

# Studio Artist<sup>TM</sup>

Graphics Synthesizer

from

Synthetik

Version 1.1

## User's Guide

This User's Guide is the official reference for Studio Artist 1.1.

Studio Artist User's Guide by John Dalton with assistance by Candice Pacheco and Tom Dimuzio.

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## Welcome to Synthetik Studio Artist!

As a new Studio Artist user, we just wanted to take a few minutes to welcome you to the Synthetik user base and tell you a little about our company. Synthetik's mission is to develop innovative software tools for computer artists and creative professionals.

We're trying to tread new ground and create tools that are unique, ground breaking, and different from existing software for computer artists. Unlike many companies that have abandoned computer art to focus on graphics business applications, our primary focus is to help expand your range of artistic and creative possibilities.

Studio Artist is unique in several different ways. First, it takes many work metaphors that have existed in the computer music and audio world and incorporates them into a painting and image processing program.

Musicians have used audio synthesizers for many years to generate complex sounds and arrangements. Studio Artist can be thought of as a graphics synthesizer. An individual can generate an unlimited number of graphics patches. These patches can be anything from a paint brush or paint type to complex graphical processes that can emulate traditional graphics arts techniques or produce a totally new visual look.

The factory patches shipped with the program barely scratch the surface of the potential possible visual looks and artistic manipulations that can be created within the program. The immense flexibility of the program also allows artists to create their own art tools or processes with unique visual looks based on their own personal tastes. For example, if you don't like our watercolor brushes, you can make your own.

Synthetik is also unique among many companies in that we are dedicated to creating software that is affordable by individuals. Artist contains some features that are currently only available in software costing thousands of dollars. We feel that the most compelling work is created by individuals. That's why we've brought you features that you would have to spend thousands of dollars to get in other software packages as well as additional features unavailable before at any price.

For many years we've been interested in the relationship between artistic representation and how our brains internally represent visual images that we see in the world. Studio Artist is the first commercial program for computer artists that incorporates research results from cognitive neuroscience investigations into the nature of visual perception in the brain. What this allows us to do is

to provide intelligent assisted drawing.

What does this mean for you as a user of the program? Artist understands something about how drawings are made and perceived. If you don't know how to draw, Studio Artist can help you by drawing for you. You can work to direct its activity at a much higher level than drawing individual lines.

But wait you say, I already know how to draw. That's OK, because you can still use Intelligent-Assisted™ drawing to help you with repetitive or complex drawing tasks, or to create new visual looks. In addition to being a creative tool, this feature can also help you reduce the use of repetitive mouse or pen movements that can lead to problems like carpal tunnel syndrome. Try out the auto crosshatching and you may never do it manually again.

We're extremely interested in getting feedback from users about what they like, don't like, would like to see added or done differently, etc. You can have the unique opportunity to see your feature suggestions quickly incorporated into the program. Don't hesitate to become a part of the design process.

Feel free to contact us via email at [admin@synthetik.com](mailto:admin@synthetik.com).

We look forward to hearing from you!



# Chapter 1: Getting Started

**Studio Artist is a smart painting, drawing and video processing program which includes:**

Unlimited User Editable Natural to Out-of-this-World Paints

Intelligent-Assisted Painting and Drawing

Resolution Independent Raster Painting with Vector Editing

A Complete Image Processing Effects Suite

Auto Rotoscoping and Video Effects Processing

Real-time Warping

Dynamic Kaleidoscope and Symmetry Effects

Full use of the Advanced Features of Wacom's Intuos Graphics Tablets

Unique Interactive Magic Wand Region Selection

Record, Edit and Playback of Paint Action Sequences

Unlimited Keyframe Paint Animation

Morphing

## **The World's First Graphics Synthesizer**

Musicians have used music synthesizers for many years. **Studio Artist** takes metaphors from music synthesis and applies those metaphors to interactive painting, graphics and photo manipulation.

Unlike other paint programs with a small number of editable parameters, Studio Artist's Graphics Synthesizer module has literally hundreds of editable controls. This kind of control enables Studio Artist to produce unlimited lush dynamic and complex paints while allowing for the randomness or happy accidents of real art materials. But realistic oil, chalk, watercolor or wet paints are only a part of the picture. Studio Artist travels way beyond the world of natural media and into the realm of **Wow!** Watch paint brushes interact with a virtual canvas to create truly unique paintings, drawings and processed video.

## **Intelligent-Assisted drawing**

Studio Artist can automatically paint and draw based on built-in intelligent visual perception modules. A touch of a button can start Artist's Paint Actions. Studio Artist examines the source image, then automatically draws or paints it in the style of the user's choosing.

The user can choose to interactively navigate through the creative process with Studio Artist or let Artist do all the work. Whatever the user's skill, Artist can Intelligently-Assist in achieving a much greater level of expression.

## **The complexity of Raster paint with the editability of Vector paths**

Studio Artist uses a unique hybrid graphics model that combines the complexity and richness of Raster paint with the editability of Vector paths. Drawings and paintings can be edited using Bezier curves after the fact. Paintings can be designed at low resolution and then rerendered at higher resolution with added detail.

## **Extensive Interactivity**

Artist takes full advantage of all of the advanced features of the awesome Wacom Intuos Graphics Tablets. Go wild! The user can interactively modulate hundreds of paint parameters in real time using



Wacom's pressure sensitive pens, air brush tools, 4D mouse, tilt and pressure modulation. Watch delicious tilt and pressure sensitive wet paints magically flow over the canvas.

## **Auto Rotoscoping**

Studio Artist can autopaint or rotoscope QuickTime video frame by frame automatically. Design a series of paint and image processing operations and then let Artist automatically generate a hand-painted and/or processed video sequence.

## **Vector-based warping and morphing**

Design vector-based unlimited keyframe image warps, morphs, or video feedback effects that can be saved as QuickTime moves. Warp, stretch, and mutilate images in real time using a pressure sensitive pen or mouse.

## **Image Processing**

Studio Artist has a full range of image processing filters and unique visual effects. Custom art processes can be designed that combine paint operations and image processing filters as Paint Action sequences.

---

## **Overview**

Studio Artist is based around the metaphor of a graphics synthesizer. A user can construct graphical patches that allow for an unlimited number of potential visual looks. This overview will help you understand the structure of the program so that you can quickly start modifying preset patches as well as create your own.

First, some terminology. Most of the screen real estate is taken up by the working Canvas, located on the right hand side of the main Studio

Artist window. The “**Canvas**” is the image you are painting, editing, manipulating, etc. The “**Source**” is located in the top left corner of the screen, and is the source of the visual attributes used by the program for intelligent-assisted drawing.

What is a visual attribute? Studio Artist understands visual representation of images, and is always trying to use this information to aid in drawing or painting. We call this Intelligent-Assisted™ drawing, and the results may be subtle or “in-your-face” depending on the current paint settings of the program.

Unlike other painting programs, there is always a Source as well as a Canvas in Studio Artist. The Source is responsible for much of the visual complexity of the resulting painted images. This is much more complex than what has traditionally been called cloning in other programs, and the uses of the Source are consequently much more varied than these other programs.

“But I hate representational painting,” you may say. “Why do I have to choose a Source.” The answer is that you don’t have to choose a representational image. You might choose your source for it’s textures, colors, or some other desired visual attribute. Or, you can ignore the Source and manually control all aspects of color selection and drawing as desired.

The program has a number of categories of modal interaction with the paint canvas. These categories of interaction are referred to as **Operations**. Interaction may be through an automatic “**Action**”, or one or more interactive “**Mouse Modes**”. The user can choose the desired type of interaction (Category and associated Mouse Modes) with popups located directly below the source image in the top left corner of the interface.

Users can navigate through a hierarchy of control panes to edit parameters associated with the current Operation. Individual parameter panes are accessed by using text popups associated with each pane. A complete collection of parameters is called a Patch.

All of the nested control panes can also be accessed directly via the

**Operation** menu located in the main menu bar.

Control panels are associated with the following types of modal interaction or Operation categories:

### **Paint Synthesizer**

Allows a user to edit parameters associated with painting or interactive drawing. Painting can be user directed via a mouse or pressure sensitive tablet, or automatic through Intelligent-Assisted™ drawing, or a hybrid combination of the two techniques. There are a large number of editable and modulatable parameters that control the look and feel of the paint.

All interactive painting can be edited with vector paths and then redrawn as Raster paint. Painting actions can also be recorded as a History Sequence and later rerendered at different resolutions.

### **Presets**

Allows a user to access Presets. Presets are a pre-edited set of paint parameters. There are three types of presets.

A “**Paint Patch**” is a complete set of Paint Synthesizer parameters. Think of each Paint Patch as a unique paint tool.

A “**Paint Action Sequence**” is a series of Actions that can include things like auto-painting, image processing operations, interactive warps, layer transformations, etc.

A “**Workspace**” is a collection of all of the Studio Artist parameter memories as well as additional information about window locations and configuration. The parameter memories recorded in a Workspace include the current Paint, Paint Preset, Paint Action Preset, Color, and Bezier memories. Importing and Exporting Workspaces allows you to switch between sets of these memories, which you can configure for different tasks.

### **Image Operations**

Allows a user to perform a large number of different image processing operations on the paint canvas. Each image processing operation also

includes extensive compositing options which can be used to dramatically change the operation's resulting visual effect. Iterative or repetitive operations can also be defined.

### **Bezier Drawing and Editing**

Allows the user to draw and edit Bezier paths. All interactive Raster drawing operations within Studio Artist can be recorded as Bezier paths for later Vector editing. The edited vector paths can then be redrawn with Raster Paint.

Bezier paths can be generated on the fly from the Canvas or Source Images. Collections of Bezier paths can be used to define path drawing in the Paint Synthesizer. Bezier paths can also be recorded as keyframes for subsequent animation over time using the Keyframe Timeline.

### **Region Selection**

Allows the user to interactively define area selection regions based on image or canvas visual attributes, or by hand painting a mask. These regions can be used for masking of other Actions within the program, or for Paint Fill Actions.

### **Interactive Warp**

Allows the user to dynamically warp, flip, move, or rotate the canvas image in a variety of different ways.

### **Timeline Animation**

Allows for keyframe paint animation or warping or morphing based on editable Bezier paths. Animation can be output frame by frame as a QuickTime movie. Separate sets of animation keyframes can be associated with each Canvas Layer.

All modal Operations can be performed on a static Canvas with unlimited Layers, or on the individual frames of a QuickTime movie. Movies can be loaded into RAM for uncompressed editing and playback.

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## System Requirements

- Power Macintosh with 32 MB of RAM or more
- System version must be 8.0 or higher.
- QuickTime 3.0 or higher.

### Note:

You should adjust Studio Artist's memory allocation (via the Get Info dialog in the Macintosh Finder). Select the **Studio Artist 1.0** application icon in the Finder and use the "**File : Get Info...**" menu command. Depending on the amount of memory in your Macintosh, you may need to adjust the factory default memory allocation.

The more memory you can allocate to Studio Artist, the better. This is particularly true if you plan to work with uncompressed RAM movies, which are very memory intensive. The maximum size of Studio Artist's working Canvas will also depend on the amount of memory you allocate to the application.

Synthetik does not recommend using virtual memory with Studio Artist. We recommend that you turn off virtual memory in the Memory Control Panel, accessed via the Control Panels menu in the Apple main menu.

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## Navigating the Modal Operations and their Control Panes

At it's highest level, the program has a number of categories of modal interaction with the Canvas. The desired type of modal interaction or Operation and it's associated control parameter panes are accessed with popups located directly below the Source Image in the top left corner of the interface.

Users can navigate through a nested hierarchy of control panes to edit parameters associated with the current Operation. Individual parameter panes are accessed by using text popups associated with each pane.

Studio Artist provides shortcuts via the **Operation** menu to access the various control panes associated with the different modal operations. For example, choosing “**Region Selection:Lasso**” from the **Operation** main menu would immediately switch the control pane to **Region Selection** and allow **Lasso** selection via the mouse in the main Canvas.

---

## Studio Artist Windows

Studio Artist is primarily designed around one main control and drawing window. Auxiliary functions primarily associated with lists of actions or layers that interact with the main controls are accessed from several floating windows.

You can choose in the “**File : Preferences...**” menu command dialog to split off the control surfaces from the main Studio Artist window as two additional floating control windows. This may be desirable for users with more than one monitor. The two control windows will automatically split to separate floating windows if you have an older 640 x 480 color monitor.

## Main Drawing and Editing Window

Most of the editing and drawing is performed within the main Studio Artist window. Control strips run along the left side and the top of the main Studio Artist window. The working Canvas takes up most of the right hand side of the screen.

### Source Area

The top left corner of the main Studio Artist window is the Source area. A small representation of the Source Image is displayed there.

The source display can be switched from the **Source Image** to **Source Color**, which allows for user specification of color from a color picker. When the Source Image is active, the initial paint color source is cloned directly from the Source Image. When the Source Color picker is active, the initial paint color source is the user selected picker color.

Several memory icons are also next to the source display. Memory icons are used throughout the Studio Artist interface to provide easy storage and playback of any editable parameters. Memory icons always work the same way. You Option-click them to record new parameters into the memory, you click them to play back the recorded parameters into the working controls.

The colored squares are color memories, and can be used to store and switch between paint colors while working. The three rows of four memory icons store Paint Synthesizer patch parameters. The first row of four Patch Memories stores paint Synthesizer parameters associated with Paths. The second row of four Patch Memories stores Paint Synthesizer parameters associated with Paint and the Paint Brush. The bottom row of four Paint Memories stores complete Paint Synthesizer Patches.

These Paint Synthesizer Patch memories can be used to store favorite Paint Synthesizer settings for easy access while working, or as working buffers while editing Paint Patches to store your intermediate editing work, or to easily compare different Patches or Patch edits on the fly.

## Operation Control Area

Below the Source Area on the left side of the main Studio Artist window is the Operation control area. A hierarchical series of Operation control panes with sets of individually editable parameters can be navigated by popup controls. Individual control panes can also be accessed directly by using the Operation main menu.

Each control parameter is edited via a collection of interactive controls. Numerical parameters can be edited with slider controls or their associated text edit fields. Non-numeric parameters can be edited with

popups or checkboxes.

## **Working Canvas**

The working Canvas takes up most of the main Studio Artist window. This is where you interactively paint with a mouse or pressure sensitive pen or airbrush tool. The Canvas is where the various Operation Actions are performed. All of Studio Artist's visual editing and art creation takes place in the Canvas.

## **Canvas Control Strips**

Two horizontal control strips reside above the working Canvas on the right side of the main window. The top control strip contains a popup to control masking with the current region selection. It also contains controls to work with RAM movies loaded into the Canvas. These movie transport controls will be inactive until a movie is loaded.

The second horizontal control surface contains popups to change the current Mouse Mode for a particular modal Operation, and a popup to change the Canvas Background. Two eraser buttons are to the left of the Background popup. The first erase button to the left replaces the current Canvas with the specified Background. The second erase button is a complete eraser. It erases the current Canvas to the specified Background, erases any Bezier paths in the current path buffer, and erases the Blanking frame, which is a hidden frame buffer used by the Paint Synthesizer to keep track of where you have previously drawn, or for certain special visual effects.

The plus and minus buttons directly above the Canvas vertical slider bar are used to zoom the current view in or out of the Canvas. The numeric indicator directly to the left of these two zoom buttons indicates the current zoom ratio. A display of 1 means a 1:1 view ratio (ie. no magnification). A display of 2 means a 2:1 magnification. A display of 1/2 means the view is 1/2 the size of the actual Canvas.

There are also four Bezier path memories located in the Canvas Control Strip. These memories can be used to record and playback of



complete sets of Bezier paths. The contents of these memories can also be accessed by the Paint Synthesizer to define various autopath generation operations. Like all memories in Studio Artist, you Option-click to record the current Bezier path frame into the memory and click to replace the current Bezier path frame with the contents of the memory.

For example, a Bezier path cross hatch pattern composed of several vector paths could be recorded into one of the Bezier path memories. A Paint Synthesizer patch could then be built that would use the recorded vector crosshatch paths as a source for interactive drawing under the control of the mouse or pen.

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## Installing Studio Artist on your Hard Disk

Although you can run Studio Artist directly from the CD-Rom, you should install it on your hard disk for maximum performance and utility.

1. Drag the Synthetik Studio Artist 1.1 folder from the CD-Rom onto your hard disk. This will copy the Studio Artist application as well as the various Preset folders that need to reside next to the application.

Studio Artist looks for paint presets in a 'Preset' folder located next to the application. Studio Artist looks for Paint Action Sequence Presets in the 'PASEq' folder located next to the application. Studio Artist looks for Workspace presets in the 'Workspace' folder located next to the application. Studio Artist looks for image brushes and movie brushes associated with Presets in the 'Brush' folder located next to the application.

2. Studio Artist needs QuickTime 3.0 or greater to be installed on your Macintosh in order to run properly. A QuickTime 4.0 installer is included on the CD-ROM in case you need to install or upgrade QuickTime. Double click on the QuickTime 4.0 installer and follow it's instructions if you need to install QuickTime.

3. You can adjust Studio Artist's memory allocation (via the Get Info dialog in the Macintosh Finder). Select the **Studio Artist 1.1** application icon in the Finder and use the "**File : Get Info...**" menu command. Depending on the amount of memory in your Macintosh, you may need to adjust the factory default memory allocation.

The more memory you can allocate to Studio Artist, the better. This is particularly true if you plan to work with uncompressed RAM movies, which are very memory intensive. The maximum size of Studio Artist's working Canvas will also depend on the amount of memory you allocate to the application.

---

## Quick Start

Ok, you hate manuals and just want to get started painting. Here's how to get started quickly.

1. Double-click on the Studio Artist application icon. A standard file dialog will come up and you should select the Source Image you wish to work with. Then, a dialog will come up that allows you to specify the working Canvas size. Typically, you might choose a Canvas size different than the original Source Image. The Source Image is not modified in any way. The Canvas Image will be the final output image.
2. After you click **OK** in the Set Canvas Size dialog, the cursor will spin for a short period of time while Studio Artist examines your Source Image. Then, the main Studio Artist Canvas window will appear. Studio Artist boots into the Paint Preset Operation control pane.
3. Use the mouse or pressure sensitive pen to start drawing into the Canvas. Or, click the **Action** button to watch Studio Artist autopaint without any manual assistance.

4. To change the current Paint Patch Preset, either click on one of the colored Paint patch Preset icons in the control surface on the left side of the main Canvas window, or use the **Category** and **Patch** popups to choose a preset by category and name. Every time you change to a new Paint Patch Preset, the look and feel of the current paint tool will totally change. Working your way through the various Paint Patch Presets (there are over 700 included with the application to get you started) will give you a feel for the unlimited range of potential visual looks and tactile feels that the Paint Synthesizer can generate.
5. When you feel you are ready to explore other areas of the program, use the **Operation** menu to move to a new Operation control pane and explore what it has to offer.

**Hint:**

The “**spacebar**” is used throughout the program as a hot key to quickly perform certain actions. You can always use “**Cmd-spacebar**” to execute the current Operation’s Action. You can use the “**spacebar**” to stop any currently executing Action. Studio Artist also uses the “**spacebar**” hot key to execute any interactive edits that use pressure. This allows you to execute a pressure sensitive edit without losing your pressure setting during mouse up.

---

## Technical Support and Registration

Your Serial Number:

**Note:**

*Before contacting Technical Support, please first look for the answer in this manual and also be sure to read the Read Me document on your Studio Artist CD-Rom. The Read Me contains updated information that may be newer than information in this manual. There may also be other documentation accompanying this manual—you should look there for answers as well. If you can’t find the answer and do contact Technical Support, please have the manual and serial number in front of you and the application open with the area you want to know about easily acces-*

*sible.*

## **Registration**

It's important that you send in the registration card included with the Studio Artist CD-Rom, or register online. You need to register in order to qualify for technical support and future program and documentation updates. Mail in the registration card that came with the CD-Rom. You can also register online at the following URL:

<http://www.synthetik.com/>

## **Technical Support**

Registered Studio Artist owners are entitled to receive reasonable technical support.

There are several ways to get the answers you need online by using the internet:

Answers to the most frequently asked questions are available on our online Tech Doc pages. Click on the link for detailed instructions, tips and troubleshooting help.

<http://www.synthetik.com/>

We encourage you to use email as your first resource for help with technical support. Please include your Studio Artist serial number. You can email a technical question to: [techsupport@synthetik.com](mailto:techsupport@synthetik.com)

FAX your technical questions to (415) 864-0433.

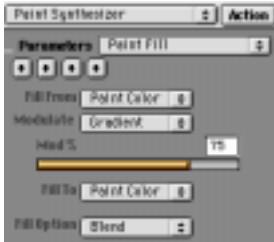
You can speak directly to a Synthetik Technical Support Specialist between 10 AM and 5 PM, PST, Monday through Friday at (415) 864-6587. You must supply your Studio Artist Serial Number to receive Technical Support.

## Chapter 2: Operations

Studio Artist is based around the metaphor of a graphics synthesizer. Musicians have used audio synthesizers for many years to generate complex sounds and arrangements. Studio Artist extends these musical metaphors to the world of graphics. An individual can use Studio Artist's graphics synthesizer to generate an unlimited number of graphics patches that can be stored and recalled on the fly. These patches can be anything from a paint brush or paint type to complex graphical processes that can emulate traditional graphics arts techniques or produce some totally unknown new visual look.



At it's highest level, the program has a number of categories of modal interaction with the working Canvas that are referred to as **Operations**. Interaction may be through an automatic "**Action**", or one or more interactive "**Mouse Modes**". The user can choose the desired type of interaction (Operation and associated Mouse Modes) with popups located directly below the source image in the top left corner of the interface.



Users can navigate through a hierarchy of control panels to edit parameters associated with the current interaction mode. Individual parameter panels are accessed by using text popups associated with each pane. A complete collection of parameters is called a patch.

