# DL.3 Digital Light with Collage Generator™ Software

# User Manual





DL.3 User Manual
Software Release Version 2.0
July, 2010

HIGH END SYSTEMS

BARCO
Visibly yours

## Contacting High End Systems®


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## Patents

# Declaration of Conformity

according to ISO/IEC Guide 22 and EN45104

**Manufacturer's name:** **High End Systems, Inc.**

**Distributor's name:** **High End Systems, Inc.**

**Distributor's address:** **2105 Gracy Farms Lane**

**Austin, Texas 78758 USA**

**Declares that the product:**

**Product Name: DL.3**
**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 2005:

**Safety:** EN 60598-1: 1997
EN 60598-2-17; 1990
A1-A3: 1998
A13: 1999

EMC:

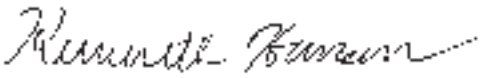
EN 55022

Conducted Emissions Class A
Radiated Emissions Class A
ANSI C63.4 Class A
FCC 47 CFR Part 15 Class A
VCCI V-1/2001.04 Class A

EN 55024

EN 61000-4-2 4/8kV
EN 61000-4-3 A1 3V/m
EN 61000-4-4 1kV/0.5kV
EN 61000-4-5 2kV/1kV
EN 61000-4-6 3 Vrms
EN 61000-4-11 >95%-0.5p, 30%-25p,>95%-250p

EN 61000-3-2 Class A
EN 61000-3-3



USA, Friday, July 09, 2010
Kenneth Stuart Hansen, Compliance Engineer

## Product Modification Warning

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

**Mise En Garde Contre La Modification Du Produit**

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

**Produktmodifikationswarnung**

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

**Avvertenza Sulla Modifica Del Prodotto**

I 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.

## Important Safety Information

Instructions pertaining to continued protection against fire, electric shock, and injury to persons are found in Appendix E. 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 E. 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 E. 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 E. Si prega di leggere tutte le istruzioni prima di assemblare, montare e azionare l'apparecchiatura.

**Informacion Importante De Seguridad**

En el Apéndice E 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.

## Symbols

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

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

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

**WARNING: This symbol appears adjacent to potential fire hazard messages. Not heeding these messages could result in serious personal injury.**


**This symbol indicates the minimum focus distance from a combustible object.**

**This symbol cautions against mounting the fixture on a flammable surface.**

**This symbol indicates that, while operating, equipment surfaces may reach very high temperatures. Allow the fixture to cool before handling.**

## Fog Machine Warning

Like all high quality video projection units, DL.3 fixtures must be kept protected from excessive amounts of glycol fog, mineral oil, and smoke. Digital lights incorporate advanced air filtering to reduce these risks to a minimum; however, the user must follow these guidelines to ensure continued operation of the fixture:

- Air filters (both fixture and projector) should be checked and cleaned on a regular basis. When used in a closed or fixed environment where fog or haze is used, we recommend at least a weekly check.
- Do not situate DL.3 fixtures in areas of high fog density such as directly in front of a fog machine or mineral oil hazer.
- Minimize the exposure of DL.3 fixtures to both glycol fog and mineral oil.

Digital lights are highly complex and sensitive electro-optical devices and care and thought in how it is used, rigged, and positioned will maximize the product's life and your investment.

Failure to follow these guidelines and carry out regular maintenance will void the warranty.

## Packaged Media Notice:

Any use of this product other than consumer personal use in any manner that complies with the MPEG-2 Standard for encoding video information for packaged media is expressly prohibited without a license under applicable patents in the MPEG-2 patent portfolio, which license is available from MPEG LA, L.L.C., 250 Steele Street, Suite 300, Denver Colorado 80206.

## Warranty Information

**Limited Warranty**

Unless otherwise stated, your *product (excluding the lamp)* is covered by a one year parts and labor limited warranty. The lamp warranty for Christie projectors is 120 days or 500 hours whatever comes first. 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.

*NOTE: 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 OTHER THAN THE LIMITED WARRANTY STATED ABOVE. 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 specific to your locality.

## What You Should Know About Copyright

The following FAQ can help you understand copyright laws and how they apply to content used with the DL.3 fixture

By *Suzy Vaughan Associates* for High End Systems.

*I want to use a film clip from "When Harry Met Sally" 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, trade shows, 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 music? I hear you can use 8 bars for free.**

8 bars for free is a fallacy that has been passed around as a fact for a long period of time. However, it isn't true. Both musical compositions and records require licensing and payment.

What about High End Systems material included with the DL.3 fixtures and Axon Media Servers? Do I have to clear that?

No. High End Systems has worked to provide clearance for the content that is provided. Any materials you received directly from HES with the purchase of a new DL.3 have already been properly licensed for your use in shows and presentations. That does not, however, license you to sell this content separately from your unit. 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. What do I do to 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.

Suzy Vaughan Associates has 20 years of experience in clearing clips, talent, and music for use in any number of venues. Their clients include Barbara Streisand, Michael Jackson, and The Emmys among other shows.

You can obtain more information about Suzy Vaughan Associates' services by calling 818-988-5599 or emailing info@suzyvaughan.com. Their website is www.suzyvaughan.com. Suzy Vaughan is also an attorney specializing in intellectual property issues.

**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. Since price is content-sensitive, the best thing to do is to contact a clearinghouse like Suzy Vaughan Associates and let them find out for you.

# Table of Contents

## Chapter 3: The Digital Light Menu System

*DL.3 and DL.2 digital lights have an onboard Menu System you can use to configure the fixture, review diagnostic feedback, and view content information.*

## Chapter 4: DMX Programming Basics and Quick Start

*If you are new to DMX programing, this chapter gives you a brief overview on programming DL.3, DL.2, and Axon media servers and an example of using a Wholehog console to patch and display output from a media server.*

## Chapter 5: Tutorials

*Five simple lessons get you started programming DL.3, DL.2, and Axon media servers with a Wholehog or other DMX console.*



## Chapter 6: Graphics Engine Overview

*DL.3, DL.2, and Axon Media servers all use the same graphic engine software to control content selection, playback, and 3-D Object and Global manipulation.*



## Chapter 7:

## Graphic Functions: Defining Content

*Each Graphic Object's content is composed of a 3-D object overlaid with a media file. This chapter outlines how to select an image's object and media file components as well as define the video segment and its playback.*



## Chapter 8: Graphic Functions: Rotation, Position, Scale

*You can independently control each Graphic Object's rotation direction and speed; along with its position and scale in X, Y, and Z axis directions.*

## Chapter 9: Graphic Functions: Opacity and Effects

*You can adjust opacity and apply a variety of color mixing and geometric effects to each individual Graphic Object.*



## Chapter 10: Graphic Functions: Synchronizing Content

*After designating a master fixture, you can synchronize the content of other Axon, DL.3, or DL.2 fixtures to any Graphic Object on the master in terms of playback time, rotation or both.*

## Chapter 11: Global Functions

*Global Graphic controls affect the composite image created by defining multiple separate object graphics. You can adjust intensity, define masks, select a point in space to view the composite image, and control keystone correction.*

## Chapter 12: Global Functions: Collage Generator™ Effect

*Using the Collage Generator™ effect option lets you configure multiple media server outputs to display a single image in arrays up to 16 units horizontal by 8 units vertical.*



## Effect Mode Options Descriptions

*Effects can be applied to the Media File content (texture) mapped onto a 3-D object. Multiple Color and Geometric effects are available in Effect Mode parameters for both individual Graphic object and Global control.*

## Chapter 14: Fixture Motion Functions

*This chapter describes mechanical movement control for DL.3 and DL.2 fixtures.*

## Chapter 15: Live Video Input and Control

*The graphics engine in a DL.3 fixture can receive video from an external source or its own integrated digital video camera equipped with an infared illuminator to provide a direct digital video feed option. The features described in this chapter are not available on the DL.3F model.*



## Content Management Application (CMA)

*A Content Management Application (CMA) running on an Axon media server or a computer connected through an Ethernet network gives you remote control of content, software and configuration management functions.*

## Chapter 17: Maintenance and Troubleshooting

*This chapter includes information on replacing parts, cleaning the fixture, and some basic troubleshooting procedures.*

# Chapter I:

# Product Overview

***This chapter describes the features of the DL.3 Digital Light and the Content Management Application software.***

The DL.3 (Digital Light 3) fixture merges video projection and automated lighting technologies with a DMX controllable digital media server housed in a moving yoke fixture. The built-in 32-bit **Graphics Engine** utilizes Windows XP Embedded and DirectX application programming interface to provide extensive image control of multiple 3-D graphic objects.

DL.3 fixtures use the DMX512 protocol to control hardware functions like pan, tilt, as well as graphic control of the internal media server. Media control functions include loading images and movies and mapping them onto 3-D graphical objects. The internal graphics engine lets you manipulate position, scale, and rotation; apply visual effects and color mix each graphic object. You can create and control up to nine of these objects and then apply global effects to the composite image. A DL.3 fixture provides an extensive library of over 1500 high-resolution lighting-optimized video and still images.

The **Collage Generator™** feature allows you to create seamless vertical, horizontal or central panoramic media projections using multiple DL.2 and DL.3 units controlled from a lighting console. Using multiple digital lighting fixtures allows you to increase effective screen luminance.

The DL.3 fixture provides a fully equipped internal digital camera and IR illuminator to input live video to its own graphic engine or to another DL.3 fixture or device. While combining camera and light from the same source, the camera also features optical and digital zoom, frame rate and invert effects as well as freeze frame, color negative and grayscale conversion effects. DL.3 can also accept SDI, HD-SDI, S-Video and RGBHV formats from external sources.

***NOTE: The DL.3F fixture model for fixed installations incorporates all the functionality of the DL.3 model with the exception of the onboard camera/illuminator system and SDI and S-Video in and out.***

The **Content Management Application** (CMA) software runs on your workstation or laptop computer and communicates with other DL.3 fixtures as well as DL.2 fixtures and Axon media servers over an Ethernet network. The CMA lets you remotely upload, move and clone content files, configure fixtures, and upgrade software. It also provides tools for resource monitoring and the capability for downloading log files to assist customer service in diagnosing any software issues that may arise.

# Features

## System

- 7000 ANSI lumens output
- 2200:1 Contrast Ratio creates exceptional video black
- SDI, RGBHV and S-Video connections accept a wide range of media device inputs (not available in DL.3F models)
- Accessory Long Throw (2.4 - 4.3:1), Ultra Long Throw (4.3-6:1), and Wide Angle (1.3-1.8:1) Zoom lenses are available to maximize fixture positioning options.
- Vertical lens shift capability reduces pixel loss due to keystone correction
- A royalty-free stock digital art collection features more than 1,500 lighting-optimized files.
- DL.3 software utilizes Windows XP Embedded and DirectX technology
- Powerful Content Management and Configuration software can remotely manage multiple DL.3, DL.2, and Axon media servers over an Ethernet network
- Integrated Sony camera with Super HAD image sensor technology and infrared illuminator provides live video input and output from fixture location (not available in the DL.3F model).
- Allows importing of custom content including: 3D objects, media files, still images.
- DMX512 or Art-Net options for DMX console connection
- Provides remote software upgrade capability

## Graphics Engine

- Supports simultaneous playback of up to nine discrete media streams on separate 2D/3D objects
- Image Optimizing Controls let you adjust both Black Level and Contrast for each cue and for each image
- 34 Object parameters give you graphic controls for each individual media stream including:
  - A choice of multiple play modes and play speeds
  - The ability to define any segment of a video loop including Scrub capability
  - Three Graphic Effect Mode channels provide multiple color mixing and visual effects
  - Variable Opacity to allow for crossfading or dissolves between media streams
  - Full control of image Rotation, Positioning and Scaling on X, Y and Z axes
  - Visual Modes that let you control black level and contrast to optimize content
  - Video input or camera capture you can apply to 2D/3D objects *(not available in the DL.3F model)*
- 52 Global parameters provide graphic controls to the composite image created by up to nine media streams
  - Collage Generator™ technology configures multiple media server outputs to display a single image in arrays up to 16 horizontal x 8 vertical.
  - Curved Surface Support corrects for shape distortions that occur when you project onto surfaces that aren't flat.
  - Intensity overlays the opacity control to provide system-wide intensity level

  - Overall image Color Mixing applied to composite media stream image
  - Five Global Effect Mode channels provide multiple effects that can be applied to the composite image
  - Multiple Mask selections with edge fading and strobe effects
  - Edge fading for creating montages
  - Keystone correction of output projection
  - Digital Framing Shutters
  - Viewpoint controls provide ability to change viewing angle/perspective on images
- Multiple modes are available for synchronizing content playback on multiple media servers linked through an Ethernet network.

## Content Management Application

- Available for Windows and Mac operating systems
- Communicates with other DL.3, DL.3F, DL.2, Axon media servers over an Ethernet network
- Uploads and downloads custom digital content to fixtures on a DMX link
- Configures DL.3, DL.3F, DL.2 and Axon media servers
- Updates software including content, applications, and operating system to DL.3, DL.3F, DL.2 and Axon media servers.
- Three “gas gauges” in the server’s Hardware Tab let you view available CPU, GPU and HDD resources remaining. This gives you the information you need to manage additional layers within the capabilities of the hardware available in their system.
- Log File Download available in All Servers view in the CMA to provide troubleshooting information to customer service if a problem occurs. Logs are saved with a .dlf (digital log file) extension.

## Hardware

### DL.3 and DL.3F Models

- 17 Motion Parameters for mechanical fixture control include:
  - Mechanical Iris adjustment to full black-out
  - 400-degree Pan and 240-degree Tilt movement
  - DMX control of projector zoom and focus
  - DMX control of camera functions (not available in the DL.3F model)
- Full color display and menu functions
- Mechanical lens shift (107% vertical) to supplement software keystone correction.
- Powered by an Intel Core2 Quad Q9550 processor, a 750 GB Seagate SATA hard drive, an ATI Radeon HD4850 video card and a Decklink SDI High Definition capture card.

***NOTE:Some earlier versions of DL.3 media servers may have a different hardware configuration. Find all hardware configurations listed by serial number at the DL.3 support page of the High End System website (www.highend.com/support).***

***DL.3F models do not contain an SDI capture card.***

- Gigabit Ethernet for fast content uploading and multiple fixture synchronization
- Mounting system provides multiple orientation options
- Advanced filtration system reduces overall fixture noise

### DL.3 Models only

- Integrated digital camera feeds digital video capture directly into the graphic engine that provides:
  - Optical + digital zoom to increase image up to 216×
  - Options for 1-30 frame captures per second
  - Vertical and/or Horizontal image inversion
  - Black and White, Color Negative and Freeze Frame effects
  - White Balance including Red and Blue gain control
- Infrared illuminator allows video capture even in blackout settings
- Remote video input and output switching let you select live video from external source including another DL.3 fixture's camera feed.

## Related Products and Accessories

The following table lists related products and accessories available for the DL.3 fixture. For more information, contact your High End Systems dealer/distributor (see *Contacting High End Systems®* on page ii).

| Part Description | Part Number |
|---|---|
| Replacement lamp | 55030085 EF |
| Replacement Standard Zoom lens | 99310481 |
| Accessory Long Zoom Lens kit | 68060002 |
| Accessory Wide Angle Zoom Lens kit | 68060003 |
| Accessory Ultra Long Zoom Lens kit | 68060001 |
| 5-amp, slow-blow fuse | 90403012 |
| Replacement HEPA filter | 80260021 |
| Wholehog 3 lighting console | 61020003 |
| Road Hog Full Boar lighting console | A6020001 |
| Galvanized safety cable | 12040001 |
| Mega-Claw clamp | 67040007 |
| Male 5-pin DMX terminator | 90404039 |
| Heavy duty 5-pin XLR cable (10') | 55050017 |
| Heavy duty 5-pin XLR cable (25') | 55050018 |
| Heavy duty 5-pin XLR cable (50') | 55050019 |

| Part Description | Part Number |
|---|---|
| Heavy duty 5-pin XLR cable (100') | 55050020 |

# Chapter 2:

# Setup and Configuration

***Hardware setup includes mounting, connecting to power and establishing Ethernet and DMX links. Software setup includes launching the Content Management Application (CMA) and configuring the fixture for DMX control.***

## Hardware Setup

The following steps make up the hardware setup for DL.3 fixtures:

1. **Unpack DL.3 Media Server.**
2. **Install power cord cap if necessary for your location.**
3. **Mount the fixture upright or suspended from a standard truss.**
4. **Connect to an Ethernet network linked to a computer or an Axon media server running CMA software, and any other DL.3, DL.2 or Axon units you wish to control via the CMA.**
5. **Connect the fixture to a DMX controller via DMX cabling or Art-Net on the Ethernet network.**
6. **Connect the fixture to power.**

### Unpacking the Fixture

Your DL.3 fixture ships in a road case specifically designed to protect the product during transport. When unpacking, inspect both the outside of the fixture and the projector for physical damage to components.

Your fixture ships with the following:

- One DL.3 fixture in road case
- Two mounting brackets
- One safety cable
- Documentation CD that contains
  - — CMA application
  - — User Manual in .pdf format
  - — Fixture software
  - — Recovery software image

High End Systems® assumes no responsibility for products that are damaged during transport. Return a product for repair in its road case.

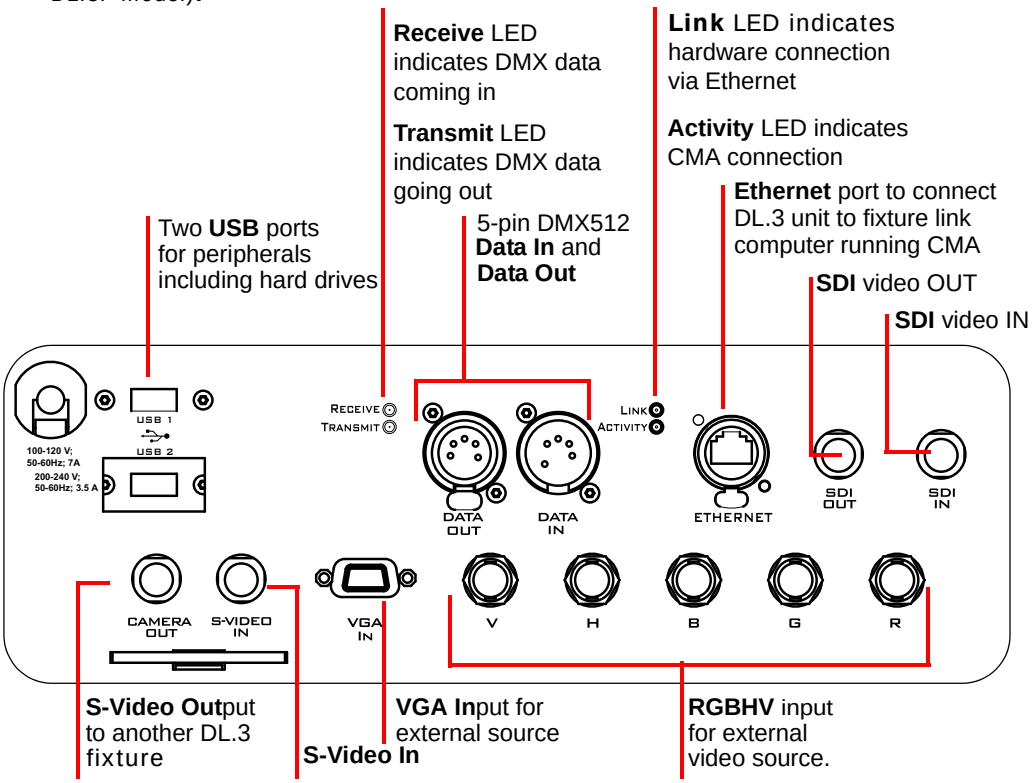
Before sending anything to the factory, call your High End Systems dealer/distributor for a Return Material Authorization (RMA) number. The factory cannot accept any goods shipped without an RMA number.

# Hardware Components

## Connection Ports

The DL.3 fixture's back panel provides ports for:

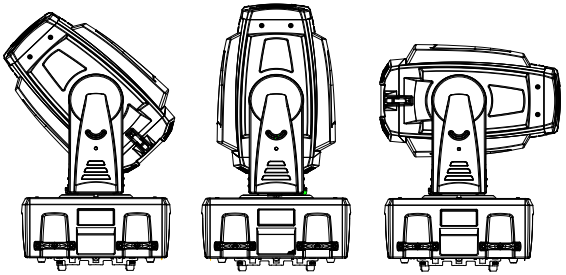
- **5-pin DMX Data In and Data Out** (see *Linking DL.3 Fixtures* on page 13 for more information).
- **Ethernet** to connect to other DL.3 fixtures and your computer running the Content Management Application (CMA) software on a fixture link (see *Setting up an Ethernet Fixture Link* on page 13).
- Two **USB** ports for connecting peripheral drives to assist with troubleshooting
- **RGBHV, VGA, S-Video In,** and **SDI** options for video input/output (not available in DL.3F model).
- **Camera Out** provides S-Video input from output from the internal camera to another DL.3 fixture or other external video output device (not available in DL.3F model).
- **Serial Digital Interface** options for input from the internal camera to the media server and output to another DL.3 fixture or other external video output device (not available in DL.3F model)**.**



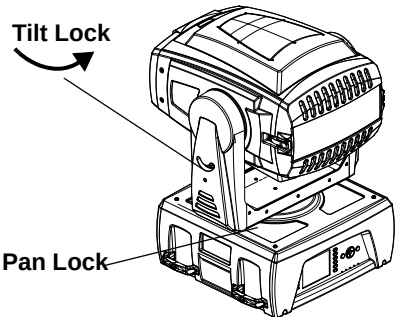

**CAUTION:**
**To avoid damaging the fixture and voiding the warranty, do not physically connect to the RGBHV and VGA inputs at the same time.**

### Pan and Tilt Locking

The DL.3 fixture ships with pan and tilt latches locked. You can unlock/adjust these latches to stabilize the fixture for mounting.



Tilt Lock Position Options




*NOTE: Disengage Pan and Tilt locks before operating the fixture.*

## Attaching a Power Cord Cap

The DL.3 fixture ships with an SJT power cord. Use the information in this section to replace the power cord cap for locations with another electrical standard.

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 coloured according to the following code:

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

### Installing a Line Cord Cap - U.K. Only

In the United Kingdom, core colours in the mains lead of this equipment may not correspond with the colored markings identifying the terminals in the fixture's plug. In that case, install a line cord cap according to the following code:

- Connect the green and yellow core to the plug terminal marked with the letter "E," or by the earth symbol ⏚ or coloured green, or green and yellow.
- Connect the blue core to the terminal marked with the letter "N" or coloured black.
- Connect the brown core to the terminal 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!
Lederne med gul/groen isolation maa kun tilsluttes en klemme maerket ⏚ eller ⏚

## Mounting the Fixture

You can mount DL.3 fixtures suspended from a support system (such as a truss) or freestanding on its base.

**WARNING!**
**Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.**

**CAUTION!**
**Only experienced lighting personnel should attempt to hang a lighting fixture to an appropriate theatrical truss.**


**Maintain a minimum focus distance of 1.4 meters from a combustible object.**

**Do not mount on a flammable surface.**

*NOTE: Due to the wide variety of possible lighting designs, High End Systems cannot make specific mounting recommendations. Consider the following procedure as a suggested guideline only.*

### Fog Machine Warning

Like all high quality video projection units, the DL.3 fixture must be kept protected from excessive amounts of glycol fog, mineral oil, and smoke. DL.3 incorporates a two-stage air filtering system with additional washable prefilters in the head and base housing to reduce these risks to a minimum. However, you must follow these guidelines to ensure continued operation of the fixture:

- Air filters (both fixture and projector) should be checked and cleaned on a regular basis. When used in a closed or fixed environment where fog or haze is used, we recommend at least a weekly check.
- Do not situate DL.3 in areas of high fog density such as directly in front of a fog machine or mineral oil hazer.
- Minimize the exposure of DL.3 to both glycol fog and mineral oil.

DL.3 is a highly complex and sensitive electro-optical device and care and thought in how it is used, rigged, and positioned will maximize the product's life and your investment.

*NOTE: Failure to follow these guidelines and carry out regular maintenance will void the warranty.*

## Mounting the Fixture Upright

**CAUTION!**
**Do not mount the fixture upright without the four rubber feet attached.**

To mount the fixture upright, place the fixture on a sturdy, stable surface that will support more than the 63.5 kg (140 lb) weight of the DL.3 fixture. If the surface is above floor height, use safety cables to secure the fixture to the surface.

## Truss Mounting

When mounting the fixture on a truss or another type of support:

- Verify the truss or support will handle the combined weight of all the devices on the truss.
- Always mount the DL.3 fixture with the mounting bracket assembly that shipped with your fixture and a safety cable attached (using the mounting bracket) to the fixture's base.

**WARNING!**
**Before mounting, disconnect power to the fixture. If it has been operating, allow the fixture to cool for five minutes before handling.**

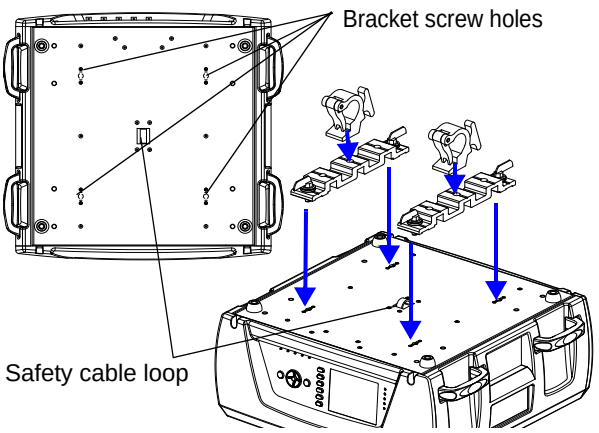
**CAUTION!**
**Only experienced lighting personnel should attempt to hang a lighting fixture to an appropriate theatrical truss.**

**WARNING!**
**In all cases, a safety cable should also be fixed between the safety cable mounting point located at the bottom of the fixture base housing and the truss. Failure to use a safety cable could result in injury or death. High End Systems supplies the proper safety cables and may be contacted for replacements if necessary. For more information go to: www.highend.com/trusshang**

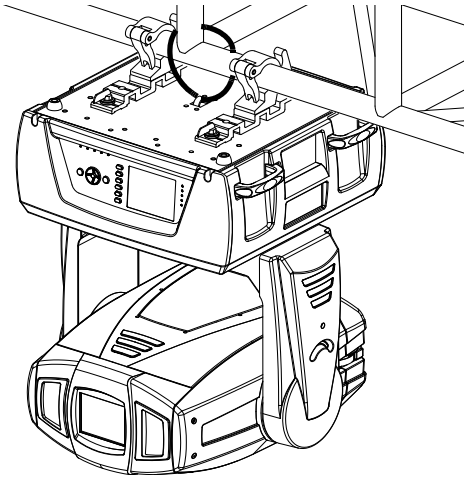
**Do not use C- Clamps to mount the DL.3 fixture to truss.**

Use the following steps to mount a DL.3 fixture on a standard truss:

1. Due to its size and weight, at least two people should support the fixture. Always stand on a firm, stable surface when mounting a fixture to its support.
2. Mount the clamps that shipped with fixture to the mounting brackets and then attach the two mounting brackets to the base of the fixture using the provided quarter-turn screws. Tighten the clamps firmly to the fixture's base and to the support.



3. Run the safety cable through the loop on the fixture's base, and around the truss.



***NOTE:*** ***High End Systems does not recommend operating the DL.3 fixture with the base perpendicular to the stage floor (fixture mounted sideways). Side mounting will result in significantly decreased lamp life.***

## Linking DL.3 Fixtures

DL.3 fixtures should be linked to a standard DMX512 link for control by a DMX desk as well as a Ethernet fixture link for CMA functions. The number of fixtures you can connect to a DMX link are determined by the combined number of channels required by all the fixtures. The DMX channel footprint of a DL.3 fixture is determined by the Protocol and the number of Graphic Objects you select for control. For more information on channel footprints for different configurations of DL.3 fixtures, see *DL.3 and DL.2 Version 2 DMX Channel Assignment* on page 321.

Use data-grade cable and 5-pin XLR cable connectors. For cable and connector specification, see *Cables and Connectors* on page 361. Test each cable with a voltage/ohm meter (VOM) to verify correct polarity and to make sure that the negative and positive pins are not grounded or shorted to the shield or to each other.

**CAUTION!**
**Do not connect anything to the ground lug on the XLR connectors.**

**Do not connect or allow contact between the common (cable shield) and the fixture's chassis ground. Grounding the common could cause a ground loop and/or erratic behavior.**

To link one or more fixtures to a DMX controller:

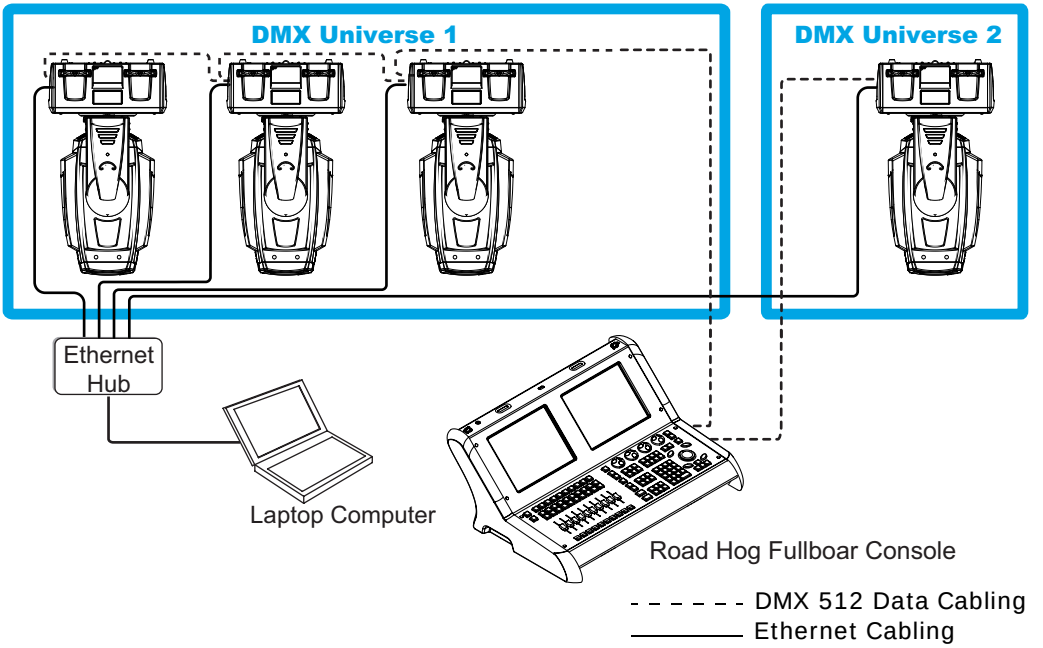
1. Connect the male XLR connector of a DMX Data cable to the controller's DMX Data Out connector.
2. Connect the Data cable's female XLR connector to the Data In connector of the first (or next) fixture on the DMX link.
3. Continue linking the remaining fixtures connecting a cable from the Data Out connector of each fixture to the Data In connector of the next fixture on the link.
4. Connect a male terminator to the Data Out connector of the last fixture in the link (see *Powering On the Fixture* on page 15). For information on obtaining a terminator, see *Related Products and Accessories* on page 4. You can construct a terminator according to the specifications listed in *Cables and Connectors* on page 361.

### Setting up an Ethernet Fixture Link

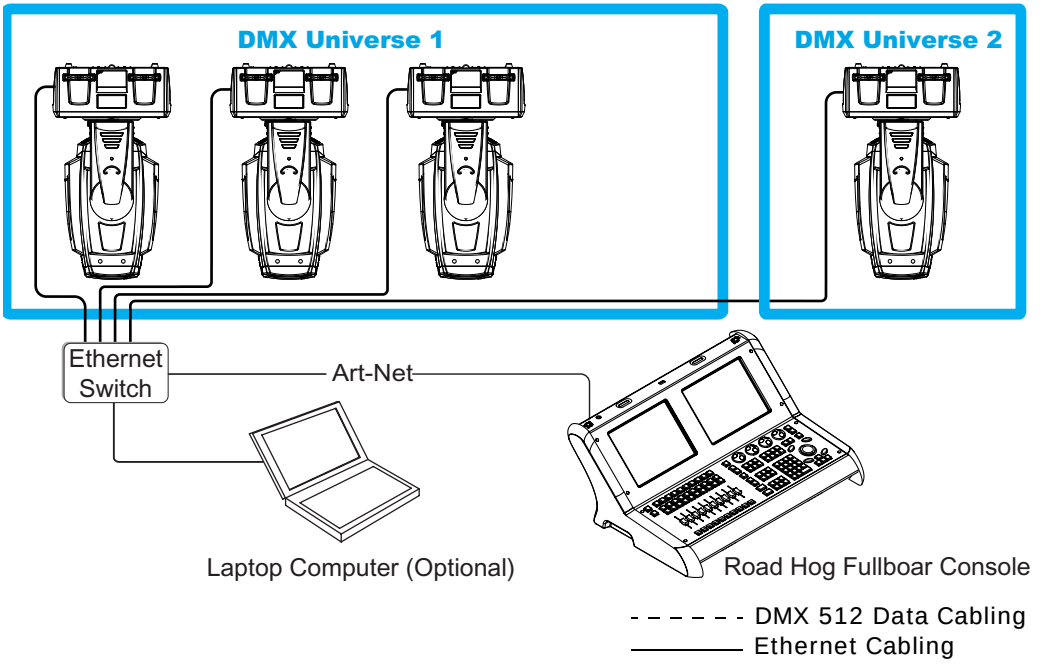
DL.3 fixtures utilize an Ethernet network to synchronize playback and access the CMA software for remote content management and fixture configuration. If you are using a DMX console and other automated lighting products compatible with Art-Net, this network can also serve as the link for DMX control.

### Linking Configurations

The following diagrams show configuration options for linking DL.3 fixtures to each other via Ethernet for accessing the Content Management Application running on your computer, and to the DMX512 link for DMX desk control.




**Configuration Option 1**




**Configuration Option 2**

## Powering On the Fixture

**WARNING:**
**This equipment is designed for connection to a branch circuit having a maximum overload protection of 20 A.**

**CAUTION:**
**Do not power on the fixture until *verifying* that the line cord cap is suitable for the power source in your location. For more information, see *Attaching a Power Cord Cap* on page 9.**

**Disengage Pan and Tilt locks before operating the fixture. For more information, see *Pan and Tilt Locking* on page 9.**

To power on the DL.3 fixture, simply connect it to an appropriately-rated power source.

**CAUTION:**
**Always isolate DL.3 fixtures from generators with a UPS or good quality power conditioner to prevent damage occurring to the integrated media server and projector housed in the DL.3 from generator drop-outs, and sharp voltage and frequency fluctuations.**

### Homing the Fixture

When the DL.3 fixture is connected to an appropriately-rated power source, it automatically begins a homing procedure to verify that the major functions of the fixture and its internal projector are oriented properly.

***Shortcut:*** ***Holding down the inner most (i.e. middle) two menu tab buttons for more than two seconds will home the unit.***

### The DL.3 Menu Display Panel

The DL.3 display panel gives access to the fixture's onboard menu system. *Chapter 3: The Digital Light Menu System* describes the menu system configuration options in detail.

***NOTE:*** ***Most configuration features are also available through the Content Management Application (CMA), (see* Viewing Server Configuration on page 278.)**

# Software Setup

Software setup for DL.3 fixtures requires the following steps:

1. **After powering on the DL.3 media server, launch the CMA software.**
2. Check the software version installed and upgrade if necessary.
3. Configure the DL.3 fixture's DMX source, DMX protocol, and DMX Start Channel.

## Installing and Launching the Content Management Application (CMA)

The Content Management Application software that shipped on CD with your fixture communicates remotely with all DL.3, DL.2 and Axon media servers over an Ethernet network to:

- Upload and download custom digital content to fixtures
- Remotely control all menu commands
- Update software

Axon media servers can run the CMA directly. If your fixture network is linking DL.3 and DL.2 fixtures only, you will need to run the CMA on a computer connected to the Ethernet link you have established.

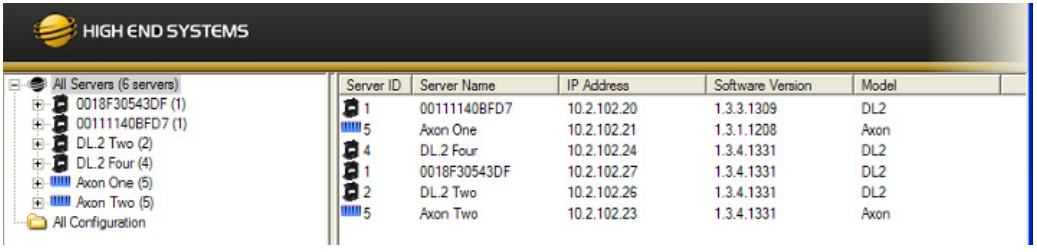
The following are the minimum hardware requirements for a remote computer running the CMA:

- Windows XP, Vista, Windows 7 (32 and 64 bit) or Mac OS 10.6 or later
- Microsoft Framework 2.0 or later
- 100/1000 base Ethernet card (a Gigabit Ethernet card is recommended for fast content uploading of large files)

After setting up an Ethernet network and linking all DL.3 fixtures and your computer, insert the CD that shipped with your fixture to automatically install the CMA on your hard drive.
For more information on CMA operation, see *Chapter 16: Content Management Application (CMA)* on page 251.

***NOTE: If the CMA doesn't automatically launch, navigate to the* CMA.msi *file in your Windows browser and double click to launch.***

When you launch the CMA, it automatically finds and identifies all DL.3, DL.2 fixtures and Axon media servers connected to the fixture link.



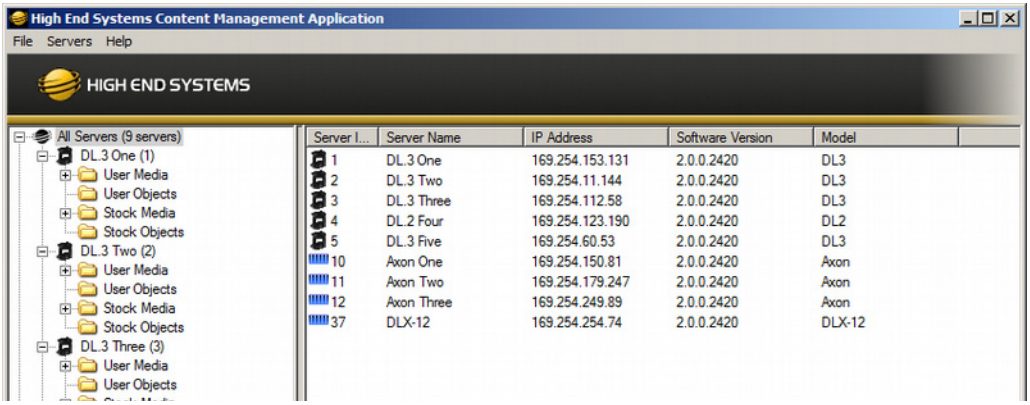
***NOTE: To avoid problems with fixture communication over the Ethernet link, disable all firewall programs on your computer when using the CMA.***

## Verifying and Upgrading Fixture and CMA Software

Fixture and CMA software are continuously being updated to increase performance and add new features. The software loaded on your fixture may not be the most up to date. The latest fixture and CMA software are always available at the High End Systems website.

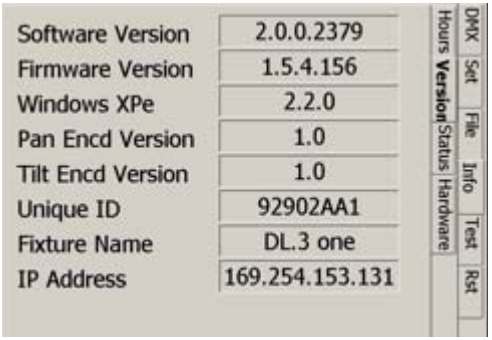
CMA software version is noted upon installation and can be accessed after that under the **File** menu.

The CMA **All Servers** view lets you view the fixture software version on all DL.3, DL.2 and Axon media servers linked to it via Ethernet.




You can also view the installed software versions by navigating to the **Info > Version** screen of a DL.3 fixture's menu system.

For downloading and upgrading CMA or fixture software, see *Upgrading Software* on page 276.



## Configuring DL.3 Fixtures

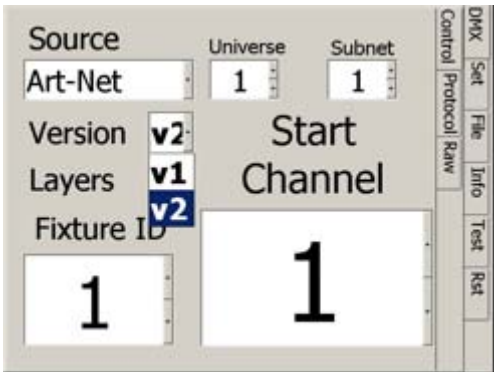
Before programming the DL.3 fixtures from a DMX512 console, configure the fixture by:

- Identifying the DMX **Source** for the fixture.
- Selecting the **Protocol** and the number of Graphic Objects to determine the DMX channel footprint this fixture will utilize.
- Selecting a **Fixture ID** number to identify this fixture on the DL.3 fixture link (required if you will be synchronizing output between fixtures).
- Assigning a valid **Start Channel** (the first channel in the unique range of DMX channels designated by the console for this fixture).

You can configure fixtures directly using the DL.3 menu system or remotely using the Content Management Application (CMA).

### Setup Configuration Using the Menu System

All setup parameters are located on the DL.3 fixture's menu **DMX Screen.** For detailed information on using the DL.3 Menu System, see *Chapter 3: The Digital Light Menu System* on page 23.




#### *Select a Source*

1. DMX **Source** defines the source of DMX data:

- **DMX512**—Data is transmitted over standard DMX cables.
- **Art-Net**—Data is transmitted over Ethernet cables using the Art-Net protocol. Set the number of DMX Universes (and DL.3 Ethernet Subnetworks containing this fixture from 0–16).

#### *Set the Channel Range*

2. Choose a Software Version.
   - **V1—**Version 1 protocol retains the original DMX protocol footprint and is compatible with legacy shows.
   - **V2—**Version 2 provides 27 additional channels.
3. Select the number of Graphic Object Layers required for your application. For more information, see *Protocol Options* on page 59.

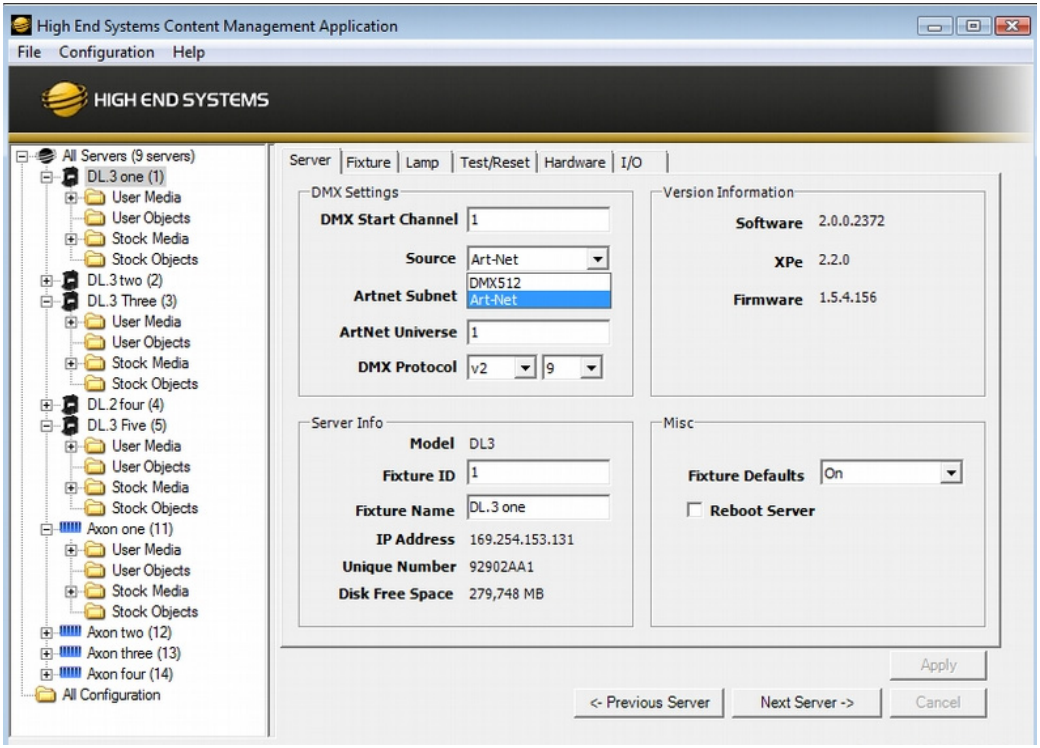
#### *DL.3 Start Channel*

4. Select a **Start Channel** in the Start Channel field using the up and down arrows to step through the numbers 1-512. See *DL.3 Channel Range and Valid Start Channels* on page 20. For more information, see *Determining a DMX Start Channel* on page 42.

## Setup Configuration Using the CMA

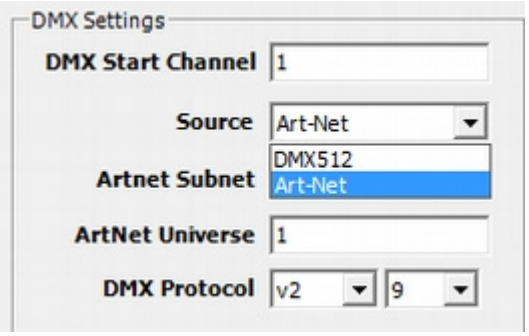
The Content Management Application running on your computer and linked to DL.3 fixtures via Ethernet lets you remotely configure the DL.3 fixtures. For more information on the CMA, see *Chapter 16: Content Management Application (CMA)* on page 251. All the setup configuration selections for DL.3 and DL.2 fixtures can be made in the **Server** tab.

To view configuration information for a individual server, click on **All Servers** in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane.

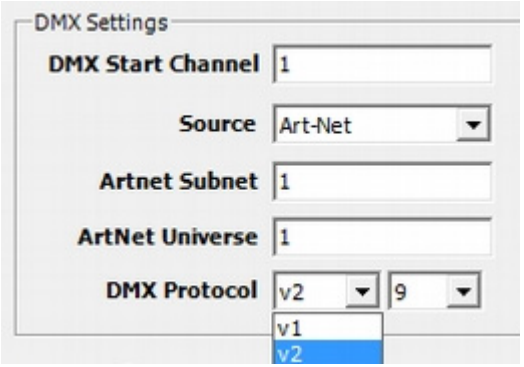



### *Select a Source*

1. Select a **DMX Source** type by clicking on the down arrow of the Source field to select DMX512 or Art-Net.



### *Set the Channel range*




2. Select a **DMX Protocol** type by choosing **V1** or **V2** from the drop down list in the option field and select the number of Graphic Objects you want to use in your application:
   - **V1—**Version 1 protocol retains the original DMX protocol footprint and is compatible with legacy shows.
   - **V2—**Version 2 protocol provides 27 additional channels.
3. Select the number of Graphic Object Layers required for your application in the drop down field next to the protocol.
4. Enter a valid Start Channel in the Start Channel field.

For more information, see *Determining a DMX Start Channel* on page 42 and *Protocol Options* on page 59.

## DL.3 Channel Range and Valid Start Channels

| # of Graphic Object Layers | Version 2 | | Version 1 | |
|---|---|---|---|---|
| | Fixture Footprint | Last Valid Start Channel | Fixture Footprint | Last Valid Start Channel |
| 0 | 76 | 437 | 56 | 457 |
| 1 | 121 | 392 | 94 | 419 |
| 2 | 166 | 347 | 132 | 381 |
| 3 | 211 | 302 | 170 | 343 |
| 4 | 256 | 257 | 208 | 304 |
| 5 | 301 | 211 | 246 | 266 |
| 6 | 346 | 167 | 284 | 229 |
| 7 | 391 | 122 | 322 | 190 |
| 8 | 436 | 77 | 360 | 152 |
| 9 | 481 | 32 | 398 | 114 |

## DMX Control Setup

### Patching the DL.3 Fixture to a Wholehog Console

Wholehog console library systems patch the DL.3 fixture as three to eleven “fixture types”. When using Wholehog software: add one motion, one global, and multiple graphic “fixtures” for each complete DL.3 unit in the *Fixture Schedule* or *Add Fixtures* wind (DL.3 #1 with user number 1 = motion, 2 = global, and 3 to 11 = graphic fixture types).

### Viewing Output

To output an image from a DL.3 fixture:

1. Open the **Dimmer** on the motion fixture and set the **Global Intensity** parameter to full.
2. Set the Object Opacity parameter for the selected object to full.

When programming with Wholehog software, the Media Folder and Object parameters default to 1, so choosing any Media File value between 1 and 37 displays a media loop from the HES Core folder (Media Folder 1) on a flat 4x3 rectangle (Object 1). The **Dimmer**, **Global Intensity**, and **Object Opacity** parameters all need values greater than zero for an image to be visible.

***NOTE: If you have trouble viewing output and you are not using a lighting console from High End Systems, check that the library for your desk has the correct default settings for all DMX channels.***

# Shutting Down the Fixture

## Recommended Shutdown Options

There are two recommended ways to shutdown the fixture:

1. A DMX controller can shut down the fixture’s motion controls and projector remotely with the shutdown option of the control channel (see *Fixture Operations* on page 242).
2. The DL.3 fixture automatically shuts down in the event of DMX data loss. The default time is 10 min.

**WARNING:**
**Removing power directly without the shutdown sequence built into the two recommended procedures can severely reduce fixture reliability.**

## Placing Fixture in Road Case

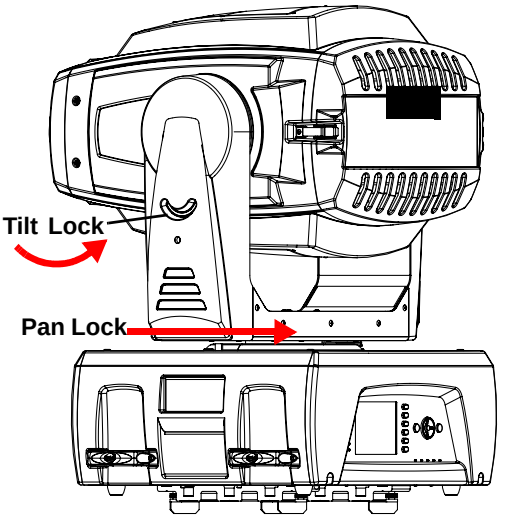
Before shipping the DL.3 fixture, lock its pan and tilt position so the fixture does not move during transit.

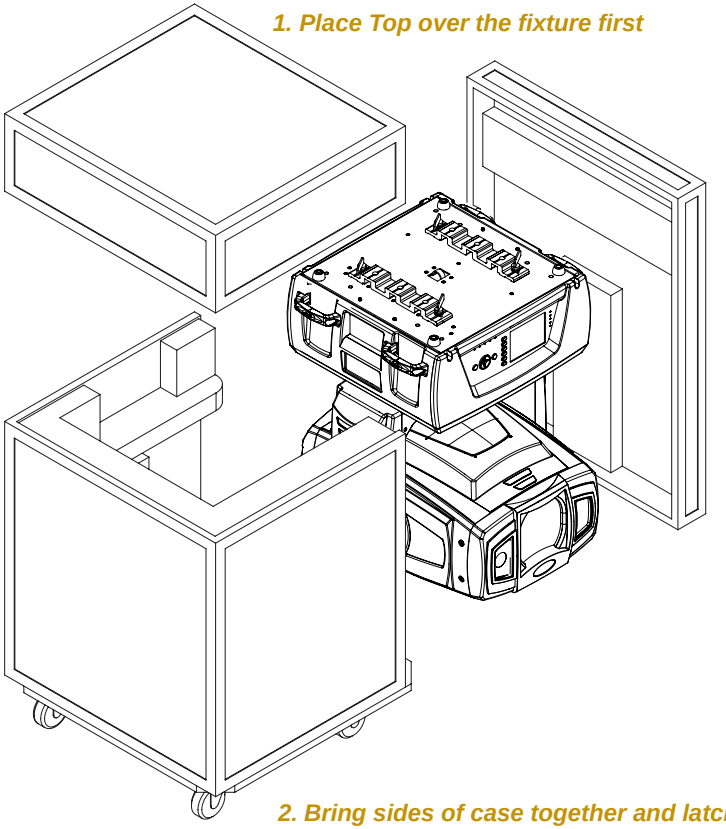
To lock the fixture:

1. Orient the projector head pan position as shown for packing in the road case
2. Secure with the pan lock located on the yoke base.

   ***NOTE: This is the only pan position that locks.***

3. Move the tilt lock peg to the upper left (locked) position.
4. Gently move the projector head and yoke to verify that both pan and tilt positions are locked in place.
5. Place the DL.3 fixture in its provided road case for shipping.



# Chapter 3:

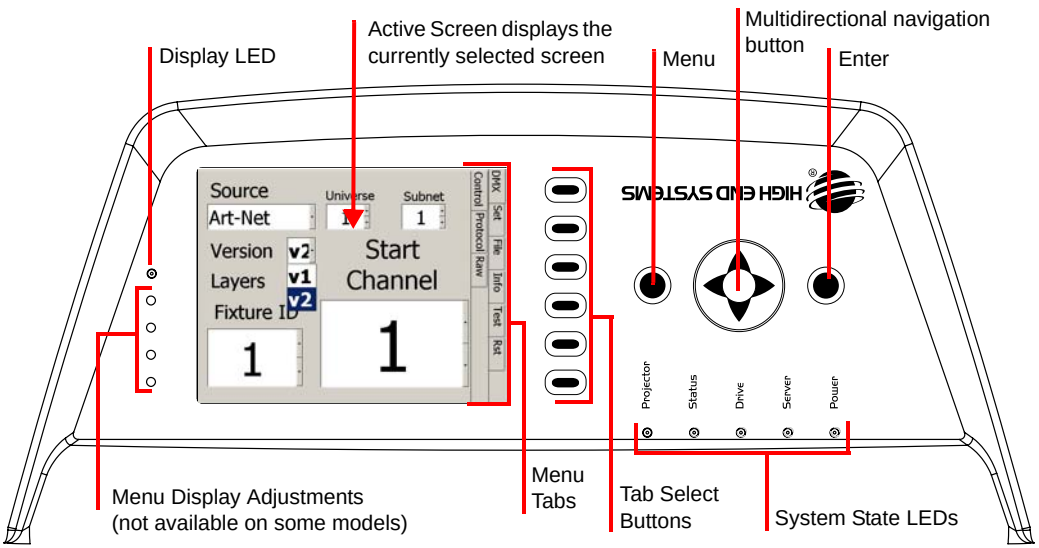
# The Digital Light Menu System

***DL.3 and DL.2 digital lights have an onboard Menu System you can use to configure the fixture, review diagnostic feedback, and view content information.***

DL.3 and DL.2 fixtures use a 5" LCD screen to display the onboard menu system. Navigation and select buttons let you move to different tab levels and options displayed on the Menu screen.

*NOTE: You can access most Menu options through the CMA (see* **Chapter 16: Content Management Application (CMA)** *on page 251.) You can also remotely control certain options via a DMX console using the Control channel (see* **Control Function Options** *on page 242).*

## Menu Panel Components




The LCD screen displays the menu system arranged with a series of **Menu Tabs** along the side for accessing configuration screens and options on the currently active screen. Clicking on one of the **Tab Select** buttons selects the screen tab next to it.

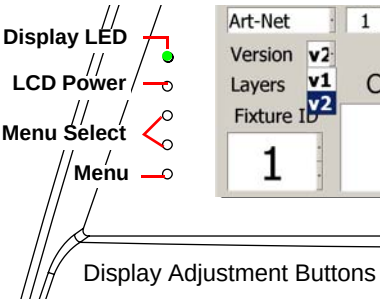
The large Multidirectional **Navigation** button controls movement between fields. Use the **Menu** button right of the **Navigation** button to access the Menu system or to cancel a selection. The **Enter** button left of the **Navigation** button selects and stores a selection.

Functionality for the **Menu** and **Enter** buttons automatically reverses when the fixture is rotated to keep operation consistent. You can also manually set this option (see *Display Options* on page 33).

The fields in the **Active Screen** display current settings and provide drop down boxes, numeric up/down selectors, and other user interface options to select in editable fields.

## LCD Display Adjustment Buttons

A display LED and four display adjustment buttons are located next to the Display screen. The **Display LED** is green whenever the Menu Display is on, even if it is dimmed to video black. LCD Display adjustment buttons control and provide visual adjustments for the menu display.




***NOTE:*** ***These adjustments are not available for some display models.***

### LCD Display Power Button

The button nearest the green LED is the **LCD Power** button. Holding it down for two seconds turns the Menu display on or off. Use this in situations when you need to turn the Menu display completely off instead of dimming it to video black.

If you turn the LCD screen off and then remove power to the Digital Light, the **LCD Power** will restore the default (ON) when you reapply power to the fixture.

***NOTE:*** ***The LCD Power button doesn't affect power to the fixture or the internal projector.***

### LCD Display Menu Options and Selection

The button farthest from the Display LED is the **Menu** button. Pressing this brings up the different functions contained in the LCD screen itself. The screen menu options are:

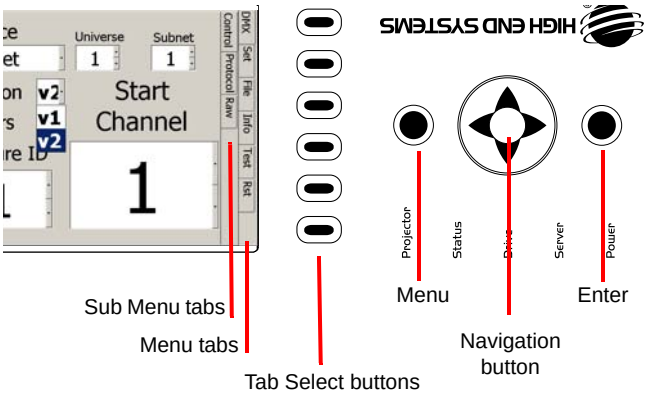
- **Picture** adjusts the sharpness of the screen
- **Color** adjusts the richness of the color
- **Contrast** adjustment
- **Black Level** adjustment
- **Tint** adjustment
- **Restore** returns the screen to the factory defaults

The two **Menu Select** buttons are used to adjust the currently selected function.

***NOTE:*** ***Display Black Level can also be controlled by the menu system (see* Set Tab *on page 33) or remotely through the configuration options in the CMA (see* DL.3 and DL.2 Media Server Configuration Options *on page 282.)***

## Navigating the Menu

Select any Menu tab by pressing the corresponding button to the side of the display. A tab will be bold when selected. Use the left and right arrow keys on the navigation buttons to move to the Sub Menu tab column.




Press the Tab select button that corresponds to the Sub Menu tab you want and press the <**Enter**> button to select.

Use the multidirection button to move left/right/up/down to a field. The currently selected field will be highlighted.

Press the <**Enter**> button to go into edit mode for the selected field. A list box will open to show all the options for that field.

Use the Up/Down keys to scroll through the items in the list highlighting the current item. Pressing the <**Enter**> button again stores the selection and closes the list.

Pressing the **<Menu>** button instead of **<Enter>** leaves the original setting and closes the list.

To return to the Menu tab column, press the left direction on the Navigation button.

## Menu Options

The menu display consists of a set of top-level tabbed screens and their associated subtabs.

| Main Tab | Sub-Tabs / Screens | Fields Controls | Options | Function / Notes |
|---|---|---|---|---|
| DMX | Control | Source | DMX512 | Sets DMX as fixture communication source |
| | | | Art-Net | Sets Art-Net as fixture communication source. You need to identify the Universe and Subnet by selecting a number from 0-16 in their corresponding field. |
| | | Protocol | V1 | V 1 protocol retains the original DMX protocol footprint and is compatible with legacy shows. |
| | | | V2 | V 2 provides 27 additional channels. |
| | | Layer Box | 0-9 | Selects the number of Graphic Objects from 1–9 |
| | | Fixture ID | 1-255 | Assigns the fixture a unique number on fixture network for use with Synchronization feature |
| | | Start Channel | 1-512 | Sets the fixture's DMX Start Channel |
| | Protocol View | Motion | | Displays current fixture Movement and Camera parameter values *(camera parameters not active in DL.3F model)* |
| | | Global | | Displays current parameter values for the composite image |
| | | 1 - 9 (graphic objects) | | Displays current parameter values for the selected graphic object |
| | Raw View | Main Table | Displays current DMX values for all 512 DMX link channels in rows of values. | |
| | | Offset | Scrolls through rows of DMX values | |
| | | Refresh Rate | 0-44 | Displays the # of DMX packets received / second |
| | | Refresh Timer | On | DMX values updated instantly |
| | | | Off | Display does not refresh |
| Set | Fixture | Pan Invert | On | Inverts the direction of the pan motor. |
| | | | Off | Default |
| | | Tilt Invert | On | Inverts the direction of the Tilt motor. |
| | | | Off | Default |
| | | Pan/Tilt Swap | On | Swaps Pan and Tilt directions |
| | | | Off | Default |
| | | Data Loss Timeout Iris | Long | Closes iris after a 5 minute DMX data loss |
| | | | Short | Closes iris after a 5 second DMX data loss |
| | | Display | On | Default intensity adjustment |
| | | | Preview | Displays current content preview |
| | | | Off | Turns off display after a period of time |

*NOTE: Unless you select Off, you can adjust display intensity level from 0 - 100%.*

| Main Tab | Sub-Tabs/ Screens | Fields Controls | Options | Function / Notes |
|---|---|---|---|---|
| Set | Fixture | Display Invert | On | Inverts menu display and navigation |
| | | | Off | Turns off the display invert |
| | | | Auto | Automatically inverts display when fixture mounting is greater than 45° |
| | | Factory Defaults | On | Restores factory default settings |
| | | | Off | Default |
| | Projector | Projector Lamp | On | Manually turns Projector Lamp on |
| | | | Off | Manually turns Projector Lamp off |
| | | Projector Powerup | Always | Turns the projector lamp on whenever the fixture is connected to power |
| | | | Manual | Turns on the lamp when Projector Lamp = On |
| | | | DMX | Turns the projector lamp on with DMX input (default) |
| | | Zoom Override | On | Overrides the DMX values sent by the console. Set value manually from 0-255 |
| | | | Off | Default |
| | | Focus Override | On | Overrides the DMX values sent by the console. Set value manually from 0-255 |
| | | | Off | Default |
| | | Projector Ceiling | On | Rotates the image 180° around the x-axis |
| | | | Off | Default |
| | | Projector Rear | On | Rotates the image 180° around the y-axis |
| | | | Off | Default |
| | | Lens Type | Standard | Selects the lens currently installed in the projector.<br>*NOTE: these options are active for DL.3 fixtures only* |
| | | | Long | |
| | | | Ultra Long | |
| | | | Wide | |
| | | Projector Defaults | | Clicking the **Reset** button restores Factory Projector Defaults |
| | I/O<br>*(not available in DL.3F fixtures)* | Projector Input | External | Chooses the input the Projector will accept |
| | | | Internal | |
| | | Projector In by DMX | Yes | Selecting Yes allows projector's input source to be selected from DMX |
| | | | No | Disables changing projector input via DMX |
| | | S-Video Input | Internal | Accepts S-Video signal from the DL.3 onboard camera input |
| | | | External | Accepts S-Video signal from another DL.3 or video source |
| | | External SVideo Format | | Options dependant on the fixtures video card configuration |
| | | SDI Format | | |
| File | | | | Displays content file locations and allows a content preview *(see page 40)*. |

| Main Tab | Sub-Tabs / Screens | Fields Controls | Options | Function / Notes |
|---|---|---|---|---|
| Info | Hours | Lamp Hours | | Monitors lamp hours of operation. Selecting **Reset** button reverts hours to 0. |
| | | Fixture Hours | | Monitors fixture hours of operation. Selecting **Reset** button reverts hours to 0. |
| | Version | Software Version | | Displays currently installed versions |
| | | Firmware Version | | |
| | | Windows XPe | | |
| | | Pan Encoder Version | | |
| | | Tilt Encoder Version | | |
| | | Unique ID | | Displays the unit's factory assigned ID number |
| | | Fixture Name | | Displays a currently assigned Fixture Name |
| | | IP Address | | Displays fixture's IP address |
| | | Projector Type | | Displays projector model |
| | | Video Adaptor | | Displays video adaptor card model |
| | Status | Motion Shutdown | | Displays system activity and errors. For more information, see *Chapter 17: Maintenance and Troubleshooting* on page 299, |
| | | Projector Status | | |
| | | Projector Air Filter | | |
| | Hardware | CPU | Q9550 | Identifies the currently loaded hardware components |
| | | | Q6600 | |
| | | | E6600 | |
| | | | P4-3.2 | |
| | | Motherboard | Intel D915FUX | |
| | | | Asus P5BV-VM | |
| | | | Asus P5Q-EMTDO | |
| | | Video Adapter | X850 | |
| | | | X1900 | |
| | | | X1950 | |
| | | | HD-2900 | |
| | | | HD-4850 | |
| | | Hard Drive | | |
| | | Projector Type | LX50 | |
| | | | LX55 | |
| | | | LS650 | |

| Main Tab | Sub-Tabs/ Screens | Fields Controls | Options | Function / Notes |
|---|---|---|---|---|
| Info | Hardware | S-Video Capture | X850 | Identifies the currently loaded hardware components |
| | | | X1900 | |
| | | | X1950 | |
| | | | HD2900 | |
| | | | HVR-1800 | |
| | | | HVR-1600 | |
| | | SDI Capture | Decklink | |
| | | | NA | |
| Test | Home | Motion All | | Clicking the **Home** button resets all mechanical functions to default positions |
| | | Calibrate Motors | | Clicking the **Calibrate** button recalibrates motors to correct misstepping or after installing new motor boards in system. |
| | Self Test | Self Test Pan/Tilt | On | Selecting On starts a test sequence for Pan and Tilt mechanical functionality |
| | | | Off | |
| | | Self Test Iris | On | Selecting On starts a test sequence for Iris mechanical functionality |
| | | | Off | |
| | | Self Test Zoom | On | Selecting On starts a test sequence for Zoom mechanical functionality |
| | | | Off | |
| | | Self Test Focus | On | Selecting On starts a test sequence for Focus mechanical functionality |
| | | | Off | |
| | | Video Test | Off | Selecting a Video Pattern displays a sample video to test graphics engine functionality. |
| | | | Test Pattern 1 | |
| | | | Test Pattern 2 | |
| Reset | | Reboot Media Server | | Clicking **Restart** reboots the internal media server |
| | | Delete User Content | | Clicking **Delete** erases all User Content on server |
| | | Upgrade Factory Content | | Clicking **Upgrade** installs updates to factory content (requires connection to the CMA) |

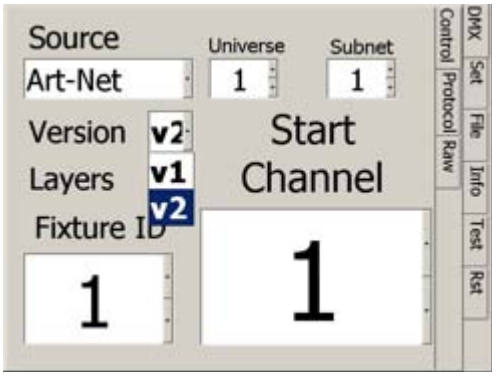
# Menu Screen Descriptions

## DMX Tab

The DMX Tab has sub-tabs for configuring the fixture for the DMX link, viewing the DMX settings for the fixture on each channel of its range, and viewing all 512 channel values on the DMX link.

### DMX_Control Screen

Use the Control sub-tab to configure your fixture for a DMX link.




DMX **Source** defines the source of DMX data and has two options:

- **DMX512**—Data is transmitted over standard DMX cables.
- **Art-Net**—Data is transmitted over Ethernet cables using the Art-Net protocol. The Art-Net screen contains for setting the number of DMX Universes and Ethernet Sub-networks containing this fixture from 0–16).

Select a **DMX Protocol** type by choosing **V1** or **V2** from the drop down list in the **Version** field and the number of Graphic Objects you want to use in your application in the **Layers** field.

- **V1—**Version 1 protocol retains the original DMX protocol footprint and is compatible with legacy shows.
- **V2—**Version 2 provides 27 additional channels to provide framing shutters, more banks of effects and 16-bit control of x, y and z scaling.

Both versions provide the latest Global and Graphic effect options and can control up to nine graphic objects for DL.3 fixtures and up to four graphic objects for DL.2 fixtures.

Edit the **DMX Start Channel** field by entering a valid Start Channel for the protocol and number of graphic objects you have selected.

Scroll through the numbers 1-512 in the **Start Channel** field to set a valid start channel for the protocol you have chosen. A valid start channel will allow the number of consecutive channels on the link needed for the protocol and number of Graphic objects you have selected. See *Determining a DMX Start Channel* on page 42.

You can assign each fixture a unique **Fixture ID** number from 1-255. This allows the fixture to be identified on the ethernet fixture link for tasks like synchronizing playback between Digital Light fixtures and uploading custom content with the Content Management Application (CMA). You can manually set this number in the menu or through the CMA, see *DL.3 and DL.2 Media Server Configuration Options* on page 282. Setting up an Ethernet Fixture Link is described in *Chapter 2: Setup and Configuration*.

## DMX_Protocol Tab

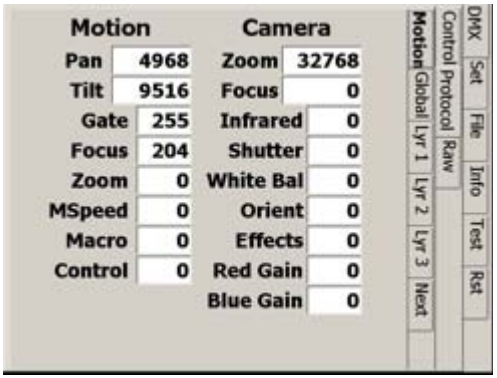
The Protocol sub-tab displays the current DMX value being received from a console for each parameter after any conversion, such as internal self test or protocol conversion. The DMX parameters are grouped into general categories, each with a separate tab. For more information on individual parameters and their DMX value ranges, see *Appendix A: DMX Protocol on page 321.*

### DMX_Protocol_Motion Screen

The **Motion** sub-tab displays parameters associated with fixture movement, projector control and integrated camera functionality.

***NOTE: Camera parameters are present but not active in DL.3F models.)***

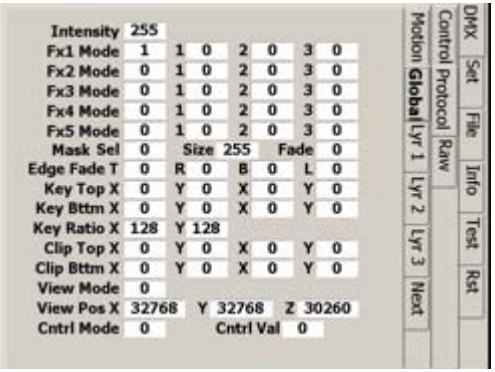
For more information on specific Motion and Camera parameters, see: *Chapter 14: Fixture Motion Functions* and Chapter 15: Live Video Input and Control.




### DMX_Protocol _Global Screen

The **Global** sub-tab display the current values for parameters that affect the composite image.

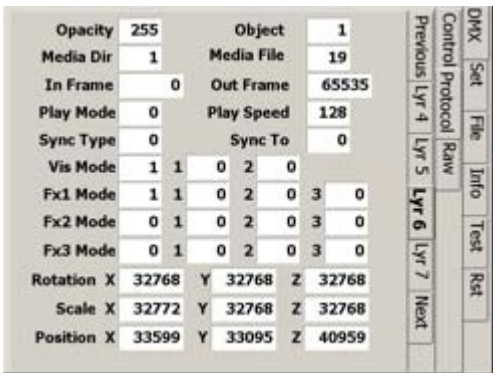
For more information on specific Global parameters, see *Chapter 11: Global Functions*.



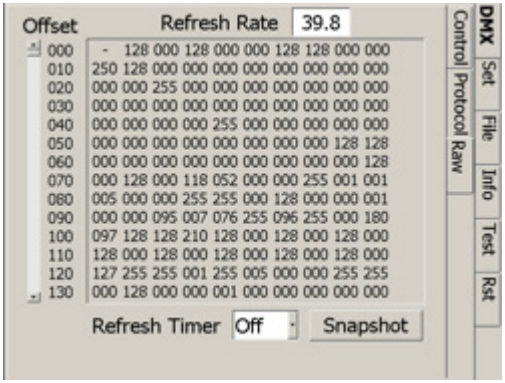

### DMX_Protocol _Obj Screens

**Object** sub-tabs are labeled from 1 to 9 and display parameter values affecting a single object's content.

For more information on specific Graphic Function parameters, see: *Chapter 7: Graphic Functions: Defining Content*; *Chapter 8: Graphic Functions: Rotation, Position, Scale*; and *Chapter 10: Graphic Functions: Synchronizing Content*



## DMX_Raw Screen




Use the Raw sub-tab to view the DMX values of all fixtures on the link. The **Raw Tab** displays every DMX value for Channels 001–512 in lines of eight DMX values each per screen. The **Offset** number at the beginning of each line indicates the first DMX channel with a value displayed on that line. Use the scroll bar at the left of the offset number to scroll through all the values.

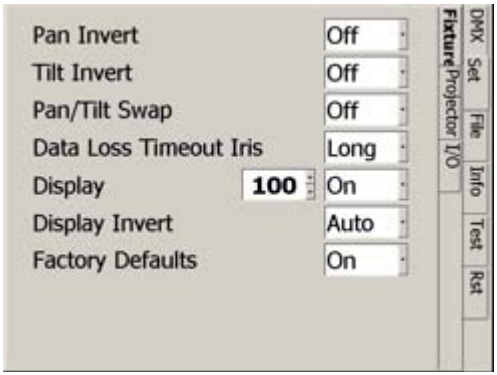
The **Refresh Rate** is the rate at which DMX is being received by the fixture.

With **Refresh Timer** set to ***On***, you see the raw DMX values updated instantly. When ***Off*** is selected, you will see a ***Snapshot*** button. Each time you select ***Snapshot*** you see the screen frozen at the current values. Select ***On*** again to restart automatic refresh.

# Set Tab

## Set_Fixture Screen

The Fixture sub-tab provides options for selecting or changing fixture movement, dimming the mechanical iris, and controlling the LCD display black level and orientation.




### *Movement Option Fields*

Set the **Pan Invert** option **On** to invert the direction of the pan motor. Use this option to coordinate movements between fixtures facing each other in a horizontal orientation. **Off** is the default setting.

Setting the **Tilt Invert** field to **On** inverts the direction of the tilt motor. Use this option to coordinate movements between fixtures facing each other in a vertical orientation. **Off** is the default setting.

Setting **Pan Tilt Swap** field to **On** swaps the pan and tilt motor operation to coordinate movements between fixtures mounted perpendicular to each other. **Off** is the default setting.

### *Timeout Option*

The Dimmer Iris closes when it stops receiving DMX data for a designated time interval. Use the **Data Loss Timeout Iris** field to set the DMX data loss time interval as ***Long*** (5 minutes) or ***Short*** (5 seconds). ***Short*** is the default setting.

After 10 minutes of no data, the fixture will shut down the projector and the motion functions. Fans remain on to maintain the temperature control for the internal graphics engine.

### *Display Options*

The **Display** field lets you adjust the black level of the Menu display with the following options:

- **On** is the factory default.
- **Preview** displays the most recent media change of any Graphic function when opacity > 0. The Menu screen displays content in both partial and full screen. The Preview function can be enabled from the menu system, the CMA, as well as remotely via DMX.
  - — When Preview is enabled, a partial, full color video is shown on the LCD display along with the folder, file, and DMX information. If there is no change of content on any Graphic Function it will automatically switch to full screen mode within 12 seconds.
  - — The Preview function always shows the latest selected content without any modification of effects. Preview mode displays movies and still images only. S-video and internal camera input will not be displayed in the Preview mode.
  - — The Preview function uses substantial memory and should be turned off when rendering multiple Graphic Object options to ensure high quality playback.

***NOTE:*** ***After selecting the* On *or* Preview *option, you can use the numeric up/down control to adjust the Menu display brightness level from 25 (dim) to 100 (brightest).***

- ***Off*** turns off the display after 20 seconds of inactivity. Touching any button on the fixture menu will re-enable the display.

The **Display Invert** field inverts the display and navigation control functions. This is useful in certain fixture orientations. There are three invert control options:

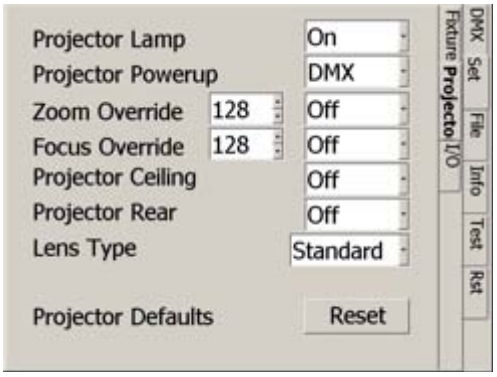
- ***On*** manually inverts the display and navigation buttons
- ***Off*** manually turns off the display invert function
- ***Auto*** sets the display to invert automatically when the fixture is rotated more than 45% off the horizontal axis. This is the default setting.

### *Restoring Factory Defaults*

Selecting ***On*** in the **Factory Defaults** field restores all factory default fixture settings.

## Set_Projector Screen

The Projector sub-tab provides settings related to the internal projector functionality.




### *Projector Control*

**Projector Lamp** field lets you manually turn the lamp ***On*** or ***Off***.

Use the **Projector Powerup** field to choose the control option for turning the lamp on. The options are: Always On, Manual, and DMX. This only takes effect when the fixture powers up.

- ***Always On*** turns the projector lamp on when the fixture starts up regardless of whether there is a DMX/Art-Net signal. If there is no DMX/Art-Net signal the lamp shuts off when the shutdown timeout period expires.
- ***Manual*** turns on the projector lamp only when set to On via DMX, Menu or the CMA.
- ***DMX*** only turns the lamp on when it receives a DMX signal or Art-Net signal.

When the internal projector menu is selected for display, you may need to manually adjust the zoom and /or focus parameters to view the display clearly. Setting the **Zoom Override** or **Focus Override** options to ***ON*** overrides the DMX values sent by the console and allow you to control Zoom and Focus manually with a DMX decimal value between ***0-255***.

**Projector Ceiling** rotates the image 180 degrees. **Projector Rear** projects a mirror invert of the image for rear-screen projection applications.

Selecting ***ON*** in the **Projector Defaults** field resets all the options on the Projector tab to their factory default settings. For more information, refer to the *Projector User Manual* that shipped with your fixture.

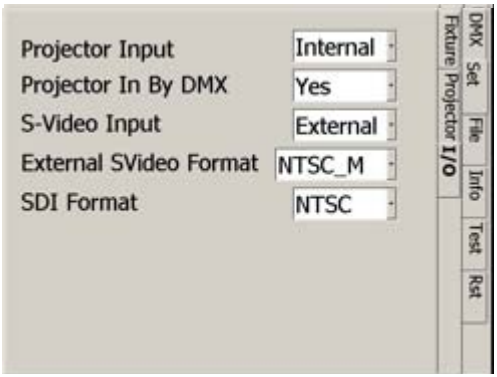
### *Lens Type Options (DL.3 fixture only)*

There are three accessory lenses available for the DL.3 Digital Light. The default setting for the **Lens Type** field is Standard. When you install a ***Long*** throw, an ***Ultra Long*** throw, or a ***Wide Angle*** lens, you will need to select that lens type to configure your system.

*NOTE: The Lens Type field is not active if you are operating this version of the software on a DL.2 fixture.*

## Set_I/O Screen

This screen lets you select the Input and Output options for the fixture.




Use the **Projector Input** field to select which input the projector should accept. When ***External*** is selected, the projector takes input directly from an external source and bypasses the internal graphics engine. When ***Internal*** is selected, the projector takes input directly from the graphics engine. Internal is the default configuration setting.

**Projector In By DMX** toggles the ability to set the projector input via the Control Console. ***Yes*** is the default and allows the input to be changed via the console, ***No*** doesn't allow the input to be changed.

### *Video Format*

- The **S-Video Input** field allows you to accept ***Internal*** S-Video signal from the DL.3 onboard camera input or ***External*** from another DL.3 or video source.
- The **External SVideo Format** field lets you choose which S-Video format the fixture will accept. Digital Light fixtures support multiple S-Video formats including:

| | | | | |
|---|---|---|---|---|
| NTSC_M | PAL_B | PAL_H | SECAM_B | SECAM_K |
| NTSC_MJ | PAL_D | PAL_I | SECAM_D | SECAM_K1 |
| | PAL_G | PAL_M | SECAM_G | SECAM_L |
| | | PAL_N | SECAM_H | SECAM_L1 |

*Notes: The format must be set to NTSC_M to receive input from the internal camera.*

*This format is not available in the DL.3F model.*

- The **SDI Format** field lets you select from the SDI formats supported.

## File Tab

The **File** screen displays information about the currently selected content file. Use this screen to preview content — both still images and movies.

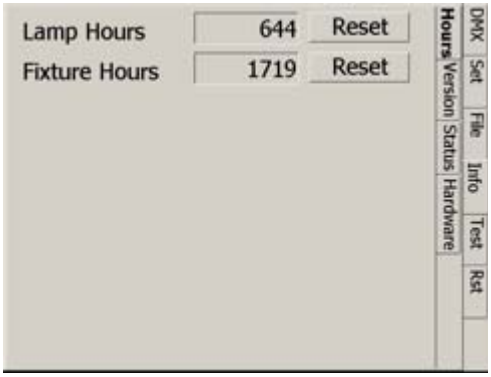
When you select the File tab, the file plays in the window to the left. The bottom right window displays content folders and highlights the current file location.

You can scroll through the Content folders and the files inside each folder to preview any content file.

## Info Tab

The Info tab displays current fixture information such as hardware and software versions, sensor status, total fixture and lamp hours, and DMX errors. You can also reset Lamp and Fixture hours.

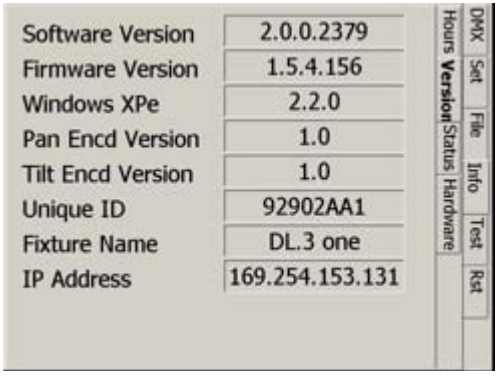
### Info_Hours




The **Hours** tab displays the **Lamp** and **Fixture** hours of operation since the last reset. Clicking on the **Reset** button resets the associated hours to zero. **Lamp** hours should be reset to zero whenever a lamp is replaced.

**Fixture Hours** information is often used to track fixture hours for a show or a rental period. The number field displays the number of hours the fixture has been operating since the last reset. Pressing the Fixture Hours Reset returns the value to 0.

### Info_Version Screen




This screen displays the current versions of the fixture's configuration components. You can compare these to the latest versions available on the DL.3 support page at ***www.highend.com***.

**Software Version** and **Firmware Version** fields display the current versions loaded on this fixture.

**Unique ID** is a factory assigned ID for the media server.

**Fixture Name** field displays a name you assign in the Content Management Application for easy reference in developing your show.

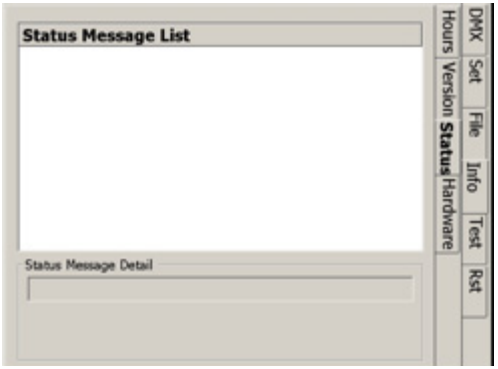
**IP Address** is assigned to that unit by the router or Auto IP.

