

# USER MANUAL

## Mbox EXtreme™



02.9800.0001

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Mbox Extreme™ Media Server User Manual  
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Mbox Extreme™ Media Server User Manual  
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## Safety Notice

It is extremely important to read ALL safety information and instructions provided in this manual and any accompanying documentation before installing and operating the products described herein. Heed all cautions and warnings during installation and use of this product. Safety symbols used throughout this manual are as follows:



**CAUTION** advising of potential damage to product.



**WARNING** advising of potential injury or death to persons.

GENERAL INFORMATION PERTAINING TO PROTECTION AGAINST ELECTRICAL SHOCK, FIRE, AND INJURY TO PERSONS CAN BE FOUND BELOW.

**WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST ELECTRICAL SHOCK**

1. PRG equipment is designed for dry locations only. Exposure to rain or moisture may damage equipment.
2. Disconnect power before servicing any PRG equipment.
3. Servicing to be performed by qualified personnel only.

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## Notes

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## Notes



# Introduction

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## About This Manual

This manual provides necessary information regarding product safety, installation, and operation for the following PRG equipment:

- Mbox Extreme™ Media Server

Familiarizing yourself with this information will help you get the most out of your PRG product.



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**WARNING:** It is important to read ALL accompanying safety and installation instructions to avoid damage to the product and potential injury to yourself or others.

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## Additional Documentation

For more information regarding DMX512 systems, refer to the DMX512/1990 & AMX 192 Standards publication available from United States Institute for Theatre Technology, Inc. (USITT).

USITT  
6443 Ridings Road  
Syracuse, NY 13206-1111 USA  
1-800-93USITT  
[www.usitt.org](http://www.usitt.org)

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## Customer Service

Our comprehensive technical services department ensures you get the full benefit of being a PRG customer. Whether your needs are simple or complex, our full-time staff of experienced professionals are on-hand to provide support. For assistance, contact your nearest PRG office:

**PRG Dallas (International Service)**

8617 Ambassador Row, Suite 120  
Dallas, Texas 75247  
Ph: 1.214.630.1963  
Fx: 1.214.630.5867  
Service Fx: 214.638.2125  
Service Email: orders@prg.com

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9111 Sunland Blvd.  
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Ph: 1.818.252.2600  
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Fx: 905.270.2590

For additional resources and documentation, please visit our website at: [www.prg.com](http://www.prg.com)

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# Overview

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This chapter provides an overview of product features, components, and operations.

- **Description**
- **Components**
- **Theory of Operation**



# Description

---

## Features

The Mbox Extreme™ Media Server is a case-mount unit which allows advanced integration of video and automated lighting. Powerful real time rendering, built-in effects, and interactive 3D objects provide tools for combining pre-recorded video and still images to create visual imagery, which can be displayed by any projector, LED wall, plasma screen or low-res LED lighting fixture.

The Mbox Extreme server can be programmed and operated directly from DMX512-based moving light consoles, allowing ease of coordination between video/image effects and lighting cues. Intricate Mbox Extreme sequences can be generated instantly on site without the need for offline video processing, rendering or editing. The Mbox Extreme stock library includes a wide variety of video clips, still images and 3D objects. Custom media files may also be added.

The Mbox Extreme software runs on a rack-mounted Apple® Macintosh® G5 computer controlled by DMX512 or Art-Net. All video, still images and 3D objects are stored directly on the Mbox Extreme hard drive, allowing instant access to any file. Mbox Extreme is available in either a single or dual-server rack and each server is equipped with one video output that can be used to drive a projector, LED wall or plasma screen. The included I/O module provides analog (RGBHV), DVI, SDI and HD-SDI outputs for video.

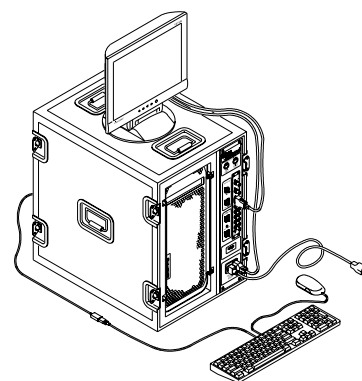
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**Note:** The Mac® G5 provided requires the Tiger™ (10.4) operating system.

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## Feature List

- Real time rendering.
- Movable camera viewpoint.
- Keystone correction.
- Ambient and directional light sources.
- Five interactive, scalable layers that can be configured as backgrounds or 3D geometric objects.
- Digital gobos that can be used as backgrounds, masks or for advanced layer blending effects.
- Image tiling and edge-blending.
- Pixel mapping.
- Layer break-out view.
- Mapping of textures (videos or still images) to 3D objects and digital gobos.
- Real time crossfades and transitions between videos and images on the same layer.
- Effects including blur, pixelate, LED Wall, twirl, color, exposure and alpha adjustment can be applied individually or in combination.
- Accepts live video input – SDI, Composite and FireWire® (DV).
- Advanced video playback with direction, speed and in-point/out-point control.
- User-configurable aspect ratio and output resolution control.
- Control by DMX512 or Art-Net.



- Stores up to 65,535 videos and still images.
- Stores up to 65,535 3D objects.
- Starter media library and objects.
- Hardware I/O module with built in DMX - Art-Net converter and Ethernet switch. Analog (RGBHV), DVI, SDI and HD-SDI video outputs.
- Live video inputs can be shared between multiple servers using Ethernet.

### **Controllable Elements**

#### **Light (4 directional, 1 ambient)**

- Intensity
- Color

#### **Camera (1)**

- Orbit X and Y
- Dolly
- Camera Roll (Spin)
- Field of View
- Theatrical Framing Shutters (four modes)
- Shutter X and Y
- Shutter Scale
- Shutter Edge
- Keystone X and Y
- Keystone Scale
- Keystone Skew
- Edge Blending
- Tiling
- Master Effect (2)
- Master Color

#### **Object: Background/Shape (5)**

- Transparency
- Shape
- Texture
- Texture Effect (2 per object)
- Color
- Playmode
- Playspeed
- Transitions (Type and Timing)
- X, Y, Z Position
- X, Y, Z Rotation (Spin)
- X, Y, Z Scale

# Components

## Mbox Extreme Case Assembly

The following illustrations show the case components.

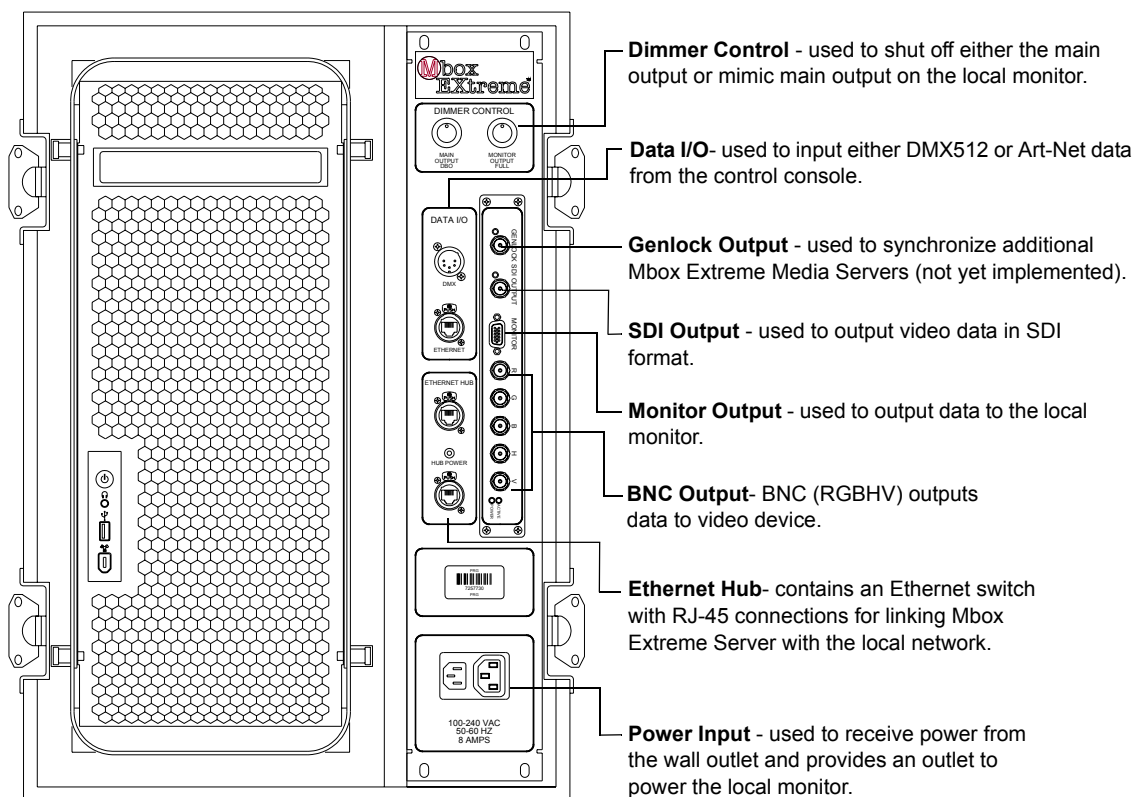
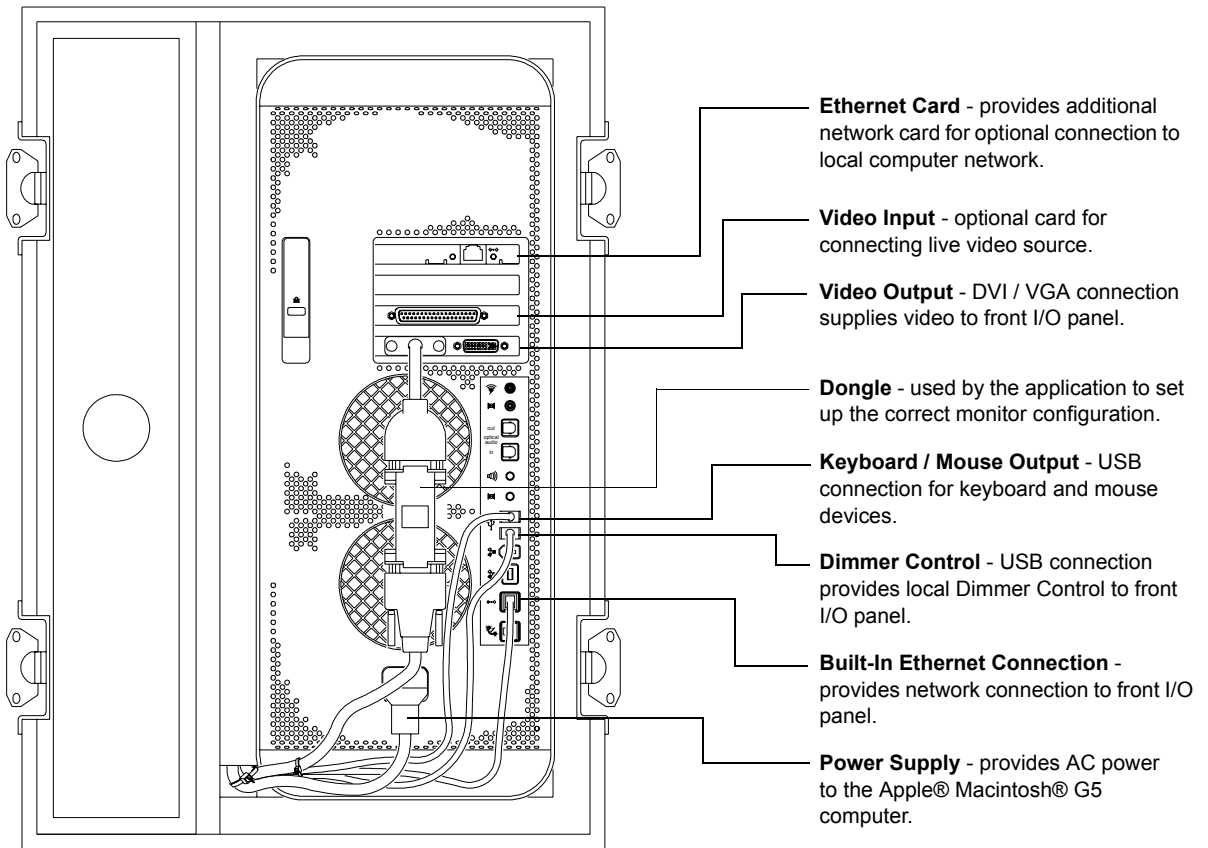


Figure 1-1: Case Components / Front View



**Figure 1-2: Case Components / Rear View**

# Theory of Operation

## Data Flow Diagrams

### DMX512 Input Configuration:

#### Single Media Server with DMX512 Devices

In the following configuration, DMX512 control signal is distributed from one DMX512 console to multiple DMX512 devices and one Mbox Extreme Media Server. Data is then distributed from the Mbox Extreme Media Server to the other components as shown below.