All of the nested control panels can also be accessed directly via the **Operation** menu located in the main menu bar.

Control panels are associated with the following types of modal Operations:

- Paint Synthesizer
- Presets
- Image Operations
- Bezier Draw
- Bezier Edit

## Region Selection

## Warp

## Timeline Animation

Each of these modal Operations will be explained in more detail in the following sections of this chapter.

---

## Paint Synthesizer

Studio Artist is based around the metaphor of a graphics synthesizer. A user can construct graphical patches that allow for an unlimited number of potential visual looks.



There are a large number of editable parameters that control the behavior of the Paint Synthesizer. These parameters determine the look and feel of the current paint. You can paint manually or have Studio Artist generate painting automatically as a Paint Action. Or, work in a hybrid mode where Artist's automatic painting is being guided by your manual painting interactions.

Paint Synthesizer Patches are complete sets of all of the editable parameters associated with the Paint Synthesizer. There are over 200 of these editable parameters. Paint parameter memories are located above the Paint Synthesizer control panes next to the Source image. These memories allow you to save and restore complete sets of all of the editable parameters on the fly.

Paint Synthesizer Patches can also be imported or exported to disk as individual files. They can also be accessed as Paint Presets. Any Paint Patch files that are placed in the **Preset** folder next to the application will appear as Paint Presets. Subfolders within the **Preset** folder will appear as Paint Preset categories. Use these sub folders to custom organize your Paint Presets.

Paint Action Sequences can be used for combining together different Paint Actions to generate complex art processes. You can use Paint

Action Presets to access these operations at the touch of a button.

**See Chapter 3: Paint Synthesizer for detailed information on how to use the Paint Synthesizer.**

---

## Presets

Presets are predefined patches stored on your hard disk. You can organize your presets according to **Category** and **Patch** names within a Category. The **Category** is the name of the sub-folder the presets are located within. The **Patch** name is the name of the preset file located on disk.

There are three kinds of presets:



Paint Presets are a complete set of parameters for the auto paint synthesizer. They are stored in the “**Preset**” folder located next to the Synthetic Artist application.

Paint Action Presets are a set of actions that can be applied to the current Canvas. They are like macros and can include paint actions as well as image operation actions, warp actions, etc. They are stored in the “**PASeq**” folder located next to the Synthetic Artist application.

Workspace Presets allow all of the different paint, Bezier, color, and preset memories in the application to be saved and restored. They are stored in the “**Workspace**” folder located next to the Synthetik Artist application.

You can access Presets by choosing from the **Category** and **Patch** popups, or by clicking on the appropriate patch icon. The set of icons in the scrollable table corresponds to the patches located in the currently selected Category folder. The 10 preset icons located at the bottom of the Preset pane are Preset memories. They are gray if currently empty. Click on them to make the stored preset the currently active one. Option click them to record the current preset in the

memory.

You can use the Preset memories to quickly switch back and forth between paint patches or paint action sequences while you are working.

You can load a new set of Paint and PASEq preset memories by calling up a specific Workspace preset.

You can import a Preset file located anywhere on your hard disk by using an import menu command.

You can export or write a preset to a file on your hard disk by using an Export menu command.



You can edit or overwrite an existing current preset by option clicking the large current Preset Icon. The icon PICT itself will not be overwritten. The actual icon image is stored as PICT resource #1000 in the Preset's resource fork. You can edit it with ResEdit if you wish. Or, you can use the **"Update Current Preset Pict"** menu command to overwrite the PICT with the current Canvas image.

**Hint:**



Each preset has an associated balloon help message. To read the message, click on the ? icon next to the current preset's image icon. A balloon help message for the preset will appear.

The factory presets have helpful hints in this message. However, you can customize any preset's help message. Similarly, when you construct a new preset, you should add a help message to it. To edit the current preset's help message, use the **'Update Current Preset Help Text'** menu command.

---

## Image Operations

Image Operations are a set of image processing filters or processes that





each have unique parameter panes. They act to transform the current Canvas. Some Image Operations may also be modifiable by current visual attributes, global paint color memories, or the current region. The current Image Operation is initiated by pressing the **Action** button (or **Cmd Spacebar**).

Each Image Operation also has a compositing operation and mix control located at the bottom of the parameter pane. The use of different compositing operators can totally change the effect of a given image operation, resulting in a manyfold increase in possible visual effects achieved with a given image operation. You can also specify a specific number of repetitions of a particular image operation.

Paint Action Sequences can be used to combine together different Image Operations to generate complex visual processes. You can use Paint Action Presets to access these operations at the touch of a button.

**See Chapter 4: Image Operations for detailed information on how to use the Paint Synthesizer.**

## Bezier Draw



You can use the mouse or pen to draw a Bezier path on the Canvas. If you are using a pressure sensitive pen, the pressure information will be stored along with the path. If you are using a mouse, the default pressure settings will be stored with the path.

Each Canvas layer has an associated Bezier Frame that contains all of the active Bezier Paths currently associated with that Canvas layer. Switching to a new Canvas layer will also switch to it's associated Bezier Frame.

The current Bezier frame can be used in several different ways. It can be a scratch pad for editing existing paint paths stored in a Paint Action Sequence. It can be used to interactively define paths for subsequent painting with the Paint synthesizer. The shape and

position of bezier paths can be animated over time. Bezier paths can also be used to generate selection regions or masks.

## Mouse Mode

### Freestyle



Allows for drawing a freeform curve that is then converted into a Bezier representation at mouseup. The accuracy vs smoothness of the conversion algorithm can be adjusted with the editable Smoothness parameter.

### Bezier Curve



Allows a curve to be built up by positioning Bezier control points. You can interactively adjust the Bezier curve until drawing is terminated by mouse up or the 'spacebar' key.

Pen tilt controls the direction and extent of the curve. If you don't have a tilt sensitive pen, press 'option' to adjust the direction of the curve. To add a new segment to the curve, press the 'Cmd' key. The 't' hot key lets you translate the existing curve path. The 'r' hot key lets you rotate the existing curve path.

## Editable Bezier Draw Parameters

### Curve Options

Various options for how subsequent Bezier control points interact.

### Smoothness

Allows you to determine the complexity of the Bezier curve that results from your freestyle drawing. Increasing the smoothness will result in a smoother curve with fewer Bezier control points. Decreasing smoothness will result in a curve that more accurately tracks what you draw at the cost of more Bezier control points and a rougher appearance.

### Offset Max

Specifies the maximum amount of interactive offset for one section of the Bezier curve when drawing in the Bezier Curve mouse mode.

If you wish to edit a Bezier path after you draw it, you need to switch to the Bezier Edit operation pane.

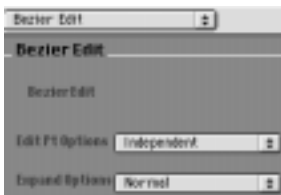
If you turn on Bezier recording, then the paths associated with normal paint operations will be converted on the fly to Bezier paths and stored in the current Bezier frame. You can turn on and off Bezier recording by using the ‘Path:Path Layer Record” menu flags to toggle the record state.

You can save the current Bezier frame in a Bezier memory by option clicking on one of the four Bezier memory buttons, located above the paint Canvas. Clicking on a Bezier memory will erase the existing Bezier frame and set it to the contents of the specific Bezier memory.

The master erase button erases the Canvas image layer and its Bezier path frame. The Set to Background button just erases the Canvas image layer and does not erase its associated Bezier path frame.

---

## Bezier Edit



You can use the mouse or pen to edit any Bezier paths in the current layer's Bezier frame. Menu commands are also available for Bezier Path Copy / Paste style editing as well as path transformation operations.

## Adjustable Bezier Edit Parameters

### Edit Pt Options

Options for how adjacent Bezier control points interact when editing the curve.

### **Expand Options**

Options for how the Expand Path Layer menu command works.

### **Curve Editing Hints:**

Right now you can select any combination of individual curves. However, you can't currently select individual control points.

You can select a curve by mousing down on it. Or, you can mouse down in an empty area and drag out a selection rectangle. Any curves in the selection rectangle will be selected.

If you hold down the '**shift**' key while selected, your new selection will be added to any existing selected curves. If you '**shift**' select a pre-selected curve, it will be deselected. If you don't use the '**shift**' hot key while selecting, any pre-selected curves will be deselected.

You can move selected curves by dragging them with the mouse in the Canvas.

### **Hot Keys:**

- 'r' - rotate selection
- 's' - scale selection

Need to mouse down on specific curve for '1' and '2'

- '1' - interactive displacement of curve
  - pressure controls width
  - horz movement controls amount
- '2' - interactive smoothing
  - horz movement controls smoothing

- '3' - interactive sphere displacement of selected curve(s) control points

**'4'** - interactive sphere displacement of 1 selected curve

**'5'** - redraw pressure for selected curves.

**'spacebar'** -used to execute an interactive edit (hot keys '1,2,3,4')

arrow keys (up,down,left,right)  
- nudge selected curves accordingly

**'shift'** - normal shift select behavior

Note that **'space bar'** is used to execute hot keys '1,2,3,4'. In general, the **'space bar'** hot key is used throughout the program to execute an interactive edit. We use a hot key to execute, as typically interactive edits use pressure. This means we can't use mouse up to execute, as you'd lose your pressure setting.

To delete a control point:  
**option** click the control point

To delete a curve:  
**option** click the curve  
or, **'delete'** key deletes all selected curves

To cut a curve into 2 curves:  
**'c'** hot key and touch curve at cut point

To join 2 curves into 1:  
Select the 2 curves. Go to the Edit menu and pick the **"Edit : Connect Two Curves"** menu command. The menu is only active if 2 curves are selected. The closest end points are connected, so move the 2 curves accordingly before using the menu command to connect.

You can use the Edit menus **'Cut, Copy, Paste, and Clear'** to edit selected curves.

You can use the Edit menus **'Flip and Rotate'** to transform selected

curves.

If you copy a selected curve, and then immediately paste it, the pasted curve will sit directly on top of the source curve. Due to the xor curve drawing, you won't see the pasted curve. You can use the arrow keys to nudge the pasted curve off of the source curve, which will then make them both visible.

---

## Region Selection



This interactive Operation mode is used to generate region or area selections. The current selected regions can then be used to mask the various Studio Artist Operations like painting or image processing. The current selection can also be filled with color or a gradient as an Action while in this pane. The current selection can also be used to generate an alpha channel for movie output. Selected regions of the Canvas can be moved from within this Operation mode using the “m” hot key.

Mouse or pen down on the Canvas to dynamically select an area based on the current Interactive Generation settings. These settings include common selection methods such as rectangular and lasso selection as well as dynamic region growth based on visual attributes such as color.

The current selection is displayed as a color inversion on the current Canvas. Use the **spacebar** to grab the current selection as the current region.

After interactive generation, all unselected areas of the Canvas will be grayed out while in this Operation mode ( unless the **Region Display** checkbox is deactivated ). To extend the existing selection, use the “shift” hotkey. To remove from the existing selection, use the “option shift” hot key.

When in other Operation modes within Studio Artist, unselected areas

will only be grayed out if Region Masking is turned on. You can turn on and off Region Masking with the **Mask** popup located in the Control Strip above the Canvas. If Region Masking is turned on, then operations will only take place within the masked regions.

## Interactive Generation

### Source

#### Source Image / Canvas Image / Texture Image / Orient Image

Interactively grows a region from the start point, based on the chosen source attribute and the **Set Mode**.

#### Local vs. Global

Local grows a region from the current start point. Global grows a region everywhere in the chosen selection source that matches the current range.

#### Soft Growth

A soft selection will be grown with a smooth feathered transition over the last portion of the growth range if checked. A hard edged selection with no feathering will be grown if unchecked.

### Rectangle

Interactively select a rectangular region.

### Circle Paint

Interactively paint your selection with a pressure sensitive circle brush.

### Lasso Area

Interactively draw your selection with a marching ants path.

### Bezier Curve Area

Interactively draw your selection with a marching ants Bezier curve path.

### Set Mode

Determines whether pressure or mouse location is used to grow the region.

### Display

Determines how the interactive selection region is displayed on the Canvas as it is interactively generated.

### Region Display Active

Determines whether the current region selection is displayed while in this pane. Anything not selected will be grayed out on the Canvas if turned on.

## Fill Action

### Fill Operation

Determines what is filled in the current region if the **Action** button is pressed (or **cmd spacebar**).

### Move Mode

Specifies the compositing operation used when moving the region selected Canvas to a new location with the '**m**' hot key. Holding down the '**m**' key allows you to move a copy of the selected Canvas region to a new location instead of performing a new selection.

## Hot Keys

'**spacebar**' - used to grab current selection as the current region.

'**x spacebar**' - overwrite the Canvas with the appearance of the current



active region selection. Useful as a special effect.

‘t’ - translate current start location. (Currently works for **Rectangle** and **Circle Paint** only).

‘z’ - holds the current interactive selection

‘shift’ - adds to current selection region rather than replaces

‘option shift’ - subtracts from current selection rather than replaces.

‘m’ - moves a copy of the selected Canvas region instead of performing a new selection.

#### Hint:

The use of the ‘q’ hot key with a mouse down in the Canvas can be used at any time when in a different Operation Mode of the program to momentarily drop back into Region Selection to generate a region on the fly. The current **Source** setting will determine the type of Region Selection performed during this momentary operation.

## Region Masking



The current region selection can be used at any time as a mask for different Operations within Studio Artist. This includes painting, image operations, and interactive warping. To turn on Masking, use the Mask popup located above the top left of the Canvas.

Setting the Mask popup to Paint currently masks interactive painting or paint actions with a hard mask. Setting the Mask popup to Path masks the path associated with any painting, but not the actual brush fill process. This results in a more natural appearance that looks like it was actually hand painted rather than artificially masked.

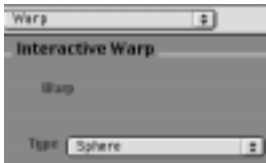
Both Paint and Path masking work the same for image processing and interactive warping. Feathered selection regions work with image processing and interactive warping operations. Feathering does not

currently blend for paint operations.

The status of Masking is recorded in a Paint Action Sequence for any recorded Action steps. When you playback a Paint Action or History Sequence, masking will turn on and off as appropriate. The mask used in playback will be the current selection region.

---

## Warp



Interactive warps are complex spatial transformations or distortions that operate on the current Canvas layer and can be interactively controlled by the current pen position and pressure. They are fully recordable as a step in a Paint Action Sequence. They can be used for subtle spatial distortion, complex mosaic or symmetry operations, and for outrageous or grotesque special effects.

Simply choose a specific warp type and use the pen or mouse to dynamically control the warp. Many of the specific warp types are pressure as well as position sensitive.

### Type

Specifies the type of interactive warp.

## Warp Quality Settings

There are two different warp quality settings. They are low memory and high quality, and can be set in the main Preferences dialog, which is accessed via the "File:Preferences..." menu command. Low memory uses less memory and is faster. High quality uses more memory and is slower, but generates a higher image quality rendering of the final warp after mouseup. This may take a few seconds to compute depending on the Canvas size and interactive warp type.

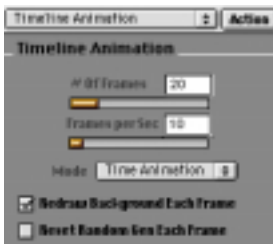
## Hot Keys

't' - used to translate or move the start position of a local warp.

'spacebar' - used to execute the current warp.

---

## Timeline Animation



Used to generate keyframe animation actions. The keyframes are determined by keyframe positions for sets of Bezier curves. You specify the Bezier curves by storing them in position memories located in the Timeline Animation window, which is opened by executing the “**Movie : Keyframe Timeline Window...**” menu.

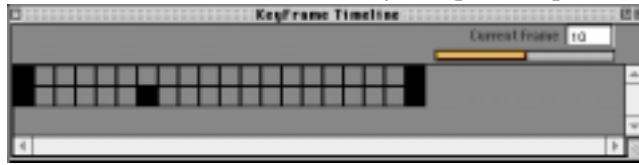
The timeline animation window is currently very basic, and will be extended in future versions. It's based on the concept of a time grid of keyframe memories. Each layer has its own row of horizontal cells in the timeline animation window. Each vertical column of cells in the timeline animation window corresponds to a specific frame time. Clicking on a cell moves the Canvas to the frame time associated with that particular cell. Option-clicking on a cell records the current Bezier path frame into that particular keyframe position.

You draw a set of bezier curves using the **Bezier Draw** Operation mode. Or, you can record your Bezier paths by drawing in the Paint Synthesizer with Bezier Mouse Recording turned on.

You can then edit the path shapes and positions using the **Bezier Edit** Operation mode. You can record the current positions of a set of Bezier curves in a timeline memory by option clicking on the desired memory cell. You should only edit the positions of the Bezier curves (ie. translate, rotate, scale). Don't change the number of Bezier control points, or the number of curves across keyframes for a layer.

The **Action** button will start generation of the animation frames. They

will not be written out to a movie file unless you have specified a current output movie. Use the “**Start Movie to File...**” menu located in the Movie main menu to initially setup an output movie file.



## Editable Animation Parameters

### # of Frames

How many frames in the animation

### Frames per Second

How many frames per second of animation

### Mode

What kind of animation.

Time Animation - Paints the bezier curves.

Warp - Warps the specified Source image. The warp is specified by the movement of the bezier curves.

Morph - Currently morphs layers 2 and 3 into layer 1. Your Bezier keyframes should be located on layers 2 and 3.

Geodesic Warp - Uses a different algorithm to compute the warp.

Feedback Warp - Simulates video feedback.

The **# of Frames** and the **Frames per Second** parameters will also be used for any Paint Action Sequence Animations as well as for any Movie Files written to disk.

See the “**Keyframe Timeline**” and “**Working With Movies**” sections of this chapter for more information on how to generate animation movies.

**Note:**

This set of actions is still under development and will be more fully developed in future versions of Studio Artist. However, the existing limited functionality is still very useful and fun, so we are including it within the 1.1 program release.

---

## Canvas Layers

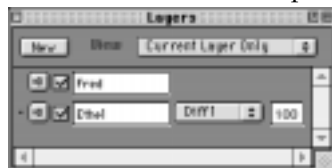
The Canvas can have an unlimited number of Layers. Each Layer is composed of an individual image buffer as well as an associated Bezier path frame.

Layers can be viewed individually, or in combination. When viewed in combination, they can interact with each other through different compositing operations.

You can switch between Canvas Layers using the Current Layer popup located in the control strip directly above the Canvas. Or, you can access and edit individual Layers in the Layer Window, which can be opened by executing the **'Canvas : Layer Window...'** menu.

The Layer Window contains a list of all of the individual layers associated with the Canvas. Each individual Layer in the list has controls to mute playback of the Layer, edit the Layer name, specify an associated compositing operation, and specify a mix.

Like all lists in Studio Artist, individual Layers are applied to the Canvas in order from top to bottom.



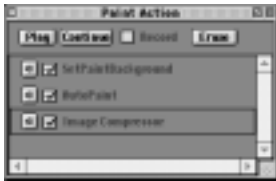
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## Actions

Studio Artist has two different ways to record and playback a series of Operation Actions. These are Paint Action Sequences and History Sequences. At the base level, they are both composed of the same kinds of data and are stored in the same file format, but are used in different ways within the program.

**See Chapter 5: Action Sequences for detailed information on how to work with paint Action and History Sequences within Studio Artist.**

### Paint Action Sequences



A Paint Action Sequence is a series of Actions that can be recorded and played back in series of step by step to an existing or new source image and Canvas. Paint Action Sequences can be used in several different ways. They can be used to build custom art processes that are then accessible at the click of a button. Or, they can be used to record everything you do in the program. This History Sequence can be played back at a later date, used as a form of unlimited undo, or rerendered to be played back at a higher resolution on a larger Canvas.

Paint Action Sequences can be imported or exported to disk as individual files. They can also be accessed as Paint Action Presets. Any Paint Action Sequence files that are placed in the **PASeq** folder next to the application will appear as Paint Action Presets. Subfolders within the **PASeq** folder will appear as Paint Action Preset categories. Use these sub folders to custom organize your Paint Action Presets.

All interactive operations as well as operation actions can be recorded as a Paint Action Sequence or as a History Sequence. As far as Studio Artist is concerned, there is no difference between the two. The file formats are the same, and they can be exchanged at will. For example, a History Sequence of a painting session could be played back later as a Paint Action Sequence with a different source image into a different size Canvas.

The reason there are two different Sequences is that they are typically used in different ways. Paint Action Sequences are used to implement custom art processes on the fly while you work. The History Sequence is used to keep a record of everything you've done in a painting session. This sequence can later be played back and edited, and can be thought of as a form of unlimited undo.

**See Chapter 5: Action Sequences for detailed information on how to work with paint Action and History Sequences within Studio Artist.**

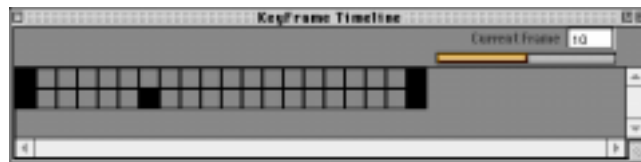
## KeyFrame Timeline

The Keyframe Timeline can be used to specify Bezier path movement over time. The resulting path movement can be used to build up paint animation, or to define image warping or morphing operations.

The Keyframe Timeline allows recording and playback of unlimited Bezier path keyframes over the course of an animation or movie. The Timeline looks and acts like a large matrix of Bezier path memories. Each horizontal row of cells corresponds to a Canvas layer. Each vertical column of cells corresponds to a particular frame time.

Individual Bezier path keyframes are drawn and edited using the Bezier Draw and Bezier Edit operation panes. You can draw or edit Bezier paths with the mouse, or generate them automatically from the Source image, Canvas image, or individual movie frames.

