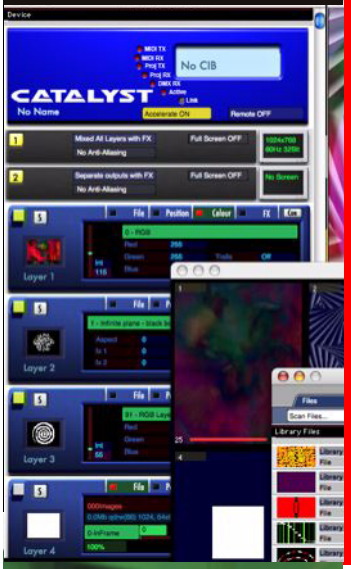
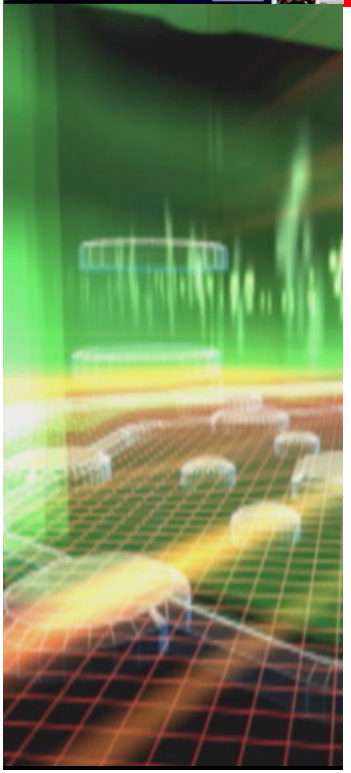
HIGH END SYSTEMS





MEDIA SERVER
User Manual

Software Version 3.3

CATALYST

HIGH END SYSTEMS

DIGITAL • LIGHTING

Patents

This product may use one or more of the following patents:

US 4,392,187; US 4,602,321; US 4,688,161; US 4,701,833; US 4,709,311; US 4,779,176; US 4,800,474; US 4,962,687; US 4,972,306; US 4,980,806; US 5,010,459; US 5,031,078; US 5,073,847; US 5,078,039; US 5,186,536; US 5,209,560; US 5,278,742; US 5,282,121; US 5,307,295; US 5,329,431; US 5,331,822; US 5,367,444; US 5,402,326; US 5,430,629; US 5,432,691; US 5,454,477; US 5,455,748; US 5,506,762; US 5,515,254; US 5,537,303; US 5,545,951; US 5,580,164; US 5,590,954; US 5,590,955; US 5,640,061; US 5,647,662; US 5,665,305; US 5,691,886; US 5,728,994; US 5,758,955; US 5,758,956; US 5,769,527; US 5,774,273; US 5,798,619; US 5,806,951; US 5,823,661; US 5,825,548; US 5,828,485; US 5,829,868; US 5,857,768; US 5,882,107; US 5,934,794; US 5,940,204; US 5,945,786; US 5,953,152; US 5,980,066; US 6,048,080; US 6,327,103; US 6,048,081; US 6,057,958; US 6,054,816; US 6,126,288; US 6,142,652; US 6,172,822; US 6,188,933; US 6,208,087; US 6,219,093; US 6,220,730; US 6,241,366; US 6,255,787; US 6,256,136; US 6,278,542; US 6,288,828; US 6,327,103; US 6,421,165; US 6,430,934; US 6,466,357; US 6,502,961; US D347,113; US D350,408; US D359,574; US D360,404; US D365,165; US D366,712; US D370,080; US D372,550; US D377,338; US D381,740; US D409,771; US 6693392; US 6719433; EP 0662275; EP 0767398; DE 621495; DE 655144; DE 797503; EP 0475082; GB 2 043 769 B; GB 2 055 842 B; GB 2 283 808 B; GB 2 290 134 B; GB 2 291 814 B; GB 2 292 530 B; GB 2 292 896 B; GB 2 294 909 B; GB 2 295 058 B; GB 2 303 203 B; GB 2 306 887 B; GB 2 307 036 B; GB 2 316 477 B; MR0862-1996; M9,604,224.9

CATALYST®

Media Server

User Manual

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Catalyst Media Server User Manual
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according to ISO/IEC Guide 22 and EN45104

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Distributor's name: High End Systems, Inc.

Distributor's address: 2105 Gracy Farms Lane
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Declares that the product:
Product Name: Catalyst
Product Number: All
Product Options: All

Conforms to the following EEC directives:
73/23/EEC, as amended by 93/68/EEC
89/336/EEC, as amended by 92/31/EEC and 93/68/EEC

Equipment referred to in this declaration of conformity was first manufactured in compliance with the following standards in 2002:
Catalyst Interface Box

EMC: EN55103-1:1996 (E2)
EN55103-2:1996 (E2)

Safety: EN60950:2000

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directives and Standards.

Kenneth Hansen

22 June 2003

Important Safety Information

Instructions pertaining to continued protection against fire, electric shock, and injury to persons are found in Appendix D. Please read all instructions prior to assembling, mounting, and operating this equipment.

Important: Informations De Sécurité. Les instructions se rapportant à la protection permanente contre les incendies, l'électrocution, excessif et aux blessures corporelles se trouvent dans l'Annexe D. Veuillez lire toutes les instructions avant d'assembler, de monter ou d'utiliser cet équipement.

Wichtige Sicherheitshinweise. Sicherheitsanleitungen zum Schutz gegen Feuer, elektrischen Schlag, und Verletzung von Personen finden Sie in Anhang D. Vor der Montage, dem Zusammenbau und der Intbetriebnahme dieses Geräts alle Anleitungen sorgfältig durchlesen.

Informazioni Importanti Di Sicurezza. Le istruzioni sulla protezione da incendi, folgorazione, e infortuni sono contenute nell'appendice D. Si prega di leggere tutte le istruzioni prima di assemblare, montare e azionare l'apparecchiatura.

Informacion Importante De Seguridad. En el Apéndice D se encuentran instrucciones sobre protección continua contra incendios, descarga eléctrica, y lesiones personales. Lea, por favor, todas las instrucciones antes del ensamblaje, montaje y operación de este equipo.

Warning Labels

The following international caution and warning symbols appear throughout this manual to highlight messages.

CAUTION!
This symbol appears adjacent to Caution messages. Not heeding these messages could result in personal injury or damage to the equipment.

WARNING!
This symbol appears adjacent to high voltage warning messages. Not heeding these messages could result in serious personal injury.

Introduction

The High End Systems Catalyst® Media Server utilizes Catalyst software to allow simultaneous preview and play back of multiple still images or movie files. Catalyst software add effects such as crossfading (dissolves), montages, masking, strobing, color changes, and 3D geometry—all rendered in real time. The resulting composite image can be triggered from a lighting console using DMX-512 protocol; or, in the case of user-defined Presets, with a computer keyboard, mouse or touchscreen.

The Media Server plays many types of content—Quicktime video files, JPEG and GIF still images, and any other industry-standard format supported by Apple's Quicktime player. The Catalyst system package includes a wide variety of still and movie files. In addition, custom content can be easily added to the system. Independent video signals can be sent to LED walls, DL1 digital lights, or digital media projectors, each controlled and operated independently.

Catalyst Media Servers are available in a turnkey system with fully configured hardware and software. Information on configuring a hardware system to run Catalyst software only projects can be found in the Digital Lighting Support section of the High End Systems website.

Catalyst Software Versions

High End Systems currently offers three Catalyst Media Server software products.

- Catalyst Pro offers eight layers with two video feeds from one server.
- Catalyst DV is a single digital output solution with five cross-fadable layers.
- Catalyst Xpress is a software only product with 2 movie layers, 1 mask layer and a single output.

Choosing the right version of Catalyst software will depend on the number of layers, inputs and outputs you will need and your performance requirements.

The following matrix compares each version's feature set.

Feature	Pro *	DV **	Xpress**
Dual Output	Yes	No	No
Single Output	Yes	Yes	Yes
Total number of layers	8	5	3
Movie Playback layers	4	4	2
Video Inputs	2	2	1

Feature	Pro *	DV **	Xpress**
MIDI Show Control Input	Yes	Yes	Yes
Serial Control Devices	4	3	0
RS422 Control Devices	3	2	0
MIDI Timecode Input	Yes	Yes	No
Presets	Yes	Yes	Yes
Movie Audio Support	Yes	Yes	Yes
Turnkey or Software Only Version	Both	Both	Software only

* ***The Pro version of Catalyst software can, in theory, play 8 movies back simultaneously if you have the appropriate hard drive array. Some hardware configurations can affect performance for multiple layer playback. For example, a Catalyst server running on a Dual 2.0 GHz G5 with all stock media served on an Atlas IV 10,000 RPM SCSI drive can generally playback a maximum of four simultaneous movies at PAL or NTSC resolutions and framerates, or fewer at higher resolutions. The additional layers can still be used effectively for masks, video input, images/gobos or for pre-loading movies.***

** ***Catalyst DV and Xpress have one output that can mix layers and one that can display only the separate layers with or without FX layout. DV and Xpress also contain a non-movie layer that can serve as a 'mask' layer, which can play still images, 'gobos', or movie frames only. Pro does not contain such a layer.***

Product specifications are subject to change without notice.

This Manual

This Manual describes and illustrates all the features in Catalyst Pro Media Server turnkey system running Catalyst Version 3.3. If you are using another Software version, some of the features described in this manual may not be available. Support pages with manual downloads are available for previous versions at the High End Systems website: (http://www.highend.com/support/digital_lighting)

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Chapter 1:
System Overview

Catalyst Media Server Layers are designed to be controlled in a DMX-512 environment, The software's user interface is used for configuration and diagnostic purposes and can also define presets for standalone operation. Media selections and manipulations can be accomplished by and recorded to a lighting controller. User-defined presets can be triggered with a computer keyboard, mouse or touchscreen.

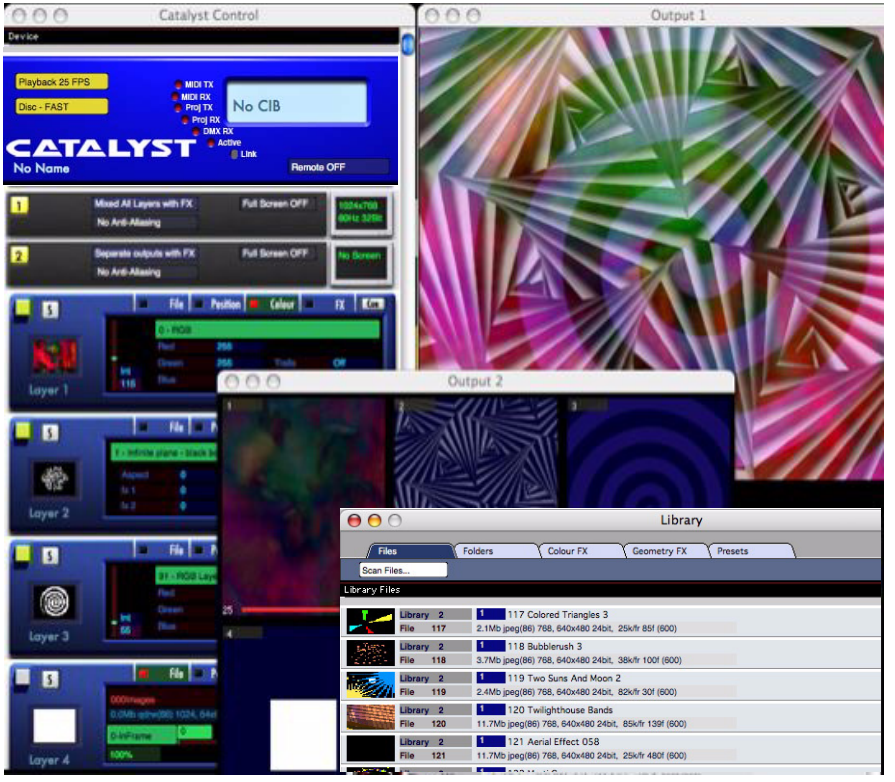


Figure 1: Catalyst Pro Software User Interface Display Screens

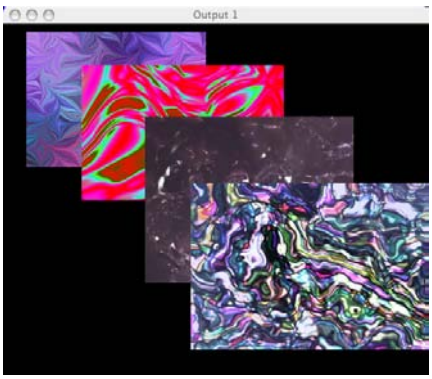
Selecting Media for Playback

Any content to be played back from the Catalyst Media Server is stored within computer folders accessible from the application. The folder names begin with a three-digit number from 000-253. This is known as the folder's *index number* and corresponds directly to a DMX value for the **Library** parameter. For example, when the DMX value of the **Library** parameter is **11**, the selected folder is the **011 Artbeats** folder.

Similarly, the files in each Library file folder have names beginning with a three-digit *index number* from 000 to 255. Each file's index number corresponds directly to a DMX value for the **File** parameter DMX channel. Adjusting the DMX value of the **File** parameter on a lighting console selects a file from the active folder for playback.

Working with Layers

Catalyst layers have a fixed priority order of visibility, similar to sheets stacked back-to-front. A layer with higher priority is in front of those with lower priority. Layer 1 is at the back of the stack (lowest priority), and all other available layers are stacked in front of it in numerical order. Reducing a layer's **Intensity** parameter DMX value reveals the layer behind it in the stack.



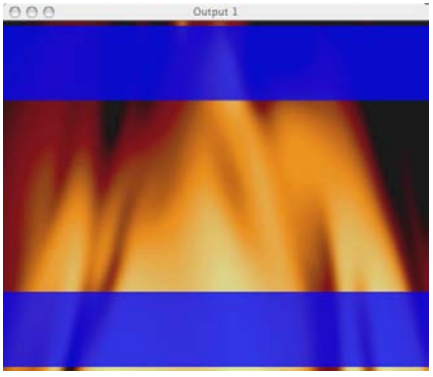
Note: ***Different versions of Catalyst software support a different number of layers.***

Software Security

High End Systems uses a USB dongle to prevent unauthorized copying of Catalyst software. Factory configured Catalyst Media Servers have a dongle internally installed. Software only versions of the application require a USB dongle plugged into one of the PowerMac USB ports.

When the USB dongle is not detected by the Catalyst software, blue bars will appear at the top and bottom of both outputs.

Reconnecting the USB dongle will remove the blue bars.



Chapter 2: QuickStart

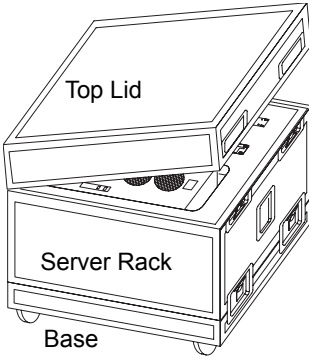
This Chapter describes the steps to quickly setup and begin using a Catalyst Media Server system. These instructions also ship with your product as a Startup Sheet for the model you purchased. If you purchased a Software Only version of the product, setup instructions shipped with your product. For information on configuring hardware to run Catalyst Media Servers software, visit the High End System website support section [http://www.highend.com/support/digital_lighting/catalystsupportguide/].

Media Server Setup

Unpacking the Roadcase

Unlatch and remove the top lid from the roadcase.Verify that the following contents are stored in the lid and remove any you need for your application:

- LCD monitor
- Keyboard
- Mouse
- IEC TO 110v Adapter to attach an additional monitor or device like a firewire drive to the power conditioner in the server rack
- IEC 220v power cord optional for 220v applications
- USB Serial Adapters: One RS232 for serial devices and One RS422 for Deck Control
- A Mac G5 power cord and phone cable (only needed if you upgrade your G5 computer in the future)
- Documentation for the G5, Power Conditioner, VDA, USB PCI CD, and a Catalyst Software CD-ROM



Inspecting Your Catalyst Media Server

As you unpack the Media Server rack, verify that it is undamaged. If the product is damaged or parts are missing, notify both the shipping company and your sales agent immediately.

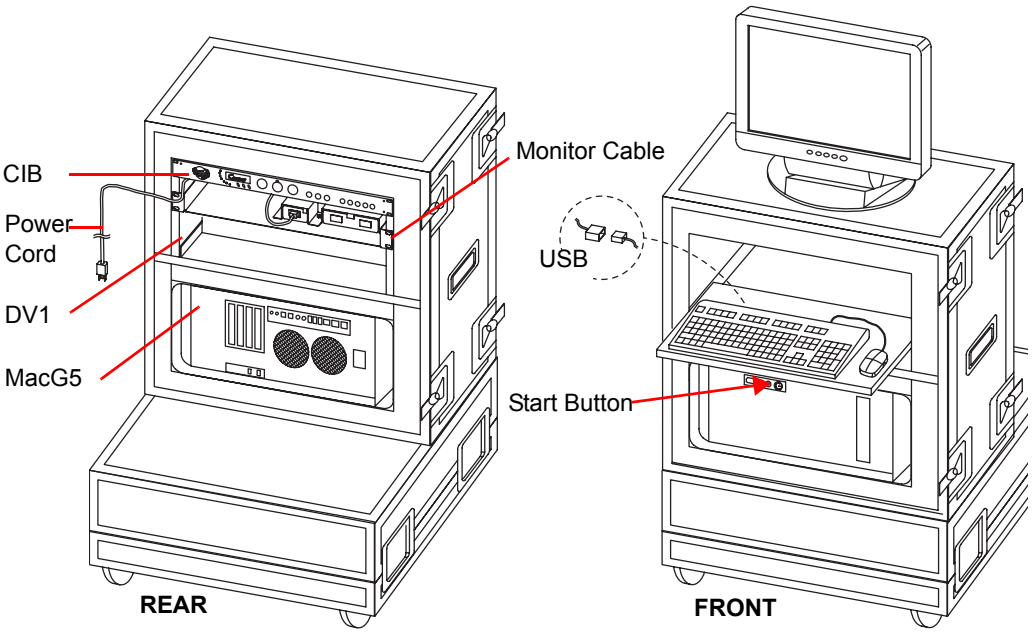
> Before returning merchandise, contact your High End Systems dealer/distributor for a Return Material Authorization (RMA) number. The factory cannot accept goods shipped without an RMA number. Return a damaged product for repair in its original roadcase. High End Systems assumes no responsibility for products damaged during transport.

See “Product and Safety Information” for more information on warranties provided by High End Systems for your product.

Setting up the Server Rack

1. Position the server rack upright on a platform constructed by latching the lid and the roadcase base together.
2. The server rack contains a PowerMac® G5, the Catalyst Interface Box (CIB) a power conditioner and a Digital Video Amplifier (VDA).
   - The Catalyst DV model utilizes an Extron® VDA
   - The Catalyst Pro version contains a DV1 Dual VDA
3. Set the LCD monitor on top of the server rack with the screen facing front and plug the monitor power cord from the rack into the back of the monitor.
4. At the front of the server rack, pull the keyboard shelf out until it stops.
5. Plug the keyboard into the white USB connector port attached to the keyboard shelf.
6. Plug the mouse's USB plug into either of the two USB ports on the keyboard's back edge.

TIP: For better performance, use the optical mouse on a non-reflective surface instead of the keyboard tray.



Catalyst Pro Media Server Rack Setup

Hardware Connections

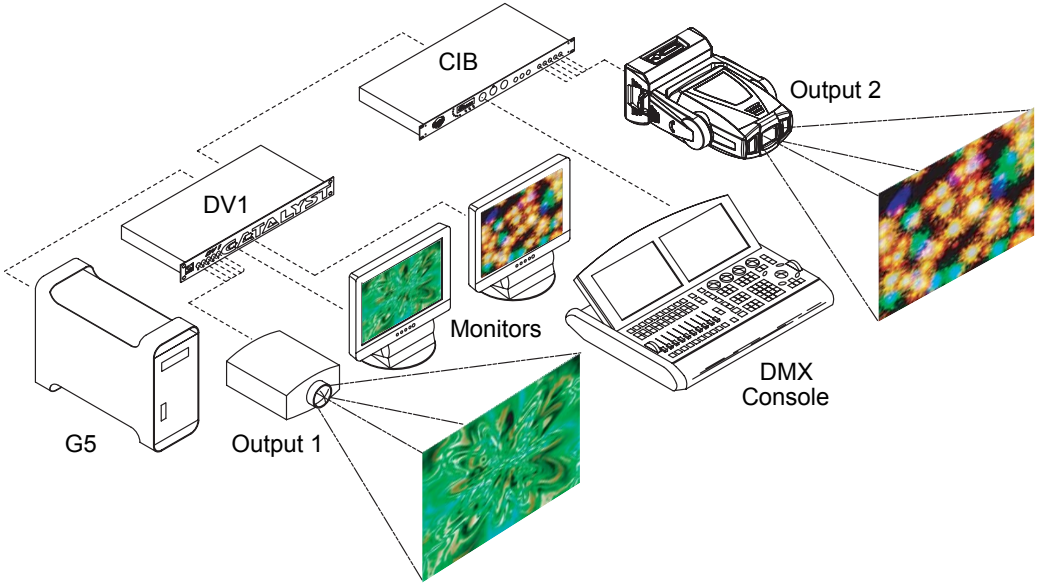
Catalyst Media Server models feature Dual or Single Output capability. Use the hardware setup for your model.

Connecting Preview Monitors and Outputs

Catalyst Pro Dual Output Versions

1. Locate the DV1 (VDA) on the back of Catalyst Media Server rack.

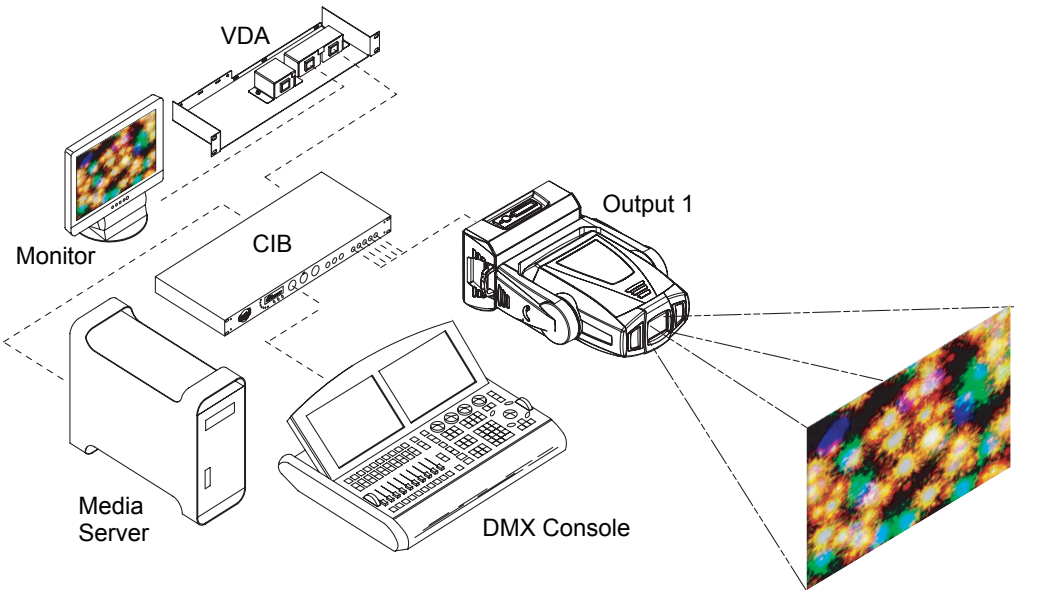
2. Plug the PowerMac LCD monitor data cable to the P1 monitor port on the DV1. If you are using two preview monitors, connect the second monitor to the P2 monitor port.
3. Connect the device you want to designate as Output 1 to the RGBHV connectors on the DV1.
4. Connect a second Output device to the RGBHV connectors on the CIB



Catalyst Pro connected to two output devices and utilizing two monitors

Catalyst DV Single Output Versions

1. Locate the Extron Video Distribution Amplifier (VDA) on the back of Catalyst Media Server rack.
2. Plug the PowerMac LCD monitor data cable into the local monitor port on the VDA.
3. Connect an Output device to the RGBHV connectors on the CIB.



Catalyst DV Connected to a DL1 digital light for output and utilizing an emulation monitor

Connecting the Media Server to a DMX-512 Link

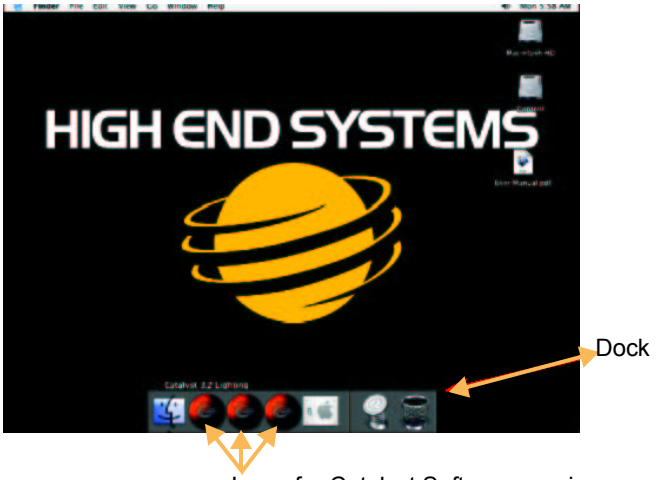
1. Connect the male XLR connector of a DMX data cable to the lighting controller's "DMX out" connector.
2. Connect the data cable's female XLR connector to the "DMX in" connector of the Catalyst Interface Box (CIB).

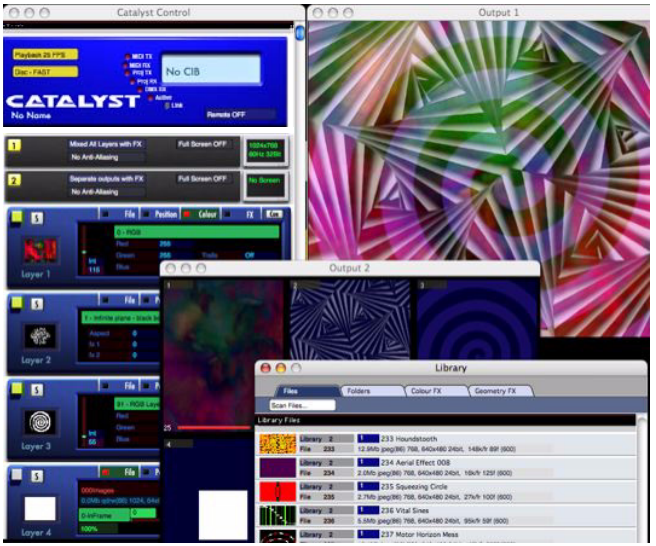
Catalyst Software Application Setup

At the front of the Catalyst Media Server rack, press the PowerMac G5power button to turn on the computer. The desktop appears with icons for the Macintosh HD, the Content drive and the User Manual (in .pdf format).

1. Move the mouse pointer to the bottom of the screen. A strip of icons forming the Dock will pop up that includes three Catalyst icons. Each Catalyst icon is connected to a content format optimized for specific applications (Lighting, NTSC or PAL).
2. Move the mouse over the version you want to select and click once to launch the application.

The application ships from the factory set to open the Catalyst windows upon launch. If the windows aren't open on your desktop, you can access them via the Windows pull down menu at the top of the monitor display.





BACK UP THE CONTENT DRIVE

High End Systems recommends that you back up your content drive to a firewire drive or other media. The drive contains over35GB of content files. As an option, you can purchase Content backup on DVDs from High End Systems by contacting Customer Service at 800.890.8989.

Configuring the Catalyst Software

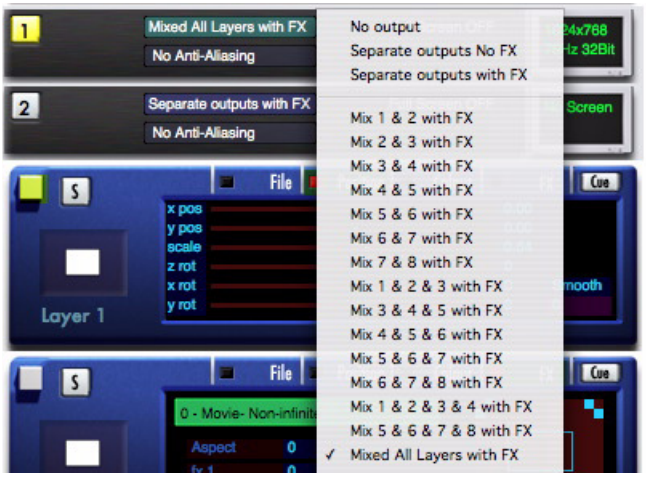
The following steps give you a basic default startup configuration for the Catalyst Pro 8-layer software version. Your version may have fewer layers or fewer outputs, but the general steps are the same for all Media Server Software.

Choose Output Options

Catalyst Pro Media Servers can display independent views of the Layer content on each output. Catalyst DV and Xpress software versions have single output capability and the monitor emulates what is being projected from the output device.

To configure Dual Outputs:

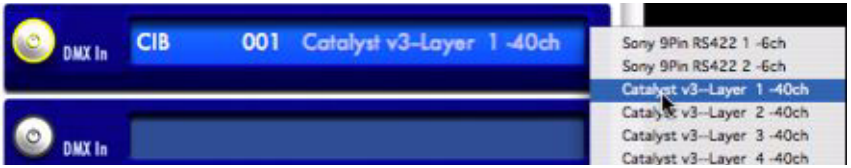
1. Locate the Output 1 panel in the Catalyst Control Window. Click the top field in of the Output 1 panel as shown to pop up a menu.
2. Highlight Mixed All Layers with FX and click to select.
3. Locate the Output 2 panel in the Catalyst Control Window and select Separate Outputs with FX.



Set DMX Start Channels for Layers

To assign a DMX start channel to a Media Server layer:

1. Scroll down the Catalyst Control Window until the first DMX In panel is visible.
2. Turn on the DMX In panel by clicking the On button on the left side of the panel. The center circle and outside edge of the button turn yellow.
3. Select a layer or serial device for that DMX In panel.



4. Click in the number field to type in the start channel. Remember that each layer requires an uninterrupted range of 40 channels for independent DMX control.

5. Patch each layer to your lighting console using the DMX Start Channels assigned with the Catalyst DMX In panels.

TIP: ***Each layer's DMX patch within the lighting console must match the corresponding layer's DMX Start Channel in the DMX In panel. For more information on setting DMX Start channels, see "Understanding DMX-512".***

Now you are ready to use your lighting console to select and manipulate content on the computer's hard drive. Chapter 3: on page 11 contains tutorials that you will find helpful if you are new to Catalyst Media Servers.

Projecting Images Using Full Screen Mode

Selecting Full Screen Mode lets you view the output on the monitor as it is displayed through the output device you are using. With Full Screen mode off, your output device projects the desktop display.

Press **A** on the keyboard to assign Output 1 to Full Screen mode.

Press **S** on the keyboard to leave full screen mode.

Once you select Full Screen mode, the output remains a black screen until the Catalyst Media server receives DMX values from a lighting console.

System Shutdown

1. If you are in Full Screen mode, press **S** to disable.
2. Close the Catalyst application by clicking on the File menu at the top of the desktop and selecting quit.

3. Click on the menu option and choose Shut Down.

Chapter 3: Tutorials

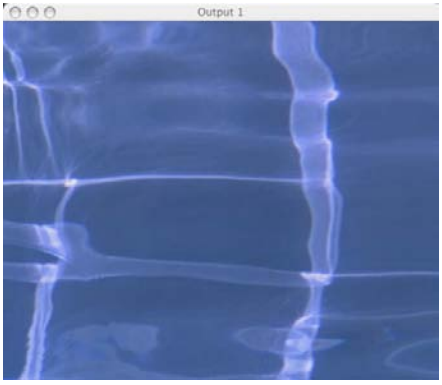
The following lessons provide a quick introduction to programming Catalyst with a lighting console. General knowledge of your lighting console is required to complete these tutorials. For information on programming without a console, see *Chapter 18: "Presets"*.

Note: ***The sample content files in these tutorial lessons were selected from content shipping May 1, 2004.***

Lesson 1: Still Logo on Moving Background

In this lesson you will set a movie playing on Layer 1; then, using Layer 2, superimpose a still image of the High End Systems logo over the movie playing onLayer 1.

Set up Layer 1



1. On your lighting console, select **Layer 1**. Set the **Intensity** parameter for Layer 1 to a DMX value of 255(100%).
2. Set the **Library** parameter to a DMX value of **11**. This should select the preloaded Catalyst Library folder **011 Artbeats**.
3. Set the **File** parameter to a DMX value of **3**. This selects the movie file numbered 003 in Library folder 011. On the Catalyst Output 1 display you should see the first frame of movie file **003WA 114**, a pale blue image of rippling water.
4. On your lighting console, set the **Play Mode** parameter to a DMX value of **2** or **Play Loop Forward**. The movie file will begin playing and the water will appear to be rippling.

The Wholehog II uses eight character alpha-numeric labels to describe values of the **Play Mode** parameter. For this exercise, select *plloopfw*.

The Wholehog III has a Mode menu with the **Play Mode** parameter options on the slotted toolbar. Select *Play Loop Forward*.

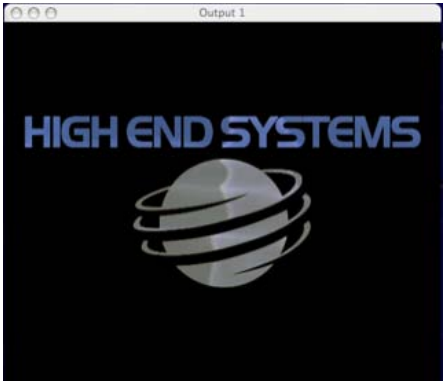
Add the Logo

5. On the lighting console, select **Layer 2.** Set the **Intensity** parameter for Layer 2 to a DMX value of 255(100%). The Catalyst Output 1 screen should change to solid white.
6. Set the **Library** parameter to a DMX value of **0.** This should select the preloaded Catalyst Library folder **000 (HES Lithos).**
7. Set the **File** parameter to a DMX value of **71 (HES-logo-color).** This selects the movie file numbered 71 in Library folder 0. You should see the High End Systems logo on the Output 1 window.

Turn Layer 2 Background Transparent

Now you'll apply a color effect that turns the black background of the Layer 2 logo transparent, revealing the movie file playing on the underlying Layer 1.

8. With Layer 2 still selected on your lighting console, set the **Color Effects** parameter to a DMX value of 3 (the color effect named *Transparent Blacks*). The black background of the High End Systems logo will become transparent and reveal the rippling water movie playing on Layer 1.
9. Now change the **Color Effects** parameter to a DMX value of 4 (the color effect named *Transparent Whites*). The non-black portions of the High End Systems logo should become transparent and reveal the rippling water movie playing on Layer 1.

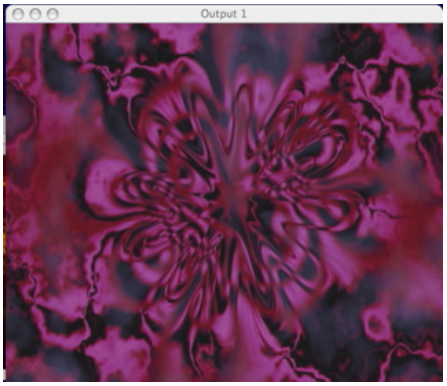


Lesson 2: Crossfading Between Layers

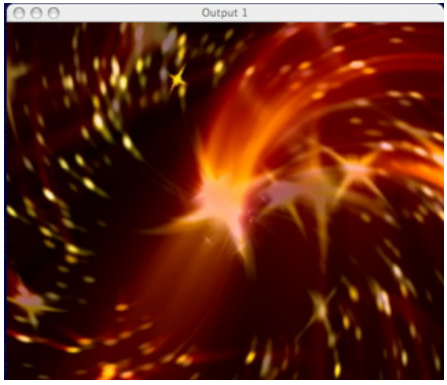
Once you display content on different Catalyst layers, you can fade the layers in and out using the **Intensity** parameter. This creates a crossfading or dissolving effect between layers.

In this lesson, you'll play a movie on Layer 1 and record it in your lighting console as a cue or look. Then you'll build and record another cue with a three-second crossfade to a colorful movie playing on Layer 2.

Set Up First Cue



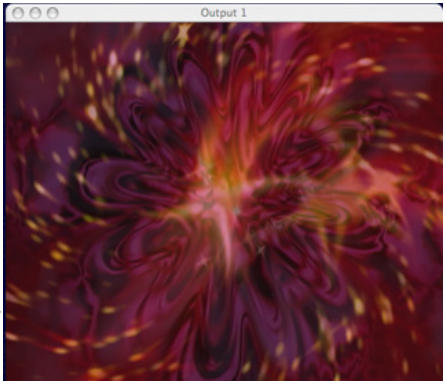
1. Clear or remove any information from Lesson 1 in your console's programmer or editor.
2. On your lighting console, select Layer 1. Set the **Intensity** parameter to a DMX value of 255(100%).
3. Setting DMX values in the **Library** and **File** parameters as in Lesson 1, select **Library 12** (Beacon DigiGobos)**, File 7** (loopedroseA).



4. Set the **Play Mode** parameter to a DMX value of **2 (Play Loop Forward)**. The movie starts playing.
5. On your lighting console, select Layer 2**.** Set the **Intensity** parameter to a DMX value of 255(100%). The Output 1 screen changes to solid white.
6. Using the preloaded Catalyst content, select **Library 14** (Beacon DigiGobos), **File 4** (swirlstars2). Set the **Play Mode** parameter to a DMX value of **2 (Play Loop Forward)**. The animation will begin playing on Output 1.
7. Still on Layer 2, change the **Intensity** parameter to a DMX value of 0 (0%**)**. Layer 2 will disappear, revealing the movie playing on Layer 1.
8. Using your lighting console's method of recording cues or looks, record the above DMX settings as Cue 1 on your lighting console.

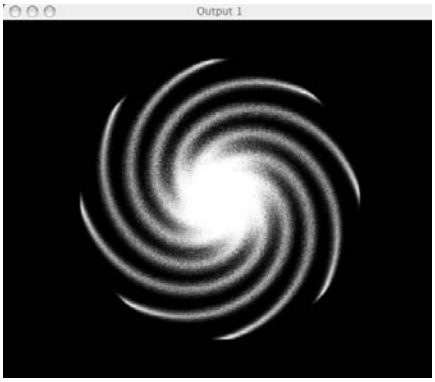
Setup the Second Cue and Playback

9. On your lighting console, select **Layer 2**. Change the **Intensity** parameter to a DMX value of 255 (100%**)**.
10. Use your lighting console's cue timing options to assign a 3 second time value to the **Intensity** parameter.
11. Record these DMX settings and timing information as Cue 2 on your lighting console.
12. Clear your lighting console's programmer or editor. The Catalyst Output 1 screen should change to all black.
13. Using your lighting console, playback the Cue 1 created above. The first movie plays on the Output 1 window of the Catalyst system.
14. Using your lighting console, playback the Cue 2 created above. Output 1 shows Layer 1 crossfading to Layer 2 over a 3-second interval.
15. When finished, follow your lighting console's procedure to turn off or release any cues that are playing back.



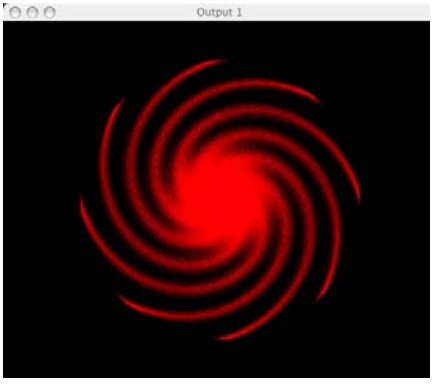
Lesson 3: Image Color and Scale

In this lesson, you'll use a Layer's Position Controls to make an image appear to zoom away into the distance. In addition the Layer's Color Controls are used to color the image.



Set up Layer 1

1. Clear or remove any information in your console's programmer or editor.
2. On your lighting console, select Layer 1. Set the **Intensity** parameter to a DMX value of 255(100%).
3. Select **Library 0** (HES lithos) and **File 5** (comets)**.** The image will be displayed on the Output 1 window.
4. Change the **Red** parameter to a DMX value of 255, and the **Blue** and **Green** parameters to a DMX value of 0. This changes the image to a red spiral galaxy
5. Using your lighting console's method of recording cues or looks, record the above DMX settings as Cue 1 on your lighting console.



On a Wholehog console the **Red, Green, and Blue** parameters are labeled as Cyan, Magenta, and Yellow. The parameter values displayed are in terms of percentage where 0% equals a DMX value of 255 and 100% equals a DMX value of 0. On a Wholehog console, set the Cyan parameter to 0% and the Magenta and Yellow to 100% to create a red color.

Set Layer 1 Rotation, Position, and Scale

6. Adjust the DMX value of the **Z Rotation** parameter so the Layer image starts spinning slowly—say 10 rotations per minute.
7. Adjust the DMX value of the **X Position** parameter (*not* the **X Rotation** parameter) to move the image to the **left edge of the Output 1 window**, so it is barely visible.
8. Adjust the DMX value of the **Y Position** parameter to move the image straight up to the **top left corner of the Output 1 window**, so only the corner is visible.

9. Adjust the DMX value of the **Scale** parameter to the midpoint of its 16-bit DMX value range. This shrinks the Layer's image to a tiny point.

On a Wholehog console, the 16-bit DMX values of the **Scale** parameter are displayed are in terms of percentage. 50% is equal to the midpoint of the 16-bit DMX range.

10. Use your lighting console's cue timing options to assign a 3-second time value to the Z-axis Rotation, Y position, and Scale parameters. Record the above DMX settings and timing information as Cue 2 on your lighting console.

Playback

11. Clear your lighting console's programmer or editor. The Catalyst Output 1 window should change to all black.
12. Using your lighting console, playback the Cue 1 created above. The red spiral galaxy appears on the Output 1 window of the Catalyst system.
13. Using your lighting console, playback the Cue 2 created above. The red spiral galaxy will spin and shrink away on the Output 1 window.
14. When finished, follow your lighting console's procedure to turn off or release any cues that are playing back.

Lesson 4: Trails

The **Trails** parameter creates an afterimage that follows an image as it moves, then slowly fades away.

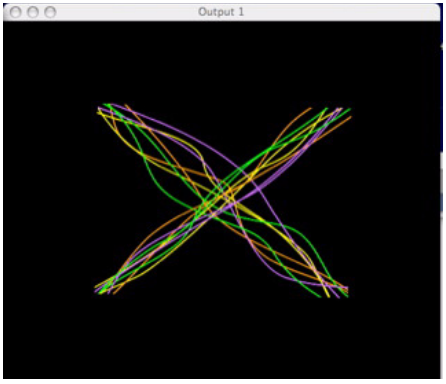
Understanding Trails

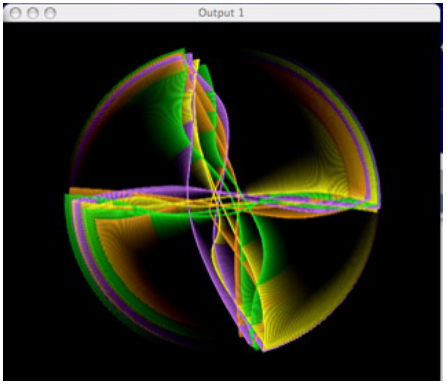
Unlike other Catalyst 3 effects, you can apply Trails **only** to Layer 1, the bottom Layer in the Layer stack. However, the Layer 1 Trails effect can also encompass content from higher layers, as long as Layer 1 is visible beneath them. For example assigning transparency to Layer 2 makes it subject to Layer 1's Trails effect

> ***Trails parameter settings for layers other than Layer 1 are ignored and do not alter layers.***

Applying Trails to Layer 1

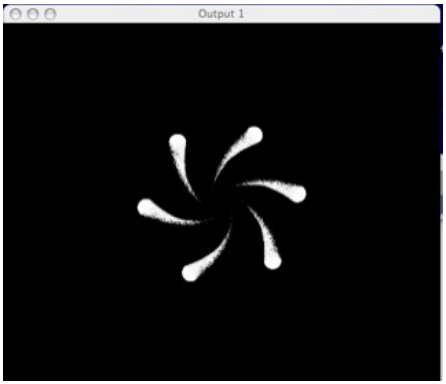
1. Clear or remove any information in your console's programmer or editor.
2. On your lighting console, select Layer 1. Set the **Intensity** parameter to a DMX value of 255(100%).
3. Select **Library 2** (HES Digital Aerials 2)and **File 124** (threaded X). Set the **Play Mode** parameter to a DMX value of **0 (In Frame)**. Using the preloaded Catalyst content, you should now see an animation with two rotating squares playing in the Output 1 window.
4. Assign the DMX value of the **Color Effect** parameter to 3 (transparent blacks).
5. Adjust the DMX value of the **Trails** parameter to 255(100%). As the movie plays, each frame will leave an afterimage that slowly fades away.

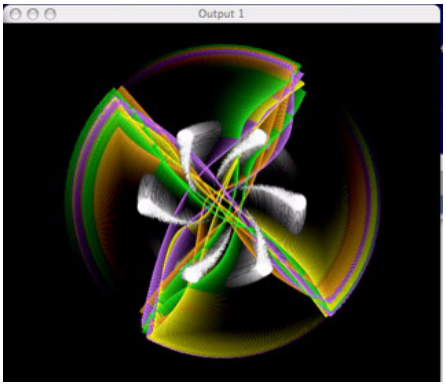




Adding Trails to Layer 2

6. On your lighting console, select Layer 2. Set the **Intensity** parameter to a DMX value of 255(100%).
7. Select **Library 0** (HES lithos) and **File 28** (comet). Using the preloaded Catalyst content, you should now see a greyscale pinwheel image on Output 1.
8. Adjust the DMX value of the **Z Rotation** parameter so the Layer 1 image starts spinning slowly— 20 rotations per minute, for example.
9. Assign the DMX value of the **Color Effects** parameter to 3 (transparent blacks). You will now see the Trails effect from Layer 1 is applied to Layer 2.
10. When finished, clear or remove any information from the above lesson in your lighting console's programmer or editor.





Lesson 5: Shutters

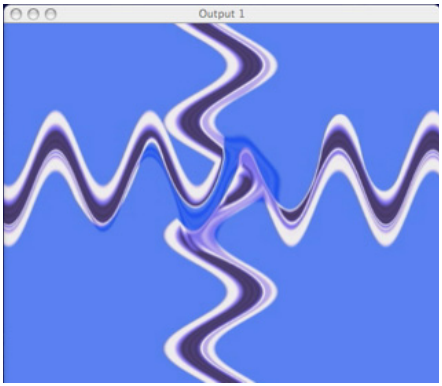
Any Layer can be used to shutter or crop content on underlying layers using the Shutter settings of the **Visual Effects** parameter.

Understanding Shutters

When a shutter Visual Effect is activated on a layer, that layer changes to a *shutter only* layer. Any assigned content for the layer will not be displayed. Instead, an adjustable transparent frame is displayed above underlying layers. A shutter Visual Effect will not function on Layer 1.

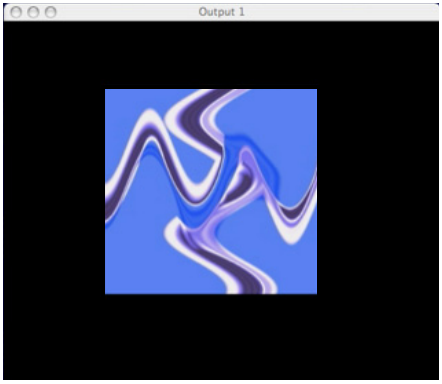
Once a layer becomes a *shutter only* layer, the **Keystone Correction** parameters can be used to adjust the frame's shape. In addition the **X, Y,** and **Z Rotation, X and Y Position,** and **Scale** parameters modify the appearance of the shutters.

Set up Layer 1



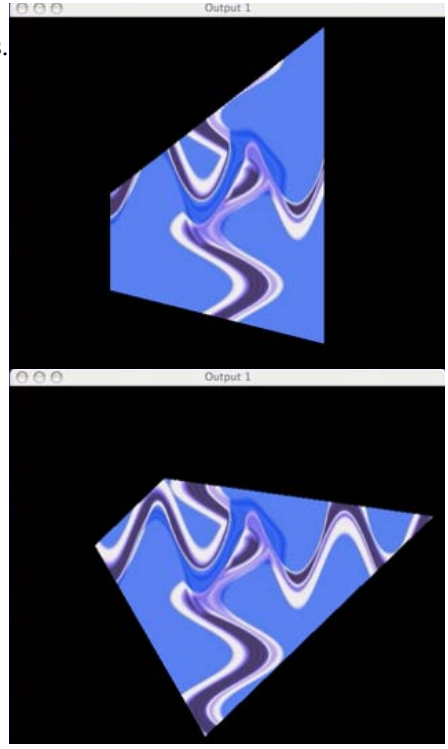
11. Clear or remove any information in your console's programmer or editor.
12. On your lighting console, select Layer 1. Set the **Intensity** parameter to a DMX value of 255(100%).
13. Adjust the **Library** and **File** parameters on your console to select **Library 12** (Sean Bridwell Textures), **File** 8 (loopedsnakes1).
14. Set the **Play Mode** parameter to a DMX value of **3 (Play Loop Reverse)**.

Add Shutters with Layer 2



15. On your lighting console, select Layer 2. Set the **Intensity** parameter to a DMX value of **255**(100%).
16. Set the **Visual Effects** parameter to a DMX value of **70 (Shutter -Black)**.
17. Adjust the **Scale** parameter until the Output 1 window displays a transparent square in a black background.

