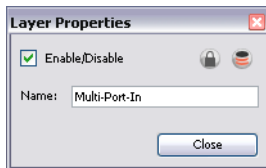


When you plug an element to a Multi-Port-In Module, an input port appears at the top of the Group module. You can add additional ports to the modules as needed.

Pass your cursor over the Group module input port to see the name of the Port Image In module that it connects to. You will notice that the Group module in these examples has no output port. It requires a Multi-Port-Out module to output data from its network.

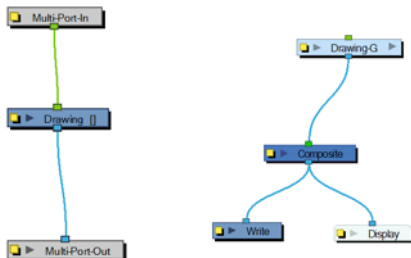
A Multi-Port-In is automatically added when you create a group.

Use the Multi-Port-In Module editor to rename the module.



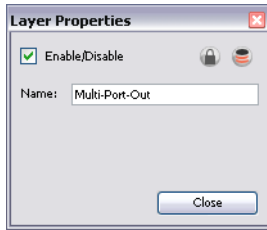
Multi-Port-Out

A Multi-Port-Out module is added in a new Group module by default. Use it to add output ports to the Group Module so that you can output the result of the group operation to the rest of the network. After you plug an element to a Multi-Port-Out module, an output port appears on the bottom of your Group module. You can add additional output ports as needed.



A Multi-Port-Out is automatically added when you create a group.

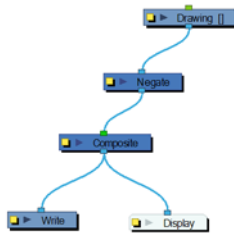
Use the Multi-Port-Out editor to rename the module in the network.



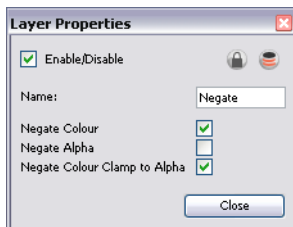
Negate Module



Use the Negate effect to invert the colour and/or alpha values in the Colour Art and Line Art of an image. The Negate module subtracts the original value of each channel (RGB or A) from the maximum value of that channel (255 for 8-bit channels) to produce the negative image.



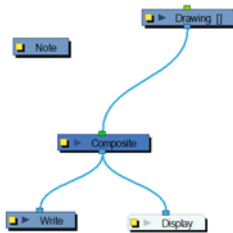
Use the Negate editor to select the colour and/or alpha values to invert.



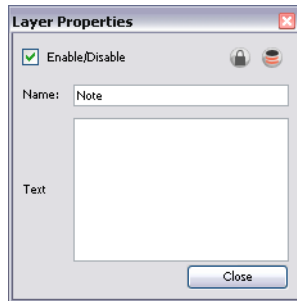
- **Negate Colour:** Inverts the values of the colour channels.
- **Negate Alpha:** Inverts the transparency value (alpha channel).
- **Negate Colour Clamp to Alpha:** Limits the negated area to the alpha channel.

Note

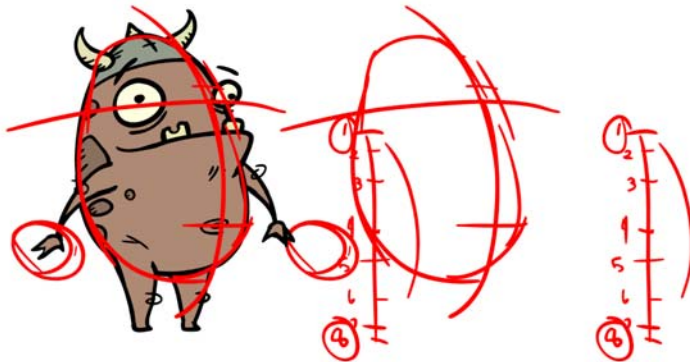
The Note module allows you to record any textual information that is relevant to your project. Use its editor to enter comments, suggestions or reminders. Note modules can be added anywhere in the network, including in groups.



Use the Note editor to add or update relevant notes with any textual information.

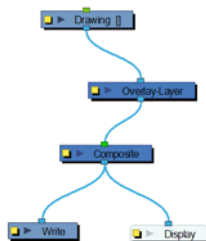


Overlay Layer

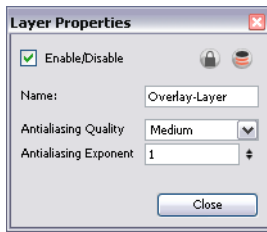


Use the Overlay Layer effect to read only the Overlay layer in an element. Place a Overlay Layer module after a Drawing module in the Network view to display only the module's Overlay layer output. The Overlay Layer module can only be connected after a vector Drawing layer or a vector type Composite module. Any bitmap information will not be processed.

This effect will only work if the user drew or painted something into the Overlay layer of the drawing.



Use the Overlay Layer editor to control how the Overlay layer is rendered by the module.

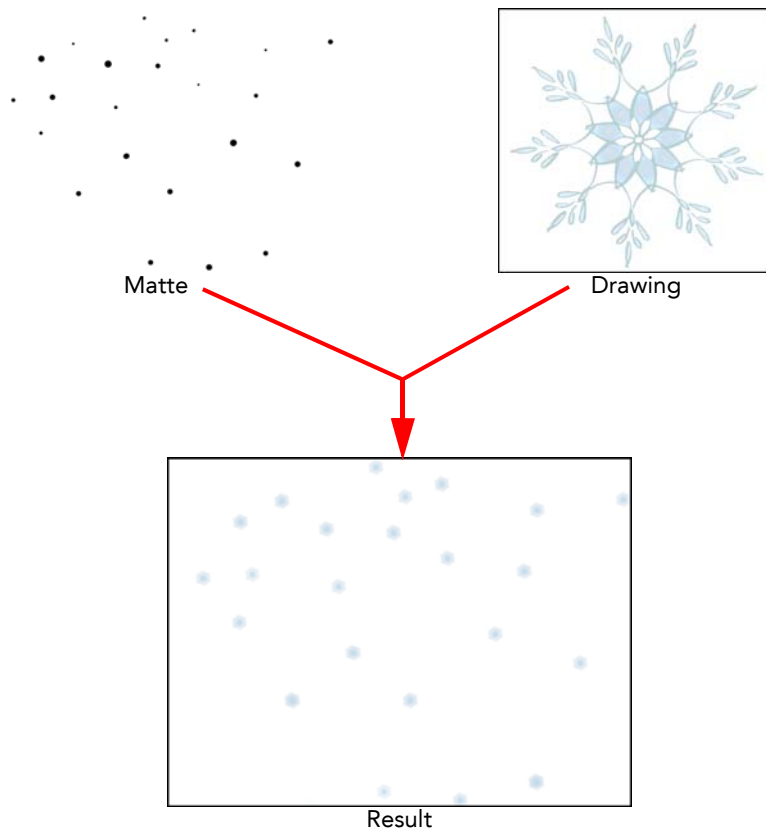


- **Antialiasing Quality:** Smoothness setting applied to the Overlay layer. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing). The higher the quality of the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more memory from your system.
- **Antialiasing Exponent:** Controls the amount of area around the Overlay layer edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.

Particle Effect, Crowd Simulation and More



The Motion Blur effect includes a Matte layer allowing you to do advanced effects such as particles. For example, you could create a snow fall using a snowflake drawing and an animated matte. The matte only has to be composed of a series of dots that you can animate with a motion path.



The matte operates such that:

- Any point created on the matte that is bigger than one pixel will increase the blur amount of the final composite as the drawing layer is actually being rendered once for every pixel that exists in an area. As no pixel exists one on top of another, these drawings are also being slightly offset from one another, which gives the final result of a blurred effect.
- The mask's alpha of 255 is divided by the number of dots you draw. Therefore if you make nine dots, which will represent nine different offset positions for your drawing, then the final output's opacity is being divided by nine. This means that the more dots you have, the paler they will all appear in the final render. To compensate, you can increase the Intensity parameter by the number of dots squared, in this case it would be 23×23 or a value of 529.

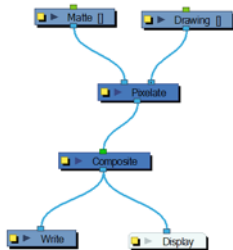
To create a **Particle Effect** using the Motion Blur, create a drawing that has different sized dots randomly distributed over the drawing space. Create the drawing to multiply, such as a snowflake or star, but be sure to draw it in the centre of the drawing plane. The Motion Blur effect will blur and filter this shape into the size, colour and location of the dots

drawn in the original image. The matte can change form over time to bring the particles to life, or the dot drawing can be animated, such as in the example of snow, to make it look like it is falling.

Pixelate



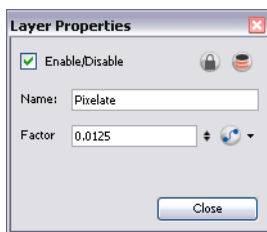
Use the Pixelate effect to apply a mosaic effect to an image (and its matte) based on the matte you supply. Pixelation makes the image look like it is made up of square tiles.



There are two input ports on the Pixelate module:

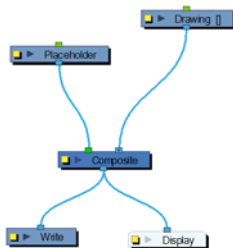
- The left port receives the matte
- The right port receives the image

Use the Pixelate editor to control the amount (Factor) the image is pixelated. You can attach the Factor value to a function curve to change the value over time.

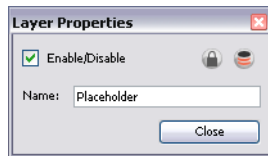


Placeholder

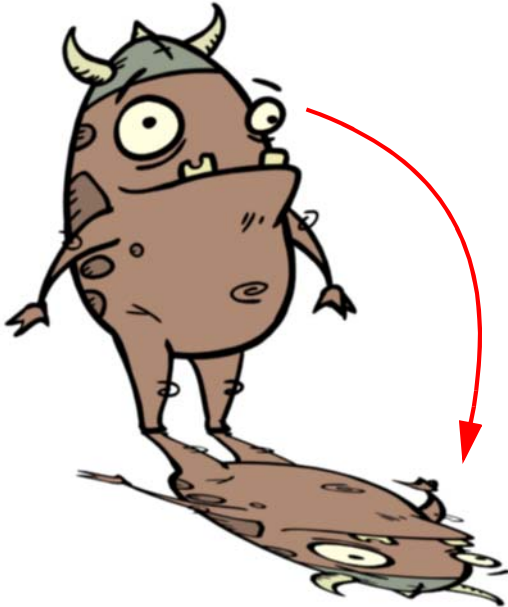
Use the Placeholder module in a network when you are either unsure of which module you will put in its place or if you want to lay out a custom network for future use.



Use the Placeholder editor to rename the module.




Quadmap

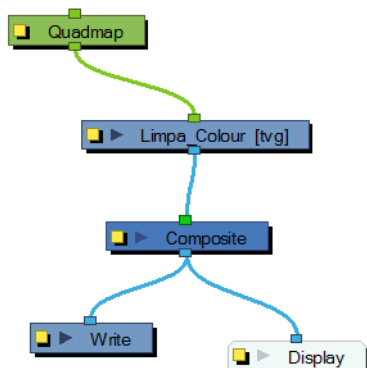


Use the Quadmap transformation layer to deform the shape of an element. For example, you can use it to create a drop-shadow effect on an element.

You can edit the Quadmap visually in the Camera view.

