Toon Boom Harmony 11.1.0
Xsheet Guide

Legal Notices

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Chapter 1: Introduction

The Harmony Xsheet is part of the Toon Boom Harmony solution. The Xsheet Module is mainly used for traditional animation when reproducing paper exposure sheet. It only covers Harmony Stage's timing features. This way, the user does not have to deal with all the other advanced animation features and can focus on his exposure sheet work.

The exposure of a drawing is the length of time that it stays on the screen. In animation, a second often can be divided as follows; 24, 25 or 30 images depending on the used format. We also call these images frames.

The human brain is able to process an animation as slow as 12 drawings per second. Therefore, the amount of drawings per second should be between 12 and 30. The general standard is 24 or 25 frames per second, so these 12 drawings are set on double exposure. This means that each drawing stays on the screen for two frames. If a drawing is exposed for 24 frames, it means that it will appear to the eye for one second.

The Xsheet also known as the Exposure Sheet, or Dope Sheet is used when an animator is planning a scene: the animator creates an individual column for each element in the scene, the name of the drawings and their exposure into the Xsheet.The Xsheet allows the user to see the timing in detail.

The Xsheet is composed of columns corresponding to the different layers. Each column is split into rows representing the frames in the scene. A paper Xsheet usually has eighty to a hundred rows and ten columns. This enables the animator to associate a column with a certain element and record at which frame each drawing will appear.

The traditional paper Xsheet was mainly created for the animator to communicate with the cameraman regarding the scene's timing, the camera moves and element trajectories. It is still used today to express the same information to the compositors and the person working on the digital Xsheet.

This guide is divided as follows:

- Toon Boom Harmony - About this Help System on page 3
- See "About Toon Boom Harmony" on page 9
- Starting Toon Boom Harmony on page 15
- Interface on page 41
- Timing

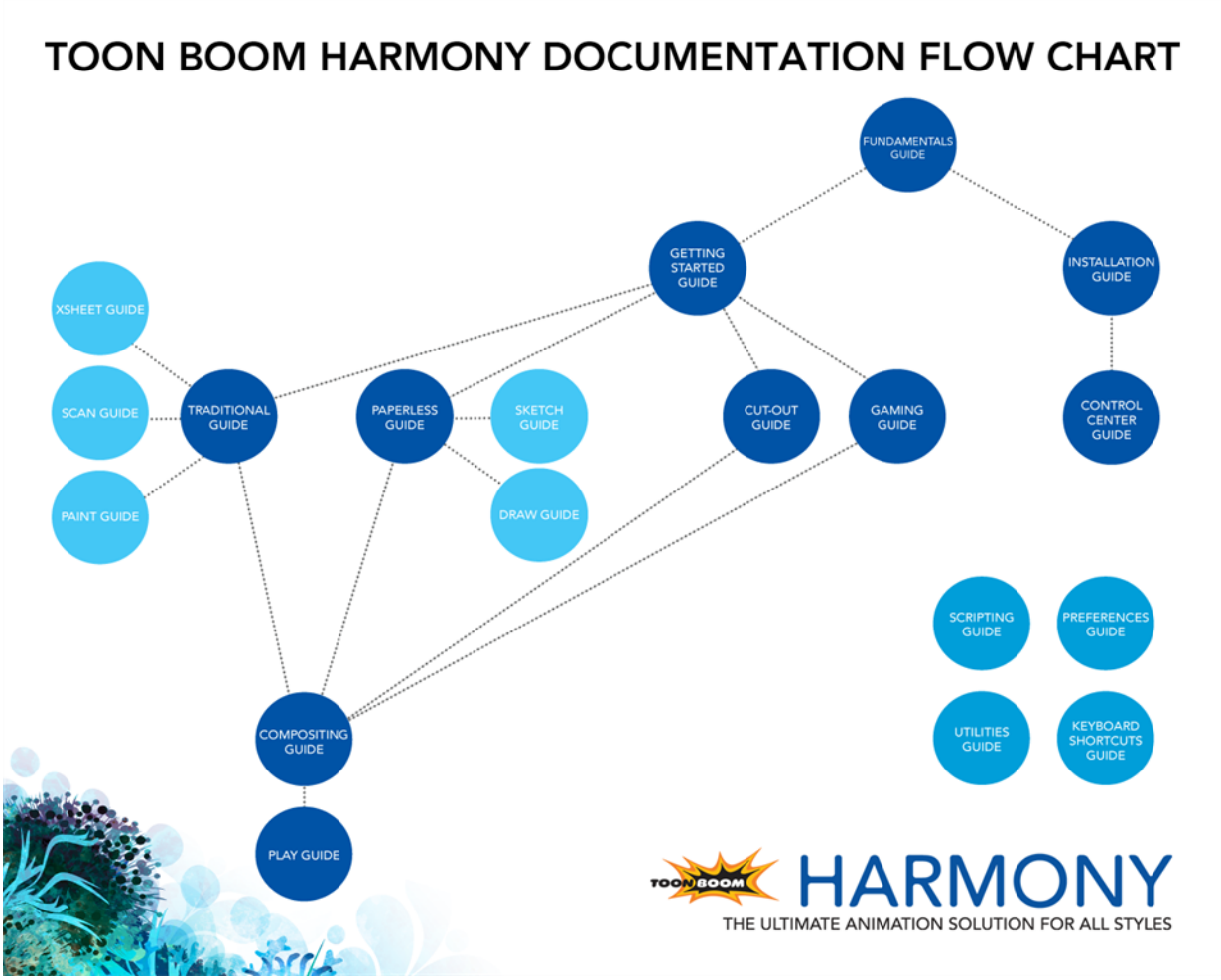
Chapter 2: Toon Boom Harmony - About this Help System

Toon Boom Harmony is an animation and digital content creation tool that offers you a wide array of features and options. Harmony is packaged in several different modules and allows you to create animation using the technique of your choice—see About Toon Boom Harmony on page 9.

This help system is built to guide you through the different workflows possible and explains which tool and module to use in a production context.

- Help Structure on the next page
- Tutorials and Other Help Tools on page 6

Help Structure



The fundamental concepts of animation and Harmony are explained in this guide. It covers the essentials of various animation workflows, basic animation principles, as well as Harmony's interface. Depending on what you want to do, you can either start with this Fundamentals Guide to get immersed into the world of Harmony and animation or go right to the Getting Started Guide, which covers the main functions and tasks. All conceptual and reference topics are omitted to get you up and running in a very short amount of time.

If your work revolves more around system administration or coordination tasks, you will probably want to move over to the Installation Guide followed by the Control Center and Server Guide to learn how to install and configure Harmony.

The core of this help system revolves around the main animation techniques you can use in Harmony to create animation:

- Traditional Animation
- Paperless Animation
- Cut-out Animation

If you use one of the animation technique listed above to produce games, you can complete your learning process using the Gaming Guide.

All workflows join in the compositing step of the process. All the information on compositing in Harmony can be found in the Compositing Guide. Finally, you can watch the rendered animations in the Play module. To learn how to use the Play module, refer to the Play guide.

If you are focusing on a single part of the workflow such as ink and paint or digital Xsheet creation, you can simply read the Fundamentals Guide and one of the corresponding module guides:

- Paint Guide
- Xsheet Guide
- Scan Guide
- Draw Guide
- Sketch Guide

Other satellite guides are also available to learn about additional information such as the preferences and keyboard shortcuts.

- Keyboard Shortcuts Guide
- Preferences Guide
- Scripting Guide
- Utilities Guide

If you are already a Harmony user and want to know more about the new features that were added to this latest version, refer to:

- Release Notes

Tutorials and Other Help Tools

Aside from the main product documentation, you can find supplementary material to learn more about Harmony. The Toon Boom website's online resources section offers a variety of videos and samples that can further your knowledge of Harmony.

- Video Tutorials: toonboom.com/resources/video-tutorials/harmony-network
- Templates and Sample Scenes: toonboom.com/resources/templates/harmony-network
- Tips and Tricks: toonboom.com/resources/tips-and-tricks/harmony-network
- White Papers: toonboom.com/solutions/white-papers

System Requirements

Here are the technical specifications for Toon Boom Harmony 11.1.0.

Harmony Network

Toon Boom Harmony Network is a server-client configuration. The server stores all the assets, and holds the database. The client machines simply run the software and allow the members of your team to work on Harmony and access the assets directly from the database.

Note that an Internet connection is required to activate the animation software.

Before installing Harmony, refer to the *Harmony and Your IT Department* white paper to learn about the network prerequisites for a Toon Boom Harmony installation. This document should be taken as a guide to help you understand the preliminary steps before performing a typical Harmony installation.

There are multiple ways of installing Harmony, as well as numerous types of hardware that can work with Harmony. To perform a custom installation which fits the studio's requirements, a proper analysis of the studio is required, such as: the type of project, the productivity expected, and the delivery date, etc. If you are not yet familiar with Harmony, you should get in touch with your sales contact at Toon Boom to organize a needs analysis of your studio and production in order to make the best of Harmony and optimize your production pipeline.

The person who performs the installation should have the knowledge and expertise required for setting up and configuring networks, computers, and operating systems. If you do not have an IT department or someone who knows the network technology thoroughly, contact your sales representative at Toon Boom to organize an installation with our consulting department.

- White Paper: Harmony and Your IT Department

Harmony

Here are the specifications to install Harmony on client machines. Note that this does not encompass the network and server specifications for Harmony Network.

Requirements	Windows	Mac OS X
Operating System	Windows 7 64-bit Windows 8 64-bit	Mac OS X 10.7.5 Mac OS X 10.8.5 Mac OS X 10.9.3 or later
Processor	Intel Core i7, 3.4 GHz Intel Core i5, 3 GHz Intel Core 2 Duo	
Monitor	Optimized for 1920 x 1080 or higher Minimum requirement is 1280 x 800	
Memory	16 GB 8 GB	

	4 GB	
Video Card	**Fast** ▸ NVIDIA Geforce GTX 780 **Medium** ▸ NVIDIA Geforce GTX 560 ▸ NVIDIA GeForce GTX 650 **Slow** ▸ Intel HD Graphics 4000, 5000 ▸ Intel Iris GraphicsNVIDIA GeForce GT 520, 620, 720	**Fast** ▸ NVIDIA GeForce GTX 775M **Medium** ▸ AMD Radeon HD 6770 ▸ NVIDIA GeForce 750M **Slow** ▸ Intel HD Graphics 4000, 5000 ▸ Intel Iris Graphics ▸ NVIDIA GeForce 320M ▸ Radeon HD 4670
Drawing Tablet	**Best** ▸ Wacom Intuos Pro ▸ Wacom Cintiq **Basic** ▸ Wacom Bamboo ▸ Wacom Intuos	
Media Player	Apple QuickTime Player (free)	

Chapter 3: About Toon Boom Harmony

Toon Boom Harmony is the most advanced professional animation software on the market. Bringing together an impressive 2D drawing toolset with the ability to work in a real 3D space, and import 3D models,

Harmony Network combines the animation toolset of Harmony with an impressive database for collaborative workflow. Share assets, batch vectorize and render, and increase production efficiency.

Top Features

- **Advanced Drawing Tools**: Texture brushes, and thick and thin pencil lines
- **Smart Colour Palettes**: Colour you can adjust on the fly
- **Character Rigging**: Hierarchy, deform, and effects for creating sophisticated rigs
- **Special Effects**: An array of effects including highlights and shadows, glows, blurs, and a full particle effects engine
- **Real 3D Camera**: A camera you can reposition in a full 3D space
- **3D Integration**: Allowing you to import 3D models, position and animate them in 3D space
- **Batch Vectorizing and Rendering**: Quickly process images for import and export through a single workstation or a render farm
- **Database File Sharing**: Share libraries, colour palettes, animation, and more across the whole team
- **Production Pipeline Integration**: Seamlessly integrate content from pre-production via Toon Boom Storyboard Pro

Toon Boom Pipeline

Toon Boom Harmony has been recognized for its excellence by winning many awards, including a Primetime Emmy® Engineering Award and the prestigious Ub Iwerks Annie Award for the integrated pipeline with Toon Boom Storyboard Pro.

Harmony works perfectly with Toon Boom Storyboard Pro for all pre-production phases. Therefore, animatics created in Toon Boom Storyboard Pro can be imported seamlessly in Harmony for animation and scene setup guidance.

Modules

Harmony Network is composed of the following modules:

- Control Center below
- Stage on the facing page
- Draw on the facing page
- Sketch on page 12
- Scan on page 12
- Xsheet on page 13
- Paint on page 13
- Play on page 13
- Cloud on page 14

These modules are all accessible from:

- Windows: **Start > Programs > Toon Boom Harmony 11.1.0**
- Mac OS X: **Applications > Toon Boom Harmony 11.1.0**
- Linux: /usr/local/ToonBoomAnimation/harmony_11.1/lnx86_64/bin
  - **`Controlcenter`**
  - **`Stage`**
  - **`Draw`**
  - **`Sketch`**
  - **`Scan`**
  - **`Stage -xsheet`**
  - **`Stage -paint`**
  - **`Play`**
  - **`ServerActivation`**
  - **`ClientActivation`**
  - **`LicenseWizard`**

Control Center

The Control Center module controls the database and organizes the production. The Control Center module is used to create the environments, jobs and scenes, as well as importing and exporting scene packages. The technical director or system administrator also uses the Control Center to create the login information for users to access the database.

Control Center is also available in a cloud form where users can access scenes via the Internet.

To learn more about Control Center, refer to the following guides:

- Fundamentals Guide
- Installation Guide
- Control Center and Server Guide

Stage

The Stage module is the core of Harmony. It comprises all the major drawing, animation and compositing features. It is used to work in the scene: design, character breakdown, cut-out animation, traditional animation, ink and paint, exposure sheet, timeline, effects, compositing, camera moves, colour styling, and so on.

You cannot create scenes in Stage Harmony Network, you require Control Center. You create them directly in Stage with Harmony Stand Alone.

To learn more about Stage, refer to the following guides:

- Fundamentals Guide
- Getting Started Guide
- Traditional Animation Guide
- Paperless Animation Guide
- Cut-out Animation Guide
- Gaming Guide
- Compositing Guide
- Play Guide
- Preferences Guide
- Keyboard Shortcuts Guide
- Scripting Guide
- Utilities Guide

Draw

The Draw module is a component of the Stage module. It contains all the tools necessary to create a paperless frame-by-frame animation project. There is no node system in this module, only the basic essential effects. Contrary to the Stage module, instead of creating effects in the Network view, you simply create them in the Timeline view. The Draw module also includes all the scene setup and camera features for you to do the compositing for your project.

- Fundamentals Guide
- Draw Guide
- Preferences Guide

Sketch

The Sketch module is a component of the Stage module. It contains the essential tools to animate frame-by-frame drawings and paint them. It allows you to add layers and animation, and paint and adjust the timing. There are no effects, camera or other compositing tools included in this module. The Sketch module allows you to focus on the paperless animation tasks at hand without being distracted by other features that are not necessary to your work.

To learn more about the Sketch module, refer to the following guides:

- Fundamentals Guide
- Sketch Guide
- Preferences Guide

Scan

The Scan module is used to scan drawings in batch. It creates a drawing list from the timing and exposure previously created in the exposure sheet (via Stage or Xsheet module).

It is possible to scan the drawings from a TWAIN device directly in the Stage module.

To learn more about the Scan module, refer to the following guides:

- Fundamentals Guide
- Scan Guide

Xsheet

The Xsheet module is a component of the Stage module. It contains the tools used to create digital exposure sheets, columns and timing. It is mainly used in large traditional animation studios to maintain a structure and avoid users having to learn the full product application. This way, the Xsheet team can concentrate on their task without having to deal with the compositing and drawing tools.

To learn more about the Xsheet module, refer to the following guides:

- Fundamentals Guide
- Xsheet Guide
- Preferences Guide

Paint

Paint module is a component of the Stage module. It contains the drawing, painting and colour styling tools. It is mainly used in large traditional animation studios to maintain a structure and avoid users having to learn the full product application. This way, the colour styling or ink and paint team can concentrate on their task without having to deal with the compositing and timing tools.

To learn more about the Paint module, refer to the following guides:

- Fundamentals Guide
- Paint Guide
- Preferences Guide

Play

The Play module is used to play back the rendered image sequences enabling the user to view the final scenes and compositing results.

To learn more about the Play module, refer to the following guides:

- Fundamentals Guide
- Play Guide

Cloud

Access your Database via the Cloud. When you're running a studio, you will most likely have a database set up. This enables all the artists working on your production to share the same scenes and assets.

What the Toon Boom Cloud enables you to do is to host this database on the Internet. When you do so, you can have freelancers log in from anywhere with an internet connection. Then they can download a scene from the database, work on it, and upload it again.

No more need to spend time copying files to an FTP. No need to have an admin exporting and importing files from the database. Do it all directly through the Cloud.

To learn more about the Cloud module, refer to the following guides:

- Installation Guide
- Control Center and Server Guide

Chapter 4: Starting Toon Boom Harmony

Once Harmony is installed, you are ready to start the application and animate! In this chapter, you will learn about starting the application, setting the resolution and opening the scenes.

Network Connection and Centralized Database

The Harmony solution is a revolutionary team-based infrastructure for animation production and 2D games. Its array of features increases productivity and encourages creativity. Developed in conjunction with leading studios worldwide, Harmony is specifically designed for long-term episodic and feature length projects, providing a true animation pipeline. Several animators can work simultaneously on the same project while the asset library provides users with easy access to up-to-date media assets. Harmony is truly scalable; more than 100 staging clients can share animation just as easily as a few can.

Note that Harmony can be used in Database mode via the Network connection or as a standalone application.

What is the Network Connection?

Harmony Network is the link between the client machines and the server. It lets you work on the different projects stored in the central Harmony database.

At the heart of the Harmony solution is the server, which centralizes all the production assets in a repository. Loaded with production proven tools to manage administration tasks, the server is completely flexible and will fit in your existing infrastructure, whether you are on Windows, Linux or Mac OS X. To learn more, refer to the Control Center Guide.

Working with Harmony Stage Via Harmony Network

When you start Harmony Stage, you can opt to either work offline in the application as a standalone software, or connect to the database to work on projects via Harmony Network.

When working with Harmony Network, the scenes and their data are stored directly on the server. No data is saved or stored on the client machine. The client machines access the database and load the scenes and drawings directly from the server. Each time the user saves his scene, the data is updated directly on the server. There are no upload or download operations (check-in, check-out) done between the server and the clients.

If you have a standalone license, you will not have access to the database. You will automatically start the application in standalone mode.

Starting Xsheet

You can run the Harmony on the Linux, Mac OS X or Windows operating systems.

How to start Harmony Xsheet

1. Do one of the following:
   - Mac OS X: Double-click on the Harmony **Xsheet** icon or select **Applications > Toon Boom Harmony 11.1 > Xsheet.**
   - Windows: Double-click on the Harmony **Xsheet** icon or select **Start > Programs/All Programs > Toon Boom Harmony 11.1 > Xsheet**
   - Linux: Select **Applications > Toon Boom Harmony 11.1 > Xsheet**

   Toon Boom Harmony opens.
2. In the User Name field, enter your username. It is generally provided by the supervisor, system administrator or team lead.

Connecting to the Database

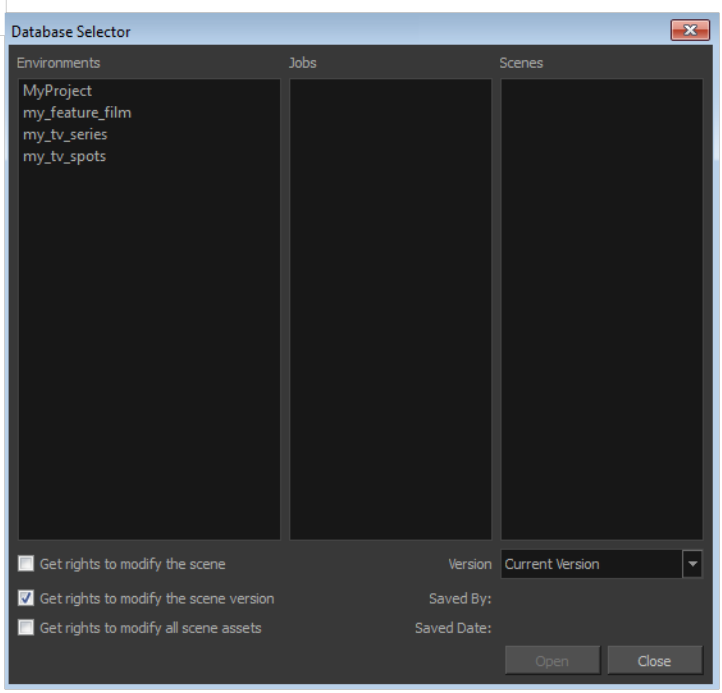
Before you can work in Xsheet via Harmony Network, you must be connected to the Harmony Database. When you connect to the database, you cannot create new scenes directly from Harmony Stage. The available scenes will be the ones that were previously created using the Control Center.

How to connect to the Harmony database

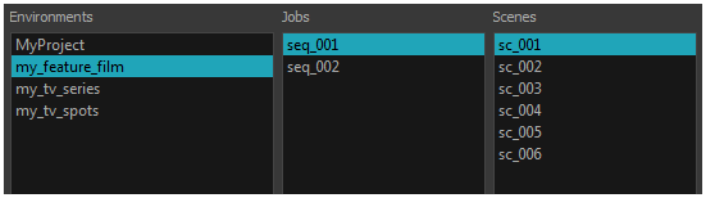
1. Start Xsheet—see Starting Xsheet above.
2. In the User Name field, type in your Harmony username which is provided by your project lead or system administrator.

3. Click **OK**.

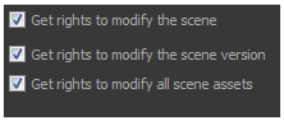
   The Database Selector dialog box opens, displaying the environments available in Harmony database.



4. In the Environments column, select the scene's environment (project, movie).



5. In the Jobs column, select the scene's job (episode, sequence).
6. In the Scenes column, select the scene.
7. Get the permissions needed for this session by selecting one of the following options:



A Harmony project can be locked at various levels. Its timing, drawings, version and palettes can be locked. Locking means to get the rights to modify a scene or its assets. Other users cannot modify locked items. They will be prompted with an error message saying that the scene has been locked by another user. At that moment the scene will be displayed as read-only.

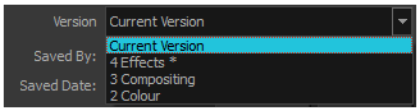
See the table below to understand the different lock possibilities.

Lock	Description
Scene or Version Lock	Controls the Xsheet timing, layers, Network modules but not the drawing, palettes, palette-lists or templates.
Drawing Lock	Only one user can edit and save a locked drawing.

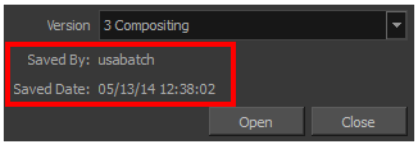
Palette Lock	Only one user can edit and save a locked palette.
Palette-list Lock	Only one user can edit and save a locked palette-list.
Library Folder lock	Only one user can edit and save into that folder in the Library.

- **Get rights to modify the scene:** Allows the user to modify the selected version of the scene and access the version manager during the opened session.
- **Get rights to modify the scene version**: Allows the user to modify the currently selected scene version, but locks access to the version manager during the opened session.
- **Get rights to modify the scene assets**: Automatically gets all the edit rights to modify the scene and its assets. the user locking the scene using this option is the only user that can edit and save the scene version, all the drawings in that scene, all the palettes in the palette-list, both palette-lists, but not the library folders..

8. Choose the version you want to open from the Version menu—see Saving a Scene on page 22.



- The Saved By and Saved Date fields display the user who last saved the selected scene and the date of the last save.



9. Click **Open**.

Global Lock

Harmony Network has a lock system, referred to as Global Lock, for the different scenes and scene assets. As all the data on the server can be accessed directly and modified from any client machine by default, the scenes are locked. Users must obtain the rights to modify scenes in order to save their work on the server.

Only one user at a time can modify a scene. Once a scene is opened on a client machine, other users can only open the scene in read-only mode; they will not be able to save any modifications.