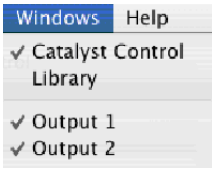
18. Adjust the eight **Keystone Correction** parameters to change the shape of the shutters.
19. Adjust the **Z Rotation** parameter to rotate the shutters.
20. When finished, clear or remove any information in your lighting console's programmer or editor.



Chapter 4: Windows Menus

The Catalyst Interface

The Catalyst Graphical User Interface is composed of the Catalyst Control, Library, and Two Output windows (One Output window for the Xpress version).They are accessed through the Windows Menu at the top of the screen. The user interface provides configuration, command and preview functions.



Selection Tools

Three mechanisms are used to select and adjust interface settings:

Menu A pop-up menu lets you scroll through the list to the desired file or setting. The library and file selection menus under the File tab, color effects under the Color tab, and FX effect under the FX tab all use menus.

Slider Moving a slider left or right, or up or down, changes the parameters. Intensity adjustments on the Color tab, and all the adjustments on the Position tab, use sliders.

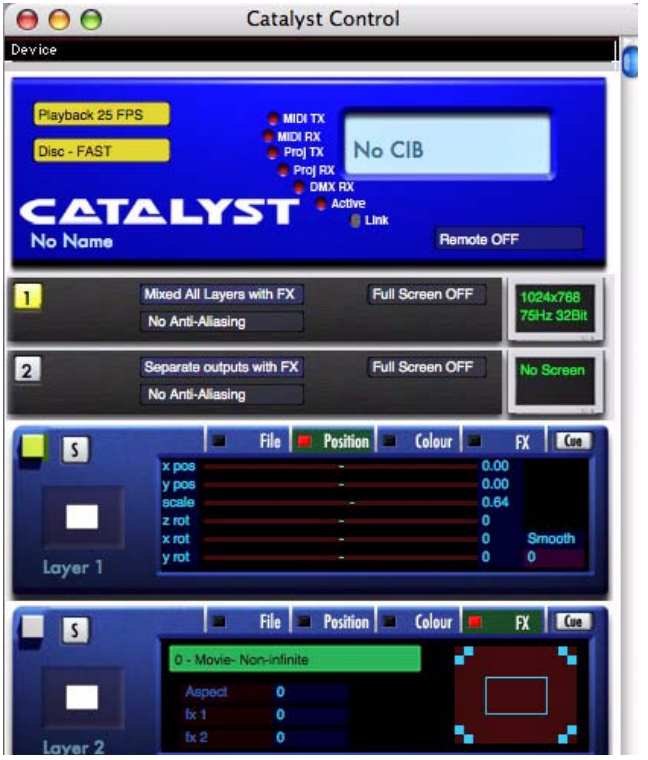
Numerical Slider Where numerical values appear in a field, such as playback speed under the File tab, or the red, blue and green settings under the Color tab, click the field while holding down the mouse button. Moving the mouse up and down to raises or lowers value.

The following sections outline each Window's components and general functionality and references other sections of this manual with more detailed functional descriptions.

Catalyst Control Window

Components

The Catalyst Control Window contains the following panels:



CIB Paneldisplays status of the CIB connection and switches sync functions.

Output Control panelssets the output display. Catalyst Pro and Catalyst DV have dual outputs, Catalyst Xpress has one output available.

Layer Panels allow preview and control of DMX parameters for each available layer. Catalyst Pro provides eight layers; Catalyst DV, five; and Catalyst Xpress, three.

DMX Insets DMX start channel values for layers, as well as the following:

Midi Show Control Input Triggeris used in conjunction with Presets

Video Inputswitches a layer's content source from the Media Server hard drive to a video feed input. Catalyst Pro and DV software provides two video inputs. Catalyst Xpress has one video input.

Sound Input activates audio input. All versions of Catalyst software provide this feature.

Custom Serial inputs configures serial devices. Four serial inputs are available in Catalyst Pro software and three in the Catalyst DV version.

Midi Time Code Input is available in Catalyst Pro and Catalyst DV versions

CIB Panel

Turnkey Catalyst systems utilize a Catalyst Interface Board (CIB) to connect to a DMX console. User configured systems utilizing Catalyst Software only versions may substitute an ArtNet box, see the High End Website for additional configuration information at

http://www.highend.com/support/digital_lighting/catalystsupportguide/index.asp

When a (CIB) is connected properly to the media server, the mini display window will say *CIB OK*. If the CIB is not hooked up, it will read **No CIB** CIBs are used with turnkey versions of Catalyst.

Figure 4-1 CIB Setting Pane

The **Name** field is editable and is used to identify the local media server on network of multiple servers.

The **Remote Off/On** field configures synchronization functionality. For more information on synchronizing output between servers, see *Multiple Servers* on page 175.

Output Control(s)

Content can be viewed locally on a monitor before sending it to a Catalyst DL1 fixture or other video output device. The Output Control panes configures each layer or stacked layers with or without effects on either or both output screens at a selected screen resolution. For more detailed information, see *Configuring Output Displays* on page 34.

The **Output On/Off** button turns Output Windows 1 and 2 On (yellow) and Off (white).

Output Windows field provides a variety of Output display options on each output individually depending on available in your version of Catalyst Software.

All layers with effects shows the composite of the individual layer effects. The most common output window setting is to show all four layers mixed with FX in Output Window 1, and Separate Outputs with FX on Output 2.

The **Anti-aliasing** popup field provides options for smoothing the edges of the outputted image.

Note: Anti-aliasing may slow the speed of FX for some images.

Full Screen Display On/Off turns the full screen display mode on and off. The hot key to turn on full screen display for Output 1 is A, and the hot key to turn it off is S.

The small monitor image displays the current resolution, screen refresh, and bit depth of the attached monitor is. If a second monitor is not hooked up it will say **No Screen**.

Layer Panel

When using a DMX console to control a Catalyst Layer, all settings within the **Layer** panel will automatically adjust in real time to reflect the current DMX values sent from a lighting console.

With the DMX In panels turned off, Preset programming allows the user to set values in each of this panel's tabs, see *Creating a Preset* on page 144

The **Solo** function allows activates only the selected layer and all others are ignored. This test function can be used to isolate one Layer from the others. Clicking the Solo button will activate or de-activate the **Solo** function

The far left portion of the Layer Panel displays a thumbnail (if available) of the currently selected media for the layer.

Each Layer can be named by clicking on the **Layer Name** field, typing in a name and pressing ENTER. This function is primarily for personal organization purposes.

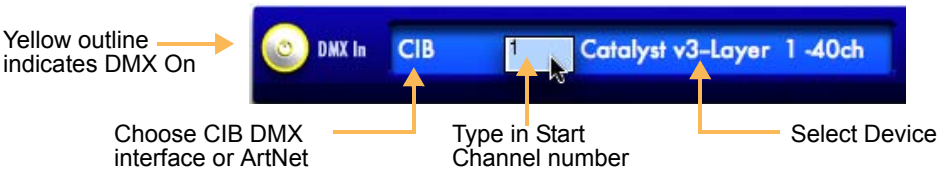
See the following for more information about parameters displayed in the layer panels:

- **File** tab fields —*Chapter 6: Media Playback* on page 41.
- **Position** tab fields — *Chapter 7: Movement and Size* on page 47.
- **Color** tab fields — *Chapter 8: Intensity and Color* on page 55, and *Chapter 9: Strobing and Trails* on page 89.
- **FX** tab fields — *Chapter 10: Visual Effects* on page 91, and *Chapter 11: Keystone and Shutters* on page 117.

DMX In Panel

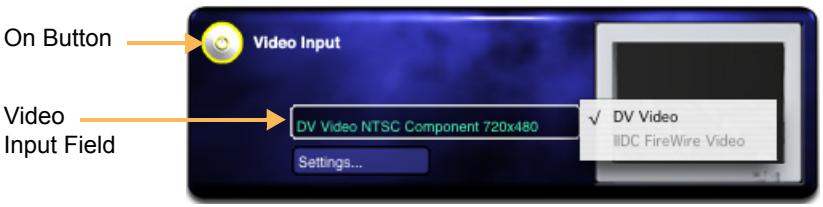
Use the DMX In panels to patch layers as well as other inputs for DMX control. There are multiple DMX In panels in each Catalyst Software Version to allow setting DMX start channel values for one of the following *Devices*:

- Layer image
- Layer volume control
- Preset Trigger
- RS 422 devices
- Serial Trigger
- ArtNet protocol



Video Input

Video feeds can be manipulated with the Layer's parameters in the same manner as content played back from the hard drive. For more information, see *Video Input* on page 127.



Sound Input

Catalyst Pro, DV and Xpress versions can all convert audio to a visual waveform. The waveform can then be manipulated with the Layer's parameters in the same manner as content played back from the hard drive.activates audio input. This panel activates the audio input. For more information on the audio feature, see *Audio Input* on page 123.

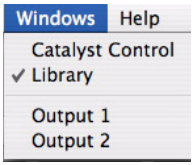
Click on the round On/Off button to activate the Video Input panel

Custom Serial Inputs

The Catalyst Media Server can control peripheral devices such as video switchers or projector shutters through the PowerMac's Universal Serial Bus (USB) ports. This feature lets non-DMX controlled devices coordinate automatically with events and images in your show. For more information, see *Chapter 15: Serial Control* on page 129.

Midi Time Code Input Catalyst Media Servers can receive MIDI timecode and a Layer's playback can synchronize to the timecode. This panel assigns the input. For more information, see *Chapter 16: MIDI Timecode* on page 135.

Library Window



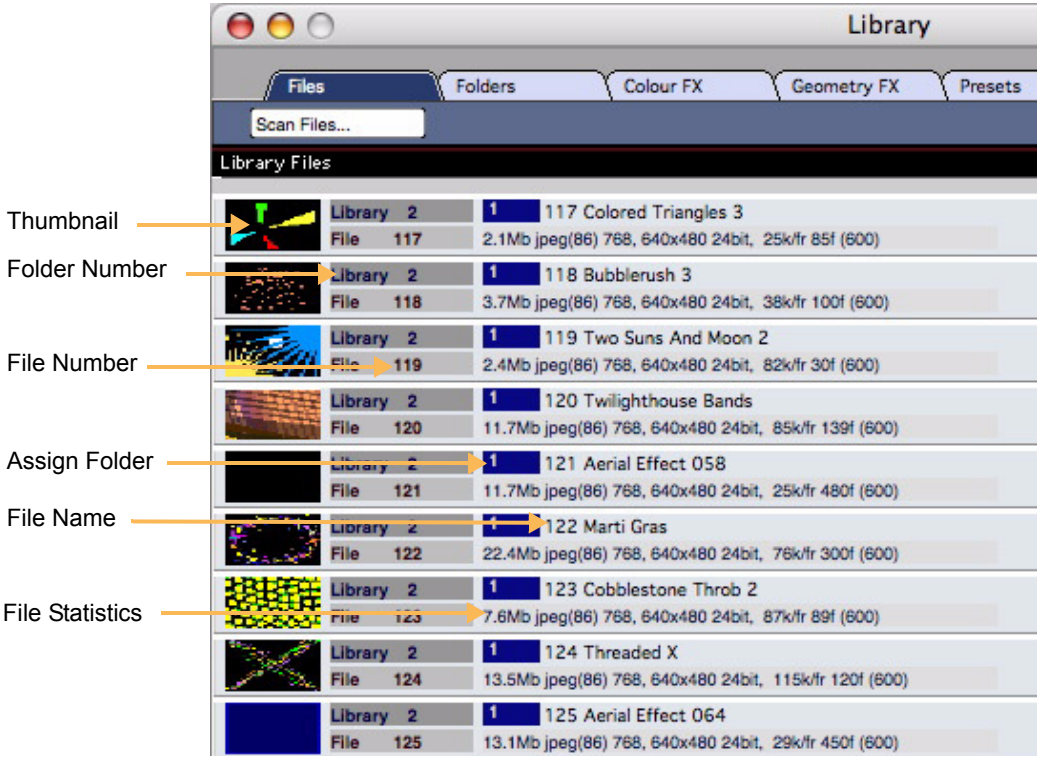
On the top of the PowerMac monitor, Click on **Library** within the **Windows** menu to open the **Library** window.

The Library window of the Catalyst Media Server has the following functions.

- Lists and describes content files and folders available to the server
- Displays details about the Color and Visual Effects.
- Configures Library folder assignments
- Creates and edits Presets

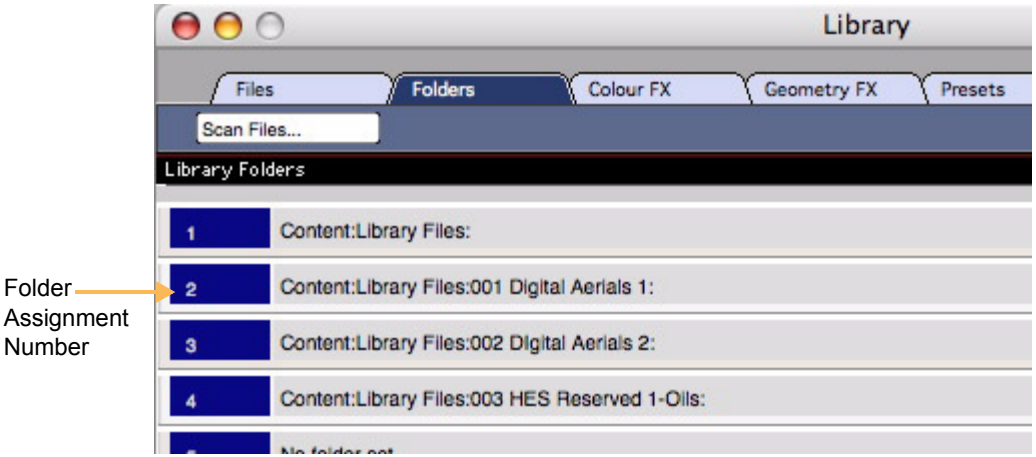
Files Tab

Clicking on the **Files** tab on the top of the **Library** window displays the content currently available to the server.

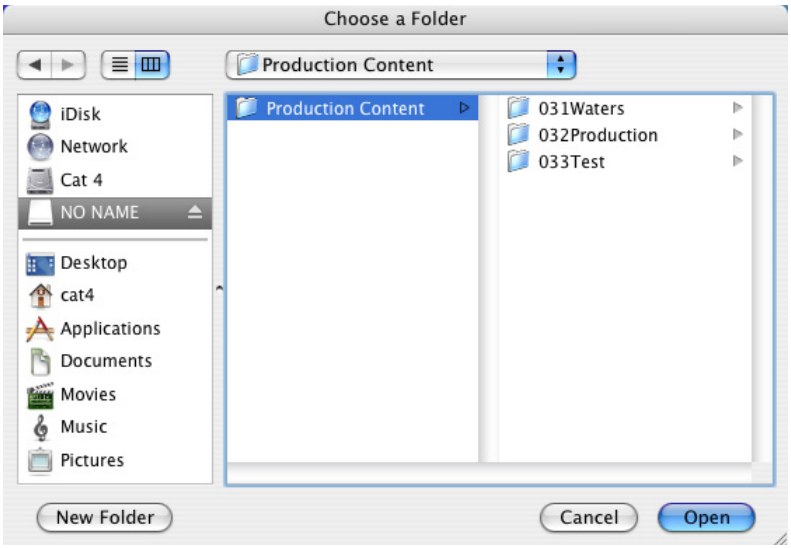


Folders Tab

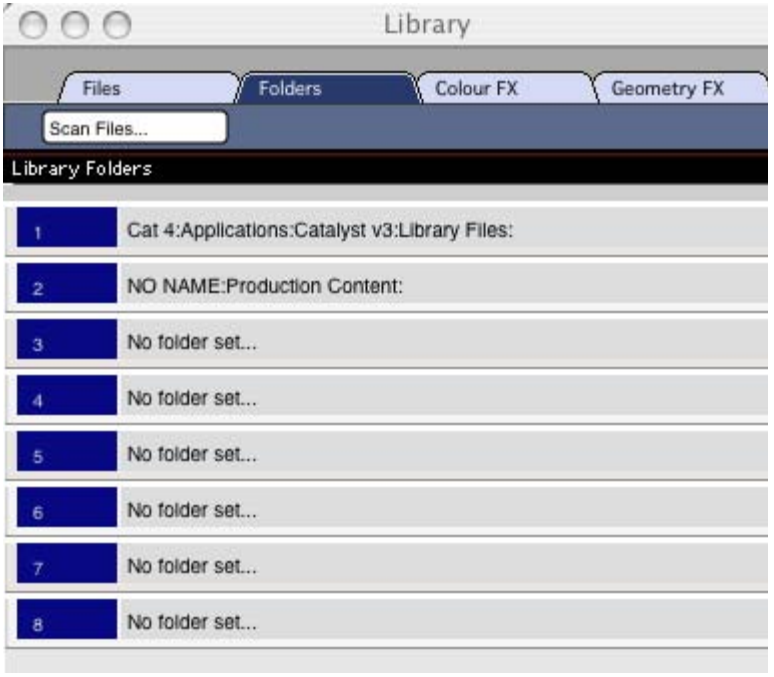
Clicking on the **Folders** tab on the top of the **Library** window displays the folders currently assigned as Library Folders. Additional folders from internal or external drives, as well as network sources, can be assigned to Catalyst. Any properly labeled folders and files in an assigned Library Folder become available content.



1. Click on a Folder assignment number to open the **Choose a Folder** window.
2. Browse to the drive and folder containing the content files and click **Open**.



The **Folders** tab of the Library Window now displays the newly assigned folder.



3. Press the **Scan Files...** button to begin a scan of all available media files. The **scanning** window will open and display the scan progress.

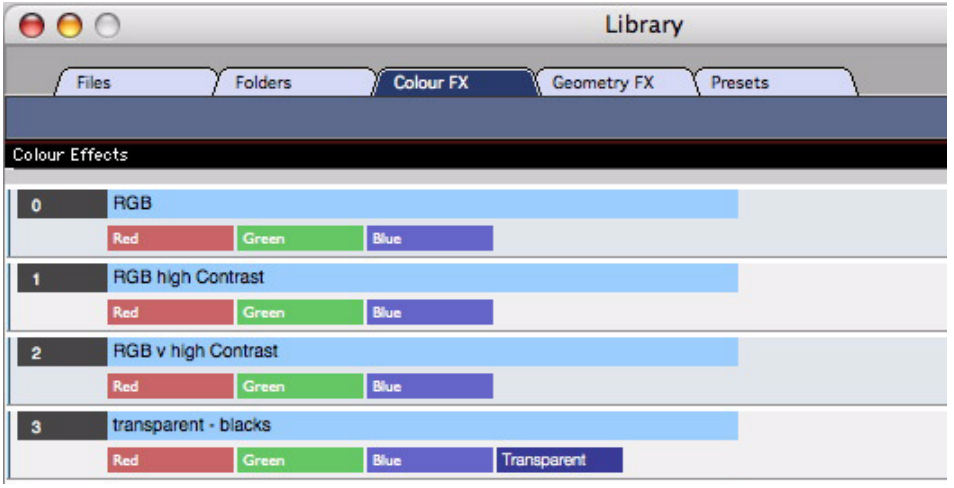
When the scan is complete the **scanning** window will close and the new media becomes available to the Catalyst Media Server.

Note: Pressing Shift during a scan will perform a Quick Scan where no thumbnails will be created.

Color FX Tab

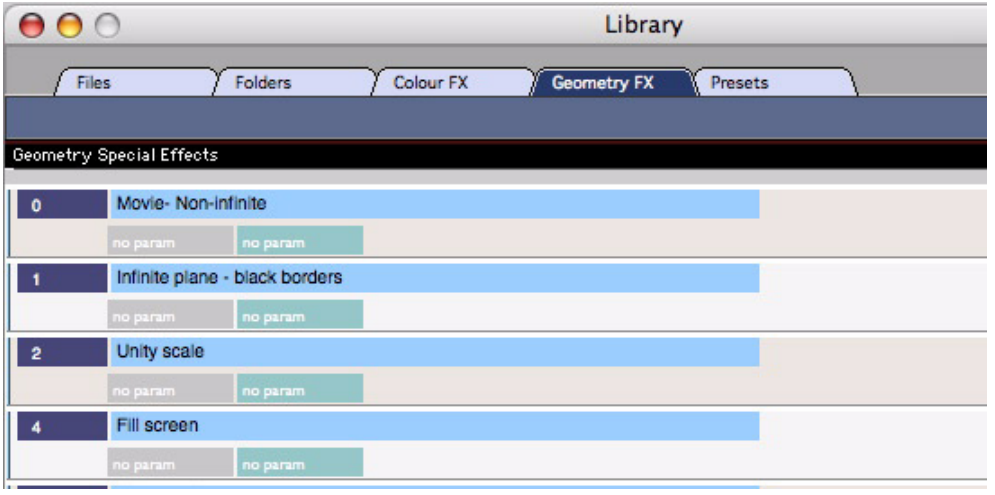
Clicking on the **Color FX** tab on the top of the **Library** window displays reference information for the **Color Effects** parameter.

Colored fields indicate the functionality of other parameters associated with each effect. For more information, see *Color Effects* on page 57.



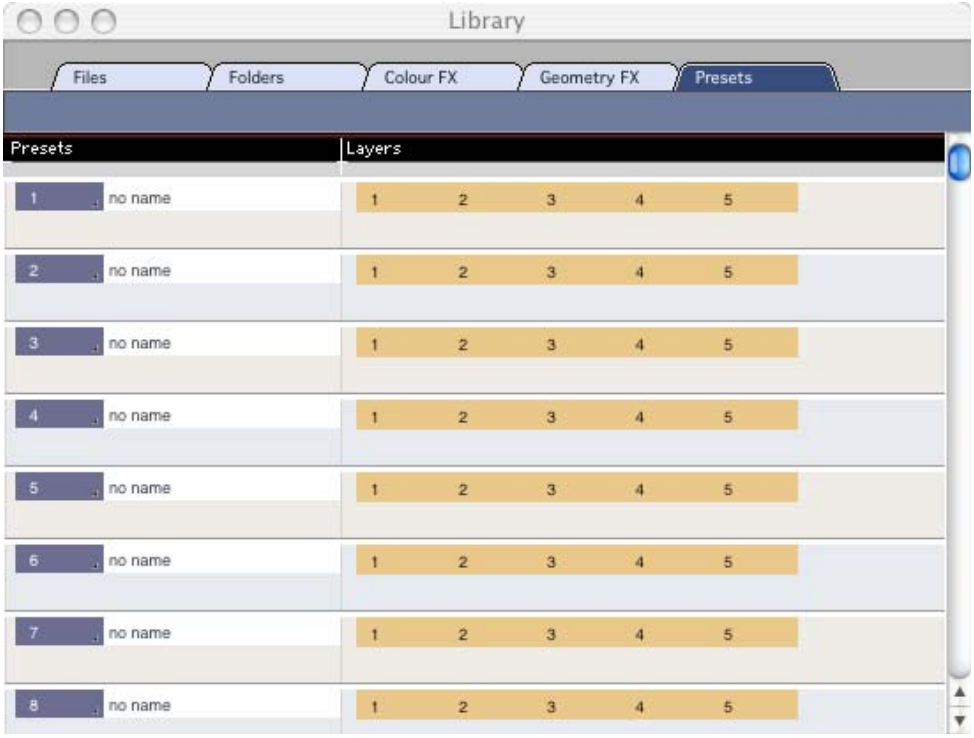
Geometry FX Tab

Clicking on the **Geometry FX** tab on the top of the **Library** window displays reference information for the **Visual Effects** parameter. Colored fields indicate the functionality of other parameters associated with each effect. For more information, see *Chapter 10: Visual Effects* on page 91.



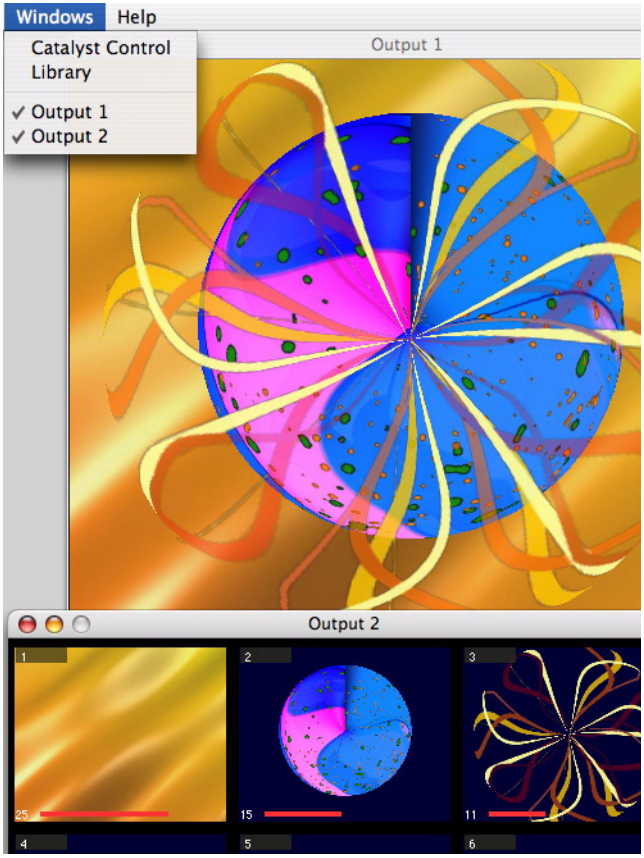
Presets Tab

The preset tab contains fields that allow the programmer to name, edit and store preset created for programming without a DMX console. For detailed information, see *Chapter 18: Presets* on page 143.



Output Windows

The output windows (Two for Catalyst Pro and DV versions, and one for Catalyst Xpress software version) allow the programmer to view the content according to the output selection criteria set in the Catalyst Control Window's Output panel(s).



Depending on the system configuration, these windows can display a preview of the content or emulate the actual output of the local server.

For more information on configuring the output windows, see *Chapter 5: Output Displays* on page 33.

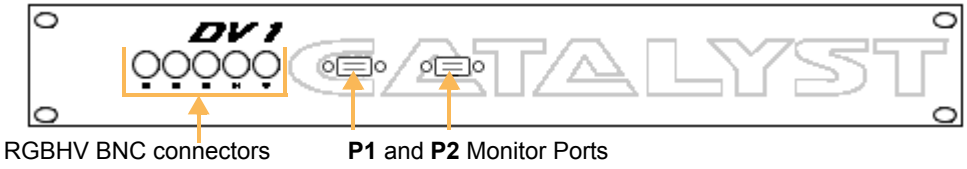
These windows also display the diagnostic screens available in the Catalyst software interface. For detailed information, see *Chapter 20: Diagnostic Displays* on page 163.

Chapter 5:
Output Displays

The Catalyst Media Server supports two output signals. Each signal is split, and can be displayed simulataneously on any output device (DL1 digital light, video projector, LED wall, etc.) and a monitor display.

DV1 Video Distribution Amplifier

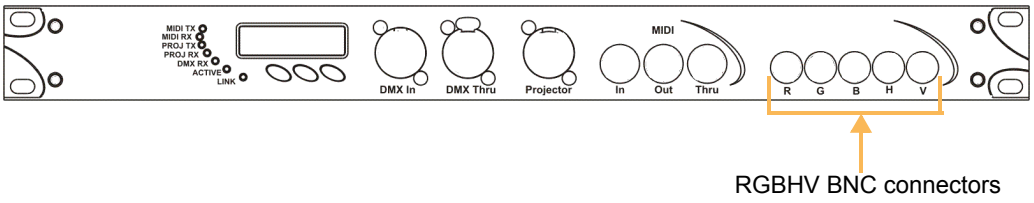
The Catalyst Media Server uses the DV1 dual video distribution amplifier to split and amplify the PowerMac's two video outputs for display on preview monitors as well as output devices. In addition, five BNC video connectors labeled R, G, B, H, and V (Red-Green-Blue-Horizontal sync-Vertical sync) are provided to send Output 1 to a device using high-quality 75-ohm video cable.



CAUTION!
Using a video cable longer than **250 feet** (80 meters) can degrade video performance.

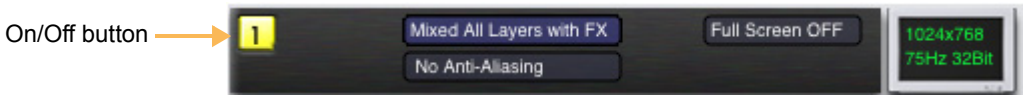
Catalyst Interface Box (CIB)

The Catalyst Interface Box is an interface between the DMX console and the computer's Universal Serial Bus (USB) port. In addition, five RGBHV connections are provided to send **Output 2** to a device using high-quality 75-ohm video cable.

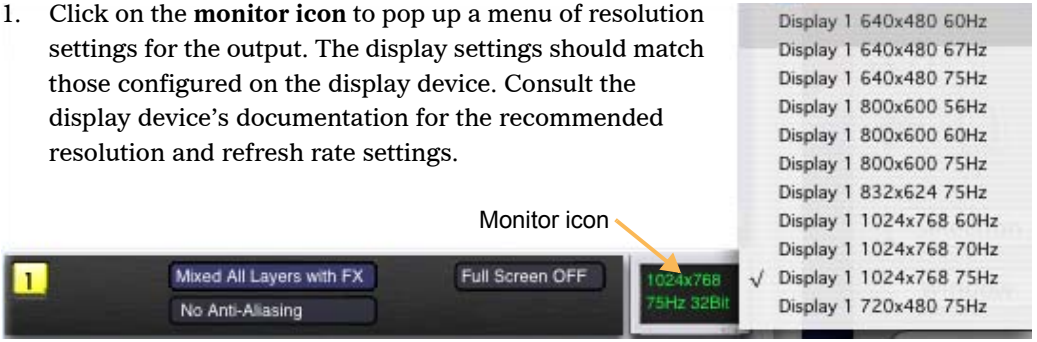


Configuring Output Displays

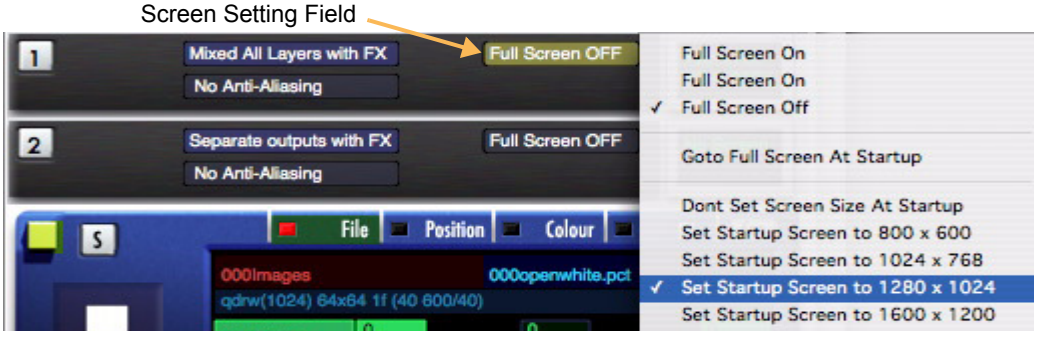
The Catalyst Control window contains the **Output** panels. Each panel can be activated with the **On/Off** button in the top right corner of the panel.



1. Click on the **monitor icon** to pop up a menu of resolution settings for the output. The display settings should match those configured on the display device. Consult the display device's documentation for the recommended resolution and refresh rate settings.



2. Click on the Full Screen button to pop up a menu containing output screen settings.



Full Screen ON: The selected output fills the entire screen on the output display.

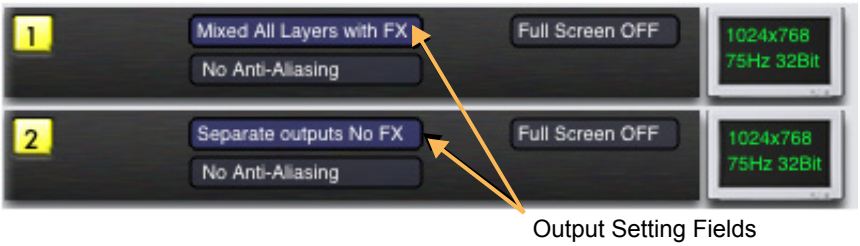
Full Screen OFF. The selected output appears in a small window on the output display.

Goto Full Screen At Startup. When the Catalyst application is started, the selected output will automatically enter Full Screen mode.

Startup Screen. Select screen display size for startup.

Note: High End Systems recommends using the "No Anti-Aliasing" option for all display configurations

3. Click on the **Output Settings** field of the **Output** panel to open a pop-up menu and select one of the options.



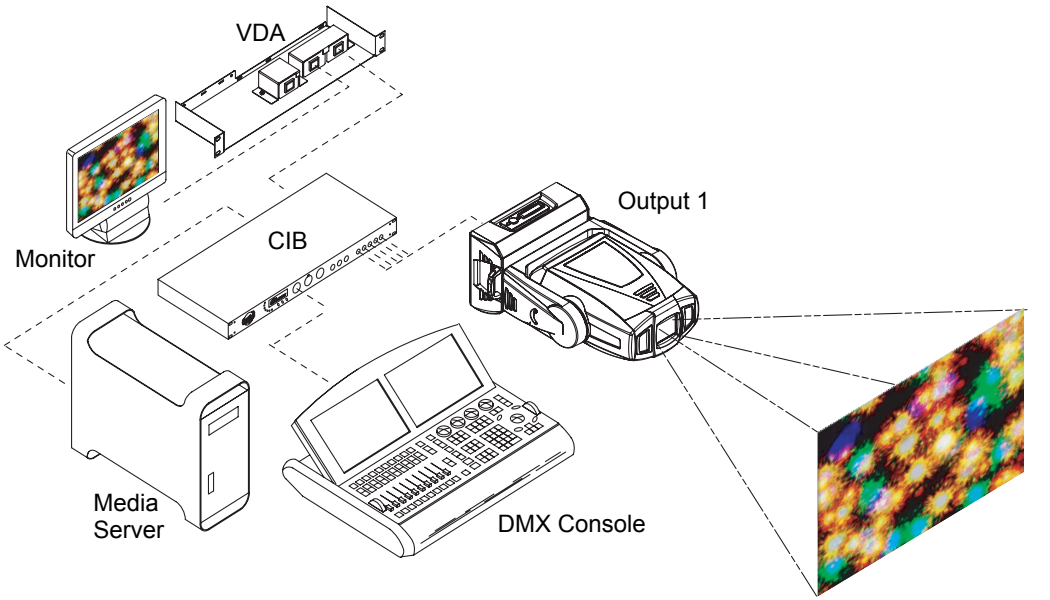
All Catalyst Media Server software products contain the following Output Setting fields.

- **No Output**
- **Separate outputs No FX** displays all configured Layers simultaneously in a grid. Each Layer displays only its content playback, and ignores all other DMX parameters.
- **Separate outputs With FX** displays all configured Layers simultaneously in a grid. Each Layer displays its content with all DMX parameter settings applied.
- **Mixed All Layers No FX** displays all configured Layers stacked on top of each other.
- **Mixed 1 & 2 with FX** displays configured Layers one and two stacked together.

Depending on the number of layers for the Catalyst version, more layer combinations will be available settings.

Output Configurations

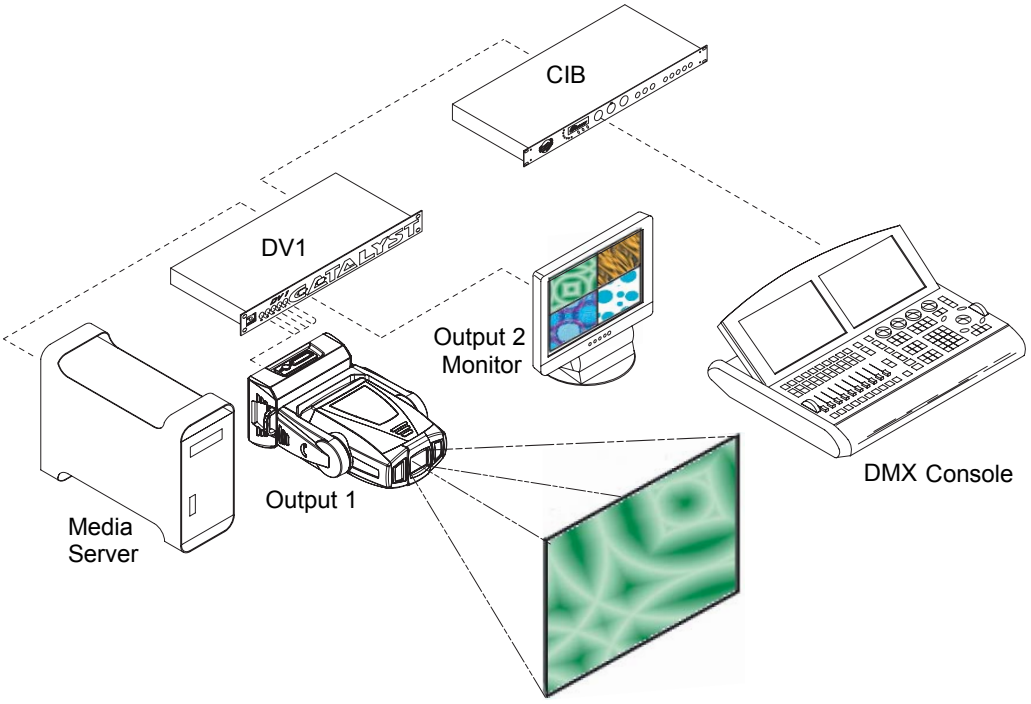
Single Output with Redundant Monitor



Catalyst DV Single Output configuration

With Single Output versions, the monitor can only display whatever signal is being sent to the output.

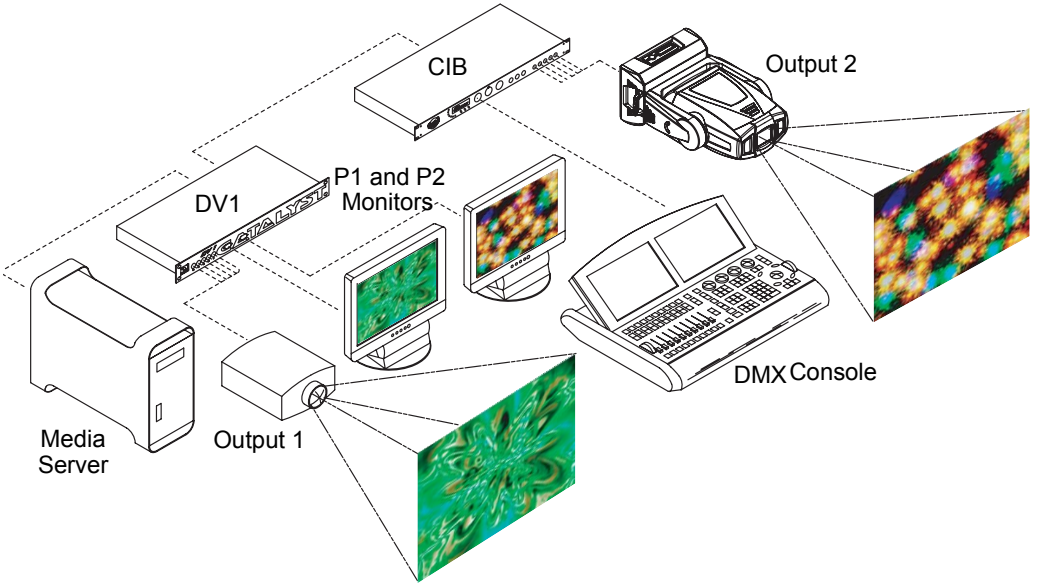
Dual Output Device With Preview Monitor



Dual Output with Preview Monitor

In this example, Output 1 displays all layers combined, and Output 2 displays each layer individually for preview purposes.

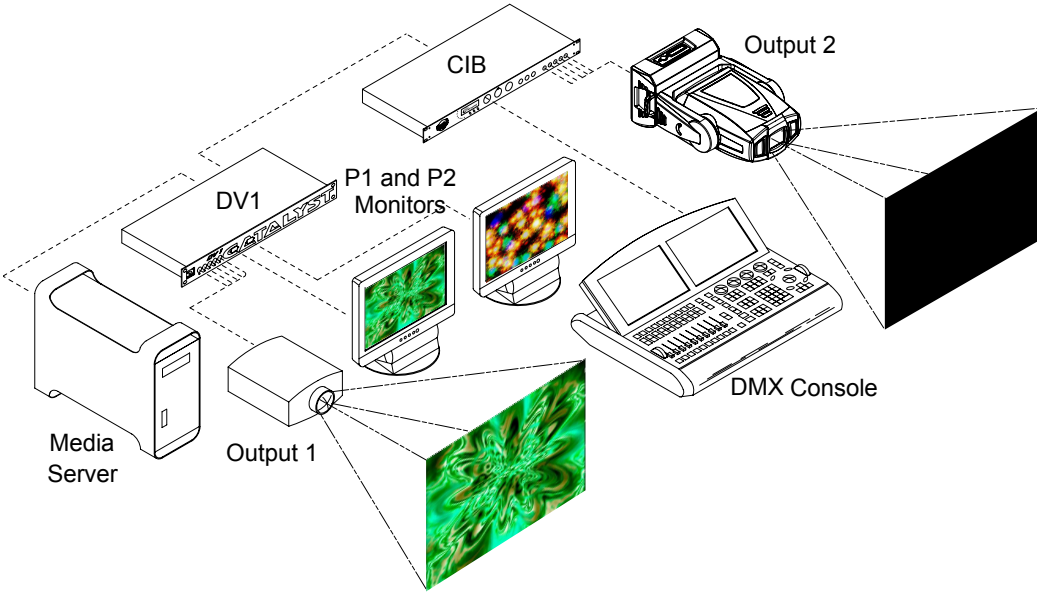
Dual Outputs with Emulation Monitors



Dual Output with Redundant Monitors

Output 1 and Output 2 each display individually assigned layers. Each monitor displays the same image as its respective output.

Dual Outputs with DL1 Dimming Control

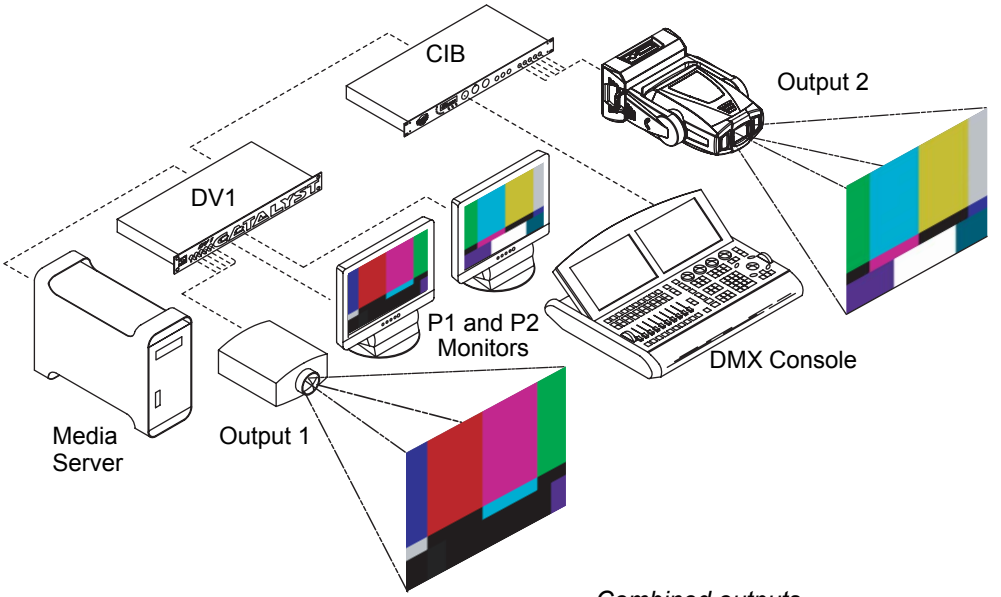


Dual Output with DL1 output dimmer at 0

Output 1 and Output 2 each display individually assigned layers. Each monitor displays the same image as its respective output. Using a DL1 digital lighting fixture or a projector with remote shuttering controls, the output displays can be hidden from view and the P1 and P2 monitors behave as preview screens. Configure the Output panels the same as Dual Outputs with Redundant Monitors.

Dual Outputs Widescreen Layers

Output 1 and Output 2 each display one half of the images from all assigned layers. Layer selections are automatically split and assigned to an output.



Combined outputs

Configure the **Output** panels as follows:

- **Widescreen Layers Left** for Output 1 displays the left half of assigned layers.
- **Widescreen Layers Right** for Output 2 displays the right half of assigned layers.

Chapter 6:
Media Playback

Libraries and Files

Choosing content from a lighting console for a Catalyst Layer is a simple process of assigning DMX values for the **Library** and **File** parameters. These DMX values directly correspond to the desired Folder and File index numbers on the hard drive.

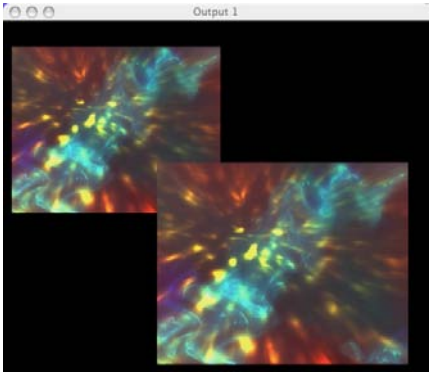
Preloaded Library Folders

The table below describes the preloaded content Library folders that ship with the Catalyst Media Server. (Note: Content included is subject to change.)

Folder Name	Content Description
000 High End Lithos	High End Systems Lithopattern® still images.
001 Digital Aerials 1	Digital still images and animations, designed specifically for aerial effects.
002 Digital Aerials 2	Additional aerial still images and animations.
003 HES-Oils	Digitally simulated psychedelic oil projections
004 HES-	
005 HES Lithos 2	More still images from High End Systems Lithopattern library
006 HES Reserved 4	
007 My Custom Content 1	
008 My Custom Content 2	
009 A Luna Blue	Digital animations.
010 Feedback Video	Digital animations.
011 Artbeats	Video clips and digital animations.
012 Sean Bridwell Textures	Digital textures.
013 Amorphous Digi-gobos	Digital animations.
014 Beacon DigiGobos	Digital animations.
015-InLight_C3	Digital animations
016 Apollo Glass 1	Digital Images
017 DHA TopMac	Digital Images
018 - 252	Available for additional content collections.
253 Setup and Test	Color bars and other diagnostic tests.
254 Use Layer (DO NOT ALTER)	References one layer's content to other layer(s).
255 Video Input (DO NOT ALTER)	Reserved for Video input.

Referencing Content with the Use Layer

By setting a layer's **Library** parameter DMX value to 254, you can then use the **File** parameter's DMX value to select another layer's content to use in place of an actual file. The DMX value of the **File** parameter directly corresponds to the layer number (1-4 for example). This turns the first layer into a *reference layer*, an "alias" of the selected layer's file—that is, a duplicate instance of the file playing on the selected layer. You can reposition and apply different effects to either instance, but playback controls work only on the *reference layer*, not the selected layer.



For example, suppose you want layers 1 and 2 to contain the same image positioned differently on the screen. First, you would select the image and assign it to Layer 1 normally, then you would assign Layer 2 to reference Layer 1. Each layer shows the same image, but you can move each instance on the screen independently.

Reference layers lighten system load, especially hard disk access. Though you manipulate the referenced file in different ways on different layers, the Catalyst system needs to read that file from the hard drive only once. If you were to assign the same movie file independently to each layer, the Catalyst system has to read the file multiple times.

In Frame and Out Frame

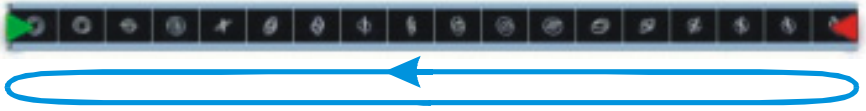
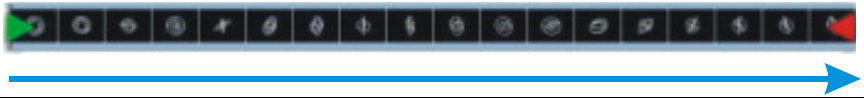
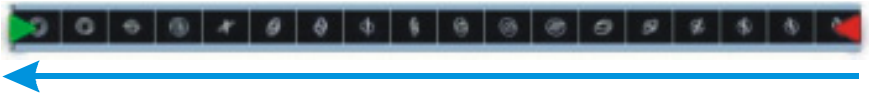
You can select a segment of a movie file for playback by assigning an *In Frame* as a start point and an *Out Frame* as an end point.

The **In Frame** parameter corresponds to a 16-bit DMX value equal to a starting frame of the selected movie file. Similarly, The **Out Frame** parameter corresponds to a 16-bit DMX value equal to an ending frame of the selected movie file. Assigning the In Frame and Out Frame parameter DMX values to 0 will playback the entire movie file.

Video Playback

Play Mode

The **Play Mode** parameter controls how movie files will playback. By assigning a corresponding DMX value to this parameter, you can play a movie file or segment in the following ways:

DMX Value	Play Mode	Description
0	In Frame	Displays the frame selected by the **In Frame** parameter.
1	Out Frame	Displays the frame selected by the **Out Frame** parameter.
2	Play Loop Forward DMX value = 2	Plays the movie in a continuous loop starting at the In frame and repeating when it reaches the Out frame.
3	Play Loop Reverse	Plays the movie in a continuous loop starting at the Out frame and repeating when it reaches the In frame.
		
