

Roadster, Matrix WU, Mirage S+/HD/WU

USER MANUAL

020-100002-06

Roadster, Matrix WU, Mirage S+/HD/WU

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020-100002-06

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- a. Damage occurring during shipment, in either direction.
- b. Projector lamps (See Christie's separate lamp program policy).
- c. Damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp supplied by a supplier other than Christie.
- d. Problems caused by combination of the product with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the product with any non-Christie interface device.
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- f. Damage caused by improper installation/alignment, or by product modification, if by other than a Christie authorized repair service provider.
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- h. Failure due to normal wear and tear.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

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1 Introduction

Every effort has been made to ensure the information in this document is accurate and reliable; however, due to constant research the information in this document is subject to change without notice.

1.1 Using this Manual

USERS/OPERATORS: This manual is intended for trained users authorized to operate professional high-brightness projection systems, located in restricted areas, such as projection rooms in theatres. Such users may also be trained to replace the lamp and air filter, but cannot install the projector or perform any other functions inside the projector. **NOTE:** *Only personnel trained specifically by Christie on lamp replacement and lamp safety may handle the lamp.*

SERVICE: Only qualified Christie trained service technicians knowledgeable about all potential hazards associated with high voltage, ultraviolet exposure and high temperatures generated by the lamp and associated circuits are authorized to **1)** assemble/install the projector and **2)** perform service functions inside the projector.

This manual contains the following sections:

- [Section 1 Introduction](#)
- [Section 2 Installation and Setup](#)
- [Section 3 Operation](#)
- [Section 4 Maintenance](#)
- [Section 5 Troubleshooting](#)
- [Section 6 Specifications](#)
- [Appendix A: KeyPad Reference](#)
- [Appendix B: Serial Communication Cables](#)
- [Appendix C: System Integration](#)
- [Appendix D: Optional Input Modules](#)

Disclaimer: *Every effort has been made to ensure the information in this document is accurate and reliable. However, due to constant research, the information in this document is subject to change without notice. Christie Digital Systems assumes no responsibility for omissions or inaccuracies. Updates to this document are published regularly, as required. Please contact Christie Digital Systems for availability.*

1.2 Safety Warnings and Guidelines

1.2.1 General Precautions

⚠ DANGER Never look directly into the projector lens or at the lamp. The extremely high brightness can cause permanent eye damage. For protection from ultraviolet radiation, keep all projector housings intact during operation. Protective safety clothing and safety goggles are recommended when servicing. Keep hands, clothes and all combustible material away from the concentrated light beam of the lamp. Position all cables where they cannot contact hot surfaces or be pulled or tripped over.

NOTES: 1) *The American Conference of Governmental Industrial Hygienists (ACGIH) recommends occupational UV exposure for an 8-hour day to be less than 0.1 microwatts per square centimeters of effective UV radiation. An evaluation of your workplace is advised to assure employees are not exposed to cumulative radiation levels exceeding the government guidelines for your area.* 2) *Be aware that some medications are known to increase sensitivity to UV radiation.*

This projector must be operated in an environment that meets the operating range specification, as listed in [Section 6 Specifications](#).

⚠ WARNING Always power down the projector using appropriate procedure and disconnect all power sources before cleaning or servicing.

⚠ WARNING Always remove the lens when shipping the projector.

⚠ WARNING NEVER look directly into the projector lens. The high brightness of this projector could cause permanent eye damage.

⚠ WARNING For protection from ultraviolet radiation, keep all projector shielding intact during operation.

⚠ CAUTION Installation should be performed by qualified personnel ONLY.

1.2.2 Labels and Markings

Observe and follow any warnings and instructions marked on the projector.

⚠ DANGER Danger symbols are used to alert situations where the user will become seriously injured if they do not follow the advice in this section.

⚠ WARNING Warning symbols are used to alert situations where there is a situation where a user may be injured.

⚠ CAUTION Caution symbols are used to convey information where equipment damage will occur.

1.2.3 Typographical Notations

The following notations are used throughout this manual:

- Keypad commands and PC keystrokes appear in bold small caps, such as POWER, INPUT, ENTER etc.
- References to specific areas of the document appear italicized and underlined. When viewed online the text appears in blue indicating a direct link to that section. For example, [Section 2 Installation and Setup](#).
- References to other documents appear italicized and bold, such as ***Service Manual***.
- References to software menus and available options appear bold, such as **Main** menu, **Preferences**.
- User input or messages that appear on screen, in status display units or other control modules appear in Courier font. For example. "No Signal Present", Login: christiedigital.
- Error codes, LED status appear in bold, e.g. **LP**, **A1**, etc.
- Operational states of modules appear capitalized, such as power ON/OFF.

1.3 Purchase Record and Service Contacts

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. Complete service manuals and updates are available for all projectors. Should a problem be encountered with any part of the projector, contact your dealer. In most cases, servicing is performed on site. If you have purchased the projector, fill out the information below and keep with your records for future reference.

Dealer:
Dealer or Christie Sales/Service Contact Phone Number:
Projector Serial Number*:
Purchase Date:
Installation Date:

* The serial number can be found on the license label located on the back of the projector.

Table 1.1 Ethernet Settings

Default Gateway	1. 2.
DNS Server	
Projector DLP Address	
Projector Mgmt IP Address	
Subnet Mask	

You can also register your product on-line by visiting www.christiedigital.com > [Service and Support](#) > [Product Registration](#). This will keep you in touch with all the latest product information, such as updates, technical bulletins, downloads, and Christie newsletters.

For complete details on the warranty of your Christie product, please contact your Christie dealer.

1.4 Projector Overview

The *Roadster*, *Matrix WU*, and *Mirage S+/HD/WU Series* User Manual supports software v1.6g or higher. The *Roadster* and *Mirage S+/HD/WU Series* of projectors are innovative, high brightness DMD™ projectors that use next generation Digital Light Processing™ (DLP™) technology from Texas Instruments. All models feature compact size, rugged construction, and integral rigging hardware, with the *Roadster Series* ideal for difficult rental/staging installations of multiple projectors, and the *Mirage Series* featuring amazing stereo 3D output. A quick-change lamp module, no-tool lens replacement, and intuitive user interface means the ultimate in versatility and ease-of-use. These projectors provide brilliant images with 1400 x 1050 (SXGA+) and 1920 x 1200 (WUXGA) or 1920 x 1080 (HD) clarity and perfect color saturation in a wide variety of applications.

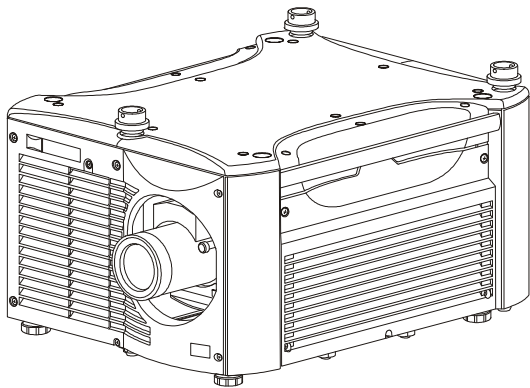


Figure 1-1 Roadster Series

The *Roadster*, *Matrix*, and *Mirage Series* each have features for your distinct needs. The stereoscopic *Mirage* projectors provide 3D solutions for power walls, simulation, and entertainment venues. *Roadster* models include an additional input module, as well as integral hardware for stacking, and flying up to 3 projectors. *Matrix* model, with its purpose built simulation features, such as RGB color matching and gamma controls, can be used to simulate any application.

This guide applies to the following projector models. See [Table 1.2](#).

Table 1.2 Projector Models

Models		
ROADSTER S+12K	MIRAGE S+12K	MIRAGE HD18
ROADSTER S+16K	MIRAGE S+14K	MIRAGE WU12
ROADSTER S+20K	MIRAGE S+16K	MIRAGE WU18
ROADSTER HD12K	MIRAGE S+20K	MATRIX WU12
ROADSTER HD18K	MIRAGE HD12	

1.4.1 How the Projector Works

The projectors accept data/graphics and video input signals for projection on to front or rear flat screens. High brightness light is generated by an internal Bubble lamp, and then modulated by 3 Digital Micromirror Device (DMD) panels that provide digitized red, green or blue color information. Light from the “ON” pixels of each panel is reflected, converged, and then projected to the screen through the front lens, where all pixels are superimposed as a sharp full-color image.

1.4.2 Main Features

General

- DLP™ 3-chip electronics with true 1400 x 1050 (SXGA+) or 1920 x 1200 (WUXGA), and 1920 x 1080 (HD) native resolution
- Ten-bit digital video processing
- Single-lens design with field-interchangeable, fast-change lens – no tools needed
- Modular design for easy servicing
- Intelligent Lens System (ILS™) to save and restore lens settings
- Built-in handles and multiple rigging points
- Motorized lens

1.4.3 Lamps/Light Output

Brightness (ANSI lumens)

- Roadster S+12K/HD12K or Mirage S+12K/HD12/WU12 = 12000
- Roadster S+16K or Mirage S+14K/S+16K = 16000
- Roadster HD18K = 18000
- Matrix WU12= 12000
- Mirage HD18 = 18000
- Mirage WU18= 18000
- Roadster S+20K or Mirage S+20K = 20000

Contrast Ratio (ANSI lumens)

- 450:1 ANSI
- 1600-2000:1 Full Field
- LiteLOC™ for automatic constant-brightness control
- Quick change bubble-style lamp module

1.4.4 Inputs

There are 2 different types of Input faceplate configurations (model dependant). Refer to [Figure 1-2](#) and [Figure 1-3](#). These configurations may include the following inputs:

- One analog RGBHV/YPbPr input with 5 BNCs
- One DVI-I input for either digital RGB/YCrCb or analog RGB/YPbPr signals
- One analog composite-video input
- One analog S-video input
- Built-in multi-standard video decoder (*NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, PAL-60 AND SECAM*)
- One Dual SD/HD-SDI module (standard on *Roadster* models only)
- Compatible with all currently used HDTV formats

For simplicity, this manual refers to the configuration in [Figure 1-2](#) only.

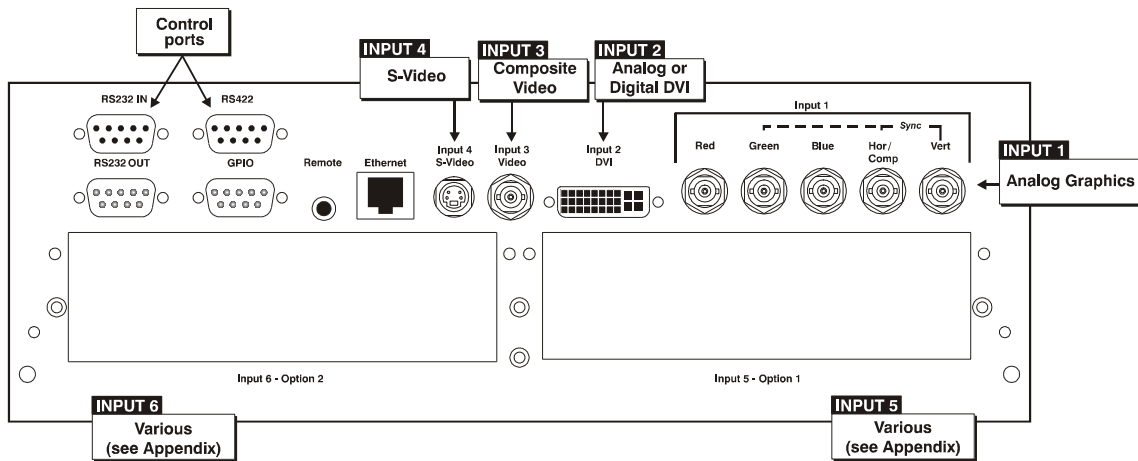


Figure 1-2

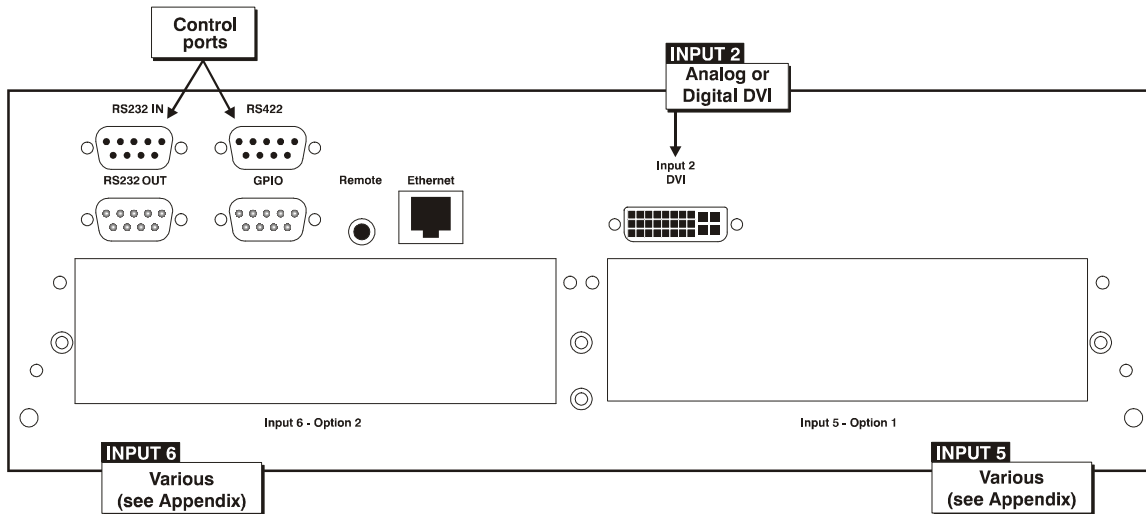


Figure 1-3

Special Display Functions

- Auto setup with seamless cut-and-fade source switching
- Electronic brightness uniformity
- Screen-to-screen matching and blending for smooth multiple-projector displays

Communications and Diagnostics

- Two standard keypads: built-in and remote (for IR or wired control)
- Front and rear dual IR sensors
- Ethernet, RS-232, RS-422, and GPIO control ports
- Easy-view LED for error codes and LCD for status and error messages
- LED for two-digit error codes, plus LCD for text-based status display
- Voltmeter for monitoring AC

1.5 List of Components

Ensure the following components were received with the projector:

- Projector
- Infrared (IR) remote keypad and conversion cable
- Power cord

NOTE: *Non-detachable on Roadster S+ 20K/HD18K/Mirage HD18/Mirage S+20K*

- Using 3D in Mirage Manual

NOTE: *For Mirage Series only*

- 3D Stereo Sync Cable

Table 1.3 Differences Between Models

Model Name	Lamp Type	Dual SD/ HD-SDI Module	3D	Adjustable Iris	Stacking Mounts	4 Top Eyebolts	Integral Rigging Hardware
Roadster S+12K	2.0 kW	✓	<i>Not Available</i>	✓	✓	✓	✓
Roadster HD12K	2.0 kW	✓	<i>Not Available</i>	✓	✓	✓	✓
Roadster S+16K	2.4 kW	✓	<i>Not Available</i>	✓	✓	✓	✓
Roadster HD18K	3.0 kW	✓	<i>Not Available</i>	✓	✓	✓	✓
Roadster S+20K	3.0 kW	✓	<i>Not Available</i>	✓	✓	✓	✓
Matrix WU12	2.0 kW	<i>Optional</i>	<i>Not Available</i>	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage HD12	2.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage WU12	2.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage S+12K	2.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage S+14K	2.4 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage S+16K	2.4 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage HD18	3.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage WU18	3.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓
Mirage S+20K	3.0 kW	<i>Optional</i>	✓	✓	<i>Optional</i>	<i>Optional</i>	✓

2 Installation and Setup

This section explains how to install, connect and optimize the projector for delivery of superior image quality. Illustrations are graphical representations only and are provided to enhance the understanding of the written material.

2.1 Projector Quick Setup and Installation

The instructions provided here are for those that are familiar with the projector and wish to quickly set it up and use it temporarily. Refer to the remaining subsections of this manual for a more complete setup.

⚠ WARNING *Always power down the projector and disconnect all power sources before servicing or cleaning.*

2.1.1 QuickSetup

1. Install a Projection Lens.

The projection lens is shipped separately from the projector and must be installed prior to setting up the projector. Install the projection lens as described in [Section 4.8 Replacing the Projection Lens](#).

⚠ WARNING *Remove the lens plug from the lens opening in the projector before installing the lens.*

⚠ WARNING *Remove the lens when shipping the projector and reuse the lens plug to prevent dust and debris from entering and settling on the projector's optical components.*

2. Position the Projector.

Place the projector on a sturdy, level surface and position it so that it is perpendicular to the screen at a suitable distance. In general, the further back the projector is positioned from the screen, the larger the image will be.

If required, you can level the projector by adjusting its 3 feet. With the projector positioned perpendicular to the screen the image will appear rectangular instead of keystone.

For more detailed instructions on positioning the projector, refer to [Section 2.3 Projector Position and Mounting](#) later in this section.

3. Connect a Source.

Located at the back of the projector is the input panel where all source connections are made. Each input is clearly labeled for easy identification.

Using the appropriate cable(s), connect your source. Connect RGB and YPbPr sources to **INPUT 1** located in the upper right corner of the input panel. Use the DVI-I connector at **INPUT 2** to connect analog or digital display signals. Connect composite video to **INPUT 3** and S-video to **INPUT 4**.

NOTE: *One of the available optional input modules can be installed at **INPUT 5** or **INPUT 6** for additional connections.*

Refer to [Section 2.4 Connecting Sources](#) for more details on connecting a specific source.

4. Connect the Line Cord

⚠ WARNING The North American-rated line cord is provided with each projector. Ensure that you are using a line cord, socket and power plug that meets the appropriate local rating standards.

Connect the projector's line cord to the AC receptacle (Roadster S+20K/HD18K/Mirage HD18/Mirage S+20K have non-detachable line cords) at the lower corner on the rear of the projector, and to proper AC.

NOTE: The outlet must be near the equipment and easily accessible.

Use **only** the line cord provided with the projector **or** a power cord of appropriate ratings that comply with regional standards. (See below and refer to [Section 6 Specifications](#) for complete details on all power requirements).

⚠ WARNING The line cord replacement must be performed by qualified service personnel in accordance with specific national electrical safety regulations. For details, refer to the Service Manual and contact your dealer.

- The Roadster S+12K/HD12K, Matrix WU12, and the Mirage HD12/WU12/S+12K require 200-240 VAC, 50-60 Hz, 12 amps @ 200 VAC.
- The Roadster S+16K and the Mirage S+14K/S+16K require 200-240 VAC, 50-60 Hz, 16 amps @ 200 VAC.
- The Roadster S+20K/HD18K/Mirage HD18/WU18/S+20K require 200-240 VAC, 50-60 Hz, 20 amps @ 200 VAC.

⚠ WARNING Do not attempt operation if the AC supply and cord are not within the specified voltage and power range. Refer to [Section 6 Specifications](#).

5. Turn ON the Projector and Lamp.

- On the projector, turn the power breaker/switch ON. The LCD Status Display Window displays the initializing window for 15 seconds, and then indicates **POWER OFF** ([Figure 2-1](#)).
- Using the keypad, do one of the following:
 - Press and hold  briefly to toggle the lamp on.
 - Press and release  followed immediately by .
 - Press  twice to toggle from the ON/OFF state.

The LCD Status Display Window will display **Powering Up** and then, **Power On** ([Figure 2-1](#)) while the two-digit Status/Error Code window will display **ON**.

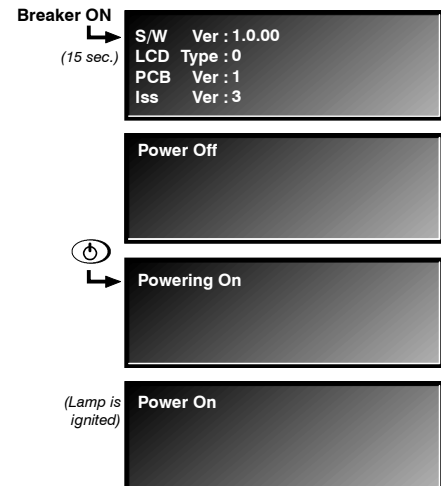


Figure 2-1 Power ON

6. Select a Source.

Using either keypad, press , , , , , or  to select and display the image for the source you connected to in Step 2. The display will resize as needed, producing an image as large as possible for the type of source present.

NOTE: Refer to [Appendix E: Menu Tree](#) to quickly navigate to a specific menu, and associated options/secondary menus.

7. Optimize the Display

Press AUTO SETUP on the built-in keypad or AUTO on the standard IR remote to initiate an automated process in which the projector optimizes critical display parameters such as size, position, pixel tracking, etc., for the current source. AUTO SETUP can save time in perfecting a display. You can modify the adjustments later as desired. Refer to [Section 3 Operation](#).

8. Lens Adjustments

Zoom

With the input image displayed:

- If standard IR remote: Press ZOOM +  or 
- If built-in keypad: Press ZOOM +  or 

Hold the ZOOM key down to see the effect – arrows in the display indicate the direction of the zoom. See [Figure 2-2](#).

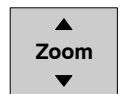


Figure 2-2

Focus

With the input image displayed:

- If remote keypad: Press FOCUS +  or 
- If built-in keypad: Press FOCUS +  or 

Hold the FOCUS key down to see the effect. Arrows in the display indicate the direction of the focus. See [Figure 2-3](#).

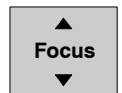


Figure 2-3

Lens Offset

To move the image:

- If standard IR remote: Press either Lens H +  or  or Lens V +  or 

See [Figure 2-4](#).

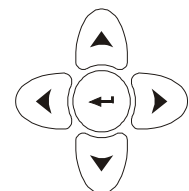


Figure 2-4 Arrow Keypad

- If built-in keypad: Press  + the Arrow keys. See [Figure 2-5](#)

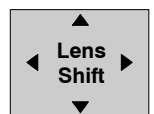


Figure 2-5

2.2 Installation Considerations

Although this projector delivers a high-brightness, high-quality output, the final display quality could be compromised if the projector is not properly installed. This subsection discusses issues you should consider before proceeding with a final installation. Even if you do not intend to use the projectors in a fixed and permanent installation, the following information will help you to better understand what you can do to enhance display performance.

2.2.1 Lifting, Hoisting, and Stacking

For any new installation, you will likely have to safely lift or hoist the projector into place. Keep in mind the following guidelines for safety.

Lifting

All models include handles for convenient hand transport only, such as when a projector is lifted from a shipping container to a table.

Note the following:

- The handles are intended to support the weight of **1** projector only.
- The handles are intended to support a projector for a brief time only.
- The handles are not safety points, nor points from which to hoist or suspend the projector.

⚠ WARNING 1) The handles cannot support more than 1 projector. 2) Do not use handles for extended time periods. 3) Do not use the handles as safety points, or as points from which to suspend or hoist the projector.

Hoisting

There are 4 integral rigging points on the top of the projector ([Figure 2-6](#)) and 8 on the bottom ([Figure 2-7](#)) enable either upright or inverted hoisting. For either orientation, hoist an individual projector, or up to 3 projectors in a stack.

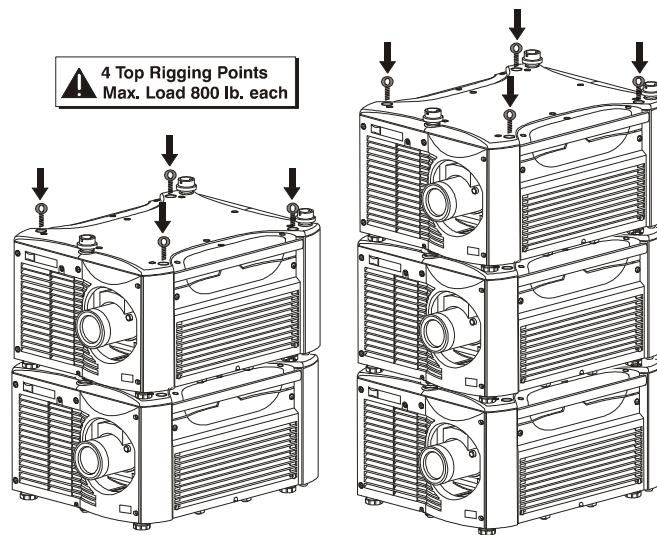


Figure 2-6 Top Rigging Points

RULES FOR ALL HOISTING

- Use at least **4** rigging points for hoisting up to **3** projectors.
- Connect safety cables, and rigging equipment to the designated locations on the projector.
- Use hoisting and rigging equipment suitable to your application such as clamps, cables, eyebolts, or straps, and which accommodate the load rating. All integral, metric hardware on the projector accepts an M12 thread only.
- Never hoist a projector by its feet, handles, or any other component (*Figure 2-8*).

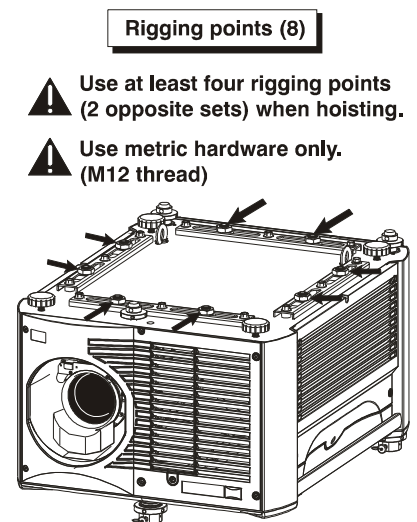


Figure 2-7 Bottom Rigging Points

⚠ WARNING Use metric hardware only.

⚠ WARNING Never force incompatible threads.

⚠ WARNING Never hoist a projector by its feet, handles, or any other component.

IMPORTANT! Remove the lens before hoisting a projector.

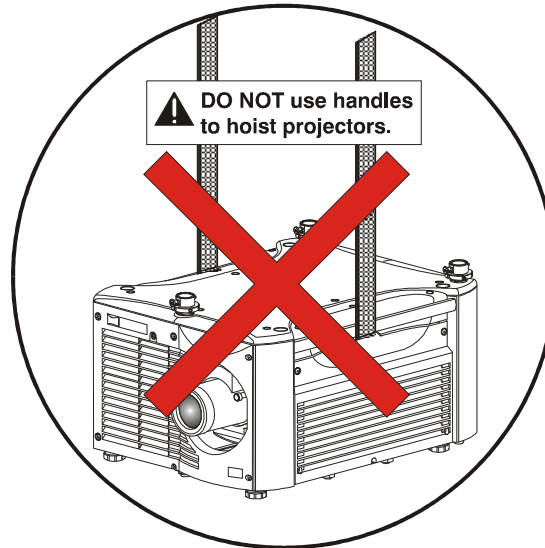


Figure 2-8 **NEVER** Use Handles for Hoisting or as Safety Points

2.2.2 Hoisting Procedure

This procedure applies to one or more projectors. To hoist a stack, first stack 2 or 3 projectors according to the stacking procedure included in this manual. Never stack or hoist more than 3 projectors together.

1. Remove lens.

Remove the projection lens to prevent possible damage during hoisting. Refer to [Section 4.8 Replacing the Projection Lens](#).

2. Retract feet.

If the projector is inverted, retract the adjustable feet to prevent the hoisting hardware from getting caught.

3. Attach safety cables.

Attach a safety cable to each of the 2 eyebolts mounted on the bottom of the projector. See [Figure 2-9](#).

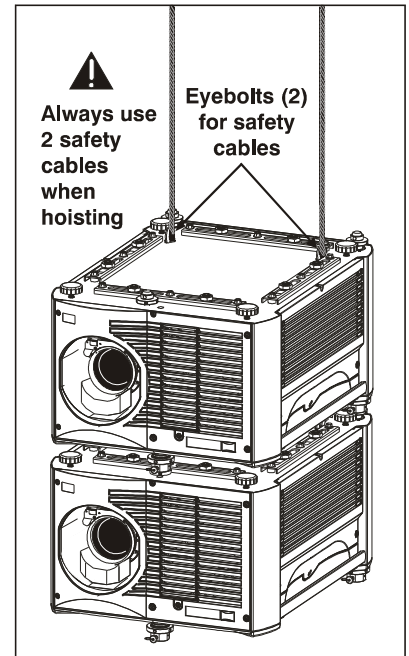


Figure 2-9 Attach Safety Cables

NOTE: Add eyebolts (2) if non-inverted.

⚠ WARNING Always use at least 2 safety cables for any hoisting.

⚠ WARNING Attach safety cables to the 2 eyebolts.

NOTE: When hoisting a non-inverted projector or stack, add 2 safety eyebolts in the front and rear threaded holes provided on the top of the projector. Ensure the eyebolts have an adequate rating for the load. Secure safety cabling to both eyebolts.

4. Attach rigging hardware.

Attach the rigging hardware by securing your rigging components to the appropriate rigging points. There are 8 sliding points provided on the bottom. Tighten the nut at each required location ([Figure 2-10](#)) to prevent sliding.

NOTES: **1)** Use **at least 4 rigging points** for all hoisting. **2)** Use straps, clamps or cabling with load capacity adequate for the total projector weight. Refer to [Section 6 Specifications](#). **3)** Do not join the rigging straps or cables to a common point, keep separated as shown.

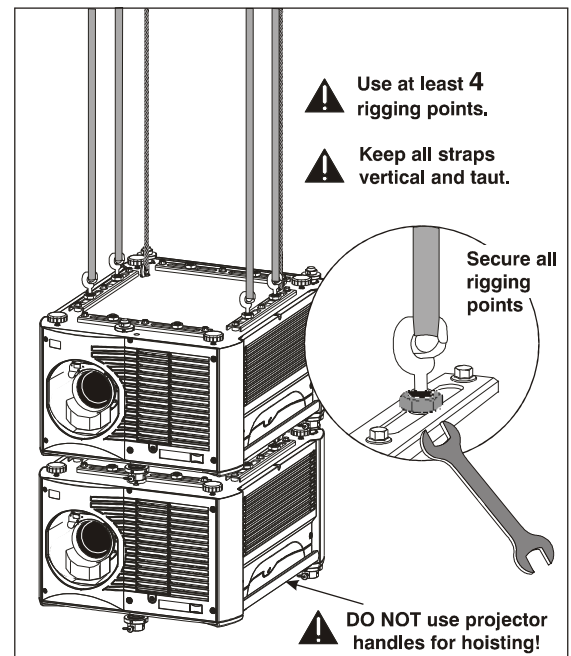


Figure 2-10 Using the Rigging Hardware

- ⚠ WARNING**
- Maximum stack = 3 projectors
 - Stack first, then hoist

2.2.3 Stacking Procedure

NOTES: 1) Requires stacking hardware provided standard with **Roadsters** only. Available separately for **Matrix** and **Mirage Series**. 2) Installation requires at least 2 people.

Roadster, Matrix, and Mirage projectors can be stacked in either the upright or inverted position. Do not mix orientations (i.e., inverted with upright) in a stack. Secure a maximum of 3 projectors with the stacking mounts as described below.

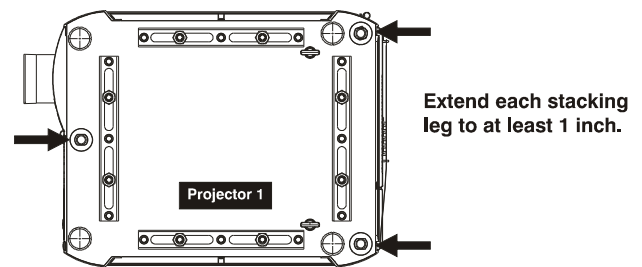
⚠ WARNING Do not stack more than 3 projectors.

⚠ WARNING Christie stacking hardware required. The top projector could slide off and cause injury or death.

⚠ WARNING Never carry a stack.

1. Position the projectors.

- Place each projector to be stacked on a secure table or cart.
- Place 1 projector on its side to access its adjustable feet, and stacking legs ([Figure 2-11](#)).
- Orient the other projector in either upright or inverted position as required (remember, each projector in a stack must be in the same orientation).



2. Fully retract the 4 adjustable feet.

Fully retract each foot (4) as far as possible by turning them clockwise.

- If upright, retract the feet on top projector.
- If inverted, retract the feet on bottom projector

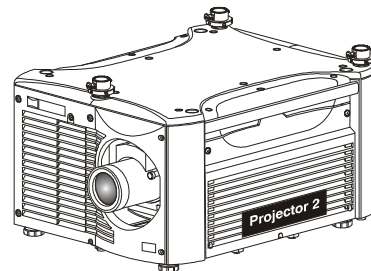


Figure 2-11 Adjust the Feet

3. Extend the 3 stacking legs.

Extend the stacking legs (3) by turning them so that at least 1 inch of thread is visible on each. This clearance accommodates the up-or-down movement for aligning the images from the stacked projectors. Ensure that you extend all 3 legs equally (see [Figure 2-12](#)) so they are level.

- If upright, extend legs on top projector (shown)
- If inverted, extend legs on bottom projector

IMPORTANT! *Extend the stacking legs equally by at least 1 inch.*

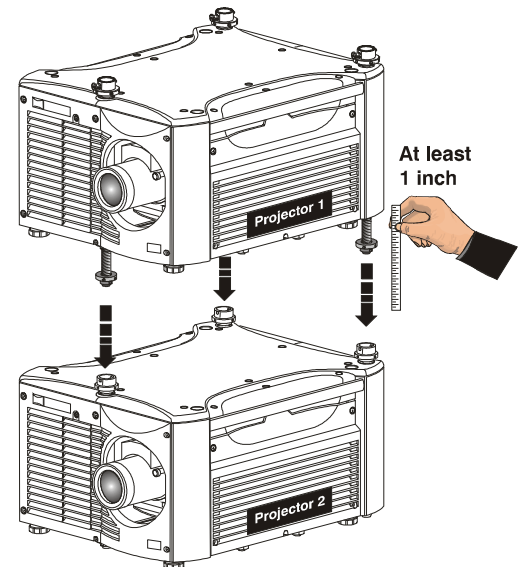


Figure 2-12 Extend 3 Stacking Legs (UPRIGHT STACK SHOWN)

4. Loosen the rear stacking leg nuts

On the rear stacking legs ([Figure 2-13](#)), loosen the nuts so the legs have some lateral movement for easier alignment with the stacking mounts on the other projector.

- If upright, release on top projector
- If inverted, release on bottom projector

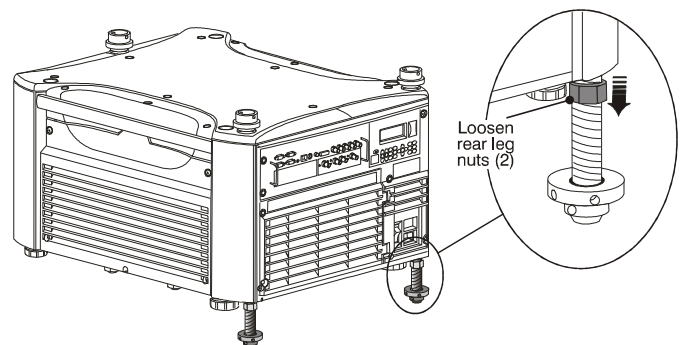


Figure 2-13 Loosen 2 Nuts

5. Release and remove three safety pins.

The 3 safety pins must be removed from the stacking mounts so that the stacking legs can fit into the mounts ([Figure 2-14](#)).

- If upright, remove the pins from the mounts on the bottom projector
- If inverted, remove the 3 safety pins from the mounts on the top projector

6. Place top projector on bottom projector.

With 1 person on each side, lift the top projector on to the bottom projector, aligning all 3 stacking points between projectors. The legs (4) should fit inside the stacking mounts.

⚠ WARNING *Minimum of 2 people required.*

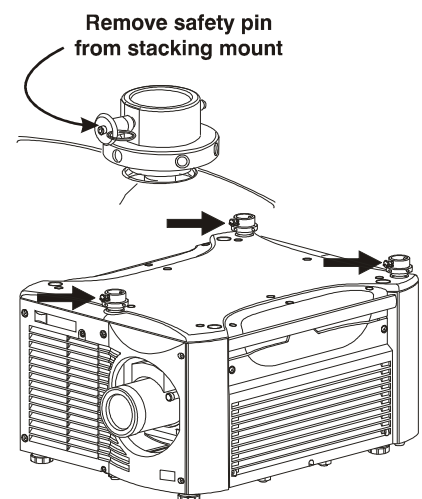


Figure 2-14 Remove Safety Pins

7. Align the holes in the 3 stacking mounts and 3 stacking legs.

On each stacking mount, turn the adjusting wheel slightly until the hole in the top portion of the mount lines up with the hole in the stacking leg (*Figure 2-15*).

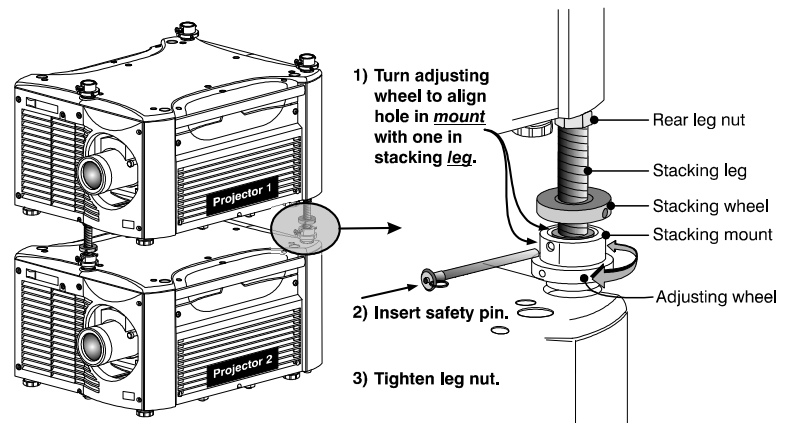


Figure 2-15 Align Holes in Mounts and Legs, and LOCK with Pin

NOTE: You can increase leverage by using a screwdriver in the holes.

8. Insert 3 safety pins and LOCK all.

⚠ WARNING Critical Safety Procedure.

At each of the 3 stacking points, insert the safety pin fully through the holes in the stacking mounts and stacking legs (*Figure 2-15*). Ensure that each pin is **fully inserted** to engage the safety lock and secure the projectors together. Failure to engage the safety lock could cause the projectors to separate and result in injury or death.

⚠ WARNING Failure to engage the safety lock could cause the projectors to separate and result in injury or death.

9. Leg Nuts.

Before hoisting, firmly tighten the nuts on the 2 rear stacking legs (*Figure 2-15*). If you are ready to align the projectors to one another, leave these nuts slightly loose until after the alignment.

10. Repeat steps 1–9 if stacking a third projector.

⚠ WARNING Never stack more than 3 projectors.

2.2.4 Alignment Procedure

Stacked projectors must be correctly aligned to one another so that the resulting display is optimized and as sharp as possible. If you are also hoisting the stack, hoist the stack into place first and then align. Lock all stacking hardware into place to maintain your alignment.

IMPORTANT! Ensure the stacking legs are extended at least 1 inch and are slightly loosened. Refer to *Figure 2-12*.

Before You Begin

- Always align to the *fixed* projector. In floor-mount or table-mount (i.e., **non-hoisted**) stacks, you will align to the **bottom** projector as shown in drawings below. In **hoisted** stacks, align to the **top** projector.
- Leg nuts must be loosened before alignment; otherwise the stacking mounts will not turn and allow movement of the projector.

Alignment Procedure:

1. Position the first image (fixed projector).

Position the fixed projector's (first) image as desired and align the other image(s) to it as described below.

2. Display the grid test pattern.

Display the *Grid Test Pattern*. To distinguish each image, enable "Red" for 1 display and "Green" for the other. Refer to [Section 3.2 Using the Keypads](#) if you need help enabling colors.

3. Adjust Zoom and Focus.

Minimize each projector's zoom and images are in focus.

4. Try aligning the two grid patterns.

Adjust the **Zoom** and **Offset** on the top projector to precisely move its test pattern display on to the bottom test pattern. When properly aligned, all red/green grid lines in the combined image will turn yellow.

- If all lines are well aligned, skip to [Step 6. b.](#) to lock all stacking mounts.
- If alignment needs improvement, proceed with the next step.

5. Align the centerlines of the grid.

Turn the 2 rear stacking mount wheels to move the top projector as necessary to achieve well-aligned centerlines. Use a screwdriver in the holes around the rim of each adjusting wheel for better leverage and control.

How to move the image. Turn independently; each stacking mount acts as a pivot point for the opposite edge of the display ([Figure 2-16](#)).

For example:

- Turn the right mount to tilt the left portion of the image up or down
- Turn the left mount to tilt the right portion of the image up or down
- Turn the mounts together to raise or lower the top image like an offset adjustment, or turn the front stacker

If the center lines form an "X". This indicates that the projectors (and images) are slightly tilted in relation to one another. Turn 1 mount to raise 1 side, and/or turn the other mount to lower the other side. See [Figure 2-16](#).

If the center lines are parallel, but misaligned:

- If centerlines are out by the same amount from top and bottom, use off-sets (on top projector) to bring the centerlines into alignment.

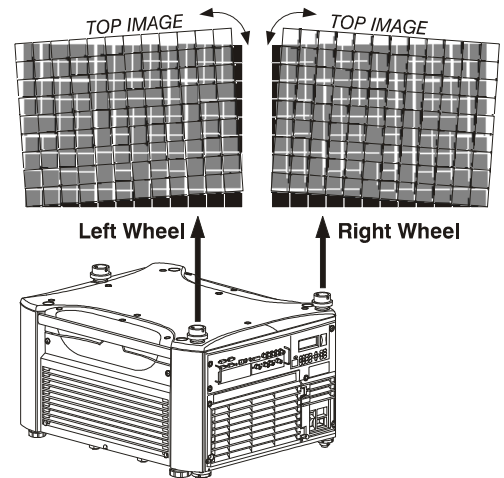


Figure 2-16 Adjustment Directions (Tilt)

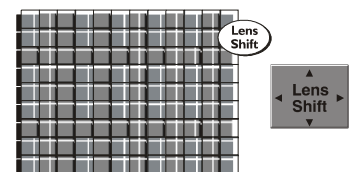
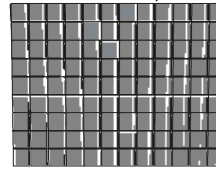


Figure 2-17 Misaligned

- If centerlines are parallel, but others are not, turn the front stacking mount wheel to bring the centerlines into alignment.

If center lines are parallel but outer lines are not...



6. **Align the edges of the grid with centerlines aligned:**

- Adjust zoom (top projector) to align the edges of its image with the other image.
- Adjust focus. When aligned, all lines from the combined red/green grids will be yellow.

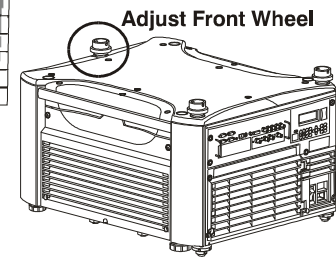


Figure 2-18 Adjust Front Wheel

7. **Secure all stacking wheels and leg nuts:**

⚠ WARNING Critical Safety Procedure.

- Turn all 3 stacking wheels until they are **firmly secure** against the rest of the stacking mount. See [Figure 2-19](#).
- Secure both 2 rear leg nuts against the bottom of the projector.

8. **Repeat Steps 1 to 7 if stacking a third projector.**

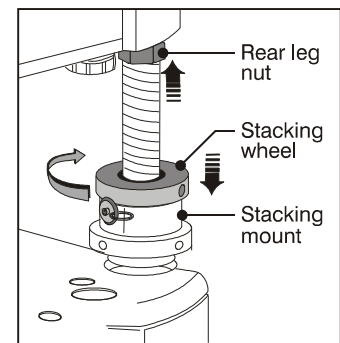


Figure 2-19 Secure All Hardware

2.2.5 Installation Type

Choose the installation type that suits your needs: front or rear screen, floor mount, or inverted mount.

ADVANTAGES	CONSIDERATIONS
• Easy to set up • Can be moved or changed quickly • Easy to access	• Shares floor space with audience

Front Screen, Inverted Mount (ceiling) Installation

ADVANTAGES	CONSIDERATIONS
• Does not take up audience space • Projector is unobtrusive • Projector cannot be accidentally moved	• Installation is more permanent • It is more difficult to access the projector

Rear Screen, Floor Mount Installation

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Projector is easily accessed • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher

Rear Screen, Inverted Mount (ceiling) Installation

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Usually good ambient light rejection	• Requires separate room • Installation cost is usually higher

Rear Screen, Floor Mount with Mirror

ADVANTAGES	CONSIDERATIONS
• Projector is completely hidden • Usually good ambient light rejection • Requires less space behind screen than other rear screen installations	• Requires separate room • Installation cost is usually higher

2.2.6 Screen Type

Front Screen Installations

While there are 2 basic screen types, flat and curved, generally flat screens are recommended for this projector ([Figure 2-20](#)). Flat screens offer a gain of about 1 with a viewing angle just less than 180°. Incident light reflects equally in all directions so the audience can see the display from various angles. Because of the low gain, flat screens are most effective when ambient lighting is reduced, although this difference may be negligible given the high brightness output from this projector.

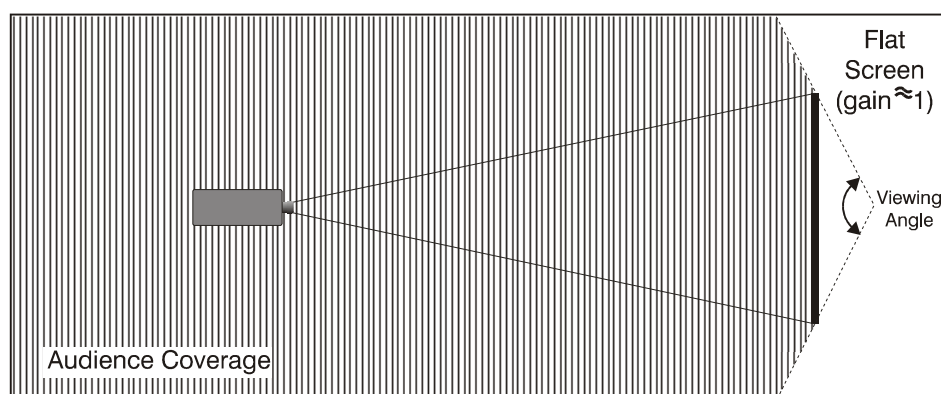


Figure 2-20 Audience Coverage with Flat Screen

NOTE: Lenses for this projector are designed primarily for use with flat screens, but the projector depth-of-field range allows the lens to be focused on curved screens as well. While focus remains sharp in the corners, there may be significant pincushion distortion, primarily at the top of the screen.

Rear Screen Installations

There are 2 basic types of rear screens: diffused and optical. A *diffused* screen has a surface that spreads the light striking it. Purely diffused screens have a gain of less than 1. The main advantage of the diffused screen is its wide viewing angle, similar to that of a flat screen for front screen projection. *Optical* screens take light from the projector and redirect it to increase the light intensity at the front of the screen. This increase at the front reduces the intensity in other areas. A viewing cone, similar to that of a curved front screen installation, is created.

To summarize, optical screens are better suited for brightly lit rooms where the audience is situated within the viewing cone. Diffused screens may be better suited when a wide viewing angle is required but there is low ambient room lighting.

2.2.7 Screen Size

Choose a screen size, which is appropriate for your lens and application. Keep in mind that if the projector will be used to display text information, the image size must allow the audience to recognize all text clearly. The eye usually sees a letter clearly if eye-to-text distance is less than 150 times the height of the letter. Small text located too far from the eye will likely be illegible at a distance no matter how sharply, and clearly it is displayed.

To fill a screen with an image, the aspect ratio of the screen should be equal to the aspect ratio of the image (expressed as the ratio of its width to its height). Standard video from a VCR has a 4:3 or 1.33:1 aspect ratio. For example, to display a VCR output with a 4:3 aspect ratio onto a 10-foot (3m) high screen, the width of the screen must be at least 13.3 feet (4m).

Ideally, to fill a screen with an image, the aspect ratio of the screen should be equal to the aspect ratio of the image. The aspect ratio of an image is expressed as the ratio of its width to its height such as a 4:3 aspect. Standard video from a VCR has a 4:3 aspect ratio. For example, to display a VCR output with a 4:3 aspect ratio onto a 10-foot (3m) high screen, the width of the screen must be at least 13.3 feet (4m).

2.2.8 Screen Aspect Ratio

Aspect ratio describes the proportion of the screen and is expressed as the ratio of width to height, such as “4:3” or “5:4”. Although image size and image aspect ratio can both be adjusted quickly through projector software, it is still a good idea to choose a screen aspect ratio that is most appropriate for your intended applications.

Ideally, to exactly fill a screen with an image, the aspect ratio of the screen should correspond to the aspect ratio of the image, which depends on the source in use. For example, standard video from a VCR has a 4:3 ratio (approximately), whereas a high-resolution graphics signal typically has a 5:4 aspect ratio. By default, images from your projector will be as large as possible and will maintain their aspect ratio.

The SXGA+ (1400 x 1050) aspect ratio for the Roadster S+ and Mirage S+ models are 4:3 (*Figure 2-21*) and the HD (1920 x 1080) aspect ratio for the Roadster HD and Mirage HD models is 16:9.

1400 x 1050 (SXGA+)

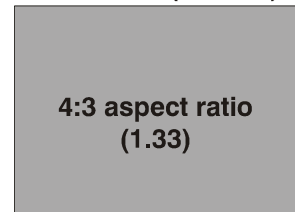


Figure 2-21 Aspect Ratio

2.2.9 Ambient Lighting

The high brightness of this projector is well suited for locations where ambient lighting might be considered less than ideal for projection. A typical room with ceiling lights and windows rarely requires special attention. Contrast ratio in your images will be noticeably reduced only if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

In general, avoid or eliminate light sources directed at the screen.

2.2.10 Other Considerations

Other considerations and tips that can help improve your installation:

- Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry that may affect performance.
- Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers, elevators, etc.
- Choose the best screen size for the application. Since more magnification reduces brightness, use a screen size appropriate for the venue but not larger than required. Installing a large screen in a small room is similar to watching television at a close range; too large a screen can overpower a room and interfere with the overall effect. A good rule of thumb is to be no closer than 1.5 times the width of the screen.

2.3 Projector Position and Mounting

2.3.1 Throw Distance

You can quickly estimate the throw distance by taking the horizontal width of the screen and multiplying it by the lens throw ratio. The result of this calculation tells you roughly how far back the projector should be positioned from the screen in order to project a focused image large enough to fill the screen.

