# RPMX/RPMSP-D132U



## USER GUIDE

020-100245-01

CHRISTIE®

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**Applies to the Following Projectors**

# *China RoHS Compliance Information*

*RPMSP-D132U*

*RPMX-D132U*

## 关于中国 《电子信息产品污染控制管理办法》的说明

² Environmentally Friendly Use Period
环保使用期限




The year number in the centre of the label indicates the Environmentally Friendly Use Period, which is required to mark on the electronic information product sold in China according to the China RoHS regulations.
本标志中表示的年数是根据 《电子信息产品污染控制管理办法》（2006 年 2 月 28 日）以及 《电子信息产品污染控制标识要求》（2006 年 11 月 6 日）制定的、适用于在中华人民共和国境内销售的电子信息产品的环保使用期限。

² Material Concentration Values Table
有毒有害物质含量表

| Part Name | 部件名称 | Material Concentration ( 有毒有害物质或元素 ) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 铅 （Pb） | 汞 （Hg） | 镉 （Cd） | 六价铬 (Cr 6+) | 多溴联苯 （PBB） | 多溴二联苯醚 （PBDE） |
| Low voltage power supply | 低压电源 | X | O | O | O | O | X |
| Power & Ballast | 电源及镇流器 | X | O | O | O | O | X |
| Ten-bit image processor module | 十位图像处理模块 | X | O | O | O | O | O |
| TDOM PCB | 专用显示输出板 | X | O | O | O | O | O |
| Backplane module | 底板模块 | X | O | O | O | O | O |
| Blower/Fan | 吹风机 / 风扇 | O | O | O | O | O | O |
| Sensor | 传感器 | O | O | O | O | O | O |
| Illumination optics system | 照明光学系统 | X | O | X | O | O | O |
| Projection Lens | 投影镜头 | X | O | X | O | O | O |
| Auxiliary optics | 辅助光学器件 | X | O | X | O | O | O |
| Mechanical enclosure* | 机械附件 | X | O | O | O | O | O |
| Software CD | 软件光盘 | O | O | O | O | O | O |
| Lamp | 灯泡 | X | O | X | O | O | O |
| Battery | 电池 | O | O | O | O | O | O |
| Remote Keypad | 遥控器 | X | O | O | O | O | O |

NOTE:

**O** : indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, is below the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 规定的限量要求以下。

**X**: indicates that the concentration value of the particular hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C, may be above the stipulated levels in China SJ/T11363-2006.

表示该有毒有害物质至少在该部件的某一均质材料中的含量可能超出 SJ/T11363-2006 规定的限量要求。

* This part uses metallic alloys, which may contain Lead.

因该部件使用金属合金材料，故可能含有铅。

# 1 Introduction

*RPMX/RPMSP D132U* are professional quality XGA and SXGA+ data projectors featuring the latest in DLP™ display technology to achieve high brightness, high resolution multimedia and video projection images. These projectors use Christie's exclusive KoRE™ electronics and firmware to accept data, graphics, and video input signals for projection onto flat, front or rear projection screens.



FIGURE 1-1 THE PROJECTOR

The modular design of these projectors makes them an ideal choice for rear screen projection and multi-display walls. With built-in flexibility, each projector is configurable for straight throw or 90° mirrored applications. The unique 6-axis adjustment mechanism enables accurate alignment of the lens to the screen minimizing distortion at all corners and edges of the display.

A dual lamp (automatic changer) hot swappable system allows the projector to operate for a long time before requiring a lamp change. The mechanical lamp changer enables an automatic lamp change to occur when a lamp fails or whenever requested by a user. The purpose-built design of these projectors makes them an ideal choice for the demanding needs of 24/7 command and control centers, telecommunications, surveillance and broadcasting applications.

## 1.1 KEY FEATURES

- RPMSP – Native SXGA+, 1400 x 1050 resolution
- RPMX – XGA, 1024 x 768 resolution
- 24-bit RGB display
- 10-bit image processing module
- Display of RGB, NTSC, PAL, and SECAM video inputs and HDTV formats
- User adjustable lamp power
- Mechanical lamp changer for easy lamp change during operation
- Picture-in-picture display
- Edge Blending ability via software for seamless displays
- Dual frequency IR sensor for use with standard IR remote and optional long-range dual frequency remote
- Unique 6-axis image geometry adjustment mechanism
- Memory for up to 50 custom “channels” (source setups)
- Intuitive on-screen menu system
- Built-in GPIO port to enable active control of external devices

- LED display for projector status monitoring
- Multiple control options including RS-232 and RS-422
- On-board ChristieNET™ software
- Universal AC input 100-240 VAC, 50/60Hz

See Section 6 for a complete list of product specifications.

## 1.2 HOW THE PROJECTOR WORKS

The user selects which lamp will be in operation through the Lamp Menu; Lamp #1 or Lamp #2. After the lamp successfully ignites, the light generated is sequentially filtered into the RGB color primaries by the spinning color wheel in the light engine of the projector. This filtered light is then presented to the single chip DMD, located in the light engine. The reflected light from the DMD chip then passes through the projection lens to the screen to display the image.

## 1.3 COMPONENTS

Ensure you have received the following components before using your projector.

- Line Cord (rated, North American)
- Configuration bracket (shipped loose, for horizontal configuration)
- 6, M6 screws (for installation of configuration bracket)
- IR Remote Keypad (with batteries)
- Setup and Adjustment Tools (includes 2mm and 5mm ball drivers, 8mm hex ball driver, nylon spacers, lint free gloves)

NOTE: *A User's Kit is provided with each projection system. Additional User's Kits can be purchased separately (part number 102-144100-01).*

## 1.4 ADDITIONAL TOOLS REQUIRED

These tools should be kept on hand during installation and setup:

#1 Phillips screw driver

## 1.5 PURCHASE RECORD AND SERVICING

Christie's factory and dealer service network is always available to diagnose and correct projector malfunctions. Service manuals and updates are available to service technicians for all projectors.

If you encounter any problems with the projector and require assistance, contact your dealer or Christie Digital Systems. Fill out the information in the table below and keep with your records for future reference.

## 1.5.1 PURCHASE RECORD

| |
|---|
| Dealer: |
| Dealer Phone Number: |
| Projector Serial Number: |
| Purchase Date: |
| Installation Date, if applicable: |

NOTE: *The serial number can be found on the license label.*

To register your product on-line visit 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.

# 2 Installation and Setup

Use this section to install and setup your projector. Complete these steps:

***Step 1*** – Unpack the projector.

***Step 2*** – Select and modify the projector's configuration based on the intended application: lens-vertical (90 degree) or lens-horizontal (0 degree) projection.

***Step 3*** – Calculate throw distance. Position and mount the projector.

***Step 4*** – Connect sources.

***Step 5*** – Turn the projector ON.

***Step 6*** – Adjust projection lens to improve image focus.

***Step 7*** – Adjust image geometry using the 6-axis adjuster.

***Step 8*** – Adjust software to optimize image on a single screen, or multiple screens.

NOTES: *1) The illustrations used in this manual are graphical representations only and may not depict your projector model exactly.*

*2) If you are installing your projector in a TotalVIEW‘ 50” or 67”cube enclosure, refer to the separate installation guide provided (020-100248-01).*

# 2.1 PRE-INSTALLATION CONSIDERATIONS

Whether installing your projector permanently or temporarily take the following into account to get the best possible performance from your projector. When designing a projection room consider:

- are you operating single or multiple units
- the room size
- lighting and audience seating
- distance the audience is sitting from the display
- from which angle the display is viewed

These are important when deciding where to place the display, or what type and size of screen to use.

## 2.1.1 SCREEN SIZE AND TYPE

Choose an appropriate screen size for your lens and application. If the projector is displaying text information, the image size must be large enough to allow the audience to view all text clearly. The eye-to-text distance should be less than 150 times the height of the letter. Small text located too far from the eye may be illegible at a distance no matter how sharply and clearly it is displayed.

To fill a screen with an image, the aspect ratio (expressed as the ratio of its width to its height) of the screen should be equal to the aspect ratio of the image. Screens with an aspect ratio of 5:4 are recommended for use with these projectors.

Diffused and optical screens that are best suited for rear screen installations. A diffused screen has a surface, which spreads the light striking it. Purely diffused screens have a gain of less than 1. Optical screens take light from the projector and redirect it to increase the light intensity at the front of the screen.

## 2.1.2 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. If light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image, the contrast ratio in your image will be noticeably reduced and may appear washed out and less vibrant.

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

## 2.1.3 OTHER CONSIDERATIONS

Other considerations and tips that can help improve your installation:

- Ventilation is important, the constant ambient temperature must below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature can cause drifts in the projector circuitry, which may affect performance.
- Keep the projector away from devices radiating electromagnetic energy such as motors and transformers, slide projectors, speakers, power amplifiers, elevators, etc.
- Use an optical mirror for rear screen installations to shorten the optical light path and use less space in the projection room.
- When designing a projection room, consider positioning the projector and screen for maximum audience coverage and space efficiency. For example, placing the screen along the larger wall in a rectangular room reduces audience coverage.

## 2.2 INSTALLATION & SETUP

This section outlines the installation sequence of a RPMX/RPMSP-D132U projector as a stand alone or multiple projector installation.

For instructions on how to install your projector into the TotalVIEW™ 50" or 67" cube enclosure, refer to the separate *Cube Installation Manual* (020-100248-01) provided in the User's Kit.

### STEP 1 UNPACKING THE PROJECTOR

The projector is shipped fully assembled in the lens-vertical (90 degree) configuration. After receiving your projector it is important that you prepare it for installation by:

Removing the projector from the box and discarding any packing material surrounding the modules.

NOTE: *An L-shaped bracket, used to change the projector's configuration, is shipped loosely in the box with the projector. Set this aside for future use.*

Verifying all cable connections are secure. Connect any loose cables. See *Figure 2-1 Internal Cable Connections*.

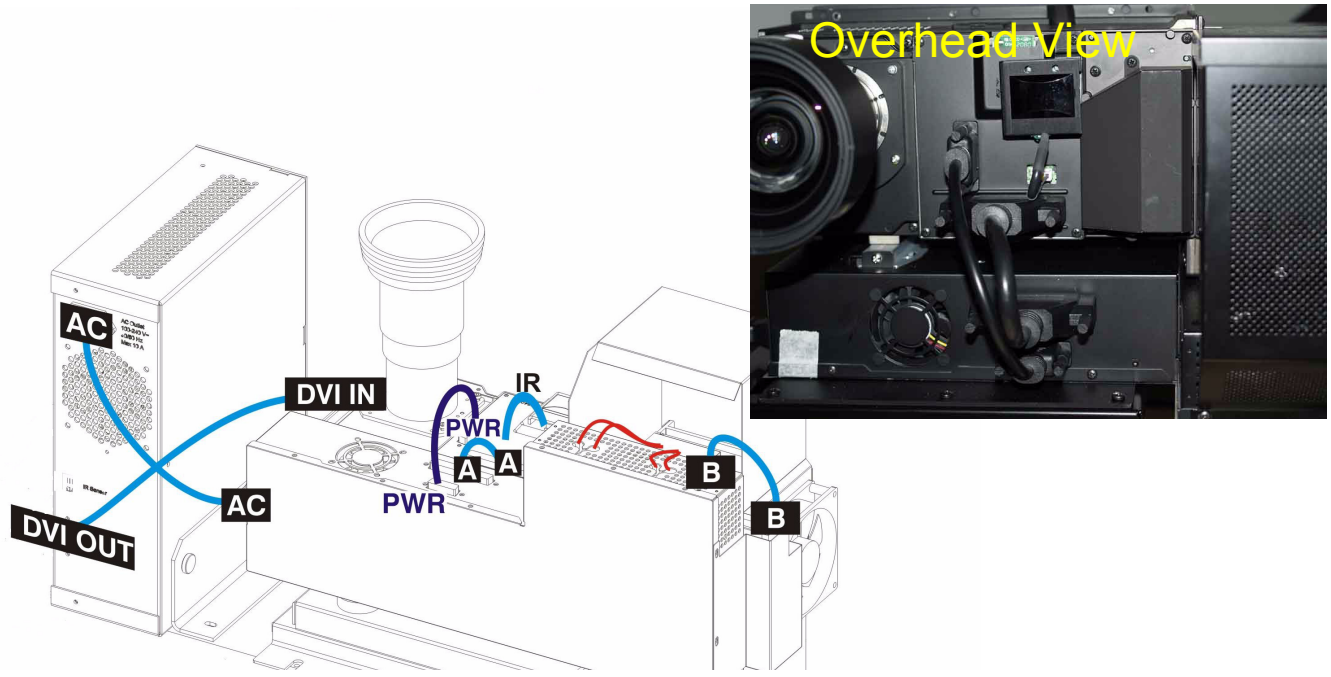



FIGURE 2-1 INTERNAL CABLE CONNECTIONS

⚠ **Check lamp handles**. These handles must lay flat against the lamp surface otherwise they will interfere with lamp operation.

⚠ **Remove the lock screw located on the mechanical lamp changer**. (*Figure 2-2 Remove Lamp Changer Lock Screw*). This screw is used for shipping purposes only and must be removed prior to turning the projector on. **Failure to do so can result in projector damage**.

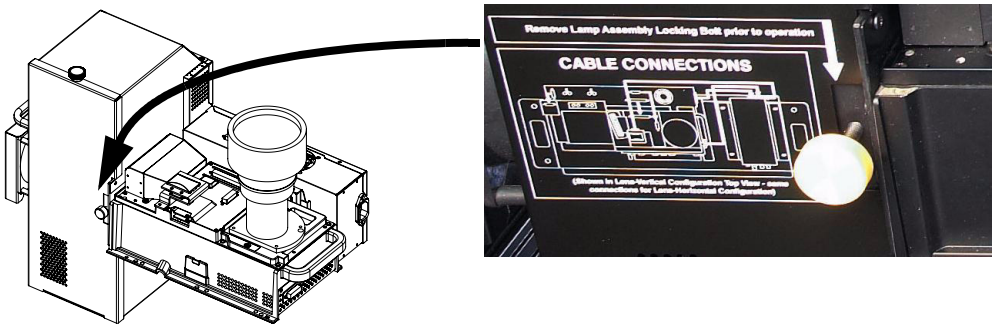



FIGURE 2-2 REMOVE LAMP CHANGER LOCK SCREW

## STEP 2 MODIFYING PROJECTOR CONFIGURATION (IF REQUIRED)

To use your projector for lens-horizontal projection then you must change its configuration. The L-shaped bracket and M6 screws shipped with the projector are needed to complete this configuration change.

1. Ensure the projector is not plugged into AC.
2. Disconnect all cable connections made between the light engine and electronics module. All disconnects must be made on the light engine side.
3. Remove the (6) M4 screws securing the light engine module to the 6-axis adjuster.

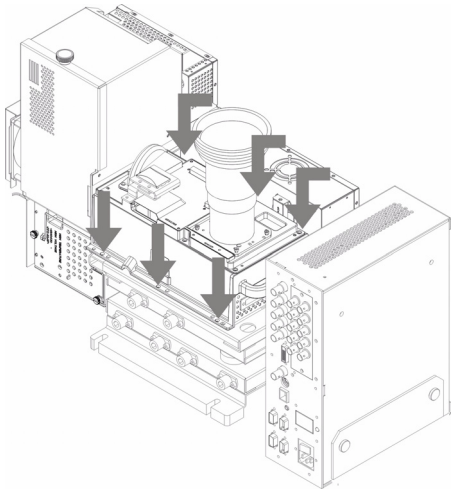


FIGURE 2-3 LOOSEN LIGHT ENGINE

4. Lift the light engine off the adjuster and set aside.
5. Take the L-shaped configuration bracket and align the shorter end with the mounting holes in the adjuster base, as shown in *Figure 2-4 Install configuration bracket to adjuster base*. The long vertical part of the bracket will face the same side as the connectors on the electronics module.
6. Secure the bracket to the adjuster base with the (6) M4 screws used to secure the light engine.

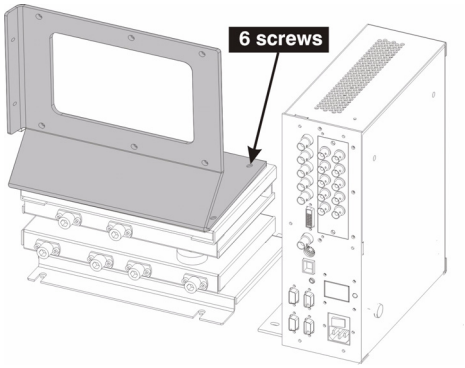



FIGURE 2-4 INSTALL CONFIGURATION BRACKET TO ADJUSTER BASE

7. Carefully, place the light engine in the lens-horizontal position on the configuration bracket and adjuster base. Align the mounting holes between the configuration bracket and light engine and secure using the (6) additional M6 screws provided with the projector.

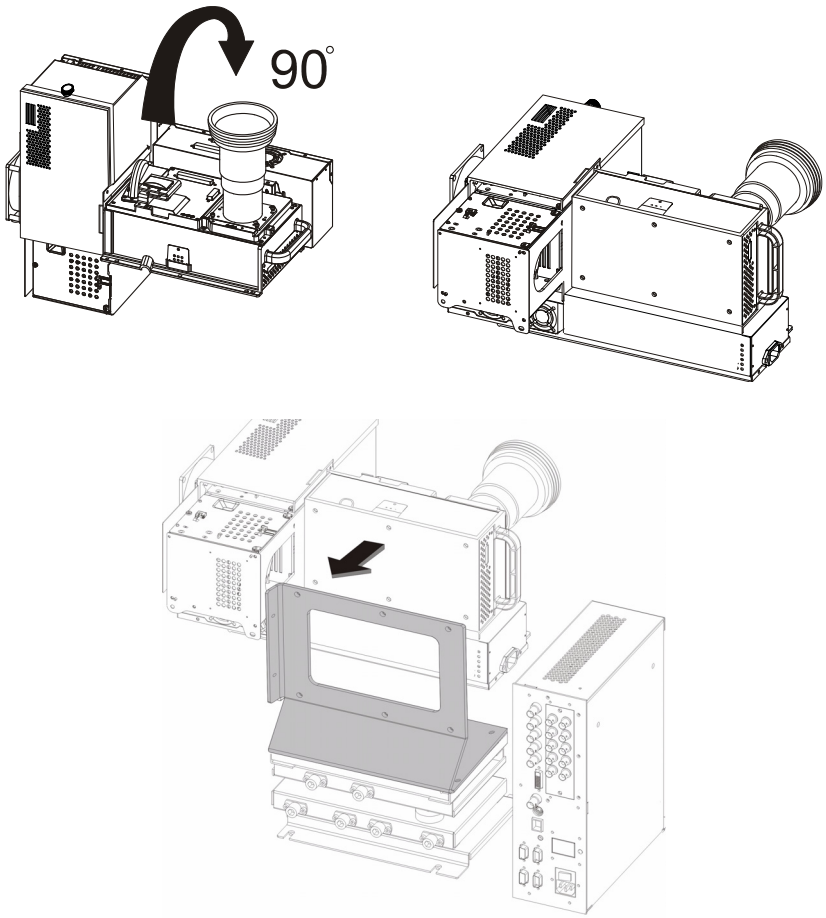



FIGURE 2-5 RE-POSITION LIGHT ENGINE

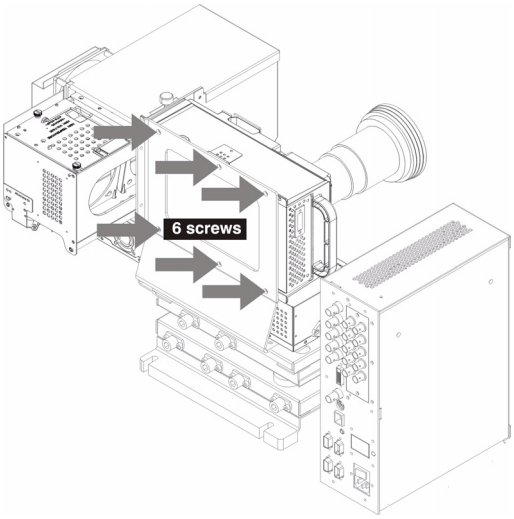



FIGURE 2-6 SECURE LIGHT ENGINE TO CONFIGURATION BRACKET

8. Connect DVI, AC power to the light engine. Refer to *Figure 2-1 Internal Cable Connections*.

## STEP 3 CALCULATING THROW DISTANCE, POSITION AND MOUNT PROJECTOR

### *THROW DISTANCE*

The throw distance calculation for RPMX/RPMSP-D132U projector is based on the final configuration of the projector. For lens-horizontal configurations, throw distance is measured from the center of the auxiliary mounting holes in the tray to the screen. Use the appropriate formula for your projector model when calculating.

In both vertical and horizontal configurations:

TD = Throw Distance

W = screen width in millimeters

| | |
|---|---|
| **RPMSP D132U** | For SXGA (1.2:1 lens). TD = 1.20 x W + 10 mm<br>For SXGA (0.69:1 lens). TD = 0.69 x W + 33 mm |

See *Figure 2-7 Throw Distance Formula for Lens-Horizontal Configuration* for an illustration of the formula

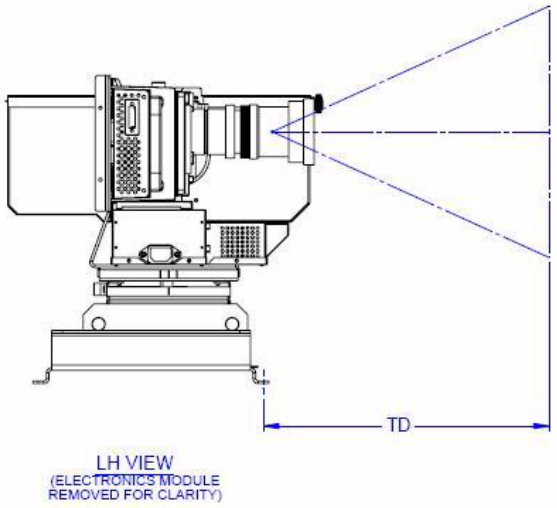



FIGURE 2-7 THROW DISTANCE FORMULA FOR LENS-HORIZONTAL CONFIGURATION

In lens-vertical configurations, where a first surface mirror is used to shorten the distance between the projector and screen by folding the optical path, throw distance is a little more difficult to calculate, as there are many variables to consider.

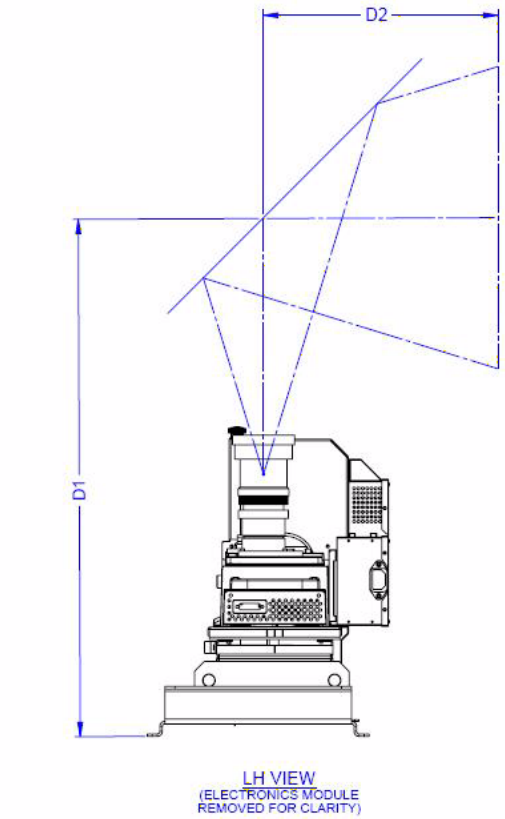



FIGURE 2-8 FIGURE THROW DISTANCE FORMULA FOR LENS-VERTICAL CONFIGURATION

| | |
|---|---|
| **RPMX/RPMSP 132U** | For SXGA (0.85:1 lens). TD = 0.85 x W + 344 mm<br>For SXGA (1.2:1 lens). TD = 1.20 x W + 333 mm<br>For SXGA (0.69:1 lens). TD = 0.69 x W + 355 mm |

## LIFTING AND TRANSPORTING THE PROJECTOR

Use the handles in the mounting tray to transport the projector a short distance. For longer distances, it is recommended you use a stable cart or ask for someone's help.

## MOUNTING

Refer to the drawings provided for your specific projector model in *Appendix D* for the mounting hole location and other technical information which may be useful during installation.

**⚠ WARNING When mounting a projector, Mount the projector to a sturdy, flat surface such as a table or cart that fits the entire projector.**

**Use all four mounting points to secure the projector to the surface. Refer to Appendix D**

**Maintain an area of empty space around the projector, called a "stay out zone", to allow for air circulation and clearance for cable connections to the input panel. An insufficient stay out zone area could cause the projector to overheat during operation and/or place undue stress on source connections**

## STEP 4 CONNECTING SOURCES

All source connections are made to the input panel of the Electronics Module. This is the stand alone module to the right of the light engine when looking at the projector from the back.

Each input is 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 for additional connections.*

Refer to *2.3 Connecting Sources* for more details on connecting a specific source.

## STEP 5 TURNING THE PROJECTOR ON AND SELECTING A SOURCE

**⚠ WARNING The North American rated line cord is provided with this projector. For all other regions, ensure that you are using a line cord, power plug and socket that meet the appropriate rating standards.**

**Before powering ON, ensure the lamp changer lock screw has been removed. Failure to remove this screw can cause damage to the projector and the lamp changer assembly.**

**Do not use a line cord that has been damaged.**

1. Plug an approved line cord into the projector's AC receptacle, located on the electronics module. Plug the 3-pronged end of the line cord into a grounded AC outlet.

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.*

NOTE:*Do not use a line cord or AC supply not in the specified voltage and power range. See Section 6 – Specifications for projector power requirements.*

2. Press ⏻ for two seconds to turn the projector ON. As the projector begins initialization, an active pattern of segments appear in the LED status display window that is located with the built-in keypad. Do not enter a keypad command until "On" appears in the status display, otherwise the command will be ignored.
3. Press one of the input keys on the remote to select and display the image for the source connected in Step 4.

NOTE: *For more information on the keys available on the remote and their function, refer to Section 3.*

NOTE: *The projector enforces a 60 second wait period from the time the projector is powered down and back up again.*

## STEP 6 ADJUSTING THE PROJECTION LENS



FIGURE 2-9 XGA LENS ADJUSTMENT

1. Loosen the adjustment handle (turn thumbwheel) on the lens barrel.
2. When the image is focused, lock adjustments in place by tightening the adjustment handle until just tight.

**⚠ CAUTION Lock lens adjustments to prevent unnecessary tampering.**

## STEP 7 ADJUSTING IMAGE GEOMETRY USING THE 6-AXIS ADJUSTER

The light engine is mounted to the 6-axis adjustment mechanism, which can fine-tune the geometry of a displayed image by moving the light engine about the X, Y and Z-axes in varying degrees.

For single projectors, adjust the 6-axis adjuster until the displayed image fills the screen and appears without any geometric distortion.

For a multi-projector display wall, use the 6-axis adjuster to closely match the image across multiple screens. You should begin adjustment on an end unit on the bottom row of wall and work your way across and up until all units are adjusted.

To adjust the 6-axis adjuster:

1. Center the image on screen, by adjusting vertical and/or horizontal position.
2. Zoom the image out (make smaller) until it fits within the borders of the screen.
3. Adjust keystone and tilt.
4. Zoom the image in (make larger) to fill the screen.
5. Repeat any adjustments until the image appears correctly.