## Info_Status Tab

This screen displays status errors and warnings on items including:

- Temperature
- Filter life
- Lamp life
- USB and Camera Communication
- USB Security

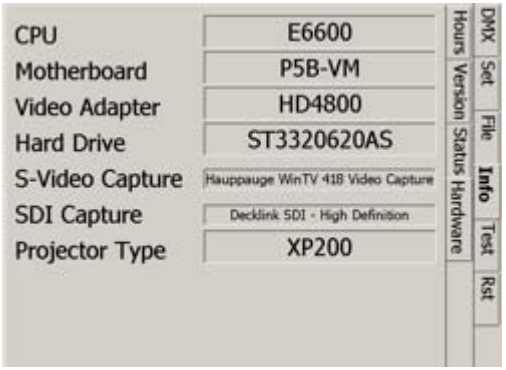
For more detailed information, see *Chapter 17: Maintenance and Troubleshooting* on page 299.




## Info_Hardware Tab

This screen identifies the version of each of the fixture's hardware components.

Features such as supported video formats are dependent on the hardware configuration of your particular DL.3 fixture.



# Test Tab

## Test_Home Screen

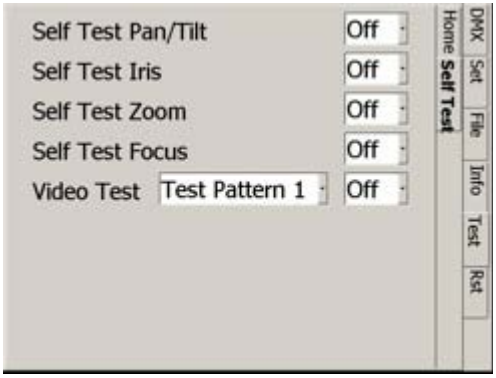

Homing sets a fixture to its default positioning. The fixture automatically homes whenever it is connected to power.

Selecting **Motion All** lets you manually home the entire fixture.

Selecting the button for **Calibrate Motors** realigns the Pan and Tilt stepper motors after maintenance procedures.

The fixture can also be remotely homed via a DMX controller, (see *Control Function Options* on page 242**)** or through the Content Management Application, (see *DL.3 and DL.2 Media Server Configuration Options* on page 282).

## Test_Self Test Screen

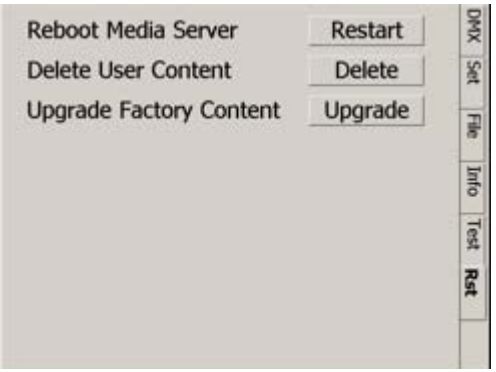



You can check the mechanical functionality of **Pan/Tilt**, **Iris**, **Zoom**, and **Focus** assemblies on the fixture head. Select **On** to start the test sequence.

The **Video Test** option opens the mechanical iris and provides test patterns to check the projection functionality. This lets you verify that the graphics engine is operating without having to use a DMX controller.

## Reset Screen

The Reset screen provides buttons to reset, shutdown and upgrade software.




**Reboot Media Server** restarts the fixture's internal graphics engine software.

**Delete User Content** removes all user content on the selected fixture(s).

**Upgrade Factory Content** lets you reinstall factory content in a recovery situation.

***NOTE:*** ***You can obtain a copy of the Factory Content from* High End Systems *customer service.***

# Chapter 4:

# DMX Programming Basics and Quick Start

***If you are new to DMX programing, this chapter gives you a brief overview on programming DL.3, DL.2, and Axon media servers and an example of using a Wholehog console to patch and display output from a media server.***

## DMX Programming Overview

### DMX512 Links

A lighting console typically utilizes a protocol called DMX512 to communicate with automated lighting fixtures and conventional dimmers. This protocol consists of 512 unique channels of control per output link (universe). Typically a lighting fixture or device will use a channel for each parameter's function. Each channel consists of 256 values ranging from 0 to 255. The lighting console is programmed to transmit a corresponding DMX value for the desired function of each parameter. All DMX values are stored within the lighting console, and typically are referred to as cues, scenes, or presets. A lighting console locates a device on the link by its DMX Start Channel.

### 8-bit vs. 16-bit DMX Parameters

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 most parameters use 8-bit DMX, several 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 as 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 provides fine control and changes of the DMX value in increments of 1.

Individual access of the two DMX channels used with 16-bit parameters varies by lighting console. Most modern DMX consoles bind these two channels into a single 16-bit parameter to accurately perform 16-bit crossfades. Consult your lighting console manual for further information.

# Determining a DMX Start Channel

## Overview

The DMX Start Channel is the first channel of a device's channel footprint on a DMX link. There are 512 available channels on each DMX universe divided among all the devices in a particular universe. A device must have a unique DMX channel range in order to respond independently to controller commands. The DMX Start Channel is the first channel in that fixtures channel range.

To determine each device's DMX Start Channel, identify the footprint of every device on the universe. The device's footprint is the number of consecutive DMX channels it requires and is determined by the channels in the fixture's protocol. The fixture's DMX channel footprint must not overlap any other device's channel footprint on the link. When two devices on the same DMX universe have overlapping channel footprints, one or both devices will be disabled or behave erratically.

Once you have determined the footprint of your device, a simple formula for finding the last valid Start Channel on a standard DMX512 link is:

***512 – the unit's channel footprint + 1***

## Digital Lighting Products

The channel range for your Digital lighting product will depend on the model, the Protocol mode and the number of Graphic objects you select. DL.3 and new Axon media servers running Version 2.0 fixture software all provide individual and composite graphical control for up to nine Graphic Objects. DL.2 fixtures and original Axon servers can control up to four Graphic objects. You can influence the footprint of the fixture on a DMX link with the protocol you select and the number of graphic objects you implement.

| #of Object Layers | V2 Footprint on DMX512 Link | | | | V1 Footprint on DMX512 Link | | | |
|---|---|---|---|---|---|---|---|---|
| | DL.3 | Axon | DL.2 | Early Axon | DL.3 | Axon | DL.2 | Early Axon |
| 0 | 76 | 55 | 76 | 55 | 56 | 35 | 56 | 35 |
| 1 | 121 | 100 | 121 | 100 | 94 | 73 | 94 | 73 |
| 2 | 166 | 145 | 166 | 145 | 132 | 111 | 132 | 111 |
| 3 | 211 | 190 | 211 | 190 | 170 | 149 | 170 | 149 |
| 4 | 256 | 235 | 256 | 235 | 208 | 187 | 208 | |
| 5 | 301 | 280 | | | 246 | 225 | | |
| 6 | 346 | 325 | | | 284 | 263 | | |
| 7 | 391 | 370 | | | 322 | 301 | | |
| 8 | 436 | 415 | | | 360 | 339 | | |
| 9 | 481 | 460 | | | 398 | 377 | | |

Select the protocol level in the fixture's onboard menu system for DL.3 and DL.2 fixtures or through the CMA for either Digital Light fixture and Axon media servers (see *Viewing Server Configuration* on page 278).

For a table of the channels included in each level of Version protocol for DL.3 or DL.2 Digital Lights see *DL.3 and DL.2 Version 2 DMX Channel Assignment* on page 321. For a table of channels for Axon media servers running Version 2 protocol, see *Axon Media Server Version 2 DMX Channel Assignment* on page 324.

# Lighting Console Tips

Lighting consoles differ in many aspects and it is important to understand how your console operates with DL.3, DL.2 and Axon 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 parameters might have different labels for parameter names and functions than are listed within this manual. Consult your lighting console manual for further information.

***NOTE: Downloading the Wholehog Wheelset preferences for DL.2 and DL.3 fixtures will provide a more intuitive order to encoder layout on the console. (see http://www.flyingpig.com/support/hog3/downloads/library/index.shtml)***

## Patching Digital Light Fixtures and Axon Media Servers

Digital Lighting servers are patched as multiple "fixture types" in the Wholehog library systems. This allows for ease of programming as well as the ability to adjust quickly for any of the various DMX protocol options. The Motion fixture type controls the actual moving yoke, projector, and integrated camera in DL.2 and DL.3 fixtures. The Global fixture type controls the global graphic engine functions such as intensity, keystone correction, viewpoint, etc. The Graphic fixture type controls each graphic object functions such as opacity, object, media.

An Axon media server has no motion control but utilizes the same Global and Graphic fixture types. In the *Fixture Schedule* or *Add Fixtures* window of Wholehog software, you would add 1 motion, 1 global, and 9 graphic "fixtures" for each complete DL.3 (4 graphic "fixtures" for each DL.2), or 1 global, and 9 graphic "fixtures" for each complete Axon (4 graphic "fixtures" for an original Axon).

The best way to organize your patching is to assign user numbers for these items. Patch the motion first, the global second, and the graphic fixture types last. For example, set up user numbers that correspond to the DL.3 fixture number 1, where user number 1 = motion, user number 2 = global, and user number 3–11 = graphic fixture types.

### DMX Output Displays

Although all lighting consoles output the same 512 DMX channels per universe, 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.

## Wholehog Programming Notes

### Play Speed

You can adjust the Play Speed using the encoder wheel on the Beam parameter of the Graphic fixture type. Additionally you can press **Enable** and select **Media Speed Default On** to revert to the default speed setting with a DMX value = 128 (50%). Then if you touch the encoder again the previous play speed will be recalled.

### Mask Strobe

A unique function of the Wholehog library system allows the creation of a special encoder type. Flying Pig Systems has created a parameter called “mask strobe” in the Global fixture type. When this is adjusted, it will automatically change the DMX value of the mask select channel to the appropriate value and adjust the DMX channel for the strobe speed. This will override the Mask Edge parameter defined in the DL.3 or DL.2 DMX Protocol.

### Play Modes (Opacity)

Using the Graphic fixture type, press the Mode button to view the play mode options. By default all modes trigger normally. You can select “Media Trigger Opacity” to change to the Play Modes that trigger when Opacity is greater than zero. To restore to normal triggering, select “Media Trigger Normal”.

### CMY

The Global and Graphic fixture types both contain CMY controls for the Effect Mode modifier channels. The default for Effect Mode 1 is set to CMY1 as well. For some effect options, the CMY parameters will not adjust color, but will adjust the effect per the DL.3 or DL.2 DMX protocol. You can find a description of CMY controls functionality for each effect option in *Chapter 13: Effect Mode Options Descriptions* on page 147.

### Control Channel Functions

Many of the control channel functions in the motion “fixture” only operate if the dimmer changes from >0 to 0 at the same time or just after a change is made to the control channel. For more detailed description, see *Control Channel Functions* on page 44.

## Quick Start with a Wholehog Console

After setting up and configuring your media server as outlined in Chapter 2, use the following steps to get to the point of displaying output. In this example, we are patching a DL.3 fixture running Version 2 software with six Graphic Objects enabled and Axon servers running Version 2 software with five graphic objects enabled.

**Step 1:** In the *Fixture Schedule* or *Add Fixtures* window of Wholehog software, Add 1 motion, 1 global, and 6 graphic “fixtures” for the DL.3 unit; and 1 global, and 5 graphic “fixtures” for each Axon unit.

**Step 2:** Assign user numbers for these items. Set up user numbers 1-8 that correspond to DL.3 fixture number 1, where user number 1 is the motion, 2 is the global, and 3-8 are graphic fixture types. Axon media servers will have user numbers 11–16 where user number 11 is global and 12-16 are graphic fixture types.

Patch the motion first, the global second, and the graphic fixture types last for the DL.3 then patch the global and graphic fixture types for the Axon.

# Chapter 5:

# Tutorials

***Five simple lessons get you started programming DL.3, DL.2, and Axon media servers with a Wholehog or other DMX console.***

A DL.3, DL.3F or DL.2 fixture should be patched on your console as multiple fixture types depending on how may graphic object layers you plan to use. The MOTION fixture type controls the actual moving yoke, projector, and the onboard camera if present. The GLOBAL fixture type controls the global graphic engine functions such as intensity, keystone correction, viewpoint, etc. The GRAPHIC fixture type controls each graphic object's functions DL.3, DL.3F, DL.2 and Axon protocol allows for 0–9 graphic objects.

Following this method, a DL.3 should be patched as 1 MOTION fixture, 1 GLOBAL fixture and 1–9 GRAPHIC fixtures. Axon Media servers are patched as 1 GLOBAL and 1-9 GRAPHIC fixtures.

***NOTE: The MOTION fixture Dimmer, GLOBAL fixture Intensity, and GRAPHIC fixture Opacity parameters all have to be greater than zero before the image you create becomes visible.***

In the first three Lessons, the 3-D object component of the Graphic Objects is left at the default DMX value of 1 (flat plane). Note that all DMX values given in the examples are in decimal units.

***NOTE: If you have trouble producing the effects in these tutorials, and you are not working with a Wholehog console library, the default settings may be incorrect.***

## Fixture Set-up (DL.3 and DL.2 Fixtures)

If you are using a DL.3 or DL.2 fixture, you will first need to set up the head and the projector. If you are using the Axon Media Server, this will not be necessary and you can proceed to Lesson 1.

To set up a DL.3 or DL.2 fixture for the tutorials:

1. Select the fixture's MOTION fixture, and set the **Dimmer** parameter to 100% (DMX = 255). This will open the mechanical iris.
2. Set the GLOBAL fixture **Intensity** parameter and GRAPHIC OBJECT 1 fixture **Opacity** parameter to 100% (DMX = 255).
3. Select the GRAPHIC OBJECT 1 and set the **Media Folder** to DMX = 39 (*HES Setup and Test*). Dial the **Media File** to DMX = 5. This will bring up the convergence bitmap.
4. Select the fixture's MOTION fixture and adjust **Pan** and **Tilt** parameters until the fixture is projecting to the desired location and adjust the **Focus** parameter until the convergence bitmap becomes sharply focused.
5. Now you can remove or "knockout" the GRAPHIC OBJECT from the programmer and still retain the MOTION and GLOBAL parameter settings.

6. Store these values somewhere on your console (to a palette or preset) so that this setup can be quickly recalled whenever you need to adjust the Pan, Tilt and Focus.

# Lesson I: Cross Fading Between Graphic Objects

1. On your lighting console, set MOTION fixture Dimmer parameter (for DL.3 or DL.2 fixtures), the GLOBAL fixture **Intensity** parameter, and GRAPHIC OBJECT 1 fixture **Opacity** parameter to 100% (DMX value = 255).

## Define Graphic Object I

2. Set the **Media Folder** Parameter for the GRAPHIC OBJECT 1 fixture to DMX value = 4. This selects preloaded media folder *HES Atmospheric*.
3. Set the **Media File** Parameter to DMX = 23. This selects a water movie (*23-Moonlite_Waves*).

Graphic Object 1

## Add the DL.3 logo as Graphic Object 2

4. Select GRAPHIC OBJECT 2 fixture and change the **Opacity** parameter to 100% (DMX = 255).
5. Set the **Media Folder** parameter to 1 and set the **Media File** parameter to DMX = 01. This selects the preloaded fixture logo as content.

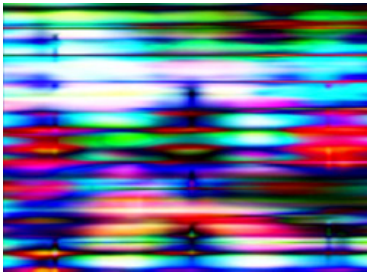

Graphic Object 2

## Define Graphic Object 3

6. Select GRAPHIC OBJECT 3 fixture and set the **Opacity** to DMX = 255 (100%).
7. Change the **Media Folder** parameter to DMX = 7 (*A Luna Blue* collection).
8. Change the **Media File** parameter to DMX = 2 (*2-Blurs_Streaks_34*).

## Create Crossfade Cues

9. Select GRAPHIC OBJECT 2 and 3 fixtures and set the **Opacity** parameter on both to DMX = 0. The only content that is now showing is GRAPHIC OBJECT 1.
10. Record this look to your console as cue 1.
11. Set the of GRAPHIC OBJECT 3 **Opacity** parameter to DMX = 255 (100%) and record this into your lighting console as cue 2.
12. Now set the **Opacity** parameter of GRAPHIC OBJECT 3 to DMX = 0 and the **Opacity** of GRAPHIC OBJECT 2 to DMX = 255 (100%). Record this as cue 3.



Graphic Object 3

13. Now clear out all information in your console's programmer and play through the cues you just recorded. You will see GRAPHIC OBJECT 1 crossfade to GRAPHIC OBJECT 3 and then crossfade to GRAPHIC OBJECT 2.

# Lesson 2 - Working with Multiple Graphic Objects

In this lesson, you will combine 2 Graphic Objects and use Transparent Color Effect options to create transparencies. You will be building off of cue 3 that was created in Lesson 1.

1. Be sure that the MOTION **Dimmer** parameter (for DL.3 or DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 and 2 **Opacity** parameters are all set to 100% (DMX = 255).

## Apply Transparency Effects

2. With the GRAPHIC OBJECT 2 selected, open the **Effect Mode 1** parameter.
3. Select the *Transparent Color Medium* option (DMX = 27). The DL.3 logo “floats” on a water background.
4. Select *Invert Chroma Fine* option (DMX value = 29). Now the Graphic Object 1 content shows through the logo.
5. Record this look to your console.


# Lesson 3 - Girt, the Fire Breathing Lizard

In this lesson you will use Rotation, X, Y, and Z positioning, and scaling parameters to control the interaction of multiple Graphic Objects. Before you begin, clear any information out of your programmer. Also, release playback of cues used in Lessons 1 and 2. You may want to start a new cuelist for this exercise. If you are using a DL.3 or DL.2 fixture, be sure that you have set up the fixture's motion parameters as described in the beginning of this tutorial.

1. Be sure that the MOTION **Dimmer** parameter (for DL.3 or DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

## Define Graphic Object 1

2. Set the **Media Folder** parameter for GRAPHIC OBJECT 1 to DMX = 14 (HES Theme Stills).
3. Set the **Media File** parameter to a DMX value = 10. (10-Tropical_10.jpg).

## Define Graphic Object 2

The following steps select and position a flame graphic object.

4. Select the GRAPHIC OBJECT 2 and set the **Opacity** parameter to DMX = 255 (100%).
5. Set the **Media Folder** parameter to DMX = 4 (HES Atmospheric).
6. Set the **Media file** parameter to DMX = 16 (16-Fire_Triple_Burst).
7. Set **Effect Mode 1** parameter for GRAPHIC OBJECT 2 to DMX = 28 to select the *Transparent Color Coarse* effect. This will make the black background transparent.
8. Reduce the Y Scale parameter to -5.7x (DMX = 55).
9. Reduce the X Scale parameter to -2x (DMX = 102).
10. Set the X Position parameter to a real world value of 37 pixels (DMX = 33530).
11. Set the Y Position parameter to a real world value of 13 pixels (DMX = 33042).
12. Set the Z Rotation parameter to a real world value of -25° (DMX = 33042).

## Define Graphic Object 3

The following steps create and position a puff of smoke.

13. Select the GRAPHIC OBJECT 3 and set the **Opacity** parameter to DMX = 255 (100%).
14. Set the **Media Folder** parameter to DMX = 4 (HES Atmospheric).
15. Set the **Media File** parameter to a DMX value of 17 (17-Dust_Explosion).

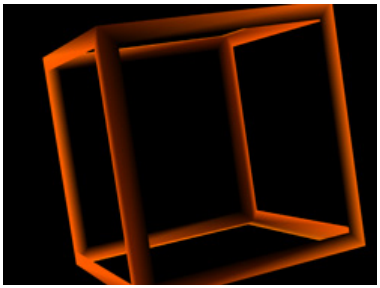
16. Set **Effect Mode 1** parameter for GRAPHIC OBJECT 3 to DMX = 28 to select the *Transparent Color Coarse* effect. This will make the black background transparent.
17. Set the **X Scale** parameter to a real world value of -7.4x. (DMX = 33)
18. Set the **Y Scale** parameter to a real world value of -6.4x. (DMX = 46)
19. Set the **X Position** parameter to a value of 20 pixels. (DMX = 33177)
20. Set the **Y Position** parameter to a value of 8 pixels. (DMX = 33932)
21. Record this look into your lighting console.

# Lesson 4: 3-D Objects, Rotation, Wobbulation, and Glow.

In this lesson you will learn how to put your chosen content on a 3D object and add rotation, glow, and wobbulation.

1. Be sure that the MOTION **Dimmer** parameter (for DL.3 or DL.2 fixtures), the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

## Define Graphic Object 1

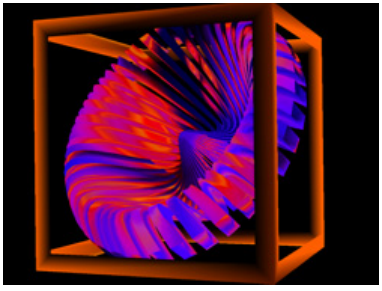


2. With GRAPHIC OBJECT 1 selected, set the **Media Folder** parameter to DMX = 1 (HES Core).
3. Set the **Media File** parameter to DMX = 3. This will call up a black.jpg.
4. Change the **Object** parameter to DMX = 23 (Outside Cube).
5. Set the **Effect Mode 1** to DMX = 73 (Glow)
6. Set the **Effect 1 Modifier 1** parameter to 93% (DMX = 236)
7. Set the **Effect 1 Modifier 2** parameter to 25% (DMX = 63).

*NOTE: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog system so you can also make use of the color picker, HSI, and other Wholehog functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.*

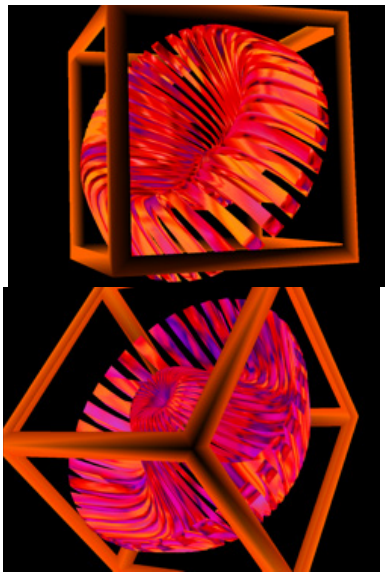
8. Change the **X Rotation** parameter to 5°. (DMX = 32887)
9. Change the **Y Rotation** parameter to a real world value of -32°. (DMX = 32033)

## Define Graphic Object 2



10. Select GRAPHIC OBJECT 2 and set the **Opacity** parameter to DMX = 255 (100%).
11. Change the **Media Folder** parameter to DMX = 6 (*Sean Bridwell*)
12. Change the **Media File** parameter to DMX = 16 (*Fractal_Flower*).
13. Change the **Object** parameter to DMX = 9 (*moiré swirl*)

14. Change the **X Rotation** parameter to 28° (DMX = 33405)
15. Change the **Y Rotation** parameter to 36° (DMX = 33577)
16. Open the **Effect Mode 1** parameter and set DMX = 66 (*Circular Sinewave Z-axis Wobbulation)*.



## Adjust this effect with the Modifier parameters.

17. Set the Effect Mode 1 Modifier 1 parameter to DMX = 104 (41%) to adjust wave size.
18. Set the Effect Mode 1 Modifier 2 parameter to DMX = 86 (34%) to adjust wobbulation rate.
19. Set the Effect Mode 1 Modifier 3 parameter to DMX = 114 (45%) to adjust offset.

***NOTE:*** ***Modifier parameters make different adjustments depending on the effect you choose.***

# Lesson 5: Viewpoint

This lesson demonstrates the global parameters including viewpoint, and global effects.

1. Be sure that the MOTION **Dimmer** parameter, (for DL.3 or DL.2 fixtures) the GLOBAL **Intensity** parameter, and GRAPHIC OBJECT 1 **Opacity** parameter are all set to 100% (DMX = 255).

## Define Graphic Object 1

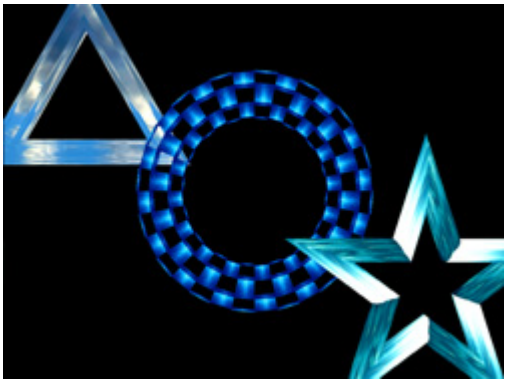
2. With GRAPHIC OBJECT 1 selected, change the **Media Folder** parameter to *feedback video* (DMX = 8).
3. Change the **Media File** parameter to DMX = 7 (*7-SD_Cloud010*)
4. Change the **Object** parameter to DMX = 21 (*triangle*)
5. Set the **Z Position** parameter to 118 pixels (DMX = 35187), the **Y Position** parameter to 30 pixels (DMX = 33372), and the **X Position** parameter to -43 pixels (DMX = 31888).

## Define Graphic Object 2

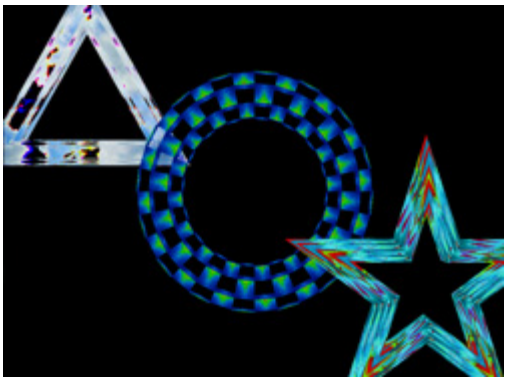
6. Select GRAPHIC OBJECT 2 and bring the **Intensity** parameter to 100% (DMX =255).
7. Change the **Media Folder** parameter to DMX = 8 (*feedback video*).
8. Change the **Media File** parameter to DMX = 9 *(9-SD_Deep01*)
9. Change the **Object** parameter to DMX = 8 (*toroid chk board*)
10. Change the **Z Position** parameter to a value of 64 pixels (DMX = 34087)

## Define Graphic Object 3

11. Select the GRAPHIC OBJECT 3 and change the **Intensity** parameter to 100% (DMX = 255).
12. Set the **Media Folder** parameter to DMX = 8 (*feedback video*)
13. Set the **Media File** parameter to DMX = 8 (*8-S_Dash*)
14. Change the **Object** parameter to DMX = 44 (*star bevel 4*)
15. Set the **Z Position** parameter to 40 pixels (DMX = 33592), the **Y Position** parameter to -13 pixels (DMX = 32493), and the **X Position** parameter to 30 pixels (DMX = 33372).

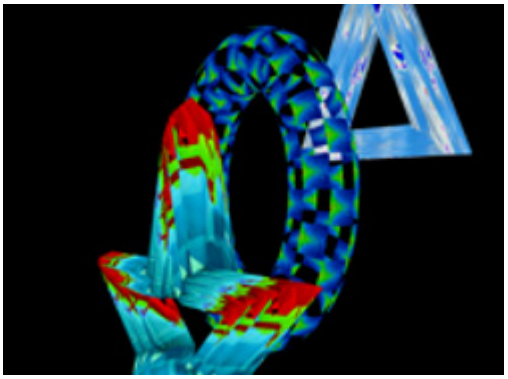


## Apply a Global Solarize Effect

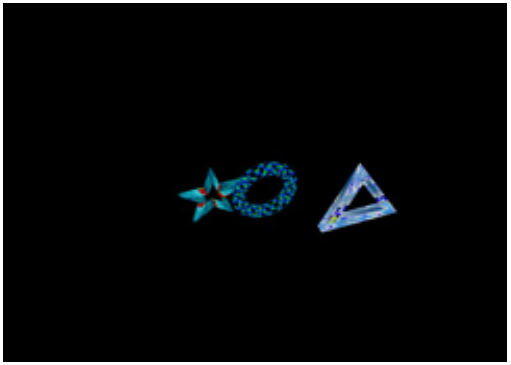


16. Select your GLOBAL fixture and change the **Effect Mode 1** parameter to DMX = 10 (*solarize 2*) and observe how the global effect changes all three of the graphic objects at one time
17. Record this look into your console.

## Adjust Global Viewpoint Mode



18. To select the *Perspective View with Spherical Coordinates* centered on Graphic Object 2, set the **Global Viewpoint Mode** parameter to *sphr lyr 2* (DMX = 2).
19. Change the **Viewpoint Position X** parameter to 316° and see how this changes the viewpoint position of all three graphic objects at one time.



20. Change the value of the **Viewpoint Mode** parameter to ortho lyr 2 (DMX = 10) for an Orthogonal View using Cartesian Coordinates.
21. Set **Viewpoint Position X** parameter to 39° (DMX = 36337)
22. Set **Viewpoint Position Y** parameter to 101° (DMX = 41947)
23. Set **Viewpoint Position Z** parameter to 116° (DMX = 43354).
24. Record this into your console and play back the cues you have created to observe how viewpoint changes the perspective on the graphic objects.

# Chapter 6:

# Graphics Engine Overview

***DL.3, DL.2, and Axon Media servers all use the same graphic engine software to control content selection, playback, and 3-D Object and Global manipulation.***

## Protocol Options

You can use one of two Protocol Versions to control DL.3 and DL.2 fixtures, and Axon media servers. Both versions provides individual and composite control for multiple graphic objects.

**Version 1** maintains the original channel range for DL.3, DL.2 fixtures or Axon media servers and offers compatibility with legacy shows.

**Version 2** adds an additional 27 channels of control with:

- Five banks of Global Effects instead of three in Version 1
- Eight channels of Global Framing Shutters
- Expanded Collage adjustments with 16-bit control of X, Y and Z scaling
- Global spherical mapping control
- An additional bank of Graphic Effects

Both Protocol versions include multiple new effects and can control up to nine Graphic Objects layers on DL.3 fixtures and Axon media servers.

***NOTE: DL.2 fixtures and the early Axon units are limited to four Graphic Object layers of control.***

You can adjust the “footprint” of the fixture on a DMX link with the protocol you choose and by implementing only the number of 3-D objects you need.

You select the protocol level in the fixture’s onboard menu system for DL.3 and DL.2 fixtures or through the CMA for both fixtures and Axon media servers (see *Viewing Server Configuration* on page 278).

*Appendix A: DMX Protocol* on page 321 has a detailed listing of all the parameters for all media servers and they are discussed in more detail in the following chapters.

| #of Object Layers | V2 Footprint on DMX512 Link | | | | V1 Footprint on DMX512 Link | | | |
|---|---|---|---|---|---|---|---|---|
| | DL.3 | Axon | DL.2 | Early Axon | DL.3 | Axon | DL.2 | Early Axon |
| 0 | 76 | 55 | 76 | 55 | 56 | 35 | 56 | 35 |
| 1 | 121 | 100 | 121 | 100 | 94 | 73 | 94 | 73 |
| 2 | 166 | 145 | 166 | 145 | 132 | 111 | 132 | 111 |
| 3 | 211 | 190 | 211 | 190 | 170 | 149 | 170 | 149 |
| 4 | 256 | 235 | 256 | 235 | 208 | 187 | 208 | |
| 5 | 301 | 280 | | | 246 | 225 | | |
| 6 | 346 | 325 | | | 284 | 263 | | |
| 7 | 391 | 370 | | | 322 | 301 | | |
| 8 | 436 | 415 | | | 360 | 339 | | |
| 9 | 481 | 460 | | | 398 | 377 | | |

## Image Optimizing Controls

Images can now be optimized for each cue. It is no longer necessary to pre-optimize images with a separate software system on a separate computer when preparing for a show. Using Visual modes, you can adjust both Black Level and Contrast for each cue and for each image (see *Visual Mode Options* on page 86).

## Graphics Control Hierarchy

There is a hierarchy to the DMX control parameters. In general, object control parameters render individual graphic images. Global control parameters act upon the composite image created by combining multiple objects. Motion parameters control the fixture movement and projection as well as live video feed from the internal camera.

It is especially important to keep this in mind when applying graphical effects. At the lowest level, Graphic effects are applied to an individual 3-D Graphic Object. Any Global effects applied affect each object in the combined Object image. Finally, motion effects control the projection of the composite image.

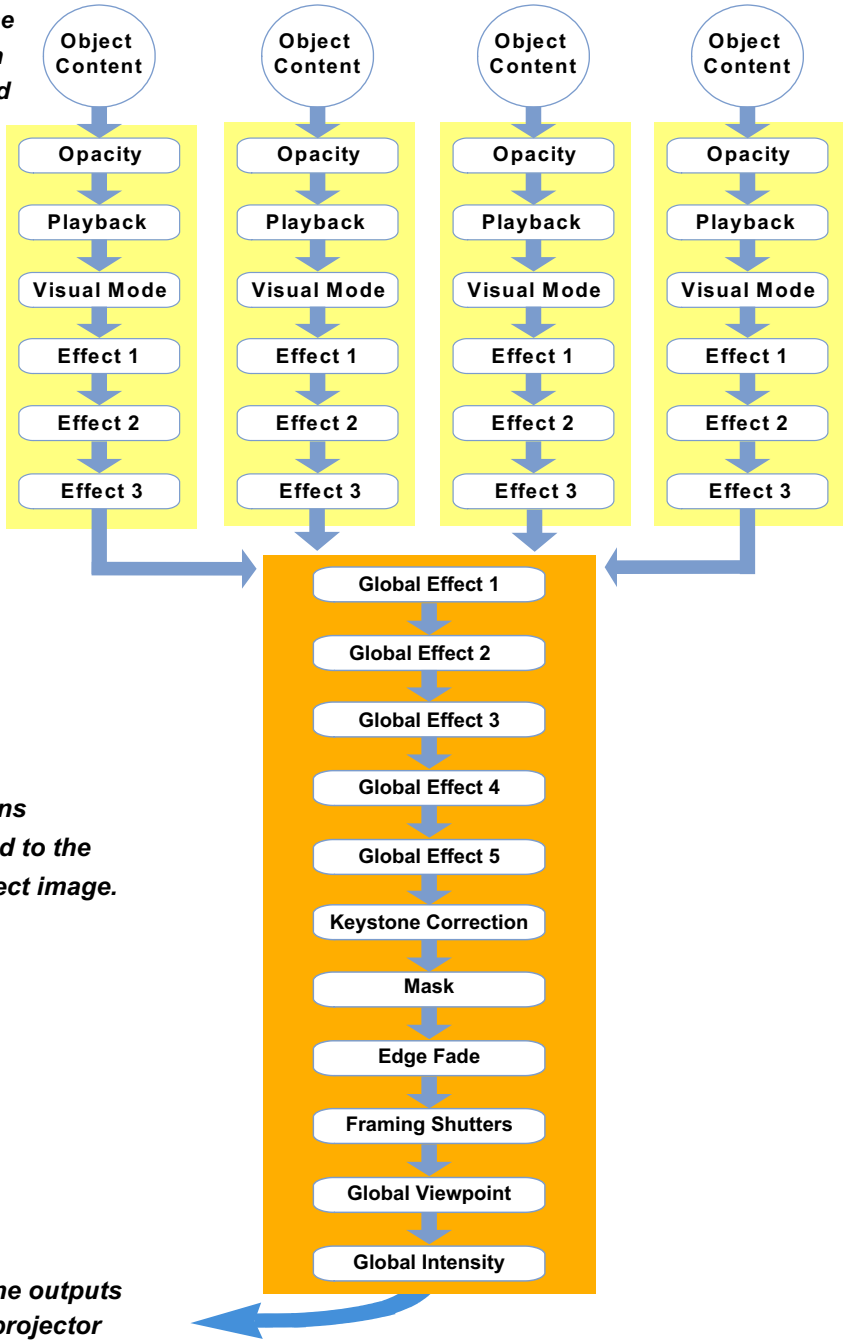
## Graphics Engine Function Flow

*Define up to nine 3-D objects with a texture applied*

*Graphic Functions are applied to each object*

*Global Functions are then applied to the composite-object image.*

*Graphics Engine outputs final image to projector*



# Graphics Engine Functions

## Object Graphic Functions

For an individual object, you can control:

- The media file and 3-D object selection for the layer
- Media playback including
  - What portion of the movie plays
  - Playback speed
  - Playback mode (direction and style of playback)
- The object transparency (opacity)
- Visual Effects including colormixing and geometric effects
- Synchronization
- Image Rotation, Scale and Position

## Global Functions

Global controls are applied to composite image created by multiple 3-D images. For the combined image, you can:

- Adjust the composite image intensity level
- Apply visual effects including colormixing and geometric effects
- Select a mask shape, size it and apply edge fades and color to the mask
- Apply and color mix an image edge fade
- Control keystone correction
- Create Framing Shutters
- Establish the point in 3-D space from which image will be viewed

# Making Graphics Effect Choices

Because you have control of many parameters, there are sometimes several ways to accomplish the same look. For Example, to make an object appear larger, you can scale it along the x, y and z axis, or you can apply a global control to zoom in on the z axis from a viewpoint that makes the object seem to increase in size.

Which solution you choose depends, to a large extent, on the transition to other effects you want to achieve.

# Chapter 7:

# Graphic Functions: Defining Content

***Each Graphic Object's content is composed of a 3-D object overlaid with a media file. This chapter outlines how to select an image's object and media file components as well as define the video segment and its playback.***

## Content Overview

In addition to a royalty-free stock digital art collection featuring more than 1,500 lighting-optimized files available as stock content, you can develop your own custom media files and 3D object files for playback on DL.3, DL.2 or Axon media servers. For a quick overview on developing your own custom User content, see *Appendix C: Custom User Content* on page 357. The Digital Lighting Product and Support pages at **highend.com/digital_lighting** offer additional assistance and the latest software and techniques for creating and encoding custom content.


Every DL.3, DL.2 and Axon media server has a file system that holds the movies, images, and 3-D objects that make up the content that the server uses. These files, folders, and their associated DMX values are collectively known as the "Content" on the media server.

The Content Management Application (CMA) organizes and identifies content by source (preloaded Stock content or custom User content) and type (Media files or 3-D Object files). For more information on using the CMA to view and manage content, (see *Chapter 16: Content Management Application (CMA)* on page 251).

## Selecting Content

Three Parameters control content selection. To define an image you have to set DMX values greater than 0 for the 3-D Object, Media Folder, and Media File parameters. The selected media file will be mapped onto the selected 3-D object.

To output an image from a media server:

1. Open the mechanical iris on the projector by setting its Dimmer parameter to full (100%).
2. Set the Global Intensity parameter to full (100%).
3. Set the Object opacity to full (100%)
4. Adjust the Object, Media Folder, and Media File parameters to greater than zero

When programming with Wholehog software, the Media Folder and Object parameters default to 1 so choosing any Media File DMX value from 1-35 will display a media loop from the HES Core folder (Media Folder 1) wrapped on a Flat Plane (Object 1).

*NOTE: The Dimmer, Opacity and Global Intensity Parameters all have to be greater than zero before the image you create becomes visible.*

## Content Selection Parameters

The following sections outline parameters you will use to create an image from content and define its playback. You will set the parameters described in this chapter for ***each*** individual Graphic Object you define.

*NOTE: The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output. They are the default values built into the Wholehog libraries for High End Systems consoles.*

### Object

The **Object** parameter selects the 3-dimensional object component of an image. Object files are the 3-D object shapes used to build a total image. The graphics engine supports a combined total of 255 stock and user-created object files.

Stock Objects have a fixed DMX value and cannot be edited. DMX values 1-149 are reserved for identifying stock object files. User-created object files must be assigned a unique DMX value from 150-255.

For a reference of 3-D object files available as stock content with your media server and information on how to create your own object files, go to the link for the Stock Object Guide for the DL.3, DL.2 and Axon products on http://www.highend.com/support/digital_lighting/.

**Default DMX Value:** 1 = full screen flat surface

*TIP: You can select the same object file for images that will be interacting with each other. If both objects occupy exactly the same area in 3-D space,*
*"Z-fighting" (a shimmering effect) on some portions of the composite image can occur as the graphics engine tries to determine which object should be in the foreground.*

*You can avoid this effect by making a slight adjustment to one of the object's scale or moving it forward or back (using the Z Position parameter) in respect to the other.*

## Media Folder

This parameter defines a folder (directory) containing a collection of media files. The media files within the assigned folder can then be selected using the **Media File** parameter. DMX values for folders are assigned as follows:

- DMX values = 1-39 are used or reserved for Stock Content
- DMX values = 40-240 are reserved for User Content
- DMX value = 255 is reserved for live video input

**Default DMX Value** = 1 (HES Core Media files)

The following table describes the Stock Content folders available on DL.3, DL.2 and Axon servers.

***NOTE: Media folders with DMX Values of 27-35 are only available as stock content on DL.3 fixtures and Axon Version 2 servers.***

## Media Folder Descriptions.

| DMX Value | Media Folder Name | Content Description |
|---|---|---|
| 1 | HES Core | Premier High End Systems video loop collection |
| 2 | HES_Digital_Aerials_1 | Digital still images and animations, designed for aerial effects |
| 3 | HES_Oils | Digitally simulated psychedelic oil projection loops |
| 4 | HES_Atmospheric | Video loops of natural settings clouds, water, fire |
| 5 | On_The_Wall_Studios | Digital video loops, promotional |
| 6 | Sean_Bridwell | Digital video loops, promotional |
| 7 | A_Luna_Blue | Digital video loops, promotional |
| 8 | Feedback_Video | Digital video loops, promotional |
| 9 | HES_Texture | Video loop textures |
| 10 | HES_Foliage | Collection of abstract and realistic foliage and floral video loops |
| 11 | HES_Religious | Religious themed video loops |
| 12 | HES_Gothic | Set of themed video loops |
| 13 | HES_Digital_Aerials _2 | Digital still images and animations, designed for aerial effects |
| 14 | HES_Theme_Stills | Nature stills (foliage and flowers) |
| 15 | Apollo Glass | Digital Gobo Patterns, promotional |
| 16 | Artbeats | Digital video loops, promotional |
| 17 | DHA_TopMac | Digital patterns, promotional |
| 18 | Beacon DigiGobos | Digital video loops, promotional |
| 19 | Amorphous Digi-gobos | Digital animations, promotional |
| 20 | InLight | Digital video loops, promotional |
| 21 | HES_Lithopatterns_1 | High End Systems Lithopattern® images |
| 22 | HES_Lithopatterns_2 | More images from High End Systems Lithopattern library |
| 23 | HES_Logos | High End Systems® Axon and DL.2™ logos |
| 24 | HES_Hi_Res | Variety of high resolution video backgrounds |
| 25 | NASA_Images | Space images from the Hubble telescope |
| 26 | Blue_Pony | Assorted video loops |
| 27 | HES_Core_02 | Mixed footage |
| 28 | V-Squared-Labs | Club themed footage |
| 29 | Virtual-Life-Media | Club themed footage and few stills |
| 30 | Daddy-Van-Productions | Digital backgrounds |
| 31 | Wet-Digital | Underwater footage |
| 32 | Idyll-Hands-Imagery | Aerial footage |
| 33 | David-Alley-Photography | Nature themed high resolution images |
| 34 | JTM-Photography | Nature stills |
| 35-38 | Reserved | Reserved for HES use |
| 39 | HES_Setup_and_Test | Images to use for setup and diagnostics |
| 40-240 | Open | Available for User Content |
| 255 | Video Input | Live video input from internal camera or external device |

### Media File

The **Media File** parameter lets you identify which Stock or User media file to apply (map) as a texture on the selected 3-D object. You can supplement the large library of Stock video loops and still images with Custom files. This parameter selects media files from within the folder defined by the **Media Folder** parameter.

For a reference of media files available as stock content with your media server, go to the link for the Stock Content Guide for DL.3, DL.2 and Axon products on **http://www.highend.com/support/digital_lighting/**.

**Default DMX Value:** 0 = No file selected

*Tip: You can preview a visual display of the media files loaded on a media server in the Content Management Application's thumbnails view, (see* **Viewing Content on page 259***) or in the File Tab of a DL.3 or DL.2 fixture menu display.*

## Defining a Media File Segment

You can define any portion of a video media file to play using the **In Frame** and **Out Frame** parameters. By default, the In Frame is the beginning of the media file and the Out Frame is the end of the file. Media files can have different lengths.

*NOTE: Media that is not properly encoded may still play, but may have issues when using* **In-Frame** *and* **Out-Frame** *parameters.*

### In Frame and Out Frame Parameters

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

*NOTE: DMX parameter values for these parameters do not correspond to a particular "frame". They are defined as a percentage of the movie length. This makes it possible to create segments with an* **Out Frame** *preceding the* **In Frame** *and simplifies playback synchronization between media files.*

The **In Frame** parameter corresponds to a 16-bit DMX value equal to a starting point for the playback segment of the selected file. The **Out Frame** parameter corresponds to a 16-bit DMX value equal to an end point for the playback segment of the selected media file.

Assigning the In Frame and Out Frame parameters to default DMX values will playback the entire movie file.

Choosing other settings are useful when you want to:

- Begin or end a media file at any point other than the default
- Start or stop on a specific image
- You need to shorten the media file to a specific length

**In Frame Default DMX Value:** 0 = The beginning of a media file is the playback start point.

**Out Frame Default DMX Value:** 65535 = The end of a media file is the playback endpoint.

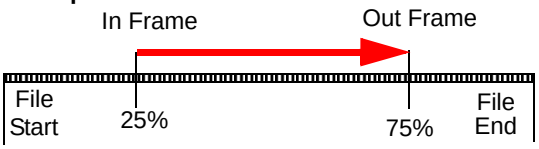
As you move from 0 to 100% of the **In Frame** value range, you can select the beginning of a media file segment as a percentage of the file length. Moving from 0 to 100% of the **Out Frame** value range selects the end of a media file segment as a percentage of the file length.

## Segment Selection Examples

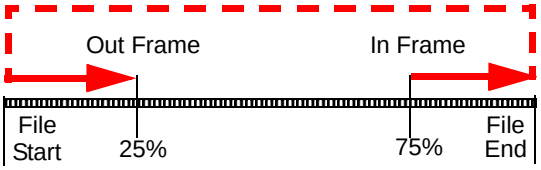
You can create a segment anywhere between the beginning and the end of a media file. The In Frame does not have to precede the Out Frame.

To skip a segment in the center of a media file, set the In Frame to a point following the Out Frame. The file will play from the In Frame to the end and then start at the beginning of the file and play to the Out Frame. When you create a segment in this way, you may notice a jump as playback skips from the end of the file to the beginning.

**Example 1**




**Example 2**



# Defining Playback

After selecting and defining a media file segment to display on a 3-D object, you can choose from several **Playback Mode**s and assign a **Playback Speed**.

## Playback Mode

A **Playback Mode** parameter for each 3-D image allows several playback options.

**Default DMX Value:** 0 = Plays forward in a continuous loop

| DMX Value | Playback Mode | Description |
|---|---|---|
| 0 | Play forward looping | Plays the media segment from In Frame setting to Out Frame setting, looping continuously |
| 1 | Play forward once | Plays the media segment from In Frame setting to Out Frame setting, and holds on the last frame |
| 2 | Pause | Stops playback at the frame currently playing |
| 3 | Play forward once if opacity > 0 | Plays the media segment from In Frame setting to Out Frame setting, and holds on the last frame, Plays only when the content opacity value is greater than zero. |
| 4 | Play forward if opacity > 0 | Plays media segment from In Frame setting to Out Frame setting, looping continuously. Plays only when the content opacity value is greater than zero. |
| 5 | Pause and rewind | Stops playback at the frame currently playing, then jumps to the In Frame setting. |
| 6 | Scrub In Frame | Displays frame that has been defined by the In Frame parameter |
| 7 | Scrub Out Frame | Displays frame that has been defined by the Out Frame parameter |
| 8 | Scrub In Frame with statistics | Displays frame that has been defined by the In Frame parameter with media file data overlaid on the output. |
| 9 | Scrub Out Frame with statistics | Displays frame that has been defined by the Out Frame parameter with media file data overlaid on the output. |

### Scrubbing

**Scrubbing** displays the selected frame of the composite output of the media server. While scrubbing the In Frame, the frame selected by the **In Frame** coarse and fine channels will be displayed. Likewise, scrubbing the **Out Frame** will display the frame selected by the **Out Frame** coarse and fine channels. When the “with statistics” option is selected, the composite output includes text data related to the selected frame. Remember that the **In Frame** and **Out Frame** parameters are defined as a DMX value mapped to the percentage of the media file length, not a specific frame.

***NOTE: If the Global Control Mode parameter = 255, a DMX value of 1-3 for the Global Control parameter provides an alternate font color to enhance statistics readability.***

## Playback Speed

The **Playback Speed** parameter controls the speed of the selected media file's Playback Mode. The Playback Speed for a media file is used whenever the Playback Mode Parameter's DMX value is assigned to any Play Forward option.

**Default DMX Value:** 128 = Playback at normal speed.

A DMX value of 0 or 128 (50%) plays back media files at the original recorded speed. DMX values from 1 to 127 plays the media file back at an increasing speed, from slowest to the original recorded speed. Values from 129-255 set playback speed from faster than normal to fastest speed.

***NOTE: DMX Values 1-127 utilize frame blending to provide a smooth playback motion at slow speeds.***

# Chapter 8:

# Graphic Functions: Rotation, Position, Scale

***You can independently control each Graphic Object's rotation direction and speed; along with its position and scale in X, Y, and Z axis directions.***

The parameters described in this chapter are set for each Graphic Object you define. Parameters for composite image rotation, position and global scale are described in *Chapter 11: Global Functions*.

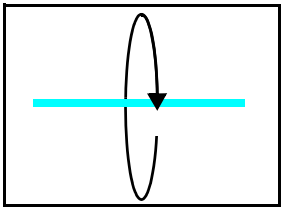
***NOTE: The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output.***

## Rotating a 3-D Object

The **Rotation** parameters for each object control 3-D object rotation with 16-bit precision. You can rotate a 3-D object up to 720° in either a clockwise or counterclockwise direction around the X, Y and/or Z axis.

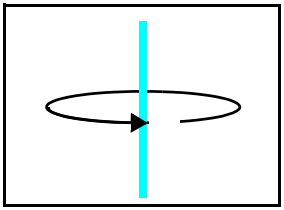
***NOTE: Remember that rotation changes could affect an object's relationship to other objects.***

When you rotate an object, you are rotating it around the selected axis. **X Rotation** produces the effect of a top-to-bottom flip. **Y Rotation** produces a left-to-right flip. **Z Rotation** causes a circular motion.



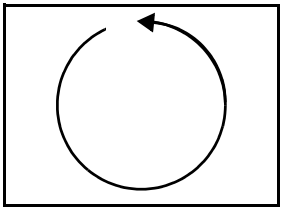
X Rotation

Rotates image about the X axis



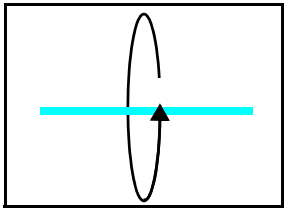
**Y Rotation**

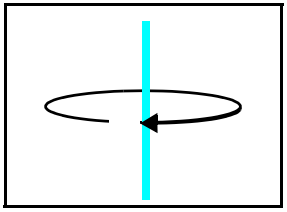
Rotates image about the Y axis

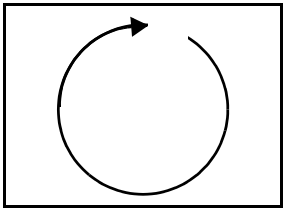


Z Rotation

Rotates image about the Z axis

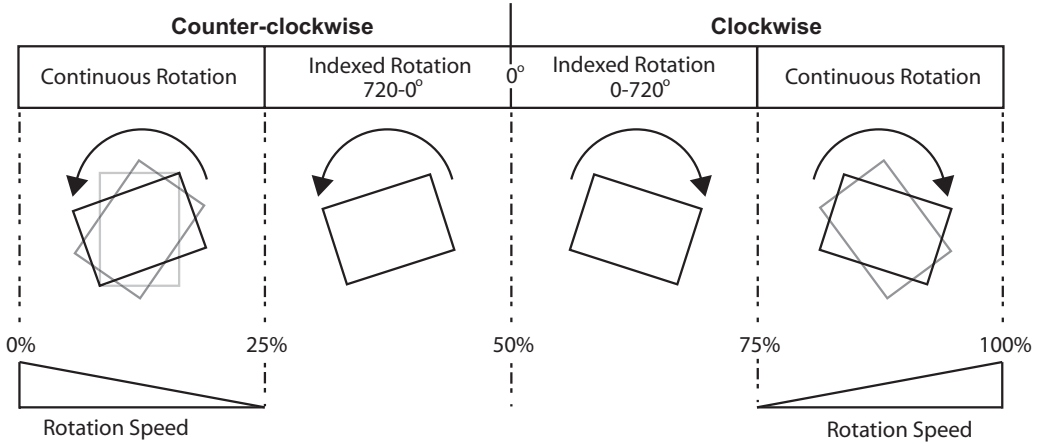






The Rotation parameters' suggested default values are the midpoint of the 16-bit DMX value range, which is equal to no rotation. Increasing the DMX value from the midpoint indexes the object in a clockwise direction. Reducing the DMX value below the midpoint indexes the object in a counterclockwise direction.

When the DMX value for a rotation parameter is greater than the 720° limit in either direction, the object begins rotating continuously. Additional adjustment to the DMX values increases the speed of continuous rotation.




***NOTE:*** ***Global and Graphic Effects Mode parameters contain a Prerotation Translation effect option. When a Global or Graphic Effects Mode DMX value = 102, you can use the Effect Modifier parameters to locate the image in a virtual three dimensional space. Applying the Rotation parameters then cause the image to orbit around the selected axis from that location, see*** **Prerotation Translation** ***on page 220.***

# Rotation Parameters

## X Rotation

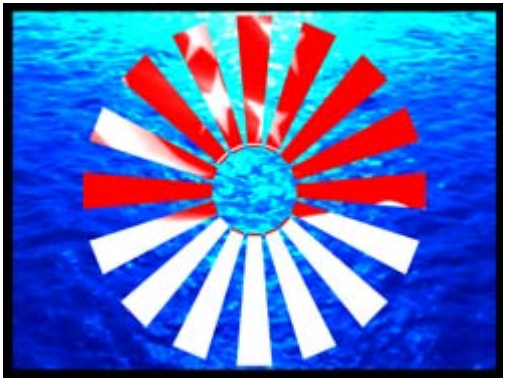
The **X Rotation** parameter rotates the selected Graphic Object around the X axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a vertical flip at variable speeds.

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 132).

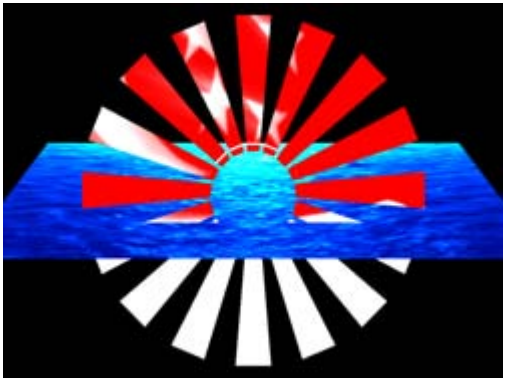
**Default DMX Value:** 32768 (50%) = No X Rotation

| % of Value Range | Function |
|---|---|
| 1–24 | Continuous variable-speed counterclockwise image rotation around X-axis (fast to slow) |
| 25 | Continuous rotation stop |
| 26–49 | Rotates the image counterclockwise around X-axis in steps to –720 degrees |
| 50 | 0° rotation around X-axis |
| 51–74 | Rotates the image clockwise around X-axis in steps to 720 degrees absolute |
| 75 | Continuous rotation stop |
| 76–100 | Continuous variable-speed clockwise image rotation around X-axis (slow to fast) |

**Tip:** Using this parameter you can turn one object through another.



Original Object 1 and Object 2



X-axis Rotation Applied to Object 2

## Y Rotation

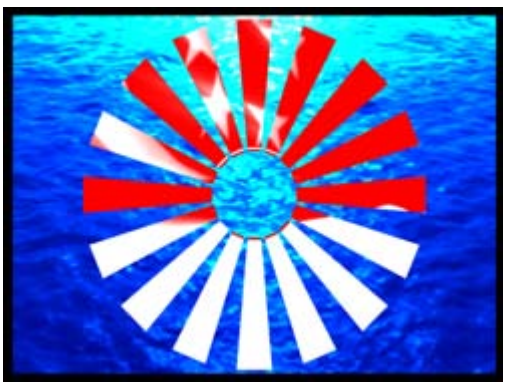
The **Y Rotation** parameter rotates or indexes the selected Graphic Object around the Y axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a horizontal flip at variable speeds.

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 132).

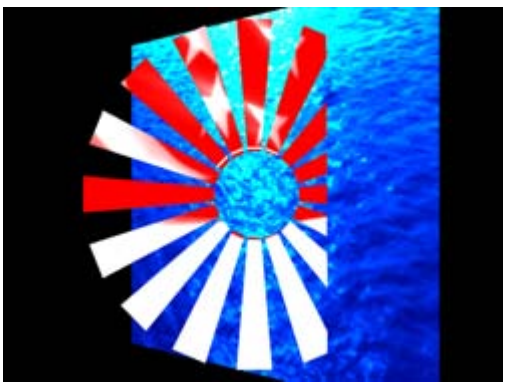
**Default DMX Value:** 32768 (50%)= No Y Rotation

| % of Value Range | Function |
|---|---|
| 1–24 | Continuous variable-speed counterclockwise image rotation around Y-axis (fast to slow) |
| 25 | Continuous rotation stop |
| 26–49 | Rotates the image counterclockwise around Y-axis in steps to –720 degrees |
| 50 | 0° rotation around Y-axis |
| 51–74 | Rotates the image clockwise around Y-axis in steps to 720 degrees absolute |
| 75 | Continuous rotation stop |
| 76–100 | Continuous variable-speed clockwise image rotation around Y-axis (slow to fast) |

**Tip:** Using this parameter you can turn one object through another



Original Object 1 and Object 2



Y-axis rotation applied to Object 2

## Z Rotation

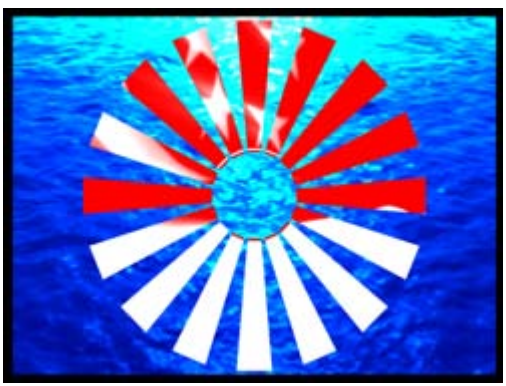
The **Z Rotation** parameter rotates or indexes the selected Graphic Object around the Z axis with 16-bit precision. You can index the rotation or set a continuous rotation creating a circular spin at variable speeds.

**Default DMX Value:** 32768 (50%)= No Z Rotation

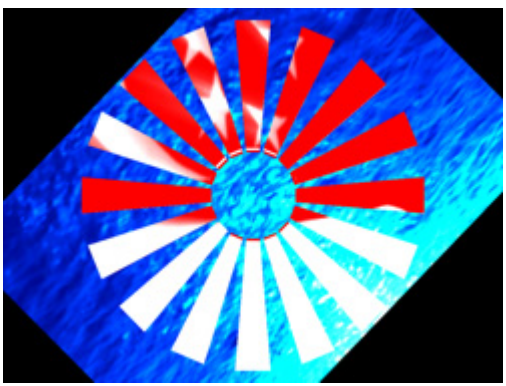
| % of Value Range | Function |
|---|---|
| 1–24 | Continuous variable-speed counterclockwise image rotation around Z-axis (fast to slow) |
| 25 | Continuous rotation stop |
| 26–49 | Rotates the image counterclockwise around Z-axis in steps to –720 degrees |
| 50 | 0° rotation around Z-axis |
| 51–74 | Rotates the image clockwise around Z-axis in steps to +720 degrees |
| 75 | Continuous rotation stop |
| 76–100 | Continuous variable-speed clockwise image rotation around Z-axis (slow to fast) |

This parameter lets you view an object from a different angle by turning the object. You can also view an object from a different angle by changing the viewpoint in space for the composite image, (see *Global Viewpoint Mode* on page 132).

**Tip:** Using this parameter you can turn one object around another



Original Object 1 and Object 2



Z-axis Rotation Applied to Object 2

# Scaling the Object

You can scale an Graphic Object along the X, Y and/or Z axis to adjust the object size.

The **Scale** parameter adjusts the size of the object's image up to approximately 10x its original size. At a DMX value of zero, the image shrinks to a dot. At the midpoint of the DMX value range, the image is normal size. 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.

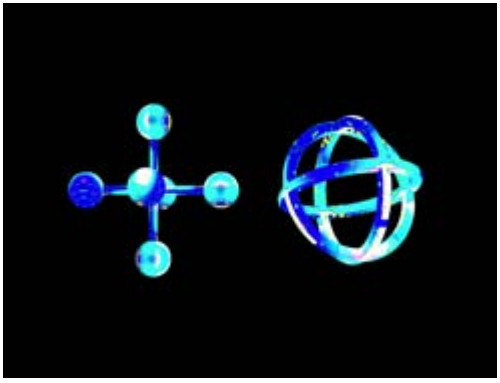
**Tip:** Use the **X**,**Y** and **Z Scale** parameters together to enlarge or shrink a 3-D object proportionally.

## X Scale

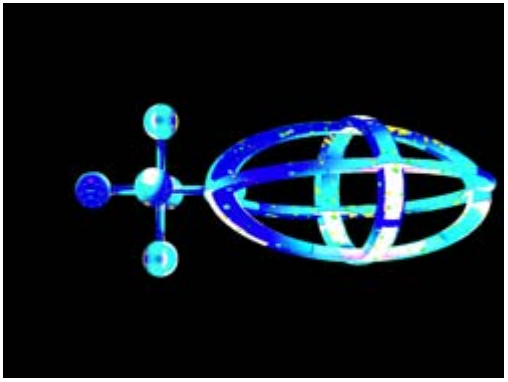
The **X Scale** parameter uses two channels to scale the selected 3-D object along the X axis, either expanding it or making it smaller. Use it when you want to size the object's horizontal component.

A DMX value of 32768 (50%) sets the object at its normal size. Values less than 50% shrink the object horizontally to the smallest at 0. Values greater then 50% enlarge the object horizontally to the largest at 255 (100%).

**Default DMX Value:** 32768 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale DMX values = 32768 (50%)



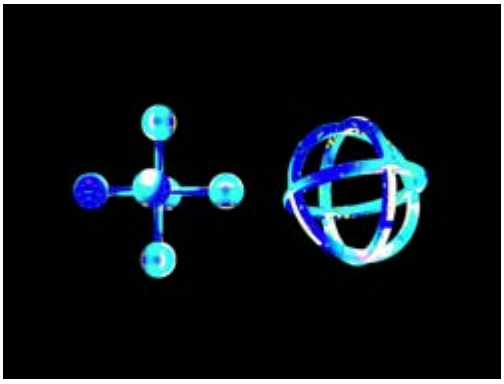
Object 2 X-Scale DMX value = 165
Scaled 3 times in X direction

## Y Scale

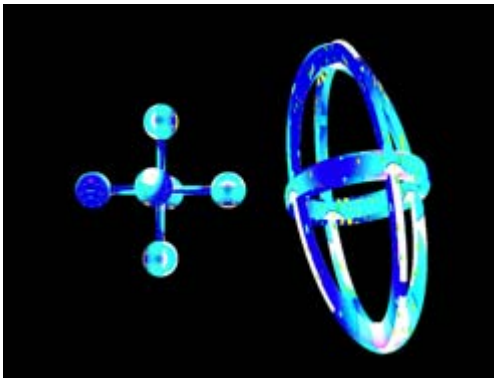
The **Y Scale** parameter uses two channels to scale the selected 3-D object along the Y axis, either expanding it or making it smaller. Use it when you want to size the object's vertical component.

A DMX value of 32768 (50%) sets the object at its normal size. Values less than 50% shrink the object vertically to the smallest at 0. Values greater then 50% enlarge the object vertically to the largest at 255 (100%).

**Default DMX Value:** 32768 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale DMX values = 32768 (50%)



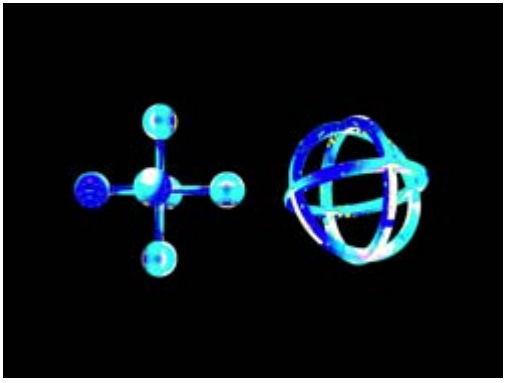
Object 2 Y-Scale parameter DMX value = 165
Scaled 3 times in Y direction

## Z Scale

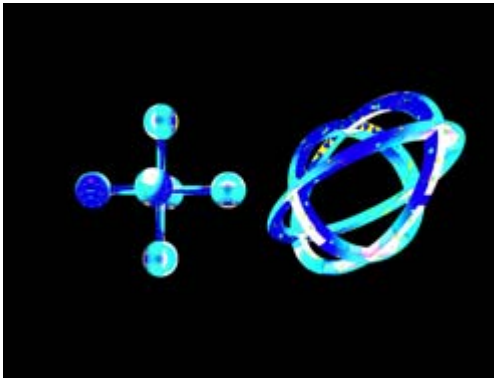
The **Z Scale** parameter uses two channels to scale the selected 3-D object along the Z axis, either expanding or shrinking it. Use it when you want to size the object's thickness.

A DMX value of 32768 (50%) sets the object at its normal size. Values less than 50% shrink the the object thickness until it reaches a point at a value of 0. Values greater then 50% enlarge the object to a maximum thickness at 255 (100%).

**Default DMX Value:** 32768 (50%) = Normal Scale



Original Object 1 and Object 2
All Scale DMX values = 32768 (50%)



Object 2 Z-Scale parameter DMX value = 223
Scaled 7.5 times in Z direction

# Changing Object Position

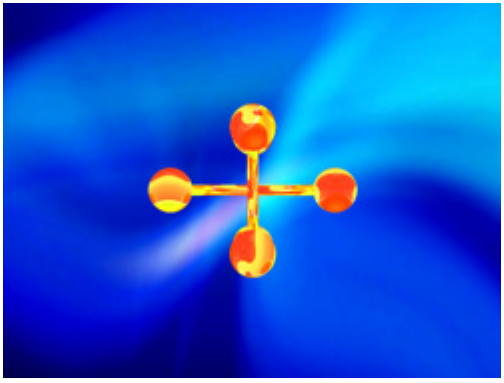
You can reposition each 3-D object's position in 3-D space by moving it along the X, Y and Z axes. The following parameters act on an individual object. Use these parameters to position 3-D images in relation to each other.

## X Position

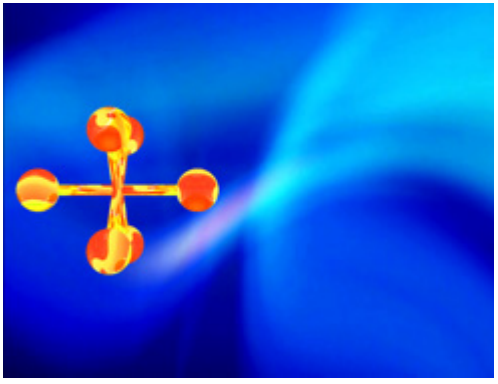
The **X Position** parameter moves your object along the X axis with 16-bit precision.

The midpoint of the 16-bit DMX value range centers the image on the X-axis. Values below the DMX midpoint move the object left, and values above the DMX midpoint move the object right.

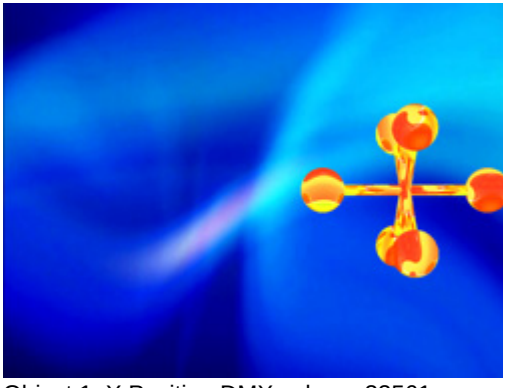
**Default DMX Value:** 32768 (50%) = object centered in frame



Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: X Position DMX value = 32022



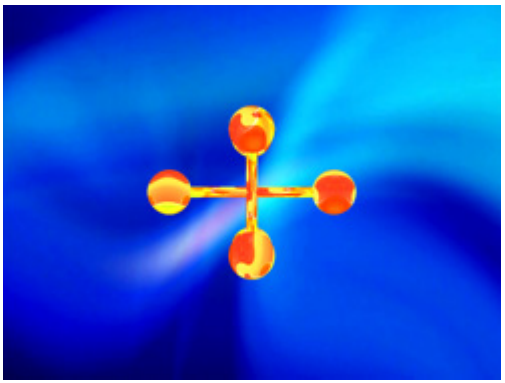
Object 1: X Position DMX value = 33561

## Y Position

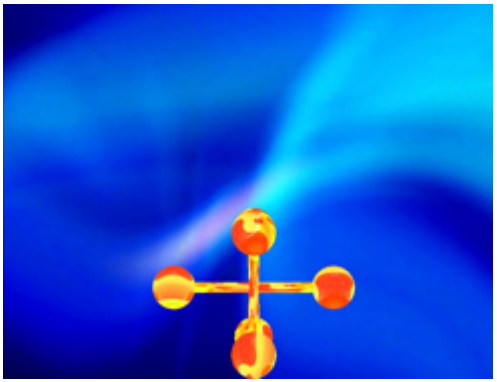
The **Y Position** parameter moves your object along the Y axis with 16-bit precision.

The midpoint of the 16-bit DMX value range, centers the image on the Y-axis. Values below the DMX midpoint move the object down, and values above the DMX midpoint move the object up.

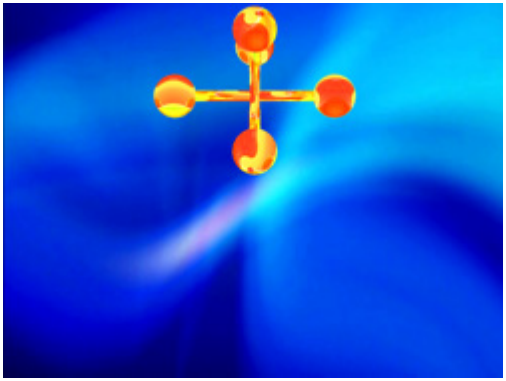
**Default DMX Value:** 32768 (50%) = object centered in frame



Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: Y Position DMX value = 32255



Object 1: Y Position DMX value = 33269

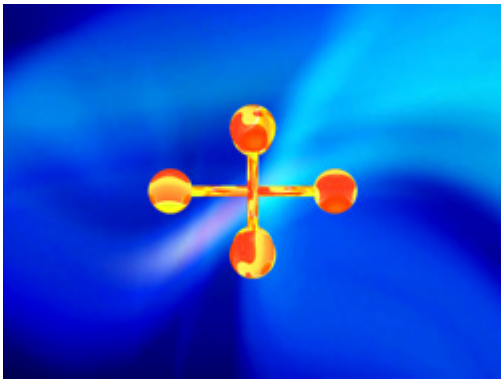
## Z Position

The **Z Position** parameter moves your object along the Z axis with 16-bit precision.

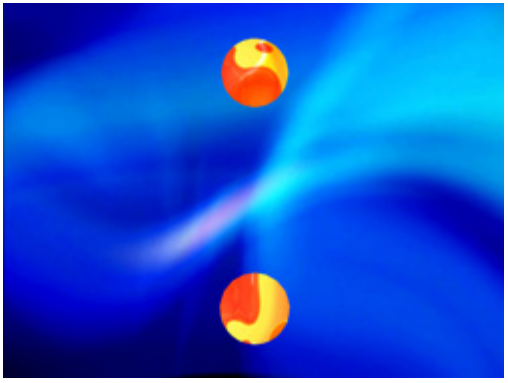
The midpoint of the 16-bit DMX value range centers the object on the Z axis. Values below the DMX midpoint move the object away from the viewer and appears to become smaller, and object above the DMX midpoint move the object toward the viewer and appears to become larger.

**Default DMX Value:** 32768 (50%) = object centered in frame

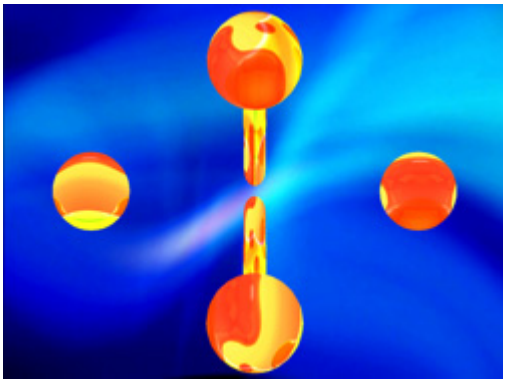
**Tip:** This parameter can create a zoom effect. Remember that by moving an object, you can obscure other objects or move it behind your viewpoint where it is no longer visible.



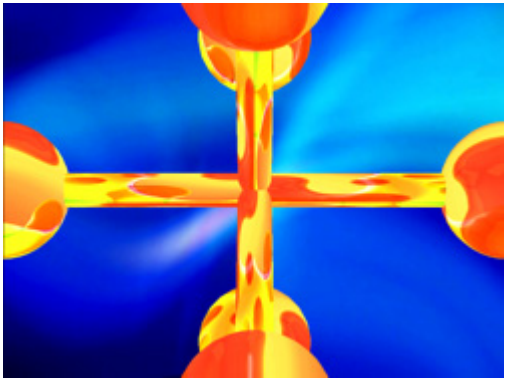
Original Object 1 and Object 2
All Position DMX values = 32768 (50%)



Object 1: Z Position DMX value = 31884



Object 1: Z Position DMX value = 32822



Object 1: Z Position DMX value = 33144

# Chapter 9:

# Graphic Functions: Opacity and Effects

***You can adjust opacity and apply a variety of color mixing and geometric effects to each individual Graphic Object.***

The parameters described in this chapter are set for each Graphic Object you define. Parameters for composite image intensity and effects are described in *Chapter 11: Global Functions on page 115*.

***NOTE: The suggested default DMX values given for each parameter are recommended to build libraries that provide the easiest and most reliable content selection, rendering and output.***

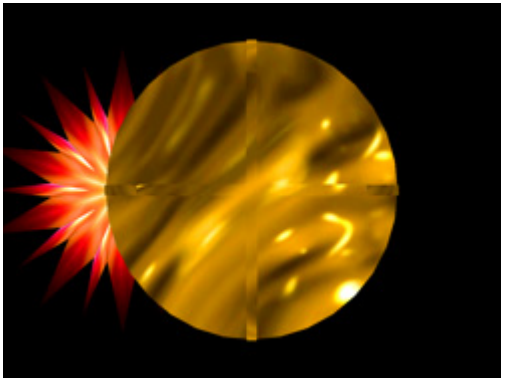
## Opacity

Adjusting an object's opacity allows one object to "show through" another. You can adjust the opacity of an individual 3-D object from completely transparent to full opacity using this parameter. Increase opacity from not visible at a value of zero to full opacity at a value of 255.

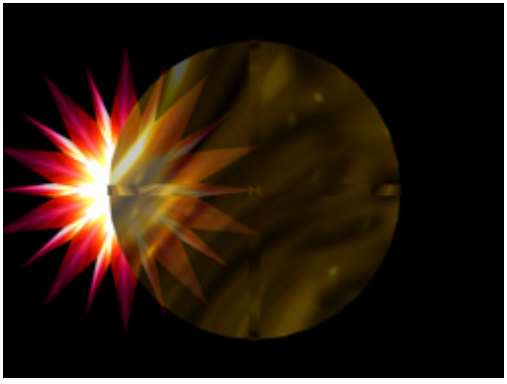
**Default DMX Value:** 0 = completely transparent

The Global Intensity parameter provides a similar adjustment to the combined image. This global control parameter controls intensity levels on the overall image (see *Global Intensity* on page 115). When you have multiple objects in relation to each other, the Global Intensity parameter is the best way to apply a fade to the composite image.

**Tip:** The **Dimmer**, **Object Opacity** and **Global Intensity** parameters all have to be greater than 0 to make a defined image visible.



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 255 (100%)



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 179 (70%)

## Visual Mode

Visual Mode options are defined using three parameters. The **Visual Mode** parameter has options for enhancing and adjusting the black level and contrast of a 3-D object. Once you choose a visual mode, two **Modifier** parameters adjust the selected mode.

***NOTE: In most cases, you won't see a change in the content until you adjust the Modifier parameters for that mode.***

**Default DMX Value:** 0 = Safe (no processing applied)

Default DMX values for Modifier 1 and Modifier 2 channels depend on the selected option.

The following table illustrates the interaction between the Visual Mode Parameter and the two associated Modifier parameters for each option.

| Visual Mode Option | | | Adjustments | |
|---|---|---|---|---|
| **DMX Value** | **Name** | **Description** | **Modifier 1** | **Modifier 2** |
| 0 | Safe | No visual mode processing applied to rendered output. | Not Used | Not Used |
| 1 | Content Optimization | Enhances image black level and contrast | Adjusts Back Level | Adjusts Contrast |
| 2 | Push to Sepia | Fades from original image color to sepia | Adjusts Fade | Adjusts Saturation |
| 3 | Push to Red | Fades from original image color to red tones | Adjusts Fade | Adjusts Saturation |
| 4 | Graymaker | Gradually transitions image from color to grayscale | Replaces color with gray | Adjusts brightness |
| 5 | Graymaker2 | Converts image to grayscale | Adjusts black level | Adjusts contrast |
| 6 | Posterizer | Converts colors to their highest values without bleeding or blending | Reduces color detail | Adjusts Contrast |
| 7 | Color to B/W | Fades colors to black/white with no grays | Fades color through B/W to White at 100% | Not Used |
| 8 | Fire Gradient | Maps original color intensity levels to a red-to-yellow gradient. | Fades image to red-yellow gradient | Not Used |
| 9 | Negative Art | Reverses image color | Scales color | Subtract red to Subtract Green |
| 10 | Exposure Control | Alternate content optimization option | Expand/Contrast Color | Adjusts color shift |
| 11 | Invert B/W | Inverts Black and White components. Color remains unaffected | Sets Black Comparison Level | Sets White Comparison Level |
| 12 | Texture Mixing | Crossfades between the current image and another graphic object texture. | Selects the Source Graphic Object Texture | Controls Crossfade |

| Visual Mode Option | | | Adjustments | |
|---|---|---|---|---|
| **DMX Value** | **Name** | **Description** | **Modifier 1** | **Modifier 2** |
| 13 | Image Scale and Rotate | Scales and rotates the media file texture applied to a 3-D object | Scales Image | Sets Rotation Angle |
| 14 | Film Roll | Scrolls the media file texture horizontally or vertically | Sets Horizontal Roll Speed | Sets Vertical Roll Speed |
| 15 | Pixelate | Divides the image into rectangles using the center pixel color of each “box” as its color | Adjusts amount of pixelation | Not Used |
| 16 | Faux LED | Divides the image into a grid of circles to mimic an LED wall | Varies grid from 100x100 to 10x10 | Varies the spacing and B/W |
| 17 | Faux Tile | Divides the image into square tiles | Varies grid from 100x100 to 10x10 | Varies the spacing and B/W |
| 18 | Fuzzifier | Creates a multi-image blurring effect | Horizontal fuzz distance | Vertical fuzz distance |
| 19 | Drop Shadow | Creates a scalable drop shadow behind the graphic object | Horizontal shadow size | Vertical shadow size |
| 20 | Zoom Blur | Zooms into a position on the image with a mult-image blurring effect | Sets horizontal position center | Sets vertical position center |
| 21 | Chroma Shift | Shifts the red, blue, and green component colors | Horizontal shift | Vertical shift |
| 22 | ShakeNBake | Introduces a random vibration effect | Horizontal shake | Vertical shake |
| 23 | CTO/CTB | Color temperature correction | Push to Orange | Push to Blue |
| 24 | Flip | Flips layer content | Horizontal flip | Vertical flip |
| 255 | Pan and Scan | Zooms in and pans across a still image | Horizontal position | Vertical position |

# Visual Mode Options

## Color to B/W

**Visual Mode** Parameter DMX value = 7

Begins with a white screen and fades to the original image in black and white. All color is converted.

**Modifier 1:** Transitions the image from full white at a DMX value of 0 to black and white at a value of 128 (50%). Increasing values above 50% reveals more of the image in black and white to complete at a value of 255 (100%).

**Modifier 2:** Not Used

## Content Optimization

**Visual Mode** Parameter DMX value = 1

Stock content provided by High End Systems on your DL.3 fixture has been optimized for lighting applications. This option lets you make the same adjustments for User content or camera input. Content Optimization adjusts the image Black level and Contrast to optimize the projected image for your performance environment. You can use it to easily modify the black level and contrast for a specific application. The Exposure Control visual mode option (see *Exposure Control* on page 89) provides an alternative algorithm for accomplishing this optimization.

**Modifier 1:** Adjusts black level from 0 = no adjustment to 255 (100%) = full black.

**Modifier 2:** Adjusts contrast from 0 = no adjustment to 255 (100%) for maximum contrast.

**Tip:** All the factory content provided has been optimized already. This parameter and the Exposure Control visual options are especially useful for optimizing User content or camera capture.

## Chroma Shift

**Visual Mode** Parameter DMX value = 21

Shifts the red, blue, and green component colors in an image. You can offset color components vertically and or horizontally.

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components right to a maximum at a value of 0. Values above the midpoint shift the color components left to a maximum at a value of 255 (100%).

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components down to a maximum at a value of 0. Values above the midpoint shift the color components up to a maximum at a value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 21

Visual Mode Modifier 1 DMX value=105
Visual Mode Modifier 2 DMX value=148

## CTO/CTB

**Visual Mode** Parameter DMX value = 23

Allows color temperature correction by adding either Color Temperature Orange or Color Temperature Blue.

**Modifier 1:** Decreases the perceived color temperature by adding orange from 0 = no adjustment to a minimum color temperature at a value of 255 (100%).

**Modifier 2:** Increases the perceived color temperature by adding blue from 0 = no adjustment to a maximum color temperature at a value of 255 (100%).

## Drop Shadow

**Visual Mode** Parameter DMX value = 19

You can create a drop shadow behind the media file texture on a 3D object, and vary its size horizontally and vertically. This option creates a black plane behind the selected media file texture on a flat rectangular object that can be positioned to form a drop shadow effect. You won't see the shadow until you select a Modifier 1 or 2 DMX value above or below 128 (50%)

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" right as you approach 0 = maximum horizontal shadow width. Values above the midpoint move the "shadow" left as you approach 0 = maximum horizontal shadow width at a value of 255 (100%)

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" down as you approach 0 = maximum vertical shadow width. Values above the midpoint move the "shadow" up as you approach 0 = maximum vertical shadow width at a value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 19

Visual Mode Parameter DMX value = 19
Visual Mode Modifier 1 DMX value= 0
Visual Mode Modifier 2 DMX value=255

## Exposure Control

**Visual Mode** Parameter DMX value = 10

Exposure Control adjusts the image Black level and Contrast to optimize the projected image for your performance environment. You can use it to easily modify the black level and contrast for a specific application.

Exposure Control provides finer Contrast and Black level control than the Content Optimization option (see *page 86*) which pushes colors to saturation more quickly.

**Modifier 1:** Adjusts black level from 0 = full black through 255 (100%) = brightest. At a DMX value of 128 (50%) there is no adjustment.

**Modifier 2:** from 0 = least contrast through 255 (100%) = maximum contrast. At a DMX value of 128 (50%) there is no adjustment.

**Tip:** All the factory content provided has been optimized already. This parameter and the Content Optimization option are especially useful for optimizing user content or camera capture.

## Faux LED

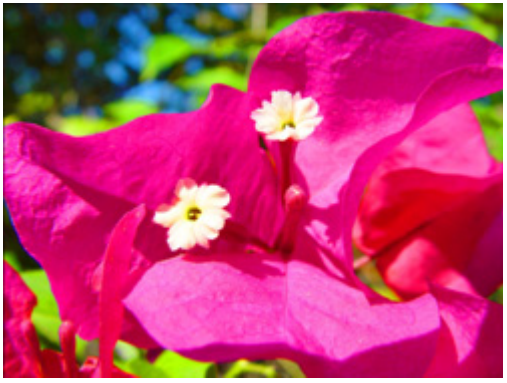
**Visual Mode** parameter DMX value = 16

This option divides the image into a grid of circles to mimic an LED wall. The color of the center pixel in each cell defines the solid color for that circle. You can control the number and spacing of LEDs and choose between a black and white background grid.