To edit the Quadmap the Camera view:

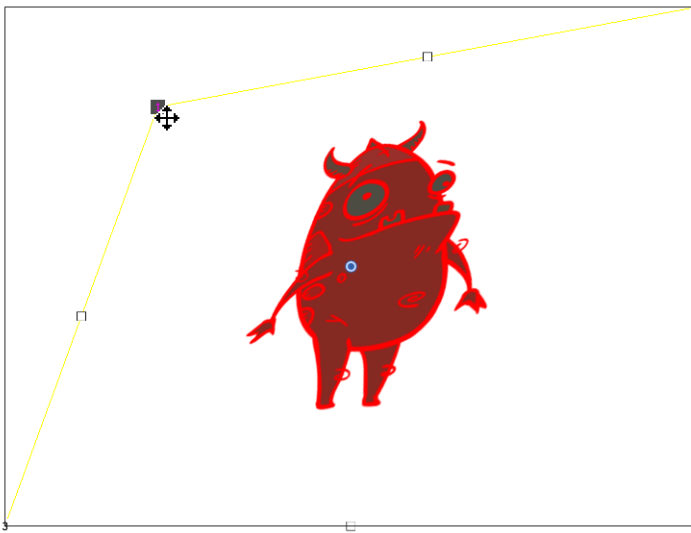
1. In the Timeline view, click on the Add Layer  button and select **Quadmap** from the drop-down menu.
2. Connect the Quadmap layer to the Drawing layer that you want to deform, or in the Network view, drag in the Quadmap module from the Module Library and connect it above the drawing element module that you want the effect to act on.



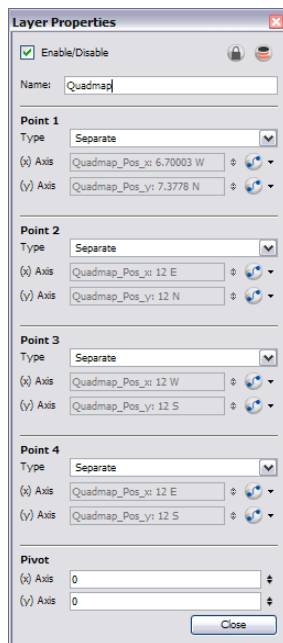
3. In the Tools toolbar, disable the Animate Mode to change the value for the Quadmap over the entire duration of the element.
4. In the Timeline view, click on the Quadmap layer to select it.
5. Select **View > Show > Control**. The default keyboard shortcut is [Shift]+[F11].

The quadmap handles appear around the element in the window. There is also a pivot point at the centre of the quadmap frame that can be repositioned.

- In the Camera View window, use the Transform tool to move the points on the quadmap. [Shift]-click to select multiple points.



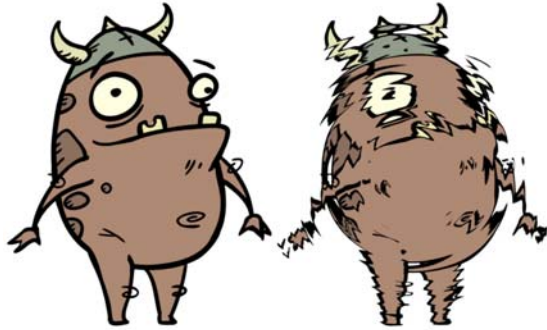
The value of each point on the quadmap can be changed gradually. To do this, use the Quadmap Layer Properties to attach the points to function curves.



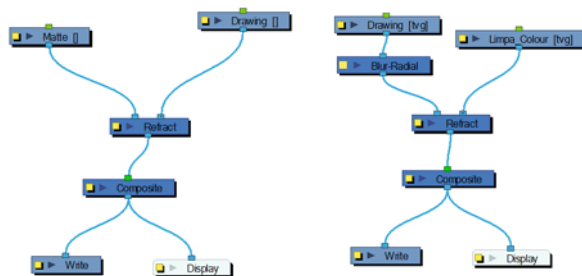
Only the X and Y values of each point in the quadmap can be changed.

- **2D Path:** change the X and Y values simultaneously and control the velocity of the change.
- **Separate:** change the X and Y values separately. Each of these can be attached to separate function curves.

Refract



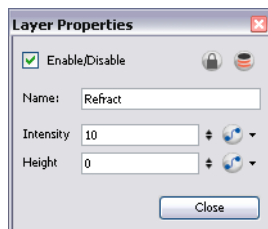
Use the Refract effect to create effects such as ripples and heat haze. This effect is based on the refraction of light, which occurs when a beam of light passes through media of different density, causing the light to refract or change angles. This effect makes objects appear distorted or offset from their actual positions. If you imagine an object in a pool of water the part beneath the surface of the water appears offset from its true position.



To create a refraction effect, you need a matte with alpha values. This creates the effect of a volume passing over an image, refracting the light that bounces off the contents below. For a ripple effect moving across an image, you must move the matte with a Peg layer.

If your matte is only black and white, meaning that there is no gradients and only solid colours in your matte drawing, you will need to connect a Blur Radial module after your matte Drawing module to soften the edges and get nicer waves.

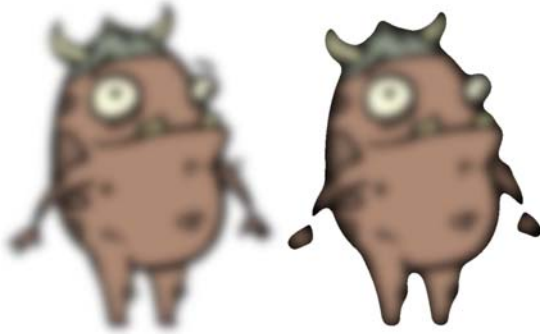
Use the Refract editor to control the effect.



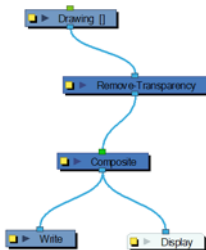
- **Intensity:** The amount of refraction to apply to the image.
- **Height:** The amount of depth to add to the refraction effect. When coupled with the Intensity effect, this value can create the effect of bending the objects below the refraction matte.

Attaching the Intensity and Height values to function curves changes their values over time.

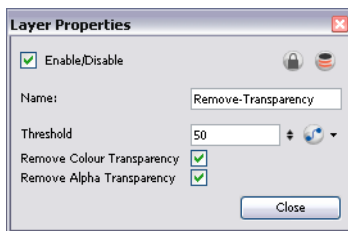
Remove Transparency



The Remove Transparency effect negates transparent values in an image. You can use the Remove Transparency module to remove the result of antialiasing around an image.



Use the Remove Transparency editor to control the effects of the module.



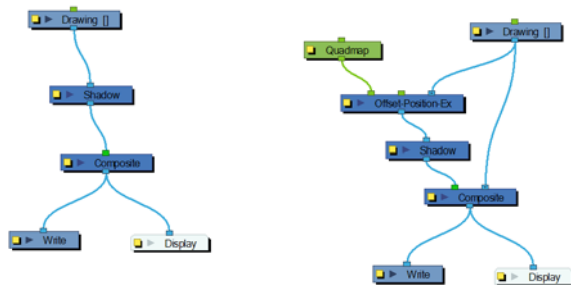
- **Threshold:** All values above the Threshold represent a transparent value. In this field, you must identify the value above which all alpha values are considered transparent. Alpha is measured from 0 to 255.
- **Remove Colour Transparency:** When selected, the Threshold value is used to determine which pixels in the Colour Art (RGB channels) to make fully opaque or fully transparent.
- **Remove Alpha Transparency:** When selected, the Threshold value is used to determine which pixels in the Alpha channel to make fully opaque or fully transparent.

Shadow



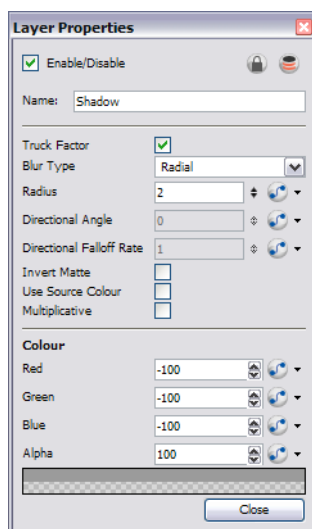
With the Shadow effect, you can turn a drawing into a shadow. It does not matter if your drawing layer is a fully coloured character, the Shadow effect will render it into a grey, semi-transparent, slightly blurry silhouette.

To add a shadow stretched out on the ground, simply add a Quadmap module to flip, stretch and skew the matte. Attach the entire effect to the same trajectory as your drawing layer and watch the shadow move along with your character.



Use the Shadow editor to modify the way the Shadow effect is created.

The Shadow effect uses the shape of the drawing connected to create the shadow behind another element and can blur the edges to create a softer effect. You can control the type and amount of blur, as well as the colour of the shadow, in this dialog box.



- **Truck Factor:** Activated by default, this option readjusts the blur when the elements undergo a change of depth or scale. When this option is disabled, the effect's values remain unchanged regardless of any depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached to this effect.
- **Blur Type (Directional or Radial):**
 - ⇒ If Directional is selected, Harmony Stage will blur the matte in the direction you select.

- ⇒ If Radial is selected, Harmony Stage will blur the edges of the matte evenly around points that make up the edge of it.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Directional Angle:** If you select a Directional Blur Type, you can select the direction of the blur by entering a value from 0 to 360 in this field.
 - ⇒ **0:** blurs the image to the west.
 - ⇒ **90:** blurs the image to the south.
 - ⇒ **180:** blurs the image to the east.
 - ⇒ **270:** blurs the image to the north.
- **Directional Fall-off Rate:** The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Invert Matte:** Activate this option to invert the matte used to create the shadow. In the render mode, the background will appear grey, while a the matte shape will act as a cut-out window, allowing you to see the original background colours beneath.
- **Use Source Colour:** Create the shadow using the matte shape's colour. Be sure that you are in render mode
 - 🌀 to see this effect and that your background is NOT white and that you do NOT have a white colour card module attached to the composite. As the shadow matte only gives colour information, but no alpha, the matte is automatically multiplied with the background colours. If there is no colour card attached, therefore the background appears black, you will see the matte colour at full opacity. If it is multiplied with a white background, the colours disappear into the full 255.
- **Multiplicative:** Multiplies the shadow colours with the background.
- **Red/Green/Blue/Alpha:** In the RGBA fields, you can enter the value to add or subtract from the colour channels in the drawings or you can attach these values to function curves.

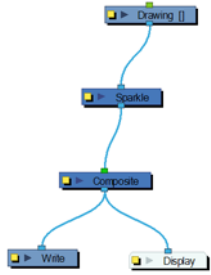
⚠ **NOTE:** If this effect is connected below a Composite module set to Pass-Through, the effect will be applied to each element connected in the Composite individually. If some of these elements are overlapping, the effect will also overlap.

Sparkle

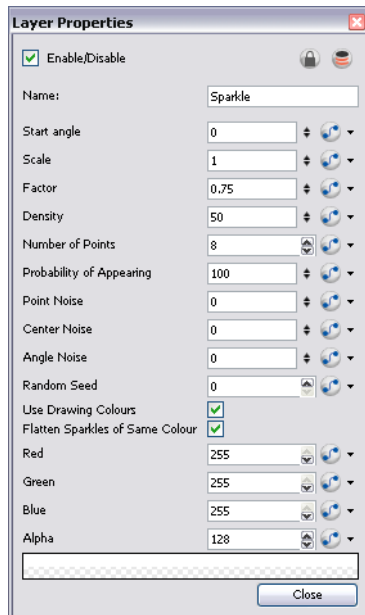


The Sparkle effect transforms a vector drawing into sparkles. You have a high degree of control over the appearance of the sparkles.

The sparkle effect can only be used with vector drawings. If the sparkle effect module is attached to a composite, verify that the Composite editor is set to Vector Flatten Output.



Use the Sparkle editor to modify how the Sparkle module creates the sparkle effect. You can also use Bezier and Ease function curves to change the values of factors over time.

