



**Toon Boom Harmony 11.1  
Getting Started Guide (Standalone)**

## Legal Notices

Toon Boom Animation Inc.  
4200 Saint-Laurent, Suite 1020  
Montreal, Quebec, Canada  
H2W 2R2

Tel: +1 514 278 8666

Fax: +1 514 278 2666

[toonboom.com](http://toonboom.com)

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### Credits

Art Development: Shabana Ali, Marie-Eve Chartrand, Tania Gray, Annie Rodrigue, Anouk Whissell

Technical Editor: Peter Cawthorne, Pamela Grimaud, Liven Tam

Technical Reviewer: Joel Baril, Marc-André Bouvier-Pelletier, Lindsay Brown, Elke Starck, Lilly Vogelesang

Technical Writer: Shabana Ali, Marie-Eve Chartrand, Christopher Diaz, Annie Rodrigue, Liven Tam, Tamu Townsend, Phoebe Wang-Chao, Anouk Whissell

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# Contents

<b>Toon Boom Harmony 11.1 Getting Started Guide (Standalone)</b> .....	<b>1</b>
Legal Notices .....	2
Contents .....	3
<b>Chapter 1: Introduction</b> .....	<b>5</b>
<b>Chapter 2: Interface</b> .....	<b>7</b>
Adding a View .....	7
Tool Properties View .....	9
Interface Navigation .....	9
<b>Chapter 3: How to Draw</b> .....	<b>13</b>
<b>Chapter 4: How to Create a Traditional Animation</b> .....	<b>15</b>
Cleaning Up .....	19
<b>Chapter 5: How to Paint</b> .....	<b>23</b>
Closing Gaps .....	25
<b>Chapter 6: How to Morph Drawings</b> .....	<b>27</b>
<b>Chapter 7: How to Import Bitmap Images</b> .....	<b>31</b>
<b>Chapter 8: How to Build a Cut-out Character</b> .....	<b>39</b>
Drawing the Pieces .....	39
Parenting Layers .....	42
Master Peg .....	44
<b>Chapter 9: How to Use Bone Deform</b> .....	<b>47</b>
Rigging .....	47
Adjusting the Deformation Chain .....	49
Display the Deformer Controls .....	52
Animation .....	53
<b>Chapter 10: How to Animate a Cut-out Character</b> .....	<b>57</b>
<b>Chapter 11: How to Create Templates</b> .....	<b>63</b>
Creating a Template from the Network View .....	64
<b>Chapter 12: How to Set Up a Scene</b> .....	<b>67</b>
Positioning the Camera .....	67
Positioning Objects .....	69
Repositioning the Pivot .....	70
<b>Chapter 13: How to Animate Objects and the Camera</b> .....	<b>73</b>
Animating a Layer .....	73

Animating the Camera .....	75
<b>Chapter 14: How to Create a Multiplane .....</b>	<b>79</b>
Positioning Elements in the Top and Side Views .....	80
<b>Chapter 15: How to Set Up Objects in 3D Space .....</b>	<b>83</b>
<b>Chapter 16: How to Import Sound and Add Lip-Sync .....</b>	<b>87</b>
Lip-Sync .....	87
Automatic Lip-Sync Detection .....	88
<b>Chapter 17: How to Add Effects to a Scene .....</b>	<b>91</b>
About Effects .....	91
Adding Effects .....	93
Module Library View Toolbar .....	94
Module Tabs .....	94
Tone Effect .....	96
Animating an Effect Over Time .....	98
<b>Chapter 18: How to Export a Movie .....</b>	<b>103</b>
<b>Glossary .....</b>	<b>104</b>
<b>Index .....</b>	<b>115</b>

# Chapter 1: Introduction

Harmony is a complete animation software allowing you to do endless creative projects. It comes with a very wide variety of tools and features.

In the Getting Started Guide, you will learn about the main features covering the basic concepts of Harmony, which will quickly bring you up to speed. Refer to the complete Harmony documentation available online at [docs.toonboom.com](https://docs.toonboom.com) to learn about all the tools and options, as well as advanced techniques.

This guide is divided as follows:

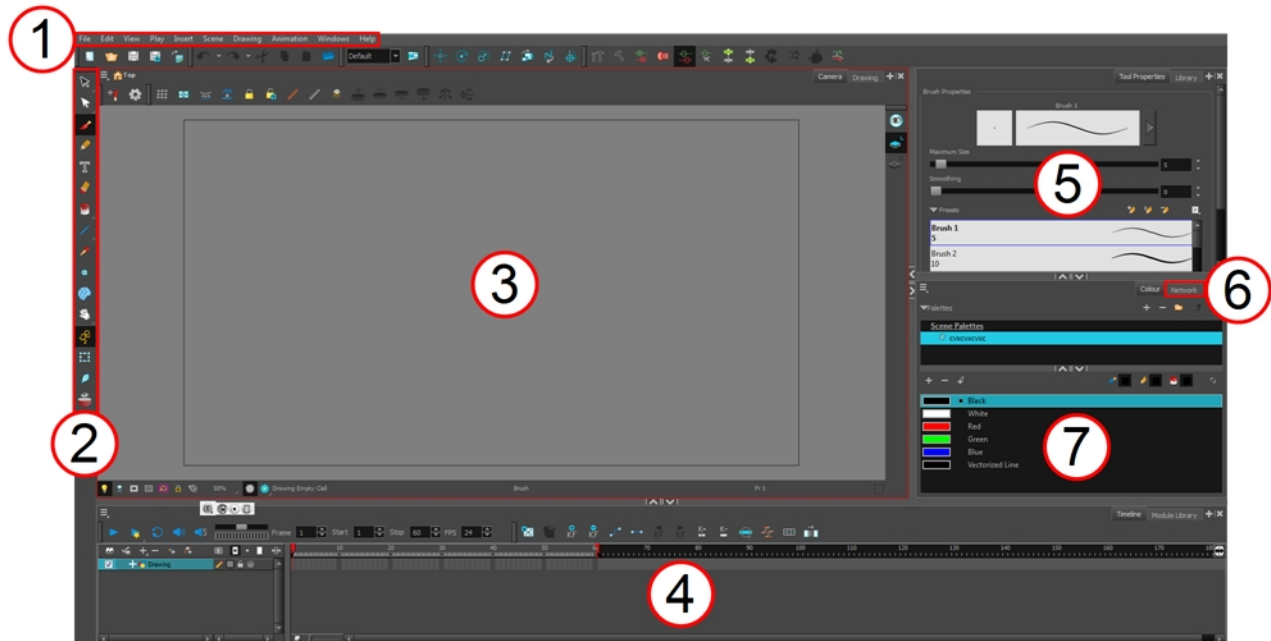
- [Interface on page 7](#)
- [How to Draw on page 13](#)
- [How to Create a Traditional Animation on page 15](#)
- [How to Paint on page 23](#)
- [How to Morph Drawings on page 27](#)
- [How to Import Bitmap Images on page 31](#)
- [How to Build a Cut-out Character on page 39](#)
- [How to Use Bone Deform on page 47](#)
- [How to Animate a Cut-out Character on page 57](#)
- [How to Create Templates on page 63](#)
- [How to Set Up a Scene on page 67](#)
- [How to Create a Multiplane on page 79](#)
- [How to Set Up Objects in 3D Space on page 83](#)
- [How to Animate Objects and the Camera on page 73](#)
- [How to Import Sound and Add Lip-Sync on page 87](#)
- [How to Add Effects to a Scene on page 91](#)
- [How to Export a Movie on page 103](#)



## Chapter 2: Interface

It's important that you become familiar with the following elements of the user interface as this will help you to start using Harmony. 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 for the first time, the default workspace is displayed. It contains all of the main elements you need to use.

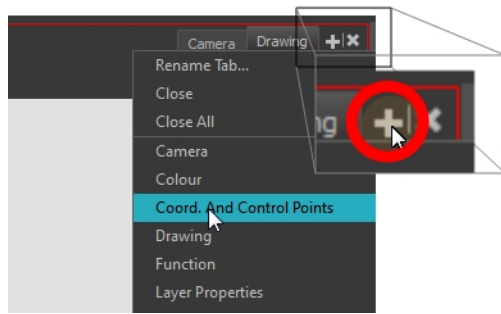


1. Menus
2. Tools toolbar
3. Camera view
4. Timeline view
5. Tool Properties view
6. Network view
7. Colour view

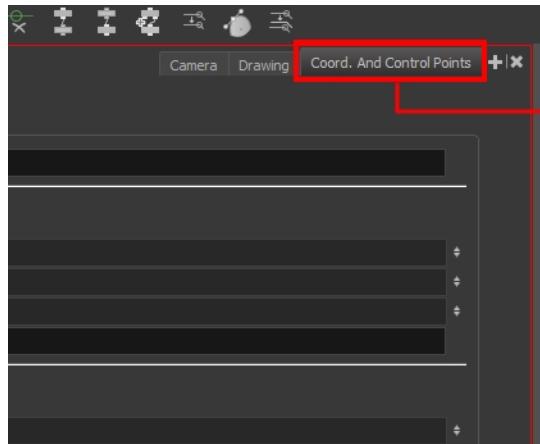
### Adding a View

#### How to add a view

1. Select the view you want to add from **Windows > the desired view**.
  - You can also use the Window drop-down menu button in each view. Click the **Add View** button and select a view from the list. You can open several instances of the same view except for the Timeline, Tool Properties, Colour and Drawing views.



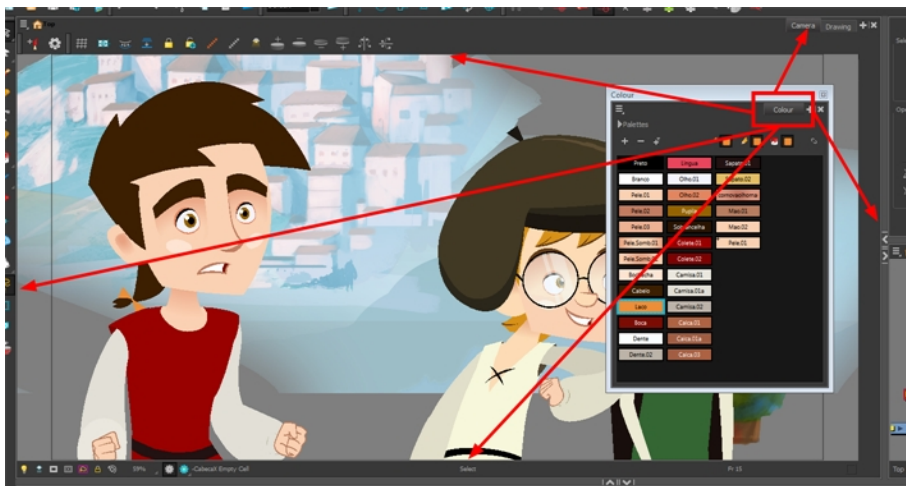
By default, the view appears tabbed.



By default, the new view appears as a tab

## How to dock a floating window in the workspace

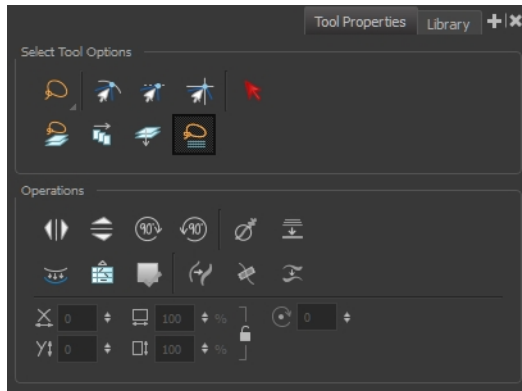
1. Drag the window's tab onto one of the workspace's views. You can drop the view onto the other existing tabs to tab the view with the other ones. You can also drop the view onto either side of an existing view to insert the floating one beside it. When you get close to one of the edges, a black rectangle will appear, indicating where the view will be inserted.




Nautilus © Gava Productions and Indiana Productions



## Tool Properties View



The contextual Tool 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 is updated.

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

## Interface Navigation

Harmony supports zoom in, zoom out, rotate, pan and reset view for easy interface navigation for the views.

Command	Action	Access Methods
Zoom In	Zooms into the view.	<p><b>View &gt; Zoom In</b></p> <p>Press 2 or roll the mouse wheel up.</p> <p>In the Timeline view, press Ctrl (Windows/Linux) or ⌘ (Mac OS X) and roll the mouse wheel up.</p>
Zoom Out	Zooms out of the view.	<p><b>View &gt; Zoom Out</b></p> <p>Press 1 or roll the mouse wheel down.</p> <p>In the Timeline view, press Ctrl (Windows/Linux) or ⌘ (Mac OS X) and roll the mouse wheel down.</p>
Zoom In or Out	Zooms in or out of the view.	Roll the middle mouse button up or down.
Pan	Moving parallel to the view.	Hold down the Spacebar and drag the mouse in the direction in which you want to pan the view.

Recenter view	Recenters the view on your mouse cursor.	Press N
Reset Pan	Resets the view's pan to its default position.	<b>View &gt; Reset Pan</b> Press Shift + N
Reset View	Resets the view to its default position.	<b>View &gt; Reset View</b> Press Shift + M
Reset Rotation	Resets the view's rotation to its default position.	<b>View &gt; Reset Rotation</b> Press Shift + X
Reset Zoom	Resets the view's zoom to its default position.	<b>View &gt; Reset Zoom</b>
Toggle Full Screen	<p>Enlarges the selected view to full screen. The full screen process is done in three stages.</p> <p>First, the selected view enlarges to the maximum width or height, but keeps the tool views such as Colour or Tool Properties view.</p> <p>Second, the view enlarges to full screen.</p> <p>Third, the view returns to its original size.</p>	<p><b>View &gt; Toggle Full Screen</b></p> <p>Press Ctrl + F (Windows/Linux) or ⌘ + F (Mac OS X)</p>
Rotate 90 CW	Rotates the Camera view 90 degrees clockwise, like an animation table.	<b>View &gt; Rotate View CW</b>
Rotate 90 CCW	Rotates the Camera view 90 degrees counter-clockwise, like an animation table.	<b>View &gt; Rotate View CCW</b>
Toggle Quick Close-up	<p>Use the Magnifier tool to quickly center on the mouse position and zoom in to a pre-defined value such as 4X. Then you can zoom out again. Hold the shift key and press Z to zoom in and back out again. Replacing the Reset Zoom by pressing Shift +.</p> <p>The area where you zoom in or out is dependent on the cursor location in the Camera view. If you zoom</p>	

	in and then move the cursor to a different location when you zoom out the mouse will be centered on that location.	
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If you are using a tablet or track pad that supports touch, then you can also use the standard two-finger gestures for zoom, rotate, and pan of the canvas in the Camera and Drawing views.


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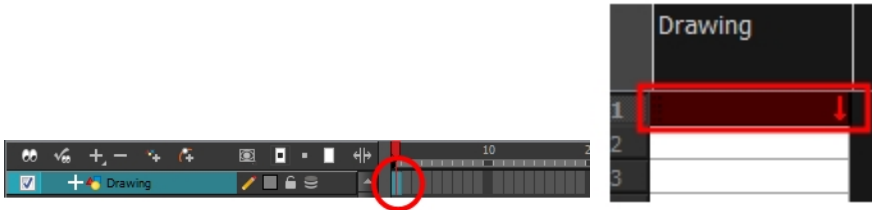


## Chapter 3: How to Draw

As soon as Harmony is started, you can start to draw straight away using the default drawing layer.

### How to draw

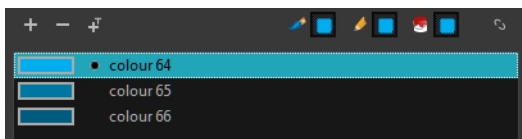
1. In the Tools toolbar, select the Brush  tool or press Alt + B.
2. In the Timeline or Xsheet view, click in the first cell of the drawing layer.
- 3.



4. In the Drawing or Camera view, start drawing.



5. To select a different colour, in the Colour view, select a different colour swatch. Double-click on the colour swatch to open the Colour Picker window and change the colour. Remember that anything already painted with that colour will update to the new colour.






## Chapter 4: How to Create a Traditional Animation

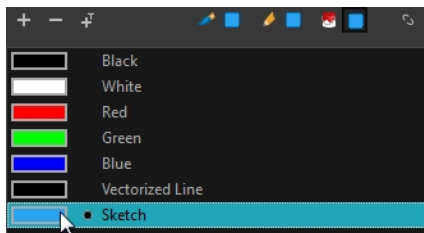


The first step to complete a traditional paperless animation is the rough construction, which is the skeleton of your animation. You would usually start with the main action. For example, to animate a walk cycle, you will start with the torso motion and the legs. Head, arms and clothes will be added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

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


### How to animate

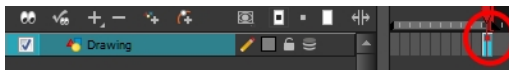
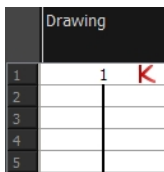
1. Press Ctrl + U (Windows/Linux) or ⌘ + U (Mac OS X) to open the Preferences dialog box.
2. Select the **Exposure Sheet** tab.
3. Select the **Use Current Frame as Drawing Name** option. When this preference is enabled, drawings will be named like the frame they are created on (frame number).
4. In the Tools toolbar, select the Brush  tool or press Alt + B.
5. In the Colour view, select a colour for the brush. It is a good idea to choose a light colour for your rough animation. This will help you in the task that follows, the clean up process.




6. In the Timeline or Xsheet view, select the cell where the first drawing will appear.
7. In the Camera or Drawing view, draw the first key drawing.



8. With your first cell still selected, do one of the following to mark your drawing as a key drawing. This will help you stay organized.
  - ▶ In the Mark Drawing toolbar, click the Mark Selected Drawings as Key  button.
  - ▶ In the Xsheet view, select **Drawings > Mark Drawing As > Key Drawing**.
  - ▶ In the Timeline view, select **Drawings > Mark Drawing As > Key Drawing**.



9. In the Tools toolbar, click the Onion Skin  button. The Onion Skin feature displays your previous and next drawings as visual references to help you draw your new pose.
10. In the Timeline view, click and drag the blue onion skin markers to extend the number of previous and next visible drawings.

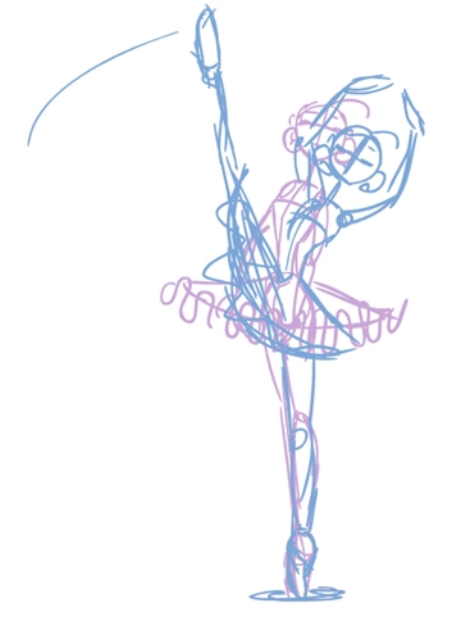


11. In the Timeline or Xsheet view, select the cell where your next key drawing will appear.

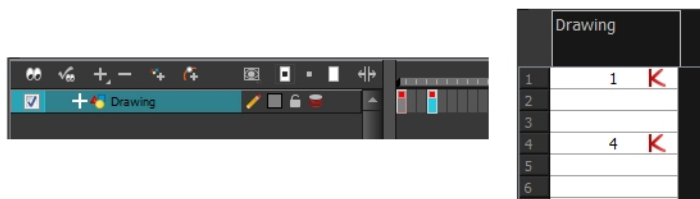


12. In the Camera or Drawing view, draw your second key drawing.

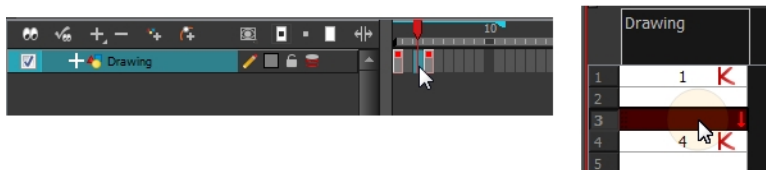





13. In the Xsheet or Timeline view, identify the drawing as a key drawing.

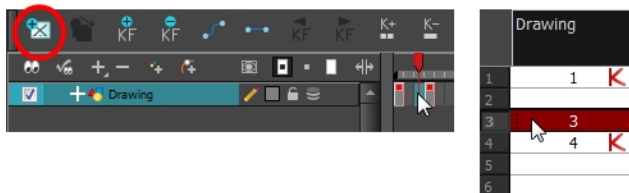


14. In the Xsheet view, select a cell between the two key drawings.

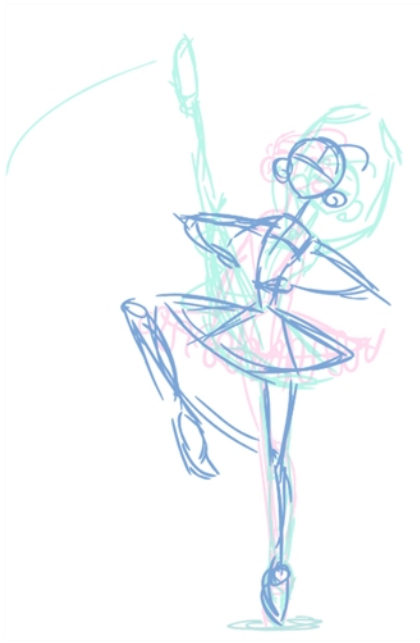


15. From the Timeline View toolbar, click  to create an empty drawing or press Alt + Shift + R.

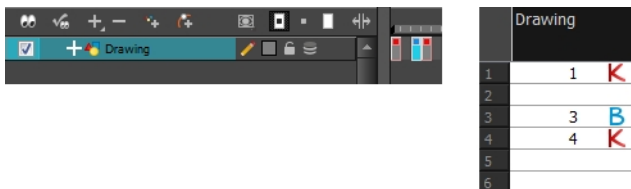
- ▶ In the Xsheet view, right-click and select **Drawings > Create Empty Drawing** or press Alt + Shift + R.





16. In the Camera or Drawing view, draw your new pose.



17. If necessary, in the Xsheet or Timeline view, identify the new drawing as a key, breakdown or in-between drawing using the Mark Drawing toolbar.



18. In the Timeline or Xsheet view, select a new cell and repeat the previous steps for each new drawing.
19. In the Timeline view, disable the layers you do not want to show during playback by disabling the check box.
20. In the Playback toolbar, click the Loop  button if you want the playback to loop.
21. In the Playback toolbar, click the Play  button to start the animation.

## Cleaning Up



When your rough animation is completed, it is time to clean it up and ink it. This step is also called *tracing*. It consists of tracing solid and clean lines over the rough animation to close any open zones. This is the final paperless animation step before the ink and paint step.

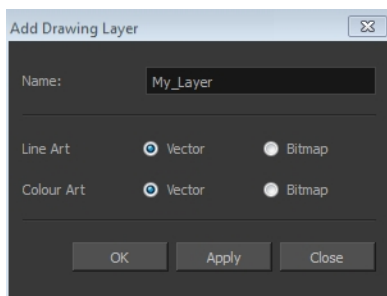
You will need to add a new drawing layer to draw your clean. This is the equivalent of adding a sheet of paper and tracing the rough using the animation disk. This method allows you to keep the roughs and the cleans intact. You only need to disable the rough layer to prevent it from appearing in the scene.


If you plan on tracing your animation in the Drawing view, you can turn on the light table to display all the layers in your project.

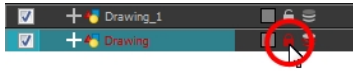
### How to trace your animation in a new layer


1. In the Timeline View toolbar, click the Add Drawing Layer  button.

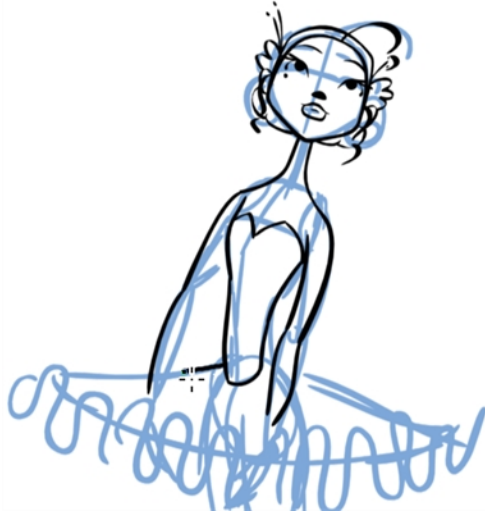
The Add Drawing Layer window opens.




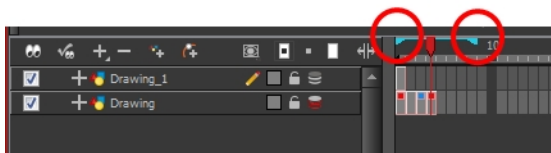
2. In the Name field, name your new layer.
3. Set the Line Art and Colour Art options to **Vector** to get a vector layer or to **Bitmap** to have a bitmap layer.
4. Click **OK**.
5. In the Timeline view, click the Lock  icon of the layer containing your rough animation to prevent the layer from being selected in the Camera view.