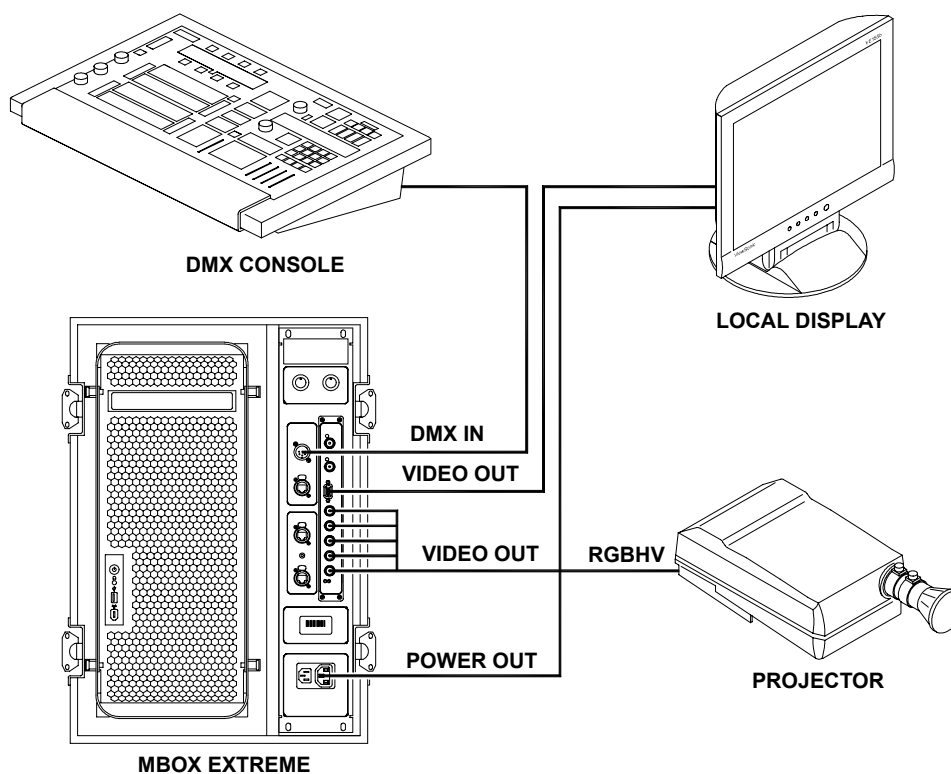


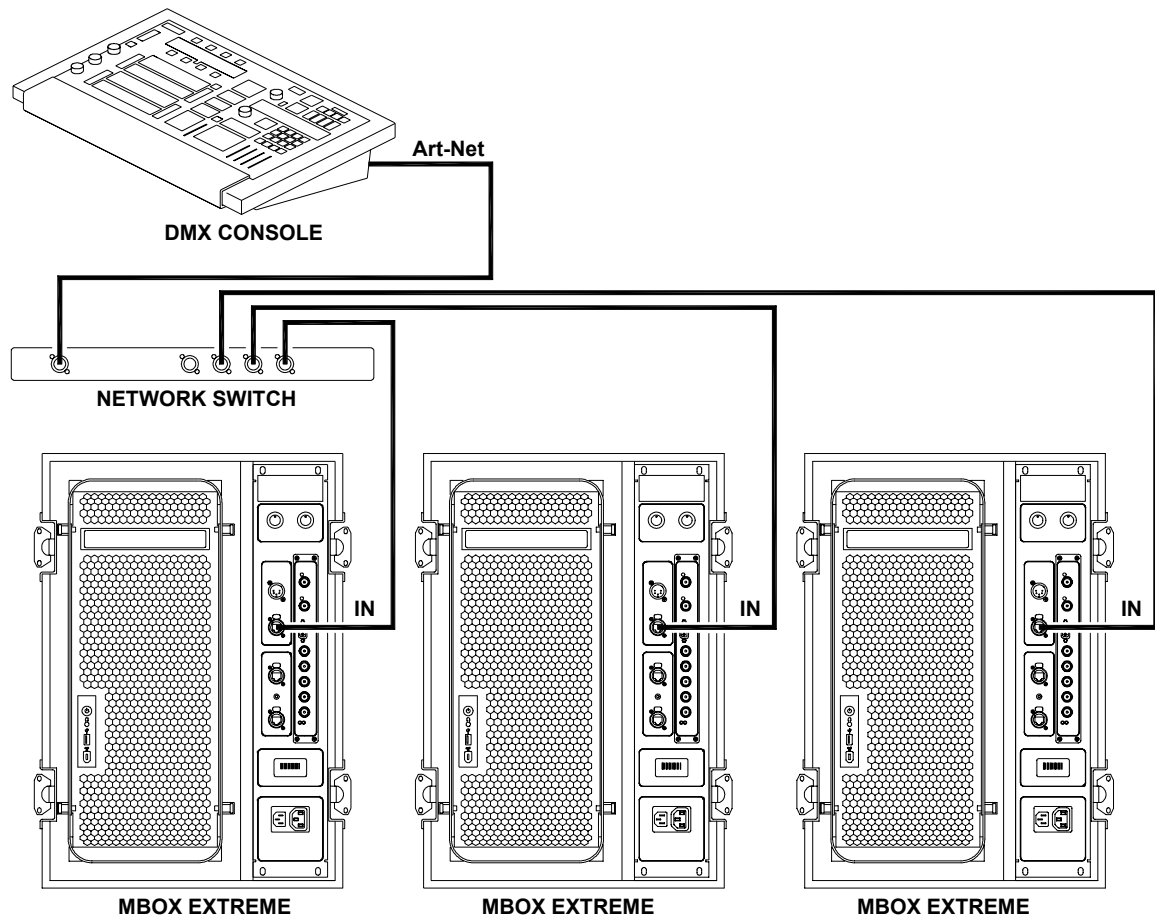
Figure 1-3: Single Media Server with DMX512 Devices



**Art-Net Input Configuration:**

**Network Switch and Multiple Media Servers**

In the following configuration, Art-Net control signal is distributed from one control console to one network switch. The network switch then distributes the control signal to all Mbox Extreme Media Servers.



**Figure 1-4: Network Switch and Multiple Media Servers**

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## Notes

## 2.

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# Installation

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This chapter provides instructions for unpacking the Mbox Extreme case, connecting to the system and powering up.

- **Setup**
- **Power Up**
- **Creating Network Connection**
- **Console Patch**



# Setup

## Unpack and Hookup Procedure

To set up case components:

- Step 1. Remove front and back covers from case (Figure 2-1).
- Step 2. Remove keyboard and mouse from back of case.

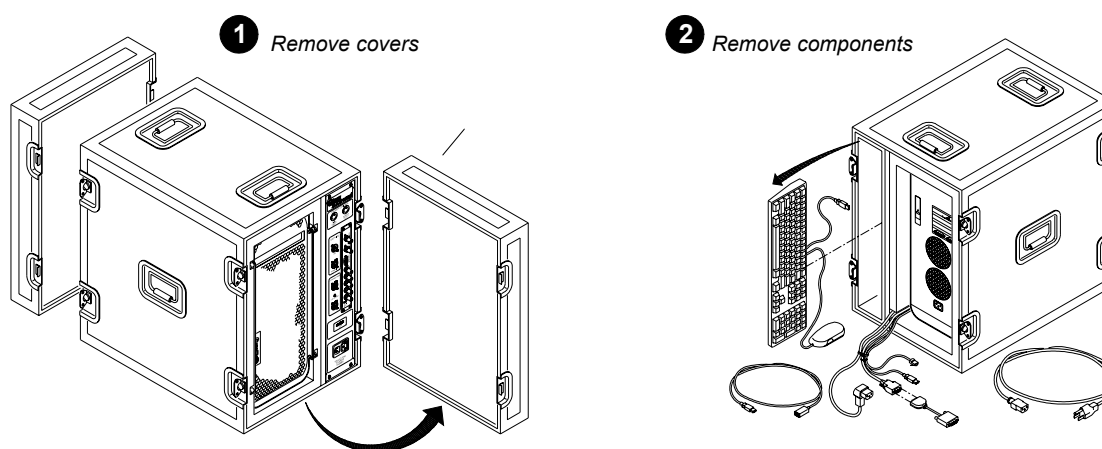


Figure 2-1: Removing Covers and Components

- Step 3. At rear of case, verify that Monitor/Dongle, Keyboard/Mouse, USB, Ethernet and Power cables are connected to computer (Figure 2-2).

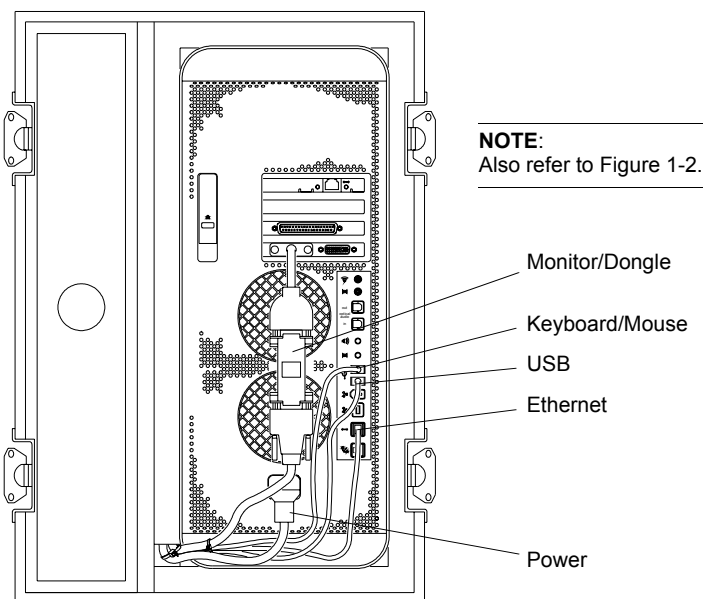
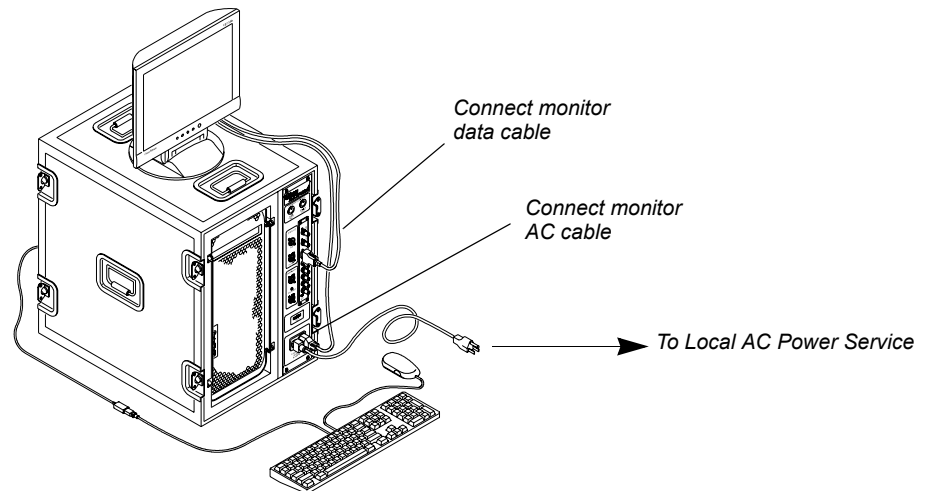


Figure 2-2: Rear Cable Connections

- Step 4. At front of case, connect local monitor data cable to VGA connector (Figure 2-3).
- Step 5. Connect local monitor power cable to power outlet on front of case or to local AC power service.
- Step 6. Connect case power cable to front of case, then to local AC power service.



**Figure 2-3: Connecting Monitor Power and Data Cabling**

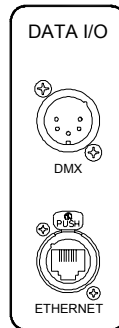
## System Connection Procedure

Once the case is set up and in place, connect to your control and video output devices.

**To connect to the system:**

Step 1. *For DMX512 controllers:*

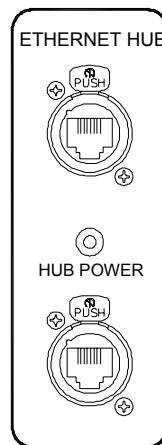
- a. At Data I/O unit, connect console or DMX512 controller to DMX connector as required.



**Figure 2-4: Connecting DMX512 Control Devices**

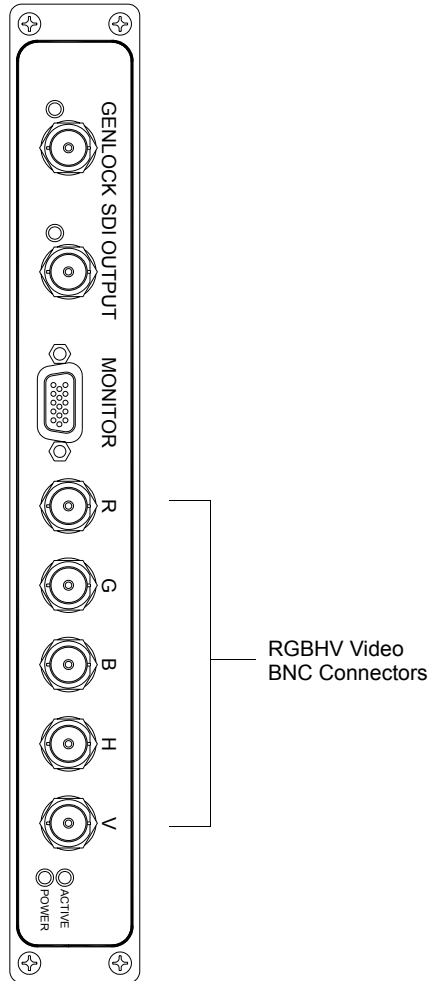
Step 2. *For Art-Net consoles:*

- a. At Data I/O unit, connect console to any Ethernet connector (Figure 2-4).
- b. If desired, connect additional Ethernet devices (such as a media server, network switch or dimmer rack) to additional Ethernet ports provided by the Ethernet Hub (Figure 2-5).



**Figure 2-5: Connecting Additional Devices to Ethernet Hub**

Step 3. At BNC connections, connect to output device.



**Figure 2-6: Connecting Output Devices**

# Power Up

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## Power Up Procedure

**To power up the Mbox Extreme Media Server and launch the application:**

- Step 1. At front of case, press main power switch on Macintosh® G5 computer.
- Step 2. At local monitor, press power switch.
- Step 3. Wait for computer to initialize. The Mbox Extreme application will start automatically.

---



**Note:** If the application does not start automatically, locate the Mbox Extreme icon on the Apple Dock and click once. For more information, see [“Starting the Mbox Extreme Application” on page 35](#).