**See Chapter 6: Movies for detailed information on how to work with the KeyFrame Timeline within Studio Artist.**



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## Working With Movies

Studio Artist has the ability to work with time-based imagery or movies. There are three basic ways you can work with movies within Studio Artist. You can generate new movie files from scratch, process existing source movie files into new processed movie files, or load an existing movie file into ram and interactively play, paint or process individual frames.

Applications of movie processing might include paint animation, auto-rotoscoping, video special effects, image warping or morphing. If processing an existing movie file, the output resolution can be different than the input resolution.

**See Chapter 6: Movies for detailed information on how to work with Movies within Studio Artist.**

### Generating a Movie File

To generate a movie file, you first need to setup the output file. Use the **“Start Movie to File...”** menu located in the **“Movie”** main menu to specify the output file. The dimensions of the output movie will be the dimensions of the current Canvas. The frame rate will be the setting of the **“Frames per Second”** parameter, located on the **Timeline Animation** Operation parameter pane.

Once you have started your movie file, you can write out movie frames in a number of different ways. You can initiate a **Timeline Animation**, **Timeline Warp**, **Timeline Morph**, or a **Paint Action Sequence (PASeq)** movie by using the submenu commands located in the **“Movie:Generate Frames”** main menu. The **# of Frames** and **Frames per Second** of the output movie are set in the **Timeline Animation** parameter pane. You can also initiate Timeline Animations from this pane by using the **Action** button.

You can save the current Canvas at anytime as a movie frame by using the **“Save Canvas as Movie Frame”** menu. If you turn on the **“Write**



**Frame Each Action**” menu flag, the next time you initiate an **Action** within Artist, the Canvas image that is the result of that action will be written out to the movie file as a new movie frame.

Remember to close your current movie file when you are done writing frames with the **“Stop Movie to File”** menu command.

## Processing an Existing Movie File

Currently, you can process an existing movie file with a Paint Action Sequence. To start the process, use the **“Process Movie with PAsEq...”** menu command located in the **“Movie”** main menu. You will first be prompted to select a source movie file. You will then get a dialog that allows you to specify the Canvas and hence processed output movie frame dimensions. The output frame dimensions can be different than the input frame dimensions. After hitting **OK** for this dialog box, you will be given a dialog to name your output movie file.

If you hit **Cancel**, the input source movie will still be processed, but the output frames will not be written to an output file. This is a good way to try out a process before committing it to an output file. Mouse down or hit spacebar to stop the movie processing at anytime.

Each input frame will be used as a source image for the current Paint Action Sequence. You can examine or edit the current Paint Action Sequence by using the Paint Action Palette Window. Remember, you need to load the source frame into the paint Canvas as a part of your Paint Action Sequence if you want to perform image processing operations on the movie source frames. You can do this by setting the Canvas Background popup to **Image** while recording your Paint Action Sequence.

## Playing a Movie File from RAM

You can load an existing movie file into RAM by using the **“Load RAM Movie...”** menu command. Depending on the size of the movie

file, it may take some time to load. Once the movie is loaded into RAM, you can playback and edit uncompressed frames using the movie transport controls located above the paint Canvas.

You can unload a RAM movie without saving by using the “**Unload RAM Movie**” menu command.. Loading a new RAM movie unloads an existing loaded movie.

### **Editing a RAM Movie**

To edit a loaded RAM movie frame, use the transport controls to go to the frame of interest. Paint or process the frame as desired. Then, press the record button located in the transport area to record the existing Canvas into the current movie frame location.

Remember to save the edited movie file when you are done with all of your edits by using the “**Save RAM Movie**” menu.

## **For More Information on Working With Movies**

**See Chapter 6: Movies for detailed information on how to work with Movies within Studio Artist.**

# Chapter 3: Paint Synthesizer

Studio Artist is based around the metaphor of a graphics synthesizer. A user can construct graphical patches that allow for an unlimited number of potential visual looks. This overview will help you understand the structure of the Paint Synthesizer so that you can quickly start modifying preset patches as well as create your own.

## Introduction



The Paint Synthesizer allows you to control and use Studio Artist's paint capabilities. There are a large number of editable parameters that make up a paint patch. These parameters determine the look and feel of the current paint. You can paint manually or have Artist generate painting automatically as a Paint Action, or work with a hybrid process where Artist's automatic painting is being guided by your manual painting interactions.

A paint stroke is composed of a path, paint, and a paint brush. The path defines where drawing is taking place on the Canvas. The paint brush applies the paint to the path. If you are painting manually, your movements of the pen or mouse define the path. If Studio Artist is painting automatically, then the path is generated by Studio Artist. What the generated path looks like will depend on the paint patch's editable path parameters as well as the source image and it's visual attributes.

Use of a graphics tablet and associated pressure and/or tilt sensitive pen or airbrush tool can greatly expand the range of artistic expression and dynamic control available from a given Paint Patch. We recommend the Wacom Intuos tablets to fully utilize the expressive potential available within Studio Artist. Expressive features like pressure, tilt, tilt orientation, tangential pressure, and pen velocity can be used to modulate individual parameters within the Paint Synthesizer. In the extreme case, you have the ability to modulate over 200 parameters in

real time as you use an expressive drawing tool like a pressure sensitive pen.

## Overview of the Paint Synthesizer

### Concept

The Paint Synthesizer is designed based on metaphors originally used in the world of audio and music synthesis. The synthesizer is composed of a number of modules that can either generate or process graphical and visual signals. Each module has a number of editable parameters that controls it's behavior.

Many parameters can also be modulated by other modules, by the signal outputs of other modules, or by external signals. It's useful to keep the concepts of signal flow and routing in mind when trying to understand how the synthesizer works. A signal could be anything from a paint color to a path for drawing to an image. Properties of one signal could be effecting the generation or processing of another. The synthesizer is a flexible and configurable environment for constructing visually rich and highly dynamic paint and drawing tools.

Studio Artist also has built in visual intelligence modules that are based on research in the cognitive neuroscience of visual perception. These modules can be used to generate paint brushes that offer intelligent-assistance. They can either aid you in creating a drawing, or generate painting paths automatically.

Studio Artist uses a Source Image in much the same way that an artist would use a model, as a source for visual abstraction. When you open a new Source Image, Studio Artist spends a short time examining it and then generates a number of internal visual attributes that it uses as the basis for it's intelligent assisted drawing.

You can use as little or as much intelligent-assisted drawing as you choose. You can turn off all assistance and totally paint in the tradition manual fashion. Or, you can press Action and have Studio Artist do all the work. The choice is up to you.

Most likely, you will work somewhere in between these two extremes.

If you don't know how to draw, you will find that Studio Artist is the first Computer Painting program that will allow you to create satisfying art without having significant drawing skills.

If you have spent years honing and refining your drawing and painting skills, you can use intelligent-assistance to aid you in performing repetitive or tedious pen work that might be too time consuming to consider doing manually. This might include painting with dynamic crosshatching patterns or auto-rotoscoping individual frames of film or video for animation.

Drawing Engine



The Paint Synthesizer is based on a model of applying dabs of paint to the Canvas along a path. How the dabs are applied to the path and the shape of the path itself can be extensively modulated under interactive control.

A path can either be defined manually using a pen or mouse, automatically by a path generation algorithm, or by a hybrid process that combines manual drawing with on the fly auto path generation. Collections of recorded Bezier paths can also be accessed and modulated or transformed in real time as a further source of automatic path generation.

A dab of paint is generated from a dynamic computational brush and dynamic computational paint. Both dynamic elements ( brush and paint ) can be changing under your interactive control, or the Paint Synthesizer may be modulating them on it's own.

The dynamic brush is generated from a **Brush Source** and a **Brush Type** computational generation algorithm. Brush modulation parameters specify additional parameters to modulate the dynamic brush size, orientation, and texture. Each time the brush is used to apply a dab of paint, it could be the same or totally unique. It all depends on how the Paint Synthesizer editable parameters are configured.

A dab of paint is generated at a particular path location using the current dynamic brush and two **Paint Fill** sources. They are called **Fill From** and **Fill To**. The dynamic brush, the two paint sources, and

several **Fill Option** parameters act together to generate a unique dab of paint to be applied at a particular path position.

The dab of paint is then applied to the Canvas with a particular painting Algorithm. Different **Compositing** and **Masking** options can be chosen for the particular painting algorithm. The application of the dab to the Canvas can be modulated interactively or algorithmically.

Certain painting Algorithms that **Mix** may spawn a second interacting **Paint Fill** process with it's own **Compositing** and **Blending** parameters. The combination of this complex generation process allows for total flexibility in creating unique and different paint visual looks and tactile feels. A Paint Patch can be built to emulate traditional media or to create something totally wild and new.

After a Paint Patch is created and edited, it can be accessed as a Preset for ease of use in creative drawing and painting. The Paint Synthesizer gives you extreme control over creating your own painting tools. The Presets allows you to access pre-built painting tools without getting under the hood into their internal complexity unless you so choose.

There are no artificial limitations in this Paint Synthesis approach. Unlike other painting programs, we don't make your decisions for you. Other programs provide a few nonuser configurable paints with very limited editability and interactivity. This generic approach to providing painting tools really limits your freedom of creative expression.

## Paint Synthesizer Editable Control Panes

The Paint Synthesizer is composed of several editable parameter panes. They are loosely organized in terms of signal flow. Each pane contains a collection of editable parameters that control a particular aspect of the Paint Synthesizer's drawing engine. These parameters define the look and feel of the resulting Paint Patch and it's associated interactive mouse or pen modes and Paint Actions.

An editable parameter may be associated with a popup control, or a

slider and associated numeric edit field. Certain parameters may use range sliders, which have two associated numeric fields for the range slider's minimum and maximum range values.



Each parameter pane also has four parameter memory buttons. They are located at the top left corner of the parameter pane. You can use these memory buttons to store or restore settings associated with a particular parameter pane while you work.

Like all memory buttons in Studio Artist, you click on a particular button to reset the current control pane parameter values to those stored in the memory button. Option clicking a memory button will take the contents of the current parameter pane and record them into the button.

The Paint Synthesizer parameter panes are organized as follows:

**Path Start**  
**Path Shape**  
**Path End**  
**Path Application**

These parameters control the appearance of the path. You can control how start positions are chosen for the path, how the path is generated (which determines its subsequent appearance or shape), and how paths are terminated or ended based on visual attributes.

How the path parameters are used depends on whether you initiate a paint action, or use the mouse or pen to draw a path. Even though you may use the pen to specify a primary path, the path parameters can still affect how the pen path is drawn onto the canvas. This interaction can be subtle or quite dramatic, depending on the path settings and the mouse mode.

**Paint Color Source**  
**Fixed Colors**  
**Paint Source Offset**  
**Paint Fill**

These parameters control the color and appearance of the paint, and how it is applied to or interacts with the canvas and the brush.

The initial paint color value will either come from the Source Color Picker or the Source Image, depending on which is currently active in the Source Area. This color value can then be modulated or transformed by the Paint Color Source parameter settings.

Two additional Fixed Colors can be generated as offsets or modulations from the Paint Color. The combination of these three dynamic color sources can generate rich paint textures or special effects.

Paint Source Offsets can be used to dynamically offset various color or image cloning operations. This can be used to generate subtle color modulation effects in a painting, for rubber-stamp style image cloning, for generating liquid flow paints, and many other application.

Paint Fill parameters determine how the dynamic brush applies dynamic paint to the Canvas.

**Brush Source**  
**Brush Type**  
**Brush Modulation**

These parameters control the characteristics of the paint brush used to apply paint to the canvas. You can control the brush mask source, appearance, type, texture, and size and orientation modulation.

An initial Brush Source can be computational, an image, text, or a movie file. It is then modified by a second dynamic brush generation algorithm. The size and orientation of the dynamic brush can be modulated by pressure, tilt, or many other interactive or algorithmic parameters.

**Background Texture**

This pane lets you define a dynamic background texture. The dynamic background texture can be used to modulate many different parameters within other parts of the paint synthesizer.

**Miscellaneous**

This pane has some additional parameters. You can access the region draw and default pressure settings here.



**Global Evolution**

This pane allows you to morph two complete paint patches, or to randomly generate or evolve new patches.

**Time Particles**

This pane expands the functionality of the paint synthesizer to generate time motion effects. If time particles are turned on, then individual paint strokes generated in the first frame of an animation of movie process will persist over time and have individual motion characteristics.

## **Paint Synthesizer Interactive Mouse Modes**

There are several different interactive mouse or pen modes associated with the Paint Synthesizer. Each mode allows you to use the mouse or pen in a completely different way. A default Mouse Mode setting is stored with each Paint Patch, but you can change this setting and subsequently change the interactive behavior of the mouse or pen tool. Switching between these different modes can have a profound effect on the visual appearance of the resulting interactive paint.

**Interactive Pen**

Paints on the fly based on the user's pen or mouse movements. Paint flows in real time from the pen to the Canvas.

**Freestyle**

Draws the pen path as a marching ants thin line until mouse up, when the path is then painted. The specified path can be repositioned before it is painted.

Certain paint parameters can be modulated by the path length. With this mouse mode, the path length modulation will be based on the complete drawn path length. Because Interactive Pen draws on the fly, the Paint Synthesizer has no way of knowing the final path length while it is painting. Default settings located in the Path Shape parameter pane are used in Interactive Pen mode to determine path length modulation.

**Freestyle Autodraw**

Draws the pen path as a marching ants thin line until mouse up. Then, the drawn path is used as a scanline to start a series of auto-drawn paths that are painted. The auto-drawn paths are generated according to the path parameter settings located in the Path Start, Path Shape, Path End, and Path Application parameter panes.

**AutoDraw One Shot**

Autodraws and paints a path from the mouse down start point. Only one path is drawn.

**AutoDraw Interactive**

Autodraws and paints a series of paint strokes from the current mouse position. The spacing of new autodrawn paths is determined by the scan spacing parameter located in the Path Start parameter pane.

How the autodrawn paths are generated and what they look like is a function of all of the paint parameters associated with the path (Path Start, Path Shape, Path End, and Path Application panes). Think of the autodrawn paths as a stream of intelligent paint particles with minds of their own that are being generated by your pen motion. You can use this stream of particles for something as subtle as generating an airbrush to generating unique-looking dynamic particle brushes to full intelligent-assisted drawing that might dynamically crosshatch or autosketch an image for you as you wave the mouse on the canvas.

**RegionDraw**

The user interactively specifies a local region with the pen. The size, orientation, and shape of the local region can be adjusted by moving the mouse and adjusting pen pressure. Mouseup or hitting the spacebar then paints the specified region with a series of paths generated algorithmically.

Using the '**Option**' hot key at mouse down allows alternative selection of the region to be drawn based on the current Region Selection source mode.

**Bezier Curve**

Draws the pen path as a marching ants Bezier curve until you mouse

up or press the spacebar, when the path is then painted. Pen tilt controls the direction and extent of the curve. If you don't have a tilt sensitive pen, press '**option**' to adjust the direction of the curve. To add a new segment to the curve, press the '**Cmd**' key. The '**t**' hot key lets you translate the existing curve path. The '**r**' hot key lets you rotate the existing curve path.

### Hot Keys for Interactive Mouse Modes

There are a number of hot keys that can be used to switch the behavior of the mouse or pen on the fly when working with the Canvas. The hot key must be pressed prior to mousing down in the canvas. The following hot keys work with all of the Interactive Mouse Modes.

#### Color selection from the Canvas:

You can select a current source color directly from the Canvas by using the '**c**' hot key when mousing down in the Canvas. This key will disable drawing. Dragging the mouse or pen will update the color in the source color current color area if source color (as opposed to source image) is selected in the source area.

Hot key:

'c' - select current source color from Canvas.

#### Quick navigation hints:

You can use the zoom in/out buttons located above the vertical slider for the Canvas image to zoom in and out of the Canvas. You can also use the following hot keys associated with mouse or pen clicks in the Canvas.

Hot keys:

'=' - zoom in centered at mouse click.

'-' - zoom out centered at mouse click.

#### Quick Region Selection:

You can define a new region selection directly from the Canvas by using the 'q' hot key when mousing down in the Canvas. This key will disable drawing. Dragging the mouse or pen will interactively generate a new selection region using the current Region Selection Operation settings.

Hot key:

'q' - select a region without leaving the Paint Synthesizer.

### **Repositioning the Canvas:**

You can reposition the Canvas without using the scroll bars by using the 'h' hot key when mousing down in the Canvas. This functionality is often implemented as a modal Hand Tool in other graphics programs. Dragging the mouse or pen will interactively reposition the Canvas within the current window view as if you were interacting with the Canvas scroll bars. This hot key will only work if you are working with a scrollable view into a larger Canvas.

All of the above hot keys work across all of the Paint Synthesizer Mouse Modes. There are also additional hot keys specific to certain Paint Synthesizer Mouse Modes that are detailed below.

#### **Freestyle Freestyle Autodraw**

Hot keys:

't' - translate existing path.

#### **Region Draw**

Hot keys:

't' - translate existing region path.

'spacebar' - terminate and draw current path.

'1,2,3,4,5,6,7,8,9,0' - hot switch to first 10 region draw fill types.

'option' - use current Region Selection generation method to define area to draw.

#### **Bezier Draw**

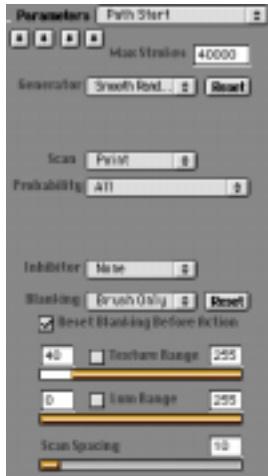
Hot keys:

't' - translate existing Bezier path.

'r' - rotate existing Bezier path.  
'cmd' - adds another section to the curve.  
'spacebar' - terminate and draw current path.  
'option' - extends curve if using mouse rather than tilt sensitive pen.

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## Path Start



The Path Start parameters define how Studio Artist automatically picks a starting location on the Canvas to begin a paint path. Studio Artist generates start points for paths by algorithmically scanning the canvas. The scan process is composed of two parts. An algorithmic generator generates an initial scan location. A second scan algorithm then works off of this initial scan location to generate a limited series of start points. When this second scan is finished, the initial generator moves to a new scan location.

Whether a scan location is actually used as a real path start point can be influenced by a number of settings. Most of these settings are tied to the Source Image visual attributes. Some of the settings are tied to other attributes based on the current Canvas, Blanking buffer, or Region Selection. Start points may be chosen from a set range of a visual attribute, or with a probability based on the visual attribute.

The individual start points generated by the Path Start process can have temporal continuity in a movie sequence if Time Particles are turned on. See the Time Particles section for more information.

### Max Strokes

Determines how many paths will be generated before a paint action stops on its own. You can manually stop a paint action at any time by hitting the spacebar (or any other key) or by mousing down anywhere in the interface (typically on the gray background).

### Generator

The generator scans the canvas according to the algorithm chosen in the popup. Different generator algorithms will scan or move around the canvas in different ways, generating correspondingly different visual appearances. Some of the settings generate random movement while others scan the complete canvas or its borders with a regular grid.

The reset button resets the current generator algorithm.

**Scan**

Determines whether a secondary scan path is followed from the initial starting scan location derived by the generator algorithm.

**Probability**

Sets a probability constraint on whether the current scan point is actually used as a path start location. If the probability constraint causes a scan point to be ignored, the generator will continue to generate new start scan locations until one meets the probability constraint.

**Inhibitor**

Determines a condition that absolutely inhibits a current scan location from being used as a path start. If the current scan point is inhibited, the generator will continue to generate new start scan locations until one is not inhibited.

**Blanking**

Determines how a paint stroke will overwrite the blanking buffer.

The reset button resets the current blanking buffer.

**Texture Range**

A scan location is only used for a path start if the value of the texture visual attribute at the scan location falls within this range when the checkbox is checked.

**Luminance Range**

A scan location is only used for a path start if the value of the color luminance visual attribute at the scan location falls within this range when the checkbox is checked.

**Scan spacing**

Determines the spacing for the path scan specified by the scan popup. This parameter also specifies the scan spacing for freestyle autodraw and autodraw interactive painting mouse modes. By scan spacing, we mean the number of pixels the mouse must move before a new autodrawn path will start.

For example, set it to 0 if you want autodraw interactive to act like an

air brush (ie. continuously generating new paths without moving the mouse) , or 10 if you want a new path to be generated every time the mouse moves 10 pixels.

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## Path Shape



The parameters on this pane determine what an automatically generated path will look like. A path can be generated algorithmically, or by interactive modulation of a set of Bezier paths stored in one of the Bezier path memories.

Each path is generated by a specified Path Type algorithm, which is controlled by a specified Path Angle generator and various Path Angle modulators. The path length can also be modulated. Certain path generation algorithms, such as those based on Bezier path memories, may offer additional types of modulation control.

Paths can radiate from the start point, or be grown symmetrically from the start point. Path symmetry can be modulated by tilt for certain airbrush or directional effect.

### Symmetry

Determines whether a path is generated symmetrically or not from a start point. Symmetric means that the start point will be in the middle of the generated path. Non-Symmetric means that the start point will be at the beginning of the path.

Tilt-Symmetric allows for an interactive continuous variation between a symmetric and non-symmetric path based on the tilt of the drawing pen.

### Path Length

Determines a range of possible path lengths. If no modulation option is specified, the Max value is used. If the path end conditions terminate the path generation before the Min path length, the path is not



used.

#### **Path Mod**

Determines how the path length is modulated (ie. the source of the modulation). The resulting modulated path length will modulate between the max and min lengths.

Certain paint parameters can be modulated by path length. However, if you are drawing using the interactive pen mode, drawing occurs on the fly and the paint synthesizer does not know what the final path length will be. It assumes the final drawn path length will be the Path Length setting, unless the Modulo checkbox is on.