For example:

- Screen Width = **10** feet
- Lens Type is **0.7:1**
- Throw Distance (TD) = **10** feet x **0.7** = 7 feet

IMPORTANT! Use the lens and screen size to calculate the precise throw distance using the tables provided in the Dealer Section of the Christie Website, PN 020-100298-xx. Due to lens

manufacturing tolerances for lens focal length, actual throw distance and vary $\pm 5\%$ between lenses with the same nominal throw ratio.

Estimating Throw Distance

$$\text{Throw Distance (TD)} = (\text{Screen Width} \times \text{Lens Type})$$

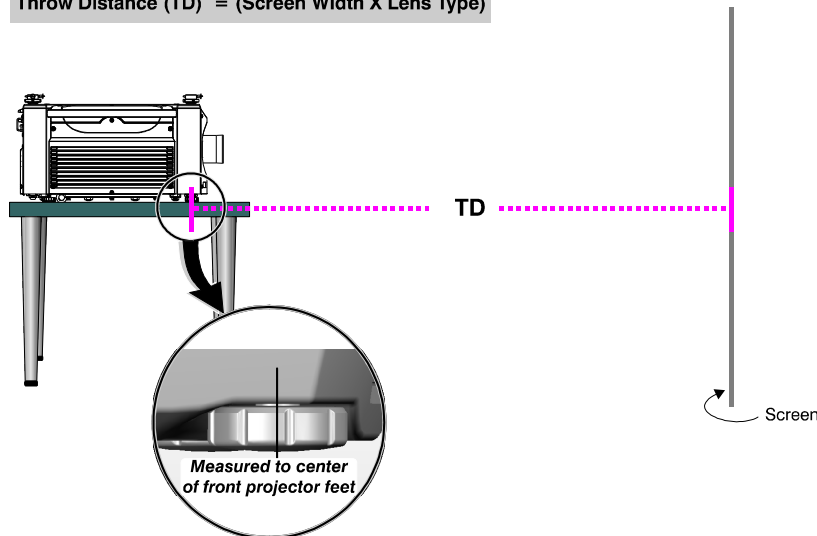


Figure 2-22 Calculating Throw Distance

2.3.2 Vertical & Horizontal

The **Vertical** position of the projector in relation to the screen also depends on the size of the screen and the lens type. Correct vertical position helps ensure that the image will be rectangular in shape rather than keystone (having non-parallel sides), and that image focus and brightness both remain optimized.

If necessary, vertical position of the image can be offset (i.e., moved up or down in relation to lens center) by using the motorized **Offset** function.

Starting with no offset, the image from this projector can be moved up or down by a maximum distance of 525 pixels for SXGA+ resolution and 643 pixels for HD and WUXGA resolution, resulting in the entire image (more for HD/WUXGA) being displayed above or below lens center. See [Table 2.1](#) and [Figure 2-23](#).

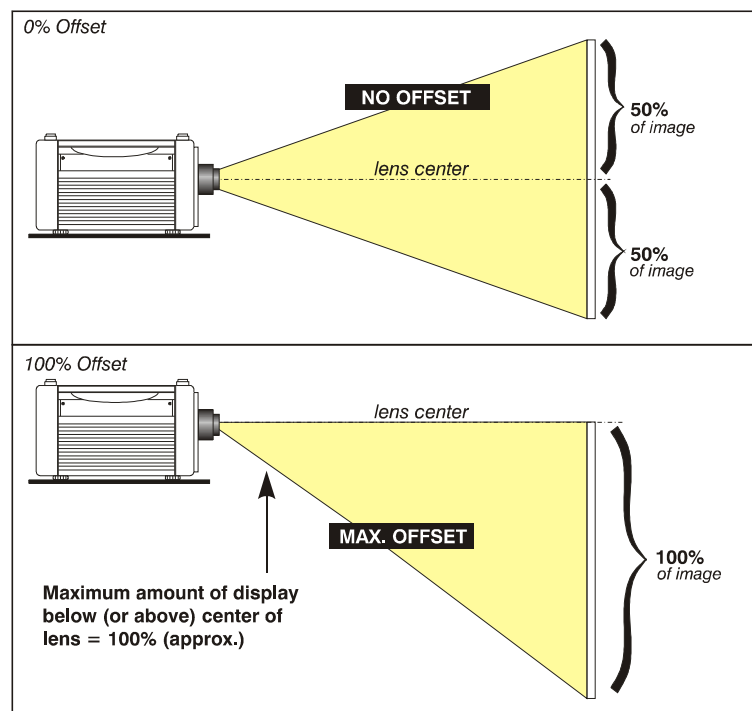


Figure 2-23 Maximum Vertical Offset

NOTE: *Not applicable for a fixed lens.*

The **Horizontal** position of the image can be offset (i.e., shifted left or right of lens center) by using the motorized offset function. Starting with no offset, the image from this projector can be moved left or right by a maximum distance of 350 pixels for SXGA+ resolution and 403 pixels for HD and WUXGA resolution, resulting in approximately 75% of the image displayed to 1 side of lens center. See [Table 2.1](#) and [Figure 2-24](#).

NOTES: 1) If the image becomes keystone'd or exhibits uneven brightness, the projector may simply be too high or low in relation to the screen. 2) Recommended offset ranges can be exceeded, however this may affect image quality. 3) Simultaneous **horizontal** and **vertical** offset limits the adjustment range of each. 4) Offset can vary by $\pm 7\%$ and may be affected by the degree of zoom currently in use.

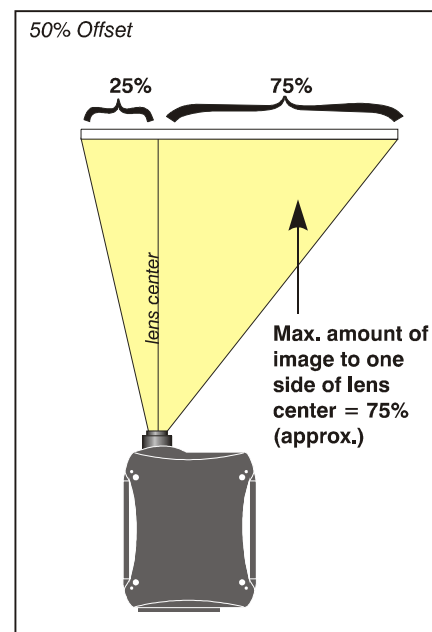


Figure 2-24 Maximum Horizontal Offset

Table 2.1 Lens Offsets

Lens Type (All motorized lenses)	Offset Movement ↑ or ↓ or →		Max. Amount of Display Above or Below Lens Center		Max. Amount of Display Right or Left of Lens Center	
SXGA+ Lenses	100%	50%	1050 pixels ↑ or ↓	100%	1050 pixels ← or →	75%
HD Lenses	119%	42%	1183 pixels ↑ or ↓	100%	1363 pixels ← or →	71%
WU Lenses	112%	54%	1243 pixels ↑ or ↓	100%	1478 pixels ← or →	77%

NOTES: 1) Offsets are subject to $\pm 7\%$ centering tolerance 2) % Offset = # pixels of offset / half panel resolution x 100. 3) 0.73:Fixed and 1.16-1.49 Zoom Lenses have less offset. Refer to Specification section, Lenses for more details.

2.3.3 Tilting the Projector

The projector can be rotated and mounted at any vertical angle (i.e., you can tilt the face of the projector up or down as much as desired for your installation). Side-to-side tilt, however, must not exceed 15° ([Figure 2-25](#)). Keeping the projector fairly level in this manner ensures that the lamp axis is level, and is required for safe and reliable lamp operation. Always vent exhaust air **away** from the lens.

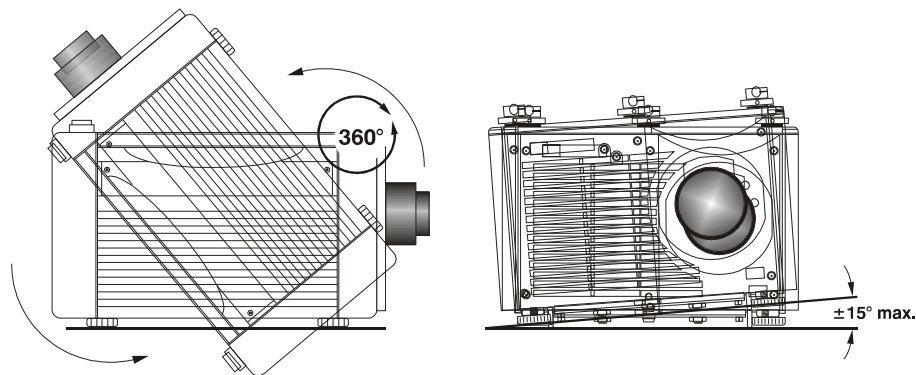


Figure 2-25 Vertical and Horizontal Tilt Ranges

2.3.4 Mounting

There are several methods for mounting the projector. Depending on your chosen installation, one method may be more suitable than another. In typical front and rear screen installations the projector can be mounted to a secure and level surface, such as a table or cart. Carts are useful when the projector has to be moved during a presentation or from site to site. It is recommended you lock the wheels on a cart, when it's in position, to prevent someone from accidentally moving it during a presentation.

Ceiling Mount

The projector can also be inverted and suspended from the ceiling using a specially designed ceiling mount fixture. This type of mounting is recommended for fixed installations and for those that want the projector out of plain view or have a limited amount of space for projector and audience. For more information, contact your dealer.

Use only the Christie-approved ceiling mount kit designed for your projector. Refer to the installation instructions and safety guidelines provided in the ceiling mount kit. For more information, contact your dealer.

2.3.5 Folded Optics

In rear screen applications ([Figure 2-26](#)) where space behind the projector is limited, a mirror may be used to fold the optical path. The position of the projector and mirror must be accurately set. Consult your dealer or Christie for details.

2.4 Connecting Sources

Sources connect to the *Input Panel* located on the rear of the projector. As shown in [Figure 2-27](#).

The upper right corner (**INPUT 1**) typically accepts an *RGB signal* from an external analog RGB source, or it can also be used for YPbPr signals or additional video sources. Just beside these BNCs, the DVI-I connector (**INPUT 2**) accepts digital or analog display signals from a computer. Connect analog *composite video* at **INPUT 3** or *S-video* at **INPUT 4** from devices such as VCRs, laser disc players or DVD players.

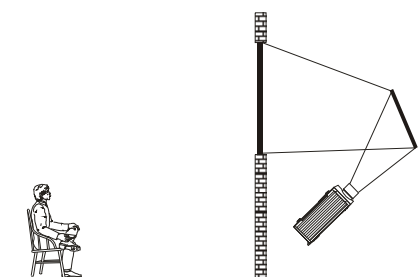


Figure 2-26 Rear Screen Projection

There are also several optional interfaces available for connecting other sources—these interfaces slide into the remaining unused option slot, and can be done while the projector is running.

NOTES: 1) Refer to [Section 6 Specifications](#) for details regarding compatible inputs. 2) Only use high quality shielded cables for all connections. 3) The **Dual SD/HD-SDI** module shown is standard on the Roadster models, optional for the Matrix and Mirage series.

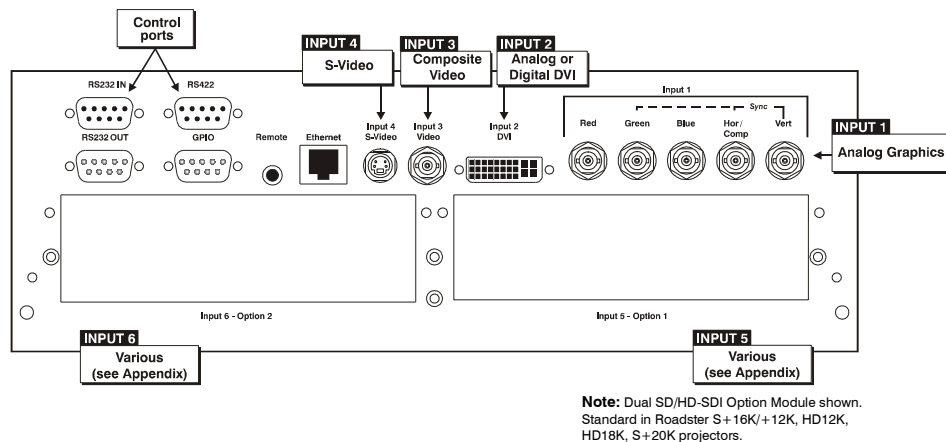


Figure 2-27 Input Panel

2.4.1 RGB Signals

INPUT 1 consists of 5 BNCs (connectors) for linking to a variety of RGB sources such as a PC, Mac, DEC, Sun, SGI, and others. This projector supports multiple Sync types with RGB signals: sync-on-green, composite sync, and separate H & V syncs.

NOTE: Depending on your source, you may need a custom adapter cable with BNC connectors at the projector end and a different type of connector at the other (such as a 15-pin “D” connector for some computer sources). Contact your dealer for details.

Connect the **SYNC** BNC input(s) first. Then connect the red, green, and blue source outputs to the **RED**, **GREEN**, and **BLUE** BNCs on the **INPUT 1** panel. If the source uses sync-on-green, only the red, green, and blue connections are required.

If the source provides a composite sync output, connect it to the **SYNC** input labeled **HOR/COMP**. If the source provides separate horizontal and vertical sync outputs, connect horizontal sync to the **SYNC** input labeled **HOR/COMP**, and connect vertical sync to **SYNC** input labeled **VERT**. See [Figure 2-28](#), below.

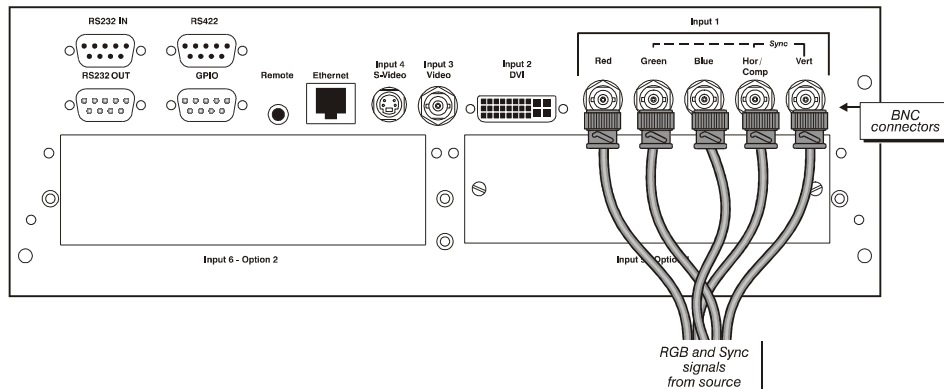


Figure 2-28 Connecting RGB Input

NOTES: 1) If for some reason the projector fails to recognize a signal as an RGB signal, specify this **Color Space** option within the **Image Settings** menu. Refer to [Section 3.5 Adjusting the Image](#). 2) To connect YPbPr signals (such as from DVDs or analog HDTV sources) to **INPUT 1**, use the red, green and blue BNCs as described in [Section 2.4.2 YPbPr \(Component Video\)](#) (below).

2.4.2 YPbPr (Component Video)

Connect a YPbPr signal (a.k.a. component video) to **INPUT 1** or **INPUT 2** as shown in [Figure 2-29](#).

NOTES: 1) If, for some reason, the projector fails to recognize a YPbPr signal, specify this **Color Space** option within the **Image Settings** menu. Refer to [Section 3.5 Adjusting the Image](#). 2) Do not connect digital component signals (known as YCbCr) to **INPUT 1** or **2**. Use the appropriate digital interface option installed at **INPUT 5** or **6**.

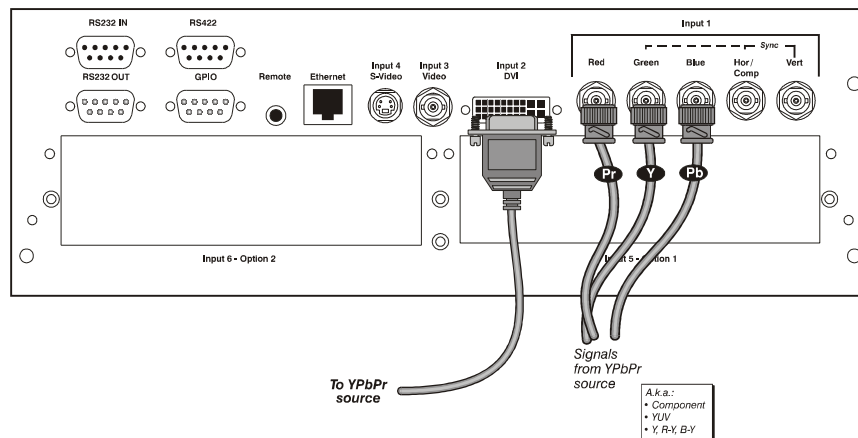


Figure 2-29 Connecting YPbPr

2.4.3 Composite Video

INPUT 3 and **INPUT 4** provide simultaneous connection of both a composite video source (**INPUT 3**) and an S-Video source (**INPUT 4**). Refer to [Figure 2-30](#).

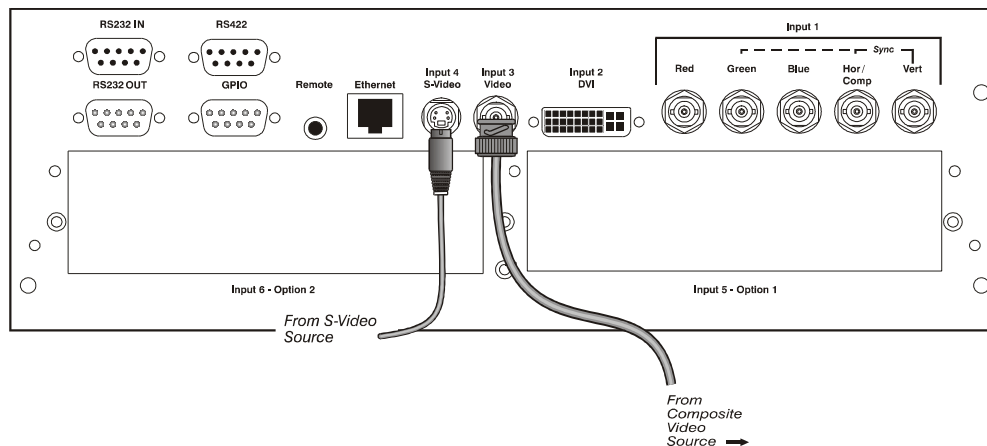


Figure 2-30 Connecting Composite Video

2.4.4 DVI Digital Video

Use the DVI-I connector at **INPUT 2** to connect either analog or digital video devices to the projector. When connecting devices that transmit an analog video signal such as VCRs, laptops, and PCs use the DVI cable provided with the projector. Plug the DVI-I (single link) connector end to the projector and the 15-pin VGA connector to the device.

Use a cable with DVI-I connectors at both ends to connect devices that transmit digital and analog video signals such as high-quality DVD players, satellite receiver and digital cable TVs.

NOTES: **1)** To ensure true digital output from devices that transmit digital signals, connect to the DVI-I connector. **2)** DVI loop through is not available unless you have the optional **DVI Input Module** installed at **INPUT 5** or **INPUT 6**.

2.4.5 Dual SD/HD-SDI

Christie's Dual SD/HD-SDI input module is standard with *Roadster* models and factory-installed in **INPUT 5** or **INPUT 6**. The module's loop-through capability enables incoming serial digital data to be tiled across multiple screens, creating vast "mega resolution" displays. Alternatively, the multiple outputs can be overlapped for extra-bright displays, or simply distributed to additional projectors for multiple screens of the same image.

The module accepts 1 or 2 independent standard- or high-definition serial digital inputs, decodes them for processing in the main electronics of the projector, and outputs 10-bit YCbCr 4:2:2 video. Either input can be set as the active primary or secondary part of a Picture-in-Picture (PIP) display, and either input can be looped through to 1 (or both) of the module's BNC outputs.

NOTE: Selection of these inputs is described in [Section 3.2 Using the Keypads](#).

Connect a compatible SMPTE 292M or SMPTE 259M-C source(s) to 1 or both of the inputs located on the left side of the module. The module will automatically detect the standard at each input and configure itself accordingly for correct termination of the signal. The module also detects and supports dual link 292M and SMPTE 372M video standards. For full details, consult the *Dual SD/HD-SDI* manual.

2.4.6 Other Optional Inputs

Optional modules allow you to increase your total number of inputs and/or accommodate different signal types, whether analog or digital. Install in the areas labeled **INPUT 6** or (if available) **INPUT 5**.

Options include:

- RGB 500 Input Module
- RGB 400BA Input Module
- RGB 400 Active Loop Thru Input Module
- Composite/S-Video Input Module (*not currently supported with software v1.1 or higher*)
- PC250 Analog Input Module
- Serial Digital Input Module
- DVI Input Module (*optional on Mirage HD18*)
- Dual SD/HD-SDI Module (*optional on Matrix and Mirage models*)

For even more sources, connect a third-party switcher to the RS-232 IN port, or, if RS-422-compatible, connect to the RS-422 port.

NOTES: 1) Optional **digital** interfaces cannot be used in a Marquee Case/Power Supply. 2) Refer to [Appendix D: Optional Input Modules](#) for a brief description of each interface.

2.5 Connecting Communications

As an alternative to the projector's keypad or remote, you may wish to communicate with the projector using a PC or other controller. Such a device sends commands and receives feedback via serial links (RS-232 and RS-422), Ethernet or GPIO communications to the projector, all described below.

2.5.1 Remote Keypads

As desired, direct the projector's IR remote keypad towards the display screen or the projector's IR sensors. Alternatively, connect a wired (tethered) version of the remote to the 3.5mm RCA jack labeled as **REMOTE** on the projector's Input panel.

NOTE: The response to a wired keypad must also be enabled in the Communications menu. Refer to [Section 3.6 Adjusting System Parameters and Advanced Controls](#) for more information.

2.5.2 Serial Port Connections

There are 2 types of serial ports available on the projector: RS-232 and RS-422. You can connect a device with a serial interface, such as a computer to either of these connectors (not both) and control the projector remotely by entering specific serial communication commands.

Connecting RS-232

The two 9-pin DIN connectors labeled RS-232 IN and RS-232 OUT on the input panel are dedicated to serial communication (refer to [Figure 2-31](#)). Using the appropriate serial communication cables (refer to [Appendix B: Serial Communication Cables](#)) connect the controlling source, such as a personal computer to the RS-232 IN connector. Then set the baud rate to match that of the computer. Refer to [Section 3 Operation](#) for details on changing the projector's baud rate.

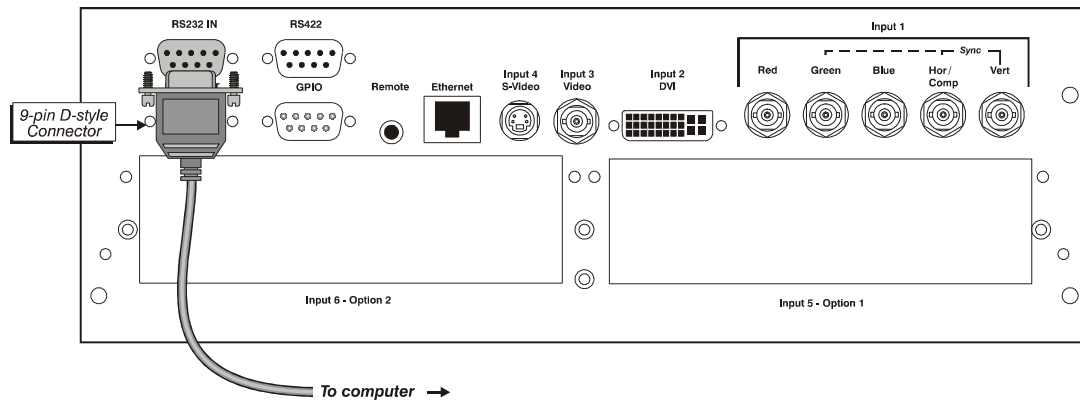


Figure 2-31 RS-232 Serial Communications

Connecting RS-422

If you wish to control the projector with a computer and or other controlling device with RS-422 capability, connect a RS-422 serial communication cable between the computer and the RS-422 port on the projector. See [Figure 2-32](#). RS-422 is better suited for serial communication over long distances then is RS-232 communication.

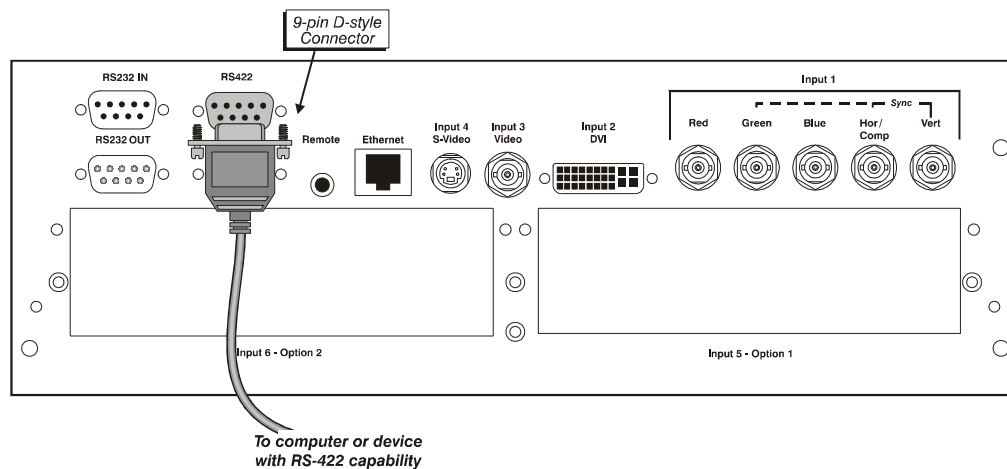


Figure 2-32 RS-422 Connection to a Computer

⚠ CAUTION Do not use an RS-422 port unless you are using equipment with RS-422 capability. The voltage levels of this signal can damage incompatible equipment.

2.5.3 Ethernet Communications

To add the projector to an existing Ethernet network with other equipment such as controllers and other projectors, connect standard CAT5 Ethernet cable between your Ethernet controller (or hub) and the Ethernet port at the rear of the projector as shown in [Figure 2-33](#).

CONNECTING TO A PC: If you are connecting the Ethernet port directly to a PC (rather than a network or hub), ensure a crossover Ethernet cable is used.

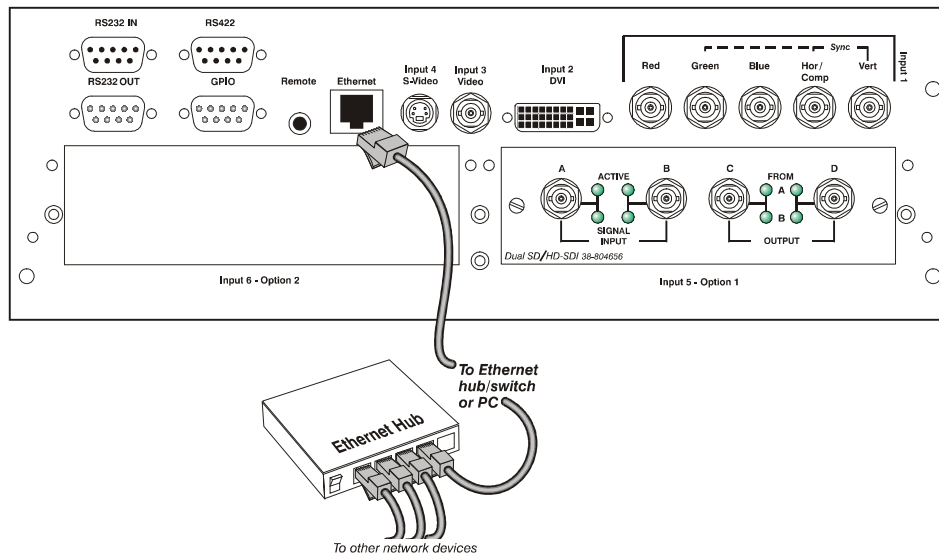


Figure 2-33 Connecting Ethernet

Upon connection to an Ethernet network, the projector's factory default IP address of 0.0.0.0 will automatically enable the DHCP function (if available on the network) to assign a new IP address that is valid and unique for that network. Or, if there is no DHCP function available on the network (or if a specific static IP address for the projector is preferred or required), you can set the address in the *Ethernet Settings* secondary menu/secondary menu or via an ASCII serial command.

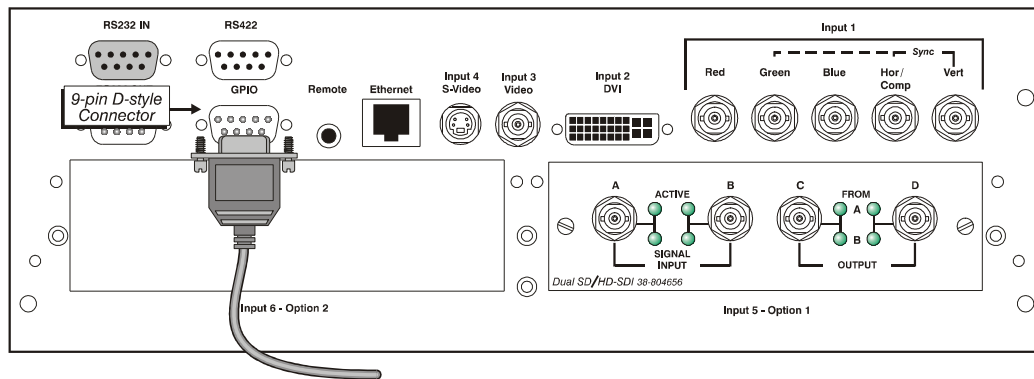
NOTE: *Ensure the projector is connected to the network before attempting to change its IP address.*

Regardless of how it is assigned, once a projector has a valid and unique address, it will respond to commands sent to this address. To determine the projector's current IP address, consult the *Status* or *Communications* menus.

Refer to [Section 3.6 Adjusting System Parameters and Advanced Controls](#) for further information about setting up and using a projector connected via Ethernet.

The GPIO Port

The General Purpose In-Out (GPIO) port enables integration of the projector within an established control system ([Figure 2-34](#)). ASCII commands sent via the GPIO link are stored in projector memory, where they can be triggered as a sequence of events in the future. Refer to [Appendix D: Optional Input Modules](#).



IMPORTANT
Use a serial cable that is compatible with the external device.

Figure 2-34 GPIO Port

2.6 Connecting Multiple Projectors

You may wish to chain 2 or more projectors together so that commands and communications to and from a controller are relayed to all projectors. Choose a hardware configuration that best suits your desired communication method.

2.6.1 Serial Links

To control multiple projectors with a computer/controller having an RS-232 interface, first set all projectors to the same baud rate as the controller, then chain the projectors together by connecting the **RS-232 OUT** connector of the first projector (already connected to the computer/controller) to the **RS-232 IN** connector of the next projector in the chain. Continue connecting projectors in this manner until you've reached the last projector in the chain, so that only the last projector has an unused **RS-232 OUT** port. See [Figure 2-35](#).

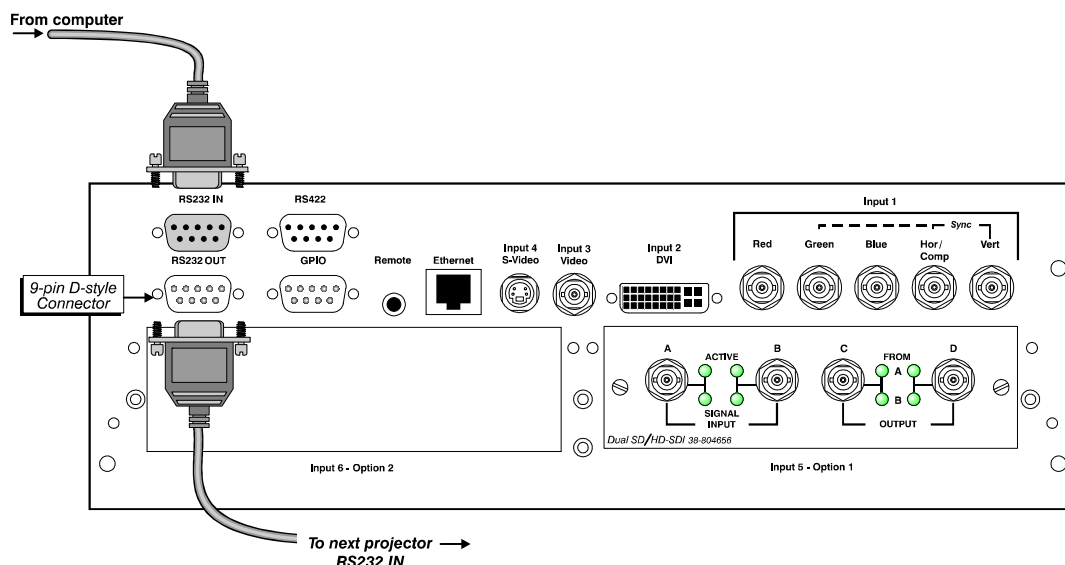


Figure 2-35 RS-232 Serial Link Loop-Through at First Projector

MIXED NETWORK: To control multiple projectors with a computer/controller having an RS-422 interface, first set them all to the same baud rate as your RS-422 controller.

NOTE: You must enable this combination of RS-422 and RS-232 in the Communications menu. Set the “Network Routing” option to “RS-232 and RS-422 Joined”. Refer to [Section 3 Operation](#) for details.

Chain the projectors together by connecting an **RS-232** port of the first projector (already connected to the computer/controller through the **RS-422** port) to an **RS-232** port on the next projector in the chain. Continue connecting projectors in this manner until you’ve reached the last projector in the chain, so that only the last projector has 1 unused **RS-232** port. See [Figure 2-36](#).

Communication parameters such as baud rate must be set to match the particular controlling device **before** connecting as a network. Refer to the documentation that came with your controlling device in order to determine the proper baud rate. If you need help changing the projector’s baud rate, refer to [Section 3.6 Adjusting System Parameters and Advanced Controls](#). In addition, set the Network Routing to “RS-232 and RS-422 Joined” if you want to reach all projectors.

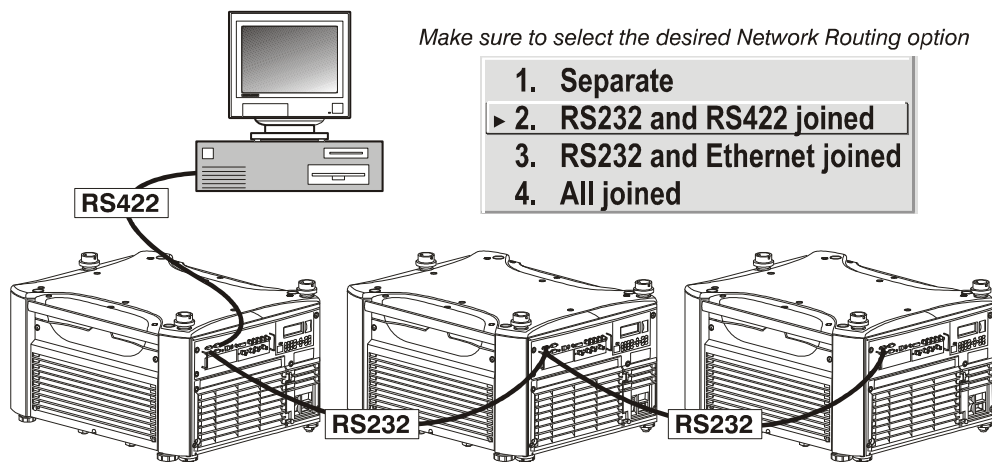


Figure 2-36 Mixed Serial Network

NOTES: 1) To avoid damage, connect only properly wired serial communication cables. Refer to [Appendix B: Serial Communication Cables](#) for details. 2) It is recommended that each RS-232 communication cable be no more than 25 feet in length. Use high quality cables.

2.6.2 Ethernet Networks

To add 1 or more projectors to an Ethernet network, use standard CAT5 cable to connect each projector’s Ethernet port to a hub on to the network. A controller or PC must also be connected to the hub. Refer to [Figure 2-37](#).

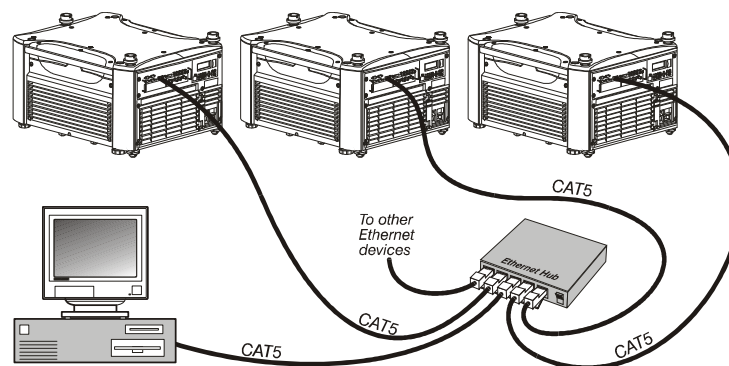


Figure 2-37 typical Ethernet Network

SETTING THE PROJECTOR'S IP ADDRESS: Upon connection to most Ethernet networks, each projector's factory default IP address of 0.0.0.0 triggers the network's DHCP (Dynamic Host Configuration Protocol) server function to automatically assign an IP address that is valid and unique for use on that network. Depending on the network, this DHCP-assigned IP address usually remains stable for a single session, but may change with subsequent power-ups and logins. On some networks, the address will remain stable from session to session. In all cases, the projector's IP address and port appear in the *Status* menu as well as the *Ethernet Settings* secondary menu. See [Figure 2-38](#).

Ethernet Settings		
1.	DHCP Enabled	☒
2.	IP Address	000.000.000.000
3.	Port	3002
4.	Subnet Mask	000.000.000.000
5.	Default Gateway	000.000.000.000
6.	Network Name	
7.	ArtNet Interface Settings	

☒ = Projector's IP address will be DHCP-assigned
☐ = Use static address assigned in "IP Address"

Figure 2-38 Setting the Projector's IP Address

If a projector's IP address is anything *other* than 0.0.0.0 (shown as 000.000.000.000 in the *Ethernet Settings* menu) upon connection to an Ethernet network, or if DHCP is not available on the network, the automatic DHCP server function for supplying a valid and unique IP address to the projector is disabled. Instead, a specific and static IP address must be defined in projector memory. Enter the new address in the *Ethernet Settings* submenu, or send to the projector via a serial command. The IP address will be in effect until it is changed again, or until the DHCP check box is re-enabled for use with a DHCP server on the network.

NOTE: Only the port and IP address of the projector can be changed. The subnet mask is fixed (255.255.255.0).

CHANGING THE PORT#: On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new port number in the *Ethernet Settings* menu or include the new port# in an XIP serial command sent to the projector. It is highly recommended not to use a port# below 1024, as these ports are typically reserved for and used by well known applications.

SUBNET MASK AND DEFAULT GATEWAY: The Subnet Mask and Default Gateway are automatically assigned when DHCP is enabled. If a static IP is being used, it must be assigned before the subnet mask. The Default Gateway is an optional router device used to send and receive data outside the subnet.

ArtNet INTERFACE SETTINGS: Refer to [Section 3.6.2 System Configuration \(Communication\)](#) for additional information about ArtNet settings.

2.6.3 Separating Networks

By default, communications originating from 1 type of serial controller (RS-232 vs. RS-422 vs. Ethernet) stays on the corresponding network path. A “Separate” setting indicates this separation for “Network Routing” in the *Communications* menu. If you are using an RS-422 controller, for example, it will communicate only with the projector to which it is connected unless you change this setting to either “RS-232 and RS-422 Joined” or “All Joined”. See [Figure 2-39](#).

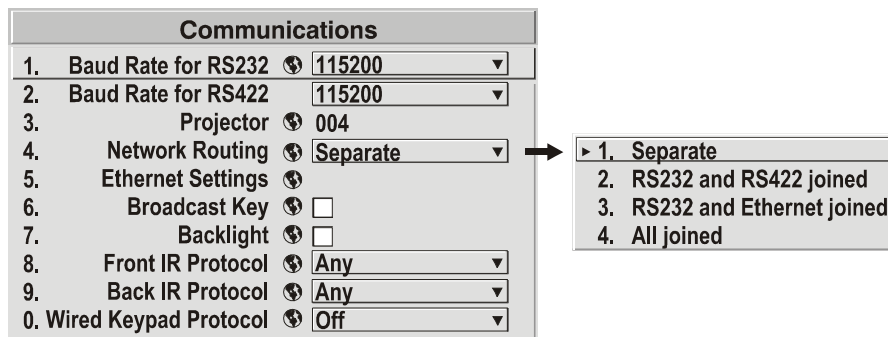


Figure 2-39 Keeping Communications Separate (default)

2.6.4 Communicating to All Ports

To relay all messages to all ports (RS-232, RS-422, and Ethernet) set the “Network Routing” option in the *Communications* menu for each projector to “All Joined”. This configuration is useful if you are using a non-RS-232 controller with the RS-232 linking available between these projectors. For example, you may want to use both an RS-422-compatible controller, and an Ethernet-connected PC for working with a network of projectors linked via their RS-232 in/out ports. Refer to [Figure 2-40](#).

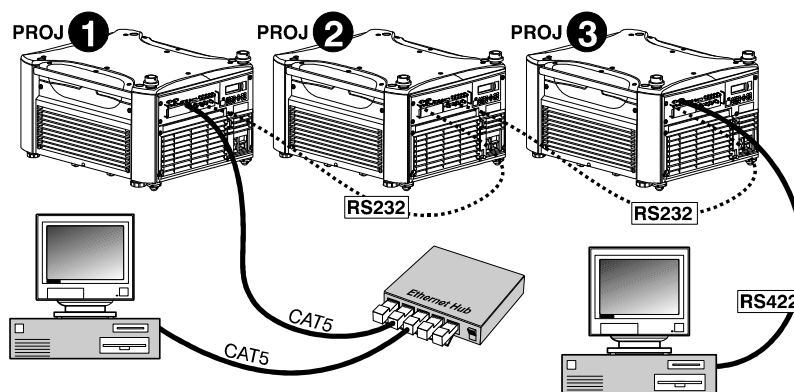


Figure 2-40 Joining All Networks

To isolate just RS-422 communications, select “RS-232 and Ethernet Joined”. In [Figure 2-40](#), only projector #3 will respond to the RS-422 controller. To isolate just Ethernet communications, select “RS-232 and RS-422 Joined”. Only projector #1 will respond via Ethernet.

2.7 Power Connection

⚠ WARNING The North American rated line cord is provided with each projector. Ensure that you are using a line cord that meets the appropriate rating standards.

Plug the projector's high-current line cord into the line input socket located in the lower right corner of the rear panel of the projector, then plug the 3-pronged end of the line cord into a grounded AC outlet. Ensure the socket outlet is installed near the equipment and is easily accessible. Input voltage to *all Roadster and Mirage* models must be capable of **200–240 VAC**. **Use the proper power source and the high-current rated line cord provided.** Refer to [Section 6 Specifications](#) for all power requirements.

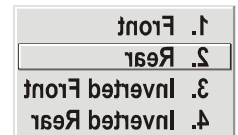
⚠ WARNING Do not attempt operation if the AC supply and cord are not within the specified voltage and power range.

⚠ CAUTION **Caution for Shutdowns:** Once the projector is turned OFF (), the lamp cooling fans will continue to run for approximately 5 minutes to ensure that the projector and lamp have sufficiently cooled, at which point the fans will automatically shut OFF. To avoid thermal stress that can lead to premature lamp failure, never unplug the line cord while the lamp cooling fans are running, and never unplug to power down.

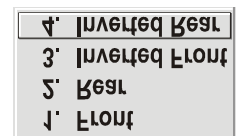
2.8 Operating Orientation

In the *Configuration Menu* highlight and select the “Image Orientation” drop-down list. See [Figure 2-41](#). Select from options Rear, Inverted Rear, Front, or Inverted Front according to your intended installation. Refer to [Section 3 Operation](#) for further information.

Select “Rear” and check that the display looks like this →



Select “Inverted Rear” and check that the display looks like this →



Select “Inverted Front” and check that the display looks like this →

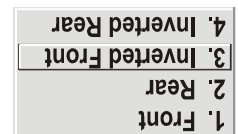


Figure 2-41 Image Orientation

2.9 Leveling

For most installations, the lens surface of the projector is parallel to the screen. This prevents major keystoneing of the image (i.e., an image with non-parallel sides). In addition, the projector must be kept level from side-to-side in order for the lamp to function safely. To make small corrections to the projector's level, rotate each leg as necessary to raise or lower. Refer to [Figure 2-42](#).

For angled installations, refer to “Special Mounting” under [Section 2.3 Projector Position and Mounting](#) discussed earlier in this section.

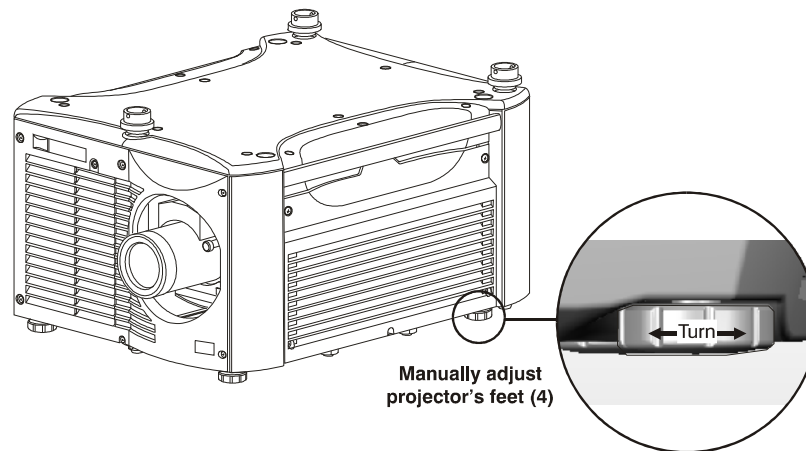


Figure 2-42 Adjusting the Feet Height

2.10 Zoom, Focus and Lens Offset

Once the projector is properly set up and producing an image, you are ready to make quick lens adjustments. Refer to [Section 3.2 Using the Keypads](#) and [Section 3.3 Navigating the Menus](#) if you are unfamiliar with using the keypad and Menu system.

2.10.1 Lens Adjustments

NOTE: *Not applicable to fixed lenses. Focus fixed lens by turning focus ring on lens.*

Zoom

With the input image displayed:

- If standard IR remote: Press ZOOM + ◀ or ▶
- If built-in keypad: Press ZOOM + ▲ or ▼

Hold the ZOOM key down to see the effect – arrows in the display indicate the direction of the zoom. See [Figure 2-43](#).

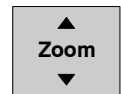


Figure 2-43

Focus

With the input image displayed:

- If remote keypad: Press FOCUS + ◀ or ▶
- If built-in keypad: Press FOCUS + ▲ or ▼

Hold the FOCUS key down to see the effect. Arrows in the display indicate the direction of the focus. See [Figure 2-44](#).

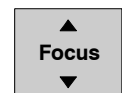


Figure 2-44

Lens Offset

To move the image:

- If standard IR remote: Press either Lens H +  or  or Lens V +  or 

See [Figure 2-46](#).

- If built-in keypad: Press  + the Arrow keys. See [Figure 2-5](#)

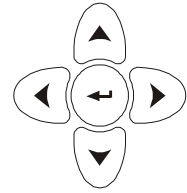


Figure 2-45 Arrow Keypad

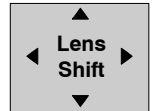


Figure 2-46

2.11 Keypad and Remote Protocols and Conversion

Both styles of remote IR keypads (ergonomic or “Brick” rental staging Standard IR remote) can be converted to a wired remote by adding the appropriate cable (provided, as shown in [Figure 2-47](#)). This is most useful for simple applications in which it is impractical to communicate via IR, such as when the projector is in another room and cannot respond to an IR signal (too dark), or when you wish to connect to and control individual projectors within a group.



Figure 2-47 Sample Wired Remote Cable

To control the projector when signals from a remote cannot reach the projector, use the projector’s rear built-in keypad. The nearby LED display provides feedback indicating current status and activities of the projector. Because the built-in keypad has fewer keys than the remote’s keypad, certain projector functions are accessible only through the Menu system rather than via a direct key press.

NOTE: *The built-in keypad cannot be disabled.*

In addition, the rental staging keypad typically used with Roadsters can operate under a variety of different IR protocols, useful in multiple-projector sites where you prefer the tether-less freedom of controlling many adjacent projectors independently. When **keypad A** operates under a different protocol than **keypad B** (or others), each keypad communicates with the projector(s) having a matching protocol defined in memory only. See below.

2.11.1 Ergonomic Keypad

This style of keypad offers one protocol (A) only, and can be converted for wired use as follows:

1. Using the built-in keypad, display the *Communications* menu, and choose the **Wired Keypad** option.
2. Connect the IR remote keypad to the phono jack Input labeled **REMOTE** on the projector's Input panel.

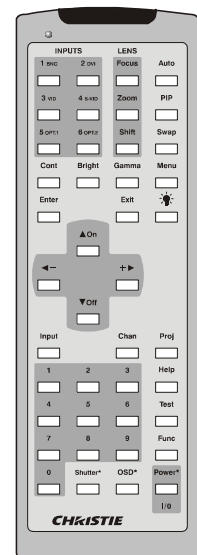


2.11.2 Standard IR Remote

NOTES: 1) Typically used for *Roadsters*. 2) Protocols B-G described here require main projector software v1.2d or higher.

At manufacture, the remote keypad is assigned “A” as its default protocol, which is simply a collection of settings that determines how the IR keypad operates. Once assigned, a protocol remains in effect until it is changed. That is, the remote keypad will operate as it currently does until you change its protocol. Each rental staging remote can operate using 1 of 7 different IR protocols, or it can be set to a “wired” protocol for use when a cable connects the remote to the projector. Change protocol via “hard-wired” jumper settings inside the keypad, set projector software to match, and add or remove the keypad cable as necessary.

NOTE: Match the protocol on the projector to that of a remote by accessing the *Communications* secondary menu. Refer to [Section 3.6 Adjusting System Parameters and Advanced Controls](#) for further information on how to define which protocol the projector's infrared sensors (rear and front) will recognize.



2.11.3 Setting the Protocol

To convert the Roadster “Brick” rental staging – Standard IR remote from IR to wired use (or vice versa), set its protocol accordingly. See below.