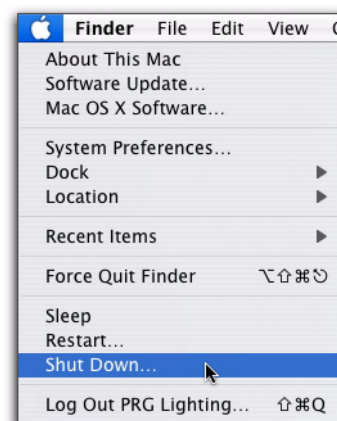
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## Power Down Procedure

**To power down case:**

- Step 1. If in full-screen mode, press  / [F] to minimize screen size.
- Step 2. Quit Mbox Extreme application by pressing  / [Q] or selecting Quit Mbox Extreme from the Mbox Extreme menu.
- Step 3. At Apple menu, select Shut Down.
- Step 4. At monitor, press power switch.



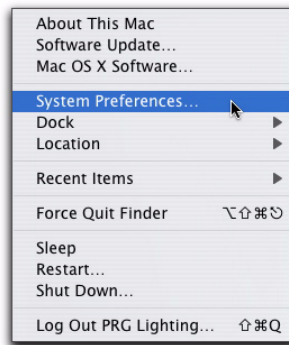


## Creating Network Connection

The network connection for the built-in Mac G5 Ethernet card should arrive with the Art-Net connection already configured. If the Art-Net connection is not pre-configured, use the following steps to create the connection.

**To create the built-in network connection:**

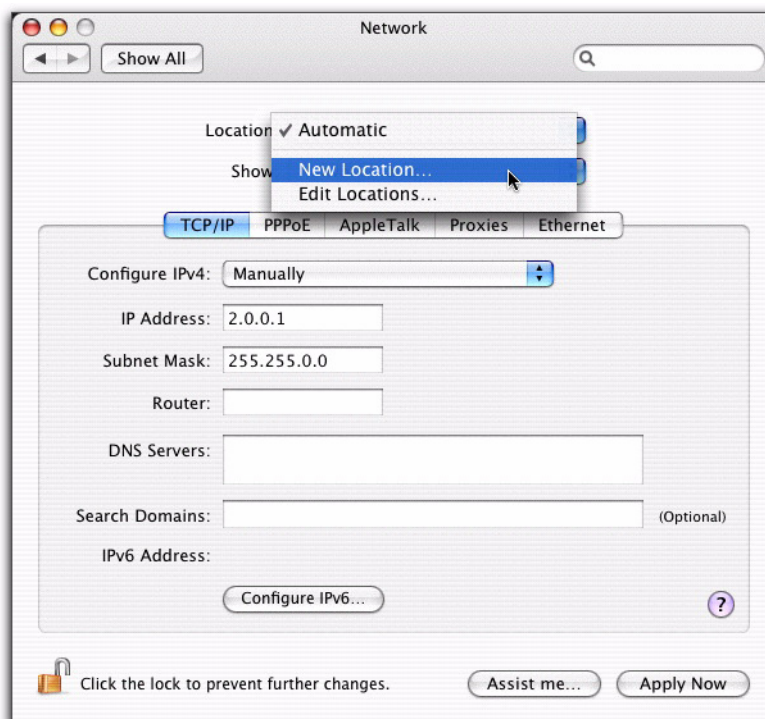
Step 1. At Apple menu, select System Preferences.



Step 2. In System Preferences window, select Network icon.



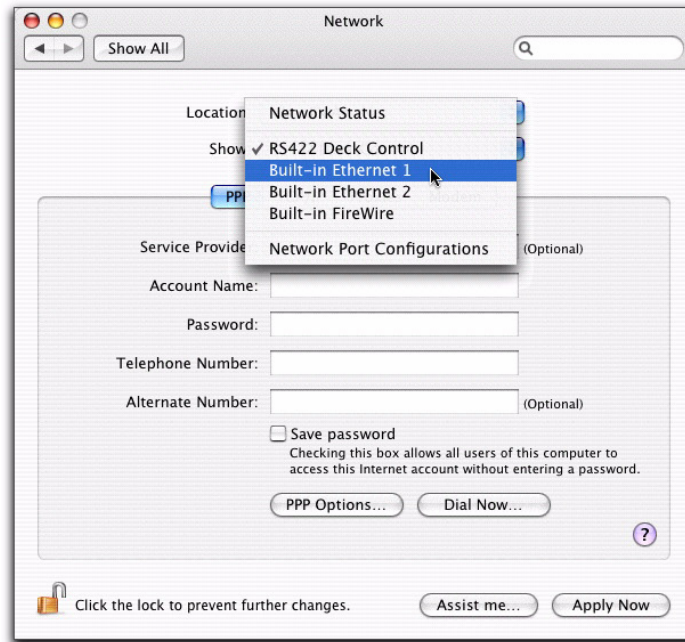
Step 3. In Network window, select Location drop-down and click New Location.



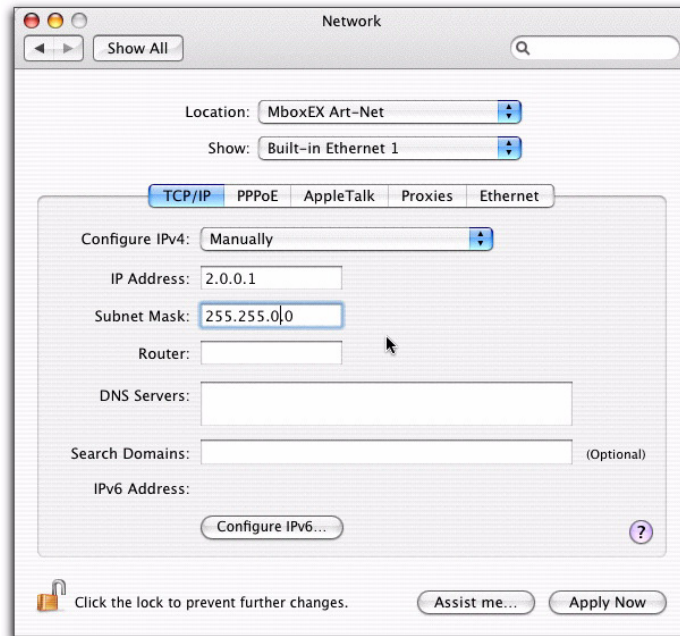
Step 4. The Name Location window appears. Enter location name and click OK.



Step 5. Select Show drop-down and click Built-In Ethernet 1.



Step 6. Enter the IP Address. This address is required to begin with 2.0.0.x, with each device in your network having a unique number for x between 1-254.



Step 7. Enter the Subnet Mask as 255.255.0.0.

Step 8. Click Apply Now.

# Console Patch

---

## Patching Fixtures

The Mbox Extreme Media Server is designed to work with moving-light consoles. Each console requires a fixture profile for the Mbox Extreme Media Server. It is strongly recommended that all fixtures be patched in the order listed in the table below.

**Table 2-1: Fixture Order**

Fixture Number	Description	Number of Channels	DMX Channel
1	Ambient Light	4	1-4
2	Spotlight 1	4	5-8
3	Spotlight 2	4	9-12
4	Spotlight 3	4	13-16
5	Spotlight 4	4	17-20
6	Camera	26	21-46
7	Shutters	20	47-66
8	Keystone	22	67-88
9	Texture 1	30	89-118
10	Object 1	23	119-141
11	Texture 2	30	142-171
12	Object 2	23	172-194
13	Texture 3	30	195-224
14	Object 3	23	225-247
15	Texture 4	30	248-277
16	Object 4	23	278-300
17	Texture 5	30	301-330
18	Object 5	23	331-353

---

**Note:** In the event you require additional profiles, they can be found on the PRG website at: [www.prg.com](http://www.prg.com). To request a profile not provided on the website, please contact the PRG Dallas office at 214.630.1963.

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# Quick Start

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## Generating Output

After connecting all components, patching all fixtures, and turning on the output device(s), you can follow these procedures to get the Mbox Extreme Media Server up and running.

### To generate Background output:

Step 1. Set Camera Intensity to value 255.

---

**Note:** The Camera Intensity channel controls the built-in dimmer on the I/O module. If this channel is set to 0, no output will appear on the output device.

---

Step 2. Select Texture 1 and Object 1 channels. Set Transparency to full (255). White square will appear on display.

Step 3. Deselect Object 1 channel, so that only Texture 1 channel is selected.

Step 4. Set Library parameter to value 253. (This selects the pre-loaded PRG stock content folder.)

Step 5. Set Texture parameter to value 007. You should see a PRG logo. (The file selected is named 007.MboxExtreme-Logo.jpg.)

Step 6. Adjust scale, color and other parameters as desired.

### To generate 3D Object output:

Step 1. Set Camera Intensity to value 255.

Step 2. To provide surface lighting for the 3D Object, select at least one Ambient light or Spot light channel and set value to 255.

Step 3. Select Texture 1 and Object 1 channels. Set Transparency to value 255. A white square will appear on display.

Step 4. Deselect Texture 1 channel. Only Object 1 channel should now be selected.

Step 5. Set 3D Object Library parameter to value 0 to access built-in 3D models.

Step 6. Set Object Number parameter value to 001. White sphere will appear on display.

Step 7. Adjust rotation and scale parameters as desired.

---

## Notes

3.

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# Operation

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This chapter provides an overview of the Mbox Extreme Media Server Environment, along with instructions for setup and operation of the Mbox Extreme application window.

- **Mbox Extreme Environment**
- **Application Window**



# Mbox Extreme Environment

---

## Concept Overview

In order to get the most out of the Mbox Extreme Media Server, it is important to understand the overall concept of the Mbox Extreme Environment, which is essentially a building platform for "virtual scenery." The final "look" of this virtual scenery can be comprised of backgrounds, 3D objects, camera angles, and lighting, all of which are controllable elements within the Mbox Extreme Environment. Likewise, each of these elements has a set of controllable parameters such as color, texture, size, and movement. When all combined, you can achieve an infinite number of possibilities for your virtual scenery.

At first, the interaction of these elements may seem complicated, but as we break down each component individually, you will find that they are similar to automated lighting parameters which you may already be familiar with. The only difference is that luminaire parameters coincide with physical hardware - i.e. beam parameters control an iris - while the Mbox Extreme parameters coincide with software elements. For example, just as you would control a luminaire's beam color from a console encoder or keypad, you can control the color of an Mbox Extreme 3D object. Once configured, the entire Mbox Extreme Environment (i.e. virtual scenery) can be sent to any video compatible device connected to the unit.



The following illustration is a virtual representation of each element within the Mbox Extreme Environment. (More detailed descriptions of each element are provided on subsequent pages.)

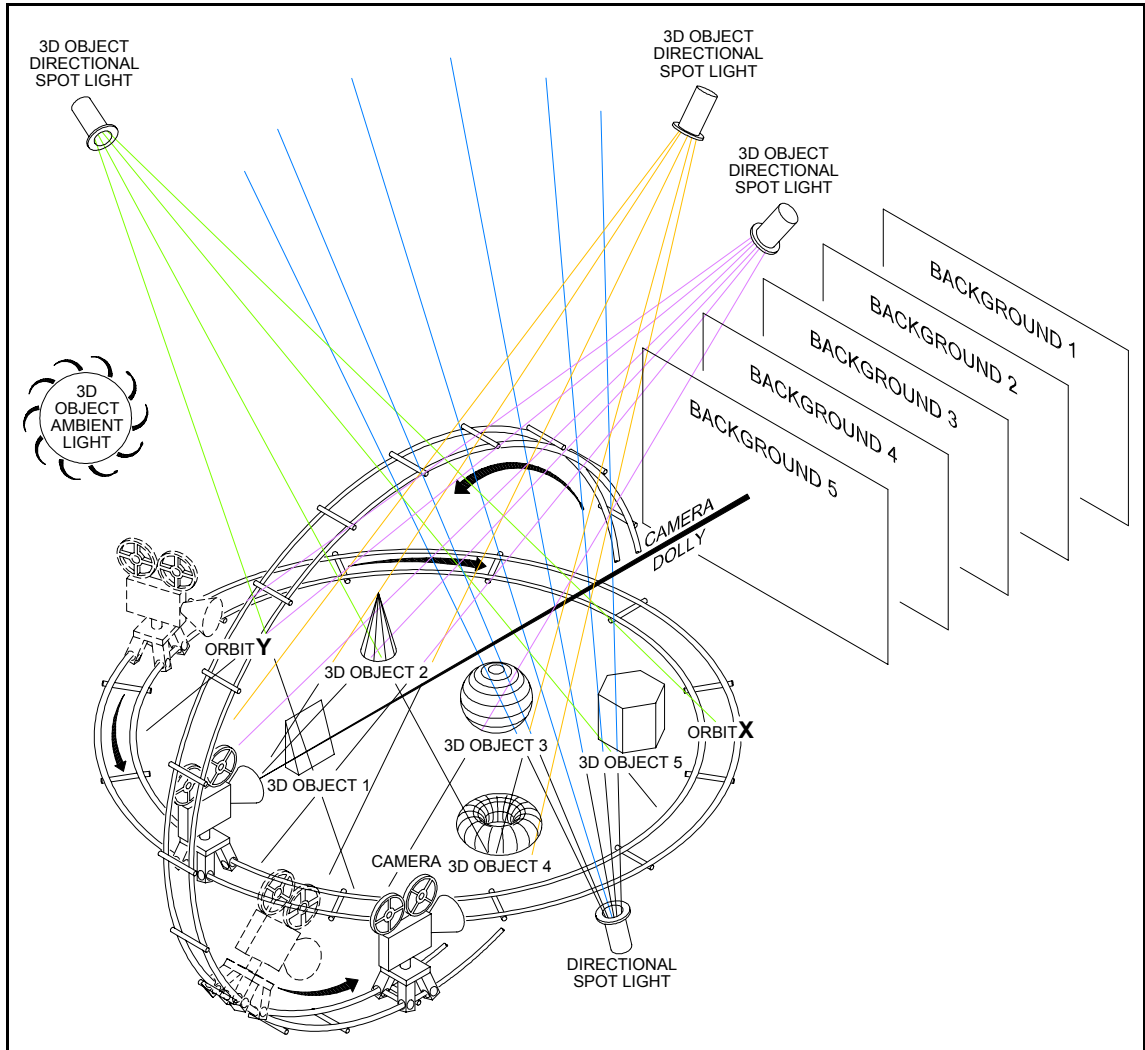


Figure 3-1: Mbox Extreme 3D Environment Overview

---

## Layers

The Mbox Extreme 3D Environment provides up to five different layers that can be used as Backgrounds or 3D Objects. You can use any combination of Backgrounds or 3D Objects up to five total. For example, you can create two Backgrounds and three 3D Objects or one Background and four 3D Objects.