If you work in standalone mode, you automatically have the rights to modify all drawings and palettes.

The Global Lock has three levels:

A Harmony project can be locked at various levels. Its timing, drawings, version and palettes can be locked. Locking means to get the rights to modify a scene or its assets. Other users cannot modify locked items. They will be prompted with an error message saying that the scene has been locked by another user. At that moment the scene will be displayed as read-only.

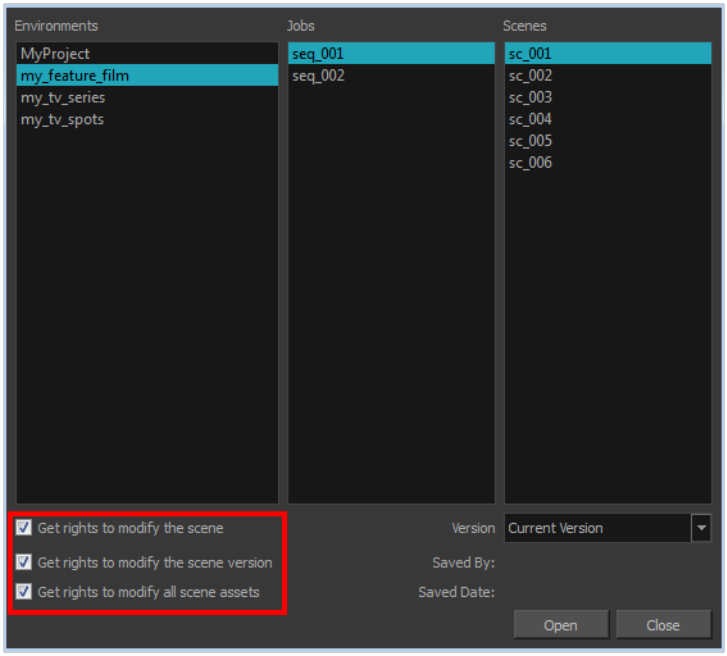
See the table below to understand the different lock possibilities.

Lock	**Description**
Scene or Version Lock	Controls the Xsheet timing, layers, Network modules but not the drawing, palettes, palette-lists or templates.

Drawing Lock	Only one user can edit and save a locked drawing.
Palette Lock	Only one user can edit and save a locked palette.
Palette-list Lock	Only one user can edit and save a locked palette-list.
Library Folder lock	Only one user can edit and save into that folder in the Library.

- **Get rights to modify the scene:** Allows the user to modify the selected version of the scene and access the version manager during the opened session.
- **Get rights to modify the scene version**: Allows the user to modify the currently selected scene version, but locks access to the version manager during the opened session.
- **Get rights to modify the scene assets**: Automatically gets all the edit rights to modify the scene and its assets. the user locking the scene using this option is the only user that can edit and save the scene version, all the drawings in that scene, all the palettes in the palette-list, both palette-lists, but not the library folders..

These three levels of locking are available from the Database Selector when the user logs into Harmony. From there you can select a scene and obtain the rights to modify it by selecting the desired lock option.



There are several different ways to obtain the rights to modify the scenes. It can be done when the user loads a scene from Harmony, inside the application once the scene is loaded, or when an environment, job or scene is created using the Control Center module.

Acquiring Rights to a Scene Once it is Loaded

If you opened a scene in read-only mode, but realize that you need to modify it, you can easily acquire the necessary rights without closing and reloading the scene.

Note that it is not possible to acquire the rights to modify the scene assets once the scene is loaded. This process is done during the initial loading of the scene. To learn more about enabling the rights to modify while creating environments, jobs and scenes, refer to the Control Center guide.

How to set the scene's rights after the scene is loaded

- In the top menu, select **File > Rights to Modify Scene** or **Rights to Modify Scene Version**.

Saving a Scene

It is important to regularly save your scene. As you make changes to a scene, an asterisk (*) appears in the title bar beside the scene name to indicate that the scene contains unsaved changes.

It is quite frequent, when working on a scene, to try out different timings, effects, camera motions or parameters to see which one will work best. Harmony allows you to save a new version of your scene. It is really important to note that the drawings and palettes are the same between ALL the scene versions. You can modify the timing, effects, parameters and camera motion, but if you modify the drawings, they will be changed everywhere.

When you use Harmony Network and work in a scene on the database, there are many choices and options available when you save your work.

- Save the scene as the current version.
- Save different versions representing different stages of the production of your scene.
- Save different versions representing different scene setups.
- Choose specific assets that you want to save, such as drawings or palettes.

When you open the scene from the database and select the version you want to edit, you can save the changes you made in the current version or create a new version. The simplest way to save your work is to update the current version.

You might want to save some specific aspects of your scene or save a new version. The Advance Save feature allows you to do this. Once you have chosen the components to save, you will conclude the procedure by following the instructions in the section. All the specific components that are selected throughout the different tabs of the Advanced Save dialog box will be saved.

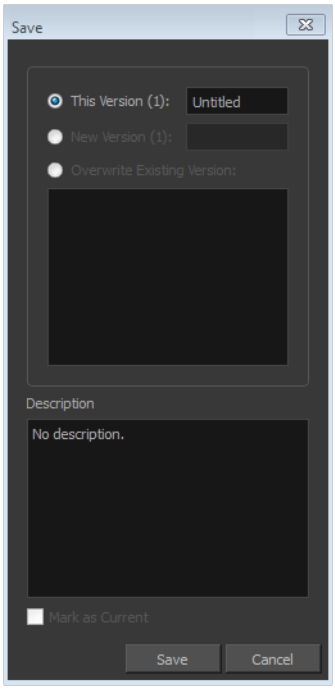
How to save a scene

- From the top menu, select **File > Save**.
- Press Ctrl + S (Windows/Linux) or ⌘ + S (Mac OS X).

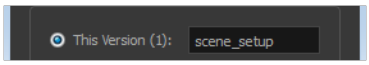
How to save the current version of a scene in Harmony Network:

1. Make sure that you have the necessary rights to save the current scene version. If you do not, you can acquire the rights by selecting **File > Rights to Modify Scene Version** or **Rights to Modify Scene**.
2. From the top menu, select **File > Save** or press Ctrl + S (Windows/Linux) or ⌘ + S (Mac OS X).

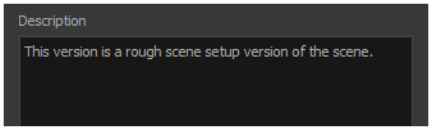
   When saving the scene for the first time, the Save dialog box opens, prompting you to name the version.



3. Edit the information in the current version:
   - In the This Version field, enter a relevant name for the current version.



   - In the Description field, enter a short description of the current version.

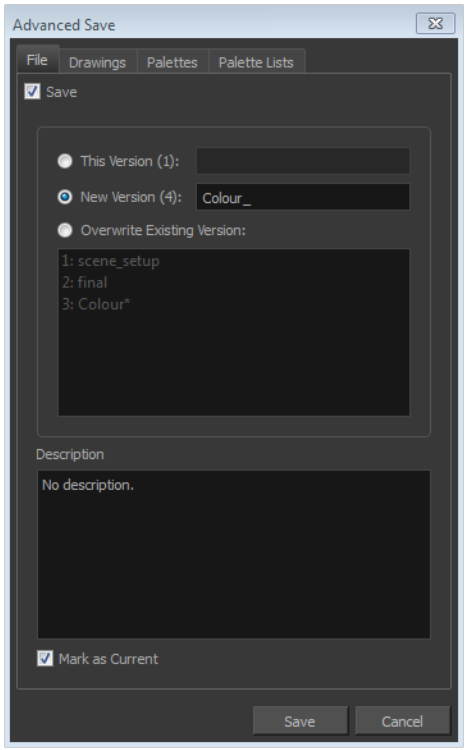


4. Click **Save**.

About the Advanced Save dialog box

1. Make sure that you have the necessary rights to save the current scene version. If you do not, you can acquire the rights by selecting **File > Rights to Modify Scene Version** or **Rights to Modify Scene**.
2. From the top menu, select **File > Save...**.

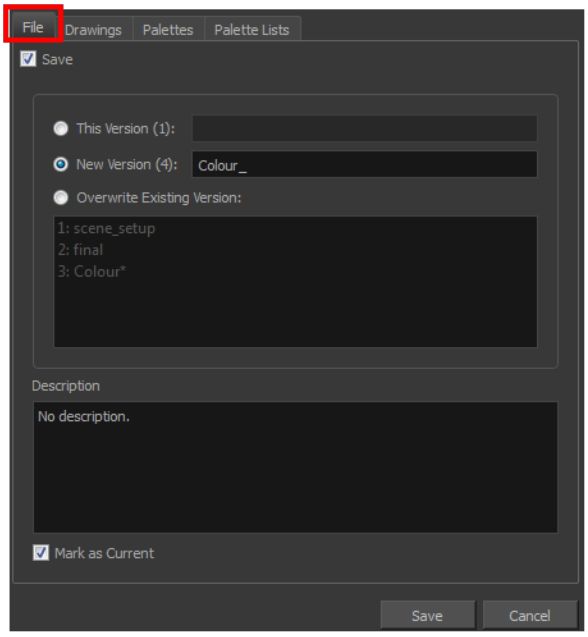
   The Advanced Save dialog box opens.



File

In the File tab of the Save dialog box, you can do the following:

- Save the scene as a new version
- Overwrite an existing version
- Set a new current version.



Parameter	Description
Save	‣ Enable this option if you want to save the modifications made to the current scene. ‣ Deselect the Save option if you only want to save specific components of your scene listed in the Drawings, Palettes or Palette Lists tabs. This will disable all option in the File tab.
This Version (number)	Saves the current version of the scene. You can rename the current version by typing a new name into the field.
New Version (number)	Saves the current scene as a new version. You can name this new version by typing a name into the field.
Overwrite Existing Version	Lets you select an existing version of your scene from the list to overwrite it.
Description	Use this field to add or edit an existing description for the scene version you want to save.
Mark as Current	Lets you set this scene version as the current one. This version will be automatically selected as the default current version when the scene is selected in the **Database Selector** dialog box

How to save with advanced settings

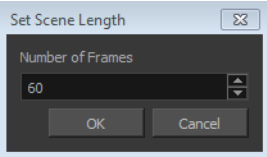
1. After selecting the components to save, click **Save**.
   All the specific components that were selected throughout the different tabs of the **Advanced Save** dialog box are saved.

Setting the Scene Length

Once you have opened your scene, you can set its length.

How to set the scene length

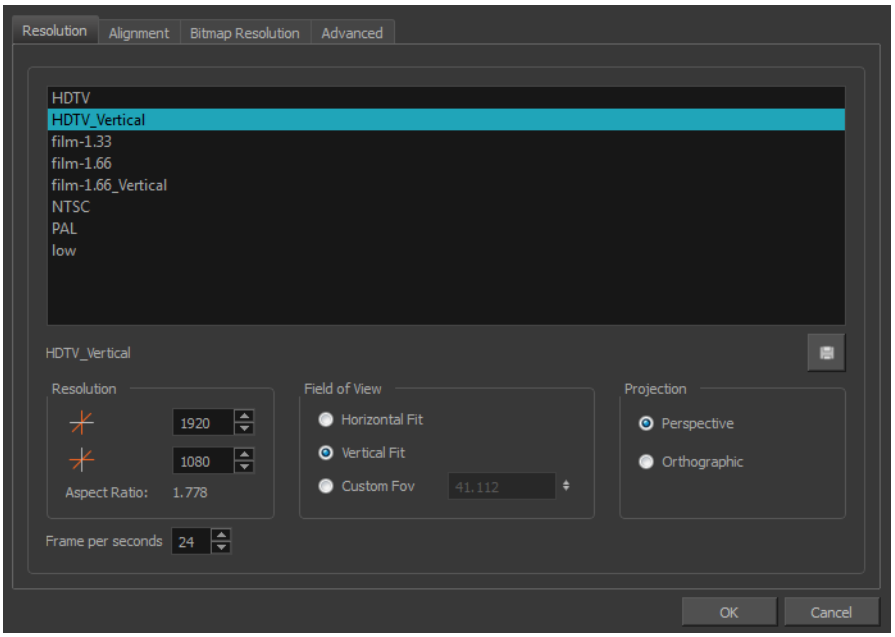
1. From the top menu, select **Scene > Scene Length.**
   The Set Scene Length dialog box opens.



2. In the Number of Frames field, enter the number of frames needed.

Scene Settings

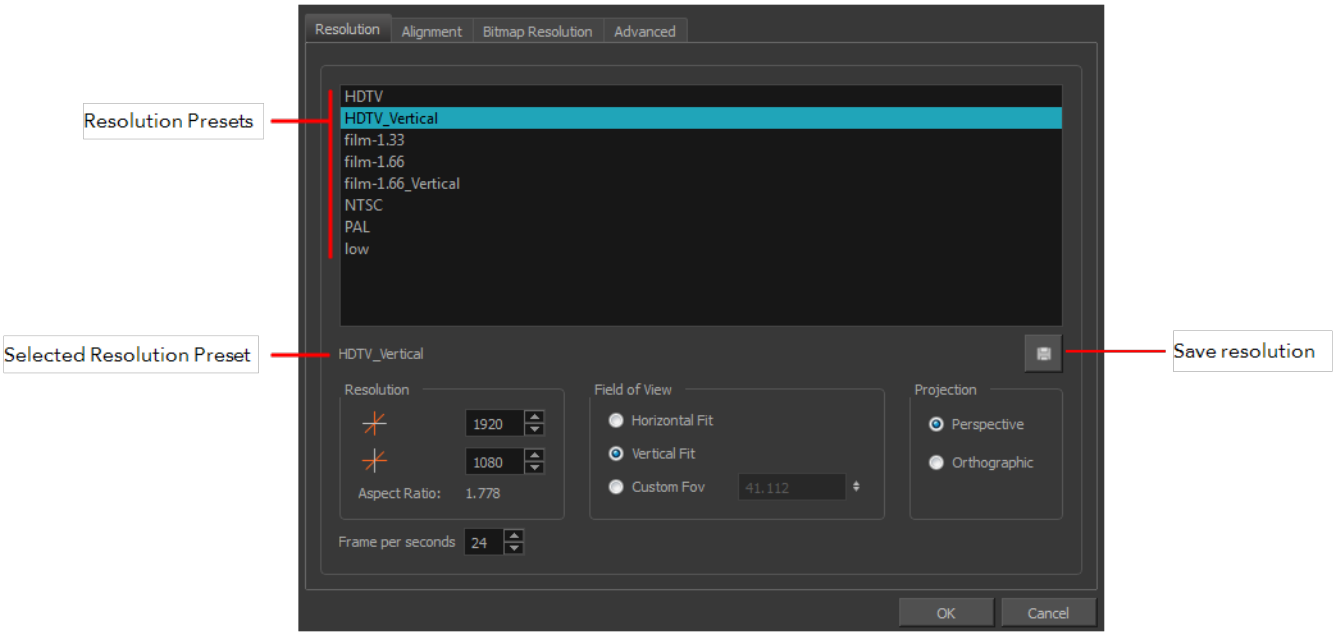
When you created your new scene, you set up the resolution and the alignment. However, if you want to change these initial settings later, you can do it using the Scene Settings dialog box. The different Scene Settings options are separated into four tabs.



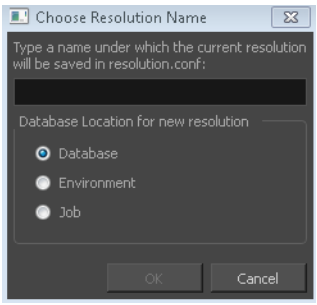
How to open the Scene Settings dialog box

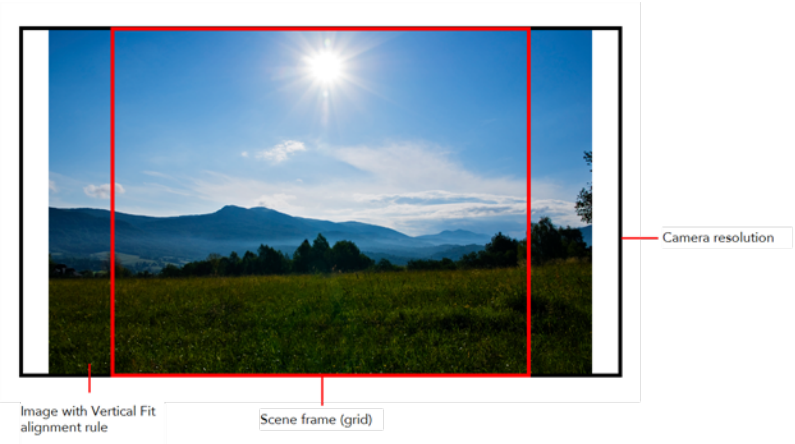
1. From the top menu, select **Scene > Scene Settings.**
   The Scene Settings dialog box opens.

Resolution Tab



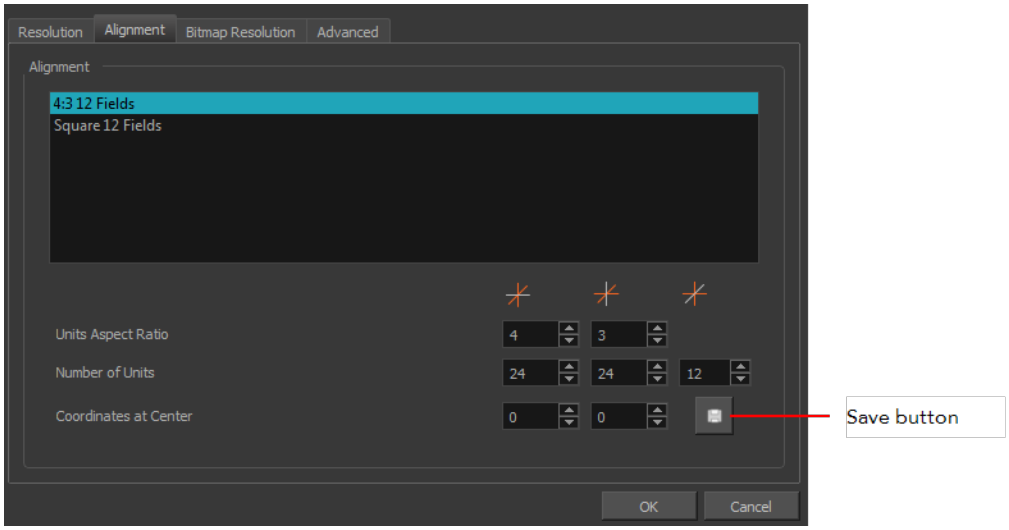
Parameter	Description
Resolution Presets	You can select your project's resolution (camera frame size) from this preset list. ▸ **HDTV:** High definition television delivers a higher quality image than standard television (4:3) does, because it has a greater number of lines of resolution. To take advantage of the superior quality your output device must be compatible with HDTV technology to make this resolution setting useful. ▸ **HDTV_Vertical**: The "vertical resolution" of HDTV_Vertical refers to how the images will be aligned in relation to the actual scene frame (default 4:3 grid). Note that the camera resolution and the scene frame are not the same. When working with 12 or 16 field drawing grids, the grid is a different aspect ratio from the camera frame. When you fit vertically, you fit the images with the top and bottom of the scene grid. ▸ **film-1.33:** Use this resolution setting for the academy film format that conforms to the standard 4:3 aspect ratio. ▸ **film-1.66**: Use this resolution setting for the widescreen film format that conforms to the 16:9 aspect ratio. ▸ **film-1.66_Vertical**: This is essentially the same as film-1.66. Refers to how the drawing is fit into the scene frame. When working with 12 or 16 field drawing grids, the grid is a different aspect ratio from the camera frame. When you fit vertically, you fit the images with the top and bottom of the scene frame.

	▸ **NTSC:** This is the standard analogue television broadcasting system used in North America and conforms to the North American standards on how rectangular pixels are displayed for computer and television screens. ▸ **PAL:** This resolution works best with the European format for television and computer screens, as the rectangular pixels are displayed at a different orientation. ▸ **Low:** This format is ideal for videos destined for the web, where size and fast download of a video file might take precedence over quality.
Selected Resolution Preset	Displays the selected resolution preset.
Save Resolution Setting	Click the Save Resolution button after you define your new resolution to save it as a preset. If you are working in Harmony Network, you will be prompter a dialog box asking you to name the new resolution as well as the level at which you want to save the resolution,conf file. 
Pixel Dimensions	Displays the pixel dimensions for your project resolution. If you decide to type in the pixel dimensions, or use the up and down arrows to change the pixel increments, you will have to save your custom selection in order to save it as a new preset. It will then appear in the resolution selection list. It doesn't modify the current resolution preset.
Aspect Ratio	Displays the ratio between the horizontal and vertical dimensions of the camera framing. Each resolution setting has a preset aspect ratio that cannot be changed.
Frame per second	Sets the frame rate for your project. The higher the frame rate, for example 30 fps, the faster the animation will pla. The lower the frame rate, for example 12 fps, the slower your animation will play. Avoid going under 12 frames per second as your animation will have a choppy playback. The human eye requires a minimum of 12 frames per second to perceive a fluid animation.
Field of View	Use these options to define the FOV (field of view) of the camera (angle of the camera cone) and how the drawing elements (and drawing grid) align to the scene grid. The drawing grid is always

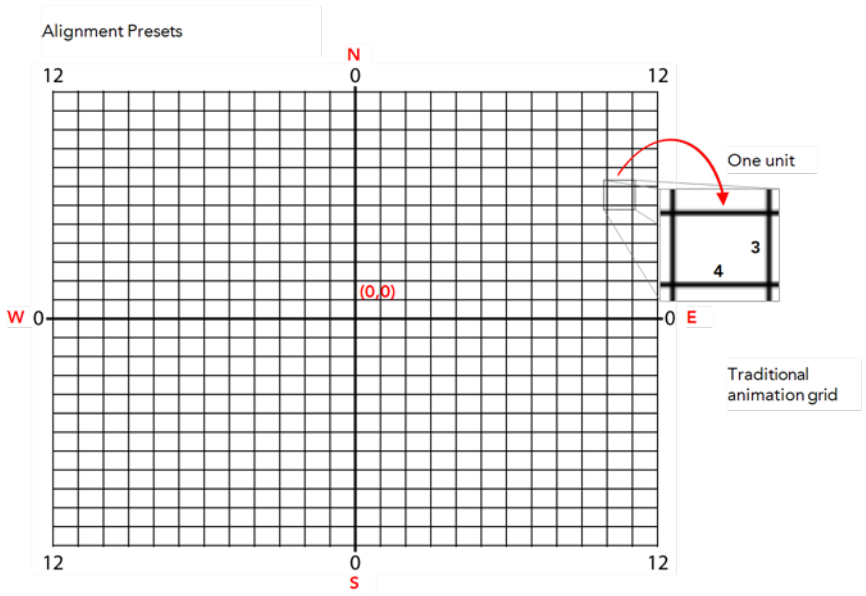
	scaled proportionally to a 4:3 ratio (unless you change the scene alignment), therefore changing the Field of View setting may not show a visible difference if your project resolution is also 4:3, such as NTSC. • **Horizontal Fit:** The camera resolution is set to fit the left and right edges of the scene grid.  • **Vertical Fit:** The camera resolution is set to fit the top and bottom edges of the scene grid.  • **Custom Fov:** After selecting this option, use the now-active field to the right to enter in a value, in degrees, of the angle that you want the camera cone to be. Increasing this value will make the camera cone wider (the angle is more obtuse), widening the FOV and making the grid and all elements appear farther away. Decreasing the default value will create the opposite effect.
Projection	The Projection settings allows you to modify the type of camera your scene is using. You can either use a perspective camera (regular camera) or orthographic camera (no perspective). • **Perspective:** The Perspective option is the default and most common option. Objects placed closer to the camera will be displayed bigger and objects placed further away will be displayed

	smaller. ▸ **Orthographic:** The Orthographic option is very specific to the gaming pipeline. It changes the camera from Perspective to Orthographic, meaning that there is no more perspective in the Camera view. Objects, when moved in depth will not change size. There is more information available about this option in the Gaming user guide. In order to create scenes with the Orthographic camera by default, you need to create a new custom scene resolution.