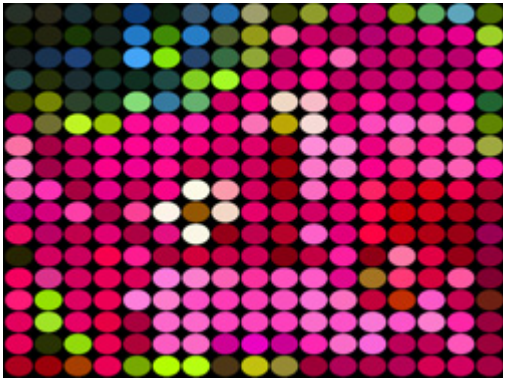
**Modifier 1:** Controls the number of LEDs. The default DMX value of 0 = a 10 x 10 grid of tiles. Increasing the DMX value increases grid divisions to a maximum of 100 x 100 tiles at a value of 255 (100%).

***NOTE: A small number of larger tiles will also result in reduced color variation.***

**Modifier 2:** Adjusts the LED spacing. DMX values below the midpoint of the range increase the spacing between tiles on a black background from O to a maximum space between tiles at a DMX value of 127. Values above the midpoint increase the spacing between tiles on a white background to a maximum space between tiles at a DMX value of 255 (100%).



Original Content
Visual Mode Parameter DMX value = 16



Visual Mode Modifier 1 DMX value =204,
Visual Mode Modifier 2 DMX value= 16

## Faux Tile

**Visual Mode** parameter DMX value = 17

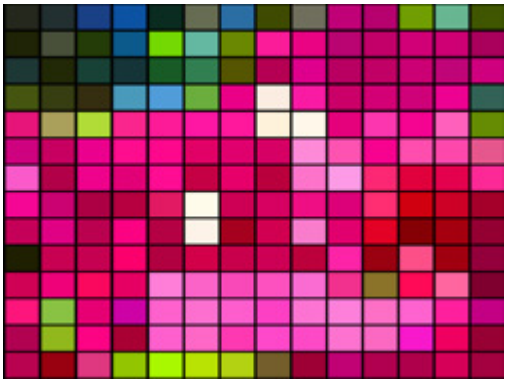
This option divides the image into a grid of tiles. The color of the center pixel in each cell defines the solid color for that tile. You can control the number and spacing of tile and choose between a black and white background grid.

**Modifier 1:** Controls the number of tiles. The default DMX value of 0 = a 10 x 10 grid of tiles. Increasing the DMX value increases grid divisions to a maximum of 100 x 100 tiles at a value of 255 (100%).

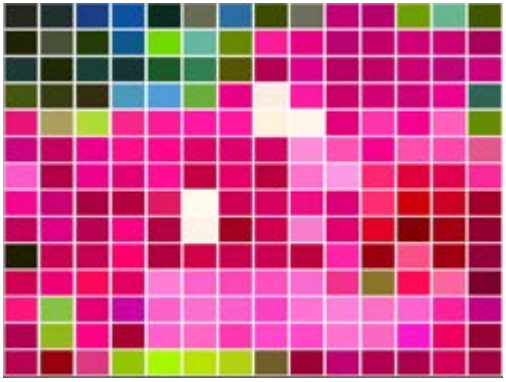
***NOTE: A small number of larger tiles will also result in reduced color variation.***

**Modifier 2:** Adjusts the grid thickness around each tile. DMX values below the midpoint of the range increase the spacing between tiles on a black background from O to a maximum space between tiles at a DMX value of 127. Values above the midpoint increase the spacing between tiles on a white background to a maximum space between tiles at a DMX value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 17



Visual Mode Modifier 1 DMX value =255
Visual Mode Modifier 2 DMX value= 0



Visual Mode Modifier 1 DMX value =255
Visual Mode Modifier 2 DMX value= 138

## Film Roll

**Visual Mode** parameter DMX value = 14

This option scrolls the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed.

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll left, increasing in speed as you approach 0. Values above the midpoint scroll right, increasing in speed to 255 (100%).

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll down, increasing in speed as you approach 0. Values above the midpoint scroll up, increasing in speed to 255 (100%).

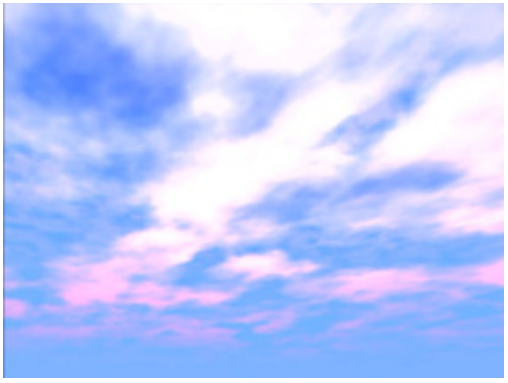
## Fire Gradient

**Visual Mode** Parameter DMX value = 8

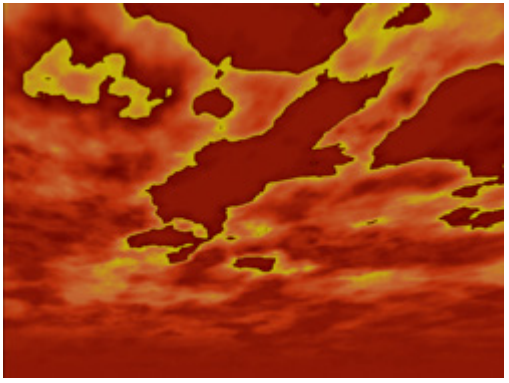
This option maps image colors to a Red-to-Yellow gradient creating a fiery effect.

**Modifier 1:** Maps the image color values from no adjustment at a value of 0 to all red to yellow tones at a value of 255 (100%).

**Modifier 2:** Not Used



Original Content
Visual Mode Parameter DMX value = 8



Visual Mode Modifier 1 DMX value=255 (100%)

## Flip

**Visual Mode** parameter DMX value = 24

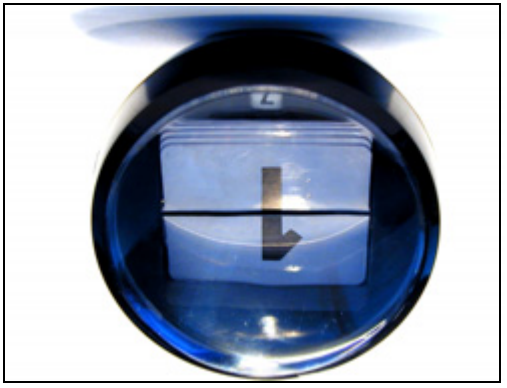
This option flips the media file texture horizontally or vertically independent from the 3-D object it overlays.

**Modifier 1:** DMX values from 0-127 have no effect. DMX values of 128 (50%) to = 255 (100%) flips the image horizontally.

**Modifier 2:** DMX values from 0-127 have no effect. DMX values of 128 (50%) to = 255 (100%) flips the image vertically.

Original content

Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 0



Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 128

## Fuzzifier

**Visual Mode** parameter DMX value = 18

This option blurs the media file texture horizontally or vertically.

**Modifier 1:** The default DMX value of 0 = no adjustment. Increasing DMX values blur the image horizontally to a maximum at a DMX value of 255 (100%).

**Modifier 2:** The default DMX value of 0 = no adjustment. Increasing DMX values blur the image vertically to a maximum at a DMX value of 255 (100%).

Original Content
Visual Mode Parameter DMX value = 18

Visual Mode Modifier 1 DMX value=255 (100%)
Visual Mode Modifier 2 DMX value=255 (100%)

## Gray maker I

**Visual Mode** Parameter DMX value = 4

This effect gradually transitions the color image to a grayscale image. Use the Gray Maker effect when you want to add an undertone of grey to the colors in an image.

*NOTE: If content is already grayscale, there is no effect applied but Modifier 2 can still affect image contrast.*

**Modifier 1:** At a DMX value of 0, the image will be full color. As you increase the DMX value, more gray is introduced until, at a DMX value of 255, all color has been replaced with shades of gray.

**Modifier 2:** Adjusts the brightness of the image at the grayscale transition level selected with the Modifier 1 parameter.

Original Content
Visual Mode Parameter DMX value = 4

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=128(50%)

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

## Gray maker 2

**Visual Mode** Parameter DMX value = 5

This option converts a color image to grayscale and then lets you adjust black level and contrast.

**Modifier 1:** Adjusts the black level of the grayscale image from a DMX value of 0 = Full brightness to 255 = completely black

**Modifier 2:** Adjusts contrast of the grayscale image from 0 = no adjustment to 255 (100%) = maximum contrast

Original Content

Visual Mode Parameter DMX value = 4

Visual Mode Parameter DMX value = 4
Visual Mode Modifier1 DMX value=90(33.3%)
Visual Mode Modifier2 DMX value=175(77%)

## Invert Black and White, Keep Color

**Visual Mode** Parameter DMX value = 11

This option allows you to invert the black and white components of an image while leaving other colors unaffected. You can vary the threshold for the “black” in a pixel required for inversion.

**Modifier 1:** Adjusts the comparison level of black for inversion from a DMX value of 0= inverting only absolute black to 255 (100%) = converting more of the image from black to white.

**Modifier 2:** Adjusts the comparison level of white for inversion from a DMX value of 0= inverting only absolute white to 255 (100%) = converting more of the image from white to black.

## Negative Art

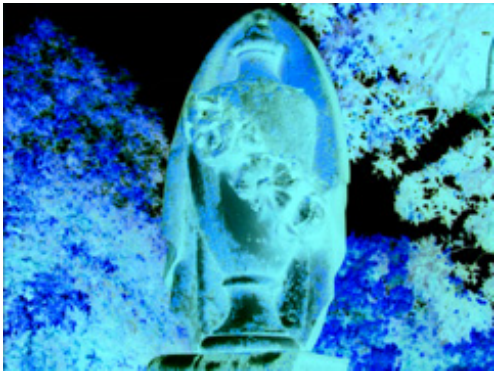
**Visual Mode** Parameter DMX value = 9

This option provides a negative of the image and then lets you adjust the amount of color and the red and green color components.

**Modifier 1:** Adjusts the color level from full at a DMX value of 0 to the lowest level at a DMX value of 255.

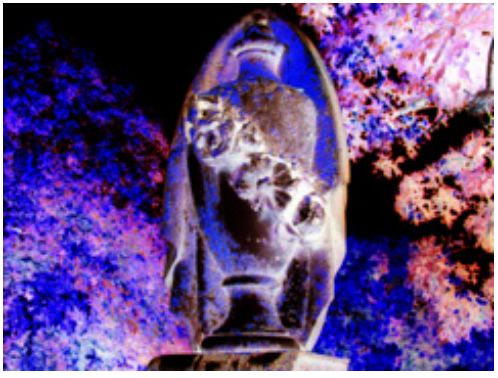
**Modifier 2:** You must set a DMX value of 128 to see no black level adjustment. Red is subtracted from the image at DMX values of 128 to 0. Green is subtracted from the image at DMX values of 129 – 255.

Original Content



Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=0
Modifier 2 DMX value = 0

Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=0
Modifier 2 DMX value = 128 (50%)



Visual Mode Parameter DMX value = 9
Modifier 1 DMX value=255 (100%)
Modifier 2 DMX value = 128 (50%)

## Pan and Scan

**Visual Mode** parameter DMX value = 255

This option Zooms into a still image and then, by changing position, you can pan across the image horizontally and vertically. It only functions on image sizes greater than 1024 x 1024 in at least one direction.

**Modifier 1:** Adjusts the horizontal pan position from 0=left edge to 255 (100%) = right edge of the image. The default DMX value of 128 (50%) = no adjustment.

**Modifier 2:** Adjusts the vertical pan position from 0 = bottom edge to 255 (100%) = top edge of the image. The default DMX value of 128 (50%) = no adjustment.

Original Content
Visual Mode Parameter DMX value = 255

Visual Mode Modifier1 DMX value=128
Visual Mode Modifier 2 DMX value = 128

Visual Mode Modifier 1 DMX value = 0
Visual Mode Modifier 2 DMX value = 0

Visual Mode Modifier 1 DMX value = 255
Visual Mode Modifier 2 DMX value = 255

## Pixelate

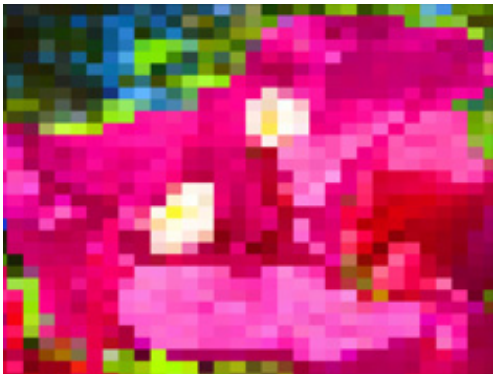
**Visual Mode** parameter DMX value = 15

This options divides the image into rectangles using the center pixel color of each as its color. You can control the number of divisions.

**Modifier 1:** Controls the number of divisions from a single cell at a DMX value = 0 to the maximum number of cells at a DMX value = 255 (100%). Since each division is a single color, fewer, larger boxes result in reduced color variation.

**Modifier 2:** Not Used

Original Content
Visual Mode Parameter DMX value = 15



Visual Mode Modifier 1 DMX value = 128

## Posterizer

**Visual Mode** Parameter DMX value = 6

This effect uses the associated **Modifier 1** parameter to posterize by replacing each color in an image with the highest values of that color but expanding it only to the border of that color. There is no bleeding or blending of colors.

*NOTE: In this visual mode, you won't see a change in the image until you adjust the Modifier 1 parameter*

**Modifier 1:** Adjusts color polarization level. The higher the value, the more color detail will be removed.

**Modifier 2:** Adjust the image contrast from 0 = no adjustment to 255 (100%) = maximum contrast.

Original Content
Visual Mode Parameter DMX value = 6

Visual Mode Parameter DMX value = 6
Visual Mode Modifier 2 DMX value=255(100%)

Visual Mode Parameter DMX value = 6
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

## Push to Red

**Visual Mode** Parameter DMX value = 3

This option reduces colors in the selected image to all Red values

**Modifier 1:** Fades from original color at a DMX value = 0 to a range of red tones at a value of 255 (100%)

**Modifier 2:** Adjusts color saturation from no adjustment at a DMX value = 0 to full saturation at a value of 255 (100%)

Original Content
Visual Mode Parameter DMX value = 3

Visual Mode Parameter DMX value = 3
Visual Mode Modifier2 DMX value=255(100%)

Visual Mode Parameter DMX value = 3
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

## Push to Sepia

**Visual Mode** Parameter DMX value = 2

This option converts all color in the image to sepia tones.

**Modifier 1:** Fades from original color at a DMX value = 0 to a range of sepia shades at a value of 255 (100%)

**Modifier 2:** Adjusts color saturation from no adjustment at a DMX value = 0 to full saturation at a value of 255 (100%)

Original Content
Visual Mode Parameter DMX value = 2

Visual Mode Parameter DMX value = 2
Visual Mode Modifier2 DMX value=255(100%)

Visual Mode Parameter DMX value = 2
Visual Mode Modifier1 DMX value=190(75%)
Visual Mode Modifier2 DMX value=255(100%)

## ShakeNBake

**Visual Mode** Parameter DMX value = 22

This option randomly vibrates the image. You can control the horizontal and vertical frequency.

**Modifier 1:** Adjusts random horizontal “shake” frequency from 0= no adjustment to 255 (100%) = maximum.

**Modifier 2:** Adjusts random vertical “shake” frequency from 0= no adjustment to 255 (100%) = maximum.

## Texture Mixing

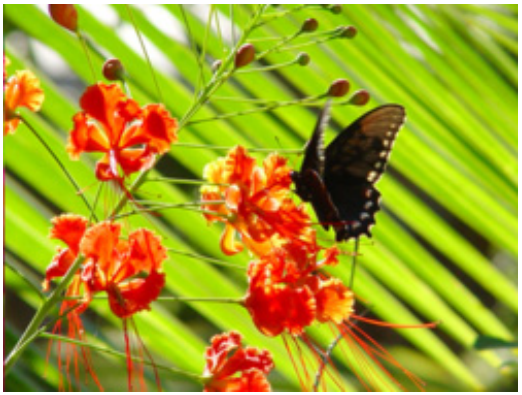
**Visual Mode** Parameter DMX value = 12

Texture Mixing lets you crossfade from textures (media file content) of one Graphic Object to the texture of another Graphic Object. Any effects applied to the Source file do not display.

**Modifier 1:** Selects the Source file for the texture you want to pull. A DMX value = 1 selects Graphic Object 1’s media file content. A DMX value = 2 selects Graphic Object 2’s media file content. A DMX value =3 selects Graphic Object 3’s media file content.

**Modifier 2:** Adjusts Graphic Object opacity of the source texture from a DMX value of 0 = fully transparent to 255 (100%) = fully opaque.

Original Content Object 1
Visual Mode Parameter DMX value = 20



Original Content Object 2
Visual Mode Parameter DMX value = 20

Visual Mode Modifier 1 DMX value=1
Visual Mode Modifier 2 DMX value=128

## Zoom Blur

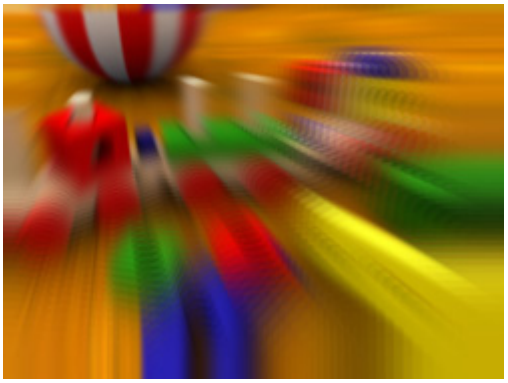
**Visual Mode** Parameter DMX value = 20

Zooms into a position on the image with a mult-image blurring effect. You can control the position of the zoom center on the image.

**Modifier 1:** Selects the horizontal center of the zoom point.

**Modifier 2:** Selects the vertical center of the zoom point.

Original Content
Visual Mode Parameter DMX value = 20



Visual Mode Modifier 1 DMX value=158
Visual Mode Modifier 2 DMX value=168

## Effect Mode Parameters

Three **Effect Mode** parameters are available for each individual 3-D object, each with three **Modifier** parameters. Both Effect parameters have an identical list of color and visual effect options. This lets you apply a dual-effect combination to the selected 3-D object.

***NOTE: Not all modes combine effectively. For example, you cannot glow a wobbulating object very well.***

The table below describes the interaction between an Effect Mode parameter and its three associated Modifier parameters. You can find a detailed description and example of each option in *Chapter 13: Effect Mode Options Descriptions* on page 147.

***NOTE: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog system so you can also make use of the color picker, HSI, and other Wholehog functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types. The default for Effect Mode 1 is set to CMY1 as well. Effect Mode 2 and 3 Modifier channels are labeled Mod 1, Mod 2, and Mod 3.***

| DMX value | Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 0 | Safe (no effects selection) | NA | NA | NA |
| 1 | CMY (RGB invert) | Cyan | Magenta | Yellow |
| 2 | CMY Add, All Pixels | Cyan | Magenta | Yellow |
| 3 | CMY Add, All Non-black Pixels | Cyan | Magenta | Yellow |
| 4 | RGB Add, All Pixels | Red | Green | Blue |
| 5 | RGB Add 2, All Pixels | Red | Green | Blue |
| 6 | RGB Add, All Non-black Pixels | Red | Green | Blue |
| 7 | RGB Swap to GBR | Red to Green | Green to Blue | Blue to Red |
| 8 | RGB Swap to BRG | Red to Blue | Green to Red | Blue to Green |
| 9 | Solarize 1 inverts a color value < DMX value | Red | Green | Blue |
| 10 | Solarize 2 inverts a color if value > DMX value | Red | Green | Blue |
| 11 | Solarize 3 sets color to 0 if value < DMX value | Red | Green | Blue |
| 12 | Solarize 4 sets color to 0 if value > DMX value | Red | Green | Blue |
| 13 | DotP and Resample | Red | Green | Blue |
| 14 | Color Cycle cycles colors with DMX value controlling cycle speed. | Red | Green | Blue |
| 15 | All or Nothing sets color values > mod value = 255 and all other color values = 0 | Red | Green | Blue |
| 16 | Solid color RGB | Red | Green | Blue |

| DMX value | Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 17 | RGB Invert | From Red to Cyan | From Green to Magenta | From Blue to Yellow |
| 18 | RGB, Invert and Swap to GBR | Red to Green | Green to Blue | Blue to Red |
| 19 | RGB, Invert and Swap to BRG | Red to Blue | Green to Red | Blue to Green |
| 20 | Edge Detect Color | Horizontal search size | Vertical search size | Comparison threshold |
| 21 | Edge Detect B/W | Horizontal search size | Vertical search size | Comparison threshold |
| 22 | Texture Ripple, Horizontal | Amplitude | Frequency | Phase |
| 23 | Texture Ripple, Vertical | Amplitude | Frequency | Phase |
| 24 | Texture Ripple, Circular | Amplitude | Frequency | Phase + Direction |
| 25 | Texture Ripple, Circular Asymmetrical | Amplitude | Frequency | Phase |
| 26 | Transparent Color Fine selects key color using Modifier channels | Red | Green | Blue |
| 27 | Transparent Color Medium selects key color using Modifier channels | Red | Green | Blue |
| 28 | Transparent Color Coarse selects key color using Modifier channels | Red | Green | Blue |
| 29 | Transparent Color Invert, Fine selects key color using Modifier channels | Red | Green | Blue |
| 30 | Transparent Color Invert, Medium selects key color using Modifier channels | Red | Green | Blue |
| 31 | Transparent Color Invert, Coarse selects key color using Modifier channels | Red | Green | Blue |
| 32 | Scan Line converts image colors to colors in a single line of the image | Selects scan line | Fades to converted image | Not used |
| 33 | Transparent Wipes “opens” the selected graphic to reveal another graphic positioned behind it | Area of wipe | Selects center of wipe | Selects from 6 wipe options |
| 34 | Pixel Twist swirls a portion of the texture | Twist center on X axis | Twist center on Y axis | Direction and amount of twist |
| 35 | Picture-in-picture duplicates the texture and overlays it on the original | Subpicture center on Xaxis | Subpicture center on Yaxis | Subpicture size |
| 36 | Magnifying Lens creates a virtual convex lens that magnifies a portion of the texture | Lens center on X axis | Lens center on Y axis | Lens size |
| 37 | Magnifying Lens 2 creates a virtual double convex lens that magnifies a portion of the texture. | Lens center on X axis | Lens center on Y axis | Lens size |
| 38 | Cartoon Edge creates variable outline around picture elements | Reduces Color | Enhances Contrast | Edge detection sensitivity |

| DMX value | Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 39 | Color DeConverge separates image color components and offsets them | Moves Red component up | Moves Green component down and right | Moves Blue component down and left |
| 40 | Horizontal Mirror creates a mirror effect | Defines mirror center | Not Used | Not Used |
| 41 | RGB Swap to BGR redefines component color | Red to Blue | Green | Blue to Red |
| 42 | RGB Swap to RBG redefines component color | Red | Green to Blue | Blue to Green |
| 43 | RGB Swap to GRB redefines component color | Red to Green | Green to Red | Blue |
| 44 | Colorize Gray Scale maps pixel intensity to color | Selects Color Scheme | Selects zero intensity point | Controls fading |
| 45 | Intensity Key turns pixels of selected intensity transparent | Selects Color Scheme | Sets Intensity bandwidth | Controls Transparency |
| 46 | Raindrop simulates raindrops falling on a liquid surface | Controls size/ speed | Seeds random # generator | Controls raindrop rate |
| 47 | RGB, Scale varies the color mapping values | Red | Green | Blue |
| 48 | Tiling On multiplies image in a defined grid | Horizontal # | Vertical # | Space between tiles |
| 49 | Color to Alpha varies the transparency level of an image's component color values | Red to alpha | Green to alpha | Blue to alpha |
| 50 | Color to Alpha, Inverted varies the transparency level of an image's inverted color values | Inverted Red to alpha | Inverted Green to alpha | Inverted Blue to alpha |
| 51 | Texture Mixing crossfades between the current image and another graphic object texture | Selects Source Texture | Selects Source Effect Level | Crossfade Between Textures |
| 52 | Image Scale and Rotate Scales and rotates the media file texture applied to a 3-D object | Scales image | Selects Rotation Angle | Sets Rotation Speed |
| 53 | Film Roll scrolls the media file texture horizontally or vertically | Horizontal roll speed | Vertical roll speed | Scales Image |
| 54 | Pixelate divides the image into rectangles using the center pixel color of each "box" as its color | Sets amount of Pixelation | Scales horizontally | Scales vertically |
| 55 | Faux LED divides the image into a grid of circles to mimic an LED wall | LED size | Spacing | Color peaking |
| 56 | Faux Tile divides the image into square tiles | Tile Size | Spacing | Color peaking |
| 57 | Fuzzifier creates a multi-image blurring effect | Horizontal distance | Vertical distance | Fuzz Decay |
| 58 | Drop Shadow creates a scalable drop shadow behind the graphic object | Horizontal shadow size | Vertical shadow size | Shadow opacity |
| 59 | Zoom Blur zooms into a position on the image with a multi-image blurring effect | Horizontal position center | Vertical position center | Zoom in and out |

| DMX value | Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 60 | Chroma Shift shifts the red, blue, and green component colors | Horizontal shift | Vertical shift | Not Used |
| 61 | ShakeNBake introduces a random vibration effect | Horizontal Shake | Vertical Shake | Scale |
| 62 | Slats, Vertical renders the image in offset vertical slats | Number of Slats | Vertical Displacement | Fade from Normal to Slats |
| 63 | Slats, Horizontal renders the image in offset horizontal slats | Number of Slats | Horizontal Displacement | Fade from Normal to Slats |
| 80 | Downward Vertical Streaks “pulls” the image down | Vertical Start Position | Streak Angle | Fade from Normal to Streak |
| 81 | Gaussian Blur blurs the image | Sample Distance | Number of Filter Passes | Scales the Effect |
| 82 | Sharpen | Sample Distance | Number of Filter Passes | Scales the Sharpen Effect |
| 83 | Flip | Horizontal Flip | Vertical Flip | Not Used |
| 84 | UV to Gray turns everything in the image gray except for a selected UV chroma coordinate | U Coordinate | V Coordinate | Tolerance |
| 85 | UV to Transparent turns everything in the image transparent except for a selected UV chroma coordinate. | U Coordinate | V Coordinate | Tolerance |
| 86 | UV Select to Transparent turns a selected UV chroma coordinate transparent with the rest of the image unchanged | U Coordinate | V Coordinate | Tolerance |
| 87 | HS to Gray retains selected hue and saturation, and turns everything else gray. | Hue Coordinate | Saturation Coordinate | Tolerance |
| 88 | HS to Transparent retains selected hue and saturation, and turns everything else transparent. | Hue Coordinate | Saturation Coordinate | Tolerance |
| 89 | HS Selected To Transparent makes selected hue and saturation transparent | Hue Coordinate | Saturation Coordinate | Tolerance |
| 90 | Texture Shift shifts texture coordinate by color value | Horizontal Shift | Vertical Shift | Color and Scale |
| 91 | Lens Grid views texture through grid of lenses | Magnification | Edge Shading | # of Lenses |
| 92 | Edge Detect, BW2 detects edges as black or white | Sample Distance | Edge Threshold Comparison | Detected Edge Scaler |
| 93 | Film Burn/Unburn creates burn pattern over image | Burn Through Rate | Film Blackening | Burn Pattern |
| 94 | Film Noise creates an “aged” film look | Noise Rate | Push to Sepia add Jitter | Noise Level |
| 95 | Particle System 1 converts image to a particle pattern | Emitter Type | Trail Length | Particle Acceleration |

| DMX value | Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 96 | Particle System 2 adds adjustments to Effect 95 | Number of Particles | Particle Size | Emitter Size |
| 97 | Particle System 3 adds adjustments to Effect 95 + Effect 96 | Initial Particle Velocity | Particle Rotation | Particle Lifetime |
| 98 | Prism | Number of Facets | Refraction Index | Rotation |
| 99 | Gaussian Halo creates blur from a clear center toward edges | Sample Distance | Number of Filter Passes | Gaussian Curve Shape |
| 100 | Scene Change Detect transparency effect | Scale RGB | Scale Alpha | Scale RGB+ alpha |
| 101 | Yxy Luminance Scaling adjusts brightness independent of color values | Scale Luminance | Scale X | Scale y |
| 102 | Prerotation Translation sets image in virtual 3-D space for rotation | Translate X | Translate Y | Translate Z |
| 103 | Digital Mspeed | Rotation MSpeed | Scaling MSpeed | Position MSpeed |
| 253 | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | NA | NA | NA |
| 254 | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | NA | NA | NA |
| 255 | Pan and Scale zooms in and pans across a still image | Horizontal position | Vertical position | Zoom in and out |

# Chapter 10:

# Graphic Functions: Synchronizing Content

***After designating a master fixture, you can synchronize the content of other Axon, DL.3, or DL.2 fixtures to any Graphic Object on the master in terms of playback time, rotation or both.***

## Network Synchronization Overview

Network Synchronization allows for certain functions of DL.3, DL.2 or Axon media servers to be synchronized over an Ethernet network. This can be extremely useful in situations such as using the Collage Generator to ensure a seamless image with multiple media servers.

Network Synchronization is done using a reference *master* server that sends certain information about its current playback and output to the other fixtures on the network through Ethernet packets. The other servers, or *slave* servers use this information to set their playback and effects timing the same as the *master* server.

Network Synchronization is not slaving. With slaving, the master fixture's DMX values for synchronized functions would override the DMX values in the slave servers. When you use Network Synchronization, the appropriate DMX channels for all the *slave* fixtures and the *master* fixture must be set to the same values.

## Network Synchronization Requirements

In order for Network Synchronization to function properly, there are a few requirements that must be adhered to in the set-up of the fixtures:

- All of the servers must be linked on an Ethernet network. This network can be set up with Auto-IP addresses or DHCP addresses.
- The Fixture ID for each media server in the network must be unique. The Fixture ID is used to assign the *master* and *slave* servers and having multiple media servers with the same ID will cause the Synchronization information being sent over the network to be processed incorrectly.

  A fixture ID default of 1 is assigned to every DL.3, DL.2 and Axon server on your Ethernet fixture network. For synchronization to work, you will need to assign each DL.3, DL.2 and Axon server a Unique Fixture ID from 1 to 255 using the CMA (see *DL.3 and DL.2 Media Server Configuration Options* on page 282 and *Axon Media Server Configuration Options* on page 291) or through the onboard Menu System (for DL.3 and DL.2 fixtures).
- All video content to be used in a Synchronization scenario MUST adhere to the High End Systems requirements for encoding custom content for DL.3, DL.2 and Axon servers. If

the content is not encoded correctly, not only will the Network Synchronization not function, but other problems with video playback (such as stuttering or jumping in the clips) can occur.

### Network Synchronization Capabilities

As currently implemented, it is possible to synchronize movie playback as well as certain graphics effects.

Movie Playback Synchronization ensures that movie playback between multiple servers stays Synchronized for either collage applications or where multiple servers are playing the same movie clip on different projection surfaces. It is especially useful for long movie clips and will solve the problems of frame drift that can be associated with media server playback.

Certain effects in the graphics engine can also be synchronized between servers. Effects such as the ripple effects, object wobbulation, or color cycle effects need to be synchronized between servers to appear correctly in Collage usage scenarios.

## Programming Synchronization

To program synchronization, first start by deciding which fixture/server will be the master server. This can be any server on the link. However, in a case of mixed computer hardware in the servers, the oldest server should be chosen as the master. This will ensure that all of the servers have the ability to playback content as well as the master server.

### Sync To Parameter

Once you have chosen your master server, the **Sync To** parameter must be set on all of the slave servers. This parameter is found on the first Graphic Layer of each server. The **Sync To** parameter is set to a value equal to the Fixture ID of your master server. For example, if your master server has a fixture ID of “3”, all of the slave servers should have their **Sync To** parameter on Graphic Layer 1 set to “3”.

*NOTE: The* **Sync To** *parameter is found on each of the Graphic Objects on the server, However, only the* **Sync To** *parameter for Graphic Object 1 has any effect. Servers can only sync to one other server, so you cannot have different servers chosen using the* **Sync to** *parameter on different graphic graphic object of the same server. If values are set in the* **Sync To** *parameter of Graphic Object 2–9, they will be ignored.*

### Sync Type Parameter

**DMX Default Value:** 0 = no sync type selection

Next, set the **Sync Type** parameter to its appropriate value. These are for synchronizing movie playback on any Graphic Object. If all Graphic Object 1s need to synchronize together, set the **Sync Type** parameter on all Graphic Object 1s of the slave servers to Graphic Object 1. The

same goes for synchronizing all of Graphic Objects 2–9. It is possible to synchronize Graphic Object 1 to Graphic Object 3, etc., as long as all of the appropriate parameters are set correctly.

***NOTE: Unlike the Sync To parameter, Sync Type does function on all graphic object layers and must be set in order for Synchronization to function correctly on that particular layer.***

When using the Sync Type parameter, keep the following in mind:

- Any Sync Type value above 45 (46-255) defaults back to 0
- Any settings affected by the synchronize mode you select need to be mirrored on both objects to Sync correctly.
- Setting a Graphic Object to sync to itself will have no effect

There are six sync type options available for each of the nine Graphic Object layers:

- Synchronize to Graphic movie time
- Synchronize to Object rotation
- Synchronize to Object reverse rotation
- Synchronize to Graphic movie time and Object rotation
- Synchronize to Graphic movie time and Object reverse rotation

See *Graphic Synchronization* on page 343 for the DMX values associated with each of these.

## Effect Synchronization

Synchronizing Effects happens as soon as the **Sync To** parameter is set on Graphic Layer 1 of a server. No special **Sync Type** setting is needed.

## Synchronizing a Server to Itself

Movie playback and effects can be synchronized between a Graphic Object on a single fixture (for example, making sure all Graphic Objects on a single fixture are playing back in sync with one another). This is programmed the same way as Synchronization between servers, except that the **Sync To** parameter is set to its own Fixture ID.

## Synchronizing a Master Server to another Server

Even if a server is functioning as a master server, it is still possible to synchronize this server to another server. This can be useful in cases where multiple collages are playing the same movie. A single server in each collage can act as that collage's master, and then those masters can be synchronized together to ensure all collages are in sync. A master server should not be set to sync to one of its own slave servers, however, as this can cause problems with playback.

# Chapter II:

# Global Functions

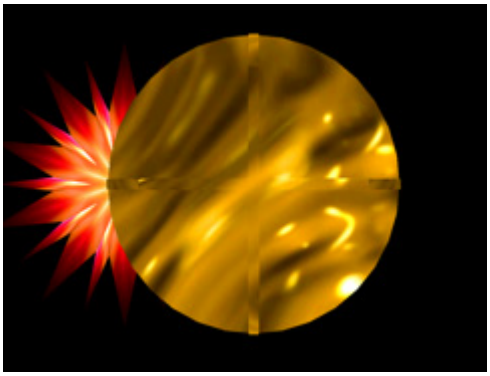
***Global Graphic controls affect the composite image created by defining multiple separate object graphics. You can adjust intensity, define masks, select a point in space to view the composite image, and control keystone correction.***

## Global Intensity

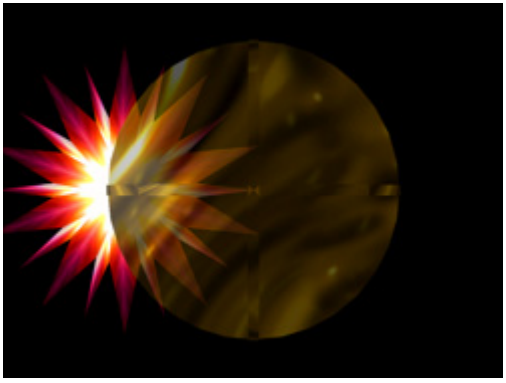
The **Global Intensity** parameter creates a smooth *fade to video black* that doesn't affect the opacity relationship between individual objects. Use this parameter to adjust the intensity of a composite image over the separate Graphic Object's Opacity parameter settings. Increase intensity from not visible at a DMX value of 0 to full intensity at a value of 255 (100%).

**Default DMX Value:** 0 = no intensity (video black)

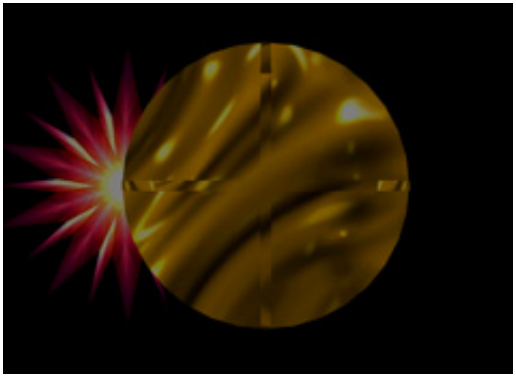
**Tip:** The Dimmer, Object Opacity and Global Intensity parameters all need DMX values greater than 0 for a defined image to be visible.



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 255 (100%)



Graphic Object 1 Intensity DMX = 255 (100%)
Graphic Object 2 Intensity DMX = 179 (70%)



Global Intensity DMX = 128 (50%)

## Global Effect Mode Channels

There are five banks of **Global Effect Mode** parameters, each with associated Modifier channels. All **Global Effect Mode** parameters have an identical list of color and visual effect options. This lets you apply a multiple-effect combination to the composite image.

The table below describes the interaction between a **Global Effect Mode** parameter and the three associated **Modifier** parameters for each option. You can find a detailed description of each option in *Chapter 13: Effect Mode Options Descriptions*.

***NOTE: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog system so you can also make use of the color picker, HSI, and other Wholehog functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.***

***The default for Effect Mode 1 is set to CMY1 as well. Other Effect Mode Modifier channels are labeled Mod 1, Mod 2, and Mod 3.***

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 0 | Safe (no effects selection) | NA | NA | NA |
| 1 | CMY (RGB inverse) | Cyan | Magenta | Yellow |
| 2 | CMY Add, All Pixels | Cyan | Magenta | Yellow |
| 3 | CMY Add, All Non-black Pixels | Cyan | Magenta | Yellow |
| 4 | RGB Add, All Pixels | Red | Green | Blue |
| 5 | RGB Add 2, All Pixels | Red | Green | Blue |
| 6 | RGB Add, All Non-black Pixels | Red | Green | Blue |
| 7 | RGB Swap to GBR | Red to Green | Green to Blue | Blue to Red |
| 8 | RGB Swap to BRG | Red to Blue | Green to Red | Blue to Green |
| 9 | Solarize 1 inverts a color if value < DMX value | Red | Green | Blue |
| 10 | Solarize 2 inverts a color if value > DMX value | Red | Green | Blue |
| 11 | Solarize 3 sets color to 0 if value is < DMX value | Red | Green | Blue |
| 12 | Solarize 4 sets color to 0 if value is > DMX value | Red | Green | Blue |
| 13 | DotP and Resample | Red | Green | Blue |
| 14 | Color Cycle cycles colors with DMX value controlling cycle speed. | Red | Green | Blue |
| 15 | All or Nothing sets color values > mod value = 255 and all other color values = 0 | Red | Green | Blue |
| 16 | Solid color RGB | Red | Green | Blue |
| 17 | RGB Invert | From Red to Cyan | From Green to Magenta | From Blue to Yellow |

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 18 | RGB, Invert and Swap to GBR | Red to Green | Green to Blue | Blue to Red |
| 19 | RGB, Invert and Swap to BRG | Red to Blue | Green to Red | Blue to Green |
| 20 | Edge Detect Color | Horizontal search size | Vertical search size | Comparison threshold |
| 21 | Edge Detect B/W | Horizontal search size | Vertical search size | Comparison threshold |
| 22 | Texture Ripple, Horizontal | Amplitude | Frequency | Phase |
| 23 | Texture Ripple, Vertical | Amplitude | Frequency | Phase |
| 24 | Texture Ripple, Circular | Amplitude | Frequency | Phase and Direction |
| 25 | Texture Ripple, Circular Asymmetrical | Amplitude | Frequency | Phase |
| 26 | Transparent Color Fine selects key color using Modifier channels | Red | Green | Blue |
| 27 | Transparent Color Medium selects key color using Modifier channels | Red | Green | Blue |
| 28 | Transparent Color Coarse selects key color using Modifier channels | Red | Green | Blue |
| 29 | Transparent Color Invert, Fine selects key color using Modifier channels | Red | Green | Blue |
| 30 | Transparent Color Invert, Medium selects key color using Modifier channels | Red | Green | Blue |
| 31 | Transparent Color Invert, Coarse selects key color using Modifier channels | Red | Green | Blue |
| 32 | Scan Line converts image colors to colors in a single line of the image | Selects scan line | Fades to converted image | Not used |
| 33 | Transparent Wipes “opens” the selected graphic to reveal another graphic positioned behind it | Area of wipe | Selects center of wipe | Selects from 6 wipe options |
| 34 | Pixel Twist swirls a portion of the texture | Twist center on X axis | Twist center on Y axis | Direction and amount of twist |
| 35 | Picture-in-picture duplicates the texture and overlays it on the original | Subpicture center on Xaxis | Subpicture center on Yaxis | Subpicture size |
| 36 | Magnifying Lens creates a virtual convex lens that magnifies a portion of the texture | Lens center on X axis | Lens center on Y axis | Lens size |
| 37 | Magnifying Lens 2 creates a virtual double convex lens that magnifies a portion of the texture. | Lens center on X axis | Lens center on Y axis | Lens size |
| 38 | Cartoon Edge creates variable outline around picture elements | Reduces Color | Enhances Contrast | Edge detection sensitivity |
| 39 | Color DeConverge separates and offsets image color components from original position | Moves Red up | Moves Green down and right | Moves Blue down and left |

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 40 | Horizontal Mirror creates a mirror effect | Defines mirror center | Not Used | Not Used |
| 41 | RGB Swap to BGR redefines component color | Red to Blue | Green | Blue to Red |
| 42 | RGB Swap to RBG redefines component color | Red | Green to Blue | Blue to Green |
| 43 | RGB Swap to GRB redefines component color | Red to Green | Green to Red | Blue |
| 44 | Colorize Gray Scale maps pixel intensity to color | Selects Color Scheme | Selects zero intensity point | Controls fading |
| 45 | Intensity Key turns pixels of selected intensity transparent | Selects Color Scheme | Sets Intensity bandwidth | Controls Transparency |
| 46 | Raindrop simulates raindrops falling on a liquid surface | Controls size/ speed | Seeds random # generator | Controls raindrop rate |
| 47 | RGB, Scale varies the color values | Red | Green | Blue |
| 48 | Tiling On multiplies image mapped to a defined grid | Horizontal # | Vertical # | Space between tiles |
| 49 | Color to Alpha varies the transparency level of an image's component color values | Red to alpha | Green to alpha | Blue to alpha |
| 50 | Color to Alpha, Inverted varies the transparency level of the inverted color values | Inverted Red to alpha | Inverted Green to alpha | Inverted Blue to alpha |
| 51 | Texture Mixing crossfades between the current image and another graphic object texture | Selects Source Texture | Selects Source Effect Level | Crossfade Textures |
| 52 | Image Scale and Rotate Scales and rotates the media file texture applied to a 3-D object | Scales image | Selects Rotation Angle | Sets Rotation Speed |
| 53 | Film Roll scrolls the media file texture horizontally or vertically | Horizontal roll speed | Vertical roll speed | Scales Image |
| 54 | Pixelate divides the image into rectangles using the center pixel color of each "box" as it's color | Sets amount of Pixelation | Scales horizontally | Scales vertically |
| 55 | Faux LED divides the image into a grid of circles to mimic an LED wall | LED size | Spacing | Color peaking |
| 56 | Faux Tile divides the image into square tiles | Tile Size | Spacing | Color peaking |
| 57 | Fuzzifier creates a multi-image blurring effect | Horizontal distance | Vertical distance | Fuzz Decay |
| 58 | Drop Shadow creates a scalable drop shadow behind the graphic object | Horizontal shadow size | Vertical shadow size | Shadow opacity |
| 59 | Zoom Blur zooms into a position on the image with a multi-image blurring effect | Horizontal position center | Vertical position center | Zoom in and out |
| 60 | Chroma Shift shifts the red, blue, and green component colors | Horizontal shift | Vertical shift | Not Used |

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 61 | ShakeNBake introduces a random vibration effect | Horizontal Shake | Vertical Shake | Scale |
| 62 | Slats, Vertical renders the image in offset vertical slats | Number of Slats | Vertical Displacement | Fade from Normal to Slats |
| 63 | Slats, Horizontal renders the image in offset horizontal slats | Number of Slats | Horizontal Displacement | Fade from Normal to Slats |
| 80 | Downward Vertical Streaks “pulls” the image down | Vertical Start Position | Streak Angle | Fade from Normal to Streak |
| 81 | Gaussian Blur | Sample Distance | Number of Filter Passes | Scales the Effect |
| 82 | Sharpen | Sample Distance | Number of Filter Passes | Scales the Sharpen Effect |
| 83 | Flip | Horizontal Flip | Vertical Flip | Not Used |
| 84 | UV to Gray turns everything in the image gray except for a selected UV chroma coordinate | U Coordinate | V Coordinate | Tolerance |
| 85 | UV to Transparent turns the image transparent except for a selected UV chroma coordinate. | U Coordinate | V Coordinate | Tolerance |
| 86 | UV Select to Transparent turns only a selected UV chroma coordinate in the image transparent | U Coordinate | V Coordinate | Tolerance |
| 87 | HS to Gray retains selected hue and saturation, and turns everything else gray. | Hue Coordinate | Saturation Coordinate | Tolerance |
| 88 | HS to Transparent retains selected hue and saturation, and turns everything else transparent. | Hue Coordinate | Saturation Coordinate | Tolerance |
| 89 | HS Selected To Transparent makes selected hue and saturation transparent with the rest of the image unchanged | Hue Coordinate | Saturation Coordinate | Tolerance |
| 90 | Texture Shift shifts texture coordinate by color value. | Horizontal Shift | Vertical Shift | Color and Scale |
| 91 | Lens Grid views texture through grid of lenses | Magnification | Edge Shading | # of Lenses |
| 92 | Edge Detect, BW2 creates a pencil line drawn effect | Sample Distance | Edge Threshold Comparison | Detected Edge Scaler |
| 93 | Film Burn/Unburn create a burn pattern on the image | Burn/Unburn Rate | Film Blackening | Burn Pattern |
| 94 | Film Noise creates an “aged” film effect | Noise Rate | Push to Sepia add Jitter | Noise Level |
| 95 | Particle System 1 converts image to a particle pattern | Emitter Type | Trail Length | Particle Acceleration |

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 96 | Particle System 2 adds adjustments to Effect 95 | Number of Particles | Particle Size | Emitter Size |
| 97 | Particle System 3 adds adjustments to Effect 95 + Effect 96 | Initial Particle Velocity | Particle Rotation | Particle Lifetime |
| 98 | Prism | Number of Facets | Refraction Index | Rotation |
| 99 | Gaussian Halo creates blur from clear center toward the edges of an image | Sample Distance | Number of Filter Passes | Gaussian Curve Shape |
| 100 | Scene Change Detect transparency effect | Scale RGB | RGB to Alpha | Scale color with alpha applied |
| 101 | Yxy Luminance Scaling adjusts brightness without effecting color | Scale Luminance | Scale X | Scale |
| 102 | Prerotation Translation places object in 3-D space | Translate X | Translate Y | Translate Z |
| 103 | Digital Mspeed. | Rotation MSpeed | Scaling MSpeed | Position MSpeed |
| 128 | Mask Color applies color to mask parameter selection | Red | Green | Blue |
| 129 | Edge Fade Color applies color to Edge Fade parameter selection | Red | Green | Blue |
| 130 | Mask Color and Edge Fade Color applies the same color to both the selected Mask and Image Edge Fade parameters | Red | Green | Blue |
| 131 | Background Color selects background color | Red | Green | Blue |
| 132 | Background Color Cycle sequences the background color | Red Speed | Green Speed | Blue Speed |
| 133 | Edge Fade Profiles defines edge fading patterns | Selects Mode | Adjusts Profile | Selects Source |
| 134 | Collage Generator creates multi-fixture panorama displays, (see *Global Functions: Collage Generator™ Effect* on page 135) | Selects Array Type | Selects array cell for display | Adjusts Edge blending |
| 135 | Curve Correction, Vertical Convex Cylinder corrects shape projecting on curved surface | Adjusts Correction | Sets Vertical Center | Not Used |
| 136 | Curve Correction, Vertical Concave Cylinder corrects shape projecting on curved surface | Adjusts Correction | Sets Vertical Center | Not Used |
| 137 | Curve Correction, Vertical Inside Corner corrects shape projecting on curved surface | Adjusts Correction | Sets Vertical Center | Sets Horizontal Center |
| 138 | Curve Correction, Vertical Outside Corner corrects shape projecting on curved surface | Adjusts Correction | Sets Vertical Center | Sets Horizontal Center |
| 139 | Curve Correction, Outside Sphere corrects shape projecting on a sphere's outside surface | Adjusts Correction | Sets Vertical Center | Sets Horizontal Center |

| DMX Value | Effect Mode Name/Description | Adjustments | | |
|---|---|---|---|---|
| | | Modifier 1 | Modifier 2 | Modifier 3 |
| 140 | Curve Correction, Inside Sphere corrects shape projecting on a sphere's inside surface | Adjusts Correction | Sets Vertical Center | Sets Horizontal Center |
| 141 | Enhanced Collage Generator provides higher resolution for collage arrays larger than 4 x 4. | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 142 | Spherical Mapping, Outside maps output to a portion of a sphere's outside surface. | Sets Longitude Angle | Sets Latitude Angle | Sets Latitude Center |
| 143 | Spherical Mapping, Inside maps output to a portion of a sphere's inside surface. | Sets Longitude Angle | Sets Latitude Angle | Sets Latitude Center |
| 144 | Mattes apply provided mattes over image | Matte Effect | Matte Pattern | Texture Source |
| 145 | Collage Generator Wrap adds right and left edge blending for 360 degree panoramas | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 146 | Segmented Collage Generator accepts user defined portion of content for each cell in the grid | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 147 | Segmented Collage Generator Wrap adds right and left edge blending to the user defined cell content for 360° panoramas | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 148 | Curved Surface, Horizontal Convex Cylinder corrects shape projecting on curved surface | Adjusts Correction | Sets Horizontal Center | Not Used |
| 149 | Curved Surface, Horizontal Concave Cylinder corrects shape projecting on curved surface | Adjusts Correction | Sets Horizontal Center | Not Used |
| 150 | Collage Gen 3 provides, updated blend curves for large collage arrays | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 151 | Collage Gen 3 Wrap provides updated right and left blend curves for 360° panoramas | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 152 | Segmented Collage Gen 3, improved blending over global effect 146. | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 153 | Segmented Collage Gen 3 Wrap, improves edge blending over global effect 147. | Selects Array Type | Selects array cell to display | Adjusts Edge blending |
| 223 | Modifier used with global spherical mapping effect 142. Defaults to 0 otherwise. | NA | NA | NA |
| 224 | Modifier used with global spherical mapping effect 142. Defaults to 0 otherwise. | NA | NA | NA |
| 255 | Pan and Scale zooms in and pans across a still image | Horizontal position | Vertical position | Zoom in and out |

# Global Control

The **Global Control** parameter allows access to different global control modes. How you set the Global control parameter determines the functionality of the **Global Control Modifier** parameter. Setting this parameter to a DMX value of 255 brings up On-screen programming statistics. In this case, the **Global Control Modifier** parameter controls the text color.

## Shutdown and Reset Options

When the Global Intensity parameter is set to 0, you can Shutdown the server (DMX Value = 120-130) or Reset the internal Graphics Engine for either DL.3, Axon or DL.2 media servers (DMX Value = 145-149).

## On-Screen Statistics

### Spherical Control Statistics

When the **Global Control** parameter is set to a DMX value = 252, Spherical Control Statistics are displayed and the **Global Control Modifier** parameter selects text color. page 324.

### Performance Statistics

When the **Global Control** parameter DMX value = 254, performance statistics are projected on screen. These are a subset of the statistics shown when **Global Control** = 255.

Statistics displayed are:

- render loops per second
- cpu utilization
- hard disk read
- cue length
- available memory

The **Global Control Modifier** controls the opacity of the of the statistics display background, fading from 0 = opaque to 255 = transparent. Discussion of the global control modifier is on page 325 and should include discussion of background opacity control.

### Text Color

When the Global Control parameter is set at a DMX Value of 255, the **Global Control Modifier** parameter lets you choose the text color that will best display over your selected image:

| DMX Value | Color |
|---|---|
| 1 | Gray |
| 2 | Red |
| 3 | Blue |
| 4 | Green |

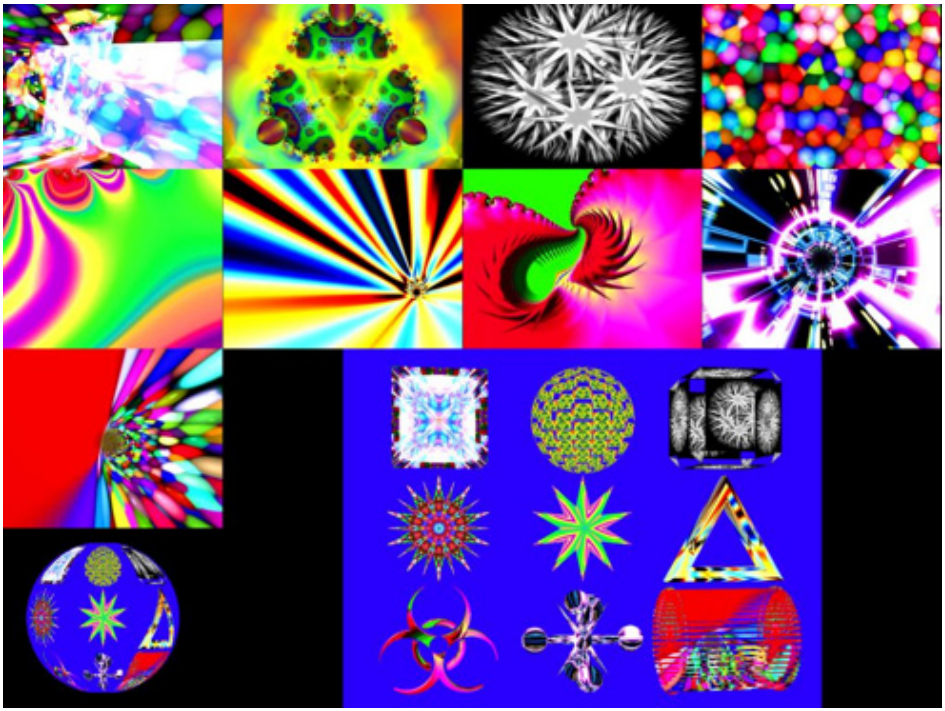
## All-in-One Control Option

When the Global Control parameter is set to a DMX value = 253, you can use the **Global Control Modifier** parameter to control the **All-in-One** control option. This option helps you visualize what the graphics engine is doing. The **All-in-One** option maps the media file content of Collage and Curved Surface support effects as well as up to three effects applied to graphics objects and displays it in a multi-quadrant grid.

These effects are accessed according to rendering hierarchy used by the graphics engine, (see *Graphics Control Hierarchy* on page 60).

When the **Global Control** parameter is set to the All-In-One option, you can view the individual effects applied to each Graphic object in the **Global Control Modifie**r parameter.

| DMX Value | Global Control Modifier Option *(Global Control parameter = 253)* | |
|---|---|---|
| 0 | Displays each defined Graphic Object with no effects applied | As the next effect level is displayed, each object displays the highest level of effect applied to that point. |
| 1 | Displays the first effect (if any) applied to any defined Graphic Object | |
| 2 | Displays the second effect (if any) applied to any defined Graphic Object | |
| 3 | Displays the third effect (if any) applied to any defined Graphic Object | |
| 4 | Displays the fourth effect (if any) applied to any defined Graphic Object | |
| 5 | Displays the fifth effect (if any) applied to any defined Graphic Object | |
| 6 | Displays the sixth effect (if any) applied to any defined Graphic Object | |
| 7 | Displays the seventh effect (if any) applied to any defined Graphic Object | |
| 8 | Displays the eighth effect (if any) applied to any defined Graphic Object | |
| 9 | Displays the ninth effect (if any) applied to any defined Graphic Object | |



| | | | |
|---|---|---|---|
| Graphic Object 1 | Graphic Object 2 | Graphic Object 3 | Graphic Object 4 |
| Graphic Object 5 | Graphic Object 6 | Graphic Object 7 | Graphic Object 8 |
| Graphic Object 9 | | **Composite Image** displaying the object with graphic effects applied | |
| Spherical Effect or Collage Effect | | | |

# Masking Control

## Mask Shape Select and Strobing

The **Mask Select** parameter lets you choose a mask to frame or overlay a composite image. You can choose to apply a mask to an image when you don't want an entire image to be seen or you want to transition from an image to black or a solid color without fading intensity.

### Mask Shapes

The graphics engine currently provides 30 mask shapes including circular, rectangular, and oval masks that close from inside out or outside in. Checker Board, Radial Wipes, and Multi-panel options are also included with variations.

**Default DMX Value** = 0 Round "iris" closes from outside in.

DMX values 0-127 (0-50%) are reserved for static mask shapes. Values of 128-255 (51-100%) are reserved for strobing Mask shapes. Values not yet implemented default to 128.

### Strobing Mask Shapes

A strobing version of each simple mask shape is defined in the 128-255 (51-100%) DMX value range. When a strobing mask is selected, the strobe rate is controlled by the **Mask Edge Fade** parameter from the slowest = 0 to the fastest = 255 (100%).

| DMX value | Strobe DMX Value | Mask Shapes |
|---|---|---|
| 0 | 128 | Round *iris* closing from outside in |
| 1 | 129 | Round *iris* closing from inside out |
| 2 | 130 | Rectangle closing from outside in |
| 3 | 131 | Rectangle closing from inside out |
| 4 | 132 | Checkerboard, variation 1 |
| 5 | 133 | Checkerboard, variation 2 |
| 6 | 134 | Radial wipe, variation 1 |
| 7 | 135 | Radial wipe, variation 2 |
| 8 | 136 | Radial wipe, variation 3 |
| 9 | 137 | Radial wipe, variation 4 |
| 10 | 138 | Triangles, variation 1 |
| 11 | 139 | Triangles, variation 2 |
| 12 | 140 | Rectangular wrap |
| 13 | 141 | Tiles closing in |
| 14 | 142 | Horizontal doors, closing |
| 15 | 143 | Horizontal doors closing from opposing sides |
| 16 | 144 | Vertical doors closing from outside in |
| 17 | 145 | Vertical wipe closing from inside out |
| 18 | 146 | Rectangular tiles closing from inside out 1 |
| 19 | 147 | Rectangular tiles closing from inside out 2 |
| 20 | 148 | Vertical panels closing from outside in 1 |
| 21 | 149 | Vertical panels closing from outside in 2 |
| 22 | 150 | Vertical diamonds 1 |
| 23 | 151 | Vertical diamonds 2 |
| 24 | 152 | Horizontal diamonds 1 |
| 25 | 153 | Horizontal diamonds 2 |
| 26 | 154 | Pinwheel |
| 27 | 155 | Oval Iris closing from outside in |
| 28 | 156 | Oval Iris closing from inside out |
| 29 | 157 | Oscillating iris closing from outside in |

***NOTE: A Global Effect Mode parameter option lets you define a Mask color, (see* Global Effect Mode Channels on page 116, *and* Mask Color *on page 166).***

## Mask Size

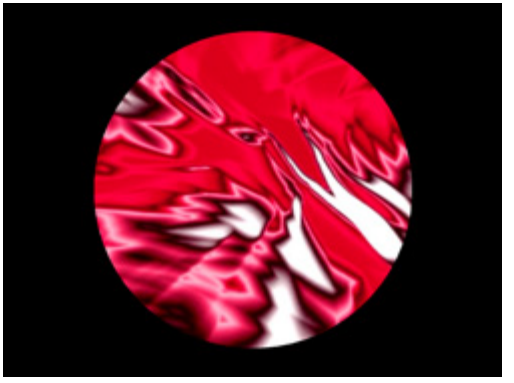
The Mask Size parameter defines mask size for all mask shapes.

**Default DMX Value:** 255 (100%) = no masking effect

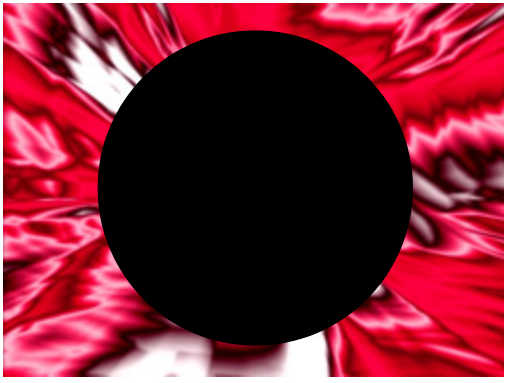
When this parameter is set at a value of 255 (100%), the mask is sized to leave the image 100% visible. When Mask Size is set at 0, the mask totally covers the composite image.

**Tip:** Crossfading the Mask Size parameter can create unique fades to and from video black.

Mask Select DMX value = 0
Mask Size DMX value = 255 (100%)



Mask Select value of 0
Mask Size DMX value = 128 (50%)



Mask Select DMX value = 1
Mask Size DMX value = 126 (50%)

## Mask Edge Fade

The **Mask Edge Fade** parameter operates differently depending on the value of the Mask Select parameter.

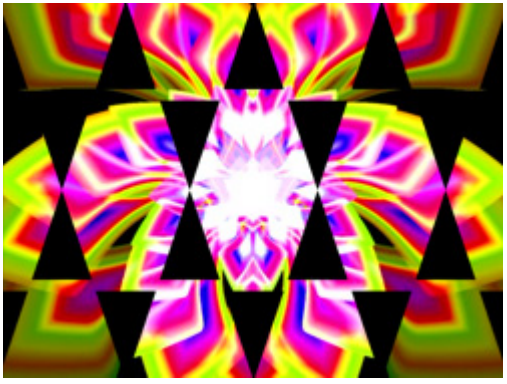
**Default DMX Value:** 0 = no adjustment to mask

When the **Mask Select** parameter value = 0 to 127 (49%), **Mask Edge Fade** adjusts the amount of fading from a DMX value of 0 = no edge fade to 255 (100%)= maximum edge fade.

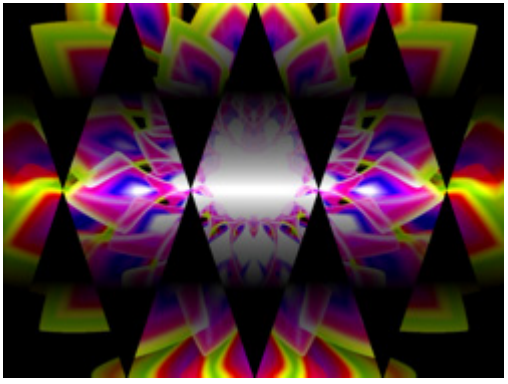
When the **Mask Select** parameter value =128 (50%) to 255 (100%), the strobing masks are selected and **Mask Edge Fade** adjusts the speed of the strobing from minimum at a DMX value = 0 to a maximum strobe speed at a DMX value = 255 (100%),

***NOTE: A Global Effect Mode parameter option lets you define a Mask Edge Fade color, (see page 167).***

Original Image



Mask applied without Edge Fade



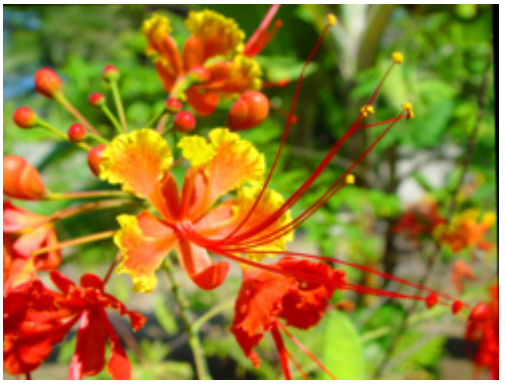
Mask with Edge Fade applied

## Image Edge Fade

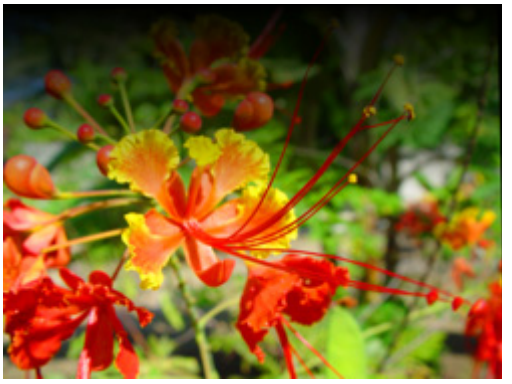
Four **Image Edge Fade** parameters let you control the Edge Fade for individual sides of your object (top, bottom, left and right). When projecting abutting images, adjusting the Edge Fade parameter lets you smooth the line between two images and also allows you to change an object's boundary.

**Default DMX Value:** 0 = all edges are sharp and hard.

Adjust each side separately for edge fade from 0 = no fade to 255 (100%) = opaque.



Original Content



100% Top Edge Fade

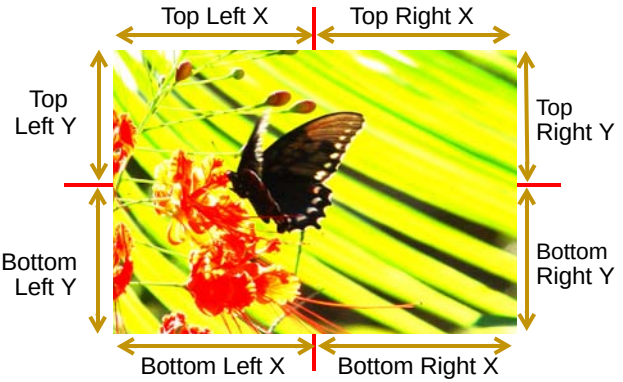
100% Left Edge Fade

100% Top, Bottom, Left, Right Edge Fade

## Keystone Correction Parameters

When you output an image from a projector at an angle, the image may appear skewed. Eight **Keystone** parameters adjust the image shape and compensate for this effect. You can control each of the four corners of the graphics output to reshape your image to a form that projects correctly.

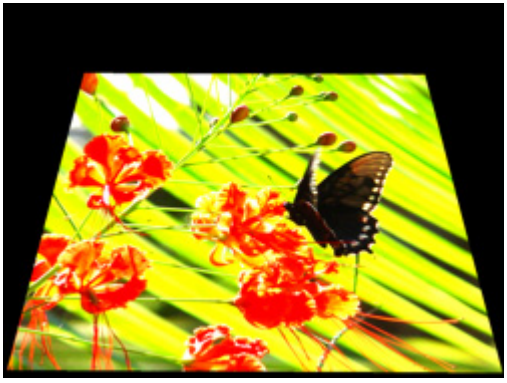
**Default DMX Value:** 0 = no keystone correction has been applied.



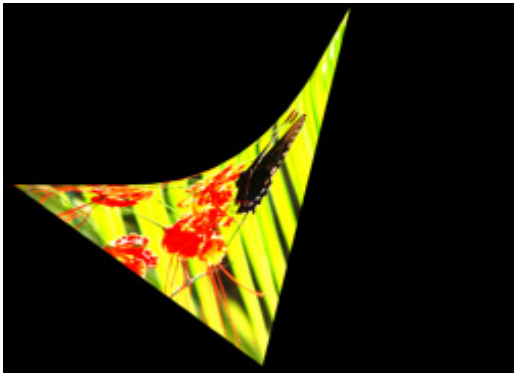

Original Content

Each corner has an x and a y value that let you adjust and correct the scale of the projection from any corner toward the image center on that axis.

Setting all **Keystone X** and **Y** parameters DMX values to zero will place the four corners of the image at the four corners of the projector output. Adjusting keystone x values toward 255 (100%) moves the respective x corner positions horizontally toward the center of that image edge. Adjusting keystone y values toward 255 (100%) adjusts the respective y corner positions vertically toward the center of that edge of the image.



Keystone Top Left X DMX value = 85
Keystone Top Left Y DMX value = 85
Keystone Top Right X DMX value = 85
Keystone Top Right Y DMX value = 85
Other Keystone parameter DMX values = 255



Keystone Top Left Y DMX value =128
Keystone Top Right X DMX value = 0
Keystone Bottom Left X DMX value = 239
Keystone Bottom Left X DMX value =0
Keystone Bottom Right Y DMX value = 2
Other Keystone parameter DMX values = 255

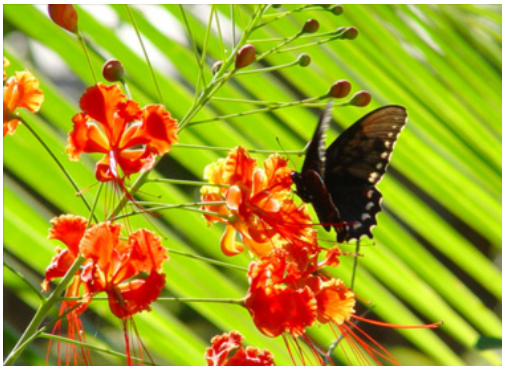
***NOTE:*** ***DL.3 fixtures have vertical lens shift capability that provides additional keystone control. Engage lens shift with your DMX console in the Control Parameter of the Motion Control fixture type.***

## Keystone X Ratio

The **Keystone X Ratio** Parameter shapes the output to adjust for keystone effects created in certain output situations. This parameter adjusts the output by compressing or expanding the image horizontally.

**Default DMX Value:** 128 (50%) = no adjustment

DMX value settings below the midpoint of the range compress the image horizontally from maximum compression at a value of 0 to no compression at a value of 128. DMX value settings above the midpoint of the range expand the image horizontally from 128 = no expansion to 255 (100%) = maximum expansion.



Original media file

X Ratio DMX value = 255 (100%)

## Keystone Y Ratio

The **Keystone Y Ratio** parameter shapes the output to adjust for keystone effects created in certain output situations. This parameter adjusts the output by compressing or expanding the image vertically.

**Default DMX Value:** 128 (50%) = no adjustment

DMX value settings below the midpoint of the range compress the image vertically from 0 = maximum compression to 255 (100%) = no compression.

Y Ratio DMX value = 255 (100%)

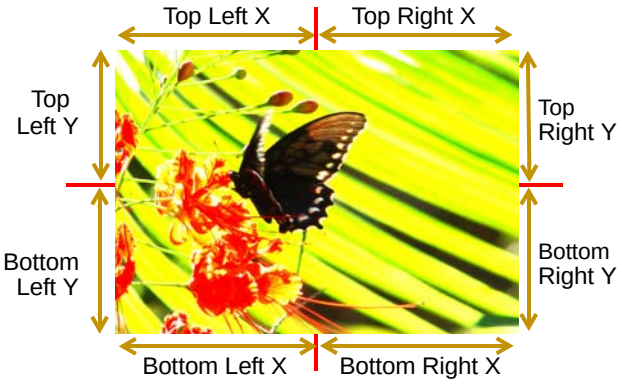
DMX value settings above the midpoint of the range expands the image vertically from 128 = no expansion to 255 (100%) = maximum expansion.

## Framing Parameters

Eight **Framing** parameters allow you to clip an image from each corner in horizontal and vertical directions.

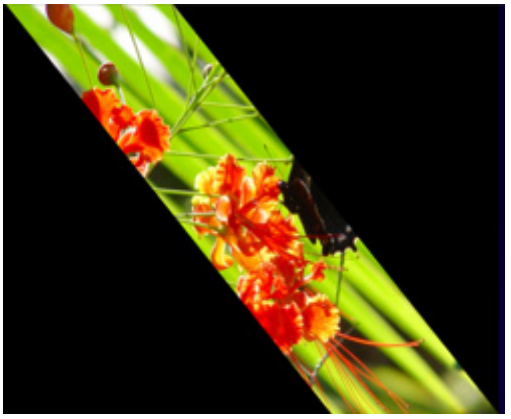
**Default DMX Value:** 0 = no effect applied.

Each corner has an x and a y value that adjust and correct scale of the projection from any corner toward the image center on that axis.




Original Content

Framing Top Left X DMX value = 8
Framing Top Left Y DMX value = 31
Framing Top Right X DMX value = 32
Framing Bottom Left X DMX value = 23
Framing Bottom Left X DMX value = 67
Other Framing parameter DMX values = 0



Framing Top Left X DMX value = 5
Framing Top Right X DMX value = 188
Framing Bottom Right X DMX value = 5
Framing Bottom Left X DMX value = 188
Other Framing parameter DMX values = 0

Setting all **Framing X** and **Y** parameters DMX values to zero will place the four corners of the image at the four corners of the projector output. Adjusting framing x values across 255 (100%) clips the image from the selected x corner position horizontally toward the image. Adjusting keystone y values toward 255 (100%) clips the image from the selected y corner position vertically across the image.

# Global Viewpoint Mode

The **Global Viewpoint Mode** parameter defines a 3-D space and the **Viewpoint Position** parameters modify your *viewing location* with the defined 3-D space. Each Viewpoint Mode uses three values to specify a viewpoint in space. This point in space is specified by the horizontal angle, vertical angle, and zoom.

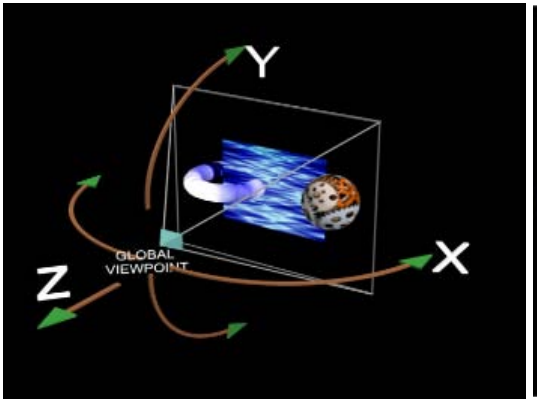
Within any 3-D space, you can choose the viewpoint target as the center of 3-D space or the center of any defined Graphic Object from 1–9.

Default DMX Value

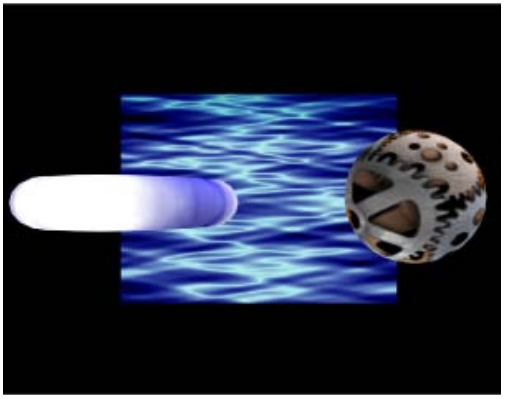
0 = Perspective view, Spherical Coordinates with the focus at the center of the 3-D space.

## Perspective View, Spherical Coordinates

This Viewpoint mode creates a 3-D space with a perspective view of a 3-D space. Viewpoints are located in terms of X, Y and Z positions located on a sphere surrounding the image.




Global Viewpoint set with X, Y, and Z positions all equal to zero.



Output displayed with global viewpoint shown at left.

## Perspective View, Cartesian Coordinates

This Viewpoint mode parameter creates a 3-D space with a perspective view. Viewpoints are located in terms of rectangular X, Y and Z positions describing a location in this space.

## Orthogonal View, Cartesian Coordinates

This Viewpoint mode creates a 3-D space without perspective. Viewpoint are located in terms of rectangular X, Y and Z positions describing a location in this space. In this case, the composite image is always flat.

## Variable Edge Blending

NOTE:Setting the Viewpoint Mode Parameter to a DMX value of 128 accesses the Variable Edge Blending function. This option extends the edge blending range between image components in a Collage. When this option is selected, the Viewpoint Modifier 1 and 2 parameters provide

horizontal and vertical adjustments. For more information on using Variable Edge Blending in conjunction with the Collage Generator Effect, see *Variable Edge Blending* on page 141.

## Viewpoint Position X

The **Viewpoint Position X** parameter determines the x component of the viewpoint position to the target you have specified in the Viewpoint Mode parameter. The horizontal angle is the angle around the vertical (y) axis. Heading is another name for this angle.

**Default DMX Value:** 32768 = center

DMX values above center of the range move counterclockwise to the maximum horizontal angle at a value of 65535 (100%). DMX values below the center move clockwise to the minimum horizontal angle at a value of 0.

## Viewpoint Position Y

The **Viewpoint Position Y** parameter sets the vertical angle above/below the horizontal plane. Pitch is another name for this component of the viewpoint position.

**Default DMX Value:** 32768 = center

DMX values above the center of the range move counterclockwise to the maximum vertical angle at a value of 65535 (100%). DMX values below the center move clockwise to the minimum vertical angle at a value of 0.

## Viewpoint Position Z (Zoom)

The **Viewpoint Position Z (Zoom)** parameter is the distance from the view target. Zooming toward the target, you can move through it and view it from the back side creating a mirror image view of the composite object.

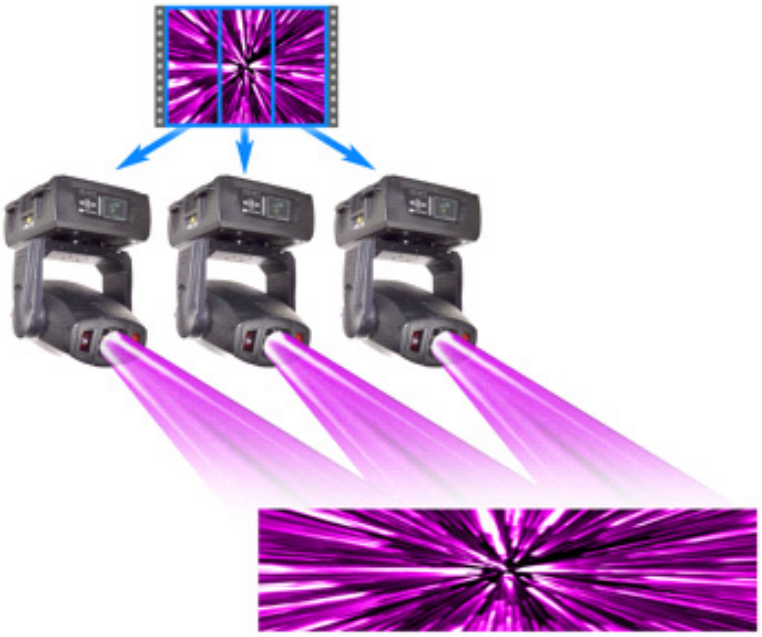
**Default DMX Value:** 30260 = center (This default value is slightly less than midway through the range to maintain some depth to the view of a composite image.)

DMX values above center move toward the maximum distance from origin in back of view target (a DMX value of 65535). DMX values below center move toward the maximum distance from origin in front of view target at a value of zero.

# Chapter 12:

# Global Functions: Collage Generator™ Effect

***Using the Collage Generator™ effect option lets you configure multiple media server outputs to display a single image in arrays up to 16 units horizontal by 8 units vertical.***



Collage Generator™ technology allows you to create virtually seamless panoramic media projections controlled from your DMX console. You can display either stock or custom content.

You can create a Collage™ effect using DL.3, DL.2 fixtures or Axon media servers outputting to Orbital Head fixtures or other digital projectors.

***NOTE: When using third party projectors, you will need to position output manually.***

The native aspect ratio of one DL.3, DL.2 or Axon media server output is 4:3. Some of the arrays configured in conjunction with the Collage Generator will output a different overall aspect ratio.

***NOTE: You can find other configurations and information on sizing and compressing media to use with the Collage Generator at the High End Systems website (www.highend.com/support/digital_lighting).***

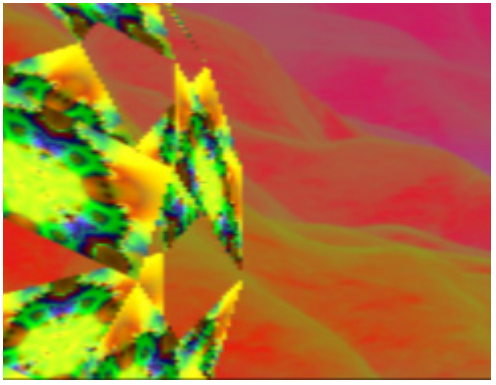
# Collage Generator Options

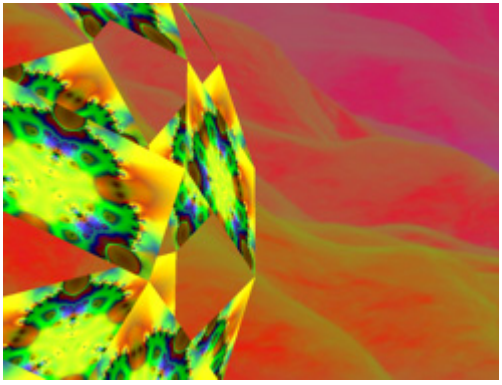
Automated and Segmented Collage Generator options are available in each of the Global Effect parameters. The Collage Generator effect has been continually developed to offer sharper images, and better edge blending. The following table shows the evolution of the effect. Choosing the highest DMX value for the collage option you are using will give you the latest version of the effect.

| | Automated Collage Generator Options | | Segmented Collage Generator Options | |
|---|---|---|---|---|
| | **Flat Collage** | **360° Wrap** | **Flat Collage** | **360° Wrap** |
| Global Effect DMX Value | 134 | | | |
| | 141 | 145 | 146 | 147 |
| | 150 | 151 | 152 | 153 |

## Automated Collage Options

The original **Collage Generator** option (selected with a Global Effect DMX value = 134), should only be used with legacy shows. The **Enhanced Collage Generator** option (Global Effect DMX value = 141) provides cleaner images and better edge blending. The **Collage Gen 3** option (DMX value = 150) offers the same image improvements as **Enhanced Collage Generator** and further expands and refines edge blending capability. The images below illustrate the difference in the projected image of a cell from an 8 x 5 grid. The image below on the left shows the projector using the original Collage Generator option and the image on the right shows the improved resolution obtained with the **Enhanced Collage Generator** option.





The **Collage Generator Wrap** (DMX value = 145) and **Collage Gen 3 Wrap** (DMX value = 151) options include right and left edge blending that lets you seamlessly project your collage on a 360 degree surface.

***NOTE:*** ***In all of the Collage Generator options the content is automatically divided into cell segments by the graphics engine after you define the array size.***

## User Segmented Collage Options

In situations where you require extremely high resolution output of custom content, you can select the **Segmented Collage Generator** option (DMX value = 146). Segmented Collage Generator options operate like automated collage option except that content is not automatically divided into cells by the graphics engine. Instead, you configure your collage content for the fixtures before loading it into the server.

Once projected, Segmented Collage options' resolution capabilities are increased many times over that of the automated collage options because the graphics engine is no longer taking a single file and stretching it across multiple servers; but is, instead, showing the file as rendered. Using Segmented Collage options, you can project a 1024x768 file from each server. In addition to the higher resolution, there is less strain on the server since it is not playing back the very large file that would be required with the automated options to get the same high resolution.

***NOTE:*** ***The Segmented Collage options only work on 3-D Object #1, which is the 4x3 default rectangle. Custom segmented content will not line up correctly when used on other 3-D objects. If you select a 3-D object other than Object #1, the server will automatically go back to running in Enhanced Collage mode.***

Just as with the Enhanced Collage Wrap, the **Segmented Collage Generator Wrap** option (DMX value = 147) adds right and left edge blending to the user defined cell content for 360 degree panoramas. The **Segmented Collage Gen 3 Wrap** (DMX value = 153) provides improved edge blending.

For more information on developing Segmented Collage content, refer to the Digital Lighting pages at **highend.com**.