1. Unlatch and open the battery compartment on the back of the keypad as shown in [Figure 2-48](#).

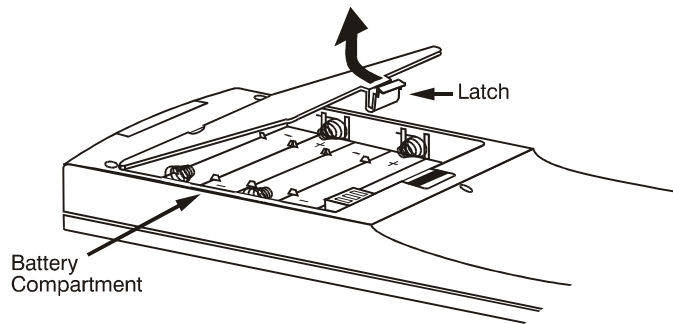
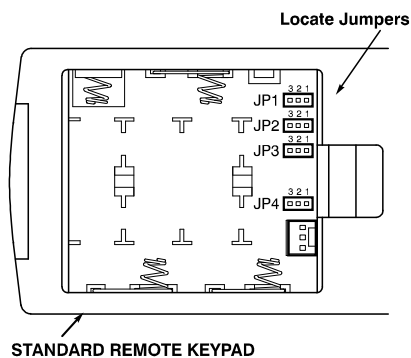


Figure 2-48 Opening the "Brick" rental staging – Standard IR remote

2. Find the 4 jumpers located along the latching side of the battery compartment. These jumper settings establish the protocol to be used so that the remote functions in a certain manner.
3. Set the jumpers to match 1 of the protocols shown in [Figure 2-49](#). Use tweezers or needle-nose pliers to remove and replace each jumper as necessary.
 - **J1** jumper: Set between 1 and 2 *or* 2 and 3 as required for the desired protocol.
 - **J2** jumper: Set between 1 and 2 *or* 2 and 3 as required for the desired protocol.
 - **J3** jumper: Set between 1 and 2 *or* 2 and 3 as required for the desired protocol.
 - **J4** jumper: For IR use, *always* set between pins 1 and 2 (see A-G below).



Protocol A	Protocol B	Protocol C	Protocol D
JP1	JP1	JP1	JP1
JP2	JP2	JP2	JP2
JP3	JP3	JP3	JP3
JP4 IR	JP4 IR	JP4 IR	JP4
Protocol E	Protocol F	Protocol G	Wired
JP1	JP1	JP1	JP1
JP2	JP2	JP2	JP2
JP3	JP3	JP3	JP3
JP4 IR	JP4 IR	JP4 IR	JP4

Figure 2-49 Setting the Jumpers in the "Brick" rental staging – Standard IR remote

NOTE: Protocols B-G require v1.2d (or higher) software.

4. Plug in the keypad cable (if jumpers are set for wired use) and replace the battery compartment cover.
5. Plug into projector (wired keypad only) and test.

NOTE: If you change any keypad to a new protocol and the projector stops responding, the projector may be set to a conflicting protocol. Use the projector's built-in keypad to access the **Communications** secondary menu. Under "Front IR" or "Rear IR", select the protocol that matches the new protocol of the keypad at hand. The projector should now respond properly.

Shortcut Method

Unlike older models of Christie projectors and keypads, there is no shortcut method for changing a keypad's protocol through a special sequence of keystrokes. Simply change the internal jumper settings as described above.

Converting a Rental Staging Keypad

If desired, you can convert this IR remote keypad into a wired remote keypad, and vice versa. Set the jumpers as shown in [Figure 2-49](#). Add or delete the cable (supplied) and batteries as required.

To Change from Infrared to Wired

1. Remove battery compartment cover from back of the keypad.
2. Remove batteries (refer to [Section 4.5 Replacing Keypad Batteries](#)).
3. Wait 1-2 minutes. Meanwhile, notch the battery cover to create an exit hole for the cable. Ensure the hole is smooth and will accommodate the cable without pinching.
4. Plug the keypad cable (supplied) into the empty battery compartment. Ensure the connector is oriented correctly (red wire nearest to the edge).
5. Set the keypad's protocol to "wired" jumper setting (refer to [Figure 2-49](#)). Ensure jumper #4 is set between pins 2 and 3 as shown in [Figure 2-49](#) (shaded example).
6. Replace battery compartment cover, keeping the strain relief tie just inside the battery compartment at the exit notch.
7. Plug into the port labeled **REMOTE** on the projector's Input panel.

To Change from Wired to IR:

1. Unplug the keypad from the projector.
2. Open the keypad back and unplug the keypad cable.
3. Wait 1-2 minutes.
4. Install batteries (refer to [Section 4.5 Replacing Keypad Batteries](#)).
5. Set the jumpers according to the desired IR protocol (refer back to [Figure 2-49](#)). Ensure jumper #4 is set between pins 1 and 2 as shown for all IR remote protocols.
6. Replace battery compartment cover.

3 Operation

This section describes the controls and switches used for basic projector operation once it is properly installed, aligned and configured by a Christie accredited service technician. Please read through these pages before using the projector for the first time. An understanding of projector features and how to access them will help you to take full advantage of the capabilities of the projector within minutes.

NOTE: *Installation involves locating the projector and adjusting it for use at that location. If you have not yet installed the projector, refer to [Section 2 Installation and Setup](#).*

3.1 Projector Basics

It is recommended that you read this section and familiarize yourself with the components and the available menu options before you begin using your projector for the first time.

Projector components and functions are illustrated below ([Figure 3-1](#)).

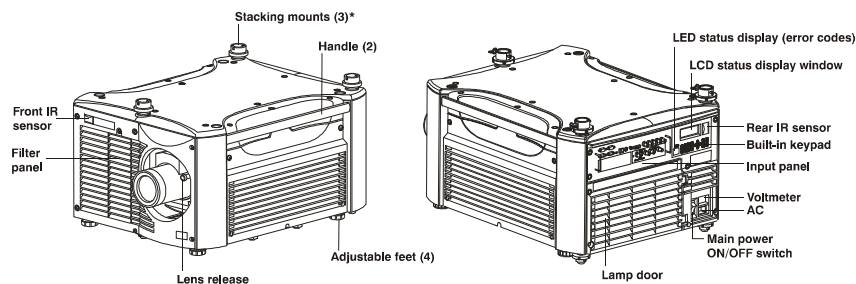


Figure 3-1 Basic Projector Components (* on Roadster series only)

3.1.1 Zoom

Operated with the keypad, the internal optics of a motorized zoom lens rotates to adjust the size of the image without moving the projector. Minimum and maximum image sizes depend on which zoom lens is installed. Refer to [Section 6 Specifications](#).

3.1.2 Lens Release

Push lens release to enable the lens to be rotated for removal.

3.1.3 Focus

Operated with the keypad, focus adjusts the sharpness of the image at the current throw distance.

3.1.4 Lens Offset

Operated with the keypad, vertical and horizontal offsets shift the lens and move the image up or down and left or right. Refer to [Section 2 Installation and Setup](#) and [Section 6 Specifications](#) for ranges and other details.

3.1.5 Shutter and Iris

Operated with the keypad, closing the internal shutter blocks the lens internally and turns the image to OFF (black). Enlarge the diameter of the iris (a.k.a. *optical aperture*) for optimized brightness; reduce the diameter to optimize contrast ratio.

3.1.6 Eyebolts

- 2 eyebolts on bottom (factory-installed)—for attaching safety cables when hoisting inverted projectors.
- 4 eyebolts for top (separate)—for non-inverted hoisting.

NOTE: *Two additional safety eyebolts required.*

3.1.7 Handles

Handles are for brief hand transport only. Not used for hoisting, rigging, or as safety points.

3.1.8 Stacking Mounts / Stacking Legs

NOTE: *Optional on Mirage models.*

Used for stacking up to 3 projectors. Refer to [Section 2 Installation and Setup](#) for details.

⚠ WARNING Use Christie stacking mounts only.

3.1.9 Adjustable Feet

Turn the 4 adjustable feet to increase or decrease height and/or tilt as needed. For most installations the projector will likely be slightly inclined to match the screen tilt – this reduces the amount of vertical offset required. Refer to [Section 2.3 Projector Position and Mounting](#) for more details.

3.1.10 Filter Panel

The filter door is a louvered grille for air intake. Remove to access and replace air filter.

3.1.11 Lamp Door

The lamp door is a louvered grille for accessing and replacing the lamp module.

NOTE: *Lamp replacement requires a qualified service technician.*

3.1.12 Input Panel

The Input panel wires the projector to inputs (sources) and controllers such as PCs.

COMPOSITE/S-VIDEO INPUT - Accepts a composite video, DVI and S-Video signal from devices such as VCRs.

RGB INPUT - Accepts RGB and sync signals from devices such as computers, as well as composite video, S-Video or YPbPr component signals.

RS-232 SERIAL INTERFACE (with Loop Through) - Allows one or more projectors to be remotely controlled by a computer or controller.

RS-422 INTERFACE - Allows one or more projectors to be remotely controlled by an RS-422 compatible computer or controller (such as the *Two-Way Controller* accessory).

3.1.13 AC Power Input and Monitoring

⚠ CAUTION AC LINE CORD INPUT. Use the AC supply specified, and always use the line cord recommended by Christie. Refer to [Section 5 Troubleshooting](#). Before unplugging, wait until the main blower turns OFF or the LCD status reads Power OFF.

Table 3.1 AC Power Specifications

Model	AC Power Specifications
ROADSTER S+12K/HD12K	200-240 VAC, 50-60 HZ, MAX. 12 AMPS @ 200VAC
MATRIX WU12	200-240 VAC, 50-60 HZ, MAX. 12 AMPS @ 200VAC
MIRAGE HD12	200-240 VAC, 50-60 HZ, MAX. 12 AMPS @ 200VAC
MIRAGE WU12	200-240 VAC, 50-60 HZ, MAX. 12 AMPS @ 200VAC
MIRAGE S+12K	200-240 VAC, 50-60 HZ, MAX. 12 AMPS @ 200VAC
ROADSTER S+16K	200-240 VAC, 50-60 HZ, MAX. 16 AMPS @ 200VAC
MIRAGE S+14K	200-240 VAC, 50-60 HZ, MAX. 16 AMPS @ 200VAC
MIRAGE S+16K	200-240 VAC, 50-60 HZ, MAX. 16 AMPS @ 200VAC
MIRAGE HD18	200-240 VAC, 50-60 HZ, MAX. 20 AMPS @ 200VAC
MIRAGE WU18	200-240 VAC, 50-60 HZ, MAX. 20 AMPS @ 200VAC
ROADSTER S+20K/HD18K	200-240 VAC, 50-60 HZ, MAX. 20 AMPS @ 200VAC
MIRAGE S+20K	200-240 VAC, 50-60 HZ, MAX. 20 AMPS @ 200VAC

⚠ WARNING Do not attempt operation if the AC supply is not within the specified voltage and power range. Use the specified line cord.

Voltmeter

Displays incoming voltage level reaching the projector.

Switch Breaker

The breaker/power switch on the rear panel serves two purposes:

- It is a power switch for the projector.
- It protects against excessive AC conditions (15A or more for *Roadster S+12K/HD12K and Mirage HD12/WU12/S+12K*, 20A or more for *Roadster S+16K and Mirage S+14K/S+16K*, and 25A or more for *Roadster S+20K/HD18K and Mirage WU18/HD18/S+20K*). If the projector is faulty or excessive AC is detected, the breaker/power switch will “trip” to OFF in order to prevent damage. Try moving the breaker ON again. If the breaker continues to trip OFF, this indicates a major fault and the AC problem must be resolved. Possible causes might include shorts, damage to lamp cables, or excessive AC.

NOTE: This switch turns on the ballast only. It does not power up the projector or start the lamp. You must press  on the keypad.

3.1.14 Status Display (Error Codes) and Status Display Window

Two-digit Status/error Code Window

This LED (light emitting diode) display is adjacent to the built-in keypad. During normal operation, the "POWER" light is steady yellow and indicates "ON". When the status of the projector changes, the LED displays a 2-digit code number representing the projector's new status. In addition to the numeric readout, there are 2 decimal points in the display: the right decimal point flashes when the projector receives a command and the left point flashes when the projector sends a command.

LCD Status Display Window

Displays a text message describing the current system status (such as an error). During normal operation, this display indicates Power ON and includes the frequencies of the vertical and horizontal syncs. The display also shows if the On Screen Display (OSD or Menu system) is ON or OFF. The LCD displays the message "Power Off" when the breaker is ON, but the lamp is OFF.

3.1.15 Keypads / Sensors

Wired Remote Connector

For optional tethered remote control of the projector.

Built-in Keypad

Alternative location for working with the projector.

Infrared Sensors

The infrared (IR) sensors on the front and rear of the projector receive infrared signals from the IR remote which remotely controls the projector's functions. For proper operation, ensure these sensors are not blocked.

3.2 Using the Keypads

⚠ WARNING Laser radiation is emitted from the laser diode in the remote. Do not look directly into the beam of the remote.

Using one of the following keypads typically controls the projector:

- **The Built-in keypad** ([Figure 3-2](#)) located at the rear of the projection head
- **The Remote keypad** ([Figure 3-3](#)) for tethered or tether-less control (includes cable for connecting as a wired remote)

While the built-in keypad or standard IR remote provides complete control of the projector, they differ slightly in their arrangement of keys, and in which functions can be accessed directly with a key press rather than requiring use of the **Menu** system. You may find one keypad more convenient than another for your specific installation and application.

NOTE: *The remote keypad has a single IR protocol and can be converted to a wired remote by connecting the cable provided with the projector to the RCA jack labeled as REMOTE on the input panel.*

3.2.1 Built-in Keypad

To control the projector when signals from a remote cannot reach the projector, use the projector's built-in keypad ([Figure 3-2](#)). The 2 nearby Status windows provide feedback, indicating current status and activities of the projector, (refer to [Table 3.2](#)). Because the built-in keypad has fewer keys than on the remote keypad, certain projector functions are accessible only through the **Menu** system, rather than via a direct key press.

NOTE: *The built-in keypad cannot be disabled.*

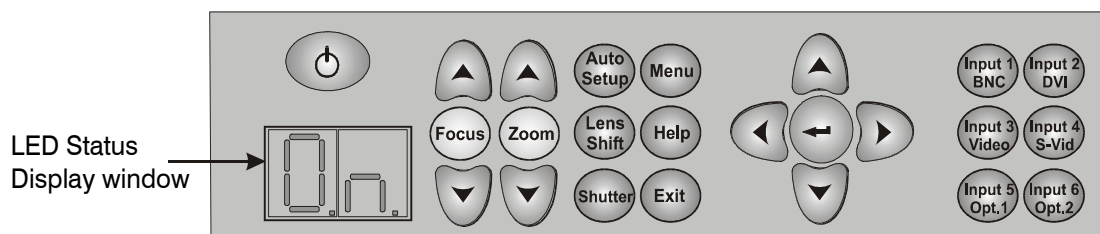


Figure 3-2 Built-in Keypad at Projector Rear

Table 3.2 LED Status Display

LED STATUS DISPLAY	DESCRIPTION
--	AC POWER SUPPLIED, PROJECTOR OFF
ON	PROJECTOR ON
LC	LENS CALIBRATION IN PROGRESS
LP	LAMP HAS REACHED DEFINED "LAMP LIMIT". REFER TO Section 3.8 Working with the Lamp
SH	CLOSED SHUTTER
# #	SYSTEM WARNING OR ERROR HAS OCCURRED
— —	COOLING DOWN (ROTATING HORIZONTAL BARS)
— └	POWER TO OFF STATE OR POWERING UP (SEGMENTS SPINNING CLOCK-WISE)

3.2.2 IR Remote

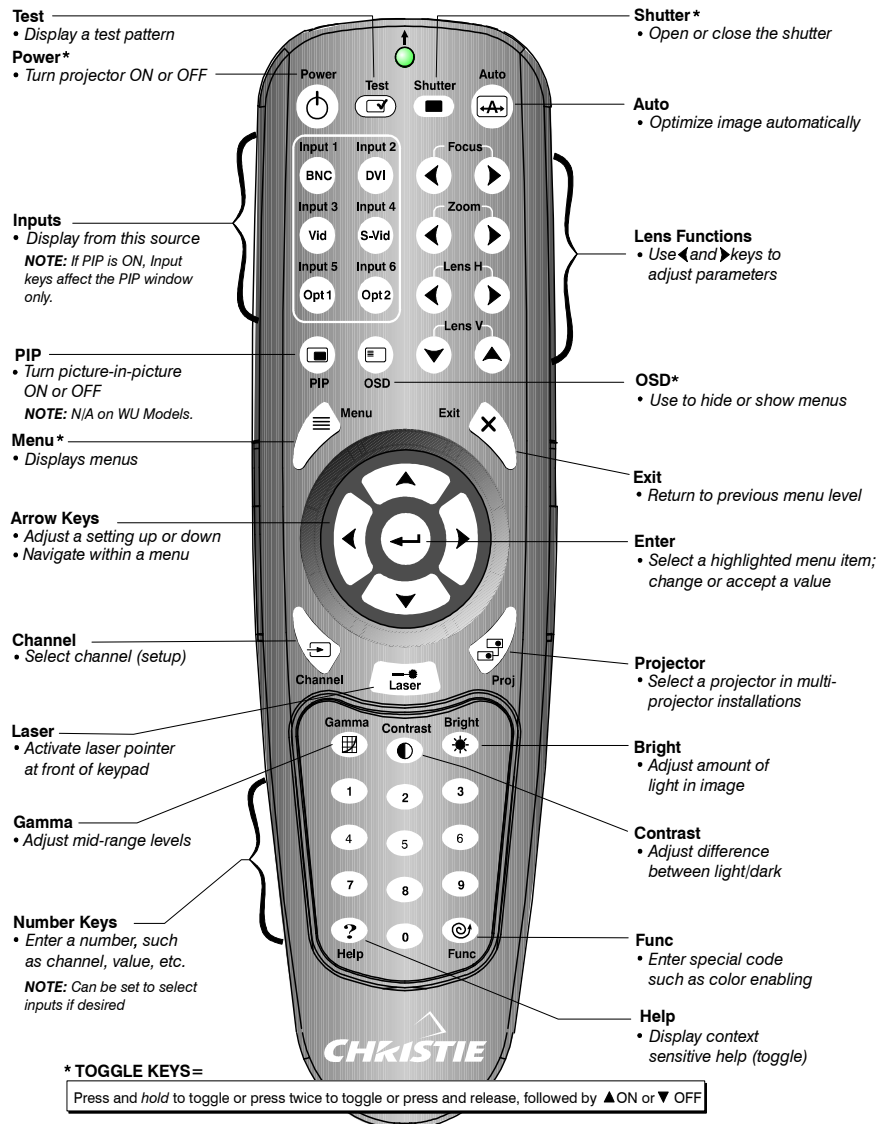


Figure 3-3 Remote Keypad

The IR remote controls the projector by way of wireless communications through a battery-powered infrared (IR) transmitter. Use the IR remote the same way you would use a remote supplied with a TV or VCR. When making key presses, direct the standard IR remote either toward the screen or toward the front or rear IR sensors on the projector.

NOTE: For improved reception, use an optional remote IR sensor to route the signal via a phone cable plugged into the wired port labeled **REMOTE**. Refer to [Figure 1-2](#).

The “Brick” style rental staging/standard IR remote, typically used with Roadster models, is shown in [Figure 3-4](#). It has no laser pointer, but includes 3 additional keys:

- SWAP key for use with PIP functions
- BACKLIGHT key for lighting keys
- Direct INPUT key used with the numbered keypad to switch from one input to another

3.2.3 Wired Remote

You can convert the IR remote into a wired remote keypad using the cable provided with the projector. Connect one end into the remote and the other to the mini stereo connector on the input panel labeled as **REMOTE**.

The wired remote is recommended when:

- The built-in keypad is inaccessible
- The lighting conditions are unsuitable for proper IR transmission

NOTE: Leave the batteries in the wired remote for the laser key () to work.

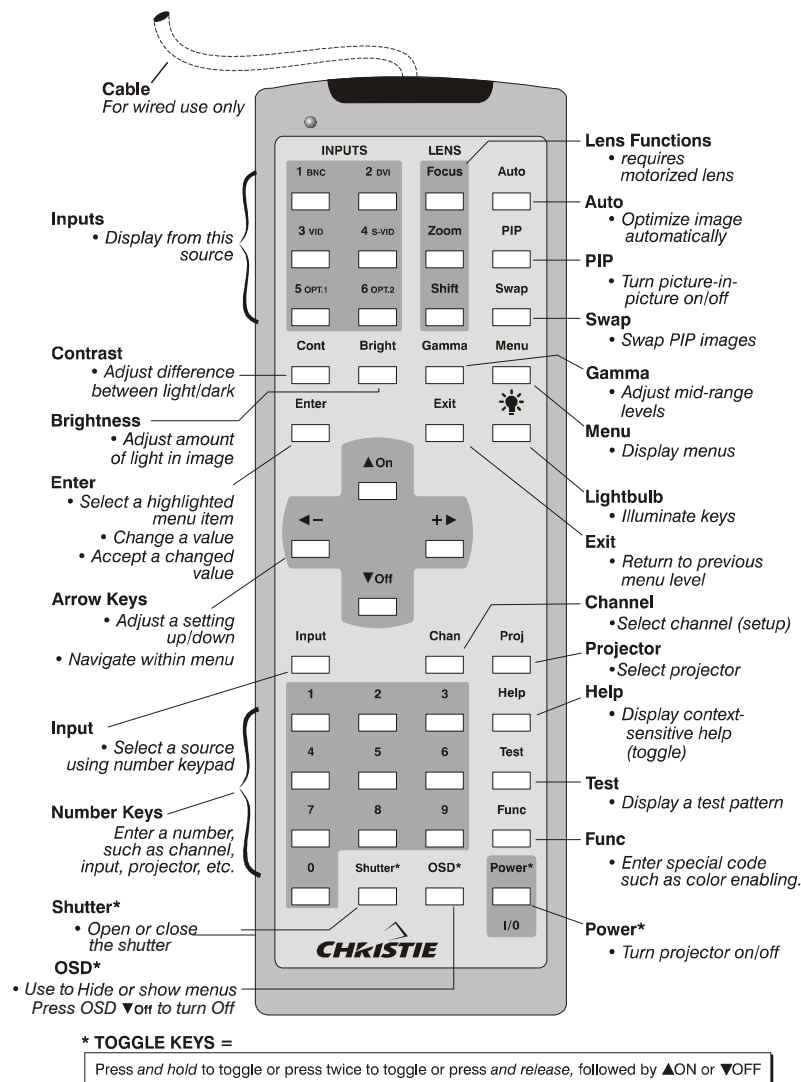


Figure 3-4 Standard IR Remote

The "Brick" style rental staging - Standard IR Remote, typically used with Roadster models, is shown in [Figure 3-4](#). It has no laser pointer, but includes three additional keys: the SWAP key for use with PIP functions, BACKLIGHT key for lighting keys, and direct INPUT key used with the numbered keypad to switch from one input to another.

3.2.4 Guide to Keypads

- Press keys one-at-a-time; there are no simultaneous key combinations required.

NOTE: Three keys: POWER, SHUTTER, and OSD. Press key once. Refer to [Figure 3-4](#).

- Hold the ARROW keys down for continuous adjustment/movement in one direction. In serial networks, pause briefly between adjustments to ensure that more distant projectors can "keep up" with the commands.
- If you press any key while the projector is still responding to the previous action, such as during power-up, the second key press may not take effect.

3.2.5 Keypad Commands

Specific keypad commands are explained below.

Power ON/OFF

- Press and hold  briefly to toggle the projector ON or OFF with a single keystroke or press twice.
- Press and release  followed immediately by the  key (ON) or the  key (OFF) to guarantee the correct toggle. This is useful if you are unsure of the present state.

NOTES: 1) After powering down, the lamp cooling fan remains on for approximately 5 minutes to cool the lamp. 2) It is a good idea to avoid turning a projector back ON until it has been OFF for several minutes. Hot re-strikes of the lamp may reduce lamp life.

Test

Press  to scroll through the projector's internal test patterns. When a test pattern is up, use  and  to scroll through the patterns without going back to the Input.

Auto

Press  to initiate an automated process in which the projector optimizes critical display parameters such as size, position, pixel tracking, etc., for the current unlocked channel. These parameters are listed in [Table 3.3](#). An Auto Setup can save time in perfecting a display, and you can further modify the settings as desired.

NOTE: For WUXGA models a window will display, "Do Auto Setup, all except UXGA" and "Do Auto Setup, all except WUXGA". If your signal is UXGA, choose "Do Auto Setup, all except WUXGA". If your signal is WUXGA, choose, "Do Auto Setup, all except UXGA". The default is "all except WUXGA". This is only used and relevant for analog UXGA or WUXGA.

Table 3.3 Auto Setup

What an "Auto Setup" Does	
OPTIMIZES:	SETS TO DEFAULT:
SIZE AND BLANKING	AUTO INPUT LEVEL (OFF)
VERTICAL STRETCH	DETAIL (IF VIDEO SOURCE)
POSITION	FILTER
INPUT LEVELS	LUMA DELAY

NOTE: You must have an unlocked channel present to use AUTO SETUP.

Channel

Press  to select a specific source setup (channel) defined, and stored in projector memory.

Once you enter a 2-digit channel number (or, if there is a list displayed, highlight it, and press ) , the display will automatically change and update according to the numerous setup parameters defined for that channel. Note that a new channel is automatically created if you adjust an image from a new source.

NOTE: The  key behavior during a presentation depends on whether or not the **Display Channel List** option is enabled in the *Menu Preferences* menu. You can choose to use a scrollable list of channels when you press , or you may prefer to enter the desired channel number "blind", i.e., without on-screen feedback. Refer to [Menu Preferences](#) in [Section 3.6.1 System Configuration \(General Settings\)](#) discussed later in this section.

Input 1

Press  to display from the data input source connected to BNCs labeled **INPUT 1**. If PIP is enabled, pressing  will change the PIP source.

Input 2

Press  to display from the DVI source connected to INPUT 2. If PIP is enabled, pressing  will change the PIP source.

Input 3

Press  to display from the composite video source connected to **INPUT 3**. If PIP is enabled, pressing  will change the PIP source.

Input 4

Press  to display from the S-video source connected to **INPUT 4**. If PIP is enabled, pressing  will change the PIP source.

Input 5

Press  to display from the **INPUT 5** interface module installed in the *Option 1* slot.

If PIP is enabled, pressing  changes the PIP source. If there are 2 inputs connected here, such as if the Dual SD/HD-SDI module is installed, the second input (B) is considered **INPUT 7**. Press  to access **INPUT 7** as follows:

- While displaying from **INPUT 5**, press  again. This switches to **INPUT 7**.
- While displaying from any input other than the Dual SD/HD-SDI Module, press . This switches to either **INPUT 5** or **INPUT 7**, depending on which of the *Dual Module* inputs (A or B) was last used. Press  again to display from the other Dual SD/HD-SDI Module input.

Input 6

Press the  key to display from the **INPUT 6** interface module installed in the *Option 2* slot. If PIP is enabled, press **INPUT 6** to assign it as the PIP source. If the *Dual SD/HD-SDI Module* is installed here, and there are two inputs connected, its second input (B) is considered **INPUT 8**. Or, if you are using the built-in keypad or the remote keypad, neither of which have a separate  key, press **INPUT 6** to access **INPUT 8** as follows:

- While displaying from **INPUT 6**, press  again to switch to **INPUT 8**.
- While displaying from any input other than the *Dual SD/HD-SDI Module*, press . This switches to either **INPUT 6** or **INPUT 8**, depending on which of the *Dual SD/HD-SDI Module* inputs (A or B) was last used. Press  again to display from the other *Dual SD/HD-SDI Module* input.

Input (Standard IR Remote Only)

Enter  (where **n** = 1, 2, 3, 4, 5, 6; 7 and 8 are optional) as an alternative method for selecting which source to display. The 6 source locations are identified with Input numbers on the projector's Input panel. The last two, 7 and 8, require the *Dual SD/HD-SDI Module* be installed in either of the option slots.

If PIP is enabled,  changes the PIP (secondary) image source, and  changes the main (primary) image source.

NOTE: Key behavior depends on whether or not the **Display Channel List** option is selected in the **Menu Preferences** menu. You can choose to have on-screen feedback when you press , or you may prefer to enter the desired source location "blind", i.e. without on-screen feedback. Refer to [Menu Preferences](#) in [Section 3.6.1 System Configuration \(General Settings\)](#).

Brightness

Press  to increase or decrease the amount of black in the image. Use the  and  keys until you reach the desired level of contrast. For best results, start high and decrease so that dark areas do not become black (i.e., "crushed"). Conversely, overly high brightness changes black to dark gray, causing washed-out images. Refer to [Section 3.5.3 Image Settings Menu](#).

NOTE: Always adjust Brightness before Contrast.

Contrast

Press  to change the amount of white in your images. Use the  and  keys until you reach the desired level of contrast. For best results, start low and increase so that whites remain bright, but are not distorted or tinted, and that light areas do not become white (i.e., "crushed"). Conversely, low contrast causes dim images. Refer to [Section 3.5.3 Image Settings Menu](#).

Gamma

NOTE: This is the same as "Gamma" in the **Image Settings** menu.

"Gamma" determines what gray shades are displayed between minimum input (black) and maximum input (white) for a given amount of signal. The proper setting helps maintain optimized blacks and whites while ensuring a smooth transition for the "in-between" values utilized in colors and grays. Thus, unlike brightness

and contrast settings controls, the overall tone of an image can be lightened or darkened without changing the two extremes, and your images will be more vibrant yet with good detail in dark areas.

The normal *Gamma Table* setting of 2.2 is correct for most signals and conditions. If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This will improve contrast ratio while maintaining good details for blacks.

Menu

Press  to enter or exit the projector's Menu system.

NOTE: Refer to [Appendix E: Menu Tree](#), which allows you to quickly locate and navigate to a specific menu, and associated options/submenus.

OSD (On-Screen Display)

Press  + the  key to hide the projector's Menu system during use.

To see the Menu system again, do one of the following:

- Press and hold  briefly
- Press and release  followed immediately by the  key
- Press  twice quickly

Invisible menus are fully functional, enabling "hidden" access to numbered features and image adjustments by entering the corresponding sequence of key presses on the keypad.

NOTES: 1) With the OSD "ON", you can still hide error messages and slidebars by disabling these options in the **Menu Preferences** menu.

PIP (Picture-in-Picture)

Press  to enable and disable Picture-in-Picture. PIP enables you to display two different images simultaneously, typically a smaller "secondary" image within a large "primary" background. When a menu control or slider is present, press  to toggle the current function to affect the other image.

NOTE: Disable PIP and Best Switching for Interlaced sources > 35 kHz.

Swap

Press  to swap the current picture-in-picture relationship so that the primary image becomes secondary, and the secondary image becomes primary.

NOTES: 1) This key is available on the "Brick" rental staging - Standard IR remote only. Alternatively, a swap can be accessed in the Menu system. 2) Requires PIP enabled.

Shutter

Press and hold the  key briefly to toggle the internal mechanical shutter blade closed or open with a single keystroke.

Press and release the  key followed immediately by the  key (shutter ON; closed) or the  key (shutter OFF; open) to guarantee the correct toggle (useful if you are unsure of the present state).

Alternatively, press the key to toggle from the present ON/OFF state. A closed shutter blanks the display (turns it to black). Close the shutter to mute all display while maintaining access to projector functions. Opening the shutter restores the image.

NOTES: 1) *The status of the shutter is shown in the LCD display window at the rear of the projector.* 2) *The shutter is open upon power-up.*

Function Key

If You are Within a Menu

Using the key for special tasks within the Menu system is noted with the appropriate topic elsewhere in **Section 3**. For example, press in the **Channel Setup** menu to enable deletion or copying of a channel.

If You are Within a Presentation

Press the key followed by a 2-digit number to enable a specific color or colors in the display (see right).

For example, will display only red and green data, will display all color data. Eliminating one or more colors can help with certain diagnostics and setups, such as when accurately overlaying one image on top of another when stacking projectors.

			= Red
			= Green
			= Blue
			= Red & Green
			= Green & Blue
			= Red & Blue
			= All Colors

Defining Other Uses

Through ASCII messaging on a PC, you can also create special user functions for keys 1 - 5 and 7 - 9, and others.

For example, the key can be programmed to trigger RTEs (Real Time Events) or to display custom menus. Refer to the separate *Christie Serial Communications* publication.

Projector

Press to access a specific projector within a group of projectors or to confirm if the local projector is listening. The number in the "Enter Number" window indicates which projector is currently listening to commands, and will match the projector number that has been defined in the **Menu Preferences** menu.

The "Projector" check box (read-only) shows whether or not the projector physically connected to a keypad are listening to commands from that keypad. A check mark means that connected projector is listening; if there is no check mark, you are communicating with a different projector.

To control a specific projector with the keypad, enter the 3-digit number assigned to the projector you want to use. If you switch to a projector other than the one you are currently using, the check mark will disappear.

To broadcast to multiple linked projectors, press twice **without** entering a projector number.

NOTE: 1) *Keypad commands will affect all projectors in the chain.* 2) *The "Broadcast Keys" option in the **Communications** menu must be selected for only **one** (any) projector in a serial network. The keypad in use must be OFF (disabled) for the remaining projectors. Refer to [Section 2.11 Keypad and Remote Protocols and Conversion](#), and [Section 3.6 Adjusting System Parameters and Advanced Controls](#).*

Enter

Press to select a highlighted menu/ option item, to toggle a check box, or to accept a parameter adjustment, and return to the previous menu or image.

Exit

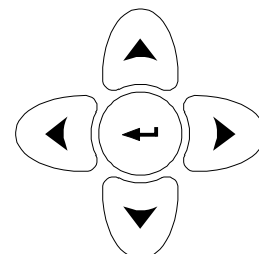
Press  to return to the previous level, such as the previous menu.

NOTE:  does not save changes within text editing boxes (including number editing of a sidebar value) or within drop-down lists. It acts as "Cancel" in these cases.

Arrow Keys

Use the   keys to change a sidebar value or to select a different option within a drop-down list without having to first scroll through options. These keys also jump to the next page in long menus. Refer to [Section 3.3.6 Editing Text](#).

Use the   keys to navigate within a menu, drop-down list, or text box. Use in combination with POWER, SHUTTER and OSD keys to force the corresponding state. See details provided on the back of the IR remote keypad.



Lens Focus, Zoom and Lens H, Lens V

Use , , , , and  with their corresponding Arrow keys to adjust the lens for optical sharpness, size, and position. Note that ZOOM requires a zoom lens.

NOTES: 1) The  key, when combined with the Arrow keys on the built-in keypad is the same as using the LENS H and LENS V keys on the remote. 2) On the "Brick" rental staging - Standard IR remote, use the 3 lens keys with the arrow keys.

Laser

NOTE: Not available on the "Brick" rental staging - Standard IR remote.

Press  to activate the laser pointer, and direct the remote at the screen to highlight an area with a light beam (dot). The closer you are to the screen the brighter the laser beam appears. The laser pointer works best with reduced ambient lighting.

Backlighting

NOTE: Only available on the Standard IR remote.

Press the  key to illuminate the keys on the remote without sending a command to the projector.

3.3 Navigating the Menus

Most of the controls for the projector are accessed from within the projector's Menu system. There are several groups of related functions, with each group selectable from the **Main** menu as shown at right.

Press  at any time to display this **Main** menu. See [Figure 3-5](#).

On the remote keypad, either enter the number corresponding to the **Function** menu you wish to access, such as **2** for the **Image Settings** menu.

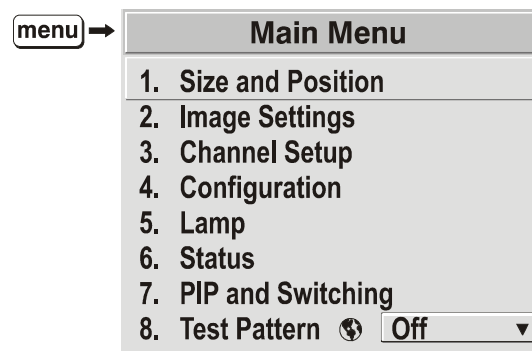


Figure 3-5 Entering the Menu System

Or use the   keys on either the built-in keypad or a remote to highlight the desired option, then press . The corresponding **Function** menu or drop-down list of further options will then appear.

With a **Function** menu displayed, navigate in a similar manner, enter a Menu option number for any numbered option, or use the   keys to highlight the desired option, and then press . Extra long menus have a scroll bar on the right-use the Arrow keys to access the remainder of the menu. Locked items or items that do not pertain to the current action or condition appear dimmed and cannot be selected.

NOTES: **1)** *If there is no signal present, all source-dependent adjustments are disabled.* **2)** *After 15 minutes of inactivity, the projector saves and leaves the Menu system, and returns to the presentation.* **3)** *The Status menu is read-only.*

When finished with a **Function** menu, do one of the following:

- Press  to return to the previous screen
- Press  to leave the Menu system and return to the presentation

3.3.1 On-line Help

If at any time you are uncertain what to do next, press  to display summary information about the current menu or highlighted option.

Press  again to exit. In addition, a line of "hint" text is included at the bottom of some menus. See [Figure 3-6](#).

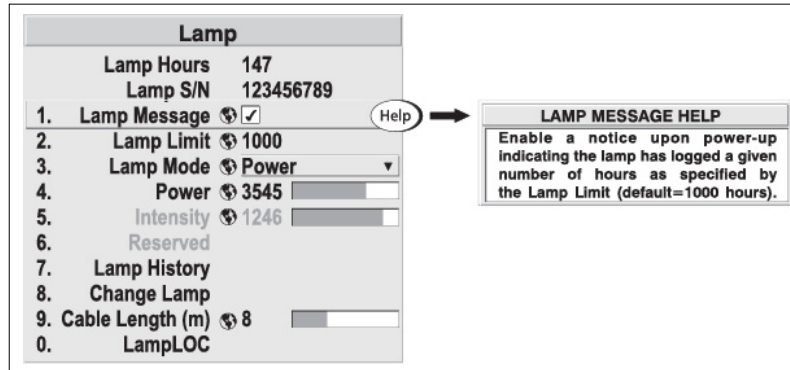


Figure 3-6 Context-Sensitive Help

From presentation level, press  to access general Help Topics ([Figure 3-7](#)). Scroll as necessary within a topic.

Press  or  to return to your presentation.

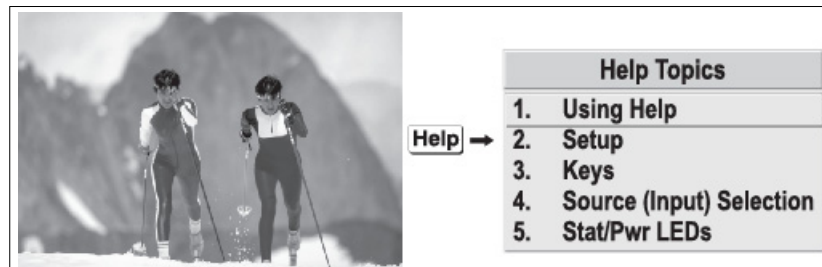


Figure 3-7 Assessing General Help Topics

3.3.2 Time-outs

If a sidebar, menu, or message is displayed, you have limited time in which to make a keypad entry before the projector returns to presentation level HELP and the graphic disappears. These time-outs may vary depending on what is displayed.

3.3.3 Global Icons

Menu options that include this icon apply universally to any incoming signal.

3.3.4 PIP Icon

Menu options that include this icon apply to PIP (secondary) images only.

3.3.5 Using Slidebars and Other Commands

Most of the **Function** menus allow you to change settings by using slidebars, check boxes, and drop-down lists. To select a sidebar, toggle a check box status, or view a drop-down list, do one of the following within the function menu:

- Enter the **Menu** option number corresponding to the setting you wish to change (for example, press 1 + 3 from the **Main** menu to select **Vertical Stretch** in the **Size & Position** menu).
- Move   to highlight the desired option, and press .
- Or move the highlight to the option desired, and press the   keys to adjust immediately.
- Or bypass the menus entirely, and use a single key to immediately access an adjustment during your presentation

NOTE: *Applies only to options having their own key, such as Contrast, Brightness, Gamma, etc.*

For "blind" access, hide the entire Menu system (refer to OSD key, above) and/or direct slidebars activated by their own key (such as CONTRAST, BRIGHTNESS, etc.). Control by using the proper key press or numerical sequence of key presses.

When using PIP images, use the  key to adjust the image.

Once selected, change the settings as desired (see below). Changes take effect immediately and are saved upon exit from all menus, or after 15 minutes.

Slidebars in Menus

The current value for a given parameter, such as size or vertical stretch, appears to the left of its slider icon (**Adjustment** window). This number often expresses a percentage, or it may have units associated with it (such as pixels, degrees Kelvin, etc.), depending on the specific option.

Press the ◀ ▶ keys to gradually adjust the setting ▲ ▼. Both the number and the length of the bar change accordingly. Hold for continuous adjustment.

Or press ⇐ to activate a slider text box for a specific number entry via the keypad, and then press ⇐ to save (or press Exit to cancel).

"Direct" Slidebars

For quick access, you can access *Gamma*, *Brightness*, and *Contrast* slidebars without traveling through the *Menu* system. For example, simply press Cont to immediately display the same CONTRAST slider accessed with the **Contrast** option in the **Image Settings** menu.

Use the Arrow keys to adjust a direct slider, or press ⇐ and type a specific number from the built-in keypad or standard IR remote, then press ⇐ or the ◀ ▶ keys to save (or Exit to cancel). When you are done, press Exit to save and return to your presentation.

NOTES: 1) You can still adjust a direct slider as usual if the display is turned OFF (refer to *OSD (On-Screen Display)* or the *Menu Preferences*) except the slider is not visible. 2) A direct slider disappears if it is not used within 5 seconds.

Check Boxes

Conditions are present if its adjacent check box contains a check mark. To select or clear a check box, simply highlight and press ⇐, or highlight and press the ▶ key to "Select" or ◀ key to "Clear". If a check box is numbered, simply enter its number to immediately toggle ("Select" or "Clear") the check box.

Drop-down Lists

To view a drop-down list of options available for a given parameter (labeled with a inverted triangle shaped icon), you can either:

- highlight the parameter, and press ⇐
- enter the **Menu** option number.

Press the ▲ ▼ keys to navigate within the list. Press ⇐ to select a highlighted option from the list, if desired. See [Figure 3-8](#).

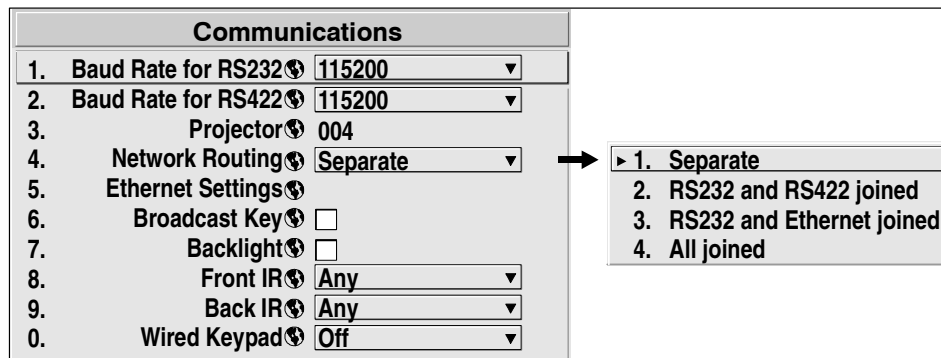


Figure 3-8 Example of drop-down List

Or, if you prefer to quickly scroll through an option list without using its drop-down list, you can use the keys to locate and highlight the desired option.

NOTES: 1) Press the keys to jump between pages in an extra long drop-down list. 2) Press while in a drop-down list to cancel any change(s) and exit.

3.3.6 Editing Text

Activate the Edit Window

To enter or edit text, highlight the desired parameter (such as a Channel name) and press to activate its adjacent **Edit** window. Any previously entered text appears with its first character highlighted in a square cursor, signifying that this character is the starting point for editing. See [Figure 3-9](#).

Navigate Within the Edit Window

Press the key to move the cursor forward or the key to move the cursor backwards, character by character, as desired.

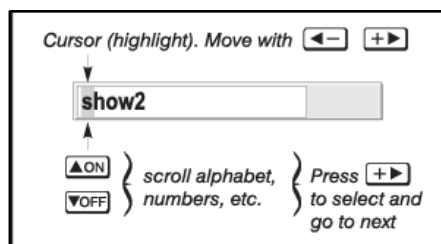


Figure 3-9 Entering Text

Add or Delete a Character or Space

To insert a space at the cursor location, press + the key. To delete a highlighted character (or space), press + the key.

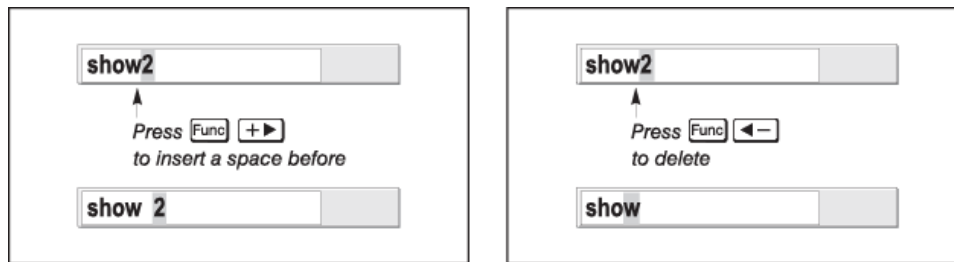


Figure 3-10 Editing Text

3.3.7 Editing Numerical Values

Enter numbers directly from the built-in keypad or standard IR remote in order to specify numbers representing projectors, channels (source setups), or slots. As each digit is entered, it displays and the cursor moves on. Note that Channels are assigned 2-digit numbers. For example, if you enter only a single digit (such as "7") for a channel number, the channel automatically changes to "07". Enter "07" to utilize this channel.

NOTES: 1) Once you enter the first digit, this digit over-writes the current entry. 2) If you press any non-numbered keys, the number entered up to that point is accepted, and updated as the new value. 3)

Press  to cancel editing of numerical values.

3.4 Using Inputs and Channels

NOTE: Refer to [Section 2 Installation and Setup](#), for a full explanation of how to connect sources to the projector.

The projector stores and automatically recalls up to 50 different channels (source setups) for a variety of inputs. This memory feature allows you to define and conveniently use a wide variety of customized setups rather than having to repeatedly re-configure the projector for different presentations. Depending on what you have defined, each physical source connection (i.e., input source to the projector) can have several different channels associated with it.

3.4.1 Do I Select an Input or a Channel?

Input

An **Input** is a source physically connected to the projector.  describes the source signal according to which Input slot (side panel) it is connected.

Switching Inputs

Press the appropriate direct  key (1 to 6) to quickly display 1 of the 6 inputs connected at the side of the projector.

The image displays according to the following:

If it is the first time you have used the source/input (or if you used the input, but did not define a channel by adjusting anything), the projector recognizes the new input signal based on its frequencies and polarities, and automatically displays an image according to default settings for such a signal. In general, the image from the

new source is as large as possible without losing its aspect ratio. This and other default image settings depend on the incoming source.

If you used the source once before and changed a display parameter such as *Contrast*, *V-Position*, etc., then a channel is automatically created and still exists in projector memory (see below).

Using an  key automatically recalls this channel (along with all associated setup parameters) and updates the display accordingly.

If more than 1 channel exists for the input, the image displays according to the setup parameters for the first channel with matching characteristics.

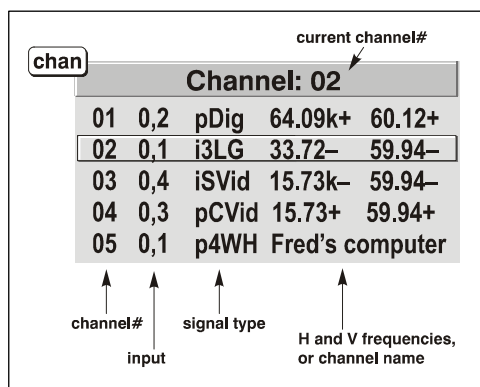
If PIP is enabled, an input key changes the PIP (secondary) image only. To switch the main input, use the keypad number keys with "Numbers Select Main Image" activated.

NOTE: *Inputs 7 and 8 require the Dual SD/HD-SDI module in either of the projector's option slots. For their selection, refer to [Section 3.2 Using the Keypads](#). For more information on numbers to select main image, refer to [Section 3.7 Working with PIP or Seamless Switching](#).*

Channel

A **Channel** is a collection of measurements, locations and settings that tailor the display of a signal to your specific needs. Since source types and applications can vary greatly, you likely want to adjust and define a wide variety of parameters, such as *Brightness*, *Contrast*, *Size*, etc., in order to customize and optimize the display from or for a particular source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or 1 signal may simply vary from another signal used previously through the same input location. Once you have adjusted a display parameter, such as pixel tracking or contrast, all current settings are collectively stored in the projector's memory as a unique 2-digit **Channel**, such as "09".

You can have numerous distinct channels available for the same input, any of which can be selected by using the  key on the keypad, followed by the 2-digit channel number.



Channel: 02				
01	0,2	pDig	64.09k+	60.12+
02	0,1	i3LG	33.72-	59.94-
03	0,4	iSVid	15.73k-	59.94-
04	0,3	pCVid	15.73+	59.94+
05	0,1	p4WH	Fred's computer	

Figure 3-11 Channel List

Shown above is a sample list of channels available when you press the  key. This is typically called the "Channel list".

NOTE: *The  key may display a channel list or not, depending on what you have defined for "Display Channel List". Refer to [Menu Preferences](#) in [Section 3.6.1 System Configuration \(General Settings\)](#).*

In order to access channels by using the  key on the remote, you must first create the channels.

3.4.2 Creating a New Channel (Automatic)

To use a new input source with the projector, a new channel must be added to the projector memory so that the projector responds properly to an input signal from that source in the future. A new channel can be created automatically, as described here, or it can be copied from an existing channel, and then edited as necessary (refer to [Section 3.4.4 Copying or Deleting Channels](#) later in this section).

When you select a direct Input (**Input 1**, **Input 2**, **Input 3**, **Input 4**, **Input 5**, or **Input 6**), any existing channels in the projector are searched for matching input and signal parameters. If no match to the incoming input signal is found in currently-defined channels, a new channel is temporarily created based on factory-defined defaults for this type of signal. The channel number assigned is the lowest available number from 01-99.