TIPS:*1) When adjusting, make ¼ to ½ turns of the adjustment knob(s). This will allow you to control adjustments and return to previous positions .*

*2) Adjustment screw #4 controls the mode for screws #3 and #6. Always adjust this screw first until it reaches its position. This adjustment screw has two positions, full in and full out, which implies the screw reaches the extent of its range in the clock-wise or counter-clockwise direction.*

*3) Do not over-adjust screws. When feel a slight resistance STOP adjusting, as this indicates the end of the adjustment range. Refer to Section 8 - Specifications for the adjuster's range of movement from the factory set nominal position.*

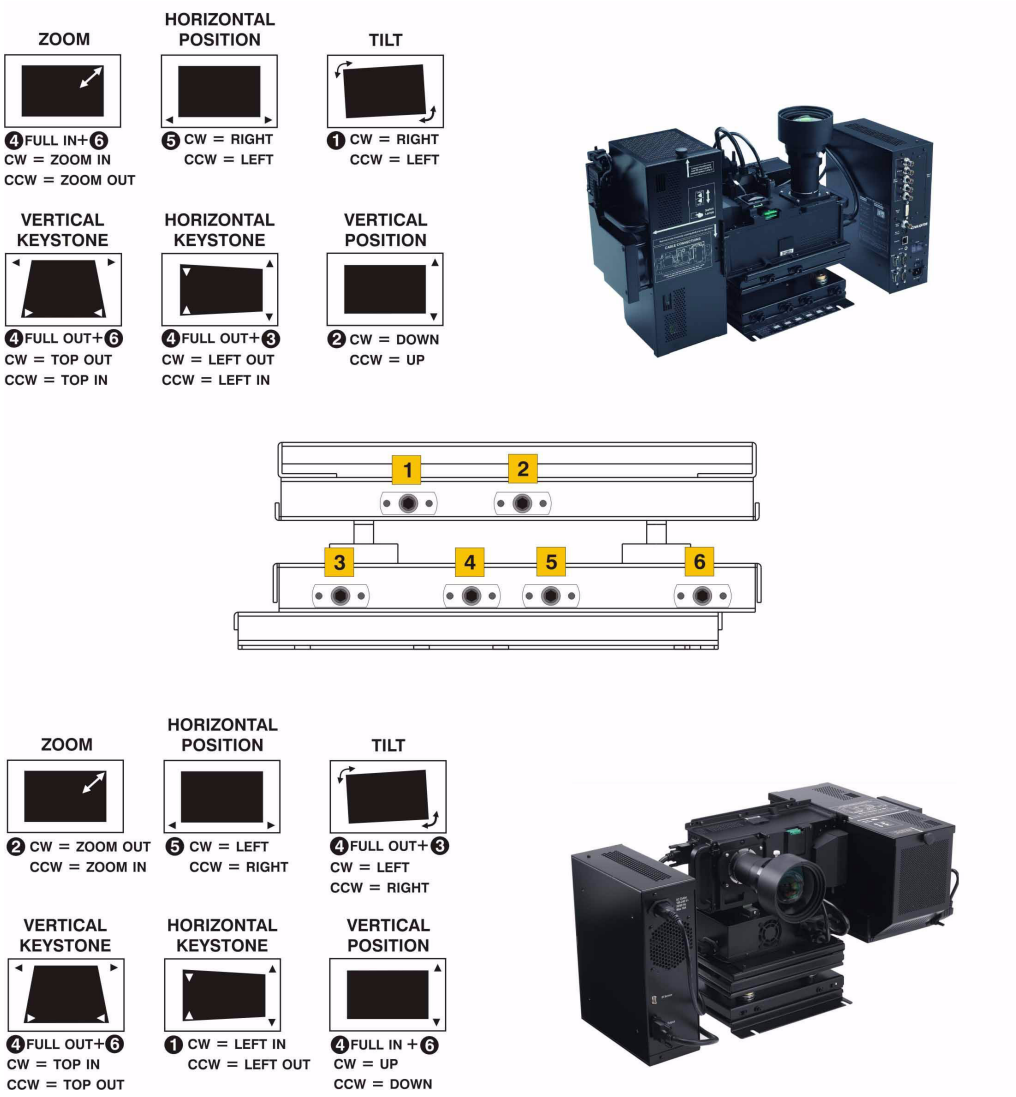



FIGURE 2-10 6-AXIS ADJUSTMENTS

## STEP 8 ADJUST SOFTWARE TO OPTIMIZE IMAGE

To optimally adjust your projector through various software settings for the first time.

NOTES: *1) Refer to Section 3 for details on accessing and adjusting individual settings.*

*2) Unless otherwise indicated, instructions apply to all projector models in stand-alone or multi-projector configurations.*

1. Display an external signal.
2. Select a lamp operation mode. Perform all setups in the mode you select.
3. Select **Image Orientation** in the ***Configuration*** menu and change the orientation of the displayed image to suit the installation. For example, in rear screen displays, select “rear” to display the image correctly.
4. Assign projector ID number(s).

5. Modify options in ***Menu Preference*** to suit your display preferences. For example, select **Language** to change the menu language to any of the five available languages.
6. Enable **Broadcast Key** in the ***Communications*** menu – this enables you to switch between communicating with one or all projectors when connected serially.
7. Select **Auto Setup** to give the projector a change to setup the best possible settings for the chosen incoming signal.
8. Verify that **Processing Mode**, in ***Image Settings***, is correct for the selected source.
9. Change **Resize Presets** if you want the image displayed at any other resolution other than native.
10. Adjust **Pixel Phase** and **Pixel Tracking** from the ***Size and Position*** menu to eliminate any noise from the displayed image.
11. Adjust **H-Position** and **V-Position** from the ***Size and Position*** menu to re-center the image on screen.
12. Adjust **Size** in ***Size and Position*** until the image is at the desired width then adjust **Vertical Stretch**. Adjusting one option may have an affect on the other, repeat adjustment if necessary. Adjust H-Position and V-Position again if required to center the image.
13. Adjust **Color Wheel Delay**.
14. Perform **Color Temperature** setup.
15. Adjust **Blacklevels** and **Input Levels**.
16. Adjust **Lamp Power** to match lamp brightness of adjacent projectors, if necessary.
17. Adjust color primaries, brightness uniformity and edge blending using the detailed procedure provided in *Section 3 – Matching Colors in Multiple Projectors*.

# 2.3 CONNECTING SOURCES

Sources connect to the *Input Panel* located at the back of the projector.

**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. The DVI-I connector at **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 disk players or DVD players.

Christie offers optional input modules that can be installed into the projector at **INPUT 5** to connect other sources.

NOTES:

*1) See Section 6, Specifications for details regarding compatible inputs.*

*2) Use only high quality shielded cables only for all connections.*

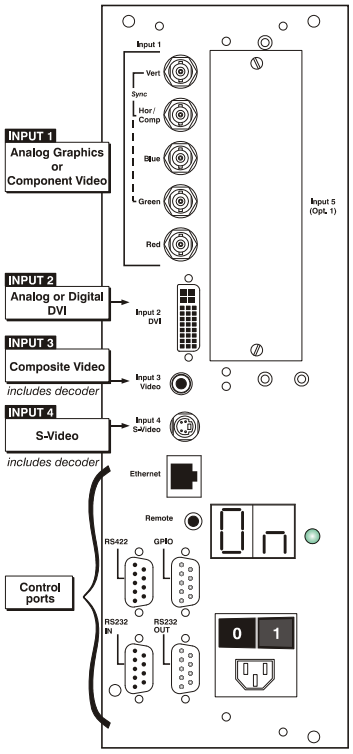



FIGURE 2-11 INPUT PANEL

## RGB SIGNALS (5 BNCS)

**INPUT 1** has 5 BNCs (connectors) for linking to a variety of sources. The typical connection would be to an RGB source such as a PC, Mac, Sun, SGI and others. This projector supports multiple sync types with RGB signals: sync-on-green, composite sync, and separate H & V syncs.

Connect the **SYNC** BNC input(s). 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 2-12*.

NOTES:*1)Depending on the 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.*

*2) If the projector fails to recognize a signal as an RGB signal, specify the Color Space option within the Image Settings menu. See 3.5 Adjusting the Image.*

*3) 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 YPbPr Signals (below).*

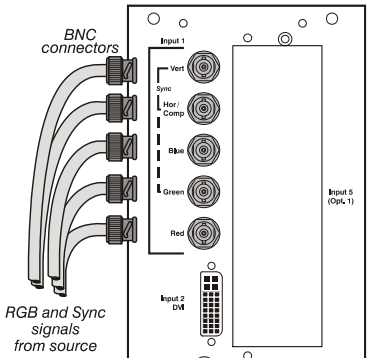



FIGURE 2-12 CONNECTING RGB

## YPBPR SIGNALS

Connect a YPbPr signal (*component video*) to **INPUT 1** or **INPUT 2** as shown in figure 2.14.

NOTES: *1) If the projector fails to recognize a YPbPr signal, specify the Color Space option within the Image Settings menu. See 3.5 Adjusting the Image.*

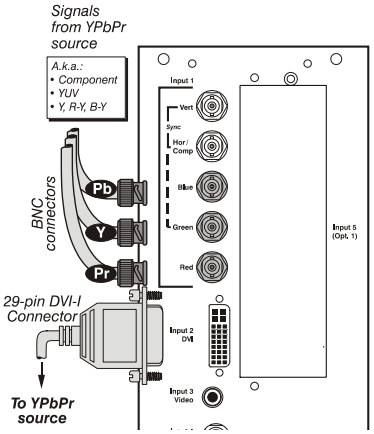



FIGURE 2-13 CONNECTING YPBPR

## DVI DIGITAL VIDEO

Use the DVI-I connector at **INPUT 2** to connect either analog or digital video devices to the projector. 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.*

*3) DVI loop through is not available unless you have the optional DVI Input Module installed at Input 5.*

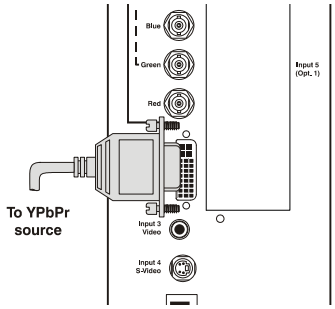



FIGURE 2-14 CONNECTING ANALOG OR DIGITAL VIDEO DEVICES

## COMPOSITE AND S-VIDEO

**INPUT 3** and **INPUT 4** provide simultaneous connection of both a composite video source (**INPUT 3**) and an S-Video source (**INPUT 4**).

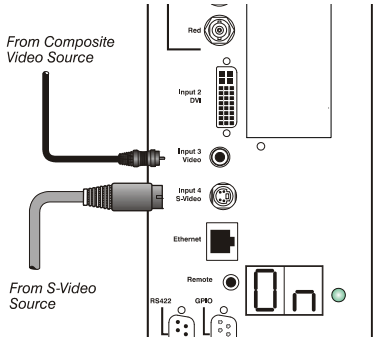



FIGURE 2-15 FIGURE 2.15. CONNECTING COMPOSITE / S-VIDEO

### EXTRA VIDEO

To use an extra video source in addition to the video source(s) connected at input 3 or input 4, connect either a Composite or S-video source to input 1 as shown.

NOTES: *1) Do not simultaneously connect composite and s-video to input 1.*

*2) You can switch between video sources connected at input 1 and input 3 or input 4.*

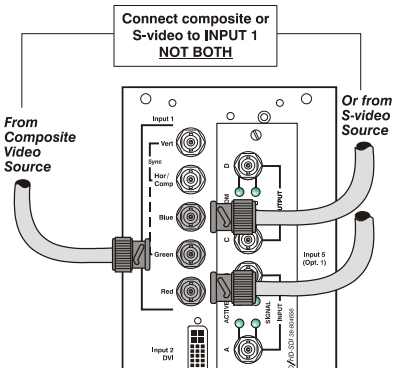



FIGURE 2-16 CONNECTING EXTRA VIDEO

### OPTIONAL INPUTS

Optional input modules allow you to increase your total number of inputs to accommodate different signal types, whether analog or digital. Install in the area labeled **INPUT 5.** Options include:

- RGB 500 Input Module
- RGB 400 Active Loop Thru Input Module
- RGB 400 Buffered Amplifier Input Module
- PC250 Analog Input Module
- Serial Digital Input Module
- DVI Input Module
- Dual SD/HD-SDI Module

NOTE: *See Appendix F, Optional Input Modules for a brief description of each interface.*

## 2.4 CONNECTING COMMUNICATIONS

As an alternative to the projector's keypad or remote, communicate with the projector using a PC or other controller. Commands and feedback are sent via serial links (RS232 and RS422) and Ethernet or GPIO communications to the projector.

### 2.4.1 REMOTE KEYPAD

Direct the projector's IR remote keypad towards the display screen or the projector's IR sensor. Alternatively, connect a wired (tethered) version of the remote to the RCA jack labeled **REMOTE** on the projector's input panel. Response to a wired keypad must be enabled in the *Communications* menu—see *3.6, Adjusting System Parameters and Advanced Controls* for more information.

## 2.4.2 SERIAL PORT CONNECTIONS

RS232 and RS422 are the serial ports available on the projector:. 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 RS232 IN and RS232 OUT on the input panel are dedicated to serial communication. Using the appropriate serial communication cables *(see Appendix C)* connect the controlling source, such as a personal computer to the RS232 IN connector. Set the baud rate to match that of the computer. Refer to *Section 3* for details on changing the projector's baud rate.

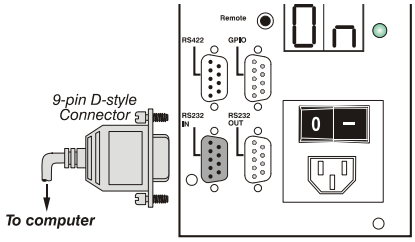



FIGURE 2-17 CONNECTING RS-232

### CONNECTING RS-422

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. RS-422 is better suited for serial communication over long distances than RS-232 communication.

Use the RS-422 port only if your device has RS-422 capability – always consult the literature provided with your equipment before connecting. Connecting to the RS-422 port with incompatible equipment could damage your projector.

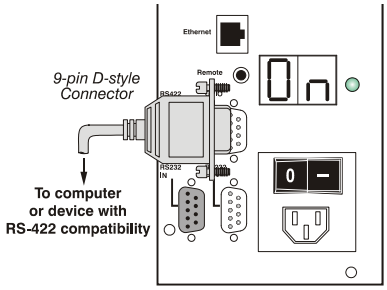



FIGURE 2-18 CONNECTING RS-422

## 2.4.3 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 on the side of the projector.

Upon connection to an Ethernet network, the projector's factory default IP address of 0.0.0.0.0 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* menu or via an ASCII serial command.

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* for further information about setting up and using a projector connected via Ethernet.

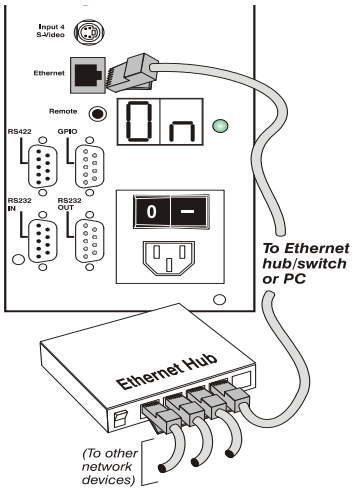



FIGURE 2-19 ETHERNET COMMUNICATION

## 2.4.4 CONNECTING MULTIPLE PROJECTORS

### RS-232 NETWORK

To connect multiple projectors in a network with serial communication, connect the controlling source to the RS232 IN connector of the first projector in the network. Then take another serial communication cable and connect one end to the RS232 OUT connector and the other end to the RS232 IN connector of the next projector. Continue this pattern of connection with all projectors in the network. The last projector in the network will only have a connection to the RS232 IN connector. See *Figure 2-20 Communicating through RS-232*.

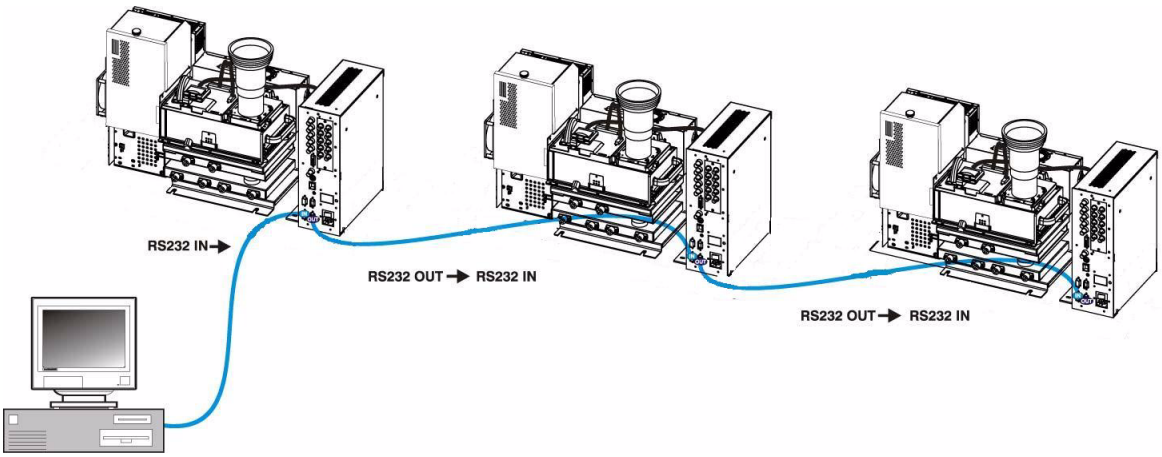



FIGURE 2-20 COMMUNICATING THROUGH RS-232

## MIXED NETWORK

To control multiple projectors with a computer/controller having an RS422 interface, first set them all to the same baud rate as your RS422 controller.

NOTE: *You must enable this combination of RS422 and RS232 in the Communications menu. Set the "Network Routing" option to "RS232 and RS422 Joined". See Section 3 for details.*

Then chain the projectors together by connecting an **RS232** port of the first projector (already connected to the computer/controller through the **RS422** port) to an **RS232** 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 one unused **RS232** port. See *Figure 2-21 Communicating through a Mixed Network*.

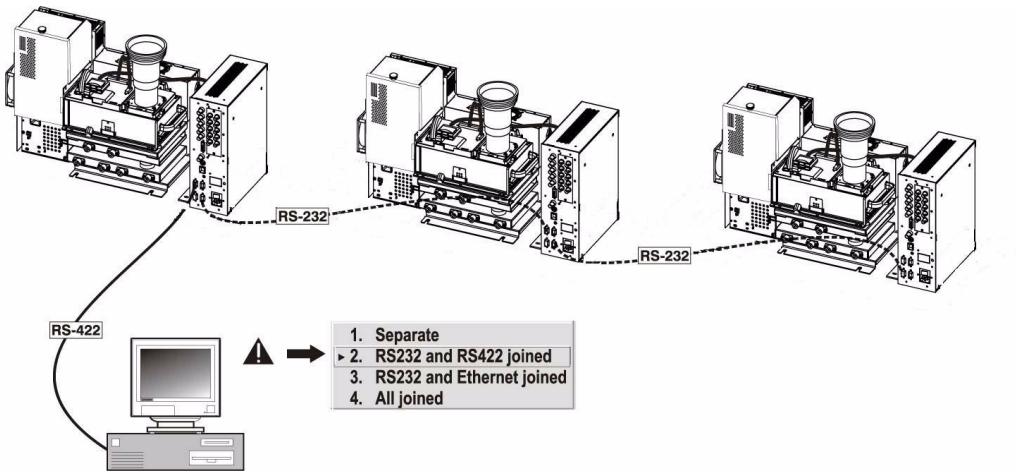



FIGURE 2-21 COMMUNICATING THROUGH A MIXED NETWORK

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. See ***3.6, Adjusting System Parameters and Advanced Controls*** if you need help changing the projector baud rate. Set the Network Routing to "RS232 and RS422 Joined" to reach all projectors.

**NOTES:** *1) To avoid damage, connect only properly wired serial communication cables. See Appendix C for details.*

*2) Each RS232 communication cable should be no more than 25 feet in length. Use high quality cables.*

## 2.4.5 ETHERNET NETWORK SETUP

To add one or more projectors to an Ethernet network, use standard CAT5 cable to connect each projector's Ethernet port to a hub belonging to the network. A controller or PC must also be connected to the hub. See *Figure 2-22 Ethernet Network*.

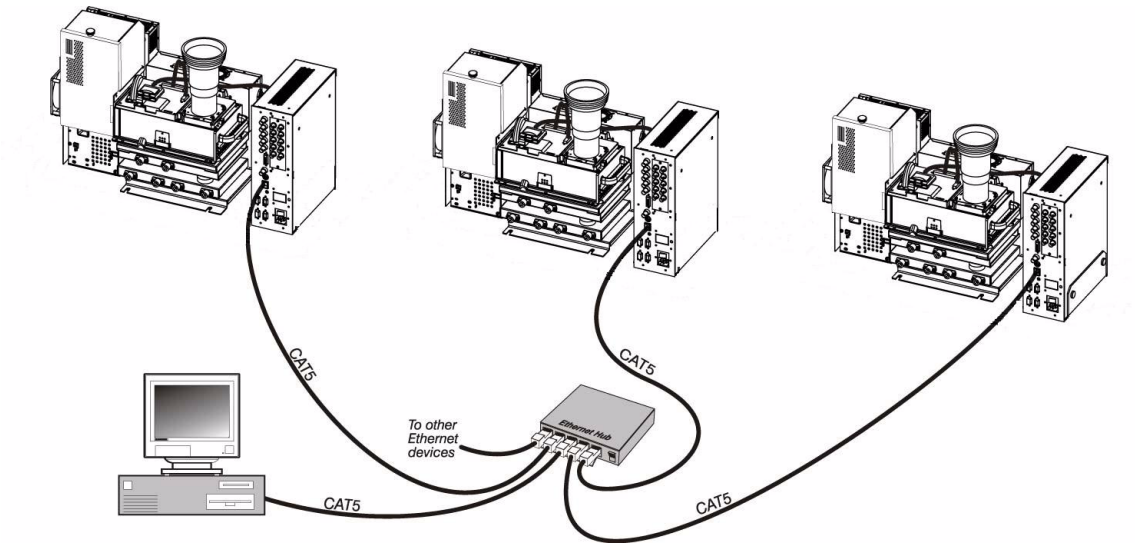



FIGURE 2-22 ETHERNET NETWORK

### SETTING THE PROJECTORS'S IP ADDRESS

Upon connecting 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* submenu.

Note that 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 checkbox is re-enabled for use with a DHCP server on the network.

### CHANGING THE PORT NUMBER

On some Ethernet networks, you may be required to change the firewall restrictions from the default value (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 1000, as these ports are typically reserved for and used 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, 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 *ArtNet Interface Settings — SUBMENU, on page 4-7* for additional information about ArtNet settings.

## 2.4.6 SEPARATING NETWORKS

By default, communications originating from one type of serial controller—RS232 vs. RS422 vs. Ethernet—stay on the corresponding network path. A "Separate" setting indicates this separation for "Network Routing" in the *Communications* menu. If you are using an RS422 controller, for example, it will communicate only with the projector to which it is connected unless you change this setting to either "RS232 and RS422 Joined" or "All Joined".

## 2.4.7 COMMUNICATING TO ALL PORTS

To relay all messages to all ports—RS232, RS422, 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-RS232 controller with the RS232 linking available between these projectors. For example, you may want to use both an RS422-compatible controller and an Ethernet-connected PC for working with a network of projectors linked via their RS232 in/out ports.

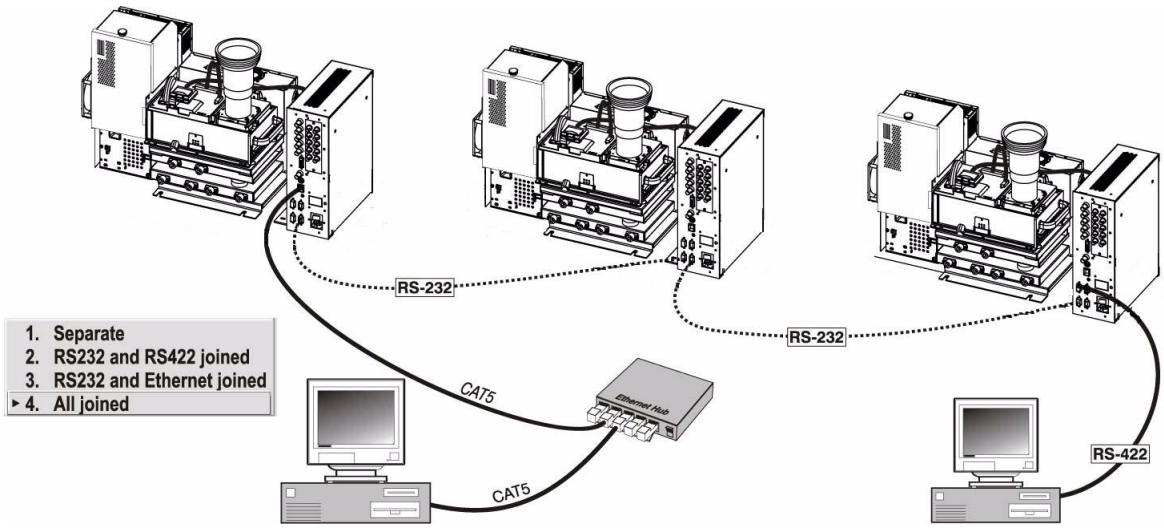



FIGURE 2-23 ALL JOINED

To isolate just RS422 communications, select "RS232 and Ethernet Joined". In *Figure 2-23 All Joined*, only projector #3 will respond to the RS422 controller. To isolate just Ethernet communications, select "RS232 and RS422 Joined"—only projector #1 will respond via Ethernet.

### 2.4.8 SYSTEM INTEGRATION GPIO CONNECTOR

The GPIO connector on the input panel can be used to provide a method of interfacing a wide range of external I/O devices to the projector.

Refer to *Appendix C System Integration* for complete details on pin configuration and how to program the various pins on the connector.

## 2.5 POVER CONNECTION

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

**The North American rated line cord is provided with this projector. For all other regions, ensure that you are using a line cord, power plug and socket that meet the appropriate rating standards.**

**Do not use a line cord that has been damaged.**

### 2.5.1 CONNECTING THE PROJECTOR TO AC

Plug an appropriately rate line cord to the AC receptacle located on the electronics module and the 3-pronged end into a grounded AC outlet.

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.*

The input voltage to the projector must be capable of 100-240 VAC.

### 2.5.2 DISCONNECTING THE PROJECTOR FROM AC

Power down the projector and wait for the internal cooling fans to stop before turning the main power switch on the electronics module OFF. This gives the lamps enough time to cool. At that time, unplug the line cord from the wall outlet.

Refer to *Section 6 – Specifications* for complete details on all power requirements for the projector.

**⚠ WARNING Wait for the cooling fans to stop before turning the main power switch OFF and unplugging the projector.**

# 3 Operation

This section explains how to operate the projector once it has been installed. Read this section and familiarize yourself with the components and menu options before using your projector.

# 3.1 ABOUT THE PROJECTOR

A brief description of each module is provided in this section. Knowing your projector will help you if troubleshooting is necessary.

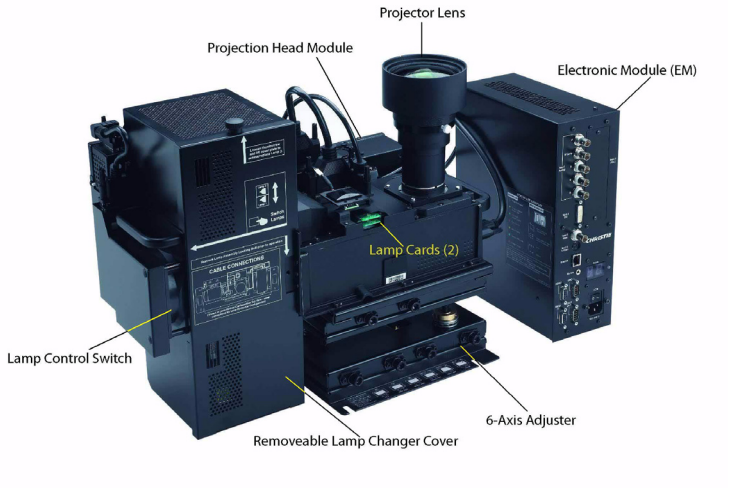



FIGURE 3-1 IDENTIFYING PROJECTOR COMPONENTS

## 3.1.1 PROJECTION HEAD MODULE

The projection head module (PHM) is the centermost module of the projector. It contains the projection lens, IR sensor, color wheel, DMD, lamps and other optical components. It also provides the electrical interfaces required to drive these components.

The PHM is mounted to the 6-axis adjustment mechanism in a lens-vertical (90 degree) configuration at the factory. It can be removed and positioned in a lens-horizontal (0 degree) configuration with a configuration bracket that comes standard with the projector.

## 3.1.2 6-AXIS ADJUSTER

The uniquely designed 6-axis adjuster enables accurate positioning of the projection lens relative to the screen. This control gives you the ability to correct image geometry issues and accurately match the corners and edges of multiple displays to create one seamless image.

## 3.1.3 LAMPS AND MECHANICAL LAMP CHANGER

Integrated with the PHM is the lamp module, which holds two identical 100/120W Ultra High Brightness (UHP) lamps. This module has a built-in mechanical lamp changer, which automatically switches lamps in the event a lamp fails. This feature allows the non-operating lamp to be replaced while the projector is still on.

You can also request a lamp switch to occur by selecting the other lamp mode from the lamp menu (*Section 4.10.1*) or by pressing the illuminated LAMP CONTROL button near the lamp module. When this selection is made, the current operating lamp will turn off and the mechanical lamp changer will move to the selected lamp position before the projector attempts to ignite the lamp.

## 3.1.4 ELECTRONICS MODULE (EM)

The EM module contains the main electronics and input connectors of the projector.

### INPUT PANEL

All source connections are made to the main input panel. Use **INPUT 1** to connect RGB and YPbPr sources, **INPUT 2** for analog or digital display signals, **INPUT 3** for composite video and **INPUT 4** to connect S-video. If you require additional connections, use **INPUT 5** to install one of the available optional input modules. For more details on connecting sources, refer to *2.4 Connecting Sources.*

### STATUS DISPLAY

Located just above the main power switch is a two-digit status display window that displays the current status of the projector. If the projector encounters an error during operation, an error code number will display. During normal operation, "ON" will appear in the window.