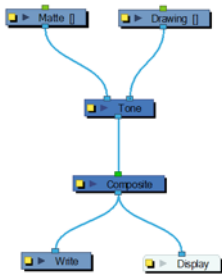


- **Start Angle:** Enter a value between -360 and 360 to indicate the angle of rotation of each sparkle.
- **Scale:** Sparkles are determined by the size of the bounding box of the coloured areas in the drawing. Enter the multiple to use to scale the sparkle size.
- **Factor:** Enter a value between 0.1 and 1 to determine how pointy the sparkle is. A value closer to 0 will result in a more pointed sparkle. A value closer to 1 will result in a more rounded sparkle.
- **Density:** Adjusts the density level.
- **Number of Points:** Enter the number of points you want each sparkle to have.
- **Probability of Appearing:** Enter the percentage of possibility that sparkles will be displayed. Enter 100 to always show sparkles. Enter 0 to always hide sparkles.
- **Point Noise:** Enter a value between 0.1 and 1 to indicate the amount by which points in a sparkle will distort.
- **Centre Noise:** Enter a value between 0.1 and 1 to indicate the amount by which the angles between each point in a sparkle will distort.
- **Angle Noise:** Enter a value between 0.1 and 1 to indicate the amount by which the **Start Angle** in a sparkle will distort.
- **Random Seed:** Enter a positive integer value that will be used to determine the sparkle pattern.
- **Use Drawing Colours:** Select this option to use the colour attributes of the drawing for the sparkle colour. When this selection is disabled (default setting), the colour values will be used as they are entered in the editor.
- **Flatten Sparkles of Same Colour:** Flatten all drawings of the same colour into a single layer.
- **Red/Green/Blue/Alpha:** In the RGBA fields, enter the values to use for the sparkle colour.

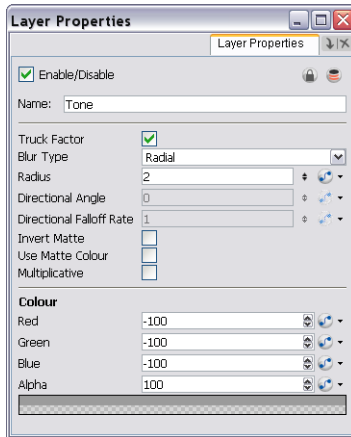
Tone



Use a Tone effect to add a dark coloured region to your drawing and simulate the shaded area away from a light source. To produce the tone effect, create a drawing to control where the tone will appear. The Tone effect uses a matte to determine the shape and position of the tone on your drawing and can be blurred at the edges to create a softer effect.



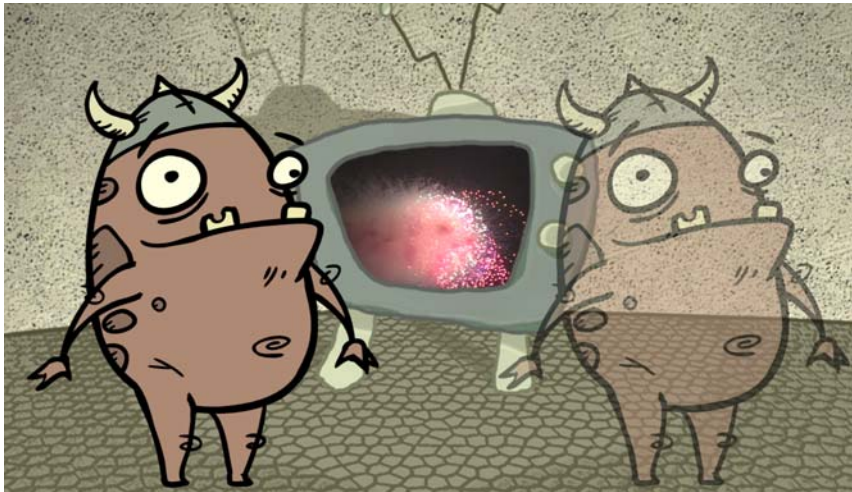
Use the Tone editor to control the type and amount of blur, as well as the colour of the tone.



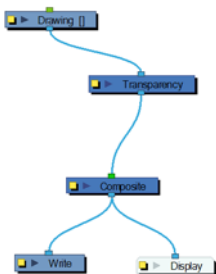
- **Truck Factor:** Activated by default, this option readjusts the blur when the elements undergo a change of depth or scale. When this option is disabled, the effect's values will remain unchanged regardless of depth or scale changes. It is recommended that this option be disabled when multiple drawings are composited and attached this effect.
- **Blur Type (Directional or Radial):**
 - ⇒ If Directional is selected, Harmony Stage will blur the matte in the direction you select.
 - ⇒ If Radial is selected, Harmony Stage will blur the edges of the matte evenly around points that make up the edge of the matte.
- **Radius:** Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
- **Directional Angle:** If you select a Directional Blur Type, you can select the direction of the blur by entering a value from 0 to 360 in this field.
 - ⇒ **0:** Blurs the image to the west.
 - ⇒ **90:** Blurs the image to the south.

- ⇒ **180**: Blurs the image to the east.
- ⇒ **270**: Blurs the image to the north.
- **Directional Fall-off Rate**: The distance where the blur fades from the edge of the image. Select a value between 0 and 1.
 - ⇒ A fall-off rate of 0 causes the blur to fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.
 - ⇒ A fall-off rate of 1 causes the blur to fade out quickly so that the blur is heaviest closer to the edge of the image.
- **Invert Matte**: Activate this option to invert the matte used to create the tone.
- **Use Matte Colour**: Uses the matte shape colour to create the tone.
- **Multiplicative**: Multiplies the tone colours with the background.
- **Red/Green/Blue/Alpha**: In the RGBA fields, you can enter the value you want added to or subtracted from the colour channels in the drawings or you can attach these values to function curves.

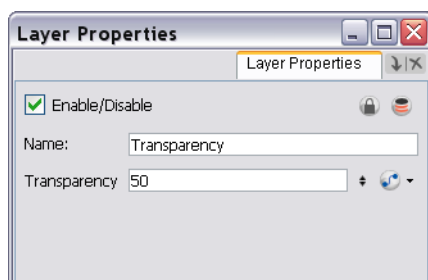
Transparency



The Transparency effect is used to make an image partially transparent. The Transparency effect is useful when fading images in and out, such as a phantom or to make something partially see-through, such as a window.

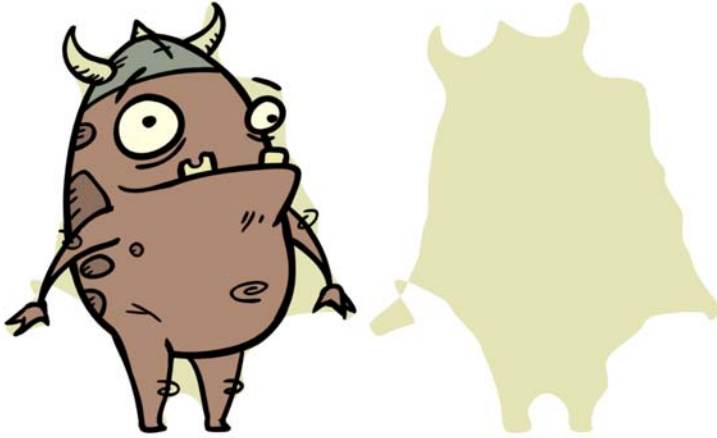


Use the Transparency editor to control how translucent the element should be.



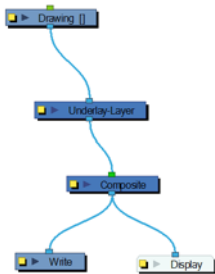
You can enter a value in the Transparency field or change the transparency value over time by linking it to a function curve. Entering a value of one hundred into the Transparency field will make the element 100% transparent, in other words, invisible. Entering a value of 0 will render the element completely opaque.

Underlay Layer

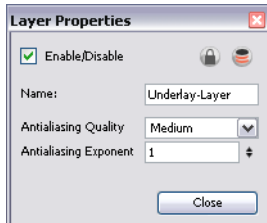


Use the Underlay Layer effect to read only the Underlay layer in an element. Place a Underlay Layer module after a Drawing module in the Network view to display only the module's Underlay layer output. The Underlay Layer module can only be connected after a vector Drawing layer or a vector type Composite module. Any bitmap information will not be processed.

This effect will only work if the user drew or painted something into the Underlay layer of the drawing.



Use the Underlay Layer editor to control how the Underlay layer is rendered by the module.




- **Antialiasing Quality:** Smoothness setting applied to the Underlay layer. Choose from Low (no antialiasing), Medium Low, Medium and High (extensive antialiasing). The higher the quality of the chosen setting, the greater the amount of antialiasing that is applied. Higher quality images require more time to render and more memory from your system.
- **Antialiasing Exponent:** Controls the amount of area around the Underlay layer edges that is used in the antialiasing process. A higher value uses less area, resulting in sharper edges, while a lower value uses more area, resulting in softer edges. If the Antialiasing Quality value is set to Low (no antialiasing), this value is ignored.

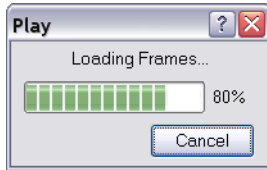
Previewing and Playing Back Effects


To preview your effects, you will have to perform a quick render. Effects must be calculated before they can be viewed in real time.

To preview your effects:

1. In the Playback toolbar, press the Render and Play  button.

The Play module opens and loads the frames.



2. Once the frames are loaded, press the Play  button in the Play window.



Preview Resolution

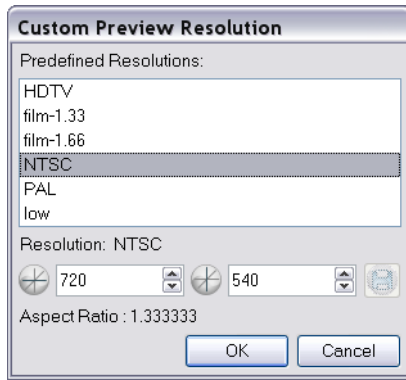
To make your previews calculate faster, you may want to render them out at a smaller resolution. You can use the Preview Resolution command so you will not have to modify the resolution of your scene every time you make a check preview.

The Preview Resolution command allows you to quickly ask for a preview at either a quarter, half or three-quarter of the scene resolution. You can even customize the preview resolution size.

To use the Preview Resolution command:

1. In the top menu, select **View > Preview Resolution**.
2. From the drop-down menu, select either **Same as Scene Resolution**, **3/4 of Scene Resolution**, **1/2 of Scene Resolution**, **1/3 of Scene Resolution**, **1/4 of Scene Resolution** or **Custom**.

If you selected the Custom option, the **Custom Preview Resolution** dialog box opens.



3. In the dialog box, select a resolution from the presets or type a new X-Y value.
4. Click on the OK button.
5. Preview your effects animation.

Extra Commands

These are some useful commands you can find only in Harmony Stage.

Recalculate all	Use the Recalculate All command to refresh the network and re-render the display when the Camera View is in render mode.	<ul style="list-style-type: none"> • In the Network View menu, select Edit > Recalculate All.
Recalculate selected	Use the Recalculate Selected command to refresh the network and re-render the display of selected elements when the Camera View is in render mode.	<ul style="list-style-type: none"> • In the Network View menu, select Edit > Recalculate Selected.
Auto Render write	Use the Auto Render Write command to render a frame each time the current frame is changed. You must have a Write module in your network to use this command.	<ul style="list-style-type: none"> • In the Network View menu, select Edit > Auto Render Write.
Print Network	Use the Print Network command to print the Network view.	<ul style="list-style-type: none"> • Select File > Print > Network. • In the Network view menu, select File> Print.

Preferences

Harmony Stage has a series of preferences you can adjust to make you work more efficient.

