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 5,432,691; 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 5,829,868; 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 6,288,828; US 6,327,103; US 6,421,165; US 6,430,934; US 6,466,357; US 6,502,961;
US 671933; 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
User Manual

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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 B. 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 B. 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 B. 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 B. Si prega di leggere tutte le istruzioni prima di assemblare, montare e azionare l'apparecchiatura.

**Informacion Importante De Seguridad.** En el Apéndice B 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!]

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

![WARNING!]

**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 allows simultaneous preview and playback of multiple still images or movie files, adding effects such as crossfading (dissolves), montages, masking, strobing, color changes, and 3D geometry—all rendered in real time, and triggered from a lighting console using DMX-512 protocol.

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.

High End Systems currently offers two Catalyst Media Server products.

- Catalyst Pro offers 6-layers with twin outputs—two separate video feeds from one server.
- Catalyst DV is a single digital output solution with three cross-fadable layers.
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Chapter 1: System Overview

Catalyst Media Server Layers are designed for control from a DMX-512 lighting console, and the software’s user interface is used only for configuration and diagnostic purposes. All selections and manipulations of media are accomplished by and recorded to a lighting controller; the Media Server is simply a playback device.
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. These instructions also ship with your product as a Startup Sheet for the model you purchased.

Inspecting Your Catalyst Media Server

The Catalyst Media Server is contained in a roadcased equipment rack designed to protect the product during transport. 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 “Appendix D: Product and Safety Information” for more information on warranties provided by HighEnd Systems for your product.

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
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.
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 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.

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 G5 power 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 over 35GB 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 6-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 software has 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. Highlight Mixed All Layers with FX and click to select.

2. 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 “Appendix A: 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.

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 on Layer 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**

15. Clear or remove any information in your console’s programmer or editor.
16. On your lighting console, select Layer 1. Set the **Intensity** parameter to a DMX value of 255(100%).
17. Select Library 2 (HES Digital Arials 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.
18. Assign the DMX value of the **Color Effect** parameter to 3 (transparent blacks).
19. 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

20. On your lighting console, select Layer 2. Set the **Intensity** parameter to a DMX value of 255(100%).

21. 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.

22. Adjust the DMX value of the **Z Rotation** parameter so the Layer 1 image starts spinning slowly—20 rotations per minute, for example.

23. 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.

24. 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

25. Clear or remove any information in your console’s programmer or editor.

26. On your lighting console, select Layer 1. Set the Intensity parameter to a DMX value of 255(100%).

27. Adjust the Library and File parameters on your console to select Library 12 (Sean Bridwell Textures), File 8 (loopedsnakes1).

28. Set the Play Mode parameter to a DMX value of 3 (Play Loop Reverse).

Add Shutters with Layer 2

29. On your lighting console, select Layer 2. Set the Intensity parameter to a DMX value of 255(100%).

30. Set the Visual Effects parameter to a DMX value of 70 (Shutter -Black).

31. Adjust the Scale parameter until the Output 1 window displays a transparent square in a black background.
32. Adjust the eight **Keystone Correction** parameters to change the shape of the shutters.

33. Adjust the **Z Rotation** parameter to rotate the shutters.

34. When finished, clear or remove any information in your lighting console’s programmer or editor.
Chapter 4: Output Displays

The Catalyst Media Server supports two output signals. Each signal is split, and can be displayed simultaneously 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.

*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.

![Output Setting Fields]

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

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

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

- **Mix 1 & 2 with FX** for Output 1 displays Layers 1 and 2 stacked on top of each other.
- **Mix 3 & 4 with FX** for Output 2 displays Layers 3 and 4 stacked on top of each other.
Dual Outputs with DL1 Dimming Control

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. When this occurs 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.

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 5:
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