## Adjusting the Collage Array with Global Modifier Parameters

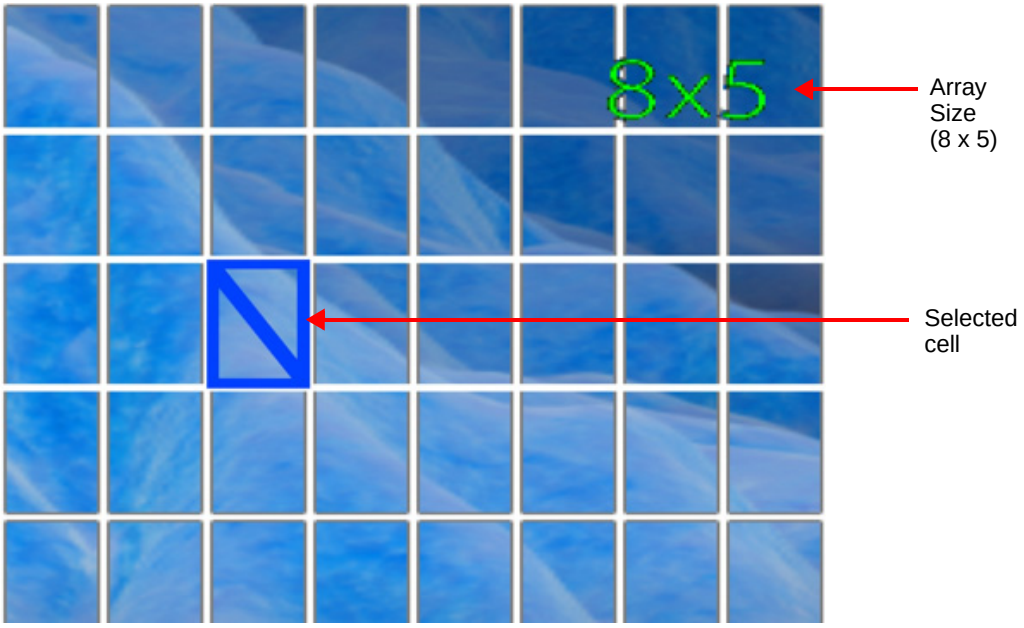
The three **Global Effects Mode Modifier** parameters operate as follows:

The **Modifier 1** parameter selects which type of Collage array to use from DMX Values 1-127. The selected size displays in the upper right corner of the grid pattern. A DMX value of 0 = No collage. DMX Values of 126-255 are reserved and default to No collage.

| DMX Value | Array (W x H) | DMX Value | Array (W x H) | DMX Value | Array (W x H) | DMX Value | Array (W x H) | DMX Value | Array (W x H) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 x 1 | 26 | 1 x 6 | 51 | 8 x 2 | 76 | 10 x 5 | 101 | 13 x 6 |
| 2 | 1 x 2 | 27 | 6 x 2 | 52 | 2 x 8 | 77 | 10 x 6 | 102 | 13 x 7 |
| 3 | 2 x 2 | 28 | 2 x 6 | 53 | 8 x 3 | 78 | 10 x 7 | 103 | 13 x 8 |
| 4 | 3 x 1 | 29 | 6 x 3 | 54 | 3 x 8 | 79 | 10 x 8 | 104 | 14 x 1 |
| 5 | 1 x 3 | 30 | 3 x 6 | 55 | 8 x 4 | 80 | 11 x 1 | 105 | 14 x 2 |
| 6 | 3 x 2 | 31 | 6 x 4 | 56 | 4 x 8 | 81 | 11 x 2 | 106 | 14 x 3 |
| 7 | 2 x 3 | 32 | 4 x 6 | 57 | 8 x 5 | 82 | 11 x 3 | 107 | 14 x 4 |
| 8 | 3 x 3 | 33 | 6 x 5 | 58 | 5 x 8 | 83 | 11 x 4 | 108 | 14 x 5 |
| 9 | 4 x 1 | 34 | 5 x 6 | 59 | 8 x 6 | 84 | 11 x 5 | 109 | 14 x 6 |
| 10 | 1 x 4 | 35 | 6 x 6 | 60 | 6 x 8 | 85 | 11 x 6 | 110 | 14 x 7 |
| 11 | 4 x 2 | 36 | 7 x 1 | 61 | 8 x 7 | 86 | 11 x 7 | 111 | 14 x 8 |
| 12 | 2 x 4 | 37 | 1 x 7 | 62 | 7 x 8 | 87 | 11 x 8 | 112 | 15 x 1 |
| 13 | 4 x 3 | 38 | 7 x 2 | 63 | 8 x 8 | 88 | 12 x 1 | 113 | 15 x 2 |
| 14 | 3 x 4 | 39 | 2 x 7 | 64 | 9 x 1 | 89 | 12 x 2 | 114 | 15 x 3 |
| 15 | 4 x 4 | 40 | 7 x 3 | 65 | 9 x 2 | 90 | 12 x 3 | 115 | 15 x 4 |
| 16 | 5 x 1 | 41 | 3 x 7 | 66 | 9 x 3 | 91 | 12 x 4 | 116 | 15 x 5 |
| 17 | 1 x 5 | 42 | 7 x 4 | 67 | 9 x 4 | 92 | 12 x 5 | 117 | 15 x 6 |
| 18 | 5 x 2 | 43 | 4 x 7 | 68 | 9 x 5 | 93 | 12 x 6 | 118 | 15 x 7 |
| 19 | 2 x 5 | 44 | 7 x 5 | 69 | 9 x 6 | 94 | 12 x 7 | 119 | 15 x 8 |
| 20 | 5 x 3 | 45 | 5 x 7 | 70 | 9 x 7 | 95 | 12 x 8 | 120 | 16 x 1 |
| 21 | 3 x 5 | 46 | 7 x 6 | 71 | 9 x 8 | 96 | 13 x 1 | 121 | 16 x 2 |
| 22 | 5 x 4 | 47 | 6 x 7 | 72 | 10 x 1 | 97 | 13 x 2 | 122 | 16 x 3 |
| 23 | 4 x 5 | 48 | 7 x 7 | 73 | 10 x 2 | 98 | 13 x 3 | 123 | 16 x 4 |
| 24 | 5 x 5 | 49 | 8 x 1 | 74 | 10 x 3 | 99 | 13 x 4 | 124 | 16 x 5 |
| 25 | 6 x 1 | 50 | 1 x 8 | 75 | 10 x 4 | 100 | 13 x 5 | 125 | 16 x 6 |
| | | | | | | | | 126 | 16 x 7 |
| | | | | | | | | 127 | 16 x 8 |

The **Modifier 2** channel selects which cell of the grid a particular DL.3 or DL.2 fixture will display. DMX values 0 up to 127 are used to step through grid pattern you selected with the Modifier 1 channel. As you dial through Modifier 2, the selected cell in the grid is highlighted.

DMX values of 128-255 default to the upper left corner of the grid.




Selecting any value larger then the number of grid rectangles defined by Modifier 1 or values from 128-255 defaults to the top-left rectangular area of the grid.

The **Modifier 3** channel lets you manually or automatically control the blended edges of the adjacent projections. You can also display grid overlays that show your Modifier 1 and Modifier 2 channel selections.

| DMX Value | Action |
|---|---|
| 0 | No blend adjustment |
| 1-63 | Progressively darkens the blend regions |
| 64 | No blend adjustment |
| 65-127 | Progressively brightens the blend regions. |
| 128-143 | Displays rectangular area with no blending |
| 144 | Selects a blend curve optimized for color content |
| 145 | Selects a blend curve optimized for grayscale content |
| 146-160 | Selects the default blend curve |
| 161-191 | Displays rectangular area with no blending covering full projector output |
| 192-199 | Displays default alignment pattern in rectangular area without blend area |
| 200-207 | Displays default alignment pattern with blending |
| 208-215 | Displays default alignment pattern and blend area with no blending |
| 216-255 | Displays collage selection grid over selected image/movie. |

## Collage Setup Example

Here's a typical scenario for setting up a 2 x 2 central panorama collage effect.

***NOTE:*** ***If you are going to be mapping your Collage to a sphere, you will need to roughly adjust the output before you set up the Collage, (see*** **Spherical Mapping Setup Guide** ***on page 142).***

***Setup the Collage effect:***

1. Select the same content on four media servers.

   ***NOTE:*** ***Any parameter adjustment to a graphic object must be set on ALL graphic objects that are a part of the Collage. For example, if you are configuring Graphic Object 1 on four media servers to project as a Collage and want to apply a color effect, that effect must be manipulated on Graphic Object 1 of all four media servers.***

2. On all the media servers you are configuring, set a **Global Effect Mode** channel to a DMX value of 150 to select the Collage Gen 3 option.

   ***TIP:*** ***For the most reliable performance, use the same Global Effect Mode parameter on all the Graphic objects to set up the Collage effect. This also leaves the other Global Effect Mode parameter available for adding a second effect like spherical mapping to the composite image.***

3. On all the media servers you are configuring, set **Modifier 1** DMX value = 1 to activate the array options. *The selection grid will not appear until the first modifier is set above 0*
4. On all the media servers you are configuring, set **Modifier 3** DMX value = 255 (100%) to display the selection grid.
5. On all the media servers you are configuring, increase **Modifier 1** to a value between 1 and 127 to select a Collage array configuration.
6. On each individual server, set **Modifier 2** DMX value between 1-127 (the range depending on the value selected in Step 5) to select which grid cell that media server will project.
7. Use **Position**, **Keystone** and **Ratio** parameters to align the projections of the individual media servers in such a way that there is some overlap between the separate portions of the image. This overlap is needed for blending adjustment.
8. Set **Modifier 3** to a DMX value between 192 and 199 to define a hard edge for alignment. Readjust Position, Keystone and Ratio parameters to bring Collage elements into good alignment.
9. Increase the **Modifier 3** DMX value = 203-207 to blend the overlap between the outputs. Readjust Position, Keystone and Ratio parameters to bring Collage elements to fine tune alignment.

10. On all the media servers you are configuring, set the **Global Effect Mode Modifier 3** parameter to a DMX value to the default range of 0-127 (with edge blending) or between 128-143 (without edge blending) to put the media server output into their cropped Collaged state. The choice between the two values will depend on your preference for aligning the images.

***Execute the panorama Collage:***

1. Create a setup cue that identifies the content media file and folder, sets the Play Mode parameter to *Pause and Rewind to In Frame* (DMX = 5) and the Opacity to 0 for the same graphic object on all units you are configuring for the panorama.
2. For this example, follow with a cue that sets the Play Mode parameter of *Play Loop Forward* (DMX = 0) and brings up the Opacity to 100% for the same graphic object on all units you are configuring for the panorama.

## Variable Edge Blending

Variable Edge Blending is used in conjunction with any of the Collage Generator Modes and allows for on-the-fly adjustment of blend overlap between projectors. Using this mode gives more flexibility for sizing a collage to a given screen or projection surface, as well as smoother blending if wider blend regions are used.

The **Variable Edge Blend** adjustment allows for blend region adjustments from 0% (hard edge) up to 50% of the image size. Horizontal and vertical blend regions can be controlled independently of one another.

**Variable Edge Blend** is turned on by setting the **Viewpoint Mode** parameter to a value of 128. When variable edge blend is used, the view point mode will default to spherical universe and cannot be changed. The view point position modifiers then become the modifiers used for adjustment of the blend region sizes.

When active, the **Viewpoint** modifiers function as follows:

**Modifier 1 (Viewpoint X Position):** Horizontal blend width adjustment (Vertical Edges) from 0 = no adjustment to 255 = a maximum overlap of 50%.

**Modifier 2 (Viewpoint Y Position):** Vertical blend width adjustment (Horizontal Edges) from 0 = no adjustment to 255 = a maximum overlap of 50%.

**Modifier 3 (View Point Z Position):** Not used.

Because both Modifier 1 and Modifier 2 default to 32768 when they are used as Viewpoint Position modifiers, they will default to the same when Variable Edge Blend is activated. With this value, the blend regions are set to approximately 25% overlap.

***NOTE: When Variable Edge Blend is used, all of the servers in the collage must be set to the same vertical and horizontal blend overlap values. If this is not done, the collage will not align properly.***

### Setting up Variable Edge Blending:

1. Select one of the collage modes available in the Global Effects
2. Using the collage modifiers, select the collage size for your application, and assign each unit it's place in the collage
3. Set the Viewpoint Mode channel to a value of 128. This will activate the Variable Edge Blending
4. Using the Viewpoint Position X and Y modifiers, adjust the blend region width to the desired value. All units in the collage must have the same X and Y values or the collage will not align properly.
5. Align the collage using the keystone parameters, (see *Keystone Correction Parameters* on page 129).

## Mapping a Collage to a Spherical Surface

The Spherical Mapping effect takes the normal rectangular output and wraps it on a selected portion of a sphere. This is the same as wrapping a flat map on to a globe. The horizontal position of a point is its longitude. The vertical position of a point is its latitude. For a detailed description of this effect, see *Spherical Mapping* on page 231.

Adjusting the Spherical Mapping effect requires a total of nine modifier parameters. Selecting Spherical Mapping along with a Collage Generator effect uses the available Global Effects. In addition to the three Global Effects Modifier parameters associated with the Spherical Mapping selection, six modifier parameters are accessed by setting any Global or Graphic Effect Mode parameters to a DMX value of 253 or 254. Any available effect mode from any Graphic Object can be used. The Effects Mode parameters used do not have to be from the same Graphic Object. One of these parameters enables the Effects Mode Modifiers to control the vertical position of the projector (actually the graphics viewpoint), the vertical position of the sphere and a vertical size. The other Effect Mode selection provides Modifier parameters to control the amount of vertical bend in horizontal lines, the vertical center of the added bend, and horizontal size.

## Spherical Mapping Setup Guide

### Before You Begin

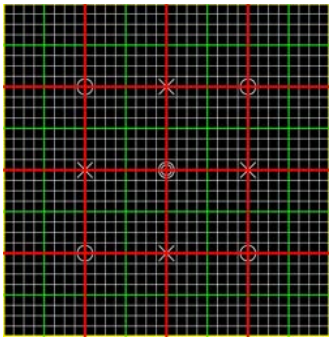
Successful spherical mapping requires careful positioning of the DL.3, DL.2 units or Axon-controlled projectors you are using. Units should be mounted at equal angles from each other and the same distance from the sphere. Mounting units at the same height will minimize the tilt angle adjustments you will need to make.

## Mapping Two Outputs to a Sphere

The following example describes mapping two outputs on a sphere, with each covering half of the surface. For best results, make each adjustment to both outputs as you follow the example. After you've completed the following steps, you can more easily transfer the DMX values to the outputs for other cells of the Collage.

***Select a Global Effect and two Graphic Effects to control Spherical Mapping:***

1. Set **Global Effect** channel to a DMX value = 142 to select the Spherical Mapping option. Set the three associated **Global Effect Modifier** parameters to their default values (Modifier 1=0, Modifier 2=0, Modifier 3 = 128).
2. Select the Spherical Mapping Control 1 option (DMX = 253) in any available Graphic **Effect Mode** channel. Set the three associated Effect Modifiers to their default DMX values (Modifier 1 = 128, Modifier 2 = 128, Modifier 3 = 64).
3. Select the Spherical Mapping Control 2 option (DMX value = 254) on any available **Graphic Effect Mode** channel. Set all associated Effect Modifiers to their default DMX values. (Modifier 1 = 0, Modifier 2 = 128, Modifier 3 = 64)
4. In the **Global Control** channel, select the on-screen statistics for the spherical mapping option (DMX value = 252). Use the **Global Control Modifier** to select text color for easier viewing.
5. Select the 4 x 3 (Flat Plane) option in the **3-D Object** channel (DMX = 1).
6. Select the HES Set Up and Test option in the **Media Folder** channel (DMX = 39), and Test Grid.jpg in the **File Folder** (DMX = 9).



At this point, you should be viewing the two projected grids with statistics displayed. If you do not see an output, check that all **Modifier** parameters are set to their default values.

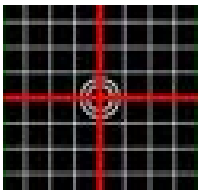
***TIP: Before you begin other adjustments, physically view the grid from along the centerline of the fixture. The centerline of the grid should align with the center of the sphere. You can easily adjust any variation using the Pan channel. The object is to align the vertical lines of the guide with the vertical axis of the sphere.***

***Adjust output positioning on the sphere:***

7. Use **Global Effect Modifier 2** to adjust the latitude angle. You can view the Latitude top and Latitude bottom statistics to see the degrees of spread + or – from the "equator".
8. Use **Global Effect Modifiers 3** to move the output up or down to the part of the sphere you want to cover. The Latitude top and Latitude bottom statistics show you the center of adjustment in degrees + or – from the "equator".
9. Adjust the **Global Effect Modifier 1** to set the longitude angle.

***Make viewpoint adjustments:***

10. On the **Graphic Effect Mode** channel set to Spherical Control 1 (DMX = 253), use **Modifier 1** to move the center of the grid to the center of the output marked by the double circles around the crossed lines. This adjusts vertical offset to accommodate the projector's position. The default value assumes a viewpoint straight on to the "equator". **Modifier 2** adjusts the sphere's offset to compensate for projector head tilt.



***NOTE: After completing a rough adjustment, you will use these two modifier channels for the fine tuning.***

11. Use **Modifier 3** to adjust the vertical size of the output, stretching and compressing it to adjust for the size of the sphere, keeping the vertical size of the grid filling the output without clipping the image.

***Correct for the flat to round surface distortions***

12. On any of the **Global** or **Graphic Effect Mode** channels set to Spherical Control 2 (DMX = 254), and then use the associated **Modifier 3** to compress the grid edges adjusting the bend in horizontal grid lines. This adjustment should not be used to fill the projector output horizontally. Instead, it should be used in conjunction with the Spherical Mapping Global Effect Modifier 1 to control the longitude angle of the projected image. Global Effect Modifier 1 should be maintained close to the theoretical longitude angle.
13. Use **Modifier 1** and **Modifier 2** to adjust the amount of bend, up or down, in the horizontal lines of the grid. **Modifier 1** controls amount of correction. **Modifier 2** controls where the center of correction occurs.
14. If the spherical mapping effect is being used in conjunction with the Collage Generator effect, select the Enhanced Collage Generator option (DMX = 141) in the other **Global Effect** channel now. Set the appropriate grid size and grid elements selected with the internal Collage alignment grid enabled. Go back through steps 1 through 11. Remember that pan and tilt adjustments are also available when using a DL.3 or DL.2 fixture.

Now you have a rough adjustment of the spherical mapping effect. From this point, finely adjust all the parameters until you bring the output to the desired shape.

When fine tuning Spherical Mapping adjustments, remember the following:

- The Graphic Object effect 253 Modifiers 1 and 2 have a major influence on the shape of the vertical lines.
- The Spherical Mapping Global Effect modifiers can be used to provide fine control of the shape of the vertical lines, but should be within several degrees of the expected latitude and longitude values.
- The Graphic Object effect 253 Modifiers 1 and 2 are used to finely adjust the vertical bend in horizontal lines.

### Spherical Mapping Tips

- If the fixtures are arranged symmetrically around the sphere, the adjustment made to the various control Modifiers of Global and Graphic Spherical Mapping effects will be the same or nearly the same when the fine tuning is complete. You can save time by selecting the Modifier on all the fixtures you are using for the Collage and making each adjustment on all the fixtures together.
- Projector Pan, Tilt, and Zoom also affect alignment.
- Don't make small changes until the alignment is roughed in.
- When alignment doesn't seem to be working, record and store your current settings, then go back to the default values and begin again.
- The longitude angle is the angle between fixtures from the vertical axis of the sphere and should be defined in your lighting plot. The plot should also give you a good idea of the latitude angle. The final values and those theoretical values should be close.

## Creating Custom Content for the Collage Generator Effect

There are two main steps to process HD footage into DL.3, DL.2 and Axon compliant media for use with the Collage Generator.

First, acquire or commission High-resolution media footage or stills. In most cases, scaling and cropping of the media is a simple process. However, certain types of media such as footage of people or round objects like planets may require more sophisticated cropping and scaling to optimize display in certain aspect ratios.

Then, save your media at Photo jpeg 95% or a non compressed format (these can be very large files) to use as a master file. Or, if you are an intermediate video editor yourself, there are many Video editing packages that will allow you to size and optimize the master for your application.

Once the master file is created, you will need high-definition encoder software.

For more information on creating Digital Lighting content and selecting encoder software, see *Custom User Content* on page 357 or go to **www.highend.com/support/digital_lighting**.

## Collages Using Live S-Video and SDI Input

DL.3, Axon and DL.2 media servers can create Collage arrays using live S-Video or SDI input. All the media servers used to project a Collage need to be receiving the same source input signal to use video as a Collage feed.

For example, using DL.3 Camera outputting across a 2 x 2 20-K lumen Central Panorama Collage, four DL.3 fixtures are assigned an output from the SDI-DMX Mixer Pro to each SDI input and a fifth DL.3 fixture is used as the source.

***NOTE: These features are not available in the DL.3F model***

# Chapter 13:

# Effect Mode Options Descriptions

***Effects can be applied to the Media File content (texture) mapped onto a 3-D object. Multiple Color and Geometric effects are available in Effect Mode parameters for both individual Graphic object and Global control.***

Most of the effect options you will find described in this chapter are available for **Effects Mode** parameters at both the graphic control level for each Graphic Object and global control level for the composite image. The following pages describe all the **Effect Mode** options available along with a description of how each **Modifier** parameter functions with that mode selected. Options are arranged alphabetically and grouped as Color or Geometric Effects.

Check boxes in the upper right hand corner indicate whether this mode is available as a Graphic Object Effect, a Global Effect or both.

☑ Object Effect ☑ Global Effect

Because the options for all **Effect Mode** parameters are identical, you can apply up to three effects at the graphic level and another five effects at the global level. This lets you choose, for example, whether to apply a color effect to an individual object or to the composite image at the global level.

After you select a mode using either a **Graphic Object Effect Mode** or a **Global Effect Mode** parameter, you can use the three associated Modifier parameters to adjust the effect. The behavior of the Modifier parameters depends upon the selected effect.

- For a general information on Graphics Control features, see *Graphics Engine Overview* on page 59.
- For a table of Graphic Effects, see *Effect Mode Parameters* on page 106.
- For a table of Global Effects, see *Global Effect Mode Channels* on page 116.

***NOTE: Both Object and Global Effect parameters include effects for swapping colors to provide quick color conversions. Use the following DMX Values in any of the Effect parameters to make these color conversions.***

| DMX Value | Color Component Conversion Effect | | |
|---|---|---|---|
| 7 | Red → Blue | Green → Red | Blue → Green |
| 8 | Red → Green | Green → Blue | Blue → Red |
| 17 | Red → Cyan | Green → Magenta | Blue → Yellow |
| 18 | Red → Magenta | Green → Yellow | Blue → Cyan |
| 19 | Red → Yellow | Green → Cyan | Blue → Magenta |
| 41 | Red → Blue | Green → Green | Blue → Red |
| 42 | Red → Red | Green → Blue | Blue → Green |
| 43 | Red → Green | Green → Red | Blue → Blue |

# Effect Mode Color Options

## All or Nothing

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 15

This effect reduces all color values to full saturation or no color based on comparison to a set threshold. This effect creates an image with fully saturated color.

**Modifier 1:** Compares the red component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

**Modifier 2:** Compares the green component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

**Modifier 3:** Compares the blue component of a pixel to the threshold value and converts it to full color if it is greater than the threshold and to black if it is below the threshold.

Original Content

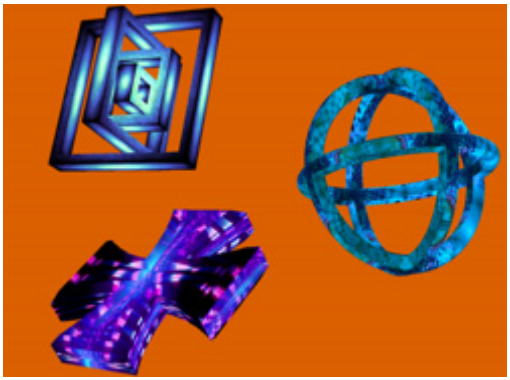
Modifier 1 parameter DMX = 125
Modifier 2 parameter DMX = 140
Modifier 3 parameter DMX = 10

## Background Color

☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 131

There is a default black background behind every composite image. You cannot rotate, scale or position the background and it is visible from every viewpoint and position. This effect allows you to apply color to the background. This background color will not affect any of the Graphic Object effects selected.



Modifier 1 parameter DMX = 220
Modifier 2 parameter DMX = 97
Modifier 3 parameter DMX = 0

**Modifier 1:** Defines the red color component from DMX values of 0 = no red to 255 (100%) = maximum red saturation.

**Modifier 2:** Defines the green color component from DMX values of 0 = no green to 255 (100%) = maximum green saturation.

**Modifier 3:** Defines the blue color component from DMX values of 0 = no blue to 255 (100%) = maximum blue saturation.

## Background Color Cycle

☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 132

There is a background behind every composite image. You cannot rotate, scale or position the background and it is visible from every viewpoint and position. This effect allows you to cycle a color sequence on the background controlling the transition speed.

**Modifier 1:** Defines the red color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

**Modifier 2:** Defines the green color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

**Modifier 3:** Defines the blue color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

## CMY

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 1

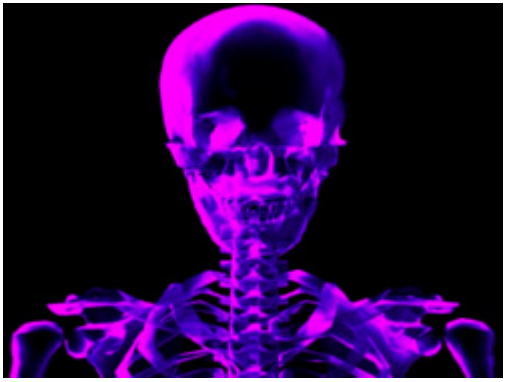
This parameter simulates CMY color by inverting RGB color components. Use this parameter when you want to color mix with a CMY color model instead of RGB color model.

**Modifier 1:** Increases cyan color component from 0 = no adjustment to 255 (100%) = maximum cyan saturation.

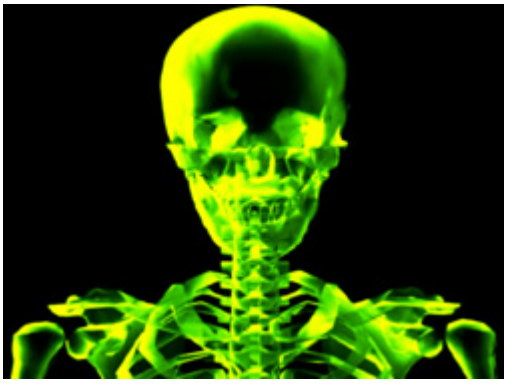
**Modifier 2:** Increases magenta color component from 0 = no adjustment to 255 (100%) = maximum magenta saturation.

**Modifier 3:** Increases yellow color component from 0 = no adjustment to 255 (100%) = maximum yellow saturation.

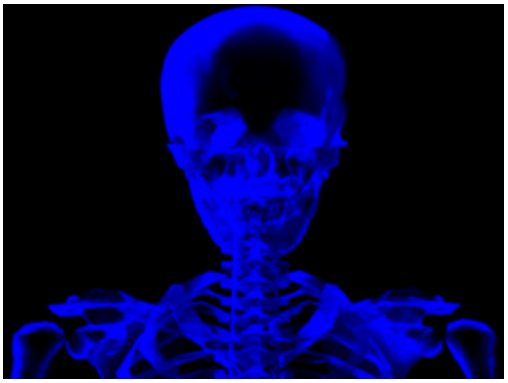
Original Content



Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 0



Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 255



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 0

## CMY Add All Pixels

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 2

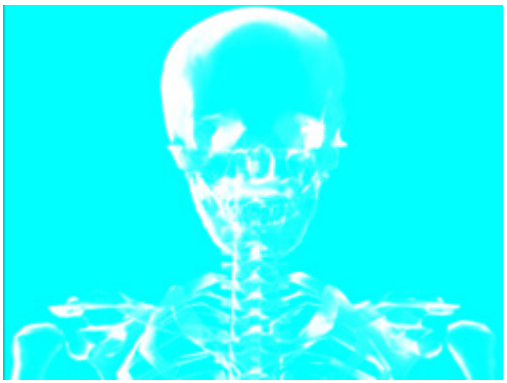
This effect increases color values across all pixels including black pixels.

**Modifier 1:** Increases cyan color component from 0 = no adjustment to 255 (100%) = maximum cyan saturation.

**Modifier 2:** Increases magenta color component from 0 = no adjustment to 255 (100%) = maximum magenta saturation.

**Modifier 3:** Increases yellow color component from 0 = no adjustment to 255 (100%) = maximum yellow saturation.

Original Content



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0

Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 0



Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 255

## CMY Add Non-black Pixels

☑ Object Effect ☑ Global Effect

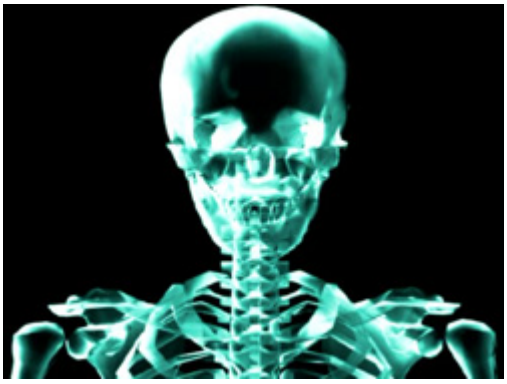
**Effect Mode** parameter DMX value = 3

This effect increases color values across all pixels except black pixels.

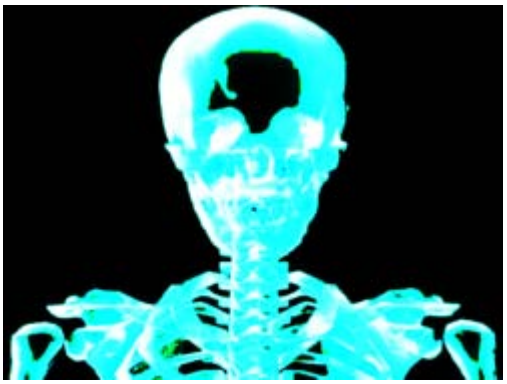
**Modifier 1:** Increases cyan color component from 0 = no adjustment to 255 (100%) = maximum cyan saturation.

**Modifier 2:** Increases magenta color component from 0 = no adjustment to 255 (100%) = maximum magenta saturation.

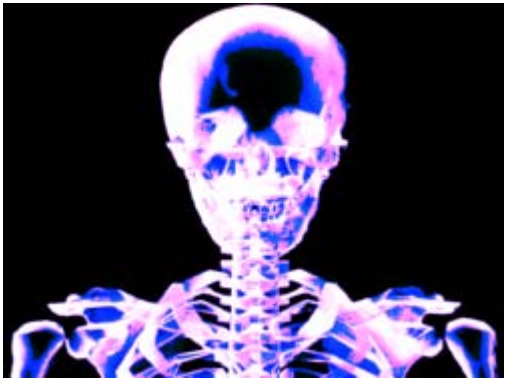
**Modifier 3:** Increases yellow color component from 0 = no adjustment to 255 (100%) = maximum yellow saturation.



Original Content



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0



Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 0

Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 255

## Color Cycle

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 14

The image's color components cycle through RGB, black, and white. When no Red Green or Blue is added, image fades from full white, to normal image, to black. When RGB/CMY is added the image fades from the RGB value, to the image with color added.

**Modifier 1:** Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

## Color DeConverge

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 39

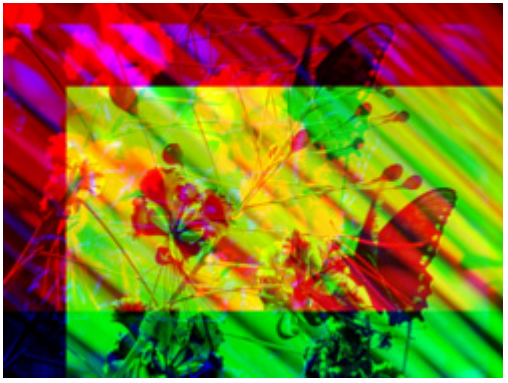
This effect separates the different color components of an image and offsets them from the original image position.

**Modifier 1:** Moves the image's red component up from 0= no adjustment to 255 (100%) = maximum distance from original position.

**Modifier 2:** Moves the image's green component down and right from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 3:** Moves the image's blue component down and left from 0 = no adjustment to 255 (100%) = maximum blue saturation.

Original Content



Modifier 1 parameter DMX = 211
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 67

## Colorize Gray Scale

☑ Object Effect ☑ Global Effect

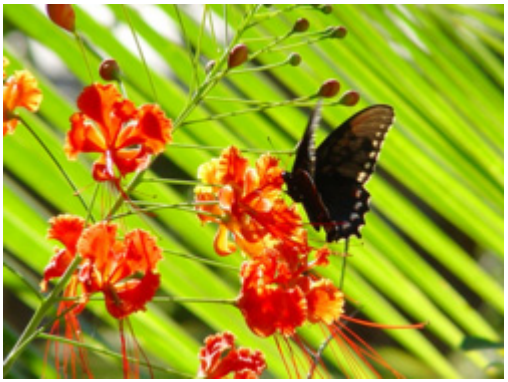
**Effect Mode** parameter DMX value = 44

This effect maps a selected pixel intensity to a selected color scheme. A variety of color schemes simulate effects like thermography. This is especially effective effect when applied to input from the internal camera.

**Modifier 1:** Selects from color schemes along a range of values from 0 – 255.

**Modifier 2:** Sets the zero point of the color intensity level from 0 = no intensity to 255 (100%) = maximum intensity.

**Modifier 3:** Fades from original color scheme to new color scheme using selected intensity.



Original Content

Modifier 1 parameter DMX = 125
Modifier 2 parameter DMX = 200
Modifier 3 parameter DMX = 100

## Color to Alpha

☑ Object Effect ☑ Global Effect

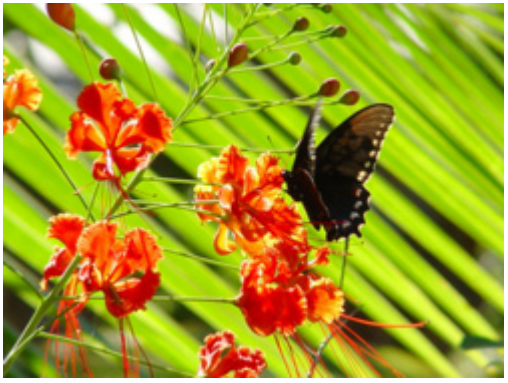
**Effect Mode** parameter DMX value = 49

This parameter varies the transparency level of an image's component color values.

**Modifier 1:** Increases the red component opacity or intensity from 0 = no adjustment to 255 (100%) = full red opacity (intensity).

**Modifier 2:** Increases the green component opacity or intensity from 0 = no adjustment to 255 (100%) = full green opacity (intensity).

**Modifier 3:** Increases the blue component opacity or intensity from 0 = no adjustment to 255 (100%) = full blue opacity (intensity).



Original Content

Original Content

Modifier 1 parameter DMX = 60
Modifier 2 parameter DMX = 75
Modifier 3 parameter DMX = 240

## Color to Alpha, Inverted

☑ Object Effect ☑ Global Effect

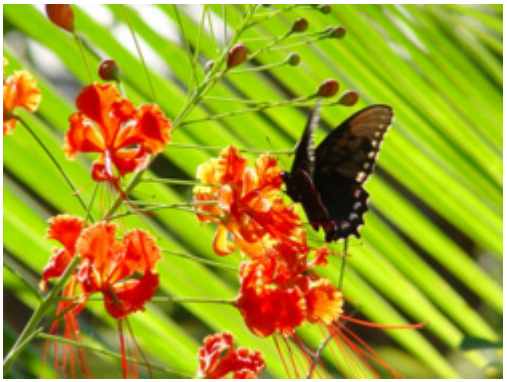
**Effect Mode** parameter DMX value = 50

This parameter varies the transparency level of the inverse of an image's component color values.

**Modifier 1:** Increases the inverse red component opacity or intensity from 0 = no adjustment to 255 (100%) = full green and blue opacity (intensity).

**Modifier 2:** Increases the green component opacity or intensity from 0 = no adjustment to 255 (100%) = full red and blue opacity (intensity).

**Modifier 3:** Increases the blue component opacity or intensity from 0 = no adjustment to 255 (100%) = full red and green opacity (intensity).



Object 1Original Content

Object 2 Original Content

Modifier 1 parameter DMX = 145
Modifier 2 parameter DMX = 215
Modifier 3 parameter DMX = 15

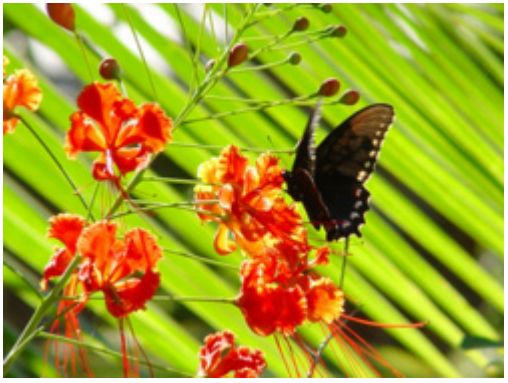
## DotP and Resample

☑ Object Effect ☑ Global Effect

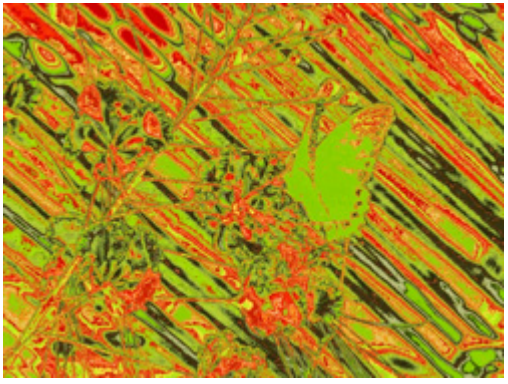
**Effect Mode** parameter DMX value = 13

This effect applies an algorithm that pixelates, and solarizes the image. It also makes the surface of some 3D objects appear reflective.

**Modifiers 1, Modifier 2 and Modifier 3** parameters work together to adjust the algorithm.



Original Content



Modifier 1 parameter DMX = 170
Modifier 2 parameter DMX = 64
Modifier 3 parameter DMX = 168

## Edge Detect Black and White

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 21

This effect displays only the edges of image components. Edges appear white, everything else is black.

**Modifier 1:** Adjusts horizontal edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 2:** Adjusts vertical edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 3:** Adjusts comparison edge threshold from 0= no adjustment to 255 (100%) = maximum adjustment.

Original Content

Modifier 1 parameter DMX value = 184
Modifier 2 parameter DMX value = 114
Modifier 3 parameter DMX value = 62

## Edge Detect Black and White 2

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 92

This effect displays only the edges of image components as either black or white.

**Modifier 1:** Adjusts sample distance from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 2:** Adjusts comparison edge threshold from 0= no adjustment to 255 (100%) = maximum adjustment:

**Modifier 3:** Sets the detected edge scaler, 0 - 127 = white edge on black background, 128-255 = black edge on white background.

Original Content

Modifier 1 parameter DMX value = 155
Modifier 2 parameter DMX value = 40
Modifier 3 parameter DMX value = 129

## Edge Detect Color

☑ Object Effect ☑ Global Effect

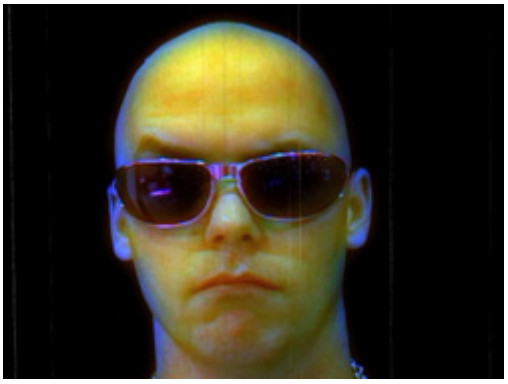
**Effect Mode** parameter DMX value = 20

This effect displays only the edges of image components with their color values.

**Modifier 1:** Adjusts horizontal edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 2:** Adjusts vertical edge search size from 0= no adjustment to 255 (100%) = maximum adjustment.

**Modifier 3:** Adjusts comparison edge threshold from 0= no adjustment to 255 (100%) = maximum adjustment.



Original Content

Modifier 1 parameter DMX = 184
Modifier 2 parameter DMX = 114
Modifier 3 parameter DMX = 62

## Edge Fade Color

☐ Object Effect ☑ Global Effect

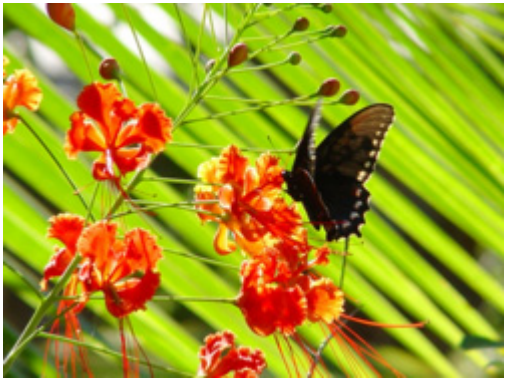
**Effect Mode** parameter DMX value = 129

This effect applies color to a selected **Edge Fade** parameter, (see *Image Edge Fade* on page 128).

**Modifier 1:** Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.



Original Content

Original Content with Edge Fade effect applied

Modifier 1 parameter DMX = 143
Modifier 2 parameter DMX = 100
Modifier 3 parameter DMX = 25

## Glow

☑ Object Effect ☐ Global Effect

**Effect Mode** parameter DMX value = 73

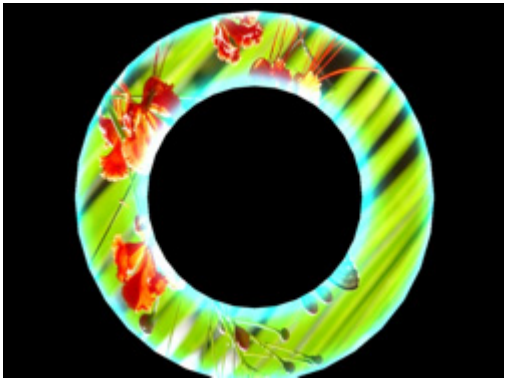
Glow colorizes and creates a glow on the 3-D object separate from the media texture on it. You can apply this effect to any 3-D object no matter which media file texture is applied to it. This parameter provides an option to view a 3-D object without displaying the associated texture.

**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.

Original Content



Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 221
Modifier 3 parameter DMX = 168

## Glow Color Cycle

☑ Object Effect ☐ Global Effect

**Effect Mode** parameter DMX value = 74

Glow colorizes and creates a glow on the 3-D object separate from the media texture on it. You can apply this effect to any 3-D object no matter which media file texture is applied to it. This parameter provides an option to view a 3-D object without an associated texture.

**Modifier 1:** Defines the red color component speed. A DMX value of 128 (50%) = default cycle speed. DMX Values above the midpoint increase cycle speed in a forward direction to 255 (100%) = fastest change speed. DMX values below the midpoint increase cycle speed in a backward direction to 0 = fastest change speed.

**Modifier 2:** Defines the green color component speed in the same way as Modifier 1.

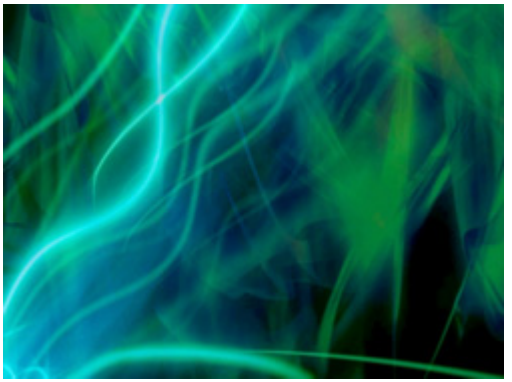
**Modifier 3:** Defines the blue color component speed in the same way as Modifier 1.

## HS Effect Mode Options

☑ Object Effect ☑ Global Effect

These Object and Global effects map the media file to an HSI color space. This makes it easier to isolate a specific feature in an image such as an individual flower in a landscape.

Object 1 Content



Object 2 Background Content

### HS to Gray

**Effect Mode** parameter DMX value = 87

This effect Maps a selected color coordinate to an HSI color space and turns everything else gray.

**Modifier 1:** Adjusts the **H**ue color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the **S**aturation color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum

.

Effect Mode parameter = 87
Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 222

## HS Selected to Transparent

**Effect Mode** parameter DMX value = 89

Maps a selected color coordinate to a HSI color space and turns it transparent and shows graphic objects “behind” it. Everything else is unchanged.

**Modifier 1:** Adjusts the **H**ue color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the **S**aturation color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum

Effect Mode Parameter = 89
Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 38
Modifier 3 parameter DMX = 255

## HS to Transparent

**Effect Mode** parameter DMX value = 88

Maps a selected color coordinate to a HSI color space and turns everything else transparent and shows graphic objects “behind” it.

**Modifier 1:** Adjusts the **H**ue color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the **S**aturation color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum

Effect Mode Parameter = 88
Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 38
Modifier 3 parameter DMX = 255

## Intensity Key

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 45

This effect turns pixels of a selected intensity transparent or applies the reverse effect.

**Modifier 1:** Selects intensity from a DMX value of 0 = no intensity to 255 (100%) = full intensity.

**Modifier 2:** Selects intensity bandwidth from a DMX value of 0 = narrowest bandwidth to 255 = widest bandwidth.

**Modifier 3:** Turns selected intensity range transparent from 0 = no change to 128 = fully transparent. DMX values above the midpoint of the range change all intensities outside of the selected range transparent from 129 = no transparency to 255 = full reverse transparency.

Original Content

Modifier 1 parameter DMX = 30
Modifier 2 parameter DMX = 75
Modifier 3 parameter DMX = 168

## Mask Color

☐ Object Effect ☑ Global Effect

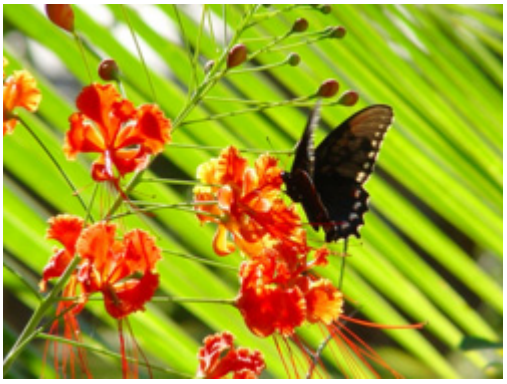
**Effect Mode** parameter DMX value = 128

This effect applies color to a selected mask shape

**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

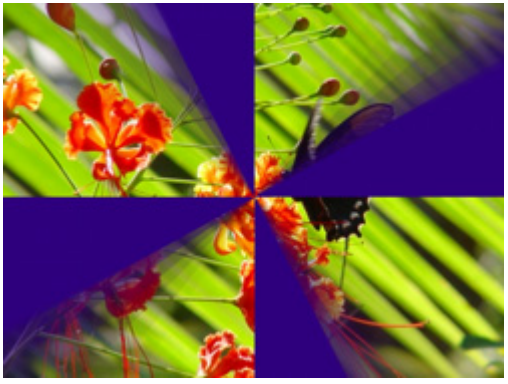
**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.



Original Content

Effect Mode Parameter = 128



Modifier 1 parameter DMX = 47
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 127

## Mask Color and Edge Fade Color

☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 130

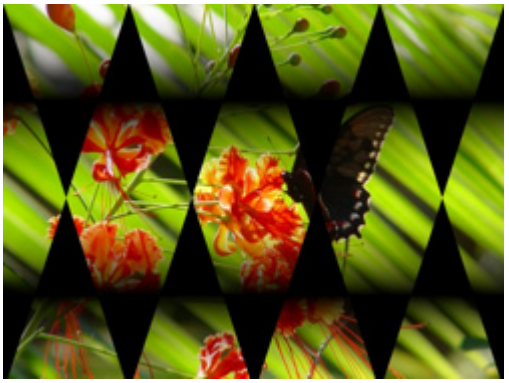
This effect applies a color to both the selected Mask shape and any selected Edge parameter. Color can also be applied to Mask shape (see *Particle System* on page 216) and Edge parameter(s) separately.

**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.

Original Content



Original Content with Mask Color and Edge Fade Color effect applied

Modifier 1 parameter DMX = 89
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 112

## RGB Add, All Pixels

☑ Object Effect ☑ Global Effect

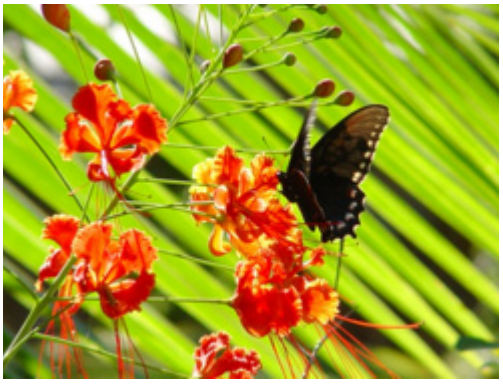
**Effect Mode** parameter DMX value = 4

This effect adds color to all pixels including black using the RGB color model.

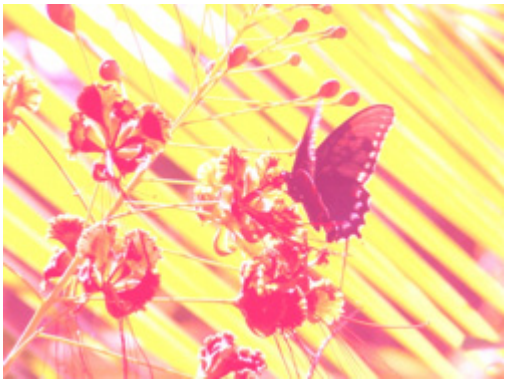
**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.



Original Content



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 56
Modifier 3 parameter DMX = 122

## RGB Add2, All Pixels

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 5

This effect adds color to all pixels including black using an alternate RGB color algorithm.

**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%)= maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.

## RGB Add to Non-black Pixels

☑ Object Effect ☑ Global Effect

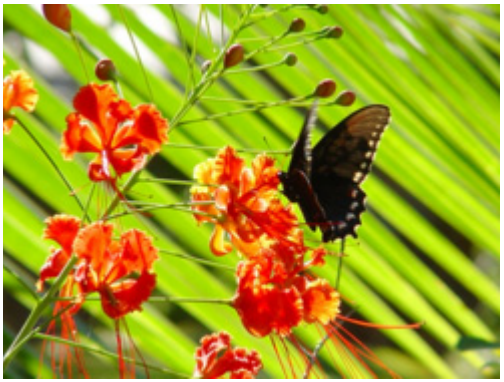
**Effect Mode** parameter DMX value = 6

This effect adds color to all pixels except black using the RGB color model.

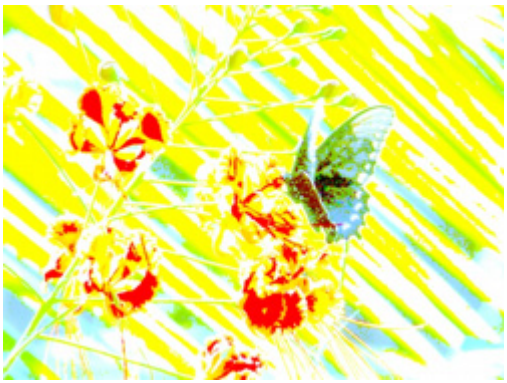
**Modifier 1:** Increases red color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases blue color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum blue saturation.

**Modifier 3:** Increases green color component from a DMX value of 0 = no adjustment to 255 (100%) = maximum green saturation.



Original Content



Modifier 1 parameter DMX = 114
Modifier 2 parameter DMX = 185
Modifier 3 parameter DMX = 255

## RGB Invert

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 17

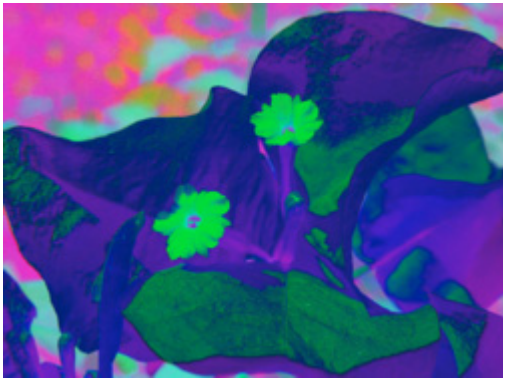
This effect inverts color values to transition the image from an RGB to a CMY color model.

**Modifier 1:** Transitions the red component from no adjustment at a DMX value = 0 to cyan at a value of 255 (100%)

**Modifier 2:** Transitions the green component from no adjustment at a DMX value = 0 to magenta at a value of 255 (100%)

**Modifier 3:** Transitions the blue component from no adjustment at a DMX value = 0 to yellow at a value of 255 (100%)

Original Content



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 34
Modifier 3 parameter DMX = 203

## RGB Invert and Swap to BRG

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 19

This effect swaps the color values from RGB to an inverted BRG color model.

**Modifier 1:** Transitions the red component from no adjustment at a value of 0 to yellow at a value of 255 (100%)

**Modifier 2:** Transitions the green component from no adjustment at a value of 0 to cyan at a value of 255 (100%)

**Modifier 3:** Transitions the blue component from no adjustment at a value of 0 to magenta at a value of 255 (100%).

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 34
Modifier 3 parameter DMX = 203

## RGB Invert and Swap to GBR

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 18

This effect swaps the color values from RGB to an inverted GBR color model.

**Modifier 1:** Transitions the red component from no adjustment at a DMX value = 0 to magenta at a value of 255 (100%)

**Modifier 2:** Transitions the green component from no adjustment at a DMX value = 0 to yellow at a value of 255 (100%)

**Modifier 3:** Transitions the blue component from no adjustment at DMX value = 0 to cyan at a value = 255 (100%)

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 34
Modifier 3 parameter DMX = 203

## RGB Scale

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 47

Reduce and increase color components in the image as a part of the overall color range.

***NOTE: the maximum of Mod1, Mod2 and Mod3 sets overall color range.***

**Modifier 1:** Scales Red in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

**Modifier 2:** Scales Green in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

**Modifier 3:** Scales Blue in the Media file. A DMX Value of 128 = no adjustment. DMX values below 128 (50%) reduce color value. DMX values over 128 increase color value.

## RGB Swap to BGR

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 41

This effect allows you to swap colors. All red values become green and all blue values become red. Green values are unaffected.

**Modifier 1:** Transitions red color component to blue from 0 = no color change to 255 (100%) = green

**Modifier 2:** No change to green color component

**Modifier 3:** Transitions blue color component to green from 0 = no color change to 255 (100%) = red

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 192
Modifier 3 parameter DMX = 255

## RGB Swap to BRG

☑ Object Effect ☑ Global Effect

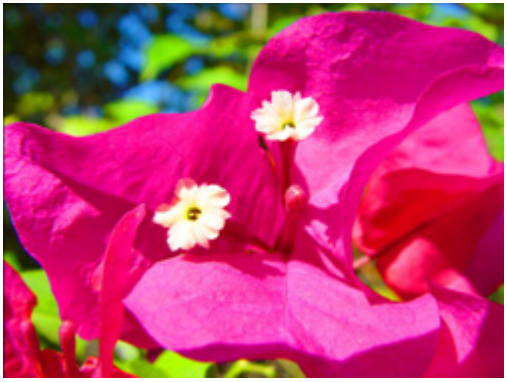
**Effect Mode** parameter DMX value = 8

This effect allows you to swap colors. All red values become blue, all green values become red and all blue values become green.

**Modifier 1:** Transitions red color component to blue from 0 = no color change to 255 (100%) = blue

**Modifier 2:** Transitions green color component to red from 0 = no color change to 255 (100%) = red

**Modifier 3:** Transitions blue color component to green from 0 = no color change to 255 (100%) = green



Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 192
Modifier 3 parameter DMX = 255

## RGB Swap to GBR

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 7

This effect allows you to swap colors. All red values become green, all green values become blue and all blue values become red.

**Modifier 1:** Transitions red color component to green from 0 = no color change to 255 (100%) = green

**Modifier 2:** Transitions green color component to blue from 0 = no color change to 255 (100%) = blue

**Modifier 3:** Transitions blue color component to red from 0 = no color change to 255 (100%) = red

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 192
Modifier 3 parameter DMX = 255

## RGB Swap to GRB

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 43

This effect allows you to swap colors. All red values become green and all green values become blue. Blue values are unaffected.

**Modifier 1:** Transitions red color component to green from 0 = no color change to 255 (100%) = green

**Modifier 2:** Transitions green color component to red from 0 = no color change to 255 (100%) = blue

**Modifier 3:** No change to blue color component

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 192
Modifier 3 parameter DMX = 255

## RGB Swap to RBG

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 42

This effect allows you to swap colors. All green values become blue and all blue values become green. Red values are unaffected.

**Modifier 1:** No change to red color component

**Modifier 2:** Transitions green color component to blue from 0 = no color change to 255 (100%) = blue

**Modifier 3:** Transitions blue color component to green from 0 = no color change to 255 (100%) = red

Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 192
Modifier 3 parameter DMX = 255

## Scan Line

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 32

Maps image color intensities to the colors in a single horizontal line of the selected texture.

**Modifier 1:** Selects a line of the media file to scan

**Modifier 2:** Adjusts the mapping transition

**Modifier 3:** Not used

## Sharpen

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 82

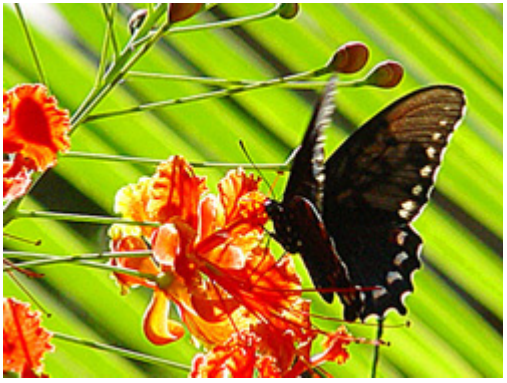
Manipulates edges of image components to sharpen contrast between them.

**Modifier 1:** Selects a sample distance from a minimum at a DMX value = 0 to a maximum at a DMX value = 255

**Modifier 2:** Selects the number of filter passes from a minimum at a DMX value = 0 to a maximum at a DMX value = 255

**Modifier 3:** Selects the scale sharpen coefficients at DMX values from 0-255

Original Content



Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0

Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 30
Modifier 3 parameter DMX = 0

Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 30
Modifier 3 parameter DMX = 128

## Solarize

☑ Object Effect ☑ Global Effect

Each of the Solarize effects remaps colors to a narrow value range and inverts the color below a set threshold using different algorithms. Solarize effects can create strong highlights.

**Modifier 1:** Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation. Red color values below the threshold are converted to cyan.

**Modifier 2:** Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation. Blue color values below the threshold are converted to magenta.

**Modifier 3:** Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation. Green color values below the threshold are converted to yellow.

### Solarize I

**Effect Mode** parameter DMX value = 9

Original Content

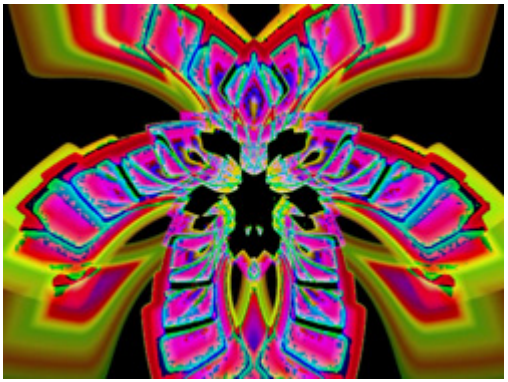
Original Content with **Effect Mode** = 9

Modifier 1 parameter DMX = 170
Modifier 2 parameter DMX = 137
Modifier 3 parameter DMX = 232

## Solarize 2

**Effect Mode** parameter DMX value = 10

Original Content



Original Content with **Effect Mode** = 10

Modifier 1 parameter DMX = 212
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 208

## Solarize 3

**Effect Mode** parameter DMX value = 11

## Solarize 4

**Effect Mode** parameter DMX value = 12

## Solid Color RGB

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 16

Solid Color RGB removes the media file texture and allows you to color mix the 3-D object to one solid color

**Modifier 1:** Increases red color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Increases green color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Increases blue color component from 0 = no adjustment to 255 (100%) = maximum blue saturation.

## Transparent Color

☑ Object Effect ☑ Global Effect

These effects remove a color (or small color range) from one graphic image to reveal another "behind" it. The removed color becomes transparent. Modifier parameters define the color you want to select as the transparent color in terms of Red, Green and Blue values set in the Modifier parameters.

**Modifier 1:** Defines the red color component from DMX values of 0 = no red to 255 (100%) = maximum red saturation.

**Modifier 2:** Defines the green color component from DMX values of 0 = no green to 255 (100%) = maximum green saturation.

**Modifier 3:** Defines the blue color component from DMX values of 0 = no blue to 255 (100%) = maximum blue saturation.

### Transparent Color Coarse

**Effect Mode** parameter DMX value = 28

The Transparent Color Coarse parameter selects a color range ±40% either side of the defined value.

### Transparent Color Fine

**Effect Mode** parameter DMX value = 26

The Transparent Color Fine parameter selects a color range ±15% either side of the defined value.

### Transparent Color Medium

**Effect Mode** parameter DMX value = 27

The Transparent Color Medium parameter selects a color range ±25% either side of the defined value.

## Transparent Color, Invert

☑ Object Effect ☑ Global Effect

These effects remove a color (or small color range) from one graphic image to reveal another "behind" it. The removed color becomes transparent. The modifier parameters define the color you want to select as the transparent color in terms of Red, Green and Blue values. An Inverted Transparent Color effect selects a color range either side of the defined value and then sets every other color as transparent.

**Modifier 1:** Defines the red color component from 0 = no red to 255 (100%) = maximum red saturation.

**Modifier 2:** Defines the green color component from 0 = no green to 255 (100%) = maximum green saturation.

**Modifier 3:** Defines the blue color component from 0 = no blue to 255 (100%) = maximum blue saturation.

### Transparent Color Invert, Coarse

**Effect Mode** parameter DMX value = 31

The Transparent Color Invert, Coarse effect selects a color range ±40% either side of the defined value.

### Transparent Color Invert, Medium

**Effect Mode** parameter DMX value = 30

The Transparent Color Invert, Medium effect selects a color range ±25% either side of the defined value.

### Transparent Color Invert, Fine

**Effect Mode** parameter DMX value = 29

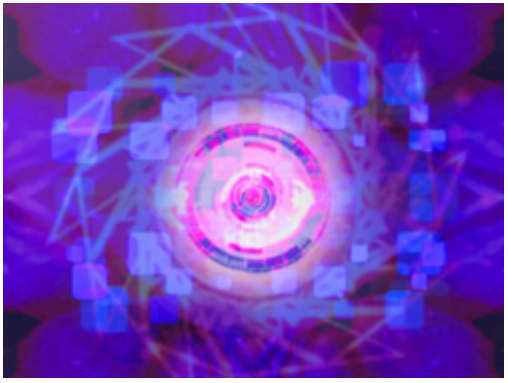
The Transparent Color Invert, Fine effect selects a color range ±15% either side of the defined value.

## UV Effect Mode Options

☑ Object Effect ☑ Global Effect

These Object and Global effects map the media file to an YUV color space. This makes it easier to isolate a specific feature in an image such as an individual flower in a landscape.

Graphic Object 1 Content



Graphic Object 2 Background Content

### UV to Gray

**Effect Mode** parameter DMX value = 84

Maps a selected color coordinate to a YUV color space and turns everything else gray.

**Modifier 1:** Adjusts the U color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the V color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum.

Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 229
Modifier 3 parameter DMX = 101

## UV Selected to Transparent

**Effect Mode** parameter DMX value = 86

Maps a selected color coordinate to a YUV color space and turns it transparent. Everything else is unchanged.

**Modifier 1:** Adjusts the U color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the V color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum.

Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 229
Modifier 3 parameter DMX = 101

## UV to Transparent

**Effect Mode** parameter DMX value = 85

Maps a selected color coordinate to a YUV color space and turns everything else transparent.

**Modifier 1:** Adjusts the U color component from 0 = no adjustment to 255 (100%) = maximum red saturation.

**Modifier 2:** Adjusts the V color component from 0 = no adjustment to 255 (100%) = maximum green saturation.

**Modifier 3:** Adjusts the color tolerance from 0 = minimum to 255 (100%) = maximum.

Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 229
Modifier 3 parameter DMX = 101

## Yxy Luminance Scaling

☑ Object Effect ☑ Global Effect

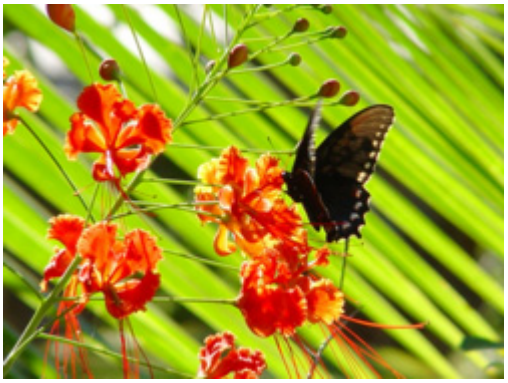
**Effect Mode** parameter DMX value = 101

Mapping the image to a Luminance Chrominance color space allows brightness adjustment with out changing image color.

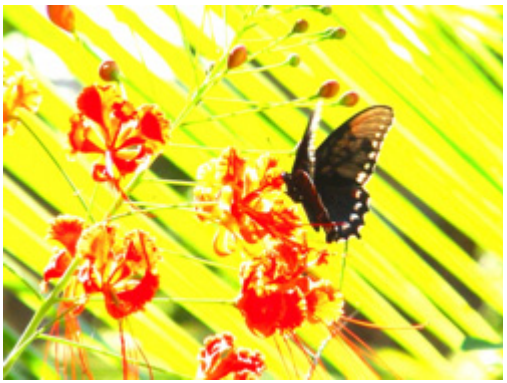
**Modifier 1:** Scales luminance. Values below the midpoint decrease luminance from 127 to 0 = black. Settings above the midpoint increase luminance from 128 to 255 (100%) = white. A DMX value of 64 allows you to view the image at a minimum luminance.

**Modifier 2:** Scales the x chrominance component. The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scale the x chrominance component down as you approach 0 = minimum. Values above the midpoint up to a maximum. at a value of 255 (100%)

**Modifier 3:** Scales the y chrominance component. The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scale the y chrominance component down as you approach 0 = minimum. Values above the midpoint scale the y chrominance component up to a maximum at a value of 255 (100%).



Original Content



Modifier 1 parameter DMX = 250
Modifier 2 parameter DMX = 128
Modifier 3 parameter DMX = 128

# Geometric Effect Options

## Cartoon Edge

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 38

Outlines the edges of image components to create a rendered effect.

**Modifier 1:** Adjusts Color reduction from 0= no adjustment to 255 (100%) = maximum.

**Modifier 2:** Adjusts contrast enhancement from 0= no adjustment to 255 (100%) = maximum.

**Modifier 3:** Adjusts ion sensitivity from 0= no adjustment to 255 (100%) = maximum adjustment.

Original Content

Modifier 1 parameter DMX value = 255
Modifier 2 parameter DMX value = 82
Modifier 2 parameter DMX value = 115

## Chroma Shift

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 60

This effect shifts the red, blue, and green component colors in an image. You can offset color components vertically and or horizontally.

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components right to a maximum at a value of 0. Values above the midpoint shift the color components left to a maximum at a value of 255 (100%).

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint shift the color components down to a maximum at a value of 0. Values above the midpoint shift the color components up to a maximum at a value of 255 (100%).

**Modifier 3:** Not Used

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Chroma Shift** *on page 87).*

Original Content

Modifier 1 parameter DMX value = 105
Modifier 2 parameter DMX value = 148
Modifier 2 parameter DMX value = 0

## Collage Generator

☐ Object Effect ☑ Global Effect

**Collage Generator** effects let you use multiple DL.3 or DL.2 units to create virtually seamless panoramic media projections with DMX control. You can display either stock (automated collage) or custom content (segmented collage) and effects are available for full 360° projection. For more information about this global effect, see *Chapter 12: Global Functions: Collage Generator™ Effect* on page 135.

**Modifier 1:** Selects which type of Collage array to use from DMX Values 1-63. A DMX value of 0 = No Collage. DMX Values of 64-255 are reserved and default to No Collage.

**Modifier 2:** Selects which portion of the grid a particular DL.3 or DL.2 fixture will display. DMX values 0-63 step through grid pattern selected by the Modifier 1 parameter. DMX values 64-255 default to the upper left corner of the grid.

**Modifier 3:** Adjusts edge blending between the selected portion of the image being projected by the fixture and adjacent portions being projected by other fixtures.

| | Automated Collage Generator Options | | Segmented Collage Generator Options | |
|---|---|---|---|---|
| | **Flat Collage** | **360° Wrap** | **Flat Collage** | **360° Wrap** |
| Global Effect DMX Value | 134 | | | |
| | 141 | 145 | 146 | 147 |
| | 150 | 151 | 152 | 153 |

### Collage Generator

**Effect Mode** parameter DMX value = 134

The standard **Collage Generator** was the original automated collage effect and should only be used with legacy shows.

### Enhanced Collage Generator

**Effect Mode** parameter DMX value = 141

This automated collage effect improves the image resolution over the initial Collage Generator.

### Collage Gen 3

**Effect Mode** parameter DMX value = 150

**Collage Gen 3** effect has the image resolution of the **Enhanced Collage Generator** effect and further expands and improves the edge blending control.

### Collage Generator Wrap

**Effect Mode** parameter DMX value = 145

The **Collage Generator Wrap** automated effect adds right and left edge blending to create 360° panoramas.

### Collage Gen 3 Wrap

**Effect Mode** parameter value = 151

This effect expands and enhances edge blending controls of effect 145.

### Segmented Collage Generator

**Effect Mode** parameter DMX value = 146

The **Segmented Collage Generator** effect accepts user defined portion of content for each cell in the grid.

### Segmented Collage Gen 3

**Effect Mode** parameter DMX value = 152

The **Segmented Collage Gen 3** effect accepts user defined portion of content for each cell in the grid with expanded and improved edge blending control to effect 146.

### Segmented Collage Generator Wrap

**Effect Mode** parameter DMX value = 147

The **Segmented Collage Wrap** effect adds right and left edge blending to the user defined cell content to create 360° panoramas.

### Segmented Collage Gen 3 Wrap

**Effect Mode** parameter DMX value = 153

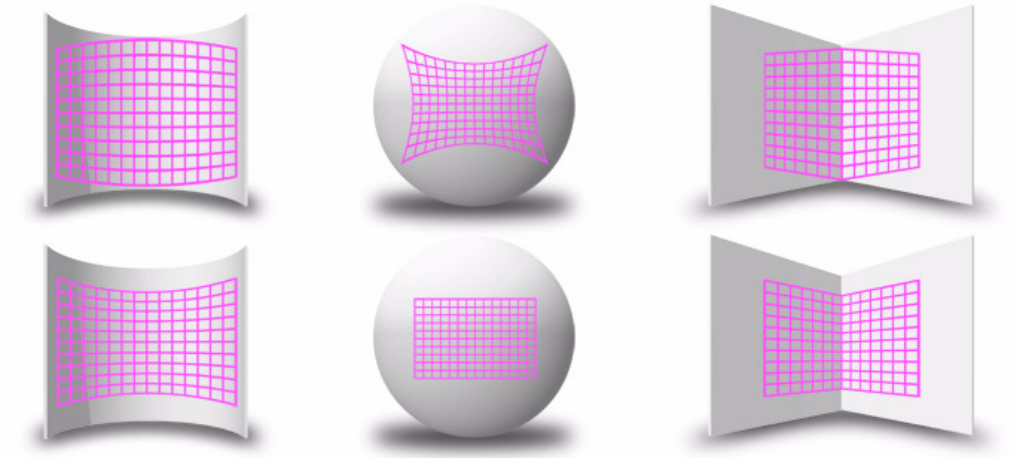
The **Segmented Collage Gen 3 Wrap** effect adds right and left edge blending to the user defined cell content to create 360° panoramas with expanded and improved edge blending control over effect 147.

## Curved Surface Support

☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 135-149

Curved Surface Support corrects for shape distortions that occur when you project onto surfaces that aren't flat. This Global effect facilitates projecting onto convex or concave cylinders, angular screens, spheres, and disk shaped surfaces.



You can apply this correction to any media server output including multi-fixture image panoramas created with the Collage Generator Effect, (see *Global Functions: Collage Generator™ Effect* on page 135).

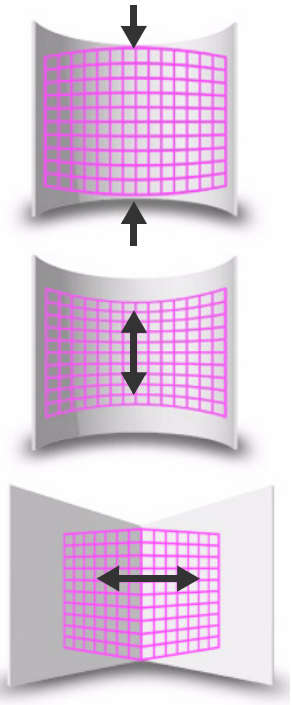
Use these adjustments in conjunction with Keystone parameters and Ratio parameters to refine the output shape on any of these surfaces.

| Effect Mode DMX Value | Surface |
|---|---|
| 135 | Curved Vertical Convex Cylinder (opening toward projector) |
| 136 | Curved Vertical Concave Cylinder (opening away from projector) |
| 137 | Vertical Inside Corner (opening toward projector) |
| 138 | Vertical Outside Corner (opening away from projector) |
| 139 | Sphere |
| 140 | Convex Disk (opening away from projector) |
| 148 | Curved Horizontal Convex Cylinder (opening toward projector) |
| 149 | Curved Horizontal Concave Cylinder (opening away from projector) |

After you have selected the surface, the Modifier parameters operate as described below:

*TIP: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog system so you can also make use of the color picker, HSI, and other Wholehog functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types. The default for Effect Mode 1 is set to CMY1 as well. Modifier channels for Effect Modes 2 and 3 are labeled Mod 1, Mod 2, and Mod 3.*

**Modifier 1:** Modifier 1 lets you adjust the amount of correction vertically. A value of 0 = no adjustment. The correction increases as you increase value to maximum at 255 (100%).



**Modifier 2:** In situations where you are projecting from any angle other than perpendicular to the surface, you can use the Modifier 2 to adjust the vertical center of the image. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the vertical center down to the bottom of the image. Values above the midrange move the vertical center up to the top of the image at a DMX value of 255 (100%).

**Modifier 3:** You can use the Modifier 3 parameter to adjust the image's horizontal center when you're projecting onto a sphere, an inside or an outside corner. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the horizontal center toward the left edge of the image. Values above the midrange move the horizontal center right toward the edge of the image at a DMX value of 255 (100%).

*NOTE: Modifier 3 is not used when projecting onto an inside or outside cylinder*

## Digital MSpeed

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 103

In an effort to smooth DMX data for rotation, scaling and position values at the Graphic Object level, historically a crossfading algorithm has been applied to these values. Digital MSpeed allows you to set a crossfade speed to these values to achieve smoother fading. The following rules apply to implementing the Digital MSpeed effect:

- This effect can be applied at the Global level or the Graphic Object level but can only be applied once at any given level. That is to say, if applied twice at the global level, only the first (lowest numbered
- When Digital MSpeed is applied at the global level, the mspeed values are applied to all the Graphic Objects.
- Digital MSpeed applied at the Graphic Object level takes precedence over digital mspeed applied at the Global level. This means you can apply a global value to all the Graphic Objects, and then override that value by assigning a different set of values on a particular Graphic Object.
- Crossfades under digital mspeed control are linear across the fade time. All ramp, snap combinations are set in the control system.

**Modifier 1 :** applies MSpeed to rotation values. When DMX = 0, no MSpeed is applied, and traditional crossfading can be used. Crossfade times increase from 0 = slowest to 255 = fastest.

**Modifier 2 :** applies MSpeed to scaling values. When DMX = 0, no MSpeed is applied, and traditional crossfading can be used. Crossfade times increase from 0 = slowest to 255 = fastest.

**Modifier 3 :** applies MSpeed to position values. When DMX = 0, no MSpeed is applied, and traditional crossfading can be used. Crossfade times increase from 0 = slowest to 255 = fastest.

## Downward Vertical Streaks

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 80

This effect lets you convert a portion of the image into vertical streaks. You can also rotate the angle of the streak and fade from the original image to the image with the streak effect applied.

**Modifier 1:** At a DMX value of 0, there is no effect. Increasing the DMX value sets the length of the streak portion of the image from the bottom up to 255 (100%) = the full image converted to streaks.

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the edge of the streaked portion of the image clockwise as you approach 0 = 90°. Values above the midpoint move the edge of the streaked portion of the image counterclockwise as you approach 90° at a value of 255 (100%).

**Modifier 3:** When Modifier 1 has a DMX value > 0, Modifier 3 lets you fade from 0 = the original image to 255 (100%) = the converted image.

Original content

Modifier 1 parameter DMX value = 170
Modifier 2 parameter DMX value = 158
Modifier 3 parameter DMX value = 255

## Drop Shadow

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 58

This effect creates a black plane behind the selected media file texture on a flat rectangular object. You can bring the plane from behind positioning it to form a drop shadow. You won't see the shadow until you select a Modifier 1 or 2 DMX value above or below 128 (50%).

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" right as you approach 0 = maximum horizontal shadow width. Values above the midpoint move the "shadow" left to a maximum horizontal shadow width at a value of 255 (100%)

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the "shadow" down as you approach 0 = maximum vertical shadow width. Values above the midpoint move the "shadow" up to a maximum vertical shadow width at a value of 255 (100%)

**Modifier 3:** Adjusts the shadow's opacity from 0 = full opacity to 255 (100%) = maximum transparency.

**Tip:** To ensure that the shadow remains black and is unaffected by other graphic effects, apply it as the last effect selected for an image.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Drop Shadow** *on page 88).*

Original Content

Modifier 1 parameter DMX value= 0
Modifier 2 parameter DMX value=255
Modifier 3 parameter DMX value=0

## Faux LED

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 55

This effect divides the image into a grid of circles that mimic an LED wall. The color of the center pixel in each cell defines the solid color for that circle. You can control “LED” size, background and color peaking.

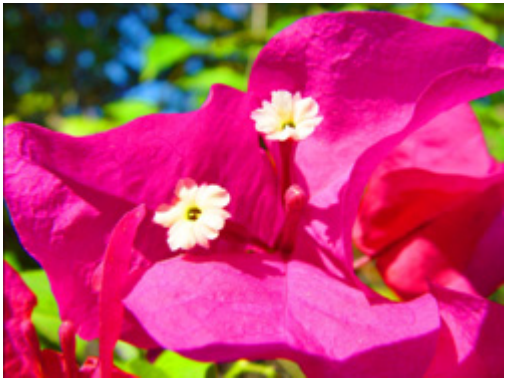
**Modifier 1:** Controls the “LED” size. The default DMX value of 0 displays a 100 x 100 grid of “LEDs”. Increasing the DMX value decreases the grid divisions to a minimum of 10 x 10 at a value of 255 (100%).

***NOTE: A small number of larger “LEDs” will also result in reduced color variation.***

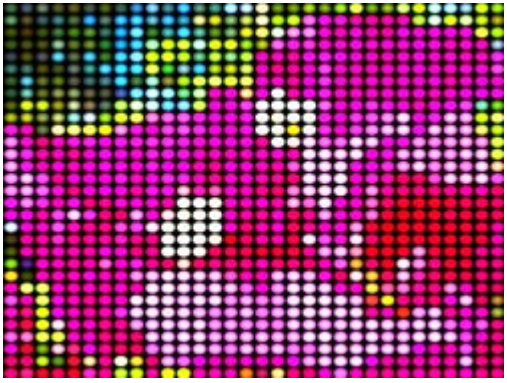
***This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* Faux LED *on page 90).***

**Modifier 2:** Adjusts the grid spacing and color around each “LED”. A DMX value of 0 = the minimum black line between cells. The spacing increases to a maximum at a DMX value of 127 (49%). At a value of 128 (50%), the space between cells reverts to the minimum spacing and turns white. Increasing the value further increases the white spacing to a maximum at a DMX value of 255 (100%).

**Modifier 3:** Adjusts the color peaking to simulate lighting at the “LED” center. A DMX value of 0 = no adjustment and flat color across the cell. As you increase the DMX value, the peaking increases to a maximum at 255 (100%).



Original Content



Modifier 1 parameter DMX = 202
Modifier 2 parameter DMX = 16
Modifier 3 parameter DMX = 167

## Faux Tile

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 56

This effect divides the image into a grid of tiles with simulated lighting at the edges. The color of the center pixel in each cell defines the solid color for that tile. You can control the number and spacing of tile, choose between a black and white grid and adjust color peaking.

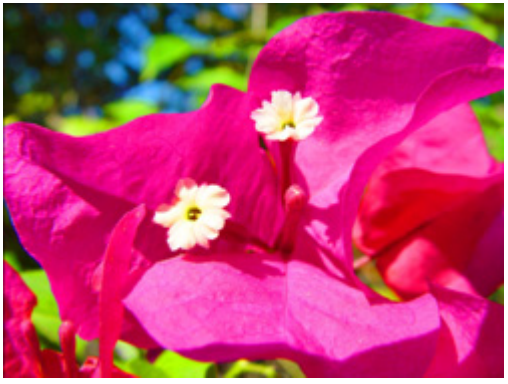
**Modifier 1:** Controls the tile size. The default DMX value of 0 displays a 100 x 100 grid of tiles. Increasing the DMX value decreases the grid divisions to a minimum of 10 x 10 at a value of 255 (100%).

***NOTE: A small number of larger "tiles" will also result in reduced color variation.***

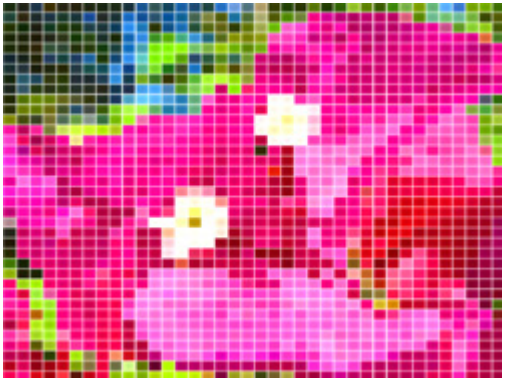
***This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* Faux Tile *on page 1160).***

**Modifier 2:** Adjusts the grid spacing and color around each tile. A DMX value of 0 = the minimum black line between tiles. The spacing increases to a maximum at a DMX value of 127 (49%). At a value of 128 (50%), the space between tiles reverts to the minimum spacing and turns white. Increasing the value further increases the white spacing to a maximum at a DMX value of 255 (100%).

**Modifier 3:** Adjusts the color peaking to simulate lighting at the tile edges. A DMX value of 0 = no adjustment and flat color across the tile. As you increase the DMX value, the peaking increases to a maximum at 255 (100%).



Original Content



Modifier 1 parameter DMX = 188
Modifier 2 parameter DMX = 139
Modifier 3 parameter DMX = 255

## Film Burn/Unburn

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 93

This effect creates multiple burn patterns over the image.

**Modifier 1:** Adjust the burn-through rate. A DMX value of 65 begins creating a burn pattern with flames from 64 = slowest to 127 = fasted rate. Values below 65 “unburn the pattern from 63 = slowest to 0 = fastest unburn. Values in the upper half of the range create the burn pattern without flames from 192 = slowest to 255 = fastest burn rate. A value of 191 “unburns” the patterns from 191 = slowest to 128 = fastest “unburn” without flames.

**Modifier 2:** Adjusts the amount of film blackening around the burn areas from 0 = the smallest amount of blackening to 255 (100%) = the largest blackened area.

**Modifier 3:** Each DMX value selects one of 255 burn patterns.

Original Content

Modifier 1 parameter DMX = 152
Modifier 2 parameter DMX = 234
Modifier 3 parameter DMX = 211

## Film Noise

☑ Object Effect ☑ Global Effect

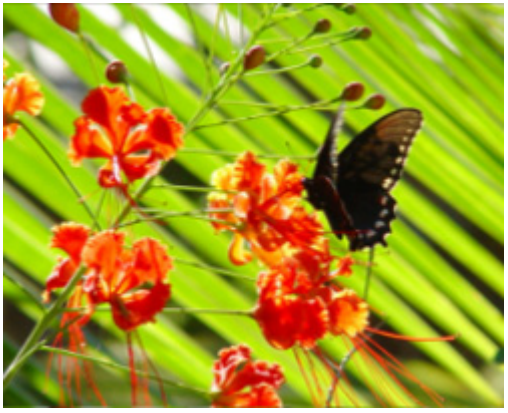
**Effect Mode** parameter DMX value = 94

This effect creates the effect of scratches on film. You can adjust the amount of “noise” as well as the tint and “jitter” to give the image an aged film effect.

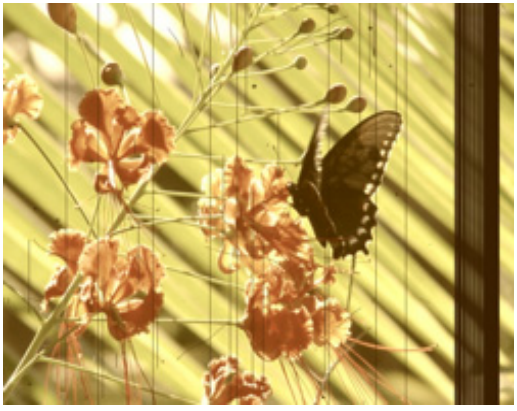
**Modifier 1:** Adjusts the noise rate. A DMX value of 128 (50%) pauses the noise. Values below the midpoint adjust the rate from 0 = fastest to 127 = slowest. Values above the midpoint adjust the rate from 129 = slowest to 255 (100%) = fastest.

