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*NOTE: Due to continuing research, all information in this manual is subject to change without notice.*

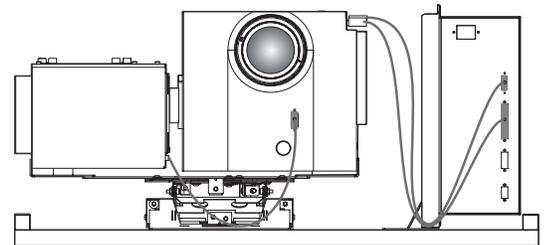


# Introduction

## 1.1 Projector Overview

*GraphXMASTER™ RPMSP-D100U* and *CSP70-D100U* products are based on single chip DLP™ (Digital Light Processing) technology by Texas Instruments with SXGA+ resolution.

The *RPMSP-D100U* is a dual lamp projector that is specially designed for rear screen projection. This purpose-built projector has a flexible mounting base, which allows it to be fitted with a variety of mounting systems in either a 0-degree or 90-degree configuration. The 6-axis adjuster also allows for precise geometric alignment with the screen – an important feature especially for rear screen tiling applications.



**Figure 1.1 RPMSP-D100U**

The *CSP70-D100U* display cube is an ideal choice for a complete solution in a variety of ever demanding 24/7 control and operations centers. The *CSP70* provides the same alignment features as the *RPMSP* along with uniform brightness and ultimate color matching ability – extremely important in tiled display walls where a single seamless image may be required.

### Key features

- ◇ true SXGA+ (1400 x 1050) native resolution with other resolutions fully scaleable
- ◇ Variable Brightness (*dependant on lamp power and white boost setting*)
- ◇ Contrast Ratio – 1100:1
- ◇ 24-bit RGB display
- ◇ Control with IR or wired keypad
- ◇ User selectable Dual lamp or Single lamp operation modes
- ◇ Automatic lamp switching for continuous operation
- ◇ Intuitive user menu system
- ◇ Built-in RS-232 and RS-422 ports for computer and network projectors
- ◇ 6-axis adjustment mechanism for image geometry adjustment
- ◇ Low distortion lens (0.7:1 or 1.16:1)
- ◇ Built in RS-232 for control via external computer, etc.
- ◇ Lens horizontal or lens vertical configurations (*CSP70, lens vertical only*)
- ◇ Modular, industrial design for ease of servicing and installation

For a complete list of product specifications, see Section 6.

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## 1.2 Components

Each projection system is provided with a User's Kit, which includes items required in the setup and maintenance of the projector. Check the User's Kit to ensure you have received the following items:

- ◆ User's Manual
- ◆ Installation Guide
- ◆ IR remote keypad with batteries
- ◆ Assorted ball nose drivers
- ◆ Bracket for 90° configuration change (*refer to Installation Guide for instructions*)

*Additional User's Kits can be purchased through Christie.  
RPMSP & CSP70 User's Kit (102-108001)*

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## 1.3 Purchase Record and Servicing

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. 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.

### Purchase Record

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

*NOTE: The projector serial number can be found below the adjustment mechanism on the mounting plate.*

You can also register your product on-line by visiting [www.christiedigital.com](http://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.

# Installation & Setup

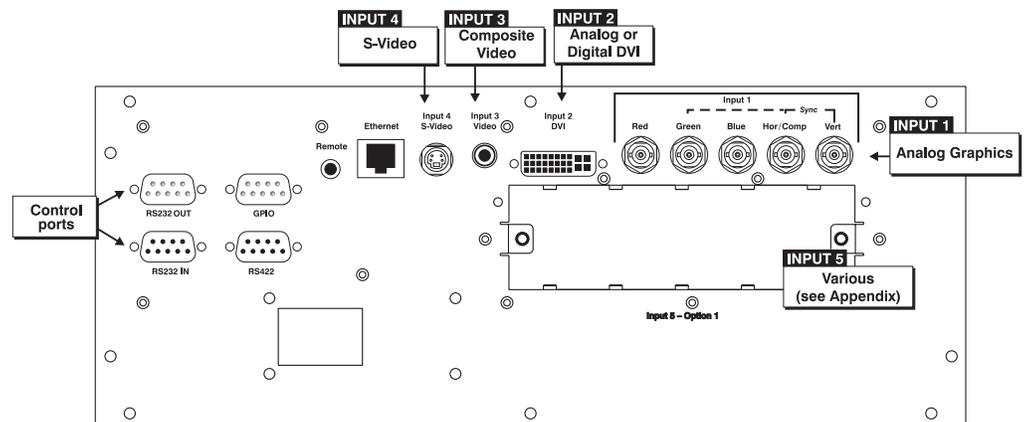
This section includes information on the setup and connection of various sources to the projector. Sources should only be connected after the projector has correctly been installed. For mechanical installation and first-time setup instructions, refer to the separate *Installation Guide* provided in the User's Kit.