### Layer Components

Due to the complexity of the 3D Object manipulation, all layers are comprised of two components: a Texture (30 channels) and Object (23 channels). Even when not using 3D Objects, the Object channels contain parameters used to control attributes of the Texture.

---

**Note:** Transparency must be set to 100% on *both* the Texture and Object channels to view a Background or 3D Object. The Transparency levels on the Background and 3D Object components for the same layer are additive. If both levels are set to 50%, the image transparency appears to be about 25%.

---

---

**Note:** If 3D Objects are not being used, the Transparency channel should be set to 100% in the fixture library.

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### Layer Hierarchy

The Layer Hierarchy, the order in which layers appear, is determined by numerical order and layer content. 3D Objects always appear in front of Background layers. Background layers appear in numerical order, back to front.

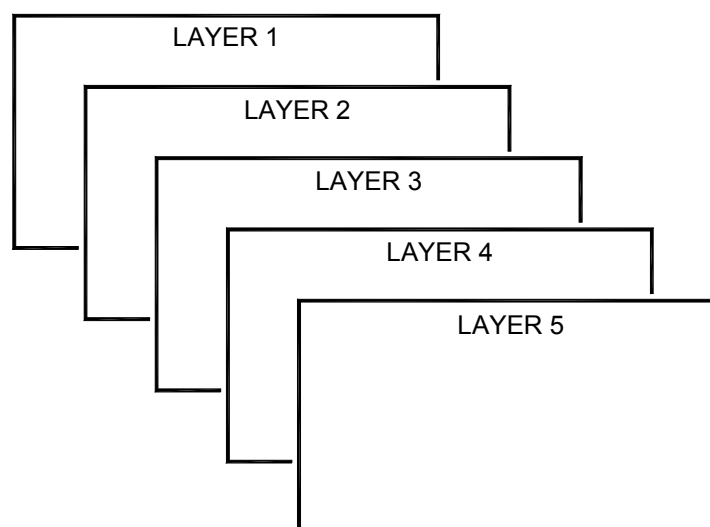


Figure 3-2: Background Order

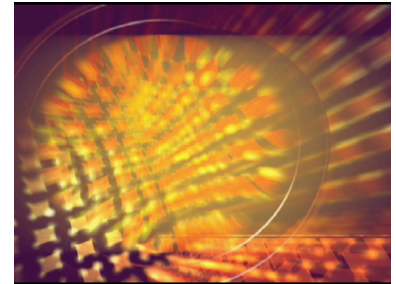
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## Backgrounds

The Mbox Extreme 3D Environment provides up to five Background elements. Parameters such as transparency level, color, texture, scale, and rotation can be configured for each, independently, to create a backdrop for your virtual scenery.

All backgrounds have the following controllable elements:

- Transparency
- Textures
- Texture Effects
- Transitions
- Color
- Scale
- X, Y Position
- Z rotation (Spin)
- Play mode and speed
- In / Out Frame
- Aspect
- Blending
- Texture Effect (2 per object)
- XFade type and timing



Sample Background

### Creating a Background using DMX512 control:

Step 1. Set Camera Intensity to value 255.

---

**Note:** The Camera Intensity channel controls the built-in dimmer on the I/O module. If this channel is set to 0, no output will appear on the output device.

---

Step 2. Select Texture 1 and Object 1 channels. Set Transparency to full (255). A white square will appear on display.

Step 3. Deselect Object 1 channel, so that only Texture 1 channel is selected.

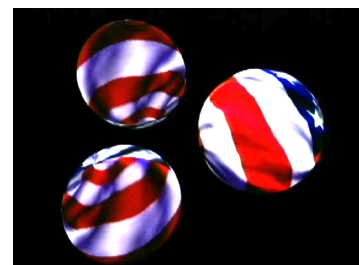
Step 4. Adjust desired parameters for Texture as desired.

For more information on background properties, see [See “Mbox Extreme Combined DMX Channel Map” on page 50.](#)

## Textures

The Mbox Extreme Environment includes the ability to apply textures to the Backgrounds and/or 3D Objects. These Textures can be derived from still images or video clips, which are stored in the Mbox Extreme digital media library.

Digital media is located on the Mbox Extreme Media Servers within file folders. These folders are referred to as "Libraries," while the actual media files are referred to as "Textures." In order to provide access to these Textures using DMX512 control, both the library folders and media files (textures) are named with a DMX512 value (from 000 to 255). When accessing a Texture using DMX512 control, you would first provide the library number, then the Texture number. (For more information on the folder/file structure, see [“Content Management” on page 41.](#))



Sample 3D Objects  
with Flag Texture

### Applying a texture to a Background using DMX512 control:

- Step 1. Using Background layer created in the previous section, set Library channel to a value between 000-255 to specify the media folder.
- Step 2. Set Texture channel to a value between 000-255 to specify the media file.

## Effects

The Mbox Extreme Media Server includes a set of pre-designed effect elements. Effects such as color, tint and alpha adjustment can be applied to any Background or 3D Object.

Refer to [“Texture Effects” on page 62](#) and for a complete list of available effects.

---

**Note:** Effects override transitions. If any effects are active, then the transition will be limited to dissolve (or snap, if effect is processor intensive).

---

### Applying an effect to a Background using DMX512 control:

- Step 1. Using Background layer created in the previous section, set Effect channel at a value between 0-255.
- Step 2. Use Effect control channels to modify how the effect is applied.

## Transitions

Transitions can be used to create video switcher style dissolves and wipes when performing timed crossfades between still images or movies. Transitions between two Backgrounds or Object textures can also be applied, along with an associated timing parameter. For example, it would be possible to create a timed crossfade on a single Background layer.

Refer to [“Transitions” on page 63](#) for a complete list of available transitions.

### Applying a transition using DMX512 control:

- Using Background layer created in the previous section, set Transition (XFade Type) channel at a value between 0-255.
- Set XFade Timing value to 3 seconds.

## Play Modes

Play modes can be used to create both In/Out and Random/Stop frames for media playback. Refer to “Play Modes” on page 60 for Play mode DMX512 mappings.

### In and Out Frame

The In and Out Frame feature provides a method for setting a start and stop frame for a video clip in order to loop between two points. Like the Effects and Transitions feature, the In/Out frame can be applied to Background or Object textures.

#### To set In/Out frames using DMX512 control:

- Step 1. Set Play mode to value between 80-89.
- Step 2. Adjust In Frame to desired in point.
- Step 3. Set Play mode to value between 90-99.
- Step 4. Adjust Out frame to desired out point.
- Step 5. Set Play mode to 0 for Forward Loop playback.

### Random and Stop

The Random feature provides a method for playing frames in random order. The Stop feature halts play.

#### To play frames in random order:

- Set encoder at a value between 60-69.

#### To stop play:

- Set play speed to 0.

## Live Video Input

The Mbox Extreme Media Server supports two separate live video inputs from FireWire® video devices and the SDI video capture card installed in the Macintosh® G5 computer. The live video is displayed on an available background.

#### To control live video:

- Step 1. Set Texture Library channel to 255.
- Step 2. Set Background to 254 (Local Camera 2) or 255 (Local Camera 1).

---

**Note:** If no camera is connected and Diagnostics are enabled, a "No Camera" image appears on the display.

---

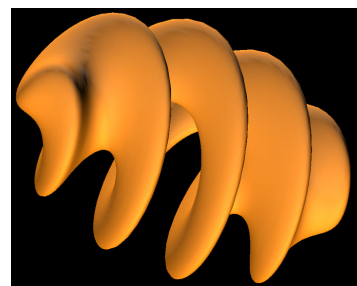
## 3D Objects

The Mbox Extreme Environment includes up to five 3D Objects. Parameters such as shape, transparency level, texture, color and scale can be configured for each, independently, to create dynamic or stationary objects within your virtual scenery. These Objects - unlike the Backgrounds - can interact in a 3-dimensional space, which means that there is no set order to their appearance. In other words, Object 1 can move in front or behind Object 2, Object 2 can move in front or behind Object 3, and so on. Objects such as a sphere or square could then be scaled, texturized and positioned to create dynamic scenery.

In order to provide access to the models using DMX512 control, both the library folders and models are named with a DMX512 value (from 000 to 255). When accessing a model using DMX512 control, you would first provide the library number, then the model number. The Mbox Extreme Media Server provides 10 pre-loaded object models located in Library folder 001. (For more information on the folder/file structure, see [“Content Management” on page 41.](#))

All 3D Objects have the following controllable elements:

- Transparency
- Shape
- Texture
- Color
- X, Y, Z Position
- X, Y, Z Scale
- X, Y, Z Rotation (Spin)
- Texture Effect
- Shape XFade time



Sample 3D Object with Background and Lighting

Just like a prop on a stage, 3D Objects (models) require illumination from either the ambient and/or spot light channels to be visible. In addition, each object has its own intensity control, which controls its overall transparency. For example, set the ambient light to 40%, then choose an object channel, set its intensity to full and use the Model Library and object channels to choose a model. Use *scale* to increase the size of a model as required.

You can also apply textures to a model by selecting the "Object Texture" channel and choosing a texture from the library. For more information, see [“Textures” on page 28.](#)

### Displaying a 3D Object using DMX512 control:

Step 1. Set Camera Intensity to value 255.

---

**Note:** The Camera Intensity channel controls the built-in dimmer on the I/O module. If this channel is set to 0, no output will appear on the output device.

---

Step 2. Select at least one Ambient light or Spot light channel and set Intensity to desired level.

Step 3. Select Texture 1 and Object 1 channels. Set Transparency to full (255). A white square will appear on display.

Step 4. Deselect Texture 1 channel, so that only Object 1 channel is selected.

- Step 5. Set Shape Library channel to a value between 000-255. This determines the folder for the model.
- Step 6. Set Shape channel to a value between 000-255. This determines the file for the model.
- Step 7. Adjust desired parameters for the Texture as desired.

---

**Note:** Some control parameters for 3D models are located in the Texture channels.

---

#### **Applying a Texture to a 3D Object using DMX512 control:**

- Step 1. Use 3D object created in previous section.
- Step 2. Select Texture 1 channel.
- Step 3. Set Library and Texture channels to desired values. Texture appears on the surface of the 3D Object.

---

## **3D Lighting**

The Mbox Extreme Environment includes five separate Lighting Elements: one ambient source and four directional spots. These Lighting Elements provide illumination for the 3D Objects.

---

**Note:** Lighting elements have no effect on Backgrounds.

---

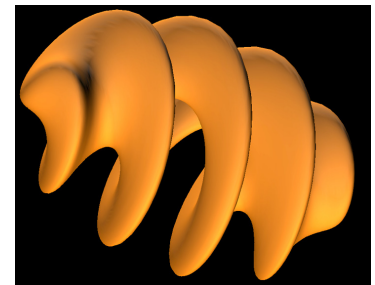
The *ambient light source* applies to the overall Mbox Extreme Environment. This is a uniform field of light which is not subject to shadows or other directional limitations.

The *directional spot lights* on the other hand, provide directional illumination in order to give the 3D Objects their 3-dimensional look. This lighting will create the shadows necessary for depth. The spot lights originate as follows:

- Spot Light 1 - from upper right.
- Spot Light 2 - from upper left.
- Spot Light 3 - from below.
- Spot Light 4 - from above.

All Lights have the following controllable elements:

- Intensity
- Color (RGB mixing)



Sample 3D Object with Background and Lighting

---

## Camera

The Mbox Extreme Environment includes one Camera element. This element performs two main functions:

- Master Intensity control of Mbox Extreme I/O Module.

---

**Note:** The Camera Intensity channel must be greater than 0 to view any output from the Mbox Extreme I/O Module.

---

- Modifies the viewpoint of the 3D Objects and Backgrounds.

Camera parameters, such as orbit, dolly, field of view, shutters and keystone correction, can be controlled in order to fully customize the look of your scenery.

The Camera has the following controllable elements:

- Intensity
- Color
- Orbit X
- Orbit Y
- Dolly - distance of the camera to the Environment.
- Camera Roll and Spin
- Field of View - overall viewing angle of the Environment. This is the equivalent of using different "virtual camera lenses," such as wide angle, telephoto, etc.
- Pitch
- Yaw
- Two effects
- Mbox Extreme Control Channels

One final thing to note in regards to Camera position is that it is always in set relation to the Backgrounds. If the Camera position is orbited upwards, then the Backgrounds are orbited downwards in an equal ratio. This will ensure that the Background elements are always in view.

## Control Channels

The Camera Control Channel element controls on-board diagnostic screens and special functions for the Mbox Extreme Media Server. For more information, see [“Control Channels” on page 59](#).



---

## Shutter

Shutter parameters offer the ability to shape a layer. Shutters can be positioned, scaled, and rotated. To activate the Shutter, the Shutter Shape channel must be set to a value other than the default.

Shutter have the following controllable elements:

- Shutter Shapes
- Shutter X
- Shutter Y
- Shutter Color
- Shutter Scale
- Shutter Edge
- Shutter Rotation

For more information, see [“Shutter” on page 51](#) and [“Shutter Shapes” on page 59](#).