6. In the Timeline or Xsheet view, select the new layer's cell corresponding to the first key drawing of your rough animation.
7. In the Tools toolbar, select a drawing tool such as the Pencil  tool.
8. In the Colour view, select a colour for tracing your animation. Pick a dark bold colour, such as black, to make sure it contrasts well with the light colour of your rough animation.
9. In the Camera or Drawing view, start tracing the first key drawing.



10. If you have other layers in the way, you can disable them temporarily in the Timeline view, so that only your rough animation and your clean up layer are displayed in the Camera view.
11. In the Tools toolbar, click the Enable Onion Skin  button.
12. If you are not using the Onion Skinning by Drawing option, extend the Onion Skin range in the Timeline view, otherwise use the Onion Skin Add One Previous Drawing and Onion Skin Add One Next Drawing buttons in the Camera View toolbar to add drawings to your onion skin display.



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



15. Repeat the previous steps for each drawing.

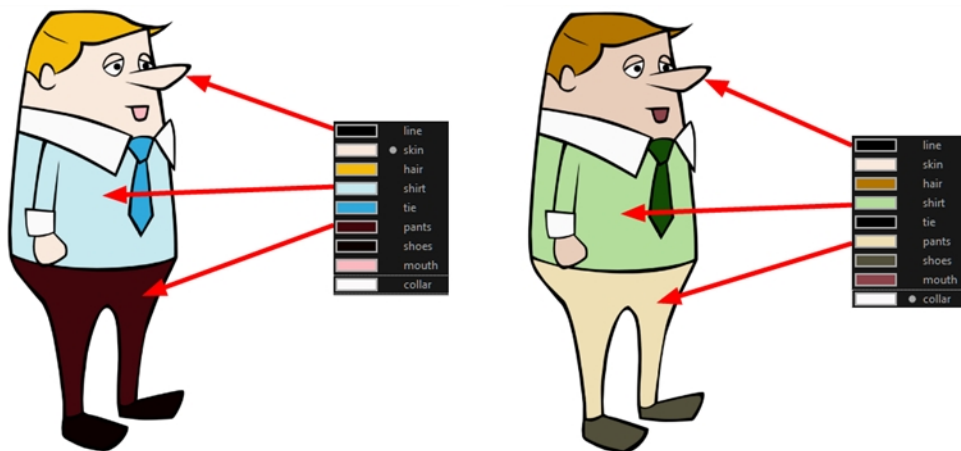


## Chapter 5: How to Paint

Harmony has some very powerful colouring features when it comes to painting. To paint your drawings, you will use different colour swatches, unlike some paint programs where you modify one swatch each time you want to paint 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 any time without having to repaint it!

In 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 palette*<sup>1</sup>s.

Master palettes contain a colour swatch for each zone to colour with a precise RGBA colour value.

<sup>1</sup>A master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire production to maintain consistency in the look and to ensure that the same colours are used throughout the production. Also known as palette.


Using a master colour palette has many benefits, including:

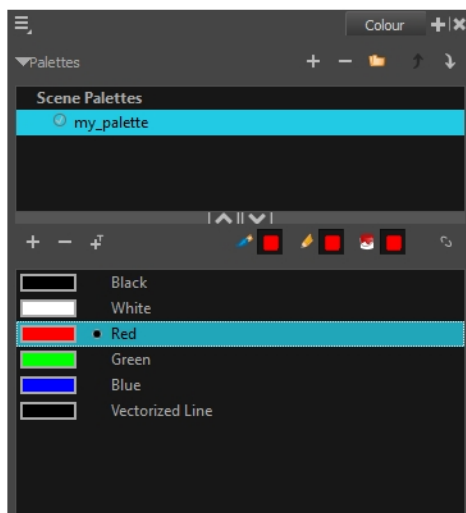
- Each character consistently retains their dedicated colours.
- You cannot accidentally use a colour which is not in the master palette.
- Standardization and colour consistency throughout the production
- Multiple artists can use the same colour palette and produce the same results.

Harmony uses palettes to hold all the colours needed to paint your elements, allowing complete control and consistency in your painting process.

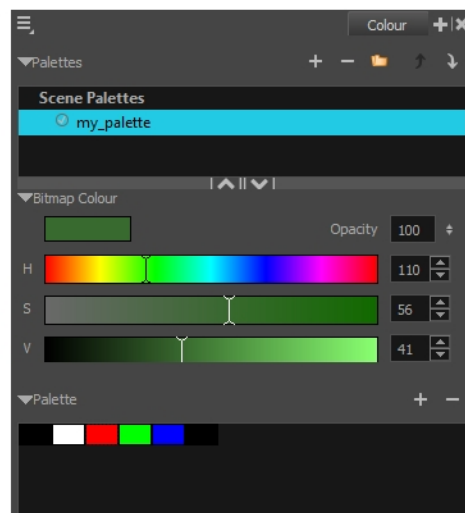
A **palette**<sup>1</sup> is created by assigning a set of colours to each character, prop or effect. You will create a new palette and add a new colour, known as a *colour swatch*, for each zone of the character, such as the skin, hair, tongue, shirt, pants, and so on.

## How to paint drawings

1. In the Timeline or Xsheet view, select the drawing you want to paint.
2. In the Tools toolbar, select the Paint  tool or press Alt + I.
3. In the Colour view, select a palette.
4. Select a colour from the palette.
  - If you are working with vector layers, double-click on a colour swatch to open the Colour Picker window and modify the colour.
  - If you are working with bitmap layers, use the RGB/HSV controls to select a colour.



Colour view when working with vector layers



Colour view when working with bitmap layers

<sup>1</sup>A palette or master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire Toon Boom Studio project to maintain a consistency in the look and avoid the colour changing during the animation. Also referred to as a master palette.

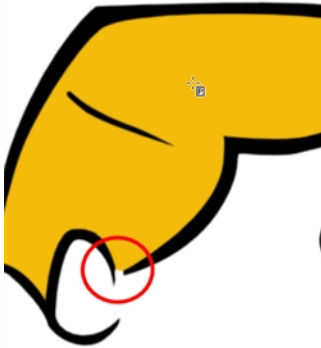


The colour palette will only appear in the Colour view when you select a drawing element.

- In the Drawing or Camera view, start painting the colours on your drawing.





## Closing Gaps

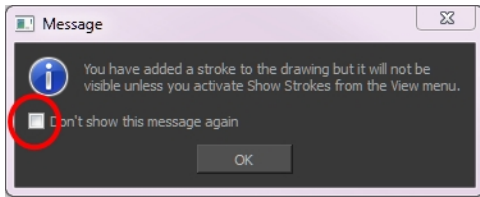


When painting, notice that some of your drawing areas are not closed. To close the zone, you can draw the missing line with the Brush or Pencil tool or close the gap with an invisible line. To do so, you will use the Close Gap tool.

The Close Gap tool lets you close small gaps in a drawing. The Paint tool only paints closed areas. The Close Gap tool creates small, invisible strokes 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 tool will automatically choose the two closest points and close the gap.

## How to use the Close Gap tool

- Do one of the following:
  - In the Tools toolbar, select the Close Gap  tool.
  - From the top menu, select **Drawing > Drawing Tools > Close Gap**.
  - Press Alt + C.
- In the Tool Properties view, select the Auto-Flatten  button if you want the stroke you draw to be flattened in your drawing instead being on top.
- You can display invisible lines by selecting **View > Show > Show Strokes** or press K. If you do not display the strokes, a message box will appear.

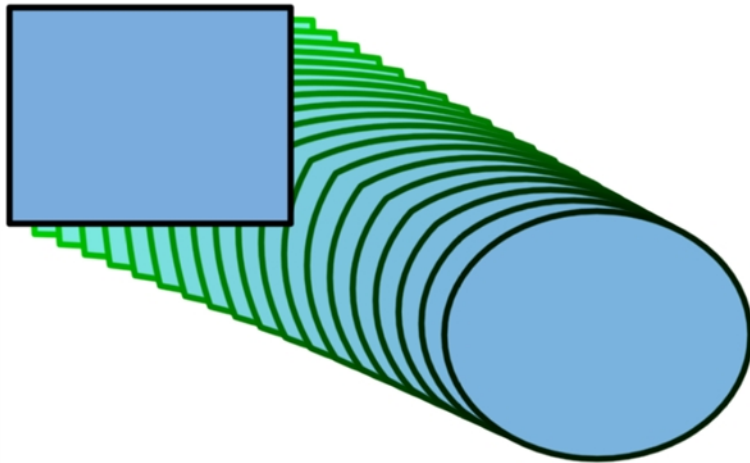


Select the **Don't Show This Message Again** option to prevent this message box from appearing again.

4. In the Camera or Drawing view, trace an invisible line near to the gap to be closed.  
The gap automatically closes.




## Chapter 6: How to Morph Drawings

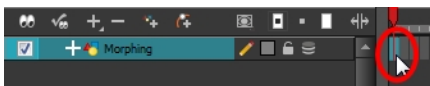



When it comes to morphing, you will need to practice and become at ease it. Once you are familiar with the basic rules, you can start creating morphing sequences. To begin, start with simple elements. When you are confident with the morphing process, you can start to use complex and advanced morphing techniques, such as head rotations or full characters.

You may want to delete an entire morphing sequence in order to redo a sequence from scratch.

### How to create a basic morph

1. In the Timeline View toolbar, click the Add Drawing Layer  button to add a new layer to your project.
2. Rename the new layer ( for example, **Morphing**).
3. In the Timeline or Xsheet view, select the first cell in the layer.




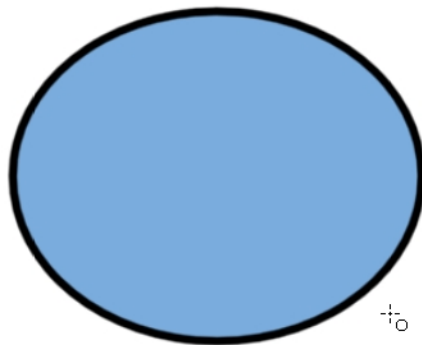
4. Do one of the following:
  - In the Tools toolbar, select the Rectangle  tool.
  - Press Alt + 7.
5. In the Camera or Drawing view, draw a rectangle.
6. Do one or both of the following:
  - Hold down the Shift key to draw a square.
  - Hold down the Alt key to draw the rectangle from its centre.
7. Paint your rectangle using the Paint tool.



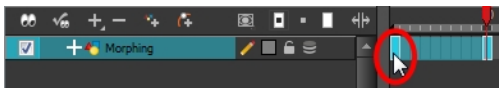
8. In the Xsheet or Timeline view, select the last cell.



9. Do one of the following:
  - ▶ In the Tools toolbar, select the Ellipse  tool.
  - ▶ Press Alt + =.
10. Draw and paint the ellipse using the same outline colour as the rectangle.

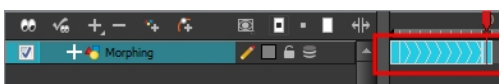


11. In the Xsheet or Timeline view, select the first frame and all the frames up to and including the last frame, which is the rectangle drawing.



12. Do one of the following:
  - ▶ From the top menu, select **Animation > Morphing > Create Morphing**.
  - ▶ In the Xsheet or Timeline view, right-click and select **Morphing > Create Morphing**
  - ▶ Press Alt + M.

Arrows appear between the two key drawings to show that computer generated in-betweens have been created.



---

Use the Playback toolbar to play the morphing sequence. To flip through the inbetweens toggle between comma ( , ) and period ( . ). Press F4 to toggle between the two key drawings.

---

## How to delete an entire morphing sequence

1. In the Xsheet or Timeline view, right-click on a cell between two keyframes.
2. Do one of the following:
  - From the top menu, select **Animation > Morphing > Delete Morphing**.
  - In the Xsheet or Timeline view, select **Morphing > Delete Morphing**.

The entire sequence between the two keyframes is removed.




## Chapter 7: How to Import Bitmap Images

A **bitmap image**<sup>1</sup> is an image composed of pixels that are both size and resolution dependent. In Harmony, you can import bitmap images and vectorize them, making the images editable. Then you can use a variety of drawing tools to edit the image. Or you can always keep the original bitmap image as is.

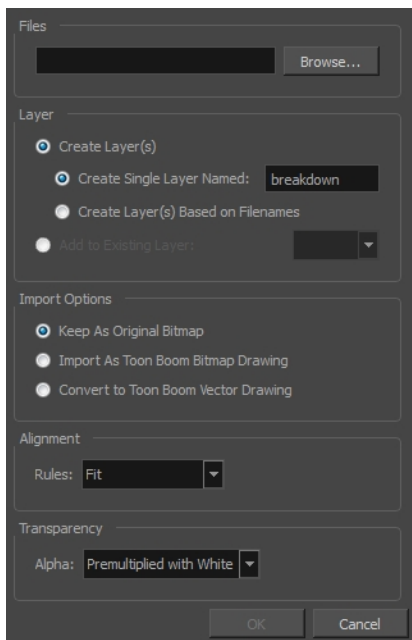
Also, you can choose to import bitmap images on bitmap or vector layers depending on your project.

You can also drag and drop a bitmap image directly from the Library into the scene (Camera) as a quick way of importing a bitmap image. However, you will not have access to all the import options.

### How to open the Import Images dialog box

- Do one of the following:
  - From the top menu, select **File > Import > Images**.
  - In the File toolbar, click the Import Images  button.
  - In the Xsheet view, right-click anywhere in the frame area and select **Import > Images**.


The Import Images dialog box opens.

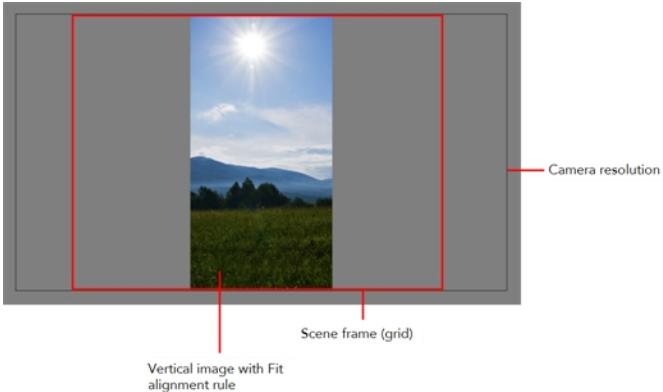


### How to import a bitmap image in its original format


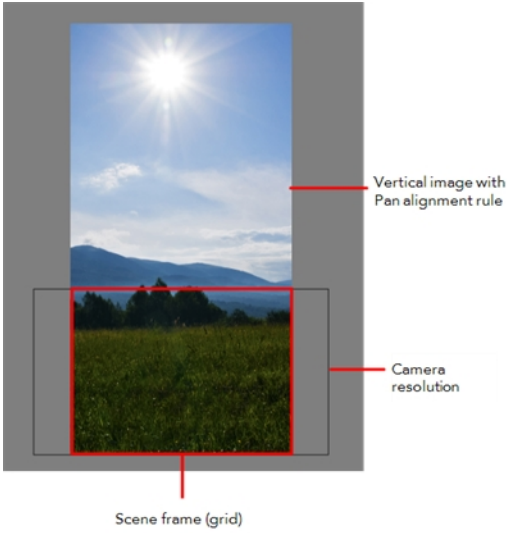
- In the Files section of the Import Images dialog box, click **Browse** to find and select one or more images on your computer.

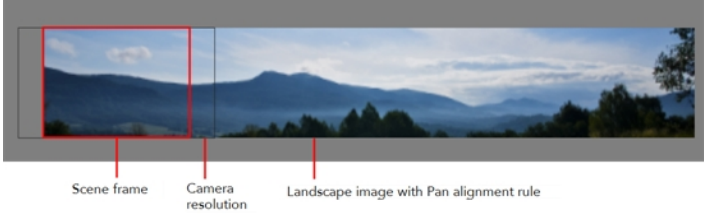
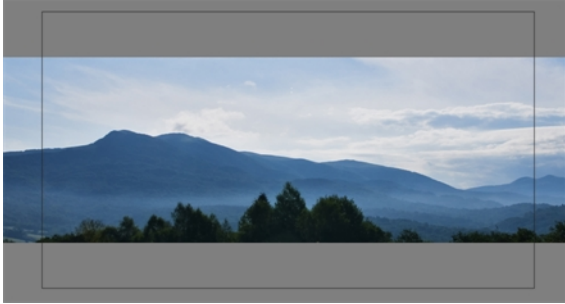
<sup>1</sup>An image composed of pixels with a single resolution (size). If it is enlarged too much, it will lose definition and pixels will begin to appear. This is known as pixelation.

2. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 4. To add the bitmap image to an existing layer, go to step 5.
3. Add the bitmap image to a new layer by selecting the **Create Layer(s)** option and one of the following options:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
4. Select the **Add to Existing Layer** option if you want to place the bitmap image on a layer you select from the list. If only vector  layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
5. In the Import Options section, select the **Keep As Original Bitmap** option. In the Alignment section, 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), an image that you import may be scaled to the point where all its individual pixels become visible. There are three options available in the Alignment section:

Parameter	Description
Fit	<p>Enlarges or shrinks (but not distorts) the image height to match the full height of the scene grid.</p>  <p>If the image orientation is landscape, this will enlarge or shrink (but not distort) your image width to match that of the scene grid.</p>



	 <p data-bbox="589 611 1279 674">Note that the Fit alignment rule equals the Center Fit rule in the layer properties.</p>
<p data-bbox="305 1150 349 1178">Pan</p>	<p data-bbox="589 695 1287 926">This is the opposite of the Fit parameter. If the image orientation is portrait, its width will be made to match the width of the scene grid. As a result, part of the image's height will extend beyond the height of the 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.</p>  <p data-bbox="589 1535 1279 1633">The opposite will apply to a landscape image. Its height will be fit to the scene grid, therefore it is possible that the image will extend beyond the scene grid's boundaries.</p>

	 <p data-bbox="646 432 1299 495">Note that the Pan alignment rule equals the Center First Page rule in the layer properties.</p>
<p data-bbox="358 842 505 898">Project Resolution</p>	<p data-bbox="646 520 1336 785">Scales the image in proportion to the scene's resolution. The system looks at the resolution of the bitmap image, for example 4000 x 2000, then compares it to the scene's resolution, for example 1920 x 1080, and adjusts the scale factor in proportion. So, in this example, the bitmap would appear at 208% (4000/1920). If you import a bitmap that is 960 x 540, it will be displayed at 50% (960/1920) of the size of the project resolution.</p>  <p data-bbox="646 1157 1321 1220">Note that the Project Resolution alignment rule is equal to the As Is rule in the layer properties.</p>


6. In the Transparency section, select one of the following from the Alpha menu:

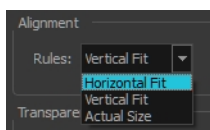
Parameter	Description
Premultiplied with White	Individual pixels at the edge of an image are blended with white.
Premultiplied with Black	Semi-transparent pixels in the original image are blended with black.
Straight	Pixels at the edge of an image are blended with black, white and greys.
Clamp Colour to Alpha	Premultiplies 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, 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 that are output would be half of the amounts listed above.
--	---

7. Click **OK**.

## How to import a bitmap image as a Toon Boom bitmap drawing

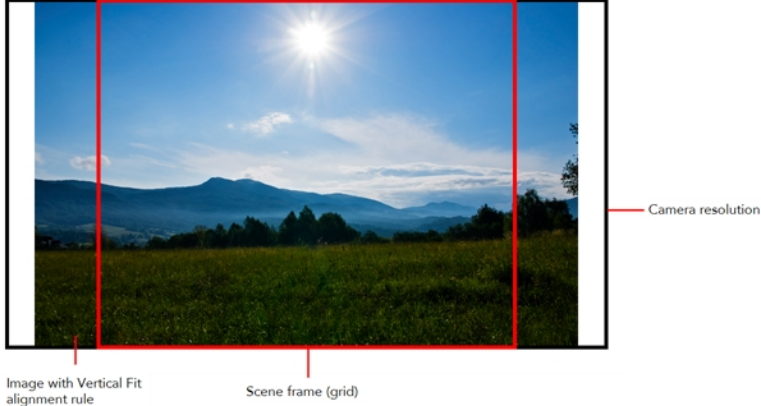

1. In the Files section of the Import Images dialog box, click **Browse** to find and select one or more images on your computer.
2. In the Import Options section, select the **Import as Toon Boom Bitmap Drawing** option.
3. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 4. To add the bitmap image to an existing layer, go to step 5.
4. In the Layer section, select the **Create Layer** option, and one of the following options to add the bitmap image to a new layer:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
5. Select the **Add to Existing Layer** option to place the bitmap image on a layer you select from the list. If only vector  layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
6. In the Alignment section, 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), an image that you import may be scaled to the point where all its individual pixels become visible.



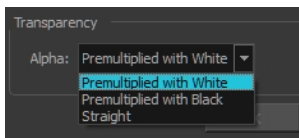
Make sure you are in the Camera view's Render Mode when judging an imported image, otherwise it may appear blurry. You can also adjust the quality of a bitmap image displayed in the OpenGL mode by using **View > Bitmap File Quality**. You must select your bitmap image using the Transform tool.

The following three Alignment Rules options are available:

Parameter	Description
Vertical Fit	Enlarges or shrinks (but not distort) to your image height to match the full height of the scene frame (alignment grid).

	
<p>Horizontal Fit</p>	<p>Enlarges or shrinks (but not distort) to your image height to match the full width of the scene frame (alignment grid).</p> 
<p>Actual Size</p>	<p>Scales the image in proportion to the scene's resolution. The system looks at the resolution of the bitmap image, for example 4000 x 2000, then compares it to the scene's resolution, for example 1920 x 1080, and adjusts the scale factor in proportion. So, in this example, the bitmap would appear at 208% (4000/1920). If you import a bitmap that is 960 x 540, it will be displayed at 50% (960/1920) of the size of the project resolution.</p>

7. In the Transparency section, decide how the bitmap image will be antialiased, more specifically, the way the pixels along the edge are blended in the RGBA (red, green, blue, alpha (transparent)) channels. Your bitmap image will exist in the bitmap layer of the newly created drawing element.




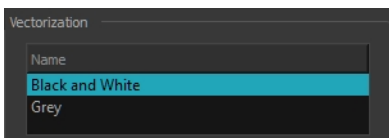
Parameter	Description
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Premultiplied with White	Individual pixels at the edge of an image are blended with white.
Premultiplied with Black	Pixels at the edge of an image are blended with black.
Straight	Pixels at the edge of an image are blended with black, white and greys.

8. Click **OK**.

## How to import a bitmap image and convert it to a Toon Boom vector drawing

1. In the Files section of the Import Images dialog box, click **Browse** to find and select one or more images on your computer.
2. In the Import Options section, select the **Convert to Toon Boom Vector Drawing** option.
3. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 4. To add the bitmap image to an existing layer, go to step 5.
4. In the Layer section, select the **Create Layer** option, and one of the following options to add the bitmap image to a new layer:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
5. Select the **Add Existing Layer** option to place the bitmap image on a layer you select from the list. If only vector  layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
6. In the Vectorization section, decide whether you want to import your image in black and white or grey.



Parameter	Description
Black and White	Vectorizes drawings as a solid black line; creates a 100% vector-based drawing.
Grey	Vectorizes your image as a mix of vector contour and grey-scale bitmap filling. Lines keep the texture from the scan, and the white of the paper becomes transparent.



## Chapter 8: How to Build a Cut-out Character



There are many techniques you can use to break down a puppet. In this section, you will learn about one of the most common and simplest methods. For your first character **breakdown**<sup>1</sup>, follow these instructions to get an idea of the way Harmony works. Once you understand Harmony's basic functions and commands, you will be able to create your own techniques to satisfy the needs of your production.

### Drawing the Pieces

The main breakdown technique shown here is to trace your model, completing the hidden lines and filling the gaps

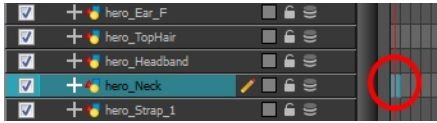
### How to break down a character

1. In the Timeline view, add a new drawing layer for each body part to separate. You can press Ctrl + R (Windows/Linux) or ⌘ + R (Mac OS X).

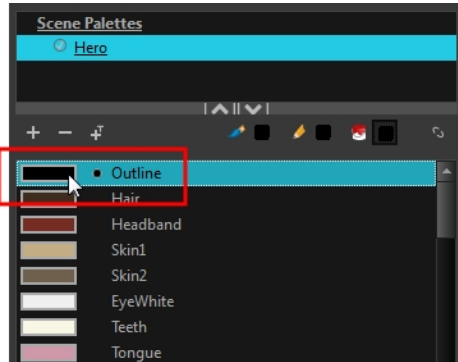


2. In the Timeline view, select the layer's first cell in which you want to draw the part.

<sup>1</sup>In cut-out animation, the breakdown is the action of breaking a character into pieces to create a puppet with articulations. To breakdown a character, the artist will cut parts, such as hands and arms, from the character's model and paste them in separate layers. Next, the joints will be fixed and the pivots set. In additional animation, a breakdown is an animation pose generally found between two key poses. The key poses are the main poses in an animation and the breakdowns are secondary poses, ones that help to describe the motion and the rotation curve.