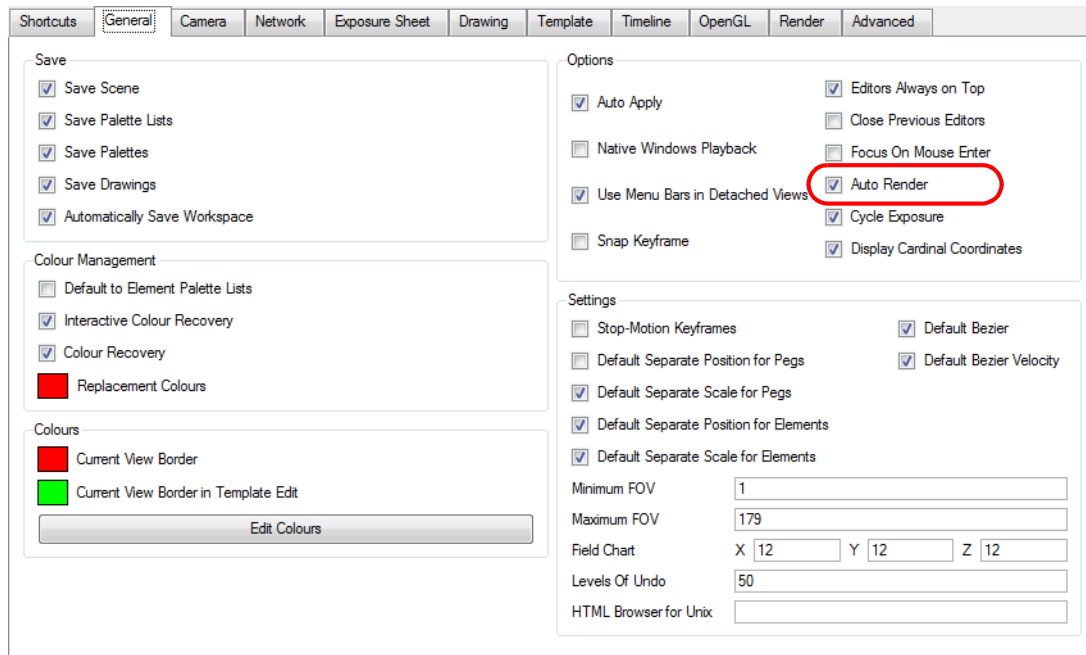
This topic is divided as follows:

- General, on page 740
- OpenGL, on page 741

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).

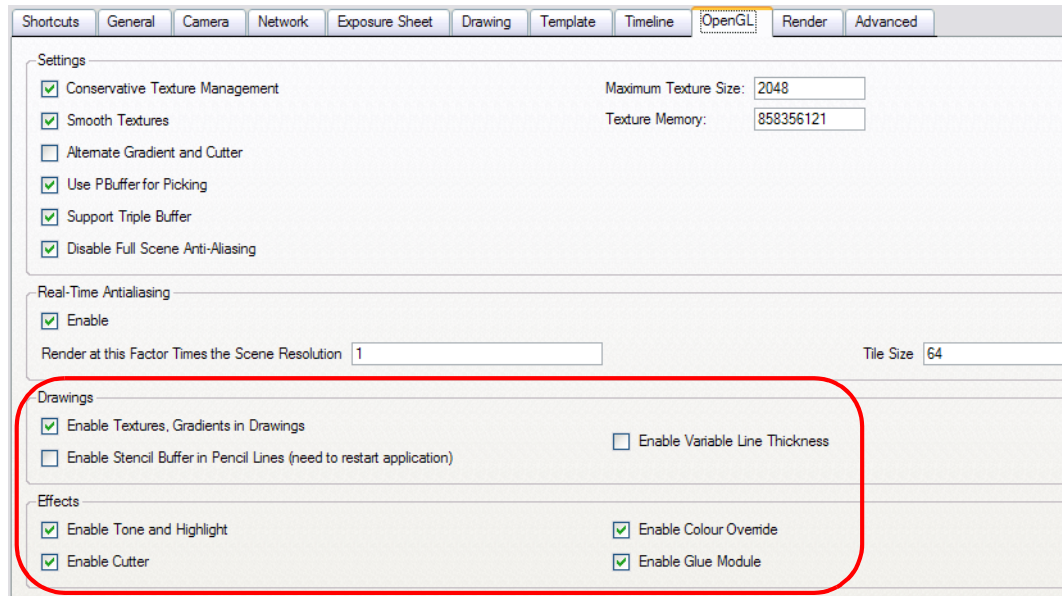
General



Options

- **Auto-Render:** Automatically enables the Auto-Render option.

OpenGL



Drawings

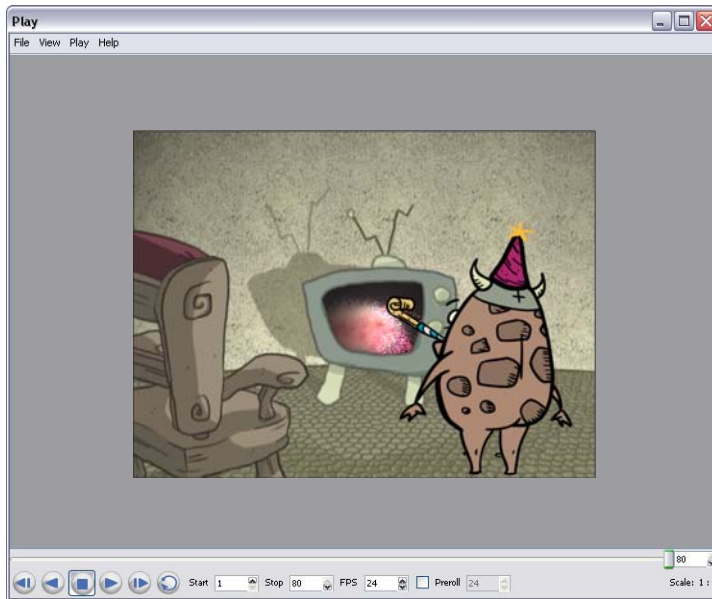
- **Enable Textures and Gradients in Drawings:** Shows zones and lines painted with texture or gradient colour pots. When disabled, zones and lines painted with textures and gradients will be filled with solid colours. Textures and gradients require more time and memory to display, so enabling this effect module can slow the performance of Harmony Stage.
- **Enable Stencil Buffer on Pencil Lines:** When this option is enabled, the pencil lines are displayed normally. The lines will be opaque (unless there are transparencies). Disabling this option will reduce rendering times, but will display additive opacities for overlapping pencil lines and unevenly filled curved pencil lines.

Effects

- **Enable Tone and Highlight:** Turns the Tone and Highlight effects on and off in the Camera, Top and Side views.
- **Enable Cutter:** Turns the rendering of Cutter effects on and off in the Camera, Top and Side views.
- **Enable Colour Override:** Turns the rendering of the Colour-Override effects on and off in the Camera, Top and Side views.
- **Enable Glue Module:** Turns the rendering of the Glue effects on and off in the Camera, Top and Side views.

Chapter 17

Exporting Your Movie



Now that you have finished your animation, it is time to render your movie. Depending on whether you plan to further edit your movie in a third party software, composite the movie in a larger body of work or put it up directly on the web, Toon Boom Harmony Stage supports several formats for all your rendering needs.

In this chapter, you will learn how to do the following:

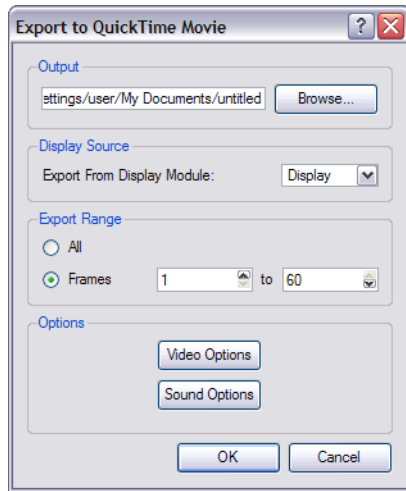
- Exporting a QuickTime Movie, on page 744
- Exporting an SWF Movie (Flash), on page 747
- Exporting an FLV Movie, on page 748
- Rendering the Network, on page 750
- Preferences, on page 763

Exporting a QuickTime Movie

To export a QuickTime Movie:

1. From the top menu, select **File > Export > Movie**.

The **Export to QuickTime Movie** dialog box opens.



2. From the dialog box, click on the Browse button to choose a destination path to where your movie will be saved and an appropriate filename for the export.
3. The Display Source section is where you can select which Display module you want to use to render out your project. If there is no Display module in the scene, the drop-down list will indicate Display All and will render out the scene in the same order as the Timeline view. It is always recommended to render out from the Display module, located under the final Composite module, unless you want to render out a specific section displayed by a particular Display module.

In the drop-down list, select the desired Display module.



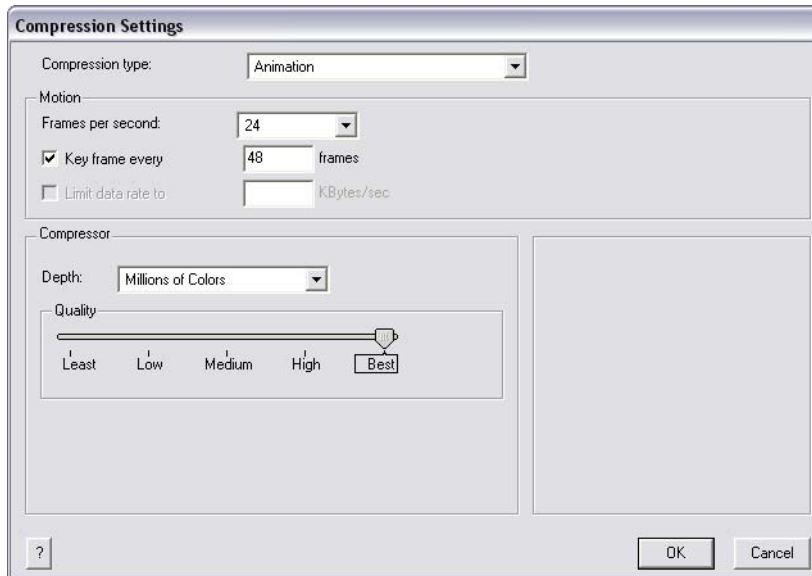
Refer to *Setting Up the Scene > Display Modules*, on page 491 to learn more about Display modules.

4. From the Export Range section, decide whether you would like to export the entire scene (All) or just a selected frame range. If you decide on the latter, be sure to enter in the frame range in the fields provided.



5. In the Options section, click on the Video Options button.

The **Compression Settings** dialog box opens.



6. From the Compression type drop-down menu, select a codec.
7. In the Motion section, choose your Frames per second from the drop-down menu.

By default, it will be set to match the frames-per-second (fps) of your Harmony Stage project. If you choose a lower frame rate, your export playback will be faster than your actual project. The reverse is also true for a higher frame rate.

8. From the same section decide whether you would like key frames inserted by checking the **Key frame every** box, and if so, the number per frame.

This is the option is recommended by QuickTime. A further description of this topic is cited below.

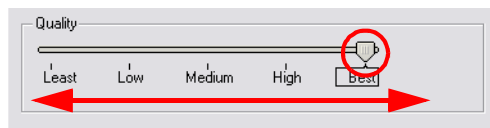
Many compressors use "frame differencing" to compress moving images.

Frame differencing is the process of determining what information has changed from a starting frame (called a "key frame") to subsequent frames. The key frame contains all of the information for an image. Subsequent frames contain only the information that has changed.

Depending on the compressor you use, you can specify how often you want key frames to occur. If you don't have enough key frames, the quality of your movie might be lower because most frames are generated from others. However, more key frames result in a larger movie with a higher data rate. With some compressors, an additional key frame is inserted automatically if too much of the image has changed from one frame to the next.

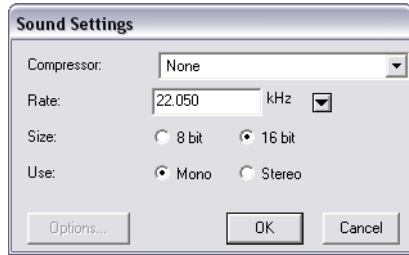
A good rule of thumb for general use is to have one key frame every 5 seconds (multiply the frames per second by 5). If you are creating a file for RTSP streaming and have concerns about the reliability of the delivery network (as with the public Internet), you may want to increase key frame frequency to one key frame every 1 or 2 seconds.

9. From the Compressor section, choose a Depth based on your movie's needs, for example, Millions of Colours+ houses an alpha channel.
10. In the Quality section, use the slider to choose a quality setting. Remember that the better the quality of the export, the larger the file.



11. Click the OK button when you are finished.
12. From the **Export to QuickTime Movie** dialog box, click-on the Sound Settings button.

The **Sound Settings** dialog box opens.



- From the Compressor drop-down menu, choose a compression type.

The default setting is None. This will preserve your original sound file, without the loss of information. However, an uncompressed sound file will inevitably add “weight” to the overall size of your video export.