---

## Keystone

Keystone parameters offer a type of geometrical distortion that causes a normally rectangular image to be displayed as a trapezoidal image. This can occur when the Environment is projected at an odd angle to the flat surface it is being projected upon. The Keystone controls provide a way to correct this distortion.

Keystone has the following controllable elements:

- Keystone X
- Keystone Y
- Keystone Scale
- Keystone Skew
- Tiling
- Edge Blending

For more information, see [“Keystone” on page 52](#) and [“Tiling Modes” on page 61](#).

# Application Window

---

## Overview

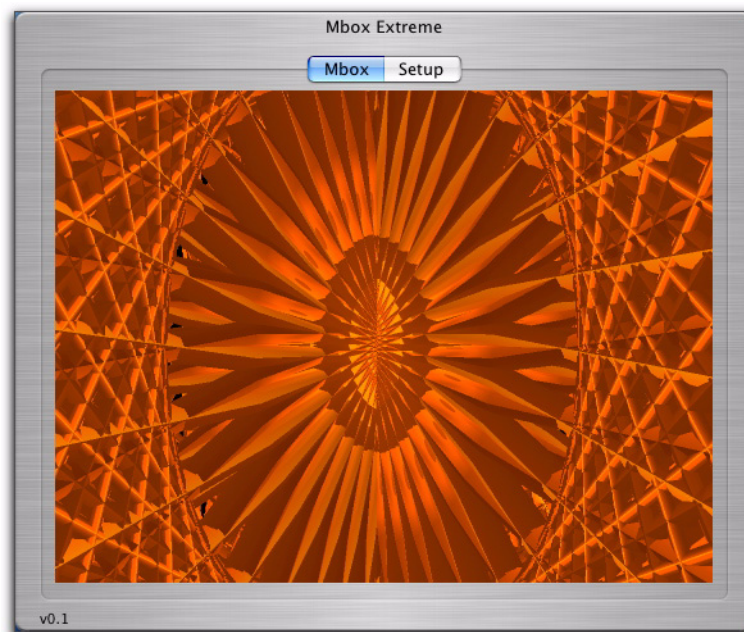
The Mbox Extreme Media Server contains the Mbox Extreme software application. The Mbox Extreme application window allows you to view the Mbox Extreme Media Server output in either window or full screen mode on the local monitor.

The application window contains two screens:

- Mbox Output window.
- Setup window.

The Setup window is used to:

- Set DMX512 or Art-Net address for this media server.
- Set application default to start in window mode and specify window size.
- Set application default resolution when starting in full screen mode.
- Set texture size.
- Set 3D models preload default.
- Configure other options.
- Input License Key to authorize the application.



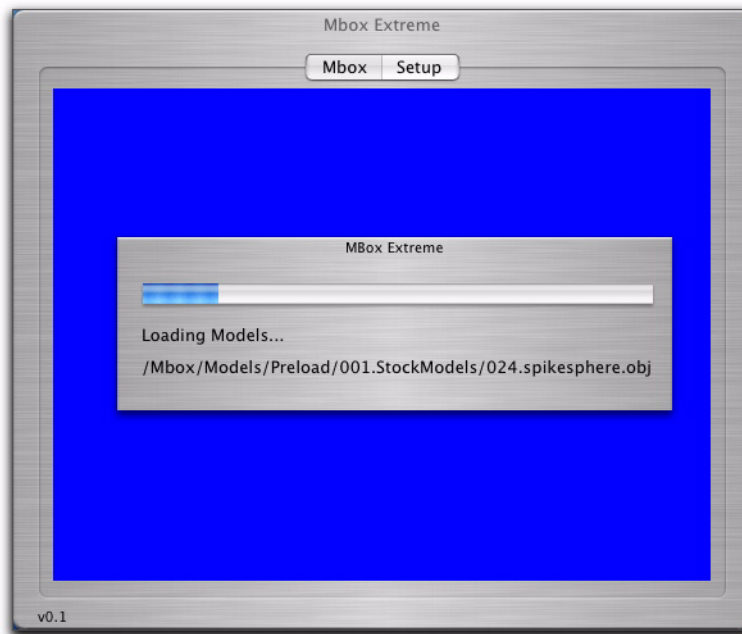
**Figure 3-3: Mbox Extreme Application Main Window**

---

## Starting the Mbox Extreme Application


The Mbox Extreme application will start automatically when the computer is turned on. If the application does not start automatically, locate the Mbox Extreme icon on the Apple Dock and click once.

When starting the application, the default is to preload all 3D models. While 3D models are loading, the computer will be locked and the Mbox Extreme application window appears with a blue screen and progress bar (Figure 3-4).



**Figure 3-4: Mbox Extreme Startup Window**

---

**Note:** The application can also be launched *without* loading 3D models by pressing the  key while clicking on the Mbox Extreme icon.

---

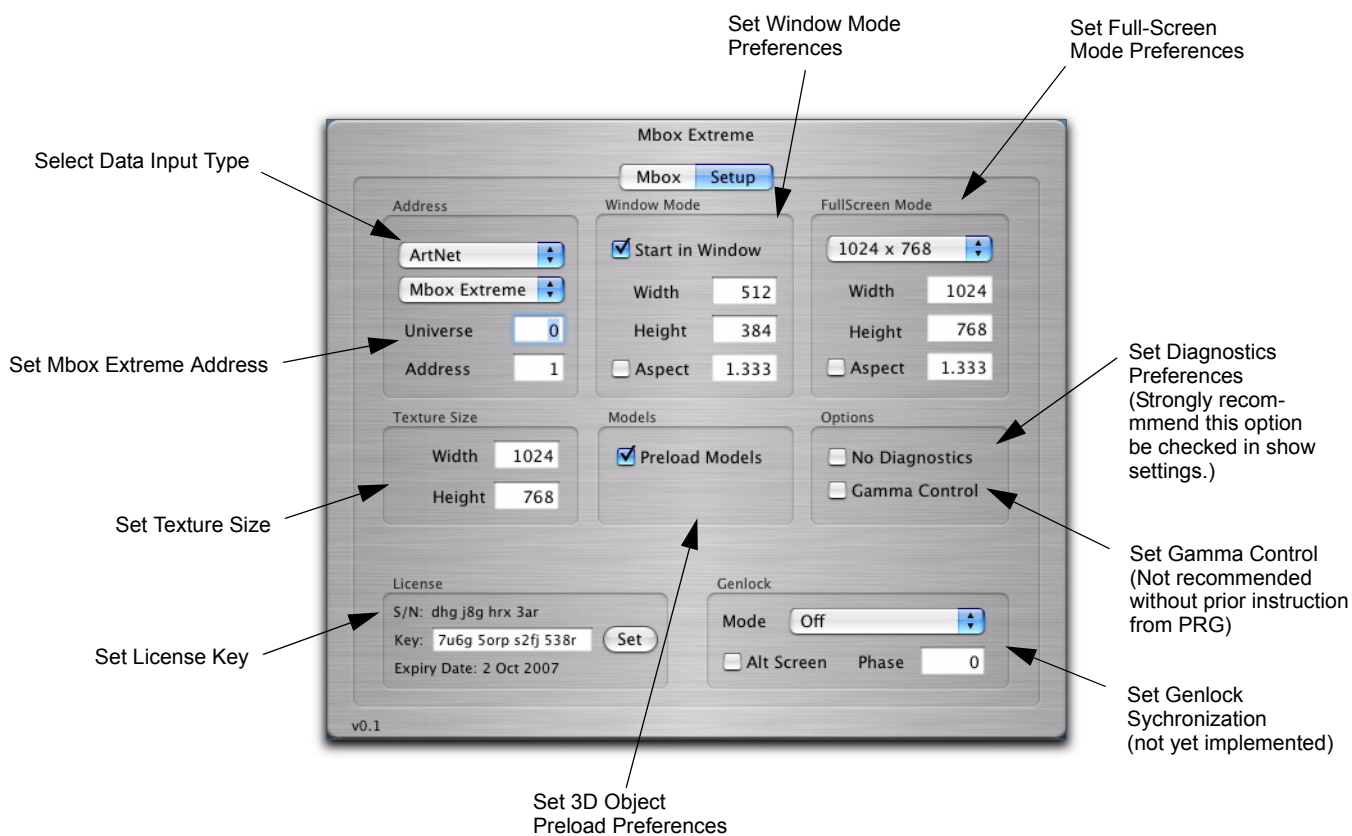
The Mbox and Setup buttons allow you to switch between the Mbox Preview window and the Setup window. For more information on the Setup window, see “[Setup Window](#)” on page 36.

## Setup Window

The Setup window allows you to configure parameters for the individual Mbox Extreme Media Server. This Setup window only appears when viewing the Mbox Extreme application in window mode.

### To open the Setup window:

- Step 1. Start the Mbox Extreme application. For more information, see [“Starting the Mbox Extreme Application” on page 35](#).
- Step 2. At top of application window, press Setup button.



- Step 3. Configure preferences.

**Note:** When changing texture size preferences, you must quit the application and restart for changes to take effect.

---

## Changing the Application Window Size


The Mbox Extreme application window opens in either window or full-screen mode depending on the settings specified in the Setup window. Set “[Setup Window](#)” on page 36.

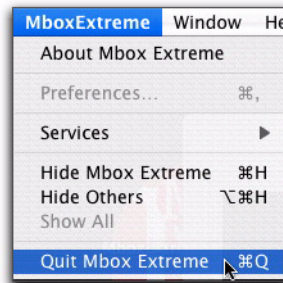
To change window size:

- Press  / [F] to toggle between full-screen and window mode.


---

## Closing the Application

To close and quit the Mbox Extreme application, press  / [Q] or select Quit Mbox Extreme from the Mbox Extreme menu.



---

**Note:** If the Mbox Extreme application window is in full-screen mode, press  / [F] to minimize screen to access the Mbox Extreme menu.

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## Notes

4.

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# Media Content

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This chapter provides instructions for managing media files which reside on the Mbox Extreme Media Server and for adding your own custom content.

- **Content Type**
- **Content Management**



# Content Type

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## Images and Video Clips

The Mbox Extreme Media Server supports Apple® QuickTime® technology for rendering and playback of images and video files. The following file types are supported:

- TIF - still image file
- TIFF - still image file
- TARGA - still image with alpha component
- JPEG - still image file
- JPG - still image file
- MOV - QuickTime movie file
- VID - QuickTime movie file from a video source
- JPG\_M - QuickTime movie file containing a still image
- NULL - used to create a small zero-alpha black image. This image is useful when using transitions.

---

**Note:** File extensions are not case-sensitive. For example, files with extension .JPG and .jpg are the same.

---

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## Recommended Codecs

JPEG and TIFF file types are recommended for creating still image content for optimum output on the Mbox Extreme Media Server. For movie content, PHOTO JPEG (medium quality) is the recommended file type for optimum playback. If you have questions regarding media file types, please contact the PRG Dallas office at 214.630.1963.

---

**Note:** The Mbox Extreme media server will play other QuickTime file types, but they may not load as quickly or play as smoothly as the recommended file type. All custom content should be created in a single common format. The PHOTO JPEG codec is *strongly* recommended.

---

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## 3D Models (Objects)

Custom 3D models can be added to the Mbox Extreme Media Server. The Mbox Extreme Media Server supports the Alias|Wavefront™ 3D .obj format. There are several third-party applications that can export files to this format, including Maya®, Poser®, Bryce® and Cheetah3D to name a few.



# Content Management

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## Overview

The Mbox Extreme Media Server offers a flexible media folder structure. Media can reside locally on the Mbox Extreme server harddrive or on additional harddrives or storage devices connected to the Macintosh® G5 computer.

At startup, the Mbox Extreme application performs a media scan to search all folders that reside within the /Mbox/Media folder that resides on the main harddrive of the Mbox Extreme Media Server. Additional media can be attached to the main /Mbox/Media folder through aliases. Aliases must be linked to folders on the supplemental media, it cannot be aliased to files. Also, an alias cannot refer to another alias. The main /Mbox and /Mbox/Media folder must reside on the local harddrive and cannot be aliases.

---

**Note:** The initial media scan allows for the locations of files to be resolved at startup, therefore the "distance" of a file from the main folder has no effect on the time required to find a file.

---

Each time the Mbox Extreme Media Server completes a media scan, a text file is created with all media files found and their corresponding combined file numbers. The text file can be found at /Mbox/MboxExtreme\_Media\_List.txt



---

**CAUTION:** All media content on the Mbox Extreme media server should be backed-up to an external drive.

---

---

## Folder and File Numbering

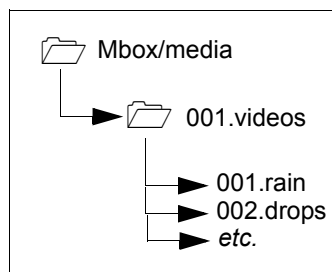
Video and image files are located within the /Mbox/Media folder on the Mbox Extreme main harddrive. They are arranged into individual "Library" folders. Each folder must be named beginning with a unique 3-digit index value between 001 and 254.

---

**Note:** The Library folder beginning with 255 is reserved for live video access commands.

---

In turn, each file within the Library folder must contain a 3-digit index value between 000 to 255.



The Mbox Extreme Media Server also supports 16-bit file numbers. When a file contains a 16-bit number, the folder number is the upper 8 bits of the 16-bit number. The folder number of any parent folders is ignored.