<table>
<thead>
<tr>
<th>CODEC</th>
<th>Recommended Use</th>
<th>Pro</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV-PAL</td>
<td>PAL TV bound footage or anything that requires a 720x576, 25 fps movie.</td>
<td>Plays back very well, even multiple movies simultaneously.</td>
<td>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.</td>
</tr>
<tr>
<td>DV/DVCPRO-NTSC</td>
<td>NTSC TV bound footage or anything that requires a 720x480, 29.97 fps movie</td>
<td>Same as DV-PAL</td>
<td>Same as DV-PAL</td>
</tr>
<tr>
<td>DVCPRO50-NTSC</td>
<td>Better color sampling (4:2:2 rather than 4:1:1) Twice the datarate for better images</td>
<td>Worse playback than DV-NTSC and PhotoJPEG. It cannot be used with any other pixel size and frame rate.</td>
<td></td>
</tr>
<tr>
<td>DVCPRO50-PAL</td>
<td>Same as DVCPRO50-NTSC</td>
<td>Same as DVCPRO50-NTSC</td>
<td></td>
</tr>
<tr>
<td>Motion JPEG A and Motion JPEG B.</td>
<td>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.</td>
<td>Adequate between 50 and 80% quality</td>
<td></td>
</tr>
<tr>
<td>Photo JPEG</td>
<td>Single layer playback</td>
<td>Adequate between 50 and 80% quality</td>
<td></td>
</tr>
</tbody>
</table>

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 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.)

<table>
<thead>
<tr>
<th>Folder Name</th>
<th>Content Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000 High End Lithos</td>
<td>High End Systems Lithopattern® still images.</td>
</tr>
<tr>
<td>001 Digital Aerials 1</td>
<td>Digital still images and animations, designed specifically for aerial effects.</td>
</tr>
<tr>
<td>002 Digital Aerials 2</td>
<td>Additional aerial still images and animations.</td>
</tr>
<tr>
<td>003 HES Reserved 1-Oils</td>
<td>Digitally simulated psychedelic oil projections</td>
</tr>
<tr>
<td>004 HES Reserved 2</td>
<td></td>
</tr>
<tr>
<td>005 HES Reserved 3</td>
<td></td>
</tr>
<tr>
<td>006 HES Reserved 4</td>
<td></td>
</tr>
<tr>
<td>007 My Custom Content 1</td>
<td></td>
</tr>
<tr>
<td>008 My Custom Content 2</td>
<td></td>
</tr>
<tr>
<td>009 A Luna Blue</td>
<td>Digital animations.</td>
</tr>
<tr>
<td>010 Feedback Video</td>
<td>Digital animations.</td>
</tr>
<tr>
<td>011 Artbeats</td>
<td>Video clips and digital animations.</td>
</tr>
<tr>
<td>012 Sean Bridwell Textures</td>
<td>Digital textures.</td>
</tr>
<tr>
<td>013 Amorphous Digi-gobos</td>
<td>Digital animations.</td>
</tr>
<tr>
<td>014 Beacon DigiGobos</td>
<td>Digital animations.</td>
</tr>
<tr>
<td>015-InLight_C3</td>
<td>Digital animations</td>
</tr>
<tr>
<td>016 Apollo Glass 1</td>
<td>Digital Images</td>
</tr>
<tr>
<td>017 DHA TopMac</td>
<td>Digital Images</td>
</tr>
<tr>
<td>018 - 252</td>
<td>Available for additional content collections.</td>
</tr>
<tr>
<td>253 Setup and Test</td>
<td>Color bars and other diagnostic tests.</td>
</tr>
<tr>
<td>254 Use Layer (DO NOT ALTER)</td>
<td>References one layer’s content to other layer(s).</td>
</tr>
<tr>
<td>255 Video Input (DO NOT ALTER)</td>
<td>Reserved for Video input.</td>
</tr>
</tbody>
</table>
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.
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:

<table>
<thead>
<tr>
<th>DMX Value</th>
<th>Play Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>In Frame</td>
<td>Displays the frame selected by the In Frame parameter.</td>
</tr>
<tr>
<td>1</td>
<td>Out Frame</td>
<td>Displays the frame selected by the Out Frame parameter.</td>
</tr>
<tr>
<td>2</td>
<td>Play Loop Forward</td>
<td>Plays the movie in a continuous loop starting at the In frame and repeating when it reaches the Out frame.</td>
</tr>
<tr>
<td>3</td>
<td>Play Loop Reverse</td>
<td>Plays the movie in a continuous loop starting at the Out frame and repeating when it reaches the In frame.</td>
</tr>
<tr>
<td>4</td>
<td>Play Once Forward</td>
<td>Plays the movie once, starting at the In frame point and stopping when it reaches the Out frame.</td>
</tr>
<tr>
<td>5</td>
<td>Play Once Reverse</td>
<td>Plays the movie once, starting at the Out frame and stopping when it reaches the In frame.</td>
</tr>
<tr>
<td>6</td>
<td>Stop</td>
<td>Stops the movie playback, displaying a still image of the last frame played.</td>
</tr>
<tr>
<td>7</td>
<td>Random</td>
<td>Continuously displays random frames between the In frame and Out frame.</td>
</tr>
<tr>
<td>8</td>
<td>PlaySine</td>
<td>Plays the movie forward from the In frame to the Out Frame, then backward from the Out frame to the In frame.</td>
</tr>
<tr>
<td>10</td>
<td>Play Loop Forward</td>
<td>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 &gt; 0 again.</td>
</tr>
</tbody>
</table>
CHAPTER 6
Media Playback

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.