4	Play Once Forward	Plays the movie once, starting at the In frame point and stopping when it reaches the Out frame.
		
5	Play Once Reverse	Plays the movie once, starting at the Out frame and stopping when it reaches the In frame.
		
6	Stop	Stops the movie playback, displaying a still image of the last frame played.
7	Random	Continuously displays random frames between the In frame and Out frame.
8	PlaySine	Plays the movie forward from the In frame to the Out Frame, then backward from the Out frame to the In frame.

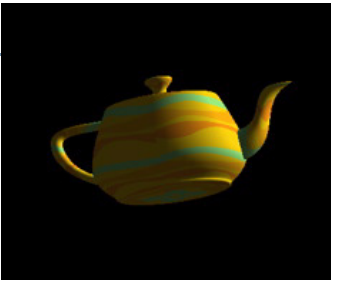
DMX Value	Play Mode	Description
10	Play Loop Forward when Intensity >0	Plays the movie in a continuous loop starting at the In frame and repeating when it reaches the Out frame. Playback pauses whenever Intensity = 0 and resumes when intensity is > 0 again.
11	Play Loop Reverse when Intensity >0	Plays the movie in a continuous loop starting at the Out frame and repeating when it reaches the In frame.Playback pauses whenever Intensity = 0 and resumes when intensity is > 0 again.
12	Play Once Forward when Intensity >0	Plays the movie once, starting at the In frame point and stopping when it reaches the Out frame. Playback pauses whenever Intensity = 0 and resumes when intensity is > 0 again.
13	Play Once Reverse when Intensity >0	Plays the movie once, starting at the Out frame and stopping when it reaches the In frame. Playback pauses whenever Intensity = 0 and resumes when intensity is > 0 again.
14	Random when Intensity >0	Continuously displays random frames between the In frame and Out frame. Playback pauses when Intensity = 0 and resumes whenever intensity is > 0 again.
15	PlaySine when Intensity >0	Plays the movie forward from the In frame to the Out Frame, then backward from the Out frame to the In frame. Playback pauses whenever Intensity = 0 and resumes when intensity is > 0 again.
40	Play Loop Forward retrigger when Intensity >0	Plays the movie in a continuous loop starting at the In frame and repeating when it reaches the Out frame. Playback pauses whenever Intensity = 0 and starts playing from the InFrame when intensity is > 0 again.
41	Play Loop Reverse retrigger when Intensity >0	Plays the movie in a continuous loop starting at the Out frame and repeating when it reaches the In frame.Playback pauses whenever Intensity = 0 and starts playing from the InFrame when intensity is > 0 again.
42	Play Once Forward retrigger when Intensity >0	Plays the movie once, starting at the In frame point and stopping when it reaches the Out frame. Playback pauses whenever Intensity = 0 and starts playing from the InFrame when intensity is > 0 again.
43	Play Once Reverse retrigger when Intensity >0	Plays the movie once, starting at the Out frame and stopping when it reaches the In frame. Playback pauses whenever Intensity = 0 and starts playing from the InFrame when intensity is > 0 again.
44	PlaySine retrigger when Intensity >0	Plays the movie forward from the In frame to the Out Frame, then backward from the Out frame to the In frame. Playback pauses whenever Intensity = 0 and starts playing from the InFrame when intensity is > 0 again.
70	Play Audio	Plays the audio track, associated with the selected video file at CD quality. For more information, see *Audio Output* on page 125.
71	Play Audio Loop	Plays the audio track in a continuous loop
80-99	Synchronize to master	Synchronizes this layer's movie with another layer's frame rate (from ID1-ID20).
100	Synchronize to MIDI Timecode	Synchronizes this layer's movie with MIDI timecode.
101	Synchronize to deck Timecode	Synchronizes this layer's movie with a remote deck's timecode.
103-105	Synchronize to Sony	Synchronizes this layer's movie with a Sony 9-pin device.

Playback Speed

The **Playback Speed** parameter controls the speed of the selected movie file's Play Mode. A DMX value of zero plays back movie files at the original recorded speed. A value of 1 pauses playback. DMX values from 2 to 255 represent increasing speed, from 1 percent to double the original recorded speed.

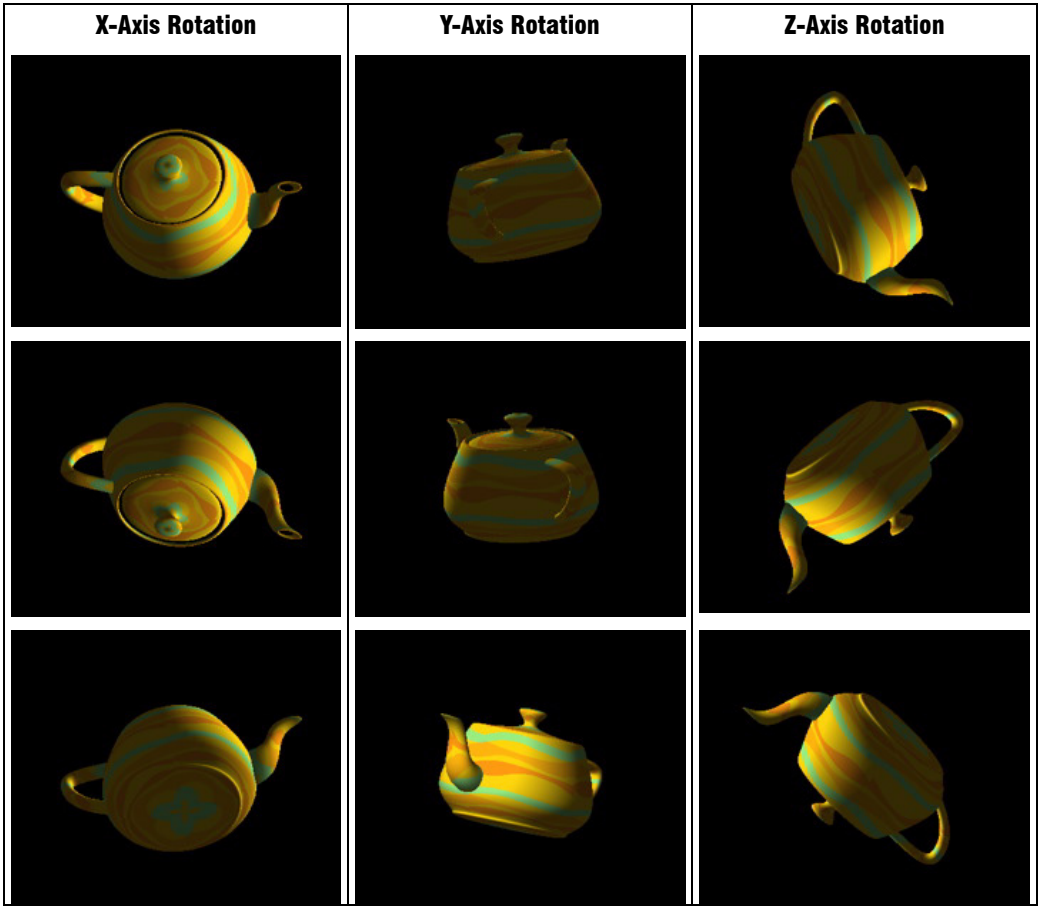
Chapter 7: Movement and Size

X, Y, and Z Rotation



The Rotation parameters provide image rotation with 16-bit precision in forward and reverse directions around the selected axis.

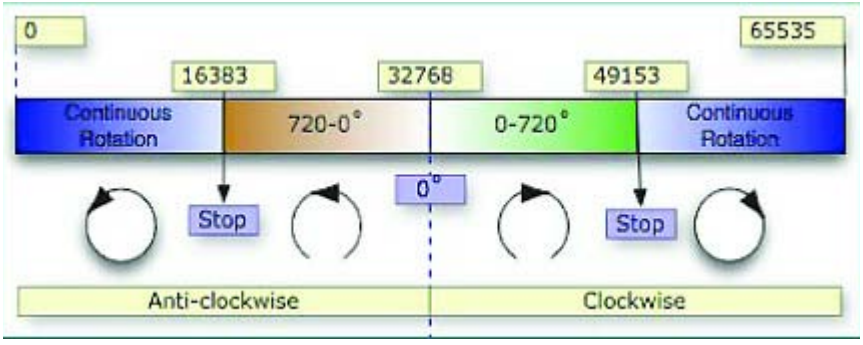
X-axis rotation produces the effect of a top-to-bottom flip. Y-axis rotation produces a left-to-right flip. Z-axis rotation spins the image in a circle.



The layer's image can be rotated on each axis by adjusting the DMX value of the appropriate **X, Y,** and **Z Rotation** parameters. The suggested default value for each channel is the midpoint of the parameter's 16-bit DMX range, which is equal to no rotation. Increasing the DMX value from the midpoint indexes the image clockwise; as reducing the DMX value below the midpoint, indexes the image counterclockwise.

X, Y, and **Z Rotation** parameter DMX values greater than the 720° limit in either direction, will start the image rotating continuously. Further adjustments to the DMX values will increase the speed of continuous rotation

.



X Position

The **X Position** parameter adjusts the layer's image horizontally along the X-axis. The midpoint of the 16-bit DMX value range centers the image on the X-axis.

X Position parameter DMX values below the DMX midpoint move the image left, and values above the DMX midpoint move the image right.

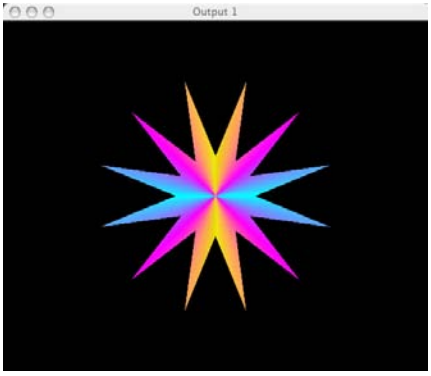


Image with an X Position value
at the DMX midpoint

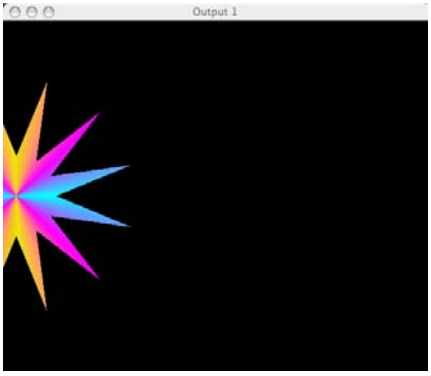


Image with an X Position value
less than the DMX midpoint

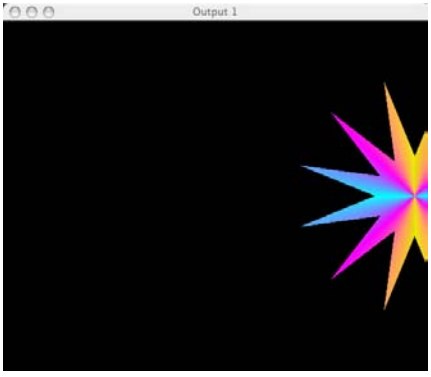


Image with an X Position value
greater than the DMX midpoint

Y Position

The **Y Position** parameter adjusts the layer's image vertically along the Y-axis. The midpoint of the 16-bit DMX value range, centers the image on the Y-axis.

Y Position parameter DMX values below the DMX midpoint move the image down, and values above the DMX midpoint move the image up.

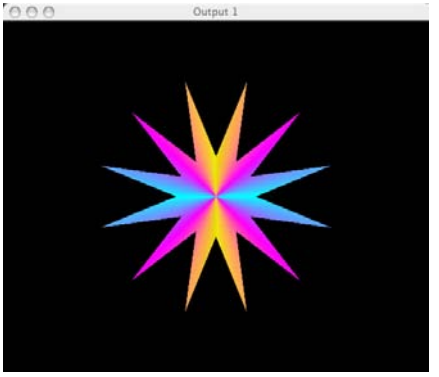


Image with a Y Position value
at the DMX midpoint

Image with a Y Position value
less than the DMX midpoint

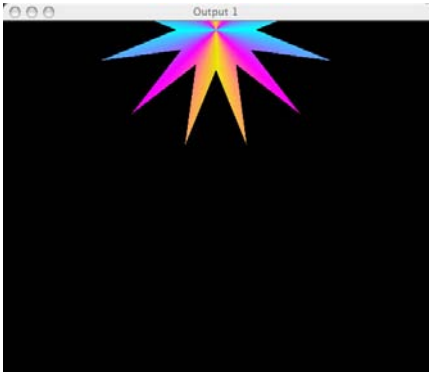


Image with a Y Position value
greater than the DMX midpoint

Scale

The **Scale** parameter adjusts the size of the layer's image up to 8x its original size. When the midpoint of the 16-bit DMX value range equals 0x, the image shrinks to invisibility). When the DMX value is increased from the midpoint, the image is enlarged. In addition, when the DMX value is reduced below the midpoint, an *inverted* image is enlarged.

Image with the suggested default DMX value

Image with a value less than the DMX midpoint

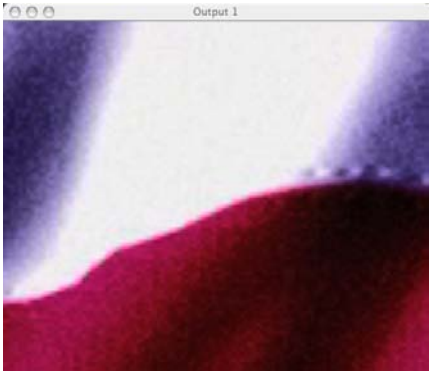


Image with a value greater than the DMX midpoint

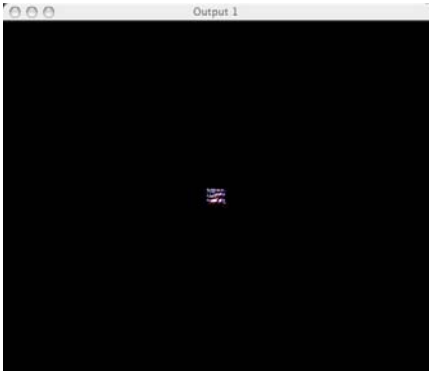
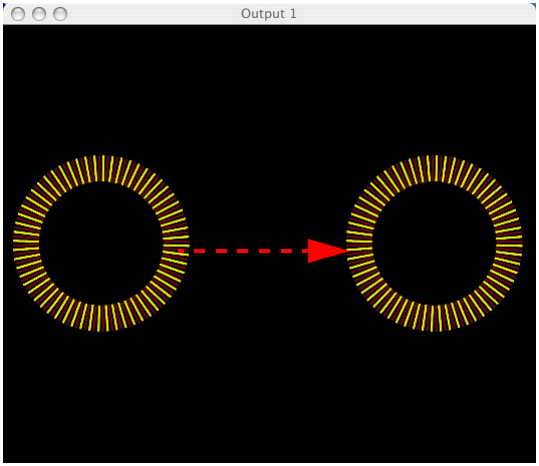


Image with a value near the DMX midpoint

Image Movement Time

The **Movement Speed** parameter provides smoothing of movements created with the Catalyst application. Sometimes the transmission speed of DMX-512 can result in choppy image movements during slow Layer position movements.

The **Movement Speed** parameter provides a variable smoothing of movements with DMX values from 0-255—the higher the DMX value, the slower the movement speed. Settings of the **Movement Speed** parameter affect changes to the **X** and **Y Position**, **X**, **Y**, and **Z Rotation**, and **Scale** parameters.



The red arrow indicates movement with the **X Position** parameter.

Aspect Ratio

The **Aspect Ratio** parameter allows horizontal or vertical image compression from full image size to a thin line (1-4 pixels). The Aspect Ratio function compensates for dissimilar aspect ratios encountered in various video formats. For example, a movie created with a 16:9 aspect ratio can be changed to a 4:3 aspect ratio. DMX values from 0 to 128 squeeze the image horizontally, and DMX values greater than 128 compress the image vertically.

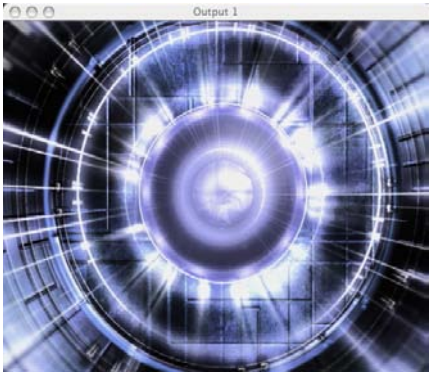


Image with the midpoint DMX value default

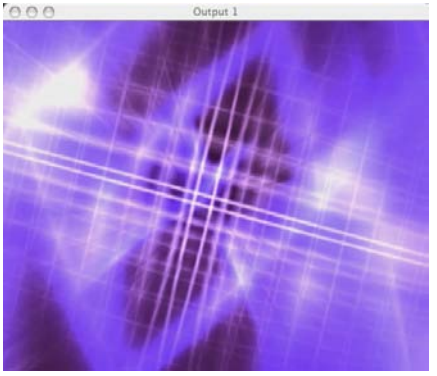
Image with a value less than the DMX midpoint

Image with a value greater than the DMX midpoint

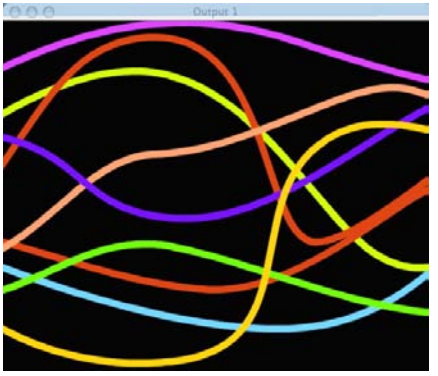
Chapter 8:
Intensity and Color

Intensity

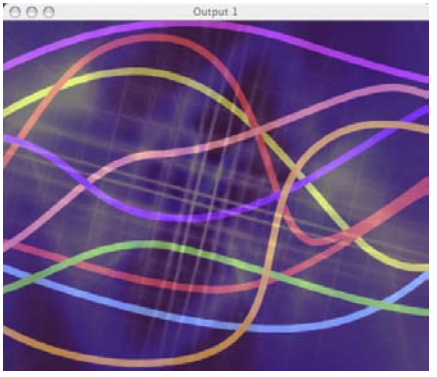
The **Intensity** parameter adjusts layer brightness levels from black (DMX = 0) to full intensity (DMX = 255). By crossfading the **Intensity** parameter of layers, a dissolve between layers can be created.



Layer 1 with full Intensity



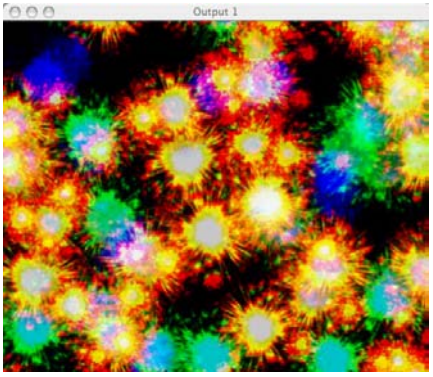
Layer 2 with full Intensity



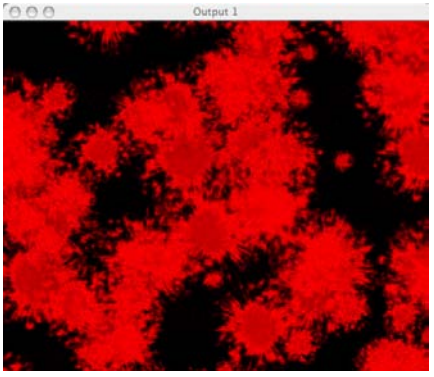
Layer 1 with full Intensity
and Layer 2 with Intensity set at the
DMX midpoint value

Red, Green, and **Blue**

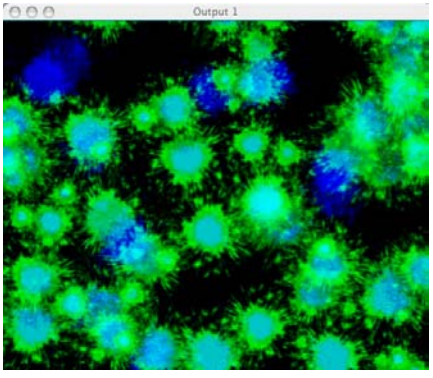
The Catalyst Media Server uses an additive RGB color mixing system that modifies image color by filtering specific percentages of red, green, and blue. With the **Red**, **Green**, and **Blue** parameter DMX channels, a DMX value of **0** filters out all of a color, and a value of **255** filters none of it. If each channel's DMX value is set to **0**, all color is filtered out and the result is black. With a DMX value of **255** in each channel, no color is filtered, which means the image has no color adjustment. Some settings of the **Color Effects** parameter change the functionality of the **Red**, **Green**, and **Blue** parameters.



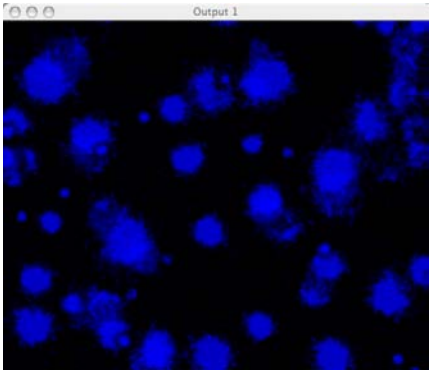
Red parameter = 255
Green parameter = 255
Blue parameter = 255



Red parameter = 255
Green parameter = 0
Blue parameter = 0



Red parameter = 0
Green parameter = 255
Blue parameter = 255



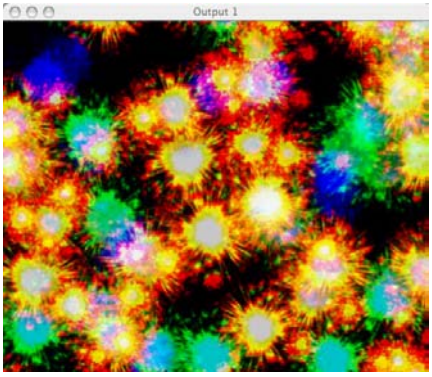
Red parameter = 0
Green parameter = 0
Blue parameter =255

Color Effects

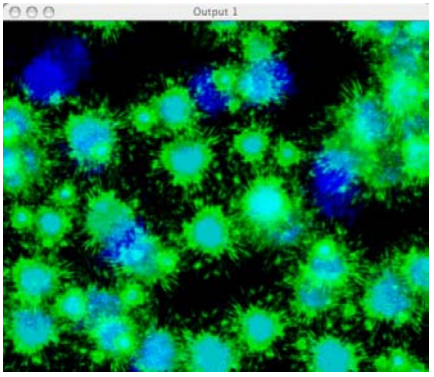
The **Color Effects** parameter alters a layer's content by applying variations to the image's colors. In addition, some Color Effects change the behavior of the **Red**, **Green**, and **Blue** parameters. This chapter describes the Color Effects and their capabilities.

0 RGB Subtract

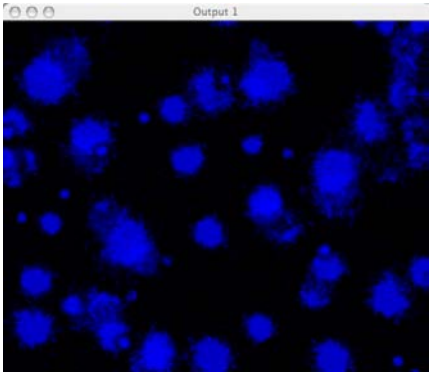
When the Color Effects parameter is assigned a DMX value of 0, the Layer's image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



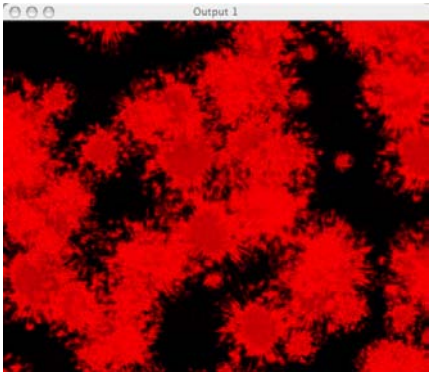
The Layer's image without tinting



The Layer's image tinted with the **Green**, and **Blue** parameters.



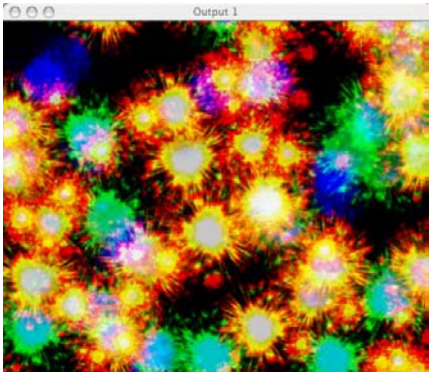
The Layer's image tinted with the **Blue** parameter.



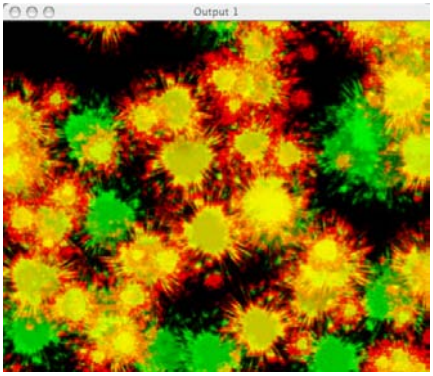
The Layer's image tinted with the **Red** parameter.

1 RGB Subtract High Contrast

When the **Color Effects** parameter is assigned a DMX value of **1**, the Layer's image can be tinted. This is a higher contrast version of the RGB Subtract Color Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



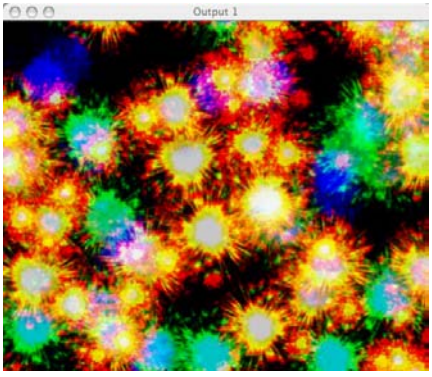
The Layer's original image without a Color Effect.



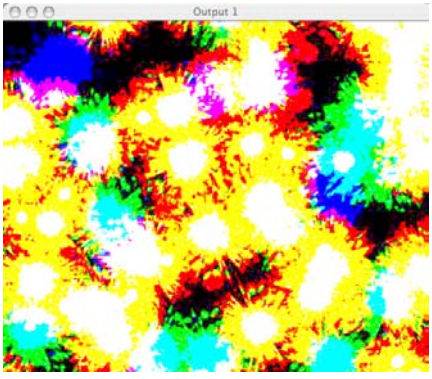
The Layer's image with the RGB Subtract High Contrast Effect.

2 RGB Subtract V High Contrast

When the **Color Effects** parameter is assigned a DMX value of **2**, the Layer's image can be tinted. This is a super high contrast version of the RGB Subtract Color Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



The Layer's original image without a Color Effect.

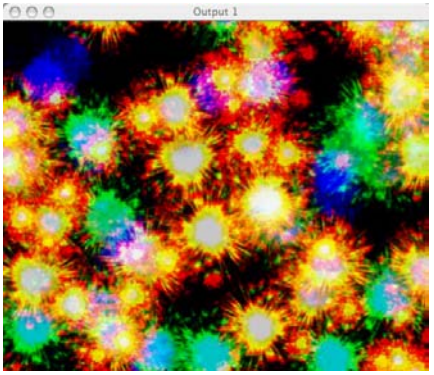


The Layer's image with the RGB Subtract V High Contrast Effect.

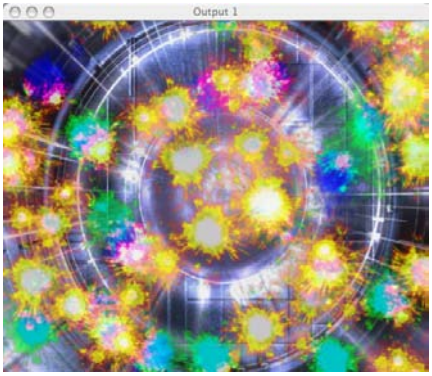
3 Transparent Blacks

When the **Color Effects** parameter is assigned a DMX value of **3**, any black in a Layer's image becomes transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.

Layer 1



Layer 2

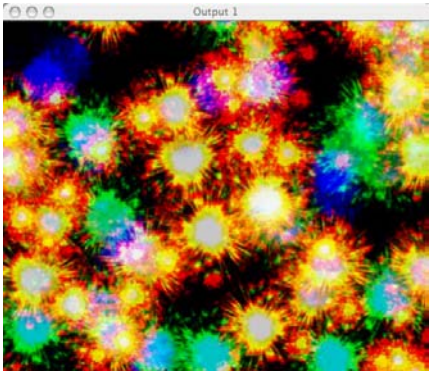


Transparent Blacks applied to
Layer 2 reveals Layer 1 image.

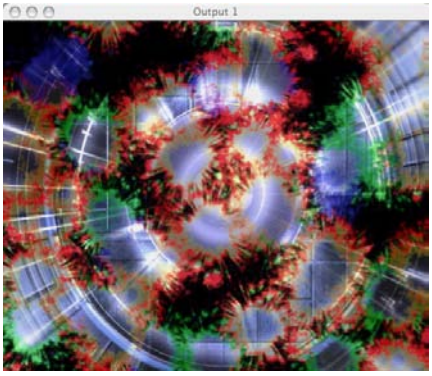
4 Transparent Whites

When the **Color Effects** parameter is assigned a DMX value of **4**, any white in a Layer's image becomes transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.

Layer 1



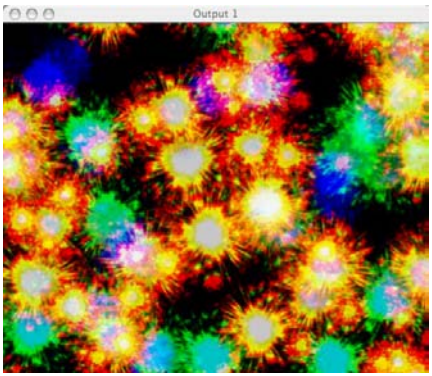
Layer 2



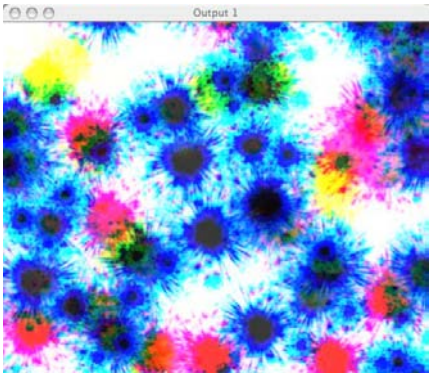
Transparent Whites applied to
Layer 2 reveals Layer 1 image.

10 RGB Subtract Inverted Color

When the **Color Effects** parameter is assigned a DMX value of **10**, the colors in a Layer's image are inverted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



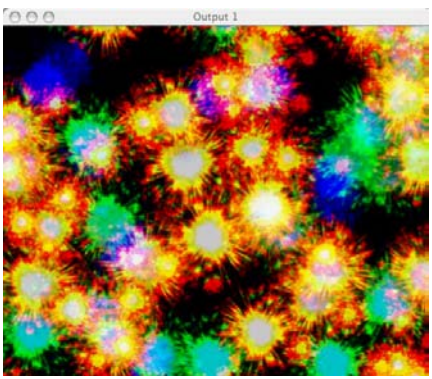
The Layer's original image without a Color Effect.



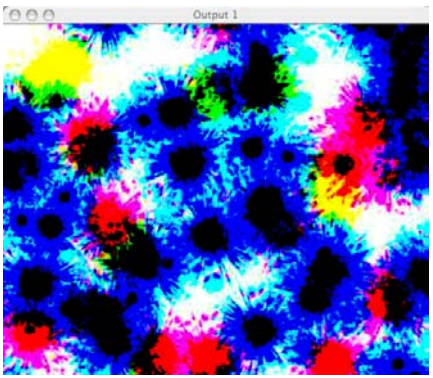
The Layer's image with the RGB Subtract Inverted Color Effect.

11 RGB Subtract High Contrast Inverted Color

When the **Color Effects** parameter is assigned a DMX value of **11**, the colors in a Layer's image are inverted. This is a higher contrast version of the RGB Subtract Inverted Color Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



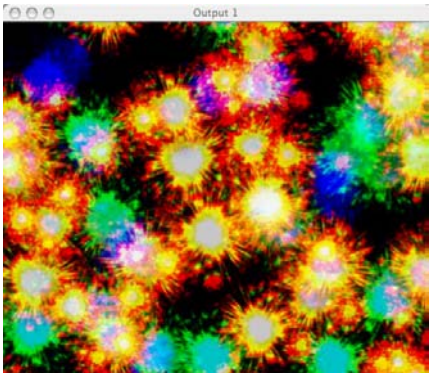
The Layer's original image without a Color Effect.



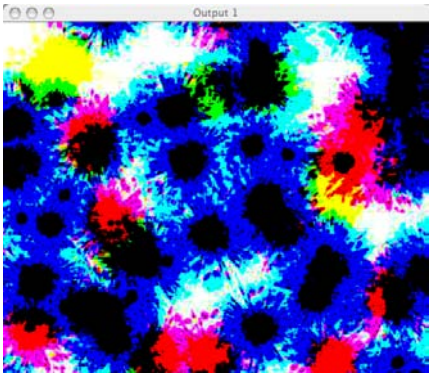
The Layer's image with the RGB Subtract High Contrast Inverted Effect.

12 RGB Subtract Super High Contrast Inverted Color

When the **Color Effects** parameter is assigned a DMX value of **12**, the colors in a Layer's image are inverted. This is a super higher contrast version of the RGB Subtract Inverted Color Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



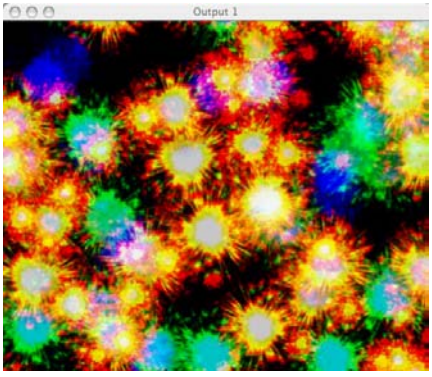
The Layer's original image without a Color Effect.



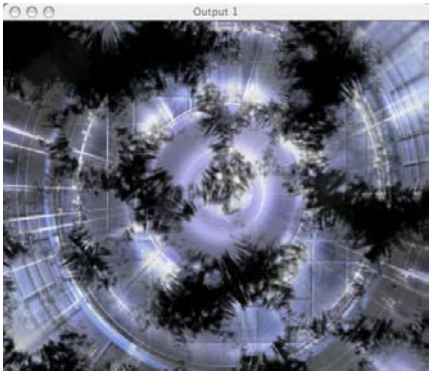
The Layer's image with the **RGB Subtract Color** Effect.

13 Invert Whatever

When the **Color Effects** parameter is assigned a DMX value of **13**, the colors in a Layer's image are inverted. This Color Effect is a unique combination of transparency and color modification. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



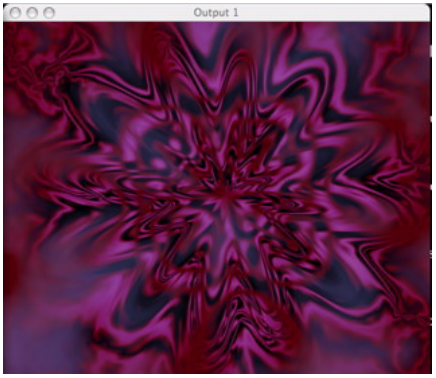
The Layer's original image without a Color Effect.



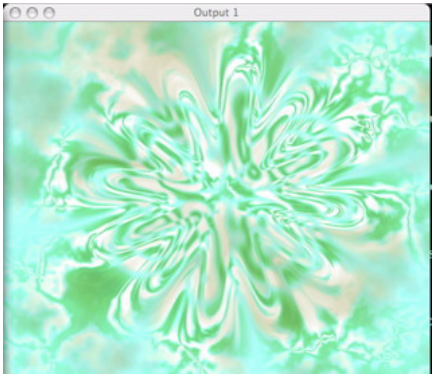
The Layer's image with the **Invert Whatever** Color Effect.

14 RGB Subtract Inverted Color CMY

When the **Color Effects** parameter is assigned a DMX value of **10**, the colors in a Layer's image are inverted and converted to CMY. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



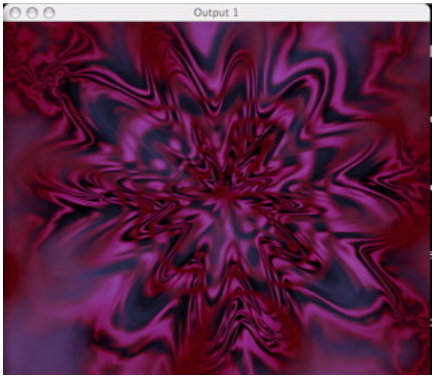
The Layer's original image without a Color Effect.



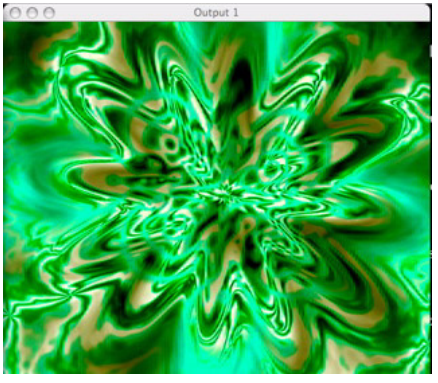
The Layer's image with the **RGB Subtract Inverted Color CMY** Effect.

15 RGB Subtract High Contrast Inverted Color CMY

When the **Color Effects** parameter is assigned a DMX value of **15**, the colors in a Layer's image are inverted and converted to CMY. This is a higher contrast version of the RGB Subtract Inverted Color CMY Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



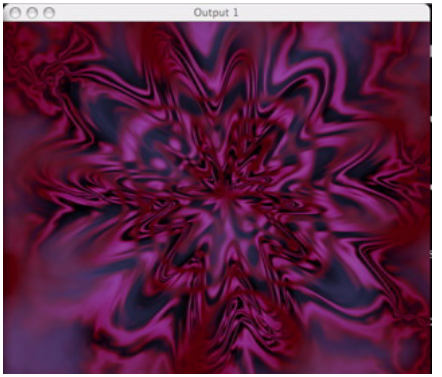
The Layer's original image without a Color Effect.



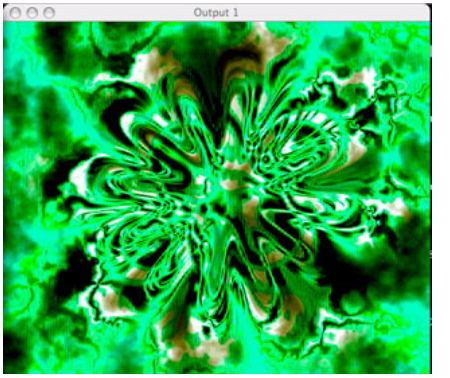
The Layer's image with the **RGB Subtract High Contrast Inverted CMY** Effect.

16 RGB Subtract Super High Contrast Inverted Color CMY

When the **Color Effects** parameter is assigned a DMX value of **16**, the colors in a Layer's image are inverted and converted to CMY. This is the highest contrast version of the RGB Subtract Inverted Color CMY Effect. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



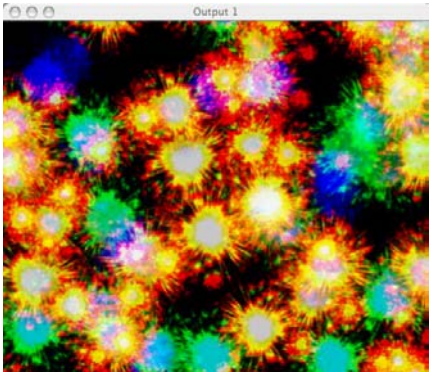
The Layer's original image without a Color Effect.



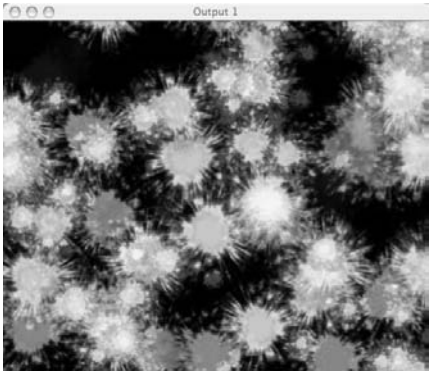
The Layer's image with the **RGB Subtract Super High Contrast Inverted CMY** Effect.

20 Black and White

When the **Color Effects** parameter is assigned a DMX value of **20**, the Layer's image becomes black and white and can **not** be tinted. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



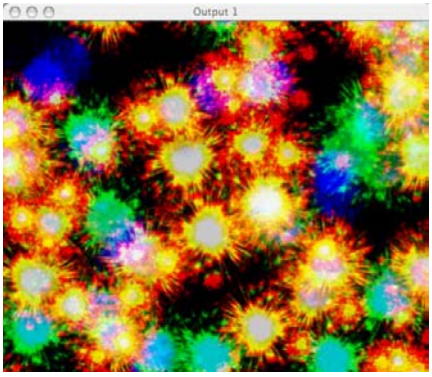
The Layer's original image without a Color Effect.



The Layer's image with the Black and White Effect.

21 Black and White High Contrast

When the **Color Effects** parameter is assigned a DMX value of **21**, the Layer's image becomes black and white and can **not** be tinted. This high contrast version of the Black and White Color Effect is transparent, revealing underlying layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.

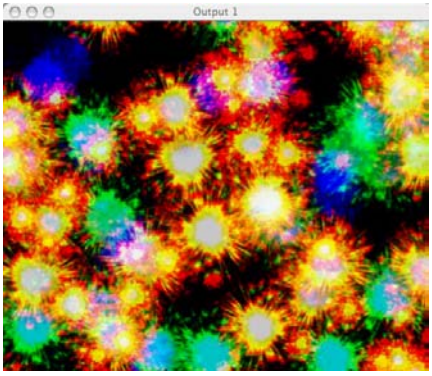


The Layer's original image without a Color Effect.

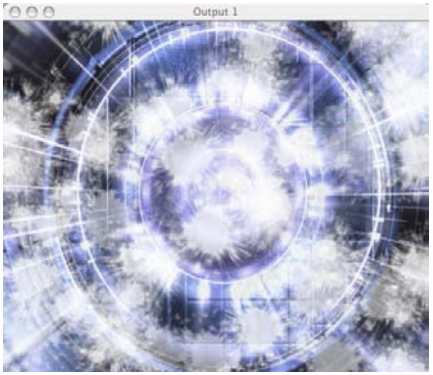
The Layer's image with the Black and White High Contrast Effect.

22 Black and White Super High Contrast

When the **Color Effects** parameter is assigned a DMX value of **22**, the Layer's image becomes black and white and can **not** be tinted. This super high contrast version of the Black and White Color Effect is transparent, revealing underlying layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



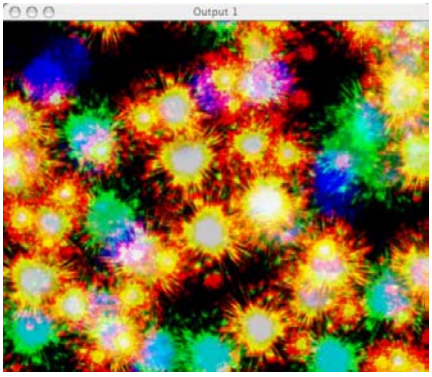
The Layer's original image without a Color Effect.



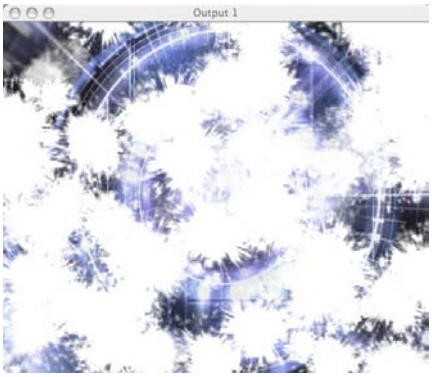
The Layer's image with the Black and White Super High Contrast Effect.

23 Black and White Variable Super High Contrast

When the **Color Effects** parameter is assigned a DMX value of **23**, the Layer's image becomes black and white and can **not** be tinted. This super high contrast version of the Black and White Color Effect is transparent, revealing underlying layers. The **Red**, **Green**, and **Blue** parameters each adjust the amount of the related color making up the final value of the black and white image.



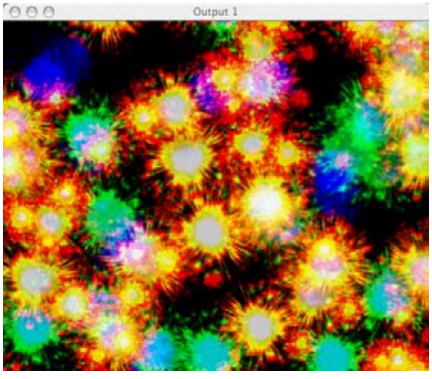
The Layer's original image without a Color Effect.



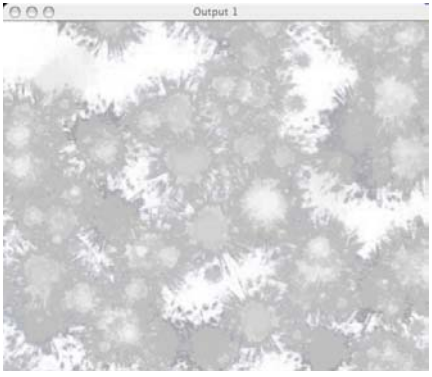
The Layer's image with the Black and White Variable Super High Contrast Effect.

24 Invert Black and White

When the **Color Effects** parameter is assigned a DMX value of **24**, the Layer's image becomes black and white and can **not** be tinted. This is an inverted version of the Black and White Color Effect. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



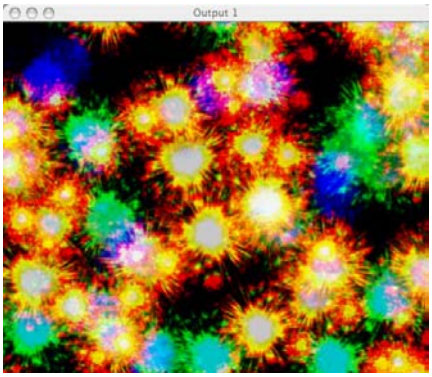
The Layer's original image without a Color Effect.



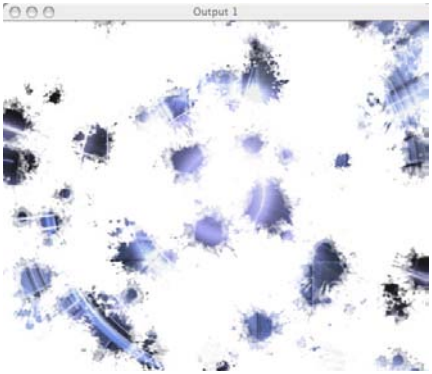
The Layer's image with the Invert Black and White Effect.

30 Mask

When the **Color Effects** parameter is assigned a DMX value of **30**, the Layer's image becomes black and white and can **not** be tinted. Any black in a Layer's image becomes transparent, revealing underlying Layers. The **Red** parameter adjusts the Layer's percentage of transparency to vary mask softness. The **Green**, and **Blue** parameters do not function with this Color Effect.



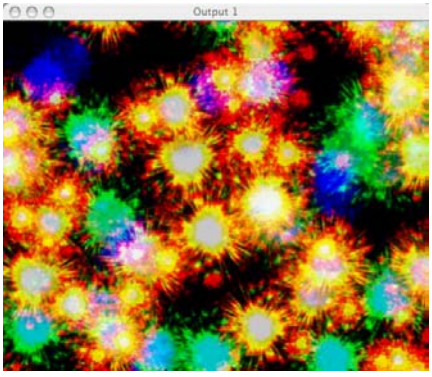
The Layer's original image without a Color Effect.



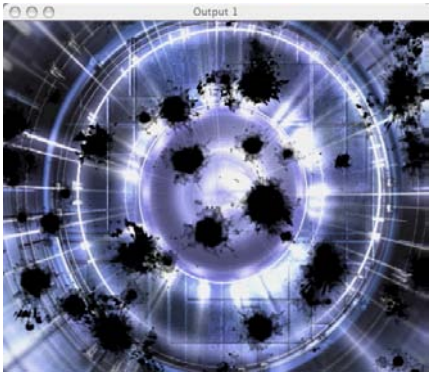
The Layer's image with the Mask Effect.

31 Invert Mask 1

When the **Color Effects** parameter is assigned a DMX value of **31**, the Layer's image becomes black and white and can **not** be tinted. Any black in a Layer's image becomes transparent, revealing underlying Layers. White areas within the Layer's image become black. The **Red** parameter adjusts the Layer's percentage of transparency to vary mask softness. The **Green**, and **Blue** parameters do not function with this Color Effect.



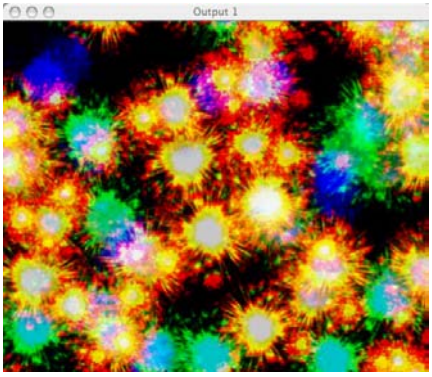
The Layer's original image without a Color Effect.