Alignment Tab



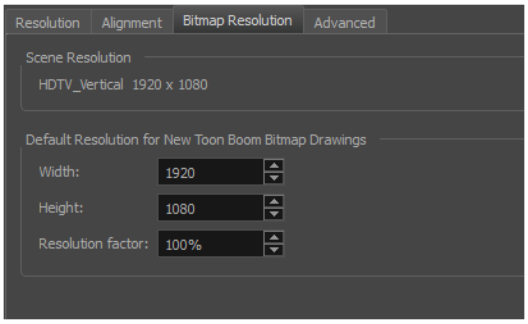
Parameter	Description
Alignment	The Alignment presets give you two preset options: ▸ **4:3 12 Fields**: Defines the units of your project to have a 4:3 ratio and sets up 12 of these units to run both vertically and horizontally in four cardinal quarters (NW, NE, SW, SE). This Alignment preset is visible in the FOV and drawing grids. ▸ **Square 12 Fields**: Defines the units of your project to have a 1:1 or square ratio and sets up 12 units to run both vertically and horizontally in four cardinal quarters (NW, NE, SW, SE). This Alignment preset is NOT visible in the FOV and drawing grids.
Units Aspect Ratio	In the Units Aspect Ratio fields, enter the aspect ratio of the grid you will use. The aspect ratio describes the shape of the grid unit. A square grid unit would have the ratio 1:1, whereas a grid unit of aspect ratio 4:3 is a unit with one side 1.33 times as big as the other side.

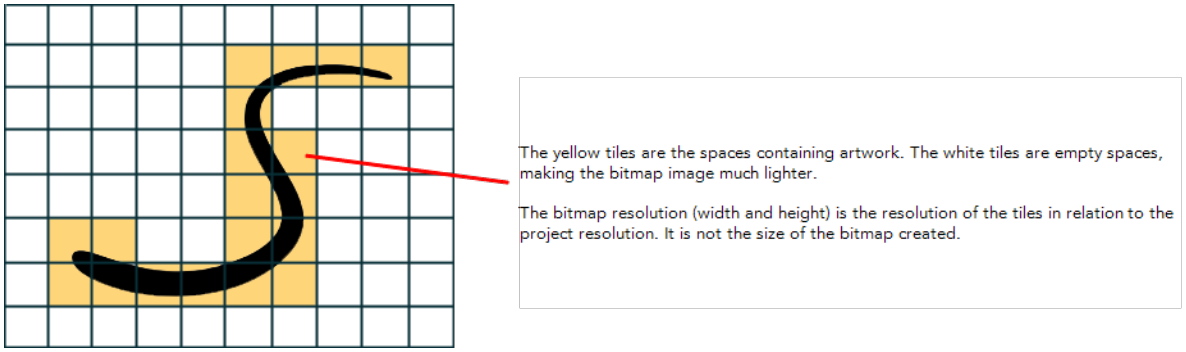
	 If the aspect ratio you want to use is 1:1, enter 1 in the Left/Right field (X-axis) and 1 in the Up/Down field (Y-axis). The default Aspect Ratio is set to 4:3 as it is the one used by traditional animators, who are accustomed to working with the grid system described above.
Number of Units	In the Number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

If you change your scene's alignment from 4:3 12 Fields to Square 12 Fields part way though your project, you may find that the animation grid becomes offset. To correct this, choose the following setting from the Layer Properties panel's Advanced tab: **Alignment > Alignment Rule > Centre First Page**.

Bitmap Resolution Tab

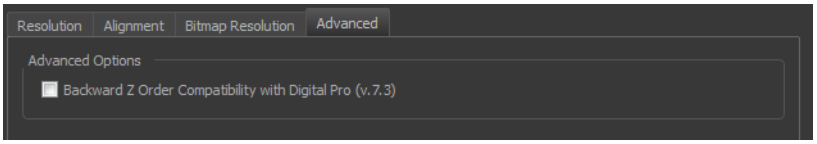
The bitmap resolution settings at the scene level affects newly created bitmap art layers.





Parameter	Description
Scene Resolution	This is the scene resolution preset name and size in pixel.
Width	This is the width of the resolution for the bitmap that will be created. This is not the actual size of the bitmap. TVG drawings (Toon Boom drawing native format) have an infinite size. Bitmap TVGs are composed of small tiles. Therefore it does not mean that because you have artwork at the four corners of your camera frame or even quite far outside of your drawing that your bitmap image will be very large and heavy. By default, it is set to the same width as the scene resolution.
Height	This is the height of the resolution for the bitmap that will be created. By default, it is set to the same height as the scene resolution.
Resolution Factor	This is the size of the bitmap resolution in relation to the scene resolution. If you increase the percentage, the width and height fields will increase accordingly. If you plan to animate the camera and zoom into your background, you will need to set a higher resolution so that the smaller area in which you will zoom will be 100% of the scene resolution.

Advanced Tab



The Advanced tab contains an option for Toon Boom Digital Pro release 7.3 and Harmony release 7.3.

Since version 7.8, the method in which Z-Ordering is calculated has been optimized. Enable this option if you want to use the version 7.3 system.

Toon Boom Digital Pro and Toon Boom Harmony 7.3 allowed smaller values on the Z-axis such as 0.0001. Since version 7.8, the Z-ordering calculation is now optimized and allows only larger values such as 0.001.

Verifying the Project Integrity

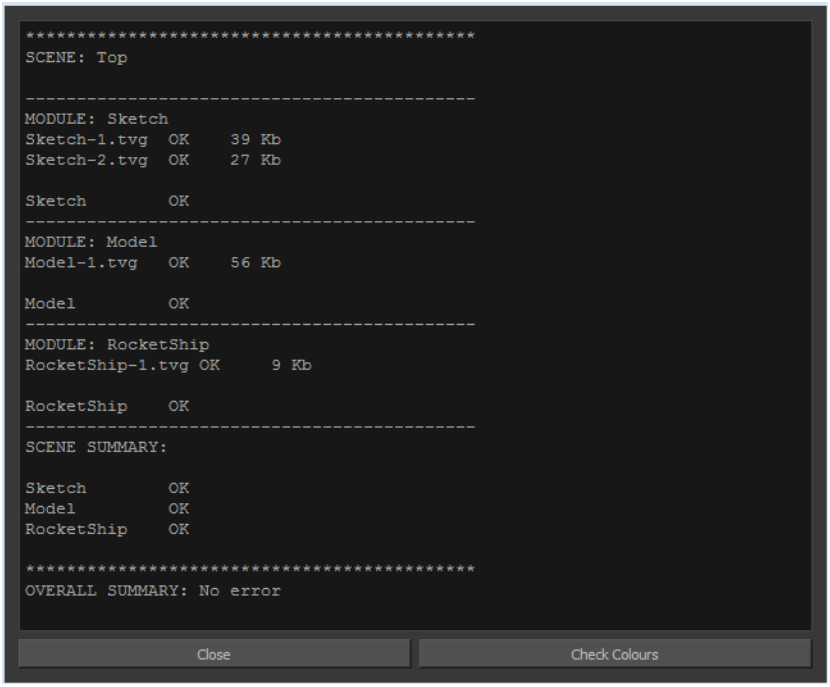
The Check Files command verifies the integrity of the drawing and palette files in your project.

How to open the Check Files dialog box

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

Check Files

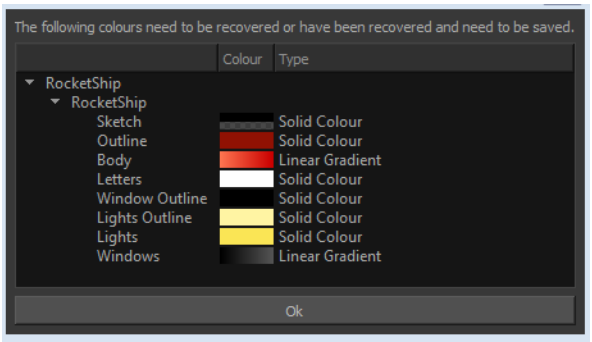
Use the Check Files dialog box to verify that the data is consistent, correct, and accessible.



- Click **Check Colours** to open the Check Colours dialog box.

Check Colours

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



Related Tasks

Reference Materials

Basic Commands

This table lists the most common commands used in Harmony.

Command	Action	Access Methods
Open	Displays the Open Scene dialog box. Browse your file system for a scene file. The Open command is not disabled when a scene is opened. You can open a new scene from the current one and the previous scene will be closed.	**File > Open** Press Ctrl + O (Windows/Linux) or ⌘ + O (Mac OS X).
Close	Closes the currently opened scene, but does not close the Harmony application.	**File > Close**
Save	Saves all changes made to the opened scene, drawings, palettes, and palette lists.	**File > Save** Press Ctrl + S (Windows/Linux) or ⌘ + S (Mac OS X).
Quit	Closes HarmonyHarmony Stage.	Windows/Linux: **File > Quit** Mac OS X: **Stage> Quit**
Cut	Removes selected objects. You can then paste the object or its properties to another object.	**Edit > Cut** Press Ctrl + X (Windows/Linux) or ⌘ + X (Mac OS X).
Copy	Copies selected objects and properties.	**Edit > Copy** Press Ctrl + C (Windows/Linux) or ⌘ + C (Mac OS X).
Paste	Places an object you cut or copied into the location you select in the Camera, Drawing and Timeline views.	**Edit > Paste** Press Ctrl + V (Windows/Linux) or ⌘ + V (Mac OS X).

Command	Action	Access Methods
Delete	Removes selected objects.	**Edit > Delete** Delete
Select All	Selects all drawing objects in the current drawing window in the Drawing, Timeline and Camera views. This helps you manage multiple objects as one when moving them.	**Edit > Select All** Press Ctrl + A (Windows/Linux) or ⌘ + A (Mac OS X).
Deselect All	Deselects all selected objects in the Drawing and Camera views.	**Edit > Deselect All** Esc
Undo	Removes remove the last change made to your project. Harmony supports multiple undo, so you can undo changes you made in the order you made them.	**Edit > Undo** Press Ctrl + Z (Windows/Linux) or ⌘ + Z (Mac OS X).
Redo	Redoes and operation you have undone that you later decide to keep. This command is active only after you use the Undo command.	**Edit > Redo** Press Ctrl + Shift + Z (Windows/Linux) or ⌘ + Shift + Z (Mac OS X).
Help	Launches the Toon Boom Harmony Online Help system, complete with instructions on how to use the system. This requires an internet connection.	**Help > Help**
Toon Boom Harmony on the Web	Launches the Toon Boom Harmony website, which features a Support and Community > Forum section.	**Help > Toon Boom Harmony on the Web**
About	Use the About command to access general information about the software.	Windows/Linux: **Help > About** Mac OS X: **Stage > About**

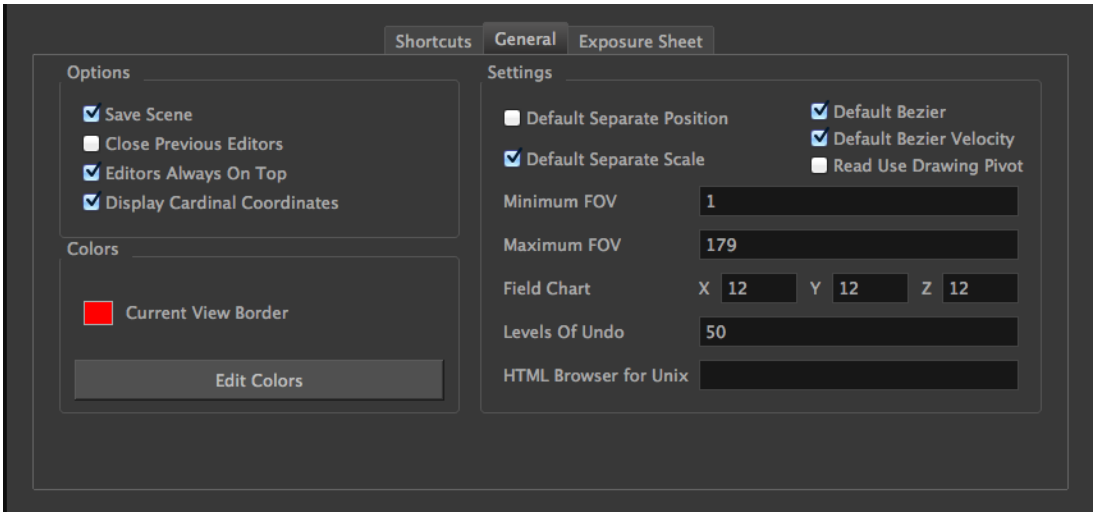
Preferences

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

To learn about the different preferences available, refer to the Preferences Guide.

How to open the Preferences dialog box

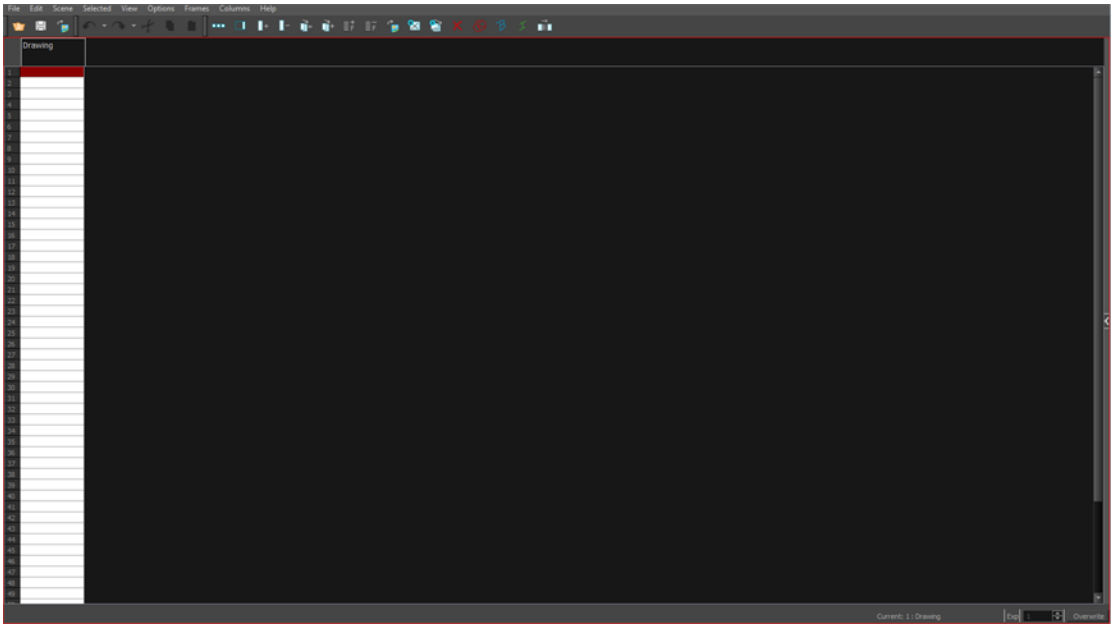
1. Do one of the following:
   - Windows/Linux: From the top menu, select **Edit > Preferences**.
   - Mac OS X: Select **Stage > Preferences**.
   - Press Ctrl + U (Windows/Linux) or ⌘ + U (Mac OS X).



Chapter 5: Interface

Knowing how to manage the Toon Boom Harmony interface helps you to work efficiently and organize your workspace conveniently. There are a series of views and toolbars you can use as you perform different operations. Usually, each person has a specific way of working in the interface and prefer particular views and toolbars. In this chapter, you will learn about the main elements of the interface and how to manage them.

Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.



This chapter is divided as follows:

Menus

Harmony has a large number of functions and options that you can access from the following menus:

Top Menu

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

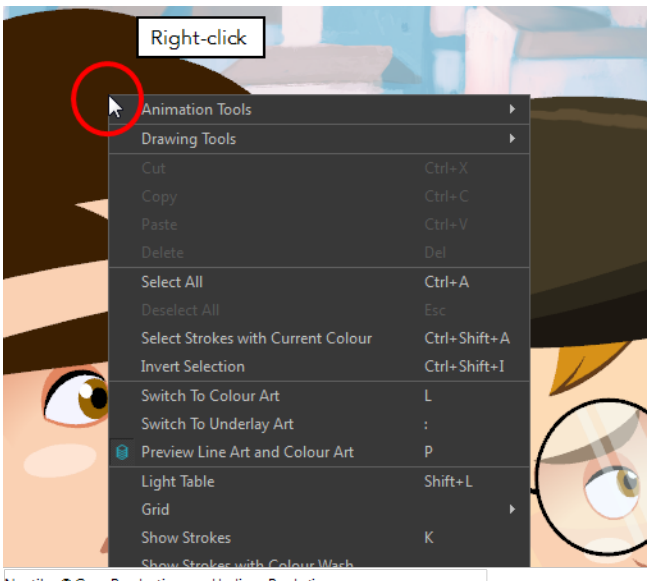
The top menu contains the following categories:

- File
- Edit
- View
- Scene
- Selected
- Options
- Frames
- Columns
- Help

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

- Preferences
- About
- Quit

Quick Access Menu



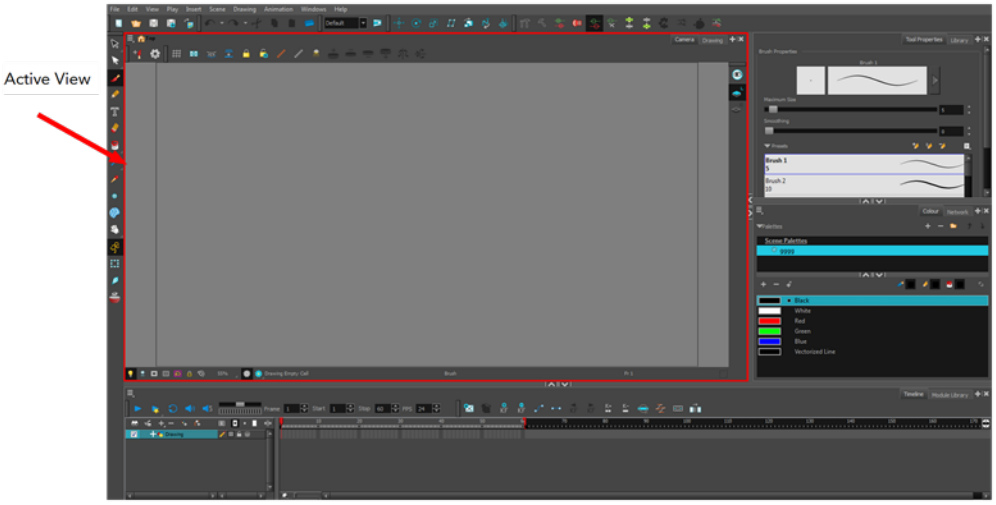
Each view has a quick access menu containing commands you will use most often. This menu is accessed by right-clicking anywhere in the view.

Managing the Views

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

Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.

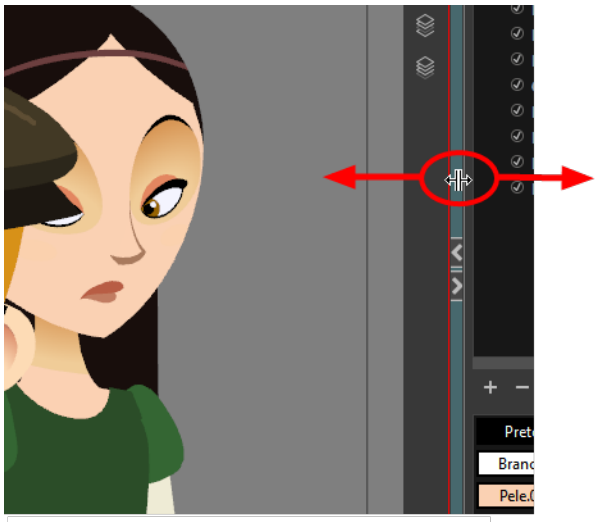
It is important to know about the active view. When a view is active, a red rectangle appears around the view. Keyboard shortcuts and top menu options are linked to the active view. If a menu option is greyed out, it either means it does not apply to your layer, drawing or other type of selection or the option does not apply to the active view.



Workspace modifications are automatically saved when you exit the application unless you deselected the Automatically Save Workspace option in the Preferences dialog box.

How to resize a view

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



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

How to temporarily hide a view

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

Managing the Toolbars

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

Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.

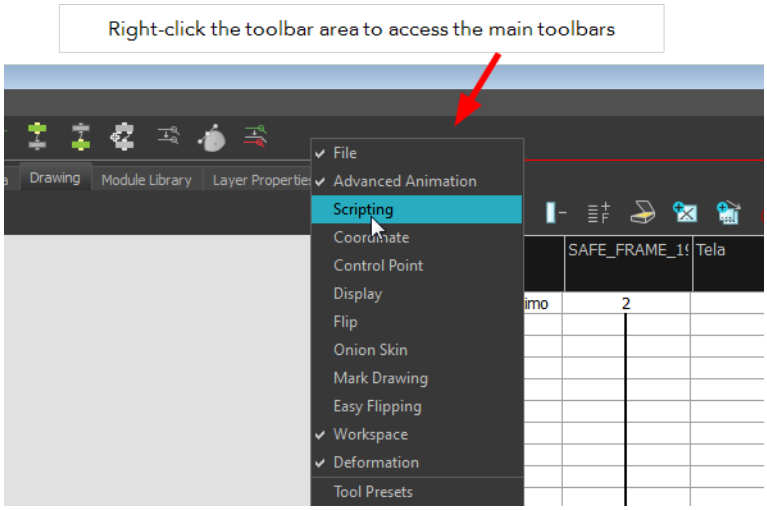
You can display or hide toolbars using the menus. The Toolbar menu only contains the View toolbars of the views that are displayed in the workspace. As you show or hide views in your workspace, the Toolbar menu updates.

The View toolbars can be customized to contain your favourite tools and options. Using the Toolbar Manager window, you can organize different toolbars to suit your working style.

If the default toolbar does not contain the tools you require, you can customize the toolbar.

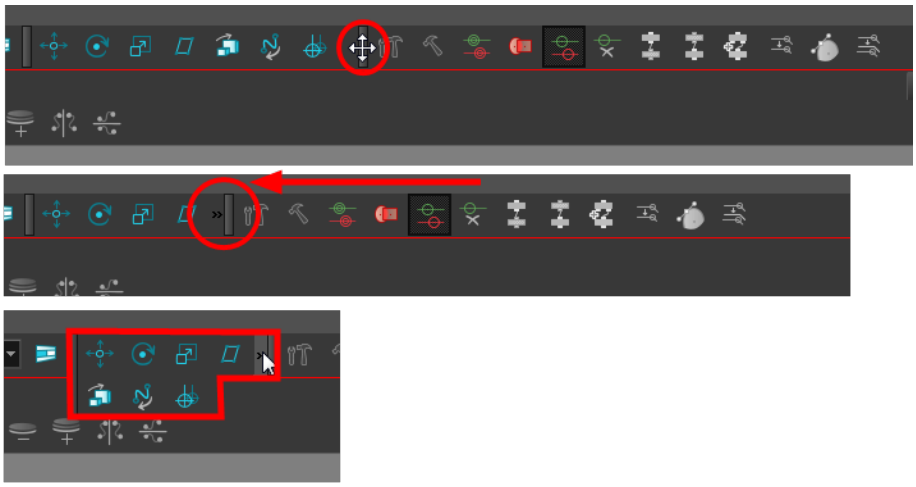
How to show and hide a toolbar

- You can right-click anywhere in the toolbar area to access Harmony toolbars. View toolbars, however, are not available by right-clicking the toolbar area. You can access the toolbar of any open and active view by right-clicking in the view's top area or the Windows menu.



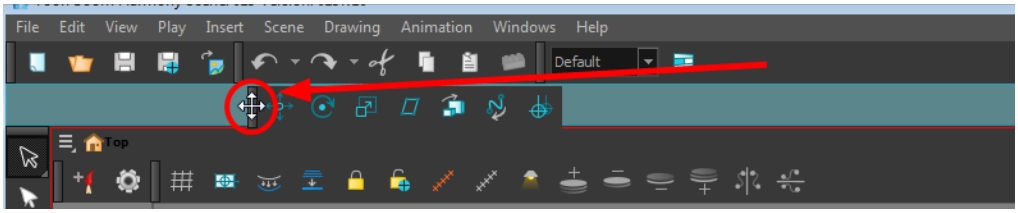
How to resize a toolbar

1. Hide a portion of a toolbar by dragging another open toolbar over its tail-end.
2. Click on the arrows appearing at the end of the collapsed toolbar to expand it.