<table>
<thead>
<tr>
<th>DMX Value</th>
<th>Play Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Play Loop Reverse when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>12</td>
<td>Play Once Forward when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>13</td>
<td>Play Once Reverse when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>14</td>
<td>Random when Intensity &gt;0</td>
<td>Continuously displays random frames between the In frame and Out frame. Playback pauses whenever Intensity = 0 and resumes whenever intensity is &gt; 0 again.</td>
</tr>
<tr>
<td>15</td>
<td>PlaySine when Intensity &gt;0</td>
<td>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 whenever intensity is &gt; 0 again.</td>
</tr>
<tr>
<td>40</td>
<td>Play Loop Forward retrigger when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>41</td>
<td>Play Loop Reverse retrigger when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>42</td>
<td>Play Once Forward retrigger when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>43</td>
<td>Play Once Reverse retrigger when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>44</td>
<td>PlaySine retrigger when Intensity &gt;0</td>
<td>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 &gt; 0 again.</td>
</tr>
<tr>
<td>80-99</td>
<td>Synchronize to master</td>
<td>Synchronizes this layer’s movie with another layer’s frame rate.</td>
</tr>
<tr>
<td>100</td>
<td>Synchronize to MIDI Timecode</td>
<td>Synchronizes this layer’s movie with MIDI timecode.</td>
</tr>
<tr>
<td>101</td>
<td>Synchronize to deck Timecode</td>
<td>Synchronizes this layer’s movie with a remote deck’s timecode.</td>
</tr>
<tr>
<td>103-105</td>
<td>Synchronize to Sony</td>
<td>Synchronizes this layer’s movie with a Sony 9-pin device.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>X-Axis Rotation</th>
<th>Y-Axis Rotation</th>
<th>Y-Axis Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="X-Axis Rotation" /></td>
<td><img src="image2.png" alt="Y-Axis Rotation" /></td>
<td><img src="image3.png" alt="Y-Axis Rotation" /></td>
</tr>
<tr>
<td><img src="image4.png" alt="X-Axis Rotation" /></td>
<td><img src="image5.png" alt="Y-Axis Rotation" /></td>
<td><img src="image6.png" alt="Y-Axis Rotation" /></td>
</tr>
<tr>
<td><img src="image7.png" alt="X-Axis Rotation" /></td>
<td><img src="image8.png" alt="Y-Axis Rotation" /></td>
<td><img src="image9.png" alt="Y-Axis Rotation" /></td>
</tr>
<tr>
<td><img src="image10.png" alt="X-Axis Rotation" /></td>
<td><img src="image11.png" alt="Y-Axis Rotation" /></td>
<td><img src="image12.png" alt="Y-Axis Rotation" /></td>
</tr>
<tr>
<td><img src="image13.png" alt="X-Axis Rotation" /></td>
<td><img src="image14.png" alt="Y-Axis Rotation" /></td>
<td><img src="image15.png" alt="Y-Axis Rotation" /></td>
</tr>
<tr>
<td><img src="image16.png" alt="X-Axis Rotation" /></td>
<td><img src="image17.png" alt="Y-Axis Rotation" /></td>
<td><img src="image18.png" alt="Y-Axis Rotation" /></td>
</tr>
</tbody>
</table>
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.
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](image1)

![Image with a value less than the DMX midpoint](image2)

![Image with a value greater than the DMX midpoint](image3)

![Image with a value near the DMX midpoint](image4)
CHAPTER 7
Movement and Size

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.
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.
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
CHAPTER 8
Intensity and Color

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](image1)

![The Layer’s image tinted with the Green, and Blue parameters.](image2)

![The Layer's image tinted with the Blue parameter.](image3)

![The Layer's image tinted with the Red parameter.](image4)
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.

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.
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.