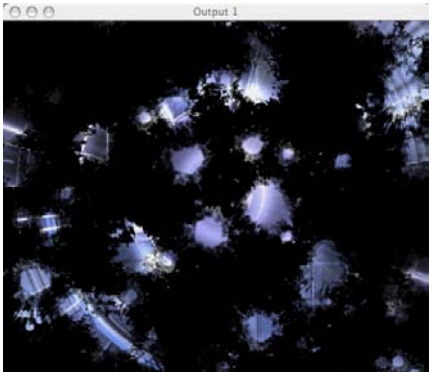
The Layer's image with the Invert Mask 1 Effect.

32 Invert Mask 2

When the **Color Effects** parameter is assigned a DMX value of **32**, the Layer's image becomes black and white and can **not** be tinted. Any white in a Layer's image becomes transparent, revealing underlying Layers. The **Red** parameter adjusts the Layer's percentage of transparency to vary mask softness. The **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.



The Layer's image with the Invert Mask 2 Effect.

35 Mask Fading

A DMX Color Effects parameter value of 35 operates the same as a DMX value of 30 with the addition of fading. The Layer's image becomes black and white and can **not** be tinted. Any black in a Layer's image becomes transparent, revealing underlying Layers. The **Red** parameter adjusts the mask percentage to vary mask softness. **Green**, and **Blue** parameters do not function with this Color Effect. The intensity channel adjusts mask fading.

36 Invert Mask 1 Fading

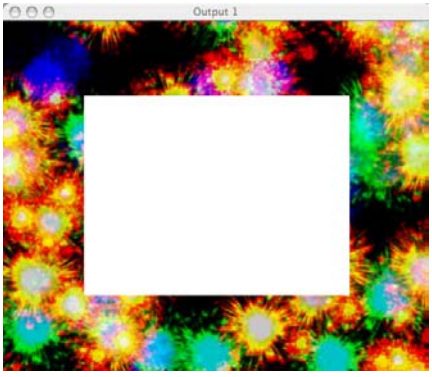
A DMX Color Effects parameter value of 36 operates the same as a DMX value of 31 with the addition of fading. The Layer's image becomes black and white and can **not** be tinted. Any black in a Layer's image becomes transparent, revealing underlying Layers. White areas within the Layer's image become black. The **Red** parameter adjusts the mask percentage to vary mask softness. The **Green**, and **Blue** parameters do not function with this Color Effect. The intensity channel adjusts mask fading.

37 Invert Mask 2 Fading

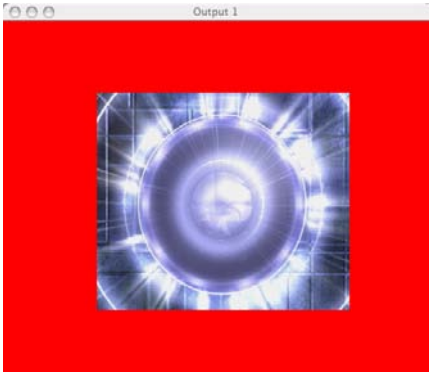
A DMX Color Effects parameter value of 37 operates the same as a DMX value of 32 with the addition of fading. The Layer's image becomes black and white and can **not** be tinted. Any white in a Layer's image becomes transparent, revealing underlying Layers. The **Red** parameter adjusts the mask percent to vary the softness. The **Green**, and **Blue** parameters do not function with this Color Effect. The intensity channel adjusts mask fading.

40 Alpha Invert as Red

When the **Color Effects** parameter is assigned a DMX value of **40**, the portions of a Layer's image without an alpha channel become red and can **not** be tinted. Any alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

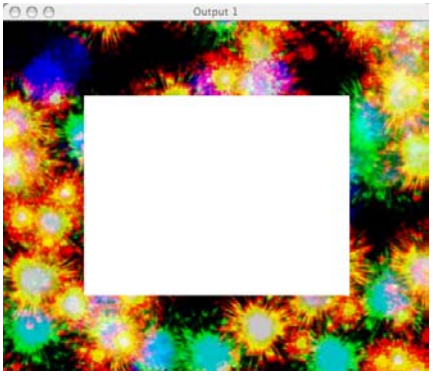


The Layer's image with an Alpha Invert as Red Effect.

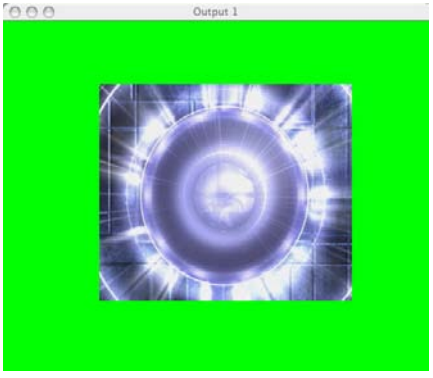
Note: An alpha channel is embedded into content when the media file is created.

41 Alpha Invert as Green

When the **Color Effects** parameter is assigned a DMX value of **41**, the portions of a Layer's image without an alpha channel become green and can **not** be tinted. Any alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

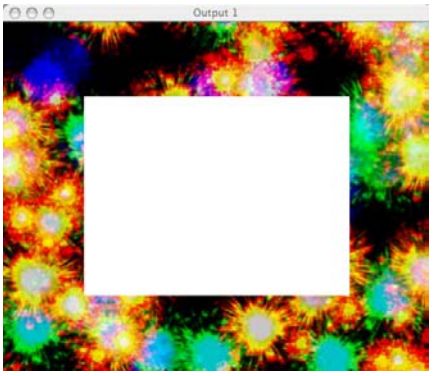


The Layer's image with an Alpha Invert as Green Effect.

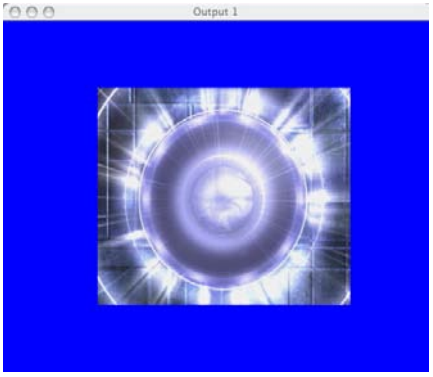
Note: An alpha channel is embedded into content when the media file is created.

42 Alpha Invert as Blue

When the **Color Effects** parameter is assigned a DMX value of **42**, the portions of a Layer's image without an alpha channel become blue and can **not** be tinted. Any alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

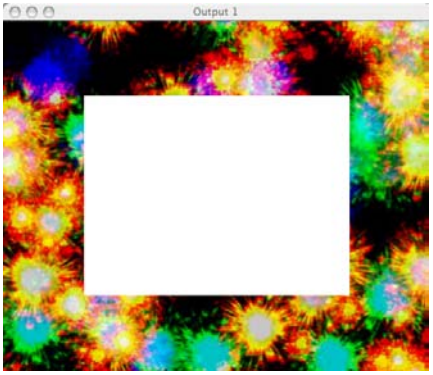


The Layer's image with an Alpha Invert as Blue Effect.

Note: An alpha channel is embedded into content when the media file is created.

43 Alpha Invert as Color

When the **Color Effects** parameter is assigned a DMX value of **43**, the portions of a Layer's image without an alpha channel become white and can be tinted. Any alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters are used to select an alpha channel color.



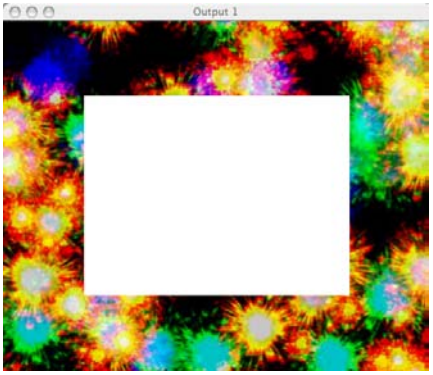
The Layer's original image without a Color Effect.

The Layer's image with an Alpha Invert as Color Effect.

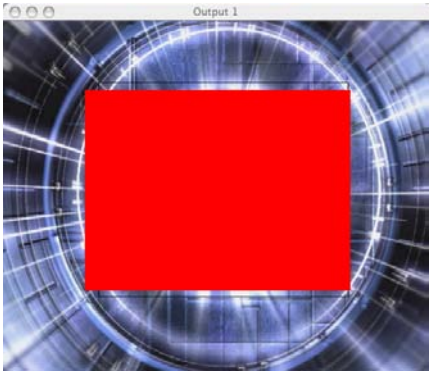
Note: An alpha channel is embedded into content when the media file is created.

44 Alpha as Red

When the **Color Effects** parameter is assigned a DMX value of **44**, the portions of a Layer's image with an alpha channel become red and can **not** be tinted. Non alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

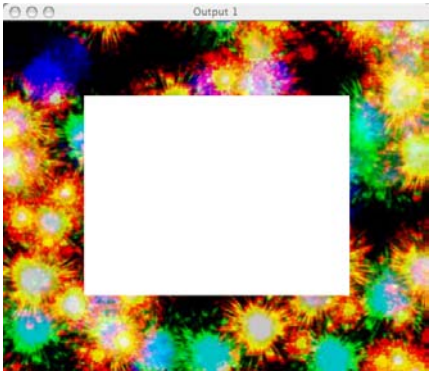


The Layer's image with Alpha as Red Effect.

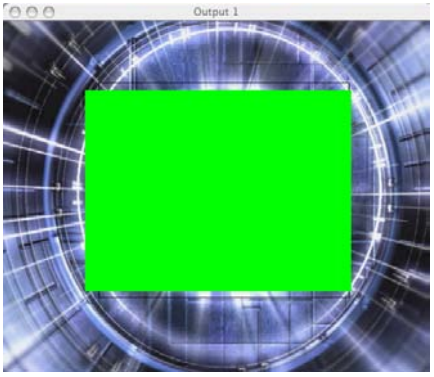
Note: An alpha channel is embedded into content when the media file is created.

45 Alpha as Green

When the **Color Effects** parameter is assigned a DMX value of **45**, the portions of a Layer's image with an alpha channel become green and can **not** be tinted. Non alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

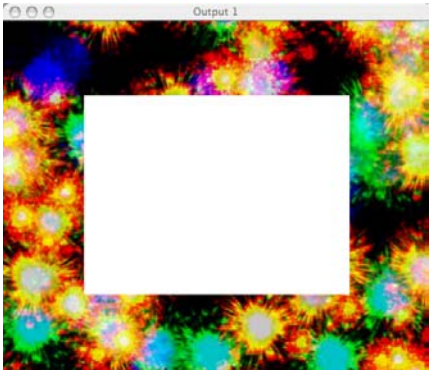


The Layer's image with Alpha as Green Effect.

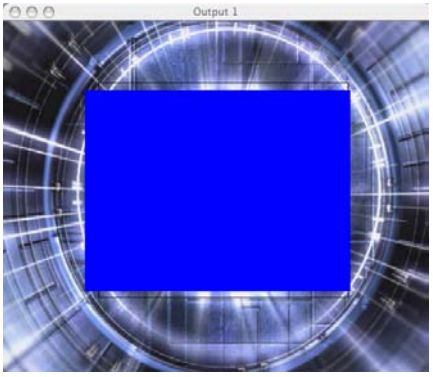
Note: An alpha channel is embedded into content when the media file is created.

46 Alpha as Blue

When the **Color Effects** parameter is assigned a DMX value of **46**, the portions of a Layer's image with an alpha channel become blue and can **not** be tinted. Non alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.

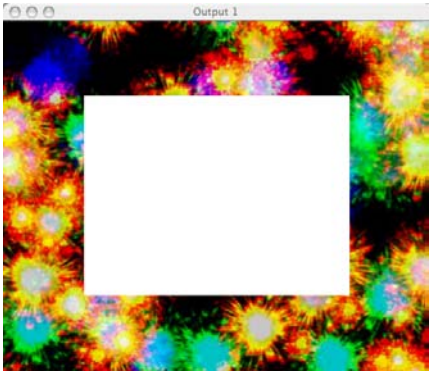


The Layer's image with Alpha as Blue Effect.

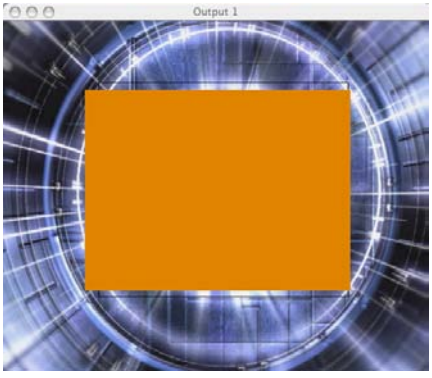
Note: An alpha channel is embedded into content when the media file is created.

47 Alpha as Color

When the **Color Effects** parameter is assigned a DMX value of **47**, the portions of a Layer's image with an alpha channel become white and can be tinted. Non alpha channel portions of the image become transparent, revealing underlying Layers. The **Red**, **Green**, and **Blue** parameters are used to select an alpha channel color.



The Layer's original image without a Color Effect.

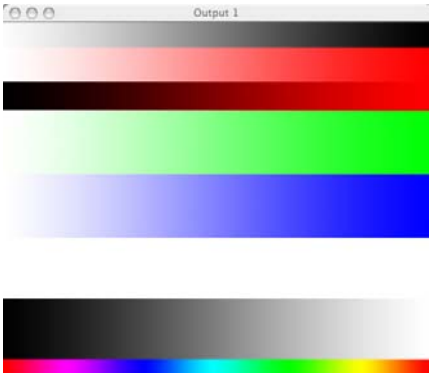


The Layer's tinted image with an Alpha as Color Effect.

Note: An alpha channel is embedded into content when the media file is created.

50 Lookup 1 Color Wheel

When the **Color Effects** parameter is assigned a DMX value of **50**, a color-wheel based formula is applied to the Layer's image colors. This effect does **not** allow tinting. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



Original image.

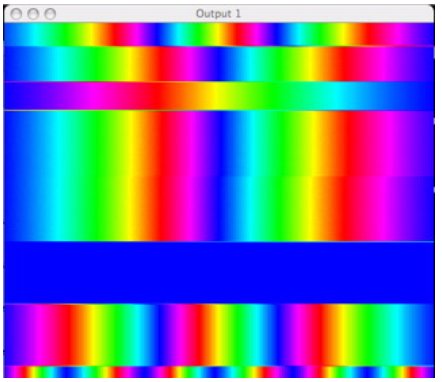
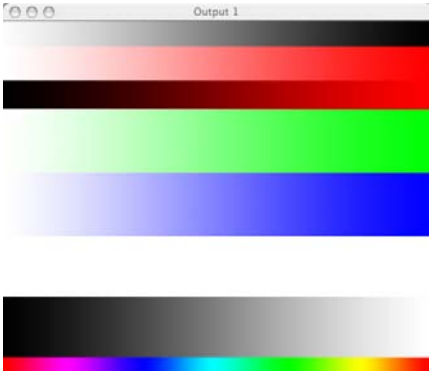


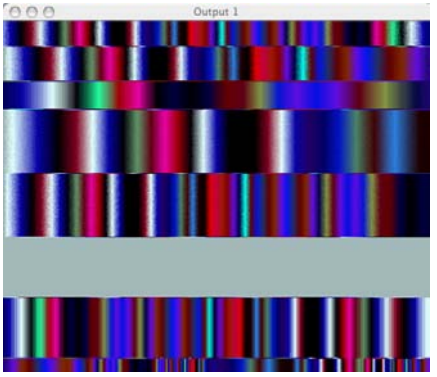
Image with the
Invert Lookup 1 Color Effect.

51 Lookup 2 False Color

When the **Color Effects** parameter is assigned a DMX value of **51**, the Layer's image becomes mutated can **not** be tinted. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



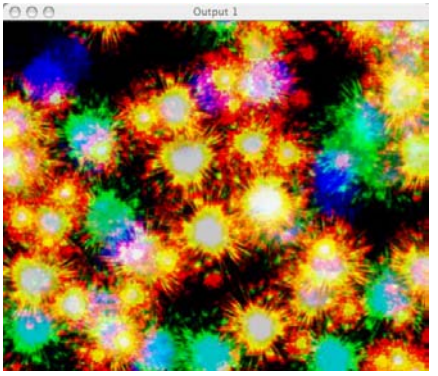
The Layer's original image
without a Color Effect.



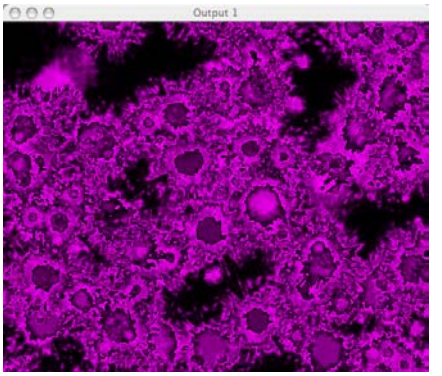
The Layer's image with the
Invert Lookup 2 Effect.

52 Lookup 3 Black and White Solarize Highlights

When the **Color Effects** parameter is assigned a DMX value of **52**, the Layer's image becomes magenta and can **not** be tinted. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



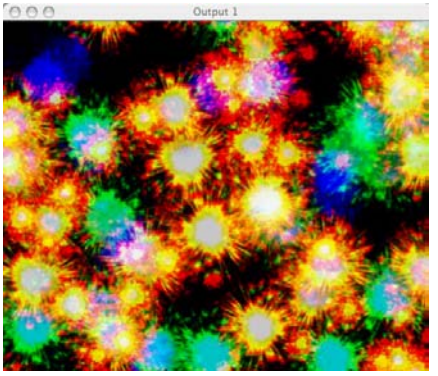
The Layer's original image without a Color Effect.



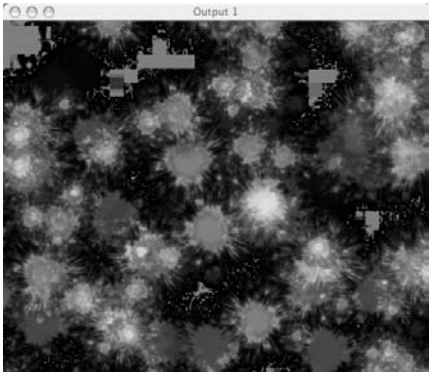
The Layer's image with the Lookup 3 Effect.

60 Gamma Black and White

When the **Color Effects** parameter is assigned a DMX value of **60**, the Layer's image becomes black and white and can **not** be tinted. The **Red** parameter adjusts the contrast of the image. The **Green**, and **Blue** parameters do not function with this Color Effect.



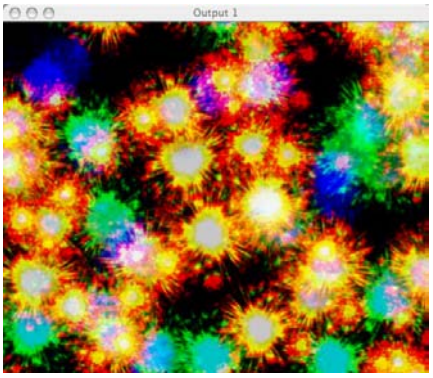
The Layer's original image without a Color Effect.



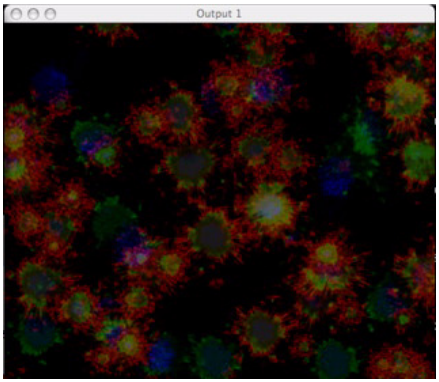
The Layer's image with the Gamma Black and White Effect.

61 Gamma Color

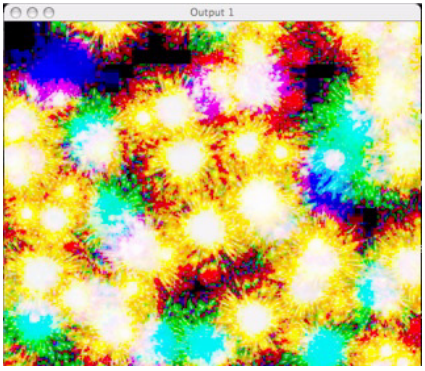
When the **Color Effects** parameter is assigned a DMX value of **61**, the Layer's image becomes red and can **not** be tinted. The **Red** parameter adjusts the overall gamma of the image. The **Green**, and **Blue** parameters do not function with this Color Effect.



The Layer's original image without a Color Effect.



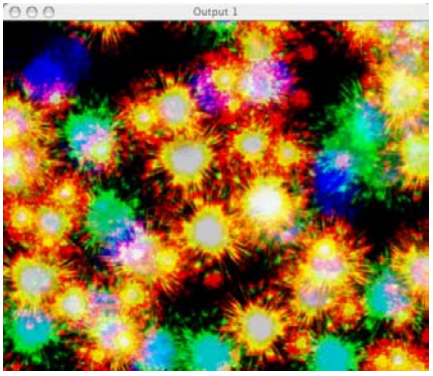
The Layer's image with the **Gamma Color** Effect applied.



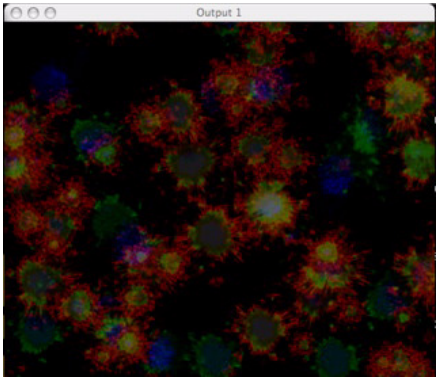
The Layer's image with the **Gamma Color** adjustment.

62 Gamma Color Separate Channels

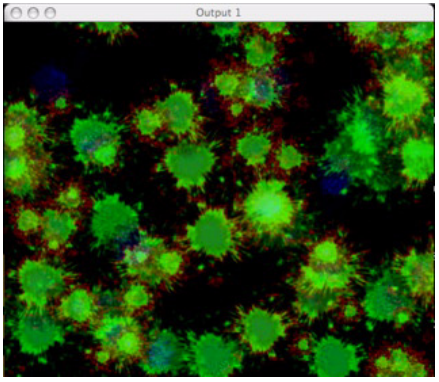
When the **Color Effects** parameter is assigned a DMX value of **62**, the Layer's image is displayed with high contrast. The **Red, Green,** and **Blue** parameters adjust the corresponding color gamma of the image.



The Layer's original image without a Color Effect.



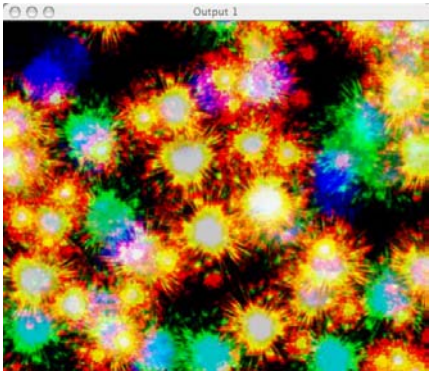
The Layer's image with the **Gamma Color Separate** Effect.



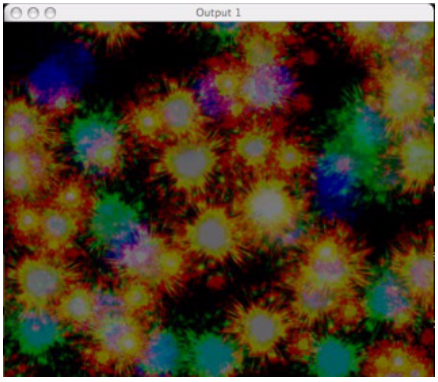
The Layer's image with the **Gamma Color Separate** Effect **Green** channel adjustment.

63 Gain Color Separate Channels

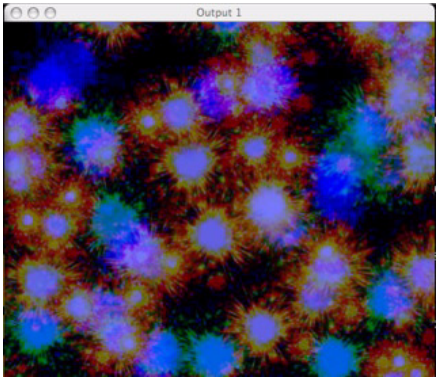
When the **Color Effects** parameter is assigned a DMX value of **62**, the Layer's image is displayed with high contrast. The **Red, Green,** and **Blue** parameters adjust the corresponding color gain of the image.



The Layer's original image without a Color Effect.



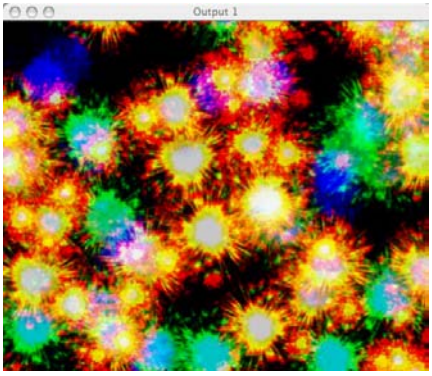
The Layer's image with the **Gain Color Separate Channels** Effect.



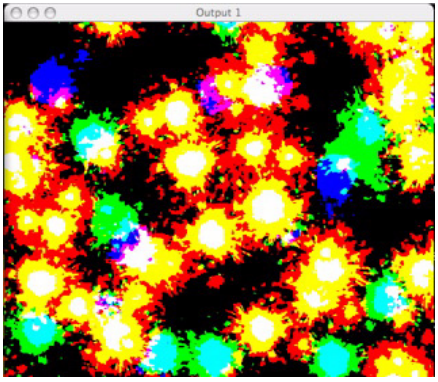
The Layer's image with the **Gain Color Separate Channels** Effect and **Blue** channel adjustment.

65 Quantize Color Separate Channels

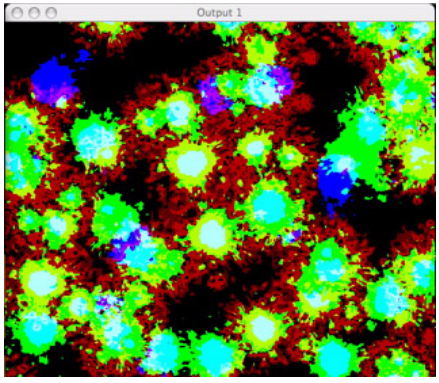
When the **Color Effects** parameter is assigned a DMX value of **65**, the Layer's image is displayed with a reduced set of representative colors. The **Red, Green,** and **Blue** parameters adjust the corresponding color in the image.



The Layer's original image without a Color Effect.



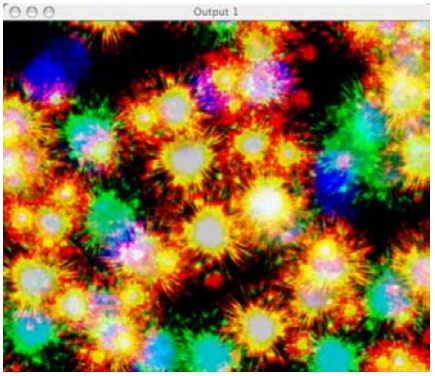
The Layer's image with the **Quantize Color Separate Channels** Effect.



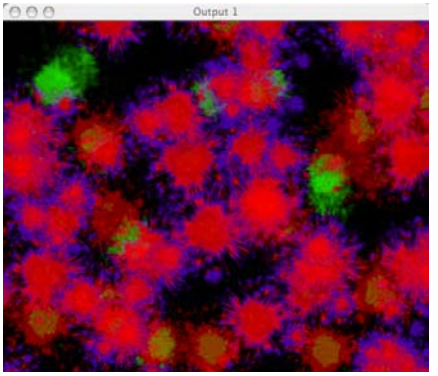
The Layer's image with the **Quantize Color Separate Channels** Effect and **Red** channel adjustment.

70 Convert to YUV

When the **Color Effects** parameter is assigned a DMX value of **70**, the Layer's image RGB color information is converted to a different color space. The **Red** parameter adjusts the illuminance of the image. The **Green** parameter adjusts the U component and the **Blue** parameter adjusts the V component.



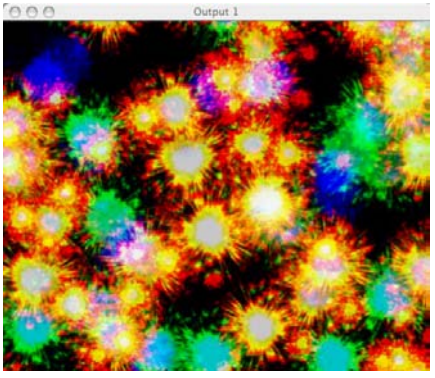
The Layer's original image without a Color Effect.



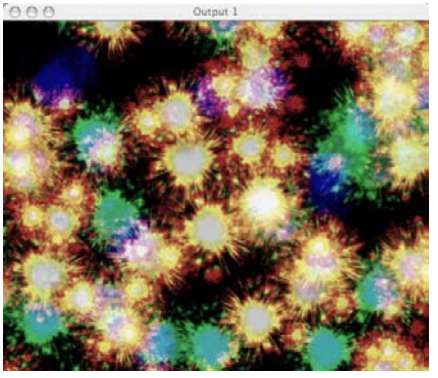
The Layer's image with the Convert to YUV Effect.

71 Saturation

When the **Color Effects** parameter is assigned a DMX value of **71**, the Layer's image can **not** be tinted. The **Red** parameter reduces the color saturation of the image. When the Red parameter is set to 0, the image is black and white. The **Green**, and **Blue** parameters do not function with this Color Effect.



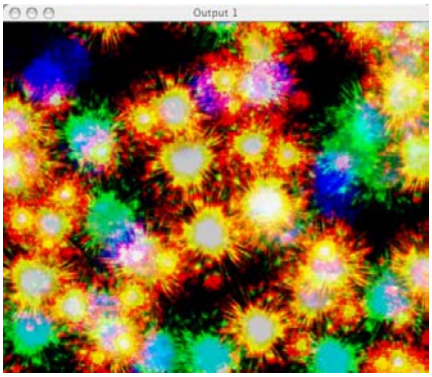
The Layer's original image without a Color Effect.



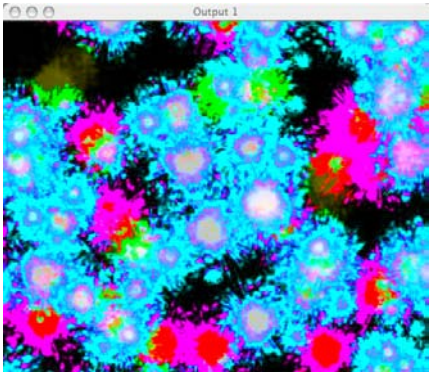
The Layer's image with a 50% Saturation Effect.

72 Mega Saturation

When the **Color Effects** parameter is assigned a DMX value of **72**, the Layer's image can **not** be tinted. The **Red** parameter adds and subtracts from the color saturation of the image. With no color saturation the image is black and white. The **Green**, and **Blue** parameters do not function with this Color Effect.



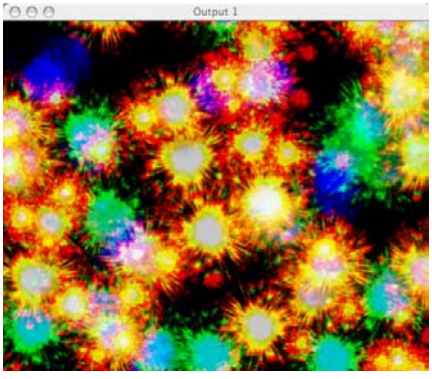
The Layer's original image without a Color Effect.



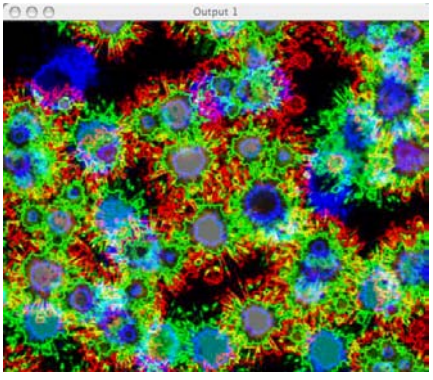
The Layer's image with a Mega Saturation Effect.

73 Solarize

When the **Color Effects** parameter is assigned a DMX value of **73**, the Layer's image becomes solarized and can **not** be tinted. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



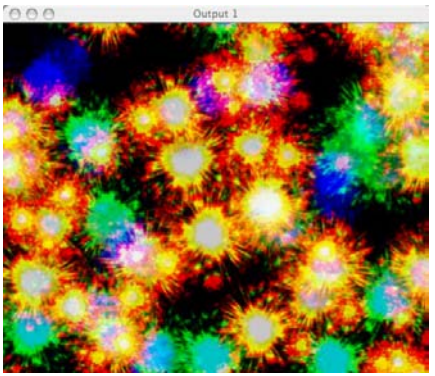
The Layer's original image without a Color Effect.



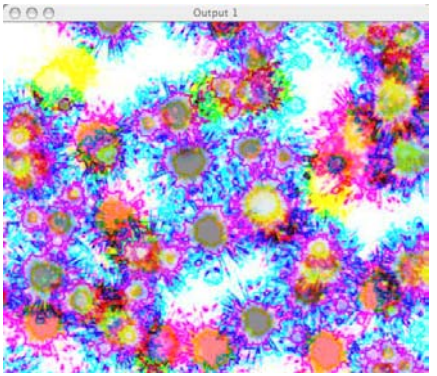
The Layer's image with the Solarize Effect.

74 Solarize Invert

When the **Color Effects** parameter is assigned a DMX value of **74**, the Layer's colors are inverted, the image becomes solarized, and it can **not** be tinted. The **Red**, **Green**, and **Blue** parameters do not function with this Color Effect.



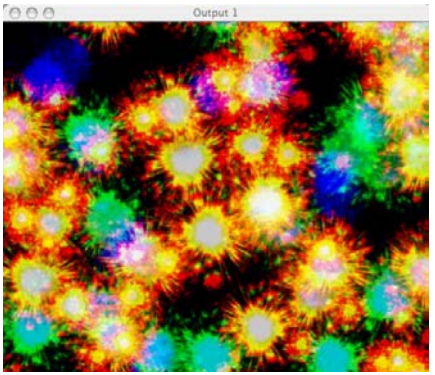
The Layer's original image without a Color Effect.



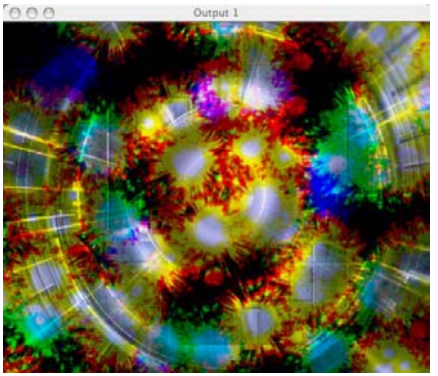
The Layer's image with the Solarize Invert Effect.

80 RGB Layer Blend 1

When the **Color Effects** parameter is assigned a DMX value of **80**, the white portions of the Layer's image become transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



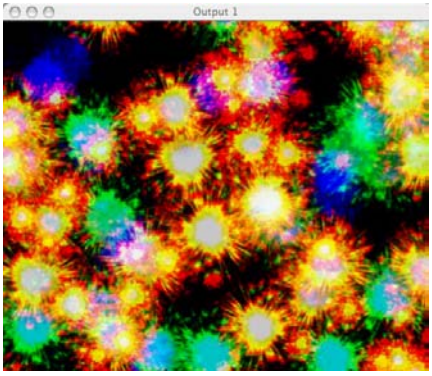
The Layer's original image without a Color Effect.



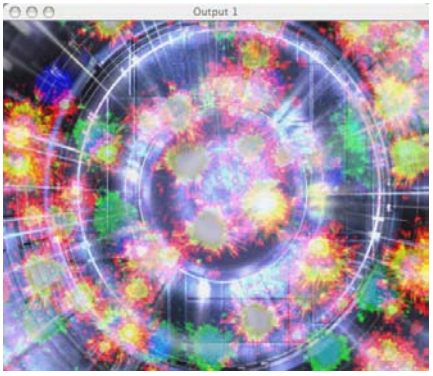
The Layer's image with the RGB Layer Blend 1 Effect.

81 RGB Layer Blend 2

When the **Color Effects** parameter is assigned a DMX value of **81**, the black portions of the Layer's image become transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



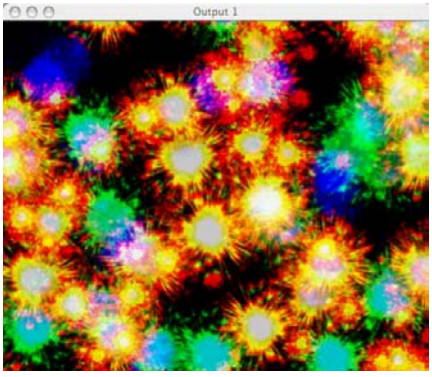
The Layer's original image without a Color Effect.



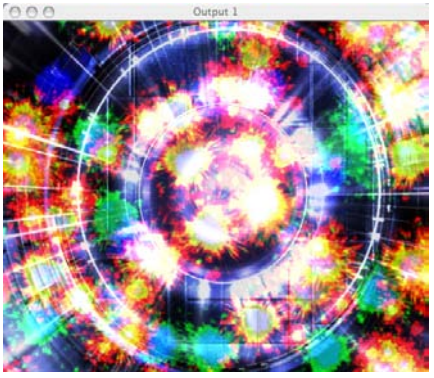
The Layer's image with the RGB Layer Blend 2 Effect.

82 RGB Layer Blend 3

When the **Color Effects** parameter is assigned a DMX value of **82**, the white portions of the Layer's image become semi-transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



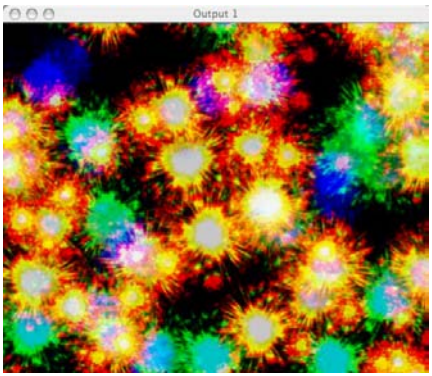
The Layer's original image without a Color Effect.



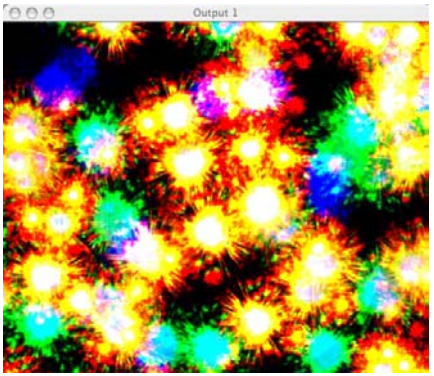
The Layer's image with the RGB Layer Blend 3 Effect.

83 RGB Layer Blend 4

When the **Color Effects** parameter is assigned a DMX value of **83**, portions of the Layer's image become transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



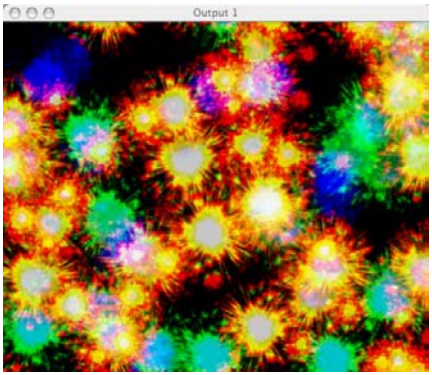
The Layer's original image without a Color Effect.



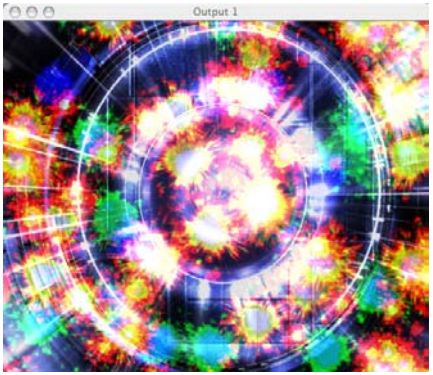
The Layer's image with the RGB Layer Blend 4 Effect.

84 RGB Layer Blend 5

When the **Color Effects** parameter is assigned a DMX value of **84**, portions of the Layer's image become semi-transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



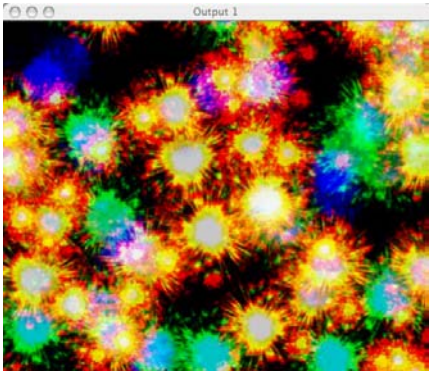
The Layer's original image without a Color Effect.



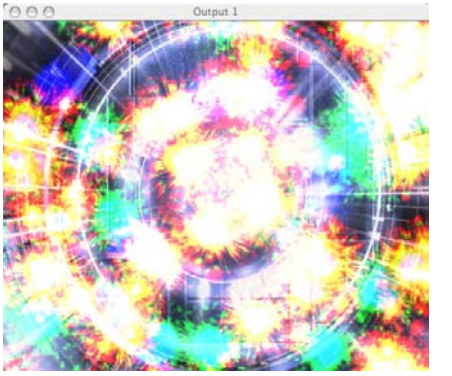
The Layer's image with the RGB Layer Blend 5 Effect.

85 RGB Layer Blend 6 Add

When the **Color Effects** parameter is assigned a DMX value of **85**, black portions of the Layer's image become transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



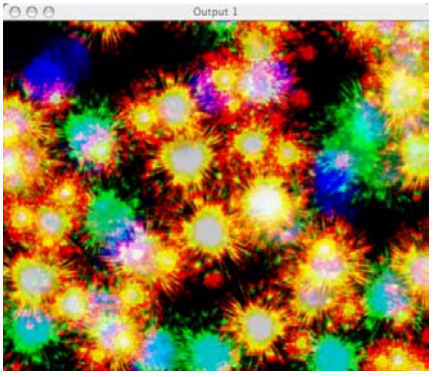
The Layer's original image without a Color Effect.



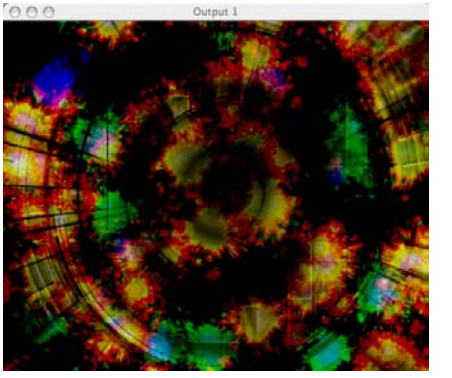
The Layer's image with the RGB Layer Blend 6 Effect.

86 RGB Layer Blend 7 Subtract

When the **Color Effects** parameter is assigned a DMX value of **86**, white portions of the Layer's image become semi-transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



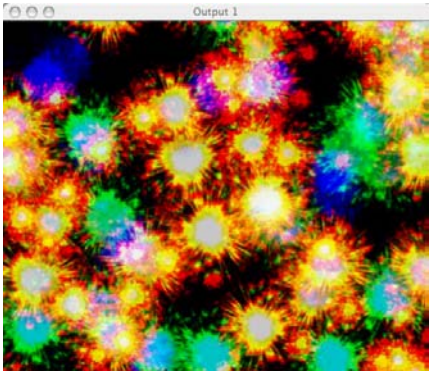
The Layer's original image without a Color Effect.



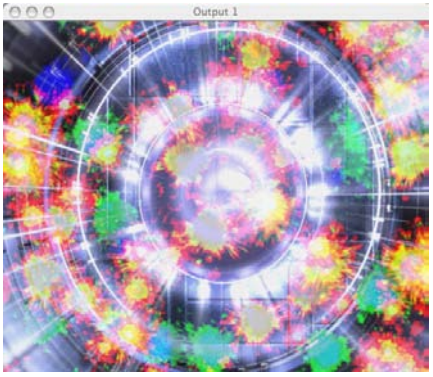
The Layer's image with the RGB Layer Blend 7 Effect.

89 RGB Layer Blend 10 Maximum

When the **Color Effects** parameter is assigned a DMX value of **89**, dark portions of the Layer's image become transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters each remove existing color from the layer's image.



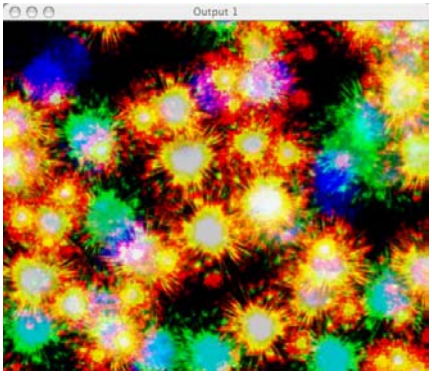
The Layer's original image without a Color Effect.



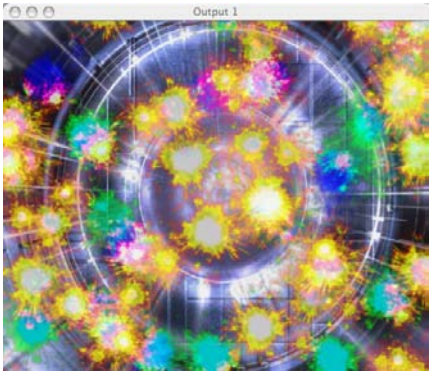
The Layer's image with the RGB Layer Blend 10 Effect.

90 RGB Layer Blend 11 Add 2

When the **Color Effects** parameter is assigned a DMX value of **90**, dark portions of the Layer's image become semi-transparent and the image can be tinted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



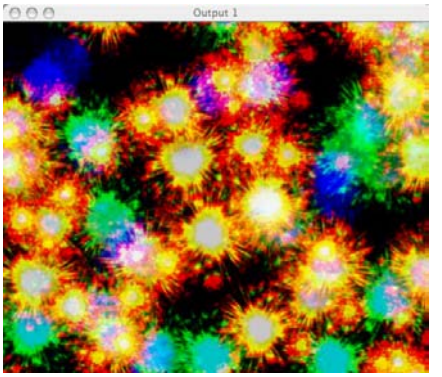
The Layer's original image without a Color Effect.



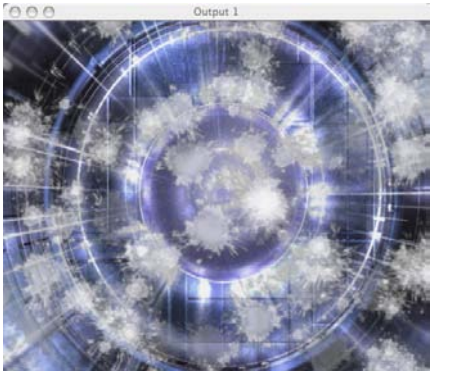
The Layer's image with the RGB Layer Blend 11 Effect.

100 Tint

When the **Color Effects** parameter is assigned a DMX value of **100**, the Layer's image is converted to black and white and the image can be tinted. Black portions of the image become transparent. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



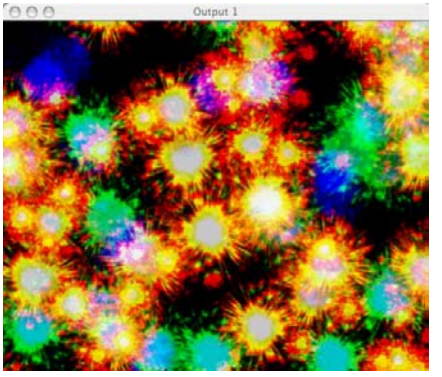
The Layer's original image without a Color Effect.



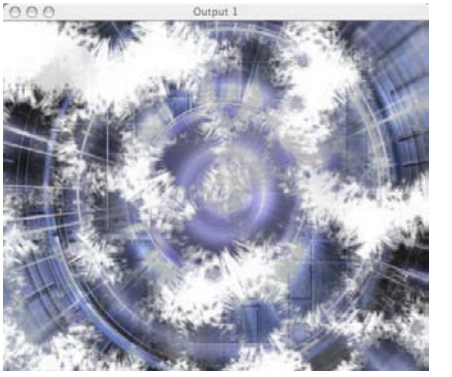
The Layer's image with the Tint Effect.

101 Tint Inverse

When the **Color Effects** parameter is assigned a DMX value of **101**, the Layer's inverted image is converted to black and white and the image can be tinted. Black portions of the image become transparent. The **Red**, **Green**, and **Blue** parameters can remove existing color from the layer's image.



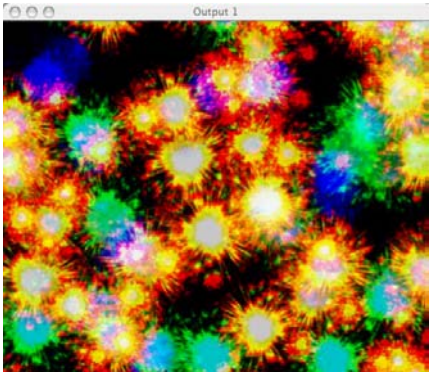
The Layer's original image without a Color Effect.



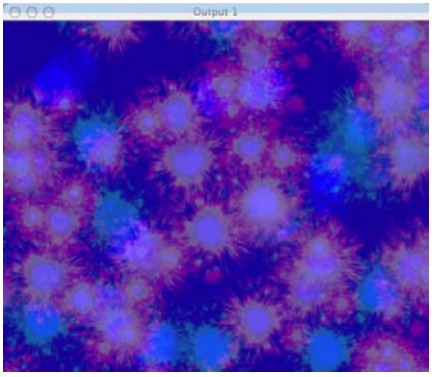
The Layer's image with the Tint Invert Effect.