NOTES: **1)** An automatic channel is discarded unless 1 or more of its parameters are changed, and it does not appear in the channel list (see below). **2)** If two channels have the same distinguishing source characteristics except for the reversal of sync connectors (i.e., H-sync and V-sync, are switched), they are still defined as distinct channels. **3)** You cannot define a new channel without an incoming signal.

If the incoming signal does match an existing channel, the image is set up and displays as usual, according to the parameters currently defined for that channel.

Using a Channel

You can normally select a channel at any time by pressing **[Chan]**. Refer to [Figure 3-12](#). If you want to prevent a channel from appearing in this list, you must edit the channel as described in [Section 3.4.5 Editing a Channel Setup](#) later in this section. Such a channel can still be selected by entering its number as shown below.

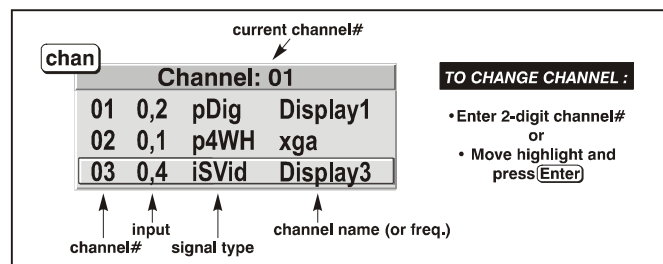


Figure 3-12 Selecting a Channel

NOTES: **1)** The current channel is highlighted upon entering the channel list, or, if this channel is not displayed here, the first channel in the list is highlighted. **2)** Channels created automatically do not appear in the channel list unless a parameter for the channel has been changed.

3.4.3 What Channels are Defined So Far?

All available channels are listed in the **Channel Setup** menu, which describes how each channel can be accessed and which serves as the gateway for editing, copying, and deleting channels.

From the presentation level, press **[Menu]** to display the **Main** menu. To display the **Channel Setup** menu:

- Move the highlight to the **Channel Setup** option, and press **[Left Arrow]**
- Press **3**

The **Channel Setup** menu appears (see [Figure 3-13](#)) with the active channel highlighted.

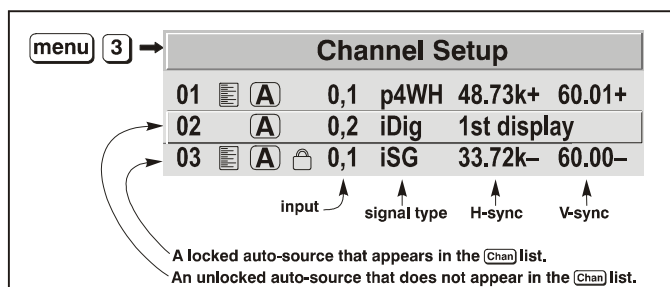


Figure 3-13 All Channels Appear in Channel Setup Menu

What Appears in the Channel Setup Menu?

This menu lists all channels currently defined and indicates where they connect on the projector's side input panel. The far left column lists channel numbers currently defined. The values in the far right columns indicate horizontal and vertical frequencies or if someone has defined a name for this channel, it appears here instead. Remaining columns contain details pertaining to each channel setup, such as the switcher number (always 0 = projector), slot location (01-06; 7 + 8 with optional SDH), a variety of icons indicating access to each channel, and an abbreviated description of each signal type. Refer to [Section 3.4.5 Editing a Channel Setup](#) for details.

[List Icon]	Appears in Chan list
[A]	Auto-source
[Lock Icon]	Locked

NOTE: If you have more than a handful of channels, use the [Left Arrow] and [Right Arrow] keys to see the remaining channels not visible in the initial display of channels.

Signal Type

Either Channel list, whether the Chan key list or the Channel Setup menu, identifies signal types in a shortened form as defined below. These description codes indicate what signal information the projector uses to identify a match for a given channel, and are preceded by either an "i" (interlaced signals) or "p" (progressive signal"). Refer to [Figure 3-13](#).

Table 3.4 Abbreviations for Signal Type

Codes	Signal Type
4WH	COMPOSITE (4 WIRE) ON HC INPUT
4WV	COMPOSITE (4 WIRE) ON V INPUT
SG	SYNC-ON-GREEN
5W	SEPARATE H,V
5WR	SEPARATE H,V SWAPPED
SVid	S-Vid
CVid	COMPOSITE VIDEO
DIG	DIGITAL

Functions within the Channel Setup Menu

To copy, delete or edit a channel, highlight the desired channel in the Channel Setup menu and do 1 of 2 things:

- Press **Func** if you want to copy the selected channel or delete one or more channels. See [Section 3.4.4 Copying or Deleting Channels](#) or refer to [To Delete a Channel](#).
- Press **←** if you want to edit a channel's setup (i.e., non-image related parameters) for the selected channel. Refer to [Section 3.4.5 Editing a Channel Setup](#).

3.4.4 Copying or Deleting Channels

To Copy a Channel

Making a copy of a channel is a quick way to duplicate a channel that contains most of the settings you need without creating a new one from scratch. This then allows you to adjust the settings specific to the new presentation required.

Highlight the desired channel in the **Channel Setup** menu, and press **Func** to go to the **Channel Copy/Delete** submenu. Select "Copy", and press **←**. A new channel will be created. It is identical to the original channel, but it is identified with the next available number from 01-50. Refer to [Figure 3-14](#). If you change your mind and do not want to copy the current channel, press **Exit** to cancel and return to the previous menu. Copying channels is a quick method for creating numerous channels, each of which can then be edited and adjusted for a variety of presentations in the future.

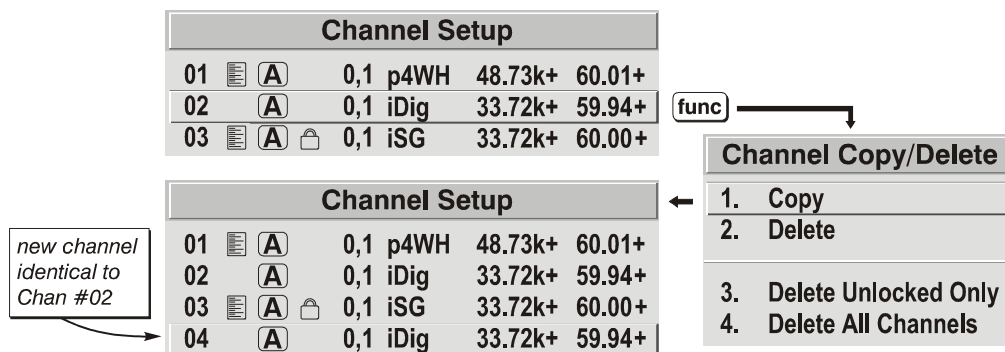


Figure 3-14 Copying A Channel

To Delete a Channel

Highlight the desired channel in the **Channel Setup** menu, and press **Func** to open the **Channel Copy/Delete** submenu. Select "Delete" and press **←**. A confirmation window appears to confirm that you want to delete this channel. See [Figure 3-15](#).

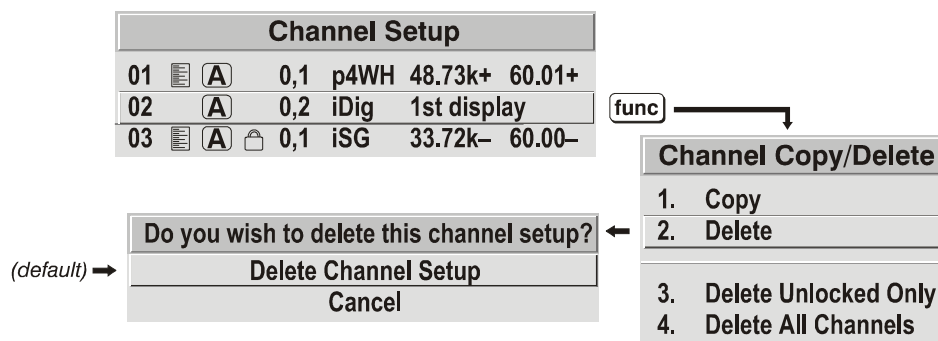


Figure 3-15 Deleting a Channel

To Delete Multiple Channels

Highlight the channel in the **Channel Setup** menu, and press **Func** to go to the *Channel Copy/Delete* submenu. Select **"Delete Unlocked Only"** and press **↩** to delete all unlocked channels.

Or select **"Delete All Channels"** to delete all channels, even those that are locked. In either case, the current channel will remain, but will be redefined from projector defaults.

NOTE: For any deletion, a confirmation box appears to ensure that you really want to delete the channel(s). Select "Cancel" (default) if you don't want to delete after all.

3.4.5 Editing a Channel Setup

The basic setups that describe how and where a channel can be accessed are listed in the **Channel Setup** menu. These channel setups can be edited at any time in the **Channel Edit** submenu.

- From the presentation level, press **Menu** to display the Main menu. To display the **Channel Setup** menu, press **3**, or move the highlight to the **Channel Setup** option and press **↩**. The **Channel Setup** menu will appear.
- To edit parameters shown in the **Channel Setup** menu, select the relevant channel, and press **↩**. The **Channel Edit** menu appears as shown in the sample in [Figure 3-16](#).

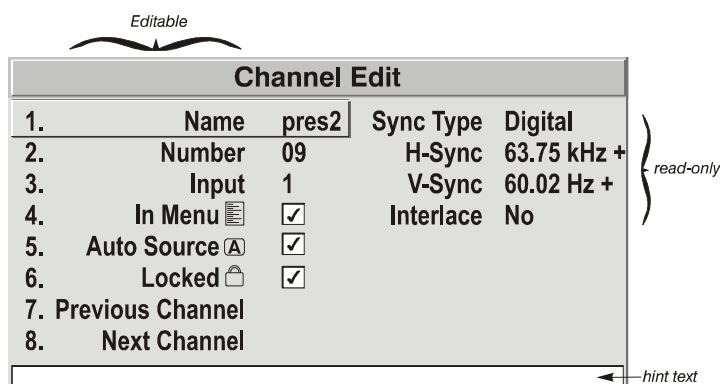


Figure 3-16 Channel Edit Menu (SAMPLE)

3. If desired, review and/or edit the selected channel's setup options in the **Channel Edit** menu:

Channel Option	Description	Notes
Name	An alpha-numeric label assigned to the current channel which can be defined and/or changed as desired. Channel names can be upto 12 characters in length.	IF YOU ENTER A CHANNEL NUMBER THAT ALREADY EXISTS, A DIALOG MESSAGE APPEARS INDICATING THAT THIS NUMBER IS ALREADY IN USE. ASSIGN A DIFFERENT CHANNEL NUMBER. YOU CAN DEFINE UP TO 99 CHANNELS.
Number	A 2-DIGIT CHANNEL NUMBER.	NOTES: 1) IF YOU ENTER A CHANNEL NUMBER THAT ALREADY EXISTS, A DIALOG MESSAGE APPEARS INDICATING THAT THIS NUMBER IS ALREADY IN USE-ASSIGN A DIFFERENT CHANNEL NUMBER 2) YOU CAN DEFINE 50 CHANNELS.
Input	ENTER A NUMERIC VALUE (1 TO 8) CORRESPONDING TO WHERE ON THE PROJECTOR'S INPUT PANEL THE SOURCE IS CONNECTED.	
In Menu	IF CHECKED (DEFAULT, EXCEPT FOR AUTOMATICALLY DEFINED CHANNELS WITH UNCHANGED PARAMETERS), THIS DEFINED CHANNEL THEN APPEARS IN THE LIST AVAILABLE WHEN THE CHAN KEY IS PRESSED. IF UNCHECKED, THE CHANNEL MUST BE ACCESSED VIA THE Channel Setup MENU (MENU + 3) ON THE KEYPAD OR VIA THE AUTO SOURCE FUNCTION.	NOTE: ON-SCREEN DISPLAY (OSD) OF THE CHANNEL LIST IS AN OPTION THAT MUST BE SET IN THE MENU PREFERENCES MENU.
Auto Source	IF CHECKED, (DEFAULT), THE PROJECTOR CAN AUTOMATICALLY LOCATE THIS CHANNEL WHEN AN INCOMING INPUT SIGNAL MATCHES. IF NOT CHECKED, THE PROJECTOR CAN LOCATE THE SELECTED CHANNEL ONLY WHEN IT IS DIRECTLY SELECTED VIA THE CHAN KEY ON THE KEYPAD.	A CHANGE IN INPUT SIGNAL WILL <u>NOT</u> RESULT IN A CHANNEL CHANGE.
Locked	If checked, all of the image settings for this channel are disabled (locked). If unchecked (default), all available image settings can be adjusted as desired.	You cannot use Auto Setup with a locked channel.
Previous Channel	Select this option to see or change its <i>CHANNEL EDIT</i> settings for the previous channel in the <i>Channel Setup</i> list.	
Next Channel	Select this option to see or change its <i>CHANNEL EDIT</i> settings for the next channel in the <i>Channel Setup</i> list.	

3.5 Adjusting the Image

The most commonly used options for image adjustments are accessed through the following two Main menus:

- **Size and Position** ( + 1)
- **Image Settings** ( + 2)

From either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate slidebars, check boxes, and drop-down lists.

Pressing  returns you to the previous menu (or to the presentation, if from the **Main** menu), and accept any changes you may have entered. Settings are saved for the current channel.

From your presentation, you can access any of the individual options in these menus by pressing **Menu**, followed by the appropriate 2-digit number representing their location in the Menu system. For example, press **Menu** + 2 + 3 to quickly access the "Gamma" option in the **Image Settings** menu.

Note that for certain options, you may prefer to use a "direct key" from presentation level to go directly to a particular option without traveling through the menu system (available for certain display parameters only). For example, press **Cont** to access the "Contrast" sliderbar immediately. Press **Exit** to return to your presentation.

NOTES: 1) To hide these "direct" sliderbars, disable the "Display Sliderbars" check box in the Menu Preferences menu. 2) To hide the entire Menu system from view, turn OFF the on-screen display by pressing the OSD key.

3.5.1 Before You Begin

Using Auto Setup

For a most efficient first step in perfecting the image, press **Auto Setup**. This initiates an automated process in which the projector quickly optimizes critical display parameters such as size, position, pixel tracking, etc., based on the type of incoming source data detected. An *Auto Setup* can save considerable setup time, and you can still modify the display parameter settings as desired using the menu options described below.

3.5.2 Size and Position Menu

In the **Size and Position** menu you can increase or decrease the size of your image, change its proportion (aspect ratio), move the image to a specific area of the screen, and refine other related parameters. Use *Size and Position* controls to match the image precisely to the screen used at the site.

Size and Position			
1.	Resize Presets	No Resizing	▼
2.	Size	0.729	
3.	Vertical Stretch	1.000	
4.	Pixel Track	858	
5.	Pixel Phase	0	
6.	H-Position	360	
7.	V-Position	262	
8.	Reserved		
9.	Reserved		
0.	Advanced Size and Position		

Figure 3-17 Size and Position Menu

Refer to [Section 3.3.5 Using Slidebars and Other Commands](#) if you need help using any of the options and controls. Changes made in the **Size and Position** menu are applied immediately, and are saved when you exit the menu (press **Exit** or **Menu**).

Resize Presets Option

NOTE: The same resize presets are available to all HD widescreen models. Please note however, the graphics used to describe each preset in this section are of the SXGA+ models only.

Select a **Resize Presets** option to quickly display an image in its native resolution or to automatically resize an image to closely fill the projector's native resolution of 1400 x 1050, or to optimize the width or height of your display. Size, Position and Blanking parameters will automatically adjust accordingly. Or, if Blanking is set first, which defines an **Active Input Area**. **Resize Preset** scaling will occur in this region of interest only. Resizing options are explained in detail below.

Resize Presets	
1. Default	= maximize for current source
2. No Resizing	= display in native resolution
3. Full Size	= fill the screen (regardless of source)
4. Full Width	= fill display width & keep aspect ratio
5. Full Height	= fill display height & keep aspect ratio
6. Anamorphic	= retain 16:9 aspect ratio
Custom (not selectable) = non-preset values for Size, Vertical Stretch, H-Position, V-Position and/or Blanking	

Figure 3-18 Resize Presets

What is the Resizing Default?

By default when displaying a new source, your image will utilize as much of the projector's display area (1400 x 1050) as possible for the type of incoming source data. Refer to [Select Default](#) below.

When "Custom" Appears

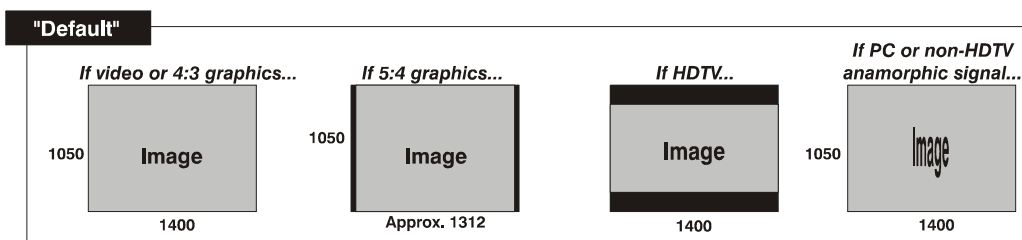
The **Custom** re-size descriptor automatically appears in the **Size and Position** menu when any of the values for Size, Vertical Stretch, H-Position, V-Position or Blanking do not correspond to those for a preset. This option is not a choice in the **Resize Presets** drop-down list.

Select Default

Select **Default** for most sources (factory default). The image is centered and displays as large as possible (without affecting aspect ratio), depending on the type of input source, as described below:

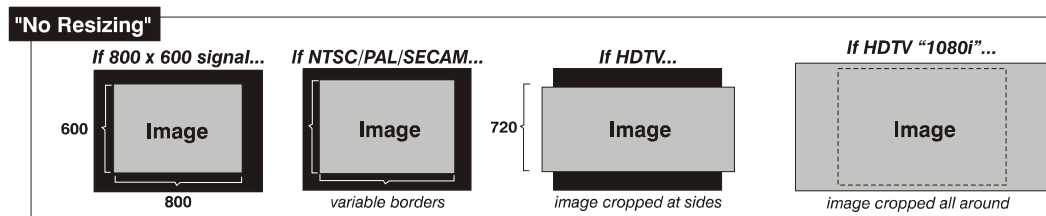
- "A 5:4 graphic image will enlarge to fill the screen height, and be centered between narrow black sidebars.
- "A video image or 4:3 graphic image will enlarge to fill the screen width.
- "An HDTV (16:9) image will fill the width and be centered between black bars on top and bottom.

NOTE: *Images and resolutions are shown for example only.*



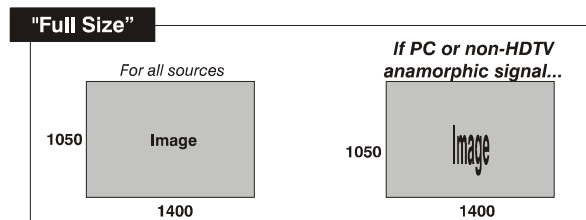
No Resizing

Select **No Resizing** to display the image in its native resolution, which is probably smaller than the projector's 1400 x 1050 resolution. For example, for a source with a native resolution of 800 x 600, the "No Resizing" centers a small image within a black border. The black border areas are unused areas. See below.



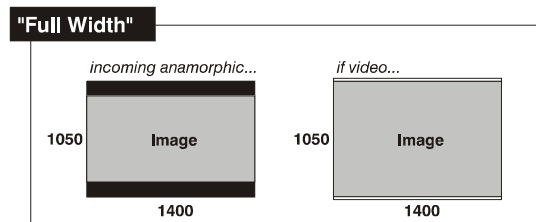
Full Screen

Select **Full Size** to use all pixels (1400 x 1050) for displaying the image, regardless of source or original aspect ratio. Incoming source material having a different aspect ratio than the projector will be stretched for display.



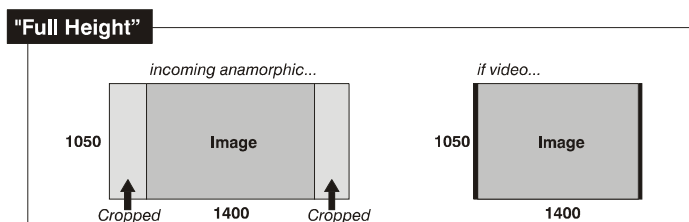
Full Width

Select **Full Width** to fill the projector's display from left-to-right without changing the original aspect ratio of the image. Depending on the source, data at the top and bottom may be discarded (cropped), or the display may have black borders at the top and bottom (called "letterboxed")



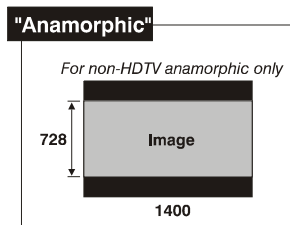
Full Height

Select **Full Height** to fill the display from top-to-bottom. Depending on the source, this may create borders.



Anamorphic Option

Select **Anamorphic** to display an image in its native 16:9 aspect ratio without the use of an anamorphic lens mount. The image fills the screen from top-to-bottom, and be centered between narrow black bars on each side. This is used for DVD players that output widescreen images compressed into 4:3 NTSC format.



Size

Size controls both the image *width* and *height* in tandem, maintaining the current aspect ratio (proportion) of the displayed signal data.

Vertical Stretch

Vertical stretch adjusts the *height* of the image while keeping the width constant. Use *Vertical Stretch* to change the aspect ratio of the display.

Pixel Track

Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Proper pixel tracking helps ensure that the image quality is consistent across the screen, that aspect ratio is maintained, and that pixel phase can be optimized (described below). Tracking determines the frequency of the pixel-sampling clock, indicated by the number of incoming pixels per line, so that all pixels generated by a particular source are sampled.

NOTE: *By default, the projector samples at the correct frequency for most sources.*

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half ON, half OFF" graphic image, such as the **Windows 2000** shutdown screen. Adjust the slider until the vertical stripes broaden to the point where 1 large stripe fills the image. If the image still exhibits some shimmer or noise, adjust the Pixel Phase (described below).

Pixel Phase

NOTE: *Adjust Pixel Phase after Pixel Tracking.*

Adjust pixel phase when the image (usually from an RGB source) still shows shimmer or "noise" after pixel tracking is optimized. Pixel phase adjusts the phase of the pixel-sampling clock relative to the incoming signal.

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar "half on, half off" graphic image, such as the *Windows shutdown* screen. Adjust the slider until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than 1 point. For example, you may find that the image appearance at "11" is identical to the image appearance at "38", thus you can use either setting.

If some shimmer from a video or HDTV source persists, use the "Filter" control to remove high-frequency noise from the signal.

H-Position

Select the *H-Position* option from the **Size and Position** menu. This option moves the image right or left within the area of available pixels.

NOTE: The value shown represents where the approximate center of the image lies in relation to the total number of pixels available horizontally. This varies widely according to the signal-watch the image while adjusting.

V-Position

Select the *V-Position* option from the **Size and Position** menu. This option moves the image UP or DOWN within the area of available pixels.

NOTE: The value shown represents where the approximate center of the image lies in relation to the total number of pixels available vertically. This varies widely according to the signal, watch the image while adjusting.

Advanced Size and Position Submenu

This submenu consists of the following options:

Advanced Size & Position			
Active Input Window		720x483	
1.	Top Blank	0	
2.	Bottom Blank	0	
3.	Left Blank	0	
4.	Right Blank	0	
5. Plug & Display <EDID>		Native Resolution 60Hz ▼	

Figure 3-19 Advanced Size and Position Submenu

Active Input Window

This read-only parameter indicates the current size (i.e., area) of your displayed data or "region of interest" as defined by the blanking controls. For example, if you have blanked (cropped) 100 pixels from both the left and right edges of an incoming source of 2048 x 1080, the remaining active input window is 1848 x 1080. When using a video source at **INPUT 3** or **INPUT 4**, the default blanking of "0" defines an active input window of 720 x 483 for NTSC video.

Blanking (Top, Bottom, Left, and Right)

Crop the image as desired so that unwanted edges are removed from the display (changed to black as shown in [Figure 3-20](#)). Blanking defines the size of the **Active Input** window, creating an area of interest. Range of adjustment depends on the source resolution and other factors for your application.

NOTE: Blanking a PIP image resembles zoom (refer to [Figure 3-21](#)). For example, left Blanking zooms the right side of the PIP image; Right Blanking zooms the left side. There are no black bars.

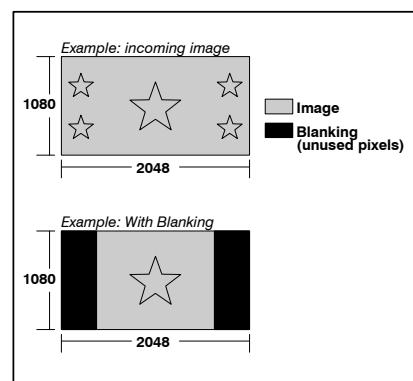


Figure 3-20 Blanking of a Primary Image

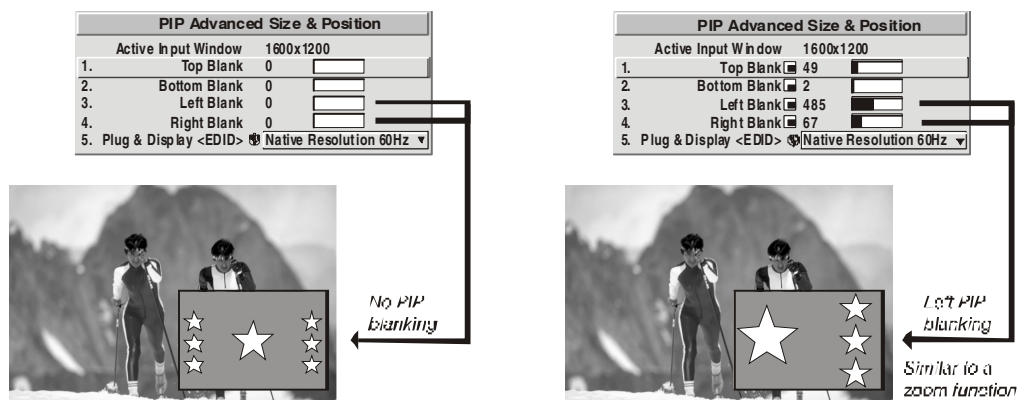


Figure 3-21 Blanking of a PIP Image

Plug & Display (EDID) Option

Select the **Plug & Play** option from the **Advanced Size and Position** menu. By default, a **Plug & Play (EDID)** source outputs a signal according to the EDID information provided by the projector. To override this information and display in a different format (for example, if your **Plug & Play [EDID]** device does not support the projector's resolution and/or frequency), select the desired **Plug & Play (EDID)** resolution from the list.

Any daisy-chained projectors also displays according to the chosen *Plug & Play (EDID)* format.

EDID = *Extended Display Identification Data standard.*

- ▶ 1. Native Resolution 60 Hz
- 2. 1400 x 1050 60 Hz
- 3. 720p (1280x720 60Hz)
- 4. DC2K (2048x720 60Hz)
- 5. 1024x768x116Hz 3D
- 6. 1280x1024x110Hz 3D
- 7. 1400x1050x102Hz 3D
- 8. 1080p 60Hz / 1080i 60Hz
- 9. 1080p 50Hz / 1080i 50Hz
- 0. 1080p 24Hz / 1080i 30Hz

3.5.3 Image Settings Menu

Use options in the **Image Settings** menu to alter your image without affecting its size or position. Changes made to the **Image Settings** menu are applied immediately and are saved when you exit the menu (press **Exit** or **Menu**). Options not available for the projector model or source are disabled and appear dim (gray).

Contrast

Short Cut: Press **Contrast** and adjust the **Contrast** slider.

"Contrast" increases or decreases the perceived difference between light and dark areas of your image (0-100). For best results, keep close to 50. If the contrast is set too high, the light parts of the image lose detail and clarity. If the contrast set too low, the light areas will not be as bright as they could be, and the overall image will be dim. For best results, start with a low value and increase so that whites remain bright , but are not distorted or tinted, and that light areas do not become white (i.e., are "crushed").

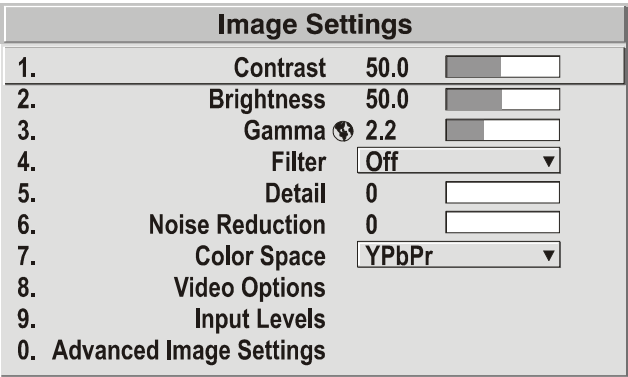


Figure 3-22 Image Settings Menu

NOTE: *If the environment lighting changes, an adjustment of Gamma is recommended (see below).*

Brightness

Short Cut: Press  on the standard IR remote and adjust the **Brightness** slider in the menu.

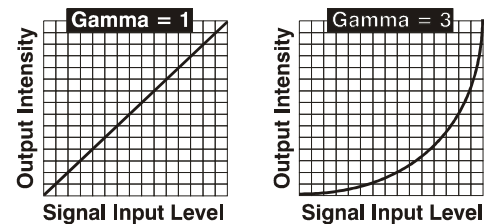
Select **Brightness** from the **Image Settings** menu. "Brightness" increases or decreases the amount of black in the image (0-100). For best results, keep close to 50. Start with a high value and decrease so that dark areas do not become black (i.e., are "crushed"). Conversely, high brightness changes black to dark gray, causing washed-out images.

NOTE: *Brightness should be adjusted before contrast, as Brightness setting affects the contrast setting.*

Gamma

Short Cut: Press  on the standard IR remote and adjust the **Gamma** slider in the menu.

Select **Gamma** from the **Image Settings** menu. "Gamma" is a global setting that determines what gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting helps to optimize blacks and whites while ensuring smooth transitions for the "in-between" values utilized in other colors.



Thus, unlike brightness and contrast settings controls, the overall tone of your images can be lightened or darkened without changing the extremes, and all images display more vibrantly while still showing good detail in dark areas.

Gamma fine-tunes the gamma table currently in use, ranging from 1- 3 (default = 2.2, indicating that the chosen gamma table has not been adjusted). If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This improves contrast while maintaining good details for blacks.

Conversely, if the image is unnatural with excessive detail in black areas, increase the setting. For more information, refer to the [Advanced Image Settings submenu; Gamma Table](#). Again, look for good contrast and good details in very dark areas.

Filter

The proper **Filter** setting is automatically set for virtually all signals, and rarely needs to be changed. It applies a low pass filter for noise reduction in the incoming input signal, particularly for HDTV or SDTV. Applied in the analog domain before sampling, this filtering removes high frequencies and thus reduces pixel phase noise (note this also reduces signal bandwidth). Override only if standard pixel tracking and phase adjustments do not adequately clear up a "noisy" video signal, or if a graphics signal appears overly "soft". Both instances indicate that "Filter" may be set to the wrong option.

- | |
|----------|
| ► 1. Off |
| 2. RGB |
| 3. HDTV |
| 4. EDTV |
| 5. SDTV |

Detail

"Detail" adjusts the sharpness of a video image so that edges remain clearly defined. It can be particularly useful if a significant "Noise Reduction" adjustment has caused the image to appear too soft. Adjust until the display is as sharp as desired, keeping in mind that because "Detail" adds some high frequencies back into the image, it can also re-introduce a certain degree of noise.

Noise Reduction

"Noise Reduction" is similar to the "Filter" control, but operates in the post-sampling digital domain with a more subtle effect. Higher settings are most useful for clearing up noisy RGB images such as those from a PC. Adjust as desired, keeping in mind that reducing noise (which reduces high frequencies) may also soften the image.

Color Space

"Color Space" determines how the color components of an analog input signal or certain digital signals connected to **INPUT 1**, **INPUT 2**, **INPUT 5**, or **INPUT 6** are decoded for accurate color in the display. Although color space for these analog signals is automatically determined by the projector, in some circumstances you may wish to override this and manually set a specific color space.

- | |
|------------------|
| ▶ 1. RGB |
| 2. YPbPr (Video) |
| 3. YPbPr (HDTV) |

NOTE: For most digital signals or for signals connected to **INPUT 3** or **INPUT 4**, the color space function is entirely automatic and the drop-down list disabled.

The current color space appears in the **Image Settings** menu. Press to select a different option:

- Select **RGB** unless you are using component video at **INPUT 1**, **2**, **5**, or **6**.
- Select **YPBPR** (Video) with a standard definition televised signal (SDTV)
- Select **YPBPR** (HDTV) with a high definition televised signal (HDTV).

NOTE: When certain RGB signals are first connected, the projector may not initially recognize them as RGB and incorrectly decodes their color information as YPbPr (video). These signals can include:

- RGB signals in NTSC, PAL, SECAM frequency ranges
- Scan-doubled sync-on-green
- Scan-quadrupled sync-on-green

For these signals, change the Color Space to RGB, then define a new channel for future use.

Video Options Submenu

This submenu is used with video sources only (**INPUTS 3** or **4**).

Video Options	
1. Enable Decoder AGC	☒
2. Video Standard	Auto ▼
3. Input Video Black	0 IRE ▼
4. Color	50.0
5. Tint	50.0
6. Decoder Luma Delay	35

Enable Decoder AGC Option

Automatic Gain Control (AGC) affects decoded video images only. Enter a check mark (default) in most instances to activate the decoder's AGC circuit and ensure properly bright images. Delete the check mark if a decoded video image exhibits strange color artifacts such as stripes in highly saturated colors, indicating an incompatibility between this source and the AGC.

Video Standard Option

For all but the more unusual video standards available in the world, the projector automatically detects the incoming horizontal and vertical frequencies and sets the projector's processing of this signal to the corresponding standard. The current video standard name appears in the **Video Options** submenu, and includes an "A" if it has been auto-detected. Press  to view or select a different video standard from those available to the projector-any that are disabled have frequency characteristics that differ from those of the incoming signal. Selecting a specific standard forces the projector to process the signal according to this standard.

1. Auto
2. NTSC
▶ 3. NTSC 4.43
4. PAL
5. PAL-M
6. PAN-NC
7. PAL-60
8. SECAM

NOTE: *Best results are obtained with defined channels. Otherwise, switching from one video source to another can sometimes cause slight disturbances in the display, indicating that the **Auto** function is struggling. Recover by briefly selecting a different video standard, then going back.*

Table 3.5 Regions and Video Standards: Summary

Standard	Where Used (SUBJECT-TO-CHANGE)
NTSC	N. AMERICA AND JAPAN
NTSC 4.43	A TAPE-ONLY STANDARD FOR PARTIALLY-TRANSLATED HYBRID SIGNALS
PAL	MOST OF EUROPE, CHINA, AUSTRALIA, SOME OF S. AMERICA, SOME OF AFRICA
PAL-M	BRAZIL
PAL-NC	ARGENTINA, CHILE, OTHER LATIN AMERICAN COUNTRIES
PAL 60	MOST OF EUROPE
SECAM	FRANCE, EASTERN EUROPE, MOST OF AFRICA

NOTE: *Generally, use "Auto" for all instances EXCEPT: **1)** a poor quality input signal or **2)** a black-and-white video signal. In order to detect and display such signals, select the relevant standard from the list.*

Input Video Black

This control compensates for incoming elevated black levels present in certain video signals, and ensures that blacks in the display are neither crushed (i.e., where dark grays appear black) nor excessively elevated (i.e., where blacks appear dark gray).

If grays are black, select →	▶ 1. 0 IRE
If blacks are gray, select →	2. 7.5 IRE

By default, the projector automatically determines the best setting according to the type of incoming video signal:

- **0 IRE** - Used for DVD output with "enhanced black", SECAM, most PAL standards, and Japanese NTSC.
- **7.5 IRE** - Used for most NTSC video signals.

For some types of video, you can override the setting. The control is disabled for other types of video (and all graphics sources). Generally, if black appears crushed when brightness = 50, choose "0 IRE". If black appears excessively elevated, use "7.5 IRE".

Color

This slider adjusts the color saturation level, i.e. the amount of color in a video image. Lower settings produce less saturated colors. For example, a setting of "0" produces a black and white image. If the color level is too high, colors will be overpowering and unrealistic.

Tint

This slider adjusts the red/green color hue for true color reproduction of video and HDTV signals connected to **Input 3** or **4**. For best results, adjust the tint while displaying an external test pattern, otherwise, it is recommended that tint remain at its default setting.

Decoder Luma Delay

This control affects any incoming composite or S-video signal, delaying the luma signal (intensity) in relation to the chroma (color). In the image, increasing the luma delay moves luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in place. Decreasing this delay moves the shadow slightly to the left. If necessary for your current source, adjust so that no shadows occur with adjacent colors.

Input Levels Submenu

Select **Input Levels** from the **Image Settings** menu.

NOTES: **1)** *Because the projector automatically optimizes input levels for all , but the most unusual of sources, it is recommended that only experienced users use the Input Levels submenu.* **2)** *Before beginning, check that overall Contrast and Brightness settings are near 50 and that color temperature is properly set up on an internal grayscale test pattern.* **3)** *There must be at least 6-12 consecutive white pixels present in the image for proper "Auto Input Level" function. Leave this control OFF after use.*

Good RGB or input levels (that is, the drives and blacklevels for each of the 3 colors, red, green and blue) ensure that images from analog sources, other than decoded video, have maximum contrast without crushing black or white. By default (and in an "Auto Setup"), the projector automatically determines the best input levels by monitoring image content and adjusting the controls appropriately. It is not necessary to make further adjustments to obtain proper blacks or whites.

NOTE: *This automatic adjustment requires at least 6-12 consecutive white pixels in the image. Without these pixels, input levels may produce skewed colors, particularly in non-video images.*

However, for a very unusual source exhibiting 1 or more overly high blacklevels (typically caused by a noisy source causing blacklevel spikes), an experienced user may prefer to use the Input Levels menu (shown above). These adjustments, which together serve as a calibration process compensating for differences in sources and cabling, enable an experienced user to perfect the source image input levels and eliminate the "overshoot" and "undershoot".

NOTE: **1)** *Input levels apply for the current source only, but for any color temperature used.* **2)** *Assuming that color temperature has been set up based on the internal test patterns, you can then set up input levels for a given source so that it matches the color temperature of the internal test patterns.*

Auto Input Level

Temporarily enter a checkmark only if you are an experienced user and you have an unusual source that you feel needs further color temperature and/or input level adjustment. This compensates for incoming out-of-range drives (white) and blacklevels (black) that would cause "crushing" of light and dark colors in the image. Once the 6 slider values stabilize, clear the check box, and exit. The **Auto Input Level** should be automatically turned OFF (check box cleared) upon exit from the **Input levels** menu.

Blacklevels and Drives

To check your image and adjust these controls:

1. Make sure overall **Contrast** and **Brightness** are both set to near 50.
 - CONT = 50 (approx.)

- BRIGHT = 50 (approx.)

NOTE: *Not required for "Auto" adjustment.*

2. Check the color temperature setup using an internal grayscale test pattern, making sure to obtain a neutral grayscale.

NOTE: *Not required for "Auto" adjustment.*

3. Confirm that you are using an analog source not connected to **INPUT 3** or **INPUT 4**, as input levels are not applicable for digital sources or sources going through the decoder. A grayscale is recommended.
4. If the blacks and/or whites appear OK, input levels do not need adjustment. If black levels are too high (and/or whites are too low, which is rare), you likely have a noisy source that is producing skewed input levels. Continue with Step 5.
5. Temporarily enable "**Auto**" in the **Input Levels** submenu. Wait for all 6 values to stabilize. Alternatively, do not use "Auto", but reduce blacklevels manually instead. Judge by eye and change 1 or more of the 6 levels as necessary to obtain proper blacks and whites. You may want to see only a certain color while adjusting by using the "**Auto Color Enable**" option (described below).
6. Delete the "Auto" check mark and leave the **Input Levels** menu.

IMPORTANT! *Do not use Input Levels to adjust color temperature. This distorts the Contrast and Brightness functions, as well as color temperature.*

Auto Color Enable

When a check mark is present, selecting a specific blacklevel or drive to adjust automatically enables the corresponding color in the display. Remove the check mark to see all colors, or to enable a different specific color through the **Color Enable Control**.

Clamp Location

This option (formerly known as "sync tip clamping") can brighten the image produced from certain high-resolution high-frequency graphic sources. For almost all sources, the projector automatically selects the best clamp location. Use the normal *Back Porch* location if the image is either sufficiently bright or overly bright. Select Sync Tip if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. This moves the clamping pulse from the normal backporch location (which is likely too short) to the tip of the horizontal sync pulse. **Tri Level** is typically recommended for an HDTV source, where the back porch is also short.

► 1. Back Porch
2. Sync Tip
3. Tri Level

Color Enable

Select which color or colors you want to see in the display, useful while working with color temperature white levels or input levels.

Peak Detector

The Peak Detector is a fast method for defining individual input levels, and can improve the accuracy of input levels set by the **Auto Input level** function. Enabling the **Peak Detector** activates a special operating mode for detecting only pixels that are considered black or white; all other levels are displayed as a mid-level gray. When used with a smooth grayscale pattern in which black and white are known to be at opposite edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives until both black and white edges are just visible and distinguished from neighboring pixels. Images from this source then displays correct blacks and whites without crushing or washing out.

Refer to *Figure 3-23 Adjusting Input Levels Using the Peak Detector (RED EXAMPLE SHOWN)*.

1. Display a 16-level grayscale test pattern from the desired external source, and select the Peak Detector check box.

NOTE: The "Peak Detector" initially renders the grayscale as a uniform gray field before adjustment.

2. Display 1 primary color.

NOTE: Selecting **Auto Color Enable** ensures the correct color is displayed for each setting.

3. For the current color, adjust its corresponding "Blacklevel" slider just until a single band of black appears at one edge of the screen. This band represents the first band of the grayscale pattern, which should be 100% black. Do not adjust too far.
4. With the same color still active, adjust its corresponding "Input Drive" slider just until a single band of color appears at the opposite edge of the screen. This band represents the last band of the grayscale pattern, which should be 100% white (or the current color, if a certain color is enabled). Do not adjust too far.
5. It may be advantageous to go back and check the black band. Adjust the blacklevel slider if necessary.

NOTE: Re-adjusting blacklevels at this point affects the gain; only re-adjust if absolutely necessary.

6. Repeat Steps 3-5 with the other 2 remaining primary colors. When each primary color shows **one** optimized black band and white (or colored) band, the input levels for this source are correctly set. Upon exiting the **Input Levels** menu, the **Peak Detector** check box is cleared.

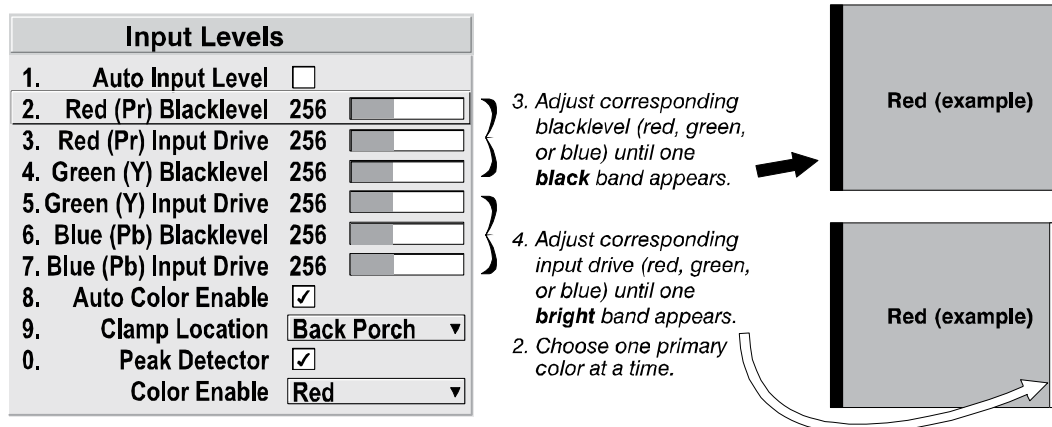


Figure 3-23 Adjusting Input Levels Using the Peak Detector (RED EXAMPLE SHOWN)

Advanced Image Settings

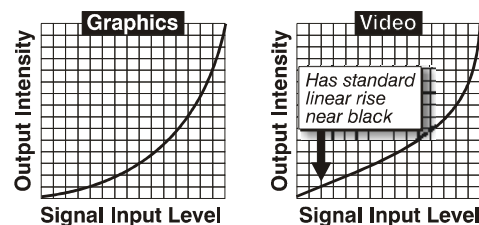
Use the **Advanced Image Settings** submenu to adjust lesser-used options used for more specialized applications.

NOTE: 3D Source option is available for Mirage HD.

Gamma Table

This control applies a default video, graphics or simple gamma table or "curve" to your images, controlling the intensity of midlevel colors and producing maximum contrast, brightness and color performance.

As shown at right, the graphics curve is a simple power curve while the video curve has a linear segment near black to compensate for increased blacklevels typical of video signals. A simple gamma curve is a value of 2.2 and is correct for most signal conditions. Although the projector automatically applies either the graphics or video curve according to what type of incoming signal is detected, in some cases you may wish to override this default and use graphics gamma for a video source or **video** gamma for a graphics source.



Alternatively, if neither default is ideal, you may prefer to apply the simple (non-optimized) gamma curve or a user-defined custom gamma curve that has been created externally, named, and downloaded to the projector (requires separate PC-based **Arbitrary Gamma** and **KoRE Librarian** software applications). If any of these special user curves have been installed, their names appear in the **Gamma Table** drop-down list.

Keep in mind that any Gamma Table choice sets the related Gamma value (shown in the **Image Settings** menu) to a 2.2 default, where it can be fine-tuned as desired. Different values (1-3) here indicate that the original gamma table has been adjusted with either the **Gamma** slider or direct key.

Select Color Adjustment

In "Select Color Adjustment", choose an overall color performance for all images. The "Max Drives" factory default simply drives all 3 colors at their maximum level so that they are fully on and cannot be changed. The two other pre-defined color adjustment choices, **SD Video** and **HD Video**, apply a color gamut optimized for video sources (standard or high-definition). Alternatively, you can specify a color temperature, which enables the nearby Color Temperature slider and applies its current setting (default = 6500K).

If none of the pre-defined "Select Color Adjustment" options or color temperatures suit your application, select 1 of 4 color gamuts previously defined by a user (User 1, 2, 3, or 4). A "User" option applies a customized color performance in which the user has precisely set the hue and intensity of each color component in the **Color Adjustment by X/Y** or **Color Saturation** submenus, and is most often needed with multiple-projector applications. Select the color adjustment producing the best color accuracy for your application and installation.

To configure a "User" color adjustment (gamut), use either the **Color Adjustment by X/Y** or **Color Saturation** submenu.

NOTES: 1) "Color Temperature" defaults to 6500K until changed. All 4 "User" options default to SD Video unless the user has redefined them. 2) Factory-defined color primaries, which ensure consistent color gamut from projector-to-projector, can be altered in the Service menu only. If you suspect alteration, the factory settings can be recovered with selection of Reset to Factory Defaults? in the Service menu (password-protected).

Color Temperature

Adjust to apply a specific color temperature to all displays. Color temperatures are expressed in degrees Kelvin (3200-9300K), and utilize different combinations of the projector's original native color primaries to produce a "coloration" or cast (reddish or bluish) in images-the lower the temperature, the more reddish the cast; the higher the temperature, the more bluish the cast.

NOTE: The slider is only enabled if you have a source connected, and have selected "Color Temperature" in the adjacent "Select Color Adjustment" drop-down list in the [Advanced Image Settings Submenu](#).

Optical Aperture

The optical aperture inside the projector controls the diameter of the light beam passing through the system. With a fully open aperture (slidebar default of "0"), the maximum amount of light passes through for maximum brightness in your images. Increase the slider setting to reduce the aperture diameter and maximize contrast ratio instead. Performance of aperture depends on the lens in use.

NOTES: 1) *Optical Aperture (when present) also appears in the Lamp menu.*

Aperture Manual Adjustment

A variable position manual aperture is present on the 1.2:1 and 1.1:1 lens. It may be used together with the internal electronic aperture to increase the contrast ratio; noting a slight decrease in brightness when it is used. It is recommended for highest brightness operation, under normal conditions, the manual aperture is to be left open. See [Figure 3-24](#) below for aperture OPEN/CLOSE, and LOCK and UNLOCK dial positions.

NOTE: *The lock/unlock dial position allows you to open the aperture at a desired position and lock it in place.*

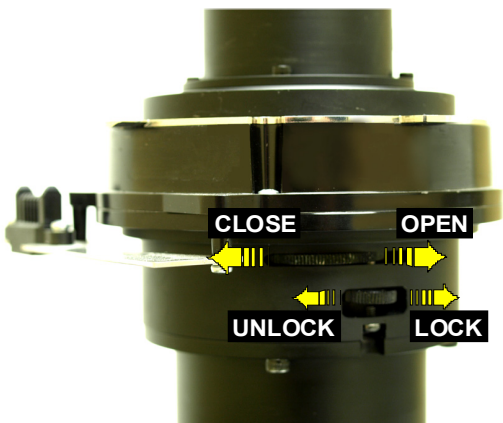


Figure 3-24 Aperture Manual Adjustment

Reserved

No function.

Mirage S+ Series - Simulation 3D - Advanced Image Settings Submenu

From the **Advanced Image Settings** menu, use the **Simulation 3D** submenu options to make timing adjustments for realistic simulation environments.

NOTE: *For complete 3D application notes, refer to the separate **Using 3D in Mirage** manual provided with the Mirage projector.*

Simulation 3D			
Frame Delay Monitor		1047	
1.	Frame Delay	1000	
2.	Dark Interval	128	
3.	3D Stero Sync Locking	Output	v
4.	3D Stero Sync Select	Input A	v
5.	3D Stereo Sync Delay	1000	
6.	Frame Lock Enable	Locked	v
7.	Reserved		

Figure 3-25 Mirage S+ Models

Frame Delay Monitor

For best results, the bar width and value should remain fairly constant, indicating that timing of input and output frames is locked; the *Frame Delay Monitor* value should stay within 5-10 lines or so of the **Frame Delay** setting. If a frame is lost or "dropped", the slider moves suddenly and the values change, indicating that the frame input is no longer equal to the output. If the signal is not locked, the values will change erratically; you can adjust the Frame delay to attempt a correction.