![](image1)

**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.

![](image2)
CHAPTER 8
Intensity and Color

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.

[Images: 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.

[Images: 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.

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.
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.

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.
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.

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.
30 Mask

When the Color Effects parameter is assigned a DMX value of 30, the Layer’s image becomes black and white and cannot 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.

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 cannot 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.
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.

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.

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.

Note: An alpha channel is embedded into content when the media file is created.
CHAPTER 8
Intensity and Color

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 cannot 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.](image1)

![The Layer’s image with an Alpha Invert as Blue Effect.](image2)

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.](image1)

![The Layer’s image with an Alpha Invert as Color Effect.](image2)

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 cannot 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 cannot 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.

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.

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.

51 Lookup 2 False Color

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

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.
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.
**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.](image1)
![The Layer’s image with a Mega Saturation Effect.](image2)

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.](image3)
![The Layer’s image with the Solarize Effect.](image4)
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.

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.
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.

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.
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.

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.
**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.](image1)

![The Layer’s image with the RGB Layer Blend 6 Effect.](image2)

**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.](image3)

![The Layer’s image with the RGB Layer Blend 7 Effect.](image4)
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.

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.
102 Fade to Hue

When the Color Effects parameter is assigned a DMX value of 102, the Layer’s 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-violet-indigo-blue-green-yellow-orange-red). The Blue parameter does not function with this Color 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.
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.

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.
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:

<table>
<thead>
<tr>
<th>Strobe Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(DMX value = 0)</td>
<td>Strobe Off</td>
</tr>
<tr>
<td>OnOff (DMX values 1-24)</td>
<td>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.</td>
</tr>
<tr>
<td>Pulse 1 (DMX values 25-49)</td>
<td>Pulse length is always 1 frame long. Time between pulses varies. Value 25 is the slowest setting; 49 is the fastest setting.</td>
</tr>
<tr>
<td>Pulse 2 (DMX values 50-74)</td>
<td>Time between pulses is 25 frames. Pulse length varies. Value 50 is the longest setting; 74 is the shortest setting.</td>
</tr>
<tr>
<td>Pulse Train (DMX values 75-99)</td>
<td>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.</td>
</tr>
<tr>
<td>Random 1 (DMX values 100-124)</td>
<td>Equal on and off amounts of time. Pulse length varies randomly.</td>
</tr>
<tr>
<td>Random 2 (DMX values 125-149)</td>
<td>Pulse length is always 1 frame. Time between pulses varies randomly.</td>
</tr>
</tbody>
</table>
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.*
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.
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](image1.png)

![Layer with the Unity Scaling Visual Effect](image2.png)
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.
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.

![](image1.png)
- 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.

![](image2.png)
- 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.

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.
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.

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.
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.

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.
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.

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.
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.
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)
CHAPTER 10
Visual Effects

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](image)

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.](image)
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.
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.
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.
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.
**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 1 with no visual effect

Layer 2 with no visual effect

Layer 2 with **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.

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.
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).
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.

**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: Library Window

The Library window of the Catalyst Media Server is primarily used as a reference screen. It lists and describes content available to the server as well as details about the Color and Visual Effects. In addition the screen is used to configure Library folder assignments.

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

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.

![Library window with Folders tab open](image)

Click on a Folder assignment number to open the **Choose a Folder** window.

![Choose a Folder window](image)

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.

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 quickscan where no thumbnails will be created.*
Colour FX Tab

Clicking on the Colour 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.
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.
Chapter 13: Monitoring Information

When using DMX 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. The information displayed on the Layer panels is intended for reference only and can not be recorded directly to the Media Server.

General Layer Panel Information

Layer Panels are displayed in the Catalyst Control window on the PowerMac monitor. 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 and typing in a name. This function is primarily for personal organization purposes.

![Layer Panel Diagram]
CHAPTER 13
Monitoring Information

Layer Panel: File Tab

Click the File tab to display the fields shown in below:

- **Library.** Indicates the currently selected Library Folder and its DMX value.
- **File.** Indicates the currently selected File name and its DMX value.
- **Playback Type.** Indicates the currently selected Playback mode and its DMX value.
- **Playback Speed.** Indicates the currently selected playback speed, expressed as a percentage from 0 to 200%.
- **In Frame.** Indicates the currently selected In Frame number.
- **Current Frame.** Indicates the current Frame number of the movie. When a movie file is playing this value will continuously change.
- **Out Frame.** Indicates the currently selected Out Frame number.