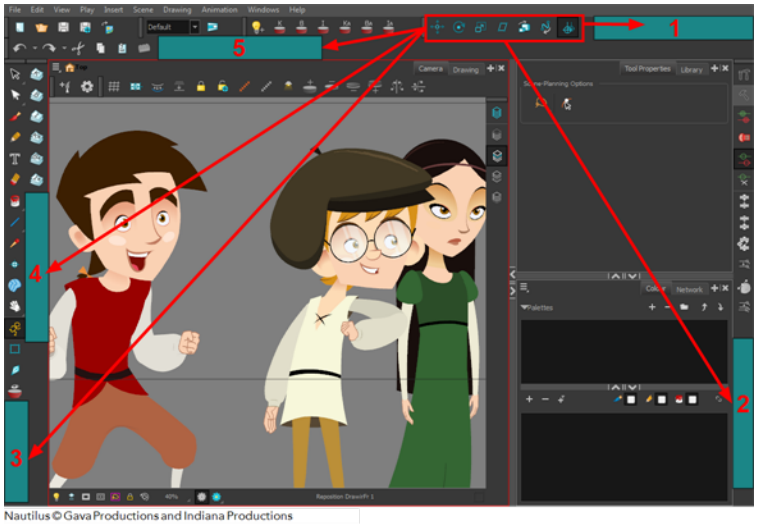


How to move a toolbar

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



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

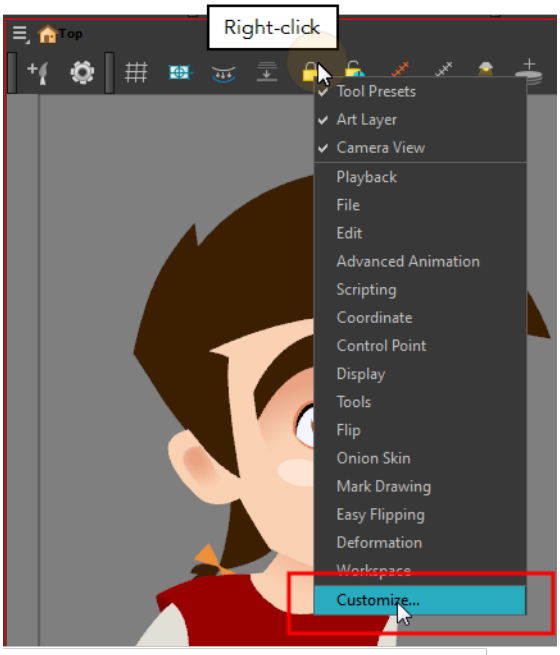


- 1. Dock to the top toolbar area.

- 2. Move a toolbar down a row.
- 3. Dock to the left toolbar area.

How to customize a view toolbar

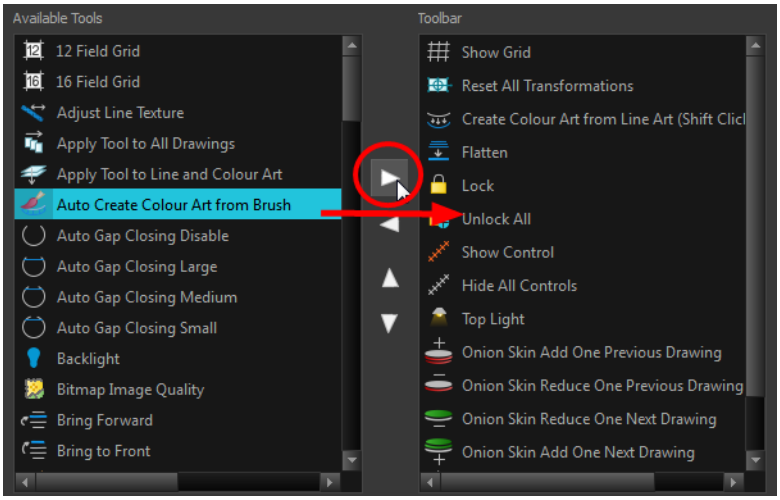
1. In the chosen view, right-click on any button in the toolbar where you want to add or subtract a new button. You can also reorder the buttons. Make sure the button you right-click on is active.
2. From the menu, select **Customize**.



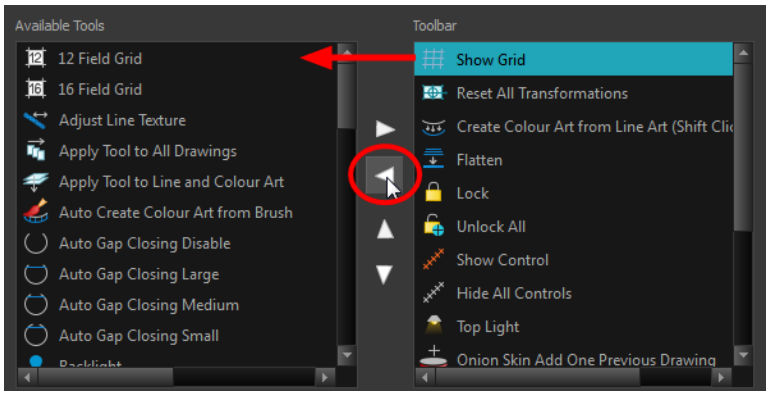
Nautilus © Gava Productions and Indiana Productions

The Toolbar Manager window opens.

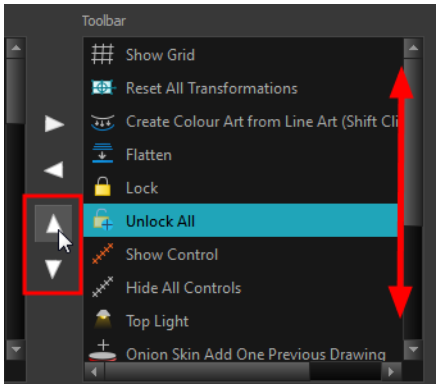
3. To add a new icon to your toolbar, select the tool or command from the Available Tools list and click the Right Arrow button to switch it to the Toolbar list.



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



5. To reorder the icons in your toolbar, select the command to be moved from the Toolbar list and click the Up △ or Down ▽ buttons to move it to the correct location.



6. Click **OK** when you are finished.

View References

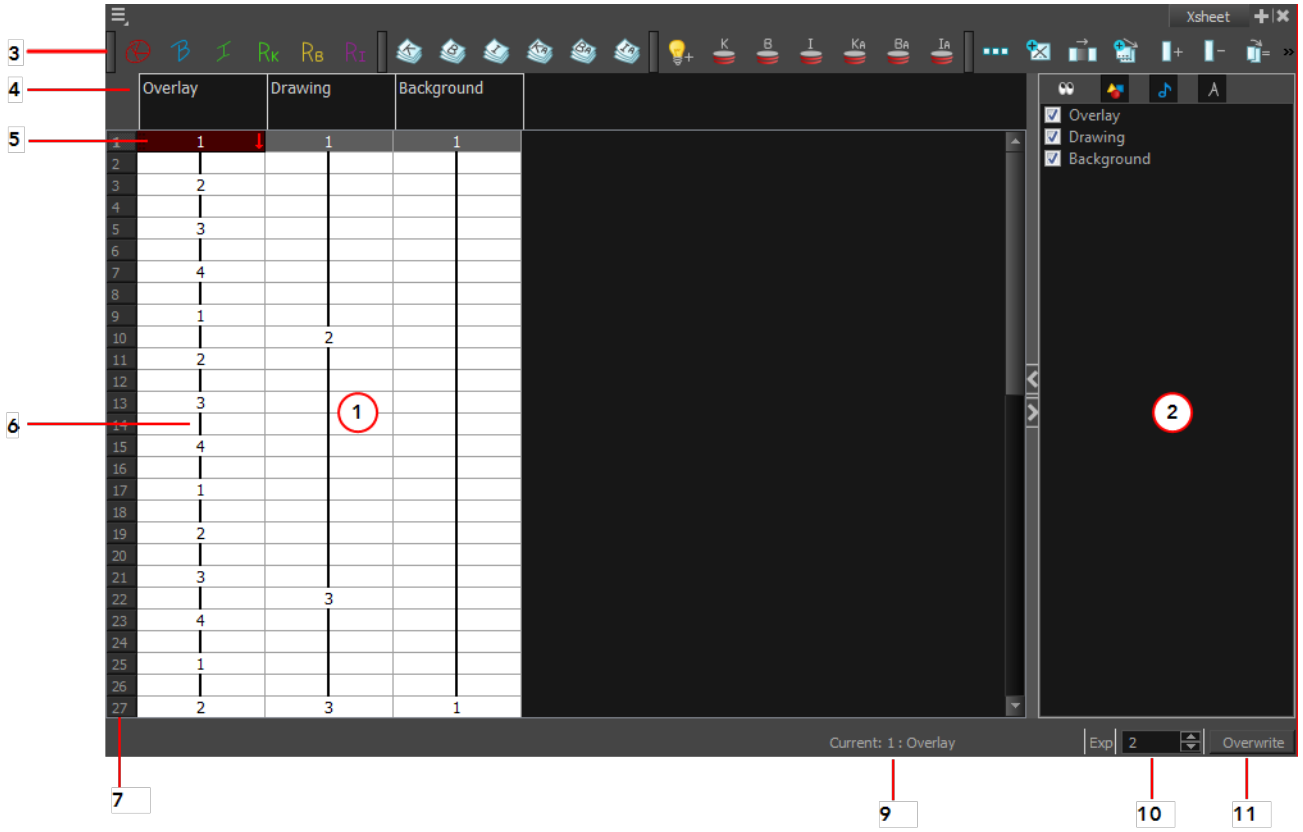
Harmony Xsheet only contains an Xsheet view. Other Harmony modules contain multiple views.

- Xsheet view

Xsheet View

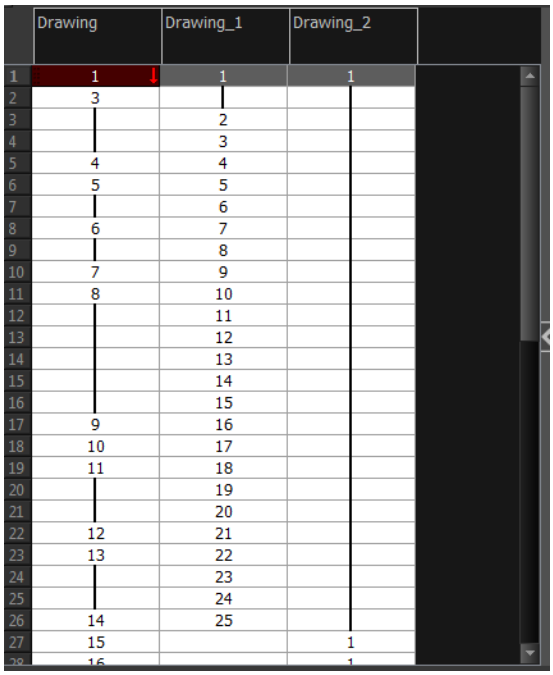
The Xsheet view lets you read the timing vertically, displays the drawing layers as columns, and shows the drawing's name. You can also see the functions and keyframes of the motion paths in the Xsheet's function columns. The value of each keyframe is shown in the Xsheet view; these are displayed as black squares in the Timeline view. The Xsheet view contains more details than the Timeline view, and is faster and easier to read.

Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.

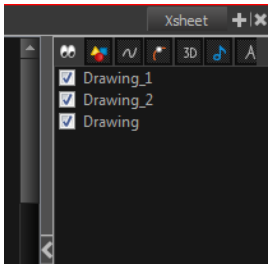


1. Xsheet Main Section

The Xsheet view has three sections. By default, only the main section is visible. It displays the drawing layers, also known as *drawing columns*.



2. Column List Section

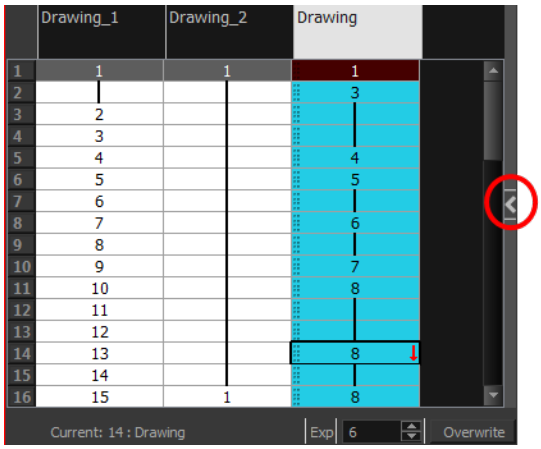


The Column List section allows you to show and hide columns in the Xsheet view. When you hide a layer in the Xsheet view, it is also disabled in the Timeline view.

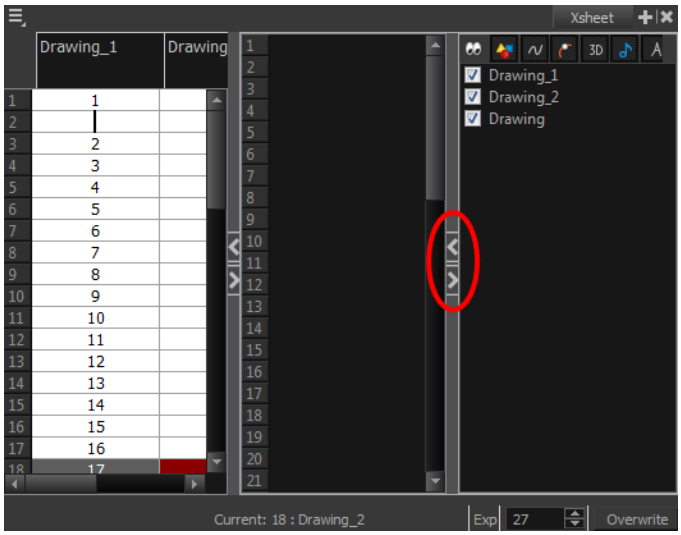
You can use the Column List to hide individual columns or hide an entire column type (drawing or function) from the Xsheet view. By default, the Functions section is hidden.

How to display the Column List section

1. In the Xsheet view, click the Expand button on the right side of the main section to show the Functions section. Click on the same button to collapse it. You can also use the Show Column List button in the Xsheet View toolbar.
   - In Harmony, you can also go to the Xsheet view menu and select **View > Show Column List**.



2. Click the Expand button on the right side of the Functions section to display the Column List section.



3. Xsheet View Toolbar

The Xsheet view has its own toolbar where you can find the most common features. This toolbar is displayed by default. If you do not see it, select **Windows > Toolbars > Xsheet View**.

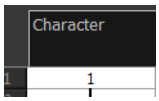
The Xsheet view must be part of your workspace in order to display its toolbar.

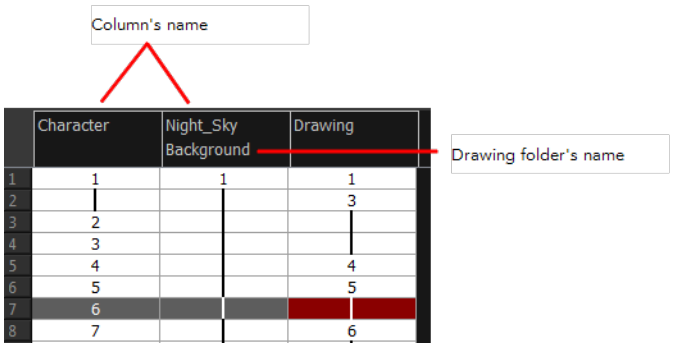
4. Column Header

Each column available in the Xsheet view has a header displaying the column's name. The column's name is the same as the corresponding timeline layer. If you rename one or the other, they will both be renamed.

A quick access menu is available when you right-click. This menu contains the command affecting an entire column such as renaming, changing the default colour, or deleting a column.

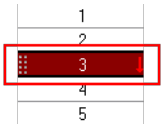
The tooltip that appears when you hover at the top of each Xsheet column shows the folder path to the source drawings for that column.





5. Current Drawing

A drawing selected in dark red indicates that the drawing is currently displayed in the Drawing and Camera views. The current drawing selection is not linked to the drawing displayed in the Camera view since drawings from each visible layer are displayed at once.

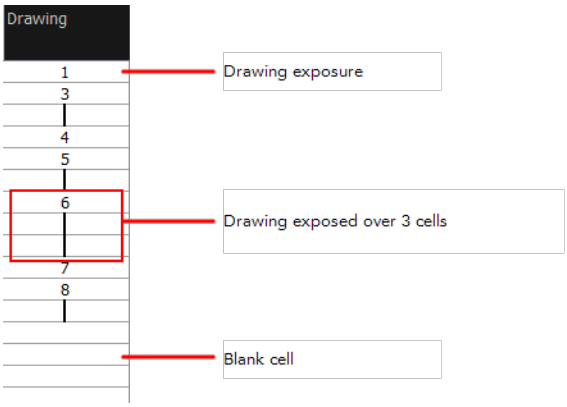


5a. Current Frame

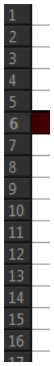
The darker frame appearing in the Xsheet view represents the current frame.

6. Drawing Exposure

In the drawing columns, you can see the drawing names and their exposure. You can use any alphanumeric symbol to name your drawing. When a drawing is exposed over more than one cell, a vertical black line is displayed to indicate the continuity of the exposure. When there is no drawing in a cell, the cell will be blank.

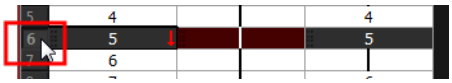


7. Frame Numbers

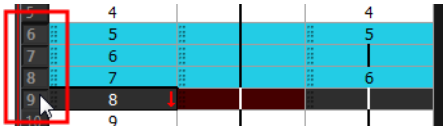


On the left side of the Xsheet view, the frame numbers are shown indicating where you are. These read vertically instead of being displayed horizontally as they are in the Timeline view.

- To go to a particular frame, click the frame number.

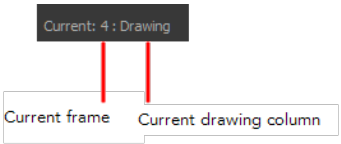


- To select an entire range of frames, click and drag a selection downwards.



8. Current Frame Display

At the bottom-right of the Xsheet view, you can see the current frame number, as well as the column containing the drawing currently displayed in the Drawing view.



10. Increase/Decrease Exposure

You can quickly increase or decrease the exposure of the selected cell by clicking on the up and down arrows in the Increase/Decrease Exposure field.

11Overwrite/Insert Modes

The Overwrite/Insert button allows you to decide the way the values are inserted into the Xsheet.

Toolbar References

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

Edit Toolbar

The Edit toolbar contains common operations such as Copy, Paste, Cut, Undo and Redo. These options can also be found in the Edit menu.

File Toolbar

The File toolbar contains the common file operations such as New, Save and Open. These options can also be found in the File menu.

Xsheet View Toolbar

The Xsheet View toolbar contains the common timing operations such as Add Column, Delete Column, Clone Column, and so on. These options can also be found in the top menu.

Interface Navigation

Toon Boom 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.	**View > Zoom In** Press 2 or roll the mouse wheel up. In the Timeline view, press Ctrl (Windows/Linux) or ⌘ (Mac OS X) and roll the mouse wheel up.
Zoom Out	Zooms out of the view.	**View > Zoom Out** Press 1 or roll the mouse wheel down. In the Timeline view, press Ctrl (Windows/Linux) or ⌘ (Mac OS X) and roll the mouse wheel 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.
Reset Pan	Resets the view's pan to its default position.	**View > Reset Pan** Press Shift + N
Reset View	Resets the view to its default position.	**View > Reset View** Press Shift + M
Reset Zoom	Resets the view's zoom to its default position.	**View > Reset Zoom**

Navigating between Frames and Columns

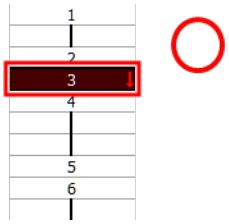
Once a cell is selected in the Timeline or Xsheet view, you can navigate between the drawings, frames, and layers using keyboard shortcuts that work in the Camera, Drawing, Timeline, and Xsheet views.

You can navigate through:

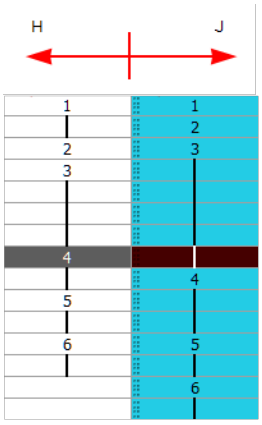
- Drawings
- Frames
- Columns

How to navigate through drawings, frames and columns

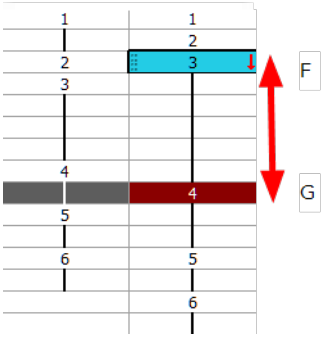
1. In the Xsheet view, select a cell.



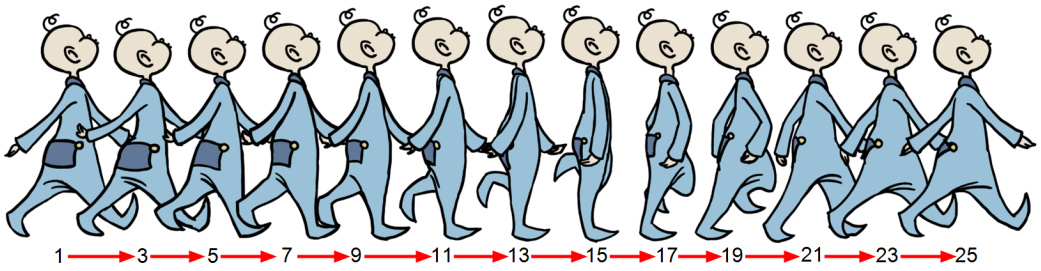
2. Once the cell is selected, you can navigate between:
   - Previous and next layers: press H and J.



   - Previous and next drawings: press F and G.



Chapter 6: Timing



Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.

When you create hand-drawn animation traditionally or in a paperless environment, it is important to know how to set and modify the timing of your drawings.

In a traditional workflow, the person in charge of the digital exposure sheet reproduces the paper exposure sheet created by the animator. In a paperless workflow, the animator creates and manages his own exposure sheet directly in Harmony without the need for reproduction.

If you are more of a traditional animator, you are more likely to work with an exposure sheet. If you are a digital animator, you may prefer to work with a timeline to visualize your timing. Harmony offers both.

The Xsheet view displays the digital reproduction of a traditional paper exposure sheet used in hand-drawn animation. You can set the animation sequence's exposure and name the drawings.

In this topic, you will learn how to work on your drawing’s exposure and length. The exposure and animation paths for symbols are covered in separate chapters.

The exposure sheet is not mandatory for Cut-out animation. It can be useful for creating characters and parts, but is not really needed for animation and timing. If you plan to work with Cut-out animation, you can still gain useful tips by reviewing the section on exposure sheets.

The basic digital exposure sheet process is divided into the following steps:

- Preparation on the facing page
- Frames on page 62
- Filling Exposure on page 77
- Managing Drawings on page 96
- Modifying the Column Display on page 102
- Printing the Xsheet on page 113

Preparation

The digital exposure task is quite simple. There are very few things to prepare in order to get ready.

Opening the Scene

The scene is generally created during a previous step such as scanning (in a traditional animation workflow), scene setup, digital layout, or production organization.

Preparing References

To start an exposure sheet, you need to prepare your references. For traditional animation, you will need to reproduce the animator's paper exposure sheet. If you are working remotely, the studio can scan the paper exposure sheet using third-party software and send the digital files to be opened and viewed digitally.

In paperless animation, you will usually create an exposure sheet from the Xsheet view.The information from your layout and posing or storyboard will help you approximate how many elements are required in the scene.

Frames

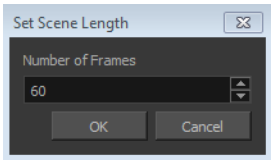
Once the references are ready, you need to set the scene length by adding the right number of frames to your scene. You can set the global scene length from the top menu.