- Select a Rate by pressing the down arrow button next to kHz.

It is best to check and match the original properties of your sound file. For example, if your file has an audio sample rate of 48 kHz and you choose a conversion rate of 22.05 kHz, the sound will play at the same speed, but with higher frequencies missing.

For a standard film sound quality, choose 44.1 kHz, or 48 kHz for DVD quality. Anything less will make the sound “dull” or less bright. For things like recorded voice this doesn't matter so much, but for music it can make an audible difference.

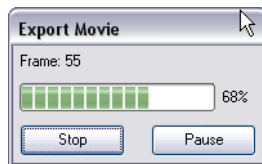
If file size is a consideration, such as with videos for the internet, then a lower rate might be more practical.

- Next, choose the Size and the Use, which are related. Once again, it is advisable to check your original sound file properties. If the file was recorded in one channel (mono), there is little point in choosing the two channel (stereo) option.

Although Mono can support a 16-bit channel, the extra information is unnecessary. Mono is generally paired with 8-bit and Stereo with 16-bit.

- Click on the OK button when you are done.
- In the **Export to QuickTime Movie** dialog box, click the OK button.

A progress bar appears.



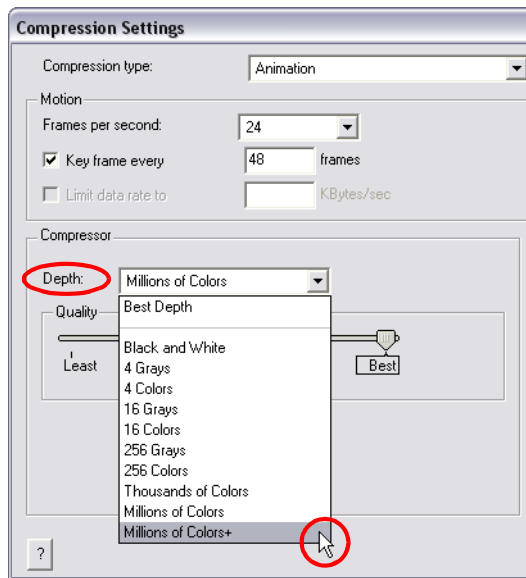
- Browse to the location on your computer where you saved your QuickTime video and double-click on it to view your export.



*If you feel that your exported video is either too small or too large, change the your project size from the top menu under **Scene > Scene Settings**. This will change the size of the video output.*

Exporting a QuickTime Movie with Transparency

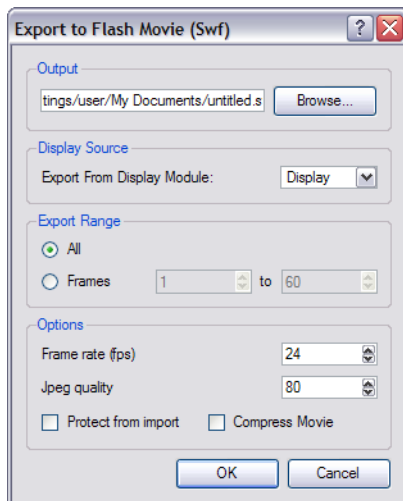
To render out a QuickTime movie with transparency, you need to set your **Video Options > Compression Settings > Depth** to **Millions of Colours +**.



Exporting an SWF Movie (Flash)

To export a SWF Movie:

1. From the top menu, select **File > Export > SWF**.
The **Export to Flash Movie (SWF)** dialog box opens.



2. From the dialog box, click on the **Browse** button to choose a destination path to where your movie will be saved and an appropriate filename for the export.
3. The **Display Source** section is where you can select which Display module you want to use to render out your project. If there is no Display module is the scene, the drop-down list will indicate **Display All** and will render out the scene in the same order as the **Timeline** view. It is always recommended to render out from the **Display** module, located under the final **Composite** module, unless you want to render out a specific section displayed by a particular Display module.
4. In the drop-down list, select the desired Display module.



Refer to *Setting Up the Scene > Display Modules*, on page 491 to learn more about Display modules.

- From the Export Range section, decide whether you would like to export all the frames of your movie or just a selected frame range. If you decide on the latter, be sure to enter in the frame range in the fields provided.



- In the Options section, enter your Frames rate (fps) into the field provided. By default, it will be set to match the fps of your Harmony Stage project. If you choose a lower frame rate, your export playback will be faster than your actual project. The reverse is also true for a higher frame rate.
- In the same section, select the JPEG quality.
 - ▶ 100 = full quality
 - ▶ 50 = average quality at about 1/5th of the size.
 - ▶ 25 = medium quality where loss of high image resolution starts to occur.
 - ▶ 10 = low quality where "macro-blocking" or large pixelation become obvious.
 - ▶ 1 = lowest quality where there is extreme loss of colour and detail and where the image becomes nearly unrecognizable.
- If you want to protect your movie to be imported in another application, enable the Protect from Import option.
- Enable the Compress Movie option if you want to get a lighter format. The movie may lose some quality, but in turn create a lighter file.
- Press the OK button when you are finished.
- Browse to the location on your computer where you saved your Flash Movie and double-click on it to view your export.

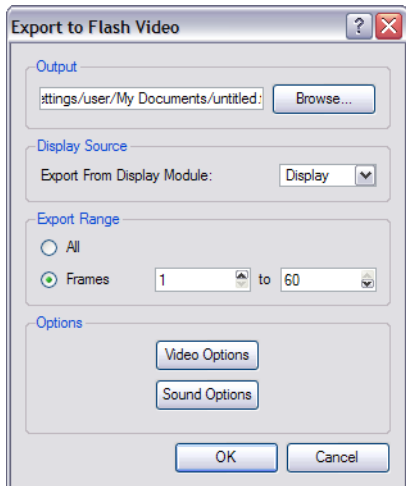
Exporting an FLV Movie

Harmony Stage can also export FLV movie files, this is an Adobe Flash format.

To export a Flash Video:

- From the top menu, select **File > Export > Flash Video**.

The **Export to Flash Video** dialog box opens.



- From the dialog box, click on the Browse button to choose a destination path to where your movie will be saved and an appropriate filename for the export.
- The Display Source section is where you can select which Display module you want to use to render out your project. If there is no Display module is the scene, the drop-down list will indicate Display All and will render out the scene in the same order as the Timeline view. It is always recommended to render out from the Display module, located under the final Composite module, unless you want to render out a specific section displayed by a particular Display module.
- In the drop-down list, select the desired Display module.



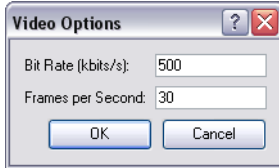
Refer to *Setting Up the Scene > Display Modules*, on page 491 to learn more about Display modules.

- From the Export Range section, decide whether you would like to export the entire scene (All) or just a selected frame range. If you decide on the latter, be sure to enter the frame range in the fields provided.



- In the Options section, click on the Video Options button.

The **Video Options** dialog box opens.

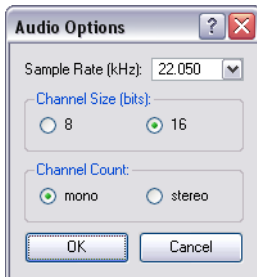


- Select the Bit Rate (compression) in Kbits/sec.
 - Between 400 to 900 is the optimal range. For Flash Videos, which are primarily used for the web, 500 or 512 is considered standard.
- Enter the Frames per Second in the field provided. It is advised that you check the frame rate of your Harmony Stage project and try to match it.

If you choose a lower frame rate, your export will appear faster than your project and vice versa is true for a higher frame rate.

- Click on the OK button.
- In the Options section, click on the Sound Options button.

The **Audio Options** dialog box opens.



- Select the Sample Rate in kHz from the drop-down menu.

It is best to check and match the original properties of your sound file. For example, if your file has an audio sample rate of 44.1 kHz and you choose a conversion rate of 22.05 kHz, the sound will play at the same speed, but with higher frequencies missing.

For a standard film sound quality, choose 44.1 kHz. Anything less will make the sound “dull” or less bright. For things like recorded voice this doesn't matter so much, but for music it can make an audible difference.

If file size is a consideration, such as with videos for the internet, than a lower rate might be more practical.

- Select the Channel size, either 8 or 16-bit.

16-bit can store more sound information than 8-bit, however, if your original sound sample was recorded on a mono channel, then this extra space is unnecessary. Once again, it is best to refer to the properties of your sound file.

- Select a Channel Count, either mono or stereo.

Stereo supports two channels and therefore requires at least 16-bits. However, if your original sound sample was recorded on a mono channel, then this option is moot. It is best to refer to the properties of your sound file.

- Click the OK button.

- In the **Export to Flash Video** dialog box, press OK.

A progress bar will appear.

- Browse to the location on your computer where you saved your Flash Video and double-click on it to view your export.

Rendering the Network

The Network view allows you to make advanced connections and isolate certain portions of your project, it also allows you to do multiple exports either from the entire network or specific sections.

For such a process, use the Write module in the Module Library view.

This topic is divided as follows:

- Write Module, on page 750
- Multiple Renders, on page 753
- Rendering from a Write Module, on page 762

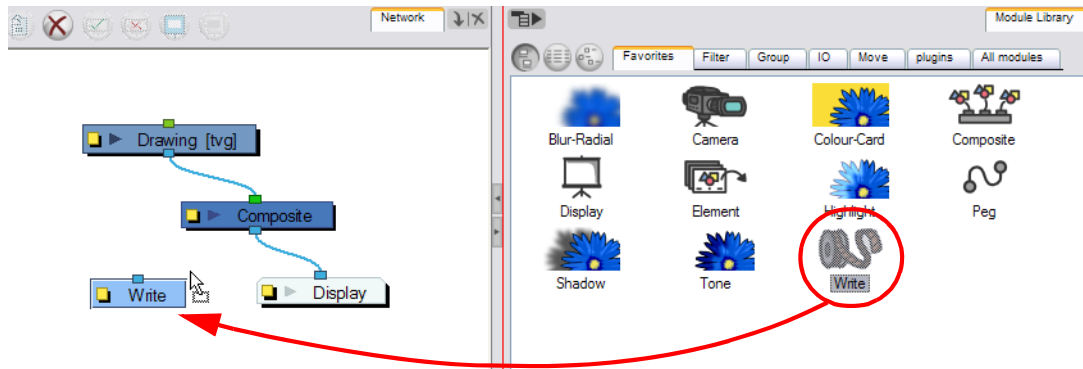
Write Module



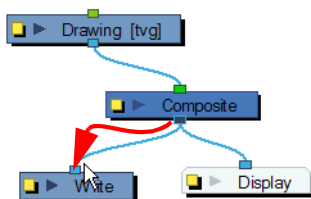
The Write module is used to record and output the connected image information.

To add a Write module:

1. In the Module Library, go to the Favorites tab.
2. Select the Write module and drag it to your Network view.



3. In the Network view, connect either the final Composite module or any other module which outputs images you want to render-out to the Write module.



Using the Write module, you can export your project as:

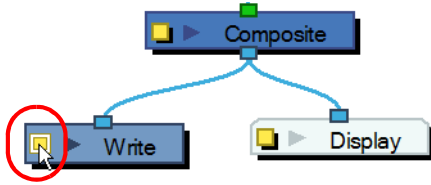
- Image Sequences
- QuickTime Movie

Image Sequences

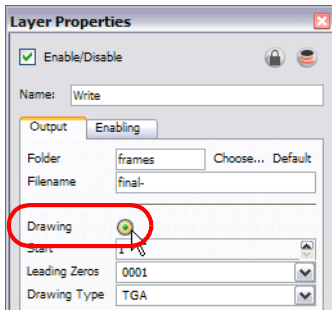
To export an image sequence, you need to adjust a few settings in the Write Module's Properties.

To set the Write Module to export an image sequence:

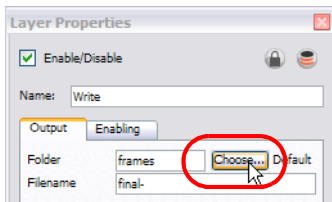
1. In the Network view, open the Write Module's editor by clicking on its Properties button.