#### **Modulo**

Path length modulation repeats along the complete path if modulo is on.

#### **% Length**

Determines the modulation path length. It's a percent of the Path Length parameter. If modulo is on, then the modulo length is this setting.

#### **Path Type**

Determines the path generation algorithm.

#### **Path Angle**

Determines the source of the angle information used in the path generation algorithm.

#### **Angle Mult**

Typically set to 100. Used as a multiplier of the current path angle in the path generator. Determines the number of revolutions (divide by 100) in a spiral path.

#### **Angle Offset**

Offset added to the path angle.

#### **Angle Slew**

Determines how quickly a change in path angle is accumulated in the

path generator. Smaller values lead to smoother paths.

### Angle Inc

Determines how often the path angle is updated. For example, a setting of 10 means that the path angle will only be updated every 10 pixels.

### Angle Mod

Specifies a modulation generator that modulates the current path angle.

### Mod Inc

The incremental spacing associated with one cycle of the various Angle Modulation algorithms.

### Mod %

The maximum percentage of displacement applied to the current path angle. Any displacement modulation will be from zero to this maximum setting.

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## Path End



Auto-generated paths have a start point, a shape, and an end. The parameters on this pane are used to specify possible conditions that will terminate or end the generation of an autodrawn path. This termination will be prior to the normal modulated path length specified in the Path Shape control pane.

Manually drawn paths can also be masked with these settings. Masking a manually drawn path will override the application of paint along the masked portion of the path. This can be thought of as dropping out the paint in the masked areas rather than terminating the path.

Possible conditions for path termination or masking can include visual attributes derived from the Source Image, from the Canvas, or from internal variable associated with the Path Shape generator such as

angular variation.

**Mask Interactive Pen**

Inhibits path generation for the Interactive Pen mouse mode based on the other Path End settings. This allows the Path End settings to be used to intelligently mask Interactive Pen drawing.

**Blanking**

Stops path generation if the current path location is set in blanking buffer

**Not White**

Stops path generation if the current path canvas location is not white

**Texture Range**

Specifies a range of values that the current path location must be within if the checkbox is on.

**Path Diverge**

Specifies a set of conditions that will cause a path to randomly diverge from it's present orientation.

**Local Color Range**

Specifies an offset range of possible color values based on the color of the path start location that the current path location must be within if the checkbox is on.

**Image Range**

Specifies a source image luminance range that the current path location must be within if the checkbox is on. Insures that a path will only be generated within the specified image area.

**Angle Threshold**

If the current path angle changes while the path is being generated by more than this amount and the checkbox is on, terminate the path. Ensures that a generated path will have the specified angular smoothness.

**Wrap Path at Edge**

Path reappears at opposite side of Canvas when it crosses a Canvas boundary if checkbox is on. Allows for the generation of canvas images that will automatically self-tile.

### Region Path Stop

Terminate current path if it leaves the current selection region.

### Visual Error

Terminate current path if the chosen visual error model thinks continued drawing will increase the visual difference between the canvas and the source.

### Note:

The Path parameters allow for the auto-generation of a large number of possible paint styles and effects. However, be aware that you can use the Path Start or Path End parameters to generate a logically inconsistent patch. For example, a patch that has the Path End parameter Not White turned on will not autodraw on a black canvas background. The path ends when the canvas is not white, and the entire canvas is not white.



## Path Application

Determines how the path is used to apply paint to the canvas. This includes the spacing of brush dabs of paint along the path as well as how a brush dab of paint is applied to the Canvas in relation to the path.

The initial path can be modulated by a random displacement algorithm. It could be repeated several times or interpolated to insure continuity. Brush dabs of paint are then applied along the path according to an adjustable spacing. Constraints can also be specified that may examine the Source or Canvas and possibly override the application of paint along the path.

Displacement and constraint effects can be combined together to generate a virtual paint brush that is composed of a number of smaller sub-brush elements based on Studio Artist's normal Brush controls. This is one approach to designing a responsive paint tool that appears to have a large interactive brush without using large Source Brush sizes.

**Interpolate Path**

Make sure paint application path is continuous if on by interpolating any gaps in the path.

**Repeat Stroke**

How many times the path should be repeated to generate a paint stroke.

**Option**

What is used to determine 100% spacing (current brush size or maximum brush size). How often the paint is applied to the canvas by the brush is determined by the Spacing % setting below.

**Mode**

Specific spacing computation algorithm.

**Prob**

Determines whether there is a probability constraint that needs to be checked before applying paint with the brush at a specific path location. If the specified probability constraint is not met, then the paint is not applied at that path location.

**Spacing %**

How often along the path paint is applied by the brush to the canvas. The pixel dimensions of 100% is determined by the setting in Option.

**Displace**

What kind of displacement algorithm if any is applied to the path.

**Displace Amount**

The maximum amount of displacement in pixels applied to the path. Any displacement modulation will be from zero to this maximum

setting.

**Displace Orient Direction**

The angular orientation of the path displacement.

**Path Increment**

The incremental spacing associated with one cycle of the various Displace algorithms.

**Orient**

Specifies fixed orientation displacement vs displacement that tracks the path and offsets from the current path orientation.

**Mod Type**

Specifies a modulation source for the Displacement amount. The displacement modulation will be from zero to the Displace amount maximum setting.

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## Paint Color Source



The output of the Paint Color Source module is a dynamic color value that can be used for painting. The input to the module depends on what is currently selected in the Source control panel. If the user has specified source color, then the current color selection value is the input to this module. If the user has specified source image, the color value of the source image at the path start point is used as the input to this module.

This pane's parameters determine how the paint color may be modified, both initially and over the paint path. The initial paint color can first be run through a color transformation. The subsequent paint color is then randomized. It is then passed to a recursive blending operation. The output of the blend operation is then passed through a path color randomizer. The output of the path color randomizer is then possibly gradient modulated.

The output of this pane is used as a possible source for the Paint From or Paint To parameters located in the Paint Fill pane. What is actually applied to the canvas by the brush is specified on that parameter pane.

#### **Color Mode**

Specifies a possible transformation of the initial source color value. Some of these settings (Prob settings) may transform the initial source color into one of a set of colors that together over an area of the canvas represent the actual initial source color value.

The initial paint color may be algorithmically randomized.

#### **Start Option**

Determines how the initial paint color is randomized and offset.

#### **Randomize**

Determines the amount of initial color randomization.

#### **Offset**

Determines the amount of initial color offset.

#### **Recursive Source Blend %**

The initial paint color may be recursively blended with another color source as the brush proceeds along the application path. This value determines the initial source blend percentage.

#### **Start**

The start color source to the recursive blend algorithm.

#### **Blend To**

The second blend color for the recursive blend algorithm.

#### **Path Color Mod**

Determines the randomization algorithm for the color as the path is traversed.

#### **Modulate Option**

Determines how the path color is randomized as the path is traversed.

**Modulate Type**

Determines the type of color randomization modulation as the path is traversed.

**Modulate Amt**

Determines the amount of color modulation as the path is traversed.

**Modulate Inc**

Determines the increment or spacing of one cycle of randomization for the path color randomization algorithm.

**Path Gradient**

Determines the path color gradient modulator. This specifies a gradient color shift that takes place as a function of the particular modulator's value along the path.

**Gradient End**

The second color the path gradient algorithm modulates to.

---

## Fixed Colors



The actual paint applied to the canvas can be constructed from various combinations of the output of the Paint Color Source module and two Fixed Colors.

The two Fixed Colors can either be static source colors or dynamically track the current Paint Color Source module output as color offsets. The tracking Fixed Colors can also be randomized or subjected to color transformations.

The use of the two Fixed Color generators along with the output of the Paint Color Source module allows for three possible interactive color source to construct paint textures within Studio Artist. The combination of these three dynamic color sources allows for the generation of rich, expressive, textured paint with many subtle visual looks.



Each Fixed Color is determined by the following parameters:

**Color Source**

Specifies whether the fixed color is a static color associated with the square color memory, tracks the Paint Color Source start value, or tracks the current Paint Color as it modulates on the path.

**Color Mode**

Specifies a possible transformation of the initial fixed color value.

**Random Start Opt**

Determines how the initial paint color is randomized and offset.

**Random Start Color**

Determines the amount of color randomization.

**Offset Start Color**

Determines the amount of color offset.

---

## Paint Source Offset



The parameters in this pane can be used to offset the physical location of the current paint source. The offset can be fixed or a function of a random generator. Only the Fill From paint source is offset, not the Fill To paint source.

Currently the source image, canvas image, and undo images are offset. The paint color location isn't currently offset (but will be in a future release of Studio Artist).

You can use the Paint Source Offset parameters as a means to clone specific sections of the Source image in variable locations on the Canvas. The "Brush Displace" Algorithm settings in the Paint Fill pane also use these settings to define the actual brush displacement.

## Tracking

This determines how the paint source tracks a path. (This should probably move out of the paint parameters and into the source control panel settings in a future version of Studio Artist).

StartPoint - subsequent locations along the path track off of the path start point. This is the normal mode for painting.

Fixed - subsequent locations are always a fixed coordinate location. Set this location by mousing down at the appropriate position in the Source Image. This setting can be used to build a brush that paints with a fixed chunk of the Source Image.

Fixed Start - subsequent locations are always a fixed coordinate location. This location is wherever the start position of the path is located on the canvas.

Offset Start - subsequent locations along the path track off of a fixed location rather than the path's start location. Set this location by mousing down at the appropriate position in the Source Image. This setting is useful for cloning specific pieces of the Source Image in variable Canvas locations.

Time Particle Start Point - subsequent locations along the path track off of the original Time Particle start point from frame 1. This is used to generate shatter effects over time.

## Offset

Determines the algorithm for generating or randomizing the source offset along the path.

### Offset Amount

The maximum amount of offset in pixels applied to the path. Any offset modulation will be from zero to this maximum setting.

### Offset Orient Direction

The orientation direction of the path offset.

### Path Increment

The incremental spacing associated with one cycle of the various Offset algorithms.

### Orient

Specifies fixed orientation offset vs offset that tracks the path and offsets from the current path orientation.

### Mod Type

Specifies a modulation source for the Offset amount. The offset modulation will be from zero to the Offset amount maximum setting.

## Paint Fill



Determines the appearance of the actual paint dab that is applied along the path to the Canvas and how the brush interacts with the paint dab and with the Canvas.

There are two paint sources (**Fill From** and **Fill To**) as well as a **Fill From Modulator**. The **Fill From** source is applied to the dark (black) part of the brush. The **Fill To** source is applied to the light (almost white) part of the brush. Pure white (or value 255) in the brush is used as a mask. How the **Fill From** and **Fill To** sources are combined over the gray values of the brush depends on the particular **Fill Option**.

The **Fill From** source can be spatially offset from the **Fill To** source by adjusting the parameters in the **Paint Source Offset** pane.

A paint dab is generated from the current brush output, the two paint fill sources, and their associated parameters. After the paint dab is generated, it is then applied to the Canvas according to a particular paint fill Algorithm, a Compositing operation, and several masking and blend options.

Certain paint fill Algorithms can generate a second paint fill process with different parameters that interacts and runs in parallel with the primary paint fill process.

**Fill From**

Determines the fill from source, which is applied to the dark parts of the brush.

**Fill From Modulate**

Determines how the fill from source is modulated.

**Mod %**

Percentage of Fill From modulation.

**Fill To**

Determines the fill to source, which is applied to the light parts of the brush.

**Fill Option**

Determines how the Fill From and Fill To sources are combined together over the grayscale range of the brush to generate a dab of paint.

**Algorithm**

Determines the particular type of painting fill process. Some algorithm settings that Mix will generate an integral second Paint Fill process with their own Composite and Blend controls. The Mix Ratio control specifies the interaction of these two parallel Paint Fill processes.

**Composite**

Specifies a compositing operation that determines how the paint dab interacts with the existing Canvas.

**Masking**

Determines masking options for the application of the paint dab to the Canvas. If the masking option is true at a particular Canvas location, the paint will be applied to the Canvas.

**Blend Mod**

Determines a modulation source to modulate the paint blend to the Canvas.

**Blend %**

Determines the maximum paint blend to the Canvas in percent.

**Z Mask**

Determines if a Z depth mask and buffer is used for paint application.

---

## Brush Source



Determines the initial source for the brush. You can see the current source brush in the small image on the top right side of the pane.

The actual brush used for painting is the output of the Brush Type algorithm, which uses the Brush Source as one of its inputs. Typically the Brush source is used as a mask for an overall dynamic computational brush. This could be a luminance mask or a depth mask or both.

**Brush Source**

Computational brushes are generated algorithmically. Image brushes are generated from a source image file. Text brushes are generated from a text font and string of text. Movie brushes are generated from a source movie file.

## Computational Brushes



Computational brushes are generated algorithmically. The basic algorithm generates a smooth symmetrical brush that blends from black at the center to white at the edges.

There are many interacting parameters available to adjust the appearance of the computational brush. They can modulate the shape and falloff of the smooth brush as well as modulate or invert symmetry.

Additional controls can randomize the brush. Randomization can be static or applied dynamically every time the brush is generated. The

source brush image will interactively update as you adjust the parameters.

**Comp Brush**

Type of computational brush

**Bias/Gain**

Define a luminance transfer function for the computational brush.

**Horizontal/Vertical**

Determines the size of the source brush.

**Orient**

Determines the orientation of the source brush. You need to set the directionality to something other than zero to see the effect of this parameter.

**Directionality**

Determines the directionality of the source brush. Increasing the directionality makes the brush more elliptical.

**Height**

Height of the source brush. Values greater than 100% will react differently depending on the comp brush type.

**Corner Pull**

Pulls the brush towards or away from the corners.

**Symmetry**

Specifies specific symmetry algorithm adjusted by Pre-Sym and Post-Sym settings.

**Pre-Sym/Post-Sym**

Distorts the symmetry of the source brush. Complicated interaction with Orient/Directionality, and Corner Pull.

**Random Type**

Specifies an algorithm to randomize the computational brush. If Unique randomization is specified, a unique and different Source Brush will be generated each time the Brush Modulation module

generates a new instance of the Source Brush.

## Image Brushes



A source brush can be generated from a static image file located on your hard disk.

You can load a new brush image file by using the “New Image Brush...” menu located in the “File” main menu. The brush file name, size, and the brush itself are displayed.

To choose a new image file as the Source Brush, use the “File : New Image Brush...” menu command. Use common sense when specifying a particular image as a Source Brush. Choose an image with dimensions appropriate for use as a brush source image. Depending on the settings in the Brush Modulation pane, many copies of the Image Source Brush will be generated in memory.

When loading a new Paint Patch, if Studio Artist can’t find the brush image file originally specified, it will do two things. First, it will see if there is a brush file of the same name in the Brush folder located adjacent to the Studio Artist application on your hard disk. If it can’t find a file with the same name in that folder or any of its subfolders, Studio Artist will then bring up a Standard File dialog so that you can manually specify the location of the Source Brush image file.

In general, you should keep your various image brush files in the Brush folder located next to the application. You can use subfolders within the Brush folder to organize your image brushes by category. Taking the time to manage your image brushes in this fashion will make moving between different machines and hard disks much easier.

## Text Brushes

This brush dynamically generates the Brush Source from the individual letters in a string of text.



To change the text string used for the text brush, use the “Canvas : Text Brush Source...” menu command. This command will bring up a dialog with a text message. You can edit this text message with your own.

Each time a brush is used to paint a dab of paint, the Source Brush is computed dynamically from one of the individual letters in the Text Brush message. Which letter is used to generate the Source Brush depends on the settings in the Position Mod control. Letter positioning can be dynamically modulated in real time or cycled sequentially.

### Style/Font

Determines the style and the specific font used for the text brush.

### Size

Determines the size of the text brush source.

### Position Mod

Determines how the current letter positioning in the source text is modulated.

## Movie Brushes



This brush dynamically generates the Brush Source from the individual frames in a QuickTime movie located on your hard disk. You can load a new brush movie file by using the “New Movie Brush...” menu located in the “File” main menu. The brush file name, size, and a frame of the brush itself are displayed. A brush movie file is a QuickTime movie. Each frame of the movie can be used as a unique Brush Source that can be dynamically varied as you paint.

To choose a new movie file as the Source Brush, use the “File : New Movie Brush...” menu command. Use common sense when specifying a particular QuickTime movie as a Source Brush. Choose a movie with frame dimensions appropriate for use as a brush source image. Depending on the settings in the Brush Modulation pane, many copies of a given movie frame will be generated in memory.



When loading a new Paint Patch, if Studio Artist can't find the brush movie file originally specified, it will do two things. First, it will see if there is a brush file of the same name in the Brush folder located adjacent to the Studio Artist application on your hard disk. If it can't find a file with the same name in that folder or any of its subfolders, Studio Artist will then bring up a Standard File dialog so that you can manually specify the location of the Source Brush movie file.

In general, you should keep your various movie brush files in the Brush folder located next to the application. Taking the time to manage your movie brushes in this fashion will make moving between different machines and hard disks much easier.

#### **Frame Mod**

Determines how the current frame positioning in the movie is modulated.

#### **Index**

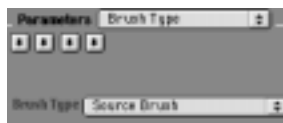
Determines the indexing used for the frame positioning modulation.

#### **Load Status**

Determines whether the movie brush is preloaded into memory or read from disk while drawing. Preload is useful for fast interactive movie brushes. Disk Draw is useful for using a movie brush to composite larger movie files in paint action sequence animations or movie processing.

---

## **Brush Type**



The actual brush used for painting is the result of the interaction between the current Brush Source and the specific brush generation algorithm specified here. Studio Artist has the ability to create modulatable brush texture on the fly to generate a dynamic brush that can interactively change depending on how you paint or draw.

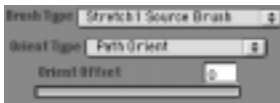
Typically, the Brush Source is used as a mask for a dynamic algorithmic texture generator.

## Brush Type

Specific brush generation algorithm

### Source Brush

Just use the Source Brush as the paint brush.



### Stretch Source Brush

Stretches the Source Brush along the path.

### Stretch1 Source Brush

Stretches the Source Brush along the path while performing an area fill.

### Procedural Stretch

Like a stretch brush but filled with algorithmic texture

### Procedural Brush

Typically the most popular brush algorithm. The dynamic algorithmic texture can interact with the Source Brush in different ways depending on the Brush Op setting.

### Geodesic Circular

### Geodesic Rectangular

Algorithmic brushes that don't use the source brush. Good for a certain kind of fractal texture look, simulation of capillary bleed, or certain unique stylistic effects.



### Computational Stretch

Algorithmic brush like the computational source brush that is stretched dynamically along the path.

### Source Alpha Brush

Just use the Source Brush alpha channel as the source brush for Paint Fill calculations.

## Specific Brush Generation Parameters

### Stretch1 Source Brush

#### **Orient Type**

Determines the orientation modulator for the stretching source brush.

#### **Orient Offset**

Specifies an angle offset for the orientation modulator.

### Procedural Stretch Procedural Brush



These brush algorithms are based on dynamic texture generators. They generate brush textures computationally on the fly as you draw. The texture can either always be the same or always be different, which is great for organic looking images that have the subtlety of nature.

Several parameters can be modulated interactively, including texture orientation and clipping.

#### **Orient Type**

Determines the orientation modulator for the procedural texture generator.

#### **Orient Offset**

Specifies an angle offset for the orientation modulator.

#### **Clip**

Specifies **maximum clipping for procedural texture**.

#### **Clip Mod**

Specifies **modulator source for clipping**.

**Random Start**

Determines if the procedural texture generator always starts from the same or a random set of initial conditions for each path.

**Brush Op**

Specifies the interaction between the generated brush texture and the Source Brush.

**Turb Levels**

Specifies the number of octaves of turbulence in the procedural texture generator.

**Turb Alg**

Determines the specific texture generator algorithm used to dynamically generate brush texture.

**Path Len Inc**

Specifies the texture scaling along the direction of the path.

**Path Width Inc**

Specifies the texture scaling perpendicular to the path.

Geodesic CircularGeodesic Rectangular

Geodesic brushes operate very differently than the other brush types. They don't always behave like the other brush types, but can generate very unique fractal or geometric visual effects.

Unlike the other brush types, geodesic brushes do not interact with the Source Brush in any way. They totally override it as they draw.

**Bias / Gain**

Define a luminance transfer function for the geodesic brush algorithm.

**Max Count**

<b>Random Count</b>	Determines the maximum size of the geodesic brush.  Specifies the random indexing associated with the geodesic brush algorithm.
<b>Iterations</b>	Specifies the number of iterations or repeats for the geodesic brush algorithm. This parameter will tend to multiply the actual size of the brush Canvas coverage.
	<u>Computational Stretch</u>
<b>Orient Type</b>	Determines the orientation modulator for the stretching computational brush.
<b>Orient Offset</b>	Specifies an angle offset for the orientation modulator.
<b>Bias / Gain</b>	Define a luminance transfer function for the computational brush algorithm.

---

## Brush Modulation



Determines how the brush size and orientation are modulated. Modulation can be interactive or algorithmic. A fixed number of brush sizes and orientations are precomputed to speed up interactive drawing. There are adjustable controls to specify how many precomputed brushes are generated. The total number of precomputed brushes will be the # of size brushes times the # of orientation brushes.

The different size and orientation brushes are generated from the Source Brush. The horizontal and vertical brush size in the Brush Source control panel maps to 100% brush size modulation.

Both the brush size and orientation can be modulated dynamically while drawing. There are a large number of potential modulation sources that can be chosen from.

### # Brush Sizes

How many different size brushes are generated

### Size Mod

Determines a modulation source for the brush size

### Brush Size Range

Specifies minimum and maximum size brushes as a percentage of the Source Brush Horizontal and Vertical dimensions.