In the Xsheet view, you can add and remove frames from a scene to edit its length.

How to set the scene length

1. From the top menu, select **Scene > Scene Length.**

   The Set Scene Length dialog box opens.

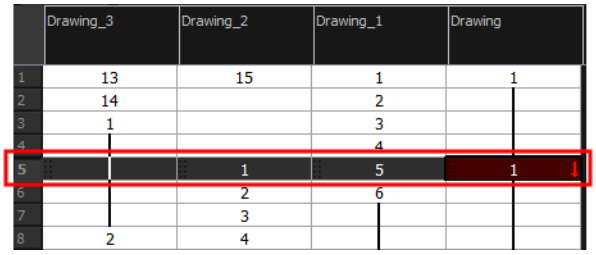


2. In the Number of Frames field, enter the number of frames needed.

How to add frames before or after a selection to the extend scene length in the Xsheet view

You can add frames anywhere in the middle of the scene. If you select a frame row in the Xsheet view, Harmony will add the new frames before or after the selection, depending on your choice.

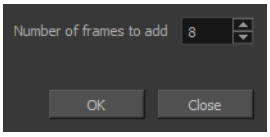
1. In the Xsheet view, select a frame row.



2. Do one of the following:

   - From the top menu, select **Frames > Add Frames Before Selection** or **Add Frames After Selection**.
   - In the Xsheet view, right-click and select **Frames > Add Frames Before Selection** or **Add Frames After Selection**.
   - In the Xsheet view toolbar, click the Add Frames button to add frame after your selection.
   - Press Ctrl + G and Ctrl + H (Windows/Linux) or ⌘ + G and Ctrl + H (Mac OS X).

   The Add Frames dialog box opens.



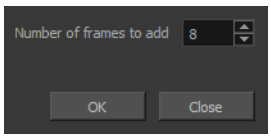
3. In the Number of Frames to Add field, enter the number of frames needed in the scene.

How to add frames at the start or end to extend the scene length from the top menu

From the top menu, select **Frame >Add Frames At Start** or **Add Frames At End**.

- In the Xsheet view toolbar, press the Add Frames button to add frame after your selection.

The Add Frames dialog box opens.

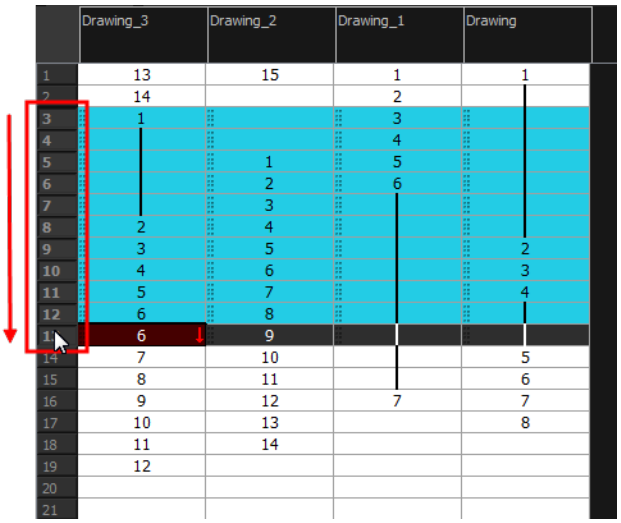


4. In the Number of Frames to Add field, enter the number of frames needed in the scene.

How to remove a frame or a range of frames to reduce the scene length in the Xsheet view

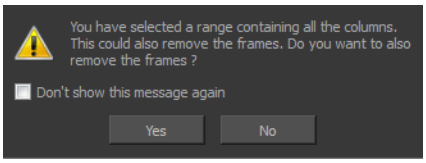
In the Xsheet view, you can remove any selected frame range, such as the last frame.

1. In the Xsheet view, do one of the following:
   - Select a frame in a given column.
   - Select a frame range by clicking the first frame's number and then dragging the selection highlight down to the last frame to delete.



2. To delete the selected frames, do one of the following:
   - From the top menu, select to **Frame > Remove Selected Frames**.
   - Press Delete to delete the selection.
   - Click Remove Frames button. To remove several frame selections, click the button repeatedly.

If you selected a range of frames, the Warning dialog box may open.



3. To complete the operation:
   - Click **Yes** to delete the selection.
   - Click **No** to delete only the exposure in the cell and not the frames.
   - Select the **Don't Show This Message Again** option to prevent the warning message from being displayed each time you delete a frame range.

Creating Drawing Elements

Before filling any value or setting any timing or exposure, you need to add different drawing elements.

Each drawing element is represented as a vertical element column in the Xsheet view.

To start an exposure sheet, you will use drawing elements. Drawing elements are drawing containers. Any image file, either bitmap or vector, will use a drawing element.

When you add a drawing element to your scene, a folder is added to the scene directory. This folder is named the same way as the drawing element. Its purpose is to contain all the drawings related to this element. For example, in cut-out animation, a character can have many heads available. All of the head drawings will be contained in this folder, even if they are not exposed in the Xsheet view. There is always a drawing container connected to a drawing element (column).

There are different element types available such as Sound and Expression. A sound element will contain sound files. Expressions, Beziers, Eases, 3D Path, Quadmaps and Pegs are for motion purposes during the compositing step. It is not necessary to create these types to create your exposure sheet.

You can add drawing elements from the Xsheet view, and the Scene menu.

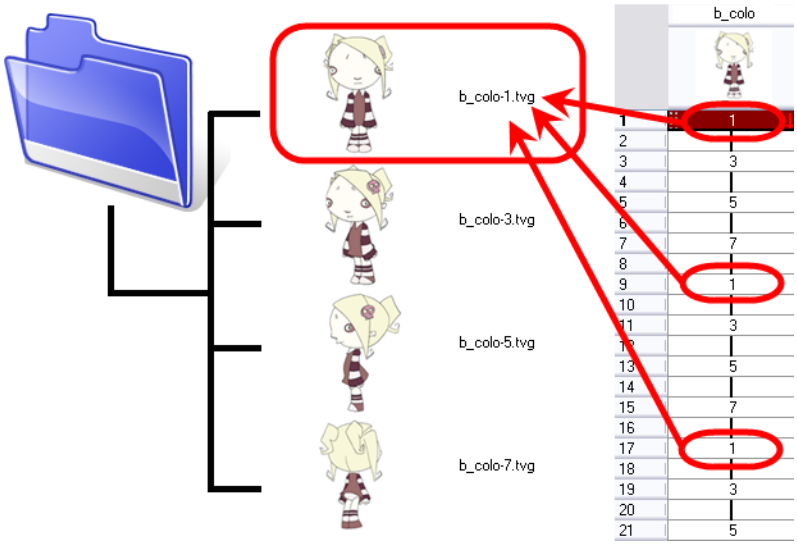
This section is divided as follows:

Layer and Column Concepts

A layer is linked to a directory, the location where all its drawings are saved. This directory has the same name as the layer. When a name is typed in a cell,Harmony searches the layer's directory for the corresponding drawing to display. If there is no corresponding drawing, a new one is created.

Drawings are exposed in cells, and linked to the drawings saved in the layer's directory. Removing a drawing from a cell means it is not displayed. It will not be deleted from the directory.

A drawing that is exposed multiple times (for example, in a walk cycle) would be linked to the same original drawing in the layer's directory. If you modify, repaint, or correct the drawing, all exposed drawings with the same name are updated simultaneously. You must duplicate or create a new drawing to modify a single exposure and retain the others.



When you create a drawing cycle, all of the repeated drawings are linked to the original files. This means that when you modify, repaint, or correct a drawing named "1," all drawings named "1" are updated simultaneously. In order to modify a drawing independently from its other exposures, you must duplicate the drawing.

Column Types

A column is also known as a layer. There are several types of layers that you can add in the Xsheet view. Each layer is tagged with an icon to help differentiate them. Some layers are represented differently in the Xsheet view.

Drawing Layer

The most common layer type is the drawing layer. Any time you need to create a vector drawing or import a symbol or image, you can use a drawing layer. You can also create bitmap artwork on a drawing layer.

Bitmap images are contained in Bitmap layers.

Peg Layer

A Peg layer is a trajectory or motion path layer that does not contain drawings. It can be attached to any drawing layer, cut-out puppet, or other peg layers; they will all follow the trajectory you set in the Peg layer.

Sound Layer

In the Xsheet view, the Sound layer is a dark grey colour.

Advanced Column Types

In the Xsheet view, you can add several advanced column types to create particular animation paths. When you create these columns, they are not linked automatically to any particular drawing layer. You can create a motion path using these columns and then link or unlink several drawing or peg layers to it.

Advanced column types include:

- Timing
- 3D Path
- 3D Rotation
- Bezier Curve
- Ease Curve
- Expression
- Annotation

Adding New Drawing Elements

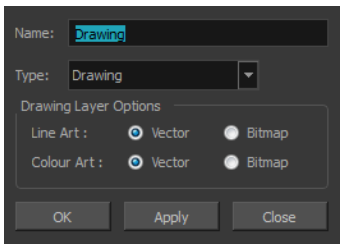
There are different ways to add a drawing layer to your project. By default, when you create a new scene there is one Drawing column in the Xsheet view.

You can add an element for each drawing and it will appear as a column in the Xsheet view and a module in the Network view.

How to add a drawing element from the Xsheet view

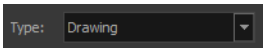
1. Do one of the following:
   - In the Xsheet view menu, select **Columns > Add Columns**.
   - Click the Add Columns button.
   - Press Shift + C.

   The Add Column dialog box opens.



2. In the Name field, type a relevant element name.

3. In the Type field, select Drawing.



4. To complete the operation:
   - Click **OK** to add your new layers and close the dialog box.
   - Click **Apply** to add your new layers and keep the dialog box open to add column.
   - Click **Close** to cancel the operation.

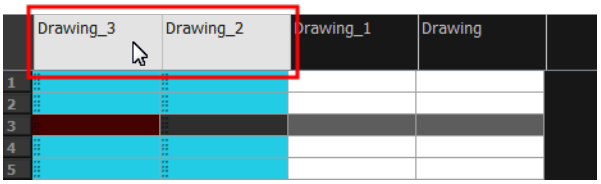
   The new drawing element appears in the—see Column Types on page 66.

Deleting Columns

You can delete an element in the Xsheet view.

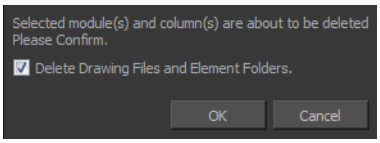
How to delete columns in the Xsheet view

1. In the Xsheet view, select the columns to be deleted by clicking on their header.



2. Do one of the following
   - Right-click on the selection and select **Delete Columns**.
   - In the Xsheet View toolbar, click the Delete Columns button.
   - Press Delete.

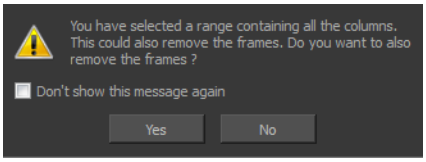
   The Confirm Delete dialog box opens.



   - Select the **Delete Drawing Files and Element Folder** option if you want to delete the drawings and folders linked to the selected column.

3. To complete the operation:
   - Click **OK** to delete the selected layers.
   - Click **Cancel** to cancel the operation.

   The Warning dialog box may open.



4. Do one of the following:
   - Click **Yes** to delete all the frames from your scene.
   - Click **No** to keep the frames in your scene.
   - Select the **Don't Show This Message Again** option if you do not want the dialog box to display again in the future.

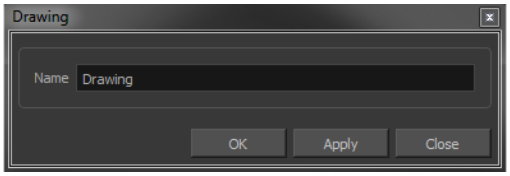
Column Properties

Each element has its own set of properties that can be modified, including effect and peg layers.

If you want to modify some of the element's properties, display the Column Properties editor.

The Column Properties editor allows you to:

- Rename the layer
- Enable or disable the layer
- Adjust parameters for bitmap format, scan type and field chart



How to display the Column Properties editor from the Xsheet view

1. Do one of the following:
   - In the Xsheet view, double-click on a column's header.
   - In the Xsheet view, right-click on a column's header and select **Column Editor**.
   - Press Shift + E.

Modifying Columns

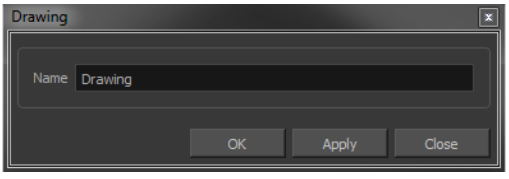
Once you add columns to your project, you can modify their properties, names, or ordering.

You can change the order of your elements in the Xsheet view.

How to rename a column

1. In the Xsheet view, double-click on a column name. Do not click on the drawing folder name that the column is linked to (this also appears in the column header just below the column name).

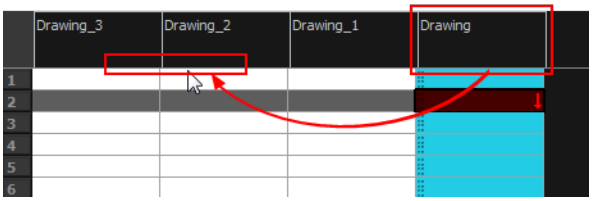
   The Drawing dialog box opens.



2. In the Name field, rename the column.
3. Click **OK**.

How to reorder columns in the Xsheet view

1. In the Xsheet view, click on the column's header with the middle mouse button.
2. Drag the column to its new position.

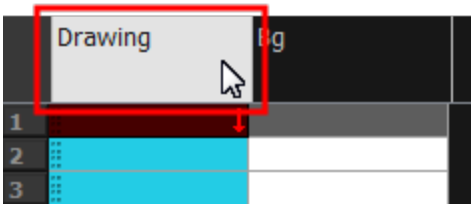


DuplicatingColumns

Duplicating an element provides you with a copy of the drawings and their exposure. You can modify anything you want in the duplicated element without affecting the original one.

How to duplicate an element

1. In the Xsheet view, click the layer you want to duplicate.



2. From the top menu, select **Edit > Duplicate Selected Elements**.
3. In the Xsheet view toolbar, click the Duplicate Drawing button.

   The new duplicated layer appears.

Cloning Columns

Cloning a column provides you with a copy of the selected element that uses the same drawings as the original. For example, if you modify a drawing in the cloned or original column, it is updated in both columns.

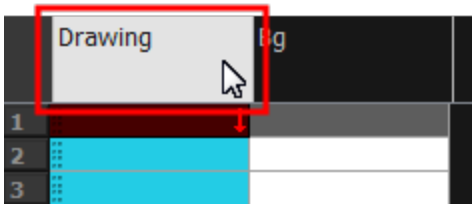
You can choose whether or not to copy the column timing to the cloned columns.

- You can modify the column timing independently from each other, but the drawings remain linked.
- You can copy the columns timing, so drawings and timings remain linked.

This feature is useful when you want to reuse a hand-drawn animation but have different timings.

How to clone an element

1. In the Xsheet view, select the column you want to clone.



2. Do one of the following:
   - From the top menu, select **Edit > Clone Selected Columns: Drawings Only** or **Edit > Clone Selected Columns: Drawings and Timing**.
   - In the Xsheet View toolbar, click the Clone Selected Columns: Drawings Only button.
   - From the Xsheet View menu, select **Columns > Clone Selected Columns: Drawings Only** or **Columns > Clone Selected Columns: Drawings Only**.
   - From the top menu, select **Edit > Clone** to clone the columns' drawings only.
   - In the Xsheet Viewtoolbar, click the Clone SelectedColumns: Drawings Only button.

   The new cloned column appears.

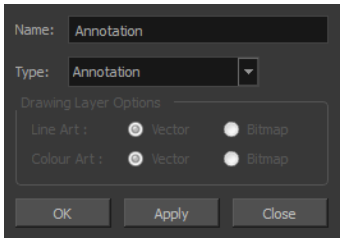
Adding an Annotation Column

The Annotation columns are useful for marking actions, corrections or other information related to your animation that you want to draw or write. This way, you can print your Xsheet, take it back to your animation table and work with the annotations.

How to add an annotation column

1. Do one of the following:
   - In the Xsheet View menu, select **Columns > Add Columns**.
   - In the Xsheet View toolbar, click the **Add Columns** button.
   - Press Shift + C.

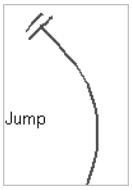
   The Add Column dialog box opens.



2. In the Name field, type in an appropriate name.
3. From the Type list, select **Annotation** and click OK.

   The new column appears.

Drawing and Typing in the Annotation Column



In the annotation column, you can type in your notes and relevant information, as well as draw sketches and ideas that will be useful in producing your animation.

How to draw in the Annotation column

Before you can draw in the Annotation column, you must first activate the Enable Drawing option to activate the Drawing mode.

Pen tablet pressure sensitivity is not supported in the Annotation column.

---

1. Do one of the following:
   - In the Xsheet View menu, select **Annotation > Enable Drawing**.
   - In the Annotation column header, click to cycle through the icons, until the Brush icon is displayed.

   The Drawing mode is enabled.
2. To draw in an Annotation column, simply use your mouse or pen tablet.

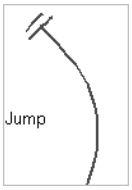
How to type in an Annotation column

Typing in an Annotation column is independent from the Drawing mode. You can be in either mode

and the typing will work.

1. Do one of the following:
   - In the selected cell, press Ctrl (Windows/Linux) or ⌘ (Mac OS X).
   - In the selected cell, hold down Ctrl + Shift + click (Windows/Linux) or ⌘ + Shift + click (Mac OS X)..

2. In the selected cell, type the desired text.



To learn about typing values in the Xsheet view, refer to Typing Exposure on page 78.

How to erase part of a drawn annotation using Erasing mode

You can erase part or all of the Annotation column's text and drawn annotations.

Annotations that you type in cannot be erased using this method.

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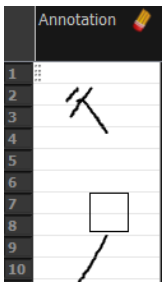
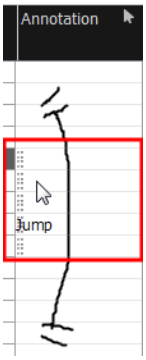
1. In the Annotation column header, click to cycle through the icons until the Eraser icon is displayed.
2. In the column, click and drag the cursor on top of the drawn annotation to erase parts of it.



When using a pen on a tablet, you MUST flip your pen to the eraser side for the eraser to work.

How to erase an Annotation column selection

1. In the Annotation column header, click to cycle through the icons until the Select icon is displayed.
2. In the Xsheet view, select the cell range you want to clear of text or drawn annotations. A selection is indicated by four pairs of dots on the left side of a cell. Do not select any cells if you plan to clear everything.



3. In the Xsheet view, right-click in the Annotation column.
4. Do one of the following:
   - Select **Annotation > Erase All** to erase the entire content of the column.
   - Select **Annotation > Erase Selected Images** to erase the images contained in the selected cell range.
   - Select **Annotation > Erase Selected Texts** to erase the text contained in the selected cell range.

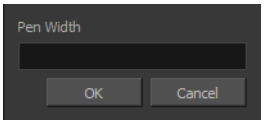
Changing the Drawing Settings

You can change the pen size and colour when you draw in the Annotation column.

How to change the pen width

1. Right click on a frame within an annotation column.
2. Do one of the following:
   - Select a pen width preset.
   - Select **Change Current**.

   If you selected the Change Current option, the Pen Width dialog box opens.



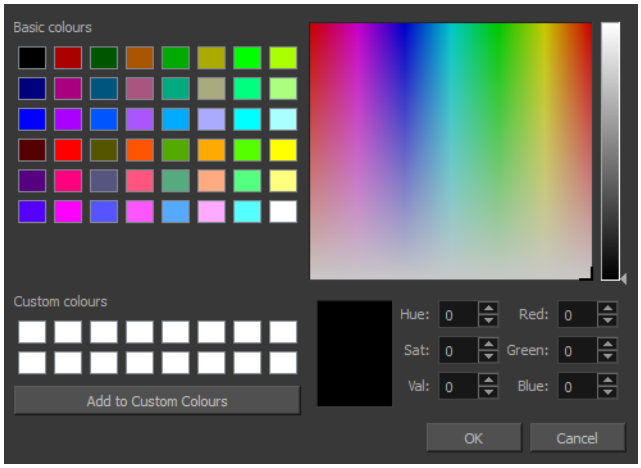
3. In the Pen Width field, type the number of pixels you want the pen size to be.

4. Click **OK**.

How to change the pen colour

1. In the Xsheet View menu, select **Annotation > Change Pen Colour**.

   The Select Colour dialog box opens.



2. Choose the new colour.
3. Click **OK**.

Importing an Annotation File

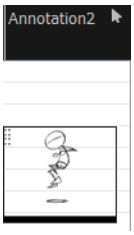
If you scanned your paper exposure sheet's annotations or if you need to place some pictures or drawings in the annotation columns, you can easily import them.

How to import annotation files

1. In the Xsheet view, select the first cell in the annotation column where you want the imported image to start.

2. Right click on the frame and select **Annotation > Import File**.
3. Browse for the bitmap image to import.
4. Click **Open**.

   The image appears in the annotation column.



Linking External Files with Timing Columns

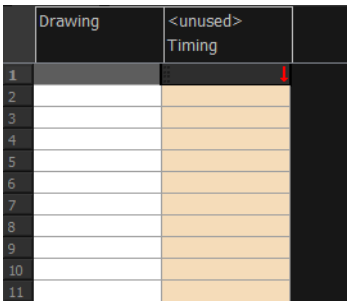
Timing columns are unique in that they can reference a source folder outside of the project folder to bring images into the project. For example, you may have background scenes created in a third party software that you might need to update in the future; by using Timing columns, you can dynamically link your backgrounds, expose different backgrounds at different times, and have live, automatic updating capabilities.

If the project file is moved, or the folder that the column is linked to is moved, then dynamic linking is broken and the images that were in that folder will disappear in Toon Boom Harmony.

How to use a Timing column

1. In the Xsheet view, click on the Add Columns button.
2. In the Add Column dialog box, type in the name of the new column, then from the Type menu, select **Timing**.
3. Do one of the following:
   - Click **OK** if you are finished.
   - Click **Apply** if you want to continue adding more columns and column types.

   A peach coloured column appears in the Xsheet with the name you typed in, and for the header, <unused>.



4. Click **OK**.

Filling Exposure

Harmony provides different tools to fill in exposures and values, create cycles, and set increments.

This section is divided as follows:

Filling Exposure Mode

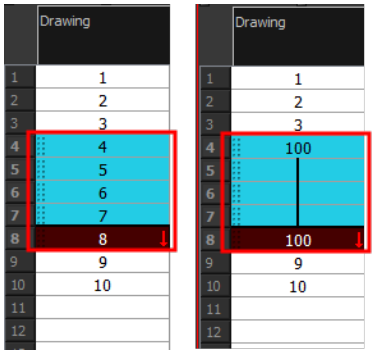
In the Xsheet view, you can fill columns using two different filling modes: Overwrite or Insert. These modes control the filling behaviour.

How to toggle between Overwrite and Insert modes

1. Do one of the following:
   - In the bottom-right corner of the Xsheet view, click the **Overwrite/Insert** button.
   - Press I.

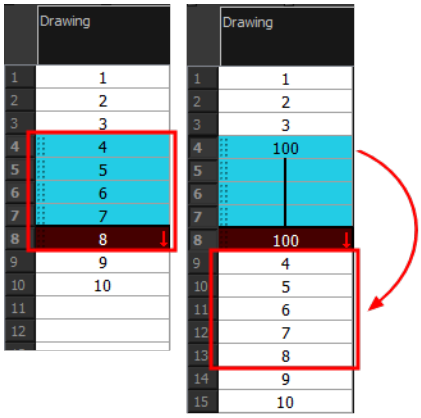
Overwrite Mode

By default, the Xsheet view is set to Overwrite mode. Adding a new value or a new value sequence overwrites existing ones. The existing timing sequence remains in the same place and is not pushed down the column.