3. In the Tools toolbar, select a drawing tool.
4. In the Colour view, select a colour swatch.

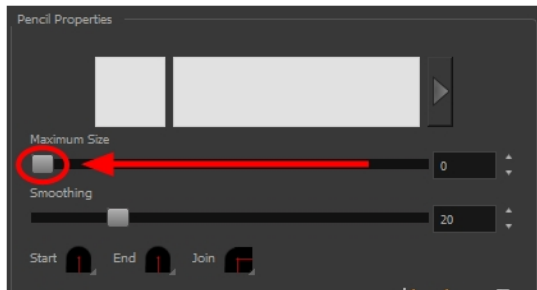


5. In the Camera or Drawing view, draw the new part.



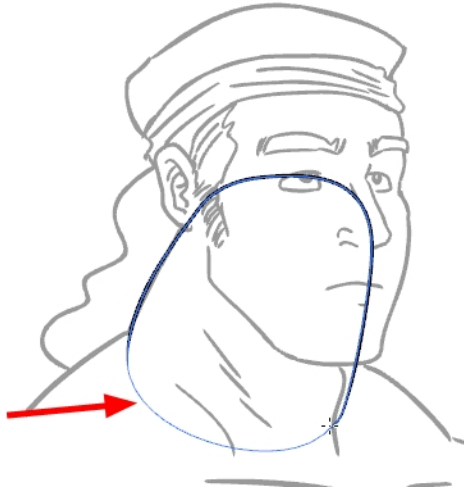
If you are working in the Drawing view, click the Light Table  button in the Drawing View toolbar to display the other layers as washed out colours. You can also press Shift + L.



6. In the Tool Properties view, you can set the Pencil tool width to 0 to create an invisible hairline if you want to close a shape without drawing an actual stroke.

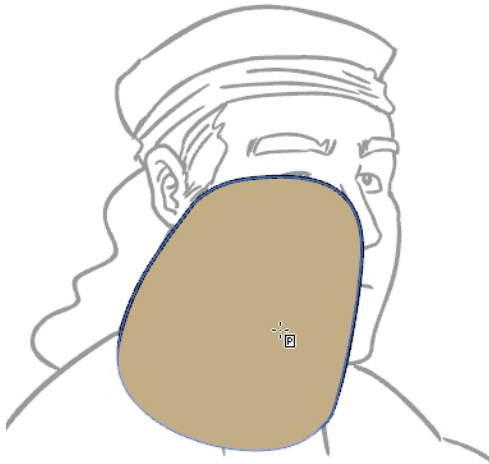





- ▶ Select **View > Show > Show Strokes** or press K to display the invisible lines.

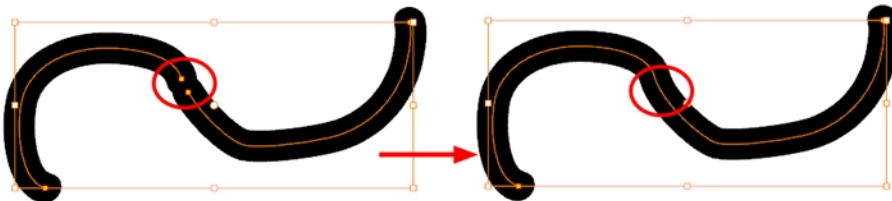




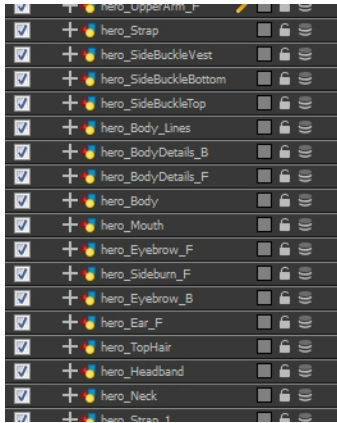
7. In the Tools toolbar, select the Paint  or Paint Unpainted  tool to colour your drawing.
8. In the Colour view, select the corresponding colour.
9. In the Camera or Drawing view, paint your drawing.



10. In the Tools toolbar, select the Select  tool. Select your drawing and flatten the lines by clicking the Flatten  button in the Tool Properties view.
11. If your lines are composed of several pencil strokes, you might want to combine them into one single smooth pencil line. Using the Select tool, select the pencil lines to be merged and in the Tool Properties view, click the Merge Pencil Lines  button.



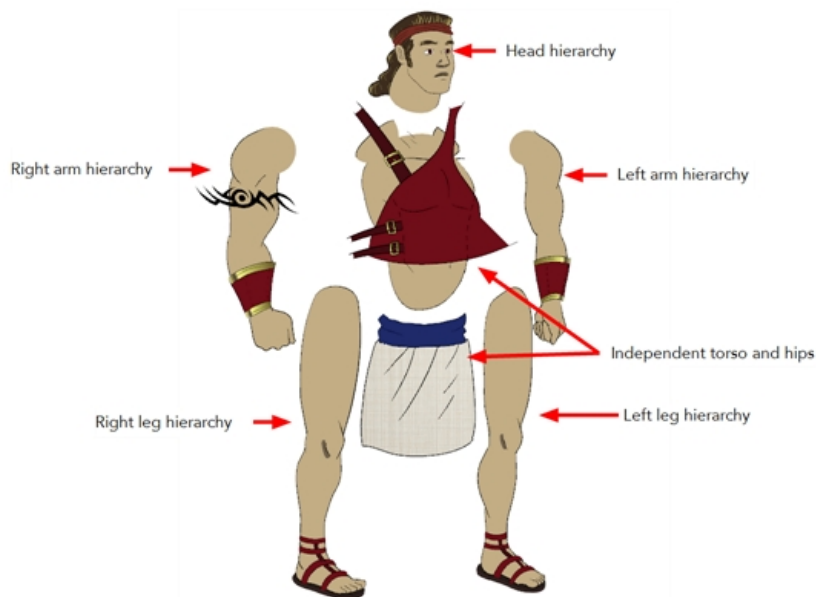
12.Repeat the entire process until the break down is completed.



## Parenting Layers

Harmony lets you extend your rigging techniques beyond normal boundaries and sets new standards. You can create hierarchies without encapsulating pieces inside each other by creating a linked structure between layers.

You should create a hierarchy on the arms and legs, and keep them separated from the body. This gives you more animation freedom, and when you need to scale or skew the torso, it will not affect the entire body.



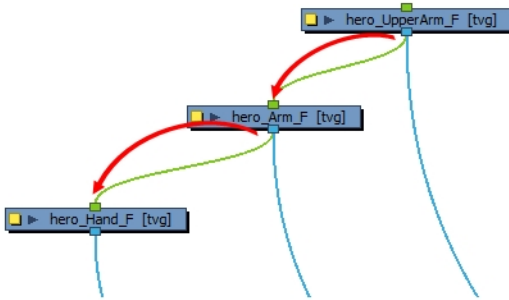
## How to create a hierarchy in the Timeline view

- ▶ 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 (upper arm).

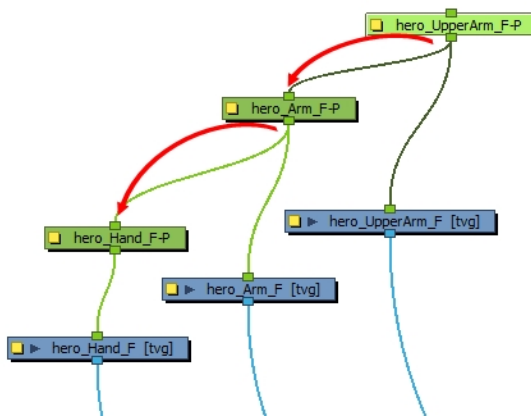


## How to create a hierarchy in the Network view

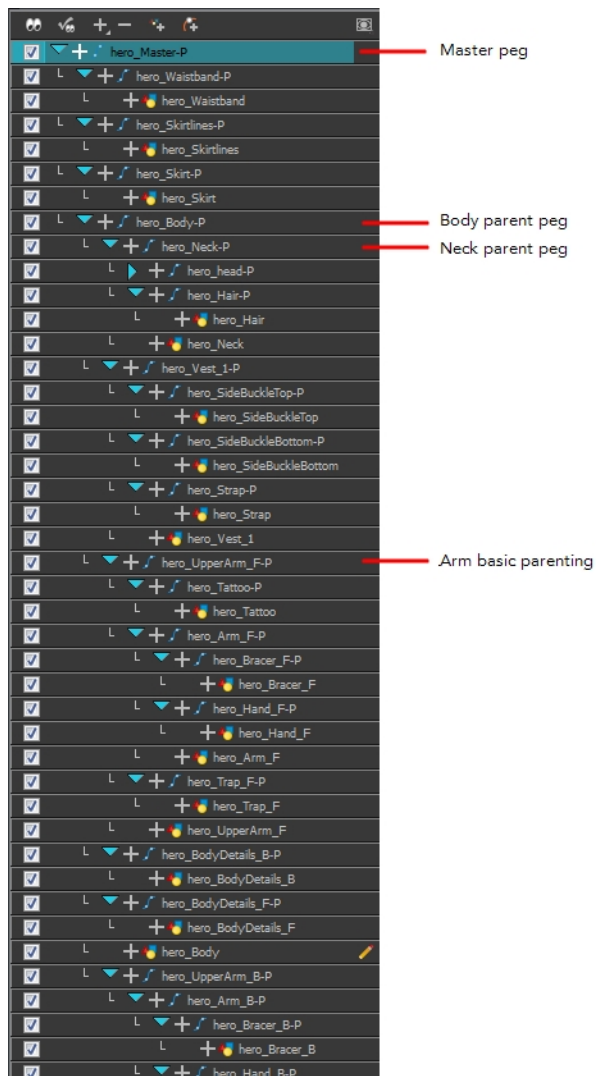
- ▶ **Without Pegs:** From the parent part, drag a new cable connection out of the module's output port (bottom) and connect it to the child part module's input port (top).



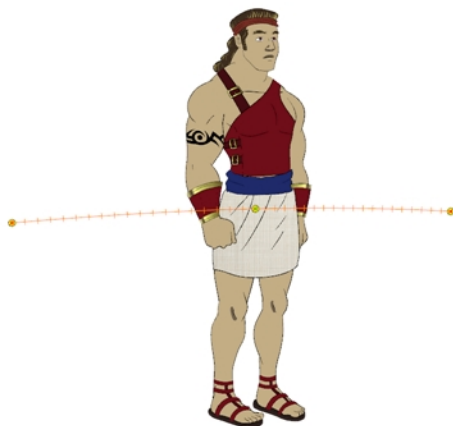
- ▶ **With Pegs:** From the parent part's peg, drag a new cable connection out of the module's output port (bottom) and connect it to the child part's peg input port (top).



Here is a basic rig with pegs example:




## Master Peg

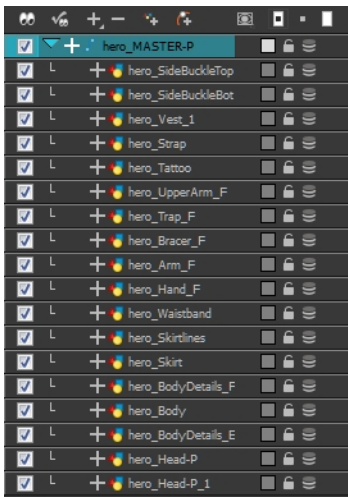


When you animate your character, you will probably need to resize and reposition it to fit your scene. When you need to scale down or move your character, it is a good idea to hook (attach) the whole puppet to a trajectory.

Attaching your puppet to a **peg**<sup>1</sup> will allow you to scale it and reposition it without having to do this to the different parts and pieces. Only one layer will contain the position information, which makes your animation easier to modify and control.

## How to add a master peg

1. In the Timeline view, select the top layer to parent a peg to it. You need to select a layer to be able to add a peg to your scene. Unless you use the Display All mode from the Display toolbar, you will get an error message if you try to add a peg without any selection.
2. In the Timeline view, click on the Add Peg  button.  
A new peg is added to the timeline as a parent of the selected layer.
3. Name the new peg **Master** plus the character's name.
4. In the Timeline view, select all the layers you want to attach to your new peg. Remember that one item is already parented to that peg.
5. Drag your selection **ON** to the peg layer to parent all your character's pieces to the peg. If your layers are added above the already parented layers, move that parented layer back on top of the layer stack.



<sup>1</sup>In traditional animation, a tool used to ensure accurate registration of action as cel layers move. In digital animation, in which you are doing a 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 add path articulations. For the latter, you can also use the Inverse Kinematics tool.





## Chapter 9: How to Use Bone Deform

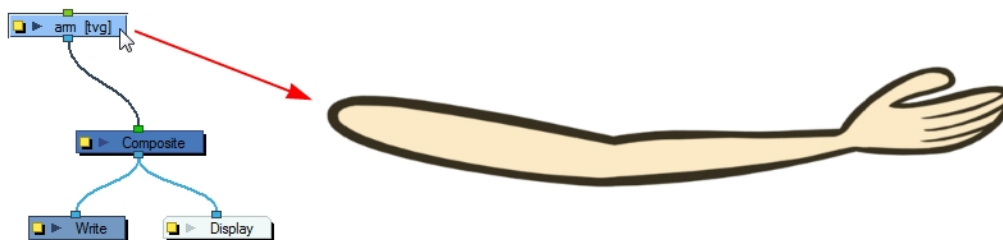
Harmony provides you with the deformation technology to deform bitmap and vector drawings over a period of time. These deformers can be linked to create a hierarchy of deformation. You can deform a character made out of one, or many, drawing or image layers and make it move as if it were a cut-out puppet. It also allows you to take an area in a single bitmap image and create animation by distortion.

### Rigging

Using the Rigging tool, you can quickly create a basic Bone and Articulation or Curve rig. Before you can create a Basic Deformation rig, you must set up the performance preferences which are necessary to allow the system to process the deformation effect efficiently.

#### How to create a basic deformation rig

1. In the Preferences dialog box, under the Deformation tab, deselect the **Automatically Create New Deformer Structure for each Pose/Drawing** option. This will result in a simpler Network rigging structure. But remember that this option must be re-enabled before rigging a multipose (front, quarter, side and back) character.
2. From the Deformation toolbar, select the Rigging  tool.
3. In the Rigging Tool Properties, enable the Automatic  Mode.
4. In the Network, Camera or Timeline view, select the element on which you want to add a deformation.



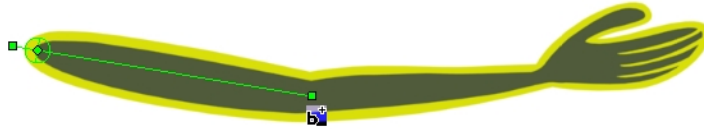
5. In the Camera view, create a Bone or Curve rig.

#### How to create a Bone rig

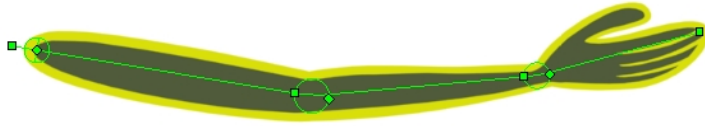
1. Place the cursor at the far end of your element, click once and release. For example, on the shoulder.



2. Click again at the location where you want your first bone to finish and your second bone to start. An articulation will automatically be inserted between each bone you create.



3. Repeat this until you are finished creating the Bone chain.

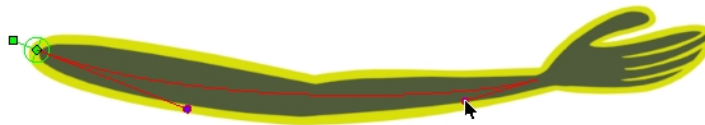


### How to create a Curve rig

1. Click at the far end of your element, for example, the shoulder and drag the cursor to extend the control handle and release just as you would do when using the Polyline tool.



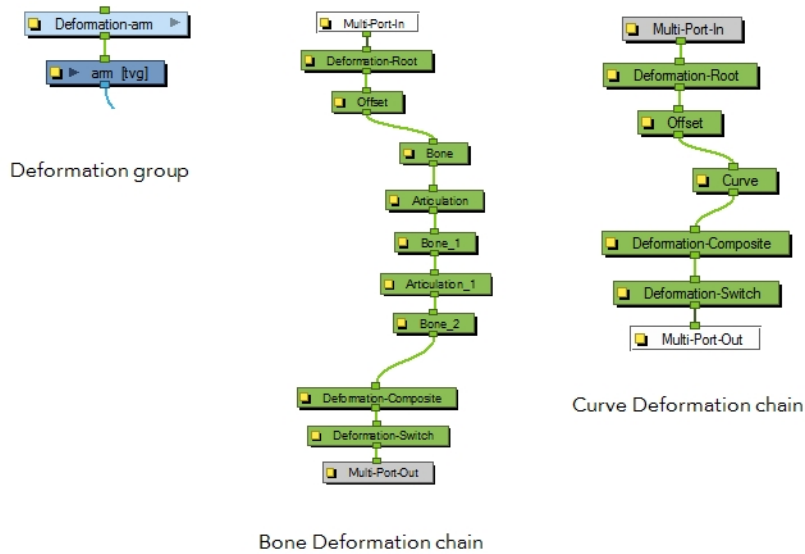
2. Click again at the location where you want the curve to end and drag the cursor to extend the second control handle.




3. Repeat this process until you have finished building the Curve chain.

This will automatically create a Deformation group connected to the top node of the selected element. This group includes all the necessary deformation modules as well as the Bones, Curves and Articulations you created. Note that this Network structure is the result of a simple rigging which was created **without** the Automatically Create New Deformer Structure for each Pose/Drawing preference.



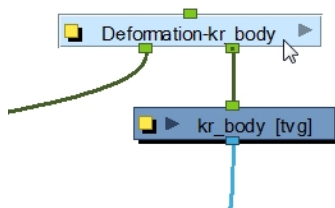




## Adjusting the Deformation Chain

Once you have a deformation chain created, you can optimize its positioning to fit the element it will deform. This task is done in the Setup  mode.

### How to set up a bone and articulation deformation chain


1. In the Network view, select the Deformation group you want to set up.

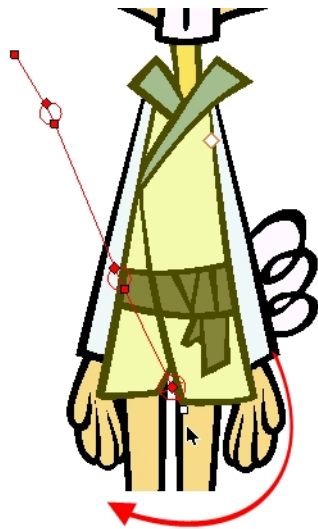


2. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button to display the deformer controls in the Camera view. This also hides all the deformer controls that were displayed.
3. In the Deformation toolbar, click the Setup Mode  button.

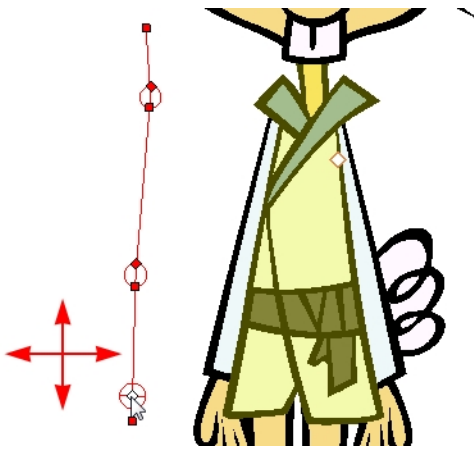
The chain turns from green to red. A green chain indicates the Setup mode is disabled. If so, click the button again to enable it.



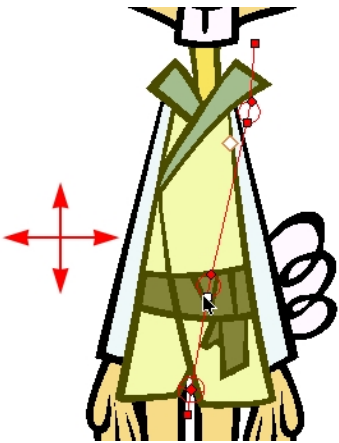
4. In the Tools toolbar, select the Transform  tool.
5. In the Camera view, set up the deformation chain.
  - ▶ Use the Pivot rotation handle to change the angle of the chain.



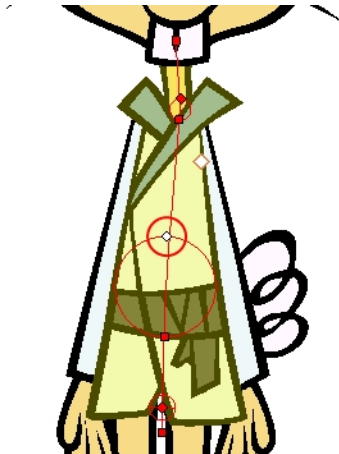
- ▶ Use the Pivot centre control point to reposition the entire chain.




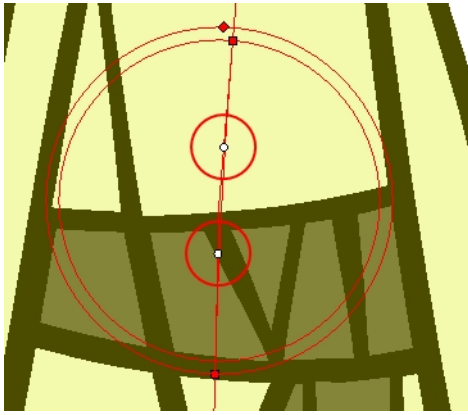
- ▶ Use the Articulation control point, the square at the bottom, to reposition the articulation. This will elongate, shorten or change the direction of the first bone.






- ▶ Use the Articulation, top diamond-shaped, control point to change the size of the articulation. For quality purposes, it is recommended to have an articulation which fits the diameter of the part it controls.



- ▶ (Optional) In the Deformation toolbar, deselect the Show Simplified Manipulators  button to display all the manipulators. You can choose to work with the simplified deformers, but if you need more control, you can also access the full deformers. You will notice two extra square control points appearing in the middle of the articulation circle. Drag these up and down to modify the steepness (bias) of the articulation.



6. Repeat until all the articulations and bones of the chain are correctly aligned to the element it is linked to.
7. With the Deformation group still selected, click the Copy Resting Position to Current  button. This will make sure to set the current resting position as the current frame one.
8. In the Deformation toolbar, click the Setup Mode  button to turn off the mode. Then test your modifications using the Transform  tool. For optimal results, make sure the size of the articulation is about the same size as the drawing.


## Display the Deformer Controls

Before you can manipulate the deformer outside of the Setup mode, you must enable the Deformation Controls.


If you have just created the bone rig, the controls will still be showing. However, when you close your project, the deformers are turned off. By enabling the Deformation Controls, the controls will display when you reopen a project so can you see the ones you need while you are animating.

You can also select all the modules from Network view and select **View > Show > Controls** from the top menu.


## How to display the selected deformation controls

1. In the Network view, select the Deformation Group containing the deformation chain you want to display.
2. Do one of the following:
  - ▶ In the Camera View toolbar, click the Show Control  button.
  - ▶ From the top menu, select **View > Show > Control**.
  - ▶ Press Shift + F11.


## How to display the selected deformation controls and hide all the others

1. In the Network view, select the Deformation Group containing the deformation chain you want to display.
2. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button. The selected deformation controls appear in the Camera view and all the others are hidden.

## How to display all the deformer controls at the same time

1. In the Top level of the Network view, select **Edit > Select All** from the top menu to select all the modules or press Ctrl + A (Windows/Linux) or ⌘ + A (Mac OS X).
2. In the Camera View toolbar, click the **Show Control**  button or press Shift + F11.  
All deformation controls in your scene are displayed.






## How to hide the deformer controls

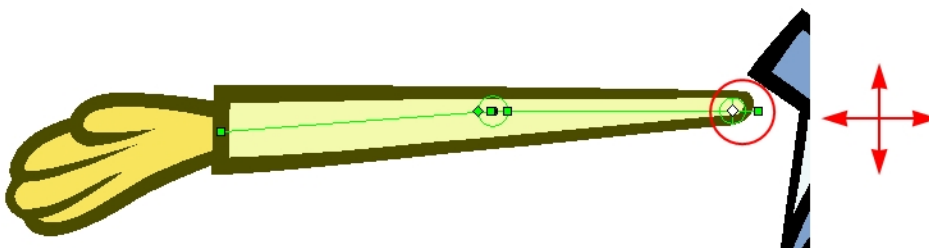
1. Do one of the following:
  - In the Camera View toolbar, click the Hide All Controls  button.
  - From the top menu, select **View > Hide All Controls**.
  - Press Shift + C.