Layer Panel: Position Tab

Click the Position tab to display the fields shown below:

- **X Pos.** The slider and numeric value indicate the right and left positioning of the image along the X-axis.
- **Y Pos.** The slider and numeric value indicate the up and down positioning of the image along the Y-axis.
**Scale.** The slider and numeric value indicate the sizing of the image.

**Z Rot.** The slider and numeric value indicate the rotation of the image around the Z-axis.

**X Rot.** The slider and numeric value indicate the rotation of the image around the X-axis.

**Y Rot (Y Rotation).** The slider indicates the rotation of the image around the Y-axis.

**Smooth.** Indicates the DMX value of the Movement Speed parameter.

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**Layer Panel: Colour Tab**

Click the Colour tab to display the fields shown below:

**Colour Effects.** IField shows the name of the currently selected Color Effect and its DMX value.

**Intensity.** The slider indicates the intensity of the image and the value indicates its DMX value.

**Red.** Indicates the DMX value of the Red parameter.

**Green.** Indicates the DMX value of the Green parameter.

**Blue.** Indicates the DMX value of the Blue parameter.

**Trails.** Indicates the DMX value of the Trails parameter.

**Strobe.** Indicates the name of the currently selected strobing effect.
Layer Panel: FX Tab

Click the FX tab to display the fields shown below:

Visual Effects. Indicates the name of the currently selected Visual Effect and its DMX value.

Aspect. Indicates the DMX value of the Aspect Ratio parameter.

FX 1. Indicates the DMX value of the Parameter 1 (FX1) parameter.

FX 2. Indicates the DMX value of the Parameter 2 (FX2) parameter.

Keystone Correction Preview. Displays the current keystone or shutter shape of the image as assigned by the eight Keystone Correction parameters.
Chapter 14: 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:

<table>
<thead>
<tr>
<th>Hotkey</th>
<th>Output</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>1</td>
<td>Exits diagnostic display mode</td>
</tr>
<tr>
<td>W</td>
<td>1</td>
<td>Enters diagnostic display mode</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>Scrolls forward through diagnostic displays</td>
</tr>
<tr>
<td>R</td>
<td>1</td>
<td>Scrolls backward through diagnostic displays</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>Full screen on</td>
</tr>
<tr>
<td>S</td>
<td>1</td>
<td>Full screen off</td>
</tr>
<tr>
<td>Z</td>
<td>2</td>
<td>Exits diagnostic display mode</td>
</tr>
<tr>
<td>X</td>
<td>2</td>
<td>Enters diagnostic display mode</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>Scrolls forward through diagnostic displays</td>
</tr>
<tr>
<td>V</td>
<td>2</td>
<td>Scrolls backward through diagnostic displays</td>
</tr>
</tbody>
</table>

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)
CHAPTER 14
Diagnostic Displays

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.

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.
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 its 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 information about Catalyst Media Servers connected together over an Ethernet network.
Chapter 15: 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 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.

![Name field](image)

### Using the Remote Machines Diagnostic Display

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.

![Remote Machines](image)

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).
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.
Chapter 17: Audio Input

On any layer, choosing a Visual Effects parameter DMX value of 123 changes the Layer’s output a waveform display of an audio input into the Catalyst Media Server. The waveform can then be manipulated with the Layer’s parameters in the same manner as 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 Catalyst 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.

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.

Waveform Type Selection

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

<table>
<thead>
<tr>
<th>Waveform Type</th>
<th>DMX Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono Sound Waveform with Solid Outline</td>
<td>0</td>
</tr>
<tr>
<td>Mono Sound Envelope with Solid Outline</td>
<td>1</td>
</tr>
<tr>
<td>Mono Sound Single Waveform with Solid Outline</td>
<td>2</td>
</tr>
<tr>
<td>Mono Sound Single Waveform with Dashed Outline</td>
<td>3</td>
</tr>
<tr>
<td>Stereo Sound Dual Envelope with Solid Outline</td>
<td>4</td>
</tr>
<tr>
<td>Spectral Analysis by Frequency</td>
<td>5</td>
</tr>
<tr>
<td>Phase Vector Scope drawn as Solid Lines</td>
<td>6</td>
</tr>
<tr>
<td>Phase Vector Scope drawn as Solid Lines</td>
<td>7</td>
</tr>
<tr>
<td>Phase Vector Scope drawn as Dots</td>
<td>8</td>
</tr>
</tbody>
</table>
Chapter 16: 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.
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.