102 Fade to Hue

When the **Color Effects** parameter is assigned a DMX value of **102**, the Layer's the image fades to a color rather than to black. The red control sets the fade percentage (100% = original image; 0% = only the color remains). The image will fade to the hue selected by the Green parameter, based on a spectrum wheel (red-violetindigo-blue-green-yellow-orange-red). The **Blue** parameter does not function with this Color Effect.



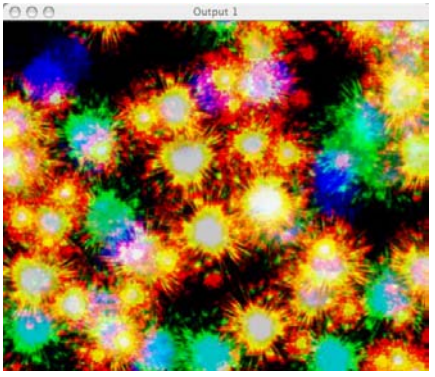
The Layer's original image without a Color Effect.



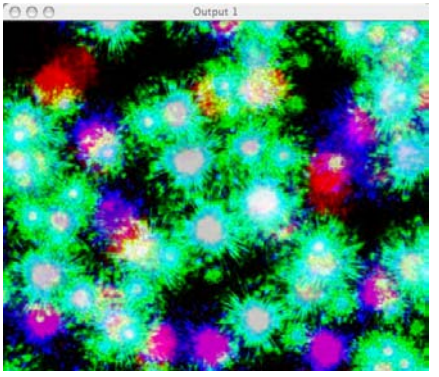
The Layer's image with the Fade to Hue Effect.

103 RGB > GBR

When the **Color Effects** parameter is assigned a DMX value of **103**, the colors of a Layer's image are swapped and can be tinted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the Layer's image.



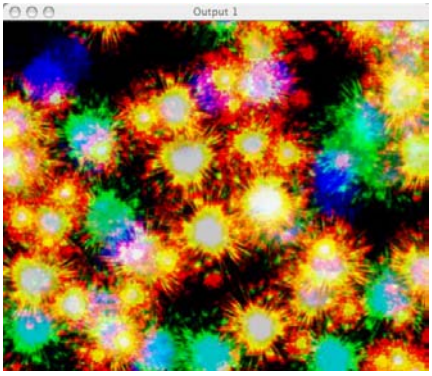
The Layer's original image without a Color Effect.



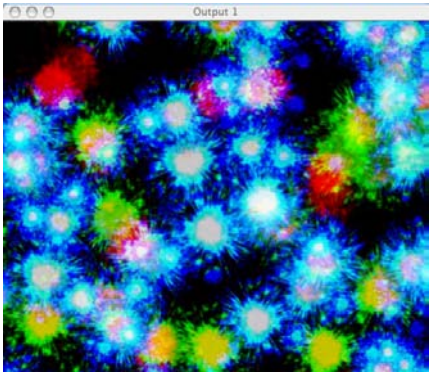
The Layer's image with the RGB > GBR Effect.

104 RGB > BGR

When the **Color Effects** parameter is assigned a DMX value of **104**, the colors of a Layer's image are swapped and can be tinted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the Layer's image.



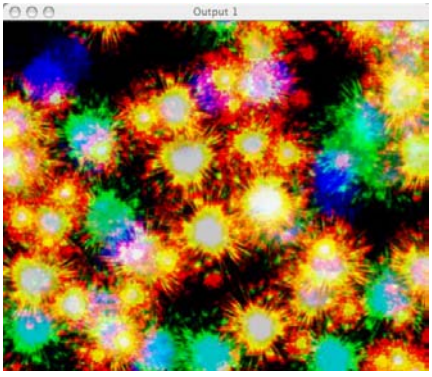
The Layer's original image without a Color Effect.



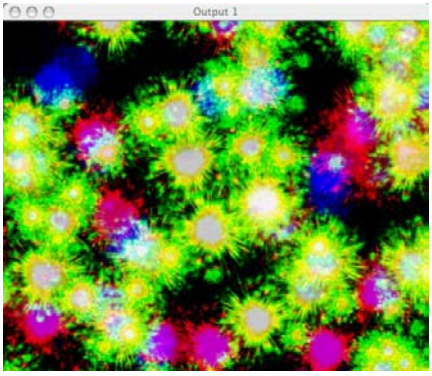
The Layer's image with the RGB > BGR Effect.

105 RGB > GRB

When the **Color Effects** parameter is assigned a DMX value of **105**, the colors of a Layer's image are swapped and can be tinted. The **Red**, **Green**, and **Blue** parameters can remove existing color from the Layer's image.



The Layer's original image without a Color Effect.



The Layer's image with the RGB > GRB Effect.

Chapter 9: Strobing and Trails

Strobing

The **Strobing** parameter creates flashing or pulsing of the layer's image as though it were lit by a strobe light. Each strobing pattern is controlled by a range of 24 DMX values that govern strobing speed of that pattern. The strobe's speed generally refers to the intervals when the image is turned on.

The suggested default DMX value of the **Strobing** parameter is 0, which produces no strobe effect. Other DMX values for the parameter determine the strobing pattern. The available strobe patterns are:

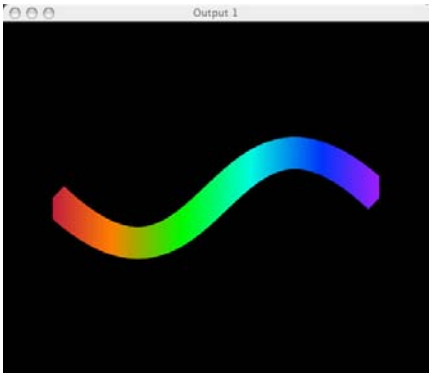
Strobe Pattern	Description
(DMX value = 0)	Strobe Off
OnOff (DMX values 1-24)	Blinks the entire image repeatedly with equal on and off amounts of time. Value 1 is the fastest setting (the image is turned on longest); 24 is the slowest setting.
Pulse 1 (DMX values 25-49)	Pulse length is always 1 frame long. Time between pulses varies. Value 25 is the slowest setting; 49 is the fastest setting.
Pulse 2 (DMX values 50-74)	Time between pulses is 25 frames. Pulse length varies. Value 50 is the longest setting; 74 is the shortest setting.
Pulse Train (DMX values 75-99)	Time between pulses is 25 frames.The number of pulses varies. Value 75 is the fastest setting with the most pulses; 99 has a single pulse.
Random 1 (DMX values 100-124)	Equal on and off amounts of time. Pulse length varies randomly.
Random 2 (DMX values 125-149)	Pulse length is always 1 frame. Time between pulses varies randomly.

Trails

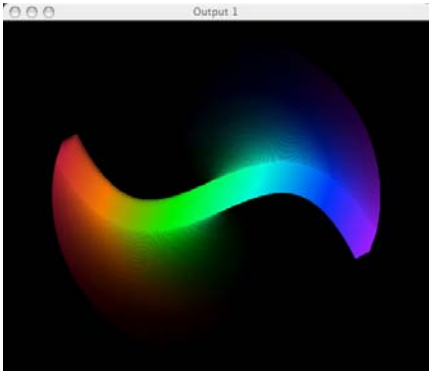
The **Trails** parameter creates an afterimage that follows a moving image as it moves on layer 1. The DMX value of the **Trails** parameter varies the length, or duration, of the trails. The suggested default DMX value of 0, creates no trails. A value of 255 creates very long trails.

The Trails effect is available only on Layer 1. However, trails are also applied to all content on other layers that become visible on Layer 1. For instance, if other layers are masked or turned partly transparent to reveal Layer 1 beneath, the Layer 1 Trails effect then applies to those layer's visible content as well.

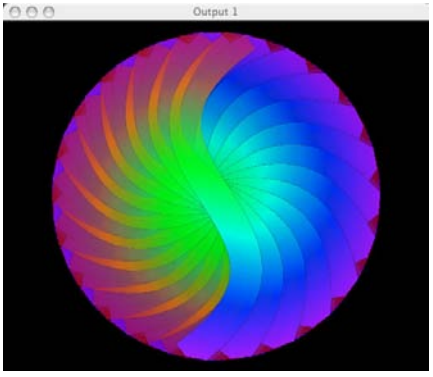
The Trails effect requires transparency of the layer, either from the Color Effects parameter, or by reducing the Intensity parameter of the layer.



Trails Off



Small Trails



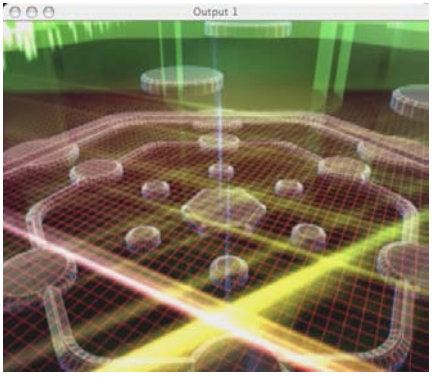
Full Trails

Chapter 10: Visual Effects

The Visual Effects parameter applies various changes to a layer's content. The Parameter 1 (FX1) and Parameter 2 (FX2) parameters are linked to selected Visual Effects, and their function changes based on the Visual Effect. This chapter describes uses of the Visual Effects and their capabilities.

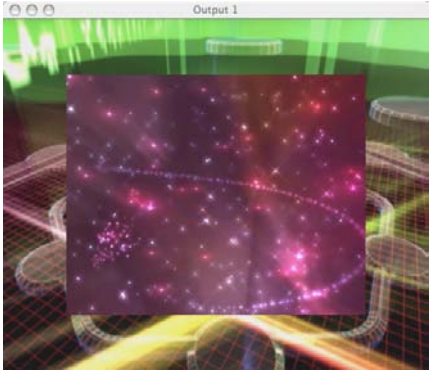
0 Movie on Non-Infinite Plane

When the **Visual Effects** parameter is assigned a DMX value of **0**, the Layer's content plays on a transparent plane. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1 with no Visual Effects

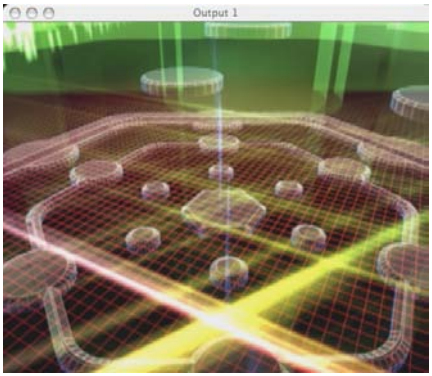
Layer 2 with no Visual Effects



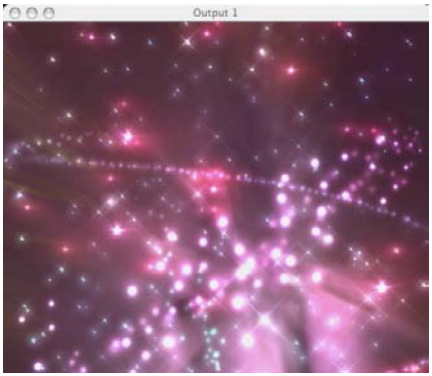
Layer 2 with a Transparent plane scaled in over Layer 1

1 Movie on Infinite Plane with Black Border

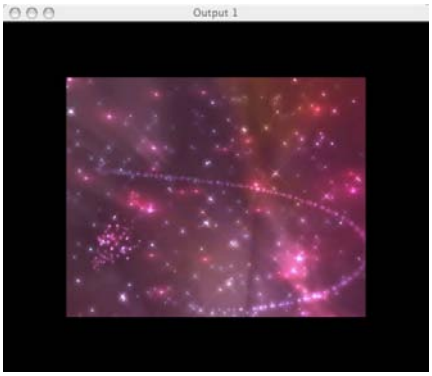
When the **Visual Effects** parameter is assigned a DMX value of **1**, the Layer's content plays on a non-transparent black plane. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1 with no Visual Effects



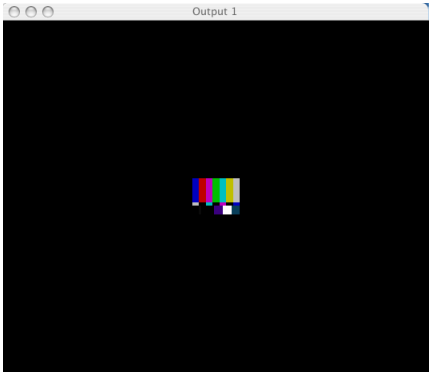
Layer 2 with no Visual Effects



Layer 2 with a non-transparent plane scaled in over Layer 1

2 Movie Unity Scaling

When the **Visual Effects** parameter is assigned a DMX value of **2**, the Layer's content will be displayed pixel for pixel without any scaling. The **Scale** parameter is disabled with this selection. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer with the default Scale setting

Layer with the
Unity Scaling Visual Effect

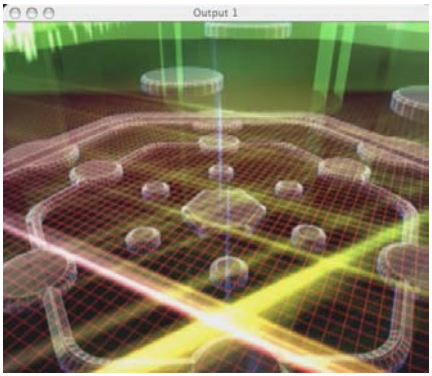
4 Full Screen

When the **Visual Effects** parameter is assigned a DMX value of **4**, the Layer's content is matched to the output device aspect ratio. This allows scaling that fills the output display screen. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect

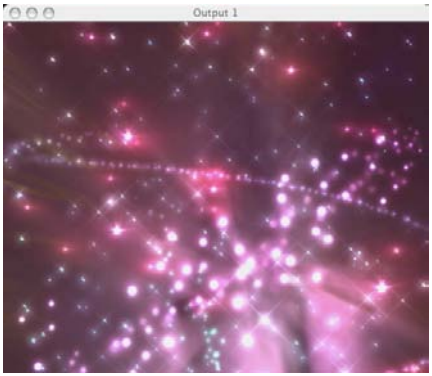
Note: Applying this visual effect may distort the projected image.

5 Movie Keystone 1

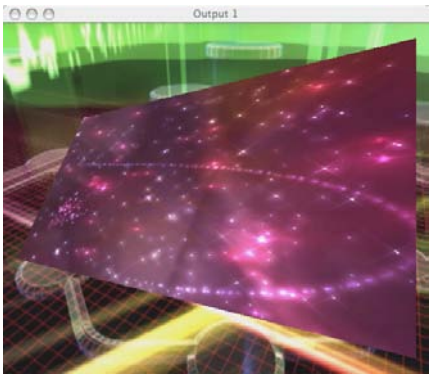
When the **Visual Effects** parameter is assigned a DMX value of **5**, the Layer's content plays on an adjustable transparent plane. The **Keystone Correction** parameters adjust the shape of the Layer. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1 with no Visual Effects



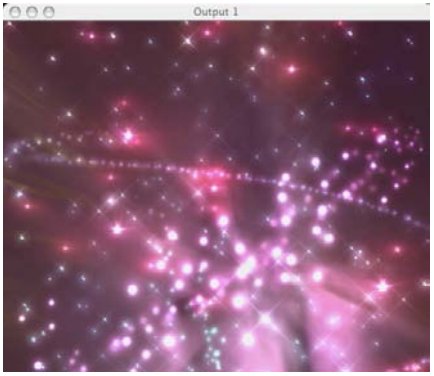
Layer 2 with no Visual Effects



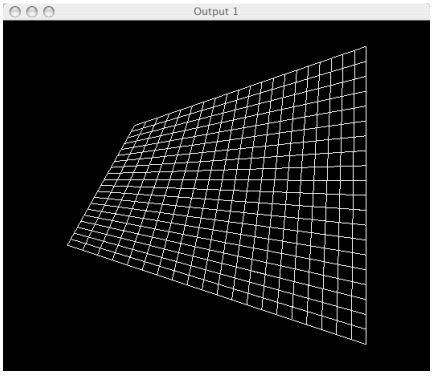
Layer 2 with Keystone adjustments over Layer 1.

9 Setup Image Keystone 1

When the **Visual Effects** parameter is assigned a DMX value of **6**, the Layer's output changes to a grid pattern. This grid pattern is useful for determining the results of Keystone adjustments. The **Keystone Correction** parameters adjust the shape of the Layer. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect



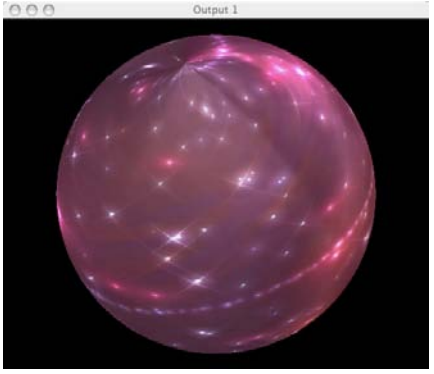
A Layer with no Visual Effects



A Layer displaying a grid with Keystone adjustments

10 Movie on Sphere Filled

When the **Visual Effects** parameter is assigned a DMX value of **10**, the Layer's content is wrapped around a solid sphere. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

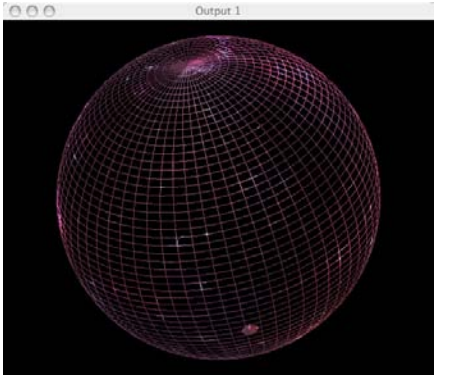


A Layer with its image wrapped around a solid sphere.

11 Movie on Sphere Wireframe

When the **Visual Effects** parameter is assigned a DMX value of **11**, the Layer's content is wrapped around a wireframe sphere. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

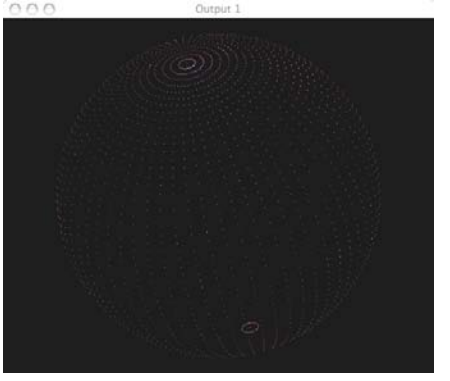
A Layer with no Visual Effects



A Layer with its layer wrapped around a wireframe sphere.

12 Movie on Sphere Points

When the **Visual Effects** parameter is assigned a DMX value of **12**, the Layer's content is wrapped around the points of a wireframe sphere. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

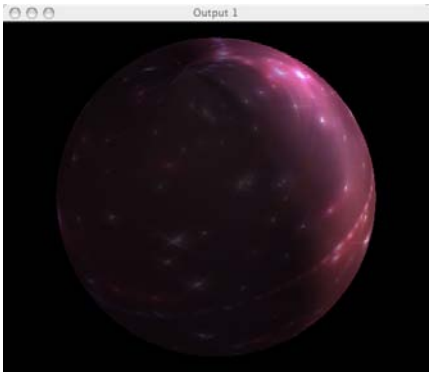


A Layer with its output wrapped around a points of a wireframe sphere.

13 Movie on Sphere Lit

When the **Visual Effects** parameter is assigned a DMX value of **13**, the Layer's content is wrapped around a solid sphere with an illumination effect. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

A Layer with no Visual Effects



A Layer with its image wrapped around a solid sphere with illumination.

14 Movie on Disc Filled

When the **Visual Effects** parameter is assigned a DMX value of **14**, the Layer's content is wrapped around a solid disc. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

A Layer with its image wrapped around a solid disc

15 Movie on Disc Wireframe

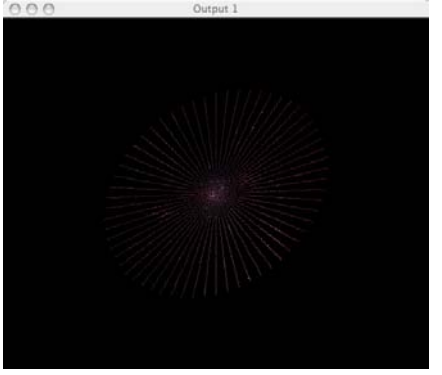
When the **Visual Effects** parameter is assigned a DMX value of **15**, the Layer's content is wrapped around a wireframe disc. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

A Layer with no Visual Effects

A Layer with its image wrapped around a wireframe disc.

16 Movie on Disc Points

When the **Visual Effects** parameter is assigned a DMX value of **16**, the Layer's content is wrapped around the points of a wireframe disc. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

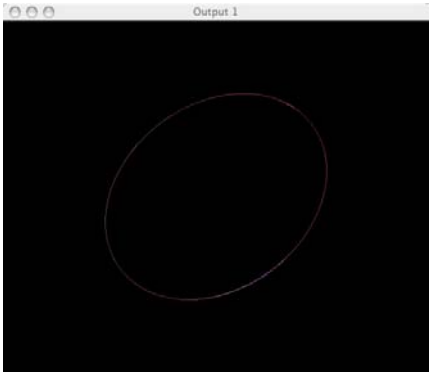


A Layer with its image wrapped around a points of a wireframe disc.

17 Movie on Disc Silhouette

When the **Visual Effects** parameter is assigned a DMX value of **17**, the Layer's content is wrapped around the edges of disc. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

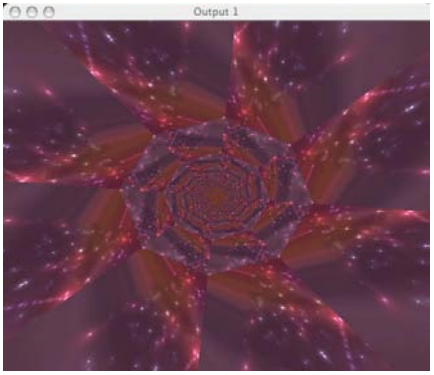
A Layer with no Visual Effects



A Layer with its image wrapped around a the edges of disc

20 Movie on Kaleidoscope

When the **Visual Effects** parameter is assigned a DMX value of **20**, the Layer's content is repeated within a kaleidoscope tunnel. The Layer's image can be rotated using the **X Rotation** parameter, and the entire kaleidoscope tunnel can be rotated with the **Z Rotation** parameter. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



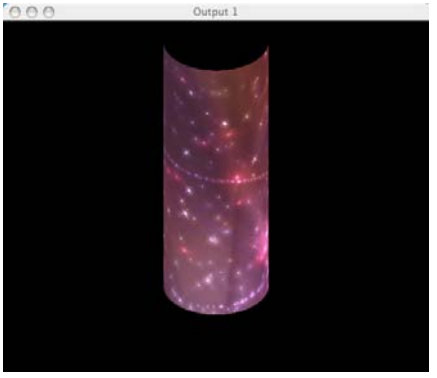
A Layer with its image repeated within a kaleidoscope tunnel

21 Movie on Magic Lantern

When the **Visual Effects** parameter is assigned a DMX value of **21**, the Layer's content is wrapped around hollow cylinder. The **Parameter 1 (FX1)** parameter adjusts the size of the cylinder and the **Parameter 2 (FX2)** parameter adjusts the number of times the content is repeated on the cylinder.

A Layer with no Visual Effects

A Layer with its image wrapped around hollow cylinder



The hollow cylinder with its size adjusted by **Parameter 1 (FX1)**

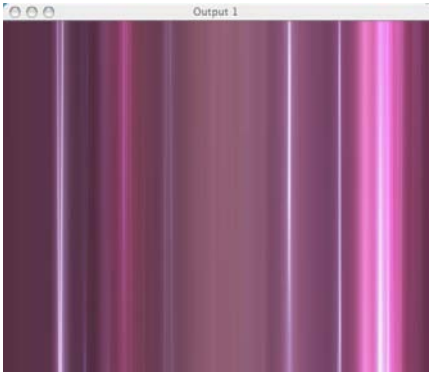
The hollow cylinder with its image repeated by **Parameter 2 (FX2)**

22 Movie Stretched

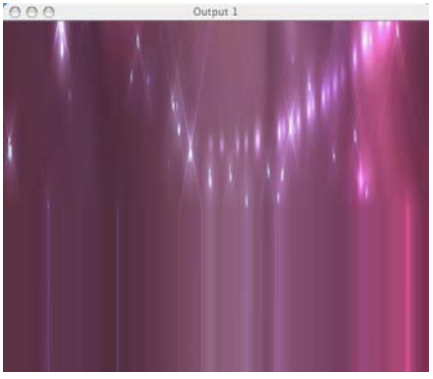
When the **Visual Effects** parameter is assigned a DMX value of **22**, the Layer's content is stretched into vertical slices. The **Parameter 1 (FX1)** parameter adjusts positioning of the stretch within the content, and the **Parameter 2 (FX2)** parameter adjusts the length of the stretched slices.

A Layer with no Visual Effects

A Layer with its output stretched into vertical slices



The stretched image with its location adjusted by **Parameter 1 (FX1)**

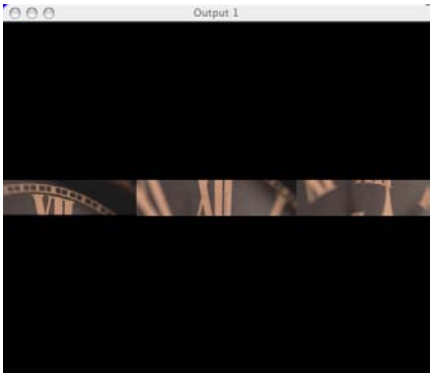


The image with the stretch length reduced by **Parameter 2 (FX2)**

23 Movie Panorama Slices

When the **Visual Effects** parameter is assigned a DMX value of **23**, the Layer's content is sliced into strips and placed side by side. The **Parameter 1 (FX1)** parameter adjusts the number of slices. The **Parameter 2 (FX2)** parameter does not function with this Visual Effect.

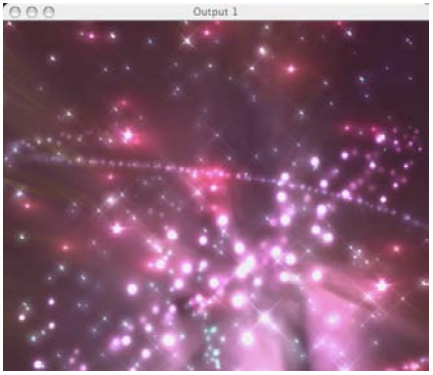
The Layer's original image.



The Layer's image sliced into strips placed side by side.

24 Movie on Magic Lantern 2

When the **Visual Effects** parameter is assigned a DMX value of **24**, the Layer's content is wrapped around solid cylinder. The **Parameter 1 (FX1)** parameter adjusts the size of the cylinder and the **Parameter 2 (FX2)** parameter adjusts the number of times the content is repeated on the cylinder.



A Layer with no Visual Effects

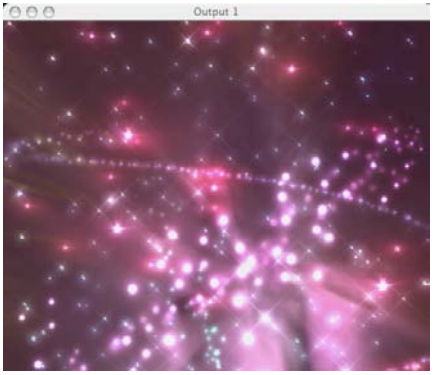
A Layer with its output wrapped around a solid cylinder

The solid cylinder with its size adjusted by **Parameter 1 (FX1)**

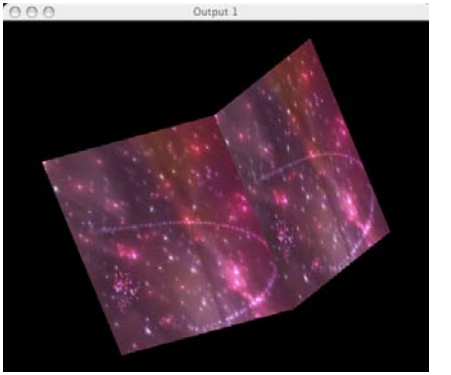
The solid cylinder with its image repeated by **Parameter 2 (FX2)**

30 Movie on Cube 4 Sides

When the **Visual Effects** parameter is assigned a DMX value of **30**, the Layer's content is wrapped around four sides of a cube. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect



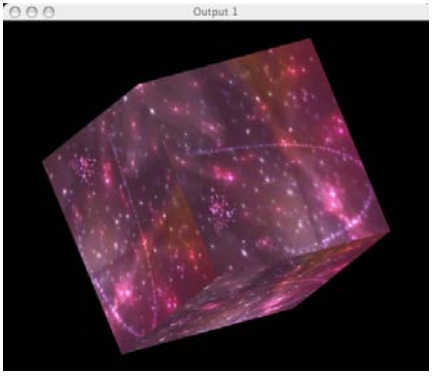
A Layer with no Visual Effects



The Layer's image on four sides of a cube

31 Movie on Cube 6 Sides

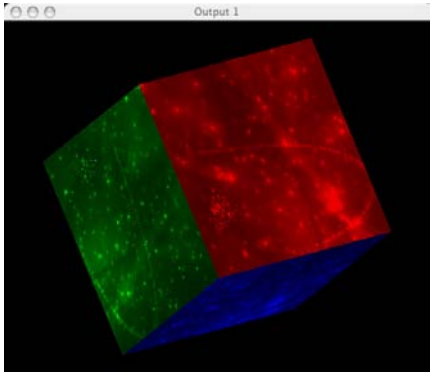
When the **Visual Effects** parameter is assigned a DMX value of **31**, the Layer's content is wrapped around six sides of a cube. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect



The Layer's image on six sides of a cube

32 Movie on Colored Cube 6 Sides

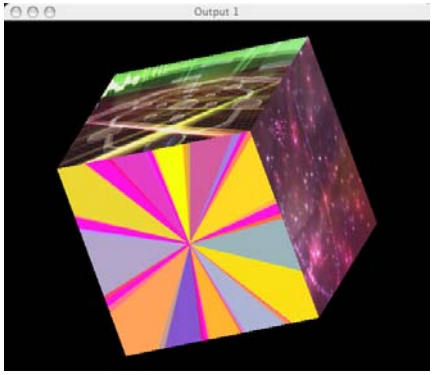
When the **Visual Effects** parameter is assigned a DMX value of **32**, the Layer's content is wrapped around six sides of a cube. Each side of the cube is tinted with a different color. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect



The Layer's image on six different colored sides

33 Movies First Four Layers on Cube

When the **Visual Effects** parameter is assigned a DMX value of **33**, the content from each Layer of the Catalyst system is applied to one side of a cube. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect



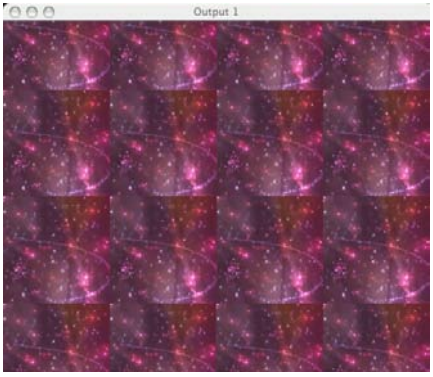
A cube with a different Layer's content on each side.

40 Movie on NxN Simultaneous

When the **Visual Effects** parameter is assigned a DMX value of **40**, the Layer's content can be tiled in both the horizontal X-axis and the vertical Y-axis. The **Parameter 1 (FX1)** parameter adjusts the number of tiles on the horizontal X-axis. The **Parameter 2 (FX2)** parameter adjusts the number of tiles on the vertical Y-axis.

A Layer's content tiled on the horizontal X-axis

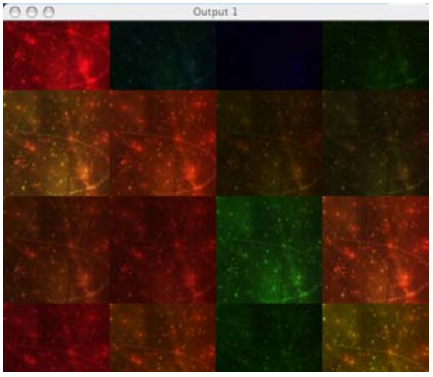
A Layer's content tiled on the vertical Y-axis



A Layer's content tiled on both the horizontal X-axis and the vertical Y-axis

41 Movie on NxN Simultaneous Random Color

When the **Visual Effects** parameter is assigned a DMX value of **41**, the Layer's content can be tiled in both the horizontal X-axis and the vertical Y-axis. Each tile of the image will randomly change color. The **Parameter 1 (FX1)** parameter adjusts the number of tiles on the horizontal X-axis. The **Parameter 2 (FX2)** parameter adjusts the number of tiles on the vertical Y-axis.



A Layer's content tiled on both the horizontal X-axis and the vertical Y-axis with randomly changing colors

42 Movie on NxN Consecutive

When the **Visual Effects** parameter is assigned a DMX value of **42**, the Layer's content can be tiled in both the horizontal X-axis and the vertical Y-axis. Each tile of the image will appear one at a time in a linear order. The **Parameter 1 (FX1)** parameter adjusts the number of tiles on the horizontal X-axis. The **Parameter 2 (FX2)** parameter adjusts the number of tiles on the vertical Y-axis.

43 Movie on NxN Consecutive Random Color

When the **Visual Effects** parameter is assigned a DMX value of **43**, the Layer's content can be tiled in both the horizontal X-axis and the vertical Y-axis. Each tile of the image will appear one at a time with a randomly changing color. The **Parameter 1 (FX1)** parameter adjusts the number of tiles on the horizontal X-axis. The **Parameter 2 (FX2)** parameter adjusts the number of tiles on the vertical Y-axis.

44 Movie on NxN Consecutive Random Frame

When the **Visual Effects** parameter is assigned a DMX value of **44**, the Layer's content can be tiled in both the horizontal X-axis and the vertical Y-axis. Each tile of the image will appear one at a time in a random order. The **Parameter 1 (FX1)** parameter adjusts the

number of tiles on the horizontal X-axis. The **Parameter 2 (FX2)** parameter adjusts the number of tiles on the vertical Y-axis.

45 Movie on Random Flicker

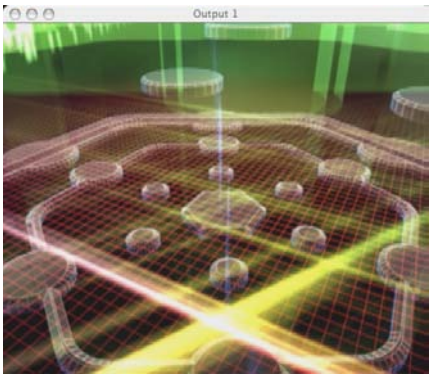
When the **Visual Effects** parameter is assigned a DMX value of **45**, the Layer's content randomly turns on and off with a result similar to the **Strobe** parameter effect. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

46 Movie on Random Color Flicker

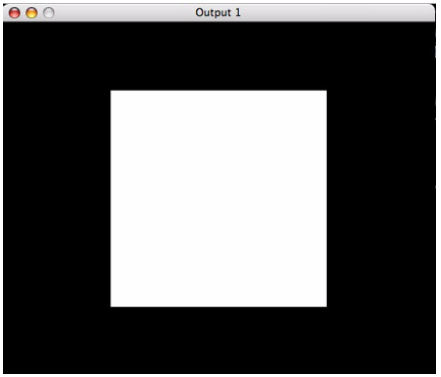
When the **Visual Effects** parameter is assigned a DMX value of **46**, the Layer's content randomly turns on and off. In addition, the image randomly changes colors. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.

60 Rectangle Shuttered

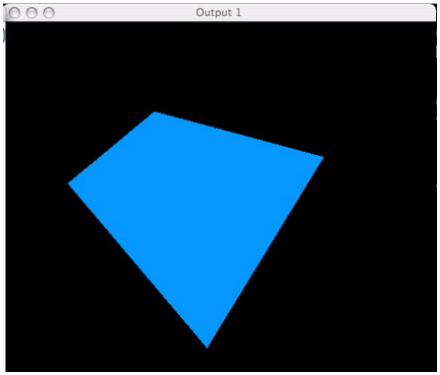
When the **Visual Effects** parameter is assigned a DMX value of **60**, the Layer's content is replaced with a non-transparent white rectangular image. This effect mimics a rectangular shuttered light. **Keystone Correction** parameters adjust the shutter sides and the color parameters let you mix the color. All the position, rotation and scale and strobe parameters adjustments can be used with this effect. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1 with no visual effect



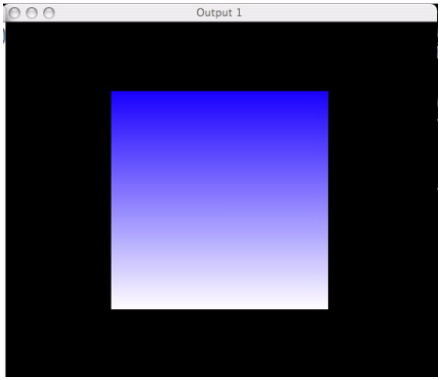
Layer 1 with **Rectangle Shuttered** visual effect.



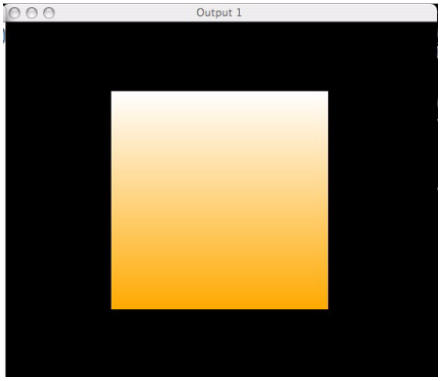
Shuttered effect with **Keystone Correction, Scale, Rotation** and **Color** parameter adjustments applied.

61 Rectangle Graduated Color Shuttered

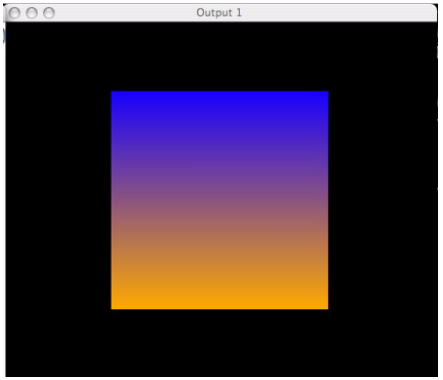
When the **Visual Effects** parameter is assigned a DMX value of **61**, the Layer's content is replaced with a non-transparent white rectangular image. The **Parameter 1 (FX1)** parameter selects graduated color from the top of the rectangle. The **Parameter 2 (FX2)** parameter selects graduated color from the bottom of the rectangle. The **Keystone Correction** parameters adjust the shape of the image. All the position, rotation and scale and strobe parameters can be used with this effect.



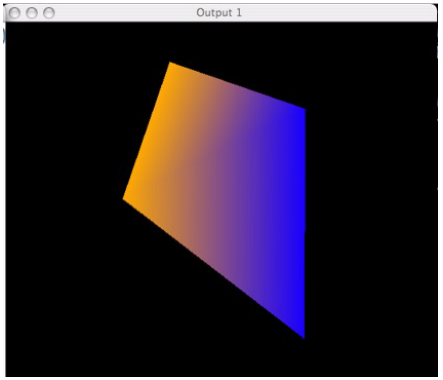
Effect with graduated color selected by **Parameter 1 (FX1)**.



Effect with graduated color selected by **Parameter 2 (FX2)**.



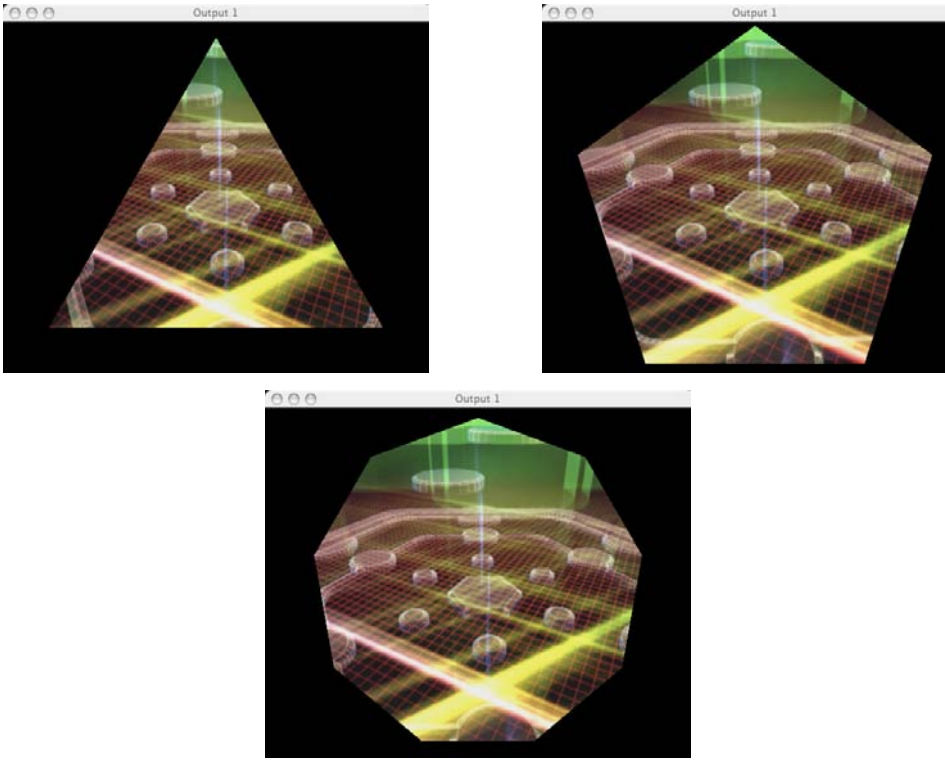
Color mixed combination of **Parameter 1** and **Parameter 2 adjustments**.



Keystone Correction and **Z Rotation** parameter adjustments applied to the effect.

62 N Sided Shape Shuttered Black

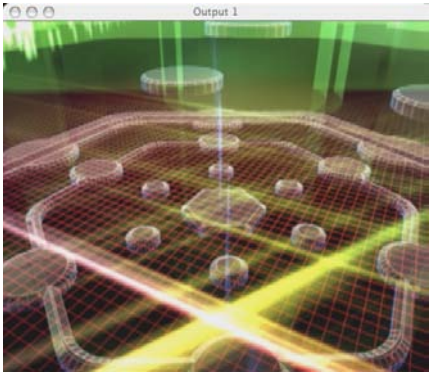
When the **Visual Effects** parameter is assigned a DMX value of **62**, the Layer's content is replaced with a transparent polygon on a black plane. The **Parameter 1 (FX1)** parameter adjusts polygon's number of sides. The **Parameter 2 (FX2)** parameter does not function with this Visual Effect. All the position, rotation and scale and strobe parameters can be used with this effect.



Examples of various sized polygons

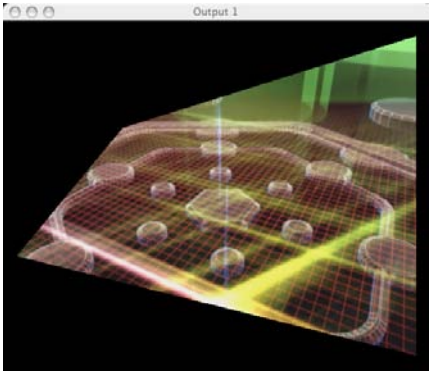
70 Shutter Shuttered Black

When the **Visual Effects** parameter is assigned a DMX value of **70**, the Layer's content is replaced with a transparent rectangular image on a black plane. The **Keystone Correction** parameters adjust the shape of the image. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1with no visual effect

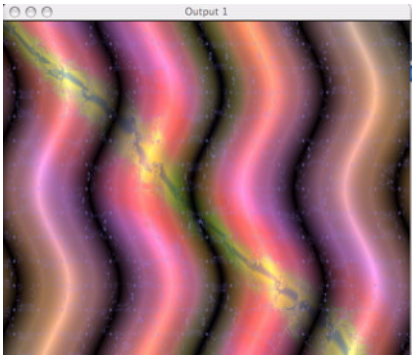
Layer 2 with no visual effect



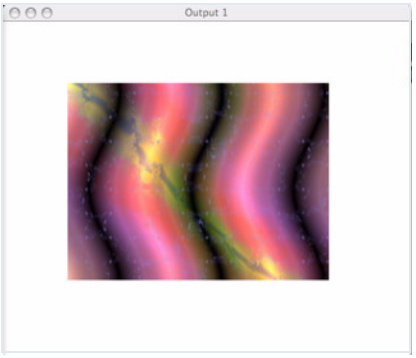
Layer 2 with **Keystone Correction** parameter adjustments over Layer 1

71 Shutter Shuttered Color

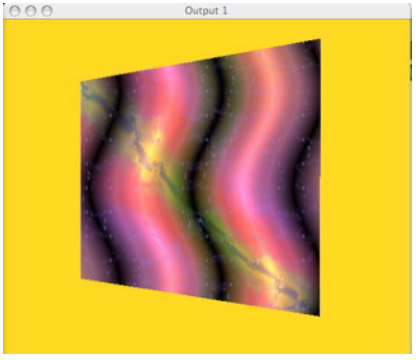
When the **Visual Effects** parameter is assigned a DMX value of **71**, the Layer's content is replaced with a transparent rectangular image on a white plane. The **Keystone Correction** parameters adjust the shape of the image. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect.



Layer 1with no visual effect



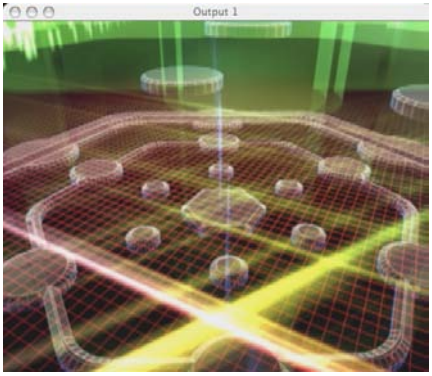
Layer 2 with no visual effect



Layer 2 with **Keystone Correction**
and **Color** parameter adjustments over Layer 1

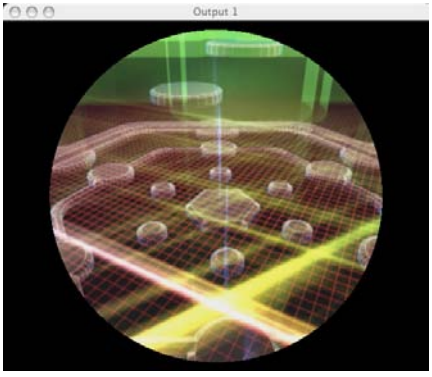
72 Iris Shutter Black

When the **Visual Effects** parameter is assigned a DMX value of **72**, the Layer's content is replaced with a transparent circular image on a black plane. The **Parameter 1 (FX1)** parameter adjusts the softness of the circle's edge. The **Parameter 2 (FX2)** parameter does not function with this Visual Effect.

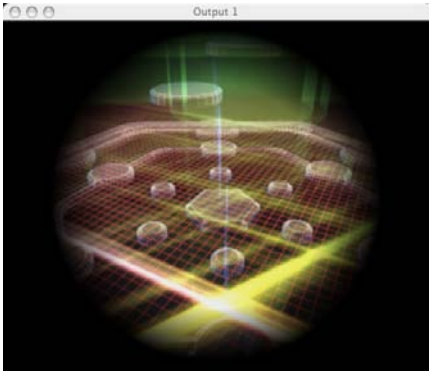


Layer 1with no visual effect

Layer 2 with no visual effect



Layer 2 with no **Parameter 1 (FX1)** parameter adjustments over Layer 1.

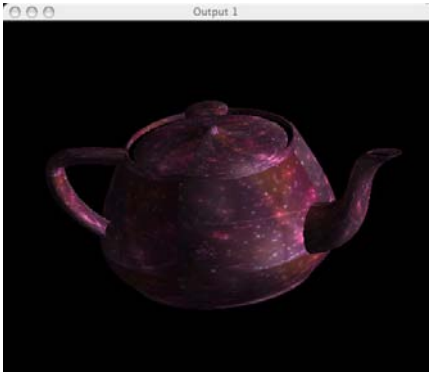


Layer 2 with **Parameter 1 (FX1)** parameter adjustments over Layer 1.

100 Movie on Teapot Filled

When the **Visual Effects** parameter is assigned a DMX value of **100**, the Layer's content is wrapped around a solid teapot. The **Parameter 1 (FX1)** and **Parameter 2 (FX2)** parameters do not function with this Visual Effect

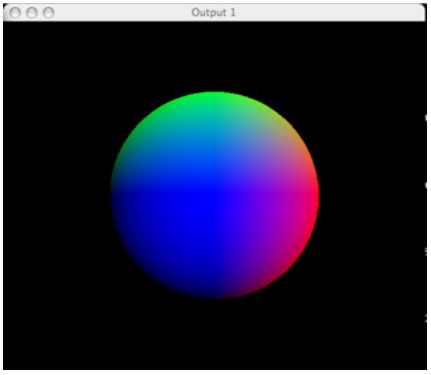
Layer with no visual effect



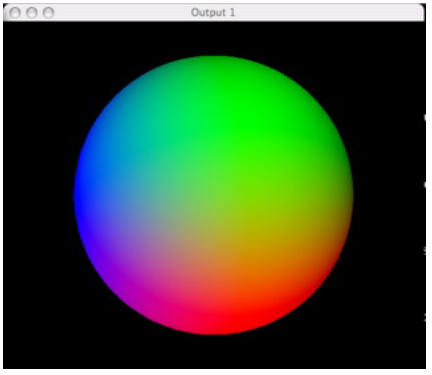
A Layer with its image wrapped around a solid teapot.