### Interpolation

Type of interpolation algorithm used to generate different size brushes.

### # Brush Orients

How many different orientation brushes are generated

### Orient Mod

Determines a modulation source for the brush orientation

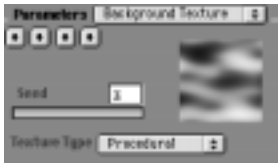
### Angle Variation

Determines the maximum orientation modulation amount.

### Angle Offset

Determines an initial orientation offset for brushes.

## Background Texture



The background texture is available throughout the paint synthesizer as a modulation source. One typical use would be to modulate a paint fill operation based on a texture. The texture can either be algorithmic or based on an image file. The texture can be static or dynamic depending on the parameter settings. The texture can be used for things like simulating textural properties of media, or as a second texture source to modify the algorithmic brush.

### Seed

Numerical seed for the random number generator.

### Texture Type

Procedural is an algorithmic texture. Image is based on a source image that is replicated according to a user definable symmetry or mosaicing pattern to cover the canvas.

## Procedural Textures



The procedural texture is based on a computational texture generator. Depending on its associated parameter settings, it can either be used to generate a fixed background texture or as a second dynamic brush texture that tracks the pen or mouse.

The size, and spatial position of the texture pattern can be adjusted. Orientation of the texture pattern can be a fixed adjustment or dynamically modulated.

Below are the adjustable parameters for procedural background textures. An interactive preview of the generated background texture is displayed at the top of the control panel as a visual aid while editing these parameters.

**Orient Mod**

Modulation source for the orientation of the texture. Fixed is static. The others allow for dynamic textures.

**Orientation**

Determines the spatial orientation of the texture.

**Size  
Directionality**

These controls interact to determine the spatial size and directionality of the generated texture.

**Horz/Vert Offset**

Determines a spatial offset for the texture.

**Random Start**

New texture for each paint stroke if checked.

**Invert**

Grayscale inversion of the background texture.

**Turb Alg**

Type of turbulence algorithm.

**Turb Levels**

# of octaves of turbulence.

**Bias/Gain**

Mapping transform for the texture.



## Image Textures



Image textures are defined by tiling a rectangular texture image. The image is read from disk. You should store your texture images in the Brush folder. Symmetry operations can be specified for the tiling replication operation.

Depending on its associated parameter settings, it can either be used to generate a fixed background texture or as a second dynamic brush texture that tracks the pen or mouse.

### **Orient Mod**

Modulation source for the orientation of the texture. Fixed is static. The others allow for dynamic textures.

### **Orientation**

Determines the spatial orientation of the texture.

### **Horz/Vert Offset**

Determines an initial spatial offset for the texture.

### **Random Start**

New texture offset for each paint stroke if checked.

### **Invert**

Grayscale inversion of the background texture.

### **Bias/Gain**

Mapping transform for the texture.

### **H Sym**

Specifies a horizontal symmetry operation for replicating the source texture image.

### **V Sym**

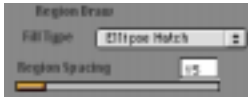
Specifies a vertical symmetry operation for replicating the source texture image.

---

## Miscellaneous

Anything we couldn't figure out where else to put.

### AutoDraw Parameters



Parameters used in action and autodraw painting. Studio Artist can generate artificial pressure channel information during autodrawing to generate more dynamic auto drawn paint strokes.

#### Autodraw Pres

Algorithm to generate pressure information when autodrawing. Allows for paint patches that work with a pressure sensitive pen to still modulate their appearance during autodraw actions.

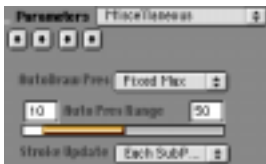
#### Auto Pres Range

Minimum and Maximum range values for the Autodraw Pressure algorithm..

#### Stroke Update

Determines whether post-stroke updating takes place for autodraw interactive mouse drawing at mouseup or for each individual stroke. Updates include resetting the Z-buffer and the Undo Canvas, which are used in certain Paint Fill operations.

### Region Draw Parameters



Parameters used in interactive region draw mouse mode. User interactively specifies a region on the canvas that is then filled with algorithmically generated paint strokes.

#### Fill Type

Algorithm to generate a path to fill an interactively specified region. The first 10 fill types are also accessible via hot keys 1,2,...,0 when in Region Draw mouse mode.

## Region Spacing

Spacing used in the Region Draw fill algorithm.

## Global Evolution



This pane can be used to algorithmically generate new paint patches. You can morph two different paint patches or evolve new patches through selective random evolution. You can automatically redraw the current Bezier layer with a newly generated patch if the Redraw Bez Layer checkbox is on.

Morphing two different paint patches continuously varies the individual parameter controls from the start patch values to the destination patch values. All in-between parameter values will be accessed with patch morphing.

Mingling two different paint patches mixes specific settings from the start patch with specific settings from the destination patch. Only parameter settings from one of the two mingle patches are accessed, there is no continuous individual parameter variation.

Random evolution randomly varies a subset of the parameters associated with the current patch.

## Interactive Morph

Specifies a modulation source to dynamically morph between the two different paint patch memories Patch 1 and Patch 2 while drawing. Be aware that this is a very modal operation that overrides all of the current paint parameters while drawing if turned on.

## Patch 1 / Patch 2

Two different paint patch memories. Option click to record the current paint parameter settings, Click to set the current paint parameters to the settings in the memory. These paint patch memory settings are used as the source and destination for patch morphing or mingling.

### Patch Morph

Use the slider to morph or generate a tween patch from Patch Mem1 and Patch Mem 2.

### Mingle

Generates a new patch by mingling parameters from Patch Mem1 and Patch Mem 2. The morph slider value determines the mix of the parameters from the two patch memories.

### Redraw Bez Layer

If checked, studio artist will redraw the current bezier path layer using the current paint parameters anytime they are changed by a global evolution morph or mutate operation.

### Randomize

Randomize the current paint patch parameters based on the current Mutate settings. Uses the Spread setting to determine the percentage of paint parameters changed in a given mutation cycle.

### Spread

Percentage of paint parameters changed in a given mutation cycle.

---

## Time Particles



Expands the functionality of the paint synthesizer to generate time motion effects. Controls persistence of paint strokes and their movement characteristics over time.

The Path Start control panel settings will be used to determine a set of path start locations for the first frame in a sequence. If time particles are turned on, these initial start locations will persist over time as individual time particles and have movement properties specified by the parameters in this control panel.

Time particle effects will only become apparent when a Paint Action Sequence is used to generate PAsEq animation or process a series of

movie frames.

If time particle operation is active when generating or processing a series of frames, then the Path Start parameters will only be active for the first frame in an animation. Each generated paint stroke Path Start location will spawn an individual Time Particle that will persist for the duration of the PAsEq animation or processing. The individual path start locations for stroke drawing in subsequent frames will be derived from the behavior of the spawned Time Particles. The parameters associated with this control panel determine the time movement behavior of the individual time particles .

<b>ON/Off</b>	Turns time particle operation on/off.
<b>Path Inc</b>	Specifies time particle path spacing.
<b>Boundary</b>	Specifies option for path adjustment when a time particle path runs into a Canvas boundary
<b>Path Diverge</b>	Specifies a set of conditions that will cause a time particle path to randomly diverge from it's present orientation.
<b>Path Type</b>	Determines the time particle path generation algorithm.
<b>Path Angle</b>	Determines the source of the angle information used in the path generation algorithm.
<b>Angle Mult</b>	Typically set to 100. Used as a multiplier of the current path angle in the time particle path generator. Also determines the number of revolutions (divide by 100) in a spiral path.
<b>Angle Offset</b>	Offset added to the time particle path angle.
<b>Angle Slew</b>	Determines how quickly a change in path angle is accumulated in the time particle path generator. Smaller values lead to smoother paths.

**Angle Inc**

Determines how often the time particle path angle is updated. For example, a setting of 10 means that the path angle will only be updated every 10 pixels.

# Chapter 4: Image Operations

Image Operations are a set of image processing filters or processes that each have unique parameter panes. They act to transform the current Canvas by processing it with a particular effect. Some image operations may also be modifiable or influenced by current visual attributes, global paint color memories, or the current region selection.



Each image operation also has a compositing operation and mix control located at the bottom of the parameter pane. The use of different compositing operators can totally change the effect of a given image operation, resulting in a manyfold increase in possible visual effects achieved with a given image operation. You can also specify a specific number of repetitions of a particular image operation.

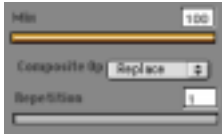
The current image operation is initiated by pressing the **Action** button, or by choosing the “**Do Current Action**” menu, or by the key shortcut **Cmd-Spacebar**. To stop an executing image operation, press the Spacebar key.

Paint Action sequences can be used to combine together different image operations to generate complex visual processes. You can use Paint Action Presets to access these operations at the touch of a button.

## Generic Image Operation Parameters

Certain image operation parameters are available for all image operations. They allow for mixing or compositing the effect image with the original canvas image, and specifying repetitive image operations.

The final output of the image operation is the result of the specified compositing operation. Depending on the particular compositing operation specified, the resulting visual effect can be totally transformed from the original image operation. This greatly increases the



### Mix

range of possible visual effects available from a single image operation. For example, specifying an **Edge1** compositing operation on an image operation that blurs the Canvas image will generate a sharpening visual effect.

The percent amount of mix between the output of the compositing operation and the original Canvas image.

### Composite Op

Specifies a compositing operation that takes the original input canvas image and the effected canvas image and algorithmically combines them in some specified fashion. The output of the compositing operation is placed in the current Canvas at the completion of the image operation.

### Repetition

Specifies the number of times to iterate or repeat the image operation. The first iteration uses the current Canvas as the source for the image operation. Each iteration after the first one takes the effected output of the previous iteration and uses that as the source.

---

## Block Abstraction

Abstracts the Canvas image as a series of colored blocks. The algorithm is smart and tries to position the blocks to best represent the original image and it's edges.

### Complexity

Decreasing the Complexity generates fewer colored blocks. Increasing the complexity generates more colored blocks that better represent the original image edges.

### Variation

Different computational options for the abstraction algorithm

---

## Blur



Performs a softening blur operation on the Canvas image.

Can be used with Edge1 compositing to provide sharpening effects.

**Blur Amount**

The percent amount of blur. Increasing gives a smoother effect.

**ColorSpace**

The color space the blur is performed in.

## Color Quantize

Quantizes or reduces the number of colors in the Canvas image to a fixed amount.

**Number of Colors**

The number of colors to quantize to.

**ColorSpace**

The color space the operation is performed in.

**Variation**

Adaptive chooses colors to best represent the image. Uniform subdivides the entire colorspace uniformly without taking the image into account.

## ColorEdge

Generates a colored thin edge rendition of the Canvas image.

**Smoothing**

Increasing the Smoothing gives a smoother edge rendition that is less susceptible to noise. Decreasing Smoothing gives more edge information but also is influenced by image noise.

## Colorize

Generates a colorizing special effect. Uses the Canvas image as the color source for the effect.

**Source**

The image attribute used as a source to be colorized by the Canvas image.

**ColorSpace**

The color space the operation is performed in.

---

## ConvexHull

Generates a complex hull, which is a type of nonlinear morphological image operation.

**Size**

The spatial extent of the operation.

**Variation**

The type of nonlinear operation used when computing the complex hull.

**Convex Alg**

The particular algorithm used when computing the complex hull.

---

## Fixed Color

Generates a fixed color field.

Can be used in movie effects to produce transitional fades. Can also be used to decrease color saturation or transform a color image into a grayscale image.

**Fixed Color**

The fixed color to fill with.

**Color Space**

The color space the operation is performed in.

**Combination**

Specifies options for which colorspace components are processed.

**Fracture**

Generates a series of random symmetry fractures of the Canvas Image.

**Number of Random Starts**

The number of random fractures generated in the operation.

**Algorithm**

The particular fracture algorithm.

**ColorSpace**

The color space the operation is performed in.

**Mode**

Specifies the type of symmetry associated with the fracture.

**Fracture Displacement**

Generates a series of random area fractures of the Canvas Image. Each fractured area is then randomly displaced.

**Number of Random Starts**

The number of random fractures generated in the operation.

**Displacement Amount**

The maximum amount of random displacement within a fracture area.

**Displace**

Specifies whether the Displacement Amount is in pixels or percent of the Canvas dimensions.

**Algorithm**

The particular fracture algorithm.

**ColorSpace**

The color space the operation is performed in.

**Geodesic Displacement**

Generates a geodesic area sampling of the Canvas Image. Each area is then randomly displaced.

**Number of Random Starts**

The number of random starts in the operation.

**Displacement Amount**

The maximum amount of random displacement within a growth area.

**Random Count**

Geodesic random count.

**ColorSpace**

The color space the operation is performed in.

---

## Geodesic FX

Generates a geodesic special effect.

**Number of Starts**

The number of random starts in the operation (times 20).

**Iterations**

The number of iterations run in the effect.

---

## Geodesic Growth

Generates a geodesic area sampling of the Canvas Image, and then fills that area with the sampled Canvas color.

**Number of Iterations**

The number of iterations in the operation.

**Number of Random Starts**

The number of random starts in each iteration.

**Random Count**

Geodesic random count.

---

## Geodesic Interpolation

Interpolates the Canvas image to fill in a background area.

Useful to fill in white space left after a series of Paint Actions. Works best with hard paint stroke edges. Does not work well with anti-aliased paint stroke edges.

**Number of Iterations**

The number of iterations in the operation.

**Gate**

Specifies a gating range for the background color.

**Background**

Background color to fill in.

---

## Geodesic Recursive Growth

Generates a geodesic area sampling of the Canvas Image, and then fills that area with the a recursively modulated Canvas color.

**Number of Iterations**

The number of iterations in the operation.

**Number of Random Starts**

The number of random starts in each iteration.

**Random Count**

Geodesic random count.

**Recursive Feedback**

Amount of recursive feedback.

---

## Geodesic Rings

Generates a geodesic area sampling of the Canvas Image, and then fills

that area boundaries with a sampled Canvas color to generate rings.

**Number of Random Starts**

The number of random starts in one iteration.

**Number of Iterations**

The number of iterations.

---

## Geodesic Variator

Interpolates the Canvas image to fill in a background area.

**Alpha**

The recursive mix.

**Number of Iterations**

The number of iterations.

**Random Count**

Geodesic random count.

**Background**

The background to be filled.

**Blend Option**

What the operation does to the background.

---

## Geodesic Warper

Performs a geodesic warp from an automatically generated edge rendition of the image.

Good for generating a visual appearance that looks like melting or liquid flow.

**Smoothing**

Increasing the Smoothing gives a smoother edge rendition that is less susceptible to noise. Decreasing Smoothing gives more edge information but also is influenced by image noise.

**Number of Iterations**

The number of iterations in the operation.

**ColorSpace**

Specifies the colorspace the operation is performed in.

---

## Gradient

Generates a lighting gradient based on the Canvas image.

Can be used to generate a 3-dimensional appearance or as a way to generate nonlinear edge effects.

**Angle**

The angle of the lighting source.

**Elevation**

The elevation of the lighting source

**Width**

The width of the effect.

**ColorSpace**

What colorspace the operation is performed in.

**Variation**

Specifies the type of gradient.

---

## Image Compressor

Smart adjustment of the Canvas image. Acts like an audio compressor on images that maximized signal gain (not to be confused with data compression algorithms that throws away information).

Used as a way to automatically enhance an image.

**Local Adaption**

Specifies the amount of local adaption

**Gain**

**Bias**

**Mode**

Attribute options for processing.

---

## **Invert**

Inverts the Canvas image.

**ColorSpace**

Specifies the colorspace the operation is performed in.

**Combination**

Specifies options for which colorspace components are processed.

---

## **Line Screen**

Smart line screen algorithm.

**Screen Size**

Specifies the size of the screen to be modulated.

**Modulation Offset**

Specifies an angle offset for the modulator.

**Mod Source**

Specifies the modulator source.

**Variation**

Colorspace variation for processing.

**Mod Option**

Option for modulator algorithm.

**Screen Option**

Option for screen algorithm.

---

## **Morphol**



A number of different nonlinear morphological operations.

Depending on the algorithm settings, this effect can do many different things. Can be used to generate edge effects, darken or lighten via edge growth, generate stained glass-like effects, and enhance or deblur images.

**Algorithm**

Specifies a particular morphological algorithm.

**ColorSpace**

Specifies the colorspace the operation is performed in.

## Oil Painter

A special effect that give a particular oil paint look to the Canvas image.

**Number of Random Starts**

Specifies the number of random starts for the algorithm.

**Number of Iterations**

Specifies the number of iterations for the algorithm.

## Random Block Exchange

Randomly exchanges area blocks within the Canvas image.

Can be used as fun special effect when combined with different compositing options.

**Number of Exchanges**

Specifies the number of block exchanges.

**# of Horizontal Blocks**

Specifies the number of horizontal blocks.

**# of Vertical Blocks**

<b>Options</b>	Specifies the number of vertical blocks.
	Specifies options for block generation algorithm.

---

## Rank Line Filter

Allows for the application of a number of different nonlinear rank filters to the Canvas image.

<b>Size</b>	
<b>Angle</b>	Specifies the spatial extent of the rank filter.
<b>Algorithm</b>	Specifies the angle of the rank filter.
<b>ColorSpace</b>	Specifies the particular rank filter algorithm used in the operation.
	Specifies the colorspace the operation is performed in.

---

## Rank Edge Filter

Generates a nonlinear edge effect that is based on rank filtering. Can be used to generate colored edges or more complex edge-related effects that delineate positive and negative space in the Canvas image.

<b>Low Size</b>	
<b>High Size</b>	Specifies the minimum spatial extent of the rank filter.
<b>Rank Type</b>	Specifies the maximum spatial extent of the rank filter.
<b>Variation</b>	Specifies the particular type of rank filter algorithm used in the operation.
	Specifies different variations of the effect.

---

## Simple Texture

Fills the Canvas image with a simple algorithmically derived texture field.

<b>Angle</b>	Orientation angle of the texture field.
<b>Directionality</b>	Specifies the directionality of the texture field.
<b>Scale</b>	Specifies the spatial scale of the texture field.
<b>Algorithm</b>	Specifies different algorithms to generate the texture field.
<b>Octaves</b>	Specifies the number of octaves of spatial texture in the texture field.
<b>Color Var</b>	Specifies different color variations for the generated texture.
<b>Mod</b>	Specifies different modulation options for the generated texture.

---

## Smart Blur

Adaptively blurs or filters the Canvas image in an intelligent way based on a specified visual attribute.

Provides a way to intelligently smooth an image without losing edge information. Can also be used to remove noise from images.

<b>Displace Amount</b>	Specifies the spatial extent of the blur.
<b>Angle Offset</b>	Specifies an angle offset for the smart blur calculation.
<b>Variation</b>	Specifies different color and attribute variations for the smart blur.
<b>Mode</b>	Specifies different algorithm variations for the smart blur.
<b>Sym</b>	

Specifies symmetry of the adaptive filter kernel.

---

## Smart Contrast

Intelligent contrast effect that works at three different spatial frequencies simultaneously. Can be used to accentuate positive and negative space, as an adaptive hard contrast effect, or to generate comic-book like effects.

### **Smoothness 1**

Specifies the spatial frequency of contrast channel 1.

### **Smoothness 2**

Specifies the spatial frequency of contrast channel 2.

### **Smoothness 3**

Specifies the spatial frequency of contrast channel 3.

### **Threshold**

Useful to reduce the effect of noise on the contrast image.

### **Variation**

Specifies different algorithm variations.

---

## Smart Contrast1

Another intelligent contrast effect that works at three different spatial frequencies simultaneously. Can be used to accentuate positive and negative space, as an adaptive hard contrast effect, or to generate comic-book like effects.

### **Smoothness 1**

Specifies the spatial frequency of contrast channel 1.

### **Smoothness 2**

Specifies the spatial frequency of contrast channel 2.

### **Smoothness 3**

Specifies the spatial frequency of contrast channel 3.

### **Threshold**

Useful to reduce the effect of noise on the contrast image.

### **Original Source Mix**

	Mixes the source into the three channel mix prior to the contrast generation.
<b>Variation</b>	Specifies different algorithm variations.

---

## Smart Displace

Intelligent displacement effect that locally adapts based on specified visual attributes.

<b>Displace Amount</b>	Specifies the amount of displacement.
<b>Angle Offset</b>	Specifies an offset angle for the smart displacement modulator.
<b>Variation</b>	Specifies colorspace and visual attribute combinations.
<b>App Mode</b>	Specifies an application mode that composites the original image with the displaced image.
<b>Disp Mode</b>	Specifies different displacement algorithms.

---

## Sparse Interpolation

Interpolates the Canvas image to fill in a background area.

<b>Subdivision</b>	Decreasing the subdivision increases the spatial extent of the interpolation and vice versa.
<b>Background</b>	Specifies the background color to fill in.

---

## Sphere Multiplier

Multiplies the Canvas image with a spherical luminance mask. Useful as a border effect or when generating a paint brush source image in the Canvas.

**Gain**

Specifies the sphere algorithm Gain.

**Bias**

Specifies the sphere algorithm Bias.

**Corner Pull**

Decreasing from 100% pulls the sphere corners into the center of the Canvas. Increasing from 100% pulls the sphere into the Canvas corners.

---

## Spot Remover

Nonlinear filter that removes spot noise from images. Primarily intended to clean up noisy binary images. Does not have the edge distortion effects associated with median filtering noise removal.

**SpotColor**

The fixed color of the spot to remove.

**Radius of Spot**

Specifies the maximum radius of the spot to remove.

---

## Watershed

Generates a geodesic area sampling of the Canvas Image, and then grows regions from the initial sampling points.

**Watershed**

Particular watershed regions growth algorithm used.

**Number of Iterations**

The number of iterations in the operation.