NOTE: For more information, refer to separate *Using 3D in Mirage* manual provided.

Frame Delay

Set the number of lines delayed between the input signal and its appearance on screen, keeping in mind that projector processing always adds 1 frame of delay to the frame delay setting. For applications such as simulation, where the feeling of "real time" image response is a priority, a minimum setting is usually preferable. For projectors capable of 3D (stereographic) applications where alternating left-right frames must be synchronized with the corresponding L/R shutters in 3D glasses, a total frame delay setting of 2 (or multiple of 2) may be more useful. If set too high or low, frame locking will not be possible-most sources require approximately 50 lines of delay to ensure frame locking.

NOTE: For more information, refer to separate *Using 3D in Mirage* manual provided.

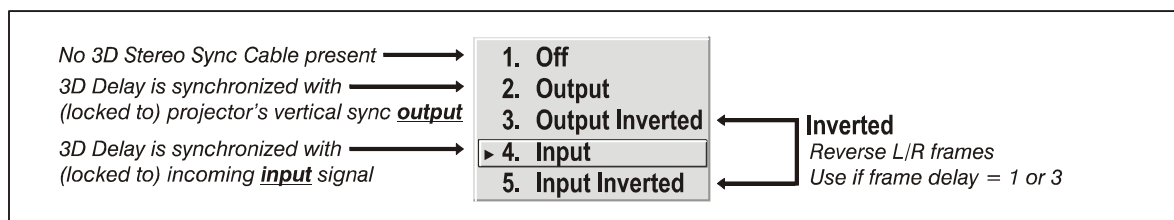
Dark Interval

Adjust the Dark Interval to artificially increase the amount of dark time between displayed frames for stereographic 3D images. Higher settings provide more time for shutters in 3D glasses to open/close, ensuring that each eye sees the full display intended for it. Symptoms of cross talk and/or color artifacts can indicate need for adjustment. The Dark Interval range of adjustment depends on the vertical frequency of your source-the higher the frequency, the smaller the range.

NOTE: For more information, refer to separate *Using 3D in Mirage* manual provided.

3D Stereo Sync Locking

This option defines 1) whether or not the incoming stereographic 3D signal locks to the vertical sync output so that signals are synchronized, and 2) whether or not the 3D frames must be inverted, i.e. swapped left-with-right. The correct setting ensures that the projector's 3D display of left/right frames is synchronized with the rest of the 3D system components so that the intended eye sees the left/right image data. Select the option corresponding to your 3D source connections and timing, and use only if the Mirage 3D Stereo Sync Cable is connected between the projector's GPIO port and a server. Keep this adjustment OFF (default) when you are not using the *Mirage 3D Stereo Sync Cable*.

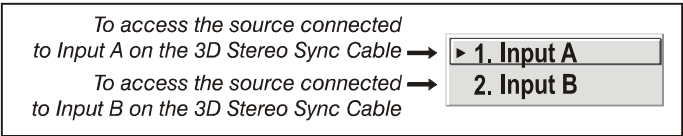


With your sync cable and, if desired, emitter connected as described in the *Using 3D in Mirage* manual, select the option suited to your 3D configuration (see above). If Frame Delay is 2 (or 0), do not invert; if frame delay is 1 or 3, invert. Generally, an "Unlocked" setting is synchronized with the incoming L/R signal rather than the vertical sync output, and may be needed only with multi-projector installations in which the vertical sync outputs vary.

NOTE: For more information, refer to the separate *Using 3D in Mirage* manual provided.

3D Stereo Sync Select

Define which of the Mirage 3D Stereo Sync Cable's input connectors is routed from your server. Use only if the cable is present.



3D Stereo Sync Delay

Set when the L/R frames begin, defining the best reference point for synchronizing the display with your glasses. Proper adjustment of this delay should eliminate cross talk and odd colors caused by timing differences between the glasses and the projected display. Use this sidebar only if the Mirage 3D Stereo Sync Cable is connected between the projector's GPIO port and a server. Slide bar values indicate the number of lines that are delayed.

Frame Lock Enable

This option allows the projector to control the output frame timing based on the input signal. The *Locked* option forces (if possible) the output image to be phase locked to the input frames. **Rate Matched** means that the output runs at close to the input frequency , but is not locked to it so the output will drift in phase relative to the output. **Free Run** forces the output to run at a 60Hz frame rate.



NOTE: For more information, refer to the separate *Using 3D in Mirage* manual provided.

Mirage HD/WU Series - Simulation 3D - Advanced Image Settings Submenu

From the **Advanced Image Settings** menu, use the **Simulation 3D** submenu options to make timing adjustments for realistic simulation environments.

Frame Delay Monitor

This sidebar monitors the latency between input and output. For best results, the bar width and value should remain fairly constant, indicating that timing of input and output frames is locked; the Frame Delay Monitor value should stay within 5-10 lines or so of the Frame Delay setting. If a frame is lost or "dropped", the sidebar moves suddenly and the values change, indicating that the frame input is no longer equal to the output.

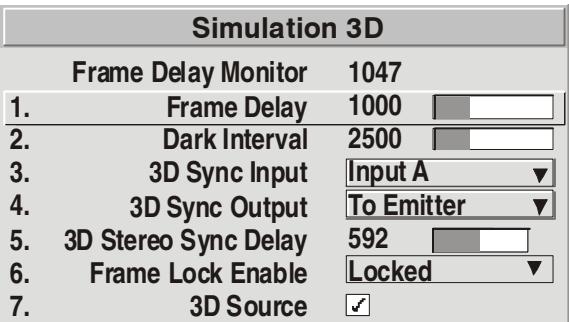


Figure 3-26 Mirage HD/WU Models

NOTE: For more information, refer to separate the *Using 3D in Mirage* manual provided.

Frame Delay

Set the number of lines delayed between the input signal and its appearance on screen, keeping in mind that projector processing always adds 1 frame of delay to the frame delay setting. For applications such as simulation, where the feeling of "real time" image response is a priority, a minimum setting is usually preferable. For projectors capable of 3D (stereographic) applications where alternating left-right frames must be synchronized with the corresponding L/R shutters in 3D glasses, a total frame delay setting of two (or multiple of two) may be more useful. If set too high or low, frame locking will not be possible-most sources require approximately 50 lines of delay to ensure frame locking.

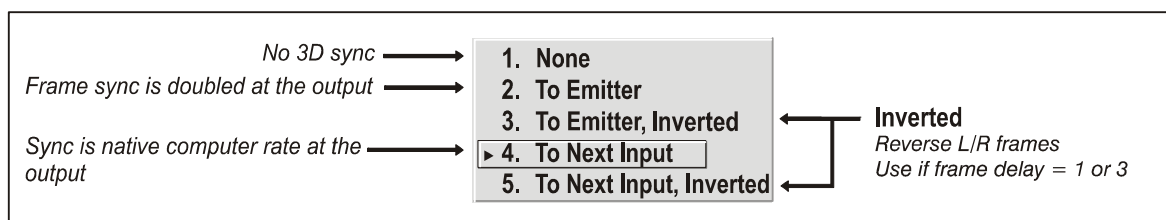
Dark Interval

Adjust Dark Interval to artificially increase the amount of dark time between displayed frames for stereographic 3D images. Higher settings provide more time for shutters in 3D glasses to open/close, ensuring that each eye sees the full display intended for it. Symptoms of cross talk and/or color artifacts can indicate need for adjustment. The Dark Interval range of adjustment depends on the vertical frequency of your source-the higher the frequency, the smaller the range.

NOTE: For more information, refer to separate the *Using 3D in Mirage* manual provided.

3D Stereo Sync Locking

This option defines 1) whether or not the incoming stereographic 3D signal locks to the vertical sync output so that signals are synchronized, and 2) whether or not the 3D frames must be inverted, i.e. swapped left-with-right. The correct setting ensures that the projector's 3D display of left/right frames is synchronized with the rest of the 3D system components so that the intended eye sees the left/right image data. Select the option corresponding to your 3D source connections and timing, and use only if the *Mirage 3D Stereo Sync* cable is connected between the projector's GPIO port and a server. Keep this adjustment OFF (default) when you are not using the *Mirage 3D Stereo Sync* cable.

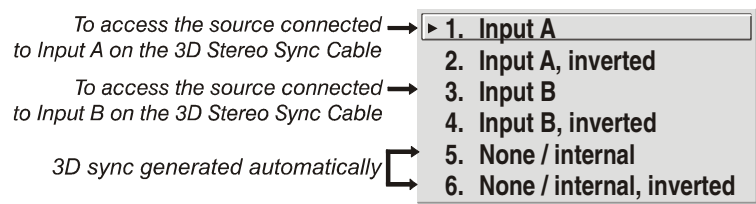


With your sync cable and, if desired, emitter connected as described in the *Using 3D in Mirage* manual, select the option suited to your 3D configuration (see above). If Frame Delay is 2 (or 0), do not invert; if frame delay is 1 or 3, invert. Generally, an "Unlocked" setting is synchronized with the incoming L/R signal rather than the vertical sync output, and may be needed only with multi-projector installations in which the vertical sync outputs vary.

NOTE: For more information, refer to separate the *Using 3D in Mirage* manual provided.

3D Sync Input

Define which of the Mirage 3D Stereo Sync Cable's input connectors is routed from your server. Use only if the cable is present. Only the first projector, possibly connected to external sync, will choose any of these selections. Every other projector will be getting sync from the previous projector on **INPUT A** or **INPUT B**.



3D Stereo Sync Delay

This value is set when the L/R frames begin and by default, is automatically calculated based on signal timing; it defines the best reference point for synchronizing the display with your glasses. Proper adjustment of this delay should eliminate cross talk and odd colors caused by timing differences between the glasses and the projected display. Slidebar values indicate the number of lines that are delayed.

NOTE: See Help menu to view the formula used to calculate this value.

Frame Lock Enable

This option allows the projector to control the output frame timing based on the input signal. The **Locked** option forces (if possible) the output image to be phase locked to the input frames. **Rate Matched** means that the output runs at close to the input frequency , but is not locked to it so the output will drift in phase relative to the output. **Free Run** forces the output to run at a 60Hz frame rate.

NOTE: For more information, refer to the separate *Using 3D in Mirage* manual provided.

3D Source

When using a Mirage projector with HD resolution, a check box option called **3D Source** will be added to the bottom of the **Simulation 3D** menu. This check box must be set by the user for all new 3D sources, and cleared for all new non-3D sources (default setting is checked). Once set, this value will be maintained for that source for all future uses. This option is also available under the **Advanced Image Settings** menu.

Simulation 3D - Advanced Image Settings Submenu - MATRIX MODELS ONLY

NOTES: Available in Matrix projectors Only.

Use the options in the **Simulation 3D** menu to make the timing adjustments necessary for realistic simulation and 3D images.

Frame Delay Monitor

For best results, the value should remain fairly constant, indicating that timing of input and output frames is locked; the Frame Delay Monitor value should stay within 5-10 lines or so of the Frame Delay setting. If a frame is lost or "dropped", this value will cycle to maximum and jump to minimum and then repeat, indicating that the frame input is no longer equal to the output. If the signal is not locked, the values will change erratically; you can adjust the Frame delay to attempt a correction.

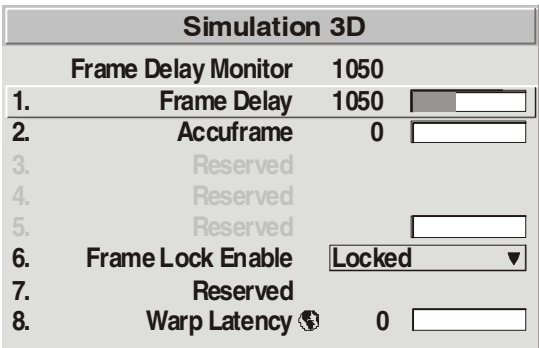


Figure 3-27 All Matrix Models

Frame Delay

Set the number of lines delayed between the input signal and its appearance on screen, keeping in mind that projector processing always adds 1 frame of delay to the frame delay setting. For applications such as simulation, where the feeling of "real time" image response is a priority, a minimum setting is usually preferable. For projectors capable of 3D (stereographic) applications where alternating left-right frames must be synchronized with the corresponding L/R shutters in 3D glasses, a total frame delay setting of 2 (or multiple of 2) may be more useful. If set too high or low, frame locking will not be possible-most sources require approximately 50 lines of delay to ensure frame locking.

AccuFrame

Increasing the AccuFrame value will reduce the artifacts related to fast motion in simulation content. Symptoms of blurry objects or loss of apparent detail may indicate a need for this value to be adjusted.

NOTE: *If increasing AccuFrame does not improve image quality, reduce the value to 0. Increasing AccuFrame may increase 'flicker' of the display and may reduce overall brightness.*

Frame Lock Enable

This option allows the projector to control the output frame timing based on the input signal. The **Locked** option forces (if possible) the output image to be phase locked to the input frames. **Rate Matched** means that the output runs at close to the input frequency, but is not locked to it so the output will drift in phase relative to the output. **Free Run** forces the output to run at a 60Hz frame rate.

Reserved

No function.

Warp Latency

Requires optional Christie TWIST™ module. Refer to *Christie TWIST™ User's Manual* provided with the module.

Advanced Image Settings Submenu

Motion Filter

This control is most useful for smoothing out moving images from interlaced sources. In most cases the proper **Motion Filter** setting is automatically determined according to the type of incoming source signal. However, if your source is noisy and/or inconsistent, you may wish to "force" a setting to ensure stable processing for this source.

- | |
|------------|
| 1. Auto |
| ► 2. Still |
| 3. Motion |
| 4. Film |

If desired, override the default "Auto" setting by selecting the appropriate motion filter:

Auto	THE PROJECTOR AUTOMATICALLY USES THE CORRECT MOTION FILTER ACCORDING TO THE INCOMING SIGNAL.
Still	FOR STATIC IMAGES WITH NO MOTION, SUCH AS GRAPHICS FROM A CD.
Motion	FOR VIDEO IMAGES THAT DID NOT ORIGINATE FROM FILM, OR FOR MOVING COMPUTER-GENERATED IMAGES.
Film	FOR VIDEO IMAGES THAT ORIGINATED FROM FILM. THIS WILL OPTIMIZE IMAGE QUALITY AND STABILITY.

Film Mode Threshold

This setting determines how sensitively the projector can detect if an incoming video signal originated from film or not.

Detail Threshold

Use "Detail Threshold" to define at what frequency level the "Detail" control will begin to magnify high frequencies, which adds details back into the image. Raise the threshold to ignore more of these high frequencies, and lower the threshold to magnify more of these frequencies. A setting of "0", for example, means no noise is ignored and all is magnified. An ideal detail threshold is 1 in which high frequencies that are causing objectionable noise are not magnified when using "Detail", but frequencies which can help sharpen an overly-soft image are magnified.

3D Source

When using a Mirage projector with HD or WUXGA resolution, a check box option called 3D Source will be added to the bottom of the Advanced Image Settings menu. This check box must be set by the user for all new 3D sources, and cleared for all new non-3D sources (default setting is checked). Once set, this value will be maintained for that source for all future uses. This option is also available under the **Simulation 3D** menu in Mirage HD or WUXGA projectors only.

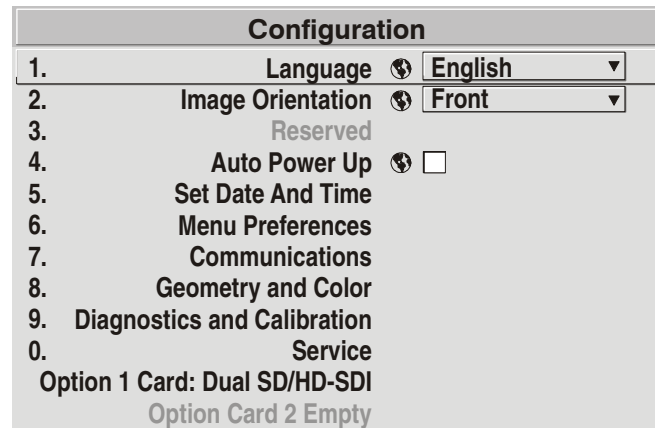
Floating Inputs

This allows the signals connected to inputs 1, 3, and 4 to have floating ground references relative to the projector. Floating the inputs can remove hum bars in the image if the installation has conflicting grounds. However, floating the inputs can also introduce hum bars when the signal ground is the only connecting ground. Select the setting that produces the best image.

3.6 Adjusting System Parameters and Advanced Controls

Use the **Configuration** menu to define general operating parameters and communications with other projectors and equipment, and to access other advanced processing and image adjustments affecting overall performance. In addition, the **Configuration** menu provides access to diagnostics, calibration tools and the Service submenu (password-protected).

Keep in mind that settings in the **Configuration** menu (and its submenus) are typically "global" settings applied regardless of the type of source you are using. This characteristic is identified with the **Globe** icon alongside the option.



NOTE: The Configuration menu is recommended for experienced users/technicians only.

3.6.1 System Configuration (General Settings)

The first 6 “General” options in the **Configuration** menu are explained below:

Language

Choose from available languages to use in the projector's menus. The change takes effect immediately.

Image Orientation

Set the orientation of the image according to the orientation of your projector. If the setting is incorrect, projected images are reversed and/or upside down.

Reserved

No function.

Auto Power-up

Enter a check mark to enable the projector to automatically power up after losing power due to a power failure or due to unplugging the projector during operation.

NOTE: *Unsaved display adjustments may be lost.*

Set Date & Time

Enter/read the current year-month-day and hour-minute-second. Changes here reset the projector's real-time clock.

Menu Preferences

Adjust the appearance, content and/or location of on-screen menus and messages.

Large Menu Font

Enter a check mark to enlarge menus and their text. You may have to adjust "Menu Location" to accommodate the increased menu area.

Menu Location

Use the drop-down list to choose a pre-defined default or customized location for the display of all on-screen menus.

To create a custom menu location quickly, choose a preset that is closest to the desired location. Then adjust the slidebars of **Horizontal Shift** and **Vertical Shift** to move the menu to the desired location. To prevent cropping of larger menus, avoid locations too close to a corner or edge.

Horizontal and Vertical Shift

Shift your menus as desired, creating a customized menu location.

Display Channel List

Enter a check mark if you want to see a scrollable channel list whenever you press  from your presentation. Channels marked with a  icon in the **Channel Setup** menu then appear in the list. The **Display Channel List** option also enables on-screen feedback when using the  key. If you prefer to hide the channel list and input dialog box while switching channels and sources during a presentation, clear the check box.

NOTE: *The Channel list and Input dialog box cannot be hidden during use of the menus.*

Display Slidebars

Enter a check mark to superimpose a small sidebar over the current image whenever an adjustable parameter is selected directly with a key such as or . If "Display slidebars" is unchecked, these slidebars can still be accessed, but will be hidden during adjustment. This option does not affect slidebars in menus.

Display Error Messages

Choose how you want to be notified of errors detected in either the incoming signal or projector. Select "Screen" or "All" (default) to see brief on-screen messages. This is particularly recommended during setup or testing of the projector. Or, select "Serial Ports" to receive messages via RS-232 or RS-422 serial communication only. To hide error message displays, such as during shows and presentations, select "OFF" or "Serial Ports".

Splash Screen Setup

Use the Splash Screen to choose when you would like to display a special introductory splash screen image, such as your company logo, graphic or message.

Always Off

A SPLASH SCREEN NEVER APPEARS.

Always On

A SPLASH SCREEN IS ALWAYS ON BEHIND THE CURRENT DISPLAY IMAGE, SIMILAR TO WALLPAPER.

Startup Only

THE SPLASH SCREEN LOGO APPEARS AT PROJECTOR STARTUP ONLY.

Startup and No Signal

A SPLASH SCREEN APPEARS AT STARTUP ONLY IF THERE IS NO SOURCE SIGNAL.

To replace the default "Christie logo" splash screen (or other) with one of your own, use the [*KoRE Librarian*](#) to download the desired .bmp to the projector. This overwrites the current splash screen content in projector memory.

3.6.2 System Configuration (Communication)

Settings in the **Communications** submenu define and control how single or multiple projectors can link with each other and with a controlling device. See [Figure 3-28](#).

Baud Rates

The baud rate setting determines the speed of communication to and from the projector on the RS-232 or RS-422 links. The maximum rate for either standard is 115200. Set the baud rate to match that of your controlling device, such as your PC. If you are unsure about what baud rate to choose, refer to the documentation for the controlling device. In an existing network of projectors, if you discover that a projector has a different

baud rate, make sure to use the drop-down list and select the correct baud rate using the key. Do not just scroll this control with the keys. Serial communication is always 8 data-bits, no parity.

Communications		
1.	Baud Rate for RS232	115200 ▼
2.	Baud Rate for RS422	19200 ▼
3.	Projector	004
4.	Network Routing	All Joined ▼
5.	Ethernet Settings	
6.	Broadcast Key	☐
7.	Backlight	☐
8.	Front IR	On ▼
9.	Back IR	On ▼
0.	Wired Keypad	Off ▼

Figure 3-28 Communications

Projector

Enter a 3-digit number (such as "001") to assign or change a number to the projector currently in use. If the current projector already has a number assigned, that number appears here (for example, "004" in , above). Numerical identity for projectors enables you to communicate with a single projector within a multiple-projector application (see also **Proj** key in [Section 3.2 Using the Keypads](#)). If you make a mistake in assigning or changing the projector number, press **Exit** to cancel.

NOTE: When multiple projectors are being used and you want to adjust the color and edge blending settings for individual projectors to create one seamless image, you must assign different numbers for each projector to allow switching back and forth between projectors while adjustments are being made

Network Routing

NOTE: Not applicable for stand-alone projectors or simple networks with only 1 type of controller and linking.

► 1. Separate	= Networks do not communicate with one another
2. RS232 and RS422 joined	= Serial networks are joined, but Ethernet is isolated
3. RS232 and Ethernet joined	= RS232 and Ethernet are joined but RS422 is isolated
4. All joined	= Network communications travel all networks

Separate. Select "Separate" (factory default) to keep RS-232, RS-422 and Ethernet messages on their respective paths instead of being broadcast to the other types of ports. In [Figure 3-29 A](#), RS-422 controls only the projector to which it is connected. In [Figure 3-29 B](#); either RS-232 or RS-422 will control the network.

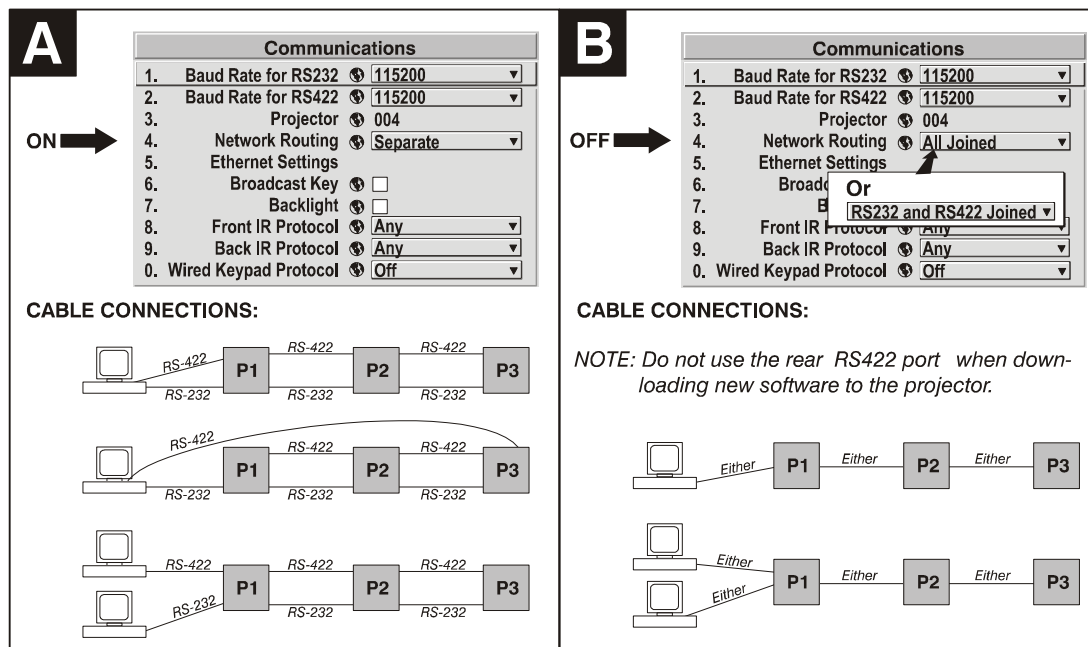


Figure 3-29 Using the "Network Routing" Option

RS-232 and RS-422 Joined. Messages to and from any serial port is also relayed to all other serial ports. Use when there is only 1 physical link between any 2 projectors, but which might be RS-232 or RS-422.

RS-232 and Ethernet Joined. Messages to and from the RS-232 ports are also relayed to the Ethernet port, and vice versa. Any RS-422 communications are isolated.

All Joined. All messages reach all ports, regardless of type.

Ethernet Settings Submenu

NOTES: *Recommended for network administrators only.*

DHCP

Select this check box if you want a DHCP server to automatically change the projector's default IP address (0.0.0.0) to 1 that is valid and unique for use on the current Ethernet network.

On networks without a DHCP server, or to simply override the automatic DHCP server function, clear the check box, and enter the new "IP Address" settings desired. Remember that only a 0.0.0.0 address triggers the DHCP addressing service only when the DHCP check box is enabled.

Ethernet Settings		
1.	DHCP Enabled	☒
2.	IP Address	000.000.000.000
3.	Port	3002
4.	Subnet Mask	000.000.000.000
5.	Default Gateway	000.000.000.000
6.	Network Name	
7.	ArtNet Interface Settings	

← ☒ = Projector's IP address will be DHCP-assigned
☐ = Use static address assigned in "IP Address"

IP Address

Enter a valid and unique IP address for use on the network to which the projector is currently connected. Upon the next power-up, this address will overwrite any previous IP address such as the projector's factory-defined default (0.0.0.0), or 1 that has been assigned by a DHCP server or other user. An IP address entered here remains in effect until it is changed again.

NOTE: *Make sure the projector is connected to the network before changing its IP address. Make sure to re-boot.*

Port

On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new valid port number here. . It is highly recommended not to use a port# below 1024, as these ports are typically reserved by common IP applications.

Subnet Mask and Default Gateway

The Subnet Mask and Default Gateway are automatically assigned when DHCP is enabled. If a static IP is being used, the IP must be assigned first since the subnet mask is estimated by the projector after the IP is entered. The Default Gateway is an optional router device used to send and receive data outside the subnet.

ArtNet Interface Settings Submenu

ArtNet is an Ethernet communication protocol that was developed by Artistic Licence. It is used for controlling lighting/staging equipment from a lighting console or PC application. It is based on the popular DMX512 control protocol.

ArtNet Subnet. This is the highest level address for a device. Typically it is set to 0.

ArtNet Universe. Each packet of data is broadcasted to all devices plugged into a universe (up to 512 devices/channels).

ArtNet Channel. There are 512 channels per universe. This control allows you to specify the starting channel for this projector.

ArtNet Advanced Mode. When this setting is enabled, each projector listens for data on 64 channels starting with the base channel. When **Advanced** mode is not in use, the projector only listens on 10 channels. You can squeeze more devices per universe when the projector uses fewer channels.

NOTE: *The additional 54 functions are not currently implemented and are reserved for future use.*

ArtNet Base Channel. When advanced mode is enabled, the projector listens to data on 64 consecutive channels, or 10 consecutive channels when **Advanced** mode is not enabled.

The projector processes requests that come on either 10 or 64 consecutive channels beginning with the 'base channel' defined here. These requests implement the following functions:

DMX Channel	Function	Value	
BASE	SHUTTER	0 – 64	OPEN
		65 – 192	NO ACTION
		193 – 255	CLOSED
BASE + 1	SLIDER LOCK	0 – 254	LOCKED
		255	UNLOCKED *
BASE + 2	INPUT *	1 – 8	INPUT #
BASE + 3	CHANNEL *	1-99	CHANNEL #
BASE + 4	LENS – VERTICAL *	0	LENS DOWN
		1 – 254	STOP
		255	LENS UP
BASE + 5	LENS – HORIZONTAL *	0	LENS RIGHT
		1 – 254	STOP
		255	LENS LEFT
BASE + 6	LENS – FOCUS *	0	NEGATIVE FOCUS
		1 – 254	STOP
		255	POSITIVE FOCUS
BASE + 7	LENS – ZOOM *	0	ZOOM OUT
		1 – 254	STOP
		255	ZOOM IN
BASE + 8	POWER *	0	POWER OFF
		1 – 254	NO ACTION
		255	POWER ON
BASE + 9	NONE		

* Functions are only active when the **Slider Lock** is set to **Unlocked**.

NOTE: It is important to make sure the channels *DO NOT* overlap another device.

Example:

Good	Bad
PROJ1_BASE = 0	PROJ1_BASE = 5
PROJ2_BASE = 10	PROJ2_BASE = 9
PROJ3_BASE = 20	PROJ3_BASE = 11

Device Name. This option is used to name each device. Some ArtNet servers support querying for devices.

Device Description. More information that is returned when a "device query" has been done.

Broadcast Key

Enter a check mark if you want keypad commands sent to 1 projector to be relayed to all projectors in a serial network.

NOTE: The  key temporarily "overrides" the effect of a broadcast setting and allow you to control a specific projector when necessary. Make sure to clear the **Broadcast Key** check box when operating redundant networks.

Backlight

Toggle the built-in keypad lighting ON/OFF.

Front IR / Back IR

As needed for your application, set to "any" so that the front and/or rear IR sensor locations on the projector respond to the IR keypad. Set to "OFF" to disable. To disable both IR sensors, you cannot use the IR remote keypad to select the second OFF setting. This safeguard prevents accidentally disabling an IR keypad while you are using it. Instead, use either the built-in keypad or a wired remote (optional) to set the remaining active sensor to OFF. The projector will no longer respond to an IR remote keypad.

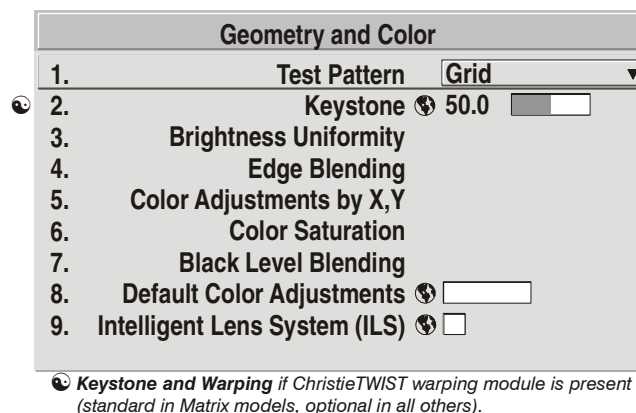
NOTE: *Protocols B - G is used for rental staging applications.*

Wired Keypad

The wired keypad is ON by default when connected to the rear of the projector. The projector will then respond to incoming commands from this port. To disable the wired keypad, you must use a different keypad (the built-in or an IR remote keypad) to select "OFF". This safeguard prevents you from accidentally disabling the wired keypad during use.

3.6.3 System Configuration (Geometry & Color) Submenu

In the **Configuration** menu, select the **Geometry and Color** submenu when you need to modify overall color performance and/or image geometry for all sources.



Test Pattern

Choose the desired internal test pattern, or select **OFF** to turn a test pattern OFF. Alternatively, use the  key for cycling through test patterns.

Keystone

NOTE: *If the optional Christie TWIST module is installed, this option is Keystone and Warping, and activates a submenu for defining custom image shapes. Please refer to documentation included with your Christie TWIST module.*

Use to correct a keystone image shape in which both sides of your image are inclined toward the top or bottom edge. Keystone is typically caused by tilting the projector in relation to the screen, so that the lens surface and screen are no longer parallel to each other.



Figure 3-30 Keystone Adjustment

Brightness Uniformity Submenu

Brightness Uniformity provides further refinement of displays already matched for their primary colors and overall light output. Use **Brightness Uniformity** option to create an exceptionally smooth image in which no area appears brighter and/or more red, green or blue than another. In the **Brightness Uniformity** submenu, select the "Uniformity Enable" check box to access a multitude of adjustments for critical color light output control in specific areas throughout the image. Your settings apply as long as the "Uniformity Enable" check box is enabled and you are using a "User" color temperature defined by the Brightness Uniformity controls. To disable the Brightness Uniformity function, delete the "Uniformity Enable" check mark.

NOTES: 1) Refer to [Section 3.10 Using Multiple Projectors](#) for the complete step-by-step procedure for achieving uniform brightness in adjacent displays. 2) If the Christie TWIST™ module is installed, the enable check box changes to a list giving the option to choose from several different uniformity maps. Please refer to documentation included with your Christie TWIST™ module.

Edge Blending Submenu

The **Edge Blending** submenu provides a range of controls for smoothing together the overlapping bright edges of multiple adjacent projected images to create a single larger "seamless" image. These controls, which primarily affect whitelevels, are typically used in conjunction with mechanical lens blinders (optional), which are installed on the front of the projector and which primarily affect blacklevels.

NOTES: 1) There is a centerline (both horizontal and vertical) in the Edge Blending test pattern. The intersection of these lines is the true center of the projector's display area. 2) Refer to [Section 3.10 Using Multiple Projectors](#).

Color Adjustments by X/Y and Color Saturation Submenus

NOTES: 1) For defining or changing a User 1, 2, 3, or 4 color palette or "gamut". Sometimes known as Comprehensive Color Adjustment™. 2) Factory-defined primary color levels, which ensure a specific color performance from projector-to-projector, can be altered in the Service menu only. If you suspect alteration of these defaults, the factory settings can be recovered with selection of "Reset to Factory Defaults?" in the Color Primary Settings submenu accessed via the Service menu (password-protected).

From the factory, the projector can utilize any of the 3 pre-defined color performance settings identified at right (default=Max Drives), or colors can be driven on the basis of color temperature ([Figure 3-31](#)). For most applications, 1 of these options will produce accurate and realistic colors from a variety of sources. They can be applied at any time in the **Advanced Image Settings** menu ("Select Color Adjustment"), and are not adjustable.

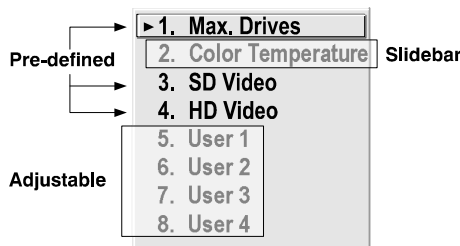


Figure 3-31 Color Performance Choices

Defining User Color Gamuts

In some cases, you may find that none of the pre-defined "Select Color Adjustment" options exactly suit your needs. For example, you may require a unique color range or gamut for a single projector or application, or you may need to precisely match colors across multiple adjacent displays. In such cases, use the **Color Adjustments by X,Y** or **Color Saturation** submenus to define the precise hue of each primary color component (red, green, blue, and white) used to generate the millions of colors produced in displays. You can create up to 4 custom color gamuts (User 1, 2, 3, or 4) with these adjustments.

NOTE: *The two menus differ only in their user interface, so use whichever menu best suits your needs and application.*

- **Color Adjustments by X,Y** - Enter known x/y coordinates from the chromaticity graph.
- **Color Saturation** - Adjust color slidebars and judge image color by eye or meter.

A user-defined color "adjustment" can be applied for a source by selecting the desired "User" option in the "Select Color Adjustment" list accessed in the **Advanced Image Settings** menu.

Color Adjustment By X,Y Submenu

Use this submenu if you want to alter, add or copy a color gamut (i.e., "color adjustment"). Controls in this menu define the precise hue of each primary color component (red, green, blue, and white) used to generate the millions of colors produced in displays.

The X/Y coordinates for each color define its location on the standard CIE chromaticity graph (refer to [Figure 3-32](#)). Changing either or both of these numbers changes the hue of the color, and relocates the "triangle" for possible colors. For example, changing the x/y coordinates for red will either move the color closer to orange or closer to violet, which in turn affects all displayed colors having a red component. Adjust the slidebars or enter new specific coordinates as desired to define or change up to 4 "User" color gamuts needed for your environment and applications. Apply at any time in the **Advanced Image Settings** menu.

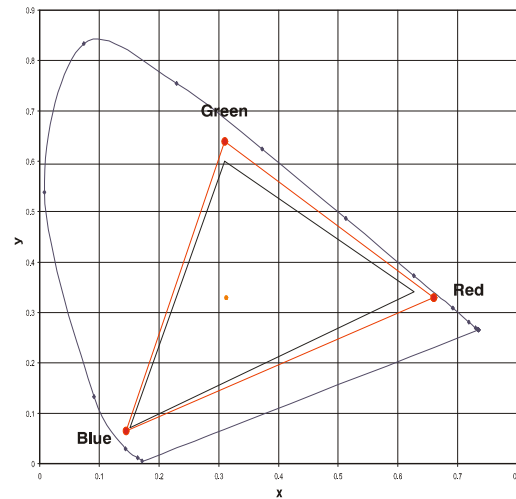


Figure 3-32 CIE 1931 Chromaticity Diagram

NOTE: Keep new X,Y coordinates within the original color gamut triangle shown here.

PROCEDURE FOR X,Y ADJUSTMENTS. Refer to [Section 3.10 Using Multiple Projectors](#).

Colour Saturation Secondary Menu

Use the **Colour Saturation** submenu if you do not have specific color coordinates in mind and will be simply judging color performance by eye or meter. Like the **Color Adjustment by X,Y** submenu, each color control actually defines new x/y coordinates for that color and changes its hue—it is just a different interface. See [Figure 3-33](#).

Adjust the hue of each primary color (red, green, blue, and white) by using more or less of it in relation to the other colors. Apply at any time in the **Advanced Image Settings** menu.

NOTE: A Color Saturation adjustment defines the corresponding x/y coordinates shown in the Color Adjustments by X,Y submenu. These x/y coordinates remain stable for this "User" gamut until they are changed again via either menu. Values displayed in the Color Saturation menu, however, will likely fluctuate as you use the projector, and will be different when you return to this menu at some point in the future. These floating changes do not affect the x/y coordinates or gamut.

Figure 3-33 Customize Color

Black Level Blending Secondary Menu

Black Level Blending is a feature that eliminates the differences between black levels when edge blending multiple projectors. The **Black Level Blending** submenu provides many controls to allow the edges of adjacent images to be smoothly overlapped creating a "seamless" image. Black Level Blending provides a simple solution for uneven black levels, without the need for external hardware, by matching up black level hues with a "target area" hue (the intersection of the center lines), and adjusting the overlaps (edges) surrounding the target area.

The use of the **Black Level Blending** feature and the use of the Christie TWIST™ module are mutually exclusive. On a WU model, Keystone is only available when Christie TWIST™ is in use.

If Christie TWIST™ is installed and Black Level Blending is desired:

1. Disable use of warps or 2D Keystone.
2. Enable edge blending; if not enabled.
3. Enable Black Level Blending.
4. Power down the projector then power up again.

Adjustments can now be made to black level controls.

To restore the use of Christie TWIST™:

1. Disable black blending.
2. Power cycle the projector.
3. Begin using the Christie TWIST™ controls.

NOTES: **1)** Refer to section [Section 3.10 Using Multiple Projectors](#) for additional information. **2)** There is a centerline (both horizontal and vertical) in the Black Level Blending test pattern. The intersection of these lines is the true center of the projector's display area. **3)** Adjust white levels before adjusting black levels. **4)** Blinders are recommended for fixed installations.

Default Color Adjustments Submenu

Refer to [Section 3.6.3 System Configuration \(Geometry & Color\) Submenu](#) for a description.

Intelligent Lens System (ILS™) Secondary Menu

ILS™ provides the ability to recall focus and zoom settings specific to each source input. Custom lens settings you've chosen for any source will be quickly and accurately applied when you select a source that has already been calibrated. Place a checkmark in the check box to enable ILS™. If no calibration has previously been done you may be prompted to do a full calibration. If a motion calibration has been done, you will be prompted to complete a reference calibration. If both calibrations have been done, the check box will be checked and ILS™ enabled. If ILS™ is enabled, a reference calibration will be done on power up and the lens will return to the saved position of the source that is active at the time of power up or to the position the lens was located when it was powered on. Further adjustments to the zoom, focus and position will be automatically saved for source the selected source. If you switch to a source with different lens settings and switch back, the lens will automatically move to your saved settings upon return. Other sources can be used without using ILS™.

NOTES: **1)** Refer to [Section 3.6.4 System Configuration \(Diagnostics / Calibration\)](#) for further details about calibration. **2)** ILS™ control is a preference setting and will be retained between power cycles.

3.6.4 System Configuration (Diagnostics / Calibration)

Test Pattern

Choose the desired internal test pattern to display, or select OFF to turn OFF a test pattern. Alternatively, use the  key for cycling through test patterns.

Test Pattern Grey Level

Set the desired level of gray for displaying in the full gray field test pattern.

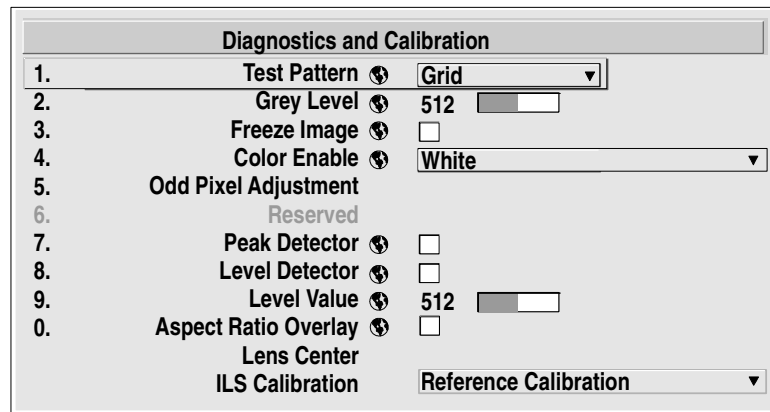


Figure 3-34 Diagnostics and Calibration

Freeze Image

Enter a check mark to freeze (stop) an image at a single frame. This diagnostic tool is useful if you need to examine in detail a still version of an incoming image that cannot be "frozen" at the source. For example, in moving images it is sometimes difficult to observe artifacts such as external deinterlacing/resizing and signal noise. Remove the check mark to return back to normal.

Color Enable

Select which color or colors you want to see. This is useful while working with color temperature, input levels or other special setup parameters. Colors can also be enabled/disabled by entering the corresponding function code listed on the back of the standard remote keypad.

Odd Pixel Adjustment

NOTES: 1) Factory-set and rarely required by user. 2) Source must be >90 MHz.

When using certain RGB sources, you may need to adjust the normal gain or offset of odd pixels in relation to even pixels. This smooths out very narrow (1-pixel wide) "checks" or vertical stripes that indicate adjacent "on" and "off" pixels. Although Offset and Gain slidebars can be adjusted individually and manually, using the **Level Detector** simplifies this process (see [Figure 3-35](#)).

1. Use an external analog native-sized continuous grayscale test pattern with at least 256-levels.
2. Turn "Level Detector" **ON**.
3. Set "Level Value" to ~200. The image should now be black-and-white (or black-and-1 color, if you use "Color Enable" function).
4. Adjust *offset*. Half of the pixels will move, the other half will not.

5. Adjust until the two transition regions overlap. The stripe of noise will be minimized, defined by the value in the sidebar.
6. Set "Level Value" to ~800. The image should now be black-and-white.
7. Repeat Steps 4 and 5, but adjusting gain.
8. Repeat Steps 3-7 for all remaining colors. Your RGB source should now be OK.

There are 2 sets of values which are automatically saved with these controls. One value for Input #1, and one for Input #2 (analog). The current set of values depends on which source is in use. This enables a source to be processed correctly via 2 different inputs.

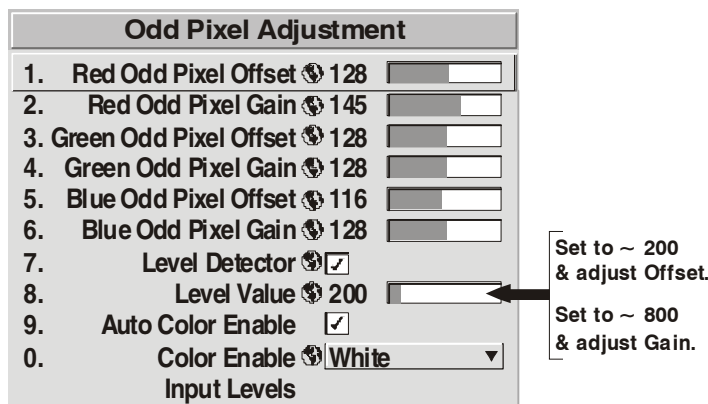


Figure 3-35 Using "Odd Pixel Adjustment"

NOTES: 1) Adjust offset before gain, since offset affects gain. 2) A value of 128 represents no change in normal odd pixel offset or gain. 3) Odd Pixel Adjustment eliminates "1 pixel on, 1 pixel off" patterns only, not any type of larger patterns.

Reserved

No function.

Peak Detector

The **Peak Detector** is fast method of defining individual input levels, and can improve the accuracy of input levels set by the Auto Input level function. Enabling the Peak Detector activates a special operating mode for detecting only pixels that are considered black or white-all other levels are displayed as a mid-level gray. When used with a 16-step grayscale pattern in which the two black and white bands are known to be at opposite edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives until both bands are just visible. Images from this source then display blacks and whites correctly without crushing or washing out.

NOTE: If using Peak Detector with PIP, both images must have the same color space.

Level Detector

The **Level Detector** check box enables a specific thresholds for blacks and whites-input levels that fall below a specified Level Value (see below) are displayed as black, and all others are displayed as white. It aids in **Odd Pixel Adjustment**.

To use:

1. Enable **Level Detector** and display a continuous grayscale.
2. Set **Level Value** to near black (such as 200).
3. Adjust Offsets to minimize area of black stripe.
4. Set **Level Value** to near white (such as 800).
5. Adjust **Gains** to minimize area of white stripe.

Level Value

The **Level Value** defines the value to be used by the Level Detector in recognizing blacks and whites. See [Level Detector](#), above.

Aspect Ratio Overlay

Selecting this option with a check mark will overlay a number of common aspect ratio boxes on top of the source image. This is very helpful during the setup of the projector and can be turned OFF after desired specifications have been achieved.

LiteLOC™ Calibration

NOTES: 1) *LiteLOC™ Calibration takes up to two minutes. 2)* *For best results, allow the projector to warm up for 15 minutes prior to calibration.*

LiteLOC™ Calibration defines the range of power needed to maintain lamp brightness. Select **Calibrate LiteLOC** for calibration using your projector's unique specifications (recommended) rather than standard specifications. The projector will revert to the default back up in the event of a power failure. Refer to the *Lamp* menu for more details.

Intelligent Lens System (ILS™) Calibration

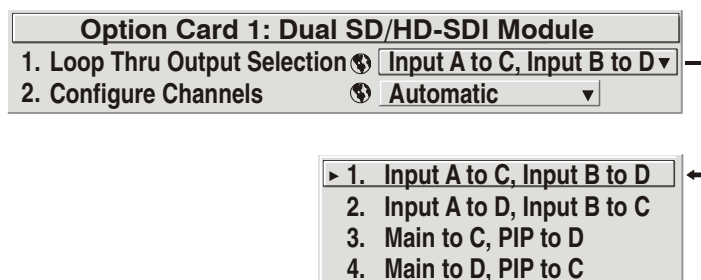
This option allows you to choose between 3 types of lens calibrations. Reference calibration determines a reference point that is used as a defined starting position for relative motion of the lens. All positioning is measured from this reference point. A reference calibration is lost when power is removed from the projector and will occur on every power up as long as ILS™ is enabled. A motion calibration determines the characteristics of each motor and values are saved in the projector's memory. If ILS™ is enabled and a motion calibration has previously been done, the projector will automatically recall these settings from memory when it's being powered up and a motion calibration will not take place. A full calibration performs both a reference and motion calibration.

Automatic ILS™ Lens Calibration

When this option is selected (default) and the projector is in ILS mode, the projector will perform a lens calibration on each power-up. During calibration, the shutter will be closed and the status LED will display 'LC'. If ILS™ is not selected, the ALC setting will be ignored. If, during power-up, ALC is not selected and ILS™ is, the last stored location from the previous ILS™ calibration will be assumed to be TRUE and the lens will moved to that position upon power-up if necessary.

3.6.5 System Configuration (Optional Input Modules)

The 2 "Option Card" entries in the **Configuration** menu identify which optional input modules (a.k.a. cards) are present at **INPUT 5** (Option 1) and **INPUT 6** (Option 2). If either of these option slots are empty, the corresponding read-only menu entry does nothing. If there is a module installed, the corresponding menu entry may activate a submenu of further options pertaining to that module.



For example, on *Roadster* and *HD* models, the *Dual SD/HD-SDI* module is factory-installed at **INPUT 5** (Option 1). The **Option 1 Card** submenu provides controls for configuring the various connections on this multi-input, multi-output module. As desired for your application, you can define 1) which physical input loops through to which output, and 2) which functional input (main or PIP signal) loops through to which output.

3.7 Working with PIP or Seamless Switching

PIP (Picture-in-Picture) and Seamless Switching are independent, but related projector features that both utilize 2 image-processing paths within the projector. In the case of Picture-in-Picture, this double processing enables you to display 2 different images simultaneously - typically a smaller "secondary" image within a large "primary" background. In a seamless switch (not currently available for this projector), the double processing essentially occurs between displays so that a full image relayed from 1 source can smoothly transform into a full image from another source. This change can be virtually instantaneous, or slowed as desired so that the current image appears to dissolve or "fade" into the new image.

NOTE: *PIP and Seamless Switching are not available on WU models.*

Options for enabling and controlling PIP and Seamless Switching all reside in the same menu. Note, however, that because both features utilize the projector's double processing capability, PIP and Seamless Switching cannot be used together. For example, fading a pair of PIP images into a new display from a different source is not possible.

For best PIP or Seamless Switching results, use two *different* signal types* as defined below. Do not mix 2 signals of the same type.