## Animation

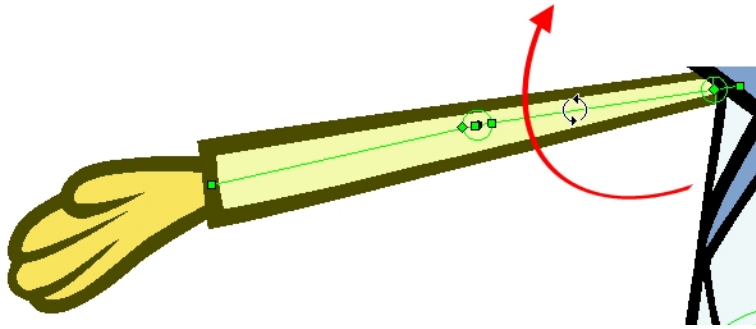
The Bone deformer operates in the same way as a human limb and is composed of a pivot as the starting point, and bones and articulations.

### How to animate a Bone and Articulation deformer

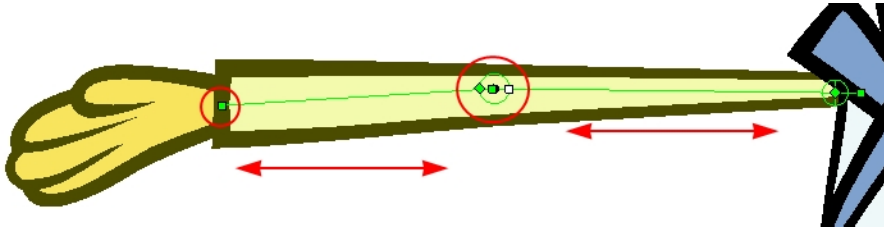
1. In the Timeline view, go the frame on which you want to create your first animation pose.
2. In the Deformation toolbar, deselect the Setup  Mode . If you leave Setup Mode on, you will modify the resting position of the deformer chain instead of animating it. When Setup Mode is disabled, the default colour of the deformation control is light green. If you made changes to your rig in Setup mode, you can select the deform group and click Copy Resting Position to Current  button, located in the Deformation toolbar. This resets the rig outside the Setup mode to match what the rig looks like in Setup mode.
3. If you want to create animation keyframes, enable the Animate  mode in the Tools toolbar.
4. In the Tools toolbar, select the Transform  tool.
5. From the Camera view, select the piece to animate.
6. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button to display the deformer of the selected piece.
7. In the Camera view, do the following:
  - Click on the centre of the Deformation-Root pivot and drag it around to reposition the entire limb.



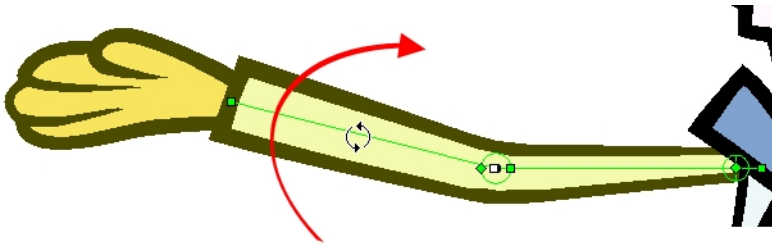
- Use the first bone or the square pivot handle to rotate the entire limb.



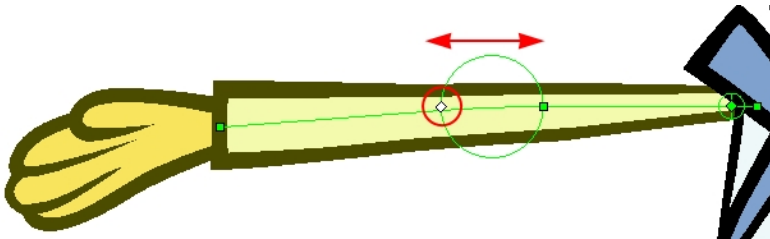
- ▶ Use the square control point located at the extremity of a bone to stretch or shorten its length.



- ▶ Use a bone next to an articulation to rotate it. You can also hold down the Alt key to lock all the controls and movement, and only allow the rotation of the articulation.

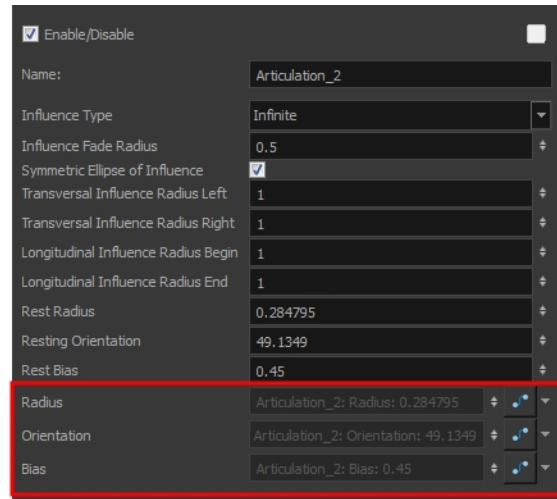
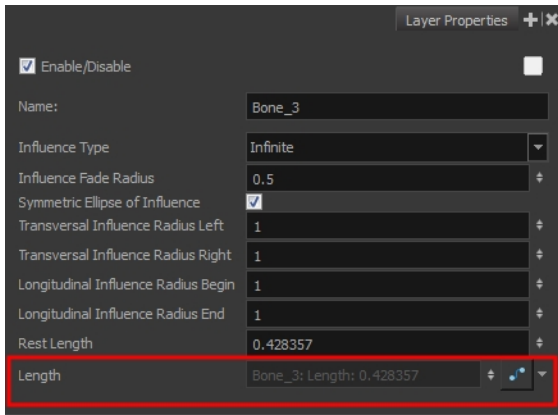


- ▶ Click and drag the articulation's diamond-shaped control point to modify its radius.



8. In the Timeline view, go the frame on which you want to set your next key pose.
9. Repeat the previous steps to animate your character.

You can also manipulate the deformer by typing values directly in the Layer Properties of the deformation effect modules.









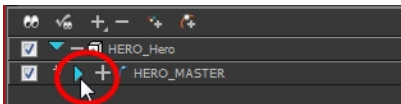
## Chapter 10: How to Animate a Cut-out Character



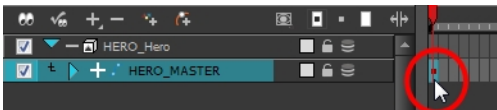
Harmony provides you with some great tools to animate your puppets. You can create simple animation using the Transform tool and you can create advanced animation using both forward and inverse kinematics. Harmony has advanced onion skinning and image swapping features to help you animate efficiently and quickly. For animation freedom, you have the ability to mix several different techniques of animation, such as simple rigging, hierarchy and symbol animation.

### How to create a simple cut-out animation

1. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. In the Tools toolbar, enable the Animate  mode so that everything you move will be keyframed automatically.
3. From the top menu, select **Animation > Stop-Motion Keyframe** so that the interpolation is not created automatically between keyframes.
4. In the Timeline view, collapse your character.




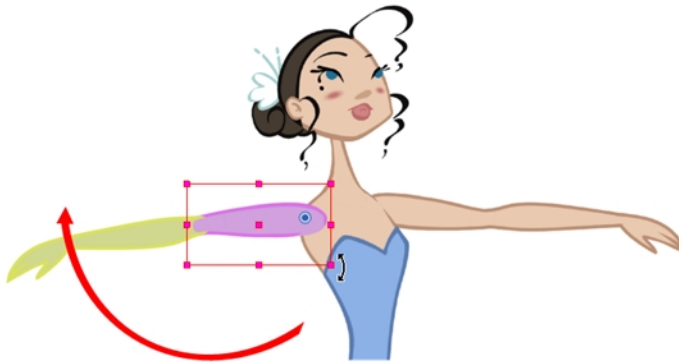
5. In the Timeline view, go to the frame where you want to set the first pose.




6. In the Camera view, select the parts to animate.



7. Use the Transform  tool to rotate, skew, scale or translate the selection to its new position. To rotate the piece, place your cursor slightly outside of a corner until you see the rotation cursor.

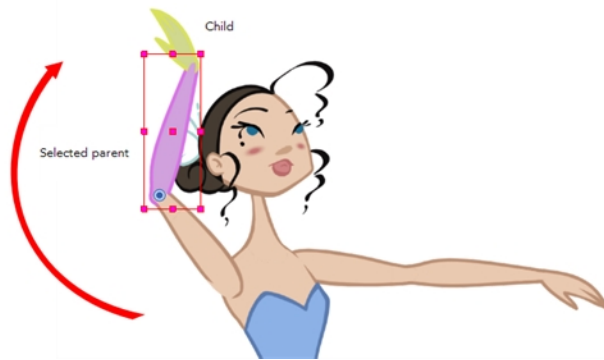


A new keyframe appears in the Timeline view.

8. To ensure that nothing will move on your new pose, in the Timeline view, select the frame corresponding to the pose, right-click and select **Add Keyframe** or press F6.
9. In the Tools toolbar, enable the Onion Skin  feature.
10. In the Timeline view, go to the frame where you want to set your second keyframe.





11. 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 and select **Add Keyframe** or press F6.
12. In the Camera view, animate your character.



13. Repeat this process until all the poses are done.

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 navigate between the children of the same parent.

### How 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 the Peg Selection  mode is deselected.
3. In the Camera or Timeline view, select a layer attached to a hierarchy.

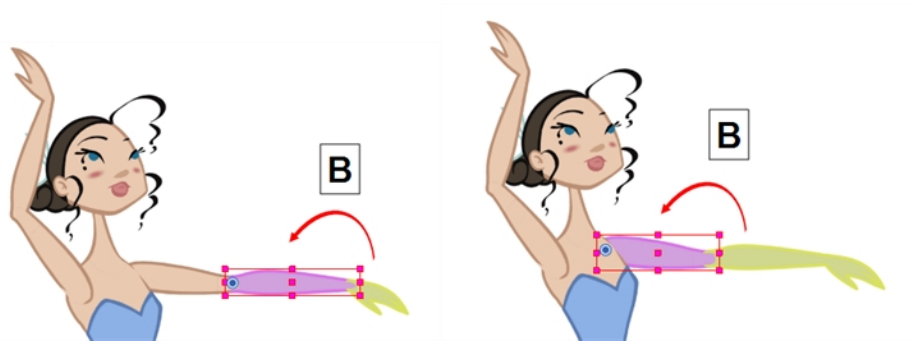


4. From the top menu, select **Animation > Select Parent** or press B to select the parent layer. Now select **Animation > Select Child** or press Shift + B to select the child layer.

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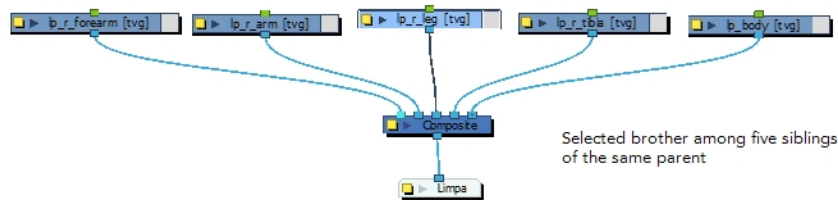
These keyboard shortcuts ignore any effect module encountered in the Network or Timeline view. Only drawing and peg modules are considered. If you want to navigate the hierarchy including the effect modules, you can create a custom keyboard shortcut in the Preferences dialog box for the Select Parent Skipping Effects and Select Child Skipping Effects commands on the General tab.

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## How to navigate among the brothers of the same parent

- In the Network view, select a child of a parent and do the following:
  - To select the previous brother in the family, press /.
  - To select the next brother in the family, press ?.




## How to set ease on multiple parameters

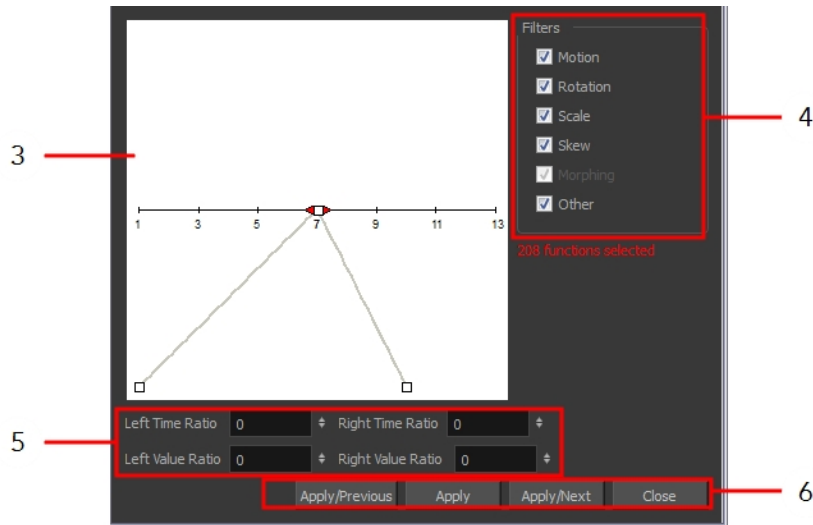
- In the Timeline view, select a keyframe from one or more layers.



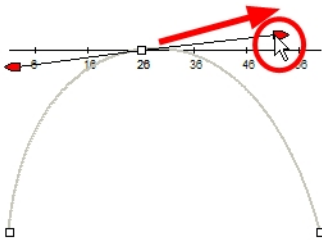
Only the first keyframe selected on a given layer will be considered when using the Set Ease for Multiple Parameter function. If many keyframes are selected on the same layer, the ease values will be applied only to the first one and the rest will be ignored.

- In the Timeline view, right-click and select **Set Ease For Multiple Parameters**. In the Timeline View toolbar, you can click the Set Ease For Multiple Parameters  button. If the button is not in the Timeline View menu, you can add it through the Toolbar Manager. Right-click on the toolbar and select **Customize**.

The Set Ease For Multiple Parameters dialog box opens.



3. In the graph interface, pull on the Bézier handle to adjust the velocity for all the selected functions.



4. If you want to apply these easing parameters to a certain type of function only, such as Rotation or Scale, in the Filters section, deselect the function types you do not want to affect.
  - ▶ **Motion:** Applies the easing parameters to the selected Position X, Position Y, Position Z and 3D Path functions
  - ▶ **Rotation:** Applies the easing parameters to the selected Angle functions.
  - ▶ **Scale:** Applies the easing parameters to the selected Scale functions.
  - ▶ **Skew:** Applies the easing parameters to the selected Skew functions.
  - ▶ **Morphing:** Applies the easing parameters to the selected Morphing Velocity functions. Note that it applied to the Morphing velocity function in the Layer Properties dialog, not to the basic Morphing ease in the Tool Properties view.
  - ▶ **Other:** Applies the easing parameters to all the other selected functions, such as all functions created to animate effect parameters.
5. You can also adjust the easing by typing values in the Time Ratio and Value Ratio fields. The values are calculated in percentage.
  - ▶ In the Left Time Ratio and Right Time Ratio fields, type the percentage value corresponding to the length of time you want the easing to last. The value must be between 0% and 100%.
  - ▶ In the Left Value Ratio and Right Value Ratio fields, type the percentage value of how strong you want the easing out. The value must be between 0% and 100%.
  - ▶ If your Time Ratio and Value Ratio values are equal, you will have a linear motion.
6. Once done, click one of the following buttons:

- ▶ **Apply:** Applies the easing parameters to the selected keyframes.
- ▶ **Apply/Previous:** Applies the easing parameters to the selected keyframes and then selects the previous keyframe in the timeline.
- ▶ **Apply/Next:** Applies the easing parameters to the selected keyframes and then selects the next keyframe in the timeline.
- ▶ **Close:** Closes the dialog box. If you did not apply the modifications, they will be cancelled.

## Chapter 11: How to Create Templates

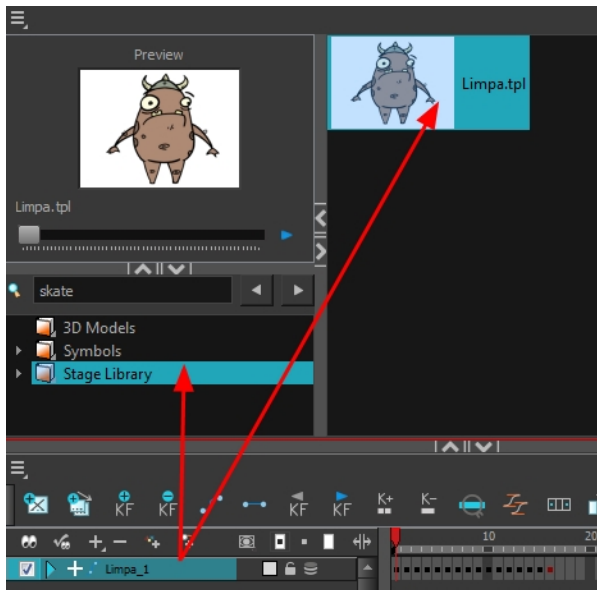
You can create a template from a layer or from cells. You can store anything available in the Timeline view as a template.

When creating a template from the Timeline view, it will lose the extra connections, effects and groupings from the Network view.

Creating a template by selecting a layer will incorporate the layer and all the drawings that were created in it, even if they're not exposed in the Timeline view. Selecting cells will only save those specific drawings in the template.

### How to create a template from the Timeline view

1. In the Timeline view, select some cells or layers.
2. In the Library view, select a folder to store the template.
3. If a library folder is locked, right-click and select **Right to Modify**.
4. Drag the selection to the Stage Library folder or any other library folder.

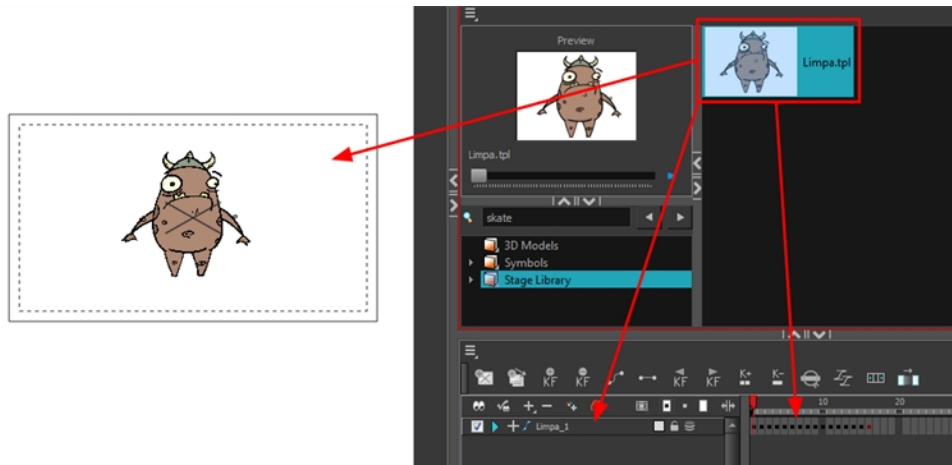


5. In the Rename dialog box, give the new template a name.  
To rename a template once it is created, right-click on the symbol and select **Rename**.
6. Click **OK**.

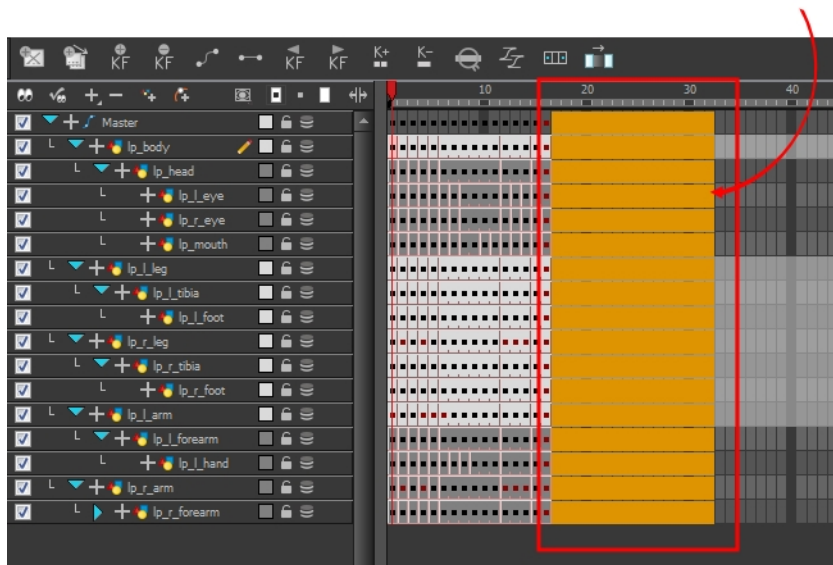
### How to import a template into the Timeline or Camera view

1. In the Library view, select the template you want to import.

2. Drag the selected template to the Camera view or to the left side of the Timeline view.



3. You can also drag a template to the right side of the Timeline view and into existing layers if the layer structure is the same as the existing one.



## Creating a Template from the Network View

The Timeline and Network views display different information about a scene.

A main character's template, also known as a *master template*, is created from the Network view. This template contains all the connections, effects, composites, modules, pegs, advanced groupings, function columns, scene lengths, drawings, timings, and so on. The template is saved in the Library view and must be imported back into the scene for use, either into the Network view or the left side of the Timeline view.

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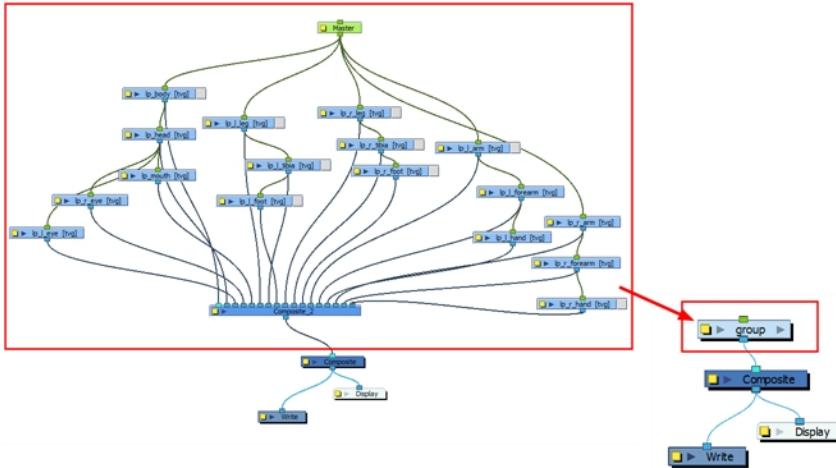
If you are creating a template from a character rig master template, you should collapse everything inside a master peg and put a keyframe on the first frame before creating the template.

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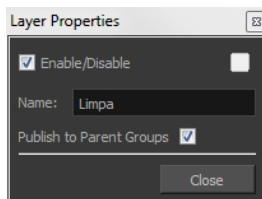


## How to create a template from the Network view

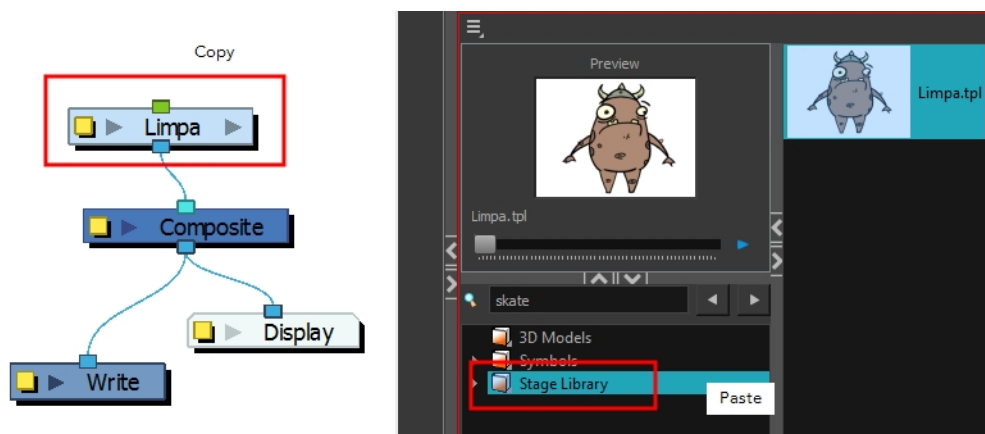
1. In the Library view, select the folder in which you want to store the template.
2. If the library folder is locked, right-click and select **Right to Modify**.
3. In the Network view, select the modules for creating the template and group them. It is very important to group your cut-out character rig before storing it in the Library.
4. From the top menu, select **Edit > Group > Group Selected Layers** or press **Ctrl + G** (Windows/Linux) or **⌘ + G** (Mac OS X).



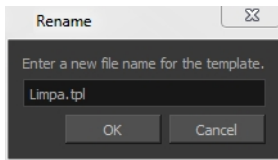
5. In the Network view, click on the group module's yellow button to rename it. The Layer Properties window opens.



6. In the Network view, select the group module and copy and paste it inside the template folder in the Library view or press **Ctrl + C** and **Ctrl + V** (Windows/Linux) or **⌘ + C** and **⌘ + V** (Mac OS X).



7. In the Rename dialog box, rename the new template.



To rename a template, right-click on it and select **Rename**.

8. Click **OK**.

## Chapter 12: How to Set Up a Scene

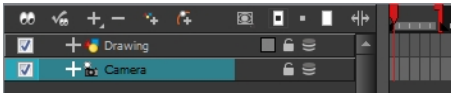
Setting up your scene can be compared to building a set for a television show. This is the point when you position each scene element such as the camera frame, the background elements and the characters.