## 2.1. Connecting Sources

Sources connect to the *Input Panel* located at the back of the projector. See Figure 2.1.

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

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



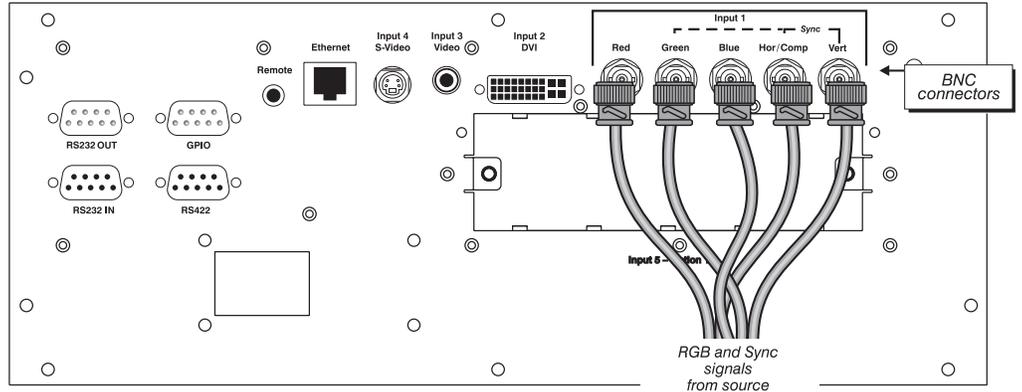
**Figure 2.1. Input Panel**

**NOTES:** 1) See **Section 6, Specifications** for details regarding compatible inputs. 2) Use high quality shielded cables only for all connections.

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

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

Connect the **SYNC** BNC input(s) first. Then connect the red, green and blue source outputs to the **RED**, **GREEN**, and **BLUE** BNCs on the **INPUT 1** panel. If the source uses sync-on-green, only the red, green, and blue connections are required. If the source provides a composite sync output, connect it to the **SYNC** input labeled **HOR/COMP**. If the source provides separate horizontal and vertical sync outputs, connect horizontal sync to the **SYNC** input labeled **HOR/COMP** and connect vertical sync to **SYNC** input labeled **VERT**. See Figure 2.2.