Signal Type	Description (Input Location)
#1	5 BNCs (RGBHV OR YPbPr)
#2	DVI - I (ANALOG OR DIGITAL)
#3	DECODED SIGNALS (INPUT 3, INPUT 4, COMPOSITE VIDEO, S-VIDEO, OR ANY VIDEO SIGNAL VIA INPUT 1 BNC CONNECTORS OR VIA AN ANALOG OPTION CARD).
#4	ANALOG OPTION CARDS
#5	DIGITAL OPTION CARDS
#6	DIGITAL OPTION CARDS

* HD interlaced sources are not recommended for the PIP window.

Other PIP or Seamless Switching tips to keep in mind include:

- When using 2 digital signals or 1 analog and 1 digital, each must be 165 mega pixels
- When using two analog signals, each must be 90 mega pixels
- Avoid using an interlaced source in the PIP window
- Seamless switching may affect image quality in some cases

3.7.1 Working with PIP

NOTE: Controls for the primary image are all accessed through the Main menu. To control the secondary (PIP) image, access picture controls through the PIP and Switching submenu.

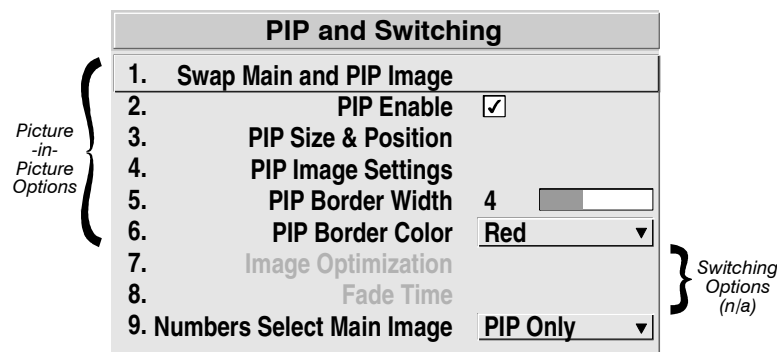


Figure 3-36 PIP Menu (Switching is not applicable for the Projector)

Use the first of 6 (1-6) options in the **PIP and Switching** menu to enable and define how you want to use PIP.

Swap Main and PIP Image

Toggle the current picture-in-picture relationship so that the primary (main) image becomes secondary (PIP), and the secondary image becomes primary. Swapping is available only when PIP is enabled (option 1).

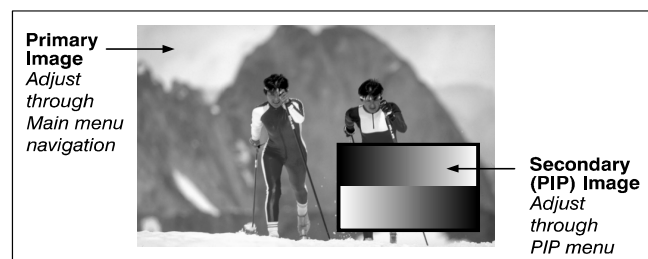
NOTE: There may be a slight delay when swapping the Primary and Secondary images.

PIP Enable

Short Cut: Press  from your presentation.

Toggle to display from two sources at once (Picture-in-Picture) or the primary source only. This check box turns the secondary source ON and OFF.

NOTE: Disable PIP for Interlaced sources > 35kHz.



PIP Size and Position Submenu

Most controls in the PIP Size and Position menu adjust the PIP (secondary) image in the same fashion as their counterparts in the main Size and Position menu adjust the main image. Refer to [Section 3.5.3 Image Settings Menu](#) for descriptions. Exceptions are as follows:

Position Presets

Set the location of the PIP (secondary) image in the display.

Aspect Ratio Presets

Choose the desired aspect ratio for your PIP window. A "Default" aspect ratio matches that of the projector, whereas "Anamorphic" will be a widescreen window. Choose according to your incoming source material.

Advanced Size and Position

Refer back to [Advanced Size and Position Submenu](#) for details.

PIP Image Settings Submenu

Adjust the PIP (secondary image) without affecting the size or position. The primary image remains unchanged. Refer to [Section 3.5.3 Image Settings Menu](#) for details.

PIP Border Width

Set the desired line thickness for your PIP window border.

PIP Border Color

Select the desired color for the PIP window border.

NOTES: 1) Numbers 7 and 8 on the Picture-in-Picture and Switching submenu control switching parameters. 2) Disable PIP in order to work with Seamless Switching. 3) Disable PIP and Best Switching for Interlaced sources > 35kHz.

PIP Size and Position			
1.	Position Presets	Bottom Right	▼
2.	Size	0.729	
3.	Vertical Stretch	1.090	
4.	Pixel Track	858	
5.	Pixel Phase	0	
6.	H-Position	360	
7.	V-Position	262	
8.	Aspect Ratio Presets	Anamorphic	▼
9.	Reserved		
0.	Advanced Size and Position		

3.7.2 Working with Seamless Switching

Seamless Switching is the ability to instantly and/or smoothly switch sources, and is controlled with options 7 and 8 in the **PIP and Switching** menu. To use *Seamless Switching*, PIP must be disabled.

Tips for best source switching:

- Ensure to configure a channel for each source.
- Progressive digital and analog sources are recommended
- Set *Image Optimization* to **Seamless Switching** (see below).
- For best results, use the same frame rate and gamma setting for each.

NOTE: Avoid using 2 interlaced sources.

Image Optimization

Use this setting to choose what is more important, image quality or switching between sources. Selecting **Best Image Quality** will ensure your image is always proper however when switching sources, the screen will go blank increasing your switching time. Smooth Switching allows for a cleaner transition between sources. The image will fade from 1 image to another according to the Fade Time control. Seamless Switching overrides the

Frame Lock Enable settings and forces the output to run at 60Hz regardless of the input signal. Image is 100% seamless when switching sources.

NOTE: *Disable PIP and Best Switching for Interlaced sources > 35kHz.*

Fade Time

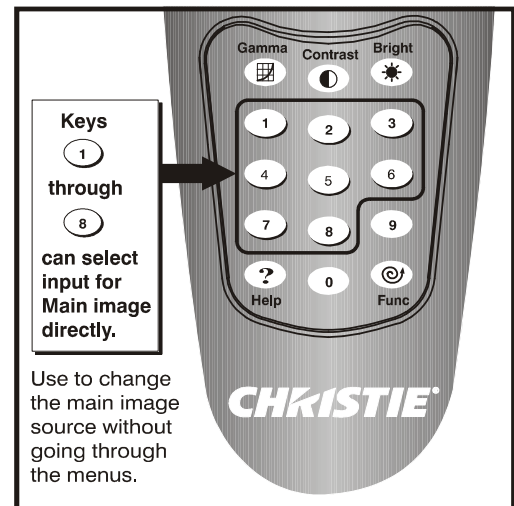
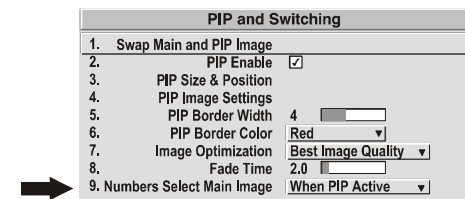
Set how long (in seconds) it takes to gradually dissolve 1 image into another for a source switch. Fading is available for single-image "best" source switching only. PIP cannot be in use, and Image Optimization must be set to *Best Switching*.

NOTE: *PIP must be disabled for Fade Time to take effect. Also, the PIP window must be closed to activate it.*

Numbers Select Main Image

Use the **Numbers Select Main Image** option to use the numeric keys #1-8 as **Input** keys. This remapping of the "lite" remote (refer to *Figure 3-35*) can be particularly useful with PIP displays, providing a convenient shortcut for changing the primary (background) image without first having to return to the **Main** menu. To use the keys in this manner all of the time, even with single displays, select **Always**. For normal remote function, select **Never** (default). Set to **When PIP Active** to activate number keys as number keys only when PIP is in use.

NOTE: *The functionality of the Numbers Select Main Image option only works when menus are closed.*



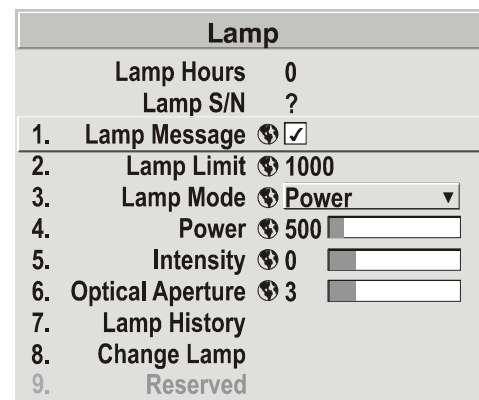
3.8 Working with the Lamp

3.8.1 Lamp Menu

Whenever you install a new lamp in the projector, access the Lamp menu to record the lamp serial number in the projector's memory. You can also choose a lamp mode for regulating power and light output, change optical aperture size (if present), and access other read-only information pertaining to past and present lamps.

Lamp Hours (read-only) shows the number of hours logged on the current lamp. Whenever you record a new lamp serial number this value automatically resets to "0", where it begins to log time for the new lamp. This information also appears in the Status menu.

Lamp S/N (read only) option is the serial number recorded for the current lamp. When you install a new lamp and enter its serial number, the number appears here.



Enter a check mark for **Lamp MESSAGE** to enable a warning message that appears upon power-up when the lamp has reached the specified lamp limit and should be replaced. Delete the check mark to prevent display of this message. Instead, when your lamp expires, only the status display messages on the back of the projector provides the visual warning to replace the lamp.

NOTES: **1)** *It is recommended that the Lamp Message check box remain enabled.* **2)** *When a lamp warning message appears, press  to temporarily cancel the message. The message will continue to appear each time you power-up until you install a new lamp.*

Set the **Lamp Limit** to the number of hours you expect to log on the current lamp before replacing it. This triggers a lamp message on-screen (if enabled).

NOTES: **1)** *If you change modes over the life of a lamp, the lamp limit you originally expected may no longer be possible.* **2)** *Turning the lamp ON and OFF reduces lamp life significantly, as do other factors.* **3)** *It is recommended that the Lamp Limit not exceed the warranted lamp life, otherwise a lamp could become dangerously fragile with overuse.*

Set which **Lamp Mode** you want to use in order to control the light output.

See [Figure 3-37](#). You can choose to run the lamp as bright as possible (i.e., always using maximum power-this is the default upon power up).

Alternatively, power the lamp with a specific wattage appropriate for the installed lamp, or you can set a specific intensity (brightness) to maintain. Although there are exceptions, generally higher light output or higher power settings can shorten lamp life.



Figure 3-37 Lamp Mode

Use the lamp mode that best suits your brightness needs. For example, in a tiled application you may want to precisely match brightness levels between adjacent images-judge by eye and set each individual **Lamp Power** setting as necessary. Or you may always want images to be as bright as possible, choose **Max Brightness**. Keep in mind that higher lamp power settings can shorten lamp life.

Lamp modes are described below.

Max Brightness

The lamp will always burn as brightly as possible, driven by 110% of the power level rating for the installed lamp. Refer to [Section 6 Specifications](#). Keep in mind that the "maximum brightness" for any lamp gradually diminishes with age and images become dimmer over time. Its current output level appears in the "Intensity" option (not in lumens).

Intensity

Brightness remains close to a specified level for as long as possible. Once you select this option, enter a number representing the Intensity level (brightness) you wish to maintain. The projector will automatically adjust power as needed to maintain this intensity as closely as possible. Note that the intensity value is a correlation only and does not represent an actual lumens level.

Power

The power supplied to the lamp remains at your specified wattage level. Once you select this option, enter the number of watts representing the power level you wish to maintain. See [Power](#) below.

Power

The **Power** sidebar and number indicates how many watts are applied to the lamp. You can apply anywhere from 60% to 100% of the lamp power rating.

Set for the number of watts as desired, keeping in mind that lower power levels produce dimmer images.



When in either **Power** or **Max Brightness** modes, the power level remains constant. Specifying a maximum power level here is the same as operating in **Max Brightness** mode, and will shorten lamp life.

NOTE: *Power level can be set only if the lamp is in "Power" mode.*

Intensity

This value and sliderbar represents the current brightness of your lamp, decreasing over time when you are operating in **Max Brightness** mode or at a specific **Power** level. When you are operating in **Intensity** mode, this value remains at the original *Intensity* setting chosen and cannot be adjusted.

NOTE: *The number shown for "intensity" is not the actual lumen output, but rather a correlated value only, 1246 may represent 3500 lumens, for example.*

To use **Intensity** mode, judge by eye or meter and set the level as desired for your application. Over time, the projector will automatically increase the power supplied to the lamp as needed to maintain the chosen intensity as closely as possible. This mode is known as "*Brightness Tracking*" or "*LiteLOC™*".

How Long Can I Maintain Brightness?

Software can maintain your "**Intensity**" setting until the required power exceeds the maximum rating for the lamp (2.0, 3.0, 4.5, or 6.0 kW) by approximately 10%. The lower the setting, the longer it takes to reach this threshold, and the longer you can maintain the desired brightness. Keep in mind that once the lamp power reaches its maximum wattage (see [Power](#), above), this tracking is no longer possible. At this point, the lamp gradually dims as usual, even though your original "**Intensity**" value still appears in the menu. To resume accurate tracking, reduce the intensity setting so that the resulting "**Power**" value is less than its maximum-the lower the intensity, the longer it can be maintained.

For example, a 1000-watt lamp (6.0 kW) can be safely driven at no more than 1000 watts. To produce desired brightness at the screen, a new lamp would likely need less than this maximum rating, perhaps 812 watts (example only). Over time, however, the lamp requires more and more current in order to generate the desired light, until eventually the lamp wattage reaches its 1000 "overdrive" maximum, and the lamp power automatically levels off. At this point, the tracking function terminates (i.e., the power level stabilizes) and the lamp begins to dim normally. Either reduce your "Intensity" setting or replace the lamp.

Do not lower the "**Intensity**" so much that the corresponding "**Power**" value reaches its minimum and the intensity setting is inaccurate, and cannot be maintained. For best results in achieving uniform intensity amongst tiled images, choose an "**Intensity**" setting that enables all lamps to operate at less than the maximum number of watts available in your projector, but high enough to keep the corresponding lamp power above its minimum. See [Power](#), above.

NOTES: **1)** *Lamps become more stable over time, thus a specific intensity is more easily maintained as the lamp ages.* **2)** *Intensity can be set only if the lamp is in "Intensity" mode* **3)** *Intensity cannot exceed the output of Max Brightness mode.*

Optical Aperture

This option is also available under the *Advanced Image Settings* menu. Refer to [Section 3.5 Adjusting the Image](#) for details.

Lamp History

This read-only option lists the lamps most recently installed and recorded in the projector. **Lamp History** automatically updates whenever you record a new lamp serial number-the new lamp is added to the bottom of the list.

Lamp History	
S/N	Hours
1234	1999
5678	27

Use **Change Lamp** to record the serial number for a newly installed lamp:

In the **Lamp S/N** window, use the number text entry keys to record the new lamp serial number, and press ENTER again to accept the change (refer to [Figure 3-38](#)). Refer to [Section 3.3.5 Using Slidebars and Other Commands](#) if you need help entering the number. Once entered, the new lamp serial number is added to the **Lamp History** menu and the **Lamp Hours** timer resets to "0". *Lamp Mode* and *Lamp Limit* remain as they were for the previous lamp, and can be changed at any time.

NOTE: To scroll through letters/alpha numerics, refer to [Section 3.3.7 Editing Numerical Values](#).

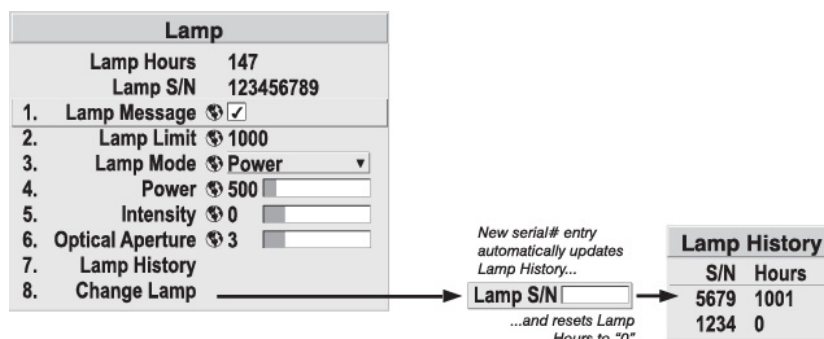


Figure 3-38 Recording the New Lamp Serial Number

NOTE: Enter a serial number only if you have just installed a new lamp. This helps to ensure that the lamp timer is not reset on an old lamp and that the number of hours logged on the lamp is accurate.

IMPORTANT! Always record the serial number of a NEW lamp.

3.8.2 How Old is My Lamp?

When a new lamp is installed and its serial number recorded by selecting "**Change Lamp**" in the **Lamp** menu, the lamp timer resets to "0" and begins logging time for the new lamp. This tally appears in both the **Lamp** menu (see [Figure 3-39](#)) and the **Status** menu.

To review the number of hours logged for previous lamps, consult the **Lamp History** menu.

3.8.3 When to Replace the Lamp

If the **Lamp Message** check box has been enabled in the **Lamp** menu (recommended), an expiry message appears upon power-up when the lamp has reached its defined **Lamp Limit**.

In addition, the LED's next to the built-in keypad will flash "LP" when lamp time has expired. The lamp should be replaced.

The **Lamp Limit** setting should never exceed the lamp's lifetime warranty by more than 20%, as an old lamp becomes increasingly fragile and more prone to sudden failure.

Refer to [Section 4.2 Lamp and Filter Replacement](#) and [Section 6 Specifications](#).

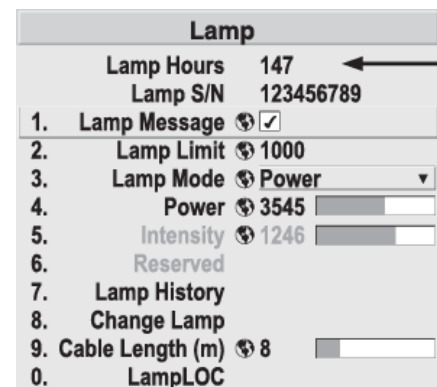


Figure 3-39 Lamp Hours

3.9 Status Menu

The read-only **Status** menu lists a variety of details about the standard and optional components currently installed in the projector. Refer to the **Status** menu for versions of hardware and software installed, the type (size) of lamp defined in projector memory, its current, voltage and hours logged in total and for a specific period (such as a rental period), and for your projector model name and serial number. In addition, the **Status** menu identifies the current channel, its location, its frequencies and other details.

Scroll the full **Status** menu using the  and . Use the  and the  for page UP/DOWN.

3.10 Using Multiple Projectors

When an installation requires multiple projectors, you can use the RS-232 and/or RS-422 serial ports to daisy chain the units together and control the group with a single keypad, remote or a computer/controller connected to the first projector. In such a network, you can choose to broadcast commands to the entire group, or use the

 key as desired to limit responses to an individual projector. Or you may prefer that each projector in an installation stands alone and responds only to a unique transmission protocol from its own remote.

Alternatively, you may want to add projectors to a hub on an Ethernet network. Refer to [Section 2.6 Connecting Multiple Projectors](#) for full routing details.

NOTE: Refer back to [Section 3.6 Adjusting System Parameters and Advanced Controls](#) for complete information about communicating with multiple projectors.

3.10.1 Matching Colors In Multiple Screens

In a multiple-projector wall, you will likely want to precisely match color and intensity from image-to-image so that the full wall is as uniform as possible. This matching is typically done in conjunction with brightness uniformity and edge blending.

Preliminary Calibration

As a final part of the manufacturing process, all primary colors in the projector are precisely set to pre-established values to ensure that overall color performance is optimized and is as accurate as possible (refer back to [Figure 3-32](#)). Upon installation at a site, however, lighting and other environmental factors may slightly change how these colors appear on your screen. While the change is negligible in most cases, you may prefer to recover the originally intended color performance before trying to match colors from several projectors. Or you may be renting a projector in which the colors were changed for use at its previous site, but are not ideal for yours.

The good first step in achieving such consistency is to use a color meter to measure the native primary colors (red, green, blue, and white) as they appear at the screen and record these as **Color Primary Settings** in the **Service** menu (password-protected) for each projector. On the basis of these new values, which are stored in memory, each projector will then automatically calculate any necessary corrections to reproduce the original factory colors under the current environmental conditions. This essentially calibrates a projector to its surroundings, compensating for factors such as screen type; lamp and/or ambient lighting that can alter the final color characteristics on-screen, and will improve color accuracy and consistency in a group of projectors. It ensures a good starting point for further customizing and matching.

To return to the factory-set color primaries, such as when a projector is moved to different site, you must access the **Service** menu (password-protected). Select the **Reset to Factory Defaults?** option in the **Color Primaries** submenu. Then repeat the calibration process describe above, if desired, and continue with matching of colors.

Color Adjustment Procedure

Once the **Color Primary Settings** are calibrated for the site (see above), use the Color Adjustments by X, Y menu to further refine each projector's fundamental primary colors so that the hue and intensity of each color appears the same from 1 display to another. Once matched, you will have created a single new shared range of colors or "color gamut" that all projectors can produce. This palette-named User 1, 2, 3 or 4-can be applied or disabled for a source at any time throughout a bank of adjacent displays, simplifying both the setup and maintenance of a "seamless" wall.

1. Set up and optimize all projector settings. You can ignore color temperature, since you will be defining a new color palette, but do set up each projector in every other aspect. Closely align all screen edges.
2. Assign projector numbers to make communications easier. Use a wired remote.
3. Use the same lamp mode for all projectors, and do the following:
 - Start **Select Color Adjustment** to "Max Drives".
 - Display a full white test pattern.
 - Adjust lamp power until white fields appear the same brightness.
4. Display the **Color Adjustments by X, Y** menus for all projectors. Each menu shows the x/y coordinates defining the "Max Drives" color gamut for this projector. Write down the values shown in one (any) of the displays. Refer to [Figure 3-40](#). Or use "Copy From" to copy these into a "User" gamut for this projector.

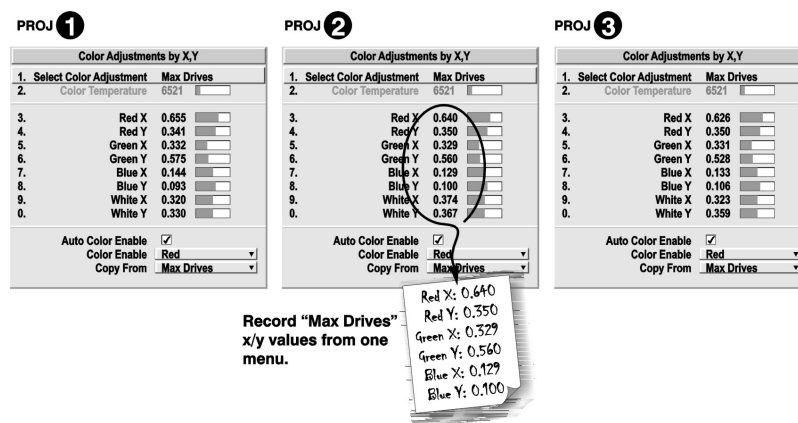


Figure 3-40 Jot Down a Set of "Max Drives" X/Y Values

5. In each projector, select a "User" color adjustment (1-4) to enable *Color Adjustments by X, Y* changes. Then enter your recorded x/y values into each menu.

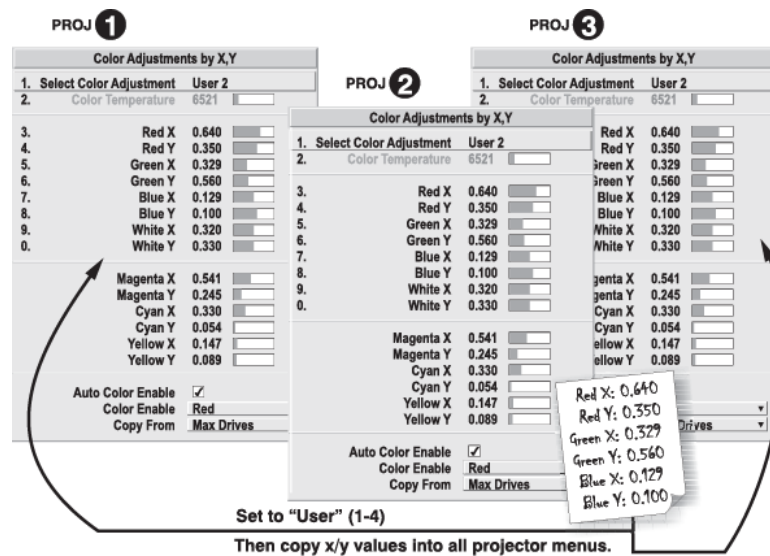


Figure 3-41 Copy X/Y Values into All Projectors

6. In each projector, judge by eye and adjust x/y coordinates slightly in the following manner:

- To match reds, decrease "Red X" until full field red screens match.
- To match greens, decrease "Green Y" until full field green screens match.
- To match blues, increase both "Blue X" and "Blue Y" until full field blue screens match.

NOTE: For speed, enable the "Auto Color Enable" check box. Each color coordinate you select automatically triggers a full field display of the corresponding color.

IN ALL PROJECTORS:

Alternatively, use the *Color Saturation* menu for these adjustments or to fine tune.

These coordinate adjustments move the 3 color points closer together (refer back to the chromaticity chart shown in [Figure 3-32](#)) to establish a "shared" gamut attainable by all projectors in your group. Adjust only as necessary to ensure the resulting color palette is as large as possible. When done, you may need to adjust lamp power slightly.

7. All screens should now be color-matched. Apply this new "User" gamut to a source at any time by selecting it in the "Select Color Adjustment" list accessed in the **Advanced Image Settings** menu.

Using the Color Saturation Menu for Color Matching

You may prefer to use the **Color Saturation** menu to match colors across multiple screens. In the **3 Color Adjustment** submenus (Red, Green, Blue. See [Figure 3-42](#)) set all main values to "100" and the secondary values to "0". Then judge by eye and adjust the slidebars as needed.

NOTE: Adjustments here define new x/y coordinates in the *Color Adjustments by X, Y* menu.

For best results, the **Color Adjustments by X, Y** menu should be used first.

Figure 3-42 Color Matching Using Color Saturation Menu

3.10.2 Achieving Brightness Uniformity

What is Brightness Uniformity?

When used to refine screens already matched for their primary colors (refer to [Section 3.10.1 Matching Colors In Multiple Screens](#)) and overall light output, proper adjustment of *Brightness Uniformity* can create an exceptionally smooth screen in which:

- No area of the screen appears more red, green or blue than another.
- No area of the screen appears brighter than another color and light output from 1 screen closely matches adjacent screens.
- Color and light output from 1 screen closely matches adjacent screens.

Although the **Brightness Uniformity** control can be used for a stand-alone projector, it is particularly useful for setting up and maintaining tiled images that form a cohesive display wall in which the color "cast" and light output appear uniform throughout each image as well as throughout the entire wall. The procedure provided here assumes a multiple-screen application.

Before You Begin

Read through the entire procedure before attempting to adjust **Brightness Uniformity** controls, and keep in mind the following checklist of prerequisites and guidelines:

- **Adjust colors first.** Adjust the primary colors as described in the "Matching Colors in Multiple Screens" procedure (above) before attempting to work with **Brightness Uniformity**. This ensures that primary colors, color temperature, and maximized light output are all well matched from 1 screen to another. These matches are needed before you can achieve good Brightness Uniformity results.
- **Run for 100 hours.** Light output and **Brightness Uniformity** can vary significantly during the first 100 hours of lamp use. For best results with new lamps, either set up **Brightness Uniformity** after this period, or do an initial setup and re-check at 100 hours.

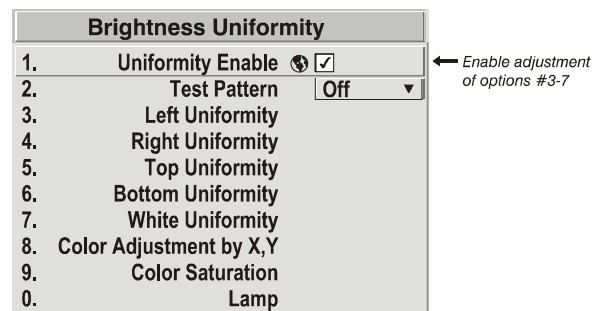
- **Set lamp power.** Make sure each "Lamp Power" setting is as high as possible for your application while still maintaining a good overall match of light output from screen-to-screen. By nature, achieving a uniform brightness will require a slightly reduced overall brightness, this reduction will help ensure that you have enough range of adjustment when examining brightness variables more closely from screen-to-screen, and will help prevent premature "maxing out" when trying to match to a certain color, zone or projector.
- **Use a "User" color temperature.** Always adjust **Brightness Uniformity** for a User color temperature defined when you matched primary colors, and continue to use it for all sources displayed on the wall. Your other color temperatures will not necessarily be matched from screen-to-screen.
- **White Uniformity sliderbars.** **White Uniformity** sliderbar values may not always reduce to "0". Each sliderbar adjusts overall light output in a specific screen zone, but the value shown represents the current setting for green in this zone. When other "hidden" values (red or blue) are lower than green, during adjustment in the **White Uniformity** menu their values reaches "0" first, causing the sliderbar to stop earlier than expected.
- **Judge by eye or use a meter.** Good brightness uniformity can be achieved with either technique.

Step 1: General Setup

1. Adjust primary colors (refer to [Section 3.10.1 Matching Colors In Multiple Screens](#)) to ensure matched overall color temperatures and light output between screens.

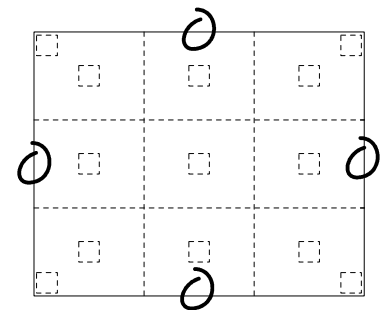
IMPORTANT! Double-check that all WHITES and LIGHT OUTPUT are well-matched.

2. Enable the **Uniformity Enable** check box. This enables access to the uniformity controls and applies the settings to your image.
3. Select the 13 Point test pattern for display. This pattern provides 9 screen "zones" with 13 targets.



FOR BEST RESULTS! Rather than examining the CENTER of each zone when assessing Brightness Uniformity adjustments, focus on extreme EDGES as indicated in the illustration shown to the right.

4. In either **Color Adjustment** menu, select a color. Then:
 - If you have created a "User 1" color gamut (recommended) for a well-matched wall, select "User 1" and continue to Step 6.
 - If you prefer maximum brightness rather than a particular color temperature, select "Max Drives".



IMPORTANT! Do not change User 1 Color Adjustment in color-matched applications!

- In the **White Uniformity** menu, set the "Overall" output level to 50.0 and all remaining slidebars to 0.0. This decreases the light output just enough throughout the screen so that any color level can then be increased later as necessary for matching light output from zone-to-zone. Do not exceed **50.0** for "Overall". A higher level will likely interfere with achieving brightness uniformity, and is not recommended.

Ensure that overall light output remains well matched from 1 screen center to the next. Where necessary, increase or decrease Lamp Power slightly to recover center matches.

White Uniformity		
1.	Left Side	0.0
2.	Right Side	0.0
3.	Top Edge	0.0
4.	Bottom Edge	0.0
5.	Top Left Corner	0.0
6.	Top Right Corner	0.0
7.	Bottom Left Corner	0.0
8.	Bottom Right Corner	0.0
9.	Overall	50.0 ← Set to 50.0
Adjust light output of entire screen.		

Step 2: Adjust Color (level of red/green/blue) in 8 Zones

NOTE: At this point, ignore menu colors and the brightness of individual zones.

- On each screen, compare the color temperatures in the 8 target zones (4 edges and 4 corners) to that of the color temperature of the center. Compare using a white field only, and take note of any areas that do not match the center. Also decide if any screen exhibits a more obvious color shift than other screens. Begin with this screen in Step 2.
- Return to the **Brightness Uniformity** menu. Beginning with the screen that exhibits the most obvious color shift(s), for each edge that exhibits a noticeably different color temperature from the center, select the corresponding **Uniformity** adjustment menu (Left, Right, Top or Bottom). For example, if any part of the left side is too blue, too red or too green, adjust the colors in the **Left Uniformity** menu (i.e., change their light output) until all portions of the left side closely match the center color temperature. Adjust an edge first (focusing on its center), and then adjust its corners. See [Figure 3-43](#).

Left Uniformity		
1.	Left Side, R	5.6
2.	G	15.6
3.	B	35.2
4.	Top Left Corner, R	19.5
5.	G	35.1
6.	B	70.5
7.	Bottom Left Corner, R	71.3
8.	G	79.1
9.	B	68.1
Color Enable		White
Adjust light output of entire left side. Look at center of side.		

Examine test pattern.

Adjust color(s) in each zone as required, matching to center zone.

Recommended:

- 0~40 for edges
- 0~80 for corners

Figure 3-43 Match Zones to Center Color Temperature

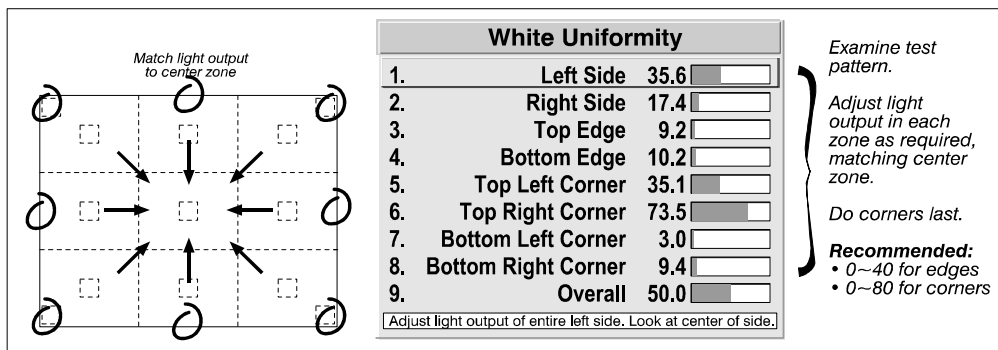
- Repeat the color adjustment of sides and corners for each edge of the screen that does not yet match the center.

NOTE: Each corner is adjustable in either of its two adjacent "side" menus.

- When done, all areas of a given screen should match. Repeat Steps 2a and 2b for all remaining screens.

Step 3: Adjust Light Output in 8 Zones.

- For each screen, compare the light output of each edge and corner to that of the center. If any of the areas differ, use the **White Uniformity** menu to match edges and corners to the center as described below (see [Figure 3-44](#)). Begin with the screen exhibiting the most obvious variations in light output.
 - Adjust edge **White Uniformity** first-note that each edge adjustment also affects the rest of the screen slightly. Keep all edges just slightly lower than the center light output rather than matching light output precisely. Otherwise, it may not be possible to brighten the corners (typically the dimmest areas of the screen) enough, i.e., the best uniformity is a compromise between the brightest and darkest areas of the screen.
 - Adjust corner **White Uniformity** last-each corner adjustment affects only this quadrant.
 - Repeat for each screen.

**Figure 3-44 Match Zones to Center Light Output****Step 4: Re-adjust Color Temperature (level of red/green/blue) in 8 Zones.**

Return to Step 2 and, if necessary, fine tune the zones so that they all still exhibit a single color temperature.

Canceling Brightness Uniformity

If you do not want to use or apply **Brightness Uniformity** settings, clear the "Uniformity Enable" check box at the top of the **Brightness Uniformity** menu.

3.10.3 Edge Blending

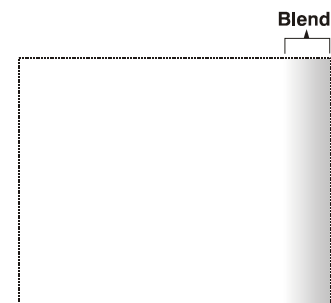
Christie Edge Blending is an innovative set of software functions that can quickly and easily blend whitelevels along the edges of multiple adjacent projected images to create a single seamless larger image.

What is a Blend?

In simple terms, a blend appears as a gradient strip along an edge of a projected image. It is darkest along the extreme edge of the image, and lightens nearer to the rest of the image (see [Figure 3-45](#)). This area runs along the edge of the projector's internal DMDs (display area); it cannot be located on interior pixels.

How Are Blends Used?

In multiple-projector walls, complementary blends between neighboring images can compensate for the extra "brightness" or intensity where these edges overlap.

**Figure 3-45**

By controlling blend width and other properties, you can achieve uniformity across the group of images. Visible overlaps disappear as illustrated in [Figure 3-46](#).

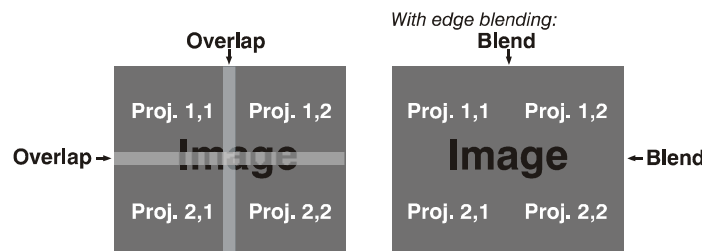


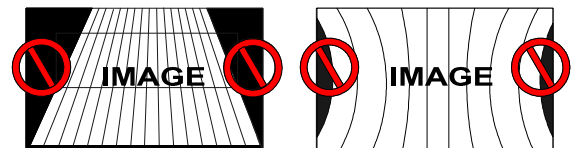
Figure 3-46 Edge Blending Concept

NOTE: Tiling is done at the source

For best results, use the same projector model and type throughout your display wall. In addition, avoid high-gain screens whenever possible. The optical performance of such screens demands minimal image offset, thus projectors must be located very close to one another. It should be noted that the requisite tiling of the image (with data repeated along internal edges that will overlap) must be correctly handled by your source.

Flat Blends vs. Warped Blends

Flat Blend. It is important to remember that the projector's standard edge blending controls affect the outer edges of the projector's display panel, and that each blend is consistent along its length. Refer to [Figure 3-45](#). The standard **Edge Blending** menu controls can blend multiple flat full-panel displays if they have no keystoneing or optional warping applied.



Requires Christie TWIST

Warped Blends. When using the optional *Christie TWIST™* module for warping images on to curved screens, work with its separate *Christie TWIST™ PC* application to create more specialized blends required. Such a blend can vary along its length to compensate for curves.

Once downloaded to the projector, simply apply the desired custom "user" blend by selecting it in the **Blending Enable** drop-down list.

Optional Blinders

If desired, you may wish to install the optional mechanical blinders at the projector lens. These adjustable blades help to blend blacklevels along edges of the image, and are available in a separate kit.

Since the *blinders* and *Edge Blending* menu controls are intended to complement each other, with blinders primarily affecting blacklevels and software primarily affecting whitelevels, together these components produce the best blends possible for any type of flat image. Or, depending on your projector model and your application needs, you may prefer to utilize only the standard software controls. For example, you may find that the edges of white or very light images can be well-blended without blinders. In other more unusual applications with only a very small area of overlap, you may need only the blinders.

Standard edge blending software controls are located in the 2-page **Edge Blending** submenu access via the **Configuration** menu > **Geometry and Color** submenu > **Edge Blending**. The **More** option opens the second page of the **Edge Blending** submenu.

Main Functions

Use edge-blending controls to set the precise width, shape and midpoint you need to blend overlapping edges together smoothly.

- **Blend Width** determines how much area is used for blending along an overlapping edge. Slidebar values represent the number of 8-pixel steps used for the blend. For example, a setting of "3" creates a blended edge 24 pixels wide. A setting of "0" signifies no blending. For best results in most applications, use a blend width of 16-48 steps (128-384 pixels).

RANGES: 0-80 horizontal, 0-60 vertical

- **Blend Shape** determines the rate of roll-off across the blend width, i.e. how quickly the white levels across the blend change from light and dark. Increasing the **Blend Shape** setting accelerates the rate of change at both extremes so that less of the region appears mid-gray (see [Figure 3-47](#)).
 - Decreasing the **Blend Shape** setting slows the rate of change so that more of the region appears mid-gray. For most applications, this subtle control is best left close to 50.

(NOTE: Simulation shown darker for printed page)

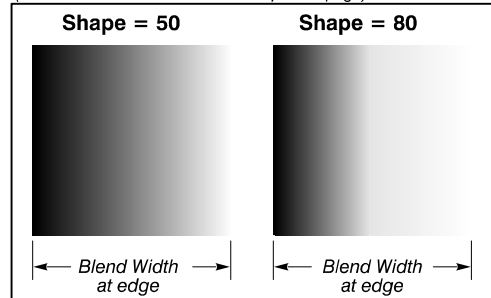


Figure 3-47 "Shape" Examples

- **Blend Midpoint** determines the white level at the blend midpoint (the point equidistant between the beginning and end of the blend). Increasing the **Blend Midpoint** setting creates a blend that appears brighter than the rest of the image. Decreasing the **Blend Midpoint** setting creates a blend that is darker than the rest of the image. A setting of 50 means the midpoint is approximately 50% black-for best results in most applications, keep fairly close to this default. See [Figure 3-48](#).

(NOTE: Simulation shown darker for printed page)

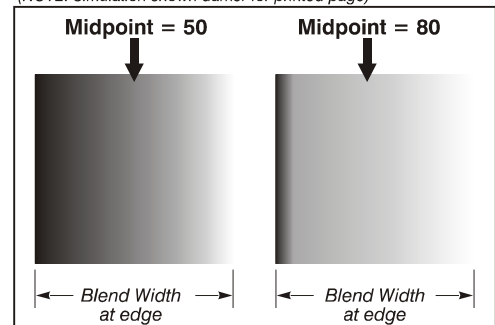


Figure 3-48 "Midpoint" Examples

- Show **Blending Overlap** turns your defined blend width area to solid gray so that 2 adjacent images can be seamlessly aligned simply by overlapping their gray bars, if needed. Toggle the **Show Blending Overlap** OFF to reactivate the blend effect.

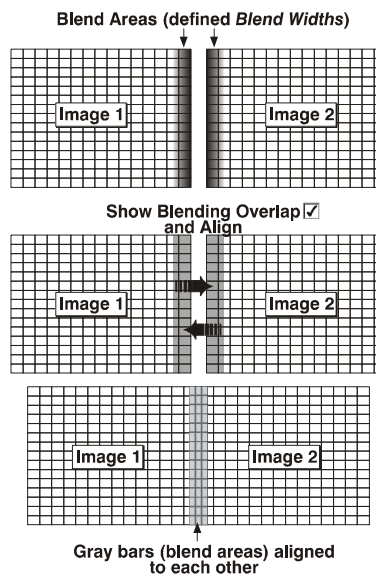


Figure 3-49 Overlap Example

NOTE: *Show Blending Overlap* appears as *Reserved* when Christie TWIST is installed.

Other Functions

For convenience, the **Edge Blending** submenu also includes related options for enabling a specific color and/or test pattern, or for working with colors or the lamp. Such functions duplicate those provided elsewhere in the Menu system.

Edge Blending Procedure

Before You Begin. Make sure your source hardware and/or software can supply a tiled image for the number of projectors in use, and that the tiling includes overlapping data of approximately 12.5-25% along shared edges (see [Figure 3-50](#)). Tiling is not built into this model of projector.

Physically align the projectors and images from your intended external source, then match colors and *Brightness Uniformity*.

IMPORTANT! *For a shared edge, all Blend procedures and settings should be identical on BOTH projectors.*

1. Start with 2 full-screen projector images overlapping by approximately 12.5-25% each. Display a full white field test pattern from both.
2. In the **Edge Blending** submenu, enable the top check box to activate all controls.

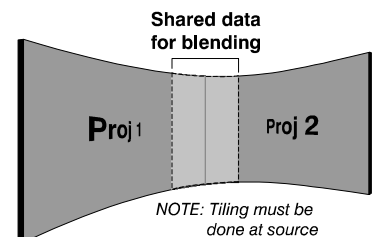


Figure 3-50 Tiling Example

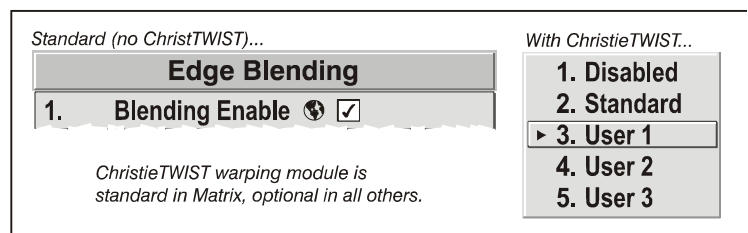


Figure 3-51 Edge Blending Submenu

NOTE: If the optional Christie TWIST™ module is installed, a drop-down list replaces this check box (see Figure 3-51). Select the desired user-defined blend created for your current warp; no further blending at the projector is required. Or, to simply edge blending a non-warped flat image, select "Standard" and continue with Step 3.

3. SET STARTING POINTS FOR ADJUSTMENT.

- Set all blend widths to 0.
- Go to "More" and set everything in the **Edge Blending (2)** menu to 50.

Edge Blending	
1.	Blending Enable ☒
2.	Test pattern Off
3.	Left Blend Width 0
4.	Right Blend Width 0
5.	Top Blend Width 0
6.	Bottom Blend Width 0
7.	Color Enable White
8.	Lamp
9.	Show Blending Overlap ☒
0.	More
Use or disable Edge Blending. Refer to Help and Manual.	

Edge Blending (2)	
1.	Left Blend Shape 50
2.	Left Blend Midpoint 50
3.	Right Blend Shape 50
4.	Right Blend Midpoint 50
5.	Top Blend Shape 50
6.	Top Blend Midpoint 50
7.	Bottom Blend Shape 50
8.	Bottom Blend Midpoint 50
9.	Color Enable 50
Adjust shape of blend curve on the left side. Refer to instructions.	

Figure 3-52 Set Starting Points for Each Projector

4. **Set Blend Width.** On 1 projector, increase the Blend Width for an overlapping edge (for example, if the projector's image is on left, its right edge overlaps the adjacent image-adjust **Right Blend Width**). Use the same setting on the second projector for this shared edge.
5. Re-adjust width (both projectors) until the overly bright band at the midpoint of the overlapping blends disappears or just changes to very light gray. For the shared edge, use the same **Blend Width** setting on each projector. If the "best blend" appears to be between two settings, choose the wider setting for both projectors.
6. **Check Blend.** If the blended region appears too dark or light in relation to the rest of the image:
 - Increase **Blend MidPoint** in both projectors to "lighten" the overall blend, decrease to "darken" the overall blend.
 - Adjust **Blend Shape** in both projectors to fine-tune change the amount of mid-gray intensity (as opposed to black/white) in the blend.
7. Repeat with remaining projectors / overlaps.
8. Check completed display wall with the desired external signal.
9. Adjust mechanical alignment if necessary to maintain perfect pixel-on-pixel alignment over time.

In applications where you are projecting only white or light images, the Blend Width may be slightly higher-set according to how much overlap you have between images.

- Recommended overlap is 12.5% - 25%

3.10.4 Black Level Blending

Similar to Edge Blending, Black Level Blending allows you to adjust the black level hues of multiple adjacent projected images to create 1 large seamless display. Edge blending must be enabled in order to use the Black Level Blending features.

The use of the **Black Level Blending** feature and the use of the Christie TWIST™ module are mutually exclusive. On WU models, Keystone is only available when Christie TWIST™ is in use.

If Christie TWIST™ is installed, and Black Level Blending is desired:

1. Disable use of warps or 2D Keystone.
2. Enable **Edge Blending**; if not enabled.
3. Enable **Black Level Blending**.
4. Power down the projector, then power up again.

Adjustments can now be made to black level controls.

To restore the use of Christie TWIST™:

1. Disable black blending.
2. Power cycle the projector.
3. Begin using the TWIST™ controls.

Black Level Blending Procedure

NOTES: **1)** *Adjust white levels before adjusting black levels.* **2)** *The zones in BLB menu correspond to the Edge Blend zones. If a given Edge Blend zone width is set to 0 (i.e. no blend on that side) then the corresponding BLB zone is disabled. It only becomes accessible when that Edge Blend zone is active.*

1. Start with two projectors. Select the black test pattern for both projectors from the **Geometry and Color** submenu.
2. In the **Black Level Blending** submenu, enable black blending by putting a check mark in the check box for each projector.
3. Working with 1 projector at a time, use the center brightness slide bar to adjust the center brightness (brightness of the non-blended region) so that the center intensity matches that of the brightest blended region (the center of all images when blending a 2 x 2 display is the target area).
4. Use the following 3 color slidebars, Black Red Level, Black Green Level and Black Blue Level, so the black hue of each projector matches.

Black Level Blending			
1.	Black Blending Enable		☒
2.	Center Brightness		0
3.	Black Red Level		128
4.	Black Green Level		128
5.	Black Blue Level		128
6.	Top		
7.	Bottom		
8.	Left		
9.	Right		

5. You can choose which of the next 4 options, Top, Bottom, Left, Right, to use depending on which edge of the projector you are working with has been edge blended. The blend width can be adjusted to line up properly but by default it corresponds to the edge blending setting determined for that edge.

Top		
1.	Top Brightness	123
2.	Top Left Brightness	0
3.	Top Right Brightness	0
4.	Top Width	117
5.	Black Red Level	128
6.	Black Green Level	128
7.	Black Blue Level	128

Not applicable when blending two projectors (corresponds to sides selected in Edge Blending menu).

6. The brightness and black hues of the blended region can be adjusted in more detail in case fine-tuning is needed (may be only necessary for blending a 2 x 2 projector display because of blending differs for the sides and center).

NOTES: 1) The menu options vary depending on the Edge Blending parameters. 2) You may need to re-adjust the black level hues following the overlap adjustments on each blended edge. 3) When adjusting 6 or more projectors, you need to ensure that the hue and brightness of each target area is matched as closely as possible.

3.11 Remote Control of the Projector

As an alternative to using a remote, most projector functions can be controlled remotely, typically at a controller such as a PC, via 1) simple bi-directional ASCII messaging on an Ethernet or serial communication link or 2) a web interface or "ChristieNET™" on an Ethernet network.

Via ASCII Messaging. Connect a serial link between your controller and the RS-232 or RS-422 port (recommended), or open an Ethernet socket (i.e., Telnet) between your controller and the valid projector address. Valid ASCII codes and messages are documented in the *Christie Serial Communications* document available on the Christie website.

Via Web Interface. Connect your PC to the projector's Ethernet port. In your web browser (Internet Explorer, for example), enter the IP address of the projector you wish to control. This initiates a password-protected ChristieNET™ application. Enter the factory default "ccm7" login and password to open the program. If the projector is powered up, you can access assorted menu options and slidebars.