### Positioning the Camera

#### How to add a camera layer in the Timeline view

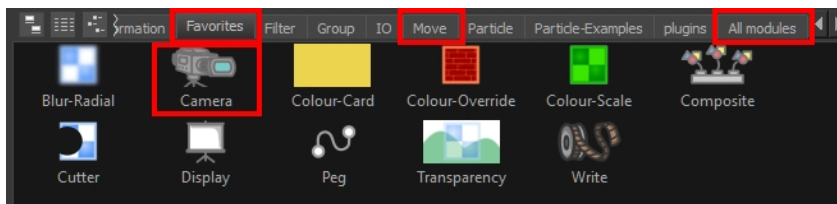
- Do one of the following:
  - In the Timeline view, click the Add Layer  button and select **Camera**.
  - From the top menu, select **Insert > Camera**.

A new camera layer is added to the scene and appears in the Timeline view.

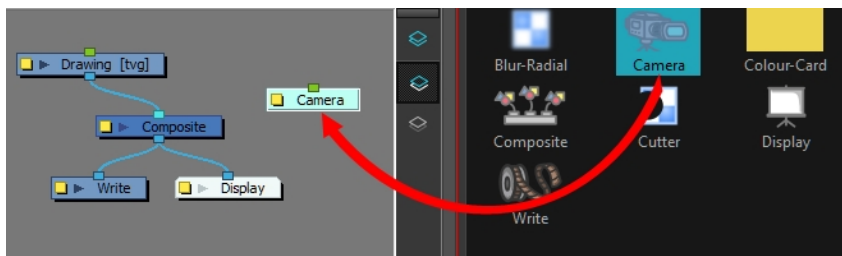


#### How to add a Camera module in the Network view



- Display the Network view.
- In the Module Library view, select a Camera module from the Favorites, Move or All Modules tab.



- Drag the Camera module into the Network view.

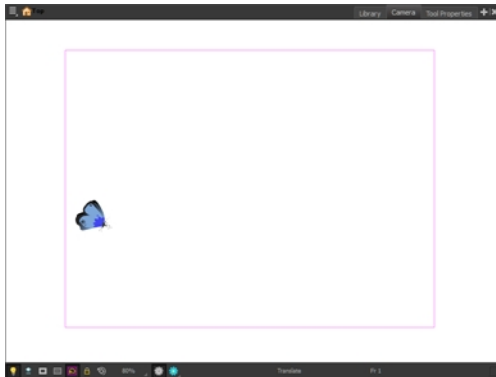


#### How to reposition the camera frame directly in the Camera view

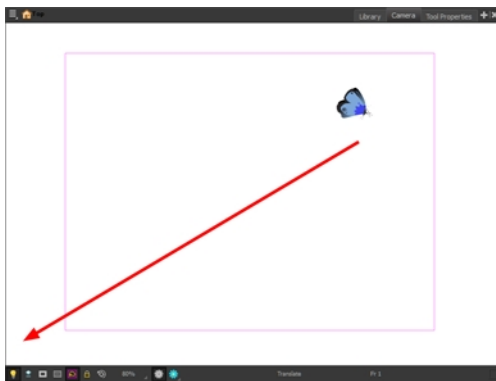
- In the Tools toolbar, disable the Animate  mode.
- Do one of the following:
  - From the top menu, select **Animation > Tools > Translate**.
  - In the Advanced Animation toolbar, click the Translate  tool.
  - Press **Alt + 2**.


3. In the Camera view, click on the camera frame to select it. You can also select the camera layer from the Timeline or Network view.

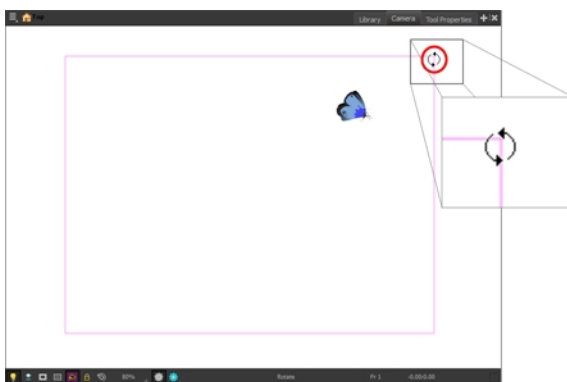
The selected camera frame is highlighted in purple.



4. Drag the camera frame to a new position.






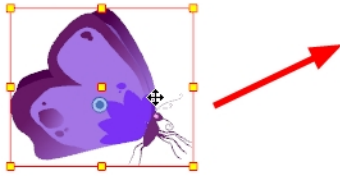
5. To tilt the camera frame, do one of the following to select the Rotate tool:
  - ▶ From the top menu, select **Animation > Tools > Rotate**.
  - ▶ In the Advanced Animation toolbar, select the Rotate  tool.
  - ▶ Pres Alt + 3.
6. In the Camera view, drag to rotate the camera frame until it reaches the desired rotation angle.






## Positioning Objects

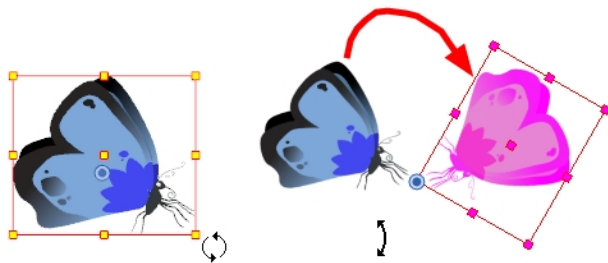
### How to pan a layer using the Transform tool

1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer and drag the selection to a new area. You can select multiple layers to reposition them at the same time. Press Shift and select the different layers.

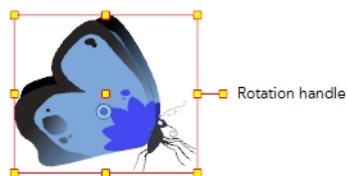


### How to rotate a layer using the Transform tool




1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer.
5. Place the pointer outside of a corner of the bounding box and drag to rotate.

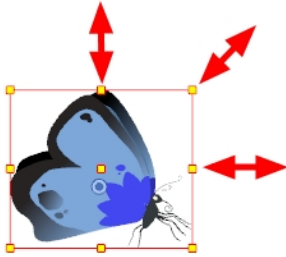


You can display a rotation handle on the bounding box when transforming a layer. In the Preferences dialog box, select the Camera tab and then select the **Use Rotation Lever with Transformation Tools** option. This preference is off by default.






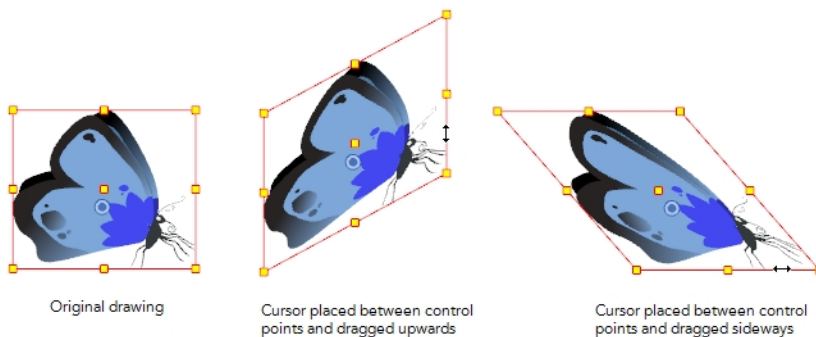
## How to scale a layer using the Transform tool

1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Transform Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer and pull or push on the size, top, or corner control point. Hold down Shift to lock the selection's aspect ratio.



## How to skew a layer using the Transform tool






1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer.
5. Place the cursor between two control points and drag sideways or up and down.



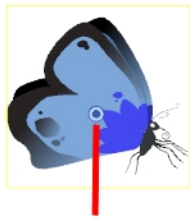
## Repositioning the Pivot

Transformations, such as rotation, scale, skew and flip, are made relative to the pivot point position. You can reposition this pivot point anywhere using the advanced animation tools.

### How to permanently reposition the pivot point

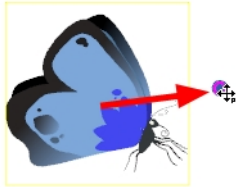
1. In the Advanced Animation toolbar, select the Translate , Rotate , Scale , or Skew  tool.
2. In the Camera view, Ctrl + click (Windows/Linux) or  + click (Mac OS X) to select your element.

The pivot point appears in the Camera view.



Pivot point

3. Drag the pivot point to a new position.



All transformations, including existing ones will be recalculated from this new pivot position.



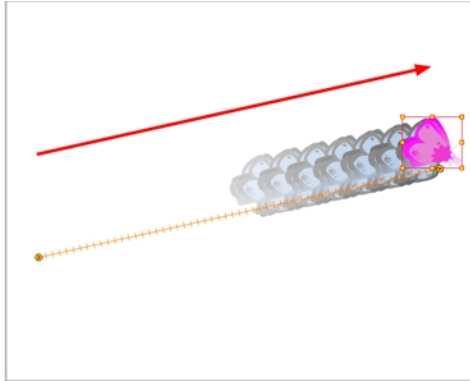


## Chapter 13: How to Animate Objects and the Camera

When it comes to animating objects, you will do this on layers by creating motion paths. You can also animate the camera which is just like any other object you can animate.

### Animating a Layer

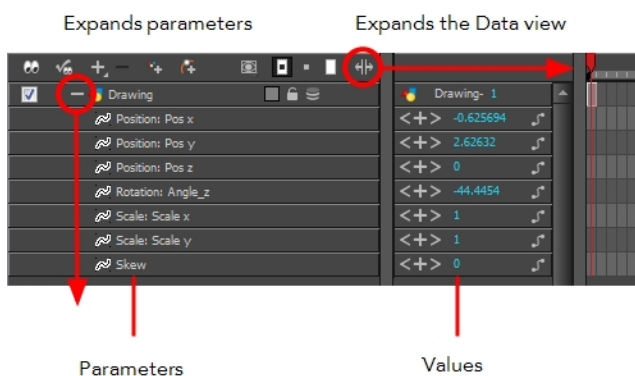
You can create a motion path directly on layers (animated layers).



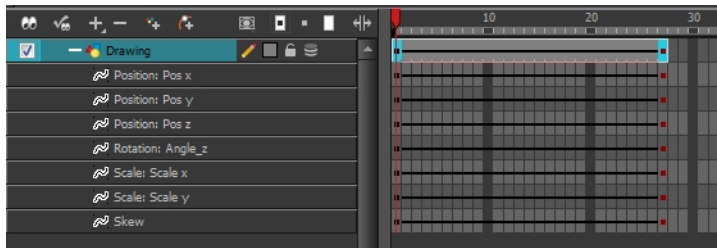
You can control and define a trajectory using several different parameters, including:

- X, Y and Z positions (3D Path or Separate Positions)
- Angle (rotation)
- Skew
- X and Y Scales
- Euler Angle or Quaternion Angle (when 3D option is enabled)
- Z Scale (when 3D option is enabled)




Each parameter has its own function curve where you can add keyframes and control the easing.

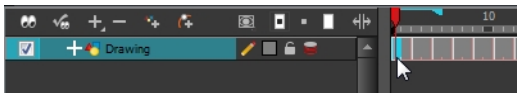


If you are not familiar with graphs and function curves, Harmony has a series of easy-to-use tools for visually controlling trajectories in the Camera and Timeline view.

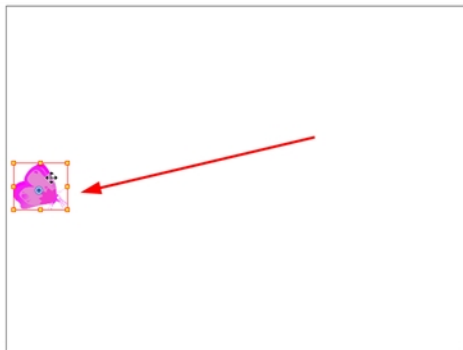


## How to animate a layer

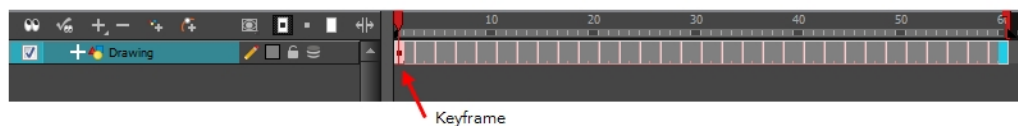
1. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. In the Tool Properties view, make sure that the Peg Selection Mode  is deselected.
3. In the Tools toolbar, enable the Animate  mode. This will create keyframes at the current frame when moving objects.
4. In the Timeline view, go to the first frame.



5. In the Camera view, select the element to animate and move it to its first position.



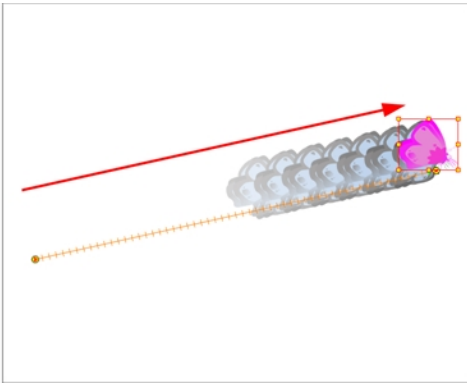
A keyframe is created on the first frame of the Timeline view.



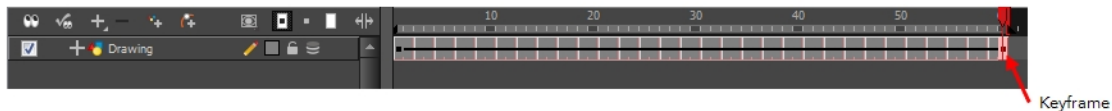
6. In the Timeline view, go to the frame on which you want to set the second position.



7. In the Camera view, move the element to its second position.



A second keyframe is created on the Timeline view.

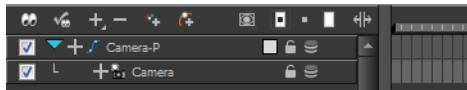


## 8. Play back your animation.

To see your motion animations in the Top, Side or Perspective views while you play back, you must turn on the Playback option. From the top menu, select **Play > Enable Playback > Top View** or **Side View** or **Perspective View**.


## Animating the Camera

The camera is treated the same way as any other element. The same tools and selection modes are used to offset or animate it, but the camera is a static object. To animate the camera, you need to connect it to a peg layer. A peg is a trajectory layer.




While making camera moves, you can use the Top, Side, and Camera views.

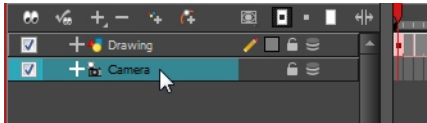
### How to open the Top and Side views

- From the top menu, select **Windows > Top** or **Side**.
- From any existing window already open in your project, click the Add View  button at the top-right corner and select **Top** or **Side**.

### How to add a camera and parent it to a peg

1. If you do not already have a camera layer, do one of the following:
  - From the top menu, select **Insert > Camera**.
  - From the Timeline view layers toolbar, click the Add Layers  button and select **Camera**.
  - From the Module Library view, select a Camera module and drag it to the Network view.

A new camera layer is added to the scene and appears in the Timeline view.
2. In the Timeline view, select the Camera layer.




- From the Timeline View Layer toolbar, click the Add Peg  button.

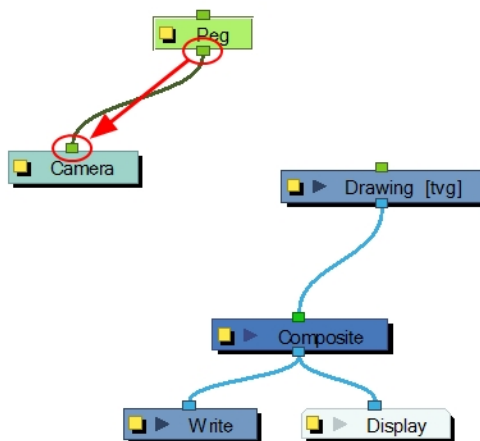
A Peg layer appears directly above the Camera layer. The Camera layer is automatically attached to it.

The Peg layer automatically takes the name of the camera and adds the suffix **-P** to indicate that it is a Peg layer, for example **Camera-P**.






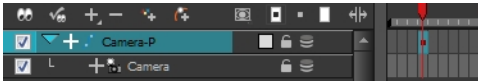
If the new Peg layer did not appear directly above the camera, you may have clicked elsewhere in the scene, which deactivated the layer on which you want to add the Peg layer.

- ▶ Select the Camera layer and drag and drop it under the new Peg layer. Or delete the misplaced Peg layer, select the Camera layer and click the Add Peg  button again.
- ▶ From the Module Library view, you can select a Peg module and drag it to the Network view. Then you can connect the peg's output port to the camera's input port.



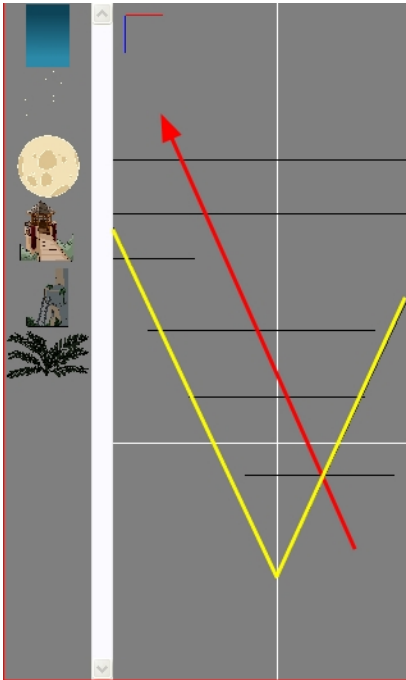
## How to animate the camera

- In the Tools toolbar, enable the Animate  mode.
- In the Tools toolbar, select the Transform  tool or press Shift + T.
- On the right side of the Timeline view, on the Camera Peg layer, select the frame at which you want the camera move to start.
- Do one of the following:
  - ▶ Right-click and select **Insert Keyframe**.
  - ▶ In the Timeline View toolbar, click the Add Keyframe  button.



A keyframe appears in that cell. Any frames preceding this keyframe cell will hold the same camera position as in this keyframe.

5. In the Top, Side or Camera view, select the camera (the large V-shaped cone) and move it to the desired position. In the Camera view, the camera is represented by a thin frame. You need to click directly on one of the edges.



In the Camera view, the camera is represented by a thin frame. In the Top and Side views, the camera is represented by a thin cone. You need to click directly on one of the edges.

6. On the Timeline view, click on another cell a bit further down in time to indicate where the camera move will end.
7. Select the camera in the Camera, Top or Side view and move it to the desired position.



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.

8. Play back  your animation.

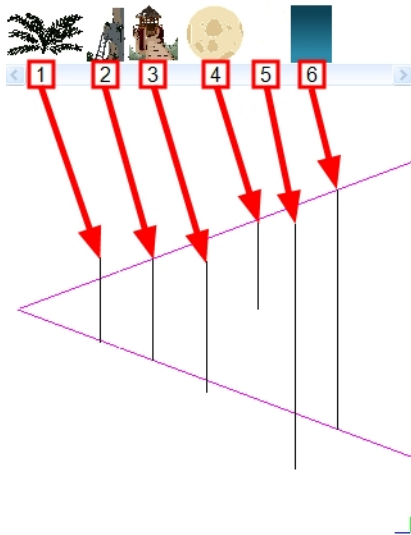


## Chapter 14: How to Create a Multiplane



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 through the space. Notice that objects in the picture 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 the background illustrated above, the main objects to be separated are:

1. Fern
2. Front tower
3. Second tower
4. Moon
5. Stars
6. Sky

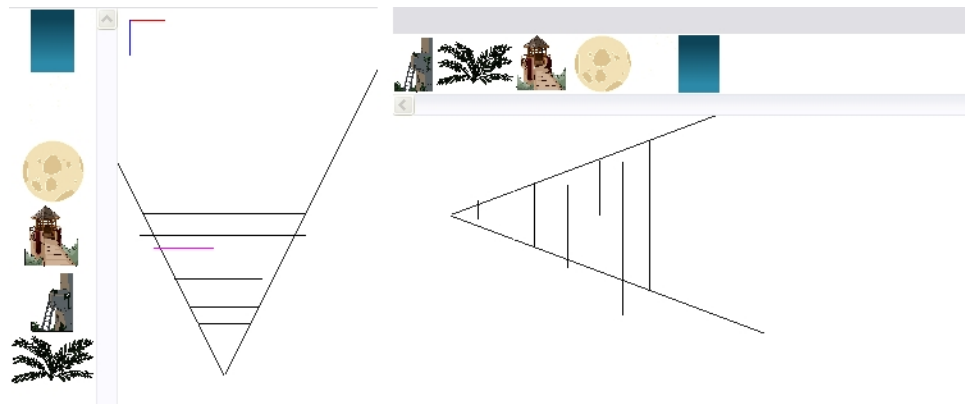
Although the bottom of the tower is hidden behind the plant and the ladder, each of the multiplane layers should be a complete drawing. This is because hidden portions may show up during a camera move later on in the scene.

Now is the time to distribute the layers that comprise your multiplane along the Z-axis. You can position layers on the Z-axis using the Side and Top view.

Positioning your element closer to the camera makes them appear bigger. You can also move element towards the camera or away from the camera while keeping the same size aspect ratio in the Camera view.


It is a good idea to keep a Camera view open to see what your scene looks like while positioning elements in the Top or Side view.

## Positioning Elements in the Top and Side Views

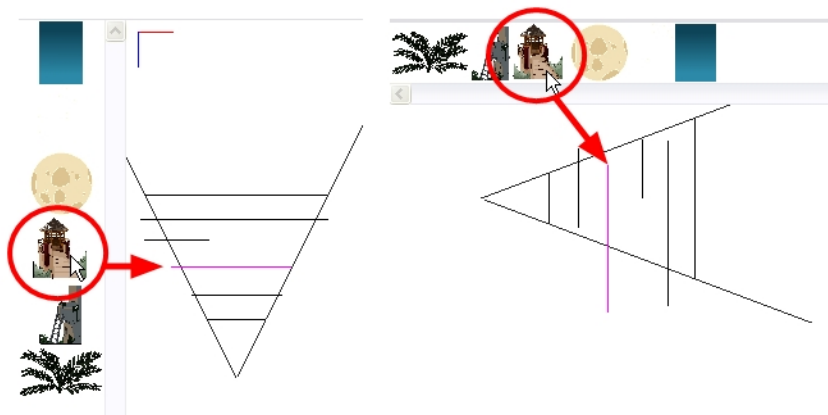


Before distributing layers along the Z-axis using the Top and Side views, deselect the No Z Dragging option by selecting **Animation > No Z Dragging**. This option is disabled by default.

## How to position an element in the Top and Side views

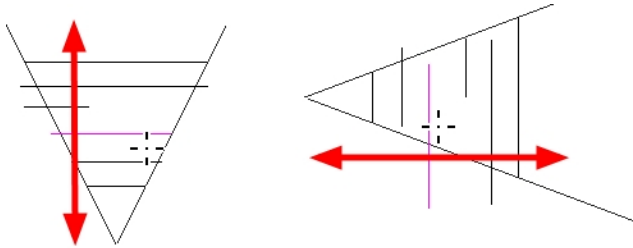
1. To maintain the visual scale in the Camera view as you move your element, in the Advanced Animation toolbar, select the Maintain Size  tool or press **Alt + 6**.
2. In the Side view, select one of the layers in the thumbnails section of the Top or Side view. You can also select a layer from the Timeline view.




The selected layer is highlighted in the Top, Side and Camera views.

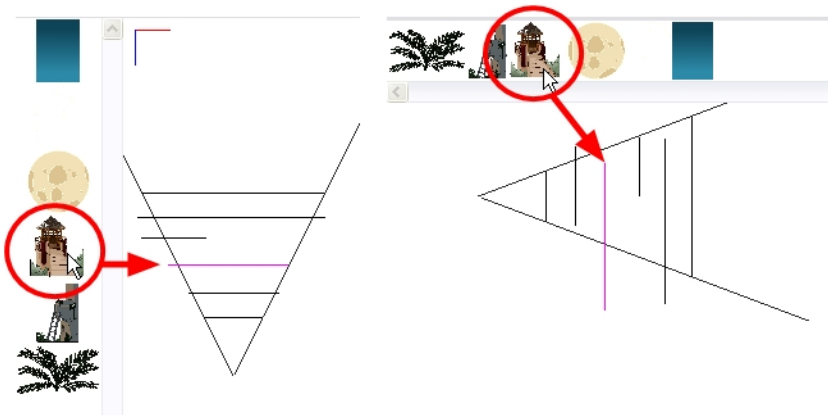




3. Drag the layer to the correct depth position in the camera cone. Your element aspect will remain the same in the Camera view.



4. For your element to scale up or down in relation to their distance to the camera, do one of the following:
- ▶ In the Tools toolbar, select the Transform  tool. Make sure the Peg Selection Mode  option is disabled in the Tool Properties view.
  - ▶ In the Advanced Animation toolbar, select the Translate  tool and select a layer from the thumbnails section of the Top or Side view.
  - ▶ Select a layer from the Timeline view.  
The selected layer is highlighted in the camera cone.