**Modifier 2:** Shifts the color to a sepia tint, 128 = no adjustment, 0 to 127 = full sepia. Values above the midpoint of the range repeat the push to sepia with jitter added from 129 (51%) = full color and no jitter to 255 (100%) = full sepia and maximum jitter.

**Modifier 3:** Reduces the noise level from 0 = maximum noise to 255 (100%) = no noise.



Original Content



Modifier 1 parameter DMX = 157
Modifier 2 parameter DMX = 94
Modifier 3 parameter DMX = 26

## Film Roll

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 53

This effect scrolls the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed and image scaling.

**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll left, increasing in speed as you approach 0. Values above the midpoint scroll right, increasing in speed to 255 (100%).

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint scroll down, increasing in speed as you approach 0. Values above the midpoint scroll up, increasing in speed to 255 (100%).

**Modifier 3:** Scales the image from 0 = no adjustment to maximum tiling at 255.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Film Roll** *on page 92).*

## Flip

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 83

This effect scrolls the media file texture horizontally or vertically independent from the 3-D object it overlays, and allows you to control the scrolling speed and image scaling.

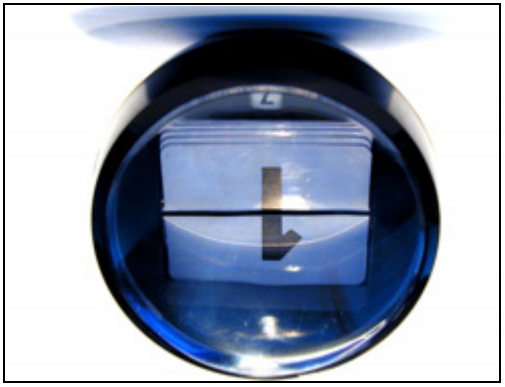
**Modifier 1:** DMX values from 0-127 have no effect. DMX values of 128 (50%) to = 255 (100%) flips the image horizontally.

**Modifier 2:** DMX values from 0-127 have no effect. DMX values of 128 (50%) to = 255 (100%) flips the image vertically.

**Modifier 3:** Not used

Original content

Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 0



Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 128

## Edge Frame Profiles

☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 133

This effect contains three modes that modify the **Global Image Edge Fade** parameters to frame the global composite image. Modifier 2 and Modifier 3 adjustments vary depending which of the framing modes is selected with Modifier 1.

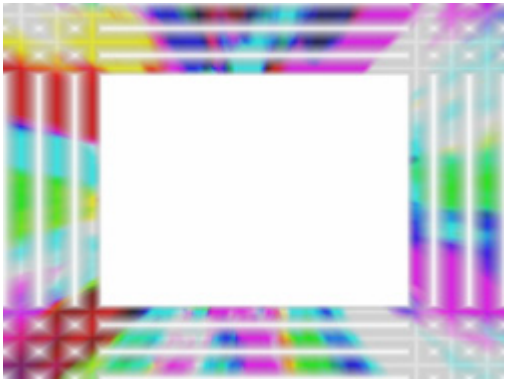
***NOTE: If the Global Image Edge Fade DMX values are set to Zero, the Framing output will be unseen in modes 0 and 1.***

The images below show examples of the first two framing modes. In the image on the left Modifier 1 selects the internal profile framing option, with Modifier 2 selecting the frame pattern.

In the example on the right, Modifier 1 selects the Graphic Object texture framing option, with Modifier 2 selecting the frame pattern. A Modifier 3 DMX value = 10 designates the Frame texture as Graphic Object 2's media file content minus any applied effects.

***NOTE: Global Image Edge Fade DMX values = 100.***

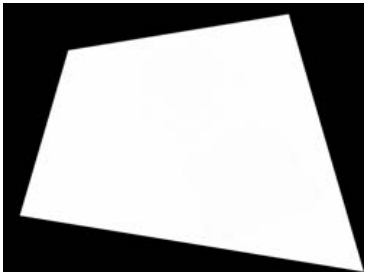
Effect Mode parameter = 133
Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 15
Modifier 3 Not Used



Effect Mode parameter = 133
Modifier 1 parameter DMX = 1
Modifier 2 parameter DMX = 251
Modifier 3 parameter DMX = 10

### Framing Shutter Emulation

When Modifier 1 is set to a DMX value = 2, Modifier parameters 2 and 3 are not used. Instead, the four **Global Image Edge Fade** parameters control image to emulate framing shutters. In the example to the right, each **Image Edge Fade** parameter has been set to a DMX value = 100.



***NOTE: This technique is useful when your are running Version 1 Protocol. Version 2 Protocol provides a much better solution for this situation with eight Framing Shutter channels.***

**Modifier 1:** This parameter allows you to select from three framing modes.

| DMX Value | Action |
|---|---|
| 0 | Frames the image using an Internal Frame profile to control the Global Fade Edge parameter appearance. |
| 1 | Frames the image using an Internal Frame profile to control the Global Fade Edge parameter appearance. Rendered Graphic Object content is selected at Frame texture using Modifier 3 parameter |
| 2 | Image clipping changing operation of the Global Image Edge Fade parameters to Emulate Framing Shutters |

**Modifier 2:** When the Modifier 1 DMX value = 0 or 1, this channel selects from profiles that vary in gradient density or pattern. When Modifier 1 DMX value = 2, this Modifier is not used.

**Modifier 3:** When Modifier 1 DMX Value = 1, this parameter determines how to use the rendered Graphic Object content as a texture for the frame.When Modifier 1 DMX value = 2, this Modifier is not used.

| Modifier 1 DMX Value | Modifier 3 | |
|---|---|---|
| | DMX value | Action |
| 0 | NA | Not Used |
| 1 | 0 | Graphic Object 1 texture without applied Effects |
| | 1 | Graphic Object 1 texture including its first applied Effect |
| | 2 | Graphic Object 1 texture including its first two applied Effects |
| | 3 | Graphic Object 1 texture including its first three applied Effects |
| | 10 | Graphic Object 2 texture without applied Effects |
| | 11 | Graphic Object 2 texture including its first applied Effect |
| | 12 | Graphic Object 2 texture including its first two applied Effects |
| | 13 | Graphic Object 2 texture including its first three applied Effects |
| | 20 | Graphic Object 3 texture without applied Effects |
| | 21 | Graphic Object 3 texture including its first applied Effect |
| | 22 | Graphic Object 3 texture including its first two applied Effects |
| | 23 | Graphic Object 3 texture including its first three applied Effects |
| 2 | NA | Not Used |

## Fuzzifier

☑ Object Effect ☑ Global Effect

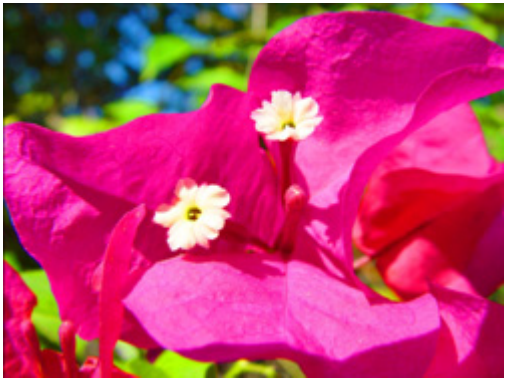
**Effect Mode** parameter DMX value = 57

This effect offsets multiple images of the media file texture to blur the image, and lets you to control image scaling at the same time.

**Modifier 1:** The default DMX value of 0 = no adjustment. Increasing DMX values blur the image horizontally to a maximum at a DMX value of 255 (100%).

**Modifier 2:** The default DMX value of 0 = no adjustment. Increasing DMX values blur the image vertically to a maximum at a DMX value of 255 (100%).

**Modifier 3:** Adjusts the decay level of the blurred edge from 0 = no adjustment to maximum full decay at 255.



Original Content

Modifier 1 parameter DMX = 255 (100%)
Modifier 2 parameter DMX = 255 (100%)
Modifier 3 parameter DMX = 0

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Fuzzifier** *on page 94).*

## Gaussian Blur

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 81

More precise than Fuzzifier effect, this effect creates a true blur effect utilizing a gaussian curve.

**Modifiers 1** and **Modifier 2** combine to create the effect. When Modifiers 1 and 2 both have a value >0, there is no Blur. Increasing Modifier 1 and Modifier 2 values increases the sample distance and number of filter passes.

**Modifier 3:** Applies a range of curve shapes from a DMX value = 0 through 255 (100%).

Original Content

Modifier 1 parameter DMX = 128,
Modifier 2 parameter DMX = 128
Modifier 3 parameter DMX = 128

Modifier 1 parameter DMX = 255,
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 255

## Gaussian Halo

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 99

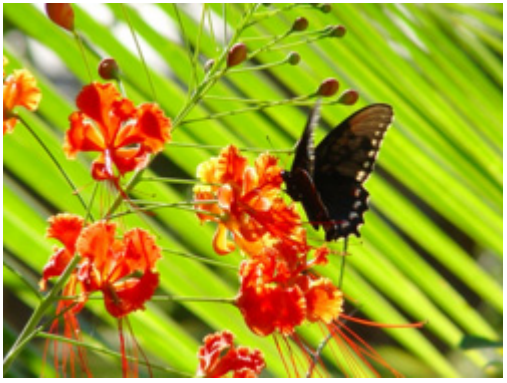
This effect blurs the content from around a circular area in the center of the image toward the edges.

***NOTE: Adjusting Mod 3, then Mod 1 and finally Mod 2 will give the best results with the least CPU demand.***

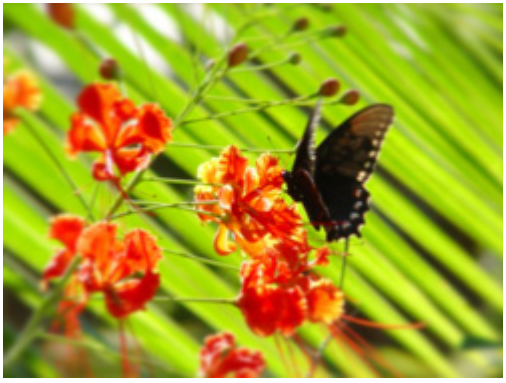
**Modifiers 1 :** Increases the sample distance to determine the "smoothness" of the blurring from 0 = minimum to 255 (100%) = maximum.

**Modifier 2 :** Increases the number of filter passes from 0 = one pass to 255 (100%) = a maximum of sixteen filter passes

**Modifier 3:** Applies a range of curve shapes from 0 = no adjustment to 255 (100%) = maximum adjustment.



Original Content



Modifier 1 parameter DMX = 193,
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 255

## Horizontal Mirror

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 40

This effect duplicates the image vertically and mirrors the image alongside its original.

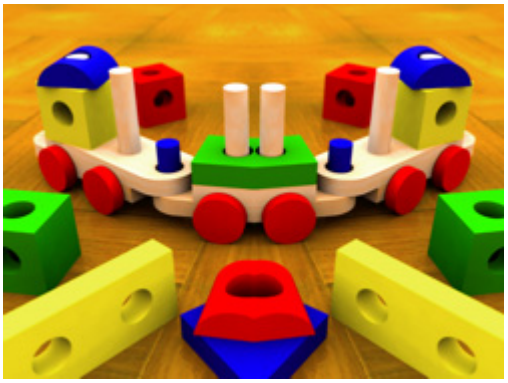
**Modifier 1:** The default DMX value of 128 (50%) sets the center point of the edge where the duplicate images meet at the center of the screen. Values below the midpoint move the center point toward the left as you approach 0. Values above the midpoint move the center point toward the right as you approach 255 (100%).

**Modifier 2:** Not Used

**Modifier 3:** Not Used

Original Content

Effect Mode parameter DMX = 40
Modifier 1 parameter DMX = 0



Effect Mode parameter DMX = 40
Modifier 1 parameter DMX = 134

## Image Scale and Rotate

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 52

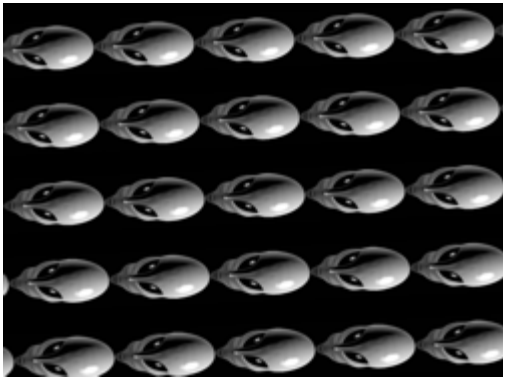
This effect lets you scale and rotate the media file texture applied to a 3-D object's surface independent of Graphic Object rotation you set with the Rotation parameters (see *Rotating a 3-D Object* on page 71). This allows scaling and rotating outside the bounds of the 3D object.

**Modifier 1:** Scales the texture. The default DMX value of 0 = no adjustment. As you increase the DMX value to 255 (100%), the single image to scales to an increasing number of multiple images similar to tiling.

**Modifier 2:** Sets the texture rotation angle. A DMX value of 128 (50%) = no adjustment. Values above the midpoint rotate clockwise 255 (100%) = maximum rotation. Values below the midpoint rotate counterclockwise to 0=maximum rotation.

**Modifier 3:** Sets the rotation speed from a DMX value of 0 = static to 255 (100%) = maximum.

Original Content



Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0

Modifier 1 parameter DMX = 255,
Modifier 2 parameter DMX = 81
Modifier 3 parameter DMX = 128

## Lens Grid

☑ Object Effect ☑ Global Effect

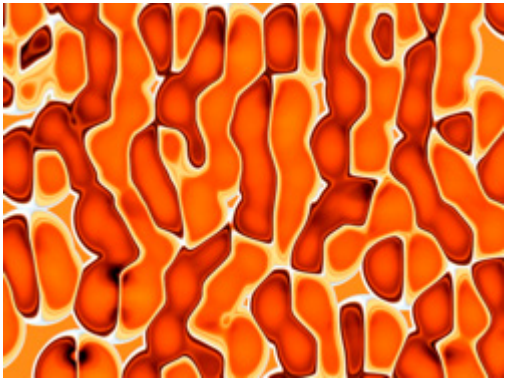
**Effect Mode** parameter DMX value = 91

This effect lets you view the image through a grid of virtual convex lenses. You can adjust the number, magnification and edge shading of the lenses over the image.

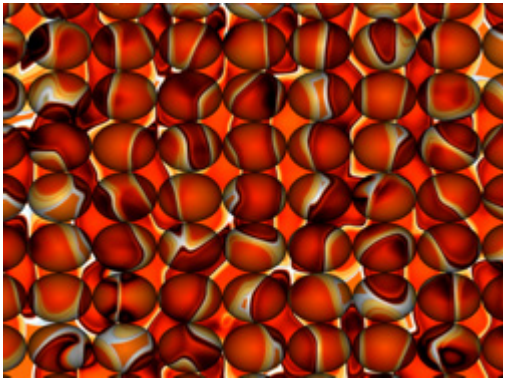
**Modifier 1:** Controls the horizontal position of the lens' centerpoint from 0 = left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the edge shading.

**Modifier 3:** Controls the number of the lens from DMX values of 0 = many to 255 (100%) = single lens.



Original Content



Modifier 1 parameter DMX = 12
Modifier 2 parameter DMX = 112
Modifier 3 parameter DMX = 33

## Magnifying Lens

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 36

This effect applies spherical overlay that magnifies a portion of the texture to create a virtual convex lens effect over a portion of the image. You can adjust the size of the lens and *move* it over different areas of the image.

**Modifier 1:** Controls the horizontal position of the lens' centerpoint from 0 = left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the vertical position of the lens' centerpoint from 0 = top edge to 255 (100%) = bottom edge of output.

**Modifier 3:** Controls the size of the lens from 0 = smallest to 255 (100%) = largest.

Original Content

Modifier 1 parameter DMX = 107
Modifier 2 parameter DMX = 143
Modifier 3 parameter DMX = 61

## Magnifying Lens 2

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 37

This effect applies spherical overlay that magnifies a portion of the texture to create a doubled virtual convex lens over a portion of the image. You can adjust the size of the lens and *move* it over different areas of the image.

**Modifier 1:** Controls the horizontal position of the lens' centerpoint from 0=left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the vertical position of the lens' centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

**Modifier 3:** Controls the size of the lens from 0=smallest to 255 (100%) = largest.

**Tip:** Zooming in with this lens effect creates an additional effect.

Original Content

Modifier 1 parameter DMX = 107
Modifier 2 parameter DMX = 143
Modifier 3 parameter DMX = 61

## Mattes

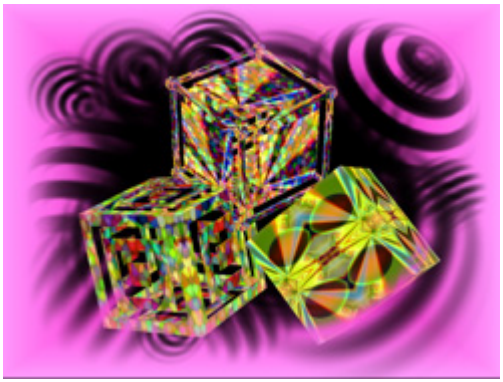
☐ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 144

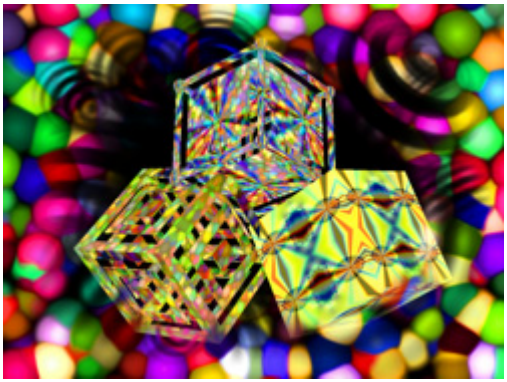
The Global Effect lets you select from a variety of provided patterns to superimpose over the composite image. Modifier parameters select the pattern and effects for a matte.

The images below show two examples of the Mattes effect. In the image on the left, the Modifier 2 value selected the matte pattern. Modifier 1 sets black as transparent. The Modifier 3 value corresponds with a lookup to an internal gradient map to determine the matte color.

In the example on the right, the same Matte is selected by Modifier 2. This time the Modifier 1 value selects white as transparent and uses a graphic object as a texture. A Modifier 3 DMX value of 0 designates the Matte texture as Graphic Object 1's media file content minus any applied effects.



Modifier parameter 1 DMX = 11
Modifier parameter 2 DMX = 13
Modifier parameter 3 DMX = 203

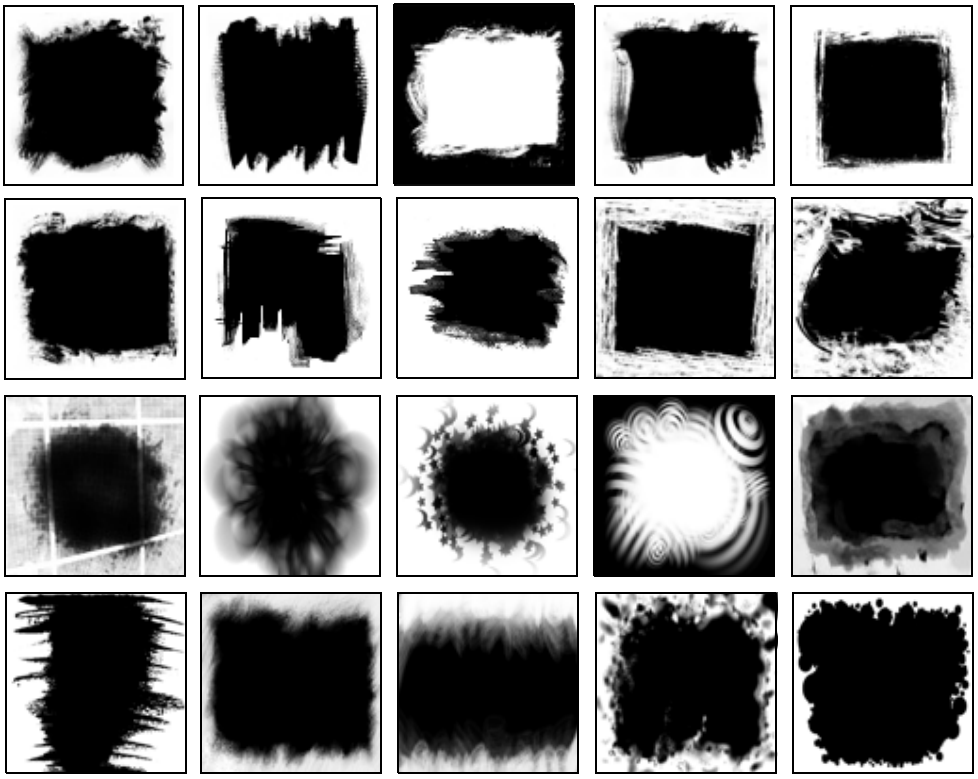


Modifier parameter 1 DMX = 5
Modifier parameter 2 DMX = 13
Modifier parameter 3 DMX = 0

**Modifier 1:** This parameter determines transparency and color effects for the selected matte:

| DMX value | Modifier 1 Action |
|---|---|
| 0 | Black transparent, use matte color |
| 1 | Black transparent, inverting matte color |
| 2 | White transparent, use matte color |
| 3 | White transparent, then invert matte color |
| 4 | Black transparent using a Graphic Object media file content as the matte texture |
| 5 | White transparent using a Graphic Object media file content as the matte texture |
| 6 | Black transparent with grayscale used as alpha |
| 7 | White transparent with grayscale used as alpha |
| 8 | Black transparent with grayscale not used as alpha |
| 9 | White transparent with grayscale not used as alpha |
| 10 | Black transparent, with matte color controlled by Modifier 3 as lookup in internal color gradient map |
| 11 | Black transparent, with matte color controlled by Modifier 3 as lookup in internal color gradient map and inverted |

**Modifier 2:** The first 20 DMX values are assigned to the following Matte pattern options:



**Modifier 3:** This parameter determines the texture for the Matte mode selected with the Modifier 1 parameter.

| Modifier 1 DMX Value | Modifier 3 | |
|---|---|---|
| | DMX value | Action |
| 0 - 3 | NA | Not Used |
| 4 - 9 | 0 | Graphic Object 1 texture without applied Effects |
| | 1 | Graphic Object 1 texture including its first applied Effect |
| | 2 | Graphic Object 1 texture including its first two applied Effects |
| | 3 | Graphic Object 1 texture including its first three applied Effects |
| | 10 | Graphic Object 2 texture without applied Effects |
| | 11 | Graphic Object 2 texture including its first applied Effect |
| | 12 | Graphic Object 2 texture including its first two applied Effects |
| | 13 | Graphic Object 2 texture including its first three applied Effects |
| | 20 | Graphic Object 3 texture without applied Effects |
| | 21 | Graphic Object 3 texture including its first applied Effect |
| | 22 | Graphic Object 3 texture including its first two applied Effects |
| | 23 | Graphic Object 3 texture including its first three applied Effects |
| 10 - 11 | 0-255 | Color selected as a look up value from an internal gradient. |

## Pan and Scan

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 255

This effect Zooms into a still image and then, by changing position, you can pan across the image horizontally and vertically. It only functions on image sizes greater than 1024 x 1024 in at least one direction.

**Modifier 1:** Adjusts the horizontal pan position from 0=left edge to 255 (100%) = right edge of the image. The default DMX value of 128 (50%) = no adjustment.

**Modifier 2:** Adjusts the vertical pan position from 0 = bottom edge to 255 (100%) = top edge of the image. The default DMX value of 128 (50%) = no adjustment.

**Modifier 3:** The default DMX value is 0 = no zoom. Increasing the value, increases the zoom into the image to a maximum at a value of 255 (100%). The total Zoom range is proportional to the image size.

**Tip:** Although you can apply this effect in several different modes (global, graphic and visual), the modifier channel adjustments will only function if there is enough “room” left on the image to move. In most cases the first application of this effect will be the only one to have an effect.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Pan and Scan** *on page 99).*

## Particle System

☐ Object Effect ☑ Global Effect

Three Particle System effects operate together to create a particle pattern effect. By using all three effects, you can, in effect, apply nine modifier adjustments.

***NOTE: You must use the Particle System 1 effect. Then you can add Particle System 2 and Particle System 3 for additional Modifier support to the initial effect.***

### Particle System I

**Effect Mode** parameter DMX value = 95

This option provides the baseline effect.

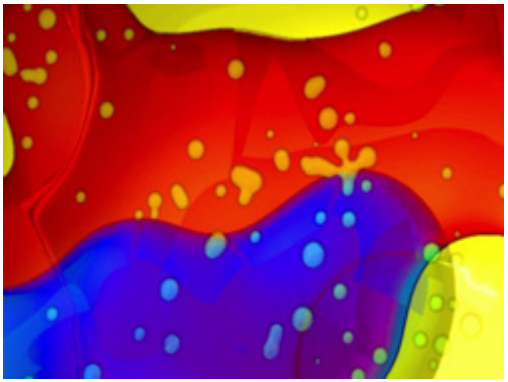
**Modifier 1:** Determines emitter pattern that will shape the particle effect. Multiple emitter patterns are available and more will be added in subsequent releases. All DMX values after the last pattern variation default to the first emitter pattern (Random Within Rectangle).

| DMX value | Modifier 1 Action |
|---|---|
| 0 | RandomWithinRectangle |
| 1 | RandomOnRectangle |
| 2 | RandomOnRectangleInward |
| 3 | RandomOnRectangleOutward |
| 4 | RandomInCircle |
| 5 | RandomOnCircleInward, |
| 6 | RandomOnCircleOutward, |
| 7 | RandomAtTop, |
| 8 | RandomAtRight, |
| 9 | RandomAtBottom, |
| 10 | RandomAtLeft, |
| 11 | RandomAtTopAndRight, |
| 12 | RandomAtRightAndBottom, |
| 13 | RandomAtBottomAndLeft, |
| 14 | RandomAtLeftAndTop |
| 15 | RandomAtTopRightBottomLeft |
| 16 | SequentialTopToBottom |

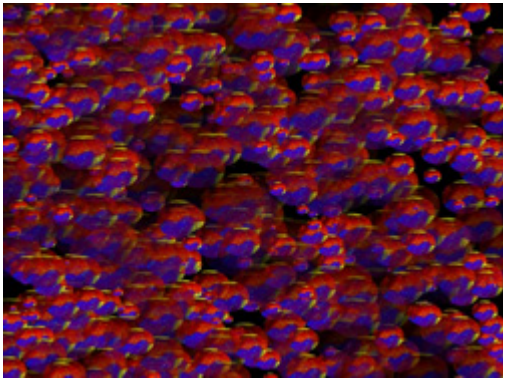
| DMX value | Modifier 1 Action |
|---|---|
| 17 | SequentialRightToLeft |
| 18 | SequentialBottomToTop |
| 19 | SequentialLeftToRight |
| 20 | SequentialClockwise |
| 21 | RandomTopLeftRadial |
| 22 | RandomTopRightRadial |
| 23 | RandomBottomRightRadial |
| 24 | RandomBottomLeftRadial |
| 25 | RandomTopLeftRightRadial |
| 26 | RandomBottomRightLeftRadial |
| 27 | RandomFourCorners |
| 28 | RandomStaticInsideRectangle |
| 29 | RandomStaticOutsideRectangle |
| 30 | RandomStaticOnRectangle |
| 31 | RandomStaticInsideCircle |
| 32 | RandomStaticOutsideCircle |
| 33 | RandomStaticOnCircle |

**Modifier 2:** Adjusts the trailing of each particle as it moves across the image from 0 = smallest trail to 255 (100%) = longest.

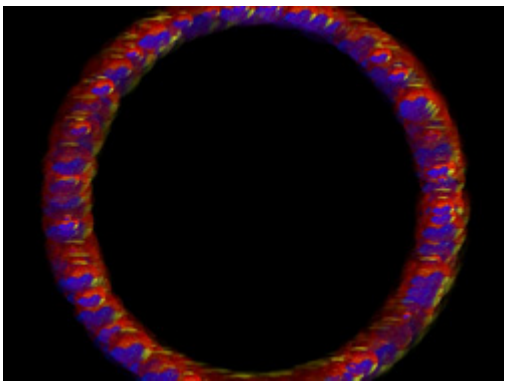
**Modifier 3:** This parameter determines particle acceleration. A DMX value of 128 (50%) is the default. Values on each side of the midpoint increase the particle acceleration from 0 = slowest to 127 (49%) = fastest and from 129 (51%) = slowest to 255 (100%) = fastest.



Original Content



Content with Particle 1 effect applied.
Modifier 1 parameter DMX = 0
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0



Modifier 1 parameter DMX = 33
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 0

## Particle System 2

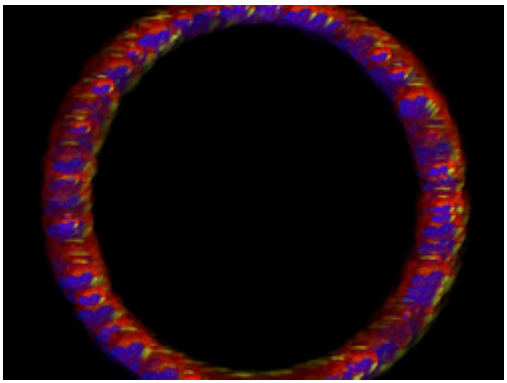
**Effect Mode** parameter DMX value = 96

This option can be used to add additional modifier adjustments to the baseline effect you set up in the Particle System 1 effect.

**Modifier 1:** Determines the number of particles from 0 = smallest number to 255 (100%) = largest number of particles.

**Modifier 2:** Adjusts particle size from 0 = smallest to 255 (100%) = largest particle size.

*TIP: Reducing the particle size enhances any trailing you set in the Particle System 1 effect.*



Modifier parameter 1 DMX value = 45
Modifier parameter 2 DMX value = 62
Modifier parameter 3 DMX value = 0

**Modifier 3:** Adjusts the size of the emitter shape you selected in the Particle System 1 effect by spreading the source area from 0 = the smallest source area to 255 (100%) = the largest.

## Particle System 3

**Effect Mode** parameter DMX value = 97

If you have already selected the Particle System 1 and 2 effects, you can further adjust the effect with this option.

**Modifier 1:** Sets the Initial Particle Velocity from 0 = slowest to 255 (100%) = fastest.

**Modifier 2:** Sets the particle rotation. A DMX value of 128 (50%) = no rotation. Values above the midpoint rotate counterclockwise from 129 = slowest to 255 (100%) = fastest. Values below the midpoint rotate clockwise from 0 = fastest to 127 = slowest.

**Modifier 3:** Sets the particle lifetime from 0 = shortest to 255 (100%) = longest

## Picture in Picture

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 35

This effects creates a window in the image containing a scaled down version of the same image and then lets you position it anywhere on the output plane.

**Modifier 1:** Controls the horizontal position of the subpicture's centerpoint from 0=left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the vertical position of the subpicture's centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

**Modifier 3:** Controls the size of the picture from 0=smallest to 255 (100%) = largest.

Original Content

Modifier parameter 1 DMX value = 176
Modifier parameter 2 DMX value = 76
Modifier parameter 3 DMX value =133

## Prerotation Translation

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 102

Rotation parameters rotate the center of an image around the x, y or z axis. The Prerotation Translation Effect Mode option allows you to position the image in a virtual 3-dimensional space. Then, when the Rotation parameters for the object are applied, the image will orbit around each axis from this new position.

*NOTE: When this option is applied as a Global effect, it will include any prerotation translation selected as an Object effect.*

**Modifier 1:** Moves the horizontal position of the image centerpoint from 0 = left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the vertical position of the subpicture's centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

**Modifier 3:** Controls the size of the picture from 0=smallest to 255 (100%) = largest.

## Pixelate

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 54

This effects divides the image into rectangles using the center pixel color of each “box” as its color. You can control the number of boxes, and adjust the vertical and horizontal dimensions.

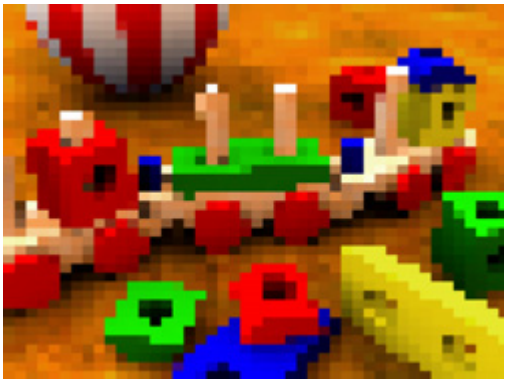
**Modifier 1:** Controls the number of divisions. Fewer, larger boxes will also result in reduced color variations.

**Modifier 2:** Reduces the box size horizontally to centerpoint from 0= no reduction to 255 (100%) = full reduction. At that point, the image will then be composed of series of horizontal bands.

**Modifier 3:** Reduces the box size vertically to centerpoint from 0= no reduction to 255 (100%) = full reduction. At that point, the image becomes a series of vertical bands.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* Pixelate *on page 100).*

Original Content



Modifier 1 parameter DMX = 93
Modifier 2 parameter DMX = 7
Modifier 3 parameter DMX = 0

## Pixel Twist

☑ Object Effect ☑ Global Effect

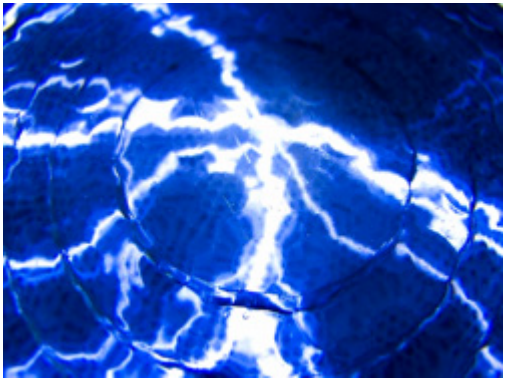
**Effect Mode** parameter DMX value = 34

This effect introduces a twisted area to the image and allows to you size it and move it in the image.

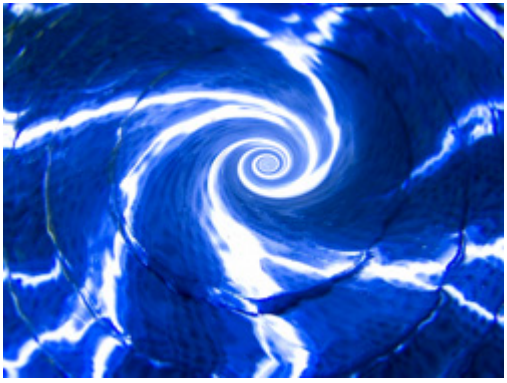
**Modifier 1:** Controls the horizontal position of the twisted area's centerpoint from 0=left edge to 255 (100%) = right edge of output.

**Modifier 2:** Controls the vertical position of the twisted area's centerpoint from 0=top edge to 255 (100%) = bottom edge of output.

**Modifier 3:** Controls the direction and amount of twist. At the midpoint of the range, there is no change in the image. The twist area and size moves counterclockwise from 128 (50%) = smallest area to 0 = largest twist area moving counterclockwise. The twist area and size moves clockwise from 128 (50%) = smallest area to 255 (100%)= largest twist area moving clockwise.



Original Content



Modifier 1 parameter DMX = 134
Modifier 2 parameter DMX = 106
Modifier 3 parameter DMX = 193

## Prism

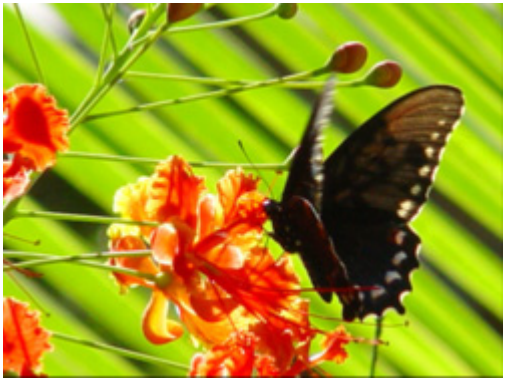
**Effect Mode** parameter DMX value = 98

This effect imitates looking at the image through a prism that you define with the Modifier parameters.

**Modifier 1:** Sets the number of facets. A DMX value of 0 = no facets. The number of facets increase from 10 = three facets to 255 (100%) = maximum 16 facets.

**Modifier 2:** Sets the refraction index from 0 = minimum to 255 = maximum

**Modifier 3:** Rotates the prism. The default value is 128 (50%). Values below the midpoint rotate clockwise from 0 = fastest to 127 = slowest rotation. Values above the midpoint rotate counterclockwise from 129 = fastest to 255 = slowest rotation.



Original Content

Modifier 1 parameter DMX = 255
Modifier 2 parameter DMX = 107
Modifier 3 parameter DMX = 155

## Raindrop

☑ Object Effect ☑ Global Effect

**Effects Mode** parameter DMX value = 46

This effect simulates a raindrop distortion on a surface.

**Modifier 1:** Controls the drop size from 0 = no drop to 255 (100%) = maximum size.

**Modifier 2:** Sets the random number generator seed number. This lets you create a repeatable random sequence that will synchronize correctly when using the Collage Generator effect, see *page 190*.

**Modifier 3:** Adjusts the raindrop creation rate from 0 = no adjustment to 255 (100%) = maximum rate.

Original Content

Modifier parameter 1 DMX value = 255
Modifier parameter 2 DMX value = 255
Modifier parameter 3 DMX value = 185

## Scene Change

☑ Object Effect ☑ Global Effect

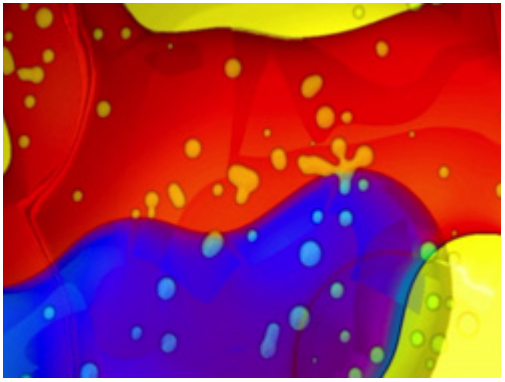
**Effect Mode** parameter DMX value = 100

This effect creates transparency in video content based on the change in pixel color from one frame to the next. Modifiers 1 and 2 use the color difference between the current frame and the previous frame to derive an alpha value for the output frame. Modifier 3 scales the color of the current frame to provide the color of the output frame.

**Modifier 1:** Scales RGB values of the previous frame; from 0 = maximum to 255 = minimum scaling.

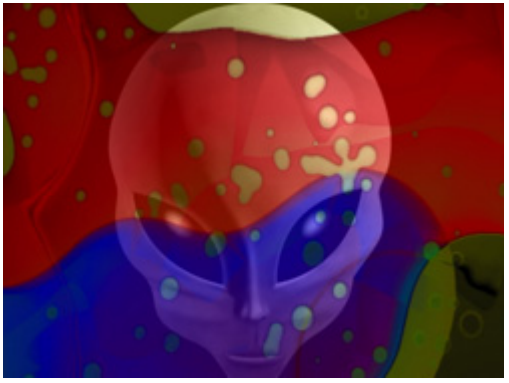
**Modifier 2:** Derives an alpha value from color difference between current frame and the result of modifier 1. DMX 0 to 127 act to make darker colors transparent, with DMX 0 resulting in maximum transparency. DMX values 128 to 255 act to make bright colors transparent, with DMX 255 = maximum transparency.

**Modifier 3:** Scales the RGB values of the current frame to provide the output RGB values. DMX 0 provides the brightest output RGB values. DMX 255 = the darkest output RGB values.



Object 1 Original Content

Object 2 Original Content



Modifier parameter 1 DMX value = 0
Modifier parameter 2 DMX value = 255
Modifier parameter 3 DMX value = 185

## ShakeNBake

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 61

This effect randomly vibrates the image. You can control the horizontal and vertical frequency.

**Modifier 1:** Adjusts random horizontal “shake” from the shortest refresh rate at a value = 0 to to a maximum at a DMX value of 255 (100%).

**Modifier 2:** Adjusts random vertical “shake” from the shortest refresh rate at a value = 0 to a maximum at a DMX value of 255 (100%).

**Modifier 3:** Adjusts how much the image is allowed to move from a minimum at a DMX value of 0 to a maximum at a DMX value of 255 (100%).

**Tip:** To get the maximum effect, set a high value for Modifier 3 and low values for Modifiers 1 and 2.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **ShakeNBake** *on page 104).*

## Sinewave, Circular

☑ Object Effect ☐ Global Effect

### Sinewave, Circular w/X Axis Wobbulation

**Effect Mode** parameter DMX value = 64

### Sinewave, Circular w/Y Axis Wobbulation

**Effect Mode** parameter DMX value = 65

### Sinewave, Circular w/Z Axis Wobbulation

**Effect Mode** parameter DMX value = 66

These effects create a circular sinewave pattern and then vary the boundaries of the underlying object along the designated axis without affecting the media file that is applied as a texture.

**Modifier 1:** Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate.

**Modifier 3:** Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset.

## Sinewave, Horizontal

☑ Object Effect ☐ Global Effect

### Sinewave, Horizontal w/X Axis Wobbulation

**Effect Mode** parameter DMX value = 67

### Sinewave, Horizontal w/Y Axis Wobbulation

**Effect Mode** parameter DMX value = 68

### Sinewave, Horizontal w/Z axis Wobbulation

**Effect Mode** parameter DMX value = 69

These effects create a horizontal sinewave pattern and then vary the boundaries of the underlying object along the designated axis without affecting the media file that is applied as a texture.

**Modifier 1:** Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate.

**Modifier 3:** Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset.

## Sinewave, Vertical

☑ Object Effect ☐ Global Effect

### Sinewave, Vertical w/X Axis Wobbulation

**Effect Mode** parameter DMX value = 70

### Sinewave, Vertical w/Y Axis Wobbulation

**Effect Mode** parameter DMX value = 71

### Sinewave, Vertical w/Z Axis Wobbulation

**Effect Mode** parameter DMX value = 72

This effect creates a Vertical sinewave pattern and then varies the boundaries of the underlying object along the X axis without affecting the media file that is applied as a texture.

**Modifier 1:** Adjusts the size (amplitude) of the wobble from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the wobble from 0 = no adjustment to 255 (100%) = maximum rate.

**Modifier 3:** Adjusts the offset (phase) of the wobble from 0 = no adjustment to 255 (100%) = maximum offset.

## Slats

☑ Object Effect ☑ Global Effect

### Vertical Slats

**Effect Mode** parameter DMX value = 62

### Horizontal Slats

**Effect Mode** parameter DMX value = 63

These effects render the image in offset slats.

**Modifier 1:** Adjusts the number of slats from from a DMX value of 0 = no slate to 255 = the maximum number of slats.

**Modifier 2:** Adjusts the displacement of the slats from a DMX value of 0 = no displacement to 255 = image completely removed from screen.

Original Content

**Modifier 3:** When the DMX value for Modifier 1 >0, Modifier 3 fades from the original image to the slatted image. A DMX value of 0 = the original image with no effect applied. Increasing the value fades to the slatted image with 255 = the slatted image at full opacity.

**Vertical Slat Option**

Effect Mode parameter DMX = 62
Modifier 1 parameter DMX = 204
Modifier 2 parameter DMX =40
Modifier 3 parameter DMX = 255

**Horizontal Slat Option**

Effect Mode parameter DMX value = 63
Modifier 1 parameter DMX =204
Modifier 2 parameter DMX =40
Modifier 3 parameter DMX = 255

## Spherical Mapping

☐ Object Effect ☑ Global Effect

Spherical Mapping adjusts a rectangular output to project on a portion of a sphere. It is especially useful for projecting a Collage onto a sphere or a portion of a sphere. Spherical mapping utilizes a total of nine Effect Modifier parameters to adjust positioning. In addition to the three modifiers associated with the Global Effect, two Graphics Object Effects provide six additional Modifier parameters. Use these adjustments in conjunction with Keystone parameters and Ratio parameters to refine the output shape on the spherical surface.

For a more information and a detailed setup guide for Spherical Mapping, see *Mapping a Collage to a Spherical Surface* on page 142.

### Spherical Mapping, Outside

**Effect Mode** parameter DMX value = 142

This effect corrects shape distortions and controls blending for Collages projected onto the outside surface of a sphere.

### Spherical Mapping, Inside

**Effect Mode** parameter DMX value = 143

This Global Effect corrects shape distortions and controls blending for Collages projected onto the inside surface of a sphere.

### Modifier Parameter Adjustments

***When Spherical Mapping is selected, the associated Global Effect Modifier parameters adjust as follows:***

**Modifier 1:** Adjusts the longitude (horizontal) angle. A value of 0 = no adjustment. The number of degrees of angle increases as you increase value to maximum at 255 (100%).

**Modifier 2:** Adjusts the latitude (vertical) angle. A value of 0 = no adjustment. The number of degrees of angle increases as you increase value to maximum at 255 (100%).

**Modifier 3:** Adjusts the center of the latitude angle. A value of 128 = no adjustment and assumes the center of the latitude angle is at the “equator”. Values below the midpoint move the center of the latitude angle down with 0 = maximum distance below the “equator”. Values above the midpoint move the center of the latitude angle up to 255 = maximum distance above the “equator”.

***NOTE: When the Spherical Mapping effect is selected in a Global Effect parameter and a Graphic Effect parameter’s DMX value = 253, the Graphic Effect Modifier parameters make the following Spherical Mapping adjustments:***

**Modifier 1:** Controls the vertical offset of the projector. A value of 128 = no adjustment. to maximum at 255 (100%). Values below the midpoint compress the grid toward the “equator”. Values above the midpoint stretch the horizontal grid lines away from the “equator”.

**Modifier 2:** Adjusts the vertical offset of the sphere. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the center of the adjustment down toward the bottom of the image. Values above the midrange move the bend center up to the top of the image at a DMX value of 255 (100%).

**Modifier 3:** Adjusts to the size of the sphere. A DMX value of 64 (25%) = no adjustment. Adjusting toward 0 compresses the grid toward the vertical center. Values above the midrange stretch the grid toward the edges of the image at a DMX value of 255 (100%).

***When the Spherical Mapping effect is selected in a Global Effect parameter and a Graphic Effect parameter's DMX value = 254, the Graphic Effect Modifier parameters make the following Spherical Mapping adjustments:***

**Modifier 1:** Corrects the vertical bend. A value of 0 = no adjustment. Values below the midpoint bend the horizontal lines toward the "equator" to a maximum at 255.

**Modifier 2:** Adjusts the center of the vertical bend. A DMX value of 128 (50%) = no adjustment. Adjusting toward 0 moves the bend center down to the bottom of the image. Values above the midrange move the bend center up to the top of the image at a DMX value of 255 (100%).

**Modifier 3:** Adjusts the center of the horizontal bend. A DMX value of 64 (25%) = no adjustment. Adjusting toward 0 bends the vertical grid lines toward the center of the output. Values above the midrange bends the lines away from the vertical center to a maximum at 255 (100%).

*TIP: Modifier channels for Effect Mode 1 are labeled as CMY in the Wholehog system so you can also make use of the color picker, HSI, and other Wholehog functions. Use the CMY parameter controls to adjust the three Effect Mode 1 Modifier parameters for both the Global and Graphic fixture types.*

*The default for Effect Mode 1 is set to CMY1 as well. Modifier channels for Effect Modes 2 and 3 are labeled Mod 1, Mod 2, and Mod 3.*

## Texture Mixing

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 51

Use Texture Mixing to mix two media file outputs on one object. With this effect, you can crossfade the texture (media file content) from one active Graphic Object to the texture of another Graphic Object. When the Texture Mixing effect is selected in the example to the right, the media file output of Graphic Object 1 (minus applied effects) is selected and mixed to Graphic Object 2 with opacity = 50%.

**Modifier 1:** Selects the Source file for the texture you want to pull. A DMX value = 1 selects the media content from Graphic Object 1, a value = 2 selects from Graphic Object 2, and a value = 3 selects from Graphic Object 3.

**Modifier 2:** Selects the effect level you want to use for the source file. A DMX value = 0 selects the original file without effects. If effects have been applied to the image, A DMX value = 1 includes the first applied effect; DMX = 2 includes the first two effects and DMX = 3 includes the first three effects.

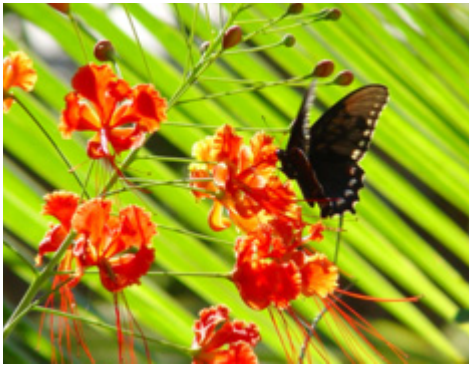
**Modifier 3:** Adjusts Graphic Object opacity of the source texture from a DMX value of 0 = transparent to 255 (100%) = fully opaque.

***TIP: Use the following steps create a modified Trails effect with the Texture Mixing effect:***

1. Select two Graphic Objects. The second object can be a solid black screen (Media Folder 1, Media File 1)
2. Use Modifier 1 to select the Graphic Object you want to display with a trail effect.
3. Set Modifier 2 to a DMX Value = 2
4. Set Modifier 3 in a range between a DMX value of 240-254. The closer to 254, the more exaggerated the trail effect appears. If Modifier 3 is set to 255, the output will appear to stall or freeze on an image.

***NOTE:This effect is also available as a Visual Mode adjusted with two Modifier parameters, (see* Texture Mixing *on page 104).***

Graphic Object 1 Content



Graphic Object 2 Content

Effect Mode parameter DMX = 51
Modifier 1 parameter DMX =1
Modifier 2 parameter DMX = 0
Modifier 3 parameter DMX = 128

## Texture Ripple, Asymmetrical Circular

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 25

This effect varies the distance of reference points to the applied media file texture around the Z axis without affecting the underlying object to create an effect of wavy ripples moving out from the object's center.

**Modifier 1:** Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate.

**Modifier 3:** Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

## Texture Ripple, Circular

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 24

This effect varies the distance of reference points to the applied media file texture around the Z axis without affecting the underlying object. This creates an effect of concentric rippling out from the object center.

**Modifier 1:** Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate

**Modifier 3:** Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

## Texture Ripple, Horizontal

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 22

This effect varies the distance of reference points to the applied media file texture around the X axis without affecting the underlying object.

**Modifier 1:** Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate.

**Modifier 3:** Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

## Texture Ripple, Vertical

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 23

This effect varies the distance of reference points to the applied media file texture around the Y axis without affecting the underlying object.

**Modifier 1:** Adjusts the size (amplitude) of the ripple from 0 = no adjustment to 255 (100%) = maximum size.

**Modifier 2:** Adjusts the rate (frequency) of the ripple from 0 = no adjustment to 255 (100%) = maximum rate

**Modifier 3:** Adjusts the offset (phase) speed and direction. A DMX value of 128 (50%) = no adjustment. DMX Values above the midpoint increase speed in a forward direction to 255 (100%) = fastest speed. DMX values below the midpoint increase speed in a backward direction from no adjustment to 0 = fastest speed.

## Texture Shift

☑ Object Effect ☑ Global Effect

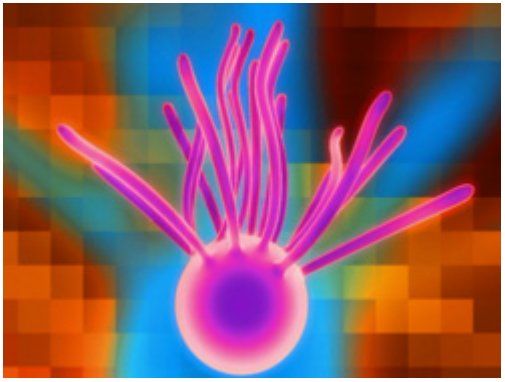
**Effect Mode** parameter DMX value = 88

This effect creates offset image elements by shifting the texture based upon selected color values.

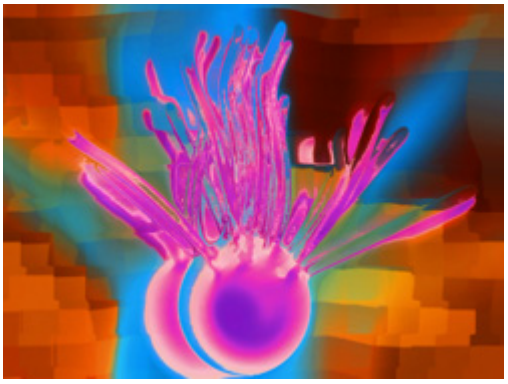
**Modifier 1:** Shifts the texture left to right

**Modifier 2:** Shifts the texture up to down

**Modifier 3:** Selects a color and scales the shift. Red and green color values (cyan) shift from 0 = maximum to 84 = a minimum shift. Red and blue color values (magenta) shift from 85 = maximum to 170 = a minimum shift. Green and blue color values (yellow) shift from a 171 = maximum to 255 = a minimum shift.



Original Content



Modifier 1 parameter DMX = 24
Modifier 2 parameter DMX = 184
Modifier 3 parameter DMX = 18

## Tiling On

☑ Object Effect ☐ Global Effect

**Effect Mode** parameter DMX value = 48

Tiling varies the number of times a media file is applied as a texture to an object. This effect works best on objects that have an undisrupted surface area.

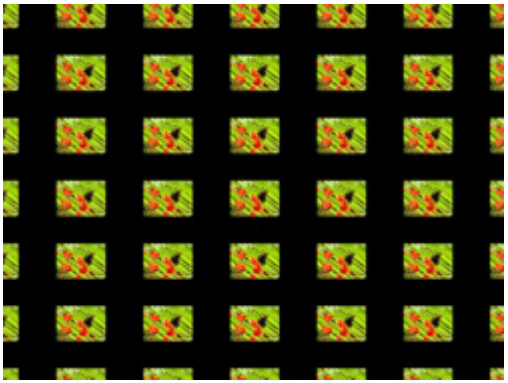
**Modifier 1:** Adjusts the size and number of tiles along the x axis. A value of 128 (50%) = no adjustment. Values below the midpoint size a single image to 0 = maximum image magnification. Values above the midpoint increase number of images displayed to 255 (100%) = maximum.

**Modifier 2:** Adjusts the size and number of tiles along the x axis. A value of 128 (50%) = no adjustment. Values below the midpoint size a single image to 0 = maximum image magnification. Values above the midpoint increase number of images displayed to 255 (100%) = maximum.

**Modifier 3:** Adjusts the spacing between tiles. Black spacing between tiles increases from a 0 = a minimum width to 127 = a maximum width. Transparent spacing between tiles increases from 128 = a minimum width to 255 = a maximum width.

***NOTE: The Tiling effect implemented on Effect 1 overrides tiling on both Effect 2 and Effect 3.***

Original Content



Modifier 1 parameter DMX = 251
Modifier 2 parameter DMX = 255
Modifier 3 parameter DMX = 97

## Transparent Wipes

☑ Object Effect ☑ Global Effect

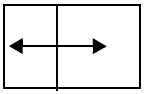
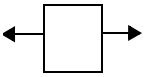
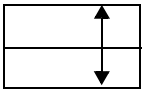
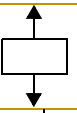
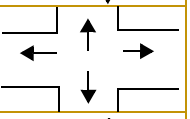
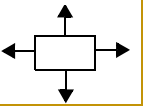
**Effect Mode** parameter DMX value = 33

Transparent wipes let you open one graphic to reveal another graphic behind it. You can select from six options and the centerline of the effect.

**Modifier 1:** Adjusts the area of the wipe from the smallest at a value of 0 to the largest at a value of 255 (100%).

**Modifier 2:** Selects the center of a wipe effect's separation

**Modifier 3:** Selects the wipe option. Each option occupies a portion of the DMX value range (see table at right).

| DMX Value | Modifier 3: Wipe Option | |
|---|---|---|
| 1-42 | Rectangle wipes from center out horizontally |  |
| 43-84 | Rectangle wipes from edges out horizontally |  |
| 85-126 | Wipes from center out vertically |  |
| 127-170 | Wipes from edges out vertically |  |
| 171-212 | Cross shape wipes from center out |  |
| 212-255 | Box shape wipes from edges outward |  |

## Zoom Blur

☑ Object Effect ☑ Global Effect

**Effect Mode** parameter DMX value = 59

Zooms into a position on the image with a mult-image blurring effect. You can control the position of the zoom center on the image.

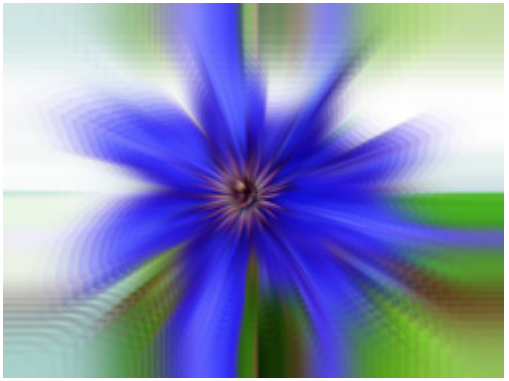
**Modifier 1:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the horizontal center of the zoom right to 0 = maximum. Values above the midpoint move the horizontal center of the zoom left to 255 = maximum.

**Modifier 2:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint move the vertical center of the zoom down as you approach 0 = maximum. Values above the midpoint move the vertical center of the zoom up to 255 (100%) = maximum.

**Modifier 3:** The default DMX value of 128 (50%) = no adjustment. Values below the midpoint zoom in to the image centerpoint to 0 = maximum image size. Values above the midpoint zoom away from the image centerpoint to 255 = a minimum image size.

*NOTE: This effect is also available as a Visual Mode adjusted with 2 Modifier parameters, (see* **Zoom Blur** *on page 131.)*

Original Content



Modifier 1 parameter DMX = 128
Modifier 2 parameter DMX = 128
Modifier 3 parameter DMX = 255

# Chapter 14:

# Fixture Motion Functions

***This chapter describes mechanical movement control for DL.3 and DL.2 fixtures.***

## Pan and Tilt

DL.3 and DL.2 fixtures have a 400° pan range and a 240° tilt range. Two DMX channels for **Pan** and two for **Tilt** provide 16-bit position adjustment to a fraction of a degree.

MSpeed values can control the timing of pan and tilt motion for DL.3 and DL.2 fixtures, (see *MSpeed (Motor Speed)* on page 242). To control Pan and Tilt movement timing via a DMX controller crossfading, leave the Pan/Tilt MSpeed in its default Off setting.

***NOTE: DL.3 and DL.2 fixtures use optical encoders for pan and tilt to instantly correct the fixture's position if the fixture is jarred from its programmed position.***

***If a physical obstruction prevents the fixture from correcting its position, this correction feature "times out" to prevent wear on the motors.***

***If the fixture's position correction has timed out, remove the obstruction and home the fixture to return it to normal operation.***

## Dimmer

DL.3 and DL.2 fixtures have a mechanical iris located in front of the projector output lens that functions as a dimmer for the fixture's output. This feature gives the operator the ability to fully shutter the output and eliminate the residual luminance from video black. The **Dimmer** parameter controls the dimming iris adjustment from closed (DMX value = 0) to fully open (DMX value = 255).

## Focus

The **Focus** parameter controls the fixture's mechanical focus from near (DMX value = 0) to far (DMX value = 255).

## Zoom

This **Zoom** parameter controls the fixture's mechanical zoom from narrow (DMX value = 0) to wide (DMX value = 255).

# MSpeed (Motor Speed)

The **MSpeed** parameter adjusts the time required for a motor to complete movement when changing from one position to another. MSpeed provides a method for all motors to reach their target position at the same time, even though each motor may have different distances to travel. MSpeed movement is extremely smooth because the fixture controls movements independent of DMX refresh rates.

MSpeed times vary from 0.15 seconds to 252.7 seconds. In general, allowing the console to crossfade the pan and tilt values for a DL.3 or DL.2 fixture is acceptable. However, extremely slow movements may require the use of Mspeed instead of console crossfades. For a listing of exact MSpeed times, see “Appendix B: MSpeed Conversion Table”.

# Control Function Options

The **Control** parameter remotely initiates various fixture operations and allows access to the internal-projector menu controls.

## Fixture Operations

***NOTE: All of the following Fixture operation Control parameter settings (except for MSpeed Off), require the Dimmer be closed (DMX Value = 0).***

| DMX Value Range | Control Option Description |
|---|---|
| 10-13 | Disables Pan and Tilt MSpeed |
| 20-28 | Disables the LCD Display |
| 30-38 | Dims the LCD display |
| 40-48 | Enables the LCD display |
| 50-58 | Enables Preview Mode for the LCD display |
| 60-68 | Homes all the fixture mechanical functions |
| 80-88 | Manually turns the Lamp ON |
| 90-98 | Manually turns the Lamp OFF |
| 120-130 | Shuts down the fixture |
| 145-149 | Resets the Graphics Engine |
| 150-155 | Resets the Camera functions |
| 160-168 | Homes only the Pan and Tilt functions |
| 170-178 | Homes only the Focus, Zoom, and Dimmer components |

# Projector Control

## Control Parameter Projector Options

These **Control** parameter options remotely access and operate the internal projector's menu system.

| Control Option Description | |
|---|---|
| Displays the Projector's internal Menu System | |
| Projector Up arrow | ***NOTE: These options control the directional buttons on the projector menu display and cannot be activated until you set the Dimmer parameter to 0.*** |
| Projector Down arrow | |
| Projector Left arrow | |
| Projector Right arrow | |
| Store Menu selection | |
| ***The following options are always active and do not require the dimmer to be at zero*** | |
| Projector Floor Orientation | These commands activate the projector's setting for specific mounting or projection alternatives.<br>Once set, these commands maintain their value until reset even after shutdown and re-homing. For example, if the Control parameter is set to switch the unit to Ceiling orientation, then the unit will remain in Ceiling orientation until another command is sent to switch back to Floor. This allows the Control parameter to revert to another value without losing the orientation or mirroring status. |
| Projector Ceiling Orientation | |
| Projector Front Projection | |
| Projector Rear Projection | |
| Input from External RGBHV to Projector | Video input can be utilized with either RGBHV or VGA but not both. You can select between RGBHV and VGA in the menu system, (see *DMX_Control Screen* on page 30). RGBHV is the factory default.<br>Before using DMX to change DL.3 or DL.2 inputs, you must enable the **Projector Input by DMX** option in the menu system (see *Set_Projector Screen* on page 34) or through the CMA (see *DL.3 and DL.2 Media Server Configuration Options* on page 282).Once the selection is made, allow about 10 seconds for the change to take effect. |
| Graphics Engine to Projector | |
| Input from S-Video In (camera to Camera Out) to Graphics Engine | |
| Input from Camera to Graphics Engine (default) | |
| ***The following options require the dimmer to be at zero*** | |
| Lens Shift Engaged | Mechanically offsets the projector lens 107% vertically ***(available for DL.3 fixtures only).*** |
| Lens Shift Off | Centers the image on the fixture ***(available for DL.3 fixtures only).*** |
| ***The following options do not require the dimmer to be at zero*** | |
| SDI Output mode | Routes the internal camera feed to the SDI card for output to another DL.3 fixture for projection after the **Input from Camera to Graphics Engine** has been selected. |
| SDI Input mode | Routes the SDI input to the capture card. |

**CAUTION:**
**Do not physically connect both the VGA and the RGBHV connectors at the same time. Doing so can damage the projector and void the warranty.**

## Using the Internal Projector's Menu

To use the native projector menu system under DMX control:

1. Set the Dimmer parameter DMX value to zero.
2. Set the Control parameter DMX value to 182. This will access the projector's main menu.
3. Next, change the DMX value of the Control panel to zero. This command is equivalent to releasing the key on the projector's keypad. *Failure to release the key will result in unpredictable performance.*

   *Optional*. If the projector is mounted on the ceiling, flip the display by selecting a Control parameter DMX value from 209-212.
4. Set the Dimmer parameter DMX value to 255 (100%) to view the projector menu's on-screen display.
5. Adjust the Zoom and Focus parameters to bring the display into focus. Now the control parameter's *Projector Floor Orientation, Projector Ceiling Orientation, Projector Front Projection and Projector Rear Projection* commands map to the Projector's menu control buttons.
6. Use the projector's on-screen display as discussed in the projector's user manual that shipped with your DL.3 fixture.

# Chapter 15:

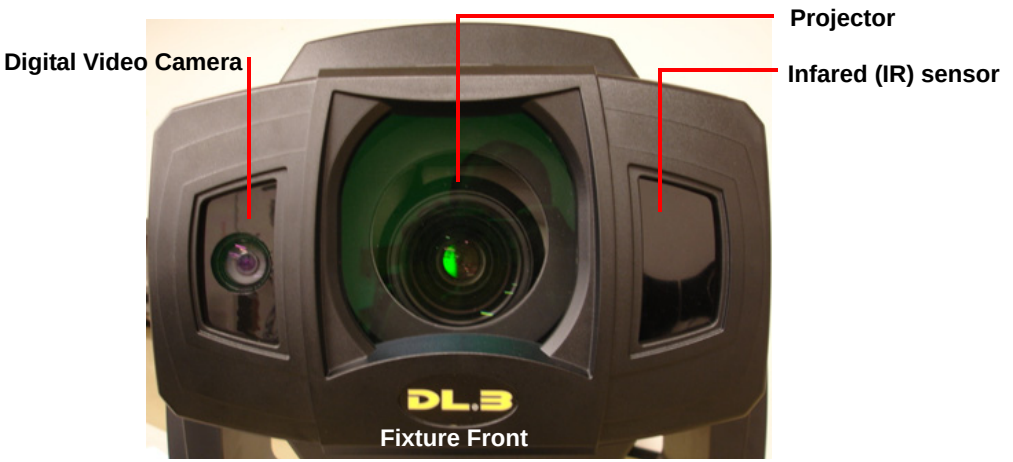
# Live Video Input and Control

***The graphics engine in a DL.3 fixture can receive video from an external source or its own integrated digital video camera equipped with an infared illuminator to provide a direct digital video feed option. The features described in this chapter are not available on the DL.3F model.***

## Live Video Sources

### Internal Camera

Every DL.3 is equipped with a internal video camera and IR illuminator capable of capturing live video even in blackout conditions.




The camera is mounted on the front of the unit near the projector iris to point wherever the fixture is directed.

All of the camera functions can be controlled via a DMX console (see *Controlling the Internal Camera Input* on page 249).

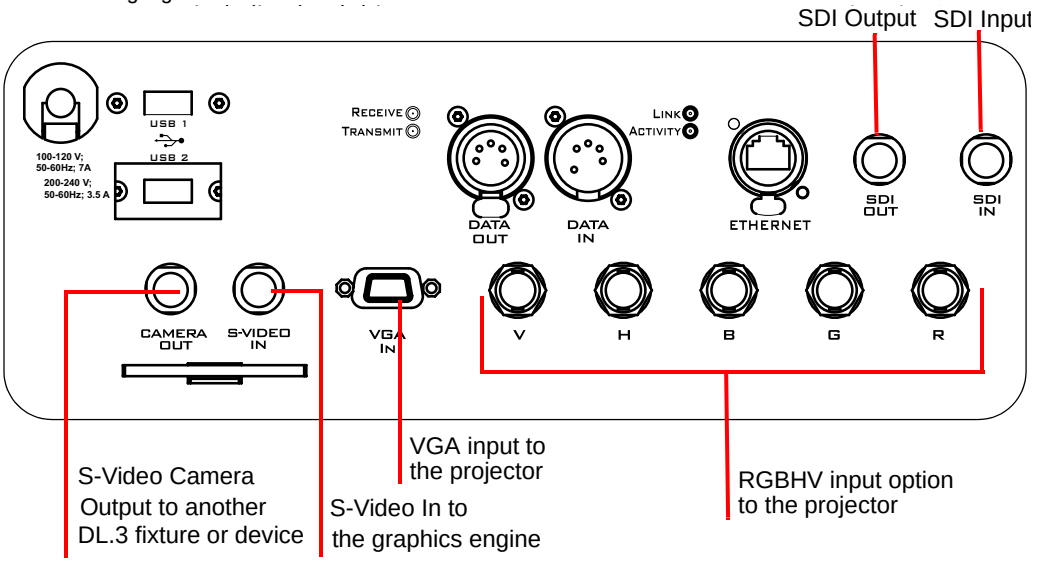
### Other Video Sources

A DL.3 fixture can also project other live video sources connected to the fixture's SDI, RGBHV, or S-Video input ports. Live SDI or S-Video input can then be enhanced and manipulated by the graphics engine. Video input via RGBHV bypasses the internal graphics engine and is projected without change.

***NOTE: You can configure the graphics engine to capture video from an external source or the internal camera but not from both at the same time.***

# Live Video Connection Options

The DL.3 fixture has video connectors for RGBHV, VGA and S-Video on its rear panel, as shown in the following figure.




**CAUTION:**
**To avoid damaging the fixture and voiding the warranty, do not physically connect to the RGBHV and VGA inputs at the same time.**

# Configuring the Video Input Source

## S-Video

DL.3 fixtures support multiple SVideo formats including:

| | | | | |
|---|---|---|---|---|
| NTSC_M | PAL_B | PAL_H | SECAM_B | SECAM_K |
| NTSC_MJ | PAL_D | PAL_I | SECAM_D | SECAM_K1 |
| | PAL_G | PAL_M | SECAM_G | SECAM_L |
| | | PAL_N | SECAM_H | SECAM_L1 |

You will need to configure the DL.3 fixture to identify a video input source. You can choose between S-Video and SDI in one of the following ways:

- Manually using the DL.3 menu system (see information about the *Projector Input* field on the *Set_I/O Screen* on page 35.)
- Remotely through the CMA (see *DL.3 and DL.2 Media Server Configuration Options* on page 282).
- Via the DMX console commands (see *Projector Control* on page 243).

***NOTE: The integrated camera provides an NTSC_M video signal.***

## Serial Digital Interface (SDI)

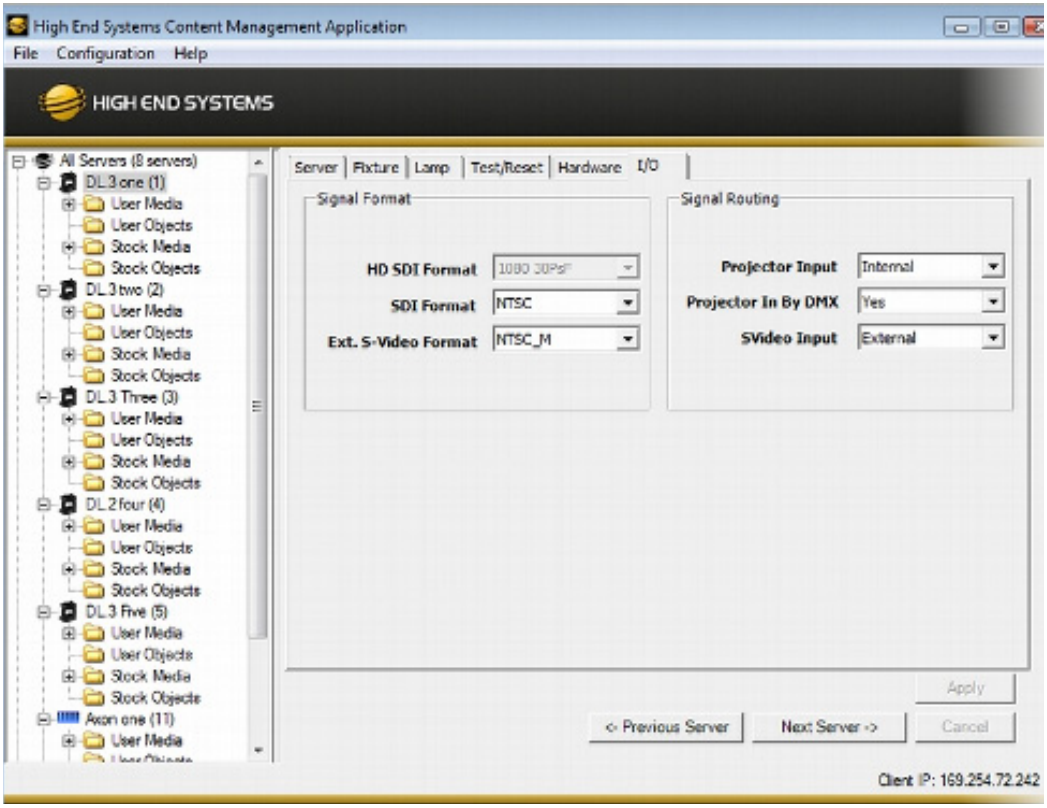
SDI capture is another option for input and output to the graphics engine.

NTSC and PAL formats are available for Standard Definition SDI capture. There is no support for SECAM.

High Definition SDI capture accepts the following formats:

| | | |
|---|---|---|
| NTSC_M | 1080 30PsF | 720 60p |
| NTSC_MJ | 1080 29.97PsF | 720 59.94p |
| | 1080 25PsF | 720p |
| | 1080 24PsF | |
| | 1080 23.97PsF | |

Select a format from the Signal Format fields under the IO tab in the CMAs configuration view and then click the Apply button to change to the new setting.




***NOTE:*** ***Unlike S-video format selection, a reboot is not required to change the SDI format selection. Changes to the SDI format take place instantly on the DL.3 fixture.***

## Displaying Live Video

When Media Folder 255 is selected, the video capture DMX assignments are as follows.

DMX = 1 SVideo source 1

DMX = 2 Standard definition SDI source 1

DMX = 3 SVideo source 2

DMX = 4 Standard definition SDI source 2

DMX = 5 High definition SDI source 1

DMX = 6 High definition SDI source 2

DMX = 7 High definition SDI source 3

DMX = 8 High definition SDI source 4

For a DL fixture with a standard definition SDI card installed, svideo capture will be at DMX = 1 and SDI video capture will be at DMX = 2. For a DL fixture with an high definition SDI card installed, svideo capture will be at DMX = 1 and SDI video capture will be at DMX = 5.

A DL.3 fixture can both capture SDI (accept external SDI feeds) and also output its camera through SDI. There are two separate ports on the DL.3 back panel.

***NOTE: A DL.3 fixture cannot capture SDI and output its own camera feed through SDI simultaneously. So, unlike the S-video capture, it cannot be displaying the SDI feed of another fixture while outputting its own camera through SDI.***

To switch between SDI in and SDI out, access the Motion Control parameters through your DMX console. The iris does not have to be closed for the switch to happen. See *Chapter 14: Fixture Motion Functions* and *Appendix A: DMX Protocol* for more detailed information.

Note the following when using the SDI video input and output option:

- While capturing SDI, anything that is being fed to the “In” SDI port will be mirrored on the “Out” port. Therefore, it is possible to daisy chain fixtures together via SDI, allowing multiple DL.3s to have the same SDI feed without a switcher/splitter device.
- In order for the DL.3 to output its camera through SDI, the S-video relays must be set to internal camera capture (otherwise known as camera feedback). This is necessary because the S-video signal must be routed to the computer.
- The “frame delay” on the SDI capture is nearly identical to that of the S-video capture. The difference cannot be seen with the naked eye.
- It is possible for a unit to have both SDI and S-video inputs coming in at the same time.

## Sending the Camera Feed to S-Video Camera Out

The factory default assigns the video feed from the internal camera to the graphics engine. However, a DL.3 fixture can be configured to route the camera video feed to the Camera Out connector by setting the Control Parameter to a DMX value between 229-232.

*NOTE: You can route the internal camera video feed to either the graphic engine or the camera out connector, but not to both at the same time.*

*This setting will be retained until you change it or restore the factory defaults.*

## Controlling the Internal Camera Input

Several parameters allow you to control and apply effects to the Internal camera input.

### Camera Zoom

The **Camera Zoom** parameter uses two DMX channels to provide 16-bit control of the camera's zoom function. This includes an 18× optical and 12× digital zoom for a total of 216× combined zoom range. You can adjust the Camera Zoom parameter from In (DMX value = 0) to Out (DMX value = 65535)

### Camera Focus

The **Camera Focus** parameter uses two DMX channels to provide 16-bit control of the camera's focus function. Auto focus for the camera is active when DMX values = 0–511. The camera focus can also be manually adjusted from In (Far End) DMX value = 512 to Out (Near End) DMX value = 65535.

### IR Illuminator

The DL.3 fixture is equipped with an illuminator that can output infrared (IR) light. The **IR Illuminator** parameter controls both the IR illuminator output and the camera's infrared sensing option. DMX values = 0 – 63 turn the illuminator off and set the camera to sense the visible light spectrum. From DMX values = 64–127, the illuminator remains off, but the camera's Auto IR function is ON, detecting ambient infrared light in the environment. The rest of the DMX range turns the Auto adjustment off and adjusts the amount of IR illuminator output from FULL (DMX value = 128) to OFF (DMX value = 255).

### Camera Shutter

The DL.3 fixture's internal camera can create slow-motion and choppy-frame effects using the camera shutter options. The **Camera Shutter** parameter controls the camera shutter providing six steps of frame rate control from 1 to 30 frames/second. DMX values = 0 – 63 set Full Auto Exposure and is the suggested default option.

## White Balance Mode

The **White Balance Mode** parameter adjusts for variation in what is perceived as “White” in different light conditions. The Auto White Balance mode computes the white balance value output using color information from the entire image. It outputs the proper value using the color temperature on a range of values from 3000 to 7500K and is the suggested default setting. Other settings for this parameter accommodate Indoor and Outdoor lighting conditions.

## Orientation

The **Camera Orientation** parameter can Vertically Invert (Flip) or Horizontally Invert (Mirror) the camera’s image being viewed by the camera. All four combinations of Vertical and Horizontal Invert are available.

## Camera Effects

The **Camera Effects** parameter provides several options for manipulating the camera’s image. This parameter provides the ability to convert the camera’s image to black and white (B&W), or invert the color (Negative art). A snapshot can also be taken of the camera’s image (Freeze Frame) with or without one of these effects applied.

# Chapter 16:

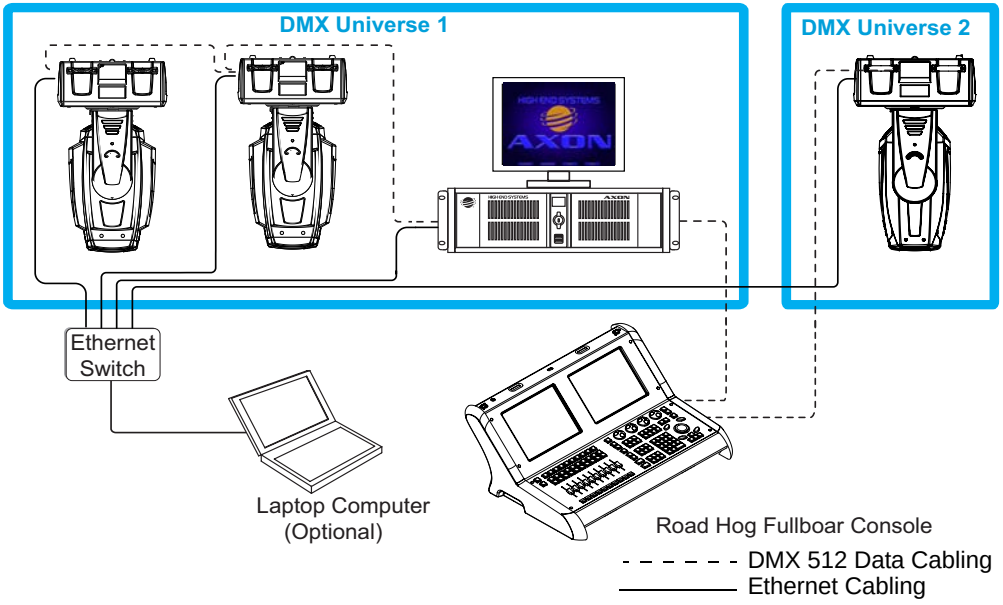
# Content Management Application (CMA)

***A Content Management Application (CMA) running on an Axon media server or a computer connected through an Ethernet network gives you remote control of content, software and configuration management functions.***

The CMA software that shipped on CD with your DL.3, DL.2 or Axon media server is used to:

- Upload and download custom digital content to fixtures
- Configure units to use in a DMX environment
- Update software for multiple units

The CMA can access all media servers connected to the same Ethernet network.




***NOTE: If you are using a DMX console and other automated lighting products compatible with Art-Net, this network can also serve as the link for DMX control.***

# Launching the CMA

## Installing the CMA on Your Computer

You can download the latest version of the application from the Digital Lighting support section of the High End Systems website www.highend.com/support/digital_lighting/. A download wizard simplifies installation on your personal computer.

The following are the recommended software requirements for running the CMA:

- Windows XP, Vista, Windows 7 (32 and 64 bit) or Mac OS 10.6 or later
- Microsoft .Net 2
- 100/1000 base Ethernet card (a Gigabit Ethernet card is recommended for fast content uploading of large files)

To automatically install the CMA on your computer's hard drive, insert the CD that shipped with your media server.

***NOTE:*** ***If you are running Windows OS and the CMA doesn't automatically install, navigate to the CMA.msi file in your windows browser and double click to install the CMA.***

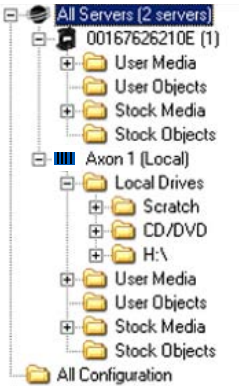
Once the CMA is installed, double clicking on the application icon will launch it and display the CMA Client Window.

## Launching the CMA on Axon

Axon media servers can launch the CMA locally. When you start Axon, the local monitor will display a desktop that gives you access to the CMA.

***NOTE: An active display device must be attached to both DVI ports before booting up the system. When only one port is connected, it defaults to display the graphics engine output and will not display the CMA screen.***

Press the **Launch CMA** button on the local desktop. The application automatically finds and identifies the **Local Drives** including any connected USB drives, the CD/DVD drive as well as other Axon, DL.3 and DL.2 media servers connected to the same Ethernet network.




***NOTE: The Axon server supports an onboard DVD drive you can use for copying content into an Axon Server as well as burning User content onto DVD/CD.***

# Auto Discovery

When a DL.3, DL.2 fixture or Axon media server is connected to an ethernet network, it sends out “Discovery” messages. These messages are received by other media servers on the link as well as the CMA software. The messages contain information that allows the media servers to communicate with each other, and the CMA to communicate with all the units on the network.

The CMA window will display the IP Address, Fixture ID, the Media Server software version and the server model. Fixtures derive their IP addresses through a router or automatic IP assignment.

## Fixture Identification

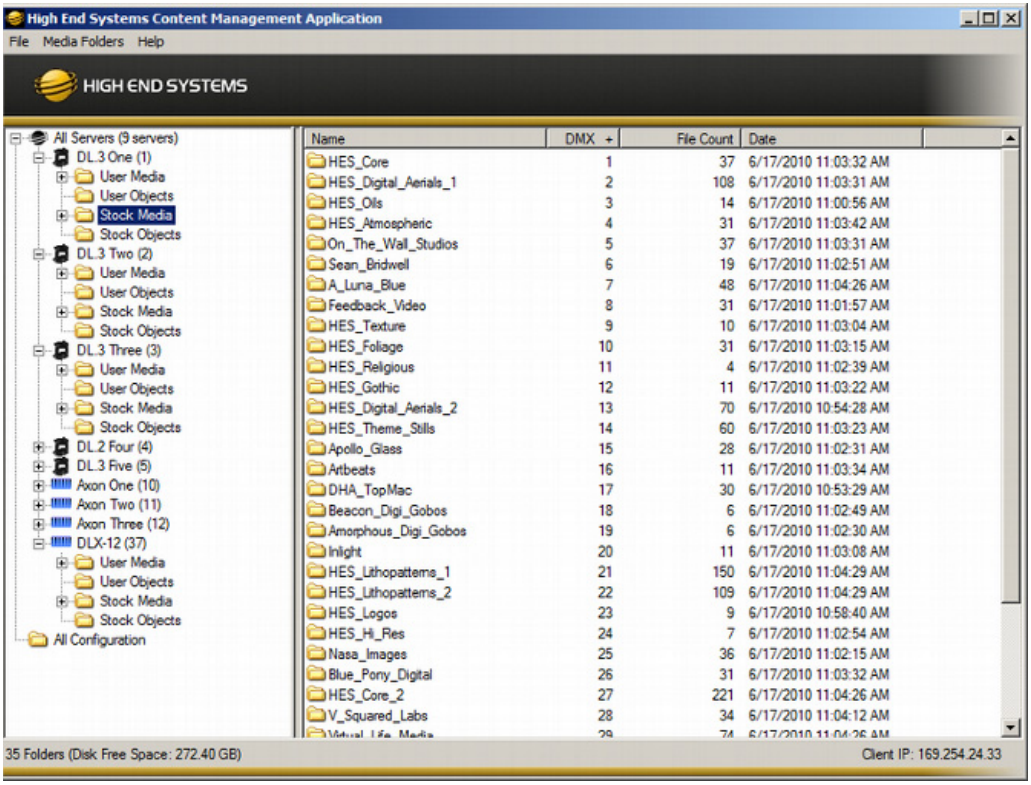
The Fixture ID is a unique number used in the control protocol to identify specific fixtures for sychronization functions. For more information on Sychronization content playback, see *Chapter 10: Graphic Functions: Synchronizing Content* on page 111.