Repeat for remaining networked projectors as desired. Keep in mind that multiple units can be controlled from 1 PC, but each unit will be in its own ChristieNET™ interface (web browser) at the PC. Likewise, you can make up to 4 separate web locations to a single projector.

The default login provides access to security settings, where you can define other users with the same or fewer rights. Use "unlimited" rights for most applications. For all logins, the **Service** menu is still protected with its own password.

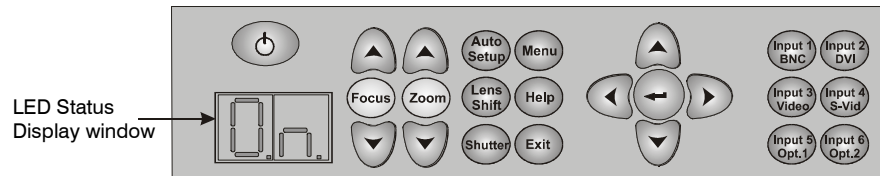
NOTES: 1) Any proxy server settings that interfere with this type of link should be disabled for using ChristieNET™. Disable through Internet Explorer's Tools > Internet Options > Connections > LAN Settings. 2) Your PC must be Java-enabled to v1.4.2 or higher to run ChristieNET™. 3) Depending on your projector model, certain controls provided through ChristieNET™ are non-functional.

3.12 Error Conditions

Occasionally the projector will encounter an error condition that can interrupt normal operation. Such a condition can be caused by a simple invalid entry, an input signal error (most common) or a system error. The manner in which users are to be notified of error conditions is set in the **Menu Preferences** menu:

- To see error messages displayed on-screen, select the **Screen** option
- To be notified via a serial communication only, select the **RS-232** option.
- To receive both types of notifications, select **All**.
- To disable error messages (except for "invalid user key entry", which can't be hidden), select **OFF**.

NOTE: *Text-based status/error messages also appear in the LCD Status Display window above the built-in keypad at the rear of the projector. They are accompanied by their corresponding 2-digit error code next to the built-in keypad, legible at a greater distance. Normal operation is indicated by the "00" status code.*



3.12.1 User Errors

Invalid User Entry

A keypad entry not recognized by the projector triggers a short on-screen error message identifying the problem. For example, if you specify a channel number that is not available, the message "Invalid Channel will appear.

Or if you try to enter the wrong password, you'll see "Invalid Password". Press  or  to clear the message, and try again.

NOTE: *On-screen display of "Invalid User Entry" messages cannot be disabled, even if Display Error Messages has been set to "OFF".*

3.12.2 Input Signal Errors

An input signal error message occurs if you are in presentation level (i.e., there are no menus present) and have selected an input on which the projector detects a problem. While menus remain operational and any key press will temporarily remove any displayed error message, you must resolve the signal problem in order to permanently eliminate the message.

No Signal

The message "*No signal*" occurs when there is no source signal detected at the selected input, both HSYNC and VSYNC are inactive, and the screen background is black. Connect or correct the signal, or try another input.

Bad Sync

The message "*Bad Sync*" occurs when HSYNC or VSYNC are active, but the signal cannot be displayed. Such a condition occurs when only 1 of the 2 sync signals is present, or when either sync signal is unstable or of the wrong frequency. Correct the signal or select another input.

Other Signal Error Messages

In addition to the common "Bad Sync" and "No Signal" errors, you may encounter a signal error message indicating that HSYNC and/or VSYNC are either too fast or too slow. When such a message appears, check the frequencies shown in the Status menu. If they are correct, then the projector does not recognize the signal.

On some PCs you may be able to change the settings to generate a compatible signal. If the frequencies shown in the Status menu are incorrect, check the cabling to see where the problem might originate.

3.12.3 System Warnings/Errors

When the projector encounters a system malfunction, either a System Warning message or a System Error message may appear. Both types of messages are accompanied by a numerical error code on the "Status" LED and a related text message in the **LCD Status Display** window. A system malfunction can be cleared by pressing EXIT twice from the presentation level, but may indicate the need for service by a Christie accredited service technician.

NOTE: *System messages appear on-screen only if Display Error Messages has been set to "Screen" or "All".*

System Warnings

A system warning indicates that a system malfunction has been detected (see Status LED Codes, below). A system warning message replaces any input signal message and disappears when the input signal status changes. While the projector will remain operational, the message indicates the presence of a potentially serious problem that should be reported to the manufacturer. You can press  twice to remove the message, but for best results you should reset the projector-power the projector down and up again with the  key.

System Errors

A system error message indicates that a serious malfunction has been detected and must be reported to the manufacturer as soon as possible (see [The Status LED Codes](#), below). The projector will no longer operate, and must be reset. Power the projector down and up again with the  key.

The Status LED Codes

If the status code displayed on the back of the projector shows one of the following values, you have encountered a likely system error requiring the attention of a Christie accredited service technician (refer to [Section 3.12.3 System Warnings/Errors](#), above). Acknowledge and clear the error by pressing  twice from presentation level, or try resetting the projector by powering it off and on again, cooling when necessary. Consult [Table 3.6](#) and contact your dealer if the problem persists.

The specific code number identifies the source of the error detected, and is particularly useful in cases where the projector is too far away to read the accompanying text message in the LCD status display window.

For example, the code "27" means the lamp could not be turned on. Error codes for this projector are listed in [Table 3.6](#).

Table 3.6 System Error Codes

Code	Description
GENERAL	
12	Software error. Contact dealer/factory.
13	CRC error in flash ROM. Download new software.
14	Engineering-only programming is complete. Call Christie, replace TIPM.
15	Attempting to download s/w code without being in boot mode
16	Invalid interrupt. Power off/on. If persists, contact dealer/factory.
17	User has forced system to stay in boot mode
18	Attempting to program boot mode without jumper
LAMP / BALLAST	
20	The lamp is unexpectedly on (likely a ballast and/or wiring problem)
22	1 or more high-current lamp cables is not connected
26	Lamp door is open (interlock)
27	Lamp cannot ignite
28	Lamp has turned off unexpectedly
29	Lamp ballast is overheated
2C	Lamp communications fault; ballast is not detected
SENSORS for COOLING	
40	Lamp has shut down due to fan failure
46	The red TEC (DMD) has overheated
48	The blue TEC (DMD) has overheated
49	The prism has overheated
4C	Projector has shut down due to critical error
4D	Integrator has overheated
4E	Inadequate lamp air intake rate (interlock)
4F	Inadequate air exhaust rate (interlock)
FANS (note: there are no Fans 1 or 2 in this projector)	
53	Fan 3 has failed (side [rear] intake fan)
54	Fan 4 has failed (side [front] intake fan)
55	Fan 5 has failed (lamp exhaust fan)
56	Fan 6 has failed (LAD fan)
57	Fan 7 has failed (card cage fan)
58	Fan 8 has failed (heat exchanger fan — for liquid cooling system)

Table 3.6 System Error Codes

10-bit IMAGE PROCESSOR (TIPM)	
60	Boot code CRC failed
61	Unable to program the DigMux PLD
62	Unable to program the Control PLD
63	Unable to program the Bubks PLD
64	Unrecognized ROM type
65	Write to flash ROM failed
66	General TIPM failure
67	Downloaded code will not fit into ROMs
68	Communication error with scaler on TIPM
BUILT-IN KEYPAD or ID EEPROM	
70	Unable to access the built-in keypad EEPROM
71	EEPROM on the built-in keypad has re-initialized
IRAM (a.k.a. Panel Driver) or IRAM/TIPM Communications, or EFIB or Modular Formatters	
80	Unrecognized IRAM (a.k.a. Panel Driver)
81	Unable to program a device on the IRAM
82	TI flash download fault — critical error
83	TI flash download fault — partial success
84	TI flash download fault — partial success
85	TI I ² C fault (write failure)
87	Consecutive RDRAM faults from modular Formatters
90	Red modular Formatter link failure
91	Green modular Formatter link failure
92	Blue modular Formatter link failure
93	Modular Formatter Architecture error
94	Modular Formatter / DMD mismatch
95	Modular Formatter sequence mismatch
96	EFIB not responding to I ² C messages
BACKPLANE OR OPTIONAL MODULES	
A0	Unable to program the optional interface module
A1	Unable to power the optional interface module
A2	Unable to program the Backplane
A3	Unable to program the Warp Module option (<i>Christie TWIST</i>)

4 Maintenance

Installers, service trained operators and all other users must maintain a safe operating environment at all times. Read through this section in its entirety and understand all warnings and precautions before attempting to operate the projector. Refer to [Section 1.2 Safety Warnings and Guidelines](#).

4.1 Projector Location

Operate the projector in an environment that meets the operating range specifications in [Section 6 Specifications](#). Do not operate the projector close to water, such as near a swimming pool.

Do not place the projector on an unstable cart, stand or table. If the projector is going to be ceiling mounted, only use the Christie-approved ceiling mount fixture designed for your projector.

A projector and cart combination should be used with care. Sudden stops, excessive force, and uneven surfaces may cause the projector and cart combination to overturn.



4.2 Lamp and Filter Replacement

LAMP: Do not operate the Bubble lamp for more than the lamp's warranty limit; risk of the lamp shattering increases as a result of changes in the quartz glass that occur with use. Operation beyond the lamp's warranty limit also significantly reduces brightness output.

⚠ WARNING Wait approximately 5 minutes after powering down the projector to allow internal cooling fans to stop and for the lamp to cool sufficiently before removing.

⚠ WARNING Never attempt to remove the lamp housing directly after use. The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Allow cooling completely.

The Bubble lamp operates at a very high temperature and pressure. Failure to allow the lamp to sufficiently cool prior to handling could result in an explosion causing personal injury and/or property damage. After turning the projector off it is important that you wait at least 5 minutes before unplugging it. This provides enough time for the internal lamp cooling fans to cool the lamp and to automatically shut off. Cool completely before handling.

⚠ WARNING Use only lamps supplied by Christie. Use lamps of the correct wattage for your projector model when replacing.

FILTER: Replace the front filter when you replace the lamp or sooner. If this filter is not replaced, airflow may become restricted and cause the projector to overheat.

Refer to [Section 4.6 Replacing the Lamp and Filter](#) for the complete replacement procedure.

⚠ WARNING Use Christie approved filters ONLY.

4.3 Power Cord and Attachments

⚠ WARNING The North American rated line cord is provided with each projector. Ensure that you are using a line cord that meets the appropriate rating standards.

Only use attachments or accessories recommended by Christie, such as the specific power cord supplied. Use of other attachments or accessories with this projector may result in the risk of fire, shock or personal injury.

⚠ WARNING Use only the AC power cord supplied. Do not attempt operation if the AC supply and cord are not within the specified voltage and power range. Refer to Section 6.

- Do not allow anything to rest on the power cord. Locate the projector where persons walking on it or objects rolling over it cannot abuse the cord.
- Operate the projector at the specified voltage only. Do not overload power outlets and extension cords as this can result in fire or shock hazards.
- The projector is equipped with a 3-wire plug having a third (grounding) pin. This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to have the outlet replaced. Do not defeat the safety purpose of the grounding-type plug.

4.3.1 Ventilation

Slots and vents in the projector provide ventilation. Never block or cover these openings. This ensures reliable operation of the projector and prevents overheating.

- Do not place the projector over a radiator or heat register. The projector should not be placed in an enclosure unless proper ventilation is provided.
- Do not insert objects into the ventilation openings of the projector. They may touch dangerous voltages or short-out components resulting in a fire or shock hazard. Do not spill liquids of any kind into the projector. Should an accidental spill occur, immediately unplug the projector and have it serviced by a qualified service technician.

4.3.2 Servicing

If any of the following conditions exist, immediately unplug the projector from the power outlet and refer service to Christie accredited service personnel.

- The power cord has been damaged.
- The internal cooling fans do not come on within two minutes after the projector is first turned ON.
- Liquid has been spilled into the projector.
- The projector has been exposed to excessive moisture.
- The projector does not operate normally.
- The projector has been dropped or the case has been damaged.
- Projector performance has deteriorated.

⚠ WARNING Do not attempt to service the projector yourself. All servicing must be performed by Christie accredited service technicians.

Use replacement parts that are manufacturer-approved only. Use of any other part other than the ones specified by the manufacturer can result in fire, electric shock or risk of personal injury and irreparable equipment damage.

4.4 Cleaning

Table 4.1 Maintenance Guide

Part Description	Frequency	Action
LENS	AS REQUIRED	CLEAN: CLEAN THE LENS ONLY WHEN ABSOLUTELY NECESSARY. A SMALL AMOUNT OF DUST ON THE LENS HAS VERY LITTLE EFFECT ON PICTURE QUALITY. TO CLEAN: USE A SOFT LINT-FREE CLOTH WITHOUT ANY CHEMICALS. USE ONLY A HIGH-QUALITY COATED OPTICS CLEANING FLUID, WHICH CAN BE PURCHASED FROM MOST CAMERA SUPPLY STORES. APPLY THE COATED OPTICS FLUID DIRECTLY ONTO THE LINT-FREE CLOTH UNTIL MOISTENED. WIPE IN A SINGLE SWEEP ACROSS THE SURFACE OF THE LENS. TO AVOID SCRATCHING THE LENS DO NOT SCRUB OR RUB IN A CIRCULAR MOTION. DISCARD THE CLOTH AFTER EVERY USE. DO NOT USE CLEANING TOOLS TREATED WITH ETHER. DO NOT USE CLEANING SOLVENTS THAT CONTAIN AMMONIA. USE COMPRESSED AIR TO REMOVE ANY PARTICLES REMAINING ON THE LENS.
LAMP	AS REQUIRED	CLEAN (GLASS ONLY): CLEAN IF ABSOLUTELY NECESSARY. NEVER TOUCH THE GLASS SURFACE OF THE LAMP. FINGERPRINTS LEFT ON THE GLASS WILL SERIOUSLY DEGRADE LAMP PERFORMANCE OR CAUSE “HOTSPOTS” WHICH CAN LEAD TO AN ACCUMULATION OF INTENSE HEAT IN THE TOUCHED AREA AND CAUSE THE LAMP TO SHATTER. TO CLEAN: WAIT UNTIL LAMP IS COOL. MOISTEN A CLEAN, LINT-FREE COTTON CLOTH WITH ISOPROPYL ALCOHOL AND GENTLY RUB THE SURFACE OF THE GLASS IN A CIRCULAR MOTION UNTIL CLEAN.
	1000 HRS OR SOONER IF REQUIRED	REPLACE: REFER TO Section 4.2 Lamp and Filter Replacement PROCEDURE LATER IN THIS SECTION.
FILTERS	WHENEVER A LAMP IS REPLACED OR SOONER IF REQUIRED	REPLACE: DO NOT REUSE OLD FILTERS. USE THE FILTER PROVIDED IN THE CHRISTIE LAMP AND FILTER KIT.
COVERS (EXTERNAL)	AS REQUIRED	CLEAN: CLEAN DUST FROM EXTERNAL COVERS USING A CLEAN, LINT FREE COTTON CLOTH AS REQUIRED. NOTE: BEFORE CLEANING THE MODULES, IT IS RECOMMENDED THAT YOU INSTALL THE LENS CAP. THIS WILL KEEP DUST PARTICLES FROM SETTLING ON THE GLASS SURFACE OF THE LENS.

NOTE: Before cleaning the modules, it is recommended that you install the lens cap. This will keep dust particles from settling on the glass surface of the lens.

⚠ WARNING Proper face shield and protective gloves are required if the lamp module is removed from the projector.

4.5 Replacing Keypad Batteries

The IR remote keypad requires 2 AA size, 1.5V batteries (preferably alkaline).

To install new batteries:

1. Open the battery compartment at the backside of the remote by placing your thumb in the oval depression and sliding the cover out about ½ inch. Refer to [Figure 4-1](#). Remove the old batteries and properly discard. Wait a minute or two.
2. Place the new batteries in the compartment, orienting the positive/negative of each battery according to the labels in the compartment. When the batteries are in place, replace the cover by placing the cover ½ inch from its closed position and slide it into place. Do not force the cover.

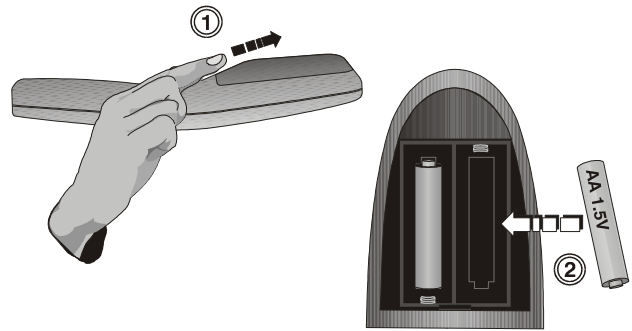


Figure 4-1 Replacing Batteries

NOTE: Always wait a minute or two when replacing batteries so that the internal electronics discharge and can recognize the change.

4.6 Replacing the Lamp and Filter

For this procedure you will need the appropriate Roadster S+12K, Roadster HD12K/Matrix WU12/Mirage WU12/Mirage HD12/Mirage S+12K, Roadster S+16K/Mirage S+14K/Mirage S+16K or Roadster S+20K/HD18K/Mirage HD18/Mirage WU18/Mirage S+20K Lamp and Filter Replacement Kit manufactured by Christie Digital Systems. See [Table 4.2](#).

Table 4.2 Lamp and Filter Kits

Projector Model	Lamp Type (Watts)	Lamp/Filter Kit Required
ROADSTER S+12K (38-DSP210-XX)	2.0 kW	03-900519-51P
ROADSTER HD12K (104-010101-XX)	2.0 kW	003-120135-XX
MATRIX WU12 (104-064101-XX)	2.0 kW	003-120135-XX
MIRAGE HD12 (104-027101-XX)	2.0 kW	003-120135-XX
MIRAGE WU12 (104-063100-XX)	2.0 kW	003-120135-XX
MIRAGE S+12K (104-066103-XX)	2.0 kW	003-120135-XX
ROADSTER S+16K (38-DSP214-XX)	2.4 kW	03-900518-51P
MIRAGE S+14K (38-DSP214-XX)	2.4 kW	03-900518-51P
MIRAGE S+16K (104-067104-XX)	2.4 kW	03-900518-51P
MIRAGE HD18 (104-022101-XX)	3.0 kW	003-000306-XX
MIRAGE HD18 (104-022138-XX)	3.0 kW	003-000306-XX
MIRAGE HD18 (104-022127-XX)	3.0 kW	003-000306-XX
MIRAGE HD18 (104-022116-XX)	3.0 kW	003-000306-XX
MIRAGE WU18 (104-065102-XX)	3.0 kW	003-000306-XX
MIRAGE WU18 (104-065135-XX)	3.0 kW	003-000306-XX
MIRAGE WU18 (104-065124-XX)	3.0 kW	003-000306-XX

Table 4.2 Lamp and Filter Kits

Projector Model	Lamp Type (Watts)	Lamp/Filter Kit Required
MIRAGE WU18 (104-065113-XX)	3.0 kW	003-000306-XX
ROADSTER HD18K (104-021101-XX)	3.0 kW	003-000306-XX
ROADSTER HD18K (104-021137-XX)	3.0 kW	003-000306-XX
ROADSTER HD18K (104-021126-XX)	3.0 kW	003-000306-XX
ROADSTER HD18K (104-021115-XX)	3.0 kW	003-000306-XX
ROADSTER S+20K (104-001101-XX)	3.0 kW	003-000306-XX
ROADSTER S+20K (104-001135-XX)	3.0 kW	003-000306-XX
ROADSTER S+20K (104-001124-XX)	3.0 kW	003-000306-XX
ROADSTER S+20K (104-001113-XX)	3.0 kW	003-000306-XX
MIRAGE S+20K (104-068105-XX)	3.0 kW	003-000306-XX

A bubble lamp permanently mounted inside its own protective assembly provides the high brightness of your projector. Using this module beyond its warranted life is not recommended—changes in the quartz of the bulb can lead to reliability problems, poor performance or sudden lamp expiry. The filter should always be changed when the lamp is replaced, or sooner in dusty environments.

The lamp module is calibrated for maximum performance and brightness in this projector. Do not attempt to re-align or adjust the lamp module.

4.6.1 How Old is My Lamp?

The number of hours logged on the current lamp appears both in the **Lamp** menu and the **Status** menu. In the **Status** menu, do not confuse "Lamp Hours" with "Lamp Counter" which indicates the number of hours logged during the current rental period only and is normally used for rental projectors only.

NOTE: *As the lamp nears its limit (as set in Lamp Limit), a message can appear on screen to warn that the lamp needs to be replaced. The LED's next to the built-in keypad will flash "LP" when lamp time has expired. To ensure this warning appears, enter a checkmark in the Lamp Message check box located in the Lamp secondary menu.*

4.7 Lamp Replacement Procedure

TOOLS: A Phillips #2 screwdriver is required. All access panels' screws are ¼-turn to lock/unlock.

⚠ WARNING A Christie accredited service technician must perform lamp replacement.

⚠ WARNING Cool the lamp completely and handle by the housing only.

⚠ WARNING Install the correct wattage lamp supplied by Christie (see above) and read the Lamp Replacement procedure in its entirety before proceeding.

⚠ WARNING Do not touch the glass surface of the lamp. Fingerprints left on the surface can lead to an intense accumulation of heat called a "hotspot", which could potentially result in the lamp shattering. It is recommended you wear clean, lint-free gloves and a face shield when working with the lamp.

1. TURN THE LAMP OFF

Press  (POWER) to switch the lamp OFF. Allow the cooling fans to stop automatically (within approximately 5 minutes) before proceeding with Step 2. This wait period is also required to allow the lamp to sufficiently cool before handling.

2. UNPLUG THE PROJECTOR

When the cooling fans have stopped, turn the projector's main switch OFF, and unplug.

⚠ WARNING Always power down and unplug the projector prior to servicing. Allow the lamps to cool before handling

3. OPEN THE LAMP DOOR

⚠ WARNING Protective gear required. Wear a face shield.

Using a #2 Phillips screwdriver, loosen the ¼-turn lock screws (2) securing the lamp door, which is located at the rear of the projector below the Input panel. See [Figure 4-2](#).

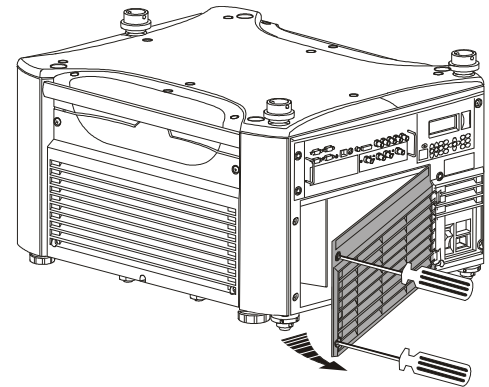


Figure 4-2 Open Lamp Door

4. REMOVE LAMP RETAINING BAR

Remove the two (2) screws that secure the retaining bar along the bottom edge of the lamp module using a #2 Phillips screwdriver. See [Figure 4-3](#). Swing the bar aside—it is hinged on the left.

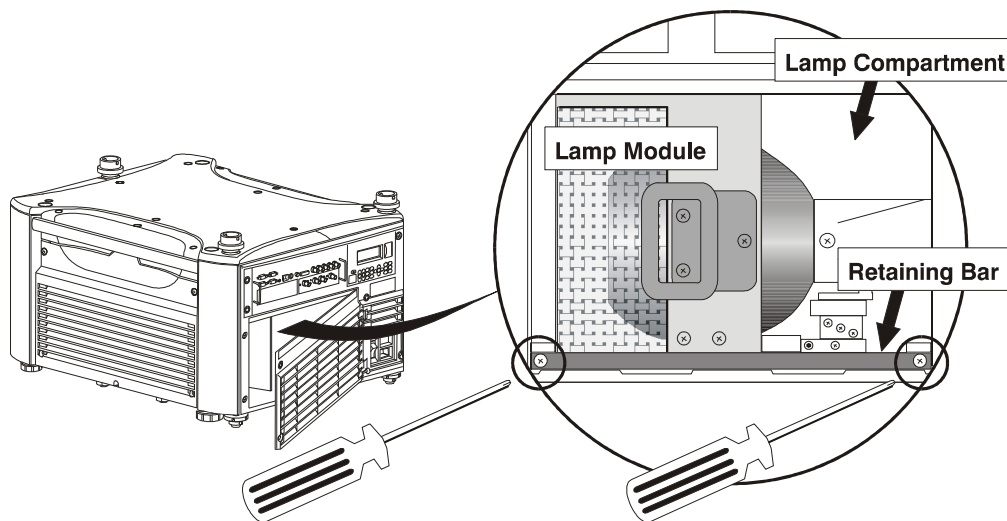


Figure 4-3 Remove Retaining Bar

5. REMOVE THE LAMP MODULE

Firmly grasp the handle and pull the lamp module straight out of the projector. See [Figure 4-4](#). Discard the lamp using safe disposal/recycling practices.

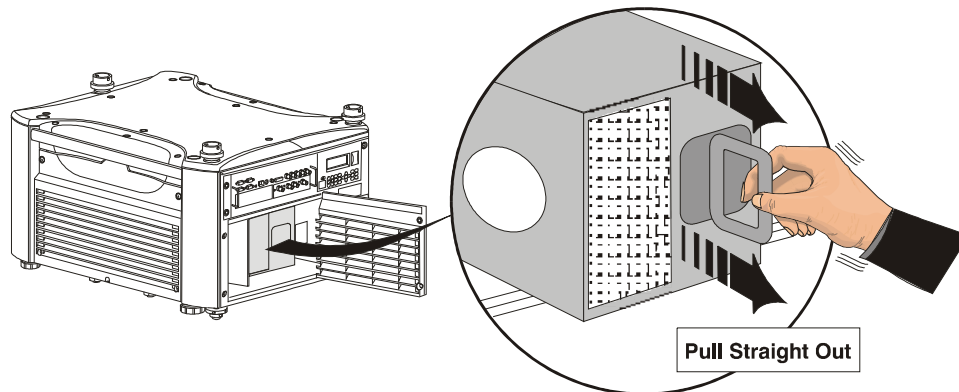


Figure 4-4 Remove Lamp Module

6. INSERT THE NEW LAMP MODULE

Align the base plate of the new lamp module under both side alignment guides (see [Figure 4-5](#)). Slide the module fully into the projector in the same orientation you removed the old lamp module. Push with normal force until the resistance increases, then firmly push module another ½ inch.

NOTE: *The lamp module must make full contact with the lamp connectors. Increased resistance when sliding the module in indicates initial contact with these connectors-push firmly at this point.*

Right side of lamp compartment shown.

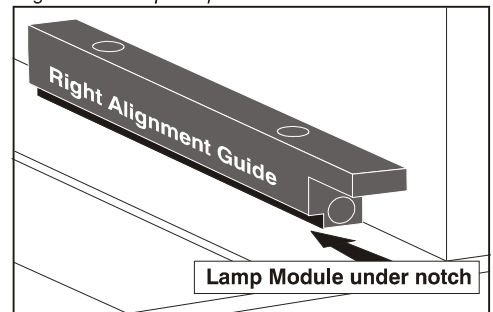


Figure 4-5 Right Alignment Guide

⚠ WARNING Improper installation could cause a serious meltdown inside the projector.

7. RE-INSTALL LAMP RETAINING BAR

Position the retaining bar along the bottom edge of the lamp module, with its ends under the alignment guides. If the bar does not fit, push the lamp module further in. See [Figure 4-6](#).

IMPORTANT! The tightening order of the screws is critical for proper lamp contact and alignment.

- Secure screw B until just engaged.
- Secure screw A until just engaged.
- Go back and forth between **A** and **B** to lock the bar in place with even pressure and correctly position the lamp module.

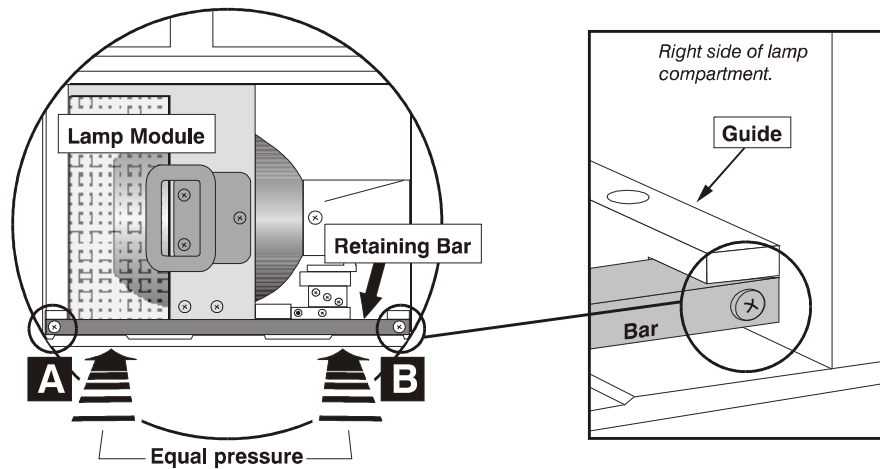


Figure 4-6 Install Retaining Bar

8. CLOSE LAMP DOOR

Close the lamp door and lock its two (2) $\frac{1}{4}$ -turn lock screws.

IMPORTANT! The lamp module is calibrated for maximum performance and brightness in this projector. Do not attempt to re-align or adjust the lamp module.

9. RECORD THE SERIAL NUMBER OF THE NEW LAMP

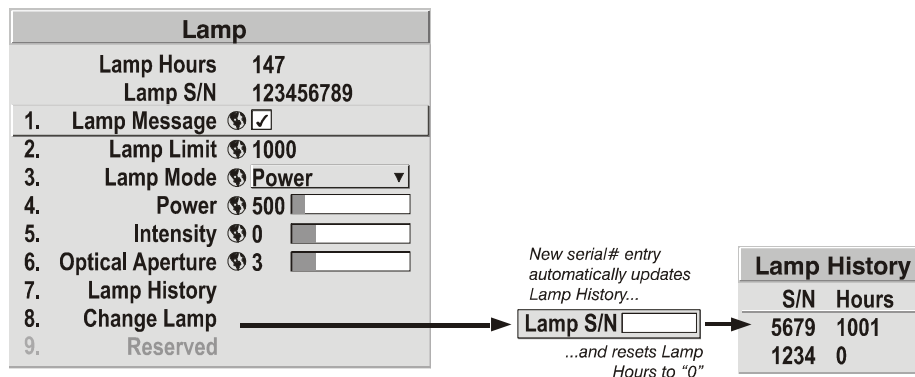


Figure 4-7 Lamp Serial Number

- Plug in the projector and power it UP.
- In the **Lamp** menu, select "**Change Lamp**".
- In the **Lamp S/N** text box, enter the serial number.
- Press to record the number and to reset the lamp timer. The timer will now begin to log time for the new lamp.

IMPORTANT! If you neglect to enter a serial number, the lamp timer will not reset to "0" and will therefore be inaccurate. The lamp life limit may then expire prematurely.

4.7.1 Filter Replacement Procedure

⚠ WARNING Use Christie approved filters **ONLY**.

The filter located at the front side of the projector should be replaced whenever the lamp is replaced. If you are working in an extremely dusty environment you may want to replace the filter sooner. Use the filter provided in the Christie approved Lamp and Filter Kit for your specific projector model (refer to [Table 4.2](#)).

1. TURN OFF THE PROJECTOR, COOL AND UNPLUG.

Before removing or installing a filter, turn OFF the projector and allow it to cool for 5 minutes before unplugging.

2. REMOVE FILTER DOOR.

Loosen the ¼-turn screw at the top of the filter grille/door. Lift the door away from the projector. See [Figure 4-8](#).

NOTE: In the Roadster S+20K/HD18K & Mirage HD18/WU18/S+20K, also remove the triangular metal filter brace.

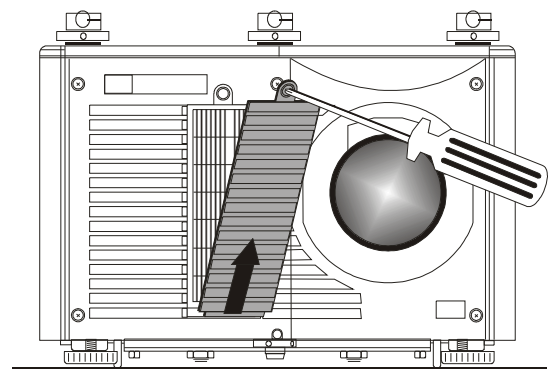


Figure 4-8 Remove Filter Door

3. REPLACE FILTER.

Remove the old filter and insert the new one. Follow the airflow arrows for correct orientation. See [Figure 4-9](#). In the Roadster S+20K/HD18K & Mirage HD18/WU18/S+20K, which has a rhomboid-shaped filter, insert the sharply angled corner first - place fully back on the left. Ensure the triangular metal filter brace is installed after the filter has been positioned. See [Figure 4-10](#).

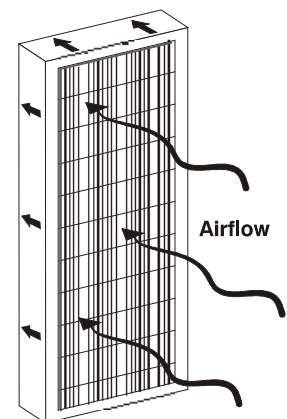


Figure 4-9 Remove Lamp Module

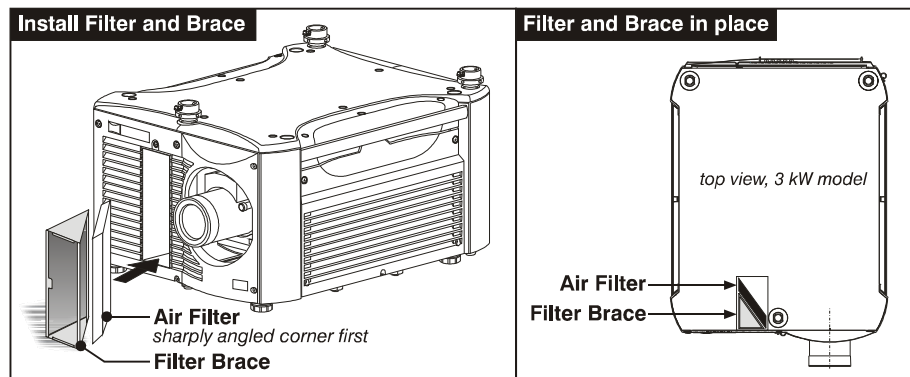


Figure 4-10 Installing the Angled Air Filter (3.0kW models only)

4. RE-INSTALL THE FILTER GRILLE/DOOR.

Secure with the single top screw.

4.8 Replacing the Projection Lens

A variety of lenses can accommodate different throw distances and specific types of installations. Refer to [Section 6 Specifications](#) for more details. To change a lens, follow the steps below.

1. TURN OFF THE PROJECTOR, COOL AND UNPLUG.

NOTE: *If necessary, a lens can be swapped out while the projector is running, but this can result in dust being drawn into the projector. Avoid if possible.*

Before removing or installing any lens, turn off the projector and allow the fans to cool the lamp before unplugging the projector. Ensure that the lens cap is ON.

⚠ WARNING Unplug the projector.

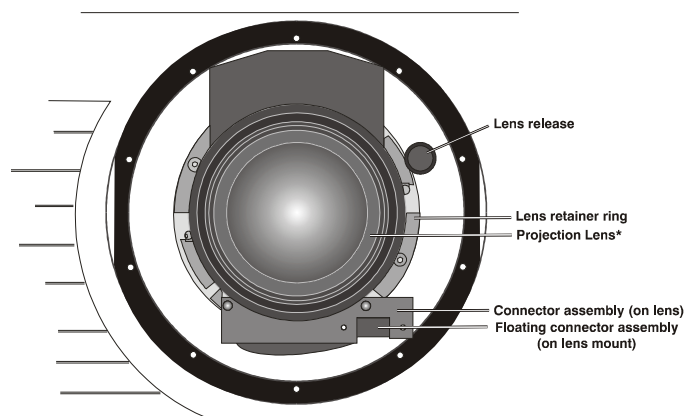


Figure 4-11 Lens Parts

2. INSTALL THE LENS CAP AND PRESS THE LENS RELEASE BUTTON.

See [Figure 4-12](#).

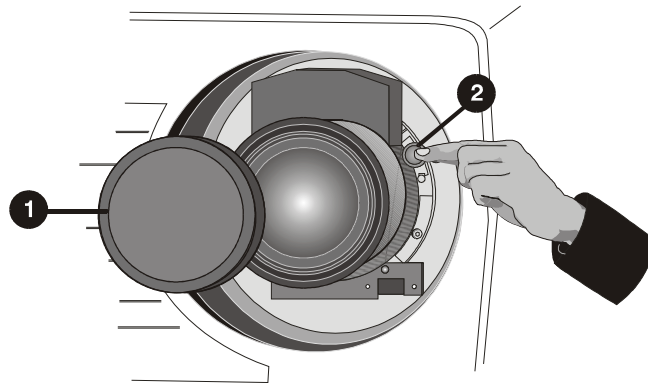
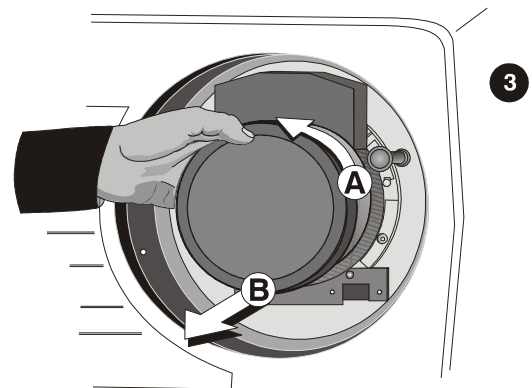


Figure 4-12 Depressing Lens Release

3. ROTATE THE LENS.

Rotate the lens counter-clockwise until the tabs are free from the lens retainer ring. See **A** in [Figure 4-13](#).

NOTE: *The connector slide assembly allows the connector to move as the lens is rotated.*



NOTE: *Connector assembly will move as you turn the lens.*

Figure 4-13 Rotating the Lens

4. PULL LENS OUT.

Lens connectors will disconnect when you pull the lens straight out from the projector. See **B** in [Figure 4-13](#).

5. INSERT NEW LENS.

NOTE: *Remove small rear cap! Keep front cap on.*

Electrical connector: Line up male connector on the lens with the female connector on the connector slide assembly.

Insert lens: Align the tabs on the lens plate lock with the slots in the lens retainer ring. Push the lens in until the tabs touch the back of the retainer ring.

Rotate the lens: To ensure the lens is secured in the lens mount, turn it clockwise until you feel the tabs on the lens butting against the end stops on the lens mount retaining ring. To ensure the locking pin is properly engaged, turn the lens counter-clockwise. If the lens does not turn counter-clockwise, the locking pin is properly engaged. If the lens turns counter-clockwise, the locking pin is not properly engaged; in this case, turn it clockwise and pull the lens plunger assembly out until the plunger assembly stops. Recheck by turning the lens counter-clockwise. The lens should not rotate.

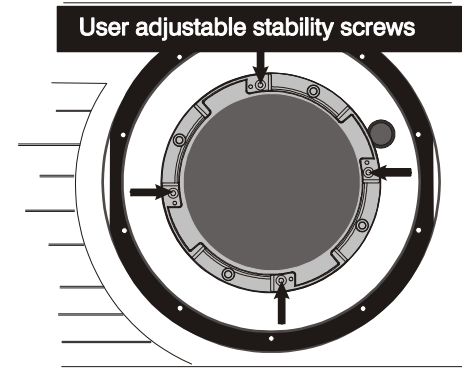


Figure 4-14 Adjustable Screws on Retaining Ring

Secure stability screws (optional): For added stability, secure the adjustment screws provided on the lens retaining ring (see [Figure 4-14](#)). If you have installed a large zoom lens, one or more of the screws may be inaccessible—simply tighten those that are accessible.

NOTE: *Recommended for heaviest lenses such as 0.73:1 and 1.2:1.*

6. POWER UP.

Remove the lens cap and power up the projector.

7. REPOSITION THE PROJECTOR FOR NEW LENS.

Reposition the projector closer or further from the screen as necessary for the screen and the new lens type, refer to lens descriptions in [Section 2 Installation and Setup](#) and [Section 6 Specifications](#). In a permanent installation, always use the appropriate throw distance formula to calculate the best position for the projector ([Figure 4-15](#)).

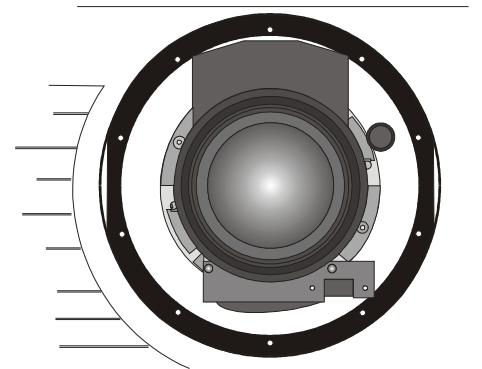


Figure 4-15 View With Zoom Lens Installed

5 Troubleshooting

If the projector does not appear to be operating properly, note the symptoms present and use the following guide to assist you. If you cannot resolve the problems yourself, contact your dealer for assistance.

NOTE: *A Christie accredited service technician is required when opening an enclosure to diagnose any "probable cause".*

5.1 Displays

5.1.1 Blank screen, no display of image

1. Confirm all power connections are still OK.
2. Ensure the lens cap has been removed.
3. Ensure the shutter is OPEN.
4. Ensure a full black test pattern has not been selected for display. Press  +  to access test patterns, then cycle patterns with the  and the  keys.
5. Is the input selected? Check connections.

5.1.2 Blacklevels seem too high

Reduce **Brightness** setting.

5.1.3 Image appears "squeezed" or vertically stretched into center of screen

1. Check your **Resizing** selection.
2. The anamorphic lens (optional) may be needed for this source.

5.1.4 The projector is ON but there is no display

1. Was a lens cover accidentally left on? Remove lens cover.
2. Ensure the shutter is OPEN.
3. Is the lamp ignited? Check for interlock problems such as an open lamp door.
4. Is the correct input selected?
5. Is the source connected properly? Check the cable connections and ensure the correct source is selected.
6. Is the AC power connected?
7. Can you access test patterns? If so, check your source connections again.

5.1.5 The display is jittery or unstable

1. If the display is jittery or blinking erratically, ensure that the source is properly connected and of adequate quality for detection. With a poor quality or improperly connected source, the projector will repeatedly attempt to display an image, however briefly.
2. The horizontal or vertical scan frequency of the input signal may be out of range for the projector. Refer to [Section 6 Specifications](#) for scan frequency ranges.
3. The sync signal may be inadequate. Correct the source problem.

5.1.6 The display is faint

1. Brightness and/or contrast may be set very low.
2. The source may be double terminated. Ensure the source is terminated only once.
3. The source (if non-video) may need a different sync tip clamp location.

5.1.7 The upper portion of the display is waving, tearing or jittering

This can sometimes occur with video or VCR sources. Check your source.

5.1.8 Portions of the display are cut off or wrap to the opposite edge

Resizing and/or Blanking may need adjustment.

5.1.9 The display appears compressed (vertically stretched)

1. The frequency of the pixel-sampling clock is incorrect for the current source.
2. Resizing, vertical stretch and positioning options may be improperly adjusted for the incoming source signal.
3. You may need an anamorphic lens for sources that have been supplied in a re-sized and vertically stretched format.

5.1.10 Data is cropped from edges

1. Check settings for Blanking.
2. If incoming data is still missing from the image, reduce the image size to within the display area available in the projector.

5.1.11 Display quality appears to drift from good to bad, bad to good

1. The source input signal may be of low quality.
2. The H or V frequency of the input may have changed at the source end.

5.1.12 The display has suddenly frozen

If the screen blacks out inexplicably, it is possible that excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Power down the projector and disconnect from AC. Then plug the AC in again and power up as usual.

5.1.13 Colors in the display are inaccurate

1. The color, tint, color space, color temperature and/or other settings may require adjustment.
2. Ensure the proper channel for this source is being used.

5.1.14 Values in Color Saturation slidebars vary over time

Once defined, *Color Saturation* slider values fluctuate over time and will likely be different upon subsequent visits to this menu. This is normal and should be ignored, as these changes do not redefine the X/Y coordinates or color gamut.

5.1.15 The display is not rectangular

1. Check leveling of the projector. Ensure the lens surface and the screen is parallel to each other as possible.
2. Is the vertical offset correct? Adjust as necessary using the vertical offset knob.

5.1.16 The display is "noisy"

1. Display adjustment at your input source may be required. Adjust pixel tracking, phase and filter. Noise is particularly common on YPbPr signals from a DVD player. (If using a PC source, adjust using a high-frequency test pattern with one pixel on/off throughout.)
2. The video input may not be terminated. Ensure the video input is terminated (75Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the last source input only.
3. The input signal and/or signal cables carrying the input signal may be of poor quality.
4. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
5. If the source is a VCR or off-air broadcast, detail may be set too high.

5.2 Lamp

5.2.1 Lamp does not ignite

1. If the lamp won't ignite, there may be an interlock failure such as an open lamp door, or failed lamp fan. An error code will display on the status LED display located on the built in keypad.
2. If a temperature is too high (e.g., "DMD over critical temp limit"), the lamp will not ignite until the temperature is low enough. Cool the projector and try again.
3. For suspected communication failures, power-down the projector and try again.
4. If the lamp does not ignite after a second and third try, replace the lamp.

5.2.2 Lamp suddenly turns OFF

1. Try increasing the lamp power.
2. The DMDs may be overheated.
3. Replace the lamp.

5.2.3 Flicker, shadows or dimness

Increase lamp power, if possible.

5.2.4 LiteLOC™ does not seem to work

1. Ensure "Intensity" is selected in the Lamp menu. Other lamp modes disable LiteLOC™.
2. If the lamp power has increased to its maximum in order to maintain a LiteLOC™ setting, LiteLOC™ is automatically terminated. If the values shown in the Lamp menu indicate that the lamp power has reached this "over-drive" state, either reduce your LiteLOC™ setting or install a new lamp.

5.3 Ethernet

1. Ensure the Ethernet settings are valid for your site-all network devices should have the same subnet mask and unique IP addresses.
2. Ensure the projector is connected to a network before you attempt to change its IP address, and always cycle power (OFF/ON) to implement the new IP address.
3. Ensure address changes have been saved, and re-boot to implement.
4. If you still have trouble establishing communications with a projector added to an existing Ethernet network, the projector's IP address is likely in conflict with another address already in use. Contact your network administrator.

5.4 3D Sync Input

5.4.1 System Error Code 1E

1. Cable not connected to specify Sync Input.
2. Connect cable.

5.4.2 System Error Code 1F

1. Sync is present, but out of range.
2. Previous hook up to projector was sending Sync to Emitter. Change *3D Sync Output* to *Next*.

6 Specifications

This section provides detailed Roadster, Matrix WU, Mirage S+/HD/WU specifications. Due to continuing research, specifications are subject to change without notice.

NOTE: 1) *Due to continuing research, specifications are subject to change without notice.* **2)** *3D available in Mirage series only.*

6.1 Display

6.1.1 Panel Resolution and Refresh Rate

PIXEL FORMAT (H X V) ON 3 DMDs	1400 x 1050 (SXGA+) 1920 x 1080 (HD) 1920 x 1200 (WUXGA)
REFRESH RATE	
ROADSTER HD SERIES	23.97 - 78 Hz
ROADSTER S+ SERIES	23.97 - 92 Hz
MATRIX WU	23.97 - 60.03 Hz
MIRAGE S+SERIES	92 - 115 Hz
MIRAGE HD18	23.97 - 115 Hz
MIRAGE WU	92 - 120 Hz

6.1.2 Brightness (ANSI 9 Point Measurement, with Fully Open Optical Aperture)

ROADSTER S+12K	12,000 ANSI LUMENS
ROADSTER HD12K	12,000 ANSI LUMENS
MATRIX WU12	12,000 ANSI LUMENS
MIRAGEHD12	12,000 ANSI LUMENS
MIRAGE WU12	12,000 ANSI LUMENS
MIRAGE S+12K	12,000 ANSI LUMENS
ROADSTER S+16K	16,000 ANSI LUMENS
MIRAGE S+ 14K	16,000 ANSI LUMENS
MIRAGE S+ 16K	16,000 ANSI LUMENS
ROADSTER HD18K	18,000 ANSI LUMENS
MIRAGE HD18	18,000 ANSI LUMENS

MIRAGE WU18	18,000 ANSI LUMENS
ROADSTER S+20K	20,000 ANSI LUMENS
MIRAGE S+ 20K	20,000 ANSI LUMENS

6.1.3 Achievable Contrast Ratio

450 ANSI
1600 - 2000:1 Full Field

6.1.4 Colors and Gray Scale

DEFAULT OPTICAL COLOR TEMPERATURE (AT GRAYS)	5150K - 6750K	
RANGE OF ADJUSTMENT	3200K - 9300K	
DISPLAYABLE COLORS	1.1 BILLION MIN.	
GRAY SCALE RESOLUTION	10 BITS (NON-LINEAR) MIN.	
COLOR PRIMARIES (NOMINAL)	X	Y
RED	0.660 ±0.025	0.330 ±0.025
GREEN	0.310 ±0.040	0.670 ±0.040
BLUE	0.145 ±0.020	0.065 ±0.025

6.1.5 Lens Offsets

Lenses	Offsets (Movement) ⬆ or ⬇ ⬅ or ➡		Max. Amount of Display Above or Below Lens Center		Max. Amount of Display Left or Right of Lens Center	
SX+ Offsets						
0.73:1 Fixed	40%	25%	735 pixels ⬆ or ⬇	70%	875 pixels ⬅ or ➡	62.5%
1.25-1.6:1 Zoom	73%	45%	908 pixels ⬆ or ⬇	86%	1015 pixels ⬅ or ➡	73%
All other SX+lenses	100%	50%	1050 pixels ⬆ or ⬇	100%	1050 pixels ⬅ or ➡	75%
HD Offsets						
.67:1 Fixed HD	47%	19%	794 pixels ⬆ or ⬇	73%	1142 pixels ⬅ or ➡	59%
1.16-1.49:1 Zoom HD	102%	40%	1091 pixels ⬆ or ⬇	100%	1344 pixels ⬅ or ➡	70%
All other HD lenses	119%	42%	1183 pixels ⬆ or ⬇	100%	1363 pixels ⬅ or ➡	71%
WU Offsets						
.67:1 Fixed HD	22%	6%	732 pixels ⬆ or ⬇	61%	1018 pixels ⬅ or ➡	53%
1.16-1.49:1 Zoom HD	82%	38%	1092 pixels ⬆ or ⬇	91%	1325 pixels ⬅ or ➡	69%
All other HD lenses	112%	54%	1272 pixels ⬆ or ⬇	100%	1478 pixels ⬅ or ➡	77%

NOTES: 1) 0% offset is equal to half the image above and below lens center OR half the image to the left or right of lens center. 2) Offsets are subject to a 7% centering tolerance.