5. In the Top view, drag the element sideways to position it horizontally. 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. Hold Shift while dragging the element to make sure it only moves along the Y-axis.



## Chapter 15: How to Set Up Objects in 3D Space

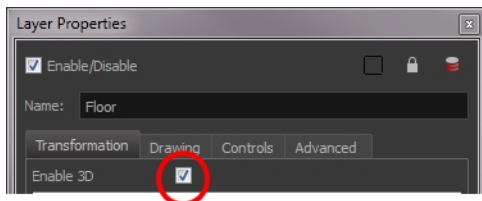
Once your drawings and symbols are assembled, it is time to position them. This section explains how this is done using the example of a simple room.

To position your layers, the following elements are required:

- Camera view
- Top view
- Side view
- Perspective view
- Library view
- Timeline view
- 3D Transformation tools
- Layer Properties view or dialog box

### How to position layers in 3D space

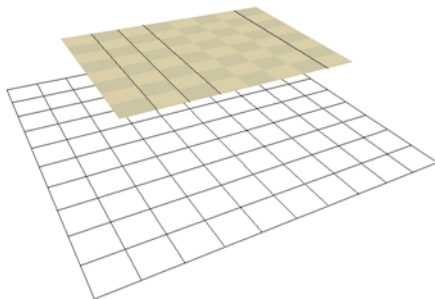
1. In the Timeline view, double-click on the new layer to open the Layer Properties dialog box.
2. In the Transformation tab, select the **Enable 3D** option.





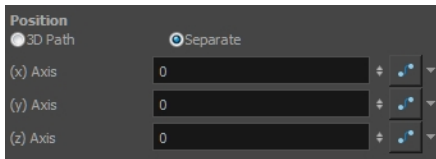
3. In the Rotation section, select the **Euler Angles** option.



4. In the (x) Axis field, type **90** to flip the floor so it is flat on the ground.



5. To position the height of the floor, type values in the Position section of the Layer Properties, use the 3D Translate  tool or 3D Transform  tool.

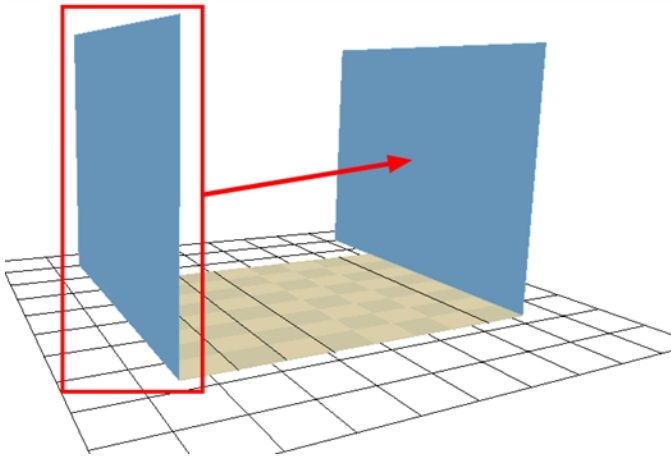


6. Repeat the process for the other pieces to import.
7. If you have parallel walls, once you have positioned one, select the Wall layer in the Timeline view.
8. From the top menu, select **Edit > Duplicate** to duplicate the layer.

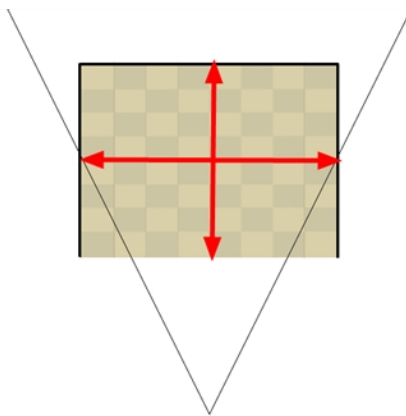
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If the drawing is contained within a symbol, the symbol will not be duplicated, only the layer containing the symbol. This way, you are still using the same drawing.

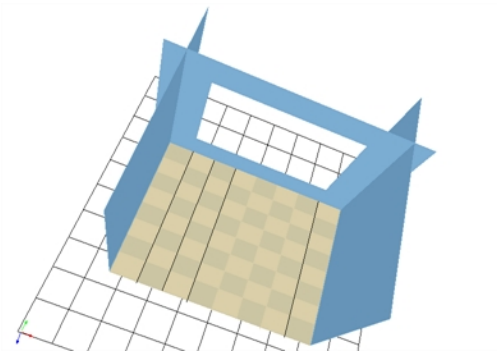
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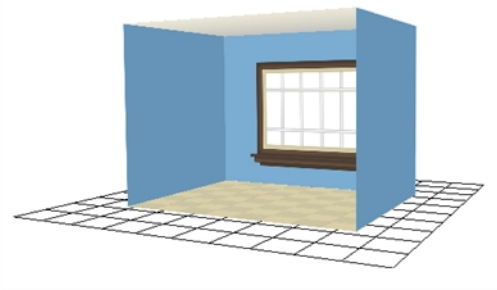
9. Once the layer is duplicated, use the Layer Properties window to enter the positioning values or use the 3D transformation tools.
10. When using the transformation tools, use the Camera, Top, or Side view to position the elements instead of the Perspective view to position your layers precisely.



11. If your walls are touching each other, you should make them intersect by extending one end of the wall through the other wall. This prevents seeing a small gap between them.



Now have a complete 3D room.





## Chapter 16: How to Import Sound and Add Lip-Sync

If you decide to add sound to your movie, you must first prepare the sound outside of Harmony. Once this is done, you must add a sound element in Harmony to the organize the sound files in your animation. 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.

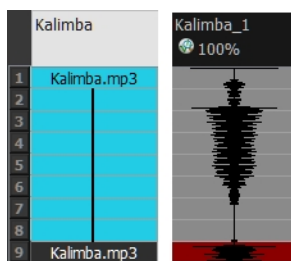
### How to import a sound file

- Do one of the following:
  - From the top menu, select **File > Import > Sounds**.
  - In the Xsheet view, right-click anywhere in the frame area of the Xsheet view and select **Import > Sounds**.
  - From the Xsheet view menu, select **File > Import > Sounds**.
  - From the Timeline view menu, select **Import > Sounds**.

The Select Sound File dialog box opens.

- From the Select Sound File dialog box, find and select a sound file.

The sound file appears as a layer in the Timeline and Xsheet views.



Different views of the same sound file



### 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 to match the sound at a precise frame.

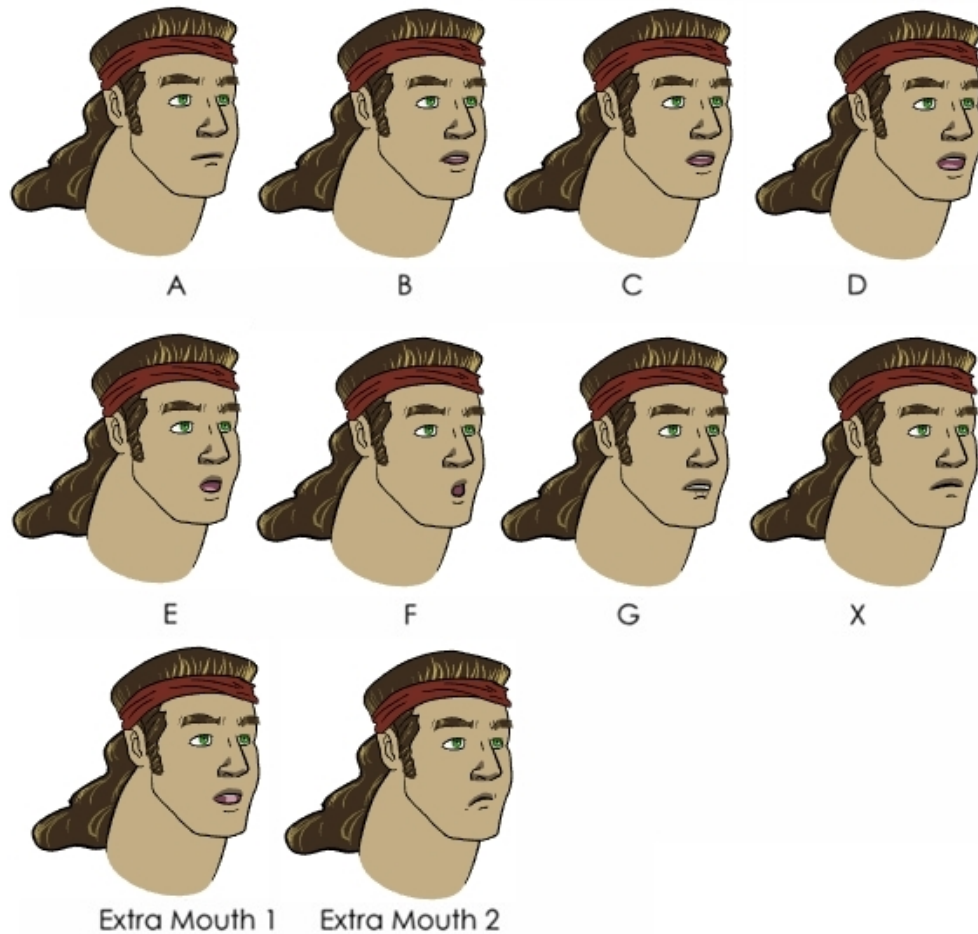
To solve this problem, Harmony provides a lip-sync feature which analyzes the contents of a sound element and generates a mouth chart (see below) based on the eight animation phonemes (A, B, C, D, E, F, G, and X, which is used to represent silence).

The mouth shapes used by Harmony are based on the conventional mouth chart used in the animation industry.

---

The letters used to represent the shapes do **NOT** correspond to an actual sound.

---



Here is an approximation of which sound each mouth shape can produce:

- A: m, b, p, h
- B: s, d, j, i, k, t
- C: e, a
- D: A, E
- E: o
- F: u, oo
- G: f, ph
- X: Silence, undetermined sound

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.

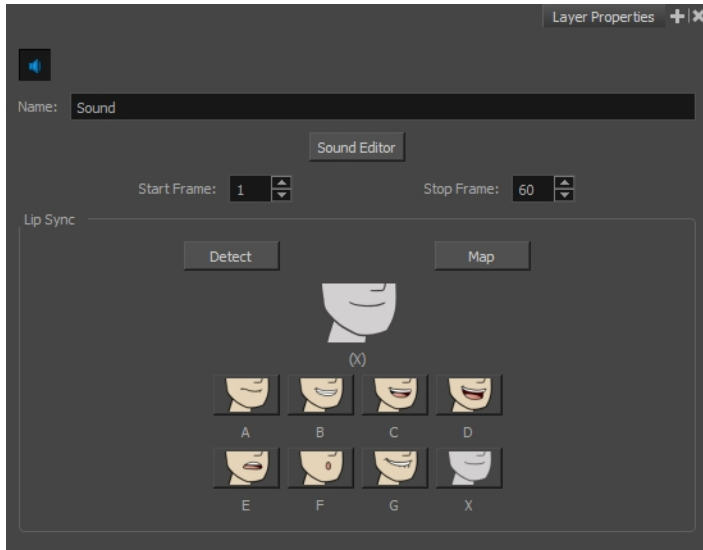
### Automatic Lip-Sync Detection

#### How to generate a sound detection for lip-sync using the Layer Properties view

1. In the Tool Properties view, click the plus (+) button and select **Layer Properties**.



The layer properties for the selected layer is added to the Tool Properties view.



2. In the Timeline or Xsheet view, select your sound layer and the options for that layer will appear in the Layer Properties view.
3. In the Layer Properties, click **Detect**.

A progress bar appears while Harmony analyzes the selected sound clips and assigns a lip-sync letter to each sound cell.

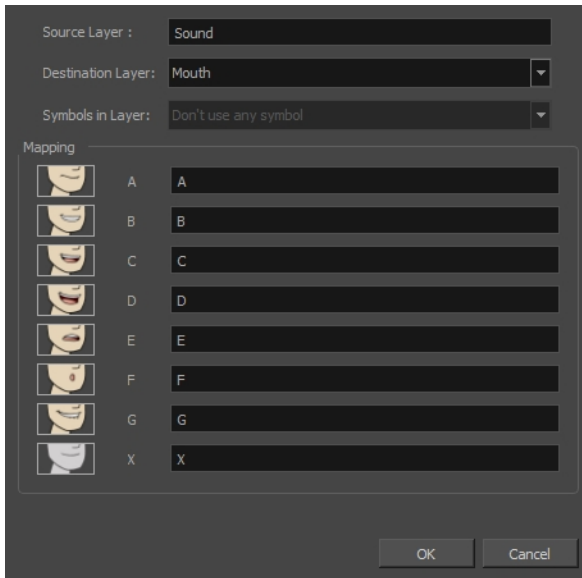
Harmony can automatically map drawings in an element to the mouth chart you have generated for a sound. This can save time when you are lip-syncing a voice track.

In the Lip-Sync Mapping dialog box, you can identify each lip drawing of a character. Harmony then automatically labels all of the cells in the character's element with the appropriate name.

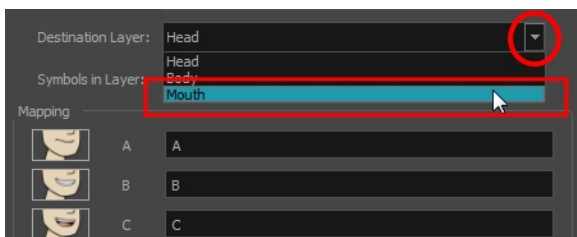
## How to automatically map lip-sync drawings to a mouth layer



1. To open the Lip-Sync Mapping dialog box, do one of the following:
  - In the Timeline view, right-click on any cell in the sound sample layer and select **Lip-Sync > Map Lip-Sync**.
  - From the top menu, select **Animation > Lip-Sync > Map Lip-Sync**.

The Lip-Sync Mapping dialog box opens.

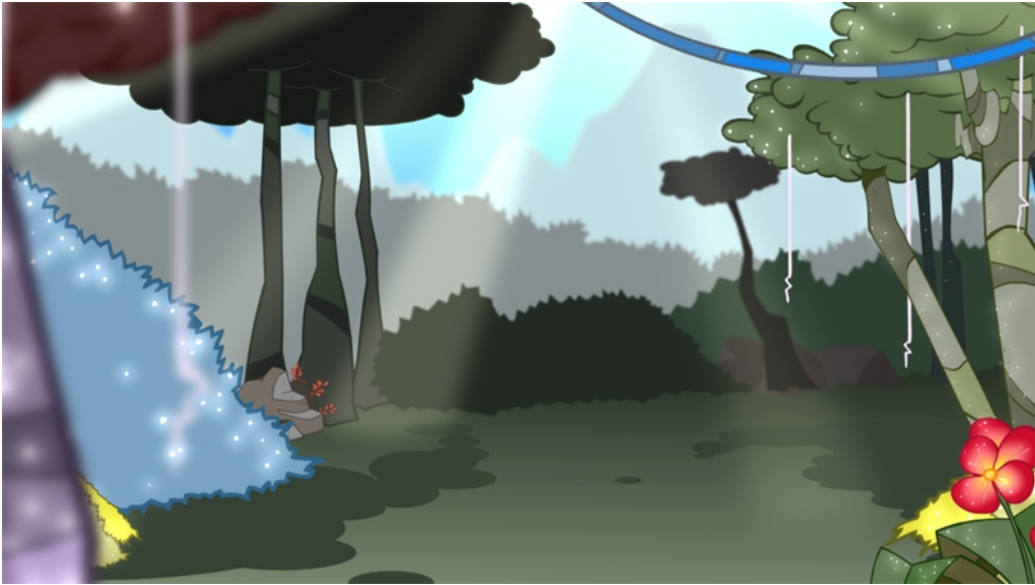


- From the Destination Layer menu, select the layer that contains the mouth positions for the character's voice track.



- 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.
- 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.
- Click **OK**.
- Press the Play  button in the Playback toolbar to see and hear the results in the Camera view. To play back your scene with sound, enable the Sound  button in the Playback toolbar.

## Chapter 17: How to Add Effects to a Scene

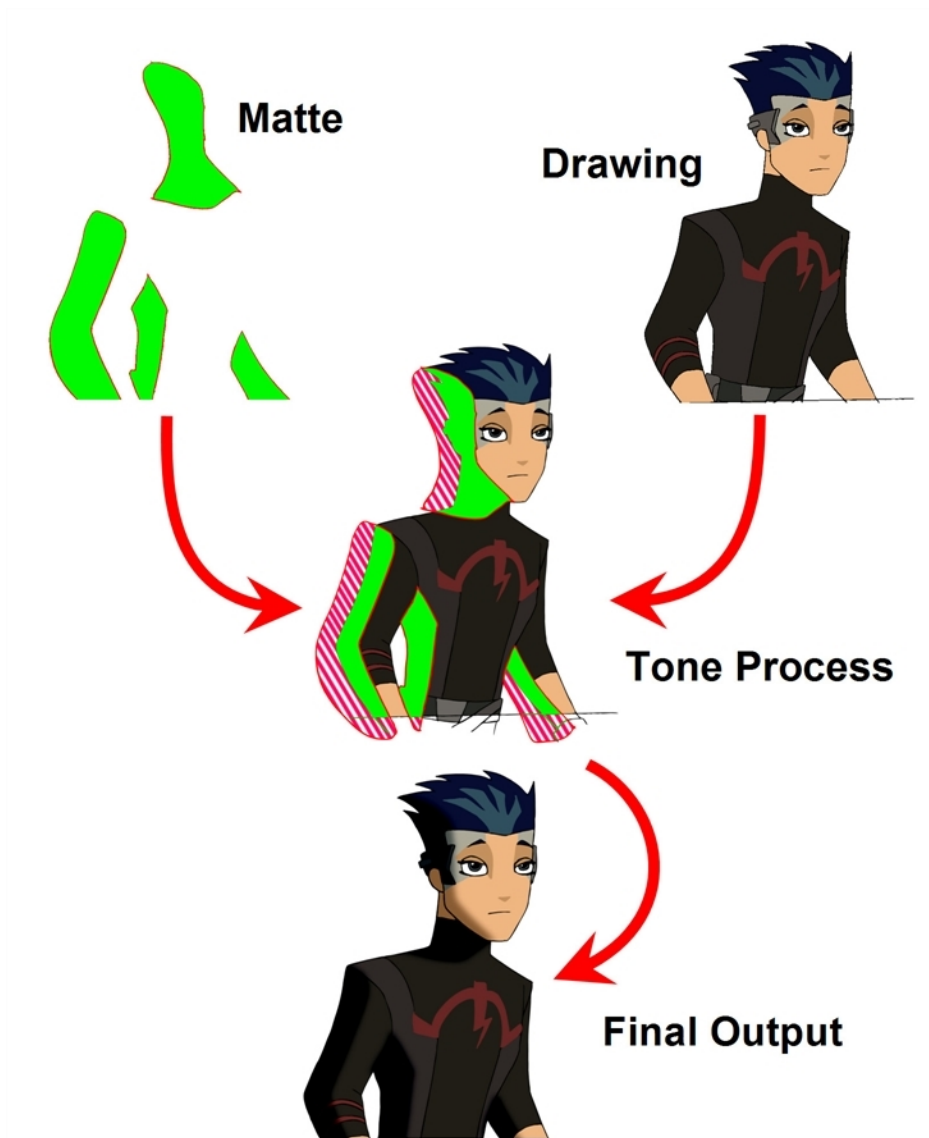


Once your animation is completed, you can add effects such as blurs and glows to make your project look even better! Harmony provides you with a series of essential effects that you can add to your layers.

### About Effects

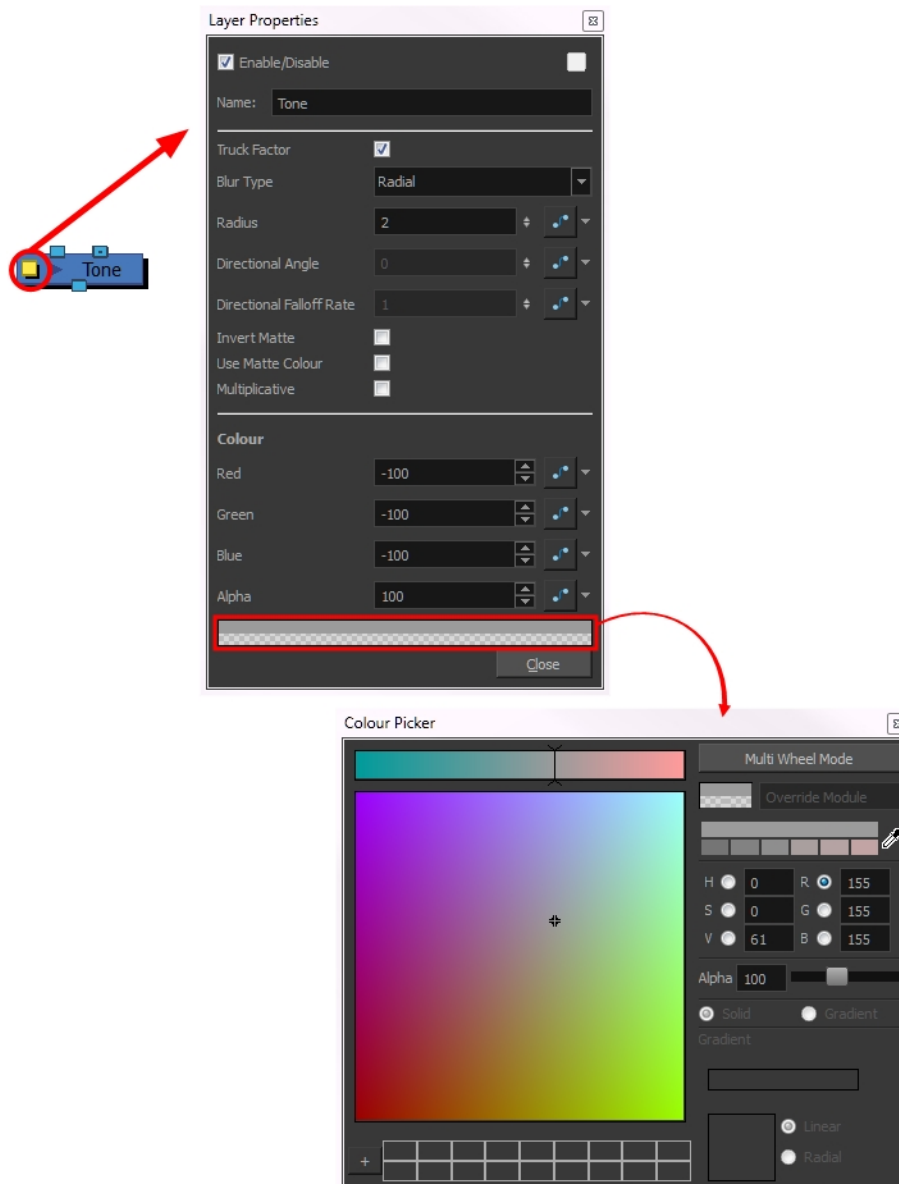
An effect always needs a drawing connection and sometimes a matte or shape connection. A matte provides drawing information that determines the area on which the effect will be applied on the drawing. The details and colours within the matte drawing do not matter, as the system will only use the shape and transparencies in it. A matte is also known as *mask*.

The matte principle can be demonstrated with the Tone effect.