### STATUS LED

Located next to the 2-digit status display is a single LED that illuminates one of three colors to convey the current status of the system. A solid red LED indicates a system error and the corresponding error code will display in the status display. Refer to Table 3.2 for a description of LED variations. Press Exit to acknowledge and clear the error.

Table 3.1 Table 3.2. Error LED Status

| LED STATUS | DESCRIPTION |
|---|---|
| *Solid yellow* | Projector powering down/powering up |
| *Solid green* | Projector powering on/cooling down |
| *Solid Red* | System error – see corresponding error code on status display |
| *Flashing yellow* | Lamp expired |
| *Flashing green* | Keypad command sent - Command received |
| *Flashing red* | Key press error - Wrong protocol sent |

### MAIN POWER SWITCH

The MAIN POWER SWITCH is located above the AC receptacle on the EM. Turn this switch OFF to cut all power to the projector before unplugging from an AC wall outlet.

### IR SENSOR

The projector has a front IR sensor that is optimally placed to receive transmissions from the IR remote from up to 100 feet away, regardless of the projector's configuration. For uninterrupted communications with the projector, it is important to keep the transmission path to this sensor unobstructed at all times, and to point the IR remote directly at the projector (or center of the screen in rear screen applications).

## 3.1.5 COOLING AND AIR VENTS

Numerous air vents are located around the projector. To keep the projector at a optimum operating temperature, keep these vents unobstructed by maintaing the recommended "stay out zone" (empty space around the projector) as indicated in the *Appendix D*. This will ensure sufficient air flow and prevent overheating.

The projector is equipped with active thermal monitoring. This adjusts the speed of the cooling fans according the projectors temperature.

# 3.2 USING THE REMOTE IR KEYPAD

The IR remote keypad controls the projector by way of wireless communications from a battery-powered infrared (IR) transmitter. Use the IR remote keypad the same way you would use a remote TV or VCR rmote. When making key presses, direct the keypad toward the screen or toward the front of the projector. The IR sensor on the projector will detect the signals and relay the commands for internal processing.

*See Figure 3-2 Remote Keypad .*

### CONVERTING TO A WIRED REMOTE

You can convert the IR remote into a wired remote keypad using a 3.5mm stereo cable (not supplied with the projector). Connect one end into the remote and the other to the mini stereo connector on the input panel labeled **REMOTE**.

The wired remote is recommended when the lighting conditions are unsuitable for proper IR transmission

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

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

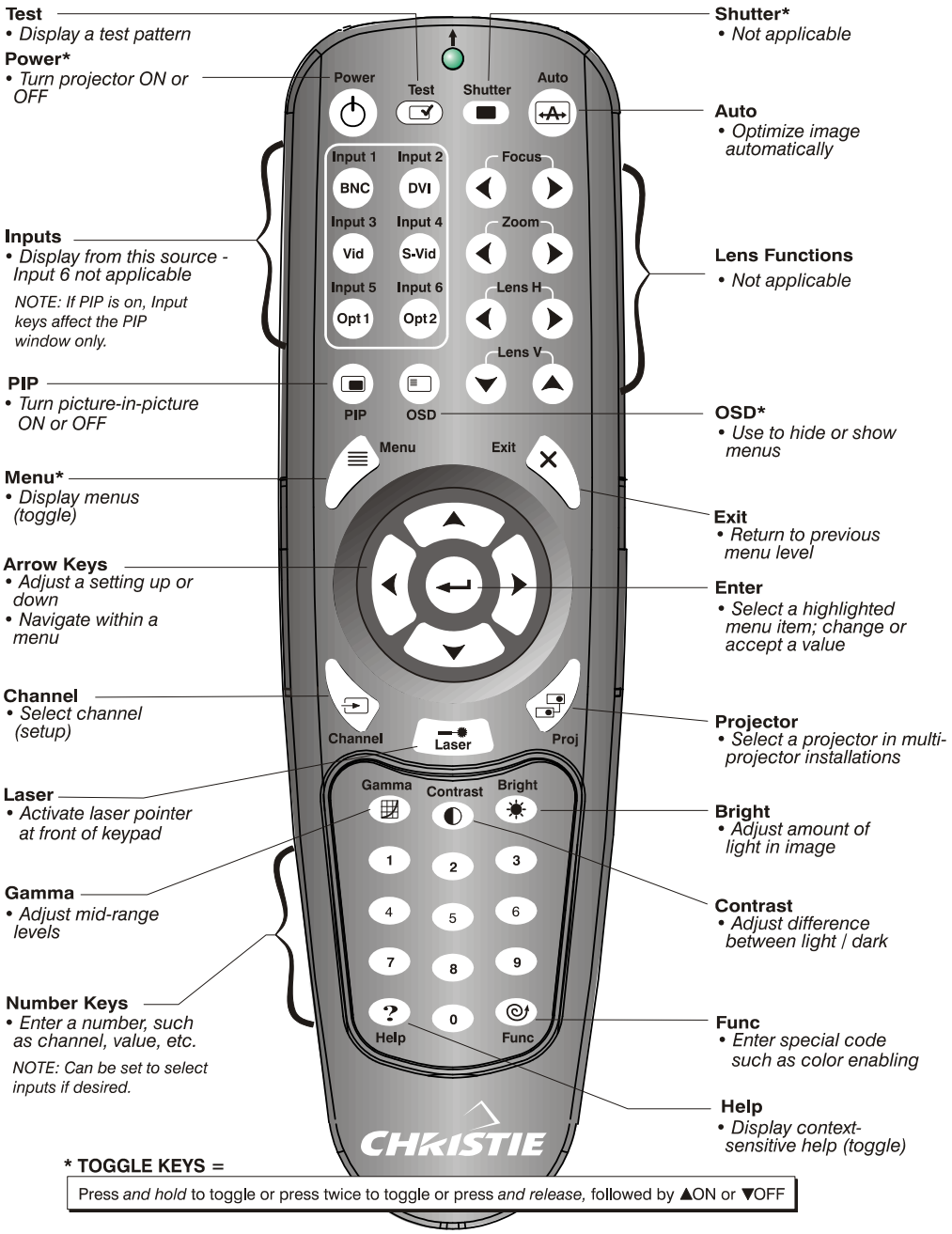



FIGURE 3-2 REMOTE KEYPAD

## 3.2.1 KEYPAD COMMANDS

When using the keypad, keep these guidelines in mind:

- Press keys one-at-a-time; there are no simultaneous key combinations required.
- Power and OSD keys —are "press-and-hold" keys that do not function with a typical quick press-and-release key press.
- Hold 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 a key while the projector is still responding to the previous action, such as during power-up, the second key press may not take effect.

Specific keypad commands are :

### POWER ON/OFF

There are 3 options you can use to power your projector ON or OFF:

- Press for two seconds to toggle the projector ON or OFF.
- Press followed immediately by (ON) or (OFF) to guarantee the correct toggle (useful if you are unsure of the present state).
- Press to toggle from the present ON/OFF state.

NOTES: *1) After powering down, the lamp cooling fan remains on for approximately 1 minute to cool the lamp.*

*2) Keep the projector OFF for a few minutes. Hot re-strikes of the lamp may reduce lamp life.*

*3) The projector enforces a 60 second wait between powering OFF and ON to allow the lamp to cool down. You will see vertical scrolling bars across the status display during this wait period.*

### TEST

Steps forward through all internal test patterns and eventually the current input.

If you press and then cycle by using the and arrow keys, you will be cycling in either direction through the test patterns only, no input.

### AUTO

Initiates an automated process in which the projector optimizes critical display parameters for the current source,listed in *Table 3.2 What an Auto Setup Does*. An *Auto Setup* can save time in perfecting a display, and you can modify the adjustments as desired.

Table 3.2 What an Auto Setup Does

| OPTIMIZES | SETS TO DEFAULT |
|---|---|
| Pixel Tracking | Contrast |
| Pixel Phase | Brightness |
| 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 Channel

Select a specific source setup (*channel*) defined and stored in projector memory. 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 setup parameters defined for that channel. A new channel is automatically created if you adjust an image from a new source.

NOTE: *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 Channel, or you may prefer to enter the desired channel number "blind", i.e., without on-screen feedback. See Menu Preferences later in this section.*

### INPUT 1 Input 1

Displays from the data or video input source connected to BNCs labeled **INPUT 1**.

### INPUT 2 Input 2

Displays from the DVI source connected to **INPUT 2**.

### INPUT 3 Input 3

Displays from the composite video source connected to **INPUT 3**.

### INPUT 4 Input 4

Displays from the S-video source connected to **INPUT 4**.

### INPUT 5 Input 5

Displays from the **INPUT 5** interface module installed in the Option 1 slot.

NOTE: *If you have the new optional Dual SD/HD-SDI Module installed at input 5 you can connect two inputs – A and B. Whether you are displaying from input 5 or from another input, press Input 5 to display the input last used. Press Input 5 again to toggle to the other input.*

### INPUT 6 Input 6

NOTE: *Not applicable.*

### CONTRAST Contrast

Changes the amount of white in your images. Use ◄ ► 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 ( "crushed"). Conversely, low contrast causes dim images. See *3.5 Adjusting the Image* (*Image Settings* subsection).

### BRIGHTNESS

Increases or decreases the amount of black in the image. Use keys until you reach the desired level of contrast. For best results, start high and decrease so that dark areas do not become black ("crushed"). Conversely, overly high brightness changes black to dark gray, causing washed-out images. See *3.5 Adjusting the Image*.

### GAMMA

"Gamma" determines how gray shades are displayed between minimum input (black) and maximum input (white) for a given amount of signal. The proper setting (normal gamma setting is 2.22) helps maintain optimized blacks and whites while ensuring a smooth transition for the "in-between" values utilized in grays. 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.

If excess ambient light washes out the image and it becomes difficult to see details in dark areas, lower the gamma setting to compensate.

### MENU

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

### OSD (ON-SCREEN DISPLAY)

Press followed by to hide the projector's menu system during use. 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.

To see the menus again, do one of the following:

- Press *and hold* for a second
- Press and release followed immediately by
- Press

NOTE: *With 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 slidebar is present, press to toggle the current function to affect the other image.

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

## FUNCTION KEY Func

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

Func 6 1 = Red
Func 6 2 = Green
Func 6 3 = Blue
Func 6 4 = Red & Green
Func 6 5 = Green & Blue
Func 6 6 = Red & Blue
Func 6 7 = All Colors

**IF WITHIN A PRESENTATION:** Press Func followed by a 2-digit number to enable a specific color or colors in the display (see right). For example, Func 6 4 will display only red and green data, Func 6 7 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 from stacked projectors.

NOTE: *Color enabling can also be implemented from numerous locations within the menu system.*

## SHUTTER Shutter

Not applicable.

## PROJECTOR Proj

Used 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.

A checkmark indicates that the projector is connected to a keypad and is listening to commands from that keypad. If there is no checkmark, you are communicating with a different projector.

To control a specific projector with the keypad, enter the projector's 3-digit number. If you switch to another projector, the checkmark will disappear.

When broadcasting to multiple projectors, press the button twice ***without*** entering a projector number. Keypad commands will then affect all projectors present. There is no method of controlling a *group* of projectors within the same wired configuration using the wired keypad exclusively

NOTE: *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. See also 3.6, Adjusting System Parameters and Advanced Controls.*

## ENTER ↵

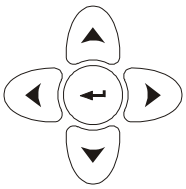
Press ↵ to select a highlighted item, to toggle a checkbox, or to accept a parameter adjustment and return to the previous menu or image.

### EXIT Exit

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

NOTE: Exit *does not save changes within text editing boxes (including number editing of a slidebar value) or within pull-down lists. It acts as a "cancel" in these cases.*

### ARROW KEYS



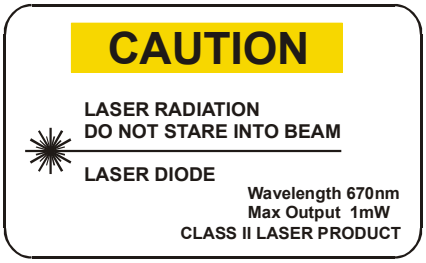
Use the ◄ ► keys to change a slidebar value or to select a different option within a pull-down list without having to first scroll through options. See also *Editing Text* later in *Section 3*.

Use the ▲ ▼ keys to navigate within a menu, pull-down list or text box.

### LENS FOCUS, ZOOM AND LENS H, LENS V Focus, Zoom, Lens H, Lens V

NOTE: *Not applicable.*

### LASER




Activates the laser pointer on the remote. Keep the key depressed and point the remote at the screen to highlight an area of the presentation. Release it to turn it off. The closer you are to the screen the brighter the laser beam appears. The laser pointer works best in an environment where ambient lighting can be controlled.

NOTE: *The batteries must be in the wired remote keypad for the* ⊸ *key to work.*

# 3.3 NAVIGATING THE MENUS

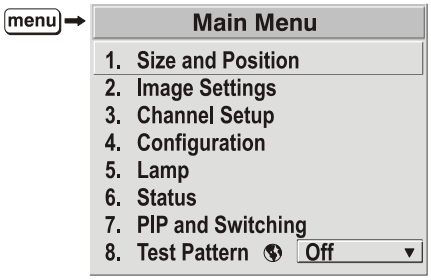



FIGURE 3-3 ENTERING THE MENU SYSTEM

Press Menu at any time to display the *Main* menu (see figure 3.3). Most of the projector controls are accessed from within the projector's menu system. There are several groups of related *functions*.

Press the number corresponding to the function menu, such as 2 for the *Image Settings* menu, or use the ▲ ▼ keys on any keypad to highlight the desired option, then press ↵. The corresponding function menu or pull-down list of further options will appear.

With a function menu displayed,enter a menu option number or use the ▲ ▼ keys to highlight the desired option and then press ↵ (Enter). Longer menus have a scroll bar on the right. Use the arrow keys to scroll the menu. Locked or disabled items 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 will return to the presentation.*

*3) The Status menu is read-only.*

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

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

### ON-LINE HELP

Displays summary information about the current menu or highlighted option. Press Help again to exit. Aline of "hint" text is included at the bottom of some menus.

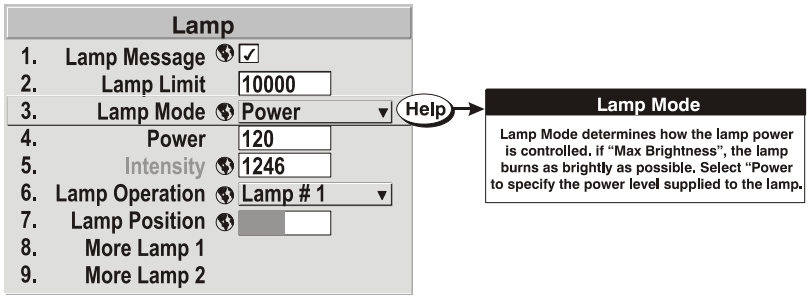


FIGURE 3-4 CONTEXT-SENSITIVE HELP

From presentation level, press Help to access general *Help Topics*.. Press Help or Exit to return to your presentation.

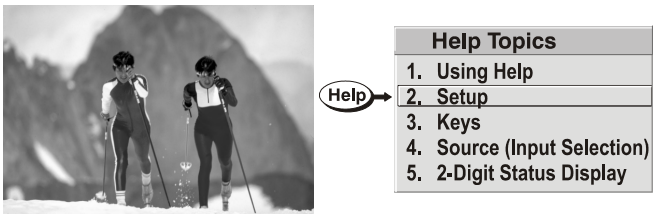



FIGURE 3-5 ACCESSING GENERAL HELP TOPICS

## TIME-OUTS

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

## THE GLOBAL ICON

Menu options with this icon apply universally to any incoming signal.

## USING SLIDEBARS AND OTHER CONTROLS

Most function menus allow you to change settings by using slidebars, checkboxes, and pull-down lists. To select a slidebar, toggle a checkbox status or view a pull-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 to select Vertical Stretch in the *Size & Position* menu).
- Or move the highlight to the option desired and press Enter (Enter).
- Or move the highlight to the option desired and press ◄ ► 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 (see 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.

Once selected, change the setting as desired and press Enter to save and return to the current function menu.

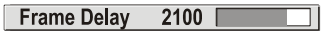



FIGURE 3-6 EXAMPLE OF SLIDEBAR

**Slidebars in menus –** The current value for a given parameter appears to the left of its slidebar icon (adjustment window). This number often expresses a percentage, or it may have units associated with it (such as pixels, degrees Kelvin), depending on the specific option. Press ◄ ► to adjust the setting up or

down.Both the number and the length of the bar change accordingly. Hold for continuous adjustment. Or press ↵ to activate a slidebar text box for specific number entry via the keypad, then press ↵ to save (or press Exit to cancel).

**"Direct" slidebars -** For quick access to Gamma, Brightness, and Contrast slidebars without traveling the menu system. For example, press Cont to immediately display the same contrast slidebar accessed with the Contrast option in the *Image Settings* menu.

NOTES: *1) A direct slidebar can still be adjusted if the display is turned off (see OSD or Menu Preferences menu) — the slidebar will not be visible.*

*2) A direct slidebar disappears if it is not used within 5 seconds.*




FIGURE 3-7 EXAMPLE OF CHECKBOX

**Checkboxes -** Conditions are present the adjacent checkbox contains a checkmark. To toggle the checkbox, highlight and press ↵, or highlight and use → to check and ← to uncheck. If a checkbox is numbered, enter its number to immediately toggle the checkbox.

**Pull-down lists –**Parameters labeled with a ↴have a pull-down list. To see the pull-down list, highlight it and press ↵ (Enter) or enter the menu option number.

Use ↑ or ↓ keys to navigate up and down the list (the current choice is noted with a small ↴). Press ↵ to choose an option from the list.

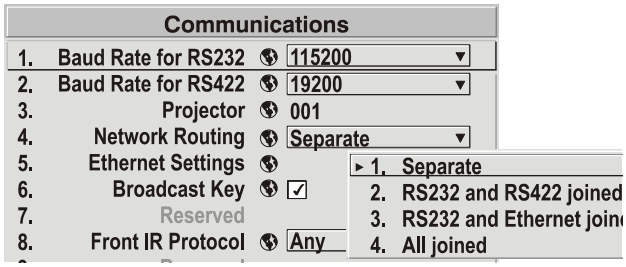



FIGURE 3-8 FIGURE 3.8. EXAMPLE OF PULL-DOWN LIST

To scroll through a list without first pulling it down, highlight the option and use ↵. Press ↵ when the desired choice appears.

NOTES: *1) Press ← or → to jump between pages in an extra long pull-down list.*

*2) Press Exit while in a pull-down list to cancel any change.*

## EDITING ALPHANUMERIC TEXT

To enter or edit text, highlight the parameter and press (Enter) to activate its adjacent edit window. Any previously entered text is displayed with its first character highlighted in a square cursor, signifying that this character is ready for editing.

To navigate the edit window press (Right) to move the cursor forward or (Left) to move the cursor backwards.

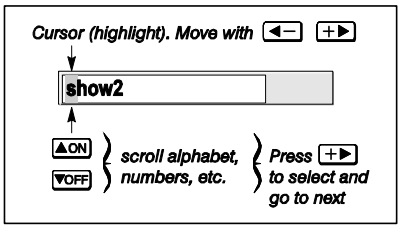



FIGURE 3-9 ENTERING AND EDITING TEXT

To edit a character press (Up) and (Down) to scroll through the alphabet, numbers, spaces and punctuation available. When the character you need appears, press (Right) to select it, The cursor will move to the next character of current text, if present. You can also enter a number directly from the keypad—it will be accepted and the cursor will move on.

NOTE: *Channel numbers are defined with 2 digits—for example, if you enter a single digit (such as "7") for a channel number, the channel will automatically be defined as "07". Enter "07" to utilize this channel.*

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

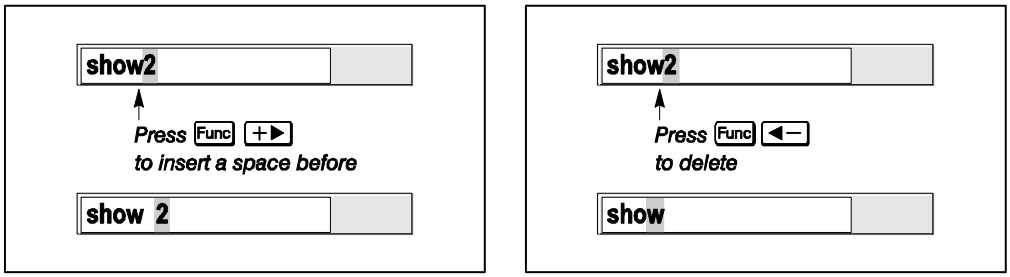



FIGURE 3-10 ADDING OR DELETING CHARACTERS

To accept edits and leave the edit window, press (Enter) (Enter).

NOTES:

*1) Press (Exit) at any time to cancel changes and return to the previously-defined text.*

*2) Once you enter the first digit, this digit replaces all old digits.*

*3) Pressing any non-numbered key will accept the number entered up to that point as the new value.*

*4) Press (Exit) to cancel editing of numerical values.*

# 3.4 USING INPUTS AND CHANNELS

NOTE: *See Section 2, Installation and Setup, for details on connecting 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 use a wide variety of customized setups. Depending on what is defined, each physical source connection (i.e., input at 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 at the projector. (input) describes the source signal according to which *input slot* it is connected.

**SWITCHING INPUTS –** Press the appropriate "direct" key — (input 1), (input 2), (input 3), (input 4), (input 5) to display from one of the five inputs connected. The image will be displayed 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 will recognize the new input signal based on its frequencies and polarities. It will automatically display an image according to the signal default settings. In general, the image from the new source will be 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 was automatically created and still exists in projector memory (see below). Using one of the (input) keys will automatically recall this channel—and all its setup parameters—and update the display accordingly.

***If more than one channel exists*** for the input, the image will be displayed according to the setup parameters for the first channel with matching characteristics.

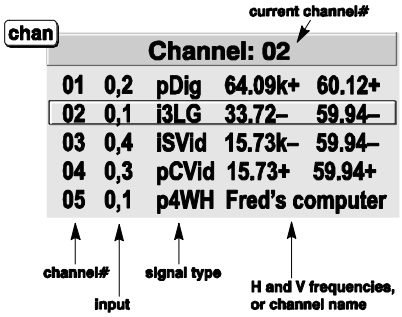



FIGURE 3-11 CHANNEL LIST

### 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 vary, you will need to adjust and define a wide variety of parameters, such as brightness, contrast and size, to customize and optimize the display from or for a particular source. For example, the display settings for a VCR source may be different from a high resolution computer source, or one signal may vary from another signal used 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 (0)(9). You can have numerous distinct channels

available for the same input, which can be selected by using the Channel key on the keypad followed by the 2-digit channel number.

NOTE: *The Channel key may display a channel list or not, depending on what you have defined for "Display Channel List" (see Menu Preferences later in this section).*

To access channels by using on the keypad, you must first create the channels..

## 3.4.2 CREATING A NEW CHANNEL

### AUTOMATIC

To use a new source with the projector, a new channel must be added to the projector memory so that the projector will respond properly to an input signal from that source. A new channel can be created automatically or copied from an existing channel and then edited (see *Copying or Deleting Channels* later in this section).

When you select a direct input (Input 1, Input 2, Input 3, Input 4, Input 5), all currently-defined channels in the projector are searched for matching input and signal parameters (Auto Source must be enabled on these channels). If no match is found 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 01-50.

NOTES: *1) An automatic channel will be discarded unless one or more of its parameters are changed, and will not appear in the channel list.*

*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 matchs an existing channel, the image will be set up and displayed as usual according to the parameters currently defined for that channel.

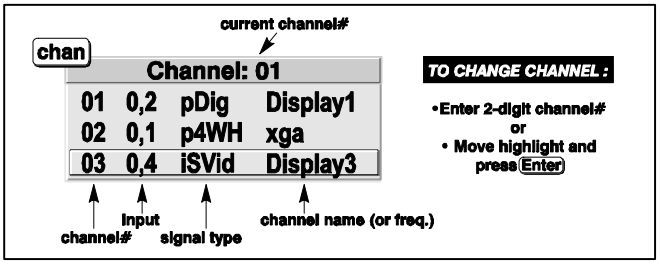



FIGURE 3-12 SELECTING A CHANNEL

## 3.4.3 USING A CHANNEL

Select a channel at any time by pressing Channel (see right). To prevent a channel from appearing in this list, edit the channel as described in *Channel Edit* later in this section.

NOTE: *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.*

## WHAT CHANNELS ARE DEFINED SO FAR?

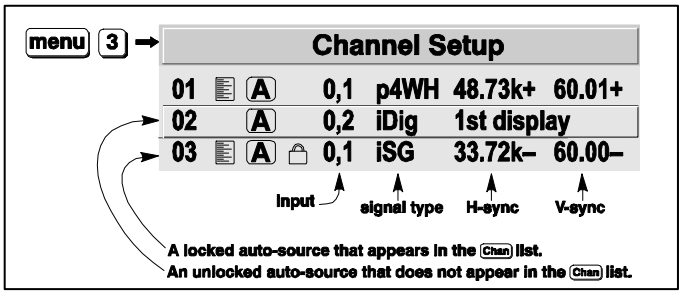



FIGURE 3-13 ALL CHANNELS APPEAR IN THE CHANNEL SETUP MENU

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, press 3, or move the highlight to the *Channel Setup* option and press ↵. The *Channel Setup* menu will appear (see sample at right), with the active channel highlighted.




FIGURE 3-14 ICONS USED TO IDENTIFY CHANNELS

## WHAT APPEARS IN CHANNEL SETUP MENU?

This menu lists all channels defined and indicates where they are connected on the input panel. The far left column lists channel numbers currently defined. The values in the far right columns indicate horizontal and vertical frequencies—if someone has defined a name for this channel, it appears here. Remaining columns contain details pertaining to each channel setup, such as its switcher number (always 0 = projector), slot location, a variety of icons indicating access to each channel, and an abbreviated description of each signal type. See *Editing a Channel Setup* for details.

NOTE: *Use ◄ and ► to see channels not visible in the initial display of channels.*

### SIGNAL TYPE

Both the Channel key list and the *Channel Setup* menu, identify signal types in a shortened form as defined in table 3.2. These descriptors 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").

Table 3.3 bbreviations for Signal Type

| ABBREV | 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 |

## 3.4.4 COPYING OR DELETING CHANNELS

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.

### COPYING A CHANNEL

1. Highlight the channel in the *Channel Setup* menu.
2. Press Func to go to the *Channel Copy/Delete* submenu.
3. Select "Copy" and press ↵ . A new channel is created (identical to original which still exists) identified with the next available number from 01-50.

If you do *not* want to copy the current channel, press Exit to cancel and return to the previous menu.

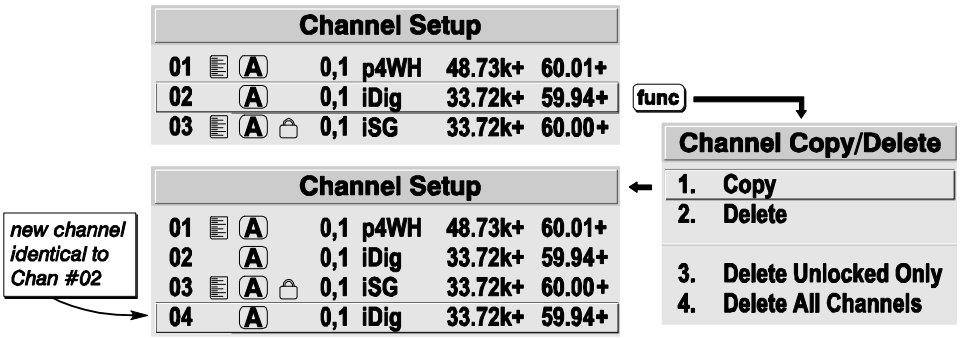



FIGURE 3-15 COPYING A CHANNEL

## DELETING A CHANNEL

1. Highlight the channel in the *Channel Setup* menu.
2. Press Func to activate the *Channel Copy/Delete* submenu.
3. Select "Delete" and press Enter. A confirmation window will appear to verify that you want to delete this channel.

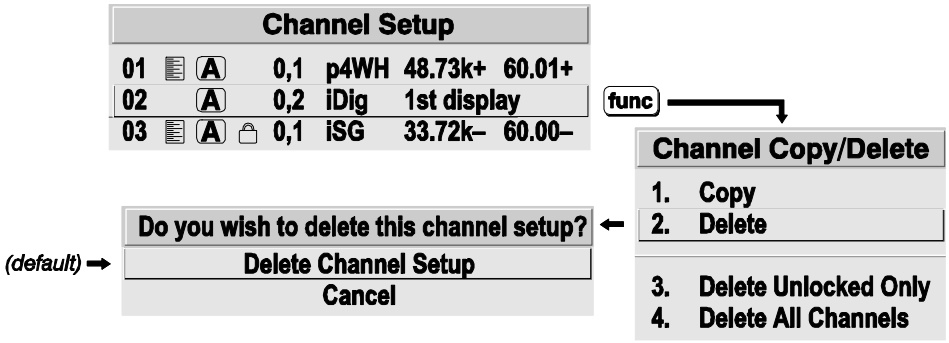



FIGURE 3-16 DELETING A CHANNEL

### DELETING MULTIPLE CHANNELS

1. Highlight any channel in the *Channel Setup* menu.
2. Press Func to go to the *Channel Copy/Delete* submenu.
3. Select "Delete Unlocked Only".
4. Press Enter 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. A confirmation window will appear to verify that you want to delete the channels.