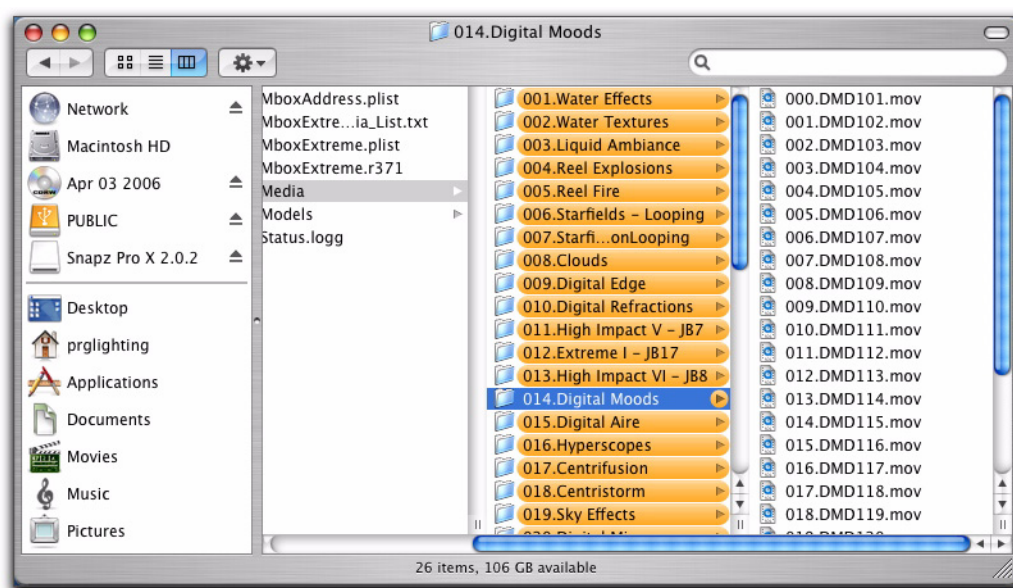
---

**Note:** When using 16-bit file numbers, the file number does not get updated when moved to another folder.

---

## Preloaded Content

The Mbox Extreme Media Server comes with preloaded stock images and movies contained in 41 folders contained in the /Mbox/Media folder. (Preloaded content is subject to change.)



**Figure 4-1: Mbox Extreme Media Folder**

Users can create additional folders to add additional content. Also, Preloaded content can be deleted, if necessary, but this is not recommended.

---

## Adding Video and Image Files

---

**Note:** You must rescan the media folders or restart the Mbox Extreme application any time you add content to the Mbox Extreme Media Server. To rescan the media, use the Rescan Media Library Control Channel on the Camera Fixture. For more information, see [“Control Channels” on page 59](#).

---

### To add video and/or image files:

- Step 1. Open /Mbox/Media folder located on the main harddrive.
  - Step 2. At **File** menu, select "New Folder" and enter a unique 3-digit number (that is not already being used) followed by a descriptive name. For example, "001.mycontentfolder."
  - Step 3. Copy image and/or video files into the new folder.
  - Step 4. For each file, add a unique 3-digit index value to each file (between 0-255) along with a descriptive name. For example, "001.earth", "002.wind", "003.fire", etc.
- 

**Note:** When adding files, it is recommended that users create new unique folder numbers.

---

---

## Adding 3D Objects

3D models are located in the Mbox/Models and Mbox/Models/Preload folders. Models located in the Preload folder are preloaded at startup and appear on the display more rapidly when called. Models must be numbered 000-255 and placed in folders numbered 001-255. Folder 000 is reserved by the system and should not be used.

---

**Note:** You must restart the Mbox Extreme application any time you add 3D content to the Mbox Extreme Media Server.

---

### To add 3D object files:

- Step 1. Open Mbox/Models.
- Step 2. At **File** menu, select "New Folder" and enter a unique 3-digit number (that is not already being used) followed by a descriptive name. For example, "001 mymodels."
- Step 3. Copy model files into the new folder.
- Step 4. For each file, add a unique 3-digit index value to each file (between 0-254) along with a descriptive name. For example, "001.man", "002.hammer", "003.airplane", etc.

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## Notes

5.

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# Troubleshooting and Maintenance

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This chapter procedures for extended care of the Mbox Extreme Media Server.

- [Routine Maintenance](#)



# Routine Maintenance

## Cleaning or Replacing the Air Filter

The air filters, located at front of the Macintosh® G5 computer, should be cleaned or replaced as needed.

### To clean/remove air filter:

- Step 1. At computer, pull four screw pins to release grill.
- Step 2. Remove grill and air filter.
- Step 3. Clean filter with compressed air (or water, if allowed to fully dry).
- Step 4. Re-install.

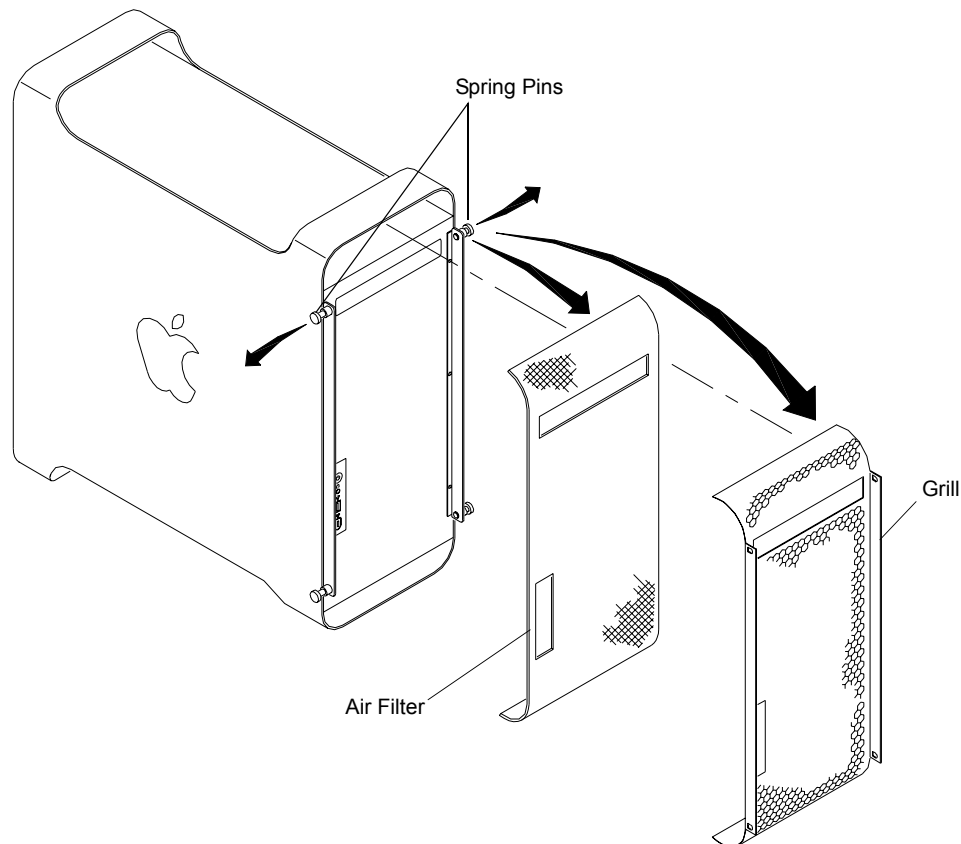


Figure 5-1: Mac G5 Computer Air Filter Removal

---

## Removing Computer from Case

The Macintosh® G5 computer can be removed from the case to be cleaned or replaced. Two configurations of the Mbox Extreme case exist: one case contains two mounting brackets that attach to the computer and the other contains only foam encasing the computer.

### **To remove Mac G5 computer with mounting brackets:**

- Step 1. At rear of case, disconnect all cables from Mac G5 computer.
- Step 2. At front of case, remove four 8mm mounting bracket screws.
- Step 3. At rear of case, remove four 8mm mounting bracket screws.
- Step 4. Carefully slide Mac G5 computer through front of case.

### **To remove Mac G5 computer with foam-only mounting:**

- Step 1. At rear of case, disconnect all cables from Mac G5 computer.
- Step 2. Carefully slide Mac G5 computer through front of case.

---

## Notes



**A.**

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## **DMX Channel Mapping**

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This Appendix contains tables for the combined DMX512 channel map as well as additional controls such as play modes, tiling, shutter shapes, aspect control, blending control, texture effect, transitions, and built-in shapes.



# DMX Operation

## Channel Mapping

### Combined DMX Channel Map

Table A-1: Mbox Extreme Combined DMX Channel Map

Channel	Function	Default	Notes
<b>Ambient Light</b>			
1	Intensity	0	
2	Red	255	
3	Green	255	
4	Blue	255	
<b>Spot Light 1</b>			
5	Intensity	0	
6	Red	255	
7	Green	255	
8	Blue	255	
<b>Spot Light 2</b>			
9	Intensity	0	
10	Red	255	
11	Green	255	
12	Blue	255	
<b>Spot Light 3</b>			
13	Intensity	0	
14	Red	255	
15	Green	255	
16	Blue	255	
<b>Spot Light 4</b>			
17	Intensity	0	
18	Red	255	
19	Green	255	
20	Blue	255	
<b>Camera</b>			
21	Intensity	255	Overall dimming provided by hardware
22	Red	255	
23	Green	255	
24	Blue	255	
25	Orbit X course	127	
26	Orbit X fine	255	
27	Orbit Y course	127	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

28	Orbit Y fine	255	
29	Dolly course	127	
30	Dolly fine	255	
31	Roll course	127	
32	Roll fine		
33	Spin	127	
34	Field of View course	127	
35	Field of View fine	255	
36	Pitch course	127	
37	Pitch fine	255	
38	Yaw course	127	
39	Yaw fine	255	
40	Effect 1	0	See Texture Effects
41	Effect Control 1a	0	
42	Effect Control 1b	0	
43	Effect 2	0	See Texture Effects
44	Effect Control 2a	0	
45	Effect Control 2b	0	
46	Control	0	See Control Channels
<b>Shutter</b>			
47	Shape	255	
48	Shutter X course	127	
49	Shutter X fine	255	
50	Shutter Y course	127	
51	Shutter Y fine	255	
52	Red	0	
53	Green	0	
54	Blue	0	
55	Shutter Scale course	255	
56	Shutter Scale fine	255	
57	Shutter Edge	0	
58	Shutter 1a	0	See Control Channels
59	Shutter 1b	0	
60	Shutter 2a	0	
61	Shutter 2b	0	
62	Shutter 3a	0	
63	Shutter 3b	0	
64	Shutter 4a	0	
65	Shutter 4b	0	
66	Shutter Rotation	127	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

<b>Keystone</b>			
67	Edge Blending Enable	0	0-9 Narrow, 10-19 Med, 20-255 Wide
68	Keystone X course	127	
69	Keystone X fine	255	
70	Keystone Y course	127	
71	Keystone Y fine	255	
72	Tile Mode	0	See Tiling Modes
73	Tile Overlap	0	
74	Scale course	255	
75	Scale fine	255	
76	Edge 1	0	Edge blending - Top
77	Edge 2	0	Edge blending - Left
78	Edge 3	0	Edge blending - Bottom
79	Edge 4	0	Edge blending - Right
80	Corner 1 - X	0	
81	Corner 1 - Y	0	
82	Corner 2 - X	0	
83	Corner 2 - Y	0	
84	Corner 3 - X	0	
85	Corner 3 - Y	0	
86	Corner 4- X	0	
87	Corner 4- Y	0	
88	Keystone Rotation	127	
<b>Object 1 - Texture</b>			
89	Transparency	0	
90	X Position course	127	
91	X Position fine	255	
92	Y Position course	127	
93	Y Position fine	255	
94	Red	255	
95	Green	255	
96	Blue	255	
97	Z Position course	127	
98	Z Position fine	255	
99	Scale course	127	
100	Scale fine	255	
101	Library	0	
102	Texture	0	
103	Play Mode	0	See Play Modes
104	Play Speed	127	
105	In Frame course	0	
106	In Frame fine	0	
107	Out Frame course	255	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

108	Out Frame fine	255	
109	Aspect	0	See Aspect Control
110	Blending	255	See Blending Control
111	Effect 1	0	See Texture Effects
112	Effect Control 1a	0	
113	Effect Control 1b	0	
114	Effect 2	0	See Texture Effects
115	Effect Control 2a	0	
116	Effect Control 2b	0	
117	XFade Type	0	See Transitions
118	XFade Timing	0	
<b>Object 1 - Object</b>			
119	Transparency	0	
120	Shape Library	0	
121	Shape	0	See Built-In Shapes
122	Shape XFade Time	0	
123	Anim Speed	127	
124	X Scale course	127	
125	X Scale fine	255	
126	Y Scale course	127	
127	Y Scale fine	255	
128	Z Scale course	127	
129	Z Scale fine	255	
130	X Rotation course	127	
131	X Rotation fine	255	
132	Y Rotation course	127	
133	Y Rotation fine	255	
134	Z Rotation course	127	
135	Z Rotation fine	255	
136	X Spin	127	
137	Y Spin	127	
138	Z Spin	127	
139	Effect 1	0	
140	Effect Control 1a	0	
141	Effect Control 1b	0	
<b>Object 2 - Texture</b>			
142	Transparency	0	
143	X Position course	127	
144	X Position fine	255	
145	Y Position course	127	
146	Y Position fine	255	
147	Red	255	
148	Green	255	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

149	Blue	255	
150	Z Position course	127	
151	Z Position fine	255	
152	Scale course	127	
153	Scale fine	255	
154	Library	0	
155	Texture	0	
156	Play Mode	0	See Play Modes
157	Play Speed	127	
158	In Frame course	0	
159	In Frame fine	0	
160	Out Frame course	255	
161	Out Frame fine	255	
162	Aspect	0	See Aspect Control
163	Blending	255	See Blending Control
164	Effect 1	0	See Texture Effects
165	Effect Control 1a	0	
166	Effect Control 1b	0	
167	Effect 2	0	See Texture Effects
168	Effect Control 2a	0	
169	Effect Control 2b	0	
170	XFade Type	0	See Transitions
171	XFade Timing	0	
<b>Object 2 - Object</b>			
172	Transparency	0	
173	Shape Library	0	
174	Shape	0	See Built-In Shapes
175	Shape XFade Time	0	
176	Anim Speed	127	
177	X Scale course	127	
178	X Scale fine	255	
179	Y Scale course	127	
180	Y Scale fine	255	
181	Z Scale course	127	
182	Z Scale fine	255	
183	X Rotation course	127	
184	X Rotation fine	255	
185	Y Rotation course	127	
186	Y Rotation fine	255	
187	Z Rotation course	127	
188	Z Rotation fine	255	
189	X Spin	127	
190	Y Spin	127	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