Insert Mode

The Insert mode is the opposite of the Overwrite mode. When you add a new value or a new value sequence over existing ones, the new values are inserted between the old ones. The existing timing sequence is pushed down the column.



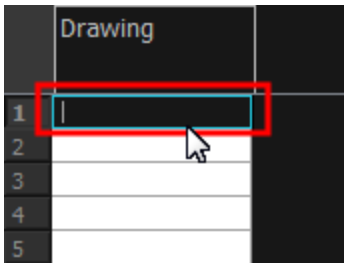
Typing Exposure

To fill in your exposure, you can directly type the values in the Xsheet view.

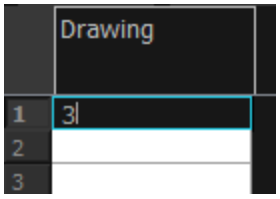
How to type values in the Xsheet view

You can only use alphanumeric values. **(0-9, a-z**, underscore (_) and dash (-)).

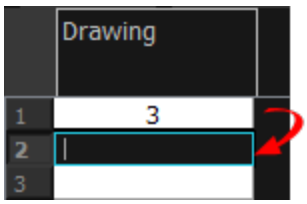
1. In an Xsheet column, double-click on one cell.



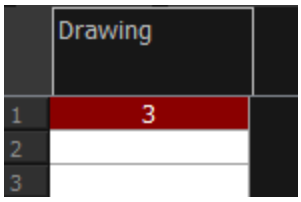
2. Type a value or drawing name in the cell.



3. Press Enter/Return to move to the next cell.



4. Press Esc to exit the typing mode and return to normal mode.



Holding Exposure

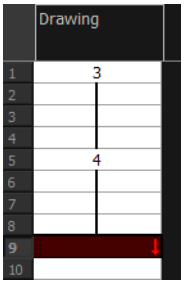
Drawings in an animation project are not always exposed on a single frame; they are often exposed for more than one frame. The most common exposure of a drawing is two frames. In the industry, this type of exposure is known as animation in double frames or animation on twos. A drawing can also be exposed for three, four, five cells and so on. To prevent mistakes and save time, the Xsheet lets you hold your cells automatically as you type.

The Set Exposure option allows you to choose how many frames you want to hold for your exposure.

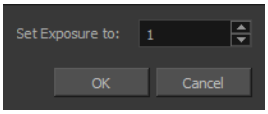
- This option is only available in the Xsheet view.
- The selected Set Exposure settings will be kept from session to session. You will not have to set them every time you use Toon Boom Harmony.

How to hold exposure

1. In the Xsheet View menu, select **Exposure > Hold Exposure > Hold 2 Cells**.
2. In the Xsheet view, select **Option > Hold 2 Cells**.
3. Type a value or drawing name in the cell.
   - Press Enter/Return to move on to the next cell.
   - Press Esc to quit the typing mode.



   - If you selected Set Exposure, the Set Exposure dialog box opens. You can hold as many cells as needed.

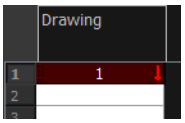


Extending a Single Exposure

Extending the exposure lets you select an Xsheet cell that contains a value and pull it down to the desired frame.

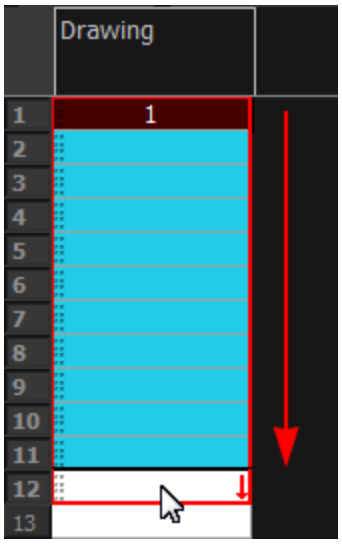
How to extend a cell exposure gesturally

1. In the Xsheet view, select the red arrow in the cell's right side. Make sure you see the drag down cursor.



2. Pull down the selected cell to the desired frame.

The red selection box must be visible when releasing the mouse button. If not, the action is considered cancelled.

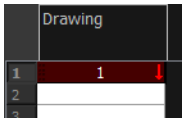


Extending an Exposure Sequence

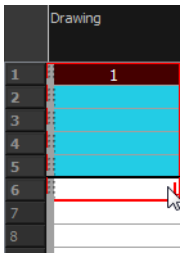
When working with a sequence that contains only numbers, you can extend an exposure sequence in a similar manner to extending a single exposure.

How to extend an exposure to create a sequence

1. In the Xsheet view, select a cell containing a number.
2. In the selected cell, click the red arrow on the cell's right side. Make sure to see the drag down cursor.

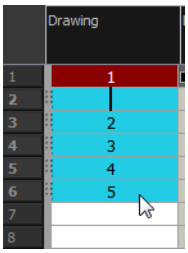


3. Hold down the Shift key. Make sure a plus (+) sign appears.
4. Pull down the selection box to the desired frame.



The red selection box must be visible when releasing the mouse button. If not, the action is considered cancelled.

5. First release the Shift key, then release the mouse button.

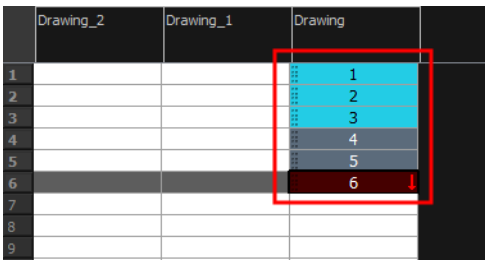


Dragging Cells

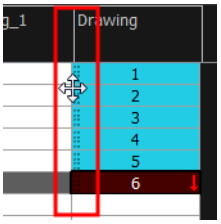
To readjust your timing, you can drag one or several cells to a new location. You can drag a cell to any other frame in the same column or into another column.

How to drag a cell to another location in the Xsheet view

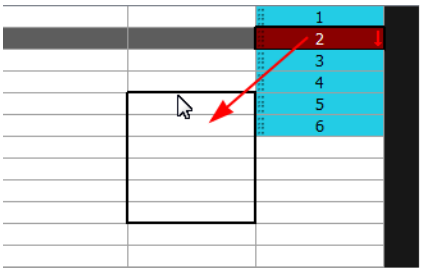
1. In the Xsheet view, select one or more cells.

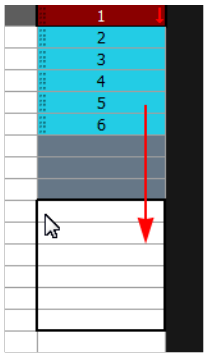


2. In the Xsheet view, select the small dotted area on the left side of the selected cells.

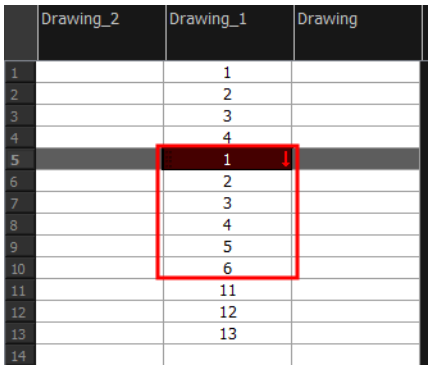


3. Drag the selection to any other cell in the same column or in another column.

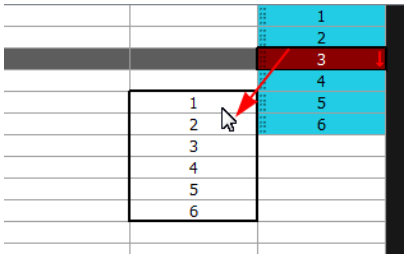




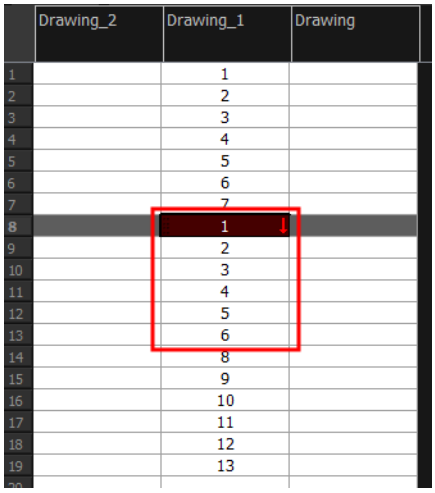
4. Do one of the following:
   - Drop the selection to overwrite the existing cells.



- Hold down Ctrl (Windows/Linux) or ⌘ (Mac OS X) while dropping the selection to copy the cells. The original selection will not be moved.



- Press Shift while dropping the selection to insert it between the existing frames.

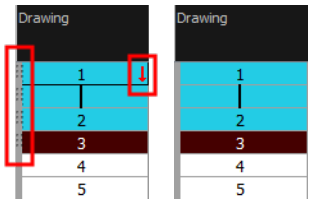


You can turn off the Gestural Drag Mode for the Xsheet view to prevent drawings from being dragged from one location to another.

How to turn off the Gestural Drag mode

1. Do one of the following:

- In the Xsheet view, right-click and deselect the **Gestural Drag Mode** option.
- Click the Toggle Gestural Drag Mode button (you may have to customize the toolbar to display it).



The dragging pad disappears when the Gestural Drag mode is off.

This feature does not apply to Annotation columns.

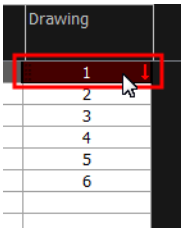
Increasing and Decreasing Exposure

Once a value is entered in the Xsheet view, you can increase and decrease its exposure.

How to increase exposure

Increasing the exposure adds one more exposure to a selected cell; repeating this action adds an extra cell each time. This is an efficient way of extending a drawing exposure and is always set in Insert mode. Increasing an exposure pushes the existing exposure ahead.

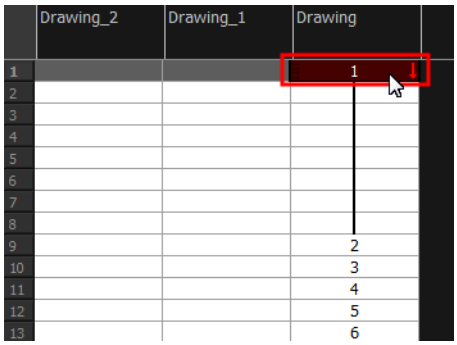
1. In the Xsheet view, select a cell.



2. Do one of the following:
   - In the top menu, select **Selected > Increase Exposure**.
   - Right-click on the selected cell and select **Exposure > Increase Exposure**.
   - Press +.
   - In the Xsheet View toolbar, click the Increase Exposure button.

How to decrease exposure

1. In the Xsheet view, select a cell.

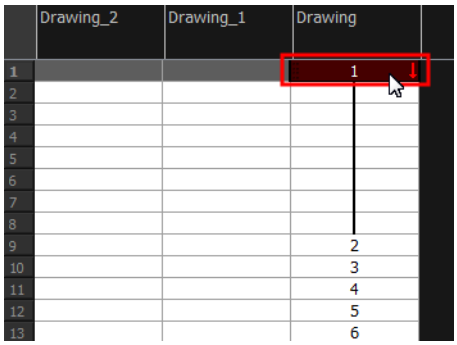


2. Do one of the following:
   - In the top menu, select **Selected > Decrease Exposure**.
   - Right-click on the selected cell and select **Exposure > Decrease Exposure**.
   - In the Xsheet View toolbar, click the Increase Exposure button.
   - Press -.

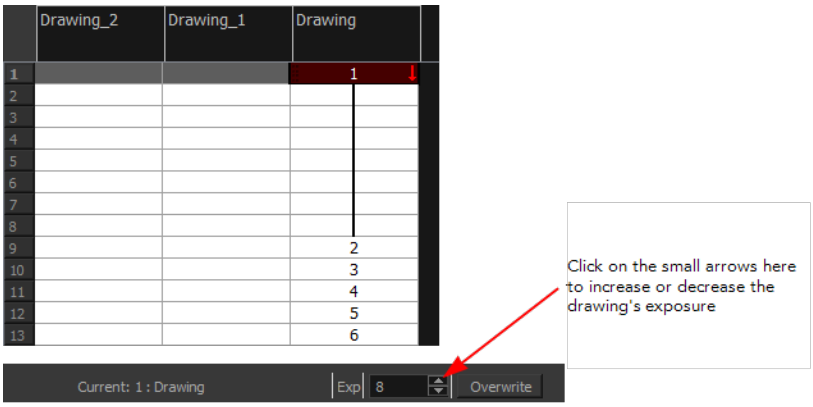
How to increase and decrease exposure using the Increase/Decrease Exposure field

You can use this option in the Xsheet view to increase or decrease the exposure of a selected drawing.

1. In the Xsheet view, select the cell to modify.



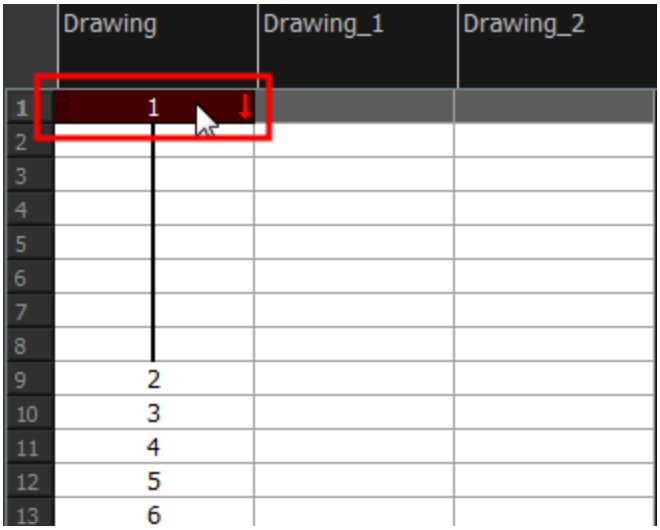
2. Do one of the following:
   - In the Xsheet's bottom right-corner, enter the number of cells over which the drawing will be exposed.
   - In the Xsheet's bottom-right corner, increase or decrease the drawing's exposure by clicking the up or down arrows.
   - Press + to increase exposure.
   - Press - to decrease exposure.



How to use the Clear Exposure and Pull feature

You can use this option to reduce a drawing's exposure.

1. In the Xsheet view, select or range of cells.



2. Do one of the following:
   - From the top menu, select **Selected > Clear Exposure and Pull**.
   - Right-click on the selected cell and select **Exposure > Clear Exposure and Pull**.
   - In the Xsheet View toolbar, click the Clear Exposure and Pull button.
3. The exposure is reduced by the selected number of cells.

Deleting Exposure

You can delete a drawing's exposure in several ways. When you delete a drawing's exposure from the Xsheet view, you are not deleting the actual drawing file. You can always retrieve it by typing its name again in a cell.

You can delete the exposure contained in a selected cell range or delete the entire exposure of a drawing exposed over several cells . Note that you can also delete the exposure for drawings contained inside a collapsed group.

How to delete selected exposures

1. In the Xsheet view, select the exposure you want to delete.
2. Do one of the following:
   - Right-click and select **Delete**.
   - Press Delete.

How to clear the entire exposure of a drawing

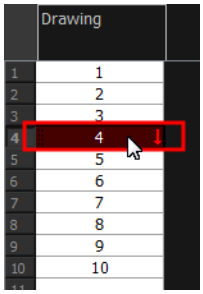
1. In the Xsheet view, select a cell of a drawing exposed over several cells.
2. In the Timeline view, right-click on the selection and select **Exposure > Clear Exposure**.
3. Do one of the following:
   - In the Xsheet View toolbar, click the Clear Exposure button (you may have to customize the toolbar to display it).

Inserting Blank Cells

You can place an empty cell between other cells. This is always done in Insert mode and pushes down existing exposure, even if you are set to Overwrite mode.

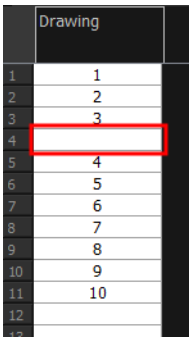
How to insert blank cells

1. In the Xsheet view, select the cell in which you want to insert a blank cell.



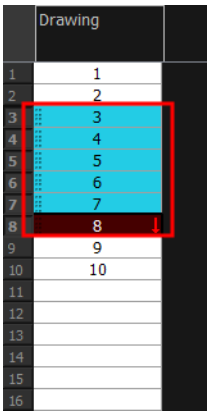
2. Do one of the following:
   - In the top menu, select **Selected > Insert Blank Cell**.
   - Right-click on the selected cell and select **Exposure > Insert Blank Cell**.
   - In the Xsheet view toolbar, click the Insert Blank Cell button (you may have to customize the toolbar to display it).
   - Press Shift + J.

   The blank cell is inserted.

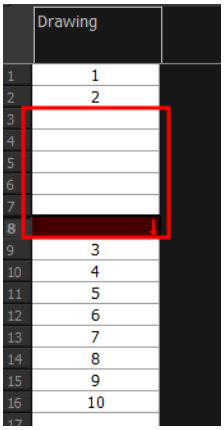


How to clear a selected cell range without changing the exposure and timing

1. In the Xsheet view, select the frame range to clear.



2. Right-click on the selected cells and select **Clear**.

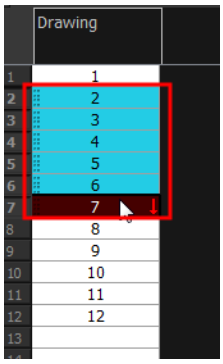


Setting the Exposure

You can easily increase or decrease the exposure for a selected cell range by using the Set Exposure options.

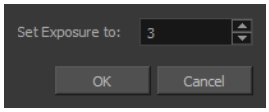
How to set the exposure

1. In the Xsheet view, select the cell range on which you want to set the exposure.



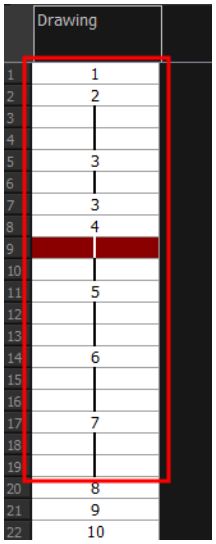
2. Do one of the following:
   - In the Xsheet view, right click and select **Exposure > Set Exposure to > Set Exposure to 1**, **2**, or **3**, or **Set Exposure**.
3. In the Xsheet view, right-click and select **Exposure > Set Exposure to > Set Exposure to 1**, **2**, or **3**, or **Set Exposure**.

   If you chose the Set Exposure option, the Set Exposure dialog box opens.



4. Type the number of frames you want the drawings to display and click **OK**.

   The new timing is displayed in the Xsheet view.

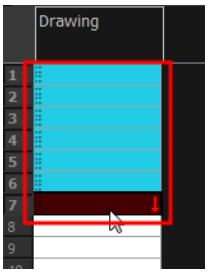


Filling a Selection with a Single Exposure

The Fill Selection option lets you fill the same value over an entire selection. The selection can be over one cell, a cell range in one column, a cell range over many columns, an entire column, or many columns. You can use numbers, words, letters, or any alphanumeric value.

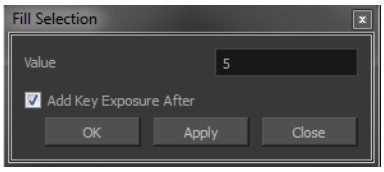
How to fill a selection with a single exposure

1. In the Xsheet view, select a cell range.

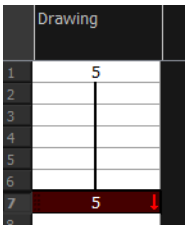


2. Do one of the following:
   - Right-click and select **Exposure > Fill Selection**.
   - Click the Fill Selection button in the Xsheet view toolbar (you may have to customize the toolbar to display it).
   - Press Ctrl + T (Windows/Linux) or ⌘ + T (Mac OS X)).

   The Fill Selection dialog box opens.



3. In the Value field, type the desired value.
4. To insert a keyframe in the frame following the last cell in the selection, select the **Add Key Exposure After** option. Otherwise, leave it deselected.
5. Click **OK**.

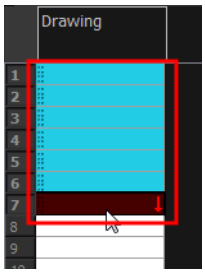


Filling a Selection with a Sequence

You can create a numbered sequence over a selection. The sequence can be forward, backward, single, double or higher increment, as a cycle, and so on. The sequence can be over one cell, a cell range in one or more columns, or one or more columns.

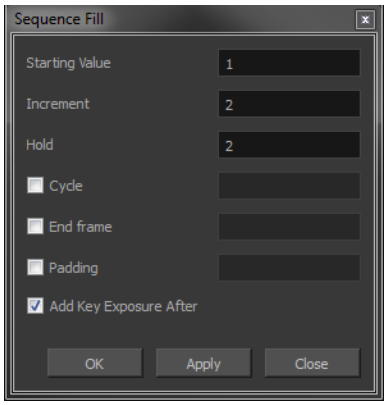
How to fill a selection with a sequence

1. In the Xsheet view, select a cell range.



2. Do one of the following:
   - From the top menu, select **Selected > Sequence Fill**.
   - In the Xsheet View toolbar, click the **Sequence Fill** button (you may have to customize the toolbar to display it).
   - Press Ctrl + M (Windows/Linux) or ⌘ + M (Mac OS X).

   The Sequence Fill dialog box opens.



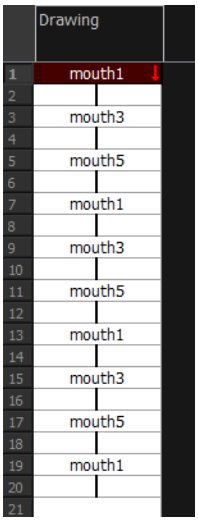
3. In the Starting Value field, type the first number in the sequence.
4. In the Increment field, type the number by which the drawing number will increase from frame to frame. For example, an increment of 1 is used in this sequence:**1–2–3–4**; this sequence increments by 2: **1–3–5–7**; and this one, by -2: **8–6–4–2**.
5. In the Hold field, select an exposure holding value.
6. Select the **Cycle** option if you want a cycle; enter the number of cells for this cycle's duration.

If you choose a two-cell hold, a cycle of three drawings will last for six cells.

7. If you selected a larger range than the amount of frames needed, select the **End Frame** option and type the last frame needed.

8. If you want to have more than one digit in your numbers such as "**001**" instead of "**1**", select the Padding option and add as many pound signs (**#**) as digits needed. In the field, you can type a letter or word to add before the drawing number.

9. To insert a keyframe in the frame following the last cell in the selection, select the **Add Key Exposure After** option. Otherwise, leave it deselected.
10. Click **OK**.

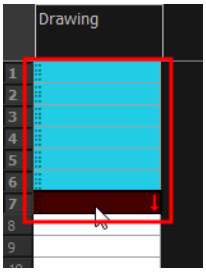


Filling a Selection Randomly

You can fill in random values over a selection. You can give a maximum and a minimum value and create a range for the system to choose the random values from. The selection can be over one cell, a cell range in one column or more, or an entire column or many entire columns.

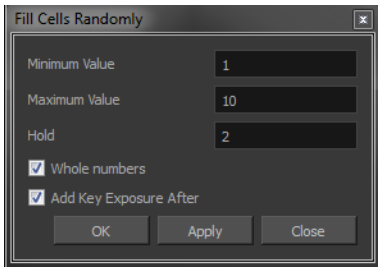
How to fill cells randomly

1. In the Xsheet view, select a cell range.

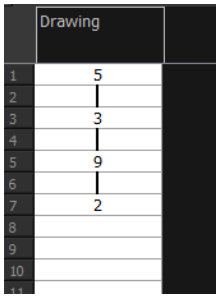


2. Do one of the following:
   - Right-click and select **Exposure > Fill Cells Randomly**.
   - In the Xsheet view, click the Fill Cells Randomly button (you may have to customize the toolbar to display it).

   The Fill Cells Randomly dialog box opens.



3. In the Minimum Value field, enter the lowest acceptable value.
4. In the Maximum Value field, enter the highest acceptable value.
5. In the **Hold** field, choose an exposure holding value.
6. If you are applying this option to a drawing column, enable the **Whole Numbers** option to avoid decimal points.
7. Click OK.