## EDITING A CHANNEL SETUP

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

1. From the presentation level, press Menu to display the main menu.
2. *P*ress 3, to display the *Channel Setup* menu or move the highlight to the *Channel Setup* option and press Enter. The *Channel Setup* menu will appear.
3. Select the relevant channel and press Enter to edit parameters shown in the *Channel Setup* menu

The *Channel Edit* menu will appear similar to the sample shown in *Figure 3-17 Channel Edit Menu (SAMPLE)*.

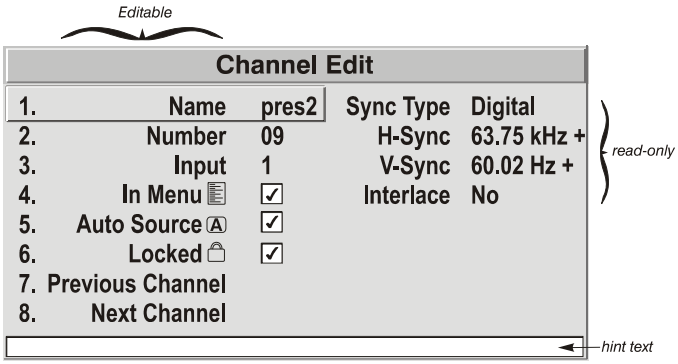



FIGURE 3-17 CHANNEL EDIT MENU (SAMPLE)

4. Review or edit the following channel setups in the *Channel Edit* menu:

   - **CHANNEL NAME:** An alpha-numeric label can be defined and/or changed here. Channel names can be up to 12 characters in length.
   - **CHANNEL NUMBER:** A 2-digit channel number can be changed here. If you enter an existing channel number, a dialog message appears indicating that this number is already in use–assign a different channel number. You can define up to 50 channels.
   - **INPUT:** 1-5, 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 will then appear in the list available when Channel key is pressed. If unchecked, the channel must be accessed via Channel on the keypad or via the "Auto Source" function.

NOTE: *On-screen display 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 Channel on the keypad—and a change in input signal will *not* result in a channel change.
   - **LOCKED:** If checked, all image settings for this channel are disabled. 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 *Channel Edit* settings for the previous channel in the *Channel Setup* list.
   - **NEXT CHANNEL:** Select this option to see or change *Channel Edit* settings for the next channel in the *Channel Setup* list.

## 3.5 ADJUSTING THE IMAGE

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

*Size and Position* (Menu 1) and *Image Settings* (Menu 2), both of which appear in the *Main* menu. From either menu, you can change settings affecting the image from the current channel by working with the appropriate slidebars, checkboxes and pull-down lists.

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

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

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

NOTE: *Available for certain display parameters only.*

For example, press Contrast to access the "contrast" slidebar immediately. Press Exit to return to your presentation.

NOTES: *1) To hide these "direct" slidebars, disable the" Display Slidebars" checkbox in the Menu Preferences menu.*

*2) To hide the entire menu system from view, toggle the on-screen display by pressing the OSD ▼ keys.*

### 3.5.1 BEFORE YOU BEGIN

The first step in optimizing the image is to perform an Auto Setup. This initiates an automated process in which the projector 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 adjustments as desired using menu options described below.

For best results, select an image that does not display black borders, and has some white and black content.

Then press Auto.

## 3.6 SIZE AND POSITION MENU

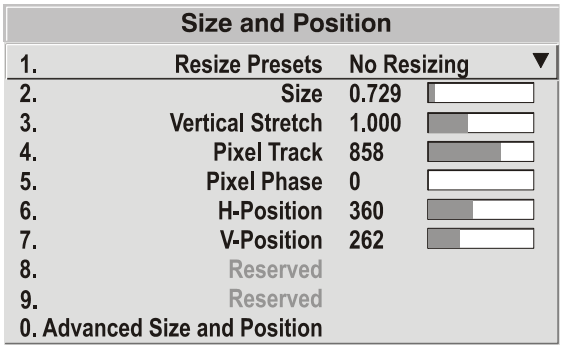



FIGURE 3-18 SIZE AND POSITION MENU

Use *Size and Position* controls to match the image precisely to the screen used at the site.

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.

Refer to *"Using Slidebars and Other Controls"* for help using 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).

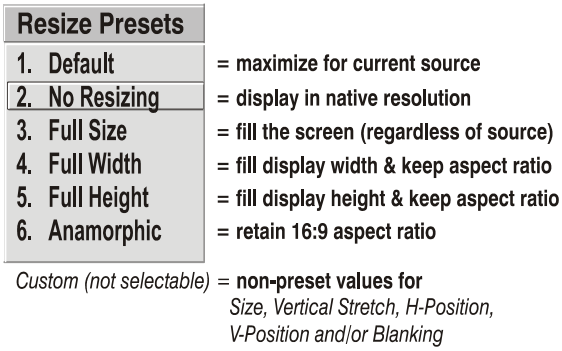



FIGURE 3-19 RESIZE PRESET OPTIONS

## 3.6.1 RESIZE PRESETS

NOTE: *The following text and figures describe the operation of an SXGA+ (1400x1050 native resolution) projector, but behaves similarly for other native resolutions (eg. XGA 1024x768).*

Select a *Resize Presets* option to display an image in its native resolution, automatically resize an image to closely fill the projector's native resolution , or to optimize the width or height of your display.

*Size*, *Position* and *Blanking* parameters automatically adjust or, if Blanking is set first, define an Active Input Area. *Resize Preset* scaling will occur only in this region of interest.

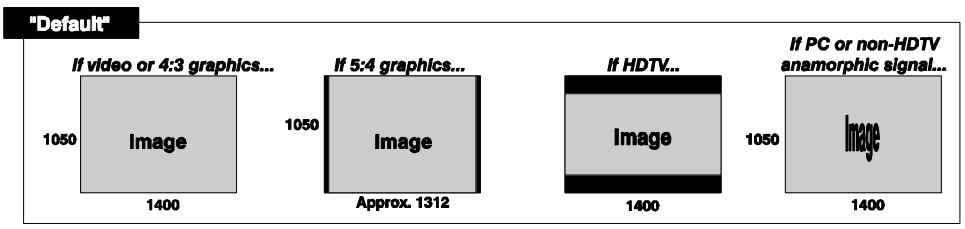
### DEFAULT

By default when displaying a new source, your image will utilize as much of the projector's display area (e.g.1400 x 1050 for SXGA) as possible for the type of incoming source data, but with minimal or no changes to aspect ratio. See *Select "Default"*.

**WHEN "CUSTOM" APPEARS:** The "Custom" re-size descriptor 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 offered in the *Resize Presets* pull-down list.

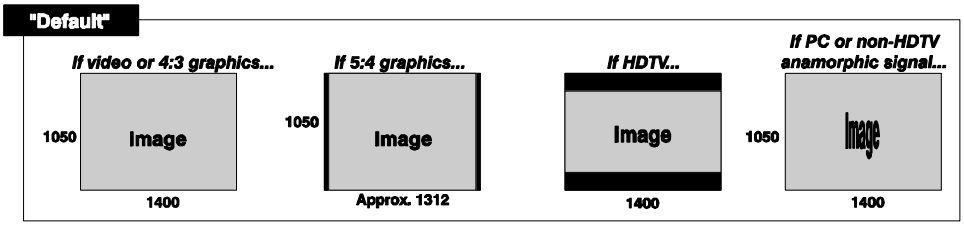
Select **"DEFAULT"** for most sources (factory default). The image will be centered and displayed as large as possible *depending on the type of source.*

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



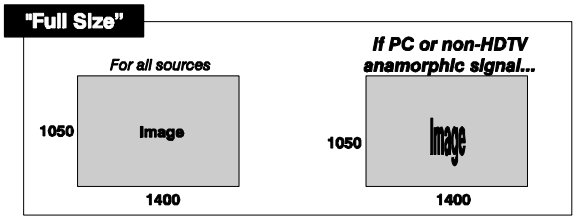
### NO RESIZING

Displays the image in its native resolution, which may or may not match the projector's resolution. For example, for a source with a native resolution of 800 x 600, "No Resizing" will use the central 800 x 600 pixels and have a black border—the black border areas are unused areas. See below.



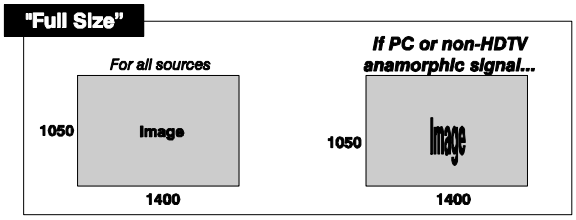

### FULL SIZE

Uses *all pixels* 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.



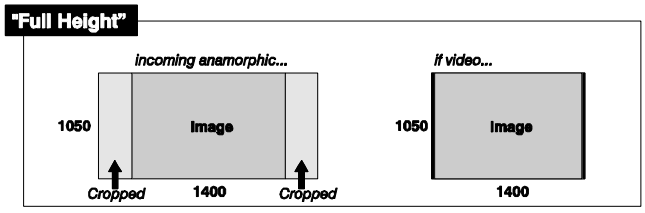

### FULL WIDTH

Fills 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").



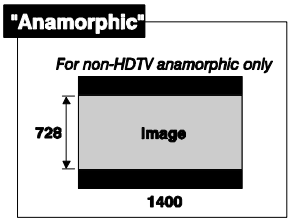

### FULL HEIGHT

Fills the display from top-to-bottom. Depending on the source, this may create borders.



### ANAMORPHIC

Displays an anamorphic image in its native 16:9 aspect ratio. The image will fill the screen from side-to-side and be centered between black bars at top and bottom.




## 3.6.2 SIZE

Controls both the image *width* and *height* in tandem, maintaining the current aspect ratio of the displayed signal data.

## 3.6.3 VERTICAL STRETCH

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

## 3.6.4 PIXEL TRACK

Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Proper pixel tracking ensures 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* shutdown screen. Adjust the slidebar until the vertical stripes broaden to the point where one large stripe fills the image. If the image still exhibits some shimmer or noise, adjust *Pixel Phase* (below).

## 3.6.5 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 slidebar until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than one point—i.e., 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.

### 3.6.6 H-POSITION

Moves the image right or left within the area of available pixels. 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.

### 3.6.7 V-POSITION

Moves the image up or down within the area of available pixels. 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.

### 3.6.8 ADVANCED SIZE AND POSITION —SUMMENU

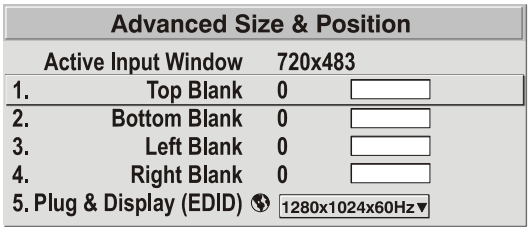



FIGURE 3-20 ADVANCED SIZE & POSITION SUBMENU

This submenu has these options:

#### ACTIVE INPUT WINDOW

Indicates the current area of your displayed data or "region of interest as defined by the blanking controls (read only). By default, the projector determines what portion of its full resolution to use, and pixels in the surrounding borders are turned off. To specify an active input window size by adjust one or more "Blank" settings. For example, if you blank (cropped) 100 pixels from both the left and right edges of an incoming source of 1400 x 1050, the active input window will be reduced to 1200 x 1050.

When using SD or HD or a decoded video source at **INPUT 3** or **INPUT 4**, the default blanking of "0" defines an active input window of 720 x 483.

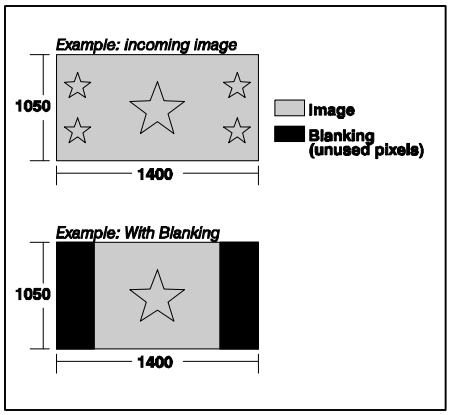


FIGURE 3-21 BLANKING

### BLAMKING (TOP, BOTTOM, LEFT, AND RIGHT

Crop the image so that unwanted edges are removed from the display (changed to black). Blanking defines the size of the *Active Input Window*, or area of interest. Range of adjustment depends on the source resolution and other factors.

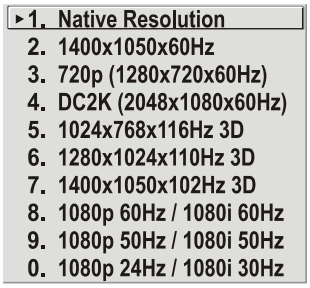



FIGURE 3-22 PLUG & DISPLAY SOURCE OUTPUTS

### PLUG & DISPLAY (EDID)

By default, a *Plug & Play (EDID)* source outputs a signal according to the EDID (Extended Display Identification Data) 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 or frequency), select the desired *Plug & Play (EDID)* resolution from the list.

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

## 3.7 IMAGE SETTINGS MENU

Use options in the *Image Settings* menu to alter your image without affecting its size or position. Changes made 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).

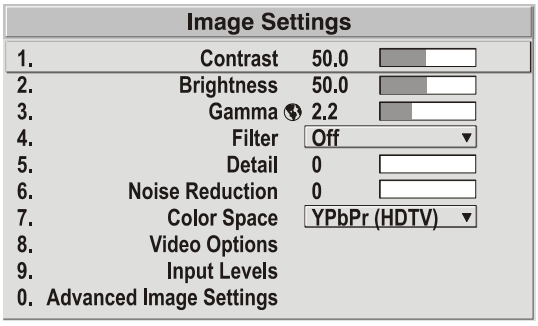



FIGURE 3-23 IMAGE SETTINGS MENU

### 3.7.1 CONTRAST

*I*ncreases or decreases the perceived difference between light and dark areas of your image (0-100). For best results, keep close to 50 or 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 (“crushed”). If contrast is set too high, the light parts of the image lose detail and clarity. If set too low, the light areas will not be as bright as they could be and the overall image will be dim.

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

### 3.7.2 BRIGHTNESS

Increases or decreases the amount of black in the image (0-100). For best results, keep close to 50 or start with a high value and decrease so that dark areas do not become black (“crushed”). Conversely, high brightness changes black to dark gray, causing washed-out images.

### 3.7.3 GAMMA

A global setting that determines how gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting optimizes blacks and whites while ensuring smooth transitions for the “in-between” values utilized in other colors. The overall tone of images can be lightened or darkened without changing the extremes and all images will be more vibrant while still showing good detail in dark areas.

A gamma setting of 2.22 is correct for most signals and conditions. If ambient light washes out the image, making it difficult to see details in dark areas, lower the gamma setting improve contrast while maintaining good details for blacks. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting.

### 3.7.4 FILTER

The proper filter setting is automatically set for most signals. 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 reduces pixel phase noise and signal bandwidth.

Override only if standard pixel tracking and phase adjustments do not clear up a “noisy” video signal, or if a graphics signal appears overly “soft”.

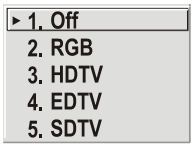



FIGURE 3-24 FILTER OPTIONS

### 3.7.5 DETAIL

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

## 3.7.6 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 useful for clearing up noisy RGB images such as those from a PC. Reducing noise, which reduces high frequencies, may also soften the image.

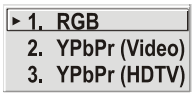



FIGURE 3-25 COLOR SPACE OPTIONS

## 3.7.7 COLOR SPACE

Determines how the color components of an analog input signal are decoded for accurate color in the display. Useful only for analog signals connected to **INPUT 1, INPUT 2, or INPUT 5.** Although color space for these analog signals is automatically determined by the projector, you may wish to override this and manually set a specific color space.

NOTE: *For digital signals or for signals connected to INPUT 3 or INPUT 4, the color space function is automatic and the pull-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, or 5.**
- 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 recognize them as RGB and will incorrectly decode their color information as YPbPr (video). These signals appear magenta and 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.

## 3.7.8 VIDEO OPTIONS — SUBMENU

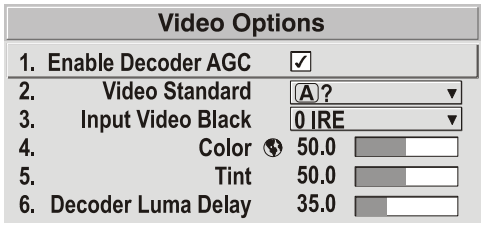



FIGURE 3-26 VIDEO OPTIONS SUBMENU

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

### ENABLE DECODER AGC

Automatic Gain Control (AGC) affects only decoded video images. Enter a checkmark (default) in most instances. This activates the decoder's AGC circuit to ensure properly bright images. Delete the checkmark 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.

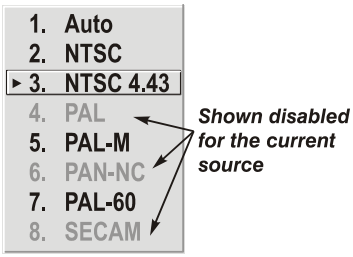



FIGURE 3-27 VIDEO STANDARD

## VIDEO STANDARD

For most video standards, 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.

Table 3.4 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 | |
| SECAM | France, Eastern Europe, most of Africa |

NOTE: *Use "Auto" for all instances EXCEPTa poor quality input signal or a black-and-white video signal. To detect and display such signals, select the relevant standard from the list.*

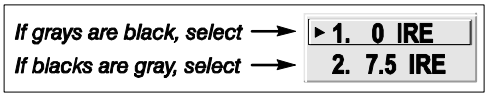



FIGURE 3-28 INPUT VIDEO BLACK OPTIONS

### INPUT VIDEO BLACK

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

Adjusts the color saturation level (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

Adjusts the red/green color hue for true color reproduction of video signals connected to Input 3 or 4. For best results, adjust tint while displaying an external color bars 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 will move luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in place. Decreasing this delay will move the shadow slightly to the left. If necessary for your current source, adjust so that no shadows occur with adjacent colors.

## 3.7.9 INPUT LEVELS — SUBMENU

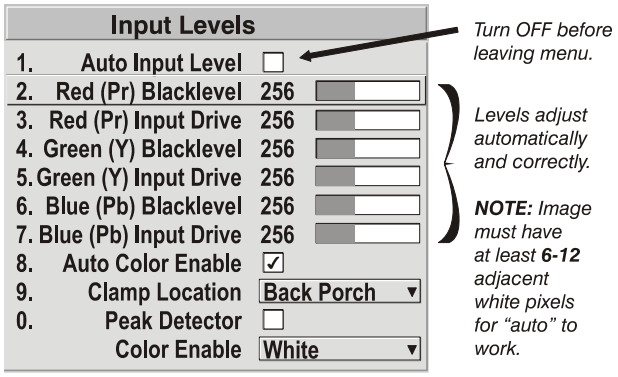



FIGURE 3-29 INPUT LEVELS SUBMENU

NOTES: *1)The projector automatically optimizes input levels for most sources. Only experienced users should use the Input Levels submenu.*

*2) Before beginning, verify that overall contrast and brightness settings are near 50 and that color temperature is set up on an internal grayscale test pattern.*

*3) There must be at least 3 consecutive white pixels and black pixels present in the image for proper "Auto Input Level" function. Leave this control off after use.*

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

NOTE: *This automatic adjustment requires at least 2 consecutive white pixels in the image. Without these pixels, input levels may produce skewed colors, particularly in non-video images.*

For an unusual source exhibiting one or more overly high blacklevels (typically caused by a noisy source causing blacklevel spikes), an experienced user can use the *Input Levels* menu. These adjustments serve as a calibration process,compensating for differences in sources and cabling to perfect the source image input levels and eliminate the "overshoot" and "undershoot". *Input Levels* are of limited use with digital signals, but do offer some ability to tweak poorly mastered source materials.

### AUTO INPUT LEVEL

Keep OFF for virtually all sources (default). Temporarily enter a checkmark *only* if you are an experienced user with an unusual source that needs color temperature and/or input level adjustment. After entering a checkmark, wait for the 6 slidebar values to stabilize then delete the checkmark and exit. This compensates for incoming out-of-range drives (white) and blacklevels (black) that would cause "crushing" of light and dark colors in the image.

### BLACK LEVELS AND DRIVES

To check your image and adjust these controls:

1. Ensure overall "Contrast" and "Brightness" settings are both set to near 50.

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**. 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, do not adjust input levels. If black levels are too high (and/or whites are too low), you likely have a noisy source that is producing skewed input levels. Continue to Step 5.
5. Enable "Auto" in the *Input Levels* submenu. Wait for all 6 values to stabilize. Alternatively, do *not* use "Auto"—reduce blacklevels manually instead. Change one or more of the six levels as necessary to obtain proper blacks and whites. You may want to see only a certain color while adjusting—use the "Color Enable" option.
6. Delete the "Auto" checkmark and leave the *Input Levels* menu.

## AUTO COLOR ENABLE

When a checkmark is present, selecting a specific blacklevel or drive to adjust will automatically enable the corresponding color in the display. Delete the checkmark to see all colors.

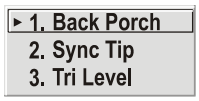



FIGURE 3-30 CLAMP LOCATION

## CLAMP LOCATION

Brightens the image produced from certain high-resolution high-frequency graphic sources. For most sources, the best clamp location is automatically selected by the projector. 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 back porch 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.

NOTE: *Clamp Location is not used for video sources or any RGB source with sync information included on the video (e.g., sync-on-green). Use Tri Level instead.*

## 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.

NOTES: **1***) Input levels apply for the current source only, but for any color temperature used.*

*2) If color temperature is set up based on the internal test patterns, you can set up input levels for a given source to matche the color temperature of the int*ernal test patterns.

## PEAK DETECTOR

A method for defining individual input levels to improve the accuracy of input levels set by the Auto Input level function. Enabling the Peak Detector activates an operating mode for detecting ***only*** pixels that are considered black or white, all other levels are displayed as a mid-level gray. Using a smooth grayscale pattern (where black and white are known to be at opposite edges of the image) adjust the individual blacklevels and input drives until both black and white edges are ***just*** visible and distinguished from neighboring pixels. Images from this source will then display correct blacks and whites without “crushing”.

## ADJUSTING INPUT LEVELS USING THE PEAK DETECTOR

1. Display a 16 level grayscale test pattern from the desired external source. Enter a checkmark in the Peak Detector checkbox.

NOTE: *The “Peak Detector” will initially render the grayscale as a uniform gray field before adjustment.*

2. Use *Color Enable* to select and display one primary color.
3. Adjust the current color’s “Blacklevel” slidebar 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 the “Input Drive” slidebar 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 color is enabled). Do not adjust too far.

5. Check the black band and adjust the blacklevel slidebar if necessary. Blacklevel and Input Drive adjustments are related, so you need fine tune them until both bands are optimized.
6. Repeat Steps 2-5 with the other two 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 checkbox will clear.

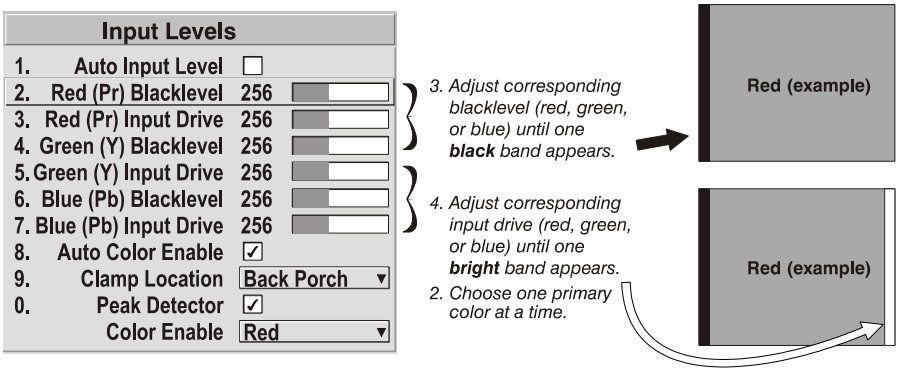



FIGURE 3-31 ADJUSTING INPUT LEVELS USING THE PEAK DETECTOR

## 3.7.10ADVANCED IMAGE SETTINGS — SUBMENU

### GAMMA TABLE

Use this option to apply a gamma table or "curve", controlling the intensity of midlevel colors while maintaining maximum contrast, brightness and color performance. Select an appropriate gamma curve for the incoming signal. Select "Simple" for most incoming signals, to apply a true 100% linear power curve. Select "Graphics" to apply a simple power curve for graphics sources and "Video" to apply a curve with a linear segment near black to compensate for increased blacklevels typical of video signals.

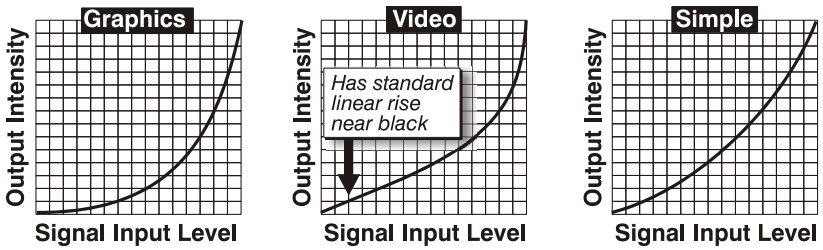



FIGURE 3-32 GAMMA TABLE OPTIONS

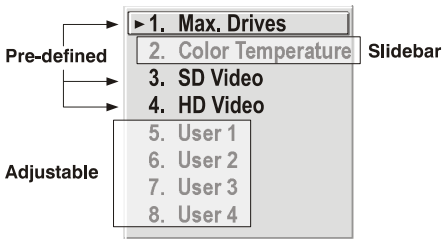



FIGURE 3-33 SELECT COLOR OPTIONS

### SELECT COLOR ADJUSTMENT

Choose an overall color performance for all images. The "Max Drives" drives all 3 colors at their maximum level so that they are on and cannot be changed.
*SD Video* and *HD Video* apply a color gamut optimized for standard or high-definition video sources. Alternatively, you can specify a color temperature, which enables the Color Temperature slidebar and applies its current setting (default = 6500K).
If none of the pre-defined "Select Color Adjustment" options or color temperatures suits your application, select one of 4 color gamuts previously defined by a user (User 1, 2, 3, 4). A "User" option applies a customized color performance in which the user has set the hue and intensity of each color component in the *Color Adjustment by X/Y* or *Color Saturation* submenus. This is often used with multiple-projector applications. Select the color adjustment producing the best color accuracy for your application and installation.

NOTE: *User 1 is the default setting for all sources and test patterns.*

To configure a "User" color adjustment (gamut), use either the *Color Adjustment by X/Y* or the *Color Saturation* submenu located in the *Configuration* menu under *Geometry and Color*.

NOTES: *1) "Color Temperature" defaults to 6500K until changed. All 4 "User" options default to Max Drives values unless redefined by the user.*
*2) White Boost automatically turns OFF when a setting other than Max Drives is selected – you will notice an immediate dimming of the display.*
*3) Factory-measured color primaries, which ensure consistent color gamut from projector-to-projector, can be altered in the Service menu only.The factory settings can be recovered by selecting Factory Defaults in the Service menu (password-protected).*

### COLOR TEMPERATURE

Adjust to apply a specific and accurate 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 in images. The lower the temperature is the more reddish the cast; the higher the temperature, the more bluish the cast. The slidebar is enabled only if you have a source connected and have selected "Color Temperature" in the "Select Color Adjustment" pull-down list in the *Advanced Image Settings* menu.

### WHITE BOOST

A source dependent setting that enables you to recapture some of the lost light from the transition between color wheel segments and the white segment as it's spinning. White Boost defaults to '0' (OFF). For NTSC, HDTV, PAL and SECAM signals a White Boost no higher than 2 is recommended. For graphic signals any values can be used. As you increase the white boost setting the image becomes brighter and a little less saturated.
NOTES: **1***) White Boost is disabled (grayed out in menu) when you enable Brightness Uniformity, Edge Blending or select a color adjustment (Select Color Adjustment) other than "Max Drives".*
*2) White Boost can also be adjusted specifically for internal test patterns. However, once you switch back to a source, the White Boost settings will reset to the value set for that source.*

### FRAME DELAY

Set the interval of delay desired between the input signal and its appearance on screen. 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 frame delay setting of two (or multiple of two) may be more useful. Delay may vary between sources.