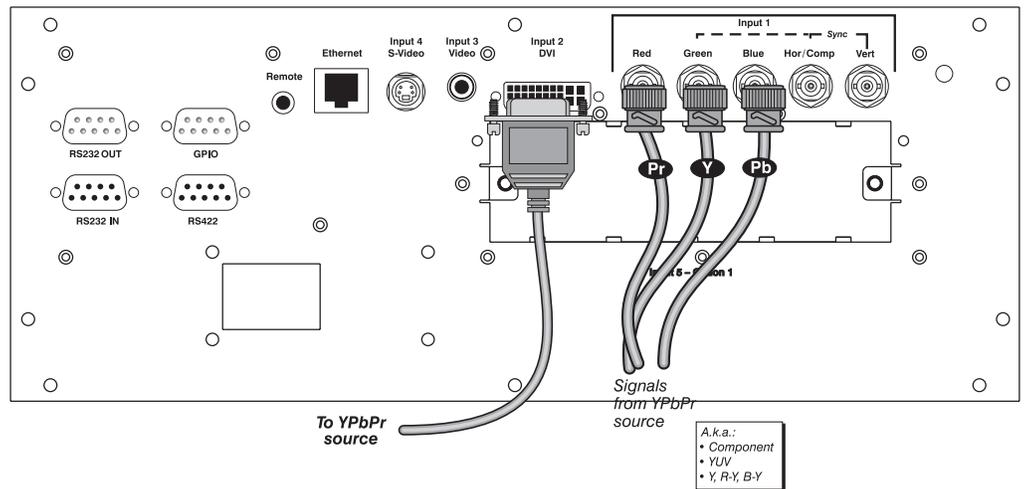


**Figure 2.2. Connecting RGB and Sync**

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

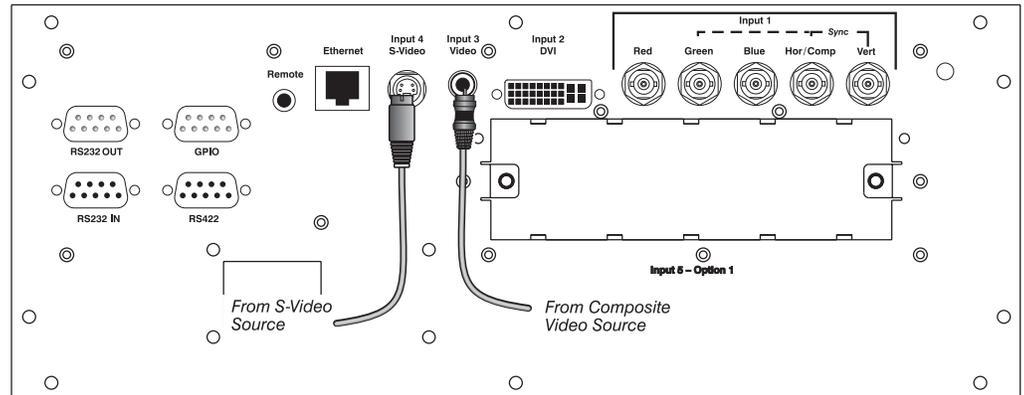
**YPbPr Signals (COMPONENT VIDEO)** ➤ Connect a YPbPr signal (*component video*) to **INPUT 1** or **INPUT 2** as shown in Figure 2.3.

**NOTES:** 1) If, for some reason, the projector fails to recognize a YPbPr signal, specify this **Color Space** option within the **Image Settings** menu. See 3.5, **Adjusting the Image**. 2) Do not connect digital component signals (known as YCbCr) to **INPUT 1**. Install an appropriate optional module in **INPUT 5** for this.



**Figure 2.3. Connecting YPbPr sources**

**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**). See Figure 2.4.

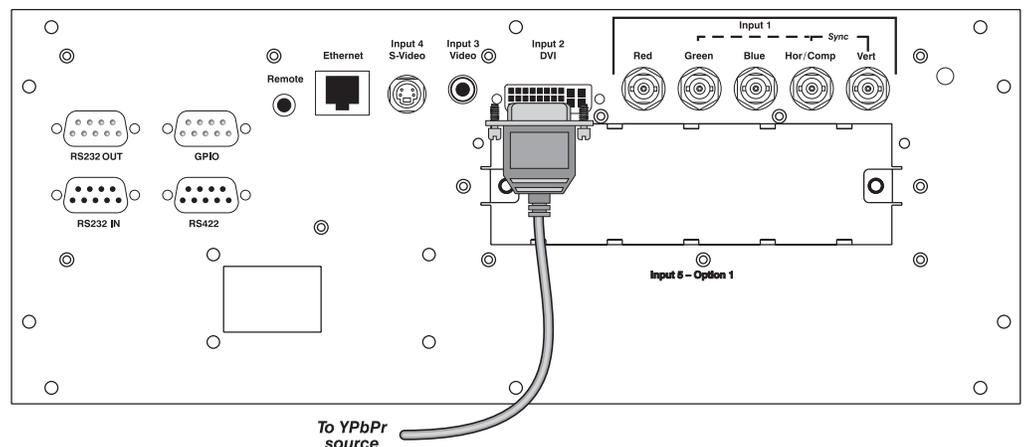


**Figure 2.4. Connecting Composite or S-Video sources**

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

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

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



**Optional Inputs** ➤ Optional modules allow you to increase your total number of inputs and/or accommodate different signal types, whether analog or digital. Install in the areas labeled **INPUT 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

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

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## 2.2 Connecting Communications