191	Z Spin	127	
192	Effect 1	0	
193	Effect Control 1a	0	
194	Effect Control 1b	0	
<b>Object 3- Texture</b>			
195	Transparency	0	
196	X Position course	127	
197	X Position fine	255	
198	Y Position course	127	
199	Y Position fine	255	
200	Red	255	
201	Green	255	
202	Blue	255	
203	Z Position course	127	
204	Z Position fine	255	
205	Scale course	127	
206	Scale fine	255	
207	Library	0	
208	Texture	0	
209	Play Mode	0	See Play Modes
210	Play Speed	127	
211	In Frame course	0	
212	In Frame fine		
213	Out Frame course	255	
214	Out Frame fine	255	
215	Aspect	0	See Aspect Control
216	Blending	255	See Blending Control
217	Effect 1	0	See Texture Effects
218	Effect Control 1a	0	
219	Effect Control 1b	0	
220	Effect 2	0	See Texture Effects
221	Effect Control 2a	0	
222	Effect Control 2b	0	
223	XFade Type	0	See Transitions
224	XFade Timing	0	
<b>Object 3 - Object</b>			
225	Transparency	0	
226	Shape Library	0	
227	Shape	0	See Built-In Shapes
228	Shape XFade Time	0	
229	Anim Speed	127	
230	X Scale course	127	
231	X Scale fine	255	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

232	Y Scale course	127	
233	Y Scale fine	255	
234	Z Scale course	127	
235	Z Scale fine	255	
236	X Rotation course	127	
237	X Rotation fine	255	
238	Y Rotation course	127	
239	Y Rotation fine	255	
240	Z Rotation course	127	
241	Z Rotation fine	255	
242	X Spin	127	
243	Y Spin	127	
244	Z Spin	127	
245	Effect 1	0	
246	Effect Control 1a	0	
247	Effect Control 1b	0	
<b>Object 4 - Texture</b>			
248	Transparency	0	
249	X Position course	127	
250	X Position fine	255	
251	Y Position course	127	
252	Y Position fine	255	
253	Red	255	
254	Green	255	
255	Blue	255	
256	Z Position course	127	
257	Z Position fine	255	
258	Scale course	127	
259	Scale fine	255	
260	Library	0	
261	Texture	0	
262	Play Mode	0	See Play Modes
263	Play Speed	127	
264	In Frame course	0	
265	In Frame fine		
266	Out Frame course	255	
267	Out Frame fine	255	
268	Aspect	0	See Aspect Control
269	Blending	255	See Blending Control
270	Effect 1	0	See Texture Effects
271	Effect Control 1a	0	
272	Effect Control 1b	0	
273	Effect 2	0	See Texture Effects



**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

274	Effect Control 2a	0	
275	Effect Control 2b	0	
276	XFade Type	0	See Transitions
277	XFade Timing	0	
<b>Object 4- Object</b>			
278	Transparency	0	
279	Shape Library	0	
280	Shape	0	See Built-In Shapes
281	Shape XFade Time	0	
282	Anim Speed	127	
283	X Scale course	127	
284	X Scale fine	255	
285	Y Scale course	127	
286	Y Scale fine	255	
287	Z Scale course	127	
288	Z Scale fine	255	
289	X Rotation course	127	
290	X Rotation fine	255	
291	Y Rotation course	127	
292	Y Rotation fine	255	
293	Z Rotation course	127	
294	Z Rotation fine	255	
295	X Spin	127	
296	Y Spin	127	
297	Z Spin	127	
298	Effect 1	0	
299	Effect Control 1a	0	
300	Effect Control 1b	0	
<b>Object 5- Texture</b>			
301	Transparency	0	
302	X Position course	127	
303	X Position fine	255	
304	Y Position course	127	
305	Y Position fine	255	
306	Red	255	
307	Green	255	
308	Blue	255	
309	Z Position course	127	
310	Z Position fine	255	
311	Scale course	127	
312	Scale fine	255	
313	Library	0	
314	Texture	0	

**Table A-1: Mbox Extreme Combined DMX Channel Map (Continued)**

315	Play Mode	0	See Play Modes
316	Play Speed	127	
317	In Frame course	0	
318	In Frame fine		
319	Out Frame course	255	
320	Out Frame fine	255	
321	Aspect	0	See Aspect Control
322	Blending	255	See Blending Control
323	Effect 1	0	See Texture Effects
324	Effect Control 1a	0	
325	Effect Control 1b	0	
326	Effect 2	0	See Texture Effects
327	Effect Control 2a	0	
328	Effect Control 2b	0	
329	XFade Type	0	See Transitions
330	XFade Timing	0	
<b>Object 5- Object</b>			
331	Transparency	0	
332	Shape Library	0	
333	Shape	0	See Built-In Shapes
334	Shape XFade Time	0	
335	Anim Speed	127	
336	X Scale course	127	
337	X Scale fine	255	
338	Y Scale course	127	
339	Y Scale fine	255	
340	Z Scale course	127	
341	Z Scale fine	255	
342	X Rotation course	127	
343	X Rotation fine	255	
344	Y Rotation course	127	
345	Y Rotation fine	255	
346	Z Rotation course	127	
347	Z Rotation fine	255	
348	X Spin	127	
349	Y Spin	127	
350	Z Spin	127	
351	Effect 1	0	
352	Effect Control 1a	0	
353	Effect Control 1b	0	

## Control Channels

**Table A-2: Control Channels**

Value	Type
0-9	none
10-19	Version HUD
40-49	Lights/Camera/Shutter/Keystone HUD
50-59	Objects HUD
240	Rescan Media Library*
241	Enable SDI output controls**
250	Quit Application*
251	Shutdown Computer*
252	Restart Computer*
253	Restart Application*

\* Special commands require that the DMX512 value be held for three seconds, followed by an immediate change to DMX value 0 without any other values in between.

\*\* When the control channel stays at this value for three seconds, the shutter controls are mapped to the SDI Configuration for Shutter Control. The configuration values are stored by the Mbox Extreme application. Change the control channel value to restore normal shutter functions. Video card gamma works in all full screen modes - not just SDI.

## SDI Shutter Control

**Table A-3: SDI Configuration for Shutter Control**

Shutter Control	SDI Configuration
Shutter 1a	Red Channel Gain
Shutter 1b	Green Channel Gain
Shutter 2a	Blue Channel Gain
Shutter 2b	Black Level
Shutter 3a	Video Card Gamma

## Shutter Shapes

**Table A-4: Shutter Shapes**

Value	Shape	Notes
0-9	Disabled	
10-19	Moving Light Mode	Separate controls for each end of shutter. If both controls are zero, shutter disappears.
20-29	Leko Mode	Distance and angle controls. If distance is zero, shutter disappears.
30-39	Iris Mode	A round Iris. Scale is magnified to enclose the screen. No other controls.
40-49	Blob Mode	A Bezier curve is drawn touching the midpoints of the rectangle formed by Leko mode.

## Play Modes

**Table A-5: Play Modes**

Value	Function
0-9	Forward Loop
10-19	Reverse Loop
20-29	Forward Once
30-39	Reverse Once
40-49	Forward Bounce
50-59	Reverse Bounce
60-69	Random
70-79	Forward Once - Restart on In Frame Change
80-89	Scrub - In Frame
90-99	Scrub - Out Frame

## Aspect Control

**Table A-6: Aspect Control**

Value	Mode
0	Square Pixels
1-254	Ratios scaling from 1:4 to 4:1
74	4:3 ratio
104	16:9 ratio
255	Fit to Screen mode

## Blending Control

**Table A-7: Blending Control**

Value	Mode
0	No blending or Blend Time = 0
1-255	Variable blend time, as a proportion of the frame time.

## Tiling Modes

**Table A-8: Tiling Modes**

Value	Mode
0	Tiling Disabled
1	2x2 - 1 of 4
2	2x2 - 2 of 4
3	2x2 - 3 of 4
4	2x2 - 4 of 4
5	3x3 - 1 of 9
6	3x3 - 2 of 9
7	3x3 - 3 of 9
8	3x3 - 4 of 9
9	3x3 - 5 of 9
10	3x3 - 6 of 9
11	3x3 - 7 of 9
12	3x3 - 8 of 9
13	3x3 - 9 of 9
14	4x4 - 1 of 16
15	4x4 - 2 of 16
16	4x4 - 3 of 16
17	4x4 - 4 of 16
18	4x4 - 5 of 16
19	4x4 - 6 of 16
20	4x4 - 7 of 16
21	4x4 - 8 of 16
22	4x4 - 9 of 16
23	4x4 - 10 of 16
24	4x4 - 11 of 16
25	4x4 - 12 of 16
26	4x4 - 13 of 16
27	4x4 - 14 of 16
28	4x4 - 15 of 16
29	4x4 - 16 of 16

---

**Note:** Tiling positions are in row major order (rows are filled in order). For example, the 3 x 3 arrangement would look appear in the following order:

```

1 2 3
4 5 6
7 8 9
    
```

---

## Texture Effects

**Table A-9: Texture Effects**

Value	Effect	Description	Control 1	Control 2
0	None	No effect		
1	Monochrome	convert colors to grayscale	amount	
2	Sepia Tone	convert colors to sepia tone image	amount	
3	Invert	color invert		
4	Color Reduce	reduce color space	amount	
5	Bright/Contrast	brightness and contrast controls	brightness	contrast
6	Saturation	saturation control	saturation	
7	Hue	hue adjustment	hue	
8	Gamma	gamma adjustment	gamma	
9	Exposure	exposure adjustment	exposure	
10	Solarize	solarize effect	amount	
11	Black & White	convert image to black and white	threshold	
12	Black Alpha	dark areas transparent	threshold	
13	X-Ray	inverted grayscale	amount	
14	Bloom	soften edges, add glow	radius	intensity
15	Gloom	dulls highlights radius	intensity	
16	Sharpen	increases image detail by sharpening	sharpness	
17	Median	reduce noise with median calculation		
18	Color Switch	RGB -> RBG/BGR/GBR/GRB	mode	intensity
19	Varietal Lines	spread single row over vertical space	row	
20	Color Shift	dynamic color shift (sine function)	range	speed
21	Blur	simple/quick image blur	amount	
22	Gaussian Blur	more sophisticated / slow blur	amount	
23	Circular Screen	circular shaped halftone screen	width	sharpness
24	Dot Screen	dot patterned halftone screen	width	angle
25	Line Screen	line patterned halftone screen	width	angle
26	Hatched Screen	hatched patterned halftone screen	width	angle
27	CMYK Screen	color, halftoned screen	width	angle
28	Tiles	image tiling	divisions	
29	Circular Crop	circular image crop with edge blur	size	edge
30	Rectangular Crop	rectangular image crop with edge blur	size	edge
31	Mirrors	various mirror modes	mode	
32	Horizontal Bars	break image into bars	number	width
33	Vertical Bars	break image into bars	number	width
34	Double Vision	offset image and overlay	x offset	y offset
38	Flicker	dynamic flickering effect	size	speed
39	Shake	dynamic shaking effect	size	speed

**Table A-9: Texture Effects (Continued)**

Value	Effect	Description	Control 1	Control 2
40	Wobble	dynamic wobbling effect	size	speed
41	Bump Distortion	bump distortion	radius	scale
42	Hole	Hole distortion	radius	
43	Pinch	pinch distortion	radius	scale
44	Torus	torus distortion	width	
45	Twirl	twirl distortion	radius	scale
46	Vortex	vortex distortion	radius	angle
47	Lozenge	lozenge distortion	width	
48	Edge Work	Black & White conversion	radius	
49	Edge Detect	edge detection with color	intensity	
50	Crystallize	break up into crystal pattern	radius	
51	Pixelate	pixelate image	scale	
52	Pointillize	break image into points	radius	
53	Kaleidoscope	geometric distortion	angle	
54	LED Wall	break up into dots	dot amount	dot size
55	Cartoon	cartoon effect	line width	color reduction
56	White Alpha	white areas transparent	threshold	
57	Red Alpha	red areas transparent	threshold	
58	Green Alpha	green areas transparent	threshold	
59	Blue Alpha	blue areas transparent	threshold	
60	White Only	everything but white areas transparent	threshold	
61	Red Only	everything but red areas transparent	threshold	
62	Green Only	everything but green areas transparent	threshold	
63	Blue Only	everything but blue areas transparent	threshold	

## Transitions

**Table A-10: Transitions**

Value	Transition	Description
0	Dissolve	dissolve
1	Dissolve2	dissolve
2	Wipe Right	slightly blended right to left wipe
3	Wipe Down	slightly blended top to bottom wipe
4	Wipe Diagonal	slightly blended diagonal wipe
5	Wash Right	more blended right to left
6	Wash Down more	blended top to bottom
7	Wash Diagonal	more blended diagonal
8	White Right	blended white stripe left to right
9	White Down	blended white stripe top to bottom

**Table A-10: Transitions (Continued)**

<b>Value</b>	<b>Transition</b>	<b>Description</b>
10	White Diagonal	blended white stripe diagonal
11	Through Black	fade to black and back in
12	Through White	fade to white and back in
13	Through Red	fade to red and back in
14	Bright First	transition by brightness of new image
15	Dark First	transition by darkness of new image
16	Dots	fade with small dots
17	Big Dots	fade with big dots
18	Burst white	star burst transition
19	Flash white	flash transition
20	Slow Dissolve	dissolve that comes in more slowly
21	Slower Dissolve	dissolve that comes in even more slowly
22	Rotate Left	simple 3D rotate effect
23	Rotate Right	simple 3D rotate effect
24	Rotate Up	simple 3D rotate effect
25	Rotate Down	simple 3D rotate effect
26	Rotate Center Vertical	simple 3D rotate effect
27	Rotate Center Horizontal	simple 3D rotate effect
28	Zoom Out	zoom out and back in
29	Zoom In	zoom in and back out
30	Horizontal Bars	10 horizontal bars, hard edge
31	Horizontal Bars + Blend	10 horizontal bars, blended edge
32	Vertical Bars	10 vertical bars, hard edge
33	Vertical Bars + Blend	10 vertical bard, blended edge
34	Circle Center	circle out from center
35	Circle Center + Blend	circle out from center, blended edge
36	Concentric Circles	circles out from center, blended edges
37	Push Right	new image pushes in left to right
38	Push Left	new image pushes in right to left
39	Push Down	new image pushes in top to bottom
40	Push Up	new image pushes in bottom to top
255	Object Fade	fade out on current object, fade in on new object



**Built-In Shapes**

**Table A-11: Built-In Shapes**

Library	Value	Shape
0	0	Background Mode
0	1	Sphere
0	2	Cube
0	3	Plane
0	4	Cylinder
0	5	Torus
0	6	Teapot

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## Notes

**B.**

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## **Reference Charts**

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This Appendix contains profiles and channel mapping which will be useful when patching the Mbox Extreme Media Server to specific types of control consoles. A list of all available Effects and Transitions is also included.