NOTE: *If frame delay is set too low it can cause frame tears.*

### MOTION FILTER

Useful for smoothing out moving images from interlaced sources. Normally, the Motion Filter setting is automatically determined according to the type of incoming source signal. If the source is jittery or tearing you may wish to "override the default to ensure stable processing for this source. Select the appropriate motion filter:

1. **AUTO:** The projector will automatically use the correct motion filter according to the incoming signal.
2. **STILL:** For static images with no motion, such as graphics from a CD.
3. **MOTION:** For video images that did not originate from film, or for moving computer-generated images.
4. **FILM:** For video images that originated from film. This will optimize image quality and stability.

### FILM MODE THRESHOLD

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

### DETAIL THRESHOLD

Defines 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 will be ignored and all will be magnified. An ideal detail threshold is one 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 when using "Detail".

# 4 Advanced Configuration and Controls

The *Configuration* menu provides access to diagnostics-and-calibration tools and the *Service* submenu (password-protected). 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.

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.*

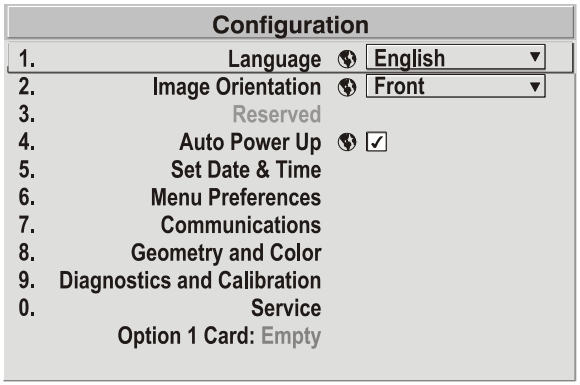



FIGURE 4-1 CONFIGURATION MENU

## 4.1 LANGUAGE

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

## 4.2 IMAGE ORIENTATION

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

## 4.3 FADE TIME

Set how long (in seconds) it takes to gradually dissolve one image into another for a source switch. Applies to seamless switching, PIP is disabled.

## 4.4 AUTO POWER-UP

Enter a checkmark 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 that unsaved display adjustments may be lost.

## 4.5 SET DATE & TIME

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

## 4.6 MENU PREFERENCES — SUBMENU

Use the options in this submenu to adjust the appearance, content and/or location of on-screen menus and messages.

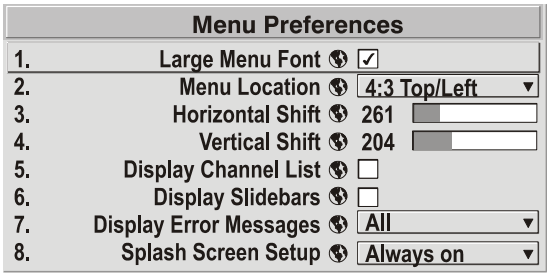



FIGURE 4-2 MENU PREFERENCES SUBMENU

| | |
|---|---|
| LARGE MENU FONT | Checkmark to enlarge menus and their text. You may have to adjust "Menu Location" to accommodate the increased menu area. |
| MENU LOCATION | Use the pull-down list to choose a pre-defined default or customized location for the display of all on-screen menus.<br>To create a custom menu location, choose a preset that is closest to the desired location. Then adjust "Horizontal Shift" and "Vertical Shift"slidebars to move the menu to the desired location. Avoid locations too close to a corner or edge to prevent cropping of larger menus. |
| HORIZONTAL SHIFT AND VERTICAL SHIFT | Shift your menus as desired, creating a customized menu location. |
| DISPLAY CHANNEL LIST | Checkmark to see a scrollable channel list when you press Channel from your presentation. Channels marked with a list icon in the Channel Setup menu will appear here. The "Display Channel List" option also enables on-screen feedback when using the Input key. To hide the channel list and input dialog box while switching channels and sources during a presentation, clear the checkbox.<br>NOTE: *The Channel List and input dialog box cannot be hidden during use of the menus.* |
| DISPLAY SLIDEBARS | Enter a checkmark to superimpose a small slidebar over the current image whenever an adjustable parameter is selected directly with a key such as Contrast or Bright.<br>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" to see a brief on-screen message or select "RS232" to receive messages via RS232 (or RS422) serial communication only. Select "Off" to hide error message displays. |

| | |
|---|---|
| SPLASH SCREEN SETUP | Choose when you would like to display a special introductory splash screen image, such as your company logo, graphic or message.<br>• Always Off = A splash screen never appears<br>• Always On = A splash screen is always on behind the current display image, similar to wallpaper.<br>• Start-up Only – The splash screen logo appears at projector start-up only.<br>• Start-up And No Signal – A splash screen appears at start-up only if there is no source signal.<br>To replace the default splash screen use,*KoRE Librarian* to download the desired .bmp to the projector. This will overwrite the current splash screen content in projector memory. |

# 4.7 COMMUNICATIONS

Settings in the *Communications* submenu define and control how single or multiple projectors can link with each other and with a controlling device.

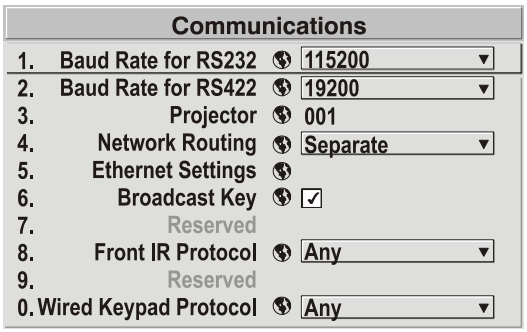



FIGURE 4-3 COMMUNICATIONS SUBMENU

## 4.7.1 BAUD RATES

The baud rate setting determines the speed of communication to and from the projector on the RS232 or RS422 links. 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 a network of projectors, if a projector has a different baud rate use the pull-down list and select the correct baud rate using the ↵ key. Do not just scroll this control with ◄ or ► keys. Serial communication is always 8 data bits, no parity.

## 4.7.2 PROJECTOR

Enter a three-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 will appear instead. Numerical identity for projectors enables you to communicate with a single projector within a multiple-projector application (see also Proj key in *3.2, Using the Keypads*). If you make a mistake in assigning or changing the projector number, press Exit to cancel.

## 4.7.3 NETWORK ROUTING

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

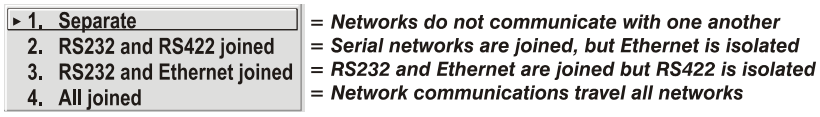



FIGURE 4-4 NETWORK ROUTING OPTIONS

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| | |
|---|---|
| SEPARATE | Select "Separate" (factory default) to keep RS232, RS422 and Ethernet messages on their respective paths instead of being broadcast to the other types of ports. In Figure 4-5 Using "Network Routing" Options A, RS422 controls only the projector to which it is connected. In Figure 4-4 Network Routing Options B, either RS232 or RS422 will control the network. |
| RS232 AND RS422 JOINED | Messages originating from an RS232 or RS422 controller will be relayed to all RS232 ports. Ethernet communication,will not be relayed. |
| RS232 AND ETHERNET JOINED | Messages to and from the RS232 ports will also be relayed to the Ethernet port, and vice versa. Any RS422 communications will be isolated. |
| ALL JOINED | All messages reach all ports, regardless of type |

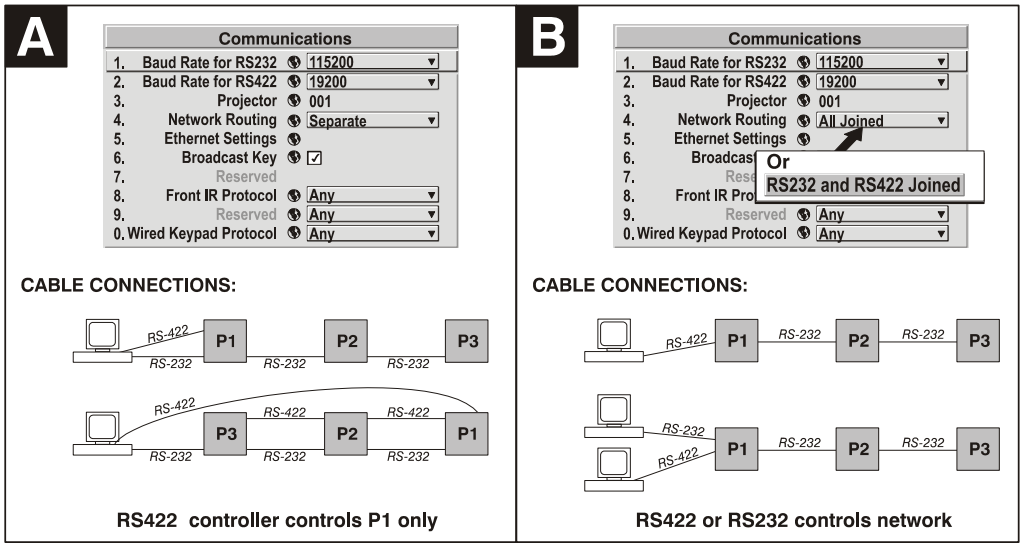



FIGURE 4-5 USING "NETWORK ROUTING" OPTIONS

## 4.7.4 ETHERNET SETTINGS (SUBMENU)

NOTE: *Recommended for network administrators only.*

### DHCP

Enable this checkbox if you want a DHCP server to automatically change the projector's default IP address (0.0.0.0) to one that is valid and unique for use on the current Ethernet network. On networks without a DHCP server, or to override the automatic DHCP server function, delete the checkmark and enter the new "IP Address" settings desired. Only a 0.0.0.0 address will trigger the DHCP addressing service, and only when the DHCP checkbox is enabled.

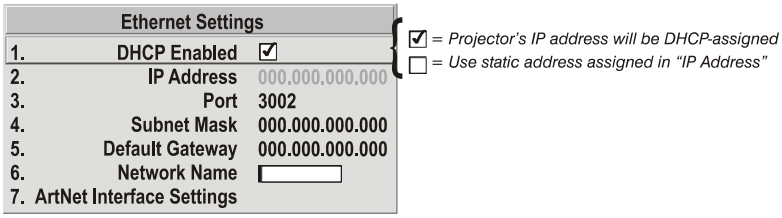



FIGURE 4-6 ENABLING AUTOMATIC IP ADDRESS

### IP ADDRESS

Enter a valid and unique IP address for use on the network to which the projector is currently connected. This address will overwrite any previous IP address, such as the projector's factory-defined default (0.0.0.0), or one that has been assigned by a DHCP server or other user. It takes approximately 10 seconds for the projector to respond at its new address.

### 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 1000, as these ports are typically reserved for and used 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 projector estimates the subnet mask 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 and based on the DMX512 control protocol. It is used for controlling lighting and staging equipment from a lighting console or PC application...

| | |
|---|---|
| ARTNET SUBNET | This is the highest level address for a device, typically set to 0 |
| ARTNET UNIVERSE | Each data packet is broadcasted to all devices plugged into a universe (maximum 512 devices/channels). |
| ARTNET CHANNEL | Allows you to specify the starting channel for this projector. ( 512 channels per universe) |
| ARTNET ADVANCED MODE | When 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 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 not enabled. The projector processes requests beginning with the 'base channel' defined here. The requests implement these functions: |

| DMX CHANNEL | FUNCTION | VALUE |
|---|---|---|
| Base | Shutter | Open (0-64), No Action (65-192), Closed (193-255) |
| Base +1 | Slider Lock | Locked (0-254), Unlocked *(255) |
| Base +2 | Input* | Input # (1-8) |
| Base +3 | Channel * | Channel #(1-99) |
| Base #4 | Lens-vertical *+ | Lens down(0), Stop(1-124), Lens Up(255) |
| Base +5 | Lens-horizontal * + | Lens Right(0), Stop(1-254), Lens Left(255) |
| Base +6 | Lens – Focus * + | Negative Focus(0), Stop(1-254), Positive Focus(255) |
| Base +7 | Lens- Zoom * + | Zoom Out(0), Stop (1-254), Zoom In (255) |
| Base +8 | Power * | Power Off(0), No Action(1-254), Power On(255) |
| Base +9 | None | |

* Functions are only active when the Slider Lock is set to Unlocked
NOTE: Ensure 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 | 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 checkmark for keypad commands sent to any one projector to be relayed to all projectors in a serial network. The Proj key will temporarily "override" the effect of a broadcast setting and allow you to control a specific projector when necessary. Remove the Broadcast Key checkmark when operating redundant networks.

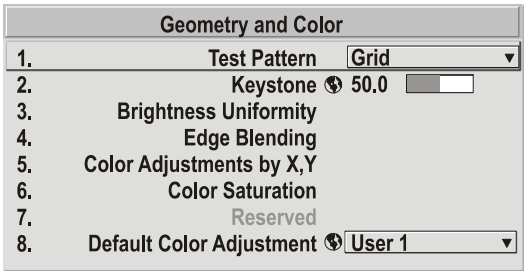
### FRONT IR PROTOCOL

This option cannot be disabled. Select "Any", to enable the projector. Use this option to select a keypad or select a specific protocol for use with the keypad. There are up to 8 protocols that can be selected. This prevents a keypad from one projector interfering with the other.

### WIRED KEYPAD PROTOCOL

Select "On" to enable use of a wired remote keypad connected to the rear of the projector. The projector will then respond to incoming commands from either port. To disable the wired keypad, 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.

## 4.8 GEOMETRY AND COLOR




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

### 4.8.1 TEST PATTERN

Choose the desired internal test pattern or select OFF to turn off a test pattern. Use the Test key for cycling through test patterns.

### 4.8.2 VERTICAL KEYSTONE

Corrects an image displaying keystone where both sides of the image are inclined toward the top or bottom edge. Keystone is typically caused by tilting the projector so that the lens surface and screen are not parallel to each other.

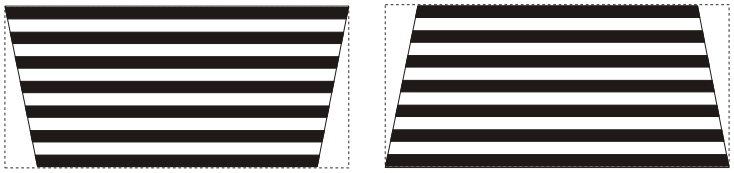


FIGURE 4-7 KEYSTONE ADJUSTMENT

## 4.8.3 BRIGHTNESS UNIFORMITY — SUBMENU

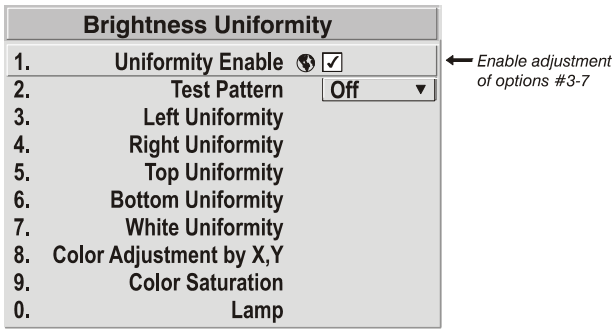



FIGURE 4-8 BRIGHTNESS UNIFORMITY SUBMENU

*P*rovides refinement of displays already matched for their primary colors and overall light output. Use to create a smooth image in which no area appears brighter or more red, green or blue than another.

Enable the "Uniformity Enable" checkbox 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" checkbox is enabled and you are using a "User" color temperature defined by the Brightness Uniformity controls. Remove the checkmark to disable the Brightness Uniformity function.

NOTE: *See 3.10, Using Multiple Projectors for the complete step-by-step procedure for achieving uniform brightness in adjacent displays.*

## 4.8.4 EDGE BLENDING — SUBMENU

Provides a range of controls for smoothing the overlapping bright edges of multiple adjacent projected images to create a single "seamless" image.

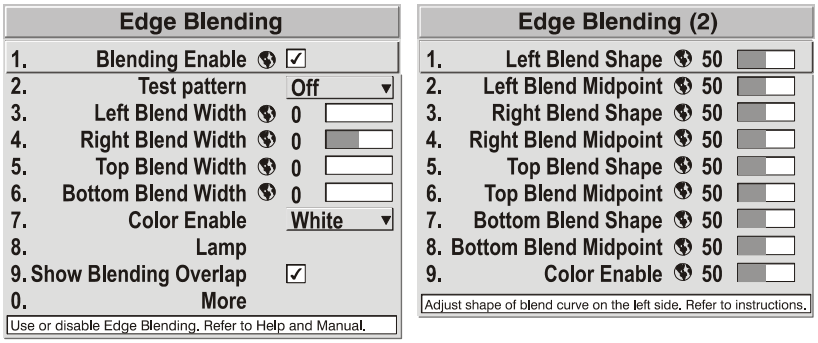



FIGURE 4-9 EDGE BLENDING SUBMENU

NOTE: *See also 3.10, Using Multiple Projectors for instructions on adjustment.*

## 4.8.5 COLOR ADJUSTMENTS BY X/Y, AND COLOR SATURATION — SUBMENUS

NOTES:
*1) For defining or changing a User 1, 2, 3, or 4 color performance or "gamut". Sometimes known as Comprehensive Color Adjustment™.*
*2) Factory-measured primary color levels, which ensure a specific color performance from projector-to-projector, can be altered only in the Service menu. To recover factory settings go to the Service menu Color Primary Settings submenu (password-protected. Select "Factory Defaults"..*

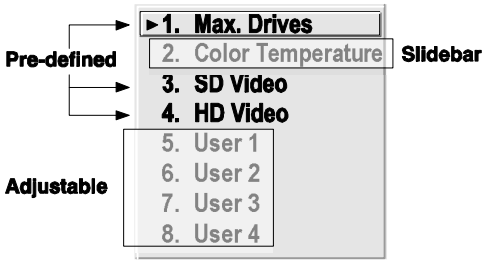



FIGURE 4-10 COLOR PERFORMANCE CHOICES

The projector can utilize any of the 3 pre-defined color performance settings identified in Figure 3.42 (default=User 1), or colors can be driven on the basis of color temperature. For most applications, one 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.

### DEFINING "USER" COLOR GAMUTS

You may find that none of the pre-defined "Select Color Adjustment" options suit your needs. For example, you may require a unique color gamut (range) for a single projector or to precisely match colors across multiple adjacent displays.

Use either the *Color Adjustments by X,Y* or *Color Saturation* submenu to define the precise *hue* of each primary color component (red, green, blue, and white). You can create up to four custom color gamuts (User 1, 2, 3, or 4) defined by these adjustments.

The 2 menus differ only in their user interface, use the one best suited to your needs and application:

- *Color Adjustments by X,Y* — Enter known x/y coordinates from the chromaticity graph. For best results, use with a color meter.
- *Color Saturation* — Adjust color slidebars and judge image color by eye. A color meter can also be used.

A user-defined color "adjustment" can be applied by selecting it in the *Advanced Image Settings* menu ("Select Color Adjustment").

NOTE: *Defining a "User" color gamut when a test pattern is displayed does not get saved in the current channel. Display the source first then select a color gamut (User) from Select Color Adjustment. Changes here are then saved for that source in channel memory.*

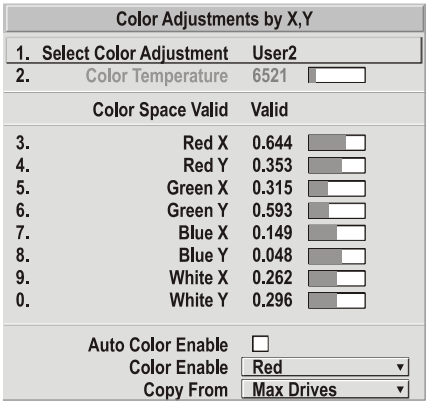



FIGURE 4-11 CUSTOMIZE COLOR HUE

## COLOR ADJUSTMENT BY X,Y

Use this submenu 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 (see *Figure 4-12 CIE 1931 Chromaticity Diagram*) Changing either or both of these numbers will change the hue of the color, and relocate 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. This will in turn affect all displayed colors having a red component. Adjust the slidebars or enter new specific coordinates as desired to define or change up to four "User" color gamuts needed for your environment and applications. Apply the new User gamut at any time in the *Advanced Image Settings* menu.

NOTE: *If adjustment is made above or below the acceptable x,y coordinate limits for a color, Color Space Valid "Error" will appear the next time you enter the menu.*

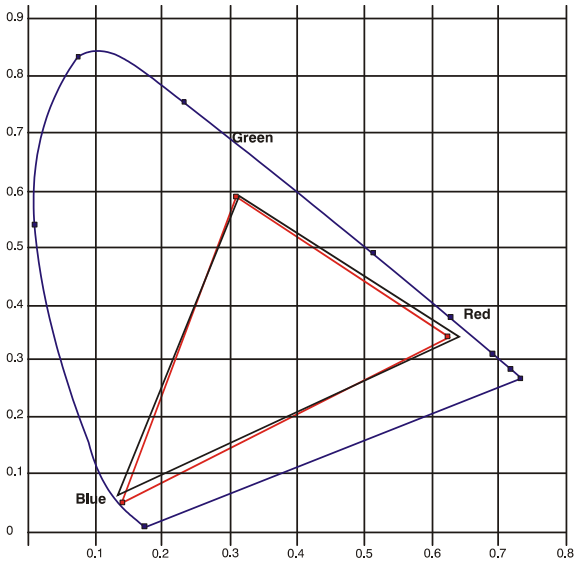



FIGURE 4-12 CIE 1931 CHROMATICITY DIAGRAM

NOTE: *Keep new x,y coordinates within the original color gamut triangle shown here.*

PROCEDURE FOR X,Y ADJUSTMENTS: *See 4.13 Using Multiple Projectors, on page 4-21.*

**COLOR SATURATION**

Use this submenu if you do not have specific color coordinates in mind and will simply judge color performance by eye.

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.

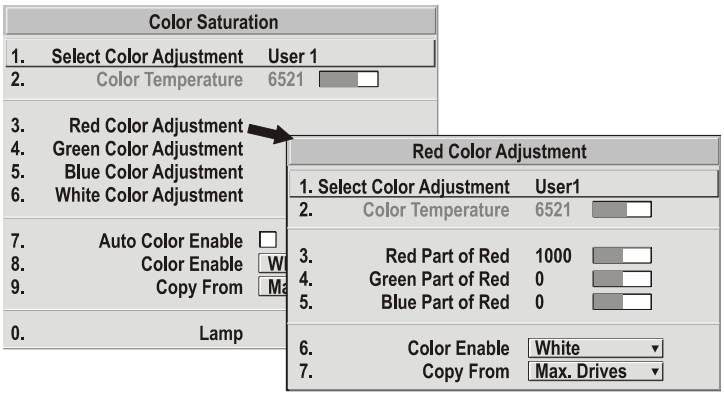



FIGURE 4-13 CUSTOMIZE COLOR

**PROCEDURE FOR USING COLOR SATURATION:** *See **3.10, Using Multiple Projectors.***

# 4.9 DIAGNOSTICS / CALIBRATION

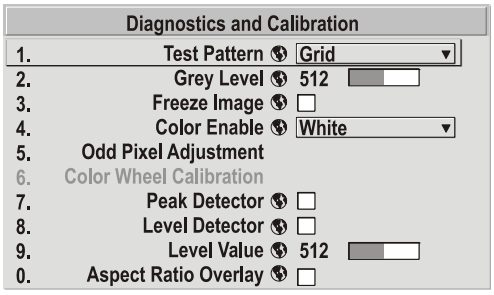



FIGURE 4-14 DIAGNOSTICS AND CALIBRATION SUBMENU

## 4.9.1 TEST PATTERN

Choose the desired internal test pattern to display or select OFF to turn off a test pattern. Use the Test key for cycling through test patterns.

## 4.9.2 GRAY LEVEL

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

### 4.9.3 FREEZE IMAGE

Enter a check mark to stop an image on a single frame. Use this diagnostic tool 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 checkmark to return back to normal.

### 4.9.4 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 or disabled by entering the corresponding function code listed on the back of the standard remote keypad.

### 4.9.5 ODD PIXEL ADJUSTMENT

NOTE: *Factory-set and rarely required by user. Source must be >110 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 will smooth 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 4-15 Using "Odd Pixel Adjustment"*.

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-one color, if you use "Color Enable" function).
4. Adjust ***offset*** for one color. As you adjust, you will see half of the pixels 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 slidebar.
6. Continue to adjust offset for the other two colors.
7. Set "Level Value" to ***~800***. The image should now be black-and-white.
8. Repeat Steps 4 and 5, but adjusting **gain** for each color. Adjust offset before gain, since offset affects gain.
9. Once all colors are adjusted, your RGB source should be OK. Tweak adjustments as required.

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

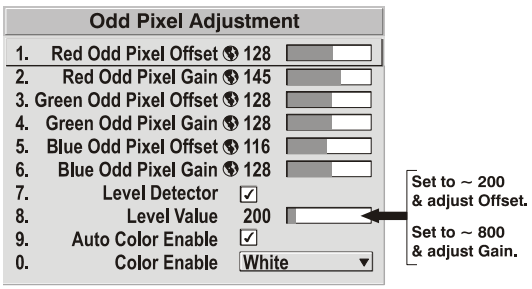



FIGURE 4-15 USING "ODD PIXEL ADJUSTMENT"

## 4.9.6 COLOR WHEEL CALIBRATION — SUBMENU

Adjusts the timing of the color wheel. If the color wheel is incorrectly calibrated, the colors throughout the displayed image will appear in various unmatched shades.

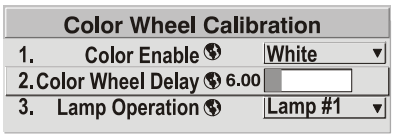



FIGURE 4-16 COLOR WHEEL CALIBRATION MENU

This adjustment is required whenever the color wheel is replaced. To calibrate the color wheel:

1. From the *Diagnostics and Calibration* menu, access *Color Wheel Calibration*. The color ramp test pattern will automatically display and the "Color Enable" option will display "White".
2. Adjust the "Color Wheel Delay" slidebar until the transitions across each color bar in the test pattern appears smooth.
3. Verify your adjustments by choosing different colors through "Color Enable". The transitions across each color bar in the test pattern should remain smooth.

## 4.9.7 PEAK DETECTOR

A method of defining individual input levels to improve the accuracy of input levels set by the "Auto Input Level*"* function. Enabling "Peak Detector" activates an operating mode for detecting ***only*** pixels that are considered black or white, all other levels are displayed as a mid-level gray.

Adjust individual blacklevels and input drives using a 16-step grayscale pattern with black and white bands at opposite edges of the image. Ajust the levels until both bands are just visible. Images from this source will then display correct blacks and whites without "crushing" or washing out.

## 4.9.8 LEVEL DETECTOR

The "Level Detector" checkbox enables a specific threshold for blacks and whites. Input levels that fall below a specified *Level Value* 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.

## 4.9.9 LEVEL VALUE

The "Level Value" defines the value to be used by the Level Detector in recognizing blacks and whites. See Level Detector, above.

# 4.10 WORKING WITH THE LAMP

The RPMX/RPMSP-D132U projectors are installed with two 275W UHP lamps. Only one lamp will be ON at any given time.

## 4.10.1 THE LAMP MENU

The *Lamp* menu provides performance adjustments for the lamp to to achieve the brightest, most uniform image for the life of the lamp. From this menu you can also access "read-only" information pertaining to the past and present lamps.

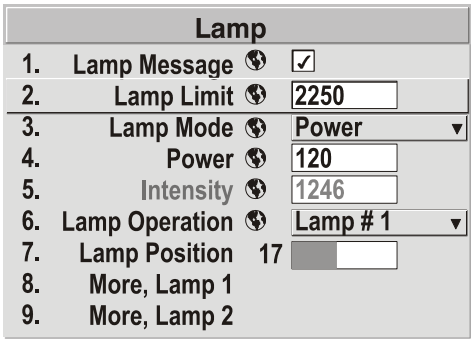



FIGURE 4-17 THE LAMP MENU

### LAMP MESSAGE

Enter a checkmark to enable a warning message that will appear upon power-up when the lamp has reached the specified lamp limit and should be replaced. Delete the checkmark to prevent display of this message—instead, when your lamp expires, only the status display messages on the back of the projector will provide the visual warning to replace the lamp.

NOTES:

*1) It is recommended the Lamp Message checkbox remain enabled.*

*2) If a lamp warning message appears during power-up, press* Exit *to temporarily cancel the message. This message will continue to appear upon power-up of the projector until a new lamp is installed.*

### LAMP LIMIT

Set the lamp limit to the number of hours you expect to log on the current lamp before replacing it. This will trigger a lamp message on-screen (if enabled in *Menu Preferences*). The maximum limit for the lamps in the RPMX/RPMSP-D132U is 2250.