6.2 Inputs

ROADSTER/HD SERIES	5 STANDARD INPUTS INCLUDING A DUAL SD/HD-SDI 1 INPUT MODULE SLOT
MATRIX SERIES	4 STANDARD INPUTS 2 INPUT MODULE SLOTS
MIRAGE SERIES	4 STANDARD INPUTS 2 INPUT MODULE SLOTS

6.2.1 Analog: RGB/YPbPr (5 BNCs at INPUT 1)

SIGNAL TYPES / COLOR SPACES	• RGB • YPbPr • Component video (CVBS), S-video (Y/C)
HORIZONTAL FREQUENCY RANGE	15 - 120 kHz
VERTICAL FREQUENCY RANGE *	23.97 - 150 Hz
SCAN FORMAT	INTERLACED OR PROGRESSIVE
PIXEL CLOCK RATE	220 MHz MAX.
ACTIVE PIXELS PER SCAN LINE (H)	640 - 2048
ACTIVE LINES PER FIELD/ FRAME (V)	200 - 1536
A/D CONVERSION RESOLUTION	10-BIT
INPUT LEVELS	
• R, B, G, Y - with sync • R, G, B - without sync • Pb, Pr	• 1.0Vp-p $\pm$2 dB (0.79Vp-p - 1.26Vp-p) • 0.7Vp-p $\pm$2 dB (0.56Vp-p - 0.88Vp-p) • 0.7Vp-p $\pm$2 dB (0.56Vp-p - 0.88Vp-p)
DC OFFSET	$\pm$ 5V
NOMINAL IMPEDANCE	75 Ω
MAX. RETURN LOSS (VSWR)	1.2:1 dB @ 200 MHz

* Specifies frame rate for non-interlaced sources and field rate for interlaced sources. Input frequencies higher than the maximum panel refresh rate are displayed at a lower rate.

6.2.2 Analog: Video (INPUTS 3 and 4)

Signal formats	Composite-video (CVBS), S-Video (Y/C)
CONNECTORS	
• Composite Video (INPUT 3) • S-Video (INPUT 4)	• BNC • 4-pin miniature DIN
Video standards	NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, PAL-60 & SECAM
A/D conversion resolution	8-bit

INPUT LEVELS

- Composite
- S-Video, Luma (Y)
- S-Video, Chroma ©
- $1.0 V_{p-p} \pm 3dB$ (including sync tip)
- $1.0 V_{p-p} \pm 3dB$ (including sync tip)
- $630 mV_{p-p}$ nominal (burst)

DC offset	$\pm 2V$
Nominal impedance	75Ω
Maximum return loss (VSWR)	1.2:1 dB @ 6 MHz

6.2.3 Analog: Sync (INTERLACED or PROGRESSIVE SCAN Format)

INPUT LEVELS (FOR COMPOSITE OR SEPARATE H & V)	$0.5V_{p-p} - 4.0V_{p-p}$
IMPEDANCE (FOR COMPOSITE OR SEPARATE H & V)	75Ω
SYNC TYPE (FOR COMPOSITE OR SEPARATE H & V)	SEPARATE H AND V • Bi-level or tri-level sync-on-green • Bi-level or tri-level composite • Serrations and/or Equalization pulses • MacroVision for std. & prog. video
POLARITY (FOR COMPOSITE OR SEPARATE H & V)	POSITIVE OR NEGATIVE

6.2.4 DVI-I (INPUT 2, Standard with MIRAGE HD Model)

INTERFACE STANDARD	DDWG DVI 1.0
SIGNAL TYPES / COLOR SPACES	• RGB (digital or analog) • YPbPr (analog) • YCbCr * (digital)
PIXEL CLOCK RATE	25 - 165 MHz
ANALOG SYNC INPUT IMPEDANCE	1 KOHMS
MAXIMUM CABLE LENGTH	5 METERS (16 FT.)
SUPPORTS EDID AND HDCP	

For all other DVI specifications, refer to Analog: RGB / YPbPr.

* Not supported in v1.1 s/w

6.2.5 Dual SD/HD-SDI (INPUT Standard with ROADSTER Models)

NUMBER OF INPUTS	2, EACH WITH ACTIVE LOOP-THROUGH
CONNECTOR TYPE	BNCs, 75Ω
SUPPORTED INTERFACE STANDARDS	• SMPTE 259M (13.5 MHz clock modes only) • SMPTE 292M • SMPTE 372M

SIGNAL TYPES / COLOR SPACES
PIXEL CLOCK RATES SUPPORTED

SERIAL DIGITAL YCbCr (4:2:2 ONLY), RGB 4:4:4
13.5 MHz, 74.25 MHz, 74.25/1.001 MHz

6.3 Control

6.3.1 Remote Keypad

KEYPAD TYPE	IR REMOTE WITH CABLE FOR CONVERTING TO WIRED
CONNECTOR TYPE *	3.5 MM PHONO JACK (2)
INPUT LEVELS	• High = 2.2 V - 5.6 V (or open) • Low = -0.6V - 0.9V @ 1mA
VOLTAGE OUTPUT	+5VDC $\pm$ 5%
CURRENT OUTPUT	100 mA NOMINAL, 250 mA MAX.

* The Roadster “Brick” rental staging - Standard IR remote includes a 3.5mm phono jack and a 3-pin connector.

6.3.2 IR Remote Sensors

NUMBER OF IR SENSORS ON PROJECTOR.	2 (FRONT AND REAR)
WAVELENGTH OF PEAK SENSITIVITY	950 NM @ 38kHz, 870 NM @ 455 kHz
MODULATION (CARRIER) FREQUENCY	38 kHz AND 455 kHz
ENCODING METHOD	BI-PHASE
IR RECEPTION RANGE	100 FT.

6.3.3 Ethernet

NUMBER OF PORTS	1
STANDARD 100	BASE-TX
CONNECTOR TYPE	FEMALE RJ-45
MAXIMUM THROUGHPUT	115.2 KBPS

6.3.4 RS-232 Serial Input

NUMBER OF PORTS	2
CONNECTORS	• One female 9-pin Dsub (IN) • One male 9-pin Dsub (OUT)
MAXIMUM BIT RATE	115.2 KBPS
FLOW CONTROL	XON/XOFF

6.3.5 RS-422 Serial Input

NUMBER OF PORTS	1
CONNECTOR TYPE	FEMALE 9-PIN DSUB
MAXIMUM BIT RATE	115.2 KBPS

6.3.6 GPIO Input

NUMBER OF I/O LINES	7 (EACH INDIVIDUALLY ASSIGNABLE AS INPUT OR OUTPUT)
CONNECTOR TYPE	9-PIN MALE D-SUB
TYPE OF CONNECTION	DRY CONTACT
OUTPUT SINK CURRENT (LOGIC LOW)	100 mA @ 1V
POWER OUTPUT	+12VDC @ 200 MA MAX.

6.4 Power

6.4.1 General

VOLTAGE RATING	200 - 240 VAC $\pm 10\%$
LINE FREQUENCY RATING	50 - 60 Hz
INRUSH CURRENT RATING	60 A MAX.
CURRENT RATING (@ 200VAC)	
ROADSTER S+12K	12 A
ROADSTER HD12K	12 A
MATRIX WU12	12 A
MIRAGE HD12	12 A
MIRAGE WU12	12 A
MIRAGE S+12K	12 A
ROADSTER S+16K	16 A
MIRAGE S+14K	16 A
MIRAGE S+16K	16 A
MIRAGE HD18	20 A
MIRAGE WU18	20 A
MIRAGE S+20K	20 A
ROADSTER HD18K	20 A
ROADSTER S+ 20K	20 A

MAX. POWER CONSUMPTION

ROADSTER S+12K	2400 W
ROADSTER HD12K	2400 W
MATRIX WU12	2400 W
MIRAGE HD12	2400 W
MIRAGE WU12	2400 W
MIRAGE S+12K	2400 W
ROADSTER S+16K	3200 W
MIRAGE S+14K	3200 W
MIRAGE S+16K	3200 W
MIRAGE HD18	4800 W
MIRAGE WU18	4800 W
MIRAGE S+20K	4800 W
ROADSTER HD18K	4800 W
ROADSTER S+ 20K	4800 W

**CURRENT RATING OF AC INPUT COUPLER
(NORTH AMERICA)**

ROADSTER S+12K	20 A
ROADSTER HD12K	20 A
MATRIX WU12	20 A
MIRAGE HD12	20 A
MIRAGE WU12	20 A
MIRAGE S+12K	20 A
ROADSTER S+16K	20 A
MIRAGE S+14K	20 A
MIRAGE S+16K	20 A
MIRAGE HD18	INPUT COUPLER NOT USED (LINE CORD NOT DETACHABLE).
MIRAGE WU18	INPUT COUPLER NOT USED (LINE CORD NOT DETACHABLE).
MIRAGE S+20K	INPUT COUPLER NOT USED (LINE CORD NOT DETACHABLE).
ROADSTER HD18K	INPUT COUPLER NOT USED (LINE CORD NOT DETACHABLE).
ROADSTER S+ 20K	INPUT COUPLER NOT USED (LINE CORD NOT DETACHABLE).

TYPE OF CONNECTOR @ PROJECTOR

ROADSTER S+12K	IEC320-C19
ROADSTER HD12K	IEC320-C19
MATRIX WU12	IEC320-C19
MIRAGE HD12	IEC320-C19
MIRAGE S+12K	IEC320-C19
MIRAGE WU12	IEC320-C19
ROADSTER S+16K	IEC320-C19
MIRAGE S+14K	IEC320-C19
MIRAGE S+16K	IEC320-C19
MIRAGE HD18	N/A - NOT DETACHABLE FROM PROJECTOR
MIRAGE WU18	N/A - NOT DETACHABLE FROM PROJECTOR
MIRAGE S+20K	N/A - NOT DETACHABLE FROM PROJECTOR
ROADSTER HD18K	N/A - NOT DETACHABLE FROM PROJECTOR
ROADSTER S+ 20K	N/A - NOT DETACHABLE FROM PROJECTOR

LINE CORDS (3 CONDUCTORS)

ROADSTER S+12K	HEAVY DUTY, 12 AWG
ROADSTER HD12K	HEAVY DUTY, 12 AWG
MATRIX WU12	HEAVY DUTY, 12 AWG
MIRAGE HD12	HEAVY DUTY, 12 AWG
MIRAGE S+12K	HEAVY DUTY, 12 AWG
MIRAGE WU12	HEAVY DUTY, 12 AWG
ROADSTER S+16K	HEAVY DUTY, 12 AWG
MIRAGE S+14K	HEAVY DUTY, 12 AWG
MIRAGE S+16K	HEAVY DUTY, 12 AWG
MIRAGE HD18	HEAVY DUTY, 12 AWG
MIRAGE WU18	HEAVY DUTY, 12 AWG
MIRAGE S+20K	HEAVY DUTY, 12 AWG
ROADSTER HD18K	HEAVY DUTY, 12 AWG
ROADSTER S+ 20K	HEAVY DUTY, 12 AWG

PLUGS

ROADSTER S+12K	NEMA 6-20P, 20 A, 250 VAC
ROADSTER HD12K	NEMA 6-20P, 20 A, 250 VAC
MATRIX WU12	NEMA 6-20P, 20 A, 250 VAC
MIRAGE HD12	NEMA 6-20P, 20 A, 250 VAC
MIRAGE WU12	NEMA 6-20P, 20A, 250 VAC
MIRAGE S+12K	NEMA 6-20P, 20 A, 250 VAC
ROADSTER S+16K	NEMA 6-20P, 20 A, 250 VAC
MIRAGE S+14K	NEMA 6-20P, 20 A, 250 VAC
MIRAGE S+16K	NEMA 6-20P, 20 A, 250 VAC
MIRAGE HD18	NEMA L6-30, 30 A, 250 VAC
MIRAGE WU18	NEMA L6-30, 30 A, 250 VAC
MIRAGE S+20K	NEMA L6-30, 30 A, 250 VAC
ROADSTER HD18K	NEMA L6-30, 30 A, 250 VAC
ROADSTER S+ 20K	NEMA L6-30, 30 A, 250 VAC

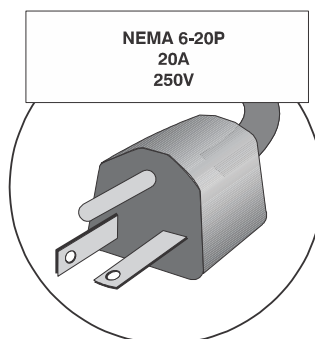


Figure 6-1 2kW & 2.4kW Plug (3kW Model plug not shown)

6.4.2 Lamp (DC)

TYPE	BUBBLE XENON LAMP
POWER	
ROADSTER HD12K	2.0 kW
ROADSTER S+ 12K	2.0 kW
MATRIX WU12	2.0 kW
MIRAGE HD12	2.0 kW
MIRAGE WU12	2.0 kW
MIRAGE S+12K	2.0 kW
ROADSTER S+ 16K	2.4 kW
MIRAGE S+14K	2.4 kW
MIRAGE S+16K	2.4 kW
MIRAGE HD18	3.0 kW
MIRAGE WU18	3.0 kW
MIRAGE S+20K	3.0 kW
ROADSTER HD18K	3.0 kW
ROADSTER S+ 20K	3.0 kW
ADJUSTMENT RANGES	
ROADSTER HD12K	1200 – 1900 W
ROADSTER S+ 12K	1200 – 1900 W
MATRIX WU12	1200 – 1900 W
MIRAGE HD12	1200 – 1900 W
MIRAGE WU12	1200 – 1900 W
MIRAGE S+12K	1200 – 1900 W
ROADSTER S+ 16K	1500 – 2400 W
MIRAGE S+14K	1500 – 2400 W
MIRAGE S+16K	1500 – 2400 W
MIRAGE HD18	2000 – 3000 W
MIRAGE WU18	2000 – 3000 W
MIRAGE S+20K	2000 – 3000 W
ROADSTER HD18K	2000 – 3000 W
ROADSTER S+ 20K	2000 – 3000 W

LAMP LIFE (WARRANTY HRS.)

ROADSTER HD12K	1000 HOURS
ROADSTER S+ 12K	1000 HOURS
MATRIX WU12	1000 HOURS
MIRAGE HD12	1000 HOURS
MIRAGE WU12	1000 HOURS
MIRAGE S+12K	1000 HOURS
ROADSTER S+ 16K	750 HOURS
MIRAGE S+14K	750 HOURS
MIRAGE S+16K	750 HOURS
MIRAGE HD18	750 HOURS
MIRAGE WU18	750 HOURS
MIRAGE S+20K	750 HOURS
ROADSTER HD18K	750 HOURS
ROADSTER S+ 20K	750 HOURS

WARM-UP TIME TO FULL BRIGHTNESS 10 MINUTES MAX.
(20 MIN FOR 3kW MODELS)

OPERATING POSITION ANY VERTICAL ANGLE. REFER TO *TILT (VERTICAL AND HORIZONTAL)* UNDER [Section 6.8 Operating Environment](#).

6.5 Audible Noise

58 dBA max. sound power (average at 1 meter, all four sides)

6.6 Safety

UL 60950-01 1st edition and CAN/CSA C22.2. No. 60950-01-03 1st edition
IEC 60950-1: 2001

6.7 EMC Emissions

FCC CFR47, Part 15, Subpart B, Class A — Unintentional Radiation
CISPR 22: 1997 / EN55022: 1998 — Radio disturbance characteristics for ITE

6.7.1 EMC Immunity

CISPR 24 / EN55024:1998 (all parts of immunity characteristics for ITE)

6.8 Operating Environment

TEMPERATURE	5°C TO 35°C (41°F TO 95°F)
HUMIDITY (NON-CONDENSING)	20% TO 80%
ALTITUDE	0 – 3000 METERS
TILT, VERTICAL	UNLIMITED
TILT, HORIZONTAL	15° MAX.

6.8.1 Non-Operating Environment

TEMPERATURE	-40C TO 70°C (-40F TO 149°F)
HUMIDITY (NON-CONDENSING)	0% TO 95%

6.9 Size & Weight

WEIGHT OF PRODUCT (WITHOUT LENS OR STACKERS)

ROADSTER S+ 12K	140 LB (63.6 KG)
ROADSTER HD12K	140 LB (63.6 KG)
MATRIX WU12	140 LB (63.6 KG)
MIRAGE HD12	140 LB (63.6 KG)
MIRAGE WU12	140 LB (63.6 KG)
MIRAGE S+12K	140 LB (63.6 KG)
ROADSTER S+ 16K	145 LB. (65.9 KG)
MIRAGE S+ 14K	145 LB. (65.9 KG)
MIRAGE S+16K	145 LB (63.6 KG)
MIRAGE HD18	160 LB. (73 KG)
MIRAGE WU18	160 LB. (73 KG)
MIRAGE S+20K	160 LB. (73 KG)
ROADSTER HD18K	160 LB. (73 KG)
ROADSTER S+ 20K	160 LB. (73 KG)

SHIPPING WEIGHT (STANDARD PACKAGING)

ROADSTER S+12K	205 LB (93 KG)
ROADSTER HD12K	205 LB (93 KG)
MATRIX WU12	205 LB (93 KG)
MIRAGE HD12K	205 LB (93 KG)
MIRAGE WU12	205 LB (93 KG)
MIRAGE S+12K	205 LB (93 KG)
ROADSTER S+16K	210 LB. (95 KG)
MIRAGE S+14K	210 LB. (95 KG)
MIRAGE S+16K	210 LB. (95 KG)
MIRAGE HD18	225 LB. (102 KG)
MIRAGE WU18	225 LB. (102 KG)
MIRAGE S+20K	225 LB. (102 KG)
ROADSTER HD18K	225 LB. (102 KG)
ROADSTER S+ 20K	225 LB. (102 KG)

6.10 Standard Components and Optional Components

6.10.1 Roadster Series

- Standard IR remote (*includes two - 1.5V AA batteries*)
- Line Cord
- Dual SD/HD-SDI Module
- Stacking mounts
- Integral rigging hardware

6.10.2 Mirage Series

- Standard IR remote (*includes two - 1.5V AA batteries*)
- Line Cord
- DVI Module
- Christie TWIST™ Module
- Christie TWIST™ User Manual

6.10.3 Mirage Series

- Standard IR remote (*includes two - 1.5V AA batteries*)
- Line Cord
- 3D Stereo Sync Cable
- Using 3D in **Mirage User Manual/Mirage CD**

6.10.4 Optional Accessories (Sold Separately)

- Wired remote keypad
- Ethernet, RS-232 and RS-422 communication cables
- Two-way remote controller
- KoRE Librarian for downloading new software
- Remote IR sensor
- Ceiling Mount
- Ceiling Mount Extension ⇄ Stacking Frame
- Service Manual

6.10.5 Lenses HD

The projection head is compatible with the following optional lenses:

0.67:1 FIXED	104-110101-01
1.1:1 FIXED FP	104-111101-01
1.1:1 FIXED RP	104-116101-01
1.16-1.49:1 ZOOM	104-137101-01
1.38-1.84:1 ZOOM	104-112101-01
1.84-2.58:1 ZOOM	104-113101-01
2.58-4.15:1 ZOOM	104-114101-01
4.15-6.74:1 ZOOM	104-115101-01
6.9-10.4:1 ZOOM	104-130101-01

6.10.6 Accessories

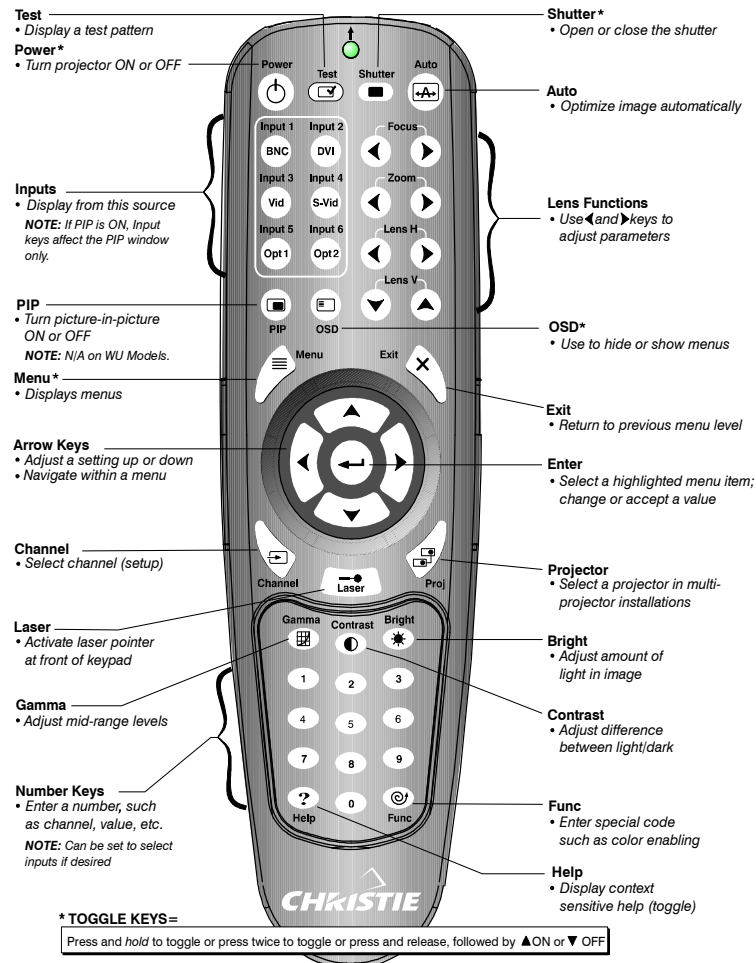
- Wired IR remote keypad
- Service Manual
- KoRE Librarian for downloading new software
- Stacking Hardware for Mirage Models
- Projector Blinders (PN 104-102011)

6.10.7 Optional Input Modules

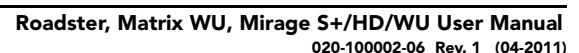
- RGB500 Input Module
- RGB400 Active Loop-Through Input Module
- RGB400 Buffered Amplifier Input Module
- PC250 Analog Input Module
- Serial Digital Input Module
- DVI Input Module
- Dual SD/HD-SDI Module (*Standard with the Roadster HD Series, optional for Mirage and Matrix models*).

Appendix A: KeyPad Reference

For a description of functionality and use, refer to [Section 3.2 Using the Keypads](#) and [Section 3.3 Navigating the Menus](#)



* Toggle keys, which require you to either press and hold, press twice, or press and use the UP/DOWN arrow keys.

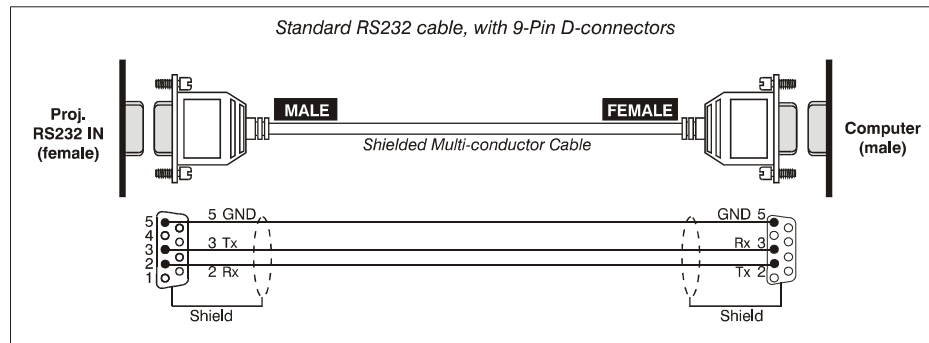


Appendix B: Serial Communication Cables

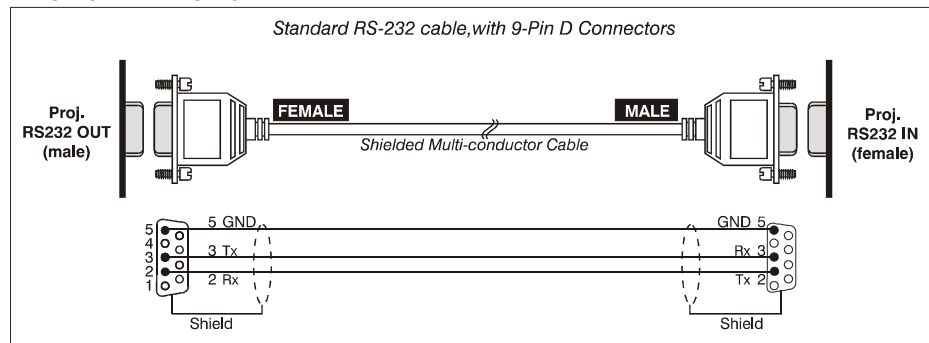
A serial link of RS-232 or RS-422 enables ASCII communication with the projector so that it can be controlled remotely from a PC or other controller. From a PC, connect a standard 9-wire RS-232 serial cable to the **RS-232 IN** port located on the side of the projection head. Or, for long-distance (>100 ft.) links with an RS-422-compatible PC or controller, connect RS-422 cable to the **RS-422** port.

❑ From projector to computer (RS232)

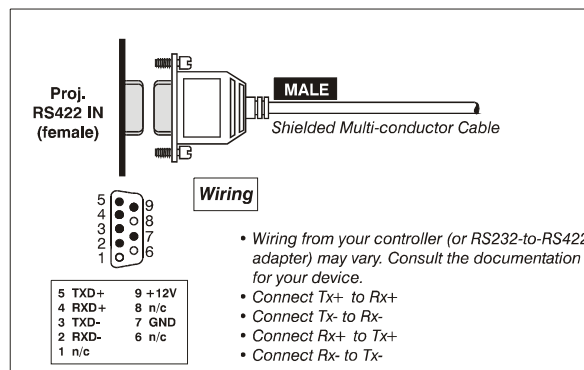
For computers having a 9-pin "AT" type serial port



❑ From projector to projector



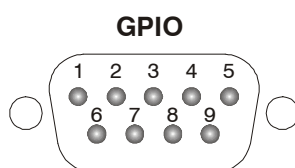
❑ From projector to RS422 compatible computer



Appendix C: System Integration

C.1 Introduction

The GPIO connector located on the side input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector, usually so that an event on one device automatically triggers an event on the other. There are 7 GIO pins available on the 9pin D-Sub GPIO connector, which are configurable via RS-232 commands. The other two pins are reserved for ground and power. The table below provides pin identification.



GPIO Pins	
Pin #	Signal
1	+ 12V (200mA)
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	Ground
6	GPIO 4
7	GPIO 5
8	GPIO 6
9	GPIO 7

The serial cable required for connecting the external device to the projector's GPIO connector, whether it's a standard serial cable or a custom one, must be compatible with the external device.

C.1.1 Configuring the GPIO

The GPIO connector is most easily configured with the KoRe 10-bit Librarian software. The **RTE** tab within the KoRe 10-bit Librarian user interface provides a graphical Helper to aid in the setup of the GPIO. In addition, Real-Time events can be used to trigger different GPIO output states when certain events occur. Refer to *KoReLibrarian* and the *Serial Protocol manual* for more details.

The GPIO connector can be configured to automate any number of events using the serial command code GIO. Each pin is defined as either an **input** or **output** depending on the desired outcome. In general, configure the pin as an input if you want the projector to respond to something an external device does, and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is turned ON.

A GIO command can also set the state of each pin as **high** or **low**. By default, the state of each pin is **high**. The voltage applied to pins in the **high** state is + 3.3V.

Example 1.

Turn room lighting ON when the projector is turned OFF. (Assumes a control/automation unit is configured to turn the lights ON when pin 2 of its input goes hi (12-2009)gh.)

(GIO C2 O)	Set pin #2 configuration to output
(GIO 2 H)	Set pin #2 to high (state)

C.1.2 Query Command

(GIO?)	Request the state and configuration of all pins
(GIO! "HLLHLH" "OOIOOOI")	Reply of pin state and configuration
(GIO? C2)	Request configuration for pin #2
(GIO! C2 O)	Reply with pin #2 configuration as output
(GIO? 2)	Request the state of pin #2
(GIO! H)	Reply with pin #2 state as high

C.1.3 Real Time Event

Use the serial command **RTE** to specify an action that is initiated at a particular time or based on an external stimulus.

For General Purpose IO "G"

Parameter	Name	Value
P1	RTE type	G (Real Time I/O Event)
P2	I/O bit	1-7
P3	Pin state (1 Character) (String)	H = High L = Low "LHXXXHLX" Combine multiple inputs and trigger occurs when all conditions are met
P4	Commands	Any valid serial protocol command for the device

Example 2.

Projector powers up when a switch on the external device is turned ON.

(GIO C2 I)	Set pin #2 configuration as input
(RTE G 2 H "(PWR 1)")	Power on when pin #2 set to high
(RTE G 2 L "(PWR 0)")	Power off when pin #2 set to low

Appendix D: Optional Input Modules

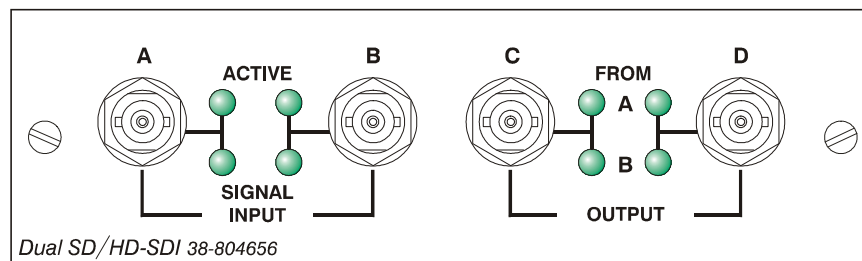
The following optional input modules are currently available, and can be installed in either option slot in the projector (**INPUT 5** or **INPUT 6**). Contact your dealer for a complete and up-to-date listing.

NOTE: 1) *Optional interface modules can be hot-swapped into a running projector.* 2) *Any audio connectors shown are non-functional in this projector.*

D.1 Dual SD/HD-SDI Module (38-804656-xx)

NOTE: *Standard with this Roadster models. Refer to [Section 2.4.5 Dual SD/HD-SDI](#).*

The Dual SD/HD-SDI Module enables incoming SD or HD serial digital data to be tiled across multiple screen displays, overlapped for extra-bright displays, or distributed to additional projectors for multiple, same-image screens.

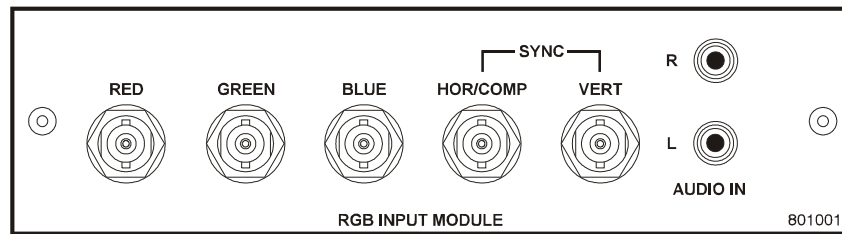


Dual SD/HD-SDI Features

- Accepts and decodes up to 2 serial digital inputs
- SMPTE 292, 259M and 372 compatible
- Outputs up to two 10-bit video signals
- Provides input(s) to output(s) loop-through capability
- Supplies interchangeable inputs as part of the Picture-in Picture (PIP) display

D.2 RGB500 Input Module 38-804606-xx

The RGB500 Input Module receives analog RGB input signals from computers or other RGB source devices.

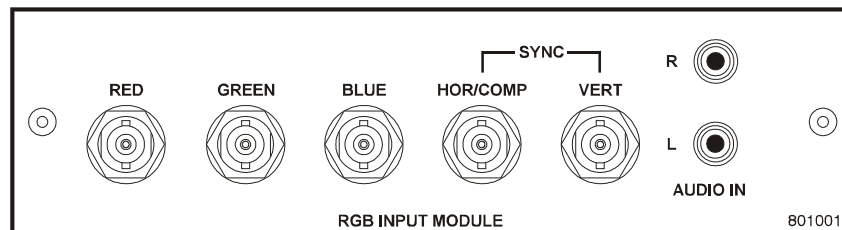


RGB500 Features

- Accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync), up to 500 MHz bandwidth
- Accepts YPbPr, composite (on green) and Y/C (on red/blue)
- BNC connectors for RGB signal inputs

D.3 RGB400BA Input Module (38-804610-xx)

Connect 3, 4, or 5 wire RGB video signals of up to 400 MHz bandwidth-these are signals typically produced by high-resolution computer or workstations. The buffering capability of the module enables the incoming signal to be sent to a remote destination. Inputs are 75 Ω terminated.

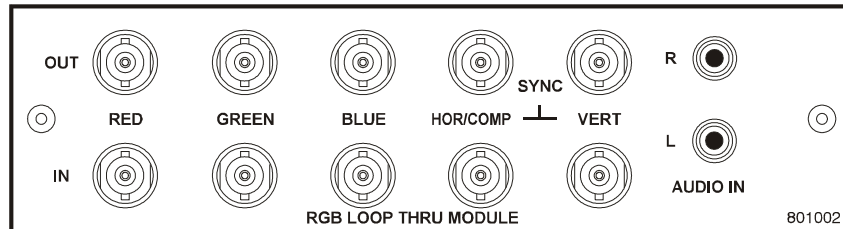


RGB400BA Features

- Accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- Accepts YPbPr, composite (on green) and Y/C (on red/blue)
- BNC connectors for RGB signal inputs
- Buffered signals to a remote destination

D.4 RGB400 Active Loop-Thru (Input Module 38-804607-xx)

The RGB400 ALT Input Module receives analog RGB input signals from computers or other RGB source devices. Video inputs are 75Ω terminated. Video outputs provide buffered loop-through to another display device.

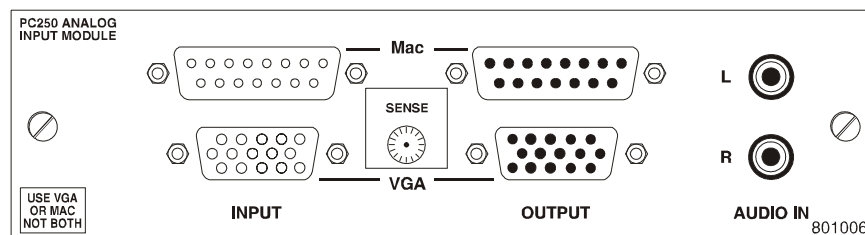


RGB400 ALT Features

- Accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- Accepts YPbPr, composite (on green) and Y/C (on red/blue)
- BNC connectors for RGB signal inputs
- Buffered loop-through video outputs

D.5 PC250 Analog (Input Module 38-804609-xx)

The *PC250 Analog Input Module* receives analog RGB input signals from IBM PC compatibles or Macintosh computers. Video inputs are 75Ω terminated. Video outputs are provided for buffered loop-through to another display device.



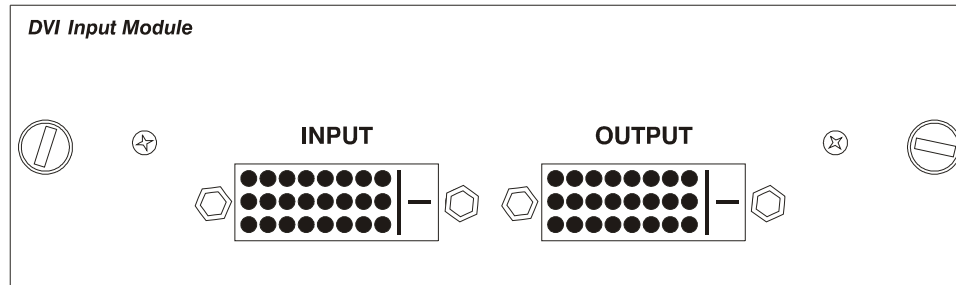
PC250 Analog Features

- Accepts VGA or MAC RGB video
- 15 pin D connectors for video
- Active loop-through video outputs

NOTE: This interface does not accept VGA and MAC signals simultaneously.

D.6 DVI Input Module (38-804635-xx)

The *DVI Input Module* can be installed to display digital video input signals conforming to the DVI (Digital Visual Interface) single-channel standard.

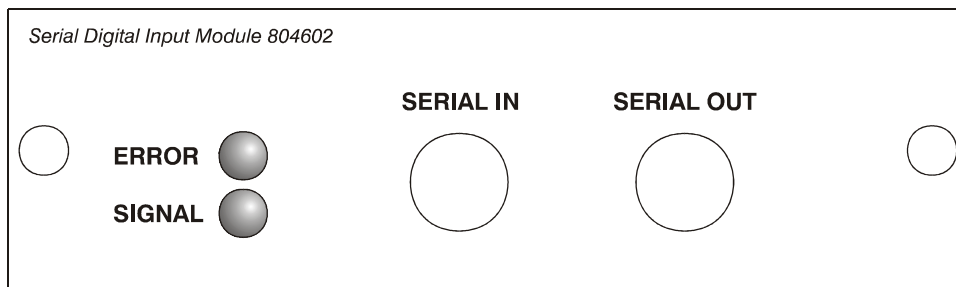


DVI Input Module Features

- Supports Digital Visual Interface (DVI) single-channel
- Supports VESA™ Extended Display Identification Data (EDID™)
- Provides an active-loop-through using a DVI connector (conforming to the DVI Specification)

D.7 Serial Digital Input Module (38-804602-xx)

The *Serial Digital Input Module* (SDI) accepts a serial digital 4:2:2 component video signal (YCbCr) via a single SERIAL IN BNC connector. The signal can loop through the SERIAL OUT BNC out to another device (such as another projector). Inputs are 75Ω terminated.



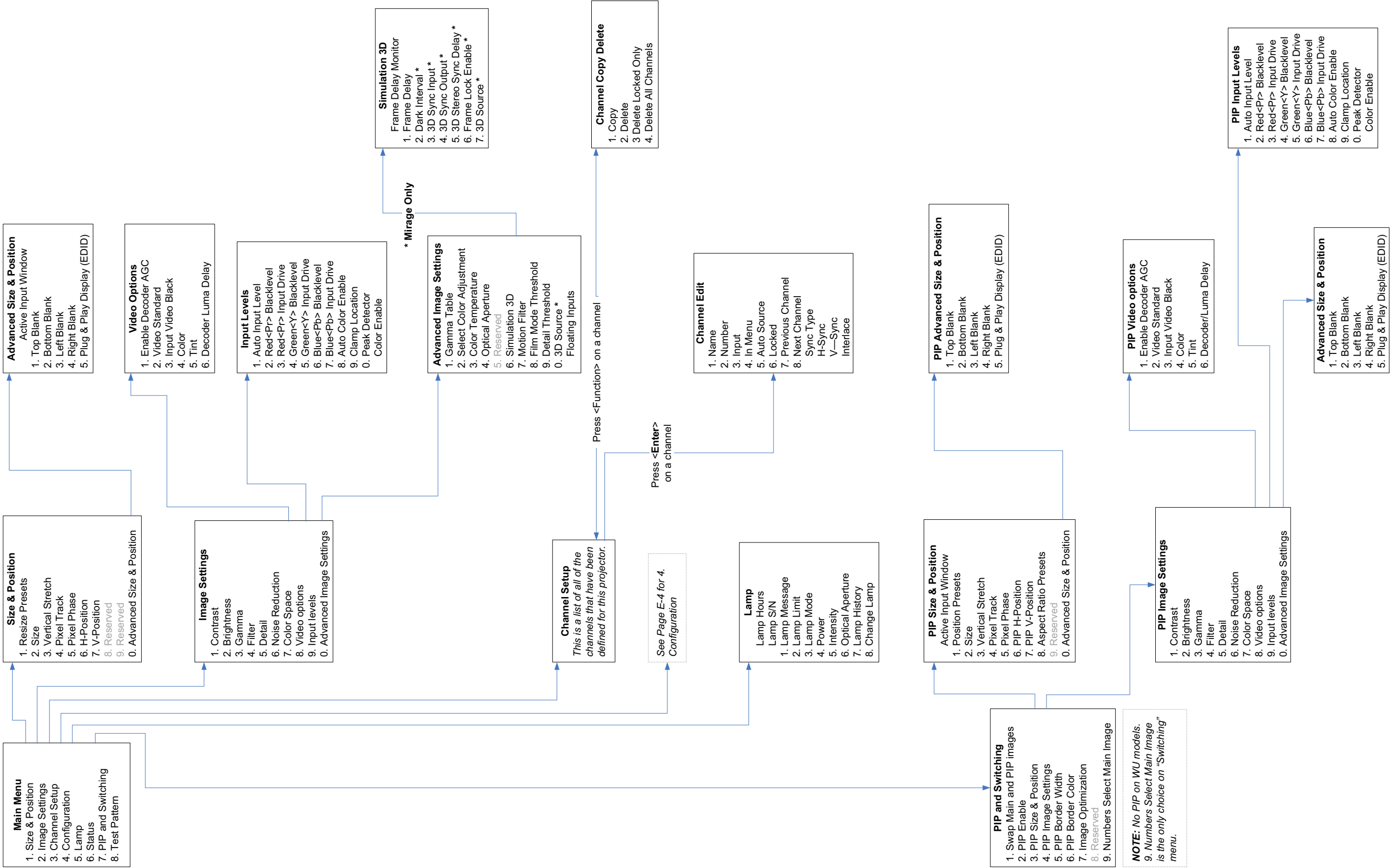
SDI Features

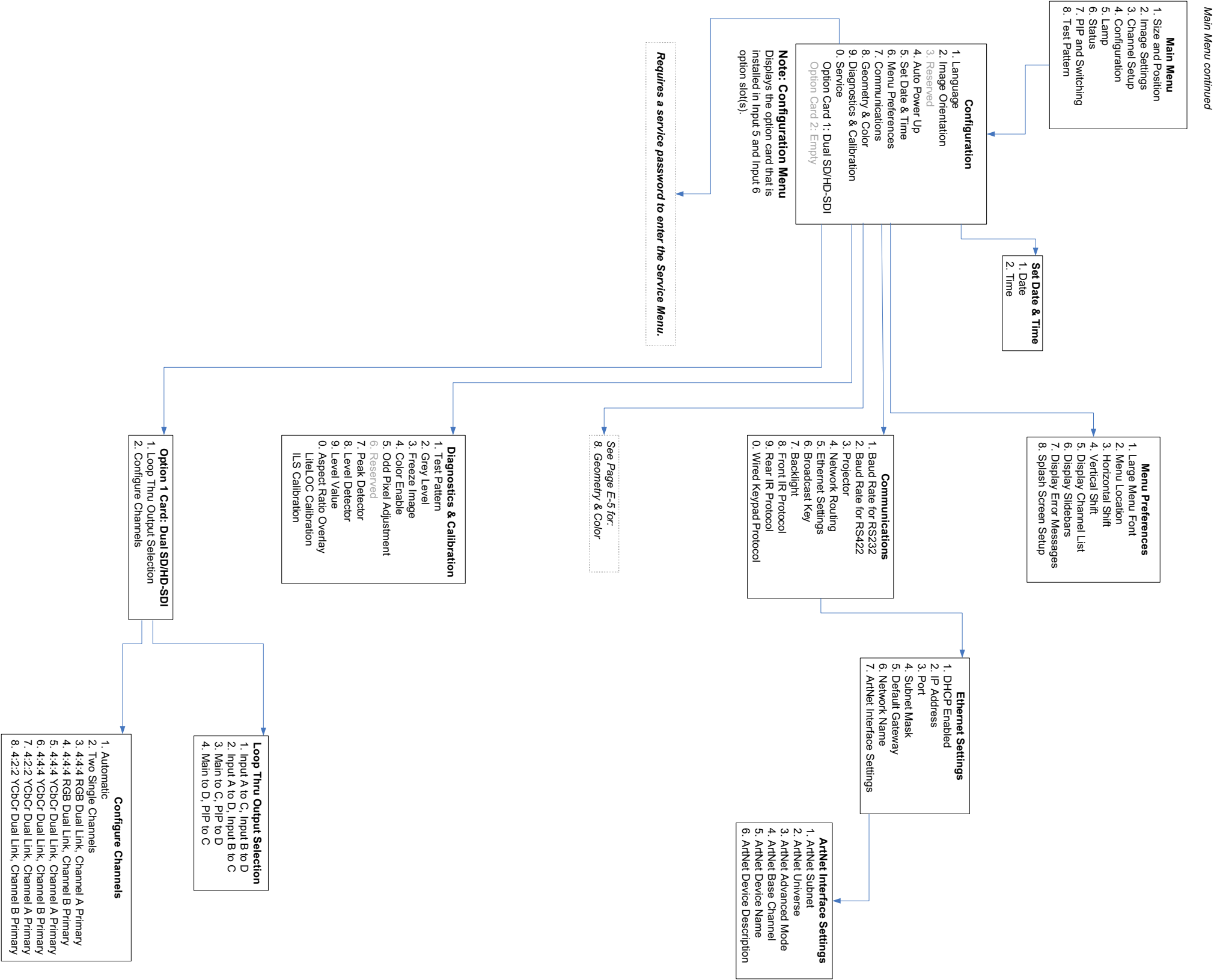
- Accepts serial digital 4:2:2 component video (YCbCr)
- Provides both a SERIAL IN and a SERIAL OUT BNC connector
- Includes status LEDs for signal and error
- SMPTE 259M compatible

Appendix E: Menu Tree

E.1 Menu Tree

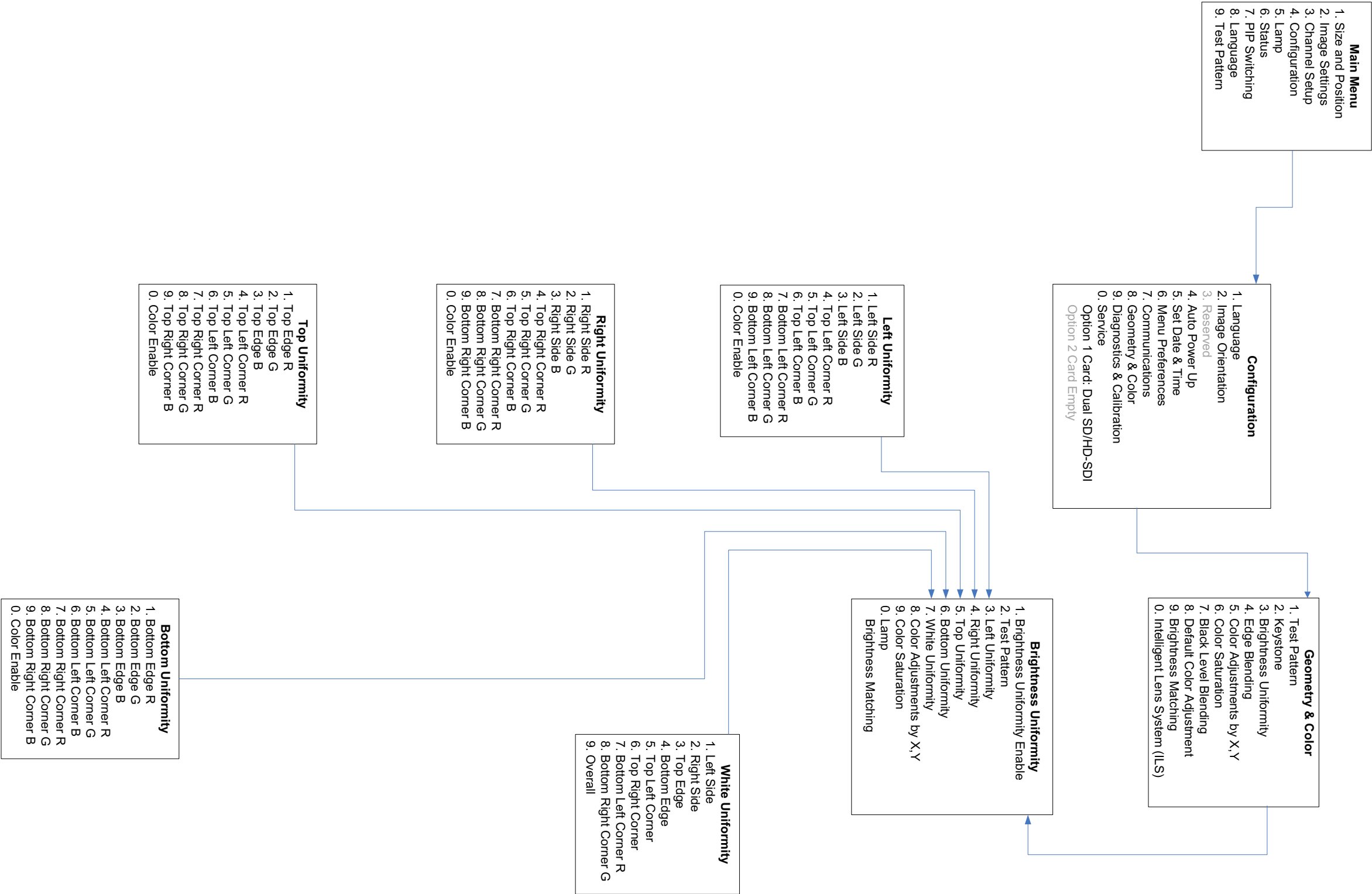
The Menu Tree provides a graphical representation of the software menu structure for the Roadster-Matrix WU and Mirage S+ HD-WU. This allows you to quickly locate and navigate to a specific menu, and associated options/secondary menus.







Main Menu continued



Corporate offices

USA – Cypress
ph: 714-236-8610
Canada – Kitchener
ph: 519-744-8005

Worldwide offices

United Kingdom
ph: +44 118 977 8000
Germany
ph: +49 2161 664540
France
ph: +33 (0) 1 41 21 44 04

Hungary/Eastern Europe
ph: +36 (0) 1 47 48 100
Singapore
ph: +65 6877 8737
Shanghai
ph: +86 21 6278 7708

Beijing
ph: +86 10 6561 0240
Korea
ph: +82 2 702 1601
Japan
ph: +81 3 3599 7481