**Number of Random Starts**

<b>Random Count</b>	The number of random starts in each iteration.
<b>Recursive Feedback</b>	Geodesic random count.
<b>Propagate</b>	Amount of recursive feedback.
	Options for neighbor propagation.





# Chapter 5: Action Sequences

Studio Artist has the ability to record, edit, and playback any series of manual or automatic Operation Actions. These individual steps could include automatic painting, manual painting, image operations, interactive warping, region selection color fills, etc. In addition, any transformational menu commands such as “Paint Path Layer” or “Canvas Image to Source Image” can also be recorded as individual steps in an Action Sequence.

Two different editable lists and associated controls are provided to work with Action Sequences. They are called Paint Action Sequences and History Sequences. Internal to Studio Artist they are essentially the same. They use the same data and file formats and are recorded, played back, and edited with the same individual sets of controls. The reason there are two different sequences is that they are used in different ways in normal workflows within Studio Artist.

The current History Sequence is intended to record everything done in Studio Artist for the purpose of providing a form of unlimited undo. In addition, a History Sequence can be rerendered and played back into a Canvas with a different resolution.

The current Paint Action Sequence is intended to be used to automate tasks that require several steps, and as a script for generating animations or for movie processing. Paint Action Sequences can also be organized as Paint Action Sequence Presets for easy access and execution.



---

## Working With Paint Action Sequences

To view or edit the current Paint Action Sequence, use the menu command ‘Action:Paint Action Window’. This menu command will bring up a floating list window that contains the current Paint Action Sequence.

### Sequence Controls



There are several controls located at the top of the Paint Action Window. The Play button plays back the different Action steps recorded in the Paint Action Sequence. Each individual step in the Action Sequence will be highlighted as that step is currently being played back. The list will auto scroll as playback progresses to always keep the currently playing Action in view.

You can stop the Sequence playback by using the spacebar or by mousing down in the Studio Artist interface at any time during playback. The Continue button will continue sequence playback from the current selected Action step.

The Erase button will erase the entire current Paint Action Sequence. To erase individual Action steps, use one of the Paint Action menu commands discussed below.

The Record checkbox turns on and off recording for the Paint Action Sequence. When recording is on, every time a recordable Action is initiated in Studio Artist, it is recorded as a new step in the Paint Action Sequence.

### Individual Action Step Controls



To select a particular Action step in the sequence, mouse down on the far left side of the Action sequence list element. You can drag a

selected Action step to a new location in the sequence list. To do this, mouse down on the far left side of the individual Action step and then drag it to a new location in the list. As you drag the outline of the individual step, a selection bar will show the potential new location for the dragged step. When you mouse up, the dragged individual step will be moved to the new list location.



Pressing the Action Button on the left side of the Action sequence list element will playback that particular Action sequence step. All of the interface settings associated with the particular Action step will also be reset to the parameter values stored within the step.

If Studio Artist's current operation mode is Bezier Edit, then pressing the individual step Action button will load the current Bezier path frame with the stored path for that particular Action step. This is only true if that Action step is associated with a single editable path, such as the individual mouse actions associated with drawing single paint strokes.

Option-clicking the button will update the Action sequence step's stored parameters to the current Studio Artist interface parameter settings. This is the mechanism used to edit a step in an Action Sequence.

If Studio Artist's current operation mode is Bezier Edit, then option-clicking the Action Button for a step will also record the first Bezier path in the path frame as its recorded path in addition to recording any appropriate interface parameter settings.



Each Action sequence list element has a checkbox that can be used to mute or disable its Action step without removing it from the list. If the checkbox is checked, then the Action step will play back. If the checkbox is unchecked, then the Action step will be skipped during playback.

## **Paint Action Menu Commands**

Various menu commands are also available in the ‘Action:Paint Action Commands’ submenus that operate on the current Paint Action Sequence or the currently selected Action sequence list element. Some of these menu commands provide an alternative to the interactive controls at the top of the floating Paint Action window. Additional menu commands allow for various editing operations such as deleting the current selected action or all of the current muted actions.

If recording is enabled and a new Action step has just been recorded, then executing a “Edit:Undo” menu command will remove the last recorded Actions step as well as undo the results of that Action in the current Canvas.

## **Unique Features of Paint Action Sequences**

Prebuilt Paint Action Sequences can be accessed by calling up Paint Action Sequence Presets. Whenever a new Paint Action Sequence Preset is imported or chosen in the Preset control panel, it will overwrite the current existing sequence in the Paint Action Window.

To save an existing Paint Action Sequence as a Paint Action Sequence Preset, use the “Action:Export Paint Action Sequence...” menu command. Save the exported file in the PASEq folder next to the Studio Artist application, and it will appear the next time you startup Studio Artist as one of the accessible Paint Action Sequence Presets. Each subfolder within the PASEq folder will show up as a specific category within the Paint Action Sequence Preset control panel. The category name will be the subfolder name. Any Paint Action Sequence files within one of these subfolders will be the individual Presets associated with its category.

---

## Working With History Sequences

To view or edit the current History Sequence, use the menu command ‘Action:History Window’. This menu command will bring up a floating list window that contains the current History Sequence.

Editing and interacting with History Sequences is virtually identical to working with Paint Action Sequences. Read the section called “Working with Paint Action Sequences” for any clarification on how to play, record, or edit History Sequences. Unique features of History Sequences are discussed below.

### Unique Features of History Sequences

The primary intention of the History Sequence is to provide a way to record all of the steps associated with generating a finished Canvas for later editing or playback. This provides a form of unlimited undo.

In addition, Studio Artist has the ability to Rerender the Canvas and its associated History Sequence to a different resolution. Playing back a rerendered History Sequence will regenerate all of your work at the new Canvas resolution. This can be used to rescale artwork while providing additional detail at the new resolution.

History Sequences can also be used as a way to generate paint animation movies. Each Action step in the History Sequence can be used to generate a new movie frame. See the chapter on Movies for more information on how to use History Sequences to generate paint animation or movie files.



# Chapter 6: Movies

You can use Studio Artist to generate movies from scratch or to process existing movies. You can also use Artist to generate paint animation, auto-rotoscoping, image warping, morphing, or process each frame with a Paint Action sequence. If processing an existing movie, the output resolution can be different than the input resolution.

There are primarily three different ways to work with Movie files within Studio Artist. You can generate a new movie file from scratch, transform an existing source movie file into a new processed output movie file, or load an existing movie file into RAM and hand paint or process individual frames.

In addition, Studio Artist has the ability to use a movie file as a source for a paint synthesizer brush. This can be used to provide a mechanism for compositing multiple source movie files into a final composited output movie file.

---

## Generating a New Movie File From Scratch

To generate a new movie file from scratch, use the menu command “Movie:Start Movie To File...” to initiate a new movie file. This menu command will bring up a standard file dialog that allows you to specify the name of the new movie file and its location on your harddisk.

The dimensions of the output movie will be the dimensions of the current Canvas. The frame rate will be the setting of the “**Frames per Second**” parameter, located in the **Timeline Animation** Operation parameter pane.

Once you start a new movie to file, you can write out movie frames in a number of different ways. You can either write new frames to the

open movie file by hand or run different animation operations that will generate a series of frames and write them sequentially to the open movie file. You can continue to write frames to the open movie file until it is closed with the menu command “Movie:Stop Movie to File”.

To manually write a frame to an open movie file, use the menu command “Movie:Write Canvas as Movie Frame” or the hot key Cmnd F. This menu command will take the current contents of the Canvas and write it out as one frame in the open movie file.

You can automatically write out a new frame to an open movie file at the conclusion of each Studio Artist Action by checking the menu command flag “Movie:Write Frame Flags:Write Frame Each Action”.

You can automatically write out a new frame to an open movie file after each individual paint stroke in a Studio Artist Paint Action by checking the menu command flag “Movie::Write Frame Flags:Write Frame Each SubAction”.

You can automatically write out a new frame to an open movie file after each individual Action Step in a History Sequence by checking the menu command flag “Movie:Write Frame Flags:Write Frame Each History SubAction” and then playing back the History Sequence.

You can initiate a series of **Timeline Animation**, **Timeline Warp**, **Timeline Morph**, or a **Paint Action Sequence (PASeq)** movie frames by using the submenu commands located in the “**Movie:Generate Frames**” main menu. The **# of Frames** and **Frames per Second** of the generated output movie frames are set in the **Timeline Animation** parameter pane. You can also initiate Timeline Animations from this pane by using the **Action** button.

The various Generate Frames commands can also be run without an active open movie file. The command will execute for the current # of frames directly into the Canvas, and can be used as a preview mode or to generate special effects. For example, time particle effects or timeline animation of individual paint strokes could be used to build up paint effects on a static 2D Canvas.



When you are finished writing our new frames to the open movie file, you need to close the active movie file by using the “Movie:Stop Movie to File” menu command. An open movie needs to be closed before it can be loaded into RAM for playback within Studio Artist, or opened and played in another application like MoviePlayer.

---

## **Automatically Processing an Existing Source Movie File**

Studio Artist allows you to automatically process an existing source movie file into a new autorotoscoped or effected movie file. The size or resolution of the processed output movie file can be different than the source movie file. This means that a postage stamp size source movie file can be used to generate a full resolution processed output movie.

Both the source movie file and the processed output movie file reside on your harddisk. You do not have to load a ram movie to process an existing movie file with a Paint Action Sequence. In fact, you should unload any current loaded ram movies to free up memory prior to processing a movie file.

## **Working with Paint Action Sequences**

Each frame of the source movie file will be processed by the various Actions in the current Studio Artist Paint Action Sequence. To view or edit the current Paint Action Sequence, use the menu command ‘Action:Paint Action Window’. This menu command will bring up a floating list window that contains the current Paint Action Sequence.

There are several controls at the top of the Paint Action Window. The Play button plays back the different Action steps recorded in the Paint Action Sequence. You can stop the Sequence playback by using the spacebar or by mousing down in the Studio Artist interface. The Continue button will continue sequence playback from the current selected Action step. The Erase button will erase the entire current

## Paint Action Sequence.

The Record checkbox turns on and off recording for the Paint Action Sequence. When recording is on, every time an Action is initiated in Studio Artist, it is recorded as a new step in the Paint Action Sequence.

To select a particular Action step in the sequence, mouse down on the left side of the Action sequence list element. You can drag a selected Action step to a new location in the sequence list. Pressing the button on the left side of the Action sequence list element will playback that particular Action sequence step. Option-clicking the button will update the Action sequence step's parameters to the current Studio Artist interface parameter settings.

Various menu commands are also available in the 'Action:Paint Action Commands' submenus that operate on the current Paint Action Sequence or the currently selected Action sequence list element.

Prebuilt Paint Action Sequences can be accessed by calling up Paint Action Sequence Presets. Whenever a new Paint Action Sequence Preset is imported or chosen in the Preset control panel, it will overwrite the current sequence in the Paint Action Window.

For more information on working with Paint Action Sequences, read the User Guide chapter on Actions.

## Processing a Movie File with a Paint Action Sequence

To process an existing source movie file with a Paint Action Sequence, you first need to choose a Paint Action Sequence Preset or record a new Paint Action Sequence.

To choose a Paint Action Sequence Preset, use the menu command "Operation:Presets:Paint Action Sequence" to bring up the appropriate Preset control panel. Select a Preset category using the Category popup. Then choose a specific Preset by mousing down on one of the Preset icons or by choosing a Preset by name using the Action

popup.

You can process an existing movie file located on your hard disk with a Paint Action Sequence. To start the process, use the **“Process Movie with PASeq...”** menu command located in the **“Movie”** main menu. You will first be prompted to select a source movie file. You will then get a dialog that allows you to specify the Canvas or output movie frame dimensions. The output frame dimensions can be different than the input frame dimensions. After hitting **OK** for this dialog box, you will be given a dialog to name your output movie file.

If you hit **Cancel**, the input source movie will still be processed, but the output frames will not be written to an output file. This is a good way to try out a process before committing it to an output file. Mouse down or hit spacebar to stop the movie processing at anytime.

Each input frame will be used as a source image for the current Paint Action Sequence. You can examine or edit the current Paint Action Sequence by using the **‘Action:Paint Action Window’** menu command. Remember, you need to load the source frame into the paint Canvas as a part of your Paint Action Sequence if you want to perform image processing operations on the movie source frames. You can do this by setting the Canvas Background popup to Source Image while recording your Paint Action Sequence.

---

## Working with RAM Movies

Movie files on disk can be loaded into RAM and then played back in real time or modified from within Studio Artist. RAM playback allows you to work with uncompressed video for high quality professional video painting or effects. Uncompressed movie files are typically very large files, and you will need to make sure you have enough memory allocated to Studio Artist to load an uncompressed movie into RAM.

To load an existing movie file into RAM, use the **“Movie:Load RAM Movie...”** menu command. Once a movie file has been loaded into RAM, it can be played or single stepped forwards and backwards.

If you have loaded a movie file into RAM, you can paint on top of it or process it manually frame by frame. You need to use the **R** movie transport button to record the changes before you move to a new frame or they will not be recorded. After you are done, you need to save the recorded changes in the RAM movie to disk by using the "Movie:Save RAM Movie" menu command. The changes are nondestructive. The changed frames are added to the existing movie file and the movie track playlist is edited accordingly when you Save.

---

## KeyFrame Timeline

The Keyframe Timeline can be used to specify Bezier path movement over time. The resulting path movement can be used to build up paint animation, specify moving Bezier Masks, or to define image warping or morphing operations.

The Keyframe Timeline allows recording and playback of unlimited Bezier path keyframes over the course of an animation or movie. The Timeline looks and acts like a large matrix of Bezier path memories. Each horizontal row of cells corresponds to a Canvas layer. Each vertical column of cells corresponds to a particular frame time.



The **# of Frames in the Timeline** and **Frames per Second** of the generated Bezier path movement are specified in the main Timeline Animation Operation control panel.

Individual Bezier path keyframes are drawn and edited using the

Bezier Draw and Bezier Edit operation panes. You can draw or edit Bezier paths with the mouse, or generate them automatically from the Source image, Canvas image, or individual movie frames.

Option-clicking a keyframe cell records the current Bezier path frame into that keyframe location. Clicking the keyframe cell moves to that cell's frame time and loads the current Bezier frame with the keyframe interpolated Bezier paths associated with the cell's frame time.

If the current Operation Mode is either Bezier Draw or Edit, clicking an individual frame time will update the current Bezier path display with the interpolated path at that particular time. If the current Operation Mode is Timeline Animation, then the animation step associated with the clicked frame time will be executed and placed in the Canvas.

The slider at the top of the Timeline window allows for continuous time movement over the fixed range of output frames.

## Generating a Moving Bezier Mask

Studio Artist has the ability to generate a series of selection masks directly from the current path frame. By using the KeyFrame Timeline, these Bezier masks can be animated over time. This could include scaling, rotation, and movement as well as deformation or reshaping.

To convert the current path frame into a set of individual mask regions, use the "Canvas:Set Current Region Selection to:Path Frame to Region" menu command. Studio Artist assumes that each Bezier path in the path frame is the outline for a single Bezier region.

If the above command is recorded in a Paint Action Sequence, then the contents of the KeyFrame Timeline can be used to specify a series of animating selection masks. To soften the edges of the resulting Bezier selection masks, use the "Canvas:Current Region Selection Commands Feather" menu command.

---

## Working with Alpha Channels in Movies

Studio Artist has the ability to work with embedded alpha channels within QuickTime movies. Selection masks based on the alpha channel associated with each source movie frame can be generated when processing movies. Alpha channels can also be generated for each output frame from a variety of sources. QuickTime's alpha graphics modes for movie playback are also supported for loaded RAM movies.

To generate a current selection region from a movie frame alpha channel, use the "Canvas:Set Current Region Selection to:Source Alpha Image" menu command. Recording this command as an Action step in a Paint Action Sequence will automatically generate a selection region from each individual movie frame when processing a movie file with that Paint Action Sequence.

To use the current selection region as a mask for any Operation, set the Mask popup above the Canvas from None to Paint. Any Actions recorded in a Paint Action Sequence while masking is on will use the current selection region as a mask.

An output frames alpha mask can be generated from a number of different sources, including:

1. Current source frame alpha channel
2. Current region selection
3. Keyframe Bezier mask
4. Current Blanking frame.

The Canvas alpha channel is not supported as an output alpha channel source in version 1.1. More complete Canvas alpha channel support is anticipated to be supported in future versions of Studio Artist.

For movie files generated from scratch, alpha channel generation options can be accessed in the "Movie:Generate Movie Settings..." menu command dialog.

For movie or image files generated by processing existing files, alpha

channel generation options can be accessed in the “Movie:Process File Settings...” menu command dialog.

In addition, embedded alpha channels in movie files can be used as masks for movie compositing. See the section on “Using Movie Brushes to Generate Compositing Effects” for more information.

---

## Working With Time Particles for Motion Effects

Studio Artist’s Paint Synthesizer has the ability to generate a series of individual paint strokes that have temporal continuity from frame to frame. The mechanism to do this is based on the notion of time particles.

A time particle is generated for each individual paint stroke in the first frame of an animation or movie. Each time particle keeps track of the path start location of its associated paint stroke. Each time particle can also have its own movement behavior. The characteristics of each time particles movement over subsequent frames in a movie sequence is determined by the parameters in the Time Particle control panel in the Paint Synthesizer.

If Time Particles are active in the Paint Synthesizer patch, then they override the Path Start generator for positioning individual paint strokes for all frames after the first frame in a generated or processed movie. How many time particles are generated in the first frame and where they are positioned are a function of the Path Start parameters.

If Time Particles are off, then the Path Start parameters are always active for each frame. If a Paint Action Sequence is played manually (ie. not a part of a generation animation or movie process) or Action Painting is initiated, the Paint Synthesizer will always act as if it is generating the first frame (ie. the current Path Start parameters will determine the start points for the auto paint strokes).

---

## Working With Movie Brushes

Studio Artist's Paint Synthesizer has the ability to use a QuickTime movie as a Brush Source. There are several different applications for movie brushes.

A movie brush can be designed to provide a rich set of individual textures or brush patterns. These can be used as raw material within the Paint Synthesizer to create dynamic paint tools. Interactive modulation parameters such as pressure or tilt can be used to index through the individual movie frames in real time while drawing.

Movie brushes can be generated automatically from folders or databases of still images. These sets of images can then be used to generate interactive photomontage paint tools and images.

The Paint Synthesizer also supports embedded alpha channels associated with movie brushes. This approach to painting allows for compositing individual movie files in other generated or processed movies.

### Using Movie Brushes to Generate Compositing Effects

Suppose you have several small movie files you would like to combine together within a larger composite movie file. Movie brushes can be used to do this.

The Paint Synthesizer supports embedded alpha channels associated with movie brushes. It can use the embedded alpha channel as the Paint Fill source brush while Filling with the individual movie brush frame images. Each compositing movie file is specified as an individual paint Action in a Paint Action Sequence. Brush frame indexing can be based on the current output movie frame.

### Using Movie Brushes to Generate Photomontage Images



Studio Artist provides several features that can be used to automatically generate movie brushes from folders or databases of individual static images. These database movie brushes can then be used to generate photo montage images in real time based on perceptual mapping using Studio Artist's embedded visual modeling.

Several examples are provided in the paint Patch Preset category called "Photomontage".

Automatically generating a movie brush is based on processing a folder of images with a Paint Action Sequence. The first step is to record an appropriate Paint Action Sequence. Open the Paint Action Window using the "Action:Paint Action Window" menu command. Erase the current sequence and turn on recording.

Record setting the Canvas background to the Source Image by either changing the background popup to Source Image or pressing the arrow button to the left of the popup if it is already set to Source Image. You should see an Action step appear in the Paint Action Window titled "Set Paint Background". Turn off Paint Action Recording.

To generate a movie brush from a folder of images, use the 'Movie:Process Image Files With PASEq to Movie...' menu command. A standard file dialog will appear that you can use to select an image file from within the folder you wish to generate a movie brush from.

Select an image file and click OK. A canvas sizing dialog will then come up. Select the canvas size to be the brush size you would like for your movie brush. Remember that for interactive painting, the entire movie brush file (ie. all of the individual frames in the movie brush) needs to be pre-loaded to memory, so try and keep your movie brush size small. Try something like 32x32 as an initial default size when experimenting.

Next, a second standard file dialog will appear. Use this dialog to name your output movie brush file. Press OK and Studio Artist will process each of the individual image files within the source folder and output them as subsequent frames in the movie brush file.

Choose a paint patch you would like to edit to use your movie brush. As a starting point, try the “Tutorial:Movie Brush Starter” Paint Patch Preset.

Switch to the Paint Synthesizer Brush Source control pane. Use the ‘File:New Movie Brush...’ menu command to select a new movie brush file. A standard file dialog will appear. Select the movie brush file you just generated and press OK. The individual frames of the movie brush will preload into memory.

Try painting a few strokes with the movie brush tool. Note how the paint tool moves through the individual movie frames as you draw. Now, switch the Frame Mod popup to RGB Mapping. Try painting a few strokes and notice how Studio Artist automatically chooses the particular movie frame that best represents the source color.

The Frame Modulation popup determines how the individual frames are chosen. Modulation can be based on interactive modulators such as pressure and tilt, or on perceptual modulators such as luminance, orientation, or color.

The Index popup chooses the particular indexing used in the modulation step. Load status determines whether the movie brush is preloaded into memory or drawn from disk. Preloading is best for interactive drawing. Drawing from disk is best for compositing large movie files.

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## **Recording Your Painting Directly to Video**

Complete individual paint strokes can be output to an open QuickTime movie file by activating the ‘Write Frame Flags:Write Frame Each Sub Action’ menu flag. Or, you can record a history sequence to a movie file by activating the “Write Frame Flags: Write Frame Each History Sub Action” menu flag and playing back the History Sequence.