NOTES:

*1) If you change the lamp mode over the life of the lamp, the lamp limit you originally expected may no longer be possible.*

*2) Frequently turning the lamp on and off will reduce its life.*

*3) Do not exceed the maximum lamp limit for these lamps, as they can become dangerously fragile with overuse.*

### LAMP MODE

Select a lamp mode to control the light output of the projector. Generally higher light output or higher power settings can shorten lamp life. You can choose to:

- run the lamp as brightly as possible (i.e., always using maximum power)
- power the lamp with a specific wattage
- set a specific intensity (brightness) to maintain.

Use the lamp mode that best suits your brightness needs. For example, in a tiled display 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 want images to be as bright as possible – choose "Max Brightness". Choosing a higher lamp power setting will shorten lamp life.

Lamp modes are:

**MAX BRIGHTNESS -** The lamp will burn as brightly as possible. It is the same as applying the maximum power level - 120 watts. The "maximum brightness" for a lamp gradually diminishes with age making images dimmer over time.

**POWER -** The power supplied to the lamp will remain at the specified wattage level. Select this option and enter the number of watts representing the power level you wish to maintain. Adjust the slidebar when LAMP MODE is set to "Power", to apply a certain number of watts to the lamp.

A lower power level will produce a dimmer image. Specifying a maximum power level is the same as operating in "Max Brightness" mode, and will shorten lamp life.

### LAMP OPERATION

From the pull down list, specify which lamp to operate the projector with. The other lamp remains in "reserve" and will only turn on if

- the current lamp "fails"
- the mode is manually selected using the keypad
- the Lamp Control button is pressed.

NOTE: *It takes approximately 80 seconds for a full lamp change to occur. This includes igniting the lamp and reaching partial brightness. However, this "switch" can take up to 6 minutes, maximum, if the lamp doesn't ignite on the first attempt. The projector will try a total of 3 times to ignite the lamp.*

### LAMP POSITION

Use this slidebar to fine-tune the position of the lamp to achieve the brightest image possible. This is a fine motor adjustment that applies to the current operating lamp only.

### MORE LAMP 1 (MORE LAMP 2)

There are two lamp submenus accessed from the *Lamp* menu. Each submenu is dedicated to one lamp displaying information such as lamp hours, lamp history and the current status of the lamp. You can also change lamp operation modes.

**LAMP HOURS –** This read-only information shows the number of hours logged on the current lamp. Whenever a new lamp serial number is detected, "Lamp Hours" will reset to the number of hours stored with the new lamp and begin logging time for the new lamp. This information also appears in the *Status* menu.

- **LAMP S/N –** This read-only information displays the serial number for the current lamp.

***NOTE*** *The serial number for each lamp is provided on the lamp card that comes with each lamp. Whenever a lamp is replaced, this card must be replaced. The projector will automatically detect the new serial number from this card and display it here.*

- **LAMP (1 or 2) STATUS –** This read-only information displays the current status of the lamp and can be viewed any time during operation. The lamp status messages you might see are:

| | |
|---|---|
| GOOD | Displays continually during operation until there is a lamp failure. |
| FAILED TO STRIKE | Displays when the projector can not turn a lamp on. This may or may not be lamp related, and may require further investigation by the user before proper servicing can take place. For example, a lamp driver may have failed causing the lamp not to ignite. |
| TURNED OFF UNEXPECTEDLY | Displays when a lamp or lamp related component fails. This error may be caused by a hot lamp, a failed lamp or a lamp driver that has failed. |
| COOLING FAN FAILED | Displays when one of the lamp cooling fans stop unexpectedly. |
| OPERATION ERROR | Displays when a lamp fails to move into the required position to operate properly. |

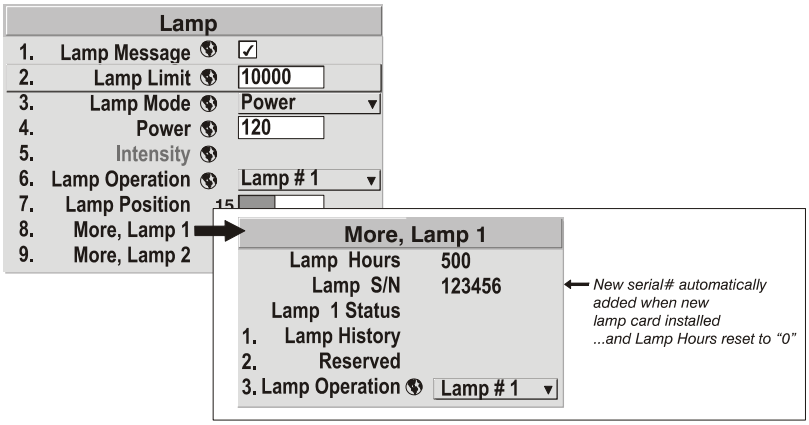



FIGURE 4-18 MORE, LAMP OPTIONS

## 4.11 PIP AND SEAMLESS SWITCHING

PIP (Picture-in-Picture) and Seamless Switching are independent but related projector features that utilize two image-processing paths within the projector.

PIP, double processing allows you to display two different images simultaneously, typically a smaller "secondary" image within a large "primary" background.

In a seamless switch, the double processing occurs between displays so that a full image relayed from one source can smoothly transform into a full image from another source. This change can be virtually instantaneous, or slowed so that the current image appears to dissolve or "fade" into the new image.

Options for enabling and controlling PIP and Seamless Switching reside in the same menu. Since 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 in Table 4.1 . Do not mix two signals of the same type.

Table 4.1

| 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 |

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

Other PIP or Seamless Switching tips include:

- When using two digital signals or one analog and one digital, each must be 165 megapixels/sec.
- When using two analog signals, each must be 90 megapixels/sec.
- Avoid using an interlaced source in the PIP window
- Seamless switching may affect image quality in some cases

## 4.11.1 WORKING WITH PIP

NOTE: *To control the primary image, access all picture controls through the Main menu. To control the secondary (PIP) image, access picture controls through the Picture-in-Picture and Switching menu.*

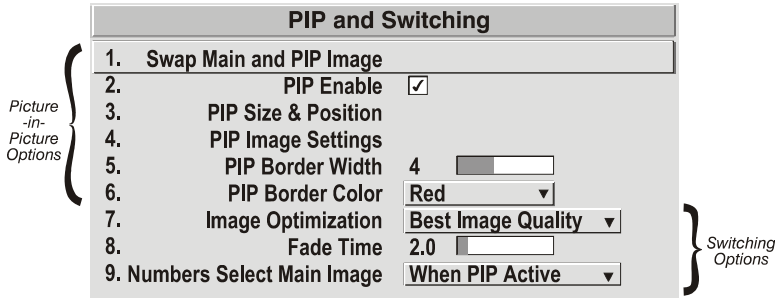



FIGURE 4-19 PIP AND SWITCHING MENU

Use the first of six 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.

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

## PIP ENABLE




**Short cut:** Press PIP on the Remote if menu not present.

Toggle to display from two sources at once (Picture-in-Picture) or the primary source only. This checkbox turns the secondary source on and off.

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

## PIP SIZE AND POSITION – SUBMENU

| 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 | |

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—see *3.5 Adjusting the Image* for details. Exceptions are:

- **POSITION PRESETS –**Set the location of the PIP (secondary) image in the display.
- **ASPECT RATIO PRESETS –** Choose the desired aspect ratio for your PIP pixels. Use the "Default" aspect ratio when incoming format has square pixels (most common). This ensures that the resulting PIP image maintains its intended aspect ratio. Use "Anamorphic" for NTSC signals having narrower pixels--this will stretch the pixels horizontally to regain the intended aspect ratio of the PIP image.

NOTE: *If the image is already resized at the source it will remain that way in the PIP window. If, for example, an NTSC signal is already set to anamorphic through the Resize and Preset menu it will remain that way in the PIP window. If the NTSC signal is formatted as widescreen at the source, then the image in the PIP window will appear with black bars above and below it.*

### PIP IMAGE SETTINGS — SUBMENU

Adjust the PIP (secondary image) without affecting the size or position. The primary image remains unchanged. See *3.5 Adjusting the Image* 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 to work with Seamless Switching.*

*3) Disable PIP and Best Switching for Interlaced sources > 35kHz.*

## 4.11.2WORKING 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:***

- Ensure a channel has been configured 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 two 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 one 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.

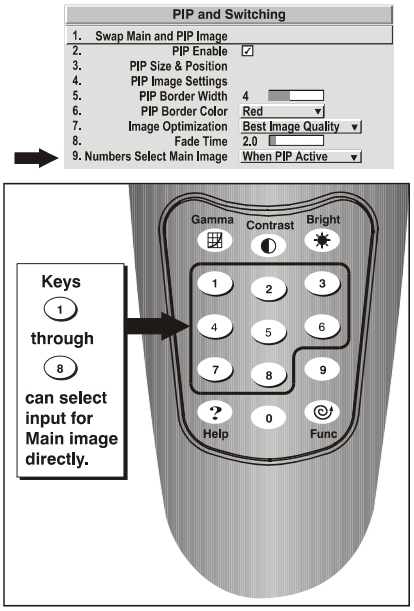
NOTE: *Disable PIP and Best Switching for Interlaced sources > 35kHz.*

### FADE TIME

Set how long (in seconds) it takes to gradually dissolve one image into another for a source switch when Image Optimization is set to Smooth 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 *Numbers Select Main Image* to use the numeric keys #1-8 as input keys. This remapping of the keypad (see right) 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. Select "Always" to use the keys in this manner all of the time, even with single displays. For normal keypad function, select *Never* (default). Set to *When PIP Active* to activate number keys only when PIP is in use.

NOTE: *Numbers Select Main Image keypad functionality works only when menus are closed.*

## 4.12 *STATUS* MENU

The read-only *Status* menu lists a variety of details about the standard and optional components currently detected in the projector. Refer to the *Status* menu for versions of hardware and software installed, the type of lamp defined in projector memory, its current, voltage and hours logged in total and for a specific period, and for your projector model name and serial number. The *Status* menu identifies the current channel, its location, its frequencies and other details.

Scroll the full *Status* menu using ▲ ▼. Use ◄ ► for page up/down.

## 4.13 USING MULTIPLE PROJECTORS

When an installation requires multiple projectors, you can use the RS232 serial ports to daisy-chain the units together and control the group with a single keypad 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 Proj key as desired to limit responses to an individual projector.

Alternatively, you may want to add projectors to a hub on an Ethernet network.

NOTE: *Refer back to 3.6, Adjusting System Parameters and Advanced Controls for complete information about communicating with multiple projectors.*

# 4.14 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.

**TIP:** *You may need to adjust the position of the on-screen menu (in Menu Preferences) while making these adjustments in order to have a full view of each screen.*

## 4.14.1 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. 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 recommended 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 a 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.

## 4.14.2 COLOR ADJUSTMENT PROCEDURE

Once the *Color Primary Settings* are calibrated for the site (see above), use the *Color Adjustments by X,Y* or *Color Saturation* menu to further refine each projector's fundamental colors so that the hue and intensity of each color appears the same from one display to another. Once matched, you will have created a single new shared range of colors or "color gamut" that all of your 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 redefining color performance in this procedure, but do optimize each projector in every other aspect. Closely align all screen edges.
2. Assign projector numbers to make communications easier. Use a wired keypad.
3. Use the same lamp mode for all projectors, and do the following:
   - Set *Select Color Adjustment* to "Max Drives"
   - Display a full white test pattern
   - Adjust lamp power until adjacent 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. Take note of the values shown in one (any) of the

displays. See *Figure 4-20 Make not of a Set of "Max Drives" X/Y Values*. Or use the "Copy From" function to copy them into a "User" gamut in one projector.

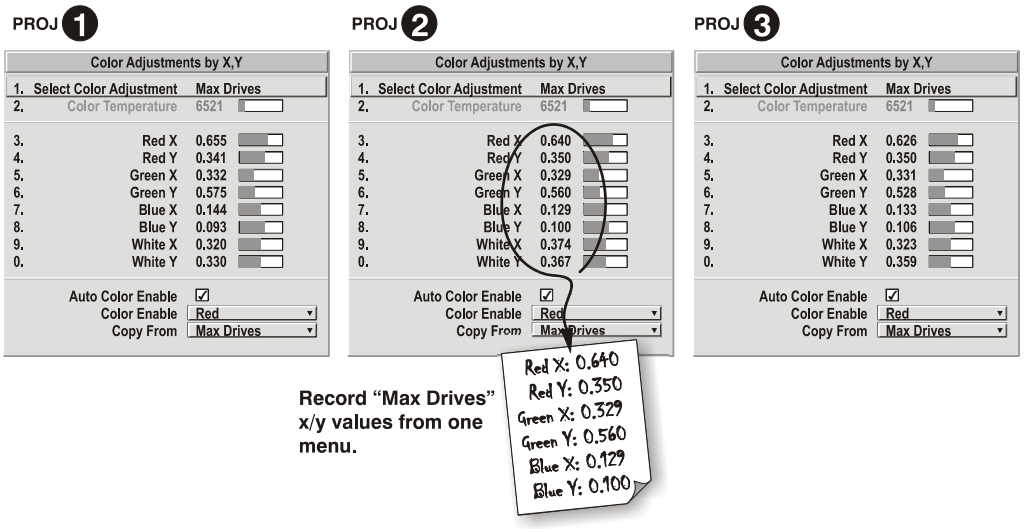



FIGURE 4-20 MAKE NOT OF A SET OF "MAX DRIVES" X/Y VALUES

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 , see *Figure 4-21 Copy X/Y Values into All Projectors*.

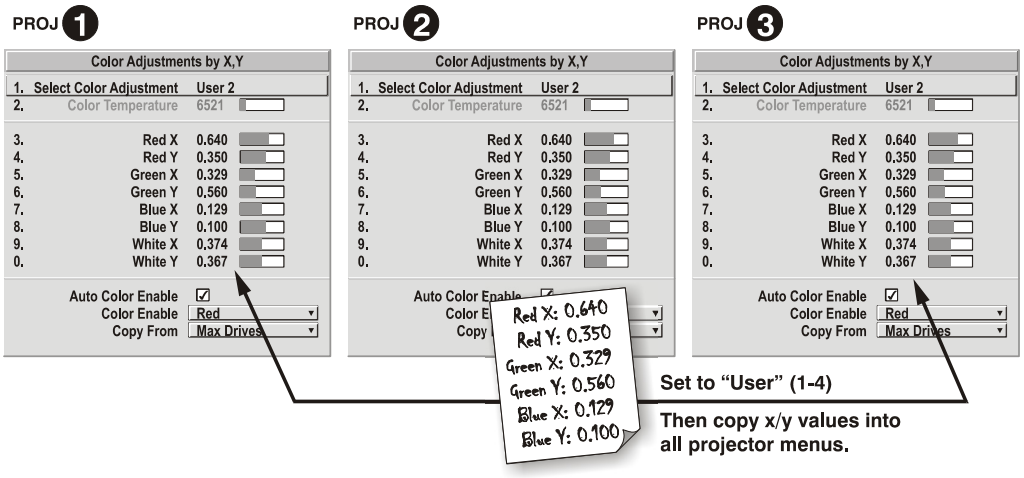
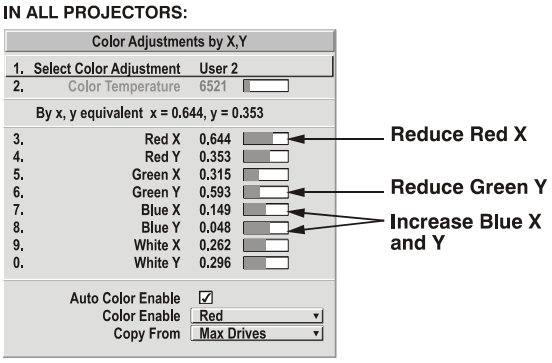


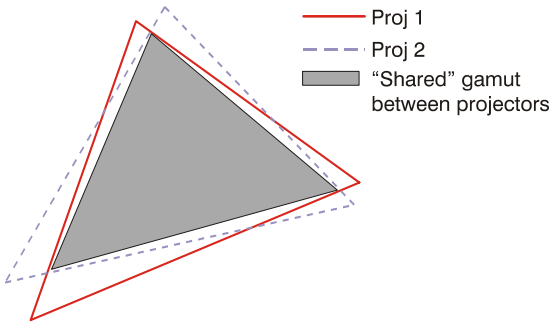

FIGURE 4-21 COPY X/Y VALUES INTO ALL PROJECTORS

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" checkbox. Each color coordinate you select will then automatically trigger a full field display of the corresponding color.*




These coordinate adjustments move the three color points closer together (see right) to establish a "shared" gamut attainable by all projectors in your group. Adjust only as necessary to ensure that 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.

## 4.14.3USING THE COLOR SATURATION MENU FOR COLOR MATCHING

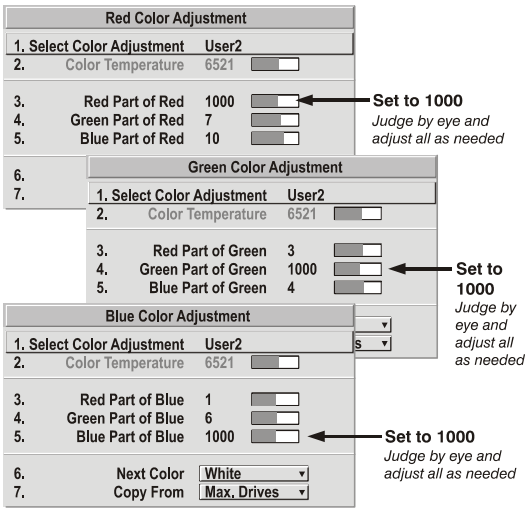



FIGURE 4-22 COLOR MATCHING USING COLOR SATURATION MENU

You may prefer to use the *Color Saturation* menu to match colors across multiple screens. In the three *Color Adjustment* submenus (Red, Green, Blue—see right), set all main values to 1000 and the secondary values to 0. Then judge by eye and adjust the slidebars as needed. Note that adjustments here define new x/y coordinates in the *Color Adjustments by X,Y* menu.

## 4.14.4ACHIEVING BRIGHTNESS UNIFORMITY

### WHAT IS BRIGHTNESS UNIFORMITY?

When used to refine screens already matched for their primary colors (see *Matching Colors in Multiple Screens*, above) 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 one 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 list of prerequisites and guidelines:

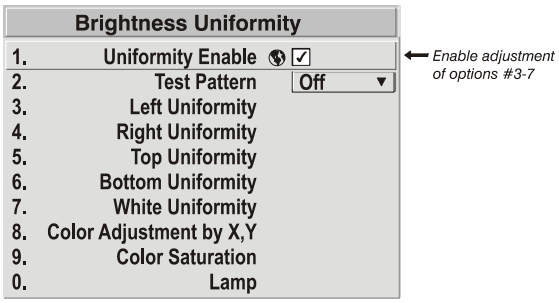
- **ADJUST COLORS FIRST—**Always adjust the primary colors as described in the "*Matching Colors in Multiple Screens*" procedure (above) before attempting to work with Brightness Uniformity. This ensures that primary colors, color temperature, and maximized light output are all well-matched from one screen to another. These matches are needed before you can achieve good Brightness Uniformity results.

- **RUN LAMP 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—**Ensure 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 SLIDEBARS—**White Uniformity slidebar values may not reduce to "0". Each slidebar 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 will reach "0" first, causing the slidebar to stop earlier than expected.
- **JUDGE BY EYE OR USE A METER—**Good brightness uniformity can be achieved with either.

## STEP 1: GENERAL SETUP

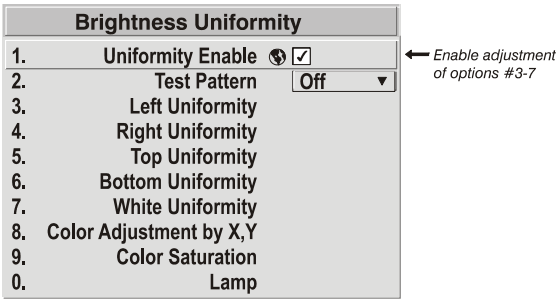
a. Adjust primary colors (see *Matching Colors in Multiple Screens)* to ensure matched overall color temperatures and light output between screens.

IMPORTANT: *Verify that all WHITES and LIGHT OUTPUT are well-matched.*




b. Enable the *Brightness Uniformity* checkbox. This will enable access to the uniformity controls and will apply the settings to your image.

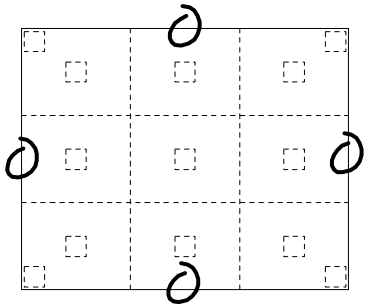
NOTE: *White Boost is automatically disabled (grayed out in menu) when you enable Brightness Uniformity.*




c. 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 at right.*

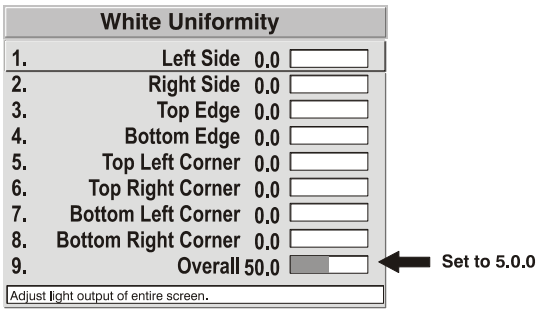
d. In either *Color Adjustment* menu, select a "User" color. Then:



- ***If you have adjusted "User 1" Color Adjustment*** to create a well-matched wall (recommended), select "User 1" and then choose a color. Continue with Step **1e**.
- ***If you prefer maximum brightness*** rather than a particular color temperature, select "Max Drives".

**IMPORTANT**

**Do not change User 1 Color Adjustments in color-matched applications!**




e. In the *White Uniformity* menu, set "Overall" to **50.0** and set all others to **0**. This decreases the light output from each color *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.

f. Ensure that overall light output remains well-matched from one screen center to the next. Where necessary, increase or decrease Lamp Power slightly to recover center matches.

## STEP 2: ADJUST COLOR (LEVEL OF RED/GREEN/BLUE) IN 8 ZONES

NOTES:
*1) Ignore the brightness of individual zones.*
*2) Ignore menu colors.*

a. 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 **2b**.

b. 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, go to the *Left Uniformity* menu and adjust the colors (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), then adjust its corners. See *Figure 4-23 Match Zones to Center Color Temperature*.

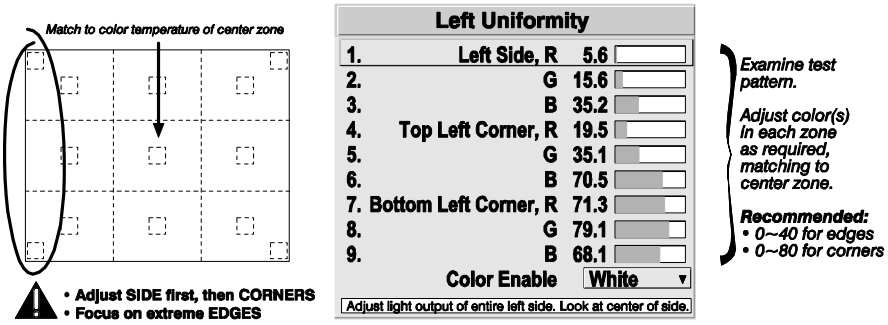



FIGURE 4-23 MATCH ZONES TO CENTER COLOR TEMPERATURE

Repeat the color adjustment of sides and corners for each edge of the screen that does not yet match the center (note that 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** & **2b** for all remaining screens.

## STEP 3: ADJUST LIGHT OUTPUT IN 8 ZONES

c. 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 4-24 Match Zones to Center Light Output*. 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.

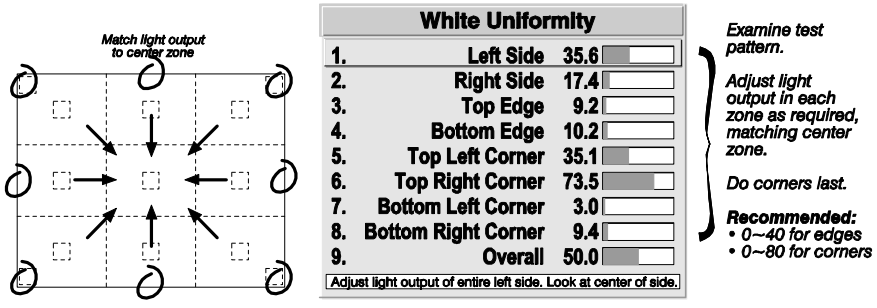



FIGURE 4-24 MATCH ZONES TO CENTER LIGHT OUTPUT

### STEP 4: READJUST COLOR TEMPERATURE (LEVEL OF RED/GREEN/BLUE) IN 8 ZONES

Return to Steps **2a** & **2b** and, if necessary, fine-tune the zones so that they all still exhibit a single color temperature.

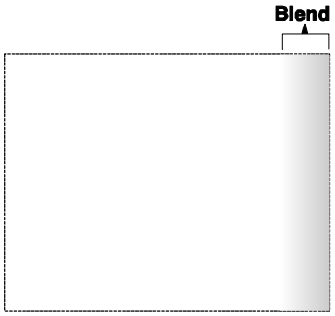
### CANCELING BRIGHTNESS UNIFORMITY

If you do not want to use or apply Brightness Uniformity settings, delete the checkmark from the "Uniformity Enable" checkbox at the top of the *Brightness Uniformity* menu.

Christie *Edge Blending* is an innovative set of software functions that can blend white levels along the edges of multiple adjacent projected images to create a single seamless larger image.

## 4.15 EDGE BLENDING

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 right).




In multiple-projector walls, complementary blends between neighboring images can compensate for the extra "brightness" or intensity where these edges overlap. By controlling blend width and other properties, you can achieve uniformity across the group of images. Visible overlaps will disappear:

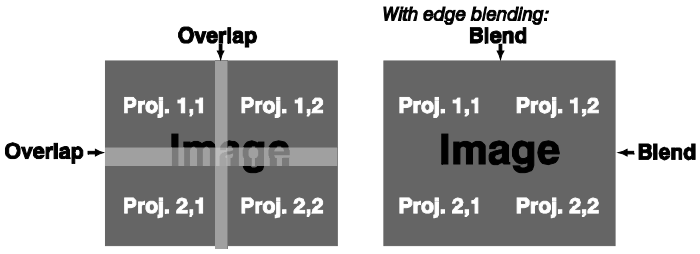



FIGURE 4-25 EDGE BLENDING CONCEPT

For best results, use the same projector model and type throughout your display wall. 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.

Edge blending software controls are located in the 2-page *Edge Blending* submenu—access via *Configuration* menu, then go to the *Geometry and Color* menu and select *Edge Blending*. The *More* option opens the second page of the *Edge Blending* submenu.

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 3.58) 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.

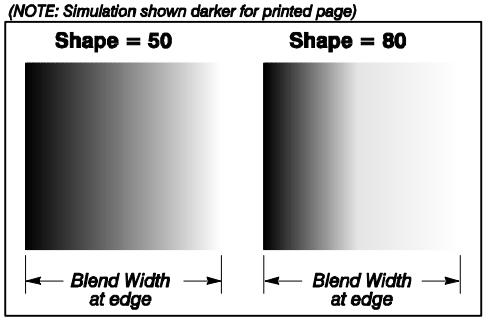



FIGURE 4-26 "SHAPE" EXAMPLES

- **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.

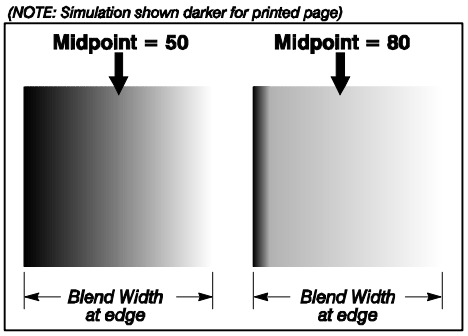



FIGURE 4-27 "MIDPOINT" EXAMPLES

## 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.

## 4.15.1 EDGE BLENDING PROCEDURE

Before working with edge blending software functions, you must:

- Physically align the projectors/images by correctly overlapping the displays from your intended external source
- Match colors and Brightness Uniformity.

IMPORTANT: *For a shared edge, all Blend procedures and settings must be identical on BOTH projectors.*

1. Start with 2 projectors. Display full white field test pattern from both.
2. In the *Edge Blending* submenu, enter a checkmark in the top checkbox to enable *Edge Blending*
3. Set Starting points for adjustment.
   a. Set all blend widths to 0.
   b. Go to "More" and set everything in the Edge Blending (2) menu to 50.