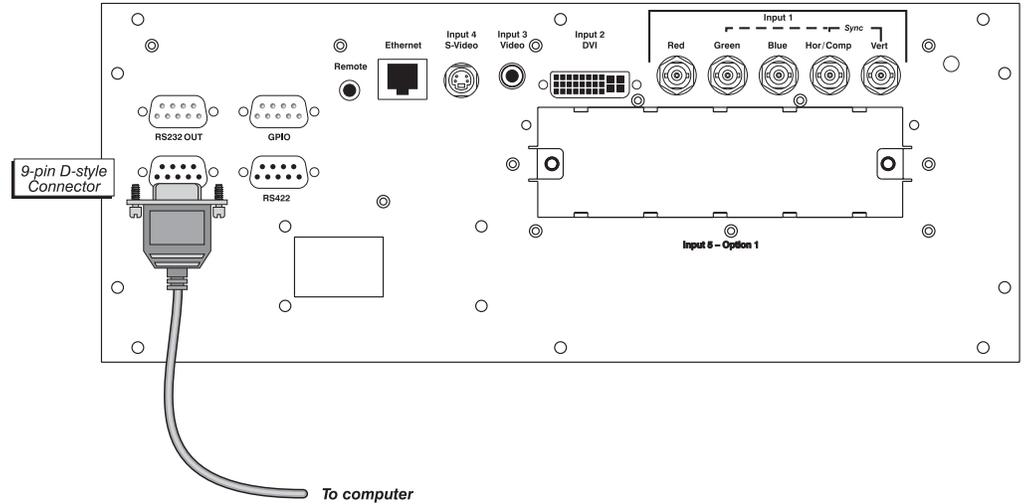
As an alternative to the projector's keypad or remote, you may wish to communicate with the projector using a PC or other controller. Such a device sends commands and receives feedback via serial links (RS232 and RS422), Ethernet or GPIO communications to the projector, all described below.

**Remote Keypads** ➤ As desired, direct the projector's IR remote keypad towards the display screen or the projector's IR sensors. Alternatively, connect a wired (tethered) version of the remote to the mini stereo connector labeled **REMOTE** on the projector's input panel. Note that response to a wired keypad must also be enabled in the *Communications* menu—see 3.6, *Adjusting System Parameters and Advanced Controls* for more information.

**Serial Port Connections** ➤ There are two types of serial ports available on the projector: RS232 and RS422. 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. Then set the baud rate to match that of the computer. Refer to *Section 3* for details on changing the projector's baud rate.

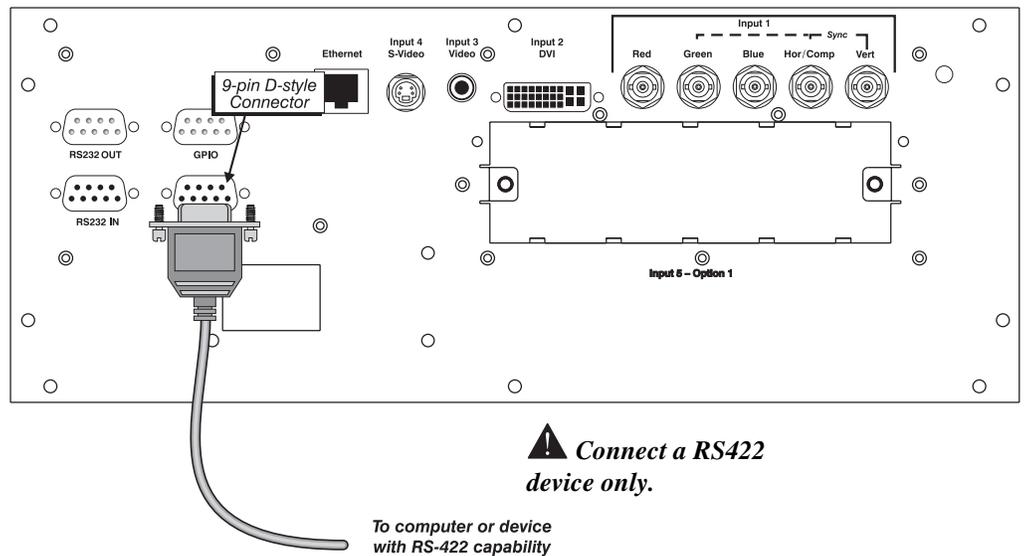


**Figure 2.5. Connecting RS232**

**Connecting RS-422**

If you wish to control the projector with a computer and or other controlling device with RS-422 capability, connect a RS-422 serial communication cable between the computer and the RS-422 port on the projector. RS-422 is better suited for serial communication over long distances than is 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 2.6. Connecting RS422**

**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.

**CONNECTING TO A PC:** If you are connecting the Ethernet port directly to a PC (rather than a network or hub), make sure to use a *crossover* Ethernet cable. Keep in mind that an Ethernet link cannot be used for downloading a software upgrade to the projector—use RS232.