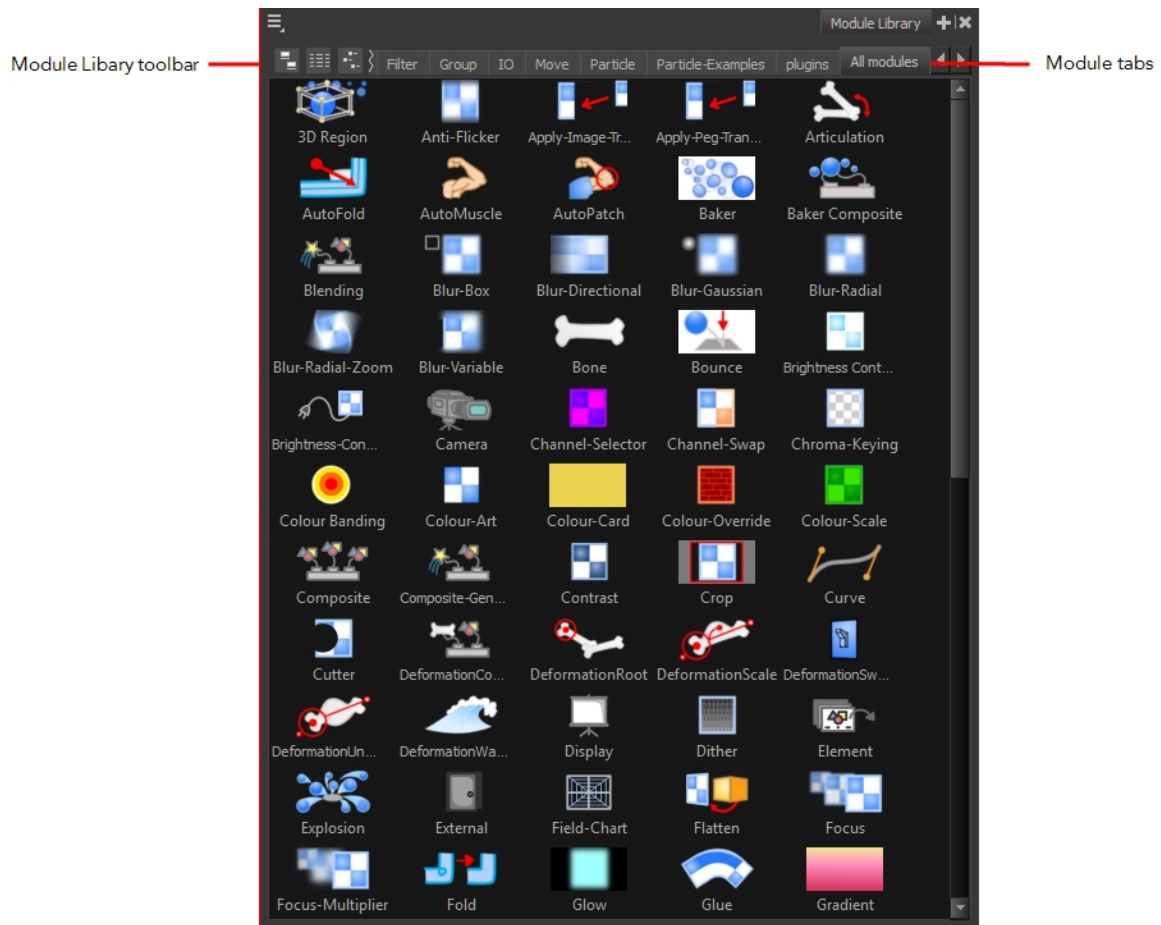
The drawing layer is connected to the right port of the effect and the matte (mask) on the left. The Tone effect then applies darker colours where the matte overlaps the image, blurs the tone edge, and finally clips out the extra tone zone outside the drawing before outputting a final drawing with a tone.

You can adjust the tone's parameters in the Layer Properties view and link any of them to a function column to be animated over time. This means that all of the effects can be customized.

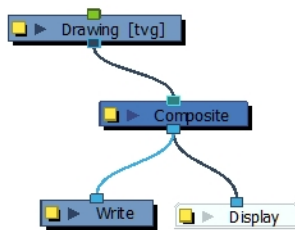


## Adding Effects

If you need to add new effects and other modules to the Network view, you will need to get them from the Module Library.



When you create a new project in Harmony, the default network that appears in the Network view looks similar to the one below.



## Module Library View Toolbar

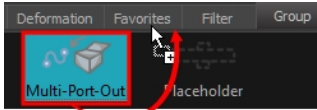
In the Module Library View toolbar, you can change how the effects are displayed.

- View as Icons
- View as List
- View as Icons with Names

## Module Tabs

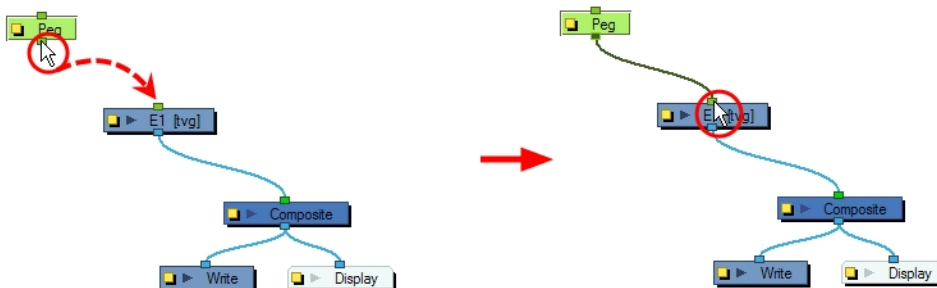
The Module Library is conveniently broken up into several sections or tabs:

- **3D:** Includes the modules related to working with 3D models within Harmony.
- **Deformation:** Includes the modules needed for building a deformation chain, as well as advanced effects such as Fold and Auto Muscle.
- **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.

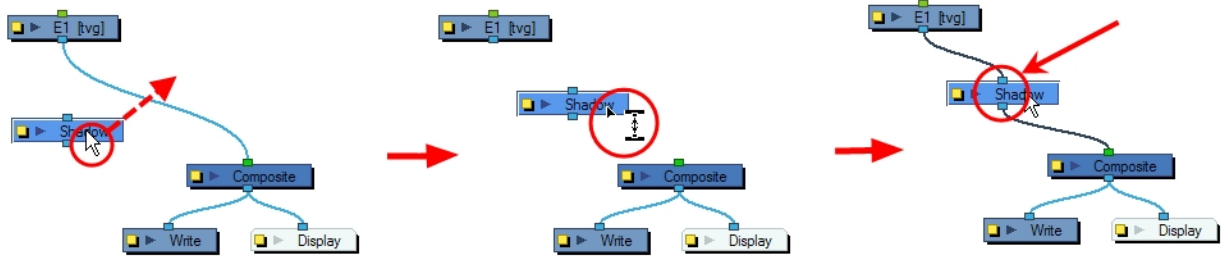


- **Filter:** Effect modules, such as blurs.
- **Group:** Modules for grouping, like Group modules and Multi-Port modules.
- **IO:** Includes Display, Drawing, Write and Note modules.
- **Move:** Modules for changing elements over time, like Peg modules, as well as certain transformations.
- **Particle:** Includes all the modules necessary to construct complex particle systems.
- **Particle-Examples:** Includes a series of examples of particle effects.
- **Plug-ins:** Includes plug-in modules.
- **All Modules:** Lists all of the modules available.

To bring a module into the Network view, drag it from the Module Library and drop it in the Network view. Once in the Network view, you can click on the input or output port of a module and drag out a cable. You can then connect this cable to the output port or input port of another module.



If you want 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.



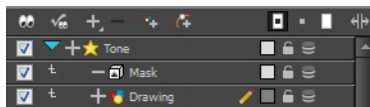
If you want to remove a module, select and press Delete to remove it from the Network view.

## Tone Effect

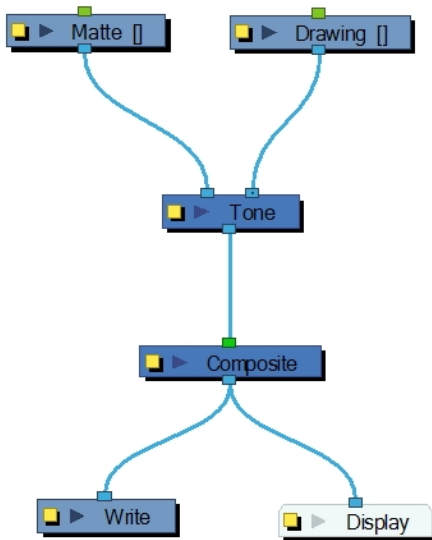


The Tone effect lets you add a dark-coloured region to your drawing and simulate the shaded area away from a light source. To produce the tone effect, create a drawing to control where the tone will appear. The Tone effect uses a matte to determine the shape and position of the tone on your drawing and can be blurred at the edges to create a softer effect.

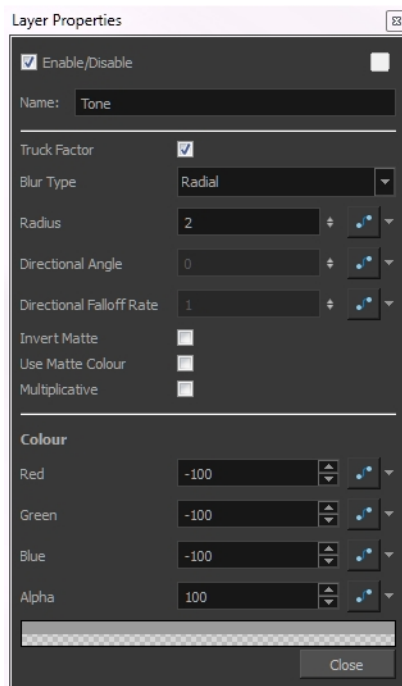
For information on all effects, refer to the [Online Help](#). The Tone Effect is shown here as an example.







Use the Tone editor to control the type and amount of blur, as well as the colour of the tone.



### Tone Effect Properties

Parameter	Description
Truck Factor	Activated by default, this option readjusts the blur when the elements undergo a change of depth or scale. When 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	<b>Radial:</b> The edges of the matte are blurred evenly around

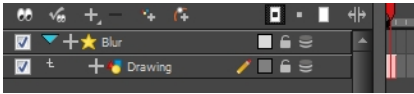
	<p>points that make up the edge of the matte.</p> <p><b>Directional:</b> The matte is blurred in the direction you select.</p>
Radius	Enter a value for the size of the blur. The larger the value, the greater the blur effect. The blur radius is affected by the drawing scale and camera position.
Directional Angle	<p>If you selected the Directional Blur type, you can set the direction of the blur by entering a value from 0 to 360 in this field.</p> <p><b>0:</b> Blurs the image to the west.</p> <p><b>90:</b> Blurs the image to the south.</p> <p><b>180:</b> Blurs the image to the east.</p> <p><b>270:</b> Blurs the image to the north.</p>
Directional Falloff Rate	<p>The distance where the blur fades from the edge of the image. Select a value between 0 and 1.</p> <p><b>0:</b> Makes the blur fade out slowly, distributing the blur evenly from the edge of the character to the farthest edge of the blur.</p> <p><b>1:</b> Makes the blur fade out quickly. The blur is heaviest closer to the edge of the image.</p>
Invert Matte	Inverts 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.
<b>Colour</b>	
Red	Red values of the image.
Green	Green values of the image.
Blue	Blue values of the image.
Alpha	Alpha values of the image.
Colour Swatch	Opens the Colour Picker where you can specify the colour of the main flare.

## Animating an Effect Over Time

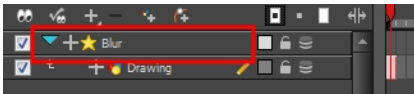
In Harmony, to animate an effect over time, create a function curve by adding keyframes to the parameters you want to animate. To do this, you will use the Layer Properties view and the Timeline view. You can fine tune your animation using the Function view.

### How to animate an effect over time

1. In the Timeline view, add the effect and connect the layers to it.

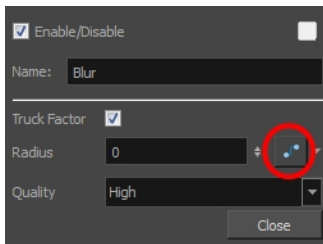


2. Select the Effect layer.




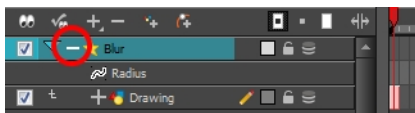
3. To create the function curve:


- In the Layer Properties view, click on the **Function**  button you want to animate to create a function curve.




OR

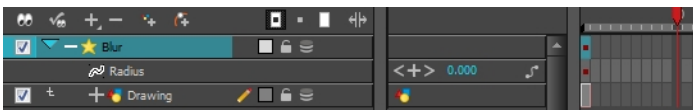
- You can also expand the effect layer's parameters in the Timeline view by clicking on the Expand  Function button and add a keyframe using the F6 key to the parameter you want to animate.



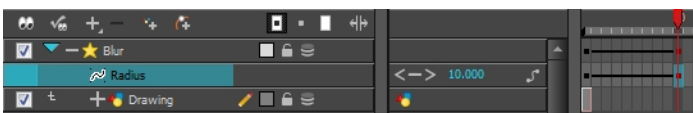
4. In the Timeline view, click on the **Show Data View**  button.
5. In the Timeline view, go to the frame where you want to start animating the effect.



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.



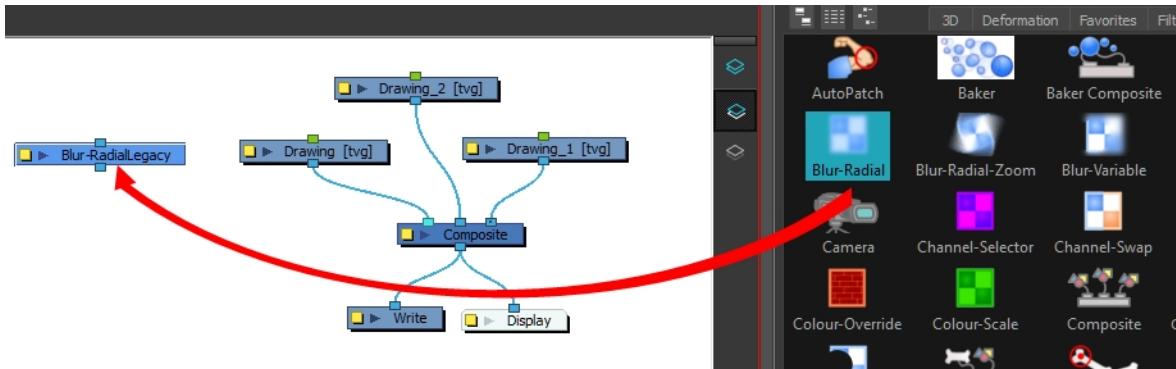
- If your keyframes are stop-motion keyframes, in the Timeline view, select the new keyframes. Right-click on the selection and select **Set Motion Keyframe**.
8. Repeat this process for each keyframe to be added.

When compositing your scene, it will often happen that you want to animate the parameters of an effect over time. You may want to have an object fading in or out by changing the transparency level over time or increasing the colour contrast on one of your drawings over a certain frame range.

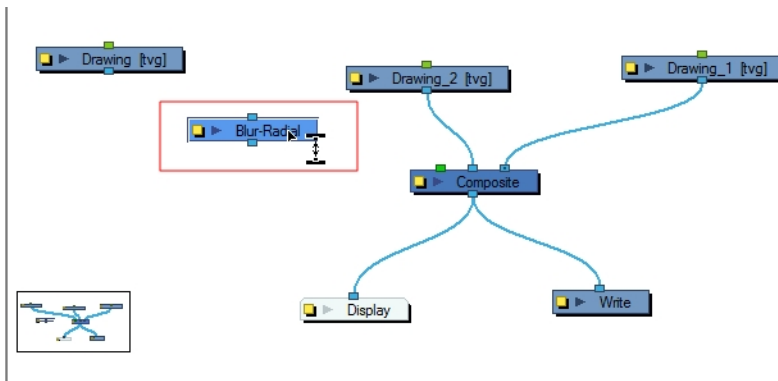
To animate an effect over time, create a function curve by adding keyframes to the parameters you want to animate. To do this, you will use these views: Layer Properties, Network and Timeline. You can fine tune your animation using the Function view.

## How to animate an effect over time

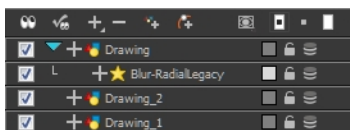
1. In the Network view, drag an effect module from the Module Library view and to the Network view.




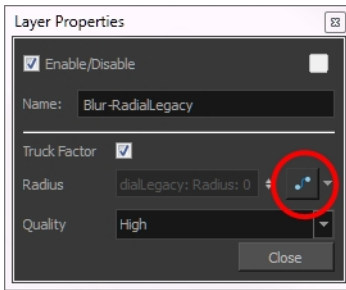
2. Plug the effect between the drawing element on which you want to apply the effect and a composite module. You can do this by manually unplugging and plugging, or by holding down Alt as you drag it through a connection.



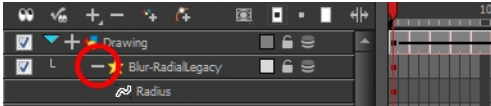
The effect should also appear in the Timeline view.



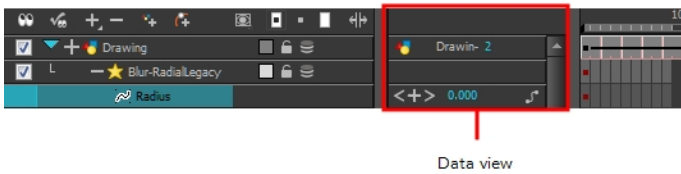
3. To animate the value of the parameter, you must create a function curve and add keyframes on it. For example, you can set the Blur-Radial effect to have no blur on the first frame and become very blurry by the end of the scene by animating its Radius parameter. Do one of the following to create the function curve:
  - ▶ In the Layer Properties view, click the Function  button you want to animate to create a function curve.



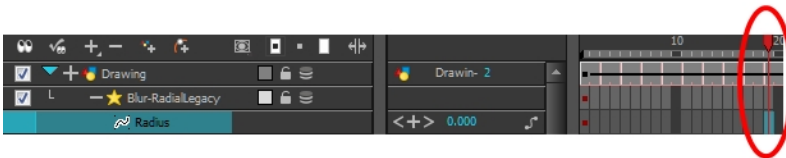
- ▶ Expand the effect layer's parameters in the Timeline view by clicking the Expand Function **+** button and press F6 to add a keyframe to the parameter you want to animate.



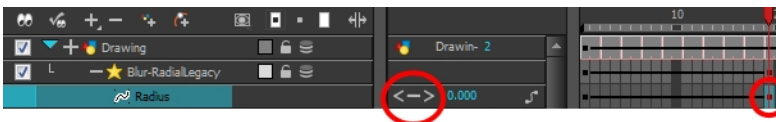
4. In the Timeline view, click the Show Data View **⇄** button.



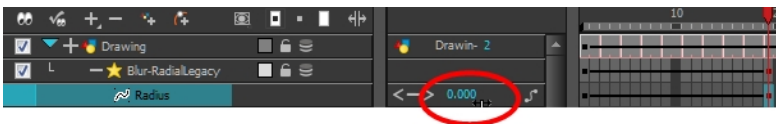
5. In the Timeline view, go to the frame on which you want to start animating the effect.



6. In the Data view, click the Add Keyframe **KF** button.



7. In the Value field, scroll to the keyframe value or type the value in the field.



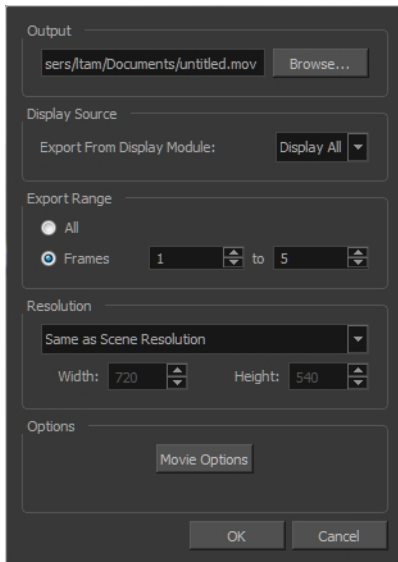
- ▶ If your keyframes are stop-motion keyframes, in the Timeline view, select the new keyframes. Right-click and select **Set Motion Keyframe**.
8. Repeat this process for each keyframe to be added.



## Chapter 18: How to Export a Movie

### How to export a QuickTime Movie

1. From the top menu, select **File > Export > Movie**.  
The Export to QuickTime Movie dialog box opens.



2. Click **Browse** and select a folder in which to save your movie and give it an appropriate file name for the export.
3. Click **OK**.

## Glossary

<b>alpha channel</b>	The image's channel carrying the transparency information. An image already has three channels: red, green and blue (RGB). The alpha channel is the fourth channel (RGBA). The matte, or the transparency information, is stored in this fourth channel. An image without an alpha channel is always opaque.
<b>animatic</b>	A movie with sound that is developed from the storyboard. The storyboard panel is exposed for the duration of the scene and at times, the characters are placed on a trajectory to indicate motion. The camera moves are also animated. The animatic is used to determine the rhythm of a project and provides a good overview of the project before beginning production.
<b>animation</b>	A simulation of movement created by displaying a series of pictures or frames.
<b>anime</b>	An animation style known for its sinister and dark feel; popular in Japan.
<b>arc</b>	Action rarely occurs in a straight-forward manner; rather it typically unfolds in what storytellers refer to as an arc. The purpose of a story arc is to move a character or a situation from one state or scenario to the next.
<b>aspect ratio</b>	The relationship between the width and height dimensions for any scene, frame or film format. Television ratio is 4:3 and widescreen ratio is 16:9.
<b>auto-feed</b>	An automated method of feeding drawings into a scanner in which multiple drawings are stacked into a sheet feeder. When the scanner is activated, the drawings are scanned consecutively, without further user intervention.
<b>automatic lip-sync detection</b>	Automatically mapping drawings in an element to the mouth chart generated for a sound. This can save time when lip-syncing a voice track.
<b>axis</b>	An imaginary line around which an object rotates. For 2D graphics, there are two axes: <ul style="list-style-type: none"> <li>• X: Horizontal</li> <li>• Y: Vertical</li> </ul> For 3D graphics, there are three axes: <ul style="list-style-type: none"> <li>• X: Horizontal</li> <li>• Y: Vertical</li> <li>• Z: Depth</li> </ul>
<b>background</b>	The part of a scene that is farthest to the rear. The background is the artwork, or decor, against which the animation takes place.
<b>Bézier</b>	A method of defining curved lines invented by French



	<p>mathematician Pierre Bézier. A Bézier curve is a mathematical or parametric curve. Bézier curves use at least three points to define a curve.</p> <p>In Toon Boom, a function can be hooked to a Bézier curve and vary along with the curve value information. Bézier curves are also very useful in vector graphics. They are used to model smooth curves and can be scaled indefinitely.</p>
<b>bitmap</b>	An image composed of pixels with a single resolution (size). If it is enlarged too much, it will lose definition and pixels will begin to appear. This is known as <i>pixelation</i> .
<b>breakdown</b>	<p>In cut-out animation, breakdown is the action of breaking a character into pieces to create a puppet with articulations. To break down a character, the artist cuts part, such as hands and arms, from the character's model and pastes them in separate layers. Next, the joints are fixed and the pivots set.</p> <p>In traditional animation, a breakdown is an animation pose generally found between two key poses. The key poses are the main poses in an animation and the breakdowns are secondary poses, ones that help to describe the motion and the rotation curve.</p>
<b>camera shake</b>	Camera shake occurs in a scene when the camera moves slightly and quickly in several directions. This gives the impression of an impact, vibration or, for example, bumps on the road.
<b>caption</b>	In a storyboard, a caption is a text field containing dialogue, effects, sound, or slugging information.
<b>cel</b>	<p>In traditional animation, a cel, also known as a <i>celluloid</i>, is a transparent sheet on which the animation is inked and painted before being sent to the camera. The picture's outline is drawn on the front of the cel and then coloured along the back.</p> <p>In Toon Boom, a cel is an individual space encountered in an Xsheet's column, from which you can expose a drawing or a function's coordinate.</p>
<b>character design</b>	Each character in an animated film is drawn from multiple angles in poster-style format, called a <i>model sheet</i> , which serves as a reference for the animators.
<b>clean up</b>	After rough drawings have been tested and approved, all the noise in the image (excess lines, notes, etc) is removed to create final drawings which can be inked, painted and shot. The cleanup process refers to either tracing a clean line over a rough drawing to achieve the final version, or removing dirt and extra lines left by the scanning process.
<b>CMYK</b>	Cyan, Magenta, Yellow, Black. Refers to the process used by printers to define colour on the printed page.
<b>colour card</b>	A Colour Card is a solid colour card that is the same size as the camera. The Colour Card can be used to fill the background with a solid colour when there is no background image included.