120 Colored Sphere

When the Visual Effects parameter is assigned a DMX value of 120, the Layer's content is replaced by a colored sphere. All position parameters can be applied.



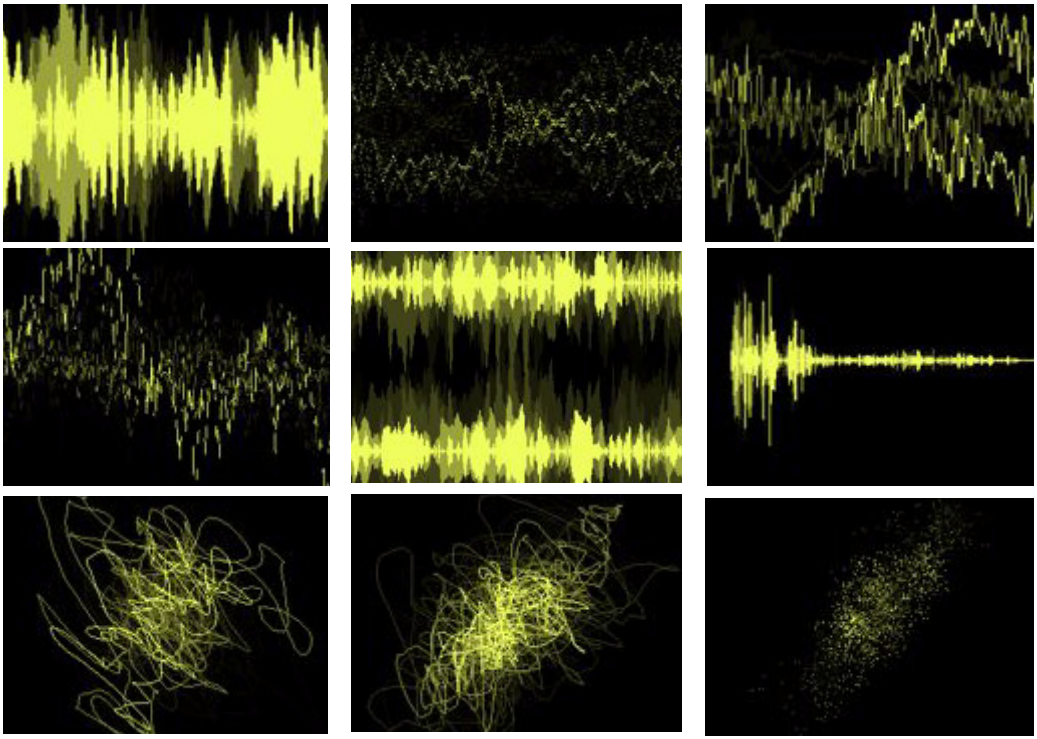
Colored Sphere effect applied to layer



Scale, x, y and z **Rotation** parameters applied to **Colored Sphere** effect.

123 Spectrograph

When the **Visual Effects** parameter is assigned a DMX value of **123**, the Layer's content is replaced with a waveform of the audio input. The **Parameter 1 (FX1)** selects different types of audio waveforms. The **Parameter 2 (FX2)** parameter does not function with this Visual Effect. Waveforms can also be modified by Color, position, scale and aspect ratio parameters.



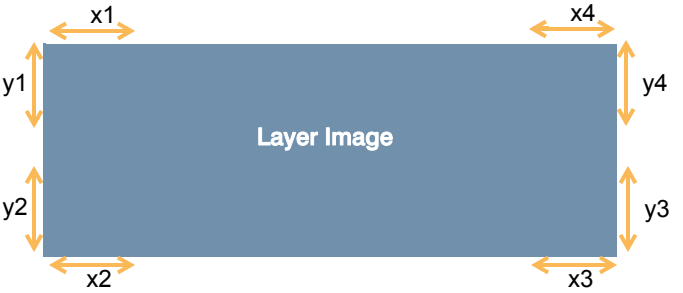
Several Variations of Waveforms are Available in the Spectrograph Parameter.

Chapter 11: Keystone and Shutters

Keystone Correction

The shape of a projected image is affected by the angle of projection. A rectangular image may appear on a wall as a trapezoidal shape. Keystone correction compensates for this effect by allowing adjustments to the geometry of the layer's image.

The eight **Keystone Correction** parameters each adjust one corner of the layer's image horizontally along the X-axis or vertically along the Y-axis.



The suggested default DMX value for each parameter is 128, which equals no geometric correction. Values less than 128 move the selected corner left or up; values greater than 128 move it right or down.

To activate the affects of the **Keystone Correction** parameters, the **Visual Effects** parameter must be assigned to a DMX value of 5 (Keystone 1).

Image with no Keystone correction

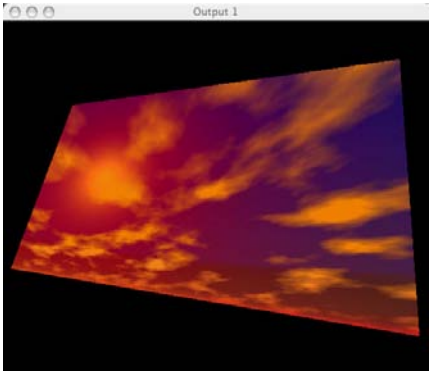


Image with Keystone correction

Shutter Effects

The eight **Keystone Correction** parameters also adjust the shape of shutter effects on a layer.

To activate the shutter affects of the **Keystone Correction** parameters, the **Visual Effects** parameter must be assigned to a DMX value between 60 and 72. A DMX value of 70 (Shuttered Black) is the most commonly used.

When a shutter Visual Effect is activated on a layer, that layer changes to a *shutter only* layer. Any assigned content for the layer will not be displayed. Instead, an adjustable transparent frame is displayed above underlying layers. A shutter Visual Effect will not function on Layer 1.

Once a layer becomes a *shutter only* layer, the **Keystone Correction** parameters can be used to adjust the frame's shape. In addition the **X, Y,** and **Z Rotation, X and Y Position,** and **Scale** parameters modify the appearance of the shutters.

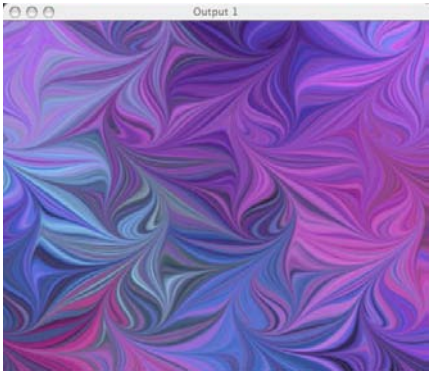
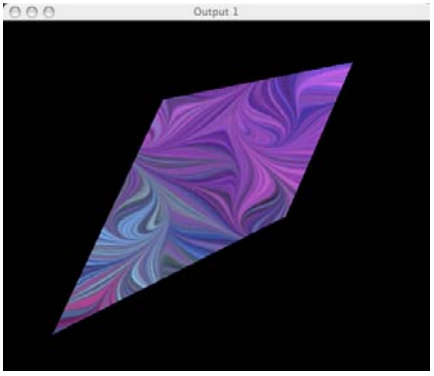


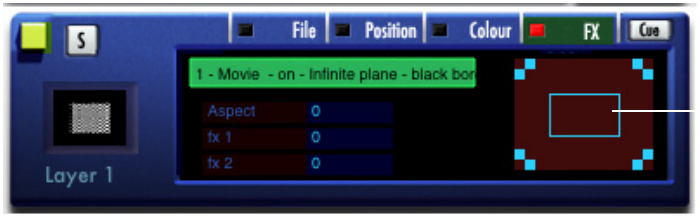
Image on Layer 1



Shutters on Layer 2 overlaying Layer 1

Keystone Correction and Shutter Shape Preview

You can also preview shapes created by the **Keystone Correction** parameters in the Catalyst Control interface window on the PowerMac monitor. This field will display the Keystone correction shape or shutter shape regardless of the active Visual Effect.



Chapter 12:
Art-Net™ Protocol

As an alternative to using standard DMX connections through the CIB, Catalyst Media Servers can receive DMX-512 over an Ethernet network using Art-Net™ protocol. Artnet is an open protocol developed by Artistic Licence to distribute DMX over Ethernet. Catalyst software is compatible with Artnet, and a suitable Artnet DMX Input device can be used to send DMX into Catalyst from a lighting console. Such devices are available from the following manufacturers, amongst others:

- Artistic Licence: Net-Lynx IP http://www.artisticlicence.com
- ELC Lighting: Node 4 http://www.elclighting.com
- ADB: Netport http://www.adb-ttv.be
- LSC Lighting: DNAnet http://www.lsclighting.com.au
- Enttec: DMX Gate Mk II http://www.enttec.com/products.php?display=ethernet

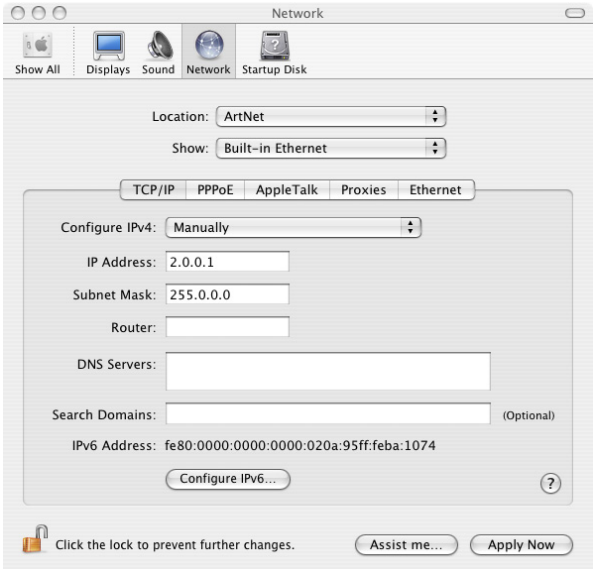
Setting Up the Server for Artnet

Connect your ArtNet device to your Media Server using a Cat 5 ethernet cable. You do not require a cross-over cable. You can also connect multiple Catalyst systems to an Artnet device using a hub/switcher. Be aware that Artnet is 10baseT, and may not work with some Gigabit hub/switchers.

After connecting the ArtNet device, use the following steps to configure the server:

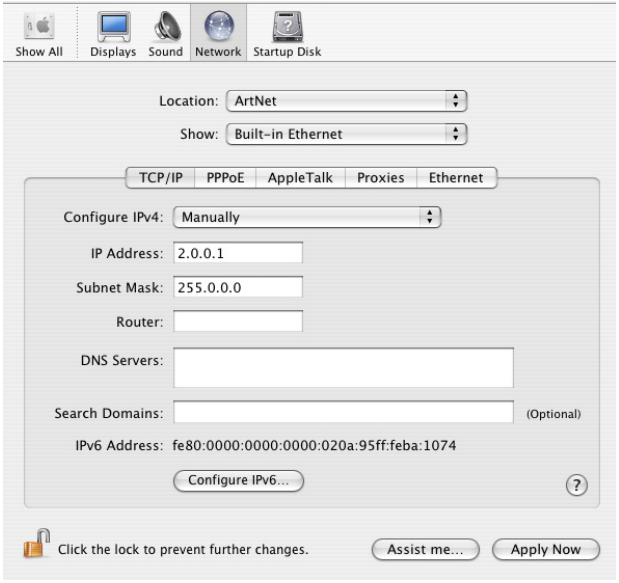
1. Open System Preferences from the Apple Menu and choose Network.
2. Create a new location and call it Artnet, and select Built-In Ethernet in the Show field.
3. Click on the TCP/IP tab to configure the TCP/IP settings.

   It is important to set Configure IPv4 to Manually.



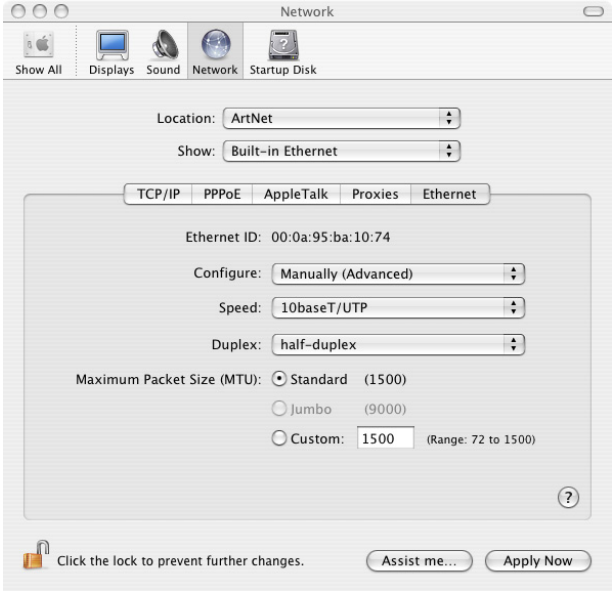
Note: ***Consult your manufacturers instruction manual for the correct IP settings, which may be different to the ones described.***

The default IP address setting is 2.0.0.x, where x is an integer value from 0 - 255. Some ArtNet boxes can use an alternative IP address, which is 10.0.0.x. The Subnet Mask for Artnet is 255.0.0.y, where y is the position of the SubNet switch on your Artnet interface. Generally, this would be set to zero.



Once you have entered your IP and Subnet settings, click the Apply Now button to apply the changes.

Sometimes it may be necessary to configure the network speed. Artnet is a 10base T protocol, and Macintosh computers can support 10base T, 100base T and Gigabit Ethernet.



4. Use the Apply Now button to apply the changes to your Ethernet settings.

Artnet status can be monitored in the ArtNet Diagnostic screen.

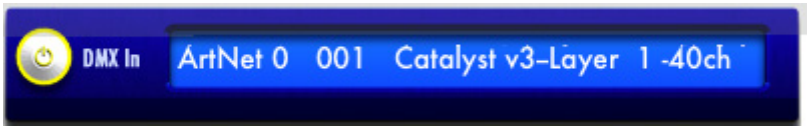
Assigning a DMX In Panel to Art-Net

Assigning Catalyst **DMX In** panels to respond to Art-Net instead of standard DMX is a simple process.

Next to the On/Off button in each DMX In panel is a field used to assign the DMX source.

Click on the field to open a pop up window with available sources. You can then select CIB (when standard DMX is used) or one of ten Art-Net channels.

The DMX panel will display its assigned DMX source:



The number after the ArtNet in DMX In corresponds to the Universe Number. The Universe Number corresponds to the Universe Number on your ArtNet device. If you set ArtNet 0, then your ArtNet device must also be set to Universe Number 0 also.

Chapter 13: Audio

Audio Input

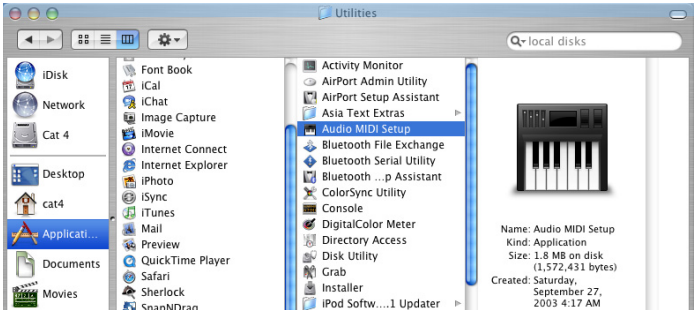
Audio Inputs to the Media server can be displayed on any layer by choosing a **Visual Effects** parameter DMX value of 123. This effect changes the Layer's output to a waveform display of the audio input. The waveform can be manipulated with the Layer's parameters in the same manner as other content played back from the hard drive.

The audio feed is input into the Catalyst Media Server via the PowerMac's audio in connection.

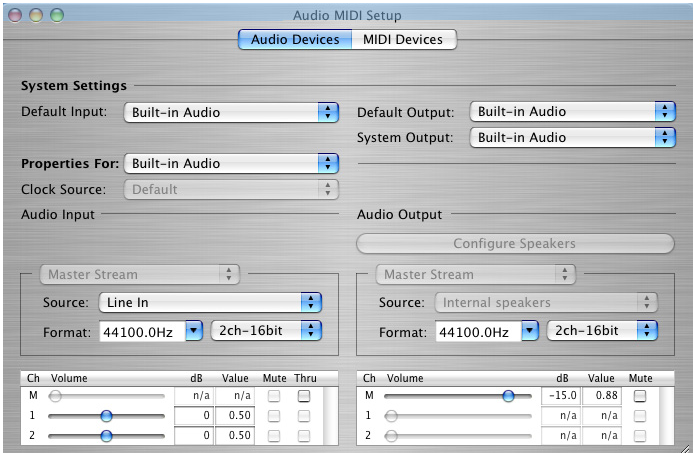
Configuring the Audio Feed

1. On the back of the PowerMac computer, connect your audio feed to the PowerMac's audio input port using a 3.5mm miniphone jack.

2. Quit the application.
3. Using the PowerMac Finder, locate the **Audio MIDI Setup** application in the **Applications>Utilities** folder. Click to open the file.



4. Assign the **Default Input** to **Built-In Audio**.
5. Assign the **Source** to **Line In**
6. Close the Audio MIDI Setup window and launch the Catalyst application.



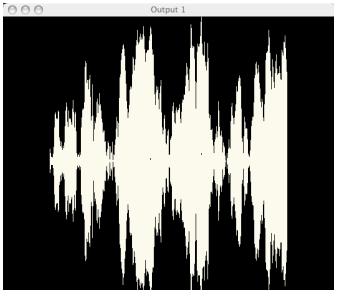
Activating the Audio Input

7. Use the **Audio Input** panel on the Catalyst Control window to activate Audio Input.

Click on the round On/Off button to activate the Video Input panel

When the **Visual Effects** parameter is assigned a DMX value of **123**, the Layer's content is replaced with a waveform of the audio input.

The **Parameter 1 (FX1)** selects different types of audio waveforms. The **Parameter 2 (FX2)** parameter does not function with this Visual Effect.



A Layer displaying an audio input waveform.

Waveform Type Selection

The following chart lists the waveform types available by adjusting the **Parameter 1 (FX1)** parameter:

Waveform Type	DMX Value
Mono Sound Waveform with Solid Outline	0
Mono Sound Envelope with Solid Outline	1
Mono Sound Single Waveform with Solid Outline	2
Mono Sound Single Waveform with Dashed Outline	3
Stereo Sound Dual Envelope with Solid Outline	4
Spectral Analysis by Frequency	5
Phase Vector Scope drawn as Solid Lines	6
Phase Vector Scope drawn as Solid Lines	7
Phase Vector Scope drawn as Dots	8

Audio Output

Audio Playback

In normal video only operation, Catalyst software will ignore audio tracks in a movie. Catalyst software uses video acceleration algorithms to get the best possible performance from the Macintosh computer. When using the audio playback feature, Catalyst software prioritizes the playback of the audio in a movie, over the playback of video. This means that video performance may be affected by the playback of multiple audio and video layers.

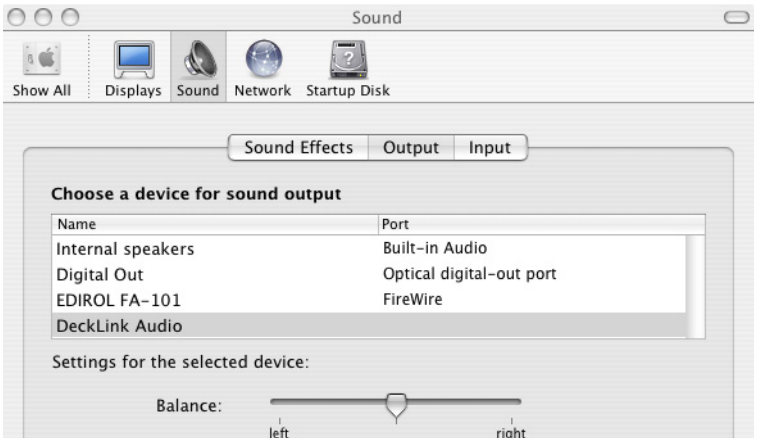
Catalyst uses Mac OS X's Core Audio API, which allows Catalyst to output through a wide variety of PCI, USB or Firewire audio devices.

Each layer in Catalyst has it's own volume control and each volume control is a separately patchable DMX channel. For more information on Playback features, see *Video Playback* on page 45.

Audio Device Set up for Catalyst Audio Output

Setting up an audio device for Catalyst to output to is done within Mac OS X System Preferences.

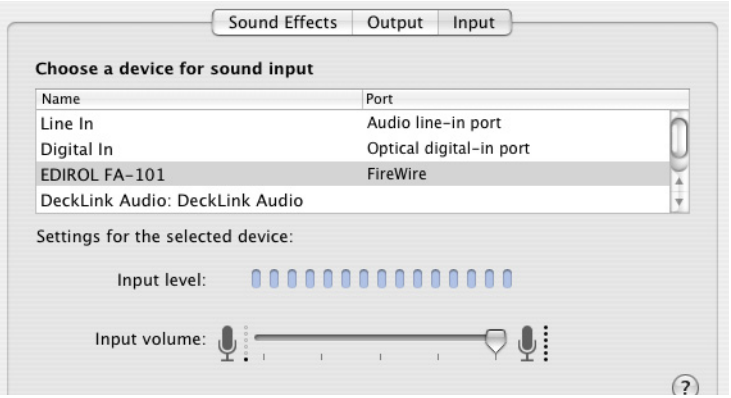
1. Open System Preferences from under the Apple Menu and click on the Sound icon.



2. Click on the Output tab to set up the sound output device. The number of sound outputs available depends on which devices you have installed. A standard G5 Mac has Internal Audio and Digital Audio available. If you

have a video input card like a Blackmagic Decklink Extreme installed, you can use the card to output audio. You can also use other Core Audio compatible audio devices, including Firewire and USB devices.

3. By clicking on the Input tab, you can also configure the Audio Input device for use with the Spectrograph visual effect.



Setting Up DMX with Audio

Each layer has a separate volume control which can be patched as a single DMX channel.

To set up a DMX channel to control a layer volume control, go to the DMX In section of Catalyst Control window.

Playing Back Audio

To playback a movie with it's audio track, select the movie in the usual manner and set the play mode parameter to Play Audio to play the movie and audio track once, or Play Audio Loop to loop the movie and audio track. The audio play modes can be used with Inframe and Outframe parameters.

Audio tracks can also be played back with Presets. Clicking on the Volume box with your mouse allows control of the volume.

Creating Content with Audio Tracks

Quicktime supports a number of large audio codecs. However, for the best audio quality it is advisable to use no compression and a sampling rate of 44.1Khz.

Currently Catalyst does not support mp3 playback.

Chapter 14:
Video Input

Choosing a **Library** parameter DMX value of **255** for any layer switches that layer's content source from the Media Server hard drive to a video feed input. The video feed can then be manipulated with the Layer's parameters in the same manner as content played back from the hard drive.

Connecting the Video Feed

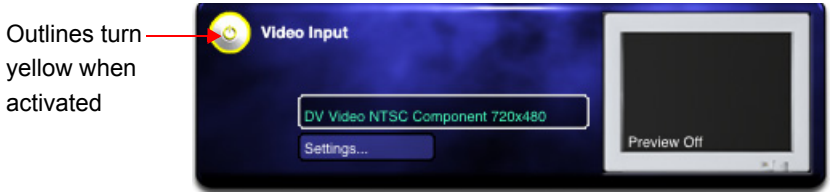
Video feeds are input into the Catalyst Media Server via the PowerMac's FireWire connection or with an optional video input card. The Catalyst Media Server supports a wide variety of video input cards from most major manufacturers. To determine whether the Catalyst Media Server supports a particular card, contact High End Systems customer support.

1. Shutdown the PowerMac computer.
2. On the back of the computer, connect your video feed to a FireWire port or video input card.
3. Reboot the computer and launch the Catalyst application.

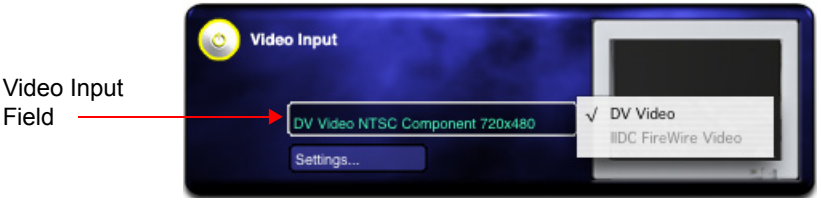
Configuring the Video Input

Use the **Video Input** panel on the Catalyst Control window to configure Video Input.

1. Click on the round On/Off button to activate the Video Input pane.l

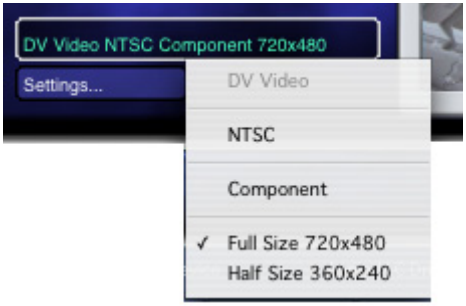


2. Click on the Video Input selection field to select a Video Input device. A popup menu will display any devices found by the Catalyst application.



3. Click on the small monitor icon to toggle on and off a live preview of the Video Input. This preview is for test purposes only and should be switched off during normal Catalyst use.Click on the **Settings...** field to pop up a menu of display options for the Video Input.

4. Choose the desired setting and click to select.



Chapter 15:
Serial Control

The Catalyst Media Server can control peripheral devices such as video switchers or projector shutters through the PowerMac's Universal Serial Bus (USB) ports. Using the RS-232 serial communications protocol, the Catalyst Control window's Custom Serial panel transmits RS-232 control commands to the peripherals as a response to changed DMX values. This feature lets non-DMX controlled devices coordinate automatically with events and images in your show.

Each RS-232-enabled serial device is configured through one DMX In panel in the Catalyst Control window. The serial device then uses one DMX channel for control from a lighting console.

Connecting RS-232 Devices

Many aftermarket companies manufacture USB to Serial devices for use with the PowerMac computer. Typically these devices consist of a USB connector on one end and a DB9 on the other. Contact High End Systems technical support for recommended USB to serial devices.

Connect the RS-232 device's USB plug to the USB port on the PowerMac G5 computer.

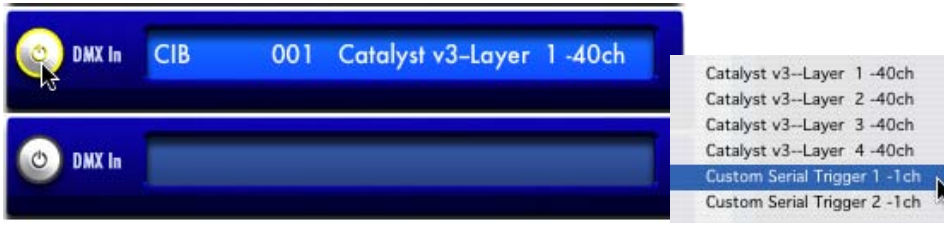
CAUTION!
RS-232 signal strength can degrade sharply over cables longer than 45-50 feet (15 meters). Consult the manufacturer's documentation to determine maximum practical cable length.

Assigning a DMX Channel

1. In an unused **DMX In** panel, click the left button to turn on the panel. The button's center and edge turn from gray to yellow.

2. Click the description of the layer, to the right of the channel number. On the pop-up menu, select **Custom Serial Trigger 1** or **2**. These triggers use the two **Custom Serial**

panels in the Catalyst Control window. Trigger 1 uses the top **Custom Serial** panel. Trigger 2 uses the bottom **Custom Serial** panel.

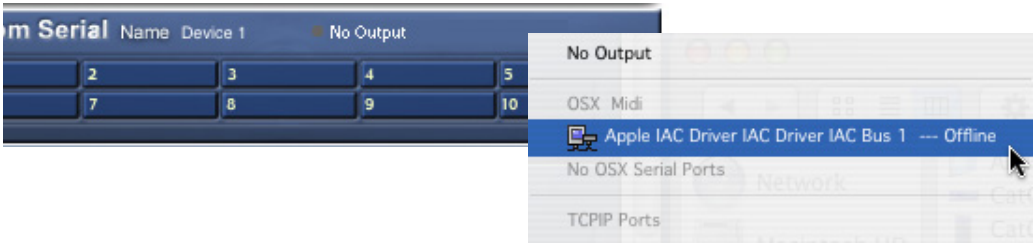


3. Click the field showing the DMX start channel number. Type the value of the channel to assign to the serial device. Each serial device uses one DMX channel.

Assigning the Interface and Data Format

The RS-232 standard specifies several different data drivers for the PowerMac computer. The Media Server can send commands using any of these drivers. Check the USB to Serial device's documentation to determine the driver used by your serial device, then set the interface using this procedure:

1. In the Catalyst Control window's **Custom Serial** panel, click the field labeled **No Output** to bring up a pop-up menu.



2. When an RS-232 device is attached to one of the PowerMac USB ports, its driver appears in this pop-up menu. By default the menu also includes several PowerMac system options:

   OSX Midi. This choice is unavailable. You cannot send RS-232 serial control commands over MIDI.

   Apple IAC Device IAC Driver IAC Bus 1. The Inter-Application Communications driver lets multiple software applications communicate with one another.

OSX Serial Ports. •Any USB to Serial devices plugged into the computer will appear in this menu section.

3. Select the RS-232 driver for the attached serial device. The **No Output** status changes to show the selected serial driver.

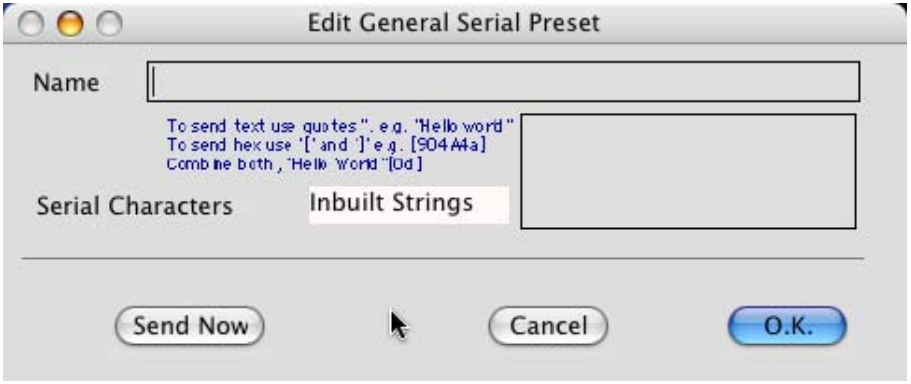
Next, set the serial device's baud rate (transmission speed) and data format (the method the device uses to encode its RS-232 messages). This information should be available in the serial device's documentation; the data format is usually described in terms of *data bits*, *stop bits*, and *parity*.

4. Click the same field you clicked in Step 1 to access the pop-up menu again.
5. Select **OSX Serial Ports.**
6. Select the baud rate and data format used by the attached serial device.

Setting the Serial Commands

Each DMX channel assigned to a serial device can trigger up to 10 strings, based on the DMX values the lighting console sends to the Catalyst Media Server. You can define each string sent to the peripheral device, or customize the sample inbuilt strings that are keyed to specific manufacturers' equipment.

1. In the **Custom Serial** panel, click one of the ten numbered buttons to create a serial command string that will be sent to the peripheral device. The **Edit General Serial Preset** dialog box appears.



2. In the **Name** field, type a description of the string's function or purpose.

3. For the command string itself, you will define your own string command as required by the triggered device. In addition, the Catalyst software includes several pre-defined strings as examples. If you choose a built-in string, you can use it as is, or customize it as needed.

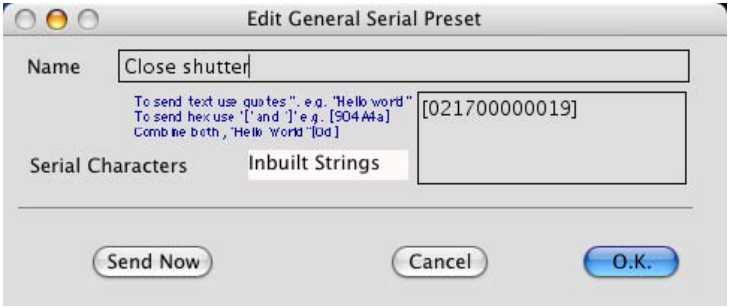
Custom String Command

In the **Serial String** box type the string itself. A string can be text, a hexadecimal value, or a combination of both. Consult the serial controlled device's manual for exact serial strings required.

Text. • Enclose a text string in quotation marks.

Hexadecimal. •Enclose a base-16 hex value in **[brackets]**.

Combination. •Chain together an indefinite numbers of text and hexadecimal strings in the Serial String box.



Sample Strings

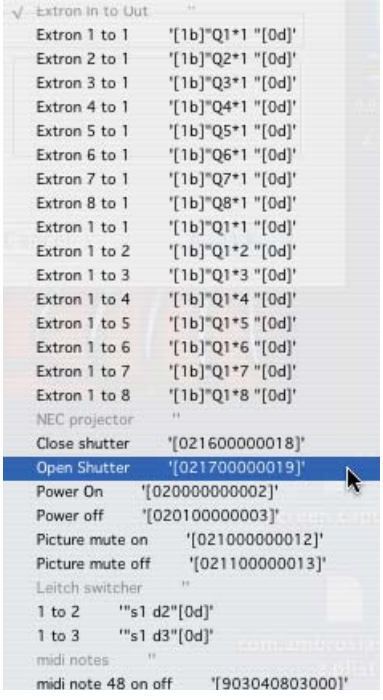
The Catalyst application offers many sample string commands. Click the **Inbuilt Strings** field to open a pop-up menu. From the pop-up menu select a function. The selected string populates the Serial String box.

Note: ***The* Extron *commands refer to video switching equipment made by Extron Electronics.***

The "Open shutter" and "Close shutter," "Power on/off," and "Picture mute on/off" commands work with NEC projectors.

The "1 to 2" and "1 to 3" commands refer to the Leitch video switcher.

The "midi notes" and "midi note 48 on off" commands are used for internal testing only and not available.



4. After defining the desired action, click **Send Now** to test this string on your serial device.
5. Close the **Edit General Serial Preset** window by clicking the **O.K.** button.
6. Repeat with the other **Custom Serial** panel buttons until you have entered all the command strings needed.

Triggering Serial Devices from DMX

When the Media Server receives a DMX channel value allocated to a particular button on the **Custom Serial** panel, the software transmits the associated string to the connected serial device. The Media Server sends the string once each time it receives the associated DMX value.

Serial Button DMX values

Serial Button	DMX Value
OFF	0
1	6
2	31
3	56
4	81
5	106
6	131
7	156
8	181
9	206
10	231

Chapter 16:
MIDI Timecode

Catalyst Media Servers can receive MIDI timecode and a Layer's playback can synchronize to the timecode.

Connecting MIDI Timecode Devices

Many aftermarket companies manufacture USB to MIDI devices for use with the PowerMac computer. Typically these devices consist of a USB connector on one end and a number of MIDI connections on the other. Contact High End Systems technical support for recommended USB to MIDI devices.

Connect the MIDI device's USB plug to the USB port on the PowerMac computer.

Assign the MIDI Device

Click on the **Device** field of the **Midi Time Code Input** panel in the Catalyst Control window. Click on the installed MIDI device to select it.

Synchronizing a Layer with MIDI Timecode

Assign the **Play Mode** parameter of a Layer to a DMX value of 100(Sync to MTC 0hr) to read the current frame from the MIDI device. The Layers content will playback according to the values of the MIDI timecode. Additional **Play Mode** values synchronize to different times. For example, a **Play Mode** parameter value of 101 synchronizes to MTC 1hr and a value of 102 to 2hr.

Chapter 17:
Sony 9-pin RS422

Some versions of Catalyst software include the ability to control video equipment using the Sony 9-pin RS422 editing protocol. Devices using this protocol include Omega video decks, Doremi players, Sony broadcast products, as well as JVC and Panasonic products. Consult your playback device specifications for further information.

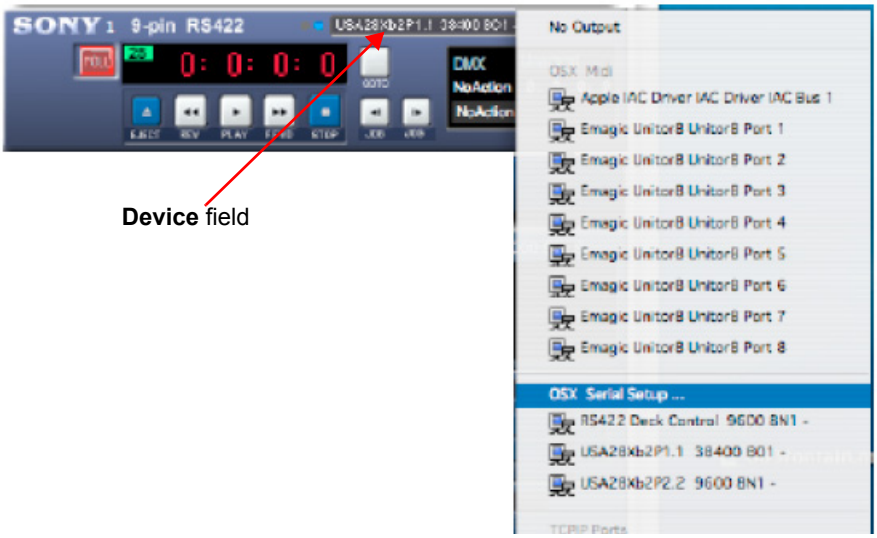
When properly configured. the Catalyst Control window's **Sony 9-pin** panel transmits RS422 control commands to the attached peripherals as a response to changed DMX values. This allows triggering of video playback decks and devices from you lighting controller.

The Sony 9-pin panel.

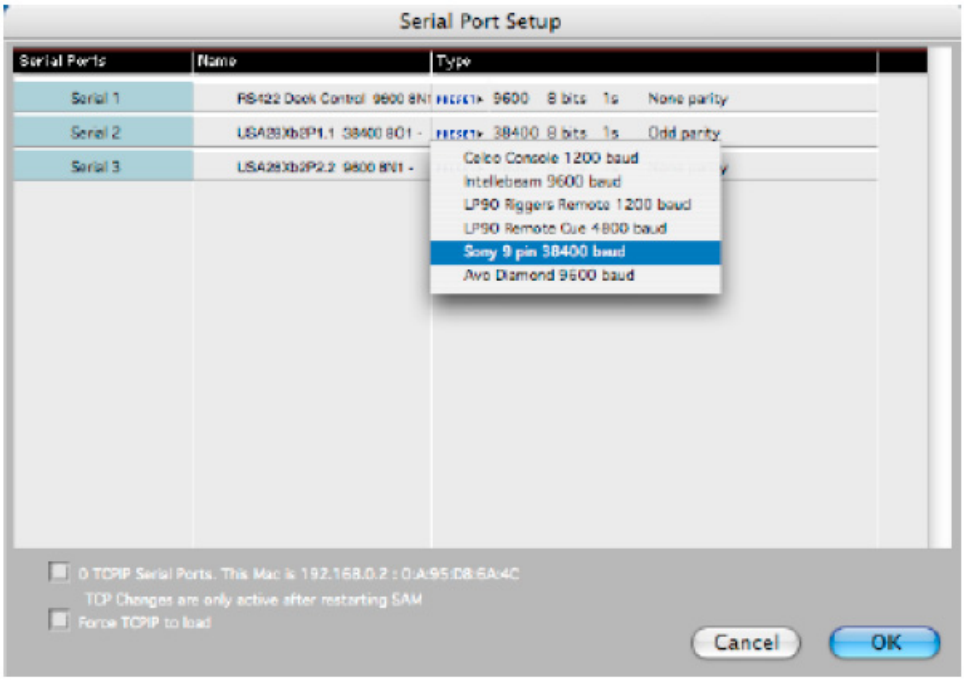
The Sony 9-pin RS422 protocol requires a serial output device for the PowerMac that is capable of transmitting RS422. Alternately an RS-232 to RS422 converter capable of operating at 38400 baud can be used. High End Systems recommends the SXPro Serial Card or the USB Twin Serial Adapter, both manufactured by Keyspan (www.keyspan.com).

Assigning the Interface and Data Format

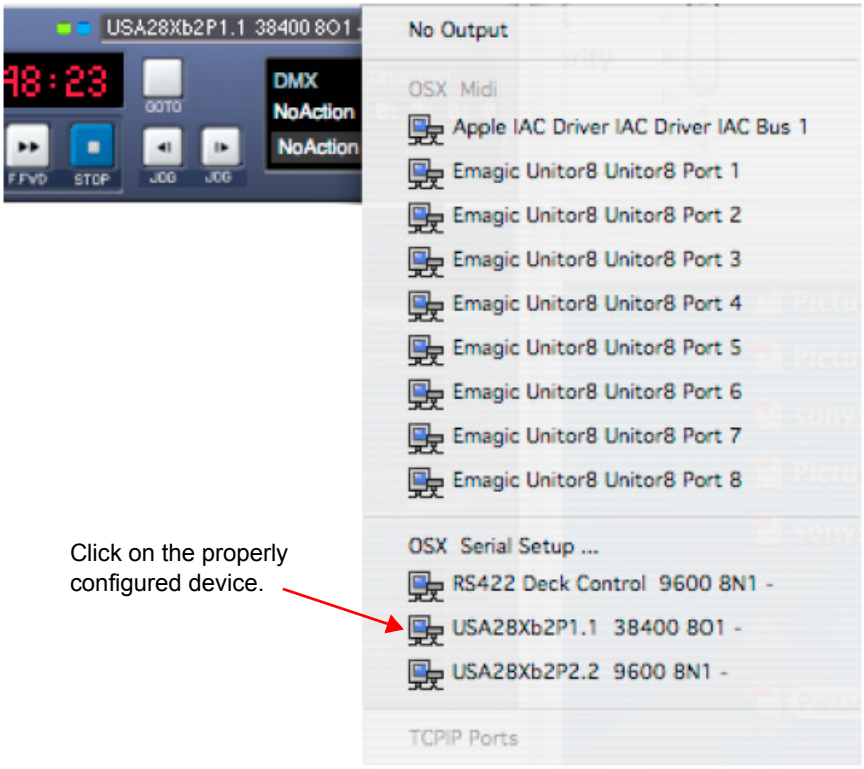
1. Click on the **Device** field to pop up a menu of serial devices:



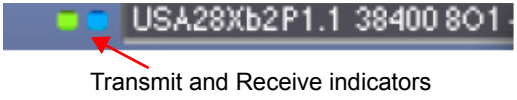
2. Click on **OSX Serial Setup...** to open the **Serial Port Setup** window. Select the **Sony 9pin38400 baud** preset and click **OK** to close the window:



3. Click on the Device field to pop up the menu of devices and click on the properly configured device:



When properly configured and connected, the **Sony 9-pin device** panel displays green and blue transmit and receive lights.

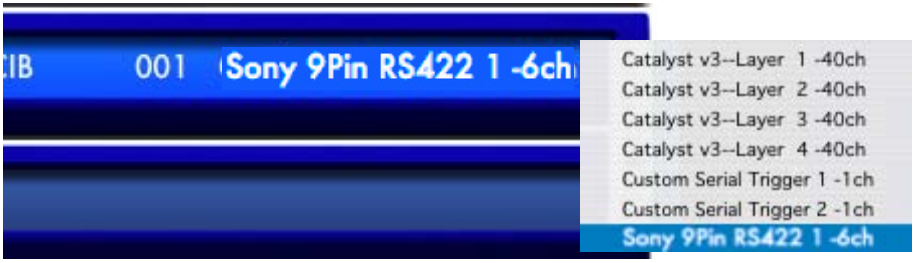


Manual testing of the device is available by clicking on the playback buttons on the **Sony 9-pin device** panel. Timecode from the playback device should also appear on the panel:

Assigning a DMX Value

1. In an unused DMX In panel, click the left button to turn on the panel. The button's center and edge turn from gray to yellow

2. Click the description of the layer, to the right of the channel number. On the pop-up menu, select **Sony 9Pin RS422 1**.



3. Click the field showing the DMX start channel number. Type the value of the DMX start channel to assign to the Sony device. The Sony 9-pin device uses six DMX channels.

Triggering a Sony 9-pin Device from DMX

Using the six DMX channels assigned to the Sony device, first setup a command then trigger that command from your lighting console.

The first channel of the device is the **master enable** channel used for triggering. The second channel is the **command**, and the remaining channels assign the deck position.

The **master enable** channel only transmits commands when the channel is changed from 0 to 255.

Command	DMX Value
no action	0-9
Play	10-19
Pause	20-29
Stop	30-39
Rewind	40-49
Fast Forward	50-59
Cue to time	60-69

The 3rd channel is timecode Hours. The 4th channel is timecode Minutes. The 5th channel is timecode Seconds. The 6th channel is timecode Frames.

Each of the above timecode parameters uses the following DMX protocol:

Time Value	DMX Value
0	0
1	3
2	7
3	11
4	15
5	19
6	23
7	27
8	31
9	35
10	39
11	43
12	47
13	51
14	55

Time Value	DMX Value
15	59
16	63
17	67
18	71
19	75
20	79
21	83
22	87
23	91
24	95
25	99
26	103
27	107
28	111
29	115

Time Value	DMX Value
30	119
31	123
32	127
33	131
34	135
35	139
36	143
37	147
38	151
39	155
40	159
41	163
42	167
43	171
44	175

Time Value	DMX Value
45	179
46	183
47	187
48	191
49	195
50	199
51	203
52	207
53	211
54	215
55	219
56	223
57	227
58	231
59	235

Time Value	DMX Value
60	240

Synchronizing to the Deck's Timecode

Catalyst Media Server layers can be synchronized with timecode sent from Sony 9-pin devices.

Assign the **Play Mode** parameter of a layer to a DMX value of 103(Sync to Sony 1) to read the current frame from the Sony 9-pin device. To assign a negative offset, use the **In Frame** parameter value and for a positive offset use the **Out Frame** parameter value. Syncing ignores the hours setting because a 16 bit DMX value is only able to represent 44 minutes at 25 fps

Example 1

To assign the first frame of a Catalyst Layer's movie to play at a time code of point 0hr 1 min 30 sec 5 frames:

1. Calculate frame offset:
   (1min * 60 * 25) + (30secs * 25) + 5frames = 1500 + 750 + 5 = 2255
2. Set the **In Frame** value to 2255 and **Out Frame** to 0.

When the Play Mode parameter is se t to **Sync to Sony 1** and the deck is played, the Layer's movie should play and stay in sync with the deck.

When the video deck is played or stopped, the Layer's movie will do the same.

Example 2

To sync to something with a timecode of 1hr 45 min 0 sec 0 fr:

Use the **Out Frame** to set a positive offset. To calculate this value, round up to the nearest hour. With the above example, the time code is 15 minutes before timecode 2hr.

So our positive offset is (15min * 60 * 25) = 22500

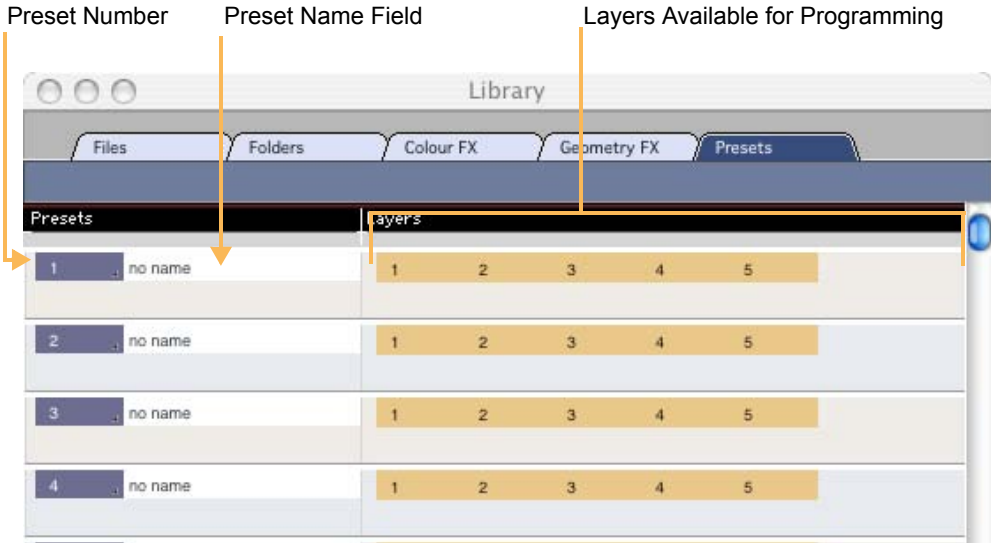
Set the **In Frame** value to 0 and the **Out Frame** value to 22500.

Note: The above examples are calculated with PAL settings of 25fps. When using NTSC 30fps change the frame rate value of the formula from 25 to 30.

Chapter 18: Presets

Presets are lighting console style cues set up within the Catalyst application. Presets are available in Pro, DV and Express versions and can control all layers and every parameter within Catalyst.

The Presets programming screens are located in the Library window. Select **Library** from the **Windows** pull down Menu, and click on the **Presets** tab in the library window.



DMX values for parameters can be set in the layer panels of the Catalyst Control window, in the Presets window, or as a snapshot from DMX. Crossfading and timing are set in the Presets programming tab.

The media server can be programmed with up to 200 Presets, triggered in one of three ways:

- From a console as a single DMX channel
- From the keyboard through Midi Show Control
- From the GUI using a mouse or a suitable touchscreen.