![Monitor Icon]

4. Choose the desired setting and click to select.
Chapter 18: 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.

<table>
<thead>
<tr>
<th><strong>Serial Button</strong></th>
<th><strong>DMX Value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>4</td>
<td>81</td>
</tr>
<tr>
<td>5</td>
<td>106</td>
</tr>
<tr>
<td>6</td>
<td>131</td>
</tr>
<tr>
<td>7</td>
<td>156</td>
</tr>
<tr>
<td>8</td>
<td>181</td>
</tr>
<tr>
<td>9</td>
<td>206</td>
</tr>
<tr>
<td>10</td>
<td>231</td>
</tr>
</tbody>
</table>
Chapter 19:
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 20:
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 your 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:

   ![Device field]

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 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 *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.

<table>
<thead>
<tr>
<th>Command</th>
<th>DMX Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>no action</td>
<td>0-9</td>
</tr>
<tr>
<td>Play</td>
<td>10-19</td>
</tr>
<tr>
<td>Pause</td>
<td>20-29</td>
</tr>
<tr>
<td>Stop</td>
<td>30-39</td>
</tr>
<tr>
<td>Rewind</td>
<td>40-49</td>
</tr>
<tr>
<td>Fast Forward</td>
<td>50-59</td>
</tr>
<tr>
<td>Cue to time</td>
<td>60-69</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Time Value</th>
<th>DMX Value</th>
<th>Time Value</th>
<th>DMX Value</th>
<th>Time Value</th>
<th>DMX Value</th>
<th>Time Value</th>
<th>DMX Value</th>
<th>Time Value</th>
<th>DMX Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>15</td>
<td>59</td>
<td>30</td>
<td>119</td>
<td>45</td>
<td>179</td>
<td>60</td>
<td>240</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>16</td>
<td>63</td>
<td>31</td>
<td>123</td>
<td>46</td>
<td>183</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>17</td>
<td>67</td>
<td>32</td>
<td>127</td>
<td>47</td>
<td>187</td>
<td></td>
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<td>44</td>
<td>175</td>
<td>59</td>
<td>235</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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:
   \[(1\text{min} \times 60 \times 25) + (30\text{secs} \times 25) + 5\text{frames} = 1500 + 750 + 5 = 2255\]
2. Set the **In Frame** value to 2255 and **Out Frame** to 0.
When the Play Mode parameter is set 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 \((15\text{min} \times 60 \times 25) = 22500\)

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 21: Art-Net™ Protocol

Catalyst Media Servers can receive DMX-512 over an Ethernet network using the Artistic License Art-Net™ protocol. Art-Net is a communications system that allows DMX-512 to be transmitted over Ethernet. Catalyst Media Servers can directly receive the Art-Net protocol instead of standard DMX plugged into the CIB.

To connect several servers to an Art-Net network, power off all servers and run Gigabit Ethernet cable from each server to a shared Gigabit Ethernet hub on the Art-Net network.

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:
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