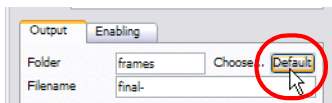
2. In the Output tab, select the Drawings option to create an image sequence.



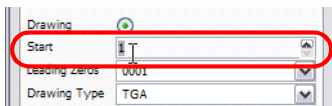
3. Click on the Choose button and browse to the directory where you will save the output.



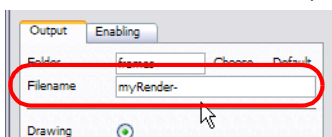
► You can also use the default directory to save in the default Frames folder included in the scene directory.



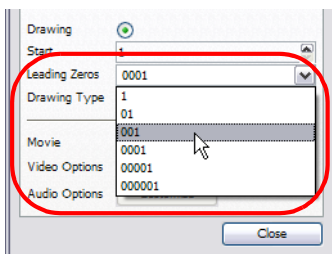
4. In the Start field, select the starting number for the image sequence.



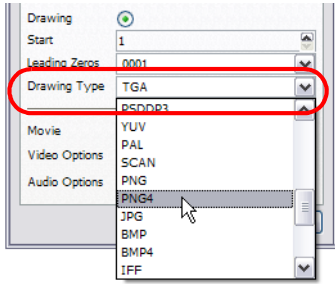
5. In the Filename field, type the image sequence's name prefix. It is very important to leave the hyphen (-) symbol at the end of the name to separate the image name from the image number.



6. In the Leading Zeros field, select the number of digits you want to see after the sequence prefix.



- In the Drawing Type field, select the file format you want to output your project to. When the file format includes a "4" at the end of its name, it means that an alpha channel will be created.



- Click on the Close button.

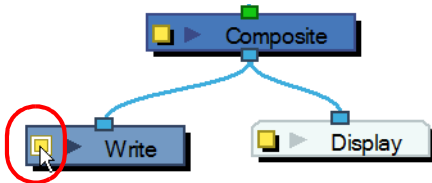
The project will not start rendering yet. These are only the settings. You can still modify your scene.

QuickTime Movie

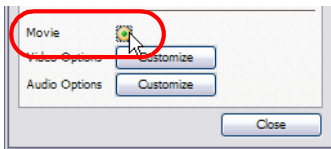
To export a QuickTime movie, you need to adjust few settings in the Write Module's Properties.

To export a QuickTime movie from a Write Module:

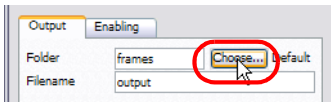
- In the Network view, open the Write Module's editor by clicking on its Properties button.



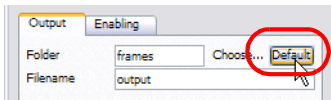
- In the Output tab, select the Movie option to create a movie file.



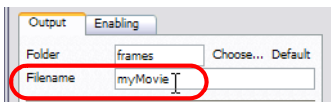
- Click on the Choose button and browse to the desired directory to save the output.



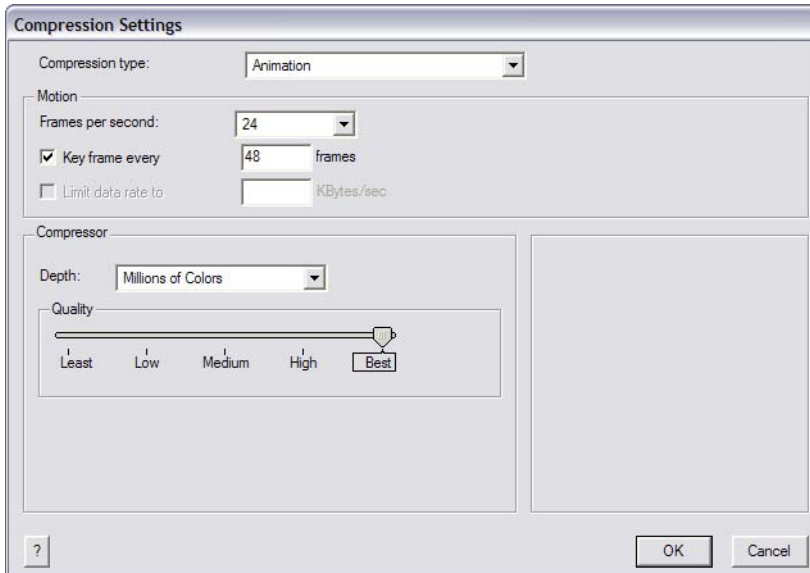
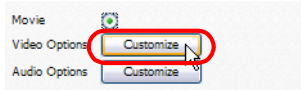
► You can also use the default directory to save in the default Frames folder included in the scene folder.



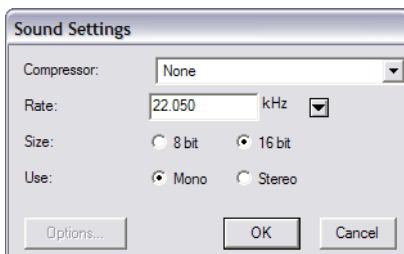
- In the Filename field, name the output file. You do not need to write the file format extension.



- In the Video Options field, click on the Customize button to set your video options.



- Click on the OK button.
- In the Audio Options field, click on the Customize button to set your audio options.



- Click on the OK and the Close buttons.

The project will not start rendering yet. These are only the settings. You can still modify your scene.



Refer to the *Exporting a QuickTime Movie* section to learn more about Audio and Video settings.

Multiple Renders

Stage allows you to simultaneously render many formats and resolutions for a scene. This saves a tremendous amount of time as you do not have to return between each render to start a new one.

Using Multiple Render is easy. Connect as many Write Modules as are needed to match the required number of exports. Then adjust each Write Module's settings to create image sequences or movies.



YOU MUST GIVE DIFFERENT NAMES TO EACH OUTPUT FILE. This is especially important if you save them all in the same directory, so that they do not overwrite each other.

When you have multiple Write Modules in a scene, it is useful to rename them according to their output settings such as: **low_resolution_movie** or **HDTV_sequence**.

This topic is divided as follows:

- Modules Used to Export to Different Resolutions, on page 754
- Connecting the Required Modules, on page 759

Modules Used to Export to Different Resolutions

To export different resolutions concurrently, you need to create a combination of:

- Write Module, on page 754
- Scale-Output Module, on page 754
- Crop Module, on page 756

Write Module

To learn more about the Write module, refer to the following sections:

- Write Module, on page 750
- Multiple Renders, on page 753

Scale-Output Module



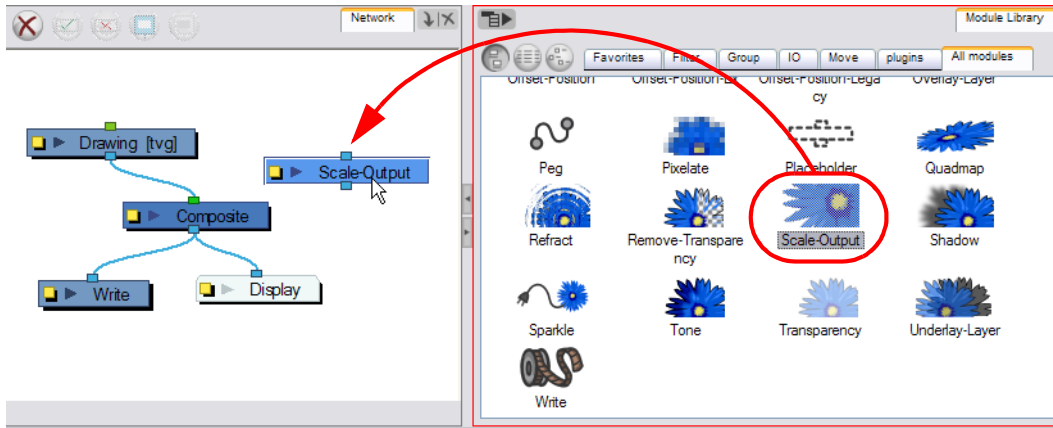
Once your Write modules are connected, you need some Scale modules to change the resolution output of the Write module. For example, if you export in a high resolution and a low resolution, you need one Scale-Output module.

Set the project's resolution to the highest resolution needed for this export and use the Scale-Output modules to scale down the other outputs. DO NOT scale up the output size, that will not provide a good result.

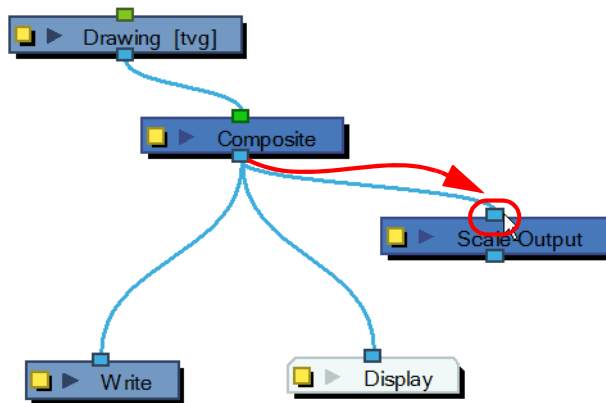
It is also better to use the Scale-Output module to scale down in a same aspect ratio so that it does not distort the image.

To add a Scale-Output Module:

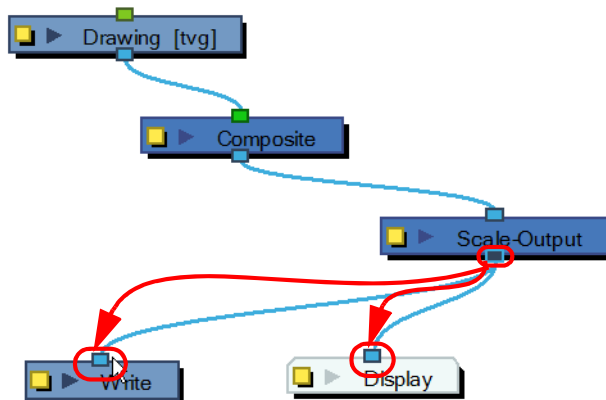
1. In the Module Library view, select a Scale-Output module and drag it to the Network view.



- In the Network view, connect the Composite module to the Input port of the Scale-Output module.

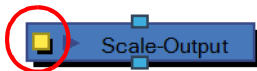


- In the Network view, connect the Scale-Output module to the input ports of both the Display module and the Write module.

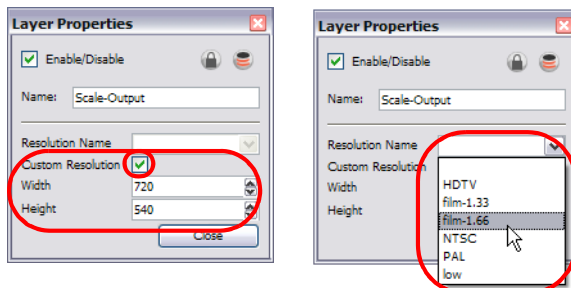


To set the Scale Module:

- In the Network view, open the Scale-Output module's editor by clicking on its Properties button.



- In the Layer Properties dialog box, select a resolution from the suggested Resolution Name list or type new resolution values to indicate the resolution to scale to.



- Click on the Close button.