Creating a Preset

Note: Before programming Presets without a DMX desk, check that DMX is turned OFF in the Catalyst Control Window* DMX In *panel for every affected layer.

Catalyst Control Window

Each layer has a panel in the Catalyst Control window with File, Position, Color and FX (Visual effects) tabs. Three mechanisms are used to select and adjust layer settings:

Menu A pop-up menu lets you scroll through the list to the desired file or setting. The library and file selection menus under the File tab, color effects under the Color tab, and FX effect under the FX tab all use menus.

Slider Moving a slider left or right, or up or down, changes the parameters. Intensity adjustments on the Color tab, and all the adjustments on the Position tab, use sliders.

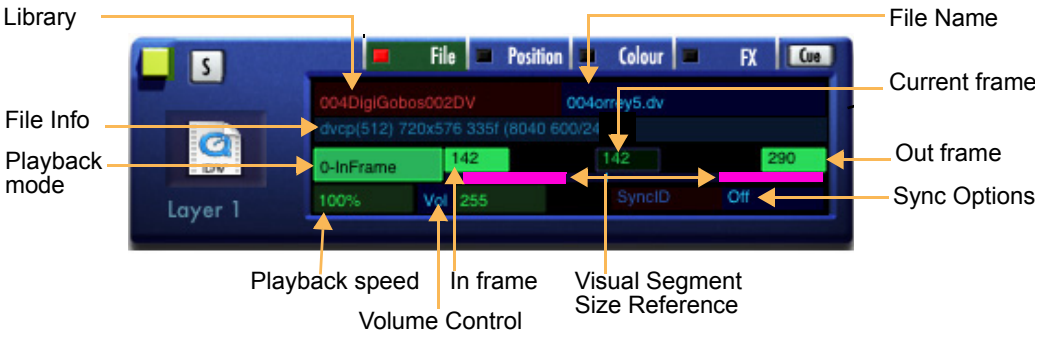
Numerical Slider Where numerical values appear on the screen, such as playback speed under the File tab, or the red, blue and green settings under the Color tab, click the field while holding down the mouse button. Then move the mouse up and down to raise or lower value. The strobe effect under the Color tab also uses this method to select a range of alphanumerical settings.

Editing DMX Values in the Layer Panels

The following sections describing the settings on each of the Layer Panel's tabs used to set DMX values for a Preset. All DMX parameters can be set using the Catalyst Control Window interface. For general information regarding the File Layer components, see *General Layer Panel Information on page 119*.

Note: These values cannot be entered from the keyboard.

File Tab Settings



File tab on Layer panel

Library Select from the drop-down list of available library folders. Note the following special reserved libraries:

- **Library 254** (Use Layer) is reserved for layer functions. See *Referencing Content with the Use Layer* on page 42.
- **Library 255** (Video Input) is reserved for FireWire video input.

File Select a file from the drop-down list of files located in the currently selected Library folder. For more info, see *Libraries and Files* on page 41)

Playback Mode Select a playback option from the pop-up list. Options are described in *Video Playback* on page 43.

Playback Speed This field shows the movie's currently selected playback speed, expressed as a percentage from 0 to 200% (where 100% is the movie's original recording speed). If you move the value below 0%, the movie pauses. If you continue to move it lower, it will default back to 100%. Note that **Pause only affects movie playback**; it does not pause other moving effects, such as strobe or rotation. For more information, see *Playback Speed* on page 45.

Video Segment The **Current Frame** will constantly display the frame that's playing. Use the numerical sliders select the **In Frame** and **Out Frame**, *except* in Random and PlaySine modes. Red bars give a visual cue of the segment boundaries. For more info, see *In Frame and Out Frame* on page 42.

Volume Control Audio volume can be set using this numerical slider from values of 0-255.

Position Tab Settings

The Position tab displays image size and position, and provides previews of advanced positioning features like Smooth and Rotation. Numerical values to the right of the sliders display the precise coordinates of the image. For more detailed information about these parameters, see *Movement and Size* on page 47.

Position Tab

x pos (X Position) Sliders moves the image right and left along the X axis.

y pos (Y Position) Slider moves the image up and down along the Y axis.

Scale Increases or decreases the size of the image. Moving the slider left shrinks the image, while moving the slider right expands it.

Z Rot (Z Rotation) Rotates the image onscreen around the Z axis (like the hands on a clock). Moving the slider left rotates the image counterclockwise; moving it right rotates it clockwise. Moving the slider left past -720, or right past 720, sets the image rotating freely. The further you move the slider in either direction, the faster the image rotates.

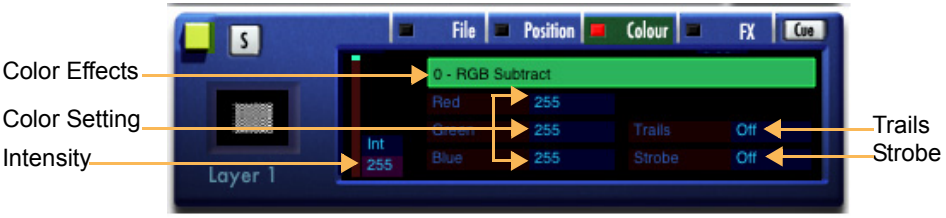
X Rot (X Rotation) Rotates the image around the horizontal (X) axis. If the image is a three-dimensional object, moving the slider to the left rotates the top of the image away from you, while moving the slider to the right rotates the image's top toward you. Moving the slider left above -720, or right past 720, sets the image rotating freely. The further you move the slider in either direction, the faster the image rotates.

Y Rot (Y Rotation) Rotates the image to the left or right around the vertical (Y) axis. If the image is a three-dimensional object, moving the slider to the left rotates the image left (that is, brings the right edge toward you); moving the slider to the right rotates the image right, bringing its left edge toward you. Moving the slider left past -720, or right past 720, sets the image free rotating around the Y axis. The further you move the slider in either direction, the more rapidly the image rotates.

Smooth DMX communication of image position changes can develop latency under high loads, resulting in choppy images, especially for slower moves. Smooth lets you specify exact transition speeds, resulting in smoother images on the screen. The Smooth numerical slider allows you to set a smooth transition from 0-255—the higher the value, the slower the transition.

Color Tab Settings

The Color Tab displays color settings for the selected image. For more information on these parameters, see *Chapter 8: Intensity and Color* on page 55 and *Chapter 9: Strobing and Trails* on page 89.



Color Tab

The following Color tab options are available:

Color Effects This menu displays the name of the color effect currently applied to the image. For a full description of all color effects and their transparency settings, see.

Intensity A slider field displays intensity from 255 (100%) to 0 (off). Intensity slider adjusts transparency settings.

Red Slider that displays the intensity of the red channel, from 255 (100%) to 0 (off). To turn the image all red, set the Red channel to 255 and the Green and Blue fields to 0.

Green Same as the Red slider, but for the green channel.

Blue Same as the Red slider, but for the blue channel.

Trails This effect leaves trails (persistent afterimages with increasing duration) when the selected image moves. Values range from 0 (no trails) to 255 (very long trails). Note that this effect only shows up in the main preview window, not the individual layer preview windows, and may not be visible in certain circumstances, such as when the image is full-screen. **Trails can only be applied to Layer 1.**

Strobe An effect that causes the image to pulse on and off, as though lit from a strobe light. For a description of strobe options.

FX Tab Settings

The FX tab lets you preview geometric (visual) effects applied to the image and adjust aspect ratio and keystone correction.

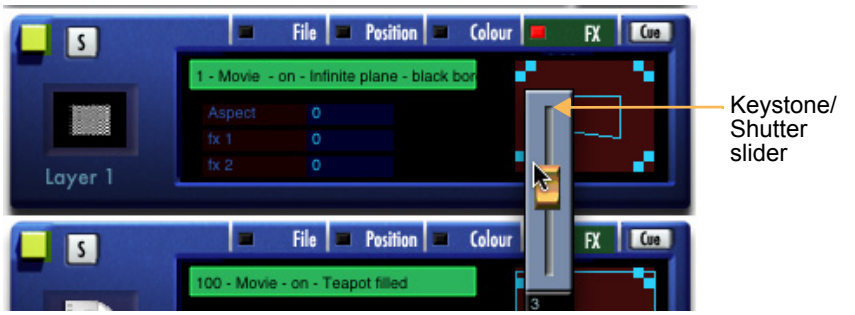
FX tab on Layer panel

Visual Effects These selections are made from the pop-up menu. For a complete description of visual effects, see Visual Effects on page 4.

FX Sliders These three numerical sliders vary in function with the effect selected.

Keystone Correction Keystone correction adjusts the image to compensate for geometric or angular distortion in beam projections. The box displays the current shape of the image, and the eight sliders (two for each corner) let you preview keystone corrections.

The inner box for each corner moves the shape of the image horizontally. Moving the mouse up stretches the corner to the left; moving the mouse down stretches the corner to the right. The outer box for each corner adjusts the image vertically. Moving the mouse up stretches the corner up; moving it down stretches it down.



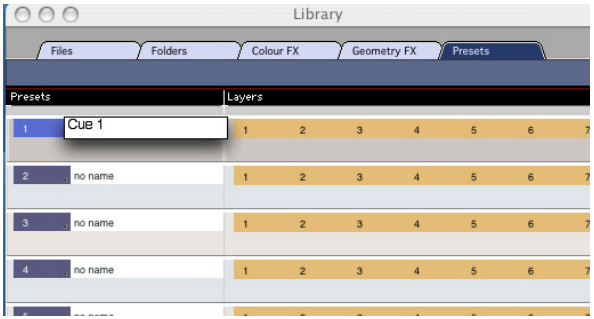
FX tab showing keystone slider

The keystone sliders also set the shape of shutters used in shutter effects, described in *Shutter Effects* beginning on *page* 111.

Setting DMX Values in the Library Preset Tab

To adjust the parameter value from within the LIbrary Window Preset window, click and hold on the value, moving the mouse either up or down to increase or decrease the value. Another option is to click and hold the mouse on the value and use the cursor keys to adjust the value.

Naming the Preset



To assign a preset name:

1. Open the Library window and select the preset tab.
2. Scroll through to pick the preset you wish to program.
3. Click on **no name** next to the Preset number and type the name.
4. Press Enter to store the Preset name.

Editing a Preset

1. Click on a layer to open the Edit Preset window.
2. Click on the Layer Tabs to select the relevant layer.
3. Click the Snapshot button to view the current DMX value information for that layer. If a value hasn't been edited in the Catalyst Control Window, the Default DMX value for that parameter will be displayed.
4. Use the scroll bar to scroll through the parameters of the layer.
5. Click on the command to add or modify a value for an individual parameter.

Storing a Preset

After selecting and manipulating content on layers, use the Command Options to store the preset.

Load and Run Preset ctrl +<preset number> This tells you how to trigger the preset from the Mac keyboard.

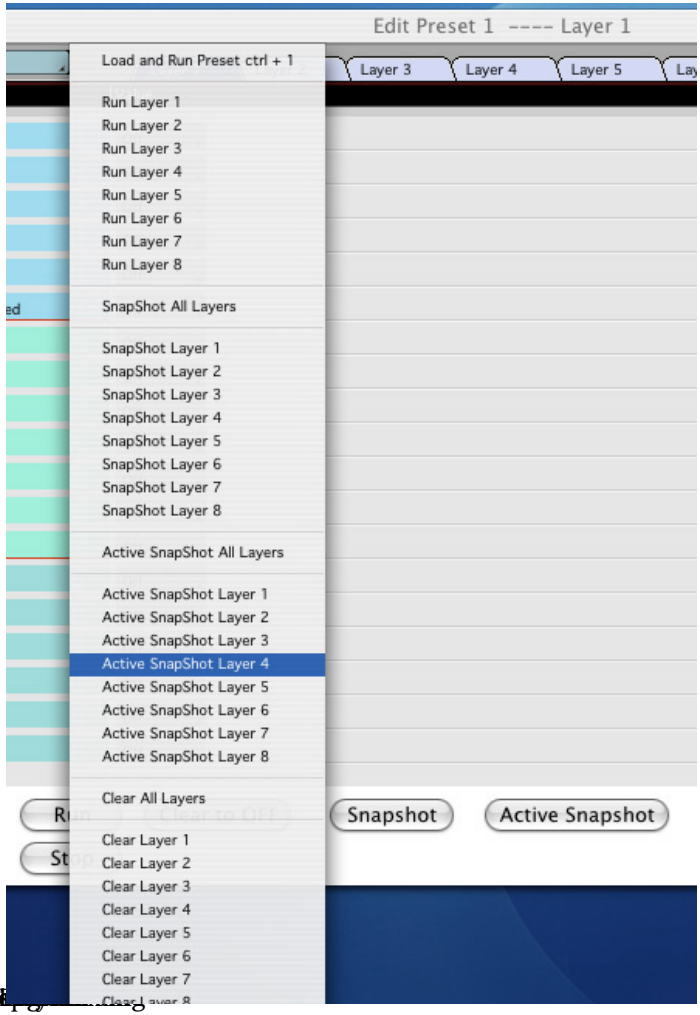
Run Layer <layer number> This runs the information recorded into the preset on a specific layer.

Snapshot All Layers This will snapshot information for all the layers from the Catalyst Application

Active Snapshot All Layers <N/A>

Active Snapshot Layer <layer number> <N/A>

Clear All Layers This clears all selections and programming from all available layers and returns the parameters back to their default values.



Clear Layer <layer number> and returns the parameters back to their default values.

Clicking on the Layer Tabs select the relevant layer. After selecting the layer, click the **Snapshot** button to Snapshot information into the preset window.

Use the scroll bar to scroll through the parameters of the layer.

Preset Window Buttons

The Preset Editor window also features buttons at the bottom of the window:

Run This runs the currently selected layer.

Snapshot This snapshots the currently selected layer.

Clear To Off This clears all programming from the currently selected layer and sets the parameters back to their default values.

Active Snapshot <N/A>

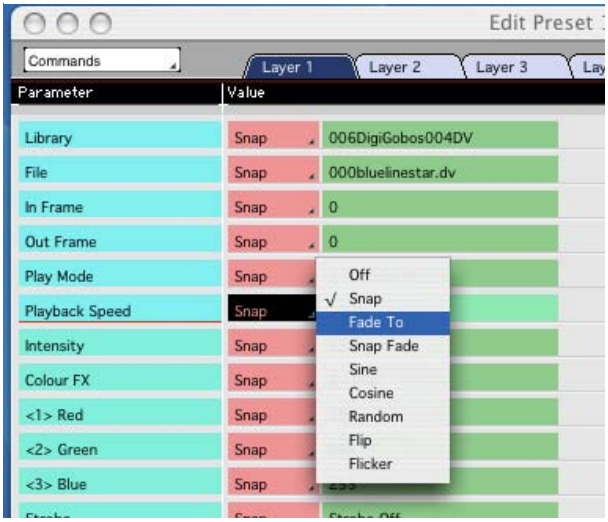
Stop <N/A>

Cancel Cancels any programming changes

OK Accepts programming changes.

Setting Crossfade Path and Fade Time

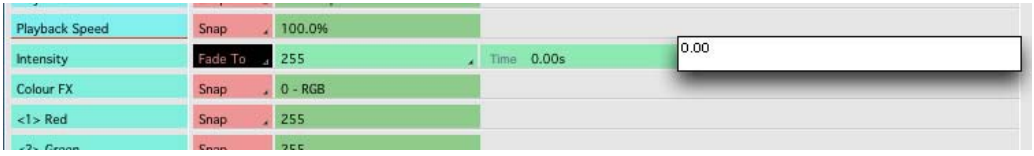
After setting values for a layer's parameters, crossfade path and fade time can be set for each relevant parameter. You can also adjust programming from this screen too. A crossfade path determines how a parameter fades from one value to another, and a fade time determines how quickly a parameter fades from one value to another. By default Catalyst will snap parameters, with a zero second fade time.



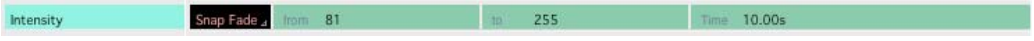
To set a crossfade path, click on the pink path box in the value column for the parameter you wish to adjust.

Snap Will snap the value - i.e. the value of the parameter will fade from one value to the desired value in zero seconds.

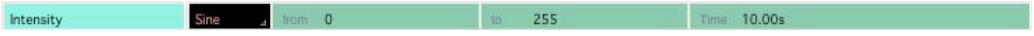
Fade To This will allow a fade time to be used with this parameter.



Click on the Time box to enter in a fade time. Hit enter when you have finished typing in the fade time.



Snap Fade This snaps the parameter into a set value and then fades to another value.



Sine This applies a sine wave between two set values

Cosine This applies a cosine wave between a maximum and minimum value.

Random This randomizes the parameter value between two points

Flip This flips between two values.

Flicker Applies a flicker to a parameter value

Triggering Presets

Presents can be triggered from the keyboard, by using a mouse or touchscreen, using a single DMX channel or by using Midi Show Control.

Triggering with a Keyboard, Mouse or Touchscreen

Triggering Presets with a keyboard, mouse or a touchscreen requires the same approach.

Go to full screen and hit the appropriate key to bring up the diagnostic screens – see 'Diagnostic Screens' for more details. Page forwards through the diagnostic screens until you reach Presets Screen.

This screen shows how the presets are mapped to the keyboard. Each preset can also be clicked on with the mouse, or if you have a suitable Mac compatible touchscreen, you can touch the relevant preset.

Each preset shows which layers that effects:

You can trigger presets from the keyboard by holding down Control and pressing the appropriate key. The first 40 presets are mapped to keys on the keyboard. See below for a keyboard map.

Preset Keyboard Mapping (UK and US Keyboards)

Preset 1	1	Preset 11	Q	Preset 21	A	Preset 31	Z
Preset 2	2	Preset 12	W	Preset 22	S	Preset 32	X
Preset 3	3	Preset 13	E	Preset 23	D	Preset 33	C
Preset 4	4	Preset 14	R	Preset 24	F	Preset 34	V
Preset 5	5	Preset 15	T	Preset 25	G	Preset 35	B
Preset 6	6	Preset 16	Y	Preset 26	H	Preset 36	N
Preset 7	7	Preset 17	U	Preset 27	J	Preset 37	M
Preset 8	8	Preset 18	I	Preset 28	K	Preset 38	,
Preset 9	9	Preset 19	O	Preset 29	L	Preset 39	.
Preset 10	0	Preset 20	P	Preset 30	;	Preset 40	/

Triggering Presets with a Single DMX Channel

Once you have set up your presets, you can trigger these with a single DMX channel from a lighting controller. DMX decimal values 1-4 are designated as idle. So the formula for determining a DMX value for a preset is the preset number + 4. For example, Preset 1 is mapped to DMX value 5 and preset 200 is mapped to DMX value 205.

To trigger Catalyst with a single DMX channel, the DMX input section must be set to DMX Trigger, patched to an appropriate DMX address.

Triggering Presets with Midi Show Control

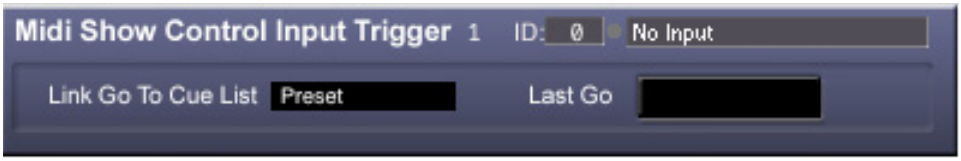
Midi Show Control (MSC) is a System Exclusive subset of the Midi Specification.

A detailed description of Midi Show Control is beyond the scope of this manual. Detailed descriptions of the Midi Show Control protocol are available from the Midi Manufacturer's Association (http://www.midi.org), or in John Huntington's *Control Systems for Live Entertainment*, Focal Press, ISBN 0240803485, published 2000.

Different control platforms, particularly lighting desks, implement Midi Show Control in different ways. Catalyst allows any platform that supports Midi Show Control to trigger presets. Please see your control platform documentation to further details on how Midi Show Control has been implemented.

Wholehog II OS (Echelon, Jands Hog, Hog 500, Hog 1000 and Wholehog II), and Wholehog III OS (iPC, Hog III PC, Wholehog III) send cue and cuelist information in Midi Show Control strings sent from these consoles.

To set up Catalyst to use Midi Show Control, open the Catalyst Control window and scroll down to the Midi Show Control Section:



Click on No Input to select a suitable Midi device. If a suitable device driver is installed on the system, Catalyst will be able to use it.

Once you have selected a suitable device, you will need to set a Midi Show Control device ID. Click on the box next to ID to do this. You will need to send this ID in the MSC string to trigger presets. MSC controllers, and many lighting controllers allow you to set the device ID.

Note: Make sure the device sending the MSC commands is sending the correct device ID.

Chapter 19: Custom Content

The preloaded Catalyst Media Server content includes hundreds of still images and movie files. You can also easily install your own files.

Content Requirements

The Media Server software supports all file formats supported by Apple Quicktime—Quicktime itself, many other video codecs such as DV camcorder, and every major image file format. A complete list of supported formats is on Apple's Web site at **http://www.apple.com/quicktime/products/qt/specifications.html.**

Maximum Image Size

Maximum image size for content files is 2048x2048 pixels. The Media Server will not load an image that measures more than 2048 pixels in either height or width.

Interlaced Images

For best display results, use only non-interlaced images with the Catalyst software. Interlaced images can show visible scan lines.

Interlaced image

De-interlaced image

When preparing content for the Catalyst Media Server, render interlaced images and movies using de-interlacing.

Rendering Content

The Basics of Content Creation

1. Start with the highest quality source content possible. This gives you more options later, such as when you are color or gamma correcting the file, or scaling it for a different sized output, or other manipulation options.
2. Master to high quality source rather that directly out of the compositing application, or a 3D program. Instead, render out to an uncompressed DM (Digital Master file). Or, if space is a concern, to a very high quality QuickTime PhotoJPEG file, with the quality at 95-98% (Control click 'n drag to get it that high on Mac, Alt click 'n drag on PC).
3. Use Batch Capable Tools When Possible. Whenever you have a group of files to work with, use a tool capable of batch processing the results. Discreet's Cleaner or Apple's Compressor are good choices. For single files, QuickTime Player Pro works well. You just can't batch or save settings for future use.
4. Know Where You're Going Beforehand. Know what you're planning on doing with the footage, and plan accordingly. If you know it's going to be a DV file, for instance, avoid strongly saturated colors. If you're destined for video output, avoid fine horizontal lines and broadcast illegal colors. If you're going to DVD, don't work with 720x486 footage unless you know how you're going to crop it.

Recommended CODECs

DV & PhotoJPEG are recommended as the best codecs for developing Catalyst content.

QuickTime DV codec plays back best under heavy load and is highly recommended if you want to play several movies concurrently. Apple has coded it to use dual processors at the same time for each movie, so it scales well.

If you are NOT trying to play the maximum number of movies at the same time, try the PhotoJPEG codec at medium (50%) quality. These movies tend to look better than the DV files, but are more processor intensive than DV, and are NOT coded to use dual processors for each movie (the code isn't multi-threaded and multi-processor).

If image quality is of paramount importance, try PhotoJPEG first and see if it will play back as many movies simultaneously as you need. If it works at medium (50%) quality, try bumping up the quality until you find the highest level that can be recompressed.

TIP: Since the PhotoJPEG compressor cannot set a fixed data rate, each movie compressed with the PhotoJPEG codec will have a different file size. It can even have different data rates within the same movie. So test your files, let the entire movie play back in case one part has a higher data rate than another, and make no assumptions about what will work without testing it.

DV ALWAYS has the same data rate, and our tests indicate that one DV file plays back as well as any other, so it is much more predictable than PhotoJPEG.

Other QuickTime codecs can be recommended in specific applications

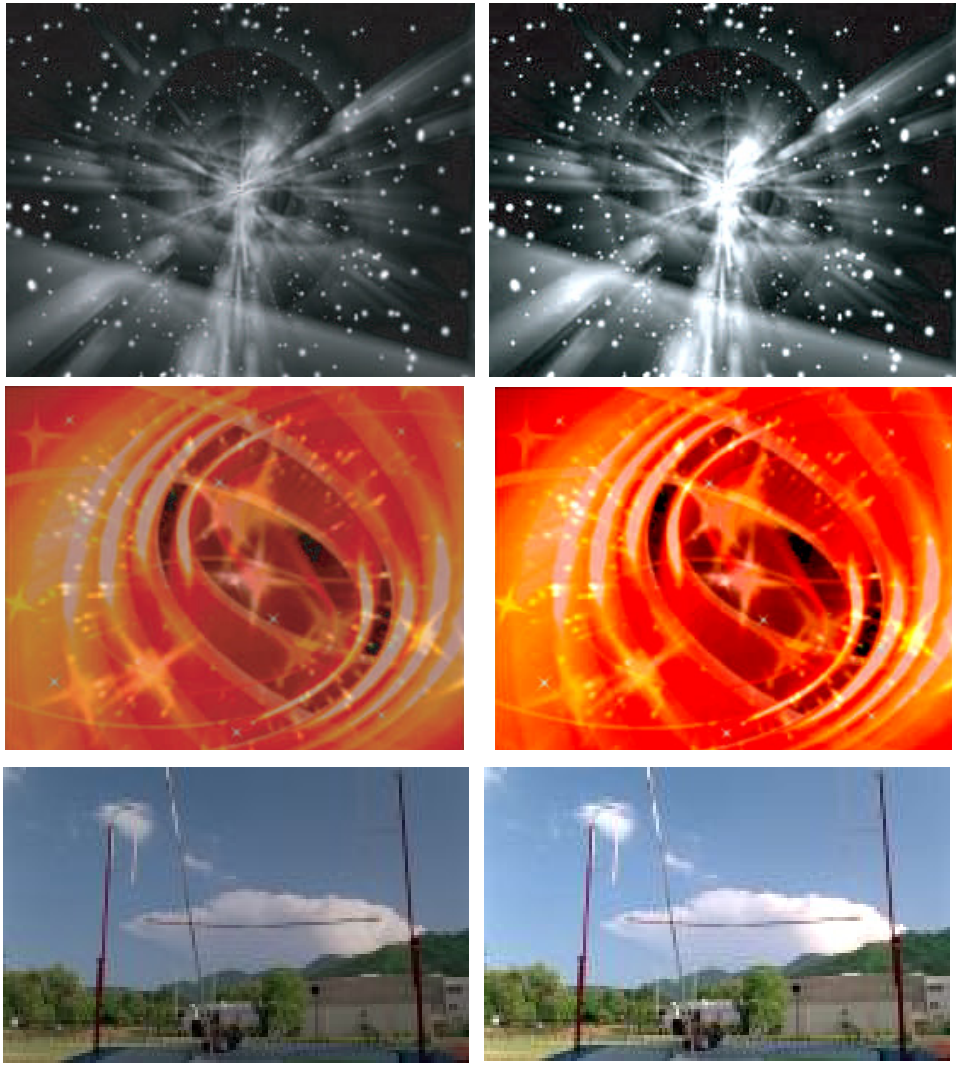
CODEC	Recommended Use	Pro	Cons
DV-PAL	PAL TV bound footage or anything that requires a 720x576, 25 fps movie.	Plays back very well, even multiple movies simultaneously.	Heavy compression, doesn't handle strongly saturated colors well Heavy color downsampling (strong reds look bad, for instance). It cannot be used with any other pixel size and frame rate.
DV/DVCPRO-NTSC	NTSC TV bound footage or anything that requires a 720x480, 29.97 fps movie	Same as DV-PAL	Same as DV-PAL
DVCPRO50-NTSC		Better color sampling (4:2:2 rather than 4:1:1) Twice the data rate for better images	Worse playback than DV-NTSC and PhotoJPEG. It cannot be used with any other pixel size and frame rate.
DVCPRO50-PAL		Same as DVCPRO50-NTSC	Same as DVCPRO50-NTSC
Motion JPEG A and Motion JPEG B:		Playback is acceptable Only option other than DV that can handle fields (interlaced material) when properly configured. Can use arbitrary frame sizes and frame rates.	
Photo JPEG	Single layer playback	Adequate between 50 and 80% quality	

Perceived Brightness

How an image is rendered can greatly influence the perceived brightness of a projected image. By rendering content for light output, the performance of the output device can be dramatically improved. Optimization for DL1 projection of the following content samples were accomplished by:

1) Applying gain to the RGB values of the original content

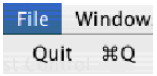
2) Applying an offset to the RGB values of the original content.



Installing Libraries and Files

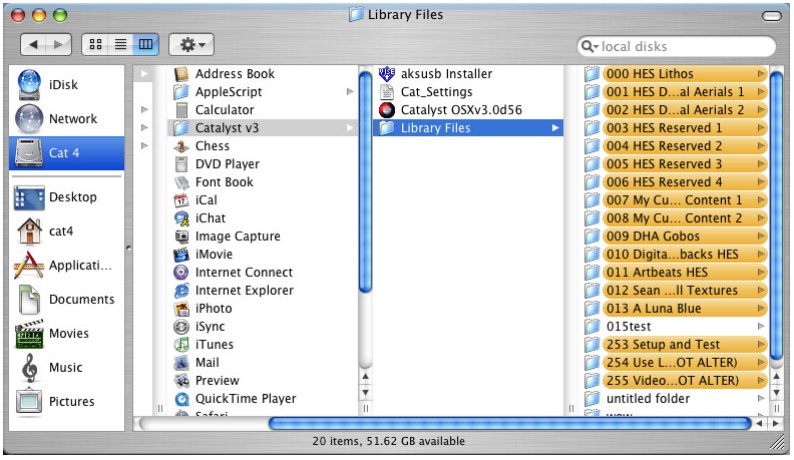
Content can be added to the Catalyst Media Server from internal and external hard drives, CD-Roms and DVD-roms, as well as over an Ethernet network. The process consists of placing properly named and formatted files within correctly named folders.

Creating a New Library Folder

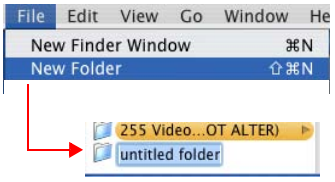


1. Quit the Catalyst application by selecting **File>Quit** on the menu bar.

2. Double-click the **Macintosh HD** icon on the desktop of the PowerMac G5. The Finder screen launches, displaying the directories and files on the root folder of the Catalyst Media Server.
3. Browse to **Applications>Catalyst v3>Library Files**. A new window opens showing the Library folders currently in the **Library Files** folder. Each folder with a name that starts with a three-digit number between 000 and 255, is a valid Catalyst Library folder accessible from DMX using the **Library** parameter.



4. With the **Library Files** folder selected, click **File>New Folder** on the menu bar at the top of the screen.



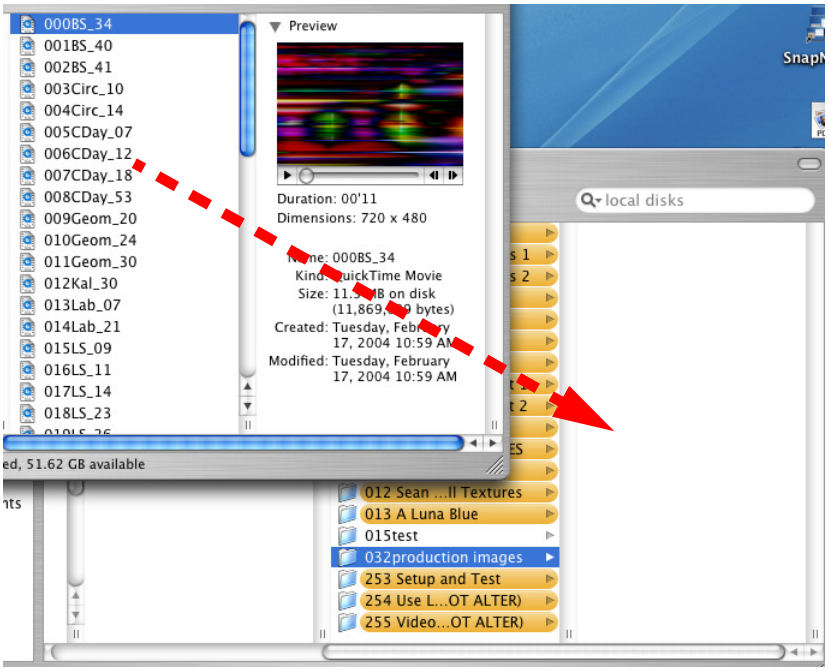
5. Type a name for a new Library folder. **The folder name must begin with the number of a non-existent Library folder in the ### format (000-253).**

   When naming folders ensure no existing folders share the same three digit number. In addition, folders 254 and 255 are reserved and cannot be used for content.

Adding New Files to a Library Folder

1. Double click on the newly created folder to open it.

2. From the Finder menu at the top of the screen, select **File > New Finder Window.** A new Finder window is displayed.
3. Browse to the drive and folder that holds your new file(s).
4. Select the file(s) you wish to add to your newly created Library folder.



5. Drag the new file(s) from the first folder into the desired Library folder.
6. Confirm all files are named so that the name begins with the ### format (000-255). For example, “051SeascapeBlue.”

   When adding content to folders with existing content, ensure no image files share the same three digit number.

7. Restart the Catalyst application by clicking the Catalyst icon in the Dock at the bottom of the monitor screen.
8. When Catalyst starts, the new Folders and Files are accessible from DMX using the **Library** and **File** parameters.

Chapter 20: Diagnostic Displays

The Catalyst Media Server offers twelve diagnostic displays accessible from keyboard hotkeys.

Hotkeys

The following keyboard shortcuts provide quick access and manipulation of the diagnostic displays:

Hotkey	Output	Action
Q	1	Exits diagnostic display mode
W	1	Enters diagnostic display mode
E	1	Scrolls forward through diagnostic displays
R	1	Scrolls backward through diagnostic displays
A	1	Full screen on
S	1	Full screen off
Z	2	Exits diagnostic display mode
X	2	Enters diagnostic display mode
C	2	Scrolls forward through diagnostic displays
V	2	Scrolls backward through diagnostic displays

Displays

Catalyst Version

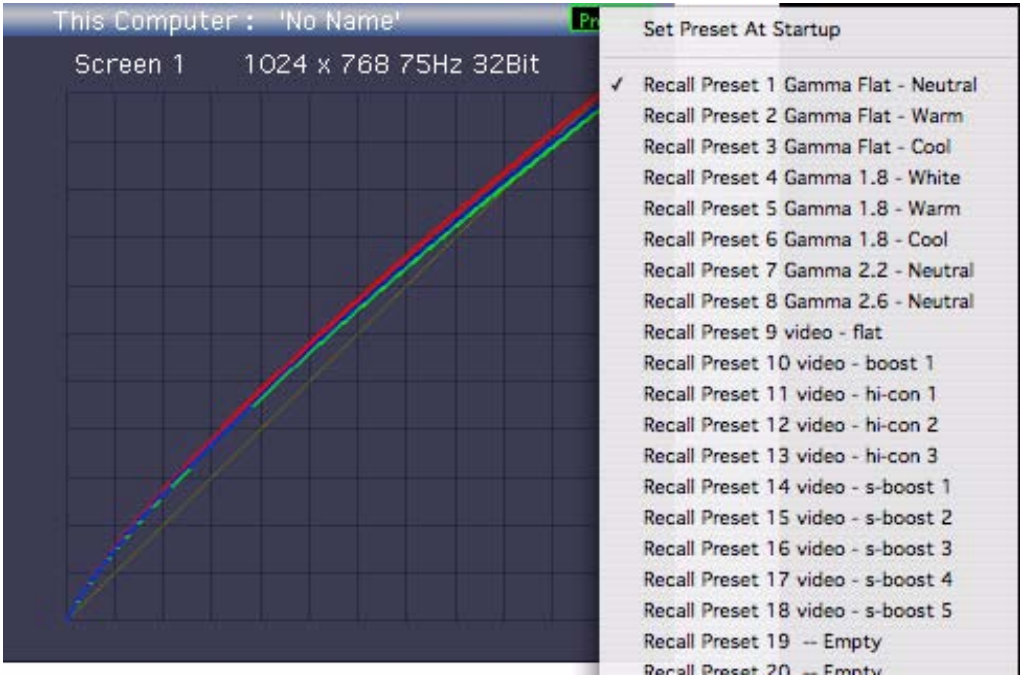
This screen displays the following information about the system:

- Software version name
- Build date
- Operating system and processor information
- Quicktime version
- Video card manufacturer
- Video card version
- Uptime (elapsed since the program was launched)

This Computer

This screen displays the assigned name of the Catalyst Media Server, the Output on which the information is being displayed, and the resolution of that Output. It also shows the current gamma transfer function across both displays. Use this to verify that all displays are using the same output gamma when overlap is critical

Selecting Preset lists a number of Color Profiles that can be used to adjust content brightness perception.

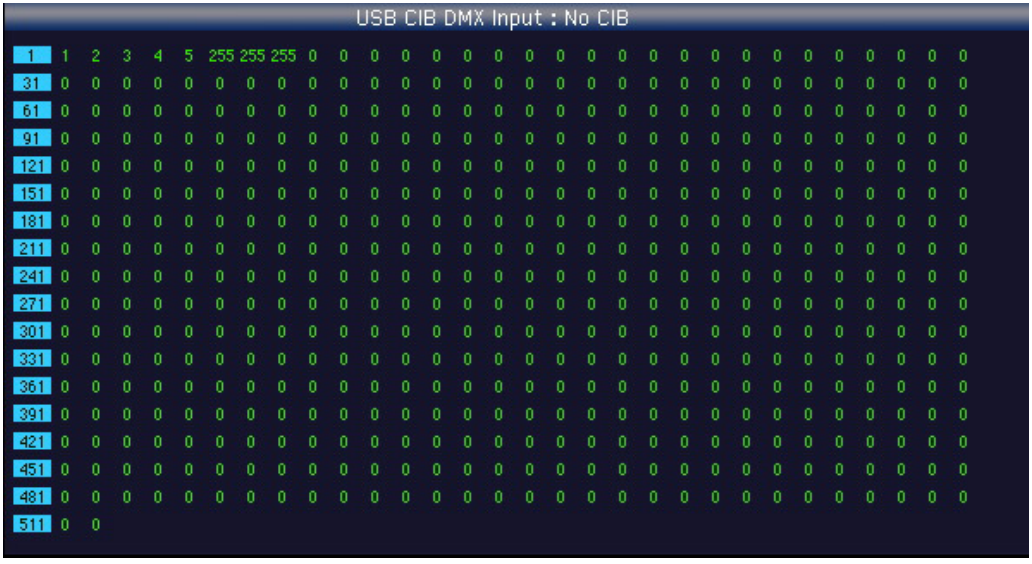


DMX Input Channels

This screen displays DMX values for the parameters of each activated DMX In panel.

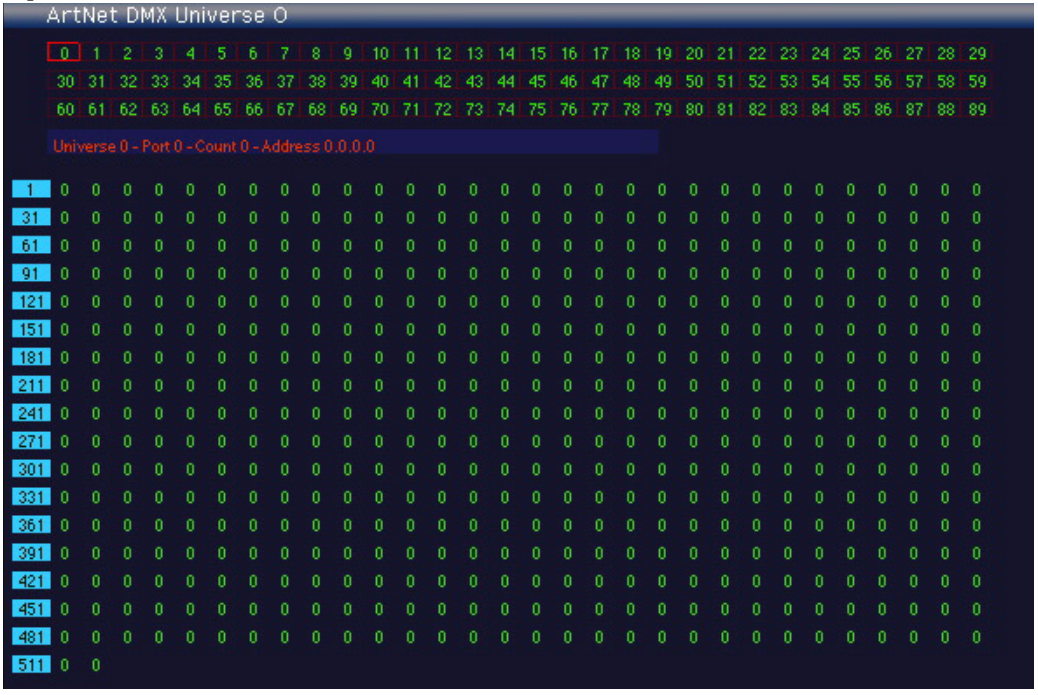
USB CIB DMX Input

This screen displays DMX values coming into the Catalyst Media Server from the Catalyst Interface Box (CIB). Actively changing DMX values are highlighted in blue.



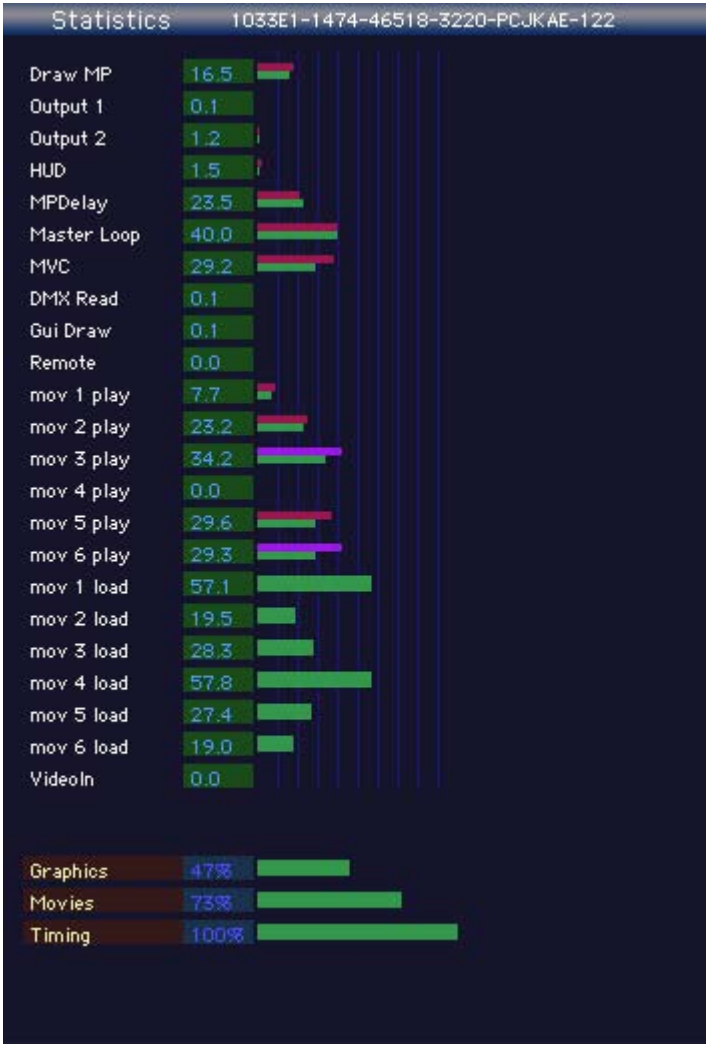
ArtNet DMX Input

This screen displays DMX values coming into the Catalyst Media Server from an Art-Net Network. Actively changing DMX values are highlighted in blue. Use hotkeys T and Y (Output 1) or B and N (Output 2) to move forward and backward through the Art-Net Inputs.



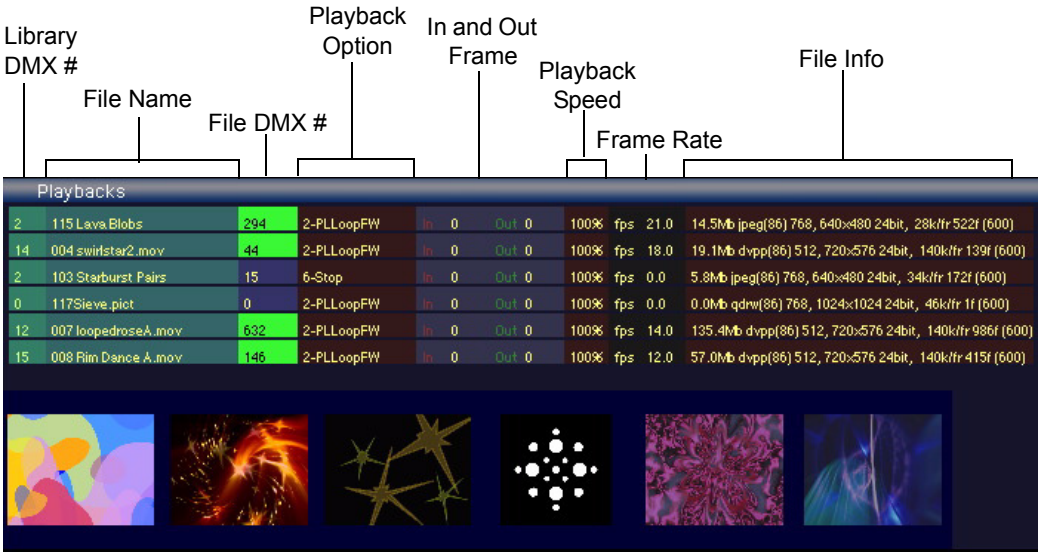
Statistics

This screen displays the amount of CPU time selected Media Server processes are using. Intended for internal diagnostics and technical support only.



Playbacks

This screen displays playback parameter information and thumbnails for all enabled layers.

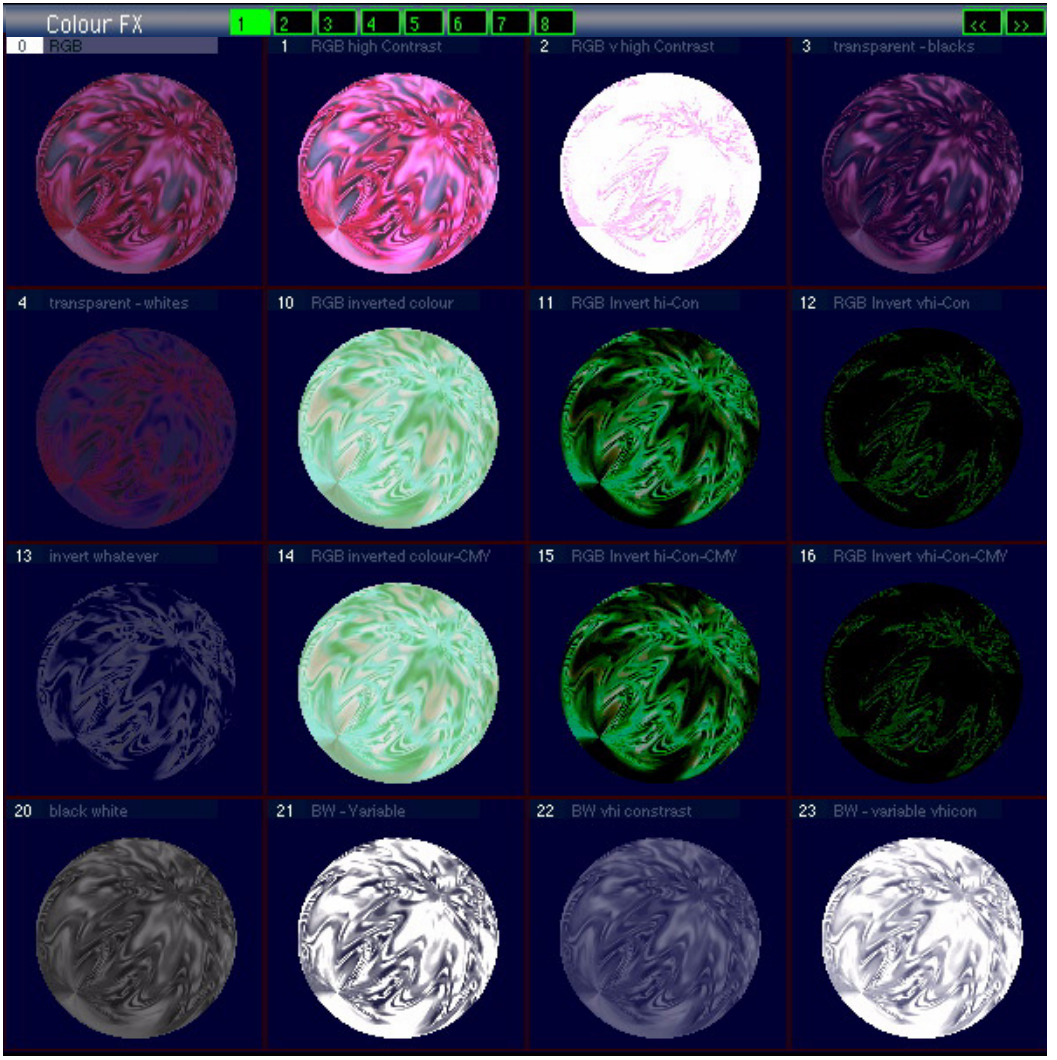


Playback Diagnostic Screen for Catalyst Pro 8-layer Version.

Color FX Preview

This screen displays thumbnail previews of Layer 1 with each Color Effect applied to the current content for a designated layer along with all other selected parameter values. Numbered tabs move through layers. The << and >> tabs move you through the range of color effects.