Filling Empty Cells

The Filling Empty Cells feature is used to extend the exposure of single frame drawings to fill the range of empty cells after each one.

When creating drawings on cells that are not side-by-side, the exposure of the first drawing no longer fills automatically. You need to select the frame range where you want your drawings to hold their exposure up to the next drawing and use the Fill Empty Cells command.

How to fill empty cells

1. In the Xsheet view, select a cell range.
2. Right-click and select **Exposure > Fill Empty Cells**.
3. Do one of the following:
   - Right-click and select **Exposure > Fill Empty Cells**.

   Each drawing in the selection is exposed in the range of empty cells that follow it.

Creating Cycles

Once you have entered a series of drawings and exposures, you can create cycles out of them in several ways.

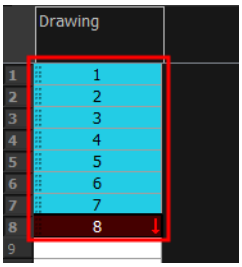
You can loop your drawings using the following commands:

- Paste Cycle
- Paste Reverse
- Create Cycle

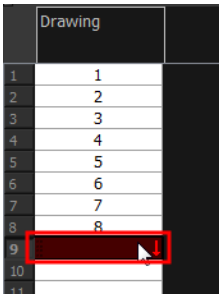
When you create a drawing cycle, all of the repeated drawings are linked to the same original files. This means that when you modify, repaint, or correct a drawing named "**1**," all drawings named "**1**" are updated simultaneously. In order to modify a drawing independently from its other exposures, you must duplicate the drawing.

How to paste a cycle

1. In the Xsheet view, select the cell range to loop.

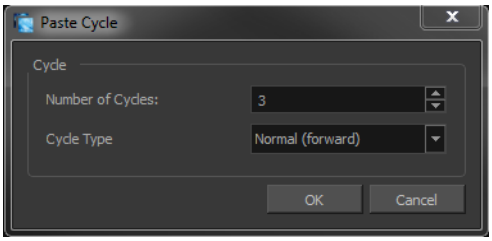


2. In the Xsheet view, select the cell where you want your cycles to start.

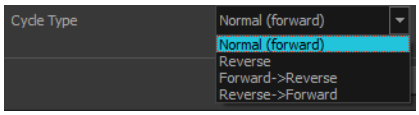


3. Do one of the following:
   - Right-click and select **Paste Cycle**.
   - Press Ctrl + / (Windows/Linux) or ⌘ + / (Mac OS X).

   The Paste Cycle dialog box opens.



4. Do one of the following:
   - In the Number of Cycles field, enter the number of cycles you want to paste.
   - Increase or decrease the number of cycles you want to paste.
5. In the Cycle Type menu, select the type of cycle you want to paste.



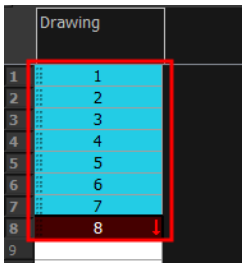
- **Normal (forward)**: Pastes cycles as for all cycles, starting with the first cell of your selection and ending with the last.
- **Reverse**: Pastes cycles in the reverse order of the original selection, starting with the last cell of your selection and ending with the first one.
- **Forward > Reverse**: Pastes the first cycle in your selection as is, then the following one in reverse order. This repeated until all cycles are pasted.
- **Reverse > Forward**: Pastes the first cycle in your selectionin reverse order, then the following one as is. This repeated until all cycles are pasted.

6. Click **OK**.

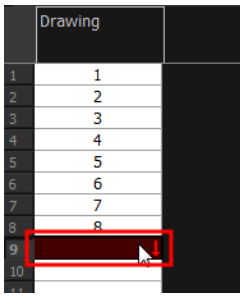
You can perform the same operation using the Paste Special dialog box. To open the Paste Special dialog box, select **Edit > Paste Special** or press Ctrl + B (Windows/Linux) or ⌘ + B (Mac OS X).

How to paste a reversed cycle

1. In the Xsheet view, select the cell range to paste in reverse order.



2. In the Xsheet view, select the cell where you want your cycles to start.



3. Do one of the following:
   - Right-click and select **Paste Reverse**.
   - Press Ctrl + . (Windows/Linux) or ⌘ + . (Mac OS X).

Managing Drawings

Drawings that are created in Toon Boom Harmony are not stored in their cells. They are actual files stored in the project's folder. If you want to rename a drawing or delete a drawing from your project, you need to edit the file and not the cells.

Throughout this chapter you might notice slight differences between your interface and the images used to demonstrate the procedure. This is because the images are taken from Harmony Stage. Xsheet is a subset of Harmony Stage.

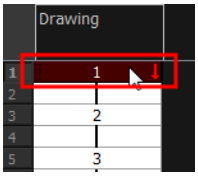
This section is divided as follows:

Renaming a Drawing

To rename a drawing, you need to select the drawing cell and use the Rename Drawing command.

How to rename a drawing

1. In the Xsheet view, select the drawing to rename.



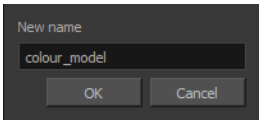
2. Do one of the following:

   - Select **Drawing > Rename Drawing**.

   In the Xsheet View toolbar, click the Rename Drawing button (you may have to customize the toolbar to display it).

   - Press Ctrl + D (Windows/Linux) or ⌘ + D (Mac OS X).

   The Rename Drawing dialog box opens.



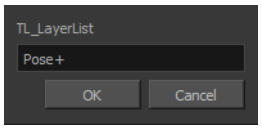
3. In the New Name field, type in the new drawing name.

How to rename a drawing sequence with a prefix

You can rename a drawing sequence with a prefix, which can be quite useful for cut-out puppet breakdown and deformation animation.

1. In the Xsheet view, select your drawing sequence. Note that you can only select a drawing range in one column or layer at the time.
2. Right-click and select **Drawings > Rename Drawing with Prefix**.

   The Rename Drawing with Prefix dialog box opens.

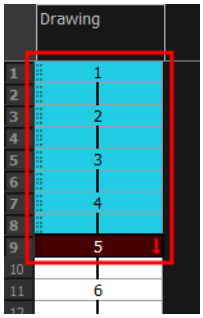


3. In the Prefix to Add field, type the prefix to add before the drawing name.

How to rename drawings by their frame position

You can rename a series of drawings relative to their frame position. This is useful in hand-drawn animation.

1. In the Xsheet view, select the drawing sequence to be renamed.



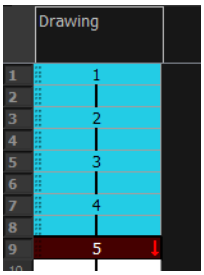
Deleting a Drawing

You can permanently delete a drawing file from a project's folder.

Deleting a drawing file is an operation that cannot be undone.

How to delete a drawing

1. In the Xsheet view, select the drawings to delete.



2. Do one of the following:
   - Right-click and select **Drawings > Delete Selected Drawings**.

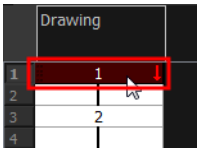
Duplicating a Drawing

If you want to modify a drawing that already exists, but keep the original drawing intact, you can duplicate the drawing and work on the copy. When duplicating a drawing, the selected cell is replaced with the new drawing. The exposure of the original drawing that was on the current cell is removed. The original drawing is not deleted from the project folder or other cells in which it is exposed.

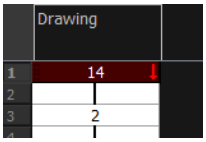
With Toon Boom Harmony you can create a keyframe at the same time as you duplicate your drawing. This way you can modify and reposition drawings without affecting the original drawing.

How to duplicate a drawing

1. In the Xsheet view, select the drawing to duplicate.



2. Do one of the following:
   - Click on the now enabled Duplicate Drawing button.
   - Right-click and select **Drawings > Duplicate Drawings**.
   - In the Xsheet view toolbar, click the Drawing > Duplicate Drawing button.
   - Press Alt + Shift + D.



Copying and Pasting Drawings

When you copy and paste a selection in the Xsheet view, you are not copying and pasting the actual drawings, you are pasting the exposure.

If you want to copy and paste the selected drawings into a different layer or paste the selection in the same layer to duplicate the drawings, you must use the Paste Special feature.

There are three methods of pasting your selected drawings with the Paste Special dialog box:

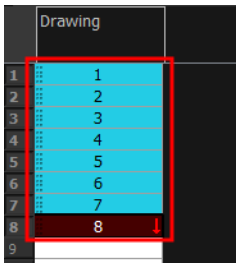
- **Never Create Drawing Files**: Pastes all of your drawings as is. If there is a drawing in a cell, it is overwritten by the pasted selection.
- **Always Create Drawings**: Pastes all of your drawings as is, unless a pasted drawing has the same name as an existing one. In this case, the pasted drawing is duplicated and renamed.
- **Only Create Drawings When They Do Not Exist**: Pastes only the drawings that are named differently from existing drawings. If a drawing has the same name as an existing one, it is ignored and not pasted. This avoids the duplication of drawings in your layers.

  This option is useful when you are pasting cut-out character templates containing drawings you may already have in your scene and some new ones. Using this option, you only paste the new drawings and are not duplicating all of the other parts you already have.

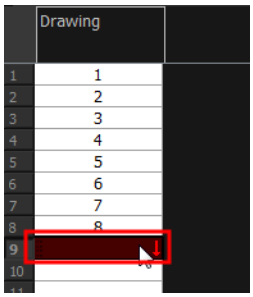
If you want to perform another Paste Special operation using the same settings you used previously, you can use the Paste Special Again command instead. You can paste your selection using the same settings as in the most recent Paste Special operation, without opening the Paste Special dialog box.

How to paste drawings with the Paste Special command

1. In the Xsheet view, select the drawings to copy and press Ctrl + C (Windows/Linux) or ⌘ + C (Mac OS X).

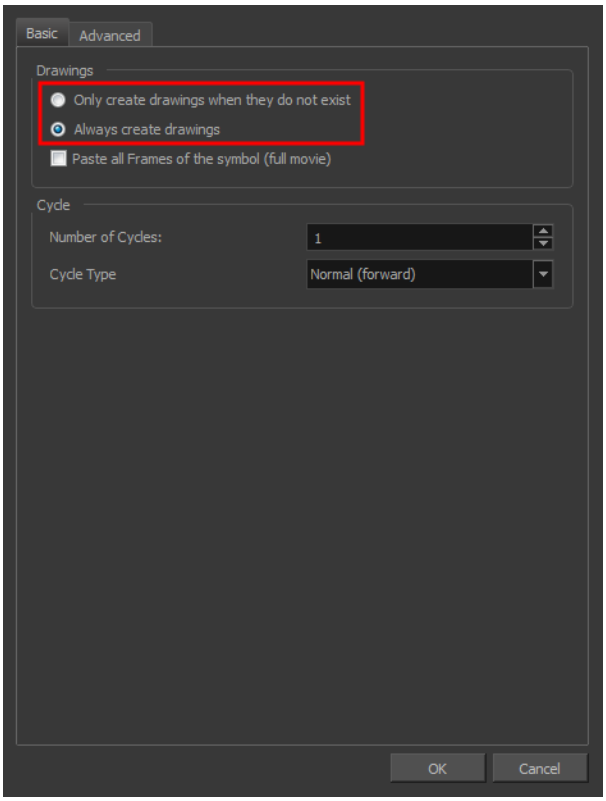


2. In the Xsheet view, select the cell where you want your pasted selection to start.



3. Do one of the following:
   - Right-click and select **Paste Special**.
   - In the Xsheet View toolbar, click the Paste Special button (you may need to customize the toolbar to display it).
   - Press Ctrl + B (Windows/Linux) or ⌘ + B (Mac OS X).

   The Paste Special dialog box opens.



4. Select the **Basic** tab.
5. In the Drawings section, select an option: **Always Create Drawings** or **Only Create Drawings When They Do Not Exist**.

How to paste new drawings with the previous Paste Special settings

1. Do one of the following:
   - Right-click and select **Paste Special Again**
   - In the Xsheet view toolbar, click the Paste Special Again button (you may have to customize the toolbar to display it).
   - Press Ctrl + Shift + B (Windows/Linux) or ⌘ + Shift + B (Mac OS X).

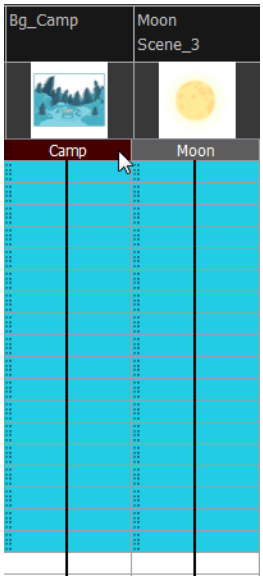
Merging Drawings

There are two methods of merging drawings.

- You can merge selected drawings in adjacent elements. The columns and layers will be left intact, and each new merged drawing will reside in the frames of the left-most column or lower layer.
- You can merge elements. All drawings will be merged. Unused columns and layers will be deleted, but the original drawing files are still accessible.

How to merge selected drawings

1. In the Xsheet view, select the drawings you want to merge.

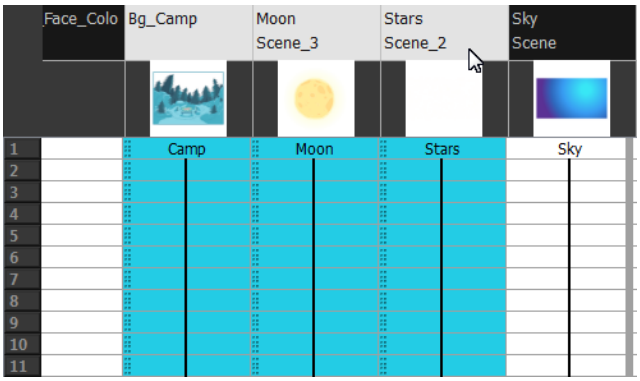


2. In the Xsheet View menu, select **Columns> Merge Selected Drawings**.

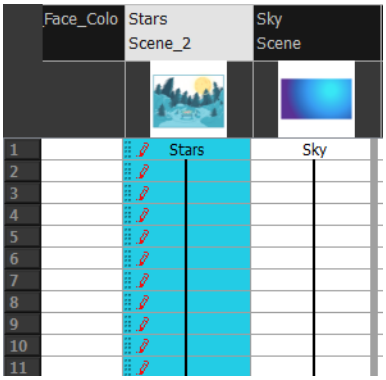
   In the Xsheet view, the right-most column will contain the merged drawings and the remaining columns will be left blank at the corresponding frames. Drawings are not deleted and are still accessible.

How to merge drawings in entirecolumns

1. In the Xsheet view, Shift-click the headers of the column you want to merge.



2. In the Xsheet view menu, select **Columns > Merge Selected Columns**.



In the Xsheet view, the right-most column will contain the merged drawings and the other columns will be deleted. Drawings are not deleted and are still accessible.

Modifying the Column Display

You can change the way a column in the Xsheet view displays. You can stay organized without changing the content of elements or your animation output.

This section is divided as follows:

- Expanding and Collapsing Columns below
- Showing and Hiding Columns on the facing page
- Modifying the Look of the Column on page 105
- Xsheet Thumbnails on page 110
- Changing the Colour of a Column on page 110
- Setting Tempo Markers on page 112

Expanding and Collapsing Columns

To simplify the look of the Xsheet view, you can expand and collapse your 3D columns.

How to collapse and expand 3D path or rotation columns in the Xsheet view

1. In the Xsheet view, select the column header of the 3D path or 3D rotation column to collapse or expand.

2. Do one of the following:
   - Right-click on the column's header and select **Expand/Collapse > Collapse Selection** or **Expand Selection**.
   - In the Xsheet View toolbar, click the Collapse Selection or Expand Selection buttons (you may have to customize the toolbar to display it).

How to collapse or expand all 3D path and 3D rotation columns in the Xsheet view

Do one of the following:

- Right-click on any column's header and select **Expand/Collapse > Expand All** or **Collapse All**.
- Press 0 and 9.
- In the Xsheet View toolbar, click the Collapse All or Expand All buttons (you may have to customize the toolbar to display it).

Showing and Hiding Columns

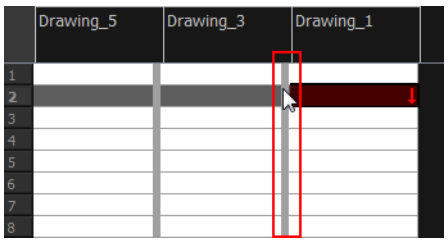
The Xsheet view has a Column List section that can display all the columns contained in the exposure sheet. It can be used to hide individual columns.

If you need to see a column after it has been hidden, you can display it directly from the Xsheet view without using the Column List section.

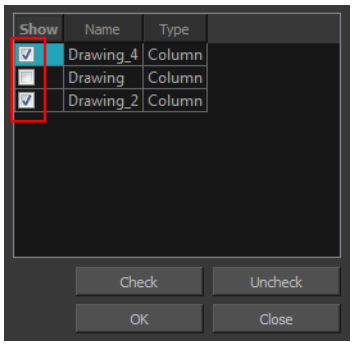
You can also hide an entire column type, such as Drawing or Sound.

How to show a hidden column in the Xsheet view

1. In the Xsheet view menu, click on the thick grey line that represents a hidden column. You can also right-click on the column header and select **Show Hidden Columns**.



The Show Hidden Columns dialog box opens.



2. In the Show column, select the hidden columns you want to display in the Xsheet view.

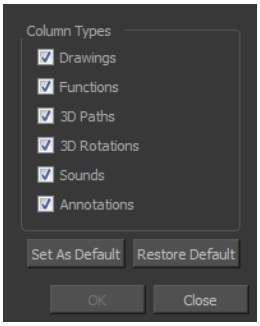
- Click **Check** to select all the selected columns.
- Click **Uncheck** to deselcted all selected columns.

How to show all columns

- In the Xsheet view menu, select **View > Unhide All Columns**.

How to show and hide column types

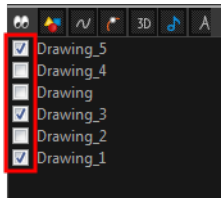
1. In the Xsheet view, select **View > Column Types Manager**.
   The Column Types dialog box opens.



2. Select the types of columns you want to display and disable the ones you want to hide.
3. Click **Set As Default** if you want to make these new settings the default ones that will be used each time to start the application.
4. Click **Restore Default** if you want to restore the settings used when installing the application.

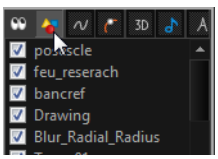
How to show or hide Xsheet columns using the Column List

5. On the right side of the Functions section, click the Expand button to display the Column List section.
6. In the Column List section, select the columns to display and deselect the columns to hide.



How to show or hide an Xsheet column type using the Column List

1. In the Column List section, click the button corresponding to the type you want to show or hide.



Column Type button	Action
	Show/Hide All Columns
	Show/Hide Drawing Columns
	Show/Hide Function Columns
	Show/Hide 3D Path Columns
	Show/Hide Sound Columns
	Show/Hide 3D Rotation Columns
	Show/Hide Annotation Columns

How to show or hide function columns on the left side of the Xsheet view

1. Right-click on a column and select **Tag > Function Columns Visible** or **Function Columns Invisible**.

Modifying the Look of the Column

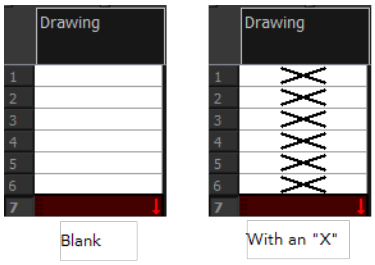
In Harmony, you can modify the way the column displays drawings, empty cells and the column width.

You can modify the following elements:

- Empty cells
- Row units
- Held exposure
- Column width

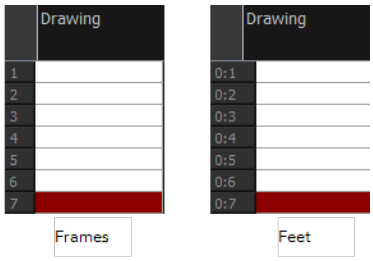
How to modify the look of empty cell

1. From the Xsheet View menu, select **View > Empty Cells > With an "X"** or **Blank**.

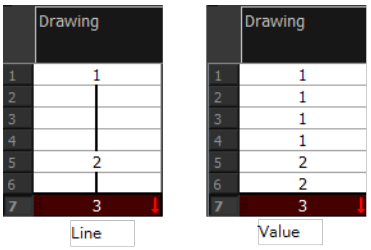


How to modify row units

1. From the Xsheet View menu, select **View > Row Units > Frames** or **Feet**.



How to modify the look of a held exposure

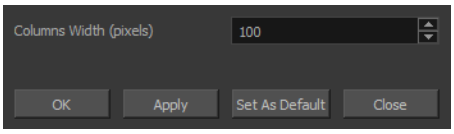


- In the Xsheet View menu, select **View > Held Exposures > Line** or **Value**.

How to modify column width

1. In the Xsheet view, select any column to modify the width.
2. From the Xsheet view menu, select **View > Set Columns Width**.

   The Xsheet Column Width dialog box opens.



3. In the Column Width field, enter the desired width in pixels.
4. To end the operation:
   - Click **OK** to validate and close the dialog box.
   - Click **Apply** to validate the operation and keep the dialog box opened to adjust the next column's width.
   - Click **Set As Default** to create all the new columns to this width.
   - Click **Close** to cancel the operation.
5. To restore all columns to the default value, in the Xsheet View menu, select **All Columns to Default Width**.

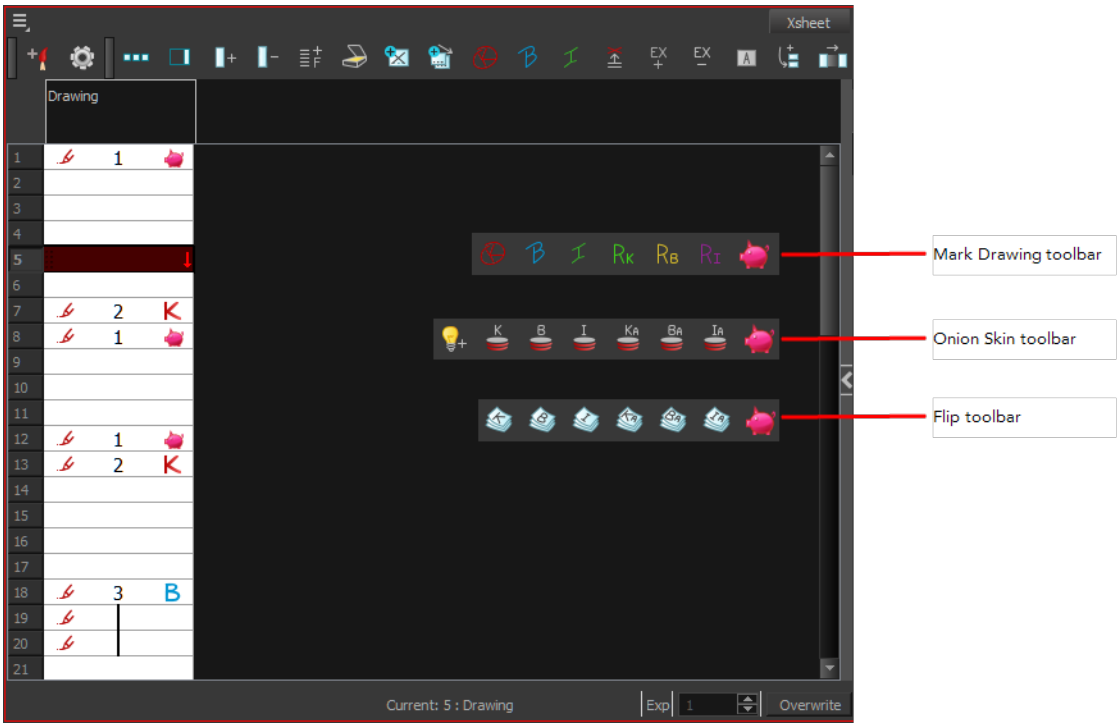
Drawing Identification

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

When working with several animators, directors, or even other studios, the necessity for retakes will often arise. Harmony also gives you the possibility to mark new drawings as either Retake Key, Retake Breakdown, or Retake Inbetweens.