***NOTE: To ensure that sychronization works properly, each DL.3, DL.2 or Axon media server should be assigned a unique fixture ID.***

# The CMA Client Window

The CMA Client Window provides views of the content and configuration for all DL.3, DL.2 and Axon servers connected to the Ethernet network in the Left pane. Information is displayed in the right pane for any item selected. Access options through the menus at the top of the window or by right clicking in the right pane.

***NOTE: You cannot drag folders or files between the left and right panes of the CMA window.***

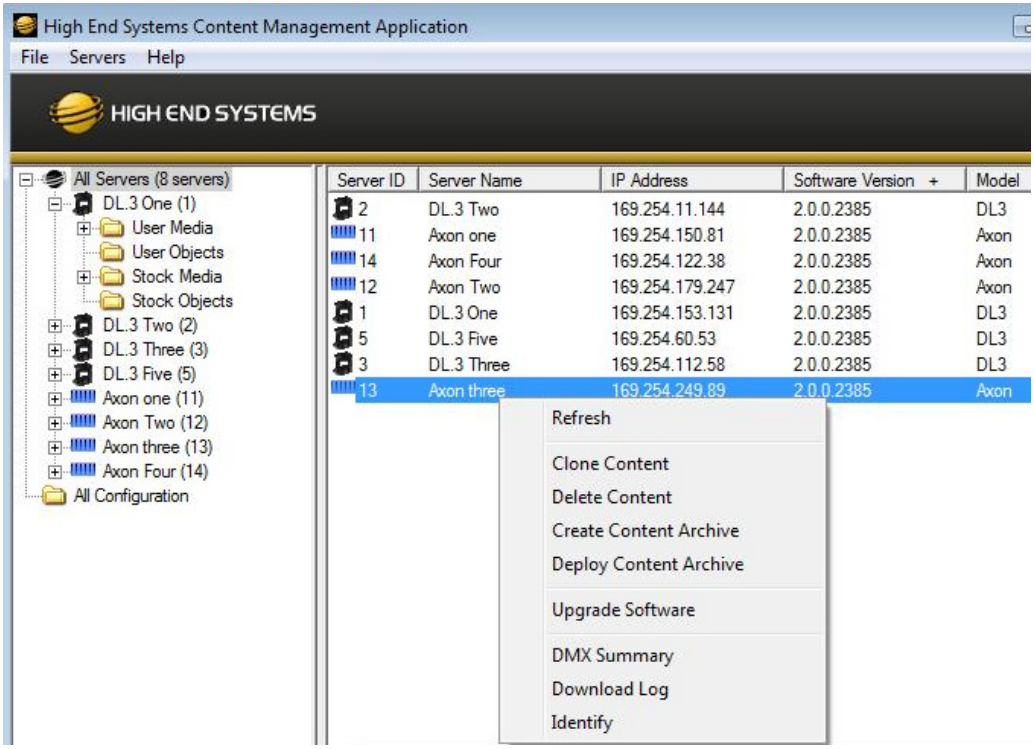



A **Status Bar** at the bottom of the page, indicates the number of files or folders in a selected folder in the left pane, as well as free space on the local computer hard drive and its IP address.

## Viewing Server Identification Information

Selecting the **All Server** view displays all the Digital Light fixtures and Axon servers on the fixture network. In the following example, six servers have been identified on the network. The right pane contains the following details in a table format.

- **Server ID** number defaults to 1, but can be configured in the CMA or in the DL.3 or DL.2 fixture's Menu system
- **Server Name** is a name you assign to a Digital Light fixture or Axon server
- **IP Address** is assigned to that unit by the router or Auto IP
- **Software Version** Number
- **Model** identifies the media server as a DL.3, DL.2 or Axon




***NOTE: Clicking in a column heading sorts the table according to the values in that column.***

In the **All Server** view, the drop down **Servers** menu or right clicking to select a server in the right pane gives you the these options:

- **Refresh** the screen.
- **Clone Content** replicates the server's user content to one or more other servers on the network, *(see page 273)*.

- **Delete Content** removes all the user content from the server.
- **Create Content Archive** lets you back up all the server's user content to a compressed file, *(see page 272)*.
- **Deploy Content Archive** restores user content to the server from the backup, *(see page 272)*.
- **Upgrade Software** allows you to upgrade fixture software. For more information on upgrade options, see *Upgrading Software* on page 276.
- **DMX Summary** provides a web-based summary of a server's content in a table format.
- **Download Log** provides useful troubleshooting information to Customer Service if needed.
- **Identify** will cause a fixture to strobe, so you can find it in the rig.

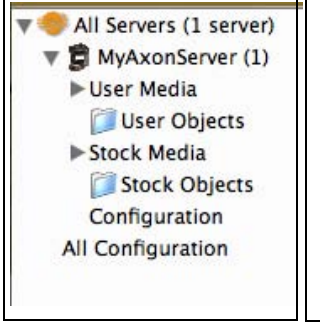
## Content Organization

The media server on each fixture has a file system that holds the movies, images, and 3-D objects that make up the content that the server uses.

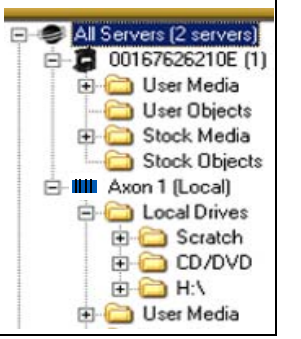
These files, folders, and their DMX values are collectively known as the "Content" on the media server.

The CMA Client Window organizes and identifies content by source (preloaded Stock content or custom User content) and type (Media files or 3-D Object files).

Mac OS




Windows OS



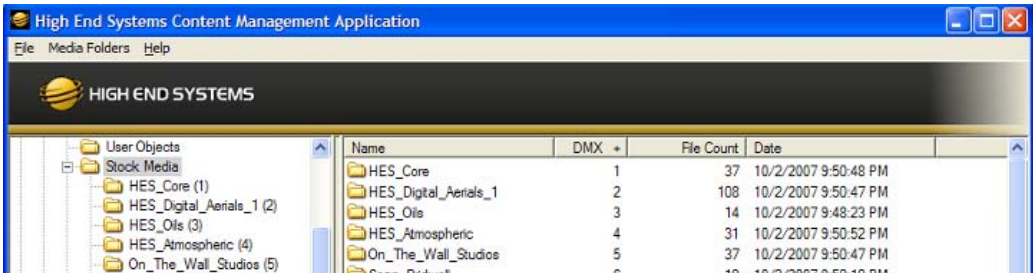

***NOTE:*** ***Tree structure differs slightly on the two platform versions. In the Mac version, to access Server Configuration information for an individual server, select the Configuration option under the individual server. In Windows Explorer, configuration information for the server is located directly by selecting the server.***

### Preloaded Stock Content

A large library of **Stock Media** and **Stock Objects** ships on every DL.3, DL.2 or Axon media server and will also be provided through upgrades from High End Systems.

***NOTE:*** ***The DL.3 fixture ships with an additional 400+ files of media content, many in higher resolution.***

This content is read only. You won't be able to download, edit the DMX values or remove these files from the fixture.




## Custom User Content

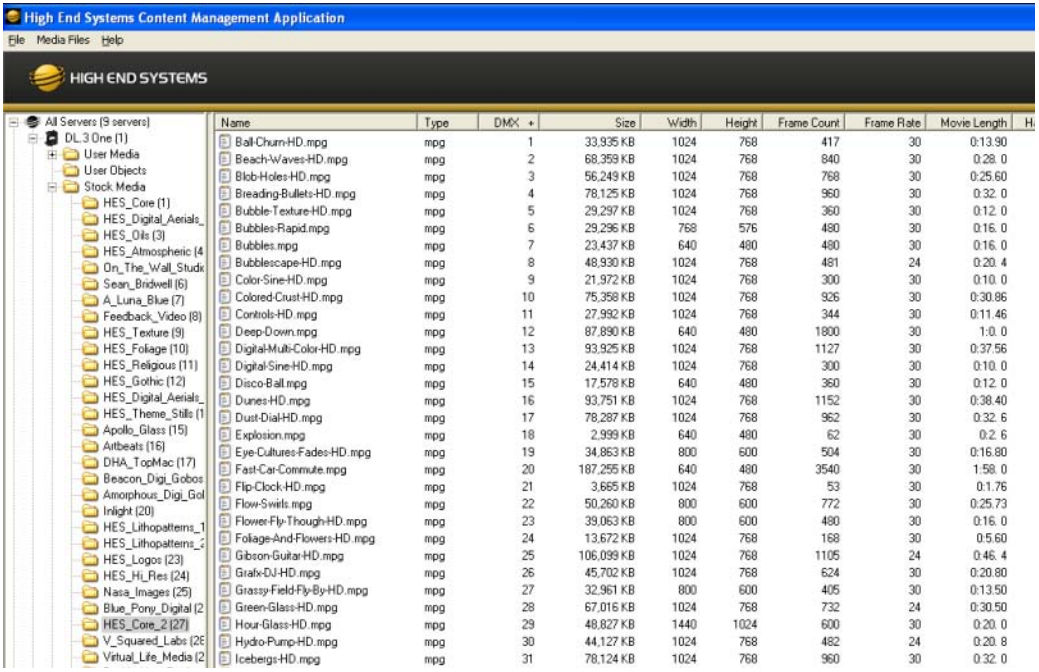
You can create your own custom User Media and User Objects content, and upload it to media servers. The Stock Content and User Content reside in separate folders. The High End Systems Digital Lighting Community (forums.highend.com) is a resource for tips and techniques on creating User Content. See *Custom User Content* on page 357 for basic considerations in developing your own content for Axon or Digital Light media servers.

## Media Files

Inside **User Image** and **Stock Image** folders are Library folders containing collections of media files. Media files can be still images or video clips in one of the following formats:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| .jpg | .gif | .png | .bmp | .mpv | .m1v | .mpg | .m2v |

***NOTE: Axon and Digital Light media servers supports .jpg formatted using RGB color. CMYK color files are not currently supported.***




The stock media files provided by High End Systems have been compressed and optimized for reliable and smooth playback from DL.3, DL.2 and Axon media servers. Each file and folder has an associated DMX value. These values are fixed for Stock Content but must be assigned for all user created content. See *Assigning DMX Values to User Content* on page 262 for more information.

## Object Files

Object files are the 3-D object component files used to build a graphic image. DL.3, DL.2 and Axon protocol supports a combined total of 255 object files displayed in **Stock Objects** and **User Objects** folders. As with **Stock Media** files, the **Stock Objects** have a fixed DMX value and cannot be edited. A user-created object file must be assigned a unique DMX value between 150-255.

## Viewing Server Configuration Data

Selecting an individual server from the list in the left pane displays all the configuration values for that server in the right pane. Selecting **All Configuration** displays the combined configuration values for all the servers on the network. For more information on server configuration, see *Viewing Server Configuration* on page 278.

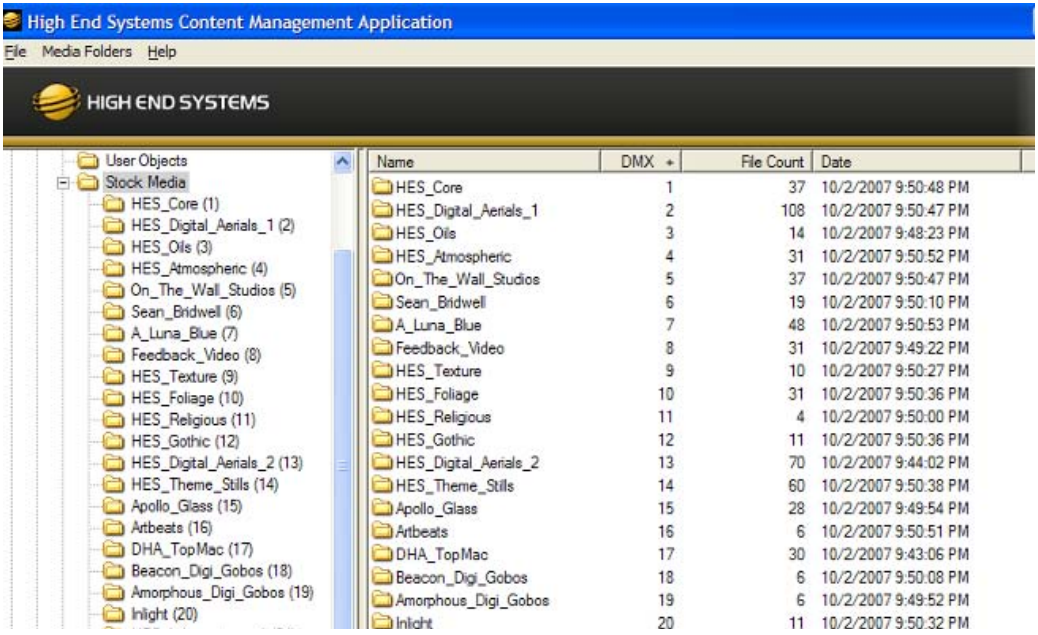
**Mac OS X: Viewing Server Configuration**

**To access Server Configuration information for an individual server, select the Configuration option under the individual server.**

## Viewing Content

You can view information about media folders and files within each folder in a table format.

***NOTE: Clicking on a column heading sorts the table according to the values in that column.***

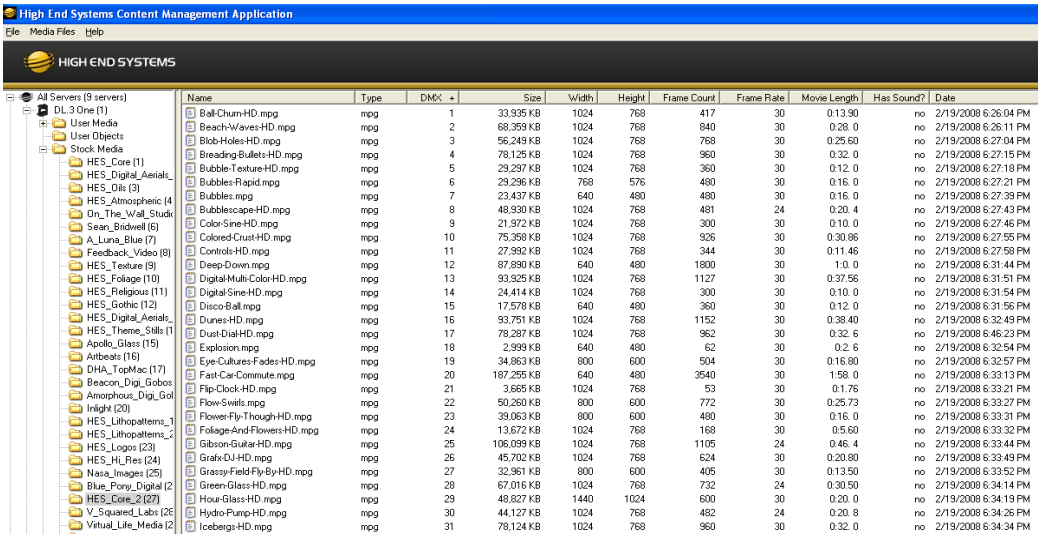



### Viewing Folders

- **Name** of the Media File collection. This value is editable for User content. See *Naming and Deleting User Content Files and Folders* on page 262.
- **DMX** is the currently assigned DMX value for the folder. This value can be auto-assigned and edited for User content. See *Editing User Content DMX Values* on page 263.
- **File Count** of files in this collection
- **Date** the folder was last modified

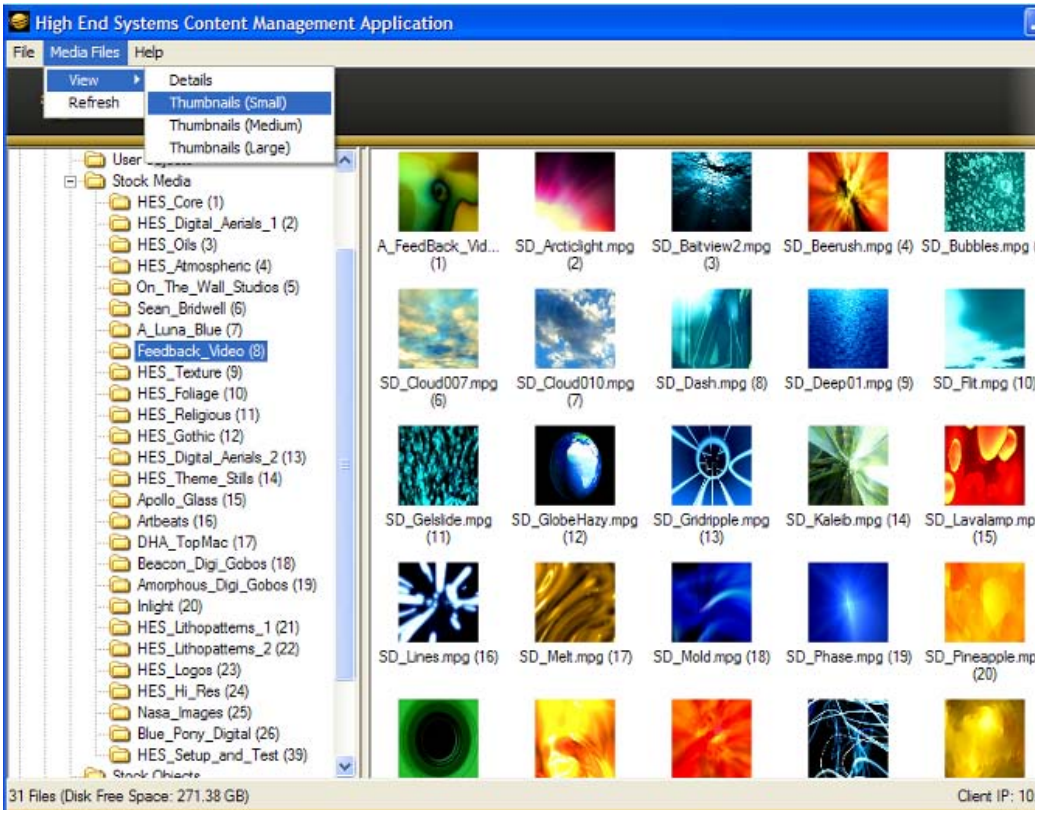
## Viewing Files

Double clicking on a media folder in the left pane reveals information about its content files.




- **Name** of the file. This value is editable for User content. See *Naming and Deleting User Content Files and Folders* on page 262.
- **Type** indicates the file format extension
- **DMX** is the currently assigned DMX value for the folder. This value can be auto-assigned and edited for User content. See *Assigning DMX Values to User Content* on page 262.
- **Size** of file in kilobytes
- **Width** in pixels
- **Height** in pixels
- **Frame Count**
- **Frame Rate** in frames per second
- Movie Length in hr.min.sec
- **Has Sound?** - Indicates whether or not the movie file has sound data encoded into it. This should always say “no” if the content is encoded correctly.
- **Date** the file was last modified

You can access several options for displaying files in the right pane through the drop down menu or by right clicking in the right pane when files are being displayed.



# Managing User Content

All Stock and User content can be viewed and refreshed but you have additional control over other aspects of your custom content. Within the CMA Client Window, you can:

- Rename user files and folders
- Delete files and folders
- Control DMX value assignment to files and folders
- Move files and folders between your local drive and a media server.

## Naming and Deleting User Content Files and Folders

You can **Rename** any user content folder or file displayed in the right pane of the CMA window using the pull down **Media Folders** or **Objects** menu or with a right click selection. Use the standard Windows operating system naming conventions.

You can **Delete** any user content folder or file displayed in the right pane of the CMA window using the pull down **Media Folders** or **Objects** menu or with a right click selection.

***NOTE: You cannot Delete a movie if the media server is playing it.***

## Assigning DMX Values to User Content

The DMX Value associated with each file and folder makes it easy to use the DMX control protocol to identify a unique media file or object.

There are up to 240 Media file folders with each capable of containing up to 255 image or movie media files. This gives a theoretical total of 61,200 possible locations for Media image or movie files. There is one DMX parameter used to identify a object so 255 DMX values are available between the Stock and User Content to identify objects.

### Assigning DMX Values Automatically

The CMA can automatically assign a unique DMX value to any file or folder that does not already have a value. This automated assignment is based on alphabetically sorting the existing file/folder names, and assigning each item a unique consecutive integer.

To automatically assign DMX values to a single file or folder with user content:

1. Display the User content folder or file in the right pane of the CMA Window
2. Select **AutoSet DMX** from either the **Media Files** folder or **Objects** drop down menu or the right click popup list. The CMA will assign a valid DMX value to the file or the folder.

You can automatically assign DMX values to all folders at once or to all the files within a folder at once. You cannot set both files and folder values at the same time. To automatically assign DMX values to all the User content folders or all files within a User content folder:

1. Display the User content folders or the files for a single folder in the right pane of the Content Management window and deselect all files or folders.
2. Select **Autoset All DMX** from either the **Media Folders** or **Objects** drop down menu or the right click popup list. The CMA will assign a valid DMX value to all selected files or folders.

Using the same steps, you can also **Reset DMX** for a single file or folder or **Reset All DMX** for all display files or folders displayed in the right pane to zero.

## Editing User Content DMX Values

You can manually assign any valid DMX value to your files or folders by selecting the file or folder in the right pane and then, using the pull down menu or the right click popup, selecting **Edit DMX**. A dialog box will allow you to input the DMX value. If it is a valid value from 0-255, the CMA will change the DMX value displayed for the file or folder.

## Valid DMX Values

Certain DMX values are **Reserved** for special purposes and are not user assignable. You can change the assigned DMX value for a User Content item to another valid DMX value. A valid DMX value is:

- From 0-255
- Is not one of the reserved values for that type of content
- Is unique from other content of its type except for zero

The following table shows valid and reserved values for User Content.

| Content Type | DMX Values | Description | Reserved ? |
|---|---|---|---|
| Media Folders (media file collections) | 0 | No Selection | No |
| | 1-40 | Default Stock media | Yes |
| | 41-239 | User collections | No |
| | 240-254 | Reserved | Yes |
| | 255 | Internal Camera video feed | Yes |
| Media Files | 0 | No Selection | No |
| | 1-255 | Media files | No |
| Objects | 0 | No selection | No |
| | 1-149 | Stock Objects | Yes |
| | 150-255 | User Objects | No |

## Moving User Content Files and Folders

User content can be easily moved between fixtures or between your local drive and fixtures. Which method you use depends on:

- How much content you want to move
- What existing server content you want to preserve
- Whether the client machine is currently connected to the Ethernet fixture link
- If you want to maintain currently assigned content identification DMX values
- Which CMA version you are using (Windows or Mac OS)

There are several methods for moving User content files and media folders between media servers to your local drive:

- Drag and Drop
- Copy and Paste commands
- Cloning transfers the User Content files and their DMX value assignments from one media server to one or more server(s) on the fixture network.
- Creating a Content Archive
- Deploying a Content Archive

Use the following table to determine the best method for your situation.

| Fixture Network File-Transfer Method | Transfer Type | | | Notes |
|---|---|---|---|---|
| | From Server to Client Machine | From Client Machine to Server(s) | Between Networked Server(s) | |
| Drag and Drop | Yes | Yes, if format is valid for the destination folder | No | Does NOT preserve DMX Values |
| Copy and Paste commands | Yes | Yes | No | |
| Clone | No | No | Yes | Preserves DMX values and Replaces any previous User Content on destination drive |
| Deploying a Content Archive | No | Yes | No | |
| Creating a Content Archive | Yes | No | No | Saves assigned DMX values when creating archive from content on a fixture |

## Downloading Content from a Media Server to Your Local Drive

The CMA supports downloading User content files or folders from a media server to your local drive. To download a file or folder of User Content:

1. Display the Folder or File that you wish to move in the right pane of the CMA window
2. If the destination for the file on your local drive is visible, you can simply drag and drop the folder or file to that location or an external drive connected to your computer.

   OR
3. Select **Copy** from the **Media Files** or **Objects** drop down menu or the right click popup list.
4. Browse to the destination on your hard drive; then select **Paste** from the **Media Files** or **Objects** drop down menu or the right click popup list.

**Mac OS X: Downloading files**

**You can drag single or multiple files and folders from a fixture to the Finder.**

**You can use the copy/paste (Apple-C, Apple-V) to move multiple files from a fixture to the Finder.**

**Mac OS X: File transfer**

**SMB limitation is 4GB file size per transfer. What this means is more than 4GB of data may be transferred, but no file can be greater than 4GB in size.**

# Uploading Content from Your Local Drive to a Media Server

You can upload User Content Media files, Media folders and Object files from your hard drive to a DL.3, DL.2 or Axon media server, provided they are:

- A valid file format (.jpg, .gif, .png, .bmp, .mpg, .m2v for Media Files; .x for Object files)
- You are uploading them to the appropriate User content folder on the media server
- They have been encoded correctly

To upload content:

1. Display the file or folder destination in the right pane of the CMA window
2. Browse to the file or folder you want to upload on your hard drive and click on it to select.
3. Drag and drop it into the appropriate User content folder

   **OR**
4. Select **Copy** from the **Edit** drop down menu or the right click popup list.
5. Select **Paste** from the **Media Files** or **Objects** drop down menu or the right click popup list.

As files are uploaded to fixtures, the User interface displays progress information and notifies the user of any naming conflicts in renamed files or encoding problems.

## Content Scanning

Incorrectly encoded content can cause issues with playback performance, network synchronization, and graphics engine stability. To prevent this, the CMA automatically scans content locally on your computer (or the Axon media server) before actually loading it. If no warnings or errors are found, the content is loaded on to the server. If warnings or errors are found, a dialog box describes specific content problems.

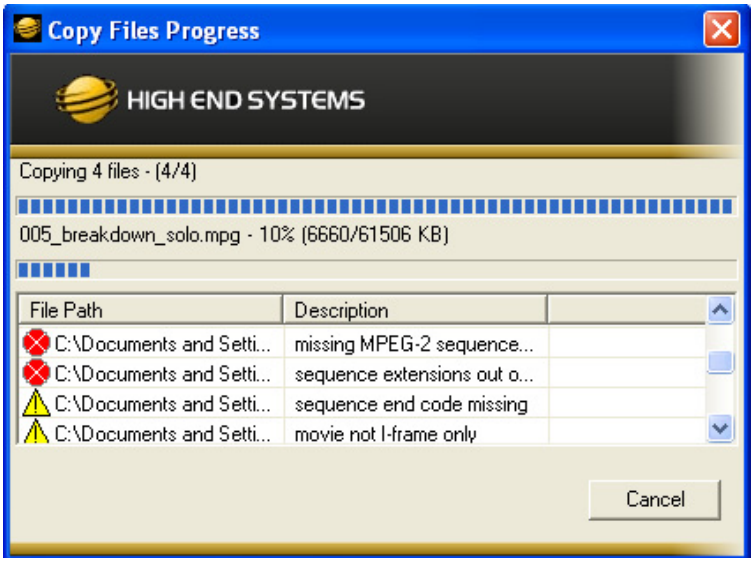
**Warnings** are problems that will potentially cause issues with playback of the media on the fixture, but won't affect graphics engine stability. An example would be a movie not being encoded with all I-frames or not having an End-of-Sequence header. The CMA will allow these files to be loaded on to the server, but it will alert you to potential issues by displaying the warnings in a dialog.

**Errors** are more serious problems with content that can create severe stability issues in media server software; for example, content encoded as the wrong type of stream (Transport Stream instead of an Elementary Stream). Errors are caused when content does not adhere to the MPEG2 encoding standard. When an error is found, the CMA will not allow this content to be loaded on to a server at all. A dialog will describe the issue, and after dismissing the dialog, you will find the specific file has not been loaded onto the server.

## CMA Interaction

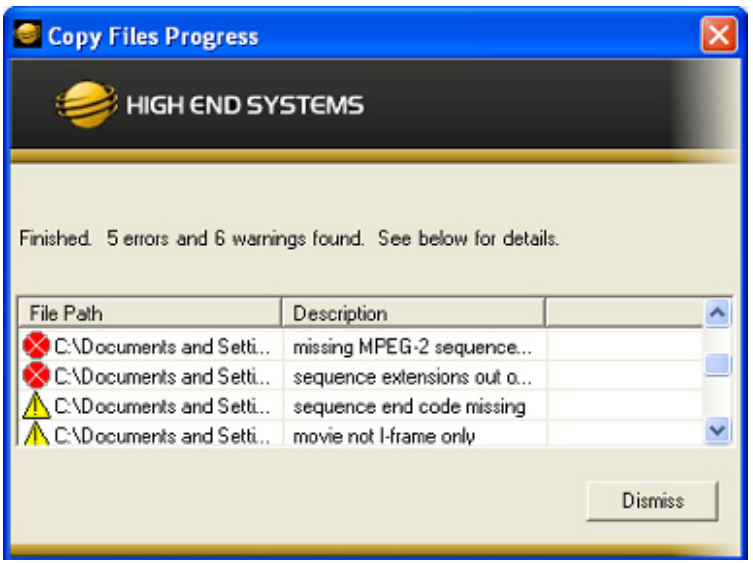
When you drag a content file (or folder) on to a server, a dialog shows the progress of the file copy process. If there is nothing wrong with the content, it copies to the fixture.

If warnings or errors are found, the CMA compiles the list of issues in the bottom half of the *Copy Files Progress* dialog.

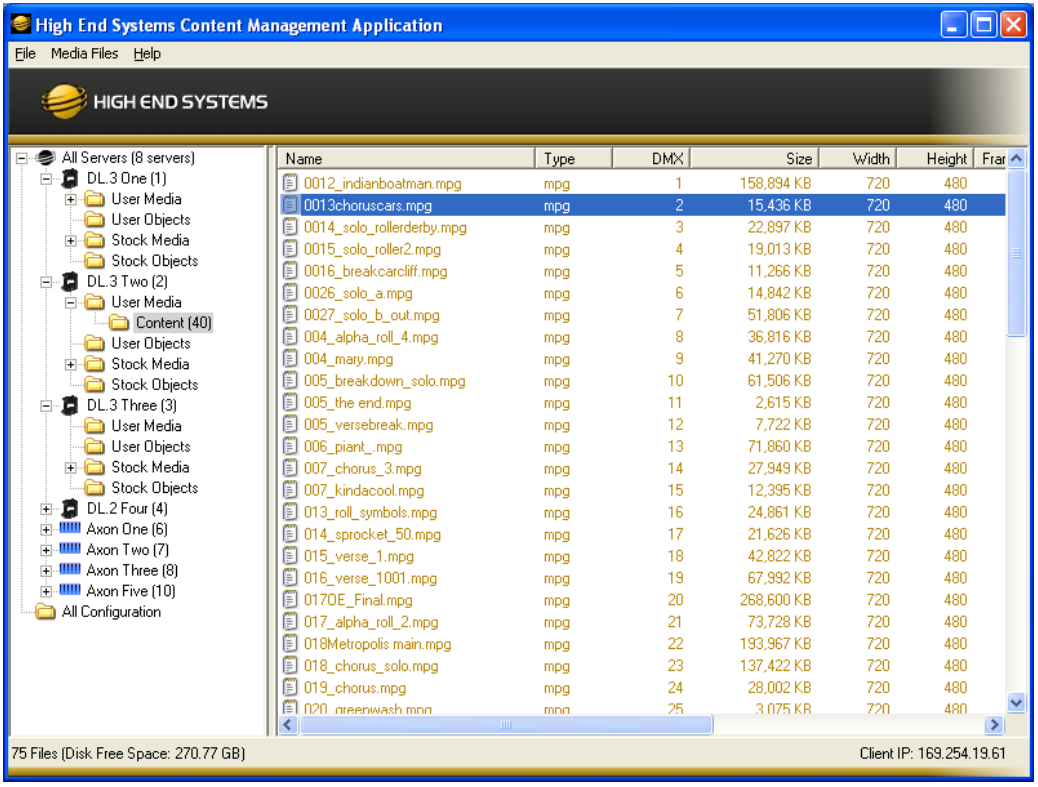



***NOTE:*** ***Since the CMA executes the scanning/copying process for the entire group of folders/files in a single operation, it will not stop or pause during the process to dismiss the errors.***

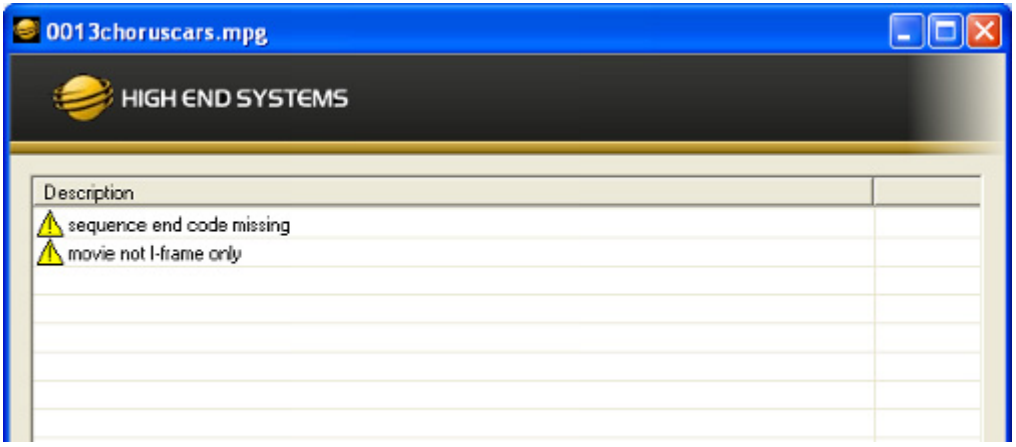
After the process has finished, the dialog will indicate the number of issues that it found and a listing of the affected files. After viewing the list, click on the **Dismiss** button to continue working with CMA.



The files with errors in a group of files will not be copied on to the server. Files with warnings will be copied. They will show up highlighted in yellow when viewed in the “Details” view in the CMA to indicate to the user that this file is problematic.




Double-clicking on the highlighted file will bring up another dialog describing the identified file error.



### Content Loaded Prior to Version 1.5

Any content that was loaded prior to 1.5.0 will be scanned on the first boot of the server. Any files with warnings will be highlighted in yellow, and files with errors will be highlighted in red and automatically have their DMX address reset. This is done to ensure you are aware that content on the fixture is problematic and needs to be corrected.

### Warnings

| Warning Message | Description/Cause |
|---|---|
| Unknown start codes detected | User defined start codes encountered. Not all features of the bitstream may be available for playback. May effect playback performance. |
| Sequence end code missing | All MPEG video streams must end with a sequence end code. The absence of the sequence end code will not prevent playback, but could impact looping and seeking performance. |
| MPEG-1 movie detected | Bitstream is an MPEG-1 stream. The video should playback, but looping and seeking performance may be affected. |
| Audio stream detected | Audio data detected in the bitstream. The video should playback, but performance may be affected. |
| Program stream detected | Content must be encoded in Elementary streams. Program and Transport streams are not accepted.<br>• The stream should playback, but looping and seeking performance will be affected.<br>• The stream may have a delay when started.<br>• Inframe and outframe functionality may be impaired. |
| Movie not I-frame only | The stream should play, but looping, seeking, inframe and outframe functionality may be affected. |

### Errors

| Error Message | Description/Cause |
|---|---|
| Failed to find movie file | Can't play it if we can't find it. |
| Transport stream detected | Content must be encoded in Elementary streams. Program and Transport streams are not accepted. |
| No pictures between sequence headers detected | These errors are caused by:<br>• data elements in the stream not being in the specified order,<br>• data elements being present when they should not be<br>• data elements not being present when they should be. |
| Group start code not followed by I-frame | |
| Forbidden frame coding detected | |
| DC intra-coded frames detected | |
| Reserved frame coding detected | |
| Missing MPEG-2 sequence extension header | |

| Error Message | Description/Cause |
|---|---|
| Sequence extensions out of place | These errors are caused by:<br>• data elements in the stream not being in the specified order,<br>• data elements being present when they should not be<br>• data elements not being present when they should be. |
| Sequence display extensions out of place | |
| Quantization matrix extension out of place | |
| Copyright extension out of place | |
| Sequence scalable extension out of place | |
| Reserved 1 extension out of place | |
| Picture display extension out of place | |
| Picture coding extension out of place | |
| Picture spatial scalable extension out of place | |
| Picture temporal scalable extension out of place | |
| Camera parameters extension out of place | |
| ITU-T extension out of place | |
| Reserved 2 extension out of place | |
| Reserved 3 extension out of place | |
| Reserved 4 extension out of place | |

***NOTE:A newly uploaded file or folder will have a default DMX value of zero. If a naming conflict occurs, you will be prompted before overwriting the file.***

**Mac OS X: File transfer**

**SMB limitation is 4GB file size per transfer. What this means is more than 4GB of data may be transferred, but no file can be greater than 4GB.**

# Archiving User Content

An Archive/Image is a compressed file used to store media files, folders and object files along with valid identification DMX values. This Content Archive is used to backup User Content that can be restored to any media server.

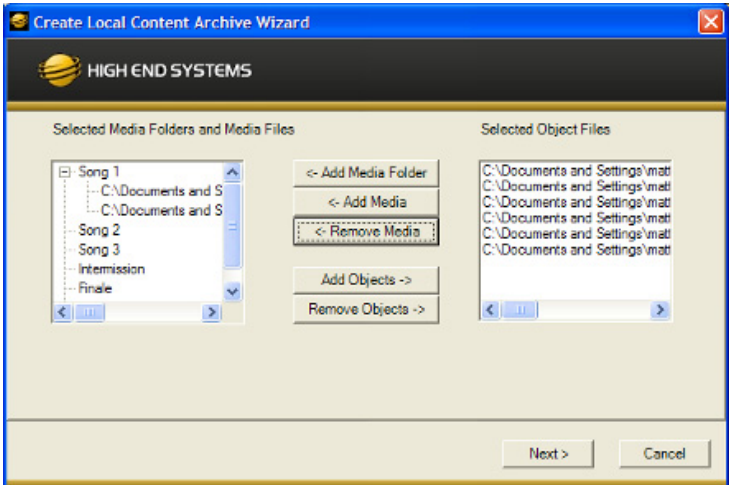
## Using Local Archives to Prepare Content Offline

You can create a Local Archive of files stored on your hard drive to be deployed to a server at another time. This lets you work on organizing files for a specific show offline and then upload it to a server at a later date.

## Creating a Local Archive

### For CMA Running Windows OS

1. Under the **File** menu, select **Create Local Archive** to launch the archiving wizard.
2. Click on **Add Media Folder.** This will add a media folder to the left-hand column named “MyMedia0”. Each successive media folder will be named “MyMedia1, MyMedia2, and so forth. You can rename these folders with a single click on the folder name.




3. After creating a folder and renaming it (if you wish), highlight the folder to add media files.
4. Click **Add Media**. This will bring up a file browser window that will allow you to navigate to the spot on your hard drive containing the media you want to add. You can add single files or multiple files. To add multiple files, hold down shift and select multiple media files with your mouse.
5. Click **Add Objects** if you wish to add custom 3-D objects to the archive. This will again bring up a file browser window to navigate to your 3-D objects. Any 3-D objects added will appear in the right hand column of the wizard. 3-D objects do not get added to folders.
6. Click **Next** at the bottom of the wizard. This will take you to another screen where you choose where to save and what to name your archive.
7. Click **Browse** to navigate to where you want to save and name your archive.
8. Click **Next.** Your archive will then be created.

***NOTES: The Remove Media and Remove Object buttons can be used to remove media files and objects from the wizard when creating the archive.***

***Currently, the archive will not be created unless each media folder created has at least one media file in it.***

***All media folders, files and objects will be assigned DMX addresses in alphabetical fashion.***

### For CMA Running Mac OS

To create a Local Archive, you must first create the folder structure recognized by the CMA. The Creative Local Archive compresses these files into a .dlc format that can be recognized for uploading. Use the following folder structure in preparing files for a local Archive:

- A top level folder, which contains a Media and Objects folder.
- The Media folder must contain subfolders, and valid files may go into those subfolders.
- Only objects with a .x extension are allowed in the Objects folder (no subfolders).

## Creating Content Backup Archive

Backups are created using the **Content Archive** feature. An Content Archive file is a compressed file containing all the User Content from a single fixture along with the assigned DMX values for folders and files.

To create a Content Archive:

1. In the CMA Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to backup in the right pane.
3. Select **Create Content Archive** from the **Media Files** or **Objects** drop down menu or the right click popup list.

## Deploying a Content Archive

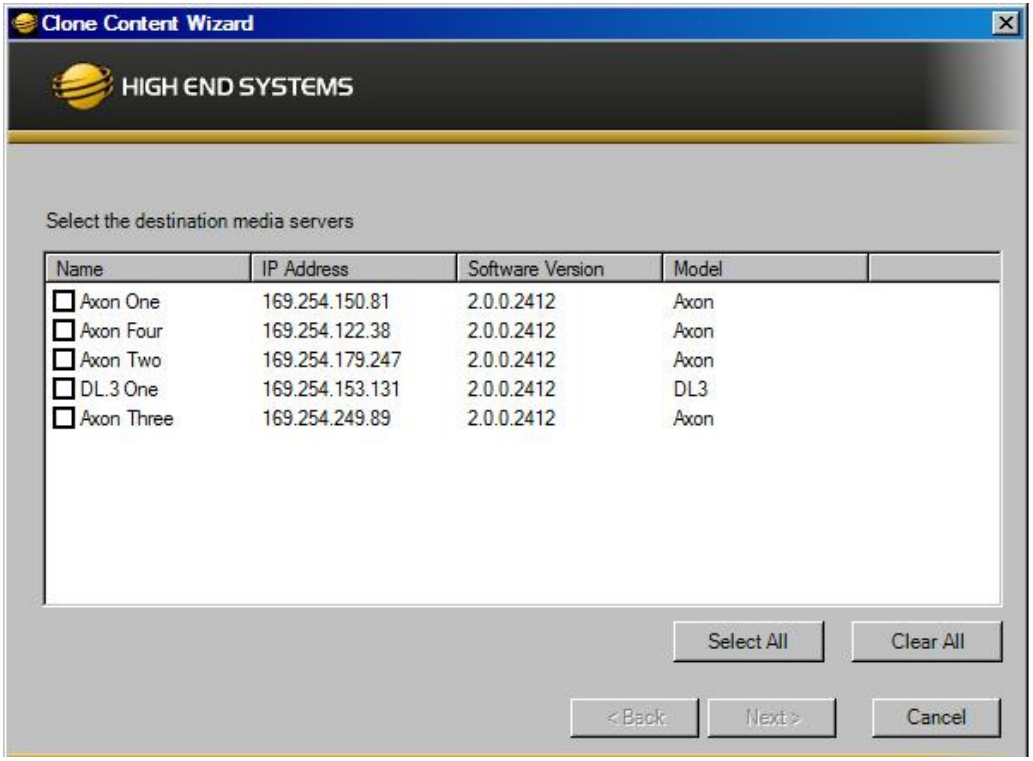
Deploying the Content Archive you created restores the user content to a fixture. To replicate this content to other fixtures on the link, use the **Clone Content** feature (see *Cloning User Content* on page 273).

## Cloning User Content

Cloning is a file transfer operation where all the User Content of a single fixture is replicated across one or more other fixtures. Cloning preserves all user content naming and DMX values. This allows you, for example, to send the custom content for a specific show to all the fixtures used in that show with one operation.

To clone user content:

1. In the CMA Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to clone in the right pane.
3. Select **Clone Content** from the **Media Files** or **Objects** drop down menu or the right click popup list. A Clone Content Wizard lets you select one or more servers on the fixture network as the destination for cloned content.

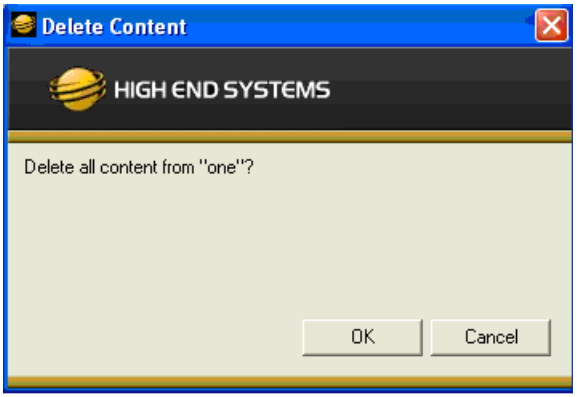



The cloning process erases all destination server(s) user content and replaces it with the selected server's user content. Stock content is unaffected.

## Deleting Content

To delete ***all*** User Content from a server:

1. In the CMA Client Window select **All Server** in the left pane.
2. Select the Server with the content you want to delete in the right pane.
3. From the drop down menu or the right-click popup list, select **Delete Content.** A dialog box OKs/cancels the action.




## DMX Summary

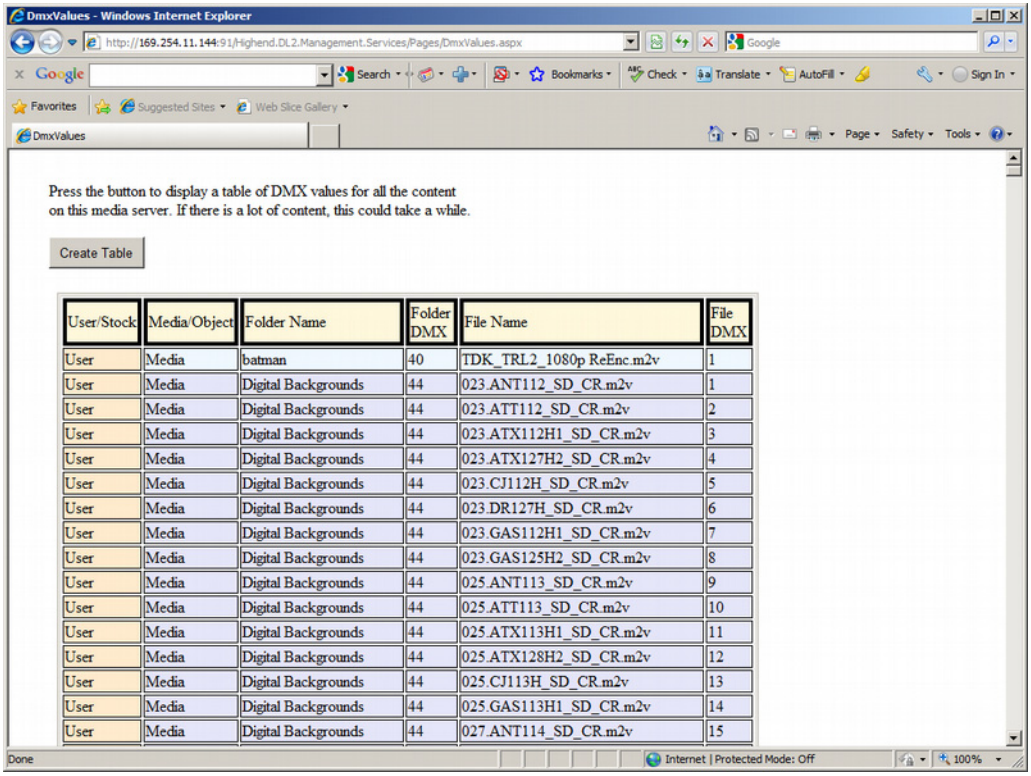
The DMX Summary lets you view all the content for a single server in a table format with the following details:

- Whether the content is a **User** Media file/folder, a **Stock** Media file/folder, or a **Object**
- The associated **Folder Name** for media files
- The **Folder DMX** value for media files
- The **File Name** for media or object files
- The **File DMX** value for media or object files

To view the DMX summary table:

1. Select **All Servers** from the left pane of the CMA Client Window.
2. Select a Server in the right pane
3. Select DMX Summary from the drop down menu or the right-click popup list.

4. Press the **Create Table** button on the screen to build the summary table.



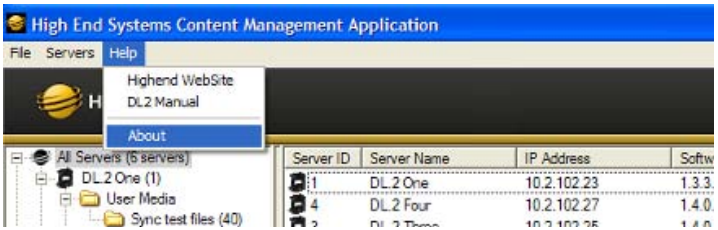

| User/Stock | Media/Object | Folder Name | Folder DMX | File Name | File DMX |
|---|---|---|---|---|---|
| User | Media | batman | 40 | TDK_TRL2_1080p ReEnc.m2v | 1 |
| User | Media | Digital Backgrounds | 44 | 023.ANT112_SD_CR.m2v | 1 |
| User | Media | Digital Backgrounds | 44 | 023.ATT112_SD_CR.m2v | 2 |
| User | Media | Digital Backgrounds | 44 | 023.ATX112H1_SD_CR.m2v | 3 |
| User | Media | Digital Backgrounds | 44 | 023.ATX127H2_SD_CR.m2v | 4 |
| User | Media | Digital Backgrounds | 44 | 023.CJ112H_SD_CR.m2v | 5 |
| User | Media | Digital Backgrounds | 44 | 023.DR127H_SD_CR.m2v | 6 |
| User | Media | Digital Backgrounds | 44 | 023.GAS112H1_SD_CR.m2v | 7 |
| User | Media | Digital Backgrounds | 44 | 023.GAS125H2_SD_CR.m2v | 8 |
| User | Media | Digital Backgrounds | 44 | 025.ANT113_SD_CR.m2v | 9 |
| User | Media | Digital Backgrounds | 44 | 025.ATT113_SD_CR.m2v | 10 |
| User | Media | Digital Backgrounds | 44 | 025.ATX113H1_SD_CR.m2v | 11 |
| User | Media | Digital Backgrounds | 44 | 025.ATX128H2_SD_CR.m2v | 12 |
| User | Media | Digital Backgrounds | 44 | 025.CJ113H_SD_CR.m2v | 13 |
| User | Media | Digital Backgrounds | 44 | 025.GAS113H1_SD_CR.m2v | 14 |
| User | Media | Digital Backgrounds | 44 | 027.ANT114_SD_CR.m2v | 15 |

# Upgrading Software

Upgrade Management lets you upgrade the media server application and system firmware.

## Verifying Software Versions

Running the latest version of both the CMA software and the media server software will ensure that you get the best performance from the fixtures on your network.




To verify the CMA version, select **About** from the **Help** drop down menu. The media server software version is displayed for each server on the network in the All Servers view.

*NOTE: Although running different versions of software on servers is not prohibited, it is highly recommended that all servers on the network be running the same software version.*

## Upgrading the CMA Software

Close the CMA before upgrading the CMA software. To Upgrade software:

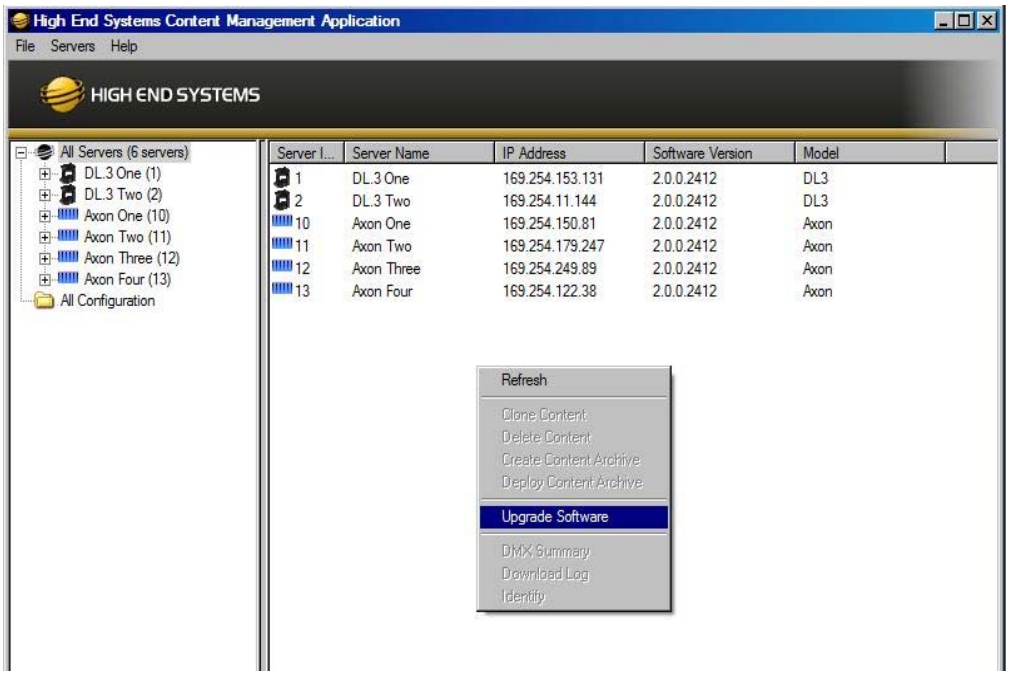
1. Download the latest version of the application from the Support section of the High End Systems website (www.highend.com). A download wizard simplifies installation on your personal computer.
2. A dialog box will give you the option to Run or Save the application. Pressing ***Run*** automatically uninstalls any existing CMA version on your hard drive and installs the new version.

## Upgrading Server Software

The server software for Digital Lights and Axon media servers can only be uploaded to fixtures from the CMA. You must first save the latest version of the software from the High End Systems website (www.highend.com) to your hard drive and then use the CMA to upload it to any media server on your link. To Upgrade Server Software:

1. Using your internet browser, select the latest version from the support section of the High End Systems website. A dialog box will give you the option to ***Save***.
2. Select the location and press ***Save*** again to put a copy of the Fixture software on your local drive.

3. Click on **All Servers** in the left pane of the CMA Window.

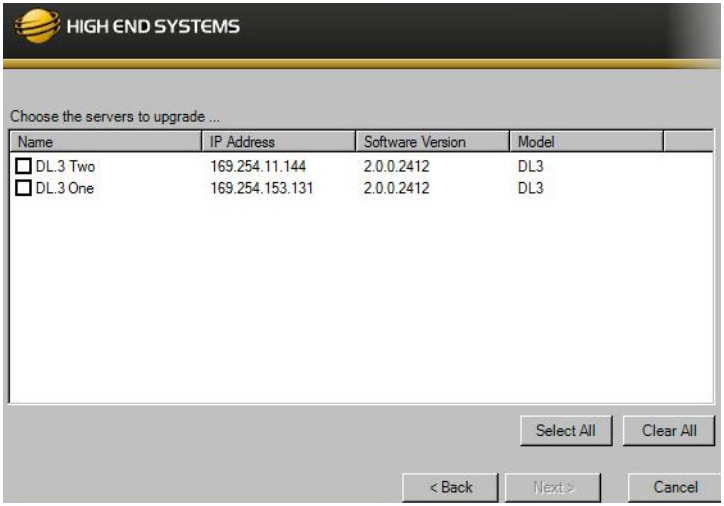



4. Right click anywhere in the CMA Window or use the Server's pull down menu to select **Upgrade Software**. The Upgrade Wizard will prompt you to browse to the location where you saved a copy of latest version.

5. After locating the upgrade file, press Next. The Upgrade Wizard displays a list of all servers connected to the fixture network.

6. Click in the box to the left of the server name to select a server(s) for upgrading.

7. Click **Next** to continue upgrade. The server will reboot after upgrading the software.




**Mac OS X: Upgrading Software**

**To upgrade multiple servers, select multiple fixtures from the All Servers list.**

# Viewing Server Configuration

The CMA lets you remotely view and modify fixture settings.Some settings like Lamp Hours, Software Versions, etc. are view only. Other settings such as Fixture ID, various Projector settings, DMX Start Channel, etc. can be modified (configured).

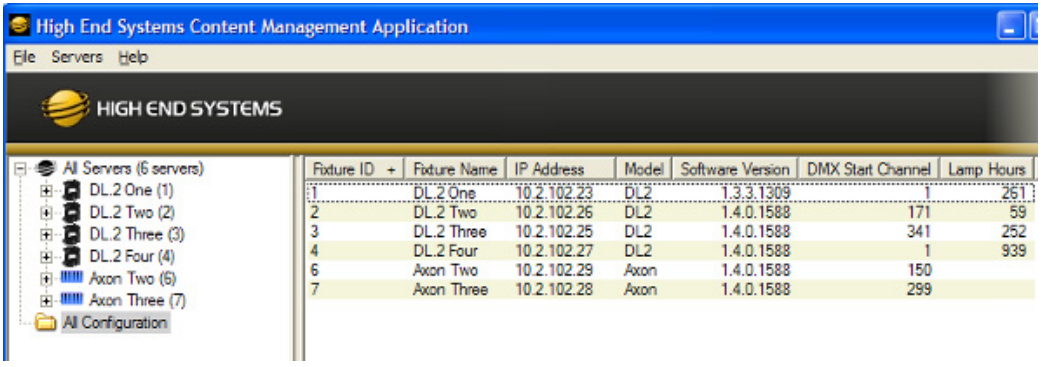
***NOTE: All of these settings are also available for DL.3 and DL.2 fixtures through the Digital Light onboard menu system.***

The CMA also has some additional configuration features that let you:

- Assign a name to servers connected over the network for easier identification of servers on your network.
- Compare all the Configuration Items of a certain type for a group of fixtures. For example, viewing the DMX Start Channels of all the fixtures on a network.
- Control monitor display settings for Axon media servers.

## Viewing Current Configuration of All Servers

To view configuration information for all Servers on the network, select All Configurations in the left pane. The right pane now displays configuration values for all the media servers on the fixture link in a sortable table. Click in the column heading to sort by that column's values. A + symbol appears in the "sort by" column heading.

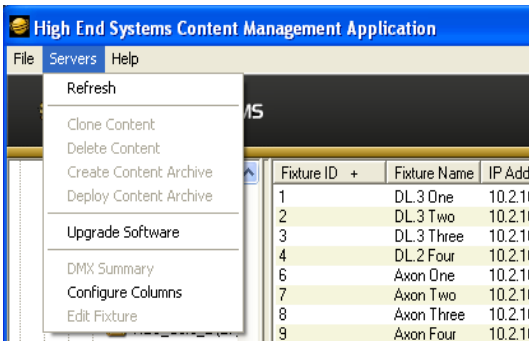



The example above contains the following information for one or all servers:

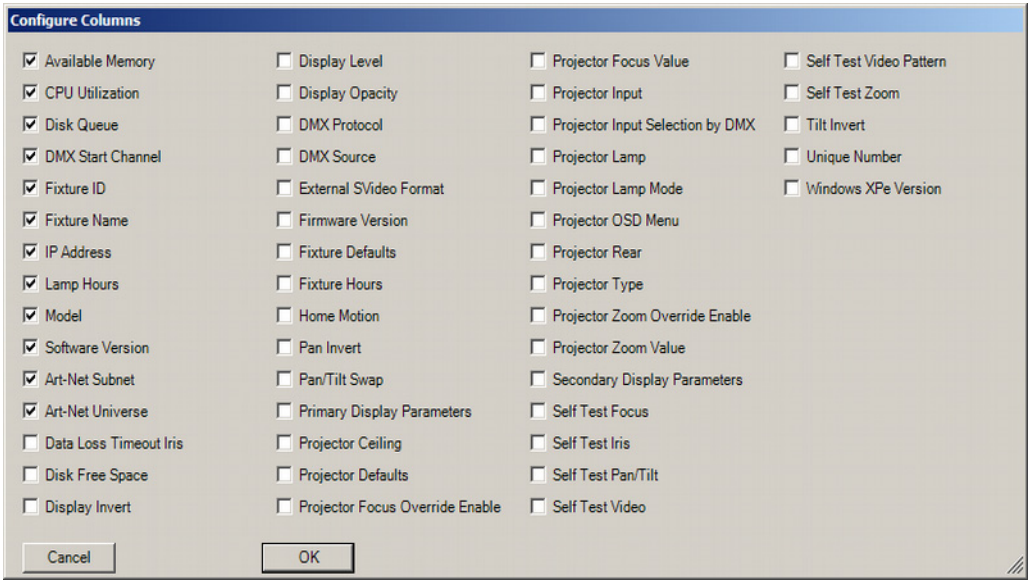
- The Fixture ID from 1-255
- The Fixture Name you have assigned
- The IP Address
- Model type
- The DMX Start Channel currently assigned to each server
- The current lamp hours for each server

### Configuring Columns

Select which columns are present by selecting **Configure Columns** from the **Servers** menu in the menu bar or by right clicking anywhere in the main pane of the CMA.




Once you select **Configure Columns**, you can view a list of all possible columns. Choose which columns to view by either checking or un-checking each selection. Once you have selected the columns you want to display, click on OK.

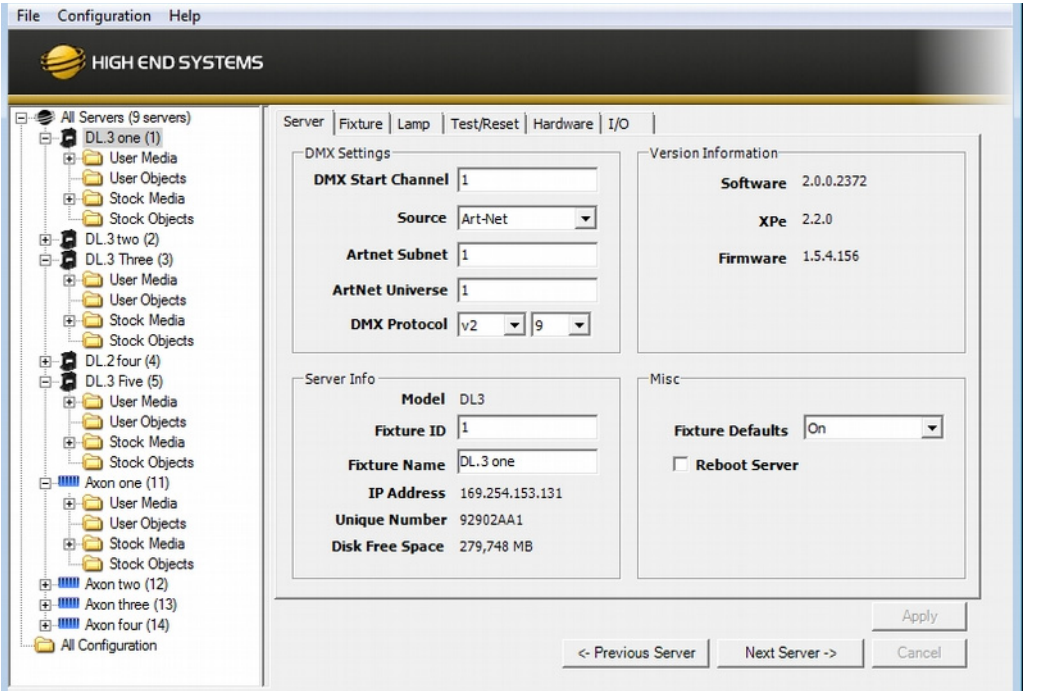


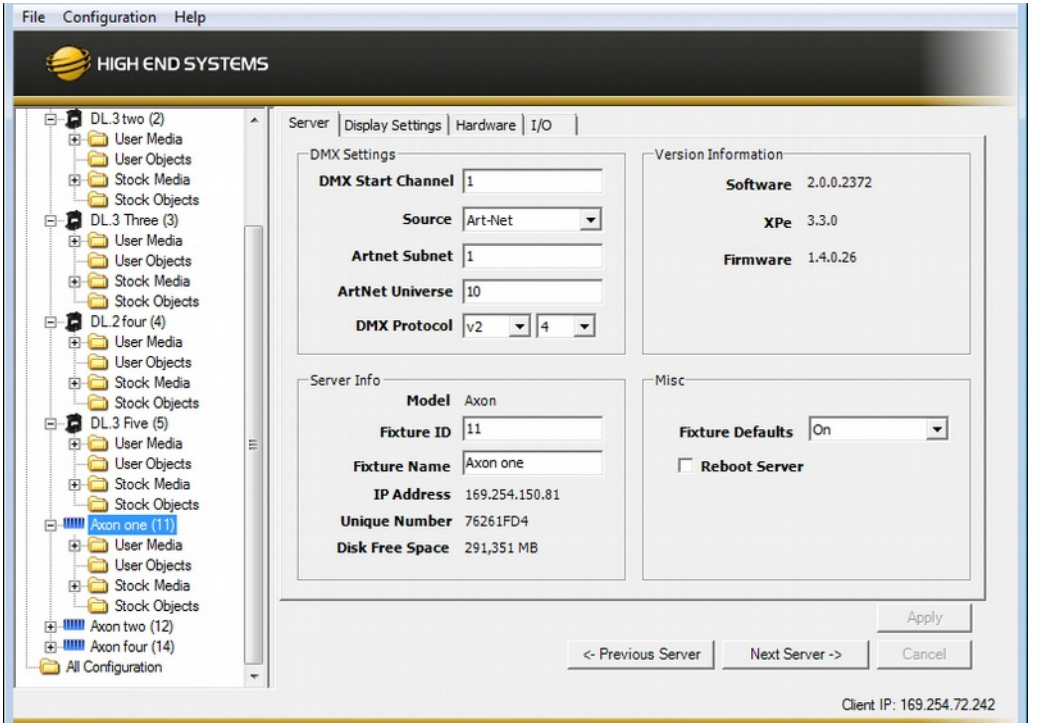

### Re-Order Columns

You also have the option to change the order that the columns are displayed. Left-click on the head of the column you wish to move, hold down the mouse button and drag the column to the desired position. Releasing the mouse button will move that column to the new location.

## Viewing Individual Fixture Configuration Values

To view configuration information for a individual server, click on **All Servers** in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane. Configuration information is grouped under tabs in the right pane. Fields are provided for all editable configuration values.The number of tabs is determined by the model selected. DL.3 and DL.2 fixtures have six tabs while Axon media servers have four.


File Configuration Help
HIGH END SYSTEMS
All Servers (9 servers)
DL.3 one (1)
User Media
User Objects
Stock Media
Stock Objects
DL.3 two (2)
DL.3 Three (3)
User Media
User Objects
Stock Media
Stock Objects
DL.2 four (4)
DL.3 Five (5)
User Media
User Objects
Stock Media
Stock Objects
Axon one (11)
User Media
User Objects
Stock Media
Stock Objects
Axon two (12)
Axon three (13)
Axon four (14)
All Configuration
Server Fixture Lamp Test/Reset Hardware I/O
DMX Settings
DMX Start Channel 1
Source Art-Net
Artnet Subnet 1
ArtNet Universe 1
DMX Protocol v2 9
Version Information
Software 2.0.0.2372
XPe 2.2.0
Firmware 1.5.4.156
Server Info
Model DL3
Fixture ID 1
Fixture Name DL.3 one
IP Address 169.254.153.131
Unique Number 92902AA1
Disk Free Space 279,748 MB
Misc
Fixture Defaults On
Reboot Server
Apply
<- Previous Server
Next Server ->
Cancel


File Configuration Help
HIGH END SYSTEMS
DL.3 two (2)
User Media
User Objects
Stock Media
Stock Objects
DL.3 Three (3)
User Media
User Objects
Stock Media
Stock Objects
DL.2 four (4)
User Media
User Objects
Stock Media
Stock Objects
DL.3 Five (5)
User Media
User Objects
Stock Media
Stock Objects
Axon one (11)
User Media
User Objects
Stock Media
Stock Objects
Axon two (12)
Axon four (14)
All Configuration
Server Display Settings Hardware I/O
DMX Settings
DMX Start Channel 1
Source Art-Net
Artnet Subnet 1
ArtNet Universe 10
DMX Protocol v2 4
Version Information
Software 2.0.0.2372
XPe 3.3.0
Firmware 1.4.0.26
Server Info
Model Axon
Fixture ID 11
Fixture Name Axon one
IP Address 169.254.150.81
Unique Number 76261FD4
Disk Free Space 291,351 MB
Misc
Fixture Defaults On
Reboot Server
Apply
<- Previous Server
Next Server ->
Cancel
Client IP: 169.254.72.242

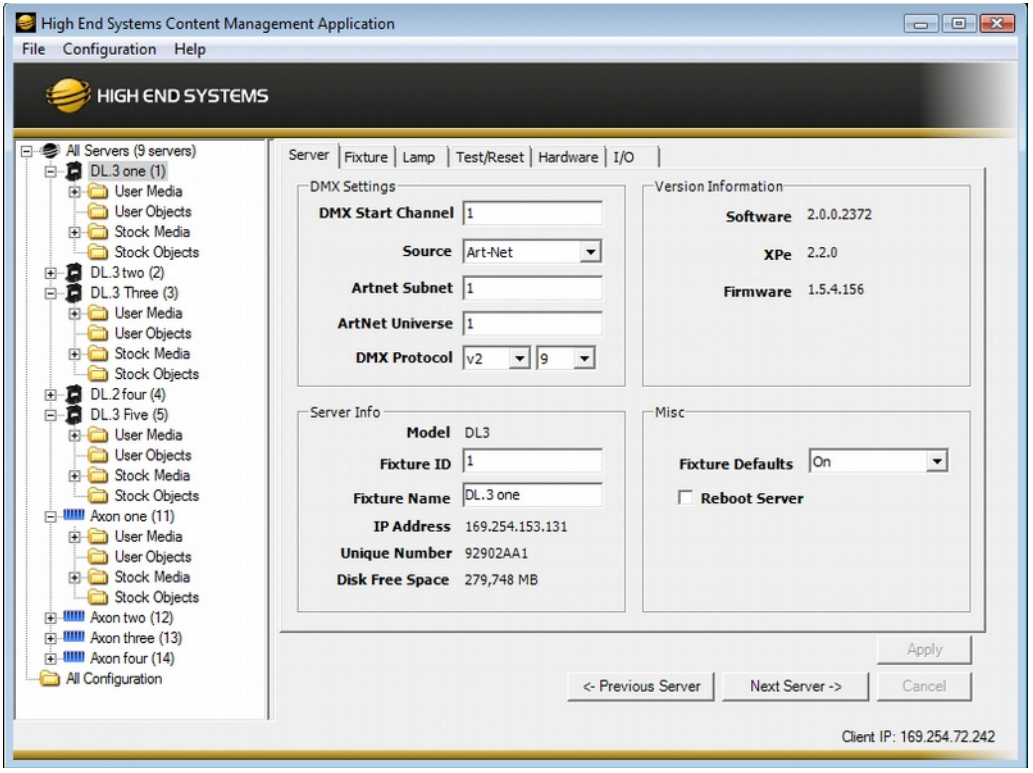
**Mac OS X: Viewing Server Configuration**

**To access Server Configuration information for an individual server, select the Configuration option under the individual server.**

# DL.3 and DL.2 Media Server Configuration Options

DL.3 and DL.2 fixtures include configuration options for the internal projector, the lamp, the menu display and motion features. The six tabs are labeled Server, Fixture, Lamp, Test/Reset, Hardware and I/O.

## Server Tab




## DMX Settings

| Configuration Item | Configuration Value Options | |
|---|---|---|
| DMX Start Channel | 1-512 | |
| DMX Source | **DMX512** or **Art-Net** | |
| Art-Net Subnet | 0-16 | |
| Art-Net Universe | 0-16 | |
| DMX Protocol | V1<br>V2 | Sets graphic objects from 1-9 |

### Server Info

| Configuration Item | Configuration Value Options |
|---|---|
| Model | Read only |
| Fixture ID | 1-255 |
| Fixture Name | Allows fixture name of up to 26 characters |
| IP Address | Read only assigned to that unit by the router or Auto IP |
| Unique Number | Read only assigned by factory |
| Disk Free Space | Read only |

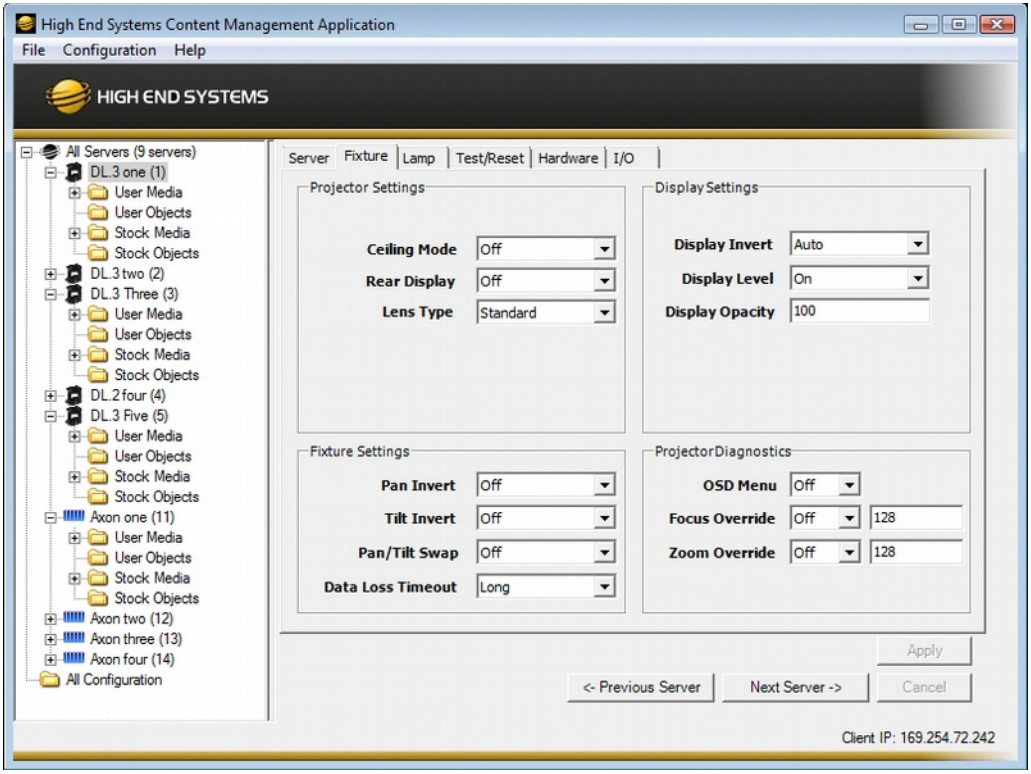
### Version Info

| Configuration Item | Configuration Value Options |
|---|---|
| Software | Read only |
| XPe | Read only |
| Firmware | Read only |

### Miscellaneous

| Configuration Item | Configuration Value Options |
|---|---|
| Fixture Defaults | **On** restores fixture defaults<br>**Off** displays whenever defaults has been changed |
| Reboot Server | Check **Reboot** to restart the internal graphics engine |

## Fixture Tab




### Projector Settings

| Configuration Item | Configuration Value Options |
|---|---|
| Ceiling Mode | **On** accesses the projector menu to rotate the image 180°<br>**Off** reverts to original orientation |
| Rear Display | **On** accesses projector menu to invert the projected image<br>**Off** reverts to original orientation |
| Lens Type | Select currently installed lens from **Standard**, **Long Throw**, **Ultra Long Throw**, or **Wide Angle** for DL.3 fixtures. *NOTE: This option is greyed out for DL.2 fixtures.* |

### Fixture Settings

| Configuration Item | Configuration Value Options |
|---|---|
| Pan Invert | **On** Inverts pan positioning<br>**Off** reverts to default position |
| Tilt Invert | **On** Inverts Tilt positioning<br>**Off** reverts to default position |
| Pan/Tilt Swap | **On** swaps pan and tilt positioning<br>**Off** reverts to default positioning |

| Configuration Item | Configuration Value Options |
|---|---|
| Data Loss Timeout | Closes iris when system stops receiving DMX data:<br>**Long** = 5 minute delay<br>**Short** = 5 second delay |

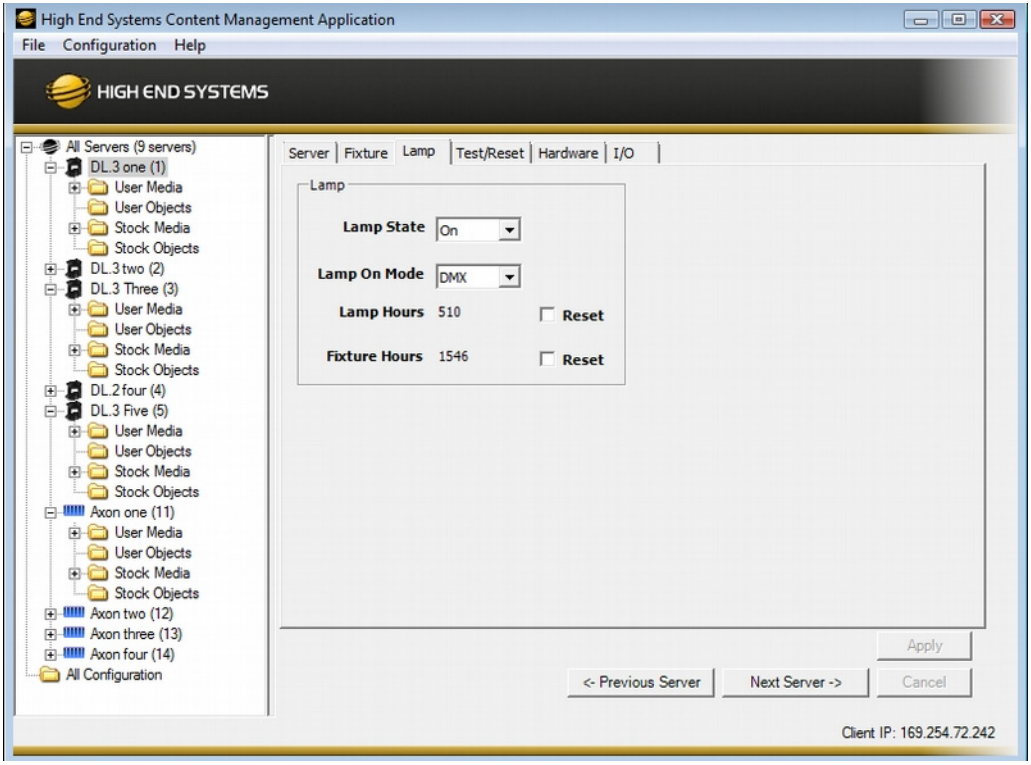
## Display Settings

| Configuration Item | Configuration Value Options |
|---|---|
| Display Invert | **On** manually inverts display,<br>**Off** reverts to default display orientation,<br>**Auto** automatically inverts display when fixture is turned more than 90 degrees vertically. |
| Display Level | **Off** turns off display. Touching any button turns it back on.<br>**Bright** = full brightness level<br>Preview = displays currently selected content |
| Display Opacity | 0-100 sets the preview display opacity from 0-100% |

## Projector Diagnostics

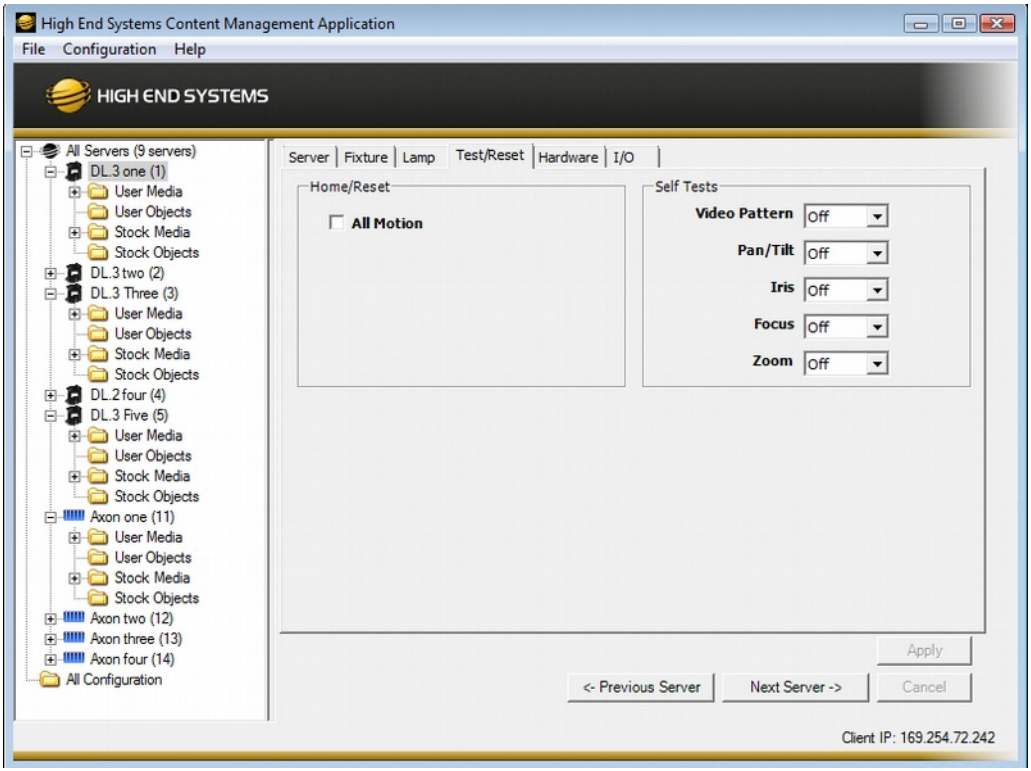
| Configuration Item | Configuration Value Options |
|---|---|
| OSD Menu | **On** accesses the projector's menu navigation buttons<br>**Off** reverts to Fixture menu |
| Focus Override | **On** selects manual focus. Value field = **0-255** |
| | **Off** resets to DMX control |
| Zoom Override | **On** selects manual zoom. Value field = **0-255** |
| | **Off** resets to DMX control |

## Lamp Tab




| Configuration Item | Configuration Value Options |
|---|---|
| Lamp State | On manually turns projector lamp on<br>Off manually turns projector lamp off |
| Lamp On Mode | **Always On** turns lamp on when the fixture is plugged in<br>**Manual** turns lamp on only if the Lamp is set to **On**<br>**DMX** turns lamp on if DMX is present |
| Lamp Hours | **Read Only**. Select **Reset** to restore Lamp hours to 0 |
| Fixture Hours | **Read Only**. Select **Reset** to restore Fixture hours to 0 |

## Test/Reset Tab



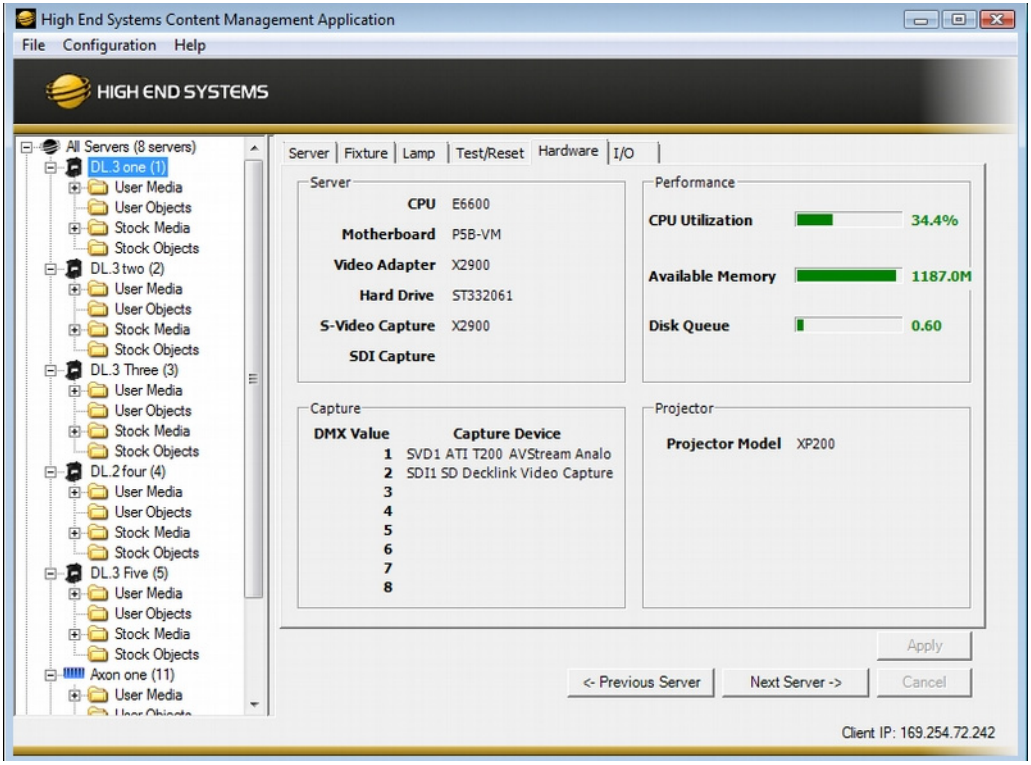

### Home/Reset

| Configuration Item | Configuration Value Options |
|---|---|
| All Motion | Select to start automatic mechanical reset for all motion functions. |

### Self Tests

| Configuration Item | Configuration Value Options |
|---|---|
| Video Pattern | **1** displays graphic object with texture for the number of graphic layers you have defined<br>**2** alternates between an alignment grid and a color calibration screen |
| Pan/Tilt | **On** tests Pan and Tilt mechanical functionality<br>**Off** stops self test |
| Iris | **On** tests Iris mechanical functionality<br>**Off** stops self test |
| Focus | **On** tests focus mechanical functionality<br>Off stops self test |
| Zoom | **On** tests Zoom mechanical functionality<br>Off stops self test |

## Hardware Tab




### Server

| Configuration Item | Configuration Value Options |
|---|---|
| All CPU | Read Only displays current hardware configuration |
| Motherboard | |
| Video Adapter | |
| Hard Drive | |
| S-Video Capture | |
| SDI Capture | |

### Performance

| Configuration Item | Configuration Value Options |
|---|---|
| CPU Utilization | Gauges display available resources remaining. This can help with balancing additional layers with the capabilities for the hardware configuration of this device. |
| Available Memory | |
| Disk Queue | |

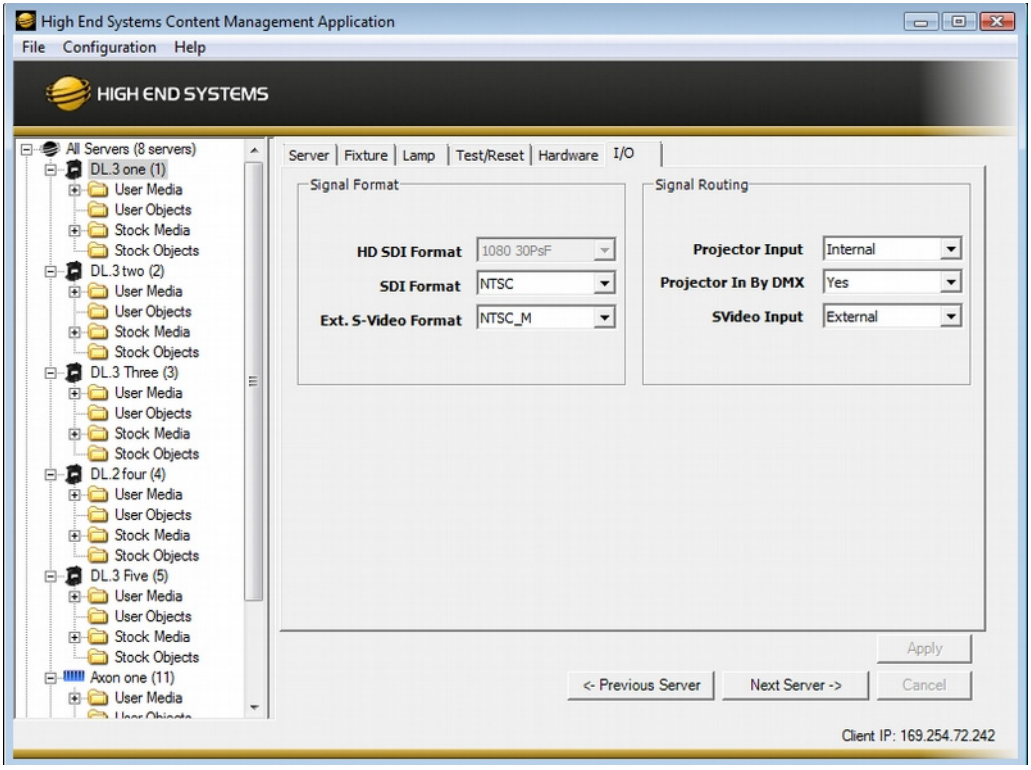
### Capture

| Configuration Item | Configuration Value Options |
|---|---|
| DMX Value and Capture Device | Displays configured capture devices at DMX values 1–8. |

### Projector

| Configuration Item | Configuration Value Options |
|---|---|
| Projector Model | Read Only |

# I/O Tab




## Signal Format

| Configuration Item | Configuration Value Options |
|---|---|
| SDI 1t | Format options vary depending on the cards installed in this device. |
| SDI 2<br>*(inactive in DL.3F model)* | |
| Ext S-Video Format<br>*(inactive in DL.3F model)* | NTSC_M NTSC_MJ PAL_B PAL_D PAL_GPAL_H<br>PAL_I PAL_M PAL_N SECAM_B SECAM_D<br>SECAM_G SECAM_H SECAM_K SECAM_K1 SECAM_L<br>SECAM_L1 |

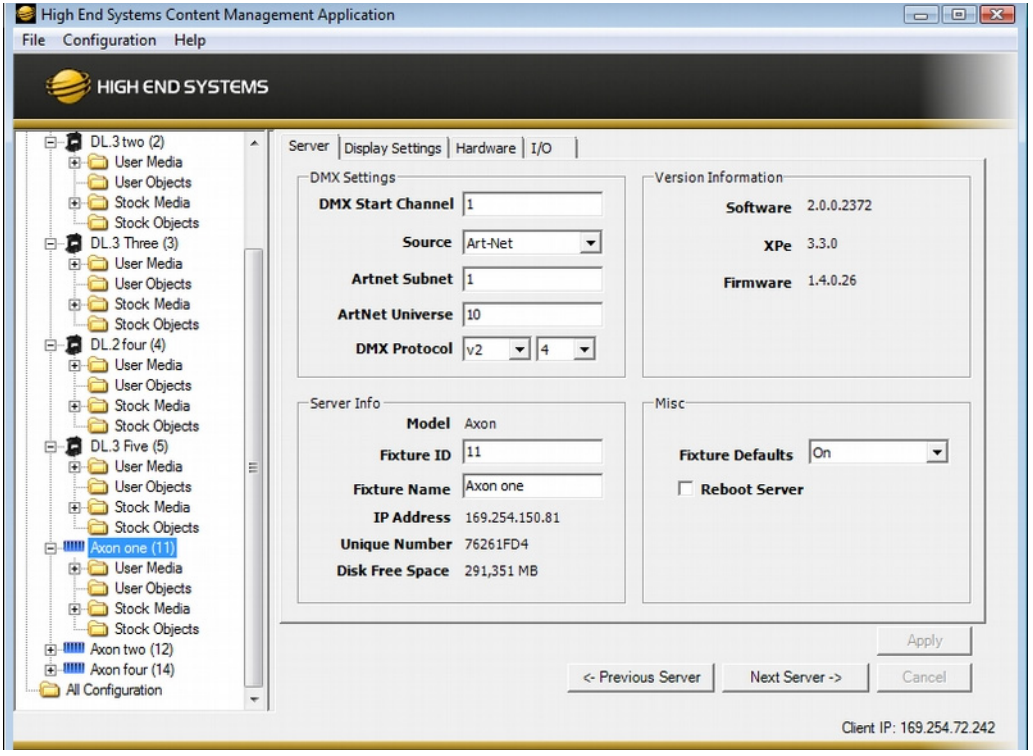
## Signal Routing

| Configuration Item | Configuration Value Options |
|---|---|
| Projector Input | Internal<br>External |
| Projector In By DMX | Yes<br>No |
| SVideo Input | Internal<br>External |

# Axon Media Server Configuration Options

Axon configuration options are grouped under a Server tab and a Display Settings tab.