Crop Module



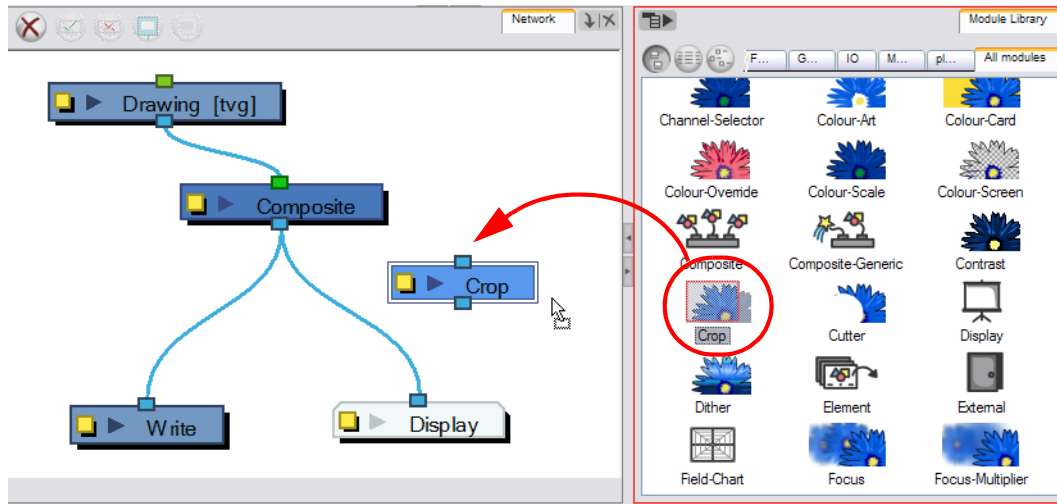
To output two files with different aspect ratios, such as 16:9 and 4:3, you can use the Crop module. This module is used to crop the final image in order to discard excess information without distorting the render.



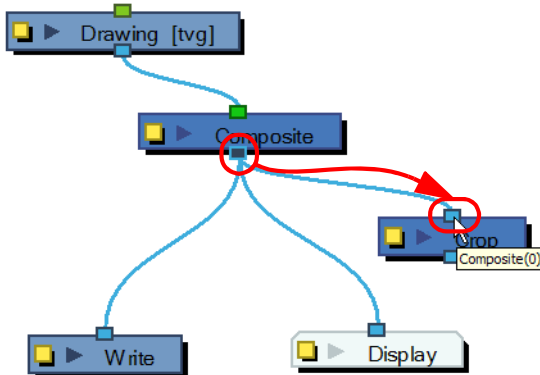
If you start with a higher resolution and want to crop down to a lower resolution, such as HDTV to NTSC, you will need to combine the Crop module with a Scale module.

To add a Crop Module:

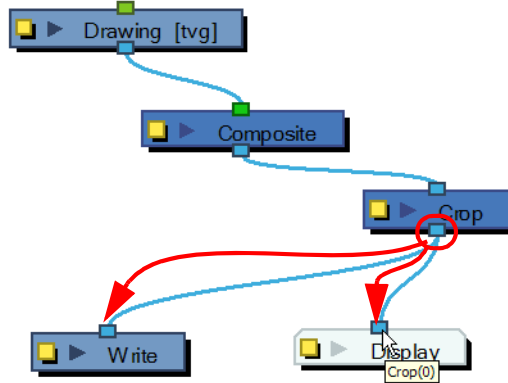
1. In the Module Library view, select a Crop module and drag it to the Network view.



2. In the Network view, connect the Composite module to the Input port of the Crop module.

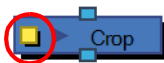


- In the Network view, connect the Crop module to the input ports of both the Display module and the Write module.

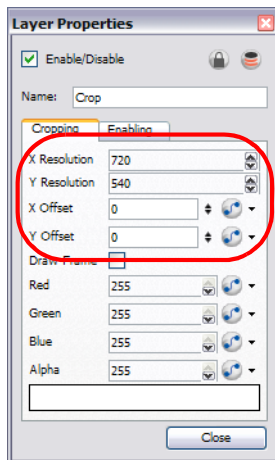





To set the Crop Module:


- In the Network view, open the Crop Module's editor by clicking on the module's Properties button.

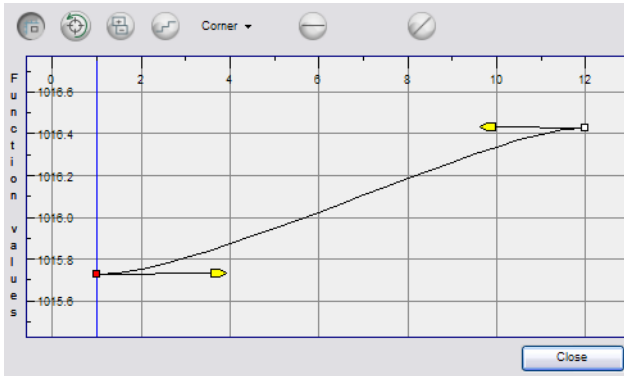


- In the Layer Properties dialog box, type new resolution values to indicate the resolution to crop to.

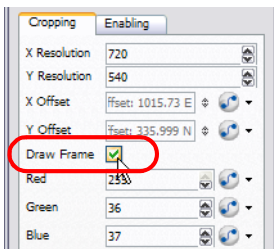


- You can manually enter the X-Y Offset, or move it in the Camera view. Select the right Display module in the Display toolbar. In the Advanced Animation toolbar, select the Translate  tool and with the middle mouse button, move the crop area. If the Animate  mode is enabled, the position of the crop area will be animated over time.
- If you want to create a Pan and Scan effect (panning the cropped selection over time to show more information), you can create a function to animate the cropped selection. Click on the Function Arrow  button beside the Local dialog box to create a Bezier or ease curve.

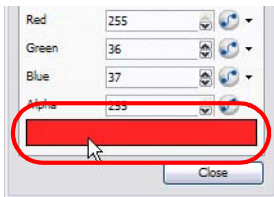
- If you created a function curve to animate the cropped selection, click again on the Function  button and edit the curve by adding keyframes and moving the selection box in the Camera View. (Refer to the Creating Animation Paths chapter for more information about function curves.)



- Enable the Draw Frame option if, instead of cropping the images, you prefer to have Stage draw the frame over the rendered scene.

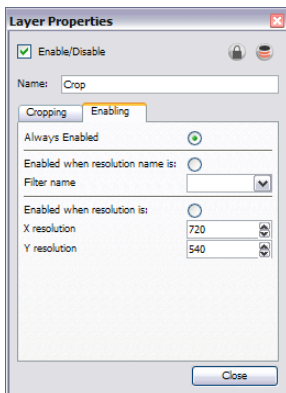


- Click in the colour rectangle to adjust the frame colour as desired if you have enabled the Draw Frame option.



- Click on the Close button.

The Crop module also has an advanced Enable tab. Use the Enabling tab to determine when the Crop module should be activated.



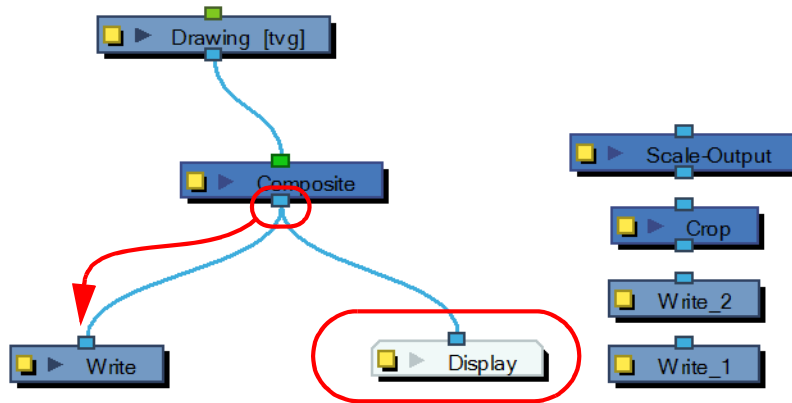
- Always Enabled:** Select this to have the Crop Module always produce output.
- Enabled when resolution name is:** Select this to activate the Crop Module only when the resolution of the scene matches the value selected from the Filter Name menu. These listed resolutions come from the Resolution/Frame Rate dialog box.
- Enabled when resolution is:** Select this to activate the Crop Module whenever the scene's resolution matches the values entered in the X resolution and Y resolution fields.

Connecting the Required Modules

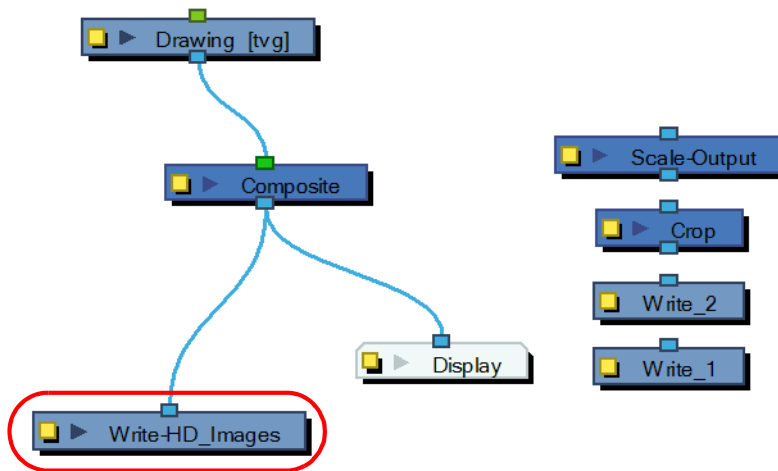
Once you know the type of render you want to do, you will need to retrieve your modules from the Module Library and connect them to the scene's network.

To connect multiple renders:

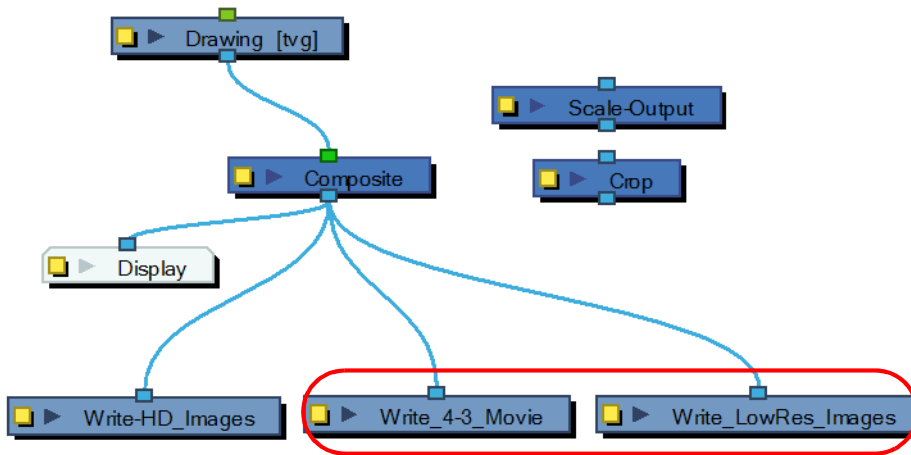
1. In the Module Library view, retrieve the necessary Write, Scale-Output and Crop modules.



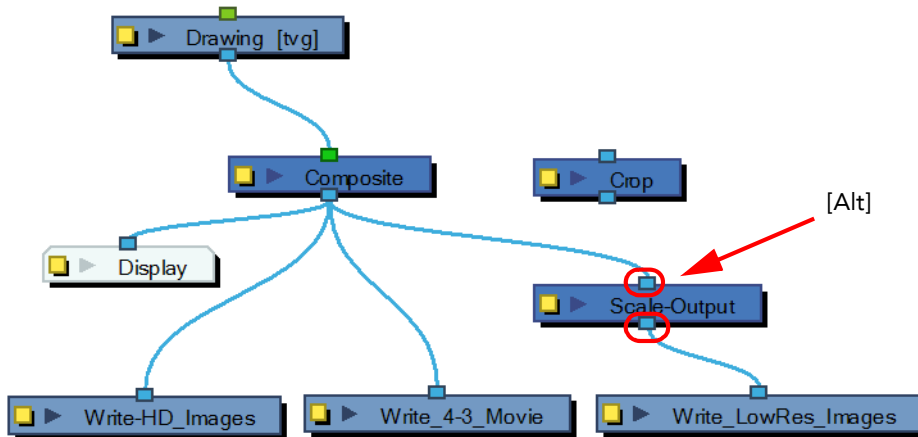
2. Connect the final Composite module to the first Write Module. (Make sure that you have a Display module reading the same information.)
3. Open the Write module's Editor by clicking on its Properties button.
4. Name the Write module according to the render type that you are planning to do.
5. Set the Write module parameters.