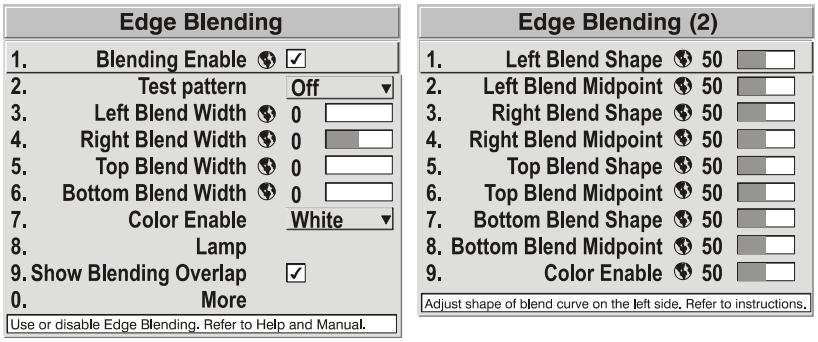



FIGURE 4-28 SET STARTING POINTS FOR EACH PROJECTOR

4. Set Blend Width. On one 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 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:
   a. Increase Blend Midpoint in both projectors to "lighten" the overall blend, decrease to "darken" the overall blend.
   b. 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 steps 1 to 6 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.
10. 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. Use the following as a guide (examples show overlapping width only—values for overlapping height will differ):
    - If side overlap is **15%**, set *Blend Width* to **24**

- If side overlap is **20%**, set *Blend Width* to **32**
- If side overlap is **25%**, set *Blend Width* to **40**
- If side overlap is **30%**, set *Blend Width* to **48**

## 4.16 REMOTE CONTROL OF THE PROJECTOR

As an alternative to using a keypad, most projector functions can be controlled remotely, typically at a controller such as a PC, via simple bi-directional ASCII messaging on an Ethernet or serial communication link

### SETTING UP A REMOTE CONTROLLER

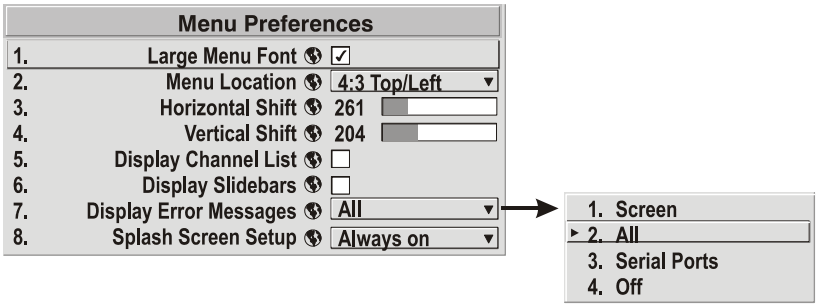
To control projector functions remotely via Ethernet and your own controller, either open an Ethernet socket between your controller and the valid projector address, or connect a serial link between your controller and the RS422 ports or the RS232 In port. Connect all ports, if desired.

For complete information, including a list of valid ASCII messages and how to structure them for use, obtain the current ***Christie Serial Communications*** document.

## 4.17 ERROR CONDITIONS

Occasionally the projector will encounter an error condition that can interrupt normal operation. This can be caused by a simple invalid keypad entry, an input signal error (most common) or a system error. How users are 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 "**RS232**" 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**".




The 2-digit error code that corresponds to the message appears in the status display window on the electronics module. During normal operation the status code "0n" is displayed.

### 4.17.1 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. Press ↵ or Exit to clear the message.

NOTE: *On-screen display of "Invalid User Entry" messages cannot be disabled, even if Display Error Messages has been set to "Off".*

## 4.17.2 INPUT SIGNAL ERRORS

These messages 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 the error message, you must resolve the signal problem to permanently eliminate 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

Occurs when HSYNC or VSYNC are active but the signal cannot be displayed. This condition occurs when only one of the two sync signals is present, or when either sync signal is unstable or the wrong frequency. Correct the signal or select another input.

### OTHER SIGNAL ERROR MESSAGES

You may encounter a signal error message indicating that HSYNC and/or VSYNC are either too fast or too slow. When this message appears, check the frequencies shown in the *Status* menu. If they are correct, then the signal is not recognized by the projector. 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.

## 4.17.3 SYSTEM WARNINGS / ERRORS

When the projector encounters a system malfunction, a *System Warning* or a *System Error* message will appear. These messages are accompanied by a numerical error code shown in the status display window. A system malfunction can be cleared with Exit Exit from presentation level, but may indicate the need for service by a qualified service technician. For best results reset the projector—power the projector down and up with the ⏻ (power) key. Wait at least 90 seconds and allow for proper cooling.

NOTE: *System messages appear on-screen only if Display Error Messages has been set to "Screen" or "All".*

### SYSTEM WARNINGS

Indicates that a system malfunction exists. 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 a potentially serious problem that should be reported to the manufacturer. Reset the projector.

### SYSTEM ERRORS

Indicates that a serious malfunction exists and must be reported to the manufacturer as soon as possible. The projector will no longer operate . Reset the projector.

## THE STATUS DISPLAY

If one of the error codes in table is shown in the status display window you have a system error that will require the attention of a qualified service technician.

Acknowledge and clear the error with Exit Exit from presentation level, or try resetting the projector by powering it off and on again, cooling when necessary. Consult and contact your dealer if the problem persists or if you encounter a code not listed in this table.

For detailed information, monitor the RS232 IN port. For an indication of engine communication failure, send (SST? 1 15) to get report.

## ERROR CODES

| CODE | DESCRIPTION |
|---|---|
| **GENERAL** | |
| 12 | Software bug. Contact dealer/factory. |
| 13 | Flash memory corrupted. Download new software. |
| 14 | Engineering-only programming is complete. Call Christie, replace TIPM. |
| 15 | Attempting to download code without being in boot mode |
| 16 | Invalid interrupt. Power off/on. If it persists, contact dealer/factory. |
| 18 | Attempting to program boot mode without jumper |
| 8D | Engine internal failure (all other failures) |
| TBD | Main processor programming failure |
| TBD | Motor processor programming failure |
| **LAMP FAILURES** | |
| 27 | Lamp 1 Failed to Strike |
| 28 | Lamp 1 Turned Off Unexpectedly |
| 32 | Lamp 2 Failed to Strike |
| 33 | Lamp 2 Turned Off Unexpectedly |
| 38 | Lamp Position Failure |
| 39 | Lamp 1 Card Not Installed |
| 3A | Lamp 2 Card Not Installed |
| **POWER AND COOLING** | |
| 53 | Lamp Fan Failure |
| 54 | DMD Fan failure |

| CODE | DESCRIPTION |
|---|---|
| 55 | Ballast A Fan Failure |
| 56 | Ballast B Fan Failure |
| 57 | Color Wheel Fan Failure |
| **TIPM (image processor)** | |
| 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 image processor failure |
| 67 | Downloaded code will not fit in the ROMs |
| 68 | Communication problem with scaler on image processor |
| **COLOR WHEEL** | |
| 42 | Color Wheel Stopped Spinning |
| **BACKPLANE or OPTIONAL INTERFACE MODULE** | |
| A0 | Unable to program the Option Card |
| A1 | Unable to power the Option Card |
| A2 | Unable to program the Backplane module |
| A3 | Unable to program the Warp Module |

## ERROR LED STATUS

Located next to the 2-digit status display is a single LED that will illuminate one of three colors to convey the current status of the system. A solid red LED indicates a system error and the corresponding error code will display in the status display. See *Status LED , on page 3-3* for description of the LED variations. Press Exit to acknowledge and clear the error.

# 5 Maintenance

The projector is an international regulatory agency approved product designed for safe and reliable operation. It is important to acknowledge the following precautions while operating the projector to assure complete safety at all times.

# 5.1 WARNINGS AND SAFETY GUIDELINES

**⚠ WARNING** Always power down the projector and unplug before servicing.

**⚠ 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.

**⚠ WARNING** Installation should be performed by qualified personnel

## 5.1.1 LABELS AND MARKINGS

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



The exclamation point within the equilateral triangle alerts the user to important operating and maintenance (servicing) instructions in the literature accompanying the projector.



The lightning flash and arrowhead symbol within the equilateral triangle alerts the user to uninsulated "dangerous voltage" within the projector's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

## 5.1.2 INSTRUCTIONS

Read all operating instructions prior to using the projector.

## 5.1.3 PROJECTOR LOCATION

Operate the projector in an environment, which meets the operating range as specified in *Section 6 – Specifications.*

- Do not operate the projector close to water, such as near a swimming pool. Do not operate in extremely humid environments.
- Do not place the projector on an unstable cart, stand or table. 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.
- Do not ceiling mount this projector.

## 5.1.4 LAMPS

Lamps require replacement when they have reached their end of life (see *Section 6 – Specifications* for lamp hours and specifications) if they have failed during operation, or have a drastic change in brightness (typical of aging lamps). To effectively maintain operation of the projector, be aware of changes that occur in brightness and the duration of each lamp. Refer to *4.4. Lamp Replacement* for more details on lamp replacement.

Follow all safety and warning precautions regarding lamp replacement and handling.

HOT



**⚠ WARNING Wait approximately 5 minutes to allow the lamp to cool before removing.**



**⚠ WARNING Do not stick hands into the lamp compartment during lamp replacement.**



**⚠ WARNING The lamp is under great pressure when hot and may explode causing physical injury and/or property damage. Allow a lamp to cool before handling and/or powering down and unplugging the projector.**

**Use only the lamps supplied by CHRISTIE, in the *Lamp Replacement Kit* for these projectors.**

## 5.1.5 POWER CORD AND ATTACHMENTS

Use only the attachment accessories recommended by CHRISTIE. Use of others 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 is not within the specified voltage and power range. See *Section 7*.**

- Do not place items on the power cord. Place the projector where the cord cannot be walked on or have objects rolling over it.
- Operate the projector only at the specified voltage. Do not overload power outlets and extension cords as this can result in fire or shock hazards.
- The projector is equipped with a three-wire grounding plug. If you are unable to insert the plug into an outlet contact an electrician to replace the outlet. Do not defeat the safety purpose of this grounding-type plug.

## 5.1.6 VENTILATION

Slots and vents in the projector provide ventilation to ensure reliable operation and prevent overheating. Do not block or cover these openings..

- Do not place the projector over a radiator or heat register.
- Do not place the projector in an enclosure without proper ventilation.
- Do not “poke” 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 into the projector. If a spill occurs, immediately unplug the projector and have it serviced by a qualified service technician.

## 5.1.7 SERVICING

If any of these conditions exist, immediately unplug the projector from the power outlet and ask a qualified service technician to look at it.

- The power cord is damaged.
- The internal cooling fans do not turn on when the projector is first powered up.
- Liquid is spilled into the projector.
- The projector is exposed to excessive moisture.
- The projector is not operating normally or its performance has significantly deteriorated in a short period of time.
- The projector has been dropped or the shipping case (if applicable) is badly damaged.

**⚠ 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.**

**⚠ WARNING Never service the projector while it is still plugged in. There are exposed voltages that could cause severe physical injuries and possibly death. Always unplug the projector and wait 2 minutes to allow the capacitors on the power supply to discharge before removing the projector’s covers.**

## 5.2 CLEANING AND MAINTENANCE GUIDE

**⚠ WARNING** Always power down and unplug the projector before cleaning or servicing.

Table 5.1 Table 4.1. Maintenance Guide

| Part Description | Frequency | How to clean |
|---|---|---|
| **Projection Lens** | **As required** | **CLEAN:** A small amount of dust on the lens has very little effect on picture quality. Clean only if absolutely necessary.<br>**To clean:** Moisten a clean (not-reused), lint-free cloth with a high-quality optical cleaning fluid. Wipe the cloth in a single continuous motion across the lens surface. Discard the cloth after cleaning. Use compressed air to remove any particles remaining on the lens.<br>**NEVER** use a cleaning solvent that contains ammonia. Avoid lens contact with Xylene and Ether. |
| **Lamp Module (glass exit window only)** | **As required** | Clean (glass only): It is important to never touch the glass surface of the lamp. Any oil left by fingerprints will seriously degrade a lamp's performance or cause "hotspots", which can lead to an accumulation of intense heat in the touched area and cause the lamp to shatter. Clean the glass exit surface of the lamp module only when absolutely necessary.<br>**To clean*:*** Wait until the lamp is completely cool. Moisten a clean, lint-free cotton cloth with isopropyl alcohol and gently wipe the surface of the glass in a circular motion until clean. |
| | **10000 hours or sooner, if required** | **REPLACE*:*** Aged lamps that show a drastic reduction in brightness or have their end of life should be replaced immediately. Refer to *5.4.1 replacing a lamp, on page 5-7*. |
| **External Projector Covers** | **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.* |

## 5.3 REPLACING REMOTE BATTERIES

The optional IR remote uses two AA size - 1.5V alkaline batteries.

1. Turn the remote over to access and remove the backside cover. See *Figure 5-1 Replacing Remote Batteries*.
2. Remove and dispose of the old batteries.
3. Insert the new batteries in the proper positive/negative orientation as indicated by the etching in the bottom of the compartment. See *Figure 5-1 Replacing Remote Batteries*.
4. Replace the cover ensuring the tabbed end is correctly inserted before snapping the opposite end into place.

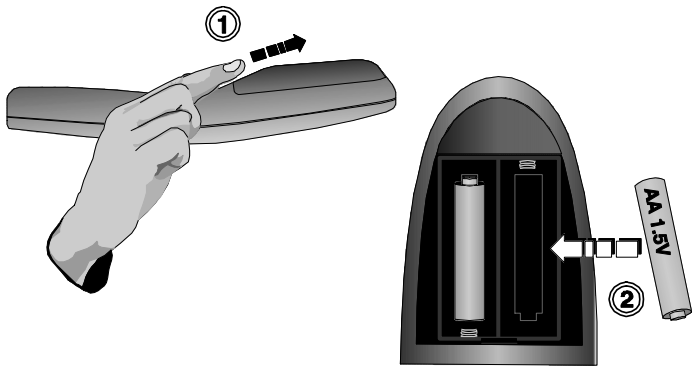



FIGURE 5-1 REPLACING REMOTE BATTERIES

## 5.4 LAMP REPLACEMENT

The RPMX/RPMSP-D132U projector includes 2 132W UHP lamps; however, only one lamp is operated at any given time. The other lamp is held in reserve until the user chooses to switch lamps operation modes or a lamp fails. The projector's hot-swap feature allows the lamp not in operation to be replaced without powering down the projector and while the other lamp is still on. Although it is recommended the projector be turned off during lamp replacement, this feature benefits applications where downtime must be kept to a minimum.

***When do I replace a lamp?*** Lamps that have shown a drastic reduction in brightness or have reached their end of life should be replaced immediately. To check the hours each lamp has been in use, look up the number of **LAMP HOURS** in individual lamp submenus or in the *Status* menu. From the *Lamp* menu (*Section 4.10.1*) , you can set a **LAMP LIMIT** and enable the projector to send a warning message when it's powered on to indicate the lamps have reached their set limit. See *4.10.1 The Lamp Menu* for more information.

At anytime during operation, you can check the status of a lamp by checking the lamp status in individual lamp submenus – *More, Lamp 1* or *More, Lamp 2*. A status message for the lamp specifies a specific failure that may require further investigation and may be directly related to the lamp. If, through investigation, you rule out the cause being an aged lamp or another component in the projector, it may indicate that your lamp has prematurely burned out or failed (check status LEDs and/or error codes through RS-232, if possible). Burned out lamps or lamps that have failed due to a flaw should be replaced as soon as possible.

In general, monitor the performance of your projector and replace lamps as needed.

## 5.4.1 REPLACING A LAMP

1. Press ⏻ to power down the projector. Wait for the internal cooling fans to stop. Turn the main power switch OFF. Allow the lamps to cool for an additional 5 minutes before continuing with Step 2.

⚠The projector should be turned off when replacing a lamp. If you choose to replace the lamp in reserve while the other lamp is still on *(hot-swap),*ensure the lamp to be removed is cool before proceeding.

**⚠ WARNING Do not remove a hot lamp.Wait at least 5 minutes after powering down or switching lamp operation modes to allow the lamp to cool sufficiently before removing.**

2. Remove the cover over the lamp changer. Turn the thumb wheel (*Figure 5-2*) on the cover until it is loose. Lift the cover off.

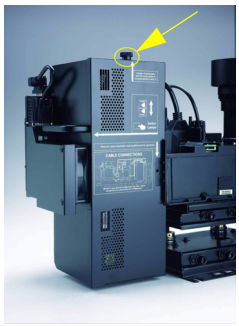


FIGURE 5-2 THUMB WHEEL

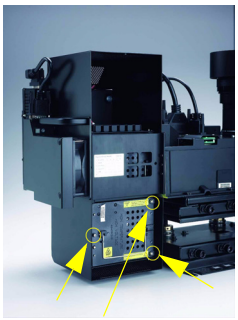


FIGURE 5-3 LAMP LOCK SCREWS

3. Loosen the (3) lock screws (*Figure 5-3*) on the lamp module held in the reserve position.
4. Using the lamp handle, pull the lamp straight up to remove from the projector.

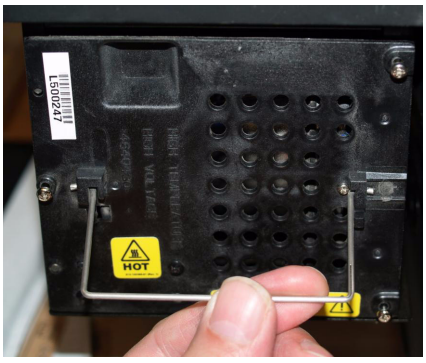



FIGURE 5-4 THE LAMP HANDLE

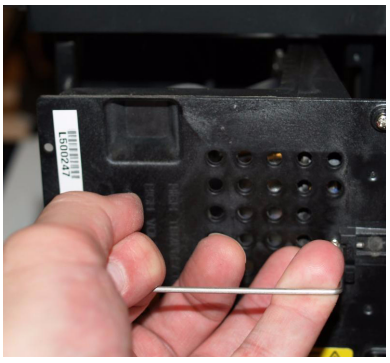


FIGURE 5-5 REMOVE THE LAMP

5. Discard the lamp using approved disposal methods for your area.

NOTE: *Lamps containing mercury must be treated as hazardous waste if discarded in large volumes.*

**⚠ WARNING Do not stick your hands in an empty lamp compartment.**

6. Handling the new lamp by its handle only, align it with the terminal plug located on the side wall of the lamp compartment. Insert the lamp all the way in until it is fully seated – the lamp connector will plug into the terminal plug.
7. Tighten the (3) lamp screws on the new lamp module to "lock" it in place. Lower the lamp handle until it clips in place.

**⚠ WARNING Lamp handle must lay flat before requesting a lamp position change.**

8. If the other lamp requires replacement, change the lamp position (*Figure 5-6*) to gain access to the other lamp. Allow the lamp to cool and proceed with lamp replacement following the same steps described earlier.

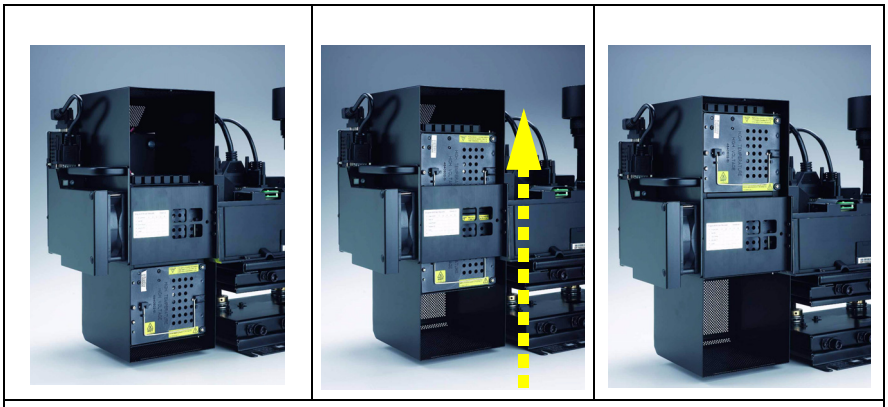


FIGURE 5-6 CHANGING THE LAMP POSITION

9. Each new lamp is supplied with a lamp card that contains lamp specific information such as the serial number. This card must be replaced whenever a lamp is replaced. Remove the corresponding lamp card from the PHM module and replace it with the new lamp card. The projector will detect the new card when the projector is powered up and read the new lamp serial number.

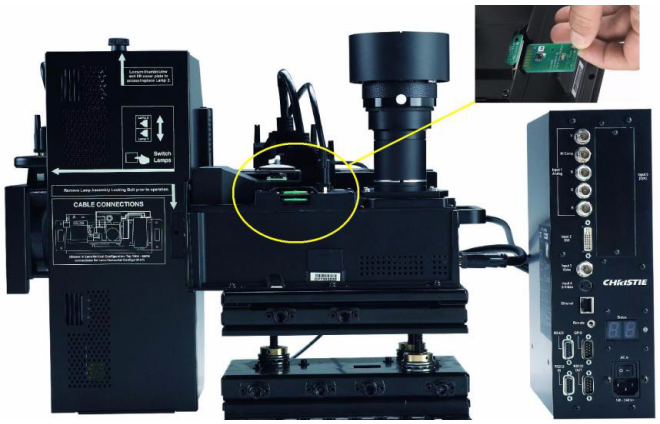



FIGURE 5-7 RLAMP CARD

# 7 Specifications

Due to continuing research, specifications are subject to change without notice.
Specifications apply to all models unless otherwise noted.

# 7.1 DISPLAY

| | RPMSP-D132U | RPMXD132U |
|---|---|---|
| **RESOLUTION** | | |
| | SXGA+ (1400x1050) | XGA (1024 x 768) |
| **BRIGHTNESS** | | |
| 132W White Boost ON | 2320 lumens | 790 lumens |
| 132W White Boost OFF | 1390 lumens | 465 lumens |
| 120W White Boost ON | 2100 lumens | 660 lumens |
| 120W White Boost OFF | 1225 lumens | 365 lumens |
| **CONTRAST RATIO** | | |
| | 2365:1 | 1180:1 |
| **BRIGHTNESS UNIFORMITY** | | |
| | 90% | 90% |
| **COLORS AND GRAY SCALE** | | |
| Resolution | 8 bits | 8 bits |
| Displayable Colors | 16.8 million | 16.8 million |
| **COLOR WHEEL** | | |
| Type | RGW40B | RGW40B |
| **COLOR TEMPERATURE** | | |
| Range of Adjustment | 3200K – 9600K | 3200K – 9600K |
| Color Temp. Variation | 500K | 500K |

## 7.2 INPUTS

Applies to RPMX/RPMSP-D132U

| | | |
|---|---|---|
| **ANALOG RGB OR YPRPB** | (Interlaced or Progressive Scan Format) | |
| Pixel Clock Rate | 13 – 210 MHz max | |
| Color Space | RGB or YPbPr | |
| Input Levels: | R, G, B, - with sync: | $1.0V_{p-p}$ ±2dB |
| | R, G, B, - without sync: | $0.7V_{p-p}$ ±2dB |
| | Pb, Pr | $0.7_{p-p}$ ±2dB |
| | DC Offset | ±2V |
| | Nominal Impedance | 75 ohms |
| **SYNC** | (Interlaced or Progressive Scan Format) | |
| Horizontal Frequency Range | 15 – 120 kHz | |
| Vertical Frequency Range [1,3] | 23.97 – 150 Hz | |
| Sync Type | Separate H and V | |
| | Composite (bi-level, tri-level, XOR)<br>Sync-On-Green/luma (bi-level, tri-level)<br>Serrations and/or Equalization pulses<br>MarcoVision™ compatible | |
| Polarity[2] | Positive or Negative | |
| Input Levels[2] | $0.5V_{pp}$ – $4.0V_{pp}$ | |
| DC Operating Range[2] | ±3V | |
| Nominal Impedance[2] | 75 ohms | |
| Horizontal Sync Duty Cycle3% min, 20% max | | |

NOTES: *1)Value specifies frame rate of non-interlaced sources and field rate for interlaced sources. Frame/field rates higher than the maximum refresh rate of the panels will be displayed at a lower rate.*

*2) Does not apply to sync-on-green/luma.*

*3) As the horizontal frequency increases and/or as the vertical scaling ratio of input lines to output lines increases many sources will run into the internal 180Mpix/s processing which limits the number of pixels that can be processed.*

## COMPOSITE VIDEO AND S-VIDEO

| | | |
|---|---|---|
| Signal Formats | Composite-video (CVBS) | S-video (Y/C) |
| Video Standards | NTSC, NTSC 4.43, PAL, PAL M, PAL N, PAL60, SECAM | |
| Input Levels | Composite-video | 1.0Vp-p ±3db *(including sync tip)* |
| | S-video luma (Y): | 1.0Vp-p ±3dB *(including sync tip)* |
| | S-video chroma (C) | 630*m*V nominal (burst) |
| | DC Offset | ±2V |
| | Nominal Impedance | 75 ohms |

## DVI-I – ANALOG

| | |
|---|---|
| Input Characteristics | Same as Analog RGB except as noted below. |
| Formats | RGB or YPbPr – video signal cannot be routed to the decoder |
| Sync Types | Separate H and V (direct or swapped)<br>Bi-level – TTL levels only<br>Composite (XOR, OR)<br>Sync-on-green<br>Serrations and/or Equalization pulses<br>MacroVision™ (standard & progressive) |
| Analog Sync Logic Low | 0V – 0.8v |
| Analog Sync Logic High | 2.4V – 5V |
| Analog Sync Input Impedance | 1kΩ |

## DVI-I – DIGITAL

| | |
|---|---|
| Input Characteristics | meets DVI spec |
| DVI Cable Length | 5m |
| Max Pixel Rate | 165 MPix/s |
| EDID | Supported |
| HDCP (High Speed Digital Content Protection) | Supported |

## RS-232/RS-422 SERIAL INPUT

| | |
|---|---|
| Connector Type | 2 male DB9 (RS-232 OUT, GPIO)<br>2 female DB9 (RS-232 IN, RS-422 IN) |

| NETWORK CONTROL | |
|---|---|
| Ethernet | meets DVI spec |
| Maximum Baude Rate | 1 RJ45 connector |
| **REMOTE CONTROL** | |
| Type | Low Frequency IR with wired ability |
| Range | 30 Meters |
| Laser Pointer | Included |
| Battery Type (2 Required) | AA, 1.5V Alkaline |
| **WIRED CONTROL** | |
| Connector Type | 3.5mm plug |
| Input Levels | High:2.2V min.<br>Low:0.9V max.<br>Power:500mA @ 5V |

## 7.3 POWER REQUIREMENTS

| GENERAL | RPMX-D132U | RPMSP-D132U |
|---|---|---|
| Voltage Range | 100 – 240 VAC nominal | 100 – 240 VAC nominal |
| Line Frequency | 50 – 60 Hz nominal | 50 – 60 Hz nominal |
| Maximum Inrush Current | 30 A max. | 30 A max. |
| Current Rating (typical) | 2.3A @ 100V (typical), | 4.5A @ 100V (typical), |
| | 0.8A @ 240V (typical) | 1.88A @ 240V (typical) |
| Power Consumption | 230W nominal | 450W nominal |

## 7.4 LAMPS

NOTE: *The projector uses two identical lamps; however only one lamp operates at any given time.*

| | RPMX/RPMSP-D132U | |
|---|---|---|
| Type | 132W Phillips UHP | |
| Power | 120 – 132 Watts | |
| Operating Position | ± 20 deg. tilt from horizontal plane | |

| | | |
|---|---|---|
| Warm up to full brightness | 5 minutes | |
| Lamp Life (typical) | 10000 hours at 100W | |

## 7.5 SIZE AND WEIGHT

Dimensions with adjuster in nominal position *(Depth x Length x Height)*

90-degree configuration 15.5”DP x 33.5” LG x 15.6” HT

0-degree configuration 14.9” DP x 33.5” x x17.7” HT

Weight<50 lbs

For projector dimensions and mounting information see *Appendix B*.