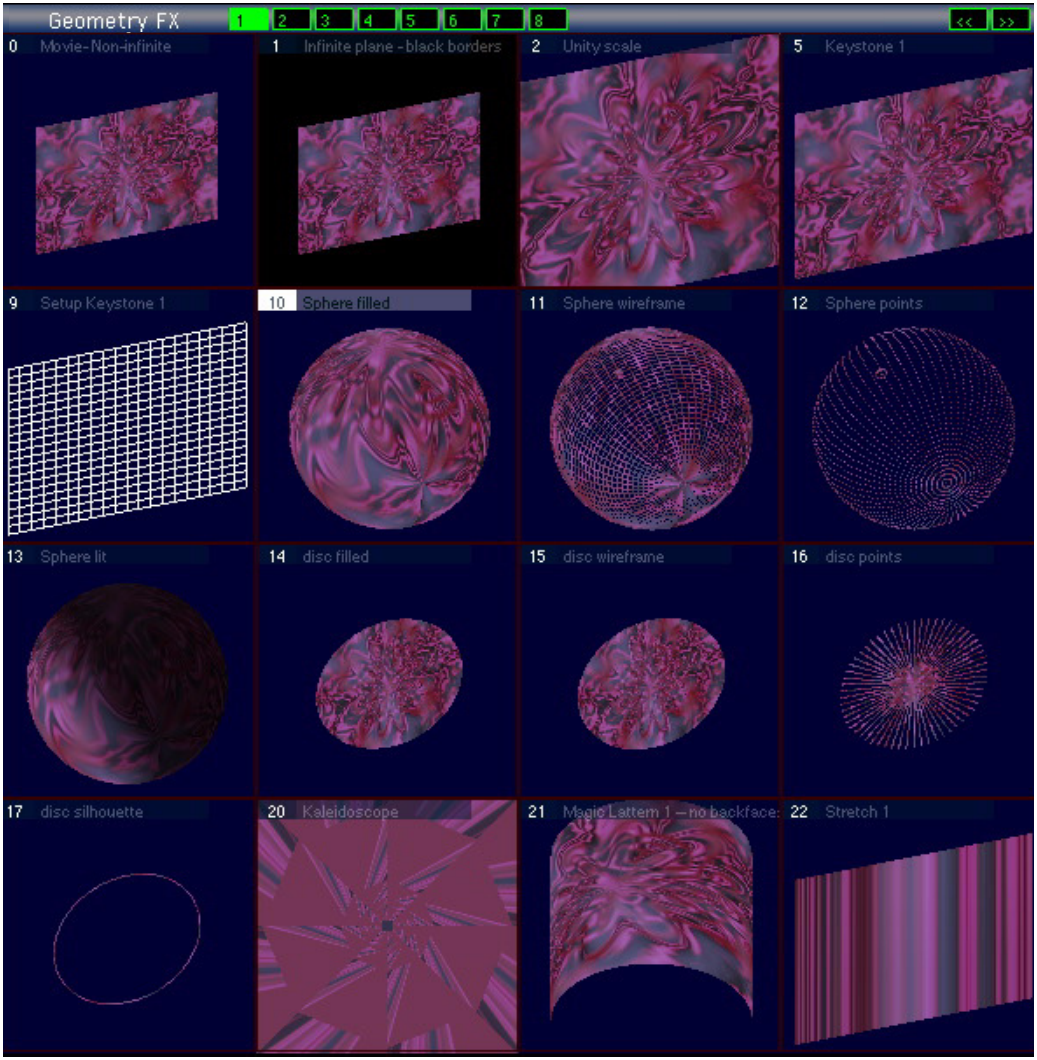
The example below shows the color effects 0 - 23 applied to layer five content with its current adjustments to position, scale and visual effects.



Geometry FX Preview

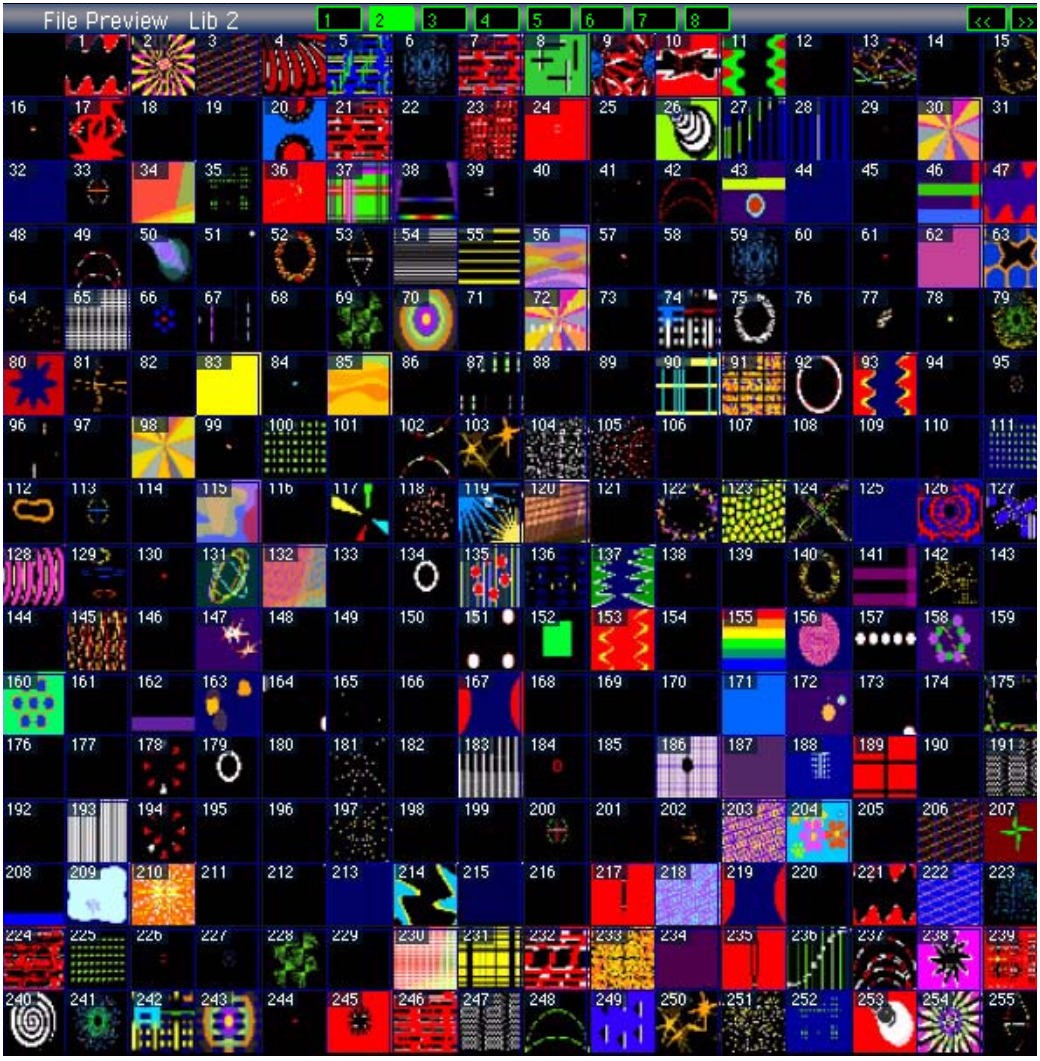
This screen displays thumbnail previews of Layer 1 with each Visual Effect applied to the current content for a designated layer with all it's parameter adjustments. Numbered tabs move through layers. The << and >> tabs move you through the range of visual effects.

The example below shows the color effects 0 - 23 applied to layer five content with current adjustments for position, and scale.



File Preview Library

This screen displays which Files in a Library Folder have content, indicated with a thumbnail preview or a green square. The << and >> tabs move you through the available library folders.



This Machine

This screen displays details of each layer's parameters on this Catalyst Media Server. Thumbnail previews of this server's individual layer outputs appear along the bottom.

Remote Machines

This screen displays DMX values for Catalyst Media Servers connected through an Ethernet network. Remote servers are identified by the named entered in the CIB panel of the Catalyst Window, see *CIB Panel* on page 23.

Mimic. In addition to monitoring layer information, the output window for this machine will display a broadcasting server's multilayer content. This is useful when an operator cannot directly view a remote server's output.

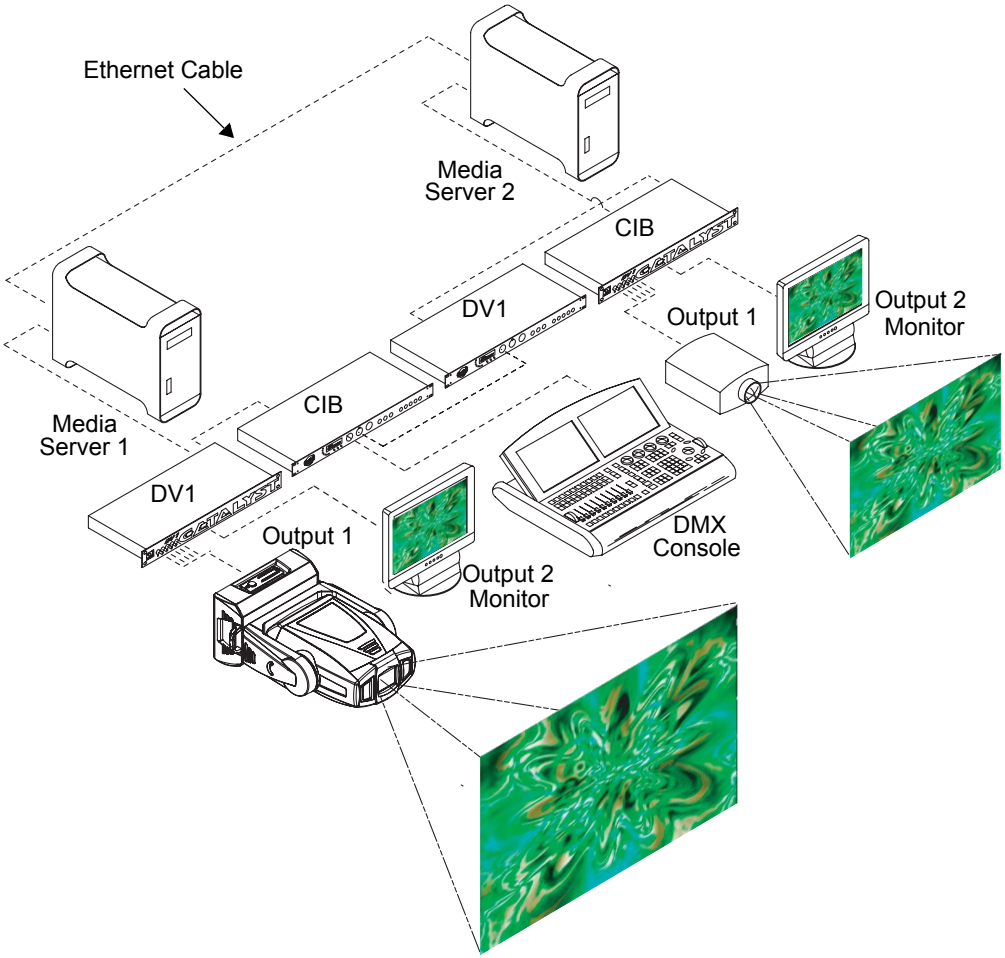
A catalyst server can also mimic another server, for example, if content needs to be synchronized across more than one server.

Remote Broadcasting needs to be set on a remote server to use the Mimic feature. For more detailed information on synchronizing, monitoring and sending values to remote servers, see *"Chapter 21:""Multiple Servers"*.

Chapter 21: Multiple Servers

Catalyst Media Servers can communicate with one another over an Ethernet network. This function allows the capabilities of synchronizing content across multiple servers, monitoring remote servers, and sending remote commands to multiple machines.

To connect several servers, power off all servers and run Ethernet cable from each server to a shared Ethernet hub. To connect only two Media Servers, use a single Ethernet cable between the Ethernet ports of each system's PowerMac; no crossover cable is needed.



Synchronizing Multiple Servers

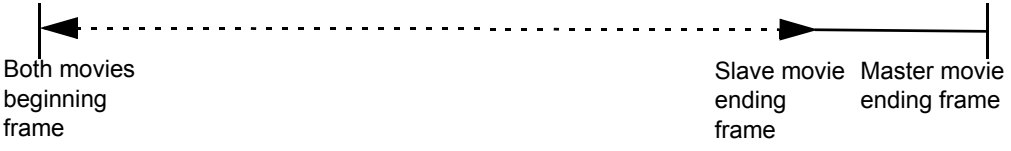
Synchronized playback allows two or more Media Servers to play media with accurate frame-by-frame synchronization over an Ethernet network connection. This applies to either simultaneous playback of the same media file on multiple servers, or to playback of coordinated clips utilizing different media files.

Synchronizing only affects server playback rates, not the Layer's content. Each layer could be playing different movies; only their playback timing will be the same. To duplicate a movie on different layers, use the **Play Mode** parameter's **use layer** setting.

When synchronizing multiple servers, assign one layer of one server to provide the "master" timing for the other servers. This master layer has a unique *Sync ID* value, a number from 1 to 20. Other linked layers, on the same server or other servers, act as "slaves", taking their playback timings, or frame rate, from the designated master layer.

Synchronization occurs frame by frame, so each layer's movie files may be different lengths, sizes, and formats. If the master layer is playing the 50th frame of a movie, the layers slaved to it will play the 50th frame of whatever movie file is selected on those systems. The master may be assigned to any of the **Play Mode** parameters (Play Loop Forward, Play Loop Reverse, etc.) available from DMX. When assigned to synchronize, the slave system's layer matches the master system's layer playback frame number by frame number.

If the master layer plays a frame number that does not exist in the slaved layer's movie, the slaved layer displays the last available frame of its movie. Therefore, if the master layer's movie is longer than the slaved layer's movie, the slaved layer will effectively freeze on its last frame until the master's layer loops.



If the slaved layer's movie is longer than the master layer's total movie, the slaved layer will loop at the same frame as the master's layer, and the slaved layer will never reach the end of its movie file.

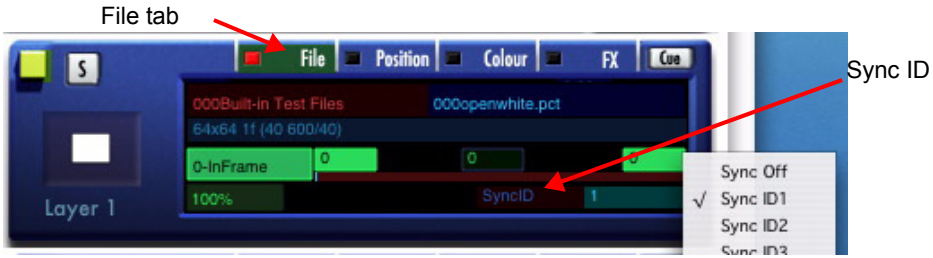
Assigning Master Sync ID Numbers

The network can have up to 20 master layers at once, each with its own unique Sync ID number. Any layer can be synchronized to a master layer.

> ***All servers on the same network share the same set of 20 Sync ID values. Don't assign the same ID value to two master layers, even if they're on different servers.***

Using the Catalyst Control window on the PowerMac, you can assign unique Sync ID values to selected layers:

1. On the appropriate **Layer** panel, click the File tab.
2. At the layer panel's lower right, click the **SyncID** field and a pop up menu will open.



3. On the pop-up menu, click the SyncID value you want to assign to that layer.

Synchronizing Content

After a layer has been assigned a unique Sync ID, any other layer can be synchronized to it using the **Play Mode** parameter. Synchronization can be switch on and off at any time using a lighting control and is selected in the same manner as any other DMX parameter function.

Set Master Layer

1. On your lighting console, select the layer to be used as the master layer (other layers will synchronize their frames with this layer).
2. Using the DMX **Library** and **File** parameters, select a folder and movie file for playback.
3. Assign the **Play Mode** parameter of this layer to a DMX value of 2 (Play Loop Forward)

Set Slave Layer

4. On your lighting console, select a layer of another server to synchronize to the master layer.

5. Using the DMX **Folder** and **File** parameters, select a folder and movie file for playback. It does not have to be the same movie as on the master layer.
6. With this slave layer, adjust the DMX value of the **Play Mode** parameter to a DMX value between 80 and 99. The exact value determines which SyncID is used for synchronization. For example, a DMX value of 80 synchronizes to SyncID number 1.

The Wholehog II uses alpha-numeric labels to describe values of the **Play Mode** parameter. SyncID modes appear as SyncID#, where # equals the numeric value of the assigned SyncID.

The Wholehog III has a toolbar menu with the **Play Mode** parameter SyncID numbers. Select the desired SyncID.

The two layers on separate servers will now synchronize their frame-by-frame playback. You can disable synchronization at any time by changing the slave layer's **Play Mode** parameter DMX value.

Monitoring Remote Servers

When multiple Catalyst Media Servers are connected with Ethernet connections, you can view information about any server on the network from any other server on the network.

Broadcast Remote Preview

1. To set up a server to broadcast remote preview information to other servers, locate the **CIB Connection** panel at the top of the Catalyst Control window on the PowerMac.

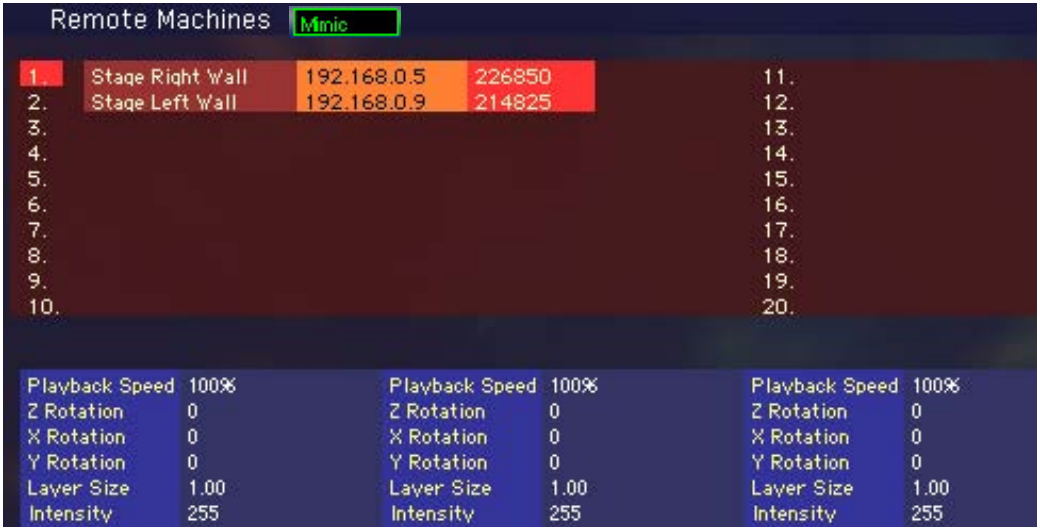
2. Click on the **Remote** field in the bottom right corner of the **CIB Connection** panel to open a pop-up menu.
3. In the pop-up menu, select "*Broadcast to Remote Preview On*". The menu will close and the Remote Field will read "**Remote ON**".
4. Repeat this process for all servers on the network that you wish to remotely monitor. Each server on the network can be assigned a custom name to assist with personal organization.

5. Click on the **Name** field of the **CIB Connection** panel and type in a desired name for the server.

Using the Remote Machines Diagnostic Display

Accessing the Remote Machines Display Screen

1. Using the keyboard, press "**W**" (Output 1) or "**X**" (Output 2) to activate the Diagnostic Displays.
2. Using the keyboard, press "**E**" (Output 1) or "**C**" (Output 2) to scroll through the Diagnostic Displays until the **Remote Machines** diagnostic display appears.



3. Within the **Remote Machines** diagnostic display, all the Catalyst Media Servers on the network are displayed in a numbered list. Their name, IP address and other information is also displayed.
4. To display parameter information for all layers of a particular Catalyst Media Server, click on the number to the left of the server name. The bottom portion of the information screen will display continually updated information about the parameters for each layer of the selected server.

5. Exit the Diagnostic Display by pressing "**Q**" (Output 1) or "**Z**" (Output 2).

Mimic Feature

When the Mimic Button is selected, this machine will display a remote server's multilayer content. This is useful when an operator cannot directly view the output of a remote server.

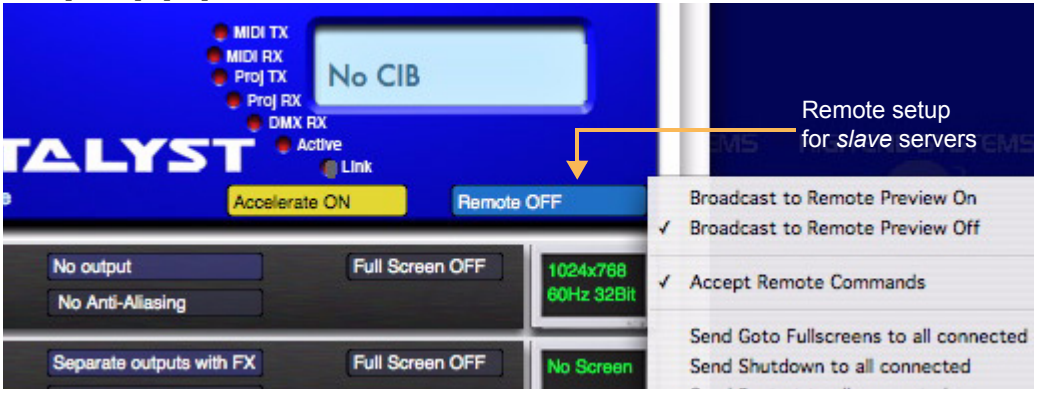
Note: The local machine can mimic a remote server's content only if it has the same content loaded.

A catalyst server can also mimic another server, for example, if content needs to be synchronized across more than one server.

Sending Remote Commands to Servers

In addition to synchronizing and monitoring other Catalyst Media Servers on an Ethernet network, you can send remote commands to networked servers.

1. To set up a server to accept remote commands from another server, locate the **CIB Connection** panel at the top of the Catalyst Control window on the PowerMac.
2. Click on the **Remote** field in the bottom right corner of the **CIB Connection** panel to open a pop-up menu.



3. In the pop-up menu, select "*Accept Remote Commands*". A check mark will be placed next to the option and the menu will close.
4. Repeat this process for all servers on the network that you wish to accept remote commands.
5. From any Media Server on the network, open the pop-up menu in the **Remote** field of the **CIB Connection** panel.

6. Click on any of the following commands to send it to all enabled machines on the network:

   Send Goto Fullscreens for All Connected. All Media Servers on the network that are set to **Accept Remote Commands** enter full screen mode on all outputs.

   Send Shutdown to All Connected. All Media Servers on the network that are set to **Accept Remote Commands** shut down.

   Send Restart to All Connected. All Media Servers on the network that are set to **Accept Remote Commands** reboot. Once the servers have rebooted, you must manually restart the Catalyst application on each server.

   Send Sleep to All Connected. All Media Servers on the network that are set to **Accept Remote Commands** enter sleep mode. You can wake sleeping Media Servers by sending them a **Broadcast to Remote Preview On** or **Goto FullScreen** command.

Appendix A
Understanding DMX-512

A lighting console typically utilizes a protocol called DMX-512 to communicate with automated lighting fixtures and conventional dimmers. This protocol consists of 512 unique channels of control per output link (universe). Each channel is capable of producing 256 values ranging from 0 to 255. Typically a lighting fixture or device will use a channel for each parameter of the fixture and the associated values of that channel will control the various functions of that parameter. The lighting console is then programmed to transmit a corresponding DMX value for the desired function of each parameter. All DMX values are stored within in the lighting console, and typically are referred to as cues, scenes, or presets.

Catalyst Media Server Layers operate in the same manner as lighting fixtures in regards to DMX control. Each parameter of a layer has one or two DMX channels assigned to it, which when adjusted from a lighting console provides various manipulations of that parameter. The total range of DMX channels used by a single Catalyst Layer is known as the DMX protocol and consists of 40 DMX channels.

8-bit vs. 16-bit DMX

Most parameters of an automated light use one channel of DMX providing 256 values of control (0-255). This is known as 8-bit DMX. Although several parameters of the Catalyst Media Server use 8-bit DMX, most require a more accurate range of values than can be provided with a single DMX channel. By utilizing two DMX channels for a single parameter, 65535 values become available for controlling and adjusting parameter functions. This is known at 16-bit DMX. You can adjust 16-bit DMX values in both coarse and fine increments. The first channel of the pair provides coarse control changes of the DMX value in increments of 256. The second channel of the pair provides fine control and changes of the DMX value in increments of 1.

Lighting Consoles

Lighting consoles differ in many aspects and it is important to understand how your console operates with Catalyst Media Servers.

> **Fixture Libraries.** Many sophisticated lighting consoles utilize pre-made fixture libraries. A fixture library consists of profiles for various types of lighting fixtures and devices. Each profile corresponds to the fixture's DMX protocol and allows for ease of programming. Depending upon the manufacturer of your lighting

console, some Catalyst parameters might have different labels for parameter names and functions than are listed within this manual. Consult your lighting console manual for further information.

DMX Output Displays. Although all lighting consoles output the same 512 channels of DMX per link, the on-screen labeling often differs. Parameter functions are displayed in either alpha-numeric descriptions (strobe 1), percentage (0-100%) or decimal (0-255 for 8-bit and 0-65535 for 16-bit). Consult your lighting console manual for further information.

16-bit DMX. Individual access of the two DMX channels used with 16-bit parameters varies by lighting console. Consult your lighting console manual for further information.

Default Values. While all Catalyst layer parameters have a range of possible DMX values starting at zero, not all functions should default to zero. Many lighting consoles define default DMX values for a fixture within the fixture's library or with a default scene or cue. High End Systems has recommended a set of defaults to create consistent and predictable profiles across consoles.

Appendix B:
DMX Protocol

Chap #	Function	Description	Value dec.	Default Value
Content Selection and Playback				
1	Library	Selects folder to access from hard drive	0-253	0
		Use Layer	254	
		Video Input	255	
2	File	Selects image file from the selected folder	0-255	0
		Selects layer when Channel 1 value equals 254		
		Selects video input when Channel 1 value equals 255		
3 4	In Frame Coarse In Frame Fine	Adjusts the In frame point	0-65535	0
5 6	Out Frame Coarse Out Frame Fine	Adjusts the Out frame point	0-65535	0
7	Play Mode	Display the In frame	0	0
		Display the Out frame	1	
		Play loop forward	2	
		Play loop reverse	3	
		Play once forward	4	
		Play once reverse	5	
		Stop	6	
		Random	7	
		PlaySine	8	
		Play loop forward when intensity is greater than zero	10	
		Play loop reverse when intensity is greater than zero	11	
		Play once forward when intensity is greater than zero	12	
		Play once reverse when intensity is greater than zero	13	
		Random when intensity is greater than zero	14	
		PlaySine when intensity is greater than zero	15	
		Play Audio	70	
		Play Audio Loop	71	
		Synchronize to master unit (1-20)	80-99	
		Synchronize to MIDI Timecode	100	
		Synchronize to Deck Timecode	101	
		Synchronize to Sony 1	103	
		Synchronize to Sony 2	104	
		Synchronize to Sony 3	105	
		[Reserved]	106-255	

Chap #	Function	Description	Value dec.	Default Value
8	Playback Speed	Playback at 100% recorded speed	0	0
		Pause playback	1	
		Playback at 0–200% recorded speed	2-255	
Position Control				
9	X-axis Rotate (vertical flip) Coarse adjustment	Continuous variable-speed counterclockwise image rotation around the X-axis (fast to slow)	0-16382	32768
		Continuous rotation stop	16383	
		Rotates the image counterclockwise around the X-axis from 720° to 0°	16384-32767	
10	X-axis Rotate (vertical flip) Fine adjustment	0° rotation about the X-axis	32768	
		Rotates the image clockwise around the X-axis 0° to 720°	32769-49152	
		Continuous rotation stop	49153	
		Continuous variable-speed clockwise image rotation around the X-axis (slow to fast)	49154-65535	
11	Y-axis Rotate (horizontal flip) Coarse adjustment	Continuous variable-speed counterclockwise image rotation around the Y-axis (fast to slow)	0-16382	32768
		Continuous rotation stop	16383	
		Rotates the image counterclockwise around the Y-axis from 720° to 0°	16384-32767	
		0° rotation about the Y-axis	32768	
12	Y-axis Rotate (horizontal flip) Fine adjustment	Rotates the image clockwise around the Y-axis 0° to 720°	32769-49152	
		Continuous rotation stop	49153	
		Continuous variable-speed clockwise image rotation around the Y-axis (slow to fast)	49154-65535	
13	Z-axis Rotate (circular rotation) Coarse adjustment	Continuous variable-speed counterclockwise image rotation around the z axis (fast to slow)	0-16382	32768
		Continuous rotation stop	16383	
		Rotates the image counterclockwise about the z axis from 720° to 0°	16384-32767	
		0° rotation about the z axis	32768	
14	Z-axis Rotate (circular rotation) Fine adjustment	Rotates the image clockwise around the z axis 0° to 720°	32769-49152	32768
		Continuous rotation stop	49153	
		Continuous variable-speed clockwise image rotation around the z axis (slow to fast)	49154-65535	
15	Scale Coarse adjustment	Adjusts size of inverted image from 8x actual size to 0	0-32767	36864
		Image scaled to 0 (vanishes)	32768	
		Resizes images from 0 to actual size	32769-36863	

Chap #	Function	Description	Value dec.	Default Value
16	Scale Fine adjustment	Actual size	36864	
		Adjusts normal image size from 0 to 8x actual size	32769-65535	
17	X Position Coarse adjustment	Moves image left from center of display	0-32767	32768
		Centers image left-to-right in display	32768	
18	X Position Fine adjustment	Moves image right from center of display	32769-65535	
19	Y Position Coarse adjustment	Moves image down from center of display	0-32767	32768
		Centers image up-and-down in display	32768	
20	Y Position Fine adjustment	Moves image up from center of display	32769-65535	
21	Aspect Ratio	Compresses image horizontally	0-128	0
		Compresses image vertically	129-255	
22	Movement Speed	Image movement speed	0-255	0
		Intensity and Color Control		
23	Intensity	Black	0	0
		Adjusts intensity from black to full	1-254	
		Full intensity	255	
24	Red	Filters out all Red in image	0	255
		Adjusts less to full Red in image	1-254	
		Red in image unaffected	255	
25	Green	Filters out all Green in image	0	255
		Adjusts less to full Green in image	1-254	
		Green in image unaffected	255	
26	Blue	Filters out all Blue in image	0	255
		Adjusts less to full Blue in image	1-254	
		Blue in image unaffected	255	
		Effects Control		
27	Strobing	No strobe	0	0
		Strobe pattern 1	1-24	
		Strobe pattern 2	25-49	
		Strobe pattern 3	50-74	
		Strobe pattern 4	75-99	
		Flicker/Black	100-124	
		Random	125-149	
		No strobe	150-255	
28	Trails	Creates persistent afterimages with increasing duration	0-255	0

Chap #	Function	Description	Value dec.	Default Value
29	Color Effects	RGB Subtract	0	0
		RGB Subtract High Contrast	1	
		RGB Subtract Very High Contrast	2	
		Transparent Blacks	3	
		Transparent Whites	4	
		RGB Subtract Inverted Color	10	
		RGB Subtract High Contrast Inverted Color	11	
		RGB Subtract Super High Contrast Inverted Color	12	
		Invert Whatever	13	
		RGB Subtract Inverted Color CMY	14	
		RGB Subtract High Contrast Inverted Color CMY	15	
		RGB Subtract Super High Contrast Inverted Color CMY	16	
		Black White	20	
		Black White High Contrast	21	
		Black White Super High Contrast	22	
		Black White Variable Super High Contrast	23	
		Invert Black White	24	
		Mask	30	
		Inverse Mask 1	31	
		Inverse Mask 2	32	
		Mask Fading	35	
		Invert Mask 1 Fading	36	
		Invert Mask 2 Fading	37	
		Alpha invert as Red	40	
		Alpha invert as Green	41	
		Alpha invert as Blue	42	
		Alpha invert as Color	43	
		Alpha as Red	44	
		Alpha as Green	45	
		Alpha as Blue	46	
		Alpha as Color	47	
		Lookup 2 False Color	51	
		Lookup 3 BW Solarize Highlights	52	
		Gamma BW (image is greyscale)	60	
		Gamma Color	61	
		Gamma Color Adjustment on Separate Channels	62	
		Color Gain Adjustment on separate channels	63	
		Quantize Color on Separate Channels	65	
		Convert to YUV	70	
		Color Saturation (controlled by Red channel)	71	

Chap #	Function	Description	Value dec.	Default Value
29	Color Effects (continued)	Mega Saturation	72	0
		Solarize	73	
		Solarize Invert	74	
		RGB Layer Blend 1	80	
		RGB Layer Blend 2	81	
		RGB Layer Blend 3	82	
		RGB Layer Blend 4	83	
		RGB Layer Blend 5	84	
		RGB Layer Blend 6 Add	85	
		RGB Layer Blend 7 Subtract	86	
		RGB Layer Blend 10 Maximum	89	
		RGB Layer Blend 11 Add 2	90	
		RGB Layer Blend 12 Inverse Add 2	91	
		Tint	100	
		Tint Inverse	101	
		Fade to hue	102	
		RGB > GBR	103	
		RGB > BGR	104	
		RGB > GRB	105	

Chap #	Function	Description	Value dec.	Default Value
30	Visual Effects	Movie on Non-infinite Plane	0	0
		Movie on Infinite Plane Black	1	
		Unity Scale	2	
		Movie on Keystone	5	
		Setup Keystone	9	
		Movie on Sphere—Filled	10	
		Movie on Sphere—Wireframe	11	
		Movie on Sphere—Points	12	
		Movie on Sphere—Lit	13	
		Movie on Disc—Filled	14	
		Movie on Disc—Wireframe	15	
		Movie on Disc—Points	16	
		Movie on Disc—Silhouette	17	
		Movie on Kaleidoscope	20	
		Movie on Magic Lantern	21	
		Movie Stretched	22	
		Movie Panorama Slices	23	
		Movie on Magic Lantern 2	24	
		Movie on Cube—Four Sides	30	
		Movie on Cube—Six Sides	31	
		Movie on Colored Cube—Six Sides	32	
		Movie on Cube—First Four Layers	33	
		Movie on N x N Simultaneous Tiles	40	
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32	Parameter 2 (FX2)		0-255	0

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33	Keystone x1	Moves image's upper left-hand corner left along X-axis	0-127	128
		No correction	128	
		Moves upper left-hand corner right along X-axis	129-255	
34	Keystone y1	Moves upper left-hand corner down along Y-axis	0-127	128
		No correction	128	
		Moves upper left-hand corner up along Y-axis	129-255	
35	Keystone x2	Moves lower left-hand corner left along X-axis	0-127	128
		No correction	128	
		Moves lower left-hand corner right along X-axis	129-255	
36	Keystone y2	Moves lower left-hand corner down along Y-axis	0-127	128
		No correction	128	
		Moves lower left-hand corner up along Y-axis	129-255	
37	Keystone x3	Moves lower right-hand corner left along X-axis	0-127	128
		No correction	128	
		Moves lower right-hand corner right along X-axis	129-255	
38	Keystone y3	Moves lower right-hand corner down along Y-axis	0-127	128
		No correction	128	
		Moves lower right-hand corner up along Y-axis	129-255	
39	Keystone x4	Moves upper right-hand corner left along X-axis	0-127	128
		No correction	128	
		Moves upper right-hand corner right along X-axis	129-255	
40	Keystone y4	Moves upper right-hand corner down along Y-axis	0-127	128
		No correction	128	
		Moves upper right-hand corner up along Y-axis	129-255	

Appendix C: Copyrighted Materials FAQ

The following FAQ, written by Suzy Vaughan Associates for High End Systems, can help you determine the correct use for materials that may be copyrighted.

I want to use a film clip in a promotional piece advertising my services. What do I have to do to be able to do that?

First of all, you need to obtain permission to use the clip from its owners. The clip is considered intellectual property, just as though it were your car or some software code developed by and belonging to Microsoft. This is because the U.S. Copyright Act gave creators of literary works [which include books, films, television programs, art works, still photos and musical compositions and recordings] the right to sell or license these works and to make money from them for the period of the copyright.

But what about public domain material? I heard that lots of material is in the public domain and can be used for free.

Once the copyright runs out, the creative work falls into the public domain and can be used freely by anyone without payment or licensing. If the work is not public domain, it is considered literary property. The Copyright Act provides substantial penalties for copyright infringement ranging from $10,000 for accidental infringement to $250,000 for willful infringement. However, contrary to popular belief, there really is not that much material in the public domain so this approach will limit you creatively.

What if I want to use a clip in a public performance? It's not being filmed or taped. Surely I don't need permission for that?

Public gatherings require clearance whenever copyrighted data is projected to audiences, or for any use other than just personal viewing. Concerts, tradeshows, industrial shows, parties and raves are all examples of public performance and permission must be obtained.

Suppose I want to use a still photo or a magazine cover or a television clip? Do I have to obtain permission for them too?

Yes, they are also copyrighted works, whose owners must grant a license for their usage.

Do I need any other permissions to use this material?

In many cases you do. You may need to obtain permission to use the appearance of actors who appear in the clip as well as pay the writers and directors of the film that your clip comes from.

What about High End Systems material included with the Catalyst? Do I have to clear that?

No. High End Systems has worked to provide clearance for the content that is provided with the Catalyst system. Any materials you received directly from High End Systems with the purchase of a new Catalyst system have already been properly licensed for your use in shows and presentations. That does not, however, license you to sell this content separately from the Catalyst system. Also, please be sure that any new content you obtain from outside sources is properly cleared for public presentation.

This sounds really difficult, and I don't know how to do it. How do I properly license copyrighted material?

You need to consult with a Content Clearing House or with a properly licensed Intellectual Property Attorney. Content clearinghouses are typically less expensive to work with and have well established industry relations that can result in cost savings. High End Systems uses and highly recommends Suzy Vaughan Associates.

How much does it typically cost to license copyrighted material?

The answer depends entirely on what material you want to use and how you plan to use it. Prices can range from hundreds of dollars for photography content to thousands of dollars for a highly desirable film/video clip. Because price is content-sensitive, the best thing to do is to contact a clearinghouse to assist you.

* Suzy Vaughan Associates has 20 years of experience in clearing clips, talent, and music for use in any number of venues. Their clients include Barbra Streisand, Michael Jackson, and The Emmys among other others. Contact Suzy Vaughan Associates' at 818-988-5599, info@suzyvaughan.com, or www.suzyvaughan.com.

Appendix D
Product and Safety Information

Product Information

Computer Specifications

The following specifications apply to currently shipping Catalyst Media Servers; earlier G4-based systems upgraded to the Catalyst Media Server will have different specifications.

- Dual 2GHz PowerMac G5 (or higher)
- ATI Radeon 9800 Pro (or higher)
- Mac OS 10.3.3 (or higher)
- Quicktime 6.5 (or higher)

Note for upgrading customers: Though Catalyst software will run on a Dual 1.25 GHz PowerMac G4 or higher, it is not recommended due to performance problems. High End Systems recommends that all Catalyst users upgrade to a Dual 2GHz PowerMac G5 or higher.

Electrical Specifications

Warning!
Class 1 equipment—this equipment must be grounded.

Auto Switching:

- 100-125v AC
- 200-240v AC

Rated Power: 400W

Environmental Specifications

Maximum ambient temperature (Ta): 35°C (95°F)

Installing Power Cord Caps

The Catalyst Media Server control rack may ship without an attached power cord cap. Different locations (even within the same country) may require a different power cord cap to connect the fixture to a power outlet.

Because of the variety of power cord caps used worldwide, High End Systems, Inc. cannot make specific recommendations for the power cord cap.

Contact a local authority for the type of power cord cap needed. When installing the power cord cap, note that the cores in the mains lead are colored in accordance with the following code:

- green and yellow = ground/earth
- blue = neutral
- brown = live

Warning!
Class 1 equipment—this equipment must be grounded.

Installing a Power Cord Cap – UK Only

In the United Kingdom, the Colors of the cores in the mains lead of this equipment may not correspond with the Colored markings identifying the terminals in the fixture's plug. Therefore, install a line cord cap in accordance with the following code:

- The core Colored green and yellow must be connected to the plug terminal which is marked with the letter "E," or by the earth symbol ⏚, or Colored green, or green and yellow.
- The core Colored blue must be connected to the terminal which is marked with the letter "N", or Colored black.
- The core Colored brown must be connected to the terminal which is marked with the letter "L" or Colored red.

Warning!
Class 1 equipment—this equipment must be earthed.

Vatic Fitter Heads Information – Danmark

Advarsel: Beskyttelse mod elektrisk chock.

Vigtigt! eller

Lederne med gul/groen isolation maa kun tilsluttes en klemme maerket

Catalyst Accessories

The following table lists accessories available for the Catalyst Media Server from your High End dealer/distributor. For more information, contact your High End Systems dealer/distributor or see .

Part Description	Part Number
Catalyst Interface Box	56040004
Wholehog III lighting console	61020001
Media Server control rack roadcase	56070001
LCD Monitor	56070009
Heavy duty 5-pin XLR cable(10')	55050017
Heavy duty 5-pin XLR cable (25')	55050018
Heavy duty 5-pin XLR cable (50')	55050019
Heavy duty 5-pin XLR cable (100')	55050020
Content Backup DVDs Vol 1	56040034
Content Backup DVDs Vol 2	56040039

Product Modification Warning

High End Systems products are designed and manufactured to meet the requirements of United States and International safety regulations. Modifications to the product could affect safety and render the product non-compliant to relevant safety standards.

Mise En Garde Contre La Modification Du Produit

Les produits High End Systems sont conçus et fabriqués conformément aux exigences des règlements internationaux de sécurité. Toute modification du produit peut entraîner sa non conformité aux normes de sécurité en vigueur.

Produktmodifikationswarnung

Design und Herstellung von High End Systems entsprechen den Anforderungen der U.S. Amerikanischen und internationalen Sicherheitsvorschriften. Abänderungen dieses Produktes können dessen Sicherheit beeinträchtigen und unter Umständen gegen die diesbezüglichen Sicherheitsnormen verstoßen.

Avvertenza Sulla Modifica Del Prodotto

Prodotti di High End Systems sono stati progettati e fabbricati per soddisfare i requisiti delle normative di sicurezza statunitensi ed internazionali. Qualsiasi modifica al prodotto potrebbe pregiudicare la sicurezza e rendere il prodotto non conforme agli standard di sicurezza pertinenti.

Advertencia De Modificación Del Producto

Los productos de High End Systems están diseñados y fabricados para cumplir los requisitos de las reglamentaciones de seguridad de los Estados Unidos e internacionales. Las modificaciones al producto podrían afectar la seguridad y dejar al producto fuera de conformidad con las normas de seguridad relevantes.

FCC Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Warranty Information

Limited Warranty. Unless otherwise stated, your *product* is covered by a one year parts,labor and technical support limited warranty. It is the owner's responsibility to furnish receipts or invoices for verification of purchase, date, and dealer or distributor. If purchase date cannot be provided, date of manufacture will be used to determine warranty period.

Returning an Item Under Warranty for Repair. It is necessary to obtain a Return Material Authorization (RMA) number from your dealer or point of purchase BEFORE any units are returned for repair. The manufacturer will make the final determination as to whether or not the unit is covered by warranty.

Any Product unit or parts returned to High End Systems must be packaged in a suitable manner to ensure the protection of such Product unit or parts, and such package shall be clearly and prominently marked to indicate that the package contains returned Product units or parts and with an RMA number. Accompany all returned Product units or parts with a written explanation of the alleged problem or malfunction. Ship returned Product units or parts to: 2105 Gracy Farms Lane, Austin, TX, 78758, USA.

Freight Damage Claims are invalid for fixtures shipped in non-factory boxes and packing materials.

Freight. All shipping will be paid by the purchaser. Items under warranty shall have return shipping paid by the manufacturer only in the Continental United States. Under no circumstances will freight collect shipments be accepted. Prepaid shipping does not include rush expediting such as air freight. Air freight can be sent customer collect in the Continental United States.

REPAIR OR REPLACEMENT AS PROVIDED FOR UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. HIGH END SYSTEMS, INC. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO ANY PRODUCT, AND HIGH END SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HIGH END SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGE, INCLUDING LOST PROFITS, SUSTAINED OR INCURRED IN CONNECTION WITH ANY PRODUCT OR CAUSED BY PRODUCT DEFECTS OR THE PARTIAL OR TOTAL FAILURE OF ANY PRODUCT REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, AND WHETHER OR NOT SUCH DAMAGE WAS FORESEEN OR UNFORESEEN.

Warranty is void if the product is misused, damaged, modified in any way, or for unauthorized repairs or parts. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Safety Information

Warning: For Continued Protection Against Fire

1. This equipment for connection to branch circuit having a maximum overload protection of 20 A.

Warning: For Continued Protection Against Electric Shock

1. If this equipment was received without a line cord plug, attach the appropriate line cord plug according to the following code:
   - brown–live
   - blue–neutral
   - green/yellow–earth
2. As the Colors of the cores in the mains lead of this equipment may not correspond with the Colored markings identifying the terminals in your plug, proceed as follows:
   - the core which is Colored green and yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol ⏚, or Colored green or green and yellow.
   - the core which is Colored blue must be connected to the terminal which is marked with the letter N or Colored black.
   - the core which is Colored brown must be connected to the terminal which is marked with the letter L or Colored red.
3. Class I equipment. This equipment must be earthed.
4. Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.
5. Refer servicing to qualified personnel; no user serviceable parts inside.

Importantes Informations Sur La Sécurité

Mise En Garde: Pour Une Protection Permanente Contre Les Incendies

1. Cet appareil de connection au circuit comporte une protection contre les surcharges de 20 A.

Mise En Garde: Pour Une Protection Permanente Contre Les Chocs Électriques

1. Si cet équipement est livré sans prise de cable, veuillez connecter la prise de cable correcte selon le code suivant:
   - marron—phase
   - bleu—neutre
   - vert/jaune—terre
2. Débrancher le courant avant de changer les lampes ou d'effectuer des réparations.
3. Cet équipement doit être uniquement utilisé dans des endroits secs. Ne pas l'exposer à la pluie ou l'humidité.
4. À l'intérieur de l'équipement il n'y a pas de pièces remplaçables par l' utilisateur. Confiez l'entretien à un personnel qualifié.
5. Equipement de Classe I. Cet équipement doit être mis à la terre.

Wichtige Hinweise Für Ihre Sicherheit

Warnung: Zum Schutz Vor Brandgefahr

1. Dieses Gerät darf nur an eine Zweigleitung mit einem Überlastungsschutz von höchstens 20 A angeschlossen werden.

Warnung: Zum Schutz Gegen Gefährliche Körperströme

1. Wenn dieses Gerät ohne einen Netzkabelstecker erhalten wurde, ist der entsprechende Netzkabelstecker entsprechend dem folgenden Code anzubringen:
   - Braun—Unter Spannung stehend
   - Blau—Neutral
   - Grün/Gelb—Erde
2. Vor dem Austauschen von Lampen oder vor Wartungsarbeiten stets den Netzstecker ziehen.
3. Diese Geräte sind nur zum Einbau in trockenen Lagen bestimmt und müssen vor Regen und Feuchtigkeit geschützt werden.
4. Servicearbeiten sollten nur von Fachpersonal ausgeführt werden. Das Gerät enthält keine wartungsbedürftigen Teile.
5. Dieses Gerät gehört zur Klasse I. Dieses Gerät muß geerdet werden.

Información Importante De Seguridad

Advertencia: Para Protección Continua Contra Incendios

1. Este equipo debe conectarse a un circuito que tenga una protección máxima contra una sobrecargas de 20 A.

Advertencia: Para La Protección Continua Contra Electrocuciones

1. Si se recibió este equipo sin el conector de alimentacion, monte usted el conector correcto según ia clave siguente:
   - moreno—vivo
   - azul—neutral
   - verde/amarillo—tierra
2. Desconecte el suministro de energía antes de cambiar lámparas o prestar servicio de reparación.
3. Este equipo esta disenado para usarce en lugares secos no lo exponga a la lluvia o humedad.
4. Derive el servicio de reparación de este equipo al personal calificado. El interior no contiene repuestos que puedan ser reparados por el usuario.
5. Equipo de Clase I. Este equipo debe conectarse a tierra.

Importanti Informazioni Di Sicurezza

Avvertenza: Per Prevenire Incendi

1. Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 ampere.

Avvertenza: Per Prevenire Le Scosse Elettriche

1. Se questa apparecchiatura è stata consegnata senza una spina del cavo di alimentazione, collegare la spina appropriata del cavo di alimentazione in base ai seguenti codici:
   - marrone—fase
   - blu—neutro
   - verde/giallo—terra
2. Disconnettere la corrente prima di cambiare la lampada o prima di eseguire qualsiasi riparazione.
3. Questo apparecchio deve essere utilizzato in ambienti secchi. Non deve essere esposto a pioggia o montato in luoghi umidi.
4. Per qualsiasi riparazione rivolgersi al personale specializzato. L' utente non deve riparare nessuna parte dentro l' unita'.
5. Aparecchio di Classe I. Questa apparecchiatura deve essere messa a terra.

Vigtig Sikkerhedsinformation

Advarsel: Beskyttelse mod elektrisk chock.

VIGTIGT! LEDEREN MED GUL/GROEN ISOLATION MAA KUN TILSLUTTES KLEMME MAERKET ⏚ ELLER ⏚.

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