## Server Tab




### DMX Settings

| Configuration Item | Configuration Value Options | |
|---|---|---|
| DMX Start Channel | 1-512 | |
| DMX Source | **DMX512** or **Art-Net** | |
| Art-Net Subnet | 0-16 | |
| Art-Net Universe | 0-16 | |
| DMX Protocol | V1<br>V2 | Sets graphic objects from 1-9 |

### Server Info

| Configuration Item | Configuration Value Options |
|---|---|
| Model | Read only |
| Fixture ID | 1-255 |
| Fixture Name | Allows fixture name of up to 26 characters |
| IP Address | Read only assigned to that unit by the router or Auto IP |

| Configuration Item | Configuration Value Options |
|---|---|
| Unique Number | Read only assigned by factory |
| Disk Free Space | Read only in MB |

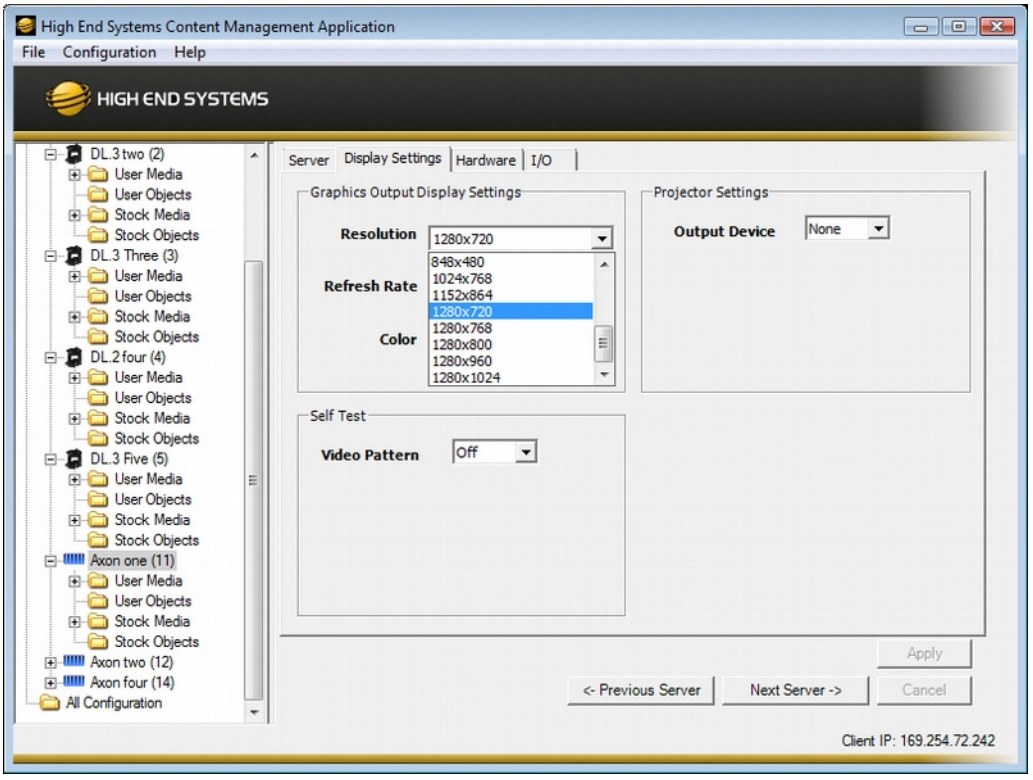
### Version Info

| Configuration Item | Configuration Value Options |
|---|---|
| Software | Read only |
| XPe | Read only |
| Firmware | Read only |

### Miscellaneous

| Configuration Item | Configuration Value Options |
|---|---|
| Fixture Defaults | **On** restores fixture defaults<br>**Off** displays whenever defaults has been changed |
| Reboot Server | Check **Reboot** to restart the internal graphics engine |

## Display Settings Tab




### Graphics Output Display Settings

| Configuration Item | Configuration Value Options |
|---|---|
| Resolution | Options in the drop-down lists are automatically populated by the Axon software for the specific display device attached. |
| Refresh Rates | |
| Color | |

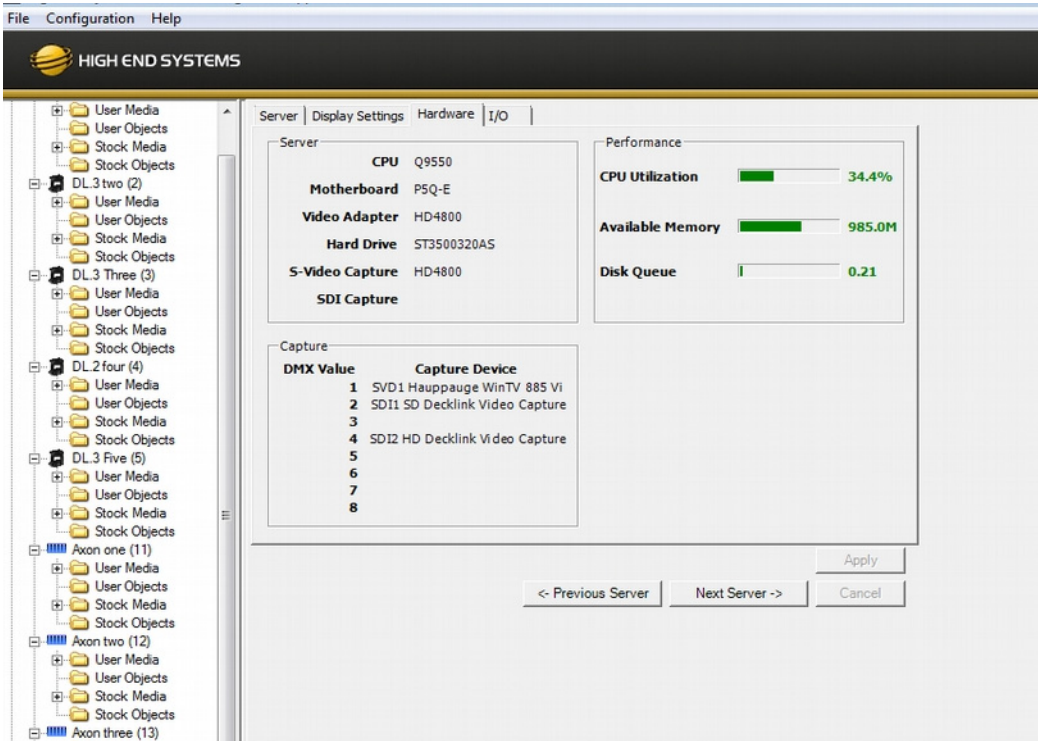
### Projector Settings

| Configuration Item | Configuration Value Options |
|---|---|
| Output Device | Read Only displays projector model |

### Self Tests

| Configuration Item | Configuration Value Options |
|---|---|
| Video Pattern | **1** displays graphic object with texture for the number of graphic layers you have defined<br>**2** alternates between an alignment grid and a color calibration screen |

## Hardware Tab




### Server

| Configuration Item | Configuration Value Options |
|---|---|
| All CPU | Read Only displays current hardware configuration |
| Motherboard | |
| Video Adapter | |
| Hard Drive | |
| S-Video Capture | |
| SDI Capture | |

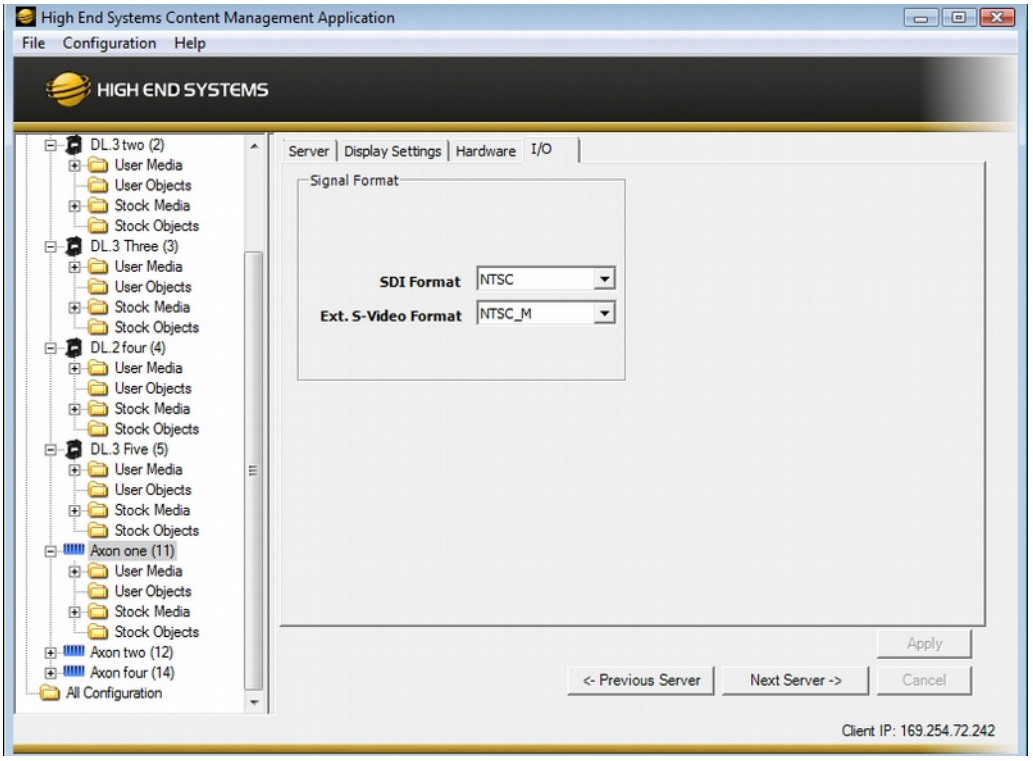
### Performance

| Configuration Item | Configuration Value Options |
|---|---|
| CPU Utilization | Gauges display available resources remaining. This can help with balancing additional layers with the capabilities for the hardware configuration of this device. |
| Available Memory | |
| Disk Queue | |

### Capture

| Configuration Item | Configuration Value Options |
|---|---|
| DMX Value and Capture Device | Displays configured capture devices at DMX values 1–8. |

## I/O Tab




### Signal Format

| Configuration Item | Configuration Value Options |
|---|---|
| SDI 1t | Format options vary depending on the cards installed in this device. |
| SDI 2 | |
| Ext S-Video Format | NTSC_M NTSC_MJ PAL_B PAL_D PAL_GPAL_H<br>PAL_I PAL_M PAL_N SECAM_B SECAM_D<br>SECAM_G SECAM_H SECAM_K SECAM_K1 SECAM_L<br>SECAM_L1 |

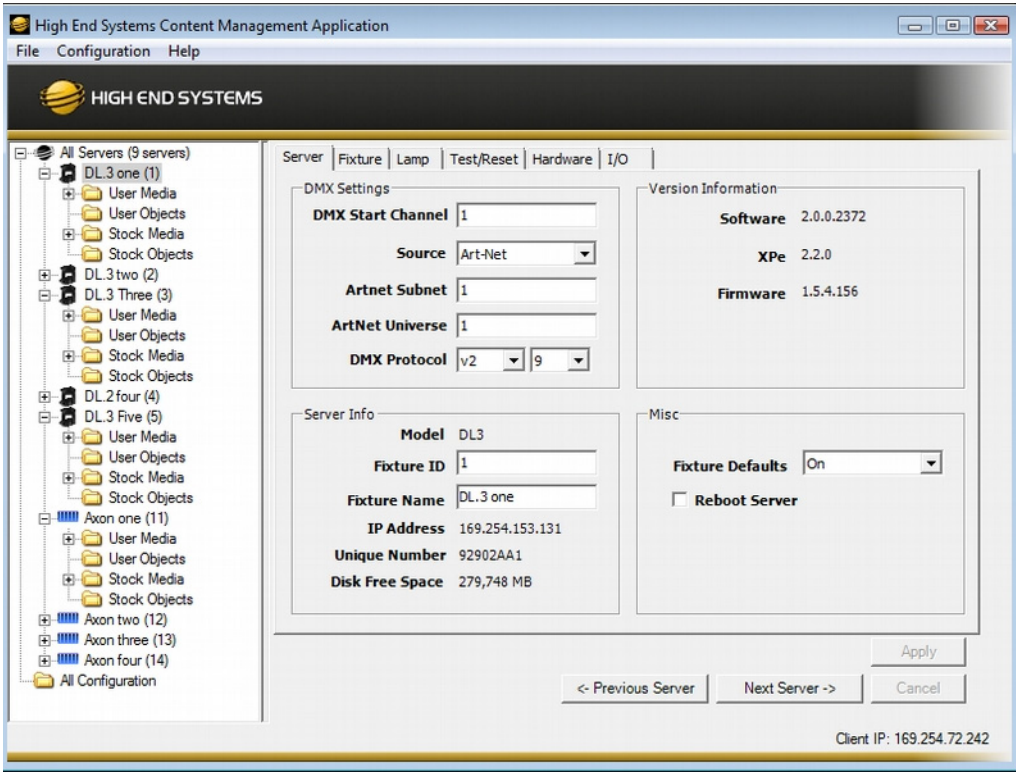
## Configuration Example

Before programming a Digital Light fixture or the Axon media server from a DMX512 console, you need to:

- Identify the DMX Source for the fixture
- Select the Protocol type to determine the DMX channel footprint this fixture will utilize
- Select a Fixture Number to identify this Axon on the Ethernet link (required if you will be synchronizing output between fixtures).
- Assign a valid Start Channel (the first channel in the unique range of DMX channels designated by the console for this Axon)

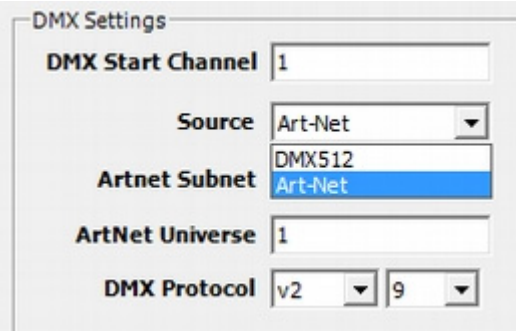
All these selections can be made in the **Server** tab for all models of media servers.

1. To view configuration information for a individual server, click on **All Servers** in the left pane of the CMA window and select the + to view all the servers on the fixture network. Select a server in the left pane to view its configuration information in the right pane.



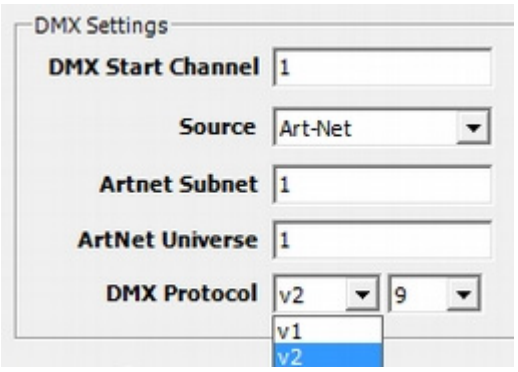
2. Select a **DMX Source** type by clicking on the down arrow of the Source field to select DMX512 or Art-Net.

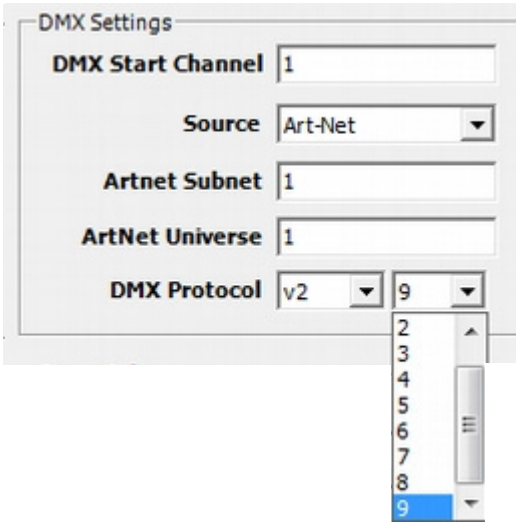
   If you select Art-Net, assign a universe number from 1–16.




3. Select a **DMX Protocol** type by choosing **V1**, or **V2** from the drop down list in the option field. and then select the number of Graphic Object layers for your application.

   The Protocol you select is based on how many DMX channels are required for your application. For more information on selecting protocol, see *Protocol Options* on page 59 and *Appendix A: DMX Protocol* on page 321.




4. Edit the DMX **Start Channel** by entering a valid Start Channel for the protocol type you have chosen.

   For more information on selecting a valid start channel, see *Determining a DMX Start Channel* on page 42.

# Chapter 17:

# Maintenance and Troubleshooting

***This chapter includes information on replacing parts, cleaning the fixture, and some basic troubleshooting procedures.***

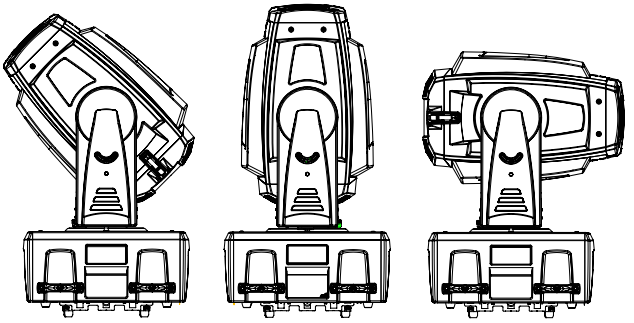
The following toolset should be all you need for the maintenance procedures in this chapter:

- 3 mm allen wrench
- 5 mm allen wrench
- #2 Phillips screwdriver
- Gloves
- Protective eyewear
- Mild glass cleaner (containing no ammonia) and a soft, lint-free cotton cloth

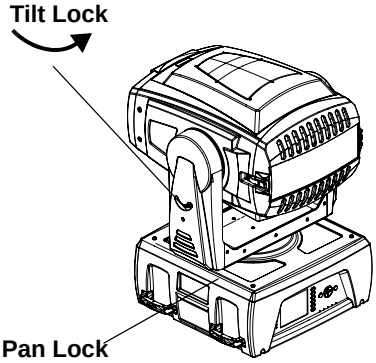
**WARNING:**
**This fixture must be serviced by qualified personnel. The information listed in this chapter is intended to assist qualified personnel *only*.**

## Pan and Tilt Locking

The DL.3 fixture is equipped with mechanical pan and tilt locking latches to stabilize the fixture for shipping or servicing. There is a single pan lock position and three tilt lock positions.



Tilt Lock Position Options



# Maintaining the Filtering System

Like all high quality video projection units, the DL.3 fixture must be kept protected from excessive amounts of glycol fog, mineral oil, and smoke. DL.3 fixtures incorporate multiple air filters to reduce these risks to a minimum; however, the user must follow these guidelines to ensure continued operation of the fixture:

- Air filters (both fixture and projector) should be checked and cleaned on a regular basis. When used in a closed or fixed environment where fog or haze is used, we recommend at least a weekly check.
- Do not situate DL.3 in areas of high fog density such as directly in front of a fog machine or mineral oil hazer.
- Minimize the exposure of DL.3 to both glycol fog and mineral oil.

## Filter Warnings

The DL.3 menu system displays a series of filter status and warnings to alert you when a filter needs to be cleaned or replaced. These appear in a large format that can be viewed from a distance. The Info_Status menu screen will include a detailed message concerning the large format Error/Warning filter message. The following messages will give you information regarding the status of the DL.3 filter system:

- **Filter Missing Error:** A filter not present or is not installed properly. Check and insert missing filter.
- **Filter Service Warning:** The filter system is not operating optimally and needs to be serviced soon.
- **Filter Service Error**: The filter system needs immediate servicing. Replace Filter.

For these and other Error/Warning messages, see *Status Message Menu Display* on page 311.

## Cleaning and Replacing Filters

The DL.3 system utilizes multiple filters to protect the internal media server and projector.

- A filter is located on the side of the fixture base housing attached with velcro for easy removal and cleaning. Check this filter often for dust or debris that can be caused when using the DL.3 in environments with confetti or pyrotechnics. ***This filter is washable, but must be completely dry before re-installing*.**
- The internal projector has an electrically operated filter cartridge that automatically advances to replace the filtering material periodically, based on hours of use. It shouldn't require any maintenance. For more information regarding this filter, you can refer to the projector manual that was shipped with your fixture.

Check the following warnings and cautions before servicing the filters:

**WARNINGS!**

**Disconnect power before servicing.**

**Replace fuses with the specified type and rating only.**

**CAUTION!**

**Do not operate a projector with Air Filter removed. Dust may accumulate on LCD Panel and Projection Mirror degrading projection quality.**

**Do not put small parts into Air Intake Vents. It may result in malfunction of a projector.**

## Cleaning the Base Housing Filter

This filter is located between the handles on the fan side of the box. You can pull it off the fixture and clean it with soap and water. Allow it to dry thoroughly before replacing.

## Replacing the Fixture Filter

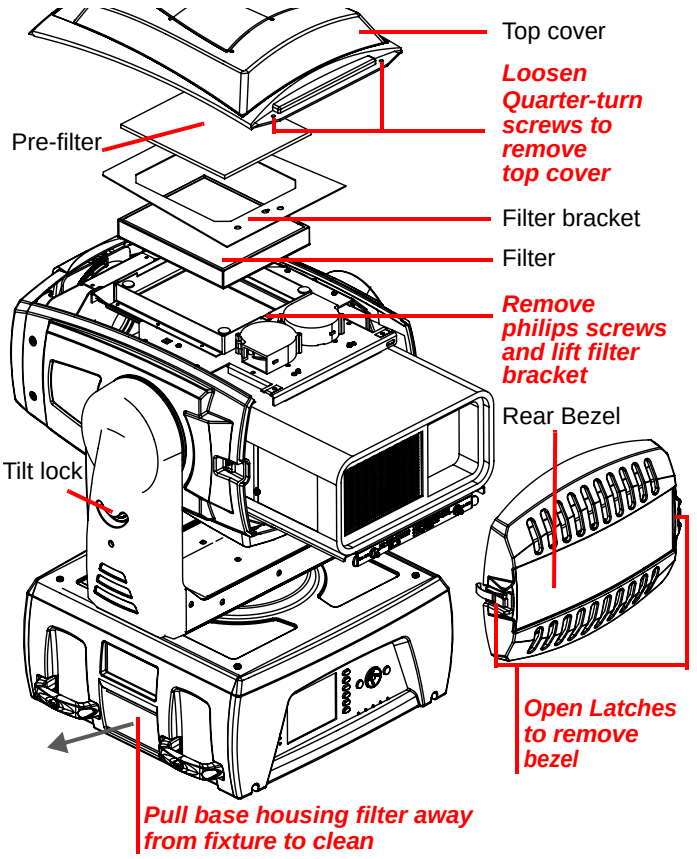
A HEPA filter and a prefilter are located inside the fixture head and should be replaced whenever they become discolored from particulates or when the Menu displays **FILTER Service ERROR** or **FILTER Service WARN.**

***Access the fixture filters:***

1. Lock the fixture head in the 90° tilt position.
2. Unlatch and remove the rear bezel assembly.
3. Loosen the two captive phillips-head screws on the top cover and remove the top cover.
4. Slide the top cover back to free it from the front bezel.

***Inspect the filters:***

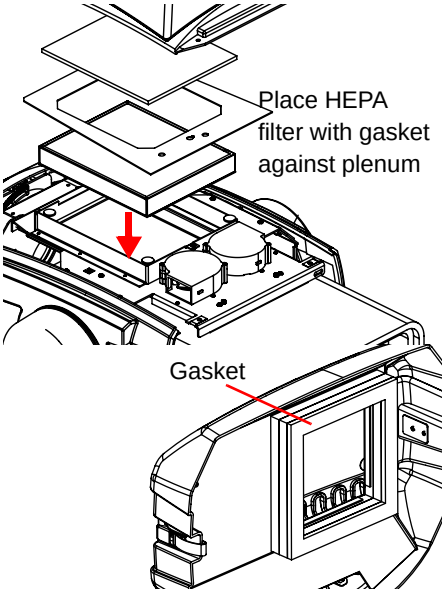
5. Lift the prefilter away from the filter bracket
6. Remove the two phillips pan screws securing the filter bracket and lift the filter unit off the fixture.



7. Remove the bracket and remove the HEPA filter from filter housing. Inspect both the prefilter and the HEPA filter.
8. A dirty prefilter can cause an early Service Filter warning. If the prefilter looks dirty, clean it with water. Thoroughly dry the prefilter before proceeding.
9. If the HEPA filter is discolored with particulates, replace it with the part listed in *Related Products and Accessories* on page 4.

***Reassemble the Fixture***

10. Reinstall the HEPA Filter with the rubber gasket down.
11. Reattach the filter bracket with the two philips pan screws.
12. Replace the prefilter over the bracket on velcro tabs.
13. Replace the top cover, fastening it with the two captive phillips-head screws.
14. Carefully replace the rear bezel, making sure to position (but *do not force*) the gasket against the lamp cover located on the back of the projector. and relatch the rear bezel assembly.



# Replacing the Lamp

**WARNING!**

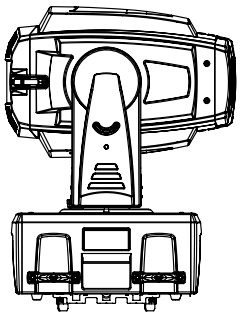
**Allow the projector to cool for at least 45 minutes before you open the lamp cover. The inside of the projector can become very hot.**

**Always replace with a lamp assembly of the same type.**

**Do not drop the lamp module or touch the glass bulb! The glass can shatter and cause injury.**

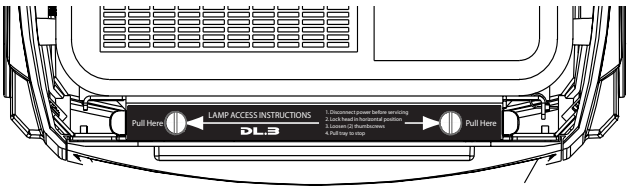
**In the unlikely event that the bulb ruptures, small glass fragments may be generated. The lamp module is designed to contain these fragments, but use caution when removing the lamp module.**

***Access the Lamp Module***

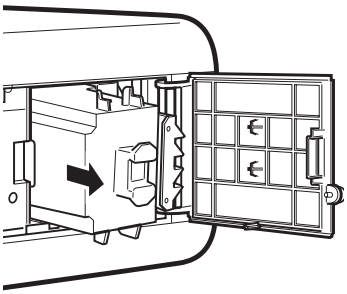


1. Shut down the fixture and disconnect from power.
2. Allow the projector to cool for at least 45 minutes.
3. Use the tilt lock to secure the unit in position.
4. Unlatch and remove the rear bezel.
5. Disconnect the power cable

6. Loosen the two thumbscrews holding the projector bracket and slide the projector out of the fixture.



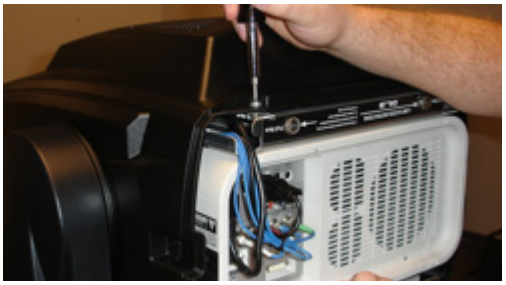

7. Loosen the thumbscrew and open the lamp cover.
8. Grasping the handle, pull out the lamp assembly.
9. Replace the lamp assembly, see *Related Products and Accessories* on page 4.
10. Close the lamp cover and tighten the two lap cover screws.
11. Reconnect to power. The fixture will begin to home.



# Removing the Projector

In the event that you need to remove the projector to return for service or to access the lens, use the following steps.

1. Douse the projector lamp and allow the projector to go through its cool down procedure. Disconnect the fixture from power.
2. Disengage the two latches on the bezel and remove the back cover.
3. Loosen the two captive screws that hold the top bezel and remove it from the unit.

4. Disconnect Zoom (HD1) and the Focus (HD2) plugs from the head-logic board.
5. Tilt and lock the head at 90° horizontal with the head-logic card facing toward the fixture's yoke.

6. On the rear of the projector, disconnect the following:
   - •Projector Power
   - •RGBHV Component Video (INPUT 2)
   - •Projector Control Serial Cable (CONTROL PORT)

7. Using a 5mm allen wrench, reach under the unit and remove the four screws mounting the projector to the projector plate. The screws are located above the plate where the head logic card is mounted.
8. Remove projector by pulling from the rear of the fixture's head, taking care that the Zoom and Focus Wires do not get caught.

# Replacing the Lens

**CAUTION: To avoid damaging the lens, do not touch glass.**

**Lens installation and replacement should be made by qualified service personnel.**

Use the following steps to access and replace the DL.3 lens with any of the lens options available for the fixture.

***Accessing the lens***

1. Follow the steps for removing the projector from the unit in the section preceding this one,
2. While pressing the release button on the top projector cover, slide the top cover toward front to remove it.

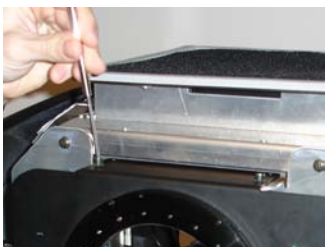
***Replacing the lens***

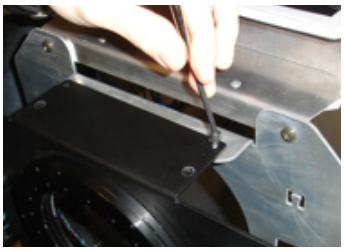
3. Slide the light-block sheet upward and remove it.
4. Hold the lens with one hand and pull the Lens latch upward with the other hand.
5. Remove the lens from the projector.
6. Fit the new lens to the projector. Make sure that the lens is fully inserted to the projector to re-engage the latch.

***Adjusting the Iris Plate for the Accessory Long Zoom lens***

If you are installing the Accessory Long Throw (2.4-4.3:1) zoom lens, you will need to adjust the Iris plate to accommodate the additional length it adds.

7. Loosen the four captive screws that hold the front bezel to the unit.
8. Slowly drop the bezel away from the fixture and detach the IR illuminator wire.
9. Remove the four screws (two on the top and two on the bottom) holding the iris plate to the frame.
10. Slide the plate forward and reinsert the screws in the Accessory position.





### *Reinstalling the projector into DL.3 fixture*

1. Push the Lens Lock Lever downward. Make sure that the lens is properly locked.
2. Replace the light-block sheet and the projector cover.
3. Keeping the DL.3 fixture head tilt-locked at 90° horizontal, feed the Zoom & Focus wires through the front of the projector.
4. Slide the projector (lens first; feet down) back into the DL.3 fixture head. Once fully inside the head of the fixture, pull excess slack from the Zoom & Focus wires out through the front of the fixture's head so that the wires can be reconnected to the head logic card.
5. Line up the projector mounting holes to the holes on the projector mounting plate.
6. Using a 5mm Allen Wrench, reattach the 4 projector screws to the mounting plate.

   ***NOTE: Tighten screws once they are all in the projector.***

7. Reconnect Zoom (HD1) and the Focus (HD2) cables to the head-logic board.
8. On the rear of the projector; reconnect:

   •Projector Power

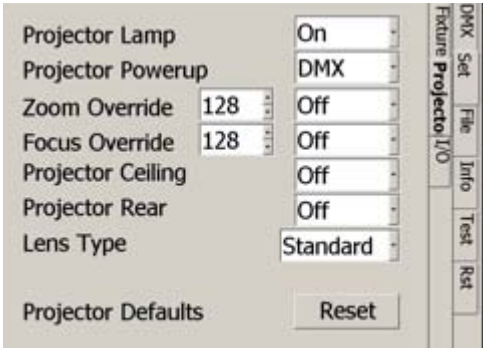
   •GBRHV Component Video (INPUT 2)

   •Projector Control Serial Cable (CONTROL PORT)
9. Replace the top bezel.
10. Replace the rear bezel carefully aligning the gasket around the lamp.

### *Configuring the fixture for the new lens*

1. Connect fixture to power.
2. Access the menu system and navigate to the **Set_Projector** screen. Select the installed lens from the drop down list options in the **Lens Type** field.

| | |
|---|---|
| **Standard** Zoom Lens | 1.8-2.3:1 |
| Accessory **Long** Throw Zoom lens | 2.4-4.3:1 |
| Accessory **Ultra Long** Throw Zoom lens | 4.3-6.0:1 |
| Accessory **Wide Angle** Zoom lens | 1.3-1.8:1 |



# Replacing the Fuse

**WARNINGS!**

**Disconnect power before servicing.**

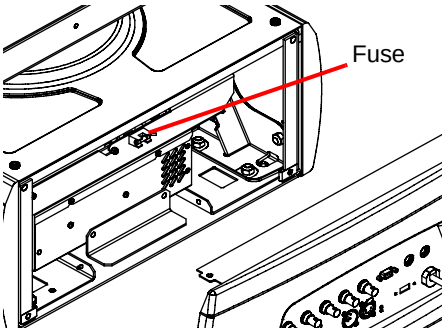
**Replace fuses with the specified type and rating only.**

**Equipment surfaces may reach temperatures up to 130° C (266° F). Allow the fixture to cool before handling.**

The DL.3 has one user-serviceable fuse which controls mains voltage to the fixture.

To replace a fuse:

1. Disconnect power to the fixture. If the fixture has been operating, allow the fixture to cool before handling.
2. Loosen the 2 Phillips head screws on the top cover of the connector side of the box.
3. Tilt the connector panel away from the box
4. Remove the fuse from the fuse holder.
5. Replace the fuse with a 5A, slow-blow fuse *only*.
6. Replace the side and top panels.



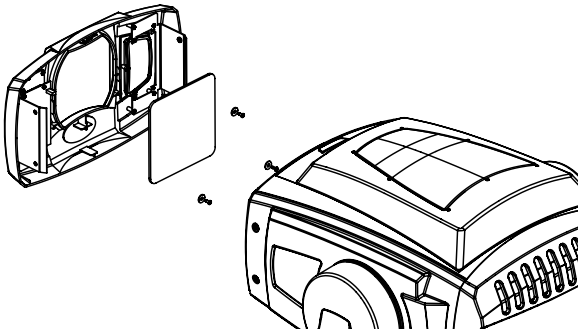
# Cleaning or Replacing the Front Window

**WARNINGS!**

**Disconnect power before servicing.**

**Equipment surfaces may reach temperatures up to 130° C (266° F). Allow the fixture to cool before handling.**

To access the front window:



1. Unlatch and remove the front bezel.
2. Disconnect power to infrared illuminator.
3. Inside the bezel, locate the three Phillips head screws and washers securing the front window in place.
4. Remove the three screws with washers that hold the window to the bezel, making sure not to misplace the washers.
5. Clean the front window using a mild glass cleaner (containing no ammonia) and a soft, lint-free cotton cloth.
6. If the window needs replacement, use the part specified in *Related Products and Accessories* on page 4.
7. Carefully replace the Phillips screws and washers, making sure not to break the glass.

**CAUTION!**

**Use plastic washers only when replacing the front glass. Using metal washers can damage the glass.**

8. Reconnect power to the infrared illuminator
9. Replace the front bezel.

# Replacing Motor Driver Boards

**WARNINGS!**

**Disconnect power before servicing.**

**Replace fuses with the specified type and rating only.**

**Equipment surfaces may reach temperatures up to 130° C (266° F). Allow the fixture to cool before handling.**

The DL.3 fixture is designed with two motor driver boards:

1. The board that controls the motors for the tilt, focus, zoom, and iris functions as well as fans is located in the fixture head.
2. The board that drives pan motor and fans is located in the base housing.

All cabling is marked with labels corresponding to locations on board for easy replacement. When changing a board, align the screw holes and standoffs to ensure correct orientation in the fixture.

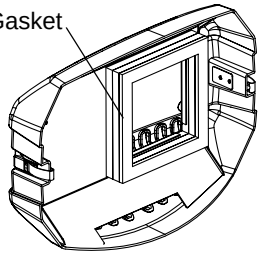
**CAUTION!**
**The fixture will not function correctly if contact screws are missing from driver boards.**

## Fixture Head Driver Board

To replace the fixture head driver board:

1. Disconnect power to the fixture and allow it to cool.
2. Unlatch the two rear latches and remove the rear bezel.
3. Use a 3mm allen wrench to remove the addressing screws and star washers.
4. Position new board against module aligning the center top standoff. Place contact screw(s) in the appropriate position.

   ***NOTE: When installing a replacement driver board on a module, always place a star washer between an address screw and the pad on the logic board to ensure good electrical contact.***




5. Carefully replace the rear bezel, making sure to place (but *do not force*) the gasket over the lamp cover located on the back of the projector.
6. Ensure that the fixture is on a solid surface. Select **Calibrate Motors** through the Test_Home menu screen and leave the fixture undisturbed for 10 minutes while calibration occurs.

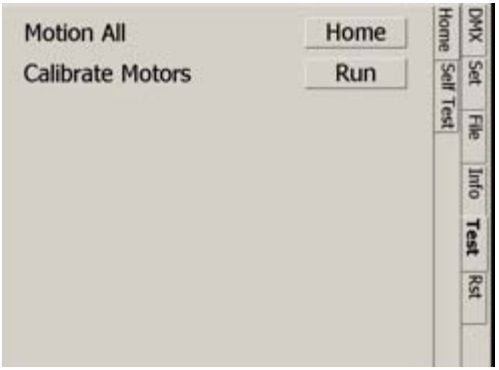
## Replacing Fixture Base Driver Board

To replace motor driver board located in the fixture base housing:

1. Disconnect power to the fixture. If the fixture has been operating, allow the fixture to cool before handling.
2. Loosen the two phillips head screws on menu display panel side of the Box cover
3. Loosen screws on menu display panel and gently open away from the fixture leaving the harness cabling attached.
4. The driver board for pan functions and fans is located directly behind the display.
5. After detaching all cabling, pull board out and replace.

**CAUTION!**
**The fixture will not function correctly if contact screws are missing from driver boards.**

6. Reattach cables.
7. Replace the side panel and top cover. Make sure you align the assembly properly when inserting; damage to the fixture can result from improper alignment.
8. Ensure that the fixture is on a solid surface. Select ***Calibrate Motors*** in the **Test_Home** menu screen and leave the fixture undisturbed for 10 minutes while the calibration process completes.



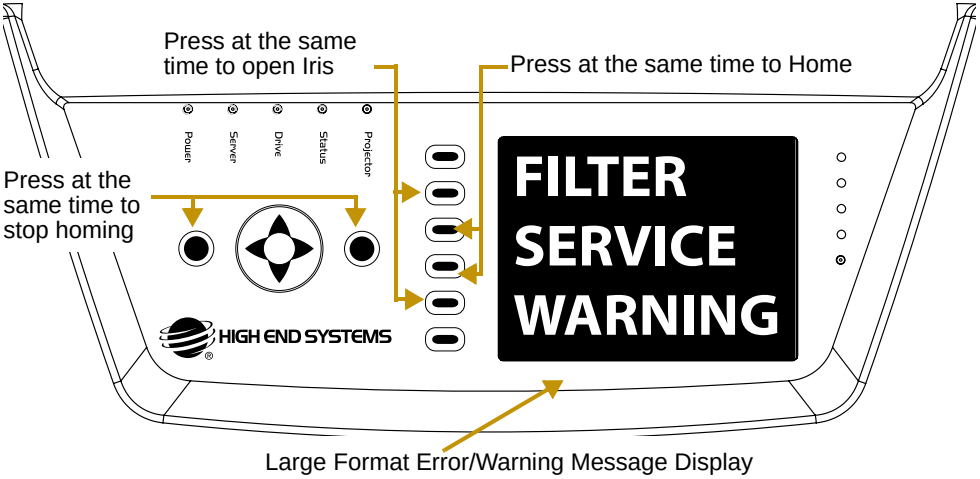
# Troubleshooting

This section discusses troubleshooting LED states and general troubleshooting suggestions.

## Button Shortcut Commands

DL.3 fixtures have button commands available for controlling and overriding functionality when you are troubleshooting your fixture.

- Holding the [Menu] & [Enter] buttons for more than two seconds disables motion system. Motors are still energized so unit can be pointed for trouble shooting. To Exit this mode, press the [Menu] & [Enter] buttons again for two seconds, or send a Global Reset command.
- Holding down the middle two menu Tab Select buttons for more than two seconds initiates a Global Reset of the motion hardware and homes the unit.
- Holding down the second from the top and second from the bottom Tab Select buttons for more than two seconds opens the iris when the fixture software is not running to allow navigation for content upgrades and motion uploads. To Exit this mode, press the same button combination again for more than two seconds.




## Status Message Menu Display

The fixture menu displays error/warning information in two ways. The first is the large block format that can be viewed from a distance when the menu is idle. When there is more than one message, the large format display cycles through the messages. Each message displays for 3 seconds before cycling to the next message and continues looping through these messages until they have been cleared internally or you interact with the menu.

## Button Action

When in the large format display, pressing any button reverts to the normal menu display showing the Detailed Message Display pane in the Info_Status tab of the menu. At that point, you can view the detailed information for the error/warning messages or navigate elsewhere.


## Inactivity Timer

After 30 seconds of inactivity from the display navigation/editing buttons has passed, the display returns to the large format error display should there be any new messages to be displayed or if there is a persistent error. A persistent error is a case where the error condition continues to occur.

The second way to view Status messages is by navigating to the Info_Status screen. This screen displays current error or status messages. If there are multiple error/warning messages displayed, use the up/down arrows to scroll through the list in the top pane. When an item is highlighted in the top pane, the bottom pane details information associated with that error.

## Supported Error/Warning Messages

| Issue | Large Format Message | Message Detail | Notes |
|---|---|---|---|
| Projector Temperature Status | Info_Status tab only<br>This message does not appear in large format | PROJ STATUS-COOLING<br>The projector must cool down before it can re-strike the lamp | This message will end when the fixture has reached the recommended operational temperature |
| Motion Shut Down Status | | Motion Shut Down<br>The Motion Systems is in shut down mode. To return to normal operation, power cycle or perform a HOME ALL | Home the fixture through the menu system “Test_Home_ Motion All_Home” screen, the CMA, (see *page 287*) or from the DMX console (see *page 242*). |
| Camera Communication Error | CAMERA COMM ERROR | The system is unable to communicate with the Camera. | Check the Ribbon cable connections at the camera and the head card. (the Blue side should be facing out).<br>Use the camera’s zoom buttons to check that the camera has power. |
| Filter Missing Error | FILTER MISSING ERROR | Filter not present. Insert Filter! | See *Cleaning and Replacing Filters* on page 300 |
| Service Filter Error | FILTER SERVICE ERROR | Filter needs Servicing. Replace Filter NOW. | |
| Filter Service Warning | FILTER SERVICE WARN | Filter needs Servicing. Replace Filter SOON. | See *Cleaning and Replacing Filters* on page 300 |

| Issue | Large Format Message | Message Detail | Notes |
|---|---|---|---|
| Projector Lamp Life Error | LAMP LIFE ERROR | The Lamp has exceeded its rated life and must be replaced now. | See *Replacing the Lamp* on page 303. |
| Projector Lamp Life Warning | LAMP LIFE WARN | The Lamp is nearing the end of it's rated life. Replace soon | |
| Projector Communication Error | PROJ COMM ERROR | The system is unable to communicate to the Projector. | Check the Comm cable connections at serial port on the back of projector and at the fixture head card.<br>Make sure lamp is struck |
| Projector Temperature Fail Error | PROJ TEMP ERROR | Projector temperature has exceeded operational range and has shutdown | Cool fixture and then restrike the lamp |
| Projector Temperature Warning | PROJ TEMP WARN | Projector is over recommended operating temperature | |
| USB port Communication Error | USB INIT ERROR | The PC failed to initialize USB communication with the box card. | Contact High End Systems Customer Support |
| USB port Security Error | USB SECURE ERROR | USB failed to pass the hardware security test. | |

## System State LEDs

Five labeled LEDs on the display panel indicate the following system activity:

| Name | Color | State | Description |
|---|---|---|---|
| Projector | White | On | Projector lamp is on |
| | | Off | Projector lamp is off |
| | | Blinking | Projector lamp is either cooling down or in a indeterminate state |
| Status | Green | On | (45 sec On/1.4 sec.Off) Running normal motion-control code |
| | | Blinking | Board communication activity; for example, during a software upload |
| | | Blinking Slowly | 320 processor card in the base housing is receiving code. |
| Drive | Amber | Blinking | Hard drive activity |
| Server | Blue | Steady | Internal computer is receiving power |
| Power | Red | Steady | Fixture's Motion Control system is receiving power |

## Board LED States

LEDs located on DL.3 fixture boards indicate how the unit is functioning. The following Table lists LED States, and problems they may indicate.

| Location | LED # | State | Problem? | Description |
|---|---|---|---|---|
| Fixture Head Card | LD1 | Steady Orange | No | S3 (iris) sensor open |
| | | Red, Green or OFF | Yes | Link communication error |
| | LD2 | Slow Flashing Green | No | Running system code, normal operation |
| | | Fast Flashing Green | Maybe | Running boot code, expecting or updating firmware |
| | | Red, Green or OFF | Yes | No firmware or power |
| Base Housing Card | LD1 | Flashing Green | No | Normal operation |
| | | Flashing Red | Maybe | Updating firmware |
| | LD2 | Off | Maybe | No DMX send or received |
| | | Green | No | Receiving DMX |
| | | Red | Maybe | Transmitting DMX |
| | LD3 | Steady Orange | No | Normal Operation |
| | | Red, Green or OFF | Yes | Link Communication error |

## General Troubleshooting Suggestions

The following table shows general troubleshooting suggestions:

| Problem | Solution |
|---|---|
| Won't power on | • Check the fuse (*page 304*).<br>• Verify fixture is plugged in to an appropriately-rated power source (power ratings are shown on *page 360*).<br>• Check power cord wiring |
| During certain movements the fixture motion slows, missteps or loses position | • If you have loosened or tightened anything in the pan and tilt assemblies, the stepper motors may be out of alignment. Recalibrate pan and tilt motors by selecting Calibrate Motors button in the Test_Home menu screen. |
| Powers on but no image | • Is the mechanical iris closed? If so, check the setting for the Dimmer parameter, (see *Dimmer* on page 241.)<br>• Did you recently change inputs? About 10 seconds are required for an input change to take effect. However, you might have selected an invalid input using projector controls.<br>Try setting the projector back its defaults, (see *Reset Screen* on page 40. Or use DMX to exit the projector menu system (see *Projector Control* on page 243).<br>• Make sure a video input is physically attached to the input you selected, and that the video feed is active. |
| Image appears "clipped off" at the bottom | • This occurs when the iris plate is in the wrong position for the installed lens and lens shift is not engaged. Standard, Accessory Wide Angle and Accessory Ultra Long Throw lenses use one position. The Accessory Long Throw lens use another (see *Adjusting the Iris Plate for the Accessory Long Zoom lens* on page 305). |

| Problem | Solution |
|---|---|
| Image is blurry, out of focus, or colors are unnatural | • Check the Fixture filters (see *page 301*).<br>• Is the DL.3 mounted less than 1.4 meters to an object? If so, move the DL.3 farther away to enable it to focus properly.<br>• Make sure the DL.3 is not operating near fog machines, hazers, or mineral oil hazers (see See “Fog Machine Warning” on page 10.)<br>• Clean the front window (see *Cleaning or Replacing the Front Window* on page 308).<br>• Check the lamp (see the projector manual shipped with the DL.3).<br>• If you’re using the projector’s on-screen programming system, you can override zoom and focus using the menu system (see *Projector Control* on page 243.) |
| The LCD Menu display is off | • If the Blue LED is off, the Computer isn’t receiving power. Press and hold the Top and Bottom Tab select buttons to restart computer, (see *Menu Panel Components* on page 23.)<br>• If the screen is not backlit, press the LCD power button, (see *LCD Display Adjustment Buttons* on page 24.)<br>• Check the Video In Video Out adapter on the video card (middle plug) connection.<br>• Check that the connectors for the composite video cable at the LCD Screen and the Video card are seated securely. |
| Fixture behaves erratically or won’t respond to DMX control | • Verify that the last unit on the DMX link is properly terminated, (see *Linking DL.3 Fixtures* on page 13.<br>• To control the DL.3 with DMX, you must first enable DMX through the menu System (see *DMX_Control Screen* on page 30) or the CMA (see *DL.3 and DL.2 Media Server Configuration Options* on page 282).<br>• If you’re using DMX to control the projector using its native menu system, make sure you send a safe command after each button command; otherwise, its analogous to pressing a button on the projector menu system and not releasing it (see page *Projector Control* on page 243). |

## Frequently Asked Questions

***How are DL.3 fixture IP addresses determined? In environments that utilize numerous DL.3s, is there risk of IP address conflicts?***

DL.3 fixture IP addresses are determined one of two ways:

1. When using DHCP server (like router) IP is generated automatically
2. Without router IP is generated randomly by Windows called *Auto IP*

The generation of IP addresses is handled just as IP addresses are handled for Window networks

***Is there a limit to the Ethernet cable run length from the fixtures to the CMA?***

Ethernet Cat 5 limit is 100 meters. For longer distances use a router that takes fiber input to Cat 5 output as for typical Ethernet distribution.

***What is the longest length High End Systems has tested for camera video distribution?***

High End has tested up to 1000 feet of quality Cat 5 without noticing degradation of signal.

***Does DL.3 support the file format "MPEG-4"?***

MPEG-4 is not currently supported. Convert original graphics and video to MPEG 2.

# Chapter 18:

# Restoring the System

***You can perform a system restore on a DL.3, Axon, or DL.2 Server with your System Restore CD.***

A system restore will replace the following components:

- Microsoft Windows Embedded Operating System
- Application

The system restore does not replace the Settings, the Stock content, or User content.

## Hardware Requirements

**Caution: Contact High End Systems Support (http://www.highend.com) PRIOR to initiating a Full Restore!**

A system restore can be done to replace the O/S partition of the drive, but should only be done as part of a specified upgrade plan. In that case, the XPe image the fixture shipped with will need to be updated.

All system restore operations require the System Restore CD that ships with each media server. If you have misplaced or damaged this CD, you may contact High End Systems (http://www.highend.com) for a replacement.

For a system restore, you will also need:

- External USB CD drive (for DL.3 and DL.2 fixtures only)
- USB keyboard
- Optional USB mouse, which may require the addition of a USB hub for DL.2 fixtures.

## Performing the System Restore

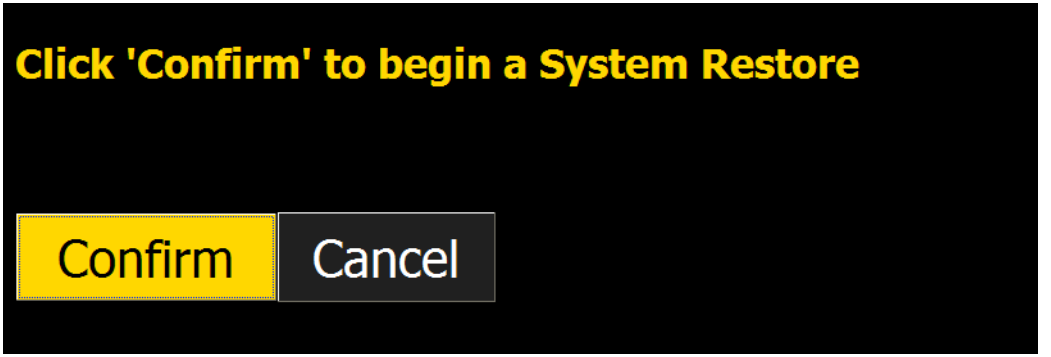
Use the following steps to perform a system restore.

1. Plug your USB CD or DVD drive, keyboard, and mouse (optional) into one of the external USB ports on the media server. On DL.3 and DL.2 fixtures, you may need to use a USB hub, although this should only be a requirement if you wish to use a mouse.
2. Power on or reboot the media server. The System Restore menu will display on the Axon monitor or the Menu Screen on DL.3 and DL.2 fixtures.
3. When the fixture boots and the High End Systems logo is seen, press F8 (Asus) or F10 (Intel) to enter the boot menu for the respective motherboard.
4. Select the appropriate boot device and when you see “Hit any key to boot from CD...”, press a key on your keyboard.

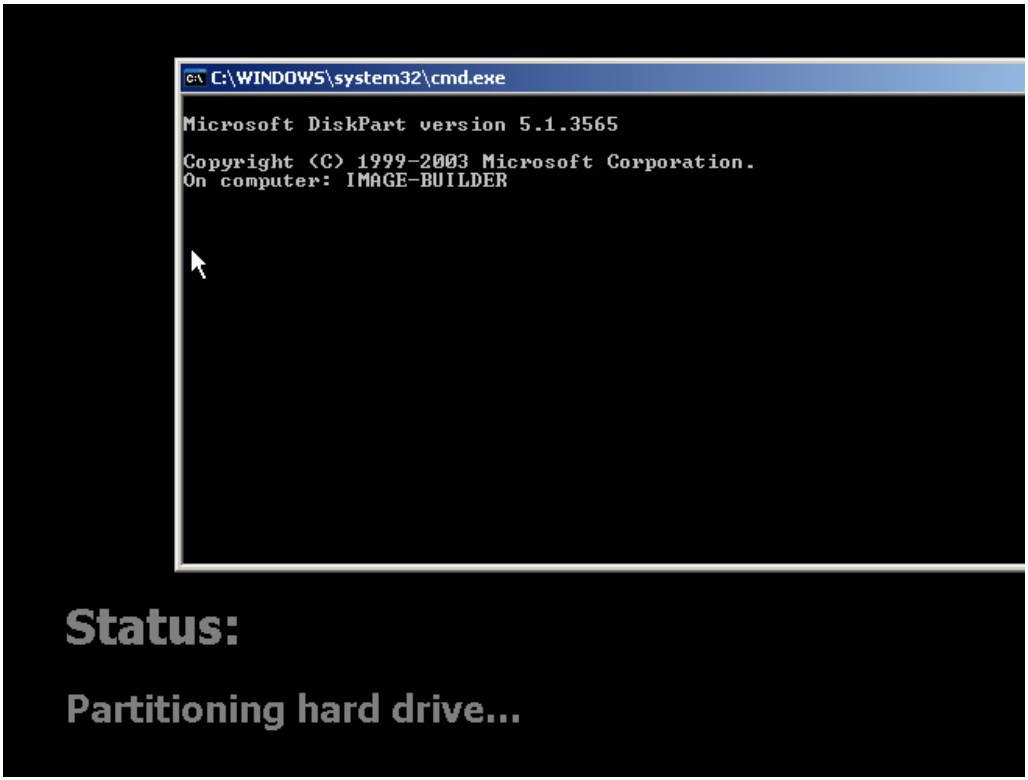
***NOTE:*** ***Pressing* Tab *on the keyboard when booting the fixture displays the mother-board information.***

5. Allow the System Restore menu to load. Depending on the speed of your USB drive, it will take between 3-5 minutes load. During this time, a number of small windows will appear and disappear. Wait until you see a full-screen menu titled *Axon System Restore Menu* or *DL.2 System Restore Menu*.

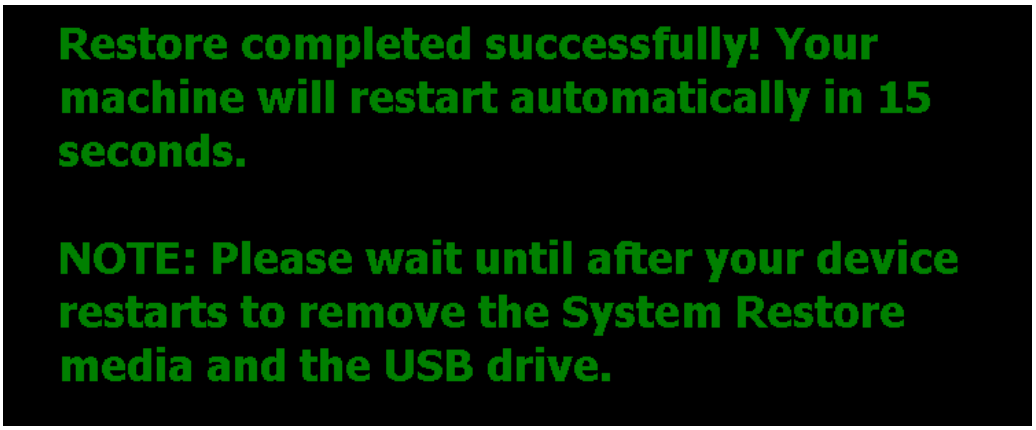

6. Using the <Tab> key on your keyboard or using your mouse, select the system restore option or Exit to cancel the operation.
7. The next page will ask you to confirm your selection. Press 'Confirm' and the restore will begin.



8. Allow the restore to run. This will take between 10-30 minutes depending on the speed of your USB drive. Status will be displayed throughout the restore.

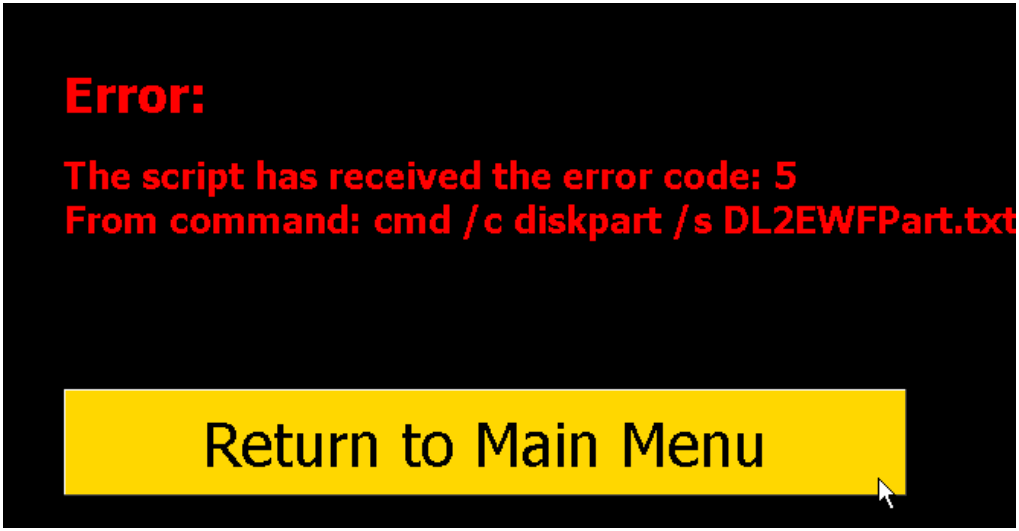



9. When this part of the restore is completed, the media server will automatically restart.




10. After allowing a few minutes for the media server to reconfigure, the upgrade is complete, you may remove all your external USB devices.

*NOTE: If you encounter an error, press the Return to Main Menu button and start the recovery process again. An error on the second attempt may indicate a hard drive failure or damaged DVD. In that case, contact High End Systems Technical Support at www.highend.com..*



# Appendix A:
# DMX Protocol

*DL.3 and DL.2 Digital Lights, and Axon Media Servers utilize the same DMX protocol with the following variations:*

- *DL.3 and DL.2 fixtures include channels for motion and camera control*
- *DL.2 and original Axon media servers allow a maximum of four Graphic Objects instead of nine*

The following tables list the parameters and their associated DMX channel number(s). The range for a server on the DMX link depends on the number of Graphic Objects you select for your application. For more detailed information on DMX Protocol, please contact customer support at High End Systems.

***NOTE: Gray shaded parameters are not available in Version 1 Protocol***

## DL.3 and DL.2 Version 2 DMX Channel Assignment

### DL.3 and DL.2 Mechanical Control

| Parameter Name | DMX Chan # |
|---|---|
| ***Motion Functions*** | |
| Pan | 1 |
| | 2 |
| Tilt | 3 |
| | 4 |
| Dimmer | 5 |
| Focus | 6 |
| Zoom | 7 |
| MSpeed | 8 |
| Macro | 9 |
| Control | 10 |
| ***Camera Functions (Not in DL.3F fixtures)*** | |
| Zoom | 11 |
| | 12 |
| Focus | 13 |
| | 14 |
| Infrared | 15 |
| Camera Shutter | 16 |
| White Balance | 17 |
| Camera Orientation | 18 |
| Camera Effects | 19 |
| Red Gain | 20 |
| Blue Gain | 21 |

## DL.3 and DL.2 Global Control

| Parameter Name | DMX Chan # |
|---|---|
| Global Intensity | 22 |
| Global Effect 1 | 23 |
| Global Effect 1 Modifier 1 | 24 |
| Global Effect 1 Modifier 2 | 25 |
| Global Effect 1 Modifier 3 | 26 |
| Global Effect 2 | 27 |
| Global Effect 2 Modifier 1 | 28 |
| Global Effect 2 Modifier 2 | 29 |
| Global Effect 2 Modifier 3 | 30 |
| Global Effect 3 | 31 |
| Global Effect 3 Modifier 1 | 32 |
| Global Effect 3 Modifier 2 | 33 |
| Global Effect 3 Modifier 3 | 34 |
| Global Effect 4 | 35 |
| Global Effect 4 Modifier 1 | 36 |
| Global Effect 4 Modifier 2 | 37 |
| Global Effect 4 Modifier 3 | 38 |
| Global Effect 5 | 39 |
| Global Effect 5 Modifier 1 | 40 |
| Global Effect 5 Modifier 2 | 41 |
| Global Effect 5 Modifier 3 | 42 |
| Mask Select (default iris) | 43 |
| Mask Size | 44 |
| Mask Edge | 45 |
| Edge Fade Top | 46 |
| Edge Fade Right | 47 |
| Edge Fade Bottom | 48 |
| Edge Fade Left | 49 |

| Parameter Name | DMX Chan # |
|---|---|
| Keystone Top Left X | 50 |
| Keystone Top Left Y | 51 |
| Keystone Top Right X | 52 |
| Keystone Top Right Y | 53 |
| Keystone Bottom Right X | 54 |
| Keystone Bottom Right Y | 55 |
| Keystone Bottom Left X | 56 |
| Keystone Bottom Left Y | 57 |
| Keystone X Ratio | 58 |
| Keystone Y Ratio | 59 |
| Framing Top Left X | 60 |
| Framing Top Left Y | 61 |
| Framing Top Right X | 62 |
| Framing Top Right Y | 63 |
| Framing Bottom Right X | 64 |
| Framing Bottom Right Y | 65 |
| Framing Bottom Left X | 66 |
| Framing Bottom Left Y | 67 |
| Viewpoint mode | 68 |
| Viewpoint Position X | 69 |
| | 70 |
| Viewpoint Position Y | 71 |
| | 72 |
| VIewpoint Position Z | 73 |
| | 74 |
| Global Control | 75 |
| Global Control Modifier | 76 |

## DL.3 and DL.2 Graphic Object Control

| Parameter Name | DMX Channel # *(Objects 5-9 not available in DL.2 Servers)* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Obj.1 | Obj.2 | Obj.3 | Obj.4 | Obj.5 | Obj.6 | Obj.7 | Obj.8 | Obj.9 |
| Opacity | 77 | 122 | 167 | 212 | 257 | 302 | 347 | 392 | 437 |
| 3-D Object File | 78 | 123 | 168 | 213 | 258 | 303 | 348 | 393 | 438 |
| Media Folder | 79 | 124 | 169 | 214 | 259 | 304 | 349 | 394 | 439 |
| Media File | 80 | 125 | 170 | 215 | 260 | 305 | 350 | 395 | 440 |
| In Frame | 81 | 126 | 171 | 216 | 261 | 306 | 351 | 396 | 441 |
| | 82 | 127 | 172 | 217 | 262 | 307 | 352 | 397 | 442 |
| Out Frame | 83 | 128 | 173 | 218 | 263 | 308 | 353 | 398 | 443 |
| | 84 | 129 | 174 | 219 | 264 | 309 | 354 | 399 | 444 |
| Play Mode | 85 | 130 | 175 | 220 | 265 | 310 | 355 | 400 | 445 |
| Play Speed | 86 | 131 | 176 | 221 | 266 | 311 | 356 | 401 | 446 |
| Sync Type | 87 | 132 | 177 | 222 | 267 | 312 | 357 | 402 | 447 |
| Sync To | 88 | 133 | 178 | 223 | 268 | 313 | 358 | 403 | 448 |
| Visual Mode | 89 | 134 | 179 | 224 | 269 | 314 | 359 | 404 | 449 |
| Visual Mode Modifier 1 | 90 | 135 | 180 | 225 | 270 | 315 | 360 | 405 | 450 |
| Visual Mode Modifier 2 | 91 | 136 | 181 | 226 | 271 | 316 | 361 | 406 | 451 |
| Graphic Effect 1 | 92 | 137 | 182 | 227 | 272 | 317 | 362 | 407 | 452 |
| Effect 1 Modifier 1 | 93 | 138 | 183 | 228 | 273 | 318 | 363 | 408 | 453 |
| Effect 1 Modifier 2 | 94 | 139 | 184 | 229 | 274 | 319 | 364 | 409 | 454 |
| Effect 1 Modifier 3 | 95 | 140 | 185 | 230 | 275 | 320 | 365 | 410 | 455 |
| Graphic Effect 2 | 96 | 141 | 186 | 231 | 276 | 321 | 366 | 411 | 456 |
| Effect 2 Modifier 1 | 97 | 142 | 187 | 232 | 277 | 322 | 367 | 412 | 457 |
| Effect 2 Modifier 2 | 98 | 143 | 188 | 233 | 278 | 323 | 368 | 413 | 458 |
| Effect 2 Modifier 3 | 99 | 144 | 189 | 234 | 279 | 324 | 369 | 414 | 459 |
| Graphic Effect 3 | 100 | 145 | 190 | 235 | 280 | 325 | 370 | 415 | 460 |
| Effect 3 Modifier 1 | 101 | 146 | 191 | 236 | 281 | 326 | 371 | 416 | 461 |
| Effect 3 Modifier 2 | 102 | 147 | 192 | 237 | 282 | 327 | 372 | 417 | 462 |
| Effect 3 Modifier 3 | 103 | 148 | 193 | 238 | 283 | 328 | 373 | 418 | 463 |
| X-axis rotation | 104 | 149 | 194 | 239 | 284 | 329 | 374 | 419 | 464 |
| | 105 | 150 | 195 | 240 | 285 | 330 | 375 | 420 | 465 |
| Y -axis rotation | 106 | 151 | 196 | 241 | 286 | 331 | 376 | 421 | 466 |
| | 107 | 152 | 197 | 242 | 287 | 332 | 377 | 422 | 467 |
| Z-axis rotation | 108 | 153 | 198 | 243 | 288 | 333 | 378 | 423 | 468 |
| | 109 | 154 | 199 | 244 | 289 | 334 | 379 | 424 | 469 |
| Scale X | 110 | 155 | 200 | 245 | 290 | 335 | 380 | 425 | 470 |
| | 111 | 156 | 201 | 246 | 291 | 336 | 381 | 426 | 471 |
| Scale Y | 112 | 157 | 202 | 247 | 292 | 337 | 382 | 427 | 472 |
| | 113 | 158 | 203 | 248 | 293 | 338 | 383 | 428 | 473 |
| Scale Z | 114 | 159 | 204 | 249 | 294 | 339 | 384 | 429 | 474 |
| | 115 | 160 | 205 | 250 | 295 | 340 | 385 | 430 | 475 |
| X Position | 116 | 161 | 206 | 251 | 296 | 341 | 386 | 431 | 476 |
| | 117 | 162 | 207 | 252 | 297 | 342 | 387 | 432 | 477 |
| Y Position | 118 | 163 | 208 | 253 | 298 | 343 | 388 | 433 | 478 |
| | 119 | 164 | 209 | 254 | 299 | 344 | 389 | 434 | 479 |
| Z Position | 120 | 165 | 210 | 255 | 300 | 345 | 390 | 435 | 480 |
| | 121 | 166 | 211 | 256 | 301 | 346 | 391 | 436 | 481 |

# Axon Media Server Version 2 DMX Channel Assignment

***NOTE: Gray shaded parameters are not available in Version 1 Protocol***

## Axon Global Control

| Parameter Name | DMX Chan # | Parameter Name | DMX Chan # |
|---|---|---|---|
| Global Intensity | 1 | Keystone Top Left X | 29 |
| Global Effect 1 | 2 | Keystone Top Left Y | 30 |
| Global Effect 1 Modifier 1 | 3 | Keystone Top Right X | 31 |
| Global Effect 1 Modifier 2 | 4 | Keystone Top Right Y | 32 |
| Global Effect 1 Modifier 3 | 5 | Keystone Bottom Right X | 33 |
| Global Effect 2 | 6 | Keystone Bottom Right Y | 34 |
| Global Effect 2 Modifier 1 | 7 | Keystone Bottom Left X | 35 |
| Global Effect 2 Modifier 2 | 8 | Keystone Bottom Left Y | 36 |
| Global Effect 2 Modifier 3 | 9 | Keystone X Ratio | 37 |
| Global Effect 3 | 10 | Keystone Y Ratio | 38 |
| Global Effect 3 Modifier 1 | 11 | Framing Top Left X | 39 |
| Global Effect 3 Modifier 2 | 12 | Framing Top Left Y | 40 |
| Global Effect 3 Modifier 3 | 13 | Framing Top Right X | 41 |
| Global Effect 4 | 14 | Framing Top Right Y | 42 |
| Global Effect 4 Modifier 1 | 15 | Framing Bottom Right X | 43 |
| Global Effect 4 Modifier 2 | 16 | Framing Bottom Right Y | 44 |
| Global Effect 4 Modifier 3 | 17 | Framing Bottom Left X | 45 |
| Global Effect 5 | 18 | Framing Bottom Left Y | 46 |
| Global Effect 5 Modifier 1 | 19 | Viewpoint mode | 47 |
| Global Effect 5 Modifier 2 | 20 | Viewpoint Position X | 48 |
| Global Effect 5 Modifier 3 | 21 | | 49 |
| Mask Select (default iris) | 22 | Viewpoint Position Y | 50 |
| Mask Size | 23 | | 51 |
| Mask Edge | 24 | VIewpoint Position Z | 52 |
| Edge Fade Top | 25 | | 53 |
| Edge Fade Right | 26 | Global Control | 54 |
| Edge Fade Bottom | 27 | Global Control Modifier | 55 |
| Edge Fade Left | 28 | | |

## Axon Graphic Object Control

| Parameter Name | DMX Channel # *(Objects 5-9 not available in Original Axon Servers)* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Obj.1 | Obj.2 | Obj.3 | Obj.4 | Obj.5 | Obj.6 | Obj.7 | Obj.8 | Obj.9 |
| Opacity | 56 | 101 | 146 | 191 | 236 | 281 | 326 | 371 | 416 |
| 3-D Object File | 57 | 102 | 147 | 192 | 237 | 282 | 327 | 372 | 417 |
| Media Folder | 58 | 103 | 148 | 193 | 238 | 283 | 328 | 373 | 418 |
| Media File | 59 | 104 | 149 | 194 | 239 | 284 | 329 | 374 | 419 |
| In Frame | 60 | 105 | 150 | 195 | 240 | 285 | 330 | 375 | 420 |
| | 61 | 106 | 151 | 196 | 241 | 286 | 331 | 376 | 421 |
| Out Frame | 62 | 107 | 152 | 197 | 242 | 287 | 332 | 377 | 422 |
| | 63 | 108 | 153 | 198 | 243 | 288 | 333 | 378 | 423 |
| Play Mode | 64 | 109 | 154 | 199 | 244 | 289 | 334 | 379 | 424 |
| Play Speed | 65 | 110 | 155 | 200 | 245 | 290 | 335 | 380 | 425 |
| Sync Type | 66 | 111 | 156 | 201 | 246 | 291 | 336 | 381 | 426 |
| Sync To | 67 | 112 | 157 | 202 | 247 | 292 | 337 | 382 | 427 |
| Visual Mode | 68 | 113 | 158 | 203 | 248 | 293 | 338 | 383 | 428 |
| Visual Mode Modifier 1 | 69 | 114 | 159 | 204 | 249 | 294 | 339 | 384 | 429 |
| Visual Mode Modifier 2 | 70 | 115 | 160 | 205 | 250 | 295 | 340 | 385 | 430 |
| Graphic Effect 1 | 71 | 116 | 161 | 206 | 251 | 296 | 341 | 386 | 431 |
| Effect 1 Modifier 1 | 72 | 117 | 162 | 207 | 252 | 297 | 342 | 387 | 432 |
| Effect 1 Modifier 2 | 73 | 118 | 163 | 208 | 253 | 298 | 343 | 388 | 433 |
| Effect 1 Modifier 3 | 74 | 119 | 164 | 209 | 254 | 299 | 344 | 389 | 434 |
| Graphic Effect 2 | 75 | 120 | 165 | 210 | 255 | 300 | 345 | 390 | 435 |
| Effect 2 Modifier 1 | 76 | 121 | 166 | 211 | 256 | 301 | 346 | 391 | 436 |
| Effect 2 Modifier 2 | 77 | 122 | 167 | 212 | 257 | 302 | 347 | 392 | 437 |
| Effect 2 Modifier 3 | 78 | 123 | 168 | 213 | 258 | 303 | 348 | 393 | 438 |
| Graphic Effect 3 | 79 | 124 | 169 | 214 | 259 | 304 | 349 | 394 | 439 |
| Effect 3 Modifier 1 | 80 | 125 | 170 | 215 | 260 | 305 | 350 | 395 | 440 |
| Effect 3 Modifier 2 | 81 | 126 | 171 | 216 | 261 | 306 | 351 | 396 | 441 |
| Effect 3 Modifier 3 | 82 | 127 | 172 | 217 | 262 | 307 | 352 | 397 | 442 |
| X-axis rotation | 83 | 128 | 173 | 218 | 263 | 308 | 353 | 398 | 443 |
| | 84 | 129 | 174 | 219 | 264 | 309 | 354 | 399 | 444 |
| Y -axis rotation | 85 | 130 | 175 | 220 | 265 | 310 | 355 | 400 | 445 |
| | 86 | 131 | 176 | 221 | 266 | 311 | 356 | 401 | 446 |
| Z-axis rotation | 87 | 132 | 177 | 222 | 267 | 312 | 357 | 402 | 447 |
| | 88 | 133 | 178 | 223 | 268 | 313 | 358 | 403 | 448 |
| Scale X | 89 | 134 | 179 | 224 | 269 | 314 | 359 | 404 | 449 |
| | 90 | 135 | 180 | 225 | 270 | 315 | 360 | 405 | 450 |
| Scale Y | 91 | 136 | 181 | 226 | 271 | 316 | 361 | 406 | 451 |
| | 92 | 137 | 182 | 227 | 272 | 317 | 362 | 407 | 452 |
| Scale Z | 93 | 138 | 183 | 228 | 273 | 318 | 363 | 408 | 453 |
| | 94 | 139 | 184 | 229 | 274 | 319 | 364 | 409 | 454 |
| X Position | 95 | 140 | 185 | 230 | 275 | 320 | 365 | 410 | 455 |
| | 96 | 141 | 186 | 231 | 276 | 321 | 366 | 411 | 456 |
| Y Position | 97 | 142 | 187 | 232 | 277 | 322 | 367 | 412 | 457 |
| | 98 | 143 | 188 | 233 | 278 | 323 | 368 | 413 | 458 |
| Z Position | 99 | 144 | 189 | 234 | 279 | 324 | 369 | 414 | 459 |
| | 100 | 145 | 190 | 235 | 280 | 325 | 370 | 415 | 460 |