## 7.6 SAFETY AND EMI

CSA C22.2 No. 60950-1-03 First Edition

UL 60950-1 1st Edition

IEC 60950-1:2001 European Norm, Safety of Information Technology Equipment

### EMISSIONS

FCC Code of Federal Regulations, Title 47, Part 15, Conducted and Radiated Emissions, Class A

EN55022 (CISPR 22) for Information Technology Equipment, Conducted and Radiated, Class A

EN61000-3-2 Induced Harmonic Distortion

EN61000-3-3 Induced Voltage Fluctuations (Flicker)

### IMMUNITY

EN55024, specific to Information Technology Equipment (all parts), under which are:

EN61000-4-2 ESD,

EN61000-4-3 Radiated Immunity,

EN61000-4-4 Fast Transient/Burst Immunity

EN61000-4-5 Surge Immunity,

EN61000-4-6 Immunity to Conducted Disturbances,

EN61000-4-8 Magnetic Field Immunity,

EN61000-4-11 Voltage Dips, Short Interruptions and Voltage Variations Immunity

## 7.7 ENVIRONMENTAL

### OPERATING ENVIRONMENT

| | |
|---|---|
| Temperature | 5°C to 35°C (40 to 95°F) |
| Humidity | 20% - 80% non-condensing |
| Altitude | 0 - 10,000ft, -5°C to 50°C |

### NON-OPERATING ENVIRONMENT

| | |
|---|---|
| Temperature | -25°C to 70°C with relative humidity varying between 0% to 95% |
| Altitude | 30,000ft, -25°C to 70°C |

## 7.8 STANDARD COMPONENTS

- Line Cord (rated, North American)
- Configuration bracket (shipped loose, for vertical configuration)
- 6, M6 screws (for installation of configuration bracket)

## 7.9 OPTIONAL ACCESSORIES

User's Kit *(includes User Manual, IR Remote Keypad, Setup and Adjustment Tools )*

Service manual

Dual frequency IR remote keypad

### 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

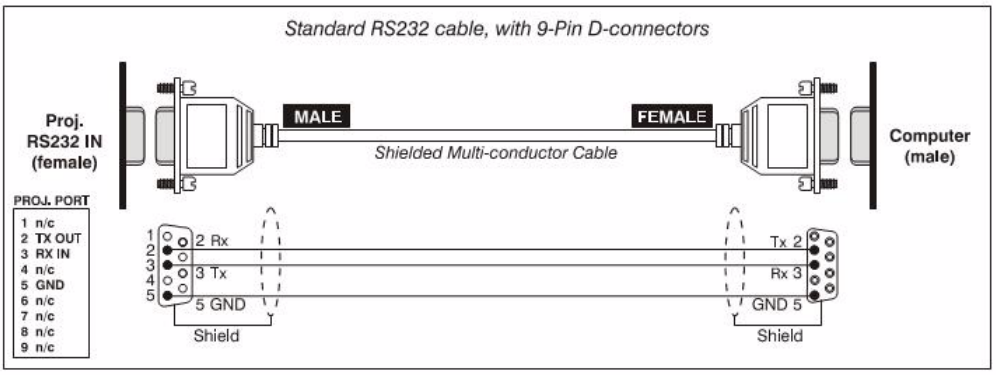
DVI/DFP Input Module

Dual SD/HD-SDI Module

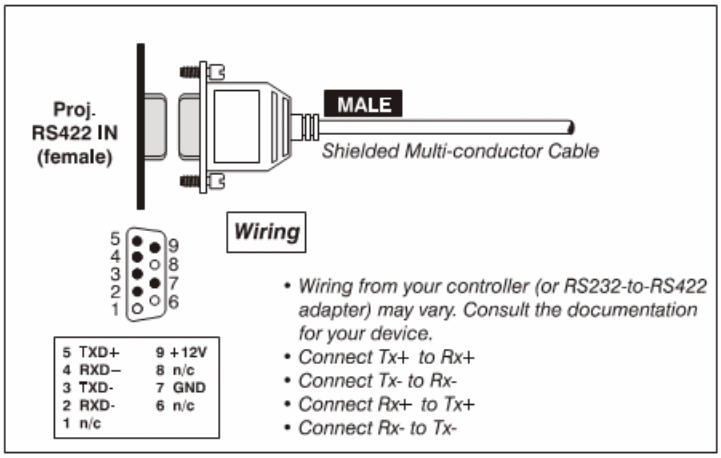
# A Cable Connections

A serial link of RS232 or RS422 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 RS232 serial cable to the **RS232 IN** port. Or, for long-distance (>100 ft.) links with an RS422-compatible PC or controller, connect RS422 cable to the **RS422** port.

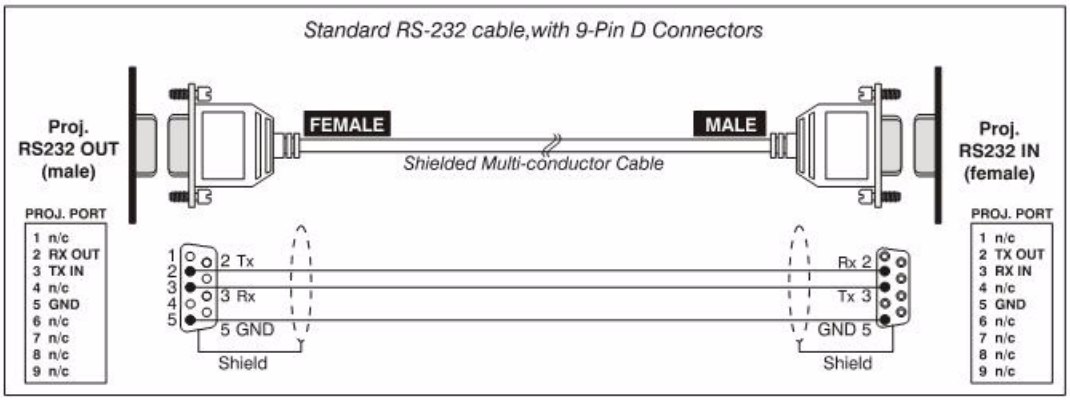
# A.1 PROJECTOR TO COMPUTER (RS232)




# A.2 PROJECTOR TO RS422 COMPATIBLE COMPUTER




# A.3 PROJECTOR TO PROJECTOR



# Appendix B Projector Dimensions & Mounting Information

## B.1 D132U HORIZONTAL CONFIGURATION

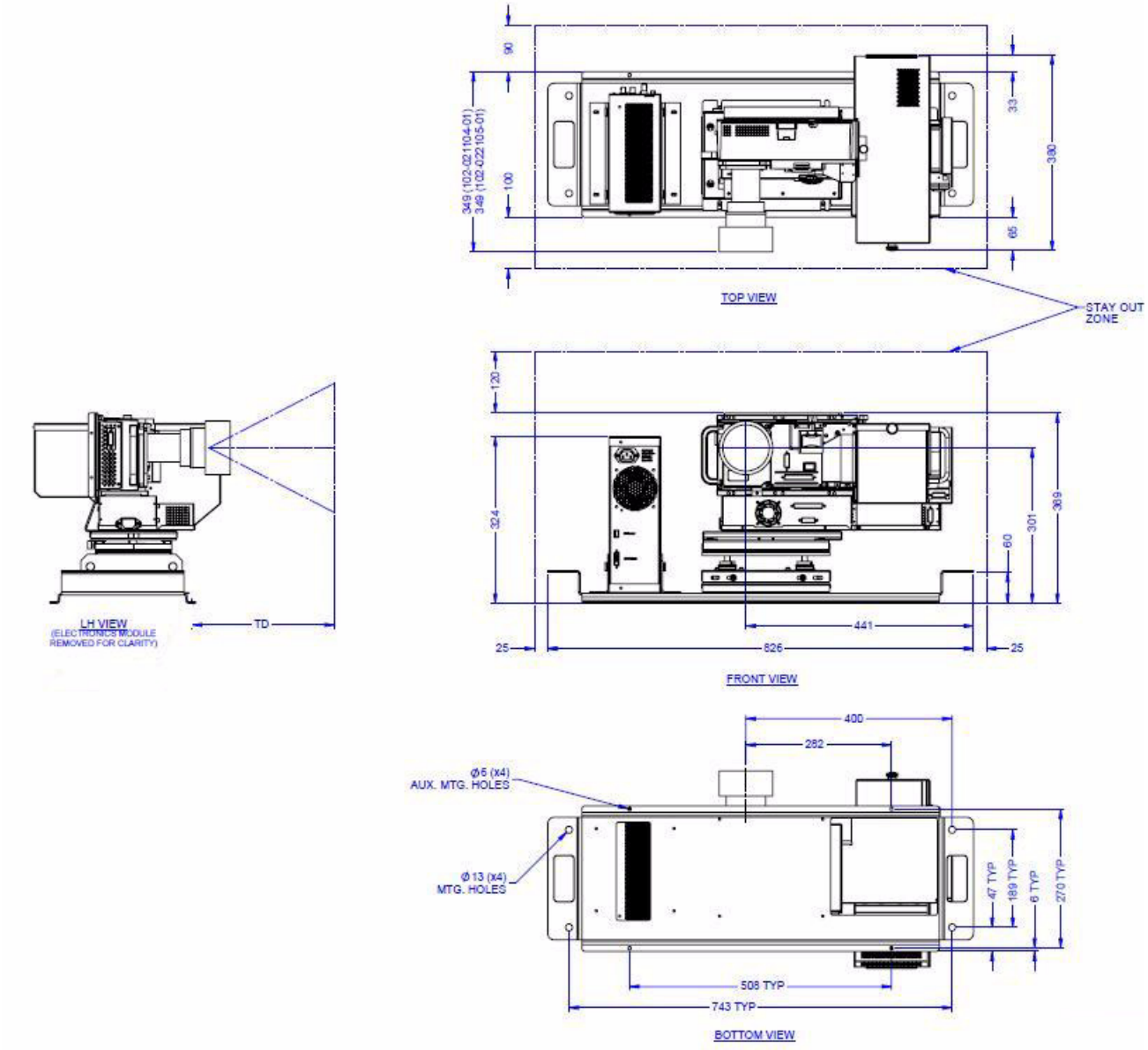



*FIGURE B-1 HORIZONTAL CONFIGURATION*

## B.2 D132U VERTICAL CONFIGURATION

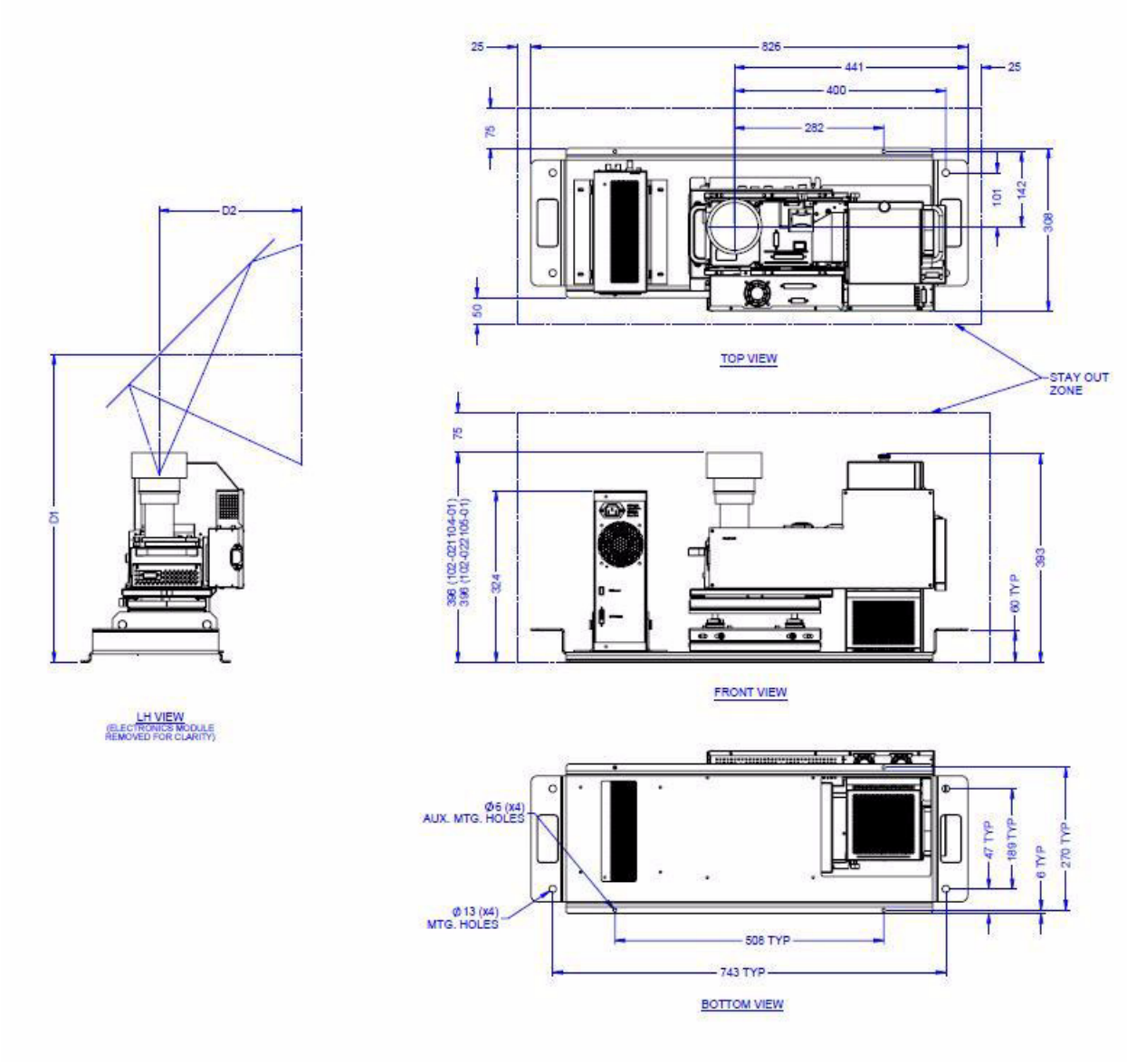
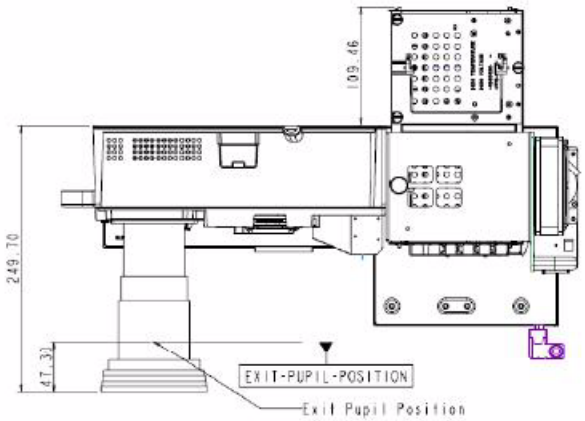
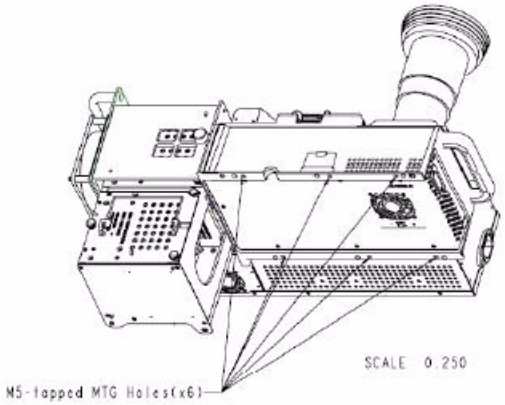
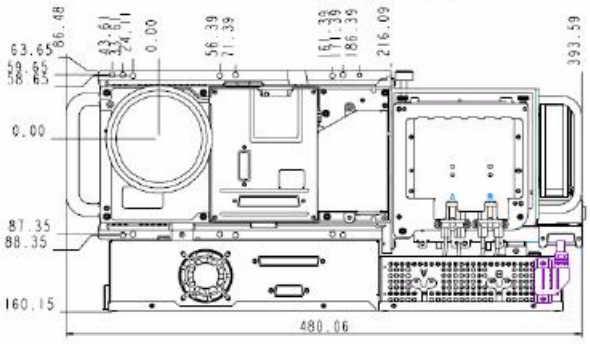


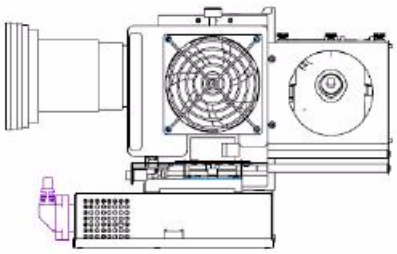

*FIGURE B-2 VERTICAL CONFIGURATION*

## B.3 D132U HORIZONTAL CONFIGURATION FOR SXGA

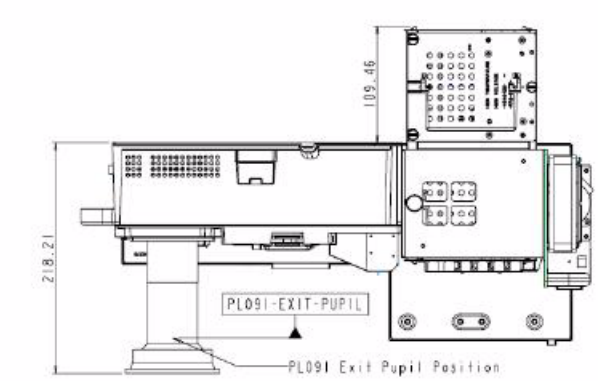


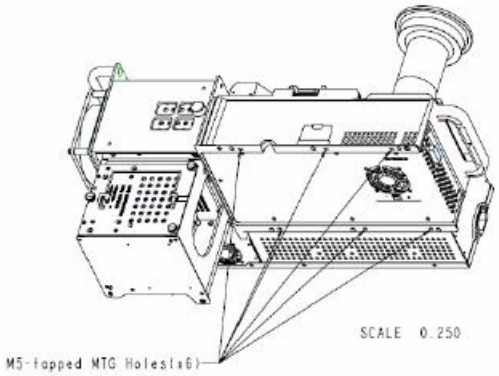



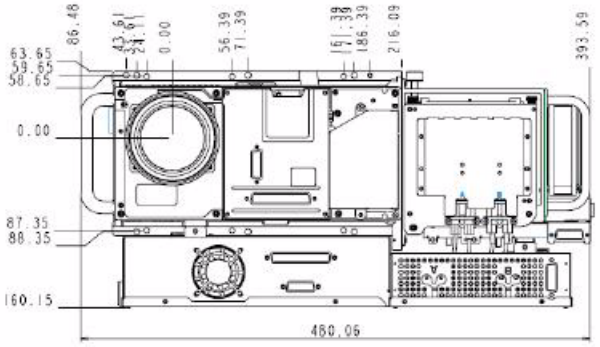



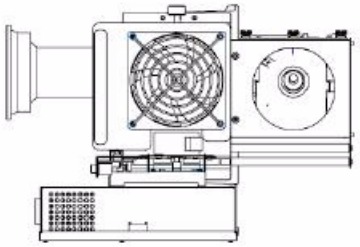



## B.4 D132U HORIZONTAL CONFIGURATION FOR XGA



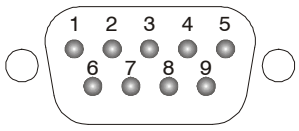



# C System Integration

The GPIO connector located on the input panel provides a flexible method of interfacing external I/O devices to the projector. There are 7 GIO pins on the 9pin D-Sub GPIO connector, which are configurable via RS232 commands. The other two pins are reserved for ground and power. See Table C.1 for pin identification.

Table C.1 GPIO Pins




| PIN NUMBER | 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 CONFIGURING THE GPIO

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 the 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.

By using the GIO command, you 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 high.)*

| | |
|---|---|
| (GIO C2 O) | Set pin #2 configuration to output |
| (GIO 2 H) | Set pin #2 to high (state) |

### (QUERY COMMAND

| | |
|---|---|
| (GIO?) | Request the state and configuration of all pins |
| (GIO! "HHLLHLH" "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.1.1 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<br>(1 Character)<br>(String) | H = High<br>L = Low<br>"LHXXXHL" 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 |

There are many optional input modules and accessories currently available for this projector. Contact your dealer for a complete and up-to-date listing.

NOTE: *Always unplug the projector or switcher before installing or removing any optional input module.*

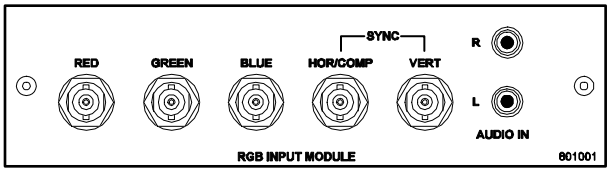
# D Optional Input Modules

There are many optional input modules and accessories currently available for this projector. Contact your dealer for a complete and up-to-date listing.

NOTE: *Always unplug the projector or switcher before installing or removing any optional input module.*

## D.1 RGB500 INPUT MODULE 38-804606-XX

The *RGB500 Input Module* may be installed in this projector, a *Marquee Signal Switcher*, or a *Marquee Case/ Power Supply.* The module receives analog RGB input signals from computers or other RGB source devices.



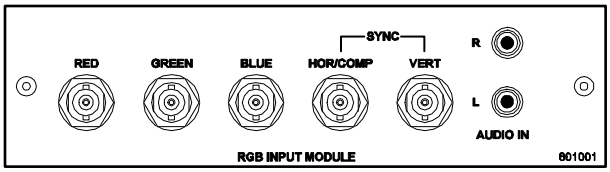

### RGB500 FEATURES

- accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync), up to 500 MHz bandwidth
- BNC connectors for RGB signal inputs

NOTE: *The audio connectors are not functional.*

## D.2 RGB400BA INPUT MODULE 38-804610-XX

The *RGB400 Buffered Amplifier Input Module* may be installed in this projector, in a *Marquee Signal Switcher* or in a *Marquee Case/Power Supply.* Connect three-, four-, or five-wire RGB video signals of up to 400 MHz bandwidth, 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 75Ω terminated.



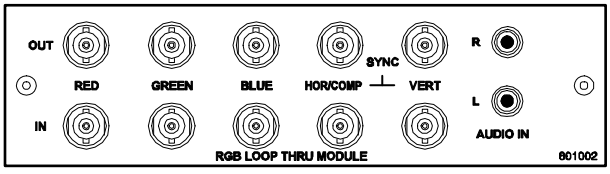

### RGB400BA FEATURES

‡accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
‡BNC connectors for RGB signal inputs
‡Buffered signals to a remote destination

NOTE: *The audio connectors are not functional.*

## D.3 RGB400 ACTIVE LOOP-THRU INPUT MODULE 38-804607-XX

The *RGB400 ALT Input Module* may be installed in this projector, a *Marquee Signal Switcher*, or a *Marquee Case/Power Supply.* The 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.



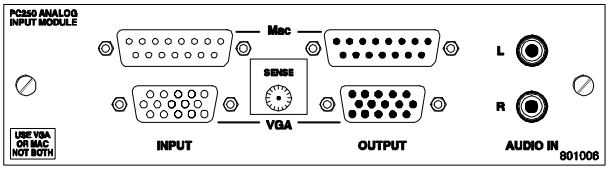

### RGB400ALT FEATURES

‡accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
‡BNC connectors for RGB signal inputs
‡buffered loop-through video outputs

NOTE: *The audio connectors are not functional.*

## D.4 PC250 ANALOG INPUT MODULE 38-804609-XX

The *PC250 Analog Input Module* may be installed in this projector, a *Marquee Signal Switcher* or a *Marquee Case/Power Supply*. The 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

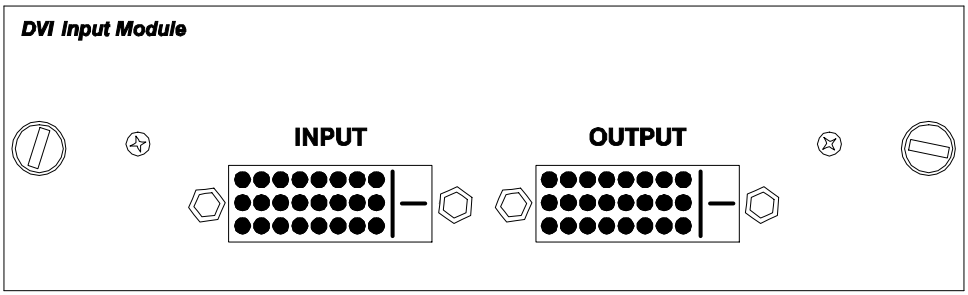
NOTES: *1) This interface does not accept VGA and MAC signals simultaneously.*

*2) The audio connectors are not functional.*

*3) Trademarks are the rights of their respective owners.*

## D.5 DVI INPUT MODULE 38-804635-XX

This module can display digital video input signals conforming to the DVI (Digital Visual Interface) single-channel standard.

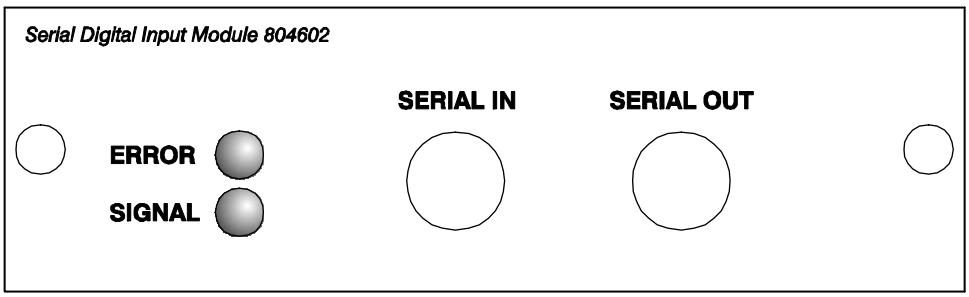



### FEATURES

‡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.6 SERIAL DIGITAL INPUT MODULE 38-804602-XX

This module 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.

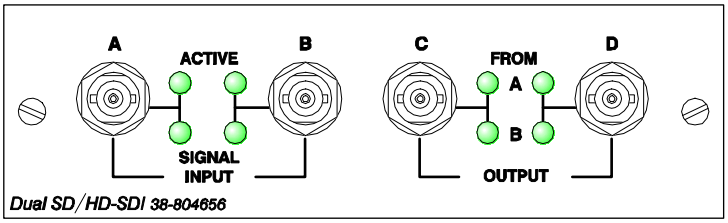



### SDI FEATURES

‡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

## D.7 DUAL SD/HD-SDI MODULE 38-804856-XX

The Dual SD/HD-SDI Module enables incoming 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 two serial digital inputs
‡outputs up to two 10-bit YCbCr 4:2:2 video signals
‡provides input(s) to output(s) loop-through capability
‡supplies interchangeable inputs as part of the Picture-in Picture display

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# 6 Troubleshooting

If the projector is not operating properly, note the symptoms and use this guide to assist you. If you cannot resolve the problems yourself, contact your dealer for assistance.

NOTE: *A qualified service technician is required when opening the projector to diagnose any "probable cause".*

# 6.1 DISPLAYS

### THE PROJECTOR IS ON BUT THERE IS NO DISPLAY

1. Was a lens cover accidentally left on? Remove lens cover.
2. Is the lamp ignited? It could take up to 5 attempts to strike a lamp. With a 30 second wait period in between each attempt it could take a total of 2 minutes to turn the lamp on. Check **LAMP STATUS**.
3. NOTE: *After striking the lamp, it can take up to 5 minutes to achieve full brightness.*
4. Is the correct input selected?
5. Is the source connected properly? Check the cable connections and ensure the correct source is selected.
6. Can you access test patterns? Ensure there is not a full black test pattern selected for display—press Menu ▲ to access test patterns, then cycle patterns with ◄ ► keys.

### SEVERE MOTION ARTIFACTS

There is a synchronization problem with reversed 3/2 pull-down in 60Hz-to-24Hz film-to-digital conversion in your source. Correct at the source.

### THE DISPLAY IS JITTERY OR UNSTABLE

1. 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.

### 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.
4. Adjust **LAMP POSITION** to optimize the position of the lamp for maximum brightness.

### THE UPPER PORTION OF THE DISPLAY IS WAVING, TEARING OR JITTERING

This can sometimes occur with video or VCR sources. Check your source.

### PORTIONS OF THE DISPLAY ARE CUT OFF OR WRAP TO THE OPPOSITE EDGE

Resizing and/or blanking may need adjustment.

### 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.

### 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.

### 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.

### 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 in again and power up as usual.

### COLORS IN THE DISPLAY ARE INACCURATE

1. The color, tint, color space, color temperature and/or other settings may require adjustment.
2. Ensure you are using the proper channel for this source.
3. Check *Color Wheel Calibration*.

### THE DISPLAY IS NOT RECTANGULAR

1. Check leveling of the projector. Ensure that the lens surface and screen are as parallel to each other as possible.
2. Is the vertical offset correct? Adjust as necessary using the vertical offset knob.
3. Check if Keystone is incorrectly set.

### 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 (75 Ω). 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.

## 6.2 LAMPS

For more information on lamp operation modes and auto-switching, refer to *4.10.1 The Lamp Menu*.

### PROJECTOR DELAYED ON POWER UP

The projector enforces a 60 second delay between powering down and up again, because a hot lamp is more difficult to ignite.

NOTE: *It can take 2 minutes to cool a lamp sufficiently enough before re-striking it.*

### POWERED UP, BUT NO LIGHT ON THE WALL

It takes approximately 60 seconds for the projector to power up and strike a lamp. A UHP lamp may not strike on the first attempt. In this case, the projector will wait 30 seconds before striking the lamp again. It will try a total of five times before it declares the lamp as *"Failed to Strike"*. Therefore it could take up to 2 minutes before light is seen on the wall. You can check the status of either lamp in the projector by checking **LAMP STATUS** in the *Lamp* Menu, refer to *4.10.1 The Lamp Menu*.

### INCORRECT LAMP SERIAL NUMBER ON STATUS PAGE

When replacing a lamp in a projector with a new lamp, remember to replace the lamp card (PCB). This card contains key information about your lamp, such as serial number, and factory default color primaries. If not installed, this can lead to incorrect lamp histories and difficulty with projector color matching.

## 6.3 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. Save any address change, and re-boot to implement.
3. 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.