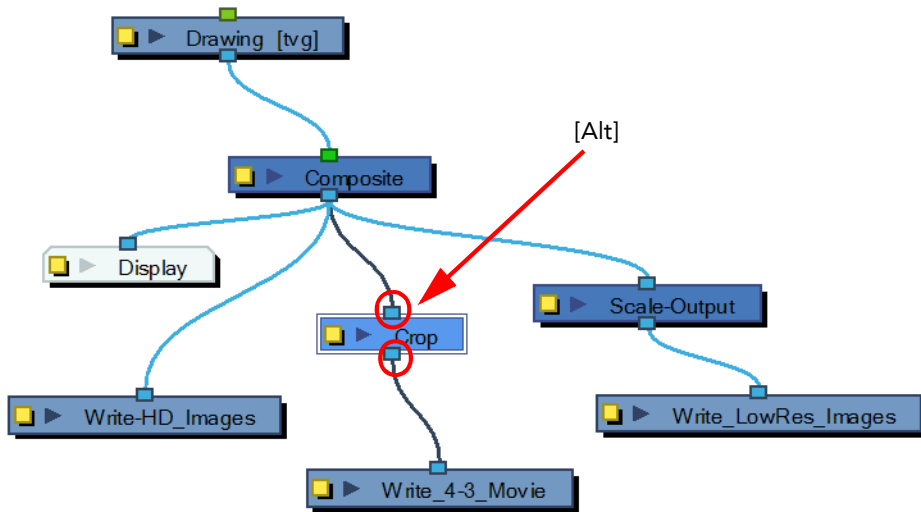
6. Connect the other Write modules and repeat Step 2 to Step 5.



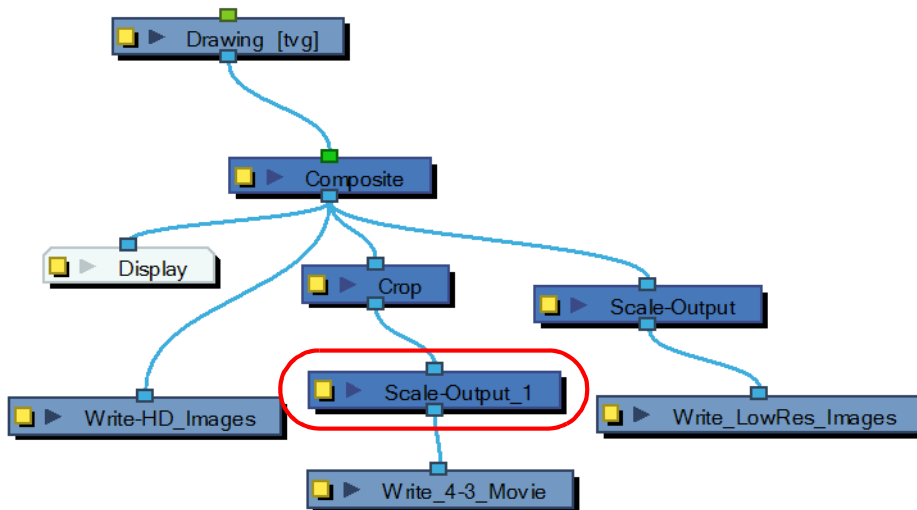
7. Using the [ALT] key, insert the Scale-Output modules between the final Composite module and their corresponding Write module.



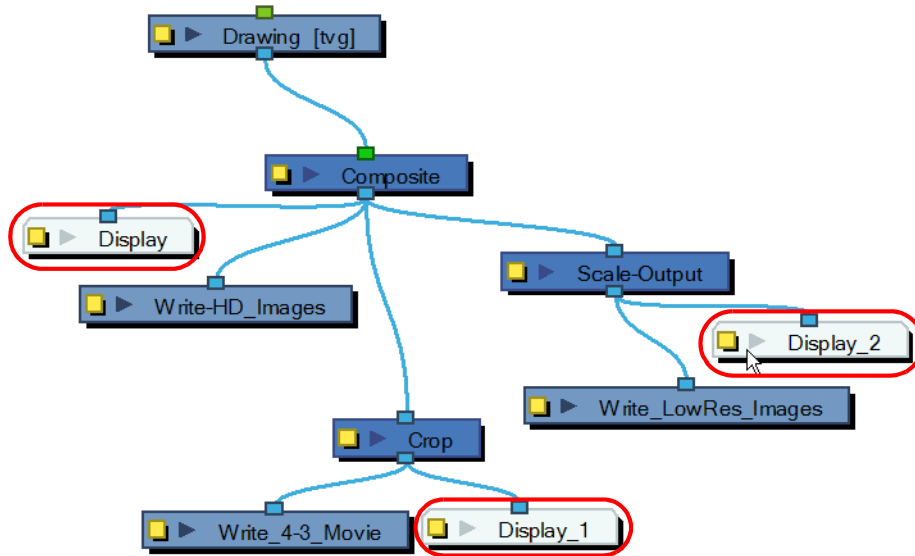
- Using the [ALT] key, insert the Crop modules between the final Composite Module and their corresponding Write or Scale module.



- ▶ If the output from the Crop module has to be scaled down, use a Scale-Output module.



- Connect a Display module to each Scale-Output or Crop module to be able to see each final image in your Camera view.

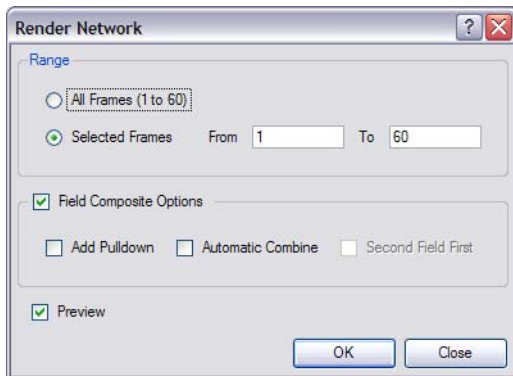


Rendering from a Write Module

If you want to render from your Write Module, you will need to use the Render Network option found in the File menu.

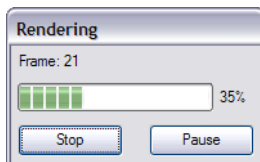
To render from the Write module:

- Select **File > Export > Render Network**. The default keyboard shortcut is [Ctrl]+[Shift]+[Y] (Windows/Linux) or [⌘]+[Shift]+[Y] (Mac OS X).



- In the Range section, select the Frame Range to render.
- Enable the Preview option if you want to automatically see the image sequence result once the render is done. (The preview will not show up for a QuickTime movie.)
- Select Field Composite if you want Harmony Stage to render the final images as fields for display on interlaced monitors.
- Click on the OK button.

All renders start.

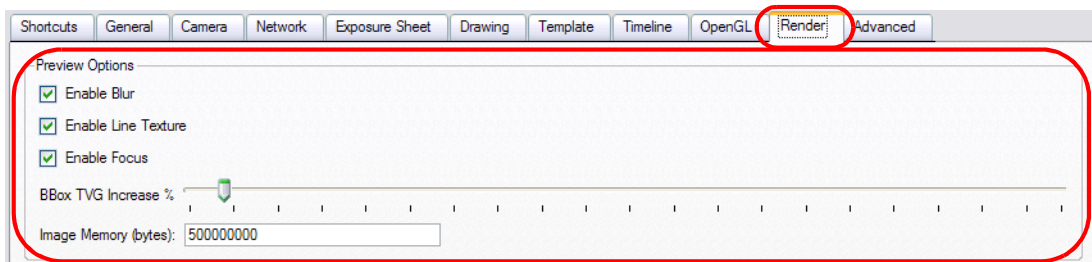
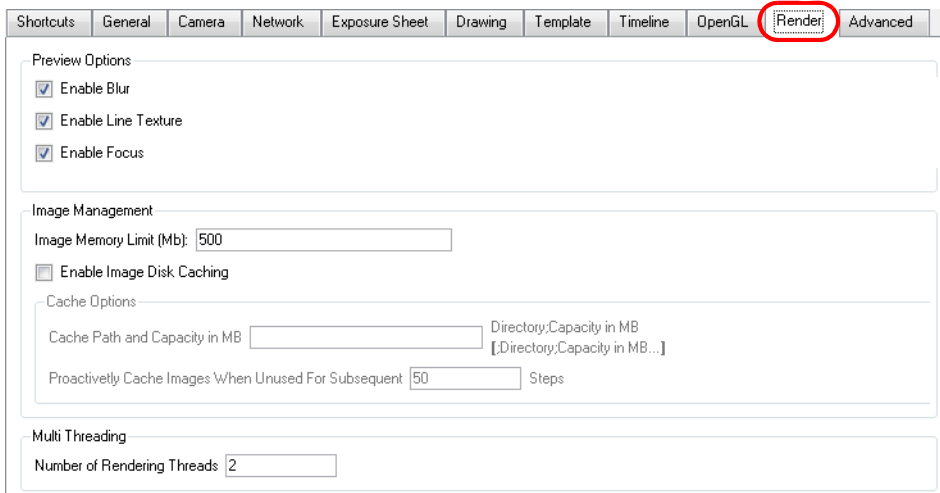


Preferences

In Harmony Stage, you will find preferences related to the rendering under the Render tab.

To open the Preferences panel:

- ▶ Windows/Linux: Select **Edit > Preferences**.
- ▶ Mac OS X: Select **Stage > Preferences**.
- ▶ You can also use the default keyboard shortcut [Ctrl]+[U] (Windows/Linux) or [⌘]+[U] (Mac OS X).



Preview Options

- **Enable Blur:** Renders blur effects derived from the Blur-Directional Module, Blur-Radial Module, and the Blur-Variable Module in the Render View window.
- **Enable Line Texture:** Renders line texture in the Render View.
- **Enable Focus:** Renders focus effects from the Focus-Apply and Focus-Set modules.

Image Management

- **Image Memory Limit (MB):** During soft rendering, Harmony Stage produces intermediate images. Roughly one image per module per frame. This process is called rendering steps. These produced images can come to hold considerable amount of memory and they are discarded once they are of no use in the rendering. Specifying a maximum memory limit in this field will discard the image once it reaches this limit.
- **Enable Image Disk Caching:** When this option is enabled, the images will be off-loaded to disk instead of being erased from memory. The off-load process occurs as soon as the image is no longer used during the current frame rendering, instead of waiting for the memory limit to be reached. This way, images do not need to be recalculated and instead, they are automatically restored from disk, considerably speeding up the interactive rendering process. During batch rendering, off-loading the image to disk after each usage reduces the average memory (RAM) usage.

Cache Options

When the Enable Image Disk Caching option is enabled, the following becomes available:

Image Management

Image Memory Limit (Mb): 500

Enable Image Disk Caching

Cache Options

Cache Path and Capacity in MB Directory:Capacity in MB
[Directory:Capacity in MB...]

Proactively Cache Images When Unused For Subsequent 50 Steps

- **Cache Path and Capacity in MB:**
 - ⇒ If this field is left empty, the Stage temporary directory will be used to off-load intermediate images. There is no disk usage limit for the temporary directory.
 - ⇒ When you specify a folder, you must type in the capacity (in MB) inside the path. Use the following method: path;capacity in MB;
ex: C:\user\tmp_image_folder;2000;
Note: The specified folder must already exist and if there is an error in the path, Stage's temporary directory will be used. You can also specify a ram drive in the path.
- **Proactively Cache Images When Unused For Subsequent ___ Steps:** This option will allow off-loading of intermediate images if they are unused for the specified number of steps.
 - ⇒ A value of **0** disables the option.
 - ⇒ A value of **1** forces the off-load of all images immediately after their creation and usage.
 - ⇒ The recommended value is **50**.
 - ⇒ If you are using a fine resolution of 2k pixels or more, the specified value should be smaller.
 - ⇒ Small networks should not use this feature.

Multi-Threading

Multi Threading

Number of Rendering Threads 2

The multi-threading preference is used to specify the level of parallel processing done during the final image calculation (soft-rendering). Allowing parallel processing speeds up the soft-render process. You can specify the number of parallel processes in the Number of Rendering Threads field:

- Entering a thread number value of **1** disables the multi threading process because it specifies that only one rendering thread will be used during the process.
- The maximum number of threads value is **64**.
- The recommended starting value is **2** threads per CPU core. Meaning that if you are using a 2 Quad Core CPU, the preferences should initially be set to **16** threads.

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