However, one of the coolest things about Studio Artist is watching it paint in real time to the screen. One of our users, Wayne Folta, came up with this method to record the output from Studio Artist directly to video as it draws in real time.

First, you need to use a Macintosh with NTSC video output built in. Wayne uses a 400Mhz “Bronze” PowerBook. You can output to S-video by mirroring the display on the LCD screen to the video output.

To enable S-video output on the Bronze PowerBook :

1. Set Studio Artists preferences to split the control panels. You will need to quit and restart Studio Artist for this preference to take place.
2. Put the PowerBook to sleep. (Close the lid and wait until the lit Apple logo goes out.)
3. Plug an S-video cable into the S-video port and connect the other end to a VCR .
4. Wake up the PowerBook. You should now see an image on the LCD screen and the NTSC monitor connected to the VCR.
5. Adjust the NTSC screen for overscan using the TV Mirroring control strip button (looks like a TV with rabbit ear antenna on top). If you do not see this control strip button, you may not have the AppleVision extension in your extensions folder.
6. Place the Studio Artist Canvas window on the NTSC screen and the other control palettes on the regular PowerBook screen.

Older PowerBooks cannot display to both the external monitor and the internal monitor, so the steps above will need to be modified to take this into account.



# Chapter 7: Helpful Hints

## Designing a Paint Strategy

Before you start editing a new paint patch, take a moment to plan out a paint strategy to aid in your patch design. A paint patch is composed of a series of parameters that define paths, paint source, paint and brush characteristics. Your strategy should take into account how these parameters interact as well as the paint look you are trying to achieve.

What are your goals? Are you designing a paint that will be drawn in real time with an interactive pen, or one that will autodraw without user supervision. Will you start your drawing from a fixed color background? Should the paint be wet or dry?

How you answer these questions will determine how the vast number of various editable parameters available within Studio Artist should be adjusted. Each parameter needs to be carefully chosen to match the specified goals of your paint strategy.

## Designing a Custom Art Process

Paint Action Sequences can be built to implement custom art processes that are accessible at the touch of a button. An art process may be composed of several different steps that combine together to generate a final effect or artistic look. These steps may emulate traditional real world tools and techniques, or generate totally new looks.

One example of an emulative art process might be a custom water color paint effect. In the real world, you might start with a textured paper and apply a background wash with a large brush. Then you might fill in details with a finer brush. Detailed edges might then be

drawn with a fine black line. This series of painting steps could be thought of as a watercolor paint process.

To emulate this example watercolor paint process within Studio Artist, each step must be broken down and defined by a Paint Action or series of Paint Action steps. The Paint Action Sequence is an editable list of all of the individual Paint Actions recorded step by step. The resulting sequence can be applied to any source image, or may be totally algorithmic and unique with each application. It all depends on how the sequence is defined.

In the example above, the textured water color paper could be simulated by designing a background texture in the paint synthesizer. There are a number of ways to do this.

You could adjust the settings on the **Background Texture** parameter pane to simulate a particular paper texture. Or, try scanning a real paper texture and load that into the Background Texture as an image texture. As a different approach, build a Paint Action that applies a random brush to the canvas with a random scan pattern. You could even build a series of image processing steps that generate a textured Canvas. This Canvas could then be loaded into the current region, and used to modulate the **Paint Fill**.

There are a large number of factory presets that could be used to generate a blurry watercolor background wash. The brush size could then be adjusted to provide a smaller, harder edge brush. The Path Start and Path End parameters could be set so that autodrawn paths would follow the source image edges. Path length and brush size could be reduced again for more detail rendition. The paint source color could be switched to black for the fine detail edge black lines. Then, a Canvas Spread Water Preset could be chosen for a final water wash.

## Using Evolution to Generate New Paint Patches

Studio Artist provides several ways to evolve new paint synthesizer

patches from existing ones. Use the **“Operation : paint Synthesizer : Global Evolution”** menu to go access the Paint Synthesizer controls associated with patch evolution. You can randomly generate variations off of a single paint patch, as well as morph or mingle two different paint patches. Morphing or mingling can either be randomly generated, adjusted with a slider, or modulated with any interactive modulation parameter (like pressure or tilt).

If you have some Bezier paths in the current Bezier frame, you can have Studio Artist autodraw these paths every time you evolve a new paint patch.

## Using Layers to Visualize Paint Edits

Suppose you want to edit a paint patch and test out your edits without ruining an existing painting in progress. Simply generate a new layer, and then use the new layer as a scratch pad for patch editing. You can build a series of pressure modulated paths, and then autodraw the paths in the new layer to automatically test out your paint parameter edits. Switch back and forth between your scratchpad layer and your original art layer depending on whether you are editing a paint patch or doing active drawing.

You can also use a second layer as a way to mix paint colors like an artist would mix colors with real paint. Try this out with a wet paint patch. The dynamics of the wet paint and several different initial paint colors will generate a rich source of color variability. To move the Canvas color back to the color source, use the ‘c’ hot key when mousing down in the Canvas. You can save a specific color in one of the color memories by option clicking them (click them to play back a saved color). Or, you can transfer the entire Canvas to the Source with a menu command.

## Alternative uses for the Source Image

The Source Image can be used in many different ways. Typically,

Studio Artist uses the Source Image the way an Artist would use a model, as a source of visual abstraction. However, there are other ways to utilize the Source Image.

One alternative approach is to use the Source Image as a way to generate a paper or media texture. Choose an appropriate textured image as the source. You can then build paint patches that use the source image to modulate paint fill, or influence autodrawing to bring out the simulated paper or media texture.

Another approach is to use the Source Image to generate custom brush images on the fly. You can use the Paint Source Offset parameters to literally paint with chunks of texture from the Source Image.

You also have the ability to import individual paint attributes (like color, edges, or orientation) from different source images. This is a way to mix and match visual features from several different images into a unique hybrid source image.

## How to Visually Abstract the Source Image

Some Artists may feel limited by the use of a Source Image, feeling that it forces their personal art onto a representational path they might not have personally chosen. Using the Source Image as a source of media texture is one approach to this issue. However, you can work with the Source Image as a creative tool in it's own right, subverting it's representational focus for your own purposes.

One approach is to start with a representational source image, and then subvert it in some way, until its totally changed into something new and different. Paint Actions, Interactive Warps, or a series of Image Operations can be used to radically change the Source image in the working Canvas. Selective interactive warping is a great way to radically transform an initial image into something very different.

The Canvas can then be loaded into the Source image using the **"Canvas : Canvas Image to Source Image"** menu. The old Source



Image will be replaced by the working Canvas, and the Studio Artist intelligent visual attributes will be recalculated from the new transformed Source Image.

Repeating this process several times can generate a Source Image that is totally unique and personal, something quite different from the representational image that started the process. This unique Source Image can then be used as a starting point for further Studio Artist Operations.

## **Knowing When to Stop Painting**

Using Action in the Paint Synthesizer is a great way to automatically generate finished paintings at the touch of a button. However, keep in mind that just like in the real world, the key to a good final image may be knowing when to stop painting.

Many of the factory Presets are configured to paint for a very long time if left to autopaint on their own. These patches were designed with the idea that you as an Artist will be watching Studio Artist work and stop an Action at an appropriate aesthetic moment.

Often, the key to a successful final image may be to combine together several different Paint Actions that work together to achieve a desired visual effect. You can use Studio Artist's Paint Action Sequences to record a series of Paint Action autopainting steps and then access them as a one click autopainting operation.

## **Using a Movie to Generate a Series of Still Paintings**

Studio Artist's various methods for generating movie output are great for generating motion animation or video effects. However, they are also of use for conventional artists that just want to generate a static image.

Think of a movie as a collection of individual images or paintings. The

various movie generation methods provide a way to auto-generate a series of individual paintings as a batch process. After the series of still paintings is generated, an artist can single step through the resulting movie and save individual frames as static images.

## Using QuickTime Movies to Build Dynamic Brush Masks

Studio Artist has the ability to build dynamic paint source brushes based on QuickTime movies. The individual frames of a movie can be used to simulate the interaction of a brush with media. Interactive modulators like pen pressure or tilt can be used to index through the frames of the movie brush in real time to generate a dynamic brush source mask.

You can design your own paint brush movies by using Studio Artist's Movie generation features. To paint your own brush movie, use the **"Start Movie to File..."** menu to specify a destination movie file on your hard disk. Then, hand paint the individual movie frames. After you are done with each individual frame, output it to the active movie file using the **"Write Canvas as Movie Frame"** menu. When you are done with the last frame, use the **"Stop Movie to File"** menu command to finish off the movie.

Typically, you'll want to paint on a Canvas that is a larger size than the final movie brush size so you have more control over rendering detail in the individual frames. You can use Studio Artist's movie processing capabilities to convert the initial larger dimension brush movie to the final smaller anti-aliased brush movie.

To convert the size of a QuickTime movie, you need to generate a simple Paint Action Sequence that will be applied frame by frame to process the larger dimension movie into a smaller dimension movie.

Use the **"Action : Paint Action Window..."** menu to bring up the Paint Action Window. Click the Erase button in the window to erase any existing Paint Action Sequence steps. Turn on recording by clicking the **Record** checkbox if it is not turned on already. Change the Canvas

Background popup (located above the Canvas to the right) to **“Image”**. You should see a **“Set Paint Background”** Paint Action appear in the Paint Action Sequence list. Turn off recording by unchecking the **Record** checkbox.

Now, you are ready to apply your simple Paint Action Sequence to the initial brush movie by using the **“Movie : Process Movie With PAsEq...”** menu. First, you’ll need to choose your source movie using the find file dialog. Then, you’ll need to set the output movie resolution with the Set Canvas Size dialog. For this example, you’ll set the output movie size to the final smaller canvas dimension desired for the final brush movie. Finally, you need to specify the output movie file name and location on your hard disk with another standard file dialog.

Now, the Paint Action Sequence you built will be applied frame by frame to the initial source movie. The simple sequence you specified generates a reduced size, anti-aliased output movie. If you had specified a more complicated series of Paint Actions (for example, a series of image processing operations), the resulting series of actions would have been applied to the source movie frame by frame as well.

## Support for the Advanced Features of Wacom Graphics Tablets

Wacom graphics tablets have several advanced features including integral erasers, pen tilt, tool id, tangential pressure via the Airbrush wheel, and the 4D mouse. Studio Artist supports all of these advanced features in a number of innovative ways.

Any of the Wacom interactive controls (pressure, tilt, pen orientation, tangential pressure, mouse wheel, mouse orientation) can be used to modulate one or more paint synthesizer parameters to generate expressive interactive paints patches. Using global evolution paint patch morphing, over 200 individual paint parameters can be modulated in real time if desired for interactive expression overload!

Pen pressure is used throughout the Studio Artist interface to provide

dynamic control over interactive operations like image warping, region drawing or selection. Pen tilt is also integrated into the interface to define and rotate path curves or selection regions.

## **Using the Wacom Pen Eraser**

Many Wacom pen tools have a built in eraser opposite the pen tip. While drawing, you can flip the pen and erase what you have drawn. Studio Artist support this feature, but also allows you to choose which paint patch is used when you flip the pen and erase.

The current eraser patch is stored in the eraser paint memory. To record a new eraser paint patch, Option click the eraser paint patch memory. The current paint synthesizer settings will then be stored in the eraser patch memory.

## **Using Multiple Wacom Pens**

Wacom's Intuos tablets support the use of multiple pen tools. Each pen or tool has a unique id that Studio Artist can sense. A specific pen can be associated with anyone of the four paint patch memories.

Remember that after you associate a specific pen or tool with a specific paint memory, it will be a modal tool that only paints with the specific settings stored in the paint patch memory.

To associate a specific tool with a specific paint patch memory, Command-Option click the memory. To de-associate the tool with the memory, Command-Shift-Option click the memory.

## **Two-Handed Drawing Using Wacom Intuos Tablets**

Wacom's Intuos tablets support dual-tracking of two pen tools or a pen and the Wacom 4D mouse. Studio Artist currently allows a second Wacom input device to be used to interactively adjust up to

three additional modulation controller channels in addition to the pressure, tilt, tilt orientation, and velocity modulation supported in the active draw pen.

These three additional channels of controller modulation are available as modulation sources in the various popup controls throughout the Paint Synthesizer control panels



# Chapter 8: Menu Commands

This chapter contains detailed explanations for all of the various Studio Artist menu commands.

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## Main Menus

The main Studio Artist menus are organized according to the following categories:

- File**
- Edit**
- Canvas**
- Path**
- Action**
- Movie**
- Operation**

Each of these main menu categories will be explained in more detail in the following sections.

### File

Menu commands associated with file access for the Source Image, Canvas Image, Image and Movie Brushes, Paint Patches, or Workspace are located here. Preferences and printing menus are also accessed here.

### Edit

Menu commands associated with editing selected objects are located here.

### Canvas

Menu commands associated with the Canvas are located here. This includes access to the Canvas Layers Window and Layer commands. Individual commands associated with the Canvas current selection region and Blanking Frame are also located in this main menu.

## **Path**

Menu commands associated with Bezier Paths and the current Bezier Path Layer are located here. This includes file access to the current path layer.

## **Action**

Menu commands associated with Studio Artist's Actions and Action Sequences are located here. This includes the Paint Action Sequence window, it's associated commands, and file access as well as the History Sequence window, it's associated commands, and file access.

## **Movie**

Menu commands associated with Studio Artist's Movie and Animation features are located here. This includes movie and animation generation, canvas RAM movies, and movie filtering or processing. Commands associated with batch processing of folders of images are also located in this menu in the Process section.

## **Operation**

The Operation menu commands allow for quick one step navigation to any of the Studio Artist control panes associated with particular modal Operations.



## File

The following menu commands are accessible from the File main menu:

- New Source Image and Canvas...**
- Open Source Image...**
- New Image Brush...**
- New Movie Brush...**
- New Background Image Texture...**
- Save Canvas Image As...**
- Import Image to Canvas..**
- Import Image to Attribute**
- Import Paint Patch ...**
- Export Paint Patch ...**
- Import Workspace...**
- Export Workspace...**
- Preferences...**
- Page Setup...**
- Print...**
- Quit**

Each of these File menu commands will be explained in more detail in the following sections.

### **New Source Image and Canvas...**

This menu command allows you to choose a new Source Image and define a new working Canvas. Your existing Canvas will be erased when you execute this command. You will be prompted to save your existing work if you haven't already.

The "Canvas" is the image you are painting, editing, manipulating, etc. The "Source" is located in the top left corner of the screen, and is the source of the visual attributes used by the program for intelligent-assisted drawing. Studio Artist does not modify your Source Image in any way.

Choose your new Source Image from the hard disk with the Standard File dialog. After you click OK, a new dialog will appear that allows you to define the dimensions of your new Canvas work area. The Canvas does not have to be the same size as the Source Image. Typically, the Canvas may be set larger than the Source Image.

### **Open Source Image...**

This menu command allows you to choose a new Source Image. The Source Image is the source of the visual attributes used by the program for intelligent-assisted drawing. Studio Artist does not modify your Source Image in any way. The working Canvas will not be changed in any way when you open a new Source Image.

### **New Image Brush...**

This menu command allows you to choose a new Paint Synthesizer Brush Source Image. Choose your new Image Brush from the hard disk with the Standard File dialog. After you click OK, the Brush Source popup will be switched to “Image” and your new Image Brush will be loaded as the active Source Brush.

Exercise common sense and choose a reasonable size Image Brush. Depending on the Brush Modulation settings in the Paint Synthesizer, Studio Artist could be generating hundreds of modified copies of the Image Brush.

### **New Movie Brush...**

This menu command allows you to choose a new Paint Synthesizer Brush Source Movie. Choose your new Movie Brush (which is a QuickTime movie file) from the hard disk with the Standard File dialog. After you click OK, the Brush Source popup will be switched to “Movie” and your new Movie Brush will be loaded as the active Source Brush.

Exercise common sense and choose a reasonable size Movie Brush.

Depending on the Brush Modulation settings in the Paint Synthesizer, Studio Artist could be generating hundreds of modified copies of the Movie Brush.

### **New Background Image Texture...**

This menu command allows you to choose a new Paint Synthesizer Background Image Texture. Choose your new Image Texture from the hard disk with the Standard File dialog. After you click OK, the Background Texture “Texture Type” popup will be switched to “Image” and your new Image Texture will be loaded as the active Background Image Texture.

### **Save Canvas Image As...**

This menu command allows you to save the current Canvas image as an image file on your hard disk. Choose a name, image format, and desired location for the saved file on your hard disk with the Standard File dialog.

### **Import Image to Canvas..**

This menu command allows you to choose a new Starting Image for your working Canvas. Your existing Canvas will be replaced by the imported image when you execute this command. The current Source Image will not be changed. The new working Canvas will be resized to the dimensions of the imported image. You will be prompted to save your existing work if you haven’t already.

You may wish to set the Canvas background to a specific image without changing your existing Canvas size, or losing your other Canvas layers. To do this, first Open a new Source image. Then, use the Canvas background popup and change it to Image. The new Source Image will be loaded into the existing working Canvas.

### **Import Image to Attribute**

This menu command allows you to import specific visual attributes

from image files on your hard disk. The existing chosen Source Image visual attribute will be replaced by a new visual attribute generated from the chosen import image.

### **Import Paint Patch ...**

This menu command allows you to import a new Paint Synthesizer Patch from a Patch file on your hard disk. A paint Patch is a complete set of Paint Synthesizer parameters. Choose your new Paint Patch from the hard disk with the Standard File dialog. After you click OK, the imported Paint Patch will be loaded as the current Paint Preset.

### **Export Paint Patch ...**

This menu command allows you to export a new Paint Synthesizer Patch to your hard disk. A Paint Patch is a complete set of Paint Synthesizer parameters. Choose a name and location for your new Paint Patch on the hard disk with the Standard File dialog. Clicking OK will save the current Paint Synthesizer settings to the hard disk as a Paint Patch file.

### **Import Workspace...**

This menu command allows you to import a new Studio Artist Workspace from a Workspace file on your hard disk. A Workspace is a complete set of all of the current settings for the various memories located within Studio Artist as well as additional information like window locations. Choose your new Workspace from the hard disk with the Standard File dialog. After you click OK, the imported Workspace will be loaded as the current Workspace Preset.

### **Export Workspace...**

This menu command allows you to export a new Studio Artist Workspace to your hard disk. A Workspace is a complete set of all of the current settings for the various memories located within Studio Artist as well as additional information like window locations. Choose

a name and location for your new Workspace on the hard disk with the Standard File dialog. Clicking OK will save the current Workspace settings to the hard disk as a Workspace file.

### **Preferences...**

This menu command brings up a dialog that allows you to choose new Preference settings for Studio Artist. If you change any Preference settings and click OK, the changes you have specified will not take place until the next time you restart the application.

### **Page Setup...**

This menu command brings up a dialog that allows you to choose Page Setup settings for printing from Studio Artist.

### **Print...**

This menu command brings up a dialog that allows you to print the current working Canvas.

### **Quit**

This menu command allows you to quit the Studio Artist application.

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## **Edit**

The following menu commands are accessible from the Edit main menu:

- Undo**
- Cut**
- Copy**
- Paste**
- Clear**
- Select All**
- Deselect All**
- Invert Selection**
- Connect Two Curves**
- Simplify**
- Size Prune**
- Flip**
- Rotate**
- Preset**
- Randomize Current Paint Settings**

The standard editing commands (Copy, Paste, etc.) are context sensitive and act on individual objects in the interface. One specific area in the user interface will be the active interface element at any given moment. You can mouse down in a specific interface element to activate it. After an interface element is made active, then the menu commands associated with it will become active.

For example, if you are editing a text edit field and select some text, the standard editing commands will act on your selected text. If you then select a Bezier path in the Canvas, the standard editing commands will switch their context as the Canvas becomes the active interface area. The standard editing commands will then act on your selected Bezier curve.

Each of these Edit menu commands will be explained in more detail in the following sections.

## **Undo / Redo**

This menu command allows you to Undo and Redo your last Studio Artist operation. The menu toggles from Undo to Redo depending on what you did last.

Studio Artist currently supports one level of Undo accessible from this menu. You can use your Paint History to implement a form of unlimited Undo. The History Window (accessible from the Action menu) allows you to play back and edit your entire Studio Artist session.

## **Cut**

Removes selected objects from their interface location and places them in the clipboard.

## **Copy**

Copies selected objects from the interface and places them in the clipboard.

## **Paste**

Copies any objects in the clipboard into the currently active interface area.

## **Clear**

Removes selected objects from the interface.

## **Select All**

Selects all objects in the active interface area.

## **Deselect All**

Deselects all selected objects in the active interface area.

## **Invert Selection**

Inverts the current object selections in the active interface area.

## **Connect Two Curves**

This command is only active if two Bezier paths are selected in the Canvas. Executing the command will attach the two selected curves at their closest end points.

## **Simplify**

This command simplifies the selected Bezier paths by smoothing the individual curves. The resulting effect is a form of stylization, and is useful to convert automatically generated paths into curves that look like they were drawn with a few smooth curves.

## **Size Prune**

This command removes any selected curves that are smaller than a default length. This command is useful to get rid of small junk paths generated by automatic path generation.

## **Flip**

These menu commands flip the selected objects in the specified fashion.

## **Rotate**

These menu commands rotate the selected objects in the specified fashion.

## **Preset**

These menu commands accesses the following sub menu commands



associated with the current Preset:

### **:Update Current Preset Icon**

This command replaces the current Preset icon image with the current visual contents of the Canvas. Use this command to personalize favorite Preset icons to an image of your choice.

### **:Update Current Preset Help Text**

This command is used to edit the current Preset help text. A dialog box is brought up that contains the current Preset help text. You can edit and customize Preset help messages with this command.

### **Randomize Current Paint Settings**

This menu commands will randomize the current Paint Synthesizer parameters according to the settings in the Paint Synthesizer Global Evolution parameter pane.