- **Virtuoso® Console**
- **Miscellaneous**



# Virtuoso® Console

## Virtuoso Profiles and Channel Map

**Table B-1: Virtuoso Light Channel Map**

Channel	Function	Default
1	Intensity	0
2	Red	255
3	Green	255
4	Blue	255

**Table B-2: Virtuoso Camera Channel Map**

Channel	Function	Default	Virtuoso Control
1	Intensity	255	Intensity
2	Red	255	Color3
3	Green	255	Color2
4	Blue	255	Color1
5-6	Orbit X	32767	Pan
7-8	Orbit Y	32767	Tilt
9-10	Dolly	32767	Beam
11-12	Roll	32767	Edge
13	Spin	127	Zoom
14-15	Field Of View	32767	Shutter
16-17	Pitch	32767	Prism
18-19	Yaw	32767	Prism Index
20	Effect1	0	Rotating Gobo
21	Effect Control 1a	0	Gobo Index
22	Effect Control 1b	0	Shift-Gobo Index
23	Effect 2	0	Effects Wheel
24	Effect Control 2a	0	Effects Index
25	Effect Control 2b	0	Shift-Effects Index
26	Control	0	Misc1
<i>Control</i>			
0-9	none		
10-19	Version HUD		
20-29	Performance HUD		

**Table B-2: Virtuoso Camera Channel Map (Continued)**

Channel	Function	Default	Virtuoso Control
30-39	FPS Display		
40-49	Lights/Camera/Shutter/Key-stone HUD		
50-59	Objects HUD		
200	DEBUG ONLY: Trace Dump		
240	Rescan Media Library		
241	Enable SDI output controls		
250	Quit Application		
251	Shutdown Computer		
252	Restart Computer		
253	Restart Application		

**Table B-3: Virtuoso Shutter Channel Mapping**

Channel	Function	Default	Virtuoso Control
1	Shape	255	Intensity
2	Shutter X	32767	Pan
3	Shutter X		
4	Shutter Y	32767	Tilt
5	Shutter Y		
6	Red	0	Color3
7	Green	0	Color2
8	Blue	0	Color1
9	Shutter Scale	32767	Zoom
10	Shutter Scale		
11	Shutter Edge	0	Edge
12	Shutter 1a	0	Framing
13	Shutter 1b	0	Framing
14	Shutter 2a	0	Framing
15	Shutter 2b	0	Framing
16	Shutter 3a	0	Framing
17	Shutter 3b	0	Framing
18	Shutter 4a	0	Framing
19	Shutter 4b	0	Framing
20	Shutter Rotation	127	Framing

**Table B-4: Virtuoso Keystone Channel Mapping**

Channel	Function	Default	Virtuoso Control
1	Enable	255	Intensity
2	Keystone X	32767	Pan
3	Keystone X		
4	Keystone Y	32767	Tilt
5	Keystone Y		
6	Tile Mode	0	Rotating Gobo
7	Tile Overlap	0	Gobo Index
8	Scale	65536	Zoom
9	Scale		
10	Edge1	0	Prism Index
11	Edge2	0	Edge
12	Edge3	0	Prism
13	Edge4	0	Beam
14	Corner 1 - X	0	Framing
15	Corner 1 - Y	0	Framing
16	Corner 2- X	0	Framing
17	Corner 2- Y	0	Framing
18	Corner 3- X	0	Framing
19	Corner 3- Y	0	Framing
20	Corner 4- X	0	Framing
21	Corner 4- Y	0	Framing
22	Keystone Rotation	127	Framing

**Table B-5: Virtuoso Object 2D Channel Mapping**

Channel	Function	Default	Virtuoso Control
1	Transparency	0	Intensity
2	X Position	32767	Pan
3	X Position		
4	Y Position	32767	Tilt
5	Y Position		
6	Red	255	Color3
7	Green	255	Color2
8	Blue	255	Color1
9	Z Position	32767	Frost
10	Z Position		
11	Scale	32767	Zoom
12	Scale		
13	Library	0	Shift-Gobo Wheel

**Table B-5: Virtuoso Object 2D Channel Mapping (Continued)**

Channel	Function	Default	Virtuoso Control
14	Texture	0	Gobo Wheel
15	Play Mode	0	Shift-Edge
16	Play Speed	127	Edge
17	In Frame	0	Prism
18	In Frame		
19	Out Frame	65535	Prism Index
20	Out Frame		
21	Aspect	0	Shutter
22	Blending	255	Beam
23	Effect1	0	Rotating Gobo
24	Effect Control 1a	0	Gobo Index
25	Effect Control 1b	0	Shift-Gobo Index
26	Effect 2	0	Effects Wheel
27	Effect Control 2a	0	Effects Index
28	Effect Control 2b	0	Shift-Effects Index
29	XFade Type	0	Misc1
30	XFade Timing	0	Gobo Wheel Timing
<i>Play Modes</i>			
0-9	forward loop		
10-19	reverse loop		
20-29	forward once		
30-39	reverse once		
40-49	forward bounce		
50-59	reverse bounce		
60-69	random		
70-79	forward once - restart on in frame change		
80-89	scrub - in frame		
90-99	scrub - out frame		

**Table B-6: Virtuoso Object DMX Mapping**

Channel	Function	Default	Virtuoso Control
1	Trasparency	0	Intensity
2	Shape Library	0	Shift-Gobo Wheel
3	Shape	0	Gobo Wheel
4	Shape XFade Timing	0	Gobo Wheel Timing
5	Anim Speed	127	Rotating Gobo
6	X Scale	32767	Color1
7	X Scale		

**Table B-6: Virtuoso Object DMX Mapping (Continued)**

Channel	Function	Default	Virtuoso Control
8	Y Scale	32767	Color2
9	Y Scale		
10	Z Scale	32767	Color3
11	Z Scale		
12	X Rotation	32767	Beam
13	X Rotation		
14	Y Rotation	32767	Edge
15	Y Rotation		
16	Z Rotation	32767	Zoom
17	Z Rotation		
18	X Spin	127	Shutter
19	Y Spin	127	Prism
20	Z Spin	127	Prism Index
21	Effect 1	0	Effects Wheel
22	Effect Control 1a	0	Effects Index
23	Effect Control 1b	0	Shift-Effects Index

**Table B-7: Virtuoso Mbox Extreme Starting Address**

Function	DMX Address
Light - Ambient	1
Light - Spot 1	5
Light - Spot 2	9
Light - Spot 3	13
Light - Spot 4	17
Camera	21
Shutter	47
Keystone	67
Object 1	89
Object 2	142
Object 3	195
Object 4	248
Object 5	301



# Miscellaneous

## Effects and Transitions

The following tables provide a complete list of effects and transitions. Where applicable, the user-configurable parameters are defined.

### Texture Effects

**Table B-8: Texture Effects**

Value	Effect	Description	Control 1	Control 2
0	None	No effect		
1	Monochrome	convert colors to grayscale	amount	
2	Sepia Tone	convert colors to sepia tone image	amount	
3	Invert	color invert		
4	Color Reduce	reduce color space	amount	
5	Bright/Contrast	brightness and contrast controls	brightness	contrast
6	Saturation	saturation control	saturation	
7	Hue	hue adjustment	hue	
8	Gamma	gamma adjustment	gamma	
9	Exposure	exposure adjustment	exposure	
10	Solarize	solarize effect	amount	
11	Black & White	convert image to black and white	threshold	
12	Black Alpha	dark areas transparent	threshold	
13	X-Ray	inverted grayscale	amount	
14	Bloom	soften edges, add glow	radius	intensity
15	Gloom	dulls highlights radius	intensity	
16	Sharpen	increases image detail by sharpening	sharpness	
17	Median	reduce noise with median calculation		
18	Color Switch	RGB -> RBG/BGR/GBR/GRB	mode	intensity
19	Varietal Lines	spread single row over vertical space	row	
20	Color Shift	dynamic color shift (sine function)	range	speed
21	Blur	simple/quick image blur	amount	
22	Gaussian Blur	more sophisticated / slow blur	amount	
23	Circular Screen	circular shaped halftone screen	width	sharpness
24	Dot Screen	dot patterned halftone screen	width	angle
25	Line Screen	line patterned halftone screen	width	angle
26	Hatched Screen	hatched patterned halftone screen	width	angle
27	CMYK Screen	color, halftoned screen	width	angle
28	Tiles	image tiling	divisions	
29	Circular Crop	circular image crop with edge blur	size	edge

**Table B-8: Texture Effects**

Value	Effect	Description	Control 1	Control 2
30	Rectangular Crop	rectangular image crop with edge blur	size	edge
31	Mirrors	various mirror modes	mode	
32	Horizontal Bars	break image into bars	number	width
33	Vertical Bars	break image into bars	number	width
34	Double Vision	offset image and overlay	x offset	y offset
38	Flicker	dynamic flickering effect	size	speed
39	Shake	dynamic shaking effect	size	speed
40	Wobble	dynamic wobbling effect	size	speed
41	Bump Distortion	bump distortion	radius	scale
42	Hole	Hole distortion	radius	
43	Pinch	pinch distortion	radius	scale
44	Torus	torus distortion	width	
45	Twirl	twirl distortion	radius	scale
46	Vortex	vortex distortion	radius	angle
47	Lozenge	lozenge distortion	width	
48	Edge Work	Black & White conversion	radius	
49	Edge Detect	edge detection with color	intensity	
50	Crystallize	break up into crystal pattern	radius	
51	Pixelate	pixelate image	scale	
52	Pointillize	break image into points	radius	
53	Kaleidoscope	geometric distortion	angle	
54	LED Wall	break up into dots	dot amount	dot size
55	Cartoon	cartoon effect	line width	color reduction
56	White Alpha	white areas transparent	threshold	
57	Red Alpha	red areas transparent	threshold	
58	Green Alpha	green areas transparent	threshold	
59	Blue Alpha	blue areas transparent	threshold	
60	White Only	everything but white areas transparent	threshold	
61	Red Only	everything but red areas transparent	threshold	
62	Green Only	everything but green areas transparent	threshold	
63	Blue Only	everything but blue areas transparent	threshold	

## Transitions

**Table B-9: Transitions**

Value	Transition	Description
0	Dissolve	dissolve
1	Dissolve2	dissolve
2	Wipe Right	slightly blended right to left wipe
3	Wipe Down	slightly blended top to bottom wipe
4	Wipe Diagonal	slightly blended diagonal wipe
5	Wash Right	more blended right to left
6	Wash Down more	blended top to bottom
7	Wash Diagonal	more blended diagonal
8	White Right	blended white stripe left to right
9	White Down	blended white stripe top to bottom
10	White Diagonal	blended white stripe diagonal
11	Through Black	fade to black and back in
12	Through White	fade to white and back in
13	Through Red	fade to red and back in
14	Bright First	transition by brightness of new image
15	Dark First	transition by darkness of new image
16	Dots	fade with small dots
17	Big Dots	fade with big dots
18	Burst white	star burst transition
19	Flash white	flash transition
20	Slow Dissolve	dissolve that comes in more slowly
21	Slower Dissolve	dissolve that comes in even more slowly
22	Rotate Left	simple 3D rotate effect
23	Rotate Right	simple 3D rotate effect
24	Rotate Up	simple 3D rotate effect
25	Rotate Down	simple 3D rotate effect
26	Rotate Center Vertical	simple 3D rotate effect
27	Rotate Center Horizontal	simple 3D rotate effect
28	Zoom Out	zoom out and back in
29	Zoom In	zoom in and back out
30	Horizontal Bars	10 horizontal bars, hard edge
31	Horizontal Bars + Blend	10 horizontal bars, blended edge
32	Vertical Bars	10 vertical bars, hard edge
33	Vertical Bars + Blend	10 vertical bard, blended edge
34	Circle Center	circle out from center
35	Circle Center + Blend	circle out from center, blended edge
36	Concentric Circles	circles out from center, blended edges
37	Push Right	new image pushes in left to right

**Table B-9: Transitions**

<b>Value</b>	<b>Transition</b>	<b>Description</b>
38	Push Left	new image pushes in right to left
39	Push Down	new image pushes in top to bottom
40	Push Up	new image pushes in bottom to top
255	Object Fade	fade out on current object, fade in on new object

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