If your production requires you to mark drawings with a custom marker, you also have the option to create your own.

Make custom marks for the Xsheet by creating your own icons, then cutting, pasting and changing a bit of code. Not only is it possible to have your custom mark appear in the Xsheet and Mark Drawing toolbars, but also in the Onion Skin and Flip toolbars.



You can create custom shortcuts for the Drawing Identification options in the Preferences dialog box.

How to mark a drawing as Key, Breakdown or In-between

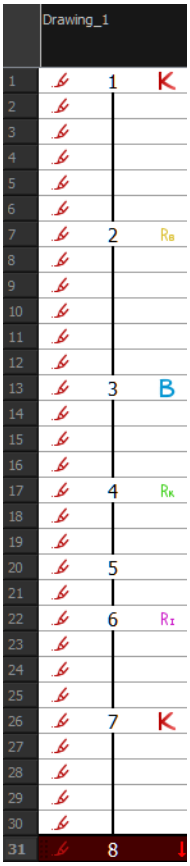
1. From the top menu, select **Windows > Toolbars > Mark Drawing.**

   The Mark Drawing toolbar displays.

2. In the Xsheet view, select the cell you want to identify. This option is not available in the Timeline view.
3. In the Mark Drawing toolbar, click one of these buttons: Mark as Key Drawing, Mark as Breakdown Drawing or Mark as In-between Drawing . In the Xsheet View menu, you can also select **Drawing > Mark Drawing As > Key Drawing**, **Breakdown Drawing**, **In-between Drawing**, **Retake Key**, **Retake BD** and **Retake IB**.
   - If you selected Mark as Key Drawing, a K icon appears in the cell.
   - If you selected Mark as Breakdown Drawing, a B icon appears in the cell.

- If you selected Mark as In-Between Drawing, there is no icon displayed in the cell since it is used to remove a Key or Breakdown marker.



How to create custom markers

1. With a bitmap editing software, create the following icons in PNG format:
   - Mark Drawing Toolbar icon (24 x 24 pixel)
   - Onion Skin Toolbar icon (24 x 24 pixel)
   - Flip Toolbar icon (24 x 24 pixel)
   - Xsheet Column icon (16 x 16 pixel)
2. Close Harmony.
3. When your icons are ready, open the Toon Boom Harmony **`drawingTypes.d`** folder.

If the **`drawingTypes.d`** folder does not exist, you must create it. To do so, copy the **`resources`** folder from the following location.

- Windows: C:/Program Files (x86)/Toon Boom Animation/Harmony 11.1/resources/drawingTypes.d
- Mac OS X: /Applications/Harmony 11.1/resources/drawingTypes.d
- Linux:

/usr/local/ToonBoomAnimation/ProductNameVersion/resources/drawingTypes.d

Stand-alone

- Windows: **C:\Users\USERNAME\AppData\Roaming\Toon Boom Animation\Toon Boom Harmony\full-1100-pref\drawingTypes.d**
- Mac OS X: **/Users/USERNAME/Library/Preferences/Toon Boom Animation/Toon Boom Harmony/full-1100-pref/drawingTypes.d**

The Library folder is usually hidden in the Finder. To see all the hidden folders and files, type the following in a terminal window:

defaults write com.apple.Finder AppleShowAllFiles YES

- Linux: **/home/USERNAME/Toon Boom Animation/Toon Boom Harmony/full-1100-pref/drawingTypes.d/**

Network

In Harmony Network, the path is global for all users so you must create the folder and place in /USA_DB.

- **/USA_DB/drawingTypes.d**

4. Paste your icons in the **drawingTypes.d** directory.
5. In the same directory, open the **drawingTypes.xml** file in a text editor.
6. For each custom icon you want to create, add the following line. Make sure to place it before this closing tag: **</DrawingTypes>**.
   - <DrawingType text="NewButtonName" pixmapFile="XsheetIcon.png" commandIcon="MarkDrawingIcon.png" flipIcon="FlipIcon.png" onionIcon="OnionIcon.png" />
7. In that line, replace the following information with your new icon information:
   - NewButtonName: Write the name of your new marker. This name will appear in the button tooltip.
   - XsheetIcon.png: Write the name of the icon that you created to appear in the Xsheet column. Include the file extension.
   - MarkDrawingIcon.png: Write the name of the icon that you created to appear in the Mark Drawing toolbar. Include the file extension.
   - FlipIcon.png: Write the name of the icon that you created to appear in the Flip toolbar. Include the file extension.
   - OnionIcon.png: Write the name of the icon that you created to appear in the Onion Skin toolbar. Include the file extension.
8. Save the file and close it.
9. Start Harmony.

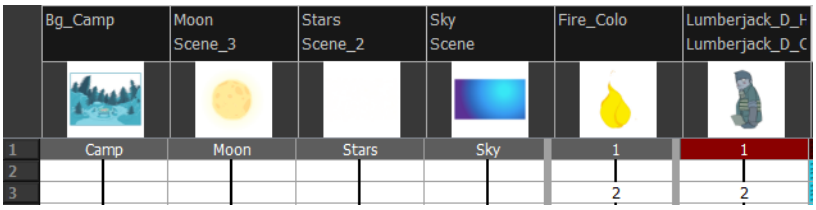
Xsheet Thumbnails

When there are a large number of columns in the exposure sheet, it is not always easy to quickly identify a particular column. Displaying the column thumbnails makes this easier. This option displays a small thumbnail picture of the current frame below the column header.

How to display the thumbnails

1. Do one of the following:
   - In the top menu, select **View > Show Thumbnails**.
   - In the Xsheet view, click the Show Thumbnails button.

   The thumbnails appear.

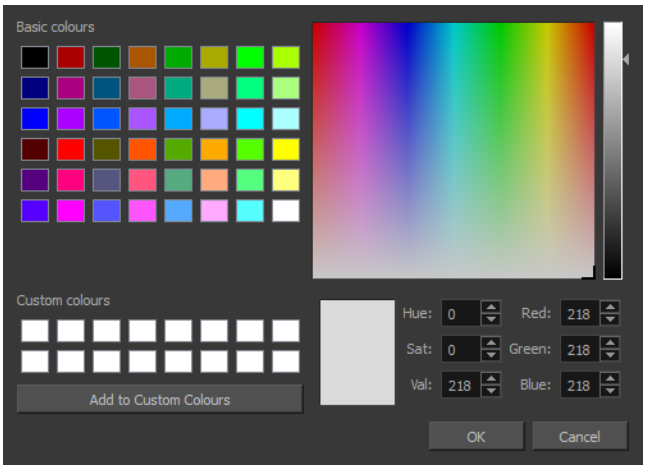


Changing the Colour of a Column

To easily identify elements in the Xsheet view, you can change the colour of columns.

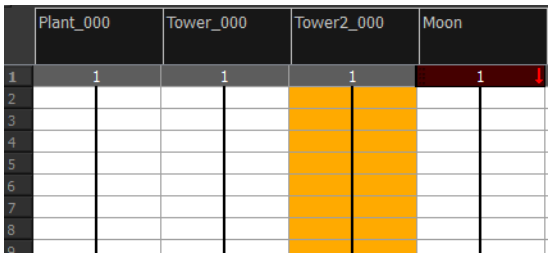
How to change a column's colour in the Xsheet view

1. In the Xsheet view, select one or more columns to modify.
2. Right-click on the column's header and select **Colour > Change Columns Colour**.
3. In the Select Colour dialog box, select a new colour for your columns.



4. Click **OK**.

   The column's colour is updated. The corresponding column colour is also updated.

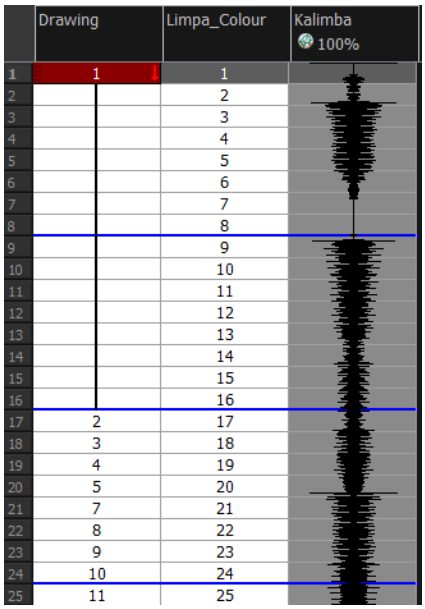


How to reset the column's colour in the Xsheet view

1. In the Xsheet view, select the columns to reset.
2. Right-click on the column's header and select **Colour > Default Columns Colour**.

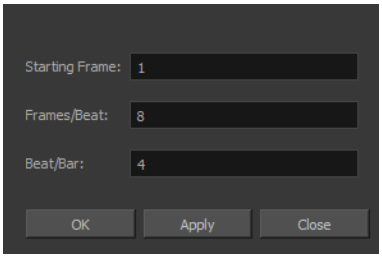
Setting Tempo Markers

Tempo markers are used to synchronize your animation with a musical score. This lets you reproduce the FPB (Frames Per Beat) and use the tempo signature as tempo markers. The Xsheet view allows you to pace your animation according to the tempo or beat of the soundtrack music or to any rhythmic sound, such as the ticking of a clock or water leaking from a spout.



How to set the tempo markers

1. In the sound column, right-click and select **View > Set Tempo Marker**.
   The Tempo Marker dialog box opens.



2. Reproduce the tempo and beat value of your music or sound for the Xsheet view marker display.
   - **Starting Frame**: Enter the number of the frame where you want the tempo markers to begin.
   - **Frames/Beat**: Set the frames per beat value. This will determine the frequency (in frames) in which a beat marker will appear. Keep in mind that, by default, 24 frames represent 1 second.
   - **Beat/Bar**: Set the tempo of your music or sound. This will determine the frequency (in beats) in which a tempo marker will appear in the Xsheet view.
3. Click **OK**.

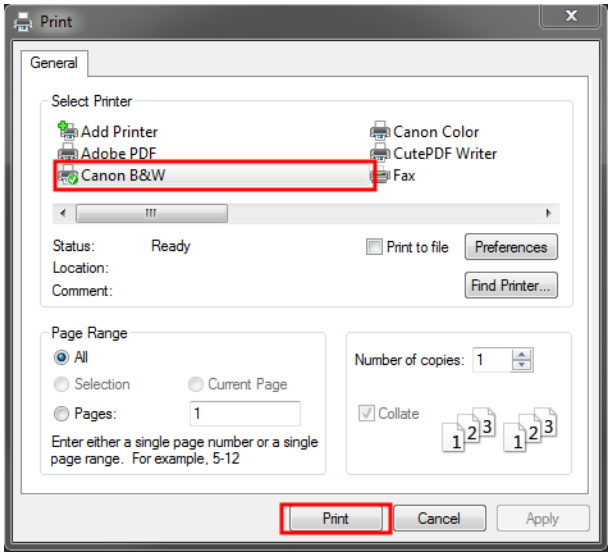
Printing the Xsheet

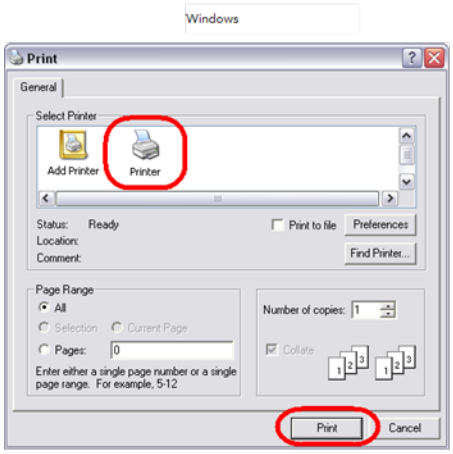
Once you have marked all the information, corrections, and timing you want in the Xsheet view, you can print your exposure sheet. Printing the Xsheet allows you to take it with you to your animation table or give a copy to the animator. You can also use it to create your Xsheet skeleton directly in Harmony.

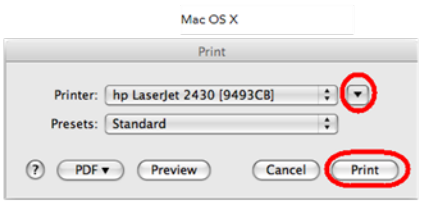
How to print your exposure sheet

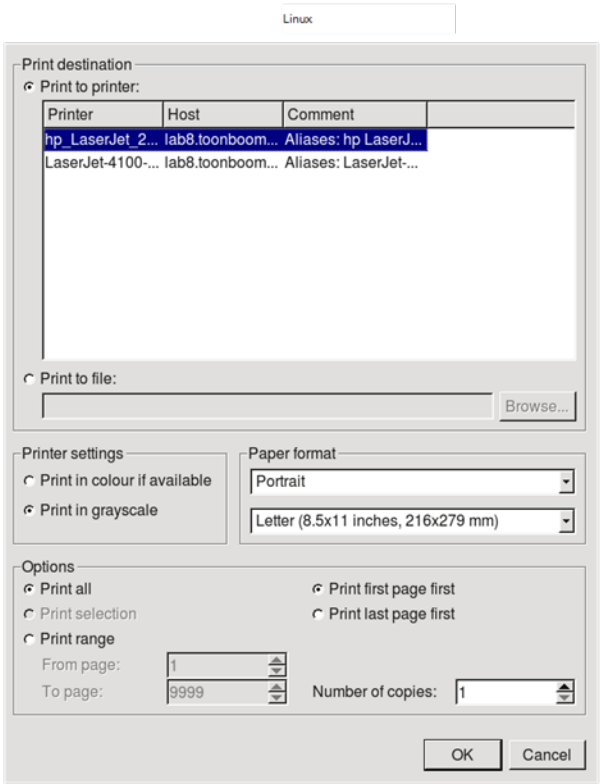
1. Select **File > Print > Xsheet**.

   The Print dialog box opens.





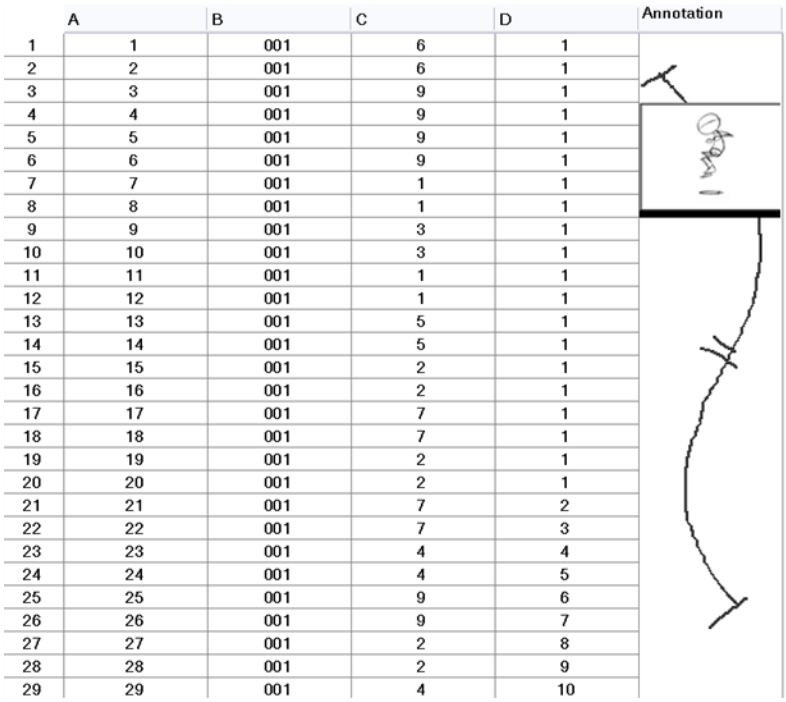




2. To set up your print:
   - **Windows**: In the Select Printer section, select your printer and adjust the rest of the printing settings.
   - **Linux**: In the Print Destination section, select your printer and adjust the rest of the printing settings.
   - **Mac OS X**: In the Printer section, select your printer and adjust the rest of the settings by clicking on the Parameters button. You can also click **PDF** and select an option from the menu if you want to save a PDF version of your exposure sheet.

Refer to your printer user guide to learn more about its options.

3. Do one of the following:
   - **Windows** and **Mac OS X**: Click **Print**.
   - **Linux**: Click **OK**.



	A	B	C	D	Annotation
1	1	001	6	1	
2	2	001	6	1	
3	3	001	9	1	
4	4	001	9	1	
5	5	001	9	1	
6	6	001	9	1	
7	7	001	1	1	
8	8	001	1	1	
9	9	001	3	1	
10	10	001	3	1	
11	11	001	1	1	
12	12	001	1	1	
13	13	001	5	1	
14	14	001	5	1	
15	15	001	2	1	
16	16	001	2	1	
17	17	001	7	1	
18	18	001	7	1	
19	19	001	2	1	
20	20	001	2	1	
21	21	001	7	2	
22	22	001	7	3	
23	23	001	4	4	
24	24	001	4	5	
25	25	001	9	6	
26	26	001	9	7	
27	27	001	2	8	
28	28	001	2	9	
29	29	001	4	10	

Glossary

alpha channel	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.
animatic	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.
animation	A simulation of movement created by displaying a series of pictures or frames.
anime	An animation style known for its sinister and dark feel; popular in Japan.
arc	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.
aspect ratio	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.
auto-feed	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.
automatic lip-sync detection	Automatically mapping drawings in an element to the mouth chart generated for a sound. This can save time when lip-syncing a voice track.
axis	An imaginary line around which an object rotates. For 2D graphics, there are two axes: • X: Horizontal • Y: Vertical For 3D graphics, there are three axes: • X: Horizontal • Y: Vertical • Z: Depth
background	The part of a scene that is farthest to the rear. The background is the artwork, or decor, against which the animation takes place.
Bézier	A method of defining curved lines invented by French

	mathematician Pierre Bézier. A Bézier curve is a mathematical or parametric curve. Bézier curves use at least three points to define a curve. 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.
bitmap	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*.
breakdown	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. 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.
camera shake	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.
caption	In a storyboard, a caption is a text field containing dialogue, effects, sound, or slugging information.
cel	In traditional animation, a cel, also known as a *celluloid*, 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. 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.
character design	Each character in an animated film is drawn from multiple angles in poster-style format, called a *model sheet*, which serves as a reference for the animators.
clean up	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.
CMYK	Cyan, Magenta, Yellow, Black. Refers to the process used by printers to define colour on the printed page.
colour card	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.

colour model	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.
colour wheel	A display of the colour spectrum in the form of a circle.
compositing	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.
cross dissolve	An effect used to fade two scenes, one into the other.
cut	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.
cut-out animation	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.
cycle	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.
dialogue	The text spoken by a character in a movie or animation.
dope sheet	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 *exposure sheet* or *Xsheet*.
doping	To assig a particular drawing to a range of frames.
DPI	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 *pixels per inch*. Either way, the dot is the smallest discrete element making up the image.
ease/velocity	In animation, the ease, also known as *velocity*, 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.
ease-in	Gradual acceleration in the action. Another common term for ease-in is slow-in.
ease-out	Gradual deceleration in the action. Another common term for ease-out is slow-out.
establishing shot	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.
exposure	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.
exposure sheet (Xsheet)	The exposure sheet or Xsheet, is a sheet with several vertical columns and horizontal frames used to indicate a scene's timing. 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. 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*.
fade in/fade out	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.
fast-in	Dramatic acceleration at the start of the action.
fast-out	Dramatic acceleration at the end of the action.
field	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.
field chart	A guide containing all the field units that animation and layout artists use to determine a scene size or camera motion.
film-1.33	Use this resolution setting for the widescreen film format that conforms to the standard 4:3 pixel aspect ratio.
film-1.66	Use this resolution setting for the widescreen film format that conforms to the 16:9 pixel aspect ratio. (The pixels are wider than they are high).
flipping	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.
follow-through	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.
forward kinematics	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.
frame	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.
frame rate	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. Frame rate is most often expressed in frames per second (FPS) and in progressive-scan monitors as hertz (Hz). 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
functions	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.
gamut	The range of colours that a particular device can represent.
HDTV	High Definition Television delivers a higher quality image than standard television does because it has a greater number of lines of resolution. To take advantage of the superior quality and make full use of your resolution setting, your output device must be compatible with HDTV technology.
hold	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.
HSV	Hue, Saturation, Value. A method of defining colours in terms of hue (tint), saturation (shade) and value (tone or luminance).
in-between	The drawings that exist between the key poses. These are drawn to create fluid transitions between poses.
ink and paint	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.
interpolation	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.
jump cut	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.

key pose	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.
keyboard shortcuts	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. 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.
keyframe	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.
layer	In animation, a layer is an individual column, level or character. A scene's layers are superposed to form the final image.
layout	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.
layout and posing	The action of putting on model, that is, at the right scale, the storyboard for the animator to start his work.
library	A library is a storage area containing templates and assets that can be reused in any project or scenes.
light table	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.
line of action	Direction that the action will follow. Also known as the Path of Action
lip-sync	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.
low resolution	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.

manual lip-sync detection	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.
master palette	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.
model/colour model	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.
motion keyframe	In Toon Boom, the motion keyframe is a keyframe with computer-generated interpolation.
mouth chart	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).
multiplane	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.
NTSC	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.
nudge	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.
onion skin	A feature that lets you see the previous and next drawings of a sequence.
overlay	A part of the scene environment, such as a chair or a bush, that is placed in front of the main animation.
PAL	A resolution that works best with the European format for television and computer screens, as the rectangular pixels are displayed at a different orientation.
palette/master palette	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.

palette style	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.
pan	To move the camera across the scene in any direction.
panel	In a storyboard, a panel is a frame in a shot. A shot can be composed of one or several panels.
paperless animation/tradigital	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.
passing position	When drawing a walk sequence for a character, the passing position is the point at which one leg passes the other.
path of action	Direction that the action will follow. Also known as the Line of Action.
peg	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.
phoneme	Unit of sound in a language.
pivot	A pivot is the point around which a peg or a drawing rotates.
pixel	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.
pose-to-pose animation	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.
rendering	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.
resolution	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.
RGB	Red, Green, Blue: method of defining colour by specifying amounts

	of these three colour components.
rigging	The rigging process is the action of attaching the cut-out puppet parts one to the other.
rotary table	The Rotary Table is equivalent to the animation disk/table and allows one to rotate the workspace to be more comfortable while drawing.
rotoscoping	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.
roughs	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.
safey area	In animation and movie parlance, the safey 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 safey area ensures that the scene's main action will remain clearly visible once the film is screened on television.
scene	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.
script	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.
sequence	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.
shot	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.
slow-in	Gradual acceleration in the action. Another common term for slow-in is ease-in.
slow-out	Gradual deceleration in the action. Another common term for slow-out is ease-out.
slugging	In Storyboard Pro, slugging refers to indicating the start and stop times of dialogue and relevant actions.
sound scrubbing	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.
stop-motion keyframe	A stop-motion keyframe is a keyframe with no computer generated interpolation.
storyboard	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.
straight-ahead	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.
strokes	Strokes are invisible vector lines forming the drawing zones. They can be adjusted with Bézier handles.
tablet/pen	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.
template	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.
thumbnails	A thumbnail is a very small image used as a reference or indicator.
timecode	Timecode is timing information printed on a movie clip to indicate what scene, hour, minute and second is currently displayed on the screen.
timeline	The timeline is a horizontal representation of the scene`s elements, timing and keyframes.
trace and paint	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.
track breakdown	The soundtrack for animated film is broken down into individual sounds documenting the precise frame-by-frame position of each sound.
traditional animation	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.
trajectory	A computer generated path or trajectory that elements can follow. The trajectory can be controlled by control points, keyframes and velocity.
transition	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.
underlay	In animation, an underlay is a specific part of the decor placed behind the main animation.
aspect ratio	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.

vector	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.
velocity/ease	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.
walk cycle	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.
workspace	In Toon Boom, the workspace is made up of the views, toolbars, and menus.
Xsheet (exposure sheet)	The Xsheet or exposure sheet, is a sheet with several vertical columns and horizontal frames used to indicate a scene's timing. 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. 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.
zone	An area which can be painted with colour.

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