# Parameter Description and Options

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **MECHANICAL CONTROL** | | | | | |
| **Movement Functions (DL.3, DL.2 fixtures only)** | | | | | |
| **Pan Course** | Moves projector head from 0° to 400° | 0-65535 | 0-100 | 32768 | 50 |
| **Pan Fine** | | | | | |
| **Tilt Course** | Moves projector head from 0° to 240° | 0-65535 | 0-100 | 32768 | 50 |
| **Tilt Fine** | | | | | |
| **Dimmer** | Adjusts the mechanical iris located in front of the projector output lens from closed to open | 0-255 | 0-100 | 0 | 0 |
| **Focus** | Adjusts focus from near to far | 0-255 | 0-100 | 128 | 50 |
| **Zoom** | Adjusts zoom from narrow to wide | 0-255 | 0-100 | 128 | 50 |
| **MSpeed** | See Appendix B for conversion tables | 0-255 | 0-100 | 0 | 0 |
| **Macro** | Reserved for future use | 0-255 | 0-100 | 0 | 0 |
| **Control Function**<br><br>*(To prevent inadvertent triggering, some Control Function options will not activate until the value has been held for a period of time.*<br>*A number in parenthesis is the minimum number of consecutive times a DMX value must be received from a controller before the operation begins.)* | ***Fixture Movement and Camera Control Options (Set Dimmer Channel = 0 except for MSpeed Off)*** | | | 0 | 0 |
| | Pan and Tilt MSpeed off | 10-13 | NA | | |
| | Reserved | 14-19 | | | |
| | Menu Display Off (5) | 20-28 | | | |
| | Reserved | 29 | | | |
| | Menu Display Dim (5) | 30-38 | | | |
| | Reserved | 39 | | | |
| | Menu Display Bright (5) | 40-48 | | | |
| | Reserved | 49 | | | |
| | Preview | 50-58 | | | |
| | Reserved | 59 | | | |
| | Home All (20) | 60-68 | | | |
| | Reserved | 69-79 | | | |
| | Lamp ON (80) | 80-88 | | | |
| | Reserved | 89 | | | |
| | Lamp OFF (80) | 90-98 | | | |
| | Reserved | 99-119 | | | |
| | Shutdown (80) | 120-130 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Control Function**<br><br>*(To prevent inadvertent triggering, some Control Function options will not activate until the value has been held for a period of time.*<br><br>*A number in parenthesis is the minimum number of consecutive times a DMX value must be received from a controller before the operation begins.)* | Reserved | 131-144 | | 0 | 0 |
| | Graphics System Reset (80) | 145-149 | | | |
| | Camera Reset | 150-155 | | | |
| | Home Pan/Tilt (20) | 160-168 | | | |
| | Reserved | 169 | | | |
| | Home Focus/Zoom/Iris (20) | 170-178 | | | |
| | Reserved | 179 | | | |
| | ***Using the Projector's Menu System*** | | | | |
| | Projector Menu | 180-184 | NA | | |
| | Projector Up arrow | 185-188 | | | |
| | Projector Down arrow | 189-192 | | | |
| | Projector Left arrow | 193-196 | | | |
| | Projector Right arrow | 197-200 | | | |
| | Store menu selection | 201-204 | | | |
| | Projector Floor Orientation | 205-208 | | | |
| | Projector Ceiling Orientation | 209-212 | | | |
| | Projector Front Projection | 213-216 | | | |
| | Projector Rear Projection | 217-220 | | | |
| | ***Changing Projector Inputs (Set Dimmer Channel = 0)*** | | | | |
| | External RGBHV to Projector | 221-224 | NA | | |
| | Graphics Engine to Projector (default) | 225-228 | | | |
| | ***Changing Graphics Engine Inputs (Set Dimmer Channel = 0)*** | | | | |
| | S-Video In to Graphic Engine, Internal Camera to Camera Out | 229-232 | NA | | |
| | Internal Camera to Graphics Engine (default) | 233-236 | | | |
| | ***Setting Projector Lens Shift (Set Dimmer Channel = 0)*** ***Available only in DL.3 and DL.3F fixtures.*** | | | | |
| | Lens Shift Engaged (100) | 237-240 | NA | | |
| | Lens Shift Off (100) | 241-244 | | | |
| | ***Setting SDI Switching Mode*** ***Available only in DL.3 fixtures.*** | | | | |
| | Camera Routed to SDI Output (100) | 245-248 | NA | | |
| | SDI Input Routed to Capture Card (100) | 249-252 | | | |
| | Reserved | 253-255 | 99-100 | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Internal Camera Functions (DL.3 and DL.2 fixtures only, reserved in DL.3F fixtures)** | | | | | |
| **Camera Zoom** | Zoom position | 0-65535 | 0-100 | 32768 | 50 |
| **Camera Focus** | Focus position. | 0-511 | 0-100 | 0 | 0 |
| | Manual Focus from In (Far End) to Out (Near End) | 512-65535 | | | |
| **Infrared Illuminator** | Camera's IR sensing off, illuminator off | 0-63 | 0-24 | 0 | 0 |
| | Camera's IR sensing on, illuminator off | 64-127 | 25-49 | | |
| | Camera's IR sensing on, illuminator scaled across the range from FULL to OFF | 128-255 | 50-100 | | |
| **Camera Shutter** | Auto Exposure = Full Auto | 0-63 | 0-25 | 0 | 0 |
| | Auto Exposure = Shutter Priority, Shutter Speed = 30 | 64-95 | 26-38 | | |
| | Auto Exposure = Shutter Priority, Shutter Speed = 15 | 96-126 | 39-49 | | |
| | Auto Exposure = Shutter Priority, Shutter Speed = 8 | 127-157 | 50-62 | | |
| | Auto Exposure = Shutter Priority, Shutter Speed = 4 | 158-188 | 63-74 | | |
| | Auto Exposure = Shutter Priority, Shutter Speed = 2 | 189-219 | 75-86 | | |
| | Auto Exposure = Shutter Priority, Shutter Speed = 1 | 220-255 | 87-100 | | |
| **White Balance Mode** | Auto Balance | 0-63 | 0-25 | 0 | 0 |
| | Indoor | 64-95 | 26-38 | | |
| | Outdoor | 96-127 | 39-49 | | |
| | Enable Manual Red and Blue gain value adjustment | 128-191 | 50-74 | | |
| | Reserved - no change from previous state | 192-255 | 75-100 | | |
| **Camera Orientation** | Flip OFF, Mirror OFF | 0-63 | 0-25 | 0 | 0 |
| | Flip OFF, Mirror ON | 64-127 | 26-50 | | |
| | Flip ON, Mirror OFF | 128-191 | 51-75 | | |
| | Flip ON, MIrror ON | 192-255 | 76-100 | | |
| **Camera Effects** | Freeze Frame OFF, Negative Art, B&W OFF | 0-63 | 0-25 | 0 | 0 |
| | Freeze Frame ON, Negative Art, B&W OFF | 64-127 | 26-49 | | |
| | Freeze Frame OFF, Negative Art, B&W ON | 128-159 | 50-62 | | |
| | Freeze Frame ON, Negative Art, B&W ON | 160-191 | 63-75 | | |
| | Freeze Frame OFF, B&W ON | 192-223 | 76-88 | | |
| | Freeze Frame ON, B&W ON | 224-255 | 89-100 | | |
| **Red Gain** | Red gain adjustment (Requires White Balance Mode = 128-191) | 0-255 | 0-100 | 0 | 0 |
| **Blue Gain** | Blue Gain adjustment (Requires White Balance Mode = 128-191) | 0-255 | 0-100 | 0 | 0 |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **GLOBAL FUNCTIONS** | | | | | |
| **Global Intensity** | Selects intensity level for the composite image | 0-255 | 0-100 | 255 | 100 |
| **Global Effects** | | | | | |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Off, no effects selection | 0 | 0 | 0 | 0 |
| | CMY simulates CMY by subtracting RGB. Reduces color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 1 | NA | | |
| | CMY adds to all pixels. Increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 2 | | | |
| | CMY adds to non-black pixels. Increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 3 | | | |
| | RGB Add, all pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 4 | | | |
| | RGB Add 2, all pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 5 | | | |
| | RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 6 | | | |
| | RGB Swap to GBR. Mod1 = red, Mod2 = green, Mod3 = blue. | 7 | | | |
| | RGB Swap to BRG. Mod1 = red, Mod2 = green, Mod3 = blue. | 8 | | | |
| | Solarize 1 If color value < DMX value, invert color. Mod1 = red, Mod2 = green, Mod3 = blue. | 9 | | | |
| | Solarize 2 If color value > DMX, invert color. Mod1 = red, Mod2 = green, Mod3 = blue. | 10 | | | |
| | Solarize 3 If color value < DMX, set color to 0. Mod1 = red, Mod2 = green, Mod3 = blue. | 11 | | | |
| | Solarize 4 If color value > DMX, set color to 0. Mod1 = red, Mod2 = green, Mod3 = blue. | 12 | | | |
| | DotP and Resample. Mod1, Mod2 and Mod3 control resampling. | 13 | | | |
| | Color Cycle, DMX value controls cycle speed. Mod1 = red, Mod2 = green, Mod3 = blue. | 14 | | | |
| | All or nothing. Mod1 = red, Mod2 = green, Mod3 = blue. | 15 | | | |
| | Solid color RGB, Mod1 = red, Mod2 = green, Mod3 = blue. | 16 | | | |
| | RGB Invert Mod1 = red to cyan, Mod2 = green to magenta, Mod3 = blue to yellow | 17 | | | |
| | RGB Invert & Swap to GBR. Mod1 = red to magenta, Mod2 = green to yellow, Mod3 = blue to cyan | 18 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | RGB Invert & Swap to BRG. Mod1 = red to yellow, Mod2 = green to cyan, Mod3 = blue to magenta | 19 | NA | 0 | 0 |
| | Edge Detect Color. Mod1 = horizontal size, Mod2 = vertical search size, Mod3 = comparison threshold | 20 | | | |
| | Edge Detect B/W. Mod1 = horizontal size, Mod2 = vertical search size, Mod3 = comparison threshold | 21 | | | |
| | Texture Ripple, Horizontal. Mod1 = size, Mod2 = rate, Mod3 = offset | 22 | | | |
| | Texture Ripple, Vertical. Mod1 = size, Mod2 = rate, Mod3 = offset | 23 | | | |
| | Texture Ripple, Circular. Mod1 = size, Mod2 = rate, Mod3 = offset | 24 | | | |
| | Texture Ripple, Asymmetrical Circular. Mod1 = size, Mod2 = rate, Mod3 = offset | 25 | | | |
| | Transparent Color Fine. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 26 | | | |
| | Transparent Color Medium. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 27 | | | |
| | Transparent Color Coarse. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 28 | | | |
| | Transparent Color Invert, Fine. Select key color Mod1 = red, Mod2 = green, Mod3 = blue | 29 | | | |
| | Transparent Color Invert, Medium. Select key color Mod1 = red, Mod2 = green, Mod3 = blue | 30 | | | |
| | Transparent Color Invert, Coarse. Select key color Mod1 = red, Mod2 = green, Mod3 = blue | 31 | | | |
| | Scan Line. Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved | 32 | | | |
| | Transparent wipes. Mod1 = width and transparent area, Mod2 = center of transparent area, Mod3 = transparency mode | 33 | | | |
| | Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 = direction and amount of twist | 34 | | | |
| | Picture-in-Picture. Mod1 = x subpicture center, Mod2 = y subpicture center, Mod3 = subpicture size | 35 | | | |
| | Magnifying lens, Mod1 = x lens center, Mod2 = y lens center, Mod3 lens size | 36 | | | |
| | Magnifying lens 2, Mod1 = x lens center, Mod2 = y lens center, Mod3 = lens size | 37 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Cartoon Edge. Mod1 = Edge Color, Mod2 = Contrast, Mod3 = Edge detection sensitivity | 38 | NA | 0 | 0 |
| | Color DeConverge. Mod1 = Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left | 39 | | | |
| | Horizontal Mirror, Mod1 = mirror center, Mod2 and Mod3 not used | 40 | | | |
| | RGB Swap to BGR. Mod1 = red, Mod2 = green, Mod3 = blue | 41 | | | |
| | RGB Swap to RBG. Mod1 = red, Mod2 = green, Mod3 = blue | 42 | | | |
| | RGB Swap to GRB. Mod1 = red, Mod2 = green, Mod3 = blue | 43 | | | |
| | Colorize Gray Scale maps pixel intensity to color. Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading | 44 | | | |
| | Intensity key turns pixels of selected intensity transparent: Mod1 = Color Scheme, Mod2 = Intensity bandwidth, Mod3 = Transparency level | 45 | | | |
| | Raindrop effect. Mod1 = size/speed, Mod2 = position, and Mod3 = raindrop rate. | 46 | | | |
| | RGB Scale. Mod1 = scale red, Mod2 = scale green, Mod3 = scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range | 47 | | | |
| | Tiling on. Mod1 = x-axis tile scale, Mod2 = y-axis tile scaler, Mod3 = space between lines | 48 | | | |
| | Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha | 49 | | | |
| | Color to Alpha, Inverted. Mod1 = cyan to alpha, Mod2 = magenta to alpha, Mod3 = yellow to alpha | 50 | | | |
| | Texture Mixing. Mod1 = Source media file, Mod2 = Source effect level, Mod3 = Crossfade from original to source texture | 51 | | | |
| | Image Scale and Rotate. Mod1 = scales image, Mod2 = rotation angle, Mod3 = rotation speed | 52 | | | |
| | Film Roll. Mod1 = horizontal roll speed, Mod2 = vertical roll speed, Mod3 = Image scale | 53 | | | |
| | Pixelate. Mod1 = Amount of pixelation, Mod2 = horizontal scale, Mod3 = vertical scale | 54 | | | |
| | Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking | 55 | | | |
| | Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod3 = color peaking | 56 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay | 57 | NA | 0 | 0 |
| | Drop Shadow. Mod1 = horizontal size, Mod2 = vertical size, Mod3 = shadow opacity | 58 | | | |
| | Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom | 59 | | | |
| | Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = Scale | 60 | | | |
| | ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = Scale | 61 | | | |
| | Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade | 62 | | | |
| | Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade | 63 | | | |
| | Reserved. Defaults to effect mode = 0 | 64-79 | | | |
| | Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade | 80 | | | |
| | Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape | 81 | | | |
| | Sharpen. Mod1 = sample distance, Mod2 = number of filter passes, Mod3 = sharpen scale | 82 | | | |
| | Flip, Mod1 = flip horizontally, Mod2 = flip vertically, Mod3 = not used | 83 | | | |
| | UV to Gray. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 84 | | | |
| | UV to Transparent. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 85 | | | |
| | UV Select to Transparent. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 86 | | | |
| | HS to Gray. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 87 | | | |
| | HS to Transparent. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 88 | | | |
| | HSSelect to Transparent. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 89 | | | |
| | Texture Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = colors and scale | 90 | | | |
| | Lens Grid. Mod1 = magnification, Mod2 = edge shading, Mod3 = number of lenses | 91 | | | |
| | Edge Detect BW2. Mod1 = Sample distance, Mod2 = edge threshold comparison, Mod3 = detected edge scaler | 92 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Film Burn. Mod1 = burn/unburn rate, Mod2 = film blackening, Mod3 = burn pattern | 93 | NA | 0 | 0 |
| | Film Noise. Mod1 = noise rate, Mod2 = push to sepia with/without jitter, Mod3 = noise level | 94 | | | |
| | Particle System 1. Mod1 = emitter type, Mod2 = trail length, Mod3 = particle acceleration | 95 | | | |
| | Particle System 2. Mod1 = number of particles, Mod2 = size of particles, Mod3 = emitter size | 96 | | | |
| | Particle System 3. Mod1 = particle initial velocity, Mod2 = particle rotation, Mod3 = particle life | 97 | | | |
| | Prism. Mod1 = number of facets, Mod2 = index of refraction, Mod3 = rotation | 98 | | | |
| | Gaussian Halo. Mod1 = sample distance, Mod2 = number of filter passes, Mod3 = shape of Gaussian curve | 99 | | | |
| | Scene Change Detect Mod1 = Scale RGB, Mod2 = RGB to Alpha, Mod3 = Scale color after alpha applied | 100 | | | |
| | Yxy Luminance Scaling. Mod1 = scale luminance (default 64), Mod2 = scale x (default 128), Mod3 = scale y (default 128) | 101 | | | |
| | Prerotation Translation. Mod1 = translate x, Mod2 = translate y, Mod3 = translate z. | 102 | | | |
| | Digital MSpeed. Mod1 = rotation mspeed. Mod2 = scaling mspeed. Mod3 = position mspeed | 103 | | | |
| | Reserved. Defaults to effect mode = 0 | 104-127 | | | |
| | Mask Color. Mod1 = red, Mod2 = green, Mod3 = blue | 128 | | | |
| | Edge Fade color. Mod1 = red, Mod2 = green, Mod3 = blue | 129 | | | |
| | Mask Color and Edge Fade Color. Mod1 = red, Mod2 = green, Mod3 = blue | 130 | | | |
| | Background Color. Mod1 = red, Mod2 = green, Mod3 = blue | 131 | | | |
| | Background Color Cycle. Mod1 = red speed, Mod2 = green speed, Mod3 = blue speed | 132 | | | |
| | Edge Fade Profile. Mod1 = Mode, Mod2 = Profile, Mod3 = Source | 133 | | | |
| | Collage. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend adjustment | 134 | | | |
| | Curve Correction, Vertical Convex Cylinder. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = Not used | 135 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Curve Correction, Vertical Concave Cylinder. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = Not used | 136 | NA | 0 | 0 |
| | Curve Correction, Vertical Inside Corner. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = adjusts horizontal centerpoint | 137 | | | |
| | Curve Correction, Vertical Outside Corner. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = adjusts horizontal centerpoint | 138 | | | |
| | Curved Surface, Outside Sphere. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = adjusts horizontal centerpoint | 139 | | | |
| | Curved Surface, Inside Sphere. Mod1 = correction, Mod2 = adjusts vertical centerpoint, Mod3 = adjusts horizontal centerpoint. | 140 | | | |
| | Enhanced Collage Generator. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend. | 141 | | | |
| | Spherical Mapping. Outside. Mod1 = longitude angle, Mod2 = latitude angle, Mod3 = center latitude. | 142 | | | |
| | Spherical Mapping. Inside. Mod1 = longitude angle, Mod2 = latitude angle, Mod3 = center latitude. | 143 | | | |
| | Mattes. Mod1 = Mode, Mod2 = Matte Select, Mod3 = texture source | 144 | | | |
| | Enhanced Collage Wrap. Mod1 = array type, Mod2 = display cell, Mod3 = edge blending | 145 | | | |
| | Segmented Collage Generator. Mod1 = array type, Mod2 = display cell, Mod3 = edge blending | 146 | | | |
| | Segmented Collage Generator Wrap. Mod1 = array type, Mod2 = display cell, Mod3 = edge blending | 147 | | | |
| | Output Correction, Horizontal Convex Cylinder. Mod1 = correction, Mod2 = adjusts horizontal centerpoint, Mod3 = Not used | 148 | | | |
| | Output Correction, Horizontal Concave Cylinder. Mod1 = correction, Mod2 = adjusts horizontal centerpoint, Mod3 = Not used | 149 | | | |
| | Collage Gen 3, improves blending. Otherwise, the same as global effect 141. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend | 150 | | | |
| | Collage Gen 3 Wrap, improved blending. Otherwise, the same as global effect 145. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend | 151 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Effect Mode 1, 2, 3, 4 & 5** | Segmented Collage Gen 3, improves edge blending. Otherwise, the same as global effect 146. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend | 152 | NA | 0 | 0 |
| | Segmented Collage Gen 3 Wrap, improves edge blending. Otherwise, the same as global effect 147. Mod1 = grid style selection, Mod2 = grid portion displayed, Mod3 = edge blend. | 153 | | | |
| | Reserved. Defaults to effect 0 | 152-252 | | | |
| | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | 253 | | | |
| | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | 254 | | | |
| | Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position, Mod3 = Zoom | 255 | | | |
| **Global Effect Modifier 1** | These Modifier parameters adjust the option selected in the corresponding channel of each of the five Global Effects Modes.The type of adjustment and the default value depends on the particular effect option.<br>NOTE: Setting the Graphic Effect Mode DMX = 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Global Effect Mode Channels* on page 116, and specific effect options listed alphabetically in *Chapter 13.* | 0-255 | 0-100 | NA | NA |
| **Global Effect Modifier 2** | | 0-255 | 0-100 | | |
| **Global Effect Modifier 3** | | 0-255 | 0-100 | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Mask** | | | | | |
| **Mask Select** | ***Static Masks*** | | | 0 | 0 |
| | Round *iris* closing from outside in | 0 | 0 | | |
| | Round *iris* closing from inside out | 1 | NA | | |
| | Rectangle closing from outside in | 2 | | | |
| | Rectangle closing from inside out | 3 | | | |
| | Checkerboard, variation 1 | 4 | | | |
| | Checkerboard, variation 2 | 5 | | | |
| | Radial wipe, variation 1 | 6 | | | |
| | Radial wipe, variation 2 | 7 | | | |
| | Radial wipe, variation 3 | 8 | | | |
| | Radial wipe, variation 4 | 9 | | | |
| | Triangles, variation 1 | 10 | | | |
| | Triangles, variation 2 | 11 | | | |
| | Rectangular wrap | 12 | | | |
| | Tiles closing in | 13 | | | |
| | Horizontal doors, closing | 14 | | | |
| | Horizontal doors closing from opposing sides | 15 | | | |
| | Vertical doors closing from outside in | 16 | | | |
| | Vertical wipe closing from inside out | 17 | | | |
| | Rectangular tiles closing from inside out 1 | 18 | | | |
| | Rectangular tiles closing from inside out 2 | 19 | | | |
| | Vertical panels closing from outside in 1 | 20 | | | |
| | Vertical panels closing from outside in 2 | 21 | | | |
| | Vertical diamonds 1 | 22 | | | |
| | Vertical diamonds 2 | 23 | | | |
| | Horizontal diamonds 1 | 24 | | | |
| | Horizontal diamonds 2 | 25 | | | |
| | Pinwheel | 26 | | | |
| | Oval Iris closing from outside in | 27 | | | |
| | Oval Iris closing from inside out | 28 | | | |
| | Oscillating iris closing from outside in | 29 | | | |
| | Artistic Iris | 30 | | | |
| | Reserved for other installed masks, defaults to 0 | 31-127 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| Mask Select | ***Strobing Masks*** | | | 0 | 0 |
| | Periodic strobe, round “iris” mask closing outside in. | 128 | 50 | | |
| | Round *iris* closing from inside out | 129 | NA | | |
| | Rectangle closing from outside in | 130 | | | |
| | Rectangle closing from inside out | 131 | | | |
| | Checkerboard, variation 1 | 132 | | | |
| | Checkerboard, variation 2 | 133 | | | |
| | Radial wipe, variation 1 | 134 | | | |
| | Radial wipe, variation 2 | 135 | | | |
| | Radial wipe, variation 3 | 136 | | | |
| | Radial wipe, variation 4 | 137 | | | |
| | Triangles, variation 1 | 138 | | | |
| | Triangles, variation 2 | 139 | | | |
| | Rectangular wrap | 140 | | | |
| | Tiles closing in | 141 | | | |
| | Horizontal doors, closing | 142 | | | |
| | Horizontal doors closing from opposing sides | 143 | | | |
| | Vertical doors closing from outside in | 144 | | | |
| | Vertical wipe closing from inside out | 145 | | | |
| | Rectangular tiles closing from inside out 1 | 146 | | | |
| | Rectangular tiles closing from inside out 2 | 147 | | | |
| | Vertical panels closing from outside in 1 | 148 | | | |
| | Vertical panels closing from outside in 2 | 149 | | | |
| | Vertical diamonds 1 | 150 | | | |
| | Vertical diamonds 2 | 151 | | | |
| | Horizontal diamonds 1 | 152 | | | |
| | Horizontal diamonds 2 | 153 | | | |
| | Pinwheel | 154 | | | |
| | Oval Iris closing from outside in | 155 | | | |
| | Oval Iris closing from inside out | 156 | | | |
| | Oscillating iris closing from outside in | 157 | | | |
| | Animated Dynamic Iris | 158 | | | |
| | Reserved for other strobing installed masks | 159-255 | | | |
| **Mask Size** | Adjusts mask size from fully closed to open | 0-255 | 0-100 | 255 | 100 |
| **Mask Edge Fade** | Hard edge to faded edge when Mask Select = 0-127. Strobe rate control from fastest to slowest when Mask Select parameter value = 128-255 | 0-255 | 0-100 | 0 | 0 |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Image Edge Fade** | | | | | |
| **Image Edge Fade, Top** | Adjusts the image's top edge diffusion from hard edge (0) to maximum fade (255) | 0-255 | 0-100 | 0 | 0 |
| **Image Edge Fade, Right** | Adjusts the image's right edge diffusion from hard edge (0) to maximum fade (255) | 0-255 | 0-100 | 0 | 0 |
| **Image Edge Fade, Bottom** | Adjusts the image's bottom edge diffusion from hard edge (0) to maximum fade (255) | 0-255 | 0-100 | 0 | 0 |
| **Image Edge Fade, Left** | Adjusts the image's left edge diffusion from hard edge (0) to maximum fade (255) | 0-255 | 0-100 | 0 | 0 |
| **Global Keystone Correction** | | | | | |
| **Keystone X Top Left** | Moves top left corner x value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone Y Top Left** | Moves top left corner y value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone X Top Right** | Moves top right corner x value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone Y Top Right** | Moves top right corner y value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone X Bottom Right** | Moves bottom right corner x value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone Y Bottom Right** | Moves bottom right corner y value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone X Bottom Left** | Moves bottom left corner x value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone Y Bottom Left** | Moves bottom left corner y value to center | 0-255 | 0-100 | 0 | 0 |
| **Keystone X Ratio** | Compresses and expands image horizontally | 0-255 | 0-100 | 128 | 50 |
| **Keystone Y Ratio** | Compresses or expands image vertically | 0-255 | 0-100 | 128 | 50 |
| **Global Framing** | | | | | |
| **Framing X Top Left** | Clip image from top left corner x value | 0-255 | 0-100 | 0 | 0 |
| **Framing Y Top Left** | Clip image from top left corner y value | 0-255 | 0-100 | 0 | 0 |
| **Framing X Top Right** | Clip image from top right corner x value | 0-255 | 0-100 | 0 | 0 |
| **Framing Y Top Right** | Clip image from top right corner y value | 0-255 | 0-100 | 0 | 0 |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Framing X Bottom Right** | Clip image from bottom right corner x value | 0-255 | 0-100 | 0 | 0 |
| **Framing Y Bottom Right** | Clip image from bottom right corner y value | 0-255 | 0-100 | 0 | 0 |
| **Framing X Bottom Left** | Clip image from bottom left corner x value | 0-255 | 0-100 | 0 | 0 |
| **Framing Bottom Left** | Clip image from bottom left corner y value | 0-255 | 0-100 | 0 | 0 |
| **Global Viewpoint** | | | | | |
| **Viewpoint Mode** | ***Perspective View, Spherical Coordinates*** | | | 0 | 0 |
| | Look at point: center of universe | 0 | 0 | | |
| | Look at point: graphic 1 | 1 | NA | | |
| | Look at point: graphic 2 | 2 | | | |
| | Look at point: graphic 3 | 3 | | | |
| | ***Perspective View, Cartesian Coordinates*** | | | | |
| | Look at point: center of universe | 4 | NA | | |
| | Look at point: graphic 1 | 5 | | | |
| | Look at point: graphic 2 | 6 | | | |
| | Look at point: graphic 3 | 7 | | | |
| | ***Orthogonal View, Cartesian Coordinates*** | | | | |
| | Look at point: center of universe | 8 | NA | | |
| | Look at point: graphic 1 | 9 | | | |
| | Look at point: graphic 2 | 10 | | | |
| | Look at point: graphic 3 | 11 | | | |
| | ***Perspective View, Spherical Coordinates*** | | | | |
| | Look at point: graphic 4 | 12 | NA | | |
| | Look at point: graphic 5 | 13 | | | |
| | Look at point: graphic 6 | 14 | | | |
| | Look at point: graphic 7 | 15 | | | |
| | Look at point: graphic 8 | 16 | | | |
| | Look at point: graphic 9 | 17 | | | |
| | ***Perspective View, Cartesian Coordinates*** | | | | |
| | Look at point: graphic 4 | 18 | NA | | |
| | Look at point: graphic 5 | 19 | | | |
| | Look at point: graphic 6 | 20 | | | |
| | Look at point: graphic 7 | 21 | | | |
| | Look at point: graphic 8 | 22 | | | |
| | Look at point: graphic 9 | 23 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Viewpoint Mode** | ***Orthogonal View, Cartesian Coordinates*** | | | 0 | 0 |
| | Look at point: graphic 4 | 24 | NA | | |
| | Look at point: graphic 5 | 25 | | | |
| | Look at point: graphic 6 | 26 | | | |
| | Look at point: graphic 7 | 27 | | | |
| | Look at point: graphic 8 | 28 | | | |
| | Look at point: graphic 9 | 29 | | | |
| | ***Additional Effects*** | | | | |
| | Reserved | 30-127 | | | |
| | Variable Edge Blend | 128 | | | |
| | Reserved | 12-255 | | | |
| **Viewpoint X Position** | Maximum horizontal angle clockwise | 0 | 0- | 32768 | 50 |
| | Center | 32768 | 50 | | |
| | Maximum horizontal angle counterclockwise | 65535 | 100 | | |
| **Viewpoint Y Position** | Maximum Vertical angle clockwise | 0 | 0- | 32768 | 50 |
| | Center | 32768 | 50 | | |
| | Maximum Vertical angle counterclockwise | 65535 | 100 | | |
| **Viewpoint Z Position (Zoom)** | Maximum distance from origin in front of view target | 0 | 0 | 32768 | 50 |
| | Center | 32768 | 50 | | |
| | Maximum distance from origin behind view target | 65535 | 100 | | |
| **Global Control** | | | | | |
| **Global Control**<br><br>*(A number in parenthesis is the minimum number of consecutive times a DMX value must be received from a controller before the operation begins.)* | No control selected. Safe | 0 | 0 | 0 | 0 |
| | Reserved | 1-119 | NA | | |
| | Axon Shutdown when Intensity = 0 (80) | 120-130 | | | |
| | Reserved | 131-144 | | | |
| | Reset when Intensity = 0 (80) | 145-149 | | | |
| | Reserved | 150-251 | | | |
| | Spherical Control Statistics (Global Control Modifier Parameter selects text color) | 252 | | | |
| | All-in-One displays an array that includes each layer's output, each layer's combined output, and any spherical effects applied. | 253 | | | |
| | Performance Statistics | 254 | | | |
| | On-screen Statistics | 255 | | | |
| | Reserved | 4-255 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Global Control Modifier** | ***All-in-one Combined Quadrant (Global Control Channel = 253)*** | | | 0 | 0 |
| | Displays each defined Graphic Object with no effects applied | 0 | 0 | | |
| | Displays the first effect (if any) applied to any defined Graphic Object | 1 | NA | | |
| | Displays the second effect (if any) applied to any defined Graphic Object | 2 | | | |
| | Displays the third effect (if any) applied to any defined Graphic Object | 3 | | | |
| | Displays the fourth effect (if any) applied to any defined Graphic Object | 4 | | | |
| | Displays the fifth effect (if any) applied to any defined Graphic Object | 5 | | | |
| | Displays the sixth effect (if any) applied to any defined Graphic Object | 6 | | | |
| | Displays the seventh effect (if any) applied to any defined Graphic Object | 7 | | | |
| | Displays the eighth effect (if any) applied to any defined Graphic Object | 8 | | | |
| | Displays the ninth effect (if any) applied to any defined Graphic Object | 9 | | | |
| | Reserved. Reverts to raw image display | 10-255 | | | |
| | ***On-screen Statistics (Global Control Channel = 252 or 255)*** | | | | |
| | Text color = gray | 0 | NA | | |
| | Text color = red | 1 | | | |
| | Text color = blue | 2 | | | |
| | Text color = green | 3 | | | |
| | ***On-screen Statistics (Global Control Channel = 254)*** | | | | |
| | Controls opacity from full to transparent | 0-255 | NA | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **GRAPHIC OBJECT FUNCTIONS** | | | | | |
| **Opacity** | Selects transparency level from completely transparent (0) to opaque (255) | 0-255 | 0-100 | 0 | 0 |
| **Graphic Content Definition** | | | | | |
| 3-D Object File | No selection | 0 | 0 | 1 | 1 |
| | First Stock 3-D Object (flat plane) | 1 | 1 | | |
| | Additional Stock 3-D Objects | 2-149 | NA | | |
| | First User 3-D Objects | 150 | | | |
| | Additional User Objects | 151-255 | | | |
| **Media Folder** | No selection | 0 | NA | 0 | 0 |
| | HES Folder 1 | 1 | | | |
| | HES Folders 2- 40 | 2-40 | | | |
| | First User Folder 41 | 41 | | | |
| | User Folders 42-239 | 42-239 | | | |
| | Reserved | 240-254 | | | |
| | Video capture. The Media File parameter selects S Video or SDI input. Other Media file values are ignored. ***NOTE: SDI available with DL.3 and Axon only*.** | 255 | | | |
| **Media File** | ***Media File Selection (Media Folder Channel = 0-254)*** | | | 0 | 0 |
| | No selection | 0 | 0 | | |
| | First Media File | 1 | NA | | |
| | Additional Media Files 2-255 | 2-255 | | | |
| | ***Video Capture Selection (Media Folder Channel = 0-255)*** | | | 0 | 0 |
| | No Video capture source selected | 0 | 0 | | |
| | SVideo capture source | 1 | NA | | |
| | Standard Definition (SD) SDI capture source, if installed | 2 | | | |
| | SVideo capture source 2, if installed. ***Available with Axon server only*** | 3 | | | |
| | SD SDI capture source 2, if installed. ***Available with Axon server only*** | 4 | | | |
| | High Definition (HD) SDI source 1, if installed. ***Available with Axon server only*** | 5 | | | |
| | High Definition (HD) SDI source 2, if installed. ***Available with Axon server only*** | 6 | | | |
| | High Definition (HD) SDI source 3, if installed. ***Available with Axon server only*** | 7 | | | |
| | High Definition (HD) SDI source 4, if installed. ***Available with Axon server only*** | 8 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **In Frame** | Defines the beginning of a media file segment as a percentage of the movie length | 0-65535 | 0-100 | 0 | 0 |
| **Out Frame** | Defines the end of a Media File segment as a percentage of the movie length | 0-65535 | 0-100 | 65535 | 100 |
| **Play Mode** | Play forward looping continuously | 0 | 0 | 0 | 0 |
| | Play forward once and hold on the last frame | 1 | NA | | |
| | Pause | 2 | | | |
| | Play forward if opacity > 0, hold on last frame | 3 | | | |
| | Play forward if opacity > 0, looping continuously | 4 | | | |
| | Pause and rewind to In Frame | 5 | | | |
| | Scrub (Display) the selected In Frame | 6 | | | |
| | Scrub (Display) the selected Out Frame | 7 | | | |
| | Scrub (Display) the selected In Frame with statistics | 8 | | | |
| | Scrub (Display) the selected Out Frame with statistics | 9 | | | |
| | Reserved | 10-255 | 3-100 | | |
| **Play Speed** | Normal Speed | 0 | 0 | 128 | 50 |
| | Slow speeds from slowest toward normal | 1-127 | 1-49 | | |
| | Normal Speed | 128 | 50 | | |
| | Faster than Normal to Fastest | 129-255 | 51-100 | | |
| **Graphic Synchronization** | | | | | |
| **Sync Type** | No selection | 0 | 0 | 0 | 0 |
| | Sync to Graphic 1 movie time | 1 | NA | | |
| | Sync to Graphic 2 movie time | 2 | | | |
| | Sync to Graphic 3 movie time | 3 | | | |
| | Sync to Object 1 rotation | 4 | | | |
| | Sync to Object 2 rotation | 5 | | | |
| | Sync to Object 3 rotation | 6 | | | |
| | Sync to reverse Object 1 rotation | 7 | | | |
| | Sync to reverse Object 2 rotation | 8 | | | |
| | Sync to reverse Object 3 rotation | 9 | | | |
| | Sync to Graphic 1 movie time and Object 1 rotation | 10 | | | |
| | Sync to Graphic 2 movie time and Object 2 rotation | 11 | | | |
| | Sync to Graphic 3 movie time and Object 3 rotation | 12 | | | |
| | Sync to Graphic 1 movie time and Object 1 reverse rotation | 13 | | | |
| | Sync to Graphic 1 movie time and Object 2 reverse rotation | 14 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| Sync Type | Sync to Graphic 1 movie time and Object 3 reverse rotation | 15 | NA | 0 | 0 |
| | Sync to Graphic 4 movie time | 16 | | | |
| | Sync to Graphic 5 movie time | 17 | | | |
| | Sync to Graphic 6 movie time | 18 | | | |
| | Sync to Graphic 7 movie time | 19 | | | |
| | Sync to Graphic 8 movie time | 20 | | | |
| | Sync to Graphic 9 movie time | 21 | | | |
| | Sync to Object 4 rotation | 22 | | | |
| | Sync to Object 5 rotation | 23 | | | |
| | Sync to Object 6 rotation | 24 | | | |
| | Sync to Object 7 rotation | 25 | | | |
| | Sync to Object 8 rotation | 26 | | | |
| | Sync to Object 9 rotation | 27 | | | |
| | Sync to Object 4 reverse rotation | 28 | | | |
| | Sync to Object 5 reverse rotation | 29 | | | |
| | Sync to Object 6 reverse rotation | 30 | | | |
| | Sync to Object 7 reverse rotation | 31 | | | |
| | Sync to Object 8 reverse rotation | 32 | | | |
| | Sync to Object 9 reverse rotation | 33 | | | |
| | Sync to Graphic 4 movie time and Object 4 rotation | 34 | | | |
| | Sync to Graphic 5 movie time and Object 5 rotation | 35 | | | |
| | Sync to Graphic 6 movie time and Object 6 rotation | 36 | | | |
| | Sync to Graphic 7 movie time and Object 7 rotation | 37 | | | |
| | Sync to Graphic 8 movie time and Object 8 rotation | 38 | | | |
| | Sync to Graphic 9 movie time and Object 9 rotation | 39 | | | |
| | Sync to Graphic 4 movie time and Object 4 reverse rotation | 40 | | | |
| | Sync to Graphic 5 movie time and Object 5 reverse rotation | 41 | | | |
| | Sync to Graphic 6 movie time and Object 6 reverse rotation | 42 | | | |
| | Sync to Graphic 7 movie time and Object 7 reverse rotation | 43 | | | |
| | Sync to Graphic 8 movie time and Object 8 reverse rotation | 44 | | | |
| | Sync to Graphic 9 movie time and Object 9 reverse rotation | 45 | | | |
| | Reserved. Defaults to mode 0, no selection. | 16- 255 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Sync To** | No Selection | 0 | NA | 0 | 0 |
| | Sync to Fixture ID Number 1 | 1 | | | |
| | Sync to Fixture ID Number 2<br>. . .<br>Sync to Fixture Number 254 | 2<br>. . .<br>254 | | | |
| | Sync to Fixture ID Number 255 | 255 | | | |
| **Graphic Object Effects** | | | | | |
| **Visual Mode** | Off. No visual mode processing applied to output. | 0 | 0 | 0 | 0 |
| | Content Optimization. Mod1 = black level, Mod2 = contrast. | 1 | NA | | |
| | Sepia tones. Mod1 fades from original color to sepia colors. Mod2 controls saturation. | 2 | | | |
| | Red tones. Mod1 fades from original color to red tones. Mod2 controls saturation. | 3 | | | |
| | Gray maker. Mod1 compresses colors to shades of gray. Mod2 adjusts contrast | 4 | | | |
| | Gray maker2. Always gray. Mod1 = brightness, Mod2 = contrast | 5 | | | |
| | Posterizer. Mod1 reduces color detail. Mod2 adjusts contrast. | 6 | | | |
| | Color to Black & White. Mod1 fades color RGB @ 0 to B/W @ 50% to white @100%. Mod2 = not used. | 7 | | | |
| | Fire Gradient, Mod1fades original to converted Mod2 not used, reserved. | 8 | | | |
| | Negative Art. Mod1 fades from original image to converted image, Mod2 subtracts red from 0-128, subtracts green from 129-255. | 9 | | | |
| | Exposure Control. Mod1 adjusts color contrast, Mod2 adjusts color shift | 10 | | | |
| | Invert B&W, Keep Color. Mod1 = black comparison level,<br>Mod2 = white comparison level | 11 | | | |
| | Texture Mixing. Mod1 = Source media file,<br>Mod2 = Crossfade from original to source texture | 12 | | | |
| | Image Scale and Rotate. Mod1 = image scale,<br>Mod2 = rotation angle. | 13 | | | |
| | Film Roll. Mod1 = horizontal roll speed, Mod2 = Vertical roll speed | 14 | | | |
| | Pixelate. Mod1 = amount of pixelation, Mod 2 not used | 15 | | | |
| | Faux LED. Mod1 = ”LED” size, Mod2 = spacing | 16 | | | |
| | Faux Tile. Mod1 = Tile size, Mod2 = spacing | 17 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Visual Mode** | Fuzzifier. Mod1 = x-axis distance, Mod2 = y-axis distance | 18 | NA | 0 | 0 |
| | Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size | 19 | | | |
| | Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center | 20 | | | |
| | Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift | 21 | | | |
| | ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake | 22 | | | |
| | CTO/CTB. Mod1 = push to orange, Mod2 = push to blue | 23 | | | |
| | Flip. Mod1 = flip horizontally, Mod2 = flip vertically | 24 | | | |
| | Reserved (Defaults to 0) | 25-254 | | | |
| | Pan and Scan. Mod1 = horizontal position, Mod2 = vertical position | 255 | | | |
| **Visual Mode Modifier 1** | Adjusts option selected in the **Visual Mode** Parameter<br>The type of adjustment and the default value depends on the particular visual mode option selected. For more about **Visual Mode Modifier** parameter functionality, see, *Visual Mode* on page 84 and *Visual Mode Options* on page 86. | 0-255 | 0-100 | NA | NA |
| **Visual Mode Modifier 2** | | 0-255 | 0-100 | | |
| **Graphic Effect Mode 1, 2 & 3** | Off, no effects selection | 0 | 0<br>NA | 0 | 0 |
| | CMY simulates CMY by subtracting RGB (reduces color values) Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 1 | | | |
| | CMY Add to All Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 2 | | | |
| | CMY Add to Non-black Pixels increases color values. Mod1 = cyan, Mod2 = magenta, Mod3 = yellow | 3 | | | |
| | RGB Add All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 4 | | | |
| | RGB Add 2 All Pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 5 | | | |
| | RGB Add, non-black pixels. Mod1 = red, Mod2 = green, Mod3 = blue | 6 | | | |
| | RGB Swap to GBR. Mod1 = red, Mod2 = green, Mod3 = blue. | 7 | | | |
| | RGB Swap to BRG. Mod1 = red, Mod2 = green, Mod3 = blue. | 8 | | | |
| | Solarize 1 (if color value<DMX value, invert color). Mod1 = red, Mod2 = green, Mod3 = blue. | 9 | | | |
| | Solarize 2 (if color value > DMX, invert color). Mod1 = red, Mod2 = green, Mod3 = blue. | 10 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Effect Mode 1, 2 & 3** | Solarize (if color value < DMX, color = 0). Mod1 = red, Mod2 = green, Mod3 = blue. | 11 | NA | 0 | 0 |
| | Solarize 4 (if color value > DMX, color = 0). Mod1 = red, Mod2 = green, Mod3 = blue. | 12 | | | |
| | DotP and Resample. Mod1, Mod2 and Mod3 control resampling. | 13 | | | |
| | Color Cycle (DMX value controls cycle speed) Mod1 = red, Mod2 = green, Mod3 = blue. | 14 | | | |
| | All or Nothing (Color value greater than Mod value, color = 255, else color = 0) Mod1 = red, Mod2 = green, Mod3 = blue. | 15 | | | |
| | Solid Color RGB. Mod1 = red, Mod2 = green, Mod3 = blue. | 16 | | | |
| | RGB Invert. Mod1 = red to cyan, Mod2 = green to magenta, Mod3 = blue to yellow | 17 | | | |
| | RGB Invert & Swap to GBR. Mod1 = red to magenta, Mod2 = green to yellow, Mod3 = blue to cyan | 18 | | | |
| | RGB Invert & Swap to BRG. Mod1 = red to yellow, Mod2 = green to cyan, Mod3 = blue to magenta | 19 | | | |
| | Edge Detect Color. Mod1 = horizontal size, Mod2 = vertical search size, Mod3 = comparison threshold | 20 | | | |
| | Edge Detect B/W Mod1 = horizontal size, Mod2 = vertical search size, Mod3 = comparison threshold | 21 | | | |
| | Texture Ripple, Horizontal. Mod1 = size, Mod2 = rate, Mod3 = offset | 22 | | | |
| | Texture Ripple, Vertical. Mod1 = size, Mod2 = rate, Mod3 = offset | 23 | | | |
| | Texture Ripple, Circular. Mod1 = size, Mod2 = rate, Mod3 = offset | 24 | | | |
| | Texture Ripple, Asymmetrical Circular. Mod1 = size, Mod2 = rate, Mod3 = offset | 25 | | | |
| | Transparent Color Fine. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 26 | | | |
| | Transparent Color Medium. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 27 | | | |
| | Transparent Color Coarse. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 28 | | | |
| | Transparent Color Invert, Fine. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 29 | | | |
| | Transparent Color Invert, Medium. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 30 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Effect Mode 1, 2 & 3** | Transparent Color Invert, Coarse. Select key color. Mod1 = red, Mod2 = green, Mod3 = blue | 31 | NA | 0 | 0 |
| | Scan Line. Mod1 selects scan line as texture, Mod2 fades from original image to converted image, Mod3 not used, reserved | 32 | | | |
| | Transparent Wipes. Mod1 = width of transparent area, Mod2 = center of transparent area, Mod3 = transparency mode | 33 | | | |
| | Pixel Twist. Mod1 = x twist center, Mod2 = y twist center, Mod3 = direction and amount of twist | 34 | | | |
| | Picture-in-Picture. Mod1 = x subpicture center, Mod2 = y subpicture center, Mod3 = subpicture size | 35 | | | |
| | Magnifying Lens. Mod1 = x lens center, Mod2 = y lens center, Mod3 = lens size | 36 | | | |
| | Magnifying Lens 2. Mod1 = x lens center, Mod2 = y lens center, Mod3 = lens size | 37 | | | |
| | Cartoon Edge. Mod1 = Edge Color, Mod2 = Contrast, Mod3 = Edge detection sensitivity | 38 | | | |
| | Color DeConverge. Mod1 = Moves red up, Mod2 = Moves green down and right, Mod3 = Moves blue down and left | 39 | | | |
| | Horizontal Mirror. Mod1 = mirror center, Mod2 and Mod3 not used | 40 | | | |
| | RGB Swap to BGR. Mod1 = red, Mod2 = green, Mod3 = blue | 41 | | | |
| | RGB Swap to RBG. Mod1 = red, Mod2 = green, Mod3 = blue | 42 | | | |
| | RGB Swap to GRB. Mod1 = red, Mod2 = green, Mod3 = blue | 43 | | | |
| | Colorize Gray Scale maps pixel intensity to color. Mod1 = Color Scheme selection, Mod2 = Zero intensity point in color scheme, Mod3 = Fading | 44 | | | |
| | Intensity key turns pixels of selected intensity transparent. Mod1 = Color Scheme, Mod2 = Intensity bandwidth, Mod3 = Transparency | 45 | | | |
| | Raindrop effect. Mod1 controls size/speed, Mod2 seeds the random number generator, and Mod3 controls raindrop rate. | 46 | | | |
| | Scale RGB. Mod1 = scale red, Mod2 = scale green, Mod3 = scale blue. Maximum of Mod1, Mod2 and Mod3 sets overall color range | 47 | | | |
| | Tiling on. Mod1 = x-axis tile scale, Mod2 = y-axis tile scaler, Mod3 = space between lines | 48 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Effect Mode 1, 2 & 3** | Color to Alpha. Mod1 = red to alpha, Mod2 = green to alpha, Mod3 = blue to alpha | 49 | NA | 0 | 0 |
| | Color to Alpha, Inverted. Mod1 = cyan to alpha, Mod2 = magenta to alpha, Mod3 = yellow to alpha | 50 | | | |
| | Texture Mixing. Mod1 = Source media file, Mod2 = Source effect level, Mod3 = Crossfade from original to source texture | 51 | | | |
| | Image Scale and Rotate. Mod1 = scales image, Mod2 = rotation angle, Mod3 = rotation speed | 52 | | | |
| | Film Roll. Mod1 = horizontal roll speed, Mod2 = vertical roll speed, Mod3 = Image scale | 53 | | | |
| | Pixelate. Mod1 = Amount of pixelation, Mod2 = horizontal scale, Mod3 = vertical scale | 54 | | | |
| | Faux LED. Mod1 = ”LED” size, Mod2 = spacing, Mod 3 = color peaking | 55 | | | |
| | Faux Tile. Mod1 = Tile size, Mod2 = spacing, Mod 3 = color peaking | 56 | | | |
| | Fuzzifier. Mod1 = Horizontal distance, Mod2 = vertical distance, Mod3 = fuzz decay | 57 | | | |
| | Drop Shadow. Mod1 = horizontal shadow size, Mod2 = vertical shadow size, Mod3 = shadow opacity | 58 | | | |
| | Zoom Blur. Mod1 = horizontal position center, Mod2 = vertical position center, Mod3 = zoom | 59 | | | |
| | Chroma Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = scale | 60 | | | |
| | ShakeNBake. Mod1 = horizontal shake, Mod2 = vertical shake, Mod3 = scale | 61 | | | |
| | Slats, Vertical. Mod1 = number, Mod2 = displacement, Mod3 = fade | 62 | | | |
| | Slats, Horizontal. Mod1 = number, Mod2 = displacement, Mod3 = fade | 63 | | | |
| | Sinewave, Circular with Y-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 64 | | | |
| | Sinewave, Circular with Y-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 65 | | | |
| | Sinewave, Circular with Z-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 66 | | | |
| | Sinewave, Horizontal with X-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 67 | | | |
| | Sinewave, Horizontal with Y-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 68 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Effect Mode 1, 2 & 3** | Sinewave, Horizontal with Z-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 69 | NA | 0 | 0 |
| | Sinewave, Vertical with X-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 70 | | | |
| | Sinewave, Vertical with Y-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 71 | | | |
| | Sinewave, Vertical with Z-axis Wobbulation Mod1 = size, Mod2 = rate, Mod3 = offset | 72 | | | |
| | Glow: Mod1 = red, Mod2 = green, Mod3 = blue | 73 | | | |
| | Glow Color Cycle: Mod1 = red cycle speed, Mod2 = green cycle speed, Mod3 = blue cycle speed | 74 | | | |
| | Reserved, defaults to Effect 0 | 75-79 | | | |
| | Downward Vertical Streaks. Mod1 = start position, Mod2 = streak angle, Mod3 = fade | 80 | | | |
| | Gaussian Blur. Mod1 = sample distance, Mod2 = filter pass number, Mod3 = curve shape | 81 | | | |
| | Sharpen. Mod1 = sample distance, Mod2 = number of filter passes, Mod3 = sharpen scale | 82 | | | |
| | Flip, Mod1 = flip horizontally, Mod2 = flip vertically, Mod3 = not used | 83 | | | |
| | UV to Gray. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 84 | | | |
| | UV to Transparent. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 85 | | | |
| | UVSelect to Transparent. Mod1 = U coordinate, Mod2 = V coordinate, Mod3 = Tolerance | 86 | | | |
| | HS to Gray. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 87 | | | |
| | HS to Transparent. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 88 | | | |
| | HSSelect to Transparent. Mod1 = H coordinate, Mod2 = S coordinate, Mod3 = Tolerance | 89 | | | |
| | Texture Shift. Mod1 = horizontal shift, Mod2 = vertical shift, Mod3 = colors and scale | 90 | | | |
| | Lens Grid. Mod1 = magnification, Mod2 = edge shading, Mod3 = number of lenses | 91 | | | |
| | Edge Detect BW2. Mod1 = Sample distance, Mod2 = edge threshold comparison, Mod3 = detected edge scaler | 92 | | | |
| | Film Burn. Mod1 = burn/unburn rate, Mod2 = film blackening, Mod3 = burn pattern | 93 | | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Effect Mode 1, 2 & 3** | Film Noise. Mod1 = noise rate, Mod2 = (0,127) push to sepia, (128,255) push to sepia with jitter, Mod3 = noise level | 94 | NA | 0 | 0 |
| | Particle System 1. Mod1 = emitter type, Mod2 = trail length, Mod3 = particle acceleration | 95 | | | |
| | Particle System 2. Mod1 = number of particles, Mod2 = size of particles, Mod3 = emitter size | 96 | | | |
| | Particle System 3. Mod1 -> particle initial velocity, Mod2 = particle rotation, Mod3 = particle lifetime | 97 | | | |
| | Prism. Mod1 = number of facets, Mod2 = index of refraction, Mod3 = rotation | 98 | | | |
| | Gaussian Halo. Mod1 = sample distance, Mod2 = number of filter passes, Mod3 = shape of Gaussian curve | 99 | | | |
| | Scene Change Detect Mod1 = Scale RGB, Mod2 = RGB to Alpha, Mod3 = Scale color after alpha applied | 100 | | | |
| | Yxy Luminance Scaling. Mod1 = scale luminance (default 64), Mod2 = scale x (default 128), Mod3 = scale | 101 | | | |
| | Prerotation Translation. Mod1 = translate x, Mod2 = translate y, Mod3 = translate z | 102 | | | |
| | Digital Mspeed. Mod1 = rotation mspeed, Mod2 = scaling mspeed, Mod3 = position mspeed | 103 | | | |
| | Reserved. Defaults to effect mode = 0 | 104-252 | | | |
| | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | 253 | | | |
| | Special value used with global spherical mapping effect 142. Defaults to 0 otherwise. | 254 | | | |
| | Pan and Scan | 255 | | | |
| **Graphic Effect Mode Modifier 1** | These Modifier parameters adjust the effect selected in the corresponding channel of each of the three Graphic Effect Mode channels.<br>The type of adjustment and the default value depends on the particular effect.<br>NOTE: Setting the Graphic Effect Mode DMX = 253 or 254 activates specific spherical mapping control options for Modifier parameters. For more about Modifier parameter functionality, see *Effect Mode Parameters* on page 106, and specific effect options listed alphabetically in *Chapter 13*. | 0-255 | 0-100 | NA | NA |
| **Graphic Effect Mode Modifier 2** | | 0-255 | 0-100 | | |
| **Graphic Modifier 3** | | 0-255 | 0-100 | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| **Graphic Rotation** | | | | | |
| **X-axis Rotation**<br><br>**(vertical flip, 16-bit adjustment)** | Continuous variable-speed counterclockwise object rotation around X-axis (fast to slow) | 0-16382 | 0-24 | 32768 | 50 |
| | Continuous rotation stop | 16383 | 25 | | |
| | Rotates the object counterclockwise around X-axis in steps to -720 degrees absolute | 16384-32767 | 26-49 | | |
| | 0° rotation around X-axis | 32768 | 50 | | |
| | Rotates the object clockwise around X-axis in steps to 720 degrees absolute | 32769-49151 | 51-74 | | |
| | Continuous rotation stop | 49152 | 75 | | |
| | Continuous variable-speed clockwise object rotation around X-axis (slow to fast) | 49154-65535 | 76-100 | | |
| **Y-axis Rotation**<br><br>**(horizontal flip, 16-bit adjustment)** | Continuous variable-speed counterclockwise object rotation around Y-axis (fast to slow) | 0-16382 | 0-24 | 32768 | 50 |
| | Continuous rotation stop | 16383 | 25 | | |
| | Rotates the object counterclockwise around Y-axis in steps to -720 degrees absolute | 16384-32767 | 26-49 | | |
| | 0° rotation around Y-axis | 32768 | 50 | | |
| | Rotates the object clockwise around Y-axis in steps to 720 degrees absolute | 32769-49151 | 51-74 | | |
| | Continuous rotation stop | 49152 | 75 | | |
| | Continuous variable-speed clockwise object rotation around Y-axis (slow to fast) | 49154-65535 | 76-100 | | |
| **Z-axis Rotation**<br><br>**(circular 16-bit adjustment)** | Continuous variable-speed counterclockwise object rotation around Z axis (fast to slow) | 0-16382 | 0-24 | 32768 | 50 |
| | Continuous rotation stop | 16383 | 25 | | |
| | Rotates the object counterclockwise around Z-axis in steps to -720 degrees absolute | 16384-32767 | 26-49 | | |
| | 0° rotation around Z-axis | 32768 | 50 | | |
| | Rotates the object clockwise around Z-axis in steps to 720 degrees absolute | 32769-49151 | 51-74 | | |
| | Continuous rotation stop | 49152 | 75 | | |
| | Continuous variable-speed clockwise object rotation around Z axis (slow to fast) | 49154-65535 | 76-100 | | |

| Parameter | Description | DMX Value | | Default | |
|---|---|---|---|---|---|
| | | Dec. | % | Dec. | % |
| Scale X | **Graphic 1 Scaling** | | | | |
| | Minimum object size along X axis (1:10) | 0 | 0 | 32768 | 50 |
| | Increases object size along X axis from minimum to actual size | 1-32767 | 1-49 | | |
| | Actual size along X axis (1:1) | 32768 | 50 | | |
| | Increases object size along X axis from actual to maximum size | 32769-65534 | 51-99 | | |
| | Maximum object size along X axis (10:1) | 65535 | 100 | | |
| Scale Y | Minimum object size along Y axis (1:10) | 0 | 0 | 32768 | 50 |
| | Increases object size along Y axis from minimum to actual size | 1-32767 | 1-49 | | |
| | Actual size along Y axis (1:1) | 32768 | 50 | | |
| | Increases object size along Y axis from actual to maximum size | 32769-65534 | 51-99 | | |
| | Maximum object size along Y axis (10:1) | 65535 | 100 | | |
| Scale Z | Minimum object size along Z axis (1:10) | 0 | 0 | 32768 | 50 |
| | Increases object size along Z axis from minimum to actual size | 1-32767 | 1-49 | | |
| | Actual size along Z axis (1:1) | 32768 | 50 | | |
| | Increases object size along Z axis from actual to maximum size | 32769-65534 | 51-99 | | |
| | Maximum object size along Z axis (10:1) | 65535 | 100 | | |
| X-Position | **Graphic 1 Position** | | | | |
| | Moves object left from center of display | 0-36767 | 0-49 | 32768 | 50 |
| | Centers object along X axis in display | 32768 | 50 | | |
| | Moves object right from center of display | 36769-65535 | 51-100 | | |
| Y-Position | Moves object down from center of display | 0-36767 | 0-49 | 32768 | 50 |
| | Centers object along Y axis in display | 32768 | 50 | | |
| | Moves object up from center of display | 36769-65535 | 51-100 | | |
| Z-Position | Moves object nearer from center of display | 0-36767 | 0-49 | 32768 | 50 |
| | Centers object along Z axis in display | 32768 | 50 | | |
| | Moves object back along Z axis at center of display | 36769-65535 | 51-100 | | |

# Appendix B:

# MSpeed Conversion Table

*This table lists the MSpeed (motor) movement times and their corresponding DMX controller values.*

If you have a numeric-type DMX controller, use the Value Decimal (dec.) column. If you have a fader-type DMX controller, use the Value Percentage (%) column. If your DMX controller allows you to program hex values, use the Value (hex) column.

| Time (sec.) | Value (dec.) | Value (%) | Value (hex) |
|---|---|---|---|
| 0.15 | 255 | 100 | FF |
| 0.15 | 254 | 100 | FE |
| 0.17 | 253 | 99 | FD |
| 0.19 | 252 | 99 | FC |
| 0.21 | 251 | 98 | FB |
| 0.25 | 250 | 98 | FA |
| 0.29 | 249 | 98 | F9 |
| 0.35 | 248 | 97 | F8 |
| 0.41 | 247 | 97 | F7 |
| 0.47 | 246 | 96 | F6 |
| 0.55 | 245 | 96 | F5 |
| 0.63 | 244 | 96 | F4 |
| 0.73 | 243 | 95 | F3 |
| 0.83 | 242 | 95 | F2 |
| 0.94 | 241 | 95 | F1 |
| 1.05 | 240 | 94 | F0 |
| 1.18 | 239 | 94 | EF |
| 1.31 | 238 | 93 | EE |
| 1.45 | 237 | 93 | ED |
| 1.60 | 236 | 93 | EC |
| 1.75 | 235 | 92 | EB |
| 1.92 | 234 | 92 | EA |
| 2.09 | 233 | 91 | E9 |
| 2.27 | 232 | 91 | E8 |
| 2.46 | 231 | 91 | E7 |
| 2.66 | 230 | 90 | E6 |
| 2.86 | 229 | 90 | E5 |
| 3.07 | 228 | 89 | E4 |
| 3.29 | 227 | 89 | E3 |
| 3.52 | 226 | 89 | E2 |
| 3.76 | 225 | 88 | E1 |
| 4.00 | 224 | 88 | E0 |
| 4.25 | 223 | 87 | DF |
| 4.52 | 222 | 87 | DE |
| 4.78 | 221 | 87 | DD |
| 5.06 | 220 | 86 | DC |
| 5.34 | 219 | 86 | DB |
| 5.64 | 218 | 85 | DA |
| 5.94 | 217 | 85 | D9 |
| 6.25 | 216 | 85 | D8 |
| 6.56 | 215 | 84 | D7 |
| 6.89 | 214 | 84 | D6 |
| 7.22 | 213 | 84 | D5 |
| 7.56 | 212 | 83 | D4 |
| 7.91 | 211 | 83 | D3 |
| 8.27 | 210 | 82 | D2 |
| 8.63 | 209 | 82 | D1 |
| 9.00 | 208 | 82 | D0 |
| 9.39 | 207 | 81 | CF |
| 9.77 | 206 | 81 | CE |
| 10.17 | 205 | 80 | CD |
| 10.58 | 204 | 80 | CC |
| 10.99 | 203 | 80 | CB |
| 11.41 | 202 | 79 | CA |
| 11.84 | 201 | 79 | C9 |
| 12.28 | 200 | 78 | C8 |
| 12.72 | 199 | 78 | C7 |
| 13.17 | 198 | 78 | C6 |
| 13.63 | 197 | 77 | C5 |
| 14.10 | 196 | 77 | C4 |
| 14.58 | 195 | 76 | C3 |
| 15.07 | 194 | 76 | C2 |
| 15.56 | 193 | 76 | C1 |
| 16.06 | 192 | 75 | C0 |
| 16.57 | 191 | 75 | BF |
| 17.09 | 190 | 75 | BE |
| 17.61 | 189 | 74 | BD |
| 18.14 | 188 | 74 | BC |
| 18.68 | 187 | 73 | BB |
| 19.23 | 186 | 73 | BA |
| 19.79 | 185 | 73 | B9 |
| 20.36 | 184 | 72 | B8 |
| 20.93 | 183 | 72 | B7 |
| 21.51 | 182 | 71 | B6 |
| 22.10 | 181 | 71 | B5 |
| 22.70 | 180 | 71 | B4 |
| 23.30 | 179 | 70 | B3 |
| 23.92 | 178 | 70 | B2 |
| 24.54 | 177 | 69 | B1 |
| 25.17 | 176 | 69 | B0 |
| 25.80 | 175 | 69 | AF |
| 26.45 | 174 | 68 | AE |
| 27.10 | 173 | 68 | AD |
| 27.76 | 172 | 67 | AC |
| 28.43 | 171 | 67 | AB |
| 29.11 | 170 | 67 | AA |
| 29.80 | 169 | 66 | A9 |
| 30.49 | 168 | 66 | A8 |
| 31.19 | 167 | 65 | A7 |
| 31.90 | 166 | 65 | A6 |
| 32.62 | 165 | 65 | A5 |
| 33.34 | 164 | 64 | A4 |
| 34.08 | 163 | 64 | A3 |
| 34.82 | 162 | 64 | A2 |
| 35.57 | 161 | 63 | A1 |
| 36.33 | 160 | 63 | A0 |
| 37.09 | 159 | 62 | 9F |
| 37.87 | 158 | 62 | 9E |
| 38.65 | 157 | 62 | 9D |
| 39.44 | 156 | 61 | 9C |
| 39.44v | 156 | 61 | 9C |
| 40.23 | 155 | 61 | 9B |
| 41.04 | 154 | 60 | 9A |
| 41.85 | 153 | 60 | 99 |
| 42.68 | 152 | 60 | 98 |
| 43.50 | 151 | 59 | 97 |
| 44.34 | 150 | 59 | 96 |
| 45.19 | 149 | 58 | 95 |

| Time (sec.) | Value (dec.) | Value (%) | Value (hex) |
|---|---|---|---|
| 46.04 | 148 | 58 | 94 |
| 46.90 | 147 | 58 | 93 |
| 47.77 | 146 | 57 | 92 |
| 48.65 | 145 | 57 | 91 |
| 49.54 | 144 | 56 | 90 |
| 50.43 | 143 | 56 | 8F |
| 51.33 | 142 | 56 | 8E |
| 52.24 | 141 | 55 | 8D |
| 53.16 | 140 | 55 | 8C |
| 54.09 | 139 | 55 | 8h |
| 55.02 | 138 | 54 | 8A |
| 55.96v | 137 | 54 | 89 |
| 56.91 | 136 | 53 | 88 |
| 57.87 | 135 | 53 | 87 |
| 58.84 | 134 | 53 | 86 |
| 59.81 | 133 | 52 | 85 |
| 60.79 | 132 | 52 | 84 |
| 61.78 | 131 | 51 | 83 |
| 62.78 | 130 | 51 | 82 |
| 63.79 | 129 | 51 | 81 |
| 64.80 | 128 | 50 | 80 |
| 65.82 | 127 | 50 | 7F |
| 66.85 | 126 | 49 | 7E |
| 67.89 | 125 | 49 | 7D |
| 68.94 | 124 | 49 | 7C |
| 69.99 | 123 | 48 | 7B |
| 71.05 | 122 | 48 | 7A |
| 72.13 | 121 | 47 | 79 |
| 73.20 | 120 | 47 | 78 |
| 74.29 | 119 | 47 | 77 |
| 75.38 | 118 | 46 | 76 |
| 76.49 | 117 | 46 | 75 |
| 77.60 | 116 | 45 | 74 |
| 78.71 | 115 | 45 | 73 |
| 79.84 | 114 | 45 | 72 |
| 80.98 | 113 | 44 | 71 |
| 82.12 | 112 | 44 | 70 |
| 83.27 | 111 | 44 | 6F |
| 84.43 | 110 | 43 | 6E |
| 85.59 | 109 | 43 | 6D |
| 86.77 | 108 | 42 | 6C |
| 87.95 | 107 | 42 | 6B |
| 89.14 | 106 | 42 | 6A |
| 90.34 | 105 | 41 | 69 |
| 91.55 | 104 | 41 | 68 |
| 92.76 | 103 | 40 | 67 |
| 93.98 | 102 | 40 | 66 |
| 95.21 | 101 | 40 | 65 |
| 96.45 | 100 | 39 | 64 |
| 97.70 | 99 | 39 | 63 |
| 98.95 | 98 | 38 | 62 |
| 100.22 | 97 | 38 | 61 |
| 101.49 | 96 | 38 | 60 |
| 102.77 | 95 | 37 | 5F |
| 104.05 | 94 | 37 | 5E |
| 105.35 | 93 | 36 | 5D |
| 106.65 | 92 | 36 | 5C |
| 107.96 | 91 | 36 | 5B |
| 109.28 | 90 | 35 | 5A |
| 110.61 | 89 | 35 | 59 |
| 111.94 | 88 | 35 | 58 |
| 113.28 | 87 | 34 | 57 |
| 114.63 | 86 | 34 | 56 |
| 115.99 | 85 | 33 | 55 |
| 117.36 | 84 | 33 | 54 |
| 118.73 | 83 | 33 | 53 |
| 120.12 | 82 | 32 | 52 |
| 121.5v | 81 | 32 | 51 |
| 122.91 | 80 | 31 | 50 |
| 124.31 | 79 | 31 | 4F |
| 125.73 | 78 | 31 | 4E |
| 127.15 | 77 | 30 | 4D |
| 128.58 | 76 | 30 | 4C |
| 130.02 | 75 | 29 | 4B |
| 134.39 | 72 | 28 | 48 |
| 135.86 | 71 | 28 | 47 |
| 137.34 | 70 | 27 | 46 |
| 138.82 | 69 | 27 | 45 |
| 140.32 | 68 | 27 | 44 |
| 141.82 | 67 | 26 | 43 |
| 143.33 | 66 | 26 | 42 |
| 144.85 | 65 | 25 | 41 |
| 146.38 | 64 | 25 | 40 |
| 147.92 | 63 | 25 | 3F |
| 149.46 | 62 | 24 | 3E |
| 151.01 | 61 | 24 | 3D |
| 152.57 | 60 | 24 | 3C |
| 154.14 | 59 | 23 | 3B |
| 155.71 | 58 | 23 | 3A |
| 157.30 | 57 | 22 | 39 |
| 158.89 | 56 | 22 | 38 |
| 160.49 | 55 | 22 | 37 |
| 162.09 | 54 | 21 | 36 |
| 163.71 | 53 | 21 | 35 |
| 165.33 | 52 | 20 | 34 |
| 166.96 | 51 | 20 | 33 |
| 168.60 | 50 | 20 | 32 |
| 170.25 | 49 | 19 | 31 |
| 171.91 | 48 | 19 | 30 |
| 173.57 | 47 | 18 | 2F |
| 175.24 | 46 | 18 | 2E |
| 176.92 | 45 | 18 | 2D |
| 178.61 | 44 | 17 | 2C |
| 180.30 | 43 | 17 | 2B |
| 182.01 | 42 | 16 | 2A |
| 183.72 | 41 | 16 | 29 |
| 185.44 | 40 | 16 | 28 |
| 187.17 | 39 | 15 | 27 |
| 188.90 | 38 | 15 | 26 |
| 190.65 | 37 | 15 | 25 |
| 192.40 | 36 | 14 | 24 |
| 194.16 | 35 | 14 | 23 |
| 195.92 | 34 | 13 | 22 |
| 197.70 | 33 | 13 | 21 |
| 199.48 | 32 | 13 | 20 |
| 201.28 | 31 | 12 | 1F |
| 203.08 | 30 | 12 | 1E |
| 204.88 | 29 | 11 | 1D |
| 206.70 | 28 | 11 | 1C |
| 208.52 | 27 | 11 | 1B |
| 210.36 | 26 | 10 | 1A |
| 212.19 | 25 | 10 | 19 |
| 214.04 | 24 | 9 | 18 |
| 215.90 | 23 | 9 | 17 |
| 217.76 | 22 | 9 | 16 |
| 219.63 | 21 | 8 | 15 |
| 221.51 | 20 | 8 | 14 |
| 223.40 | 19 | 7 | 13 |
| 225.30 | 18 | 7 | 12 |
| 227.20 | 17 | 7 | 11 |
| 229.11 | 16 | 6 | 10 |
| 231.03 | 15 | 6 | 0F |
| 232.96 | 14 | 5 | 0E |
| 234.90 | 13 | 5 | 0D |
| 236.84 | 12 | 5 | 0C |
| 238.79 | 11 | 4 | 0B |
| 240.75 | 10 | 4 | 0A |
| 242.72 | 9 | 4 | 09 |
| 244.70 | 8 | 3 | 08 |
| 246.68 | 7 | 3 | 07 |
| 248.68 | 6 | 2 | 06 |
| 250.68 | 5 | 2 | 05 |
| 246.68 | 7 | 3 | 07 |
| 248.68 | 6 | 2 | 06 |
| 250.68 | 5 | 2 | 05 |
| 252.68 | 4 | 2 | 04 |

# Appendix C:

# Custom User Content

*There are several considerations to keep in mind when creating custom content to control with the DL.2, DL.3 or Axon graphics engine software.*

## Preparing Custom Content

For the highest quality rendering and playback on a DL.2, DL.3 fixture or Axon media server, use the following steps:

1. Commission or Design High Quality (Visually Clean or Never-Compressed) video, at least 640 x 480 (for DL.2 servers) or 1024 x 768 (for DL.3 servers) in Photo jpeg 98%-100% or Animation Non Compressed (best) format.

   ***NOTE: Extracting footage from a playable DVD will not give a high quality result since it has been highly compressed.***

2. Light Optimize the content in a video editing program by boosting Brightness and Color Saturation and save the a master file in Photo Jpeg 98%-100% or Animation Non Compressed (best) format.

   ***NOTE: The DL.3 and Axon media servers can also provide light optimizing as a visual effect, (see* Content Optimization *on page 86).***

3. Import Video master into Encoder/Compressor.
4. Output encoded files to your hard drive.
5. Upload your Custom Content to the DL.3 fixture or Axon media server, (see *Uploading Content from Your Local Drive to a Media Server* on page 266).

   ***NOTE: If a file is not compatible, it may load but not appear as output. The CMA thumbnail view of content will note incompatible files with an X.***

## Encoder Selection

Any encoder you use will need to provide options that achieve the following specifications:

- Size to 640x480 pixels (for DL.2 servers) or 1024 x 768 (for DL.3 servers)
- All I-frames (an I frame every 1 frame) for optimal tracking
- Constant Bit Rate (CBR) data rates of 10 to 12 megabits/sec
- Closed Group of Picture (GOP)
- Sequence headers each GOP (every frame)
- Progressive frames (since it's a progressive display device, not interlaced)
- End of sequence “Sequence Style”

All the encoders have demos and will batch encode (ExpertHD need a small script and a settings file to batch encode).

## Creating 3-D Objects

In general, any 3-D modeling program can be used to create objects. If the particular 3-D modeler does not export in DirectX .x format, a translation program will be needed to translate the object from the modeler's output format to the DirectX .x format. For example, you can use Newtek's Lightwave 3-D® modeler to generate 3-D objects in .lwo format, and then convert the object to .x format using Deep Exploration from Right Hemisphere.

The following list includes some general notes and tips for creating a custom 3-D object.

- With the control parameters (position, scaling and rotation) set at their default values, a rectangle measuring (13.0m, 9.75m, 0m) will just fill the screen.
- Objects are stored in Microsoft's DirectX .x format. .x files may be stored in either text form or binary form.
- An object can have one layer, one surface and one file texture.
- An object's UV (texture) coordinates should be in the range [0.0,1.0] to insure proper presentation. UV coordinates outside this range will wrap to this range but the results are not predictable.
- All polygons should be triangles. When creating objects, it can be easier to work with polygons that have more than three sides. However, an object should only contain triangles (three-sided polygons) when ultimately saved for use with the graphics engine.
- An object can contain multiple, disconnected subobjects as long as item 4 is followed. An example would be an object composed of an array of disconnected spheres or cubes.

***NOTE: For additional assistance and the latest software and techniques for creating and encoding custom content, see the Digital lighting product pages and product support pages at highend.com***

## Managing Custom Content

The Content Management Application running on your own computer as a client to DL.3 media servers via Ethernet manages any User Content you create. All Stock and User content can be viewed and refreshed but the CMA client gives you additional control over other aspects of your custom content.

Sections under *Managing User Content* on page 262 in *Chapter 16* describe the User content management functions including instructions on how to:

- Rename files and folders
- Delete files and folders
- Control DMX value assignment to files and folders
- Move files and folders between your local drive and a DL.3 fixture server
- Move files between networked DL.3 fixtures

# Appendix D:

# DL.3 Specifications

*Fixture mechanical, electrical, optical and component specifications are listed.*

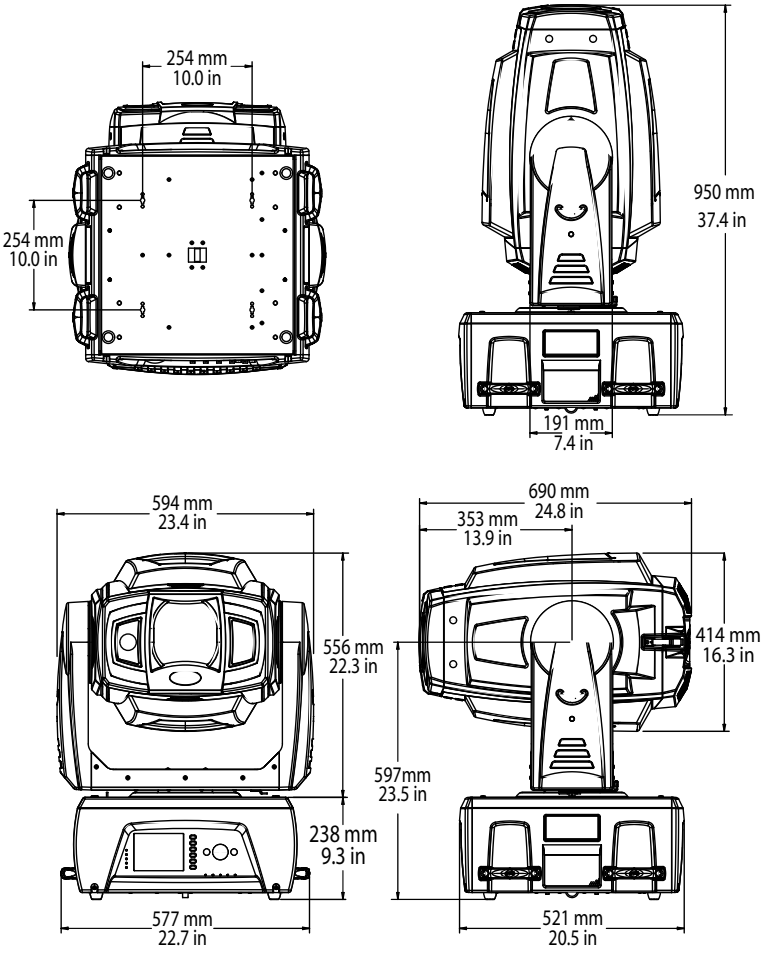
## Mechanical

**Fixture Dimensions:** 594mm x 690mm x 950mm (23.4in x 24.8in x 38.4in)

**Weight:** 63.5 kg (140 lbs)

**Road Case Dimensions:** 711mm x 737mm x 1168mm (28in x 29in x 46in)

**Weight (Fixture + Roadcase):** 118kg (260 lbs)



## Electrical

**WARNING!**
**Class 1 equipment – This equipment must be earthed.**

**Input ratings:** 100–120V 7.0A maximum 50/60Hz, 200–240V 3.5A 50/60Hz

**Power factor:** 0.94

**Fuse:** Power supply output fuse: 5A, 250V slow blow only.

**Lamp:** 330W NSH

**Light Output:** 7000 ANSI lumens

**Rated Lamp Life:** 2000 hours

## Computer

**Processor:** Intel Core2Quad Q9550

**Memory:** 2 GB DDR2 RAM

**Hard drive:** 750 GB Seagate SATA

**Video Card:** ATI Radeon HD4850

**SDI Capture Card:** Decklink SDI – High Definition (not included in DL.3F model)

**Operating System:** Windows XP embedded

*NOTE: Some earlier versions of DL.3 media servers may have a different hardware configuration. Find the hardware configuration listed by serial number at the DL.3 support page of the High End System website (www.highend.com/support/digital_lighting).*

## Projector

**Model:** Sanyo PCL-XP200L

**Aspect ratio:** 4:3 native

**Brightness uniformity:** 90%

**Contrast ratio:** 2200:1, full on/full off

**Display technology:** 1.3" TFT 3 Poly-5: x3/Color Control x1

**Panel resolution:** 1024 x 768 dots

**Zoom Lens Throw Ratio:** 1.8–2.4:1 (standard)

**Long Zoom Lens Throw Ratio:** 2.4–4.3:1 (optional accessory)

**Ultra Long Zoom Lens Throw Ratio:** 4.3–6.0:1 (optional accessory)

**Wide Angle Zoom Lens Throw Ratio:** 1.3–1.8:1 (optional accessory)

## Operation

**Pan:** 400° Tilt: 240°

**Movement Accuracy:** Pan and Tilt from the same direction to the programmed point within approximately .01°.

**Control Options:** DMX512, Art-Net

**Minimum Focus Distance:** 1.4 meters (4.6 ft)

**Compliances:** CE, CSA, ETL

## Environmental

**Ambient Operating Temperature Range:** 5°–40°C (40°–104° F)

**Humidity:** 20%–80% (non-condensing)

**Altitude:** 0–8850ft (0–2700m)

## Camera Module

**Construction:** Super HAD CCD sensor technology

**Lens:** 18x Optical Zoom

**Horizontal view angle:** 48° –2.8°

**Auto focus Range:** 29mm – 800mm

**Picture Elements:** 380K pixels {768 (H) x 582 (V)}

**Minimum working distance:** 29mm (TELE end, 800mm (WIDE end)

**Camera Capture Resolution:** 768 x 494 pixels

## Cables and Connectors

### Video Connectors:

- SDI In and Out (not available in DL.3F model)
- RGBHV—BNC x 5
- VGA—DB15
- S-Video—mini-DIN (not available in DL.3F model)

### Peripheral/Network Connectors:

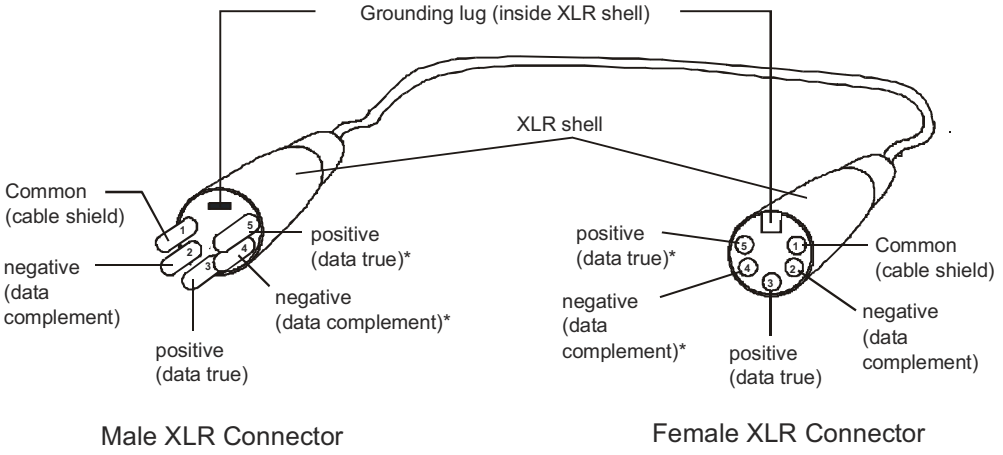
- 2 USB ports
- Ethernet

## DMX and RS-485 Projector Link

**Cables:** Belden 9841 or equivalent (meets specifications for EIA RS-485 applications) with the following characteristics:

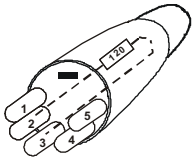
- Two 4-conductor twisted pairs plus a shield
- Maximum capacitance between conductors: 30 pF/ft
- Maximum capacitance between conductor and shield: 55 pF/ft
- Maximum resistance: 20 Ohm/100 ft
- Nominal impedance: 100–140 Ohm

**Connectors:** Two 5-pin male and female XLR connectors:




**This data line is not used by the fixture, but allows data to pass through the fixture.*

- Pin 1 Ground
- Pin 2 Data–
- Pin 3 Data+
- Pin 4 Secondary data–
- Pin 5 Secondary data+




**Terminator:** 5-pin male XLR connector with a 120 Ohm terminating resistor fitted between pins 2 and 3.

# Appendix E:

# Safety Information

**WARNING! For Continued Protection Against Fire, this equipment is designed for connection to branch circuit with a maximum overload protection of 20 A.**

**WARNING! For Continued Protection Against Electric Shock**

- 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
- 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.
- Class I equipment. This equipment must be earthed.
- Equipment suitable for dry locations only. Do not expose this equipment to rain or moisture.
- Refer servicing to qualified personnel; no user serviceable parts inside.

# Appendice E: Importantes Informations Sur La Sécurité

**Mise En Garde: Pour Une Protection Permanente Contre Les Incendies: 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**

- 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
- Débrancher le courant avant de changer les lampes ou d'effectuer des réparations.
- Cet équipement doit être uniquement utilisé dans des endroits secs. Ne pas l'exposer à la pluie ou l'humidité.
- À l'intérieur de l'équipement il n'y a pas de pièces remplaçables par l' utilisateur. Confiez l'entretien à un personnel qualifié.
- Equipement de Classe I. Cet équipement doit être mis à la terre.

# Anhang E: Wichtige Hinweise Für Ihre Sicherheit

**Warnung: Zum Schutz Vor Brandgefahr: Dieses Gerät darf nur an eine Zweigleitung mit einem Überlastungsschutz von höchstens 20 A angeschlossen werden.**

**Warnung: Zum Schutz Gegen Gefährliche Körperströme**

- 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
- Vor dem Austauschen von Lampen oder vor Wartungsarbeiten stets den Netzstecker ziehen.
- Diese Geräte sind nur zum Einbau in trockenen Lagen bestimmt und müssen vor Regen und Feuchtigkeit geschützt werden.
- Servicearbeiten sollten nur von Fachpersonal ausgeführt werden. Das Gerät enthält keine wartungsbedürftigen Teile.
- Dieses Gerät gehört zur Klasse I. Dieses Gerät muß geerdet werden.

## Apéndice E: Información Importante De Seguridad

**Advertencia: Para Protección Continua Contra Incendios: 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**

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

## Appendice E: Importanti Informazioni Di Sicurezza

**Avvertenza: Per Prevenire Incendi: Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 ampere.**

**Avvertenza: Per Prevenire Le Scosse Elettriche**

- Da non montare sopra una superficie infiammabile.
- Mantenere l' apparecchio a un minimo di 1.0 metri (3.28 piedi) di distanza dai materiali combustibili.
- Sostituire i fusibili usando soltanto quelli del tipo e della taratura adatta.
- Mantenere una distanza minima di 1.0 metri (3.28 piedi) dagli oggetti accesi.
- Questa apparecchiatura e' da collegarsi ad un circuito con una protezione da sovraccarico massima di 20 ampere.

## Vigtig Sikkerhedsinformation

Advarsel: Beskyttelse mod elektrisk chock.

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