<b>colour model</b>	In animation, a colour model is the official colour design that must be used to paint the animation. A model is the definitive character, prop, or location design that each artist must follow for the production.
<b>colour wheel</b>	A display of the colour spectrum in the form of a circle.
<b>compositing</b>	Compositing is the action of incorporating all of a scene's elements to create the final result prior to rendering. For example, the compositing artist will import all the animation sequences, background, overlays and underlays in the scene and position them correctly. The artist will then set the camera frame and animate it, if needed. Finally, the animator will create all the computer-generated effects for the project.
<b>cross dissolve</b>	An effect used to fade two scenes, one into the other.
<b>cut</b>	A direct transition between two scenes. When a cut is used, there are no transition effects inserted to pass from one scene to the next. The first scene ends and the second one starts immediately.
<b>cut-out animation</b>	The action of animating characters made of several pieces by moving them around frame by frame. Cut-out animation can either be computer generated or done traditionally using paper.
<b>cycle</b>	A group of images that together make up an action, such as walking. A cycle is an action repeated as a loop over a period of time. It can be a series of animated drawings or keyframes.
<b>dialogue</b>	The text spoken by a character in a movie or animation.
<b>dope sheet</b>	Used by animators, directors and other members of a crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as an <i>exposure sheet</i> or <i>Xsheet</i> .
<b>doping</b>	To assign a particular drawing to a range of frames.
<b>DPI</b>	Dots Per Inch is the standard measure of resolution for computerized printers. It is sometimes applied to screens, in which case it should more accurately be referred to as <i>pixels per inch</i> . Either way, the dot is the smallest discrete element making up the image.
<b>ease/velocity</b>	In animation, the ease, also known as <i>velocity</i> , is the acceleration and deceleration of a motion. It can be a motion created by a function curve, or a series of animated drawings. Other common terms for ease-in and ease-out are slow-in and slow-out.
<b>ease-in</b>	Gradual acceleration in the action. Another common term for ease-in is slow-in.
<b>ease-out</b>	Gradual deceleration in the action. Another common term for ease-out is slow-out.
<b>establishing shot</b>	A scene in which the viewer can see the whole area in which a sequence is happening. For example, if a child is playing on the ground in front of his house, the establishing shot would be a scene

	where the viewer can see the house, the ground, a part of the street and the buildings around the central point of action. This helps the viewer understand the story location and scene orientation.
<b>exposure</b>	In animation, an exposure is the number of cels on which a drawing appears in the scene. For a drawing to appear longer, the exposure must be extended over a greater number of cels.
<b>exposure sheet (Xsheet)</b>	<p>The exposure sheet or Xsheet, is a sheet with several vertical columns and horizontal frames used to indicate a scene's timing.</p> <p>Each column represents a scene's layer. In each column, the drawing's numbers are indicated and repeated over the particular amount of frames they need to appear.</p> <p>The exposure sheet is used by animators, directors and other members of a crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as a <i>dope sheet</i>.</p>
<b>fade in/fade out</b>	Fade in or fade out is a transition effect used to open or close a sequence. A fade in occurs when the first scene appears progressively, from complete transparency to its complete opacity. A fade out occurs when the last scene progressively disappears, going from complete opacity to complete transparency.
<b>fast-in</b>	Dramatic acceleration at the start of the action.
<b>fast-out</b>	Dramatic acceleration at the end of the action.
<b>field</b>	In animation, a field is a measurement unit used to calculate motion, registration and camera positioning. A standard animation scene will vary between 6 to 12 fields.
<b>field chart</b>	A guide containing all the field units that animation and layout artists use to determine a scene size or camera motion.
<b>film-1.33</b>	Use this resolution setting for the widescreen film format that conforms to the standard 4:3 pixel aspect ratio.
<b>film-1.66</b>	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).
<b>flipping</b>	In traditional animation, flipping is the action of going through the drawings of an animation sequence very quickly in order to see the animation in motion. Flipping can also be the action of creating a mirror transformation of an object.
<b>follow-through</b>	The follow-through is the secondary motion caused by the main action. For example, a character wearing a cloak is running. The main action is the body running. This will cause the cloak to follow the motion, although it will not move at the same time, but react a few frames later and follow the main motion curve.
<b>forward kinematics</b>	Forward kinematics is a feature used to animate principally 3D characters and cut-out puppets with hierarchy. It is used to animate

	a puppet from one of parent parts, such as a shoulder, and make the rest of the arm move with it as a single piece.
<b>frame</b>	A frame is a single photographic image in a movie. In traditional animation, the North American standard generally contains 24 frames per second, while in Europe the standard is 25 frames per second.
<b>frame rate</b>	<p>This is the measurement of the frequency (rate) at which an imaging device produces unique consecutive images, called frames. The term applies equally to computer graphics, video cameras, film cameras, and motion capture systems.</p> <p>Frame rate is most often expressed in frames per second (FPS) and in progressive-scan monitors as hertz (Hz).</p> <p>The frame rate is the speed at which the frames are played. They are generally calculated by frame per second. For example, a scene could be played back at 12, 24, 25, 30 or 60 frames per second or any other number</p>
<b>functions</b>	A function is a computer generated motion, trajectory or path that elements, other trajectories and effects parameters can be attached to. The function can be controlled by adding keyframes and control points on the function curve.
<b>gamut</b>	The range of colours that a particular device can represent.
<b>HDTV</b>	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 and make full use of your resolution setting, your output device must be compatible with HDTV technology.
<b>hold</b>	This is a frame in the animation in which the character maintains its position without moving. A hold can be created between any two keyframes.
<b>HSV</b>	Hue, Saturation, Value. A method of defining colours in terms of hue (tint), saturation (shade) and value (tone or luminance).
<b>in-between</b>	The drawings that exist between the key poses. These are drawn to create fluid transitions between poses.
<b>ink and paint</b>	The ink and paint process is the action of painting the empty zones and colouring the lines on the final animation drawings, while following a colour model.
<b>interpolation</b>	In animation, the interpolation is the computer generated motion created between two keyframes. You have the choice to create interpolation, or not, between your keyframes.
<b>jump cut</b>	A jump cut is a jerky cut between two scenes. Typically, a jump cut is not visually pleasing. It is generally caused by one scene ending, and a second one starting, with similar a image. The lack of difference causes the eye to see a little jump between the two scenes.

<b>key pose</b>	Important positions in the action defining the starting and ending points of any smooth transition. Keys, or key poses, are the main drawings in an animation sequence describing the motion. For example, if an arm is waving, the keys will be of the arm at one extremity of the wave motion and the other extremity. By flipping those drawings, the animator can see the skeleton of the motion without having all of the drawings.
<b>keyboard shortcuts</b>	<p>One or more keyboard keys which, when used, cause an operation to be performed. Keyboard shortcuts are used throughout the Toon Boom software and form an integral part of the workflow. It is, in most cases, possible to customize the shortcuts in the Preferences dialog of the software.</p> <p>The shortcuts are written as follows in the Toon Boom user documentation: Each key in a sequence is shown inside square brackets as in: [Ctrl]+[A]. The brackets "[" ]" separate the key from the plus sign (+). Neither the brackets, nor the plus sign are part of the sequence. To use a shortcut, press the key and the character simultaneously.</p>
<b>keyframe</b>	Important positions in the action defining the starting and ending points of any action. A keyframe is a computer generated position at a specific moment (frame) on a given trajectory.
<b>layer</b>	In animation, a layer is an individual column, level or character. A scene's layers are superposed to form the final image.
<b>layout</b>	The layout process is the communication step between the storyboard and the animation. The layout and posing process is the action of putting the storyboard on model, that is drawing the character following the design in the model pack, so that the animator can start his work. The layout artist will draw the background, create the camera and field guide matching the scene and the camera motion. Lastly, he will draw on model the main action poses.
<b>layout and posing</b>	The action of putting on model, that is, at the right scale, the storyboard for the animator to start his work.
<b>library</b>	A library is a storage area containing templates and assets that can be reused in any project or scenes.
<b>light table</b>	The Light Table feature allows you to see the other layers in transparency while you are working on a particular one in the Drawing view.
<b>line of action</b>	Direction that the action will follow. Also known as the Path of Action
<b>lip-sync</b>	The lip-sync is the character's mouth synchronization with the dialogue sound track. Frame by frame, the mouth will be adjusted to fit the sound to give the illusion of the character is speaking.
<b>low resolution</b>	This format is ideal for videos destined for the web, where size and fast download of a video file might take precedence over quality. A low-resolution image is one that lacks fine detail.

<b>manual lip-sync detection</b>	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.
<b>master palette</b>	A master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire production to maintain consistency in the look and to ensure that the same colours are used throughout the production. Also known as palette.
<b>model/colour model</b>	In animation, a model is the definitive character, prop or location design that each artist must follow for the production. A colour model is the official colour design that must be used to paint the animation.
<b>motion keyframe</b>	In Toon Boom, the motion keyframe is a keyframe with computer-generated interpolation.
<b>mouth chart</b>	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, Toon Boom provides a lip-sync feature which analyses the contents of a sound element and generates a mouth chart based on the eight animation phonemes (A, B, C, D, E, F, G, and X, which is used to represent silence).
<b>multiplane</b>	The effect of passing through multiple levels of drawings to create a sense of depth in a shot. A multiplane is a scene in which the layers are placed at different distances from the camera so that when the camera moves, a depth illusion occurs. With a multiplane, all the perspective and scale is calculated automatically.
<b>NTSC</b>	The standard analogue television broadcasting system used in North America. NTSC conforms to North American standards on how rectangular pixels are displayed for computer and television screens.
<b>nudge</b>	A small push (left, right, up, down, forward or backward) done with the keyboard arrow keys on a selected element. Nudging is used to move a selection very slightly and precisely.
<b>onion skin</b>	A feature that lets you see the previous and next drawings of a sequence.
<b>overlay</b>	A part of the scene environment, such as a chair or a bush, that is placed in front of the main animation.
<b>PAL</b>	A resolution that works best with the European format for television and computer screens, as the rectangular pixels are displayed at a different orientation.
<b>palette/master palette</b>	A palette or master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire project to maintain a consistency in the look and avoid the colour changing during the animation. Also referred to as a master palette.

<b>palette style</b>	A palette style is a second version of an existing palette with a slight change in the tint and value. A palette style can be used to create the night version of a palette. It may also be called a clone palette.
<b>pan</b>	To move the camera across the scene in any direction.
<b>panel</b>	In a storyboard, a panel is a frame in a shot. A shot can be composed of one or several panels.
<b>paperless animation/tradigital</b>	The paperless animation process is the action of animating digitally. The main paperless animation process is to draw, frame by frame, the animation directly in the software.
<b>passing position</b>	When drawing a walk sequence for a character, the passing position is the point at which one leg passes the other.
<b>path of action</b>	Direction that the action will follow. Also known as the Line of Action.
<b>peg</b>	In traditional animation, a tool used to ensure accurate registration of action as cel layers move. In digital animation, in which you are doing a 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 add path articulations. For the latter, you can also use the Inverse Kinematics tool.
<b>phoneme</b>	Unit of sound in a language.
<b>pivot</b>	A pivot is the point around which a peg or a drawing rotates.
<b>pixel</b>	Smallest element of an image displayed on a monitor or TV screen.  Pixel, short for Picture Element, is a single point in a graphic image. It is a small sample of an image, a dot, a square, or a very small section made out of smooth filtering. If you zoom in close enough on a digital image, you will see the pixels, which look like small squares of different colours and intensity.
<b>pose-to-pose animation</b>	The pose-to-pose animation process is the action of creating all the main action poses, called key poses, and then placing the secondary poses between the keys. The secondary poses are called breakdown. Finally, the animator fills the gaps with the in-between drawings to achieve a smooth animation.
<b>rendering</b>	The final step when animating by computer. During rendering, the computer takes each pixel that appears on screen and processes all of the components as well as adding motion blur before it produces a final image. In animation, the rendering process is the action of calculating the final images after the compositing process.
<b>resolution</b>	The resolution is the size of a scene, generally calculated in pixel. For example, the NTSC resolution is 720 x 480. Resolution type should match your final output: HDTV, film-1.33, film-1.66, NTSC, PAL, low.
<b>RGB</b>	Red, Green, Blue: method of defining colour by specifying amounts

	of these three colour components.
<b>rigging</b>	The rigging process is the action of attaching the cut-out puppet parts one to the other.
<b>rotary table</b>	The Rotary Table is equivalent to the animation disk/table and allows one to rotate the workspace to be more comfortable while drawing.
<b>rotoscoping</b>	Is an animation technique in which animators trace over live-action film movement, frame by frame, for use in animated films. The act of sketching over live-action footage to create an animated sequence.
<b>roughs</b>	The roughs are the skeleton sketch of an animation or a design. Roughs mainly consist of sketch lines and shapes, though they can also contain design details.
<b>safety area</b>	In animation and movie parlance, the safety area is the zone at the centre of the scene's frame, one safe from being cropped by the TV frame. As a TV frame cuts a margin off the original frame size, maintaining a safety area ensures that the scene's main action will remain clearly visible once the film is screened on television.
<b>scene</b>	A scene is a shot in a movie or show. A sequence is composed of several scenes. A scene changes to another scene by a simple cut, or a transition.
<b>script</b>	The script is the original text containing all the movie or show information. In animation, the script contains all of the location descriptions, dialogues, time and more. A project starts with a script.
<b>sequence</b>	In animation, a sequence is a series of scenes or shots forming a distinct part of the story or movie, usually connected by unity of location or time.
<b>shot</b>	A shot is a scene in a movie or show. A sequence is composed of several shots. A shot changes to another shot by a simple cut, or a transition.
<b>slow-in</b>	Gradual acceleration in the action. Another common term for slow-in is ease-in.
<b>slow-out</b>	Gradual deceleration in the action. Another common term for slow-out is ease-out.
<b>slugging</b>	In Storyboard Pro, slugging refers to indicating the start and stop times of dialogue and relevant actions.
<b>sound scrubbing</b>	A process that lets you hear sound in real time while you move the playhead forward or backward. This is very useful for finely-tuned lip-syncing.
<b>stop-motion keyframe</b>	A stop-motion keyframe is a keyframe with no computer generated interpolation.
<b>storyboard</b>	A visual plan of all the scenes and shots in an animation. The storyboard indicates what will happen, when it will happen and



	how the objects in a scene are laid out.
<b>straight-ahead</b>	A technique in which an entire sequence is drawn from the first position to the last, in order. There is very little planning in this methodology, and where the character ends up and how it gets there can be a surprise for both the audience and the animator. While this approach is a lot more spontaneous and creative, it can create inaccurate results.
<b>strokes</b>	Strokes are invisible vector lines forming the drawing zones. They can be adjusted with Bézier handles.
<b>tablet/pen</b>	Device used in conjunction with, or instead of, a mouse to move a mouse pointer (sometimes referred to as the cursor) around the computer screen.
<b>template</b>	In Toon Boom, a template is an asset stored in the library, one that can be reused in any project. A template can be a drawing, a series of keyframes, a sound file, a panel, a cut-out character, an effect, a trajectory, an animation, or anything else used in the software.
<b>thumbnails</b>	A thumbnail is a very small image used as a reference or indicator.
<b>timecode</b>	Timecode is timing information printed on a movie clip to indicate what scene, hour, minute and second is currently displayed on the screen.
<b>timeline</b>	The timeline is a horizontal representation of the scene's elements, timing and keyframes.
<b>trace and paint</b>	After the rough animations have gone through cleanup and a final line or pencil test, each drawing is traced and painted for the final animation. In today's digital world, this may be done in a variety ways other than via the traditional celluloid or acetate methods.
<b>track breakdown</b>	The soundtrack for animated film is broken down into individual sounds documenting the precise frame-by-frame position of each sound.
<b>traditional animation</b>	The traditional animation process is the action of drawing on paper all of the animation sequences, before either scanning them or inking them on cels.
<b>trajectory</b>	A computer generated path or trajectory that elements can follow. The trajectory can be controlled by control points, keyframes and velocity.
<b>transition</b>	A transition is an effect placed between two scenes as they pass from one to the other. Common transition effects are cross-dissolve and wipe.
<b>underlay</b>	In animation, an underlay is a specific part of the decor placed behind the main animation.
<b>aspect ratio</b>	The aspect ratio describes the shape of the grid unit. A square grid unit would have the ratio 1:1, whereas a grid unit of aspect ratio 4:3 is a unit with one side 1.33 times as big as the other side.

<b>vector</b>	A vector-based image is composed of points and Bézier curves. The computer reads the points and traces the segments, linking them to reproduce the image shape. There is no fixed size or resolution in a vector image. The graphic can be enlarged and distorted as much as desired and the system will simply recalculate the segments and rebuild the shapes. Vector images are translated and displayed in pixels once the calculation is done.
<b>velocity/ease</b>	In animation, the velocity, also known as ease, is the acceleration or deceleration of a motion. This can be achieved by a function curve, or via a series of animated drawings. Other common terms for ease-in and ease-out are slow-in and slow-out.
<b>walk cycle</b>	To avoid making innumerable drawings, animators routinely make a walk cycle for their character. This comprises a series of drawings "on the spot" that describe the walk for that character. The illusion of movement is created via the use of background pans.
<b>workspace</b>	In Toon Boom, the workspace is made up of the views, toolbars, and menus.
<b>Xsheet (exposure sheet)</b>	<p>The Xsheet or exposure sheet, is a sheet with several vertical columns and horizontal frames used to indicate a scene's timing.</p> <p>Each column represents a scene's layer. In each column, the drawing numbers are indicated and spread over the specific amount of frames they need to appear.</p> <p>The exposure sheet is used by animators, directors and other members of a crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as a Dope Sheet.</p>
<b>zone</b>	An area which can be painted with colour.

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# Index

---

3D

    positioning layers 83

    setting up objects 83

adding

    views 7

alpha channel

    \_defined 104

animatic

    \_defined 104

animating

    camera 73, 75-76

    effects over time 98

    layers 73

    objects 73

animation

    \_defined 104

anime

    \_defined 104

arc

    \_defined 104

aspect ratio

    \_defined 104

    defined 113

auto-feed

    \_defined 104

axis

    \_defined 104

background

    \_defined 104

Bezier

    \_defined 104

bitmap images

    \_defined 105

- converting to vector drawing 37
- importing 31
- importing as bitmap drawing 35
- importing in original format 31
- bone deform 47
  - basic rig 47
  - Bone rig 47
  - Curve rig 48
  - rigging 47
- Bone deform
  - animating bone and articulation deformer 53
- Bone rig
  - creating 47
- breakdown
  - \_defined 105
  - character 39
  - drawing pieces 39
  - parenting layers 42
- camera
  - adding and parenting to peg 75
  - animating 73, 75-76
  - positioning, scene setup 67
- camera shake
  - \_defined 105
- caption
  - \_defined 105
- cel
  - \_defined 105
- celluloid
  - See cel. 105
- character building
  - breaking down 39
  - cut-out 39
  - drawing pieces 39

- parenting layers 42
- character design
  - \_defined 105
- clean up
  - \_defined 105
  - tracing 19
- cleaning up 19
- clockwise
  - rotating 10
- Close Gap tool 25
- closing
  - gaps 25
- CMYK
  - \_defined 105
- colour card
  - \_defined 105
- colour model
  - \_defined 110
  - defined 106
- colour wheel
  - defined 106
- compositing
  - defined 106
- counterclockwise
  - rotating 10
- cross dissolve
  - defined 106
- Curve rig
  - creating 48
- customizing
  - views 7
- cut
  - defined 106

cut-out animation

- animating cut-out character 57
- character building 39
- creating 57
- defined 106
- drawing pieces 39
- navigating among brothers 60
- selecting layers 59

cycle

- defined 106

deformation

- adjusting deformation chain 49
- basic rig 47
- bone deform 47
- Bone rig 47
- chain, setting up bone and articulation 49
- Curve rig 48
- displaying deformer controls 52
- rigging 47

dialogue

- defined 106

docking

- floating window 8

dope sheet

- defined 106

doping

- defined 106

DPI

- defined 106

drawing

- how to 13
- pieces, character building 39

drawings

- morphing 27

- painting 24
- ease
  - defined 106
  - setting on multiple parameters 60
- ease-in
  - defined 106
- ease-out
  - defined 106
- effects
  - about 91
  - adding 91, 93
  - animating over time 98
  - Tone 96
- elements
  - positioning in Top and Side views 80
- establishing shot
  - defined 106
- exporting
  - movie 103
  - QuickTime 103
- exposure
  - \_defined 107
- exposure sheet
  - \_defined 107, 114
- fade-in
  - \_defined 107
- fade-out
  - \_defined 107
- field
  - \_defined 107
- field chart
  - \_defined 107
- film-1.33
  - \_defined 107

film-1.66  
    \_defined 107

flipping  
    \_defined 107

follow-through  
    \_defined 107

forward kinematics  
    \_defined 107

frame  
    \_defined 108

frame rate  
    \_defined 108

full screen 10

functions  
    \_defined 108

gamut  
    \_defined 108

gaps  
    closing 25

HDTV  
    \_defined 108

Hold  
    \_defined 108

how to  
    add lip-sync 87  
    animate objects and camera 73  
    create a multiplane 79  
    create a template 63  
    draw 13  
    import bitmap images 31  
    import sound 87  
    morph 27  
    paint 23  
    use a bone deform 47



## HSV

- \_defined 108

## importing

- bitmap image as bitmap drawing 35

- bitmap image in original format 31

- bitmap images 31

- converting to vector drawing 37

- sound file 87

- templates 63

## in-between

- \_defined 108

## ink and paint

- \_defined 108

## interface 7

- docking a floating window 8

- navigating 9

## interpolation

- \_defined 108

## jump cut

- \_defined 108

## key pose

- \_defined 109

## keyboard shortcuts

- \_defined 109

## keyframes

- \_defined 109

## layers

- \_defined 109

- animating 73

- panning with Transform tool 69

- parenting 42

- positioning in 3D space 83

- rotating with Transform tool 69

- selecting parent or child layer 59

- skewing with Transform tool 70
- layout
  - \_defined 109
- layout and posing
  - \_defined 109
- library
  - \_defined 109
  - creating templates 63-64
- light table
  - \_defined 109
- line of action
  - \_defined 109
- lip-sync 87
  - \_defined 109
  - adding 87
  - auto detection 88
  - auto detection, defined 104
  - mouth shapes 88
- lip-sync detection
  - manual, defined 110
- Llibrary view
  - importing templates 63
- low resolution
  - \_defined 109
- manual lip-sync detection
  - \_defined 110
- master palette
  - \_defined 110
- master peg 44
  - adding 45
- model
  - \_defined 110
- model sheet See character design

## Module Library view

toolbar 94

## Module Library view toolbar 94

## morphing

deleting 29

drawings 27

## motion keyframe

\_defined 110

## mouth

chart 110

shapes 88

## multiplane

\_defined 110

creating 79

positioning elements 80

## navigating

centering screen on mouse 10

full screen 10

interface 9

panning 9

recentering view 10

resetting pan 10

resetting rotation 10

resetting views 10

resetting zoom 10

rotating clockwise 10

rotating counterclockwise 10

zooming in 9

zooming in or out 9

zooming out 9

## Network view

navigating among brothers 60

## NTSC

\_defined 110

nudge

  \_defined 110

objects

  animating 73

  positioning 69

  setting up in 3D space 83

onion skinng

  \_defined 110

overlay

  \_defined 110

painting 23

  drawings 24

PAL

  \_defined 110

palettes

  \_defined 110

  style, defined 111

panel

  \_defined 111

panning 9

  \_defined 111

  layer using Transform tool 69

  resetting 10

paperless animation

  \_defined 111

parenting

  layers 42

passing position

  \_defined 111

path of action

  \_defined 111

pegs

  \_defined 111

  adding master 45

- master 44
- pen
  - \_defined 113
- phoneme
  - \_defined 111
- pivot
  - \_defined 111
  - repositioning 70
  - repositioning permanently 70
- pixel
  - \_defined 111
- pixelation See bitmap image
- pose-to-pose
  - \_defined 111
- QuickTime
  - exporting 103
- recentering
  - view 10
- rendering
  - \_defined 111
- resetting
  - pan 10
  - rotation 10
  - views 10
  - zoom 10
- resolution
  - \_defined 111
- RGB
  - \_defined 111
- rigging 47
  - \_defined 112
  - adding master peg 45
  - basic deformation rig 47
  - Bone rig 47

- chain, setting up bone and articulation 49
- Curve rig 48
- displaying deformer controls 52
- parenting layers 42
- rotary table
  - \_defined 112
- rotating
  - layer with Transform tool 69
  - resetting rotation 10
  - rotating clockwise 10
  - rotating counterclockwise 10
- rotoscoping
  - \_defined 112
- roughs
  - \_defined 112
- safe area
  - \_defined 112
- scaling
  - layer with Transform tool 70
- scene setup 67
  - panning layer using Transform tool 69
  - positioning camera 67
  - positioning objects 69
  - repositioning pivot 70
  - repositioning pivot permanently 70
  - rotating layer with Transform tool 69
  - scaling layer with Transform tool 70
  - skewing layer with Transform tool 70
- scenes
  - \_defined 112
- script
  - \_defined 112
- scrubbing
  - \_defined 112

sequences

  \_defined 112

shot

  \_defined 112

Side view

  opening 75

  positioning elements 80

skewing

  layer with Transform tool 70

slow-in

  \_defined 112

slow\_out

  \_defined 112

slugging

  \_defined 112

sound

  importing 87

  importing sound file 87

  lip-sync 87

  scrubbing

    \_defined 112

stop-motion keyframe

  \_defined 112

storyboard

  \_defined 112

straight-ahead

  \_defined 113

strokes

  \_defined 113

tablet

  \_defined 113

templates

  \_defined 113

  creating 63

- creating from Network view 64
- importing 63
- thumbnails
  - \_defined 113
- timecode
  - \_defined 113
- timeline
  - \_defined 113
- Tone effect 96
- Tool Properties view 9
- toolbars
  - Module Library view 94
- tools
  - Close Gap 25
- Top view
  - opening 75
  - positioning elements 80
- trace and paint
  - \_defined 113
- tracing 19
- track breakdown
  - \_defined 113
- tradigital
  - \_defined 111
- traditional animation 15
  - \_defined 113
  - painting 23-24
  - tracing animation 19
- trajectory
  - \_defined 113
- Transform tool
  - panning layer 69
  - rotating layer 69
  - scaling layer 70



skewing layer 70

transition

  \_defined 113

underlay

  \_defined 113

vector

  \_defined 114

velocity

  defined 106, 114

views

  adding 7

  docking a floating window 8

  recentering 10

  resetting 10

  Tool Properties 9

walk cycle

  \_defined 114

workspace

  \_defined 114

Xsheet view

  \_defined 114

zone

  \_defined 114

zooming

  in 9

  in or out 9

  out 9

  resetting zoom 10