### Catalyst DMX Protocol

<table>
<thead>
<tr>
<th>Cha #</th>
<th>Function</th>
<th>Description</th>
<th>Value dec.</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Content Selection and Playback</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Library</td>
<td>Selects folder to access from hard drive</td>
<td>0-253</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use Layer</td>
<td>254</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Video Input</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>File</td>
<td>Selects image file from the selected folder</td>
<td>0-255</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Selects layer when Channel 1 value equals 254</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selects video input when Channel 1 value equals 255</td>
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<td>3</td>
<td>In Frame Coarse</td>
<td>Adjusts the In frame point</td>
<td>0-65535</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>In Frame Fine</td>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td>Out Frame Coarse</td>
<td>Adjusts the Out frame point</td>
<td>0-65535</td>
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<td>6</td>
<td>Out Frame Fine</td>
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<td><strong>Play Mode</strong></td>
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<td>0</td>
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<td></td>
<td>Display the Out frame</td>
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<td></td>
<td>Play loop forward</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Play loop reverse</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Play once forward</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Play once reverse</td>
<td>5</td>
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<td>Stop</td>
<td>6</td>
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<td></td>
<td></td>
<td>Random</td>
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<td></td>
<td></td>
<td>PlaySine</td>
<td>8</td>
<td>0</td>
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<td></td>
<td></td>
<td>Play loop forward when intensity is greater than zero</td>
<td>10</td>
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<tr>
<td></td>
<td></td>
<td>Play loop reverse when intensity is greater than zero</td>
<td>11</td>
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<td>Play once forward when intensity is greater than zero</td>
<td>12</td>
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<td></td>
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<td>Play once reverse when intensity is greater than zero</td>
<td>13</td>
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<tr>
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<td></td>
<td>Random when intensity is greater than zero</td>
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<td></td>
<td>PlaySine when intensity is greater than zero</td>
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<td>Synchronize to master unit (1-20)</td>
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<td>Synchronize to MIDI Timecode</td>
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<td>Synchronize to Deck Timecode</td>
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<td>Synchronize to Sony 1</td>
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<td></td>
<td>Synchronize to Sony 2</td>
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</tr>
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<td></td>
<td>Synchronize to Sony 3</td>
<td>105</td>
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<td></td>
<td>[Reserved]</td>
<td>106-255</td>
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<tr>
<td>8</td>
<td><strong>Playback Speed</strong></td>
<td>Playback at 100% recorded speed</td>
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<td>0</td>
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<td></td>
<td></td>
<td>Pause playback</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
<td>Playback at 0–200% recorded speed</td>
<td>2-255</td>
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## Position Control