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## Canvas

The following menu commands are accessible from the Canvas main menu:

- Layer Window...**
- Layer Commands**
- Zoom Out Canvas**
- Zoom Into Canvas**
- TextBrush Source...**
- ReRender Canvas...**
- Canvas Image to Source Image**
- Set Current Region Selection To**
- Current Region Selection Commands**
- Set Blanking To**
- Reset Blanking**

Each of these Canvas menu commands will be explained in more detail in the following sections.

### Layer Window...

This menu command allows you to open the Layer window. Each Canvas Layer is displayed as an element in an editable list in the Layer window.

### Layer Commands

This menu command allows you to execute different commands associated with Canvas Layers. The individual commands are accessible via the sub menu.

### Zoom Out Canvas

This menu command allows you to zoom out (or demagnify) your view of the current Canvas.

## **Zoom Into Canvas**

This menu command allows you to zoom in (or magnify) your view of the current Canvas.

## **TextBrush Source...**

This menu command brings up a dialog that allows you to specify a new text string that will be drawn by the Text Source Brush.

## **ReRender Canvas...**

This menu command allows you to rerender the Canvas to a different size or resolution. You can rerender the existing Canvas image via an interpolation algorithm as well as rerender the existing Paint History and its associated Path and Paint Synthesizer settings. Playing back the rerendered Paint History will re-execute all of your session operations at the new resolution. This is a way to repaint your new sized Canvas with increased detail.

## **Canvas Image to Source Image**

This menu command allows you to copy the current Canvas into the Source Image.

## **Set Current Region Selection to**

This menu command accesses the following sub menus associated with setting the current region selection:

### **:Canvas Image**

This menu command allows you to set the Current Selection Region to the luminance of the current Canvas image.

### **:Blanking Frame**

This menu command allows you to set the Current Selection Region to the contents of the current Blanking Frame.

#### **:Source Alpha Image**

This menu command allows you to set the Current Selection Region to the alpha channel of the current Source Image.

#### **:Path Frame as Regions**

This menu command allows you to set the Current Selection Region to the individual selection regions generated from the Bezier paths in the current Path Layer.

#### **:Hard Key Color Mem 1**

#### **:Soft Key Color Mem 1**

This menu command generates the Current Selection Region by color keying the Canvas. The color in Color Memory 1 (left most) is used as the key color that will become the selection. Hard keying will only select the regions of the Canvas that are the key color. Soft keying has a smooth transition range centered on the key color.

### **Current Region Selection Cmnds**

This menu command accesses the following sub menu commands associated with the current Region Selection:

#### **:Invert**

This menu command allows you to invert the Current Region Selection.

#### **:Feather**

This menu command allows you to smooth or feather the Current Region Selection.

## Set Blanking to

This menu command accesses the following sub menu commands associated with resetting the current Blanking frame:

### **:Canvas Image**

This menu command allows you to set the Blanking Frame to the contents of the current Canvas.

### **:Source Image Edges**

This menu command allows you to generate a Blanking Frame from the Source Image Edges.

## Reset Blanking

This menu command resets or erases the Blanking Frame.

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## Path

The following menu commands are accessible from the Path main menu:

- Paint Path Layer**
- Reverse Paint Path Layer**
- AutoPaint Path Layer**
- Paint Selected Path**
- Expand Path Layer**
- Canvas Edges to Path**
- Source Edges to Path**
- Delete Path Layer**
- Import Path Layer...**
- Export Path Layer...**
- PathLayerRecord**

Each of these Path menu commands will be explained in more detail in the following sections.

### Paint Path Layer

This menu command repaints the current path frame paths in order with the current Paint Synthesizer settings.

### Reverse Paint Path Layer

This menu command repaints the current path frame paths in reverse order with the current Paint Synthesizer settings.

### AutoPaint Path Layer

This menu command autopaints the current path frame paths with the current Paint Synthesizer settings.

## **Paint Selected Path**

This menu command repaints the selected path frame paths with the current Paint Synthesizer settings.

## **Expand Path Layer**

This menu command expands the current path frame paths. A path is expanded by drawing a new path around its edges in a circle. Parameter settings to adjust this process are located on the Bezier Edit Operation pane.

## **Canvas Edges to Path**

This menu command examines the current Canvas image and generated a series of new paths that represent the edges of the current Canvas image.

## **Source Edges to Path**

This menu command examines the current Source Image and generated a series of new paths that represent the edges of the current Source Image.

## **Delete Path Layer**

This menu command deletes all of the paths in the current path frame.

## **Import Path Layer...**

This menu command allows you to choose a new set of paths stored on your hard disk in a path layer file.

## **Export Path Layer...**

This menu command allows you to export the current path frame to a path layer file on your hard disk.

## Path Layer Record

This menu command allows you to access different settings associated with recording and playing back paths. The different editable settings are accessed via the following sub menus:

### **:Mouse Draw**

Setting this flag specifies that individual mouse or pen drawn stroke paths will be immediately converted to Bezier paths in the current Path Layer when the stroke is finished being drawn.

### **:Auto Draw**

Setting this flag specifies that individual autodrawn stroke paths will be immediately converted to Bezier paths in the current Path Layer when the stroke is finished being drawn.

### **:Use Recorded Paint Color**

Setting this flag specifies that initial recorded paint stroke colors associated with each path will be used when redrawing the individual paths. If the flag is not set, then the current source color will be used when redrawing the paths.



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## Action

The following menu commands are accessible from the Action main menu:

- Do Current Action**
- Paint Action Window...**
- Paint Action Commands**
- Import Paint Action Sequence...**
- Export Paint Action Sequence...**
- History Window...**
- History Commands**
- Import History Sequence...**
- Export History Sequence...**

Each of these Action menu commands will be explained in more detail in the following sections.

### Do Current Action

This command executes the current Operation Action.

### Paint Action Window...

This command opens the Paint Action Sequence Window.

### Paint Action Commands

This menu command allows you to access different commands associated with the current Paint Action Sequence. The different commands are accessible via the following sub menus:

#### **:Play Paint Action Sequence**

This menu command starts playback of the current Paint Action

Sequence.

### **:Record Paint Action Sequence**

Setting this flag specifies whether recording is on or off for the current Paint Action Sequence.

### **:Erase Paint Action Sequence**

This menu command erases the entire current Paint Action Sequence.

### **:Delete Current Paint Action Command**

This menu command erases the selected Action step in the current Paint Action Sequence.

### **:Delete Muted Paint Action Commands**

This menu command erases all the muted Action steps in the current Paint Action Sequence.

## **Import Paint Action Sequence...**

This menu command allows you to import a new Paint Action Sequence from the hard disk.

## **Export Paint Action Sequence...**

This menu command allows you to export the current Paint Action Sequence to your hard disk.

## **History Window...**

This command opens the History Window.

## **History Commands**

This menu command allows you to access different commands associ-

ated with the current History Sequence. The different commands are accessible via the following sub menus:

**:Play History Sequence**

This menu command starts playback of the current History Sequence.

**:Record History Sequence**

Setting this flag specifies whether recording is on or off for the current History Sequence.

**:Erase History Sequence**

This menu command erases the entire current History Sequence.

**:Delete Current History Command**

This menu command erases the selected Action step in the current History Sequence.

**:Delete Muted History Commands**

This menu command erases all the muted Action steps in the current History Sequence.

**Import History Sequence...**

This menu command allows you to import a new History Sequence from the hard disk.

**Export History Sequence...**

This menu command allows you to export the current Paint Action Sequence to your hard disk.

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## Movie

The following menu commands are accessible from the Movie main menu:

- Start Movie To File...**
- Stop Movie To File**
- Generate Movie Settings...**
- Write Canvas as Movie Frame**
- Write Frame Flags**
- Generate Frames**
- Keyframe Timeline Window...**
- Timeline Commands**
- Load Ram Movie..**
- UnLoad Ram Movie**
- Save Ram Movie**
- Ram Movie Settings...**
- Process Movie File with PASEq**
- Process Image Files with PASEq**
- Process File Settings...**

Each of these Movie menu commands will be explained in more detail in the following sections.

### Start Movie To File...

This command allows you to create a new open movie file. Use this command when you want to generate a new movie file from scratch. After you execute this command, you can save individual Canvas frames or generate and save frames from Time-based Operations like Paint Animations, Warping, Morphing, or Paint Action Sequences.

### Stop Movie To File

This command closes the current open movie file.

### Generate Movie Settings...

This command opens a dialog that allows for adjustment of any settings associated with movie file generation. Settings associated with processing movie files are located in a separate Process File Settings dialog.

## **Write Canvas as Movie Frame**

This command writes the current Canvas to the current open movie file as a new movie frame.

## **Write Frame Flags**

This menu command allows you to access different settings associated with automatically writing new frames to an open movie file. The different editable settings are accessed via the following sub menus:

### **:Write Frame Each Action**

Toggling this command turns on and off automatic frame writing from any Operation Action. If turned on, every time you execute an Operation's Action, the result of that Action will be written to the current open movie file as a new frame.

### **:Write Frame Each SubAction**

Toggling this command turns on and off automatic frame writing from any Operation Sub Action.

### **:Write Frame Each History Action Step**

Toggling this command turns on and off automatic frame writing from any History Action step when the current History Sequence is played back.

## **Generate Frames**

This menu command allows you to access different sub menus that

will generate a series of time ordered frames. The different generation sub menus are:

### **:Run Time Animation**

This command generates a keyframe paint animation from the current Time Animation settings. If there is a current open movie file, each frame of the animation is written to the open movie file as a new movie frame.

### **:Run Warp Animation**

This command generates a keyframe warp animation from the current Warp Animation settings. If there is a current open movie file, each frame of the animation is written to the open movie file as a new movie frame.

### **:Run Morph Animation**

This command generates a keyframe morph animation from the current Morph Animation settings. If there is a current open movie file, each frame of the animation is written to the open movie file as a new movie frame.

### **:Run PASEq Animation**

This command generates a Paint Action Sequence animation using the current Paint Action Sequence and the current animation settings. The entire Paint Action Sequence is executed for each new animation frame. If there is a current open movie file, each frame of the animation is written to the open movie file as a new movie frame.

## **Keyframe Timeline Window...**

This command opens the Keyframe Timeline Window.

## **Timeline Commands**

This menu command allows you to access different commands associated with the Keyframe Timeline. The different commands are accessible via the following sub menus:

### **:Delete All KeyFrames**

This command deletes or erases all of the active memory cells in the Timeline.

### **Load Ram Movie..**

This menu command brings up a dialog that allows you to choose a QuickTime movie file from your hard disk that will then be loaded into RAM memory in the Studio Artist Canvas. After the movie loads, you will be able to play it back from RAM as well as paint or edit individual frames.

### **UnLoad Ram Movie**

This menu command unloads the current RAM movie. This command does not save any changes to an edited RAM movie.

### **Save Ram Movie**

This menu command saves any edited changes to the current loaded RAM movie.

### **Ram Movie Settings...**

This menu command opens a dialog that specifies any settings specific to the current loaded ram movie and its playback.

### **Process Movie With PAsEq**

This command processes a source QuickTime movie located on your hard disk with the current Paint Action Sequence frame by frame. The

following sub menus specify the output format for the processed QuickTime movie:

**:to Movie File...**

This command processes a source QuickTime movie located on your hard disk with the current Paint Action Sequence frame by frame, generating a new processed QuickTime movie. The size or resolution of the processed output movie can be different from the original source movie. The source movie file is not changed or edited in any way.

This command is executed in three steps. First, you will be prompted with a standard file dialog to choose a source movie file. After you click OK, a dialog will come up that allows you to specify the output movie size. The size of the output movie can be different than the source movie. After you click OK, you will be prompted by a final standard file dialog to name your output movie file and specify it's location on your hard disk. When you click OK, the movie processing will begin.

You can stop the movie processing at any time by hitting the spacebar or by mousing down in the Studio Artist interface. If you click Cancel in the final standard file dialog, the processing will still take place, but will not be written to an output movie file. This is a useful way to preview your processing sequence in the Canvas prior to final execution into an output movie file on your hard disk.

**:to Image File...**

This command processes a source QuickTime movie located on your hard disk with the current Paint Action Sequence frame by frame, generating a series of output image files for each processed frame. The size or resolution of the processed output images can be different from the original source movie. The source movie file is not changed or edited in any way.

This command is executed in three steps. First, you will be prompted with a standard file dialog to choose a source movie file. After you



click OK, a dialog will come up that allows you to specify the output image size. The size of the output image can be different than the source movie. After you click OK, you will be prompted by a final standard file dialog to name your output image file and specify its location on your hard disk. When you click OK, the movie processing will begin. Each processed image file will be sequentially numbered using your specified output file name as a root string.

You can stop the movie processing at any time by hitting the spacebar or by mousing down in the Studio Artist interface. If you click Cancel in the final standard file dialog, the processing will still take place, but will not be written to an output image files. This is a useful way to preview your processing sequence in the Canvas prior to final execution into output image files on your hard disk.

#### **:to EPS File...**

This command processes a source QuickTime movie located on your hard disk with the current Paint Action Sequence frame by frame, generating a series of output EPS vector files for each processed frame. The size or resolution of the processed output EPS frames can be different from the original source movie. The source movie file is not changed or edited in any way.

The Bezier paths associated with each output EPS file are derived from the individually drawn paint strokes only.

This command is executed in three steps. First, you will be prompted with a standard file dialog to choose a source movie file. After you click OK, a dialog will come up that allows you to specify the output EPS frame size. The size of the output EPS frame can be different than the source movie. After you click OK, you will be prompted by a final standard file dialog to name your output EPS file and specify its location on your hard disk. When you click OK, the movie processing will begin. Each processed EPS file will be sequentially numbered using your specified output file name as a root string.

You can stop the movie processing at any time by hitting the spacebar

or by mousing down in the Studio Artist interface. If you click Cancel in the final standard file dialog, the processing will still take place, but will not be written to an output image files. This is a useful way to preview your processing sequence in the Canvas prior to final execution into output image files on your hard disk.

## **Process File Settings...**

This command opens a dialog that allows for adjustment of any settings associated with processing movie or image files. Settings associated with generating movie files from scratch are located in a separate Generate Movie Settings dialog.

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## **Operation**

The following menu commands are accessible from the Operation main menu:

### **Paint Synthesizer**

#### **Presets**

#### **Image Operations**

#### **Bezier Draw**

#### **Bezier Edit**

#### **Region Selection**

#### **Warp**

#### **Timeline Animation**

The Operation menus provide quick one step access to the various modal Operations and their associated parameter sub panes. This menu can be used as an alternative to navigating the hierarchial parameter panes via their popup controls.

Each of these Operation menu commands will be explained in more detail in the following sections.

## **Paint Synthesizer**

This menu provides quick navigation access to the individual parameter panes associated with the Paint Synthesizer. There is a sub menu for each of the individual Paint Synthesizer control panes.

## **Presets**

This menu provides quick navigation access to the individual parameter panes associated with Studio Artist's Presets. There is a sub menu for each of the individual Preset access panes.

## **Image Operations**

This menu provides quick navigation access to the individual parameter panes associated with Studio Artist's Image Operations. There is a sub menu for each of the individual Image Operation control panes.

## **Bezier Draw**

This menu provides quick navigation access to the Bezier Draw control pane.

## **Bezier Edit**

This menu provides quick navigation access to the Bezier Edit control pane.

## **Region Selection**

This menu provides quick navigation access to the individual selection modes associated with Region Selection. There is a sub menu for each of the individual Region Selection methods.

## **Warp**

This menu provides quick navigation access to the individual selection modes associated with Interactive Warping. There is a sub menu for

each of the individual Interactive Warp methods.

## **Timeline Animation**

This menu provides quick navigation access to the individual parameter panes associated with Timeline Animation. There is a sub menu for each of the individual Timeline Animation methods and control panes.

# Chapter 9: Technical Questions

Studio Artist is a powerful creative tool with an extreme amount of user configurability. With all of this creative power comes at the cost of a certain amount of complexity under the hood. In addition, the extensive and open ended editing capabilities give a user the chance to paint themselves in a corner by specifying logically inconsistent paint patches.

This chapter provides some answers to common technical questions. Before you email or call Technical Support, you should check this chapter to see if the answer to your question is here.

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## Troubleshooting Your Problem

Is the problem a bug or is there something you don't understand?

Is the problem repeatable?

Trace your signal flow.

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## Things to Keep in Mind

The following are a few tips to keep in mind when you use Studio Artist.

## Memory Considerations

Studio Artist currently does all of its processing in RAM. Your computer has a fixed amount of RAM. This RAM memory is shared by the Mac OS and any applications that are currently running. Each application has a memory partition that determines the amount of available

memory it will hoard for itself.

Lets assume your Macintosh has 128 meg of RAM, and your copy of the Mac OS uses 25 meg. Then, you would have 103 meg left to divide among any current running applications. To see how much memory the Mac OS and any currently running applications take up, execute the 'About This Computer...' menu command located in the Apple menu from the Finder.

To set the amount of memory Studio Artist will use for its partition, select the Studio Artist icon in the Macintosh Finder and use the "File:Get Info..." menu command to open the file info dialog. The Preferred size is the maximum amount of memory Studio Artist will hoard for itself if it is available when Studio Artist is started.

In general, it is a good idea to set the Preferred memory Partition for Studio Artist to as large a value as you can comfortably get away with given the constraints of the amount of memory in your computer and any other program you may need to run.

## **Large Source Images**

Studio Artist is unique from other graphics programs in that it has the concept of a source and canvas image. The Source and Canvas dimensions or resolutions can be different. The source was originally conceived to be used like an artist uses a model, as a source of visual abstraction. Studio Artist does not modify the source image in any way. However, it does currently load the complete source image into ram. Working with large source images will reduce the amount of memory available for the Canvas and its associated working buffers.

For many applications (especially those involving painting), a low resolution source image may be more than adequate. Studio Artist's paint algorithms will be generating detail at the complete Canvas resolution even when working with a low resolution source image. This is a different metaphor than other image processing programs where you would typically choose a source image scanned at print resolution.

## Common Problems

### The Application Doesn't Launch

You are probably running a version of the QuickTime system extension that is earlier than version 3.0. If so, you need to upgrade to version 3.0 or higher. Use the QuickTime installer included on the CD-Rom to upgrade your version of QuickTime.

### The program doesn't seem to be drawing.

You may have specified a paint patch that is logically inconsistent. There are a number of possible ways to do this. Here are some scenarios to watch out for.

Check to make sure you don't have a region mask specified as a part of the paint patch. If you do, it will only draw or image process within the mask region (ie. the white part).

Check the **Paint Fill** parameter pane. Make sure you don't have the **Paint Fill** settings **Fill From** and **Fill To** both set to **Canvas Image**. If you do, this will just repaint the Canvas Image back onto itself.

Check to make sure the maximum brush size (located in the **Brush Modulation parameter pane**) isn't set to 0 or very low. If the brush size is pressure modulated and you are using a mouse, make sure the **Autodraw Pressure Range** (located in the **Miscellaneous** parameter pane) isn't set to 0.

Check the Paint Fill parameters. For example, if you have a black background and you are using a **Composite** setting of **Min**, then nothing will draw because the black background is as minimum as it can get. Same thing for a white background and a **Composite** setting of **Max**.

Check your Path Start and Path End parameters carefully. You may

have set them up in a way that is prohibiting you from drawing.

### **Why don't I have any Presets?**

#### **Why does the application take forever to boot?**

The application needs to live on your hard disk next to the '**Preset**', '**PASeq**', '**Workspace**', and '**Brush**' folders. It doesn't know how to find the presets unless these folders are in the same folder as the application. It will spend a long time searching for them on your entire hard disk if they aren't there.

While you can run Studio Artist directly off of the cd-rom, it will run much slower if you do so. You should follow the install procedure and drag the Studio Artist folder with all of its contents to your hard disk and run the application from there.

### **I try to open an image and get an assert error message**

#### **I try to save an image and get an assert error message**

The symptom for this particular problem is an error message that includes the description “(gi != 0), in file DispImage.cp”. The error may happen when you try to open or save an image. The message is an error from QuickTime stating that it can't find the graphics import components. You probably are either missing some QuickTime extensions or they were damaged in some way while being downloaded by a network installer.

Studio Artist needs QuickTime 3.0 or greater to be installed on your Macintosh in order to run properly. Some QuickTime 4.0 users have experienced file corruption from the network installer. Try reinstalling QuickTime using the installer on the CD-Rom to fix this problem. If you need to upgrade or reinstall your version of QuickTime, you can also download the latest version of the complete (ie. non-network) installer for QuickTime from [www.apple.com](http://www.apple.com).



## **Why can't I open a TIFF file?**

Studio Artist uses QuickTime to read and write image files. You need QuickTime 4.0 to read and write TIFF files. Use the QuickTime installer included on the CD-Rom to upgrade your version of QuickTime.

## **What happened to my Bezier frames, current Layers, etc.**

Opening a RAM movie will erase all of your current layers, Bezier frames, etc. The program asks you if you want to save before it does this.

## **Other tips**

Morph animations print to the current Layer. If you set the current Layer to either Layers 2 or 3 (ie. the source and destination images for the morph), they will be recursively altered during the morph process. This may look cool, but will not be what you expected if you just want a normal morph.

## **Why are some popup interface elements missing**

You are running a very early version of the Appearance manager extension, and need to update it to version 8.1 or later.

## **Why am I running out of memory after running the program for a long time**

History recording may be turned on. The history file does not spool to disk with this version. This means that your Paint Action history will grow over time as you do things with the program, taking up more and more memory. If you are working close to the memory edge, you

will eventually run out.

You might want to turn off history recording if you run Studio Artist in a low memory partition or are working with big files. You can do this by going to '**P**references...' located under the '**F**ile' menu, and turning off default history recording.