<table>
<thead>
<tr>
<th>Cha #</th>
<th>Function</th>
<th>Description</th>
<th>Value</th>
<th>Default Value</th>
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</thead>
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<tr>
<td>9</td>
<td>X-axis Rotate (vertical flip) Coarse adjustment</td>
<td>Continuous variable-speed counterclockwise image rotation around the X-axis (fast to slow)</td>
<td>0-16382</td>
<td>16383</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>16383</td>
<td>16384-32767</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rotates the image counterclockwise around the X-axis from 720° to 0°</td>
<td>16384-32767</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>X-axis Rotate (vertical flip) Fine adjustment</td>
<td>0° rotation about the X-axis</td>
<td>32768</td>
<td>32768</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rotates the image clockwise around the X-axis 0° to 720°</td>
<td>32769-49152</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>49153</td>
<td>49154-65535</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous variable-speed clockwise image rotation around the X-axis (slow to fast)</td>
<td>49154-65535</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Y-axis Rotate (horizontal flip) Coarse adjustment</td>
<td>Continuous variable-speed counterclockwise image rotation around the Y-axis (fast to slow)</td>
<td>0-16382</td>
<td>16383</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>16383</td>
<td>16384-32767</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rotates the image counterclockwise around the Y-axis from 720° to 0°</td>
<td>16384-32767</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0° rotation about the Y-axis</td>
<td>32768</td>
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<td>12</td>
<td>Y-axis Rotate (horizontal flip) Fine adjustment</td>
<td>Rotates the image clockwise around the Y-axis 0° to 720°</td>
<td>32769-49152</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>49153</td>
<td>49154-65535</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous variable-speed clockwise image rotation around the Y-axis (slow to fast)</td>
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</tr>
<tr>
<td>13</td>
<td>Z-axis Rotate (circular rotation) Coarse adjustment</td>
<td>Continuous variable-speed counterclockwise image rotation around the z axis (fast to slow)</td>
<td>0-16382</td>
<td>16383</td>
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<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>16383</td>
<td>16384-32767</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rotates the image counterclockwise about the z axis from 720° to 0°</td>
<td>16384-32767</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0° rotation about the z axis</td>
<td>32768</td>
<td>32768</td>
</tr>
<tr>
<td>14</td>
<td>Z-axis Rotate (circular rotation) Fine adjustment</td>
<td>Rotates the image clockwise around the z axis 0° to 720°</td>
<td>32769-49152</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous rotation stop</td>
<td>49153</td>
<td>49154-65535</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous variable-speed clockwise image rotation around the z axis (slow to fast)</td>
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<tr>
<td>15</td>
<td>Scale Coarse adjustment</td>
<td>Adjusts size of inverted image from 8x actual size to 0 Image scaled to 0 (vanishes)</td>
<td>0-32767</td>
<td>32768</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resizes images from 0 to actual size</td>
<td>32769-36863</td>
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</tr>
<tr>
<td>16</td>
<td>Scale Fine adjustment</td>
<td>Actual size</td>
<td>36864</td>
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<tr>
<td></td>
<td></td>
<td>Adjusts normal image size from 0 to 8x actual size</td>
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</tr>
<tr>
<td>Cha #</td>
<td>Function</td>
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<td>Value</td>
<td>Default Value</td>
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<td>-------</td>
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<td>---------------------------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td>17</td>
<td>X Position</td>
<td>Moves image left from center of display</td>
<td>0-32767</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>X Position</td>
<td>Centers image left-to-right in display</td>
<td>32768</td>
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</tr>
<tr>
<td></td>
<td>Fine adjustment</td>
<td>Moves image right from center of display</td>
<td>32769-65535</td>
<td>32768</td>
</tr>
<tr>
<td>19</td>
<td>Y Position</td>
<td>Moves image down from center of display</td>
<td>0-32767</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Y Position</td>
<td>Centers image up-and-down in display</td>
<td>32768</td>
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</tr>
<tr>
<td></td>
<td>Fine adjustment</td>
<td>Moves image up from center of display</td>
<td>32769-65535</td>
<td>32768</td>
</tr>
<tr>
<td>21</td>
<td>Aspect Ratio</td>
<td>Compresses image horizontally</td>
<td>0-128</td>
<td>0</td>
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<td></td>
<td></td>
<td>Compresses image vertically</td>
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<td></td>
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<tr>
<td>22</td>
<td>Movement Speed</td>
<td>Image movement speed</td>
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<tr>
<td></td>
<td><strong>Intensity and Color Control</strong></td>
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<tr>
<td>23</td>
<td>Intensity</td>
<td>Black</td>
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<td>0</td>
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<td></td>
<td></td>
<td>Adjusts intensity from black to full</td>
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<td></td>
<td></td>
<td>Full intensity</td>
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<tr>
<td>24</td>
<td>Red</td>
<td>Filters out all Red in image</td>
<td>0</td>
<td>255</td>
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<tr>
<td></td>
<td></td>
<td>Adjusts less to full Red in image</td>
<td>1-254</td>
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<tr>
<td></td>
<td></td>
<td>Red in image unaffected</td>
<td>255</td>
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</tr>
<tr>
<td>25</td>
<td>Green</td>
<td>Filters out all Green in image</td>
<td>0</td>
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<td></td>
<td>Adjusts less to full Green in image</td>
<td>1-254</td>
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</tr>
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<td>Green in image unaffected</td>
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<tr>
<td>26</td>
<td>Blue</td>
<td>Filters out all Blue in image</td>
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<td>Adjusts less to full Blue in image</td>
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<td>Blue in image unaffected</td>
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<td><strong>Effects Control</strong></td>
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<tr>
<td>27</td>
<td>Strobing</td>
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<td>Strobe pattern 4</td>
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<td>Flicker/Black</td>
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<td>Random</td>
<td>125-149</td>
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<td>No strobe</td>
<td>150-255</td>
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<tr>
<td>28</td>
<td>Trails</td>
<td>Creates persistent afterimages with increasing duration</td>
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<tr>
<td>29</td>
<td>Color Effects</td>
<td>RGB Subtract</td>
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<td>RGB Subtract High Contrast</td>
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<td>RGB Subtract Very High Contrast</td>
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<td>Description</td>
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<td>Color Effects (continued)</td>
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<td>RGB Subtract Super High Contrast Inverted Color</td>
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<td>Invert Whatever</td>
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<td>RGB Subtract Inverted Color CMY</td>
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<td>Black White High Contrast</td>
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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 colours of the cores in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in the fixture’s plug. Therefore, install a line cord cap in accordance with the following code:

- The core coloured green and yellow must be connected to the plug terminal which is marked with the letter “E,” or by the earth symbol 🌋, or coloured green, or green and yellow.
- The core coloured blue must be connected to the terminal which is marked with the letter “N”, or coloured black.
- The core coloured brown must be connected to the terminal which is marked with the letter “L” or coloured 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 .

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<td>Media Server control rack roadcase</td>
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<td>LCD Monitor</td>
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<td>Heavy duty 5-pin XLR cable(10')</td>
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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*


*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 colours of the cores in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
   • the core which is coloured 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 coloured green or green and yellow.
   • the core which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
   • the core which is coloured brown must be connected to the terminal which is marked with the letter L or coloured 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.
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 siguiente:
   • marron—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 TILSLUTTETS KLEMME MAERKET ☑ ELLER ✗.
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