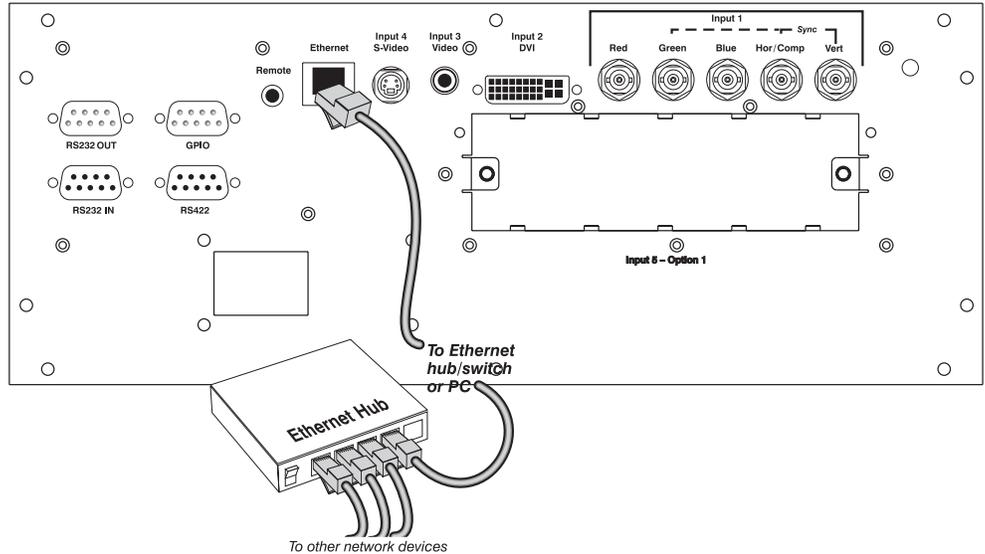


Figure 2.7.

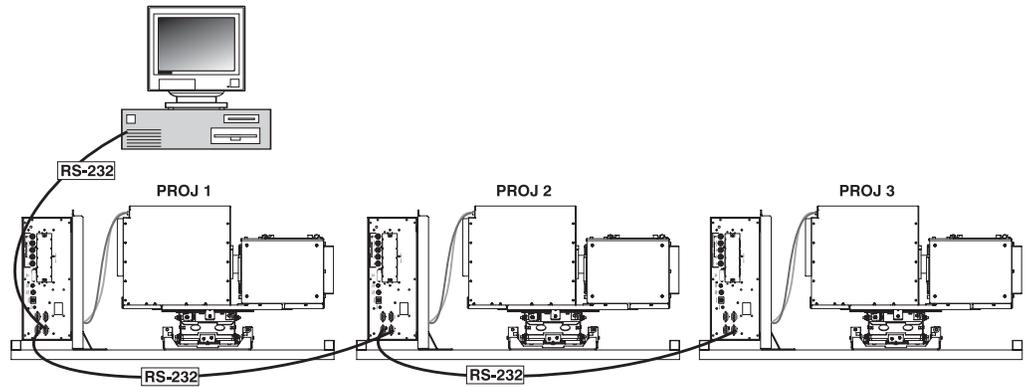
Upon connection to an Ethernet network, the projector’s factory default IP address of 0.0.0.0 will automatically enable the DHCP function (if available on the network) to assign a new IP address that is valid and unique for that network. Or, if there is no DHCP function available on the network (or if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

**Connecting Multiple Projectors**

➤ **RS-232 NETWORK:** If you want 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 2.8.

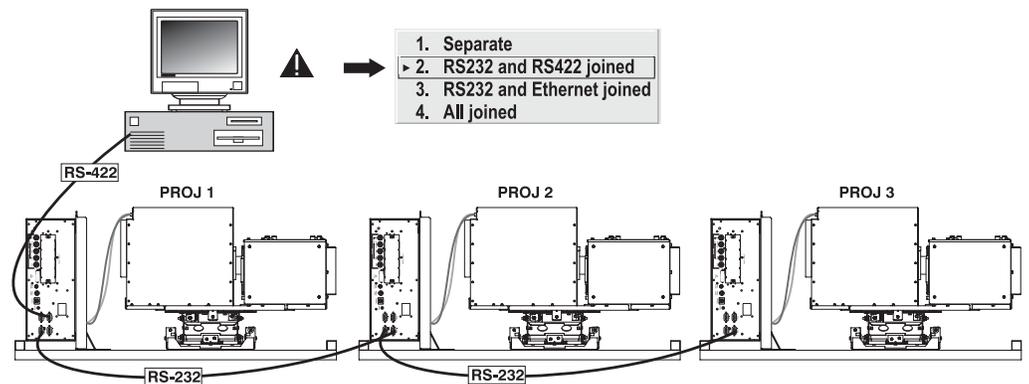


**Figure 2.8. RS232 Network**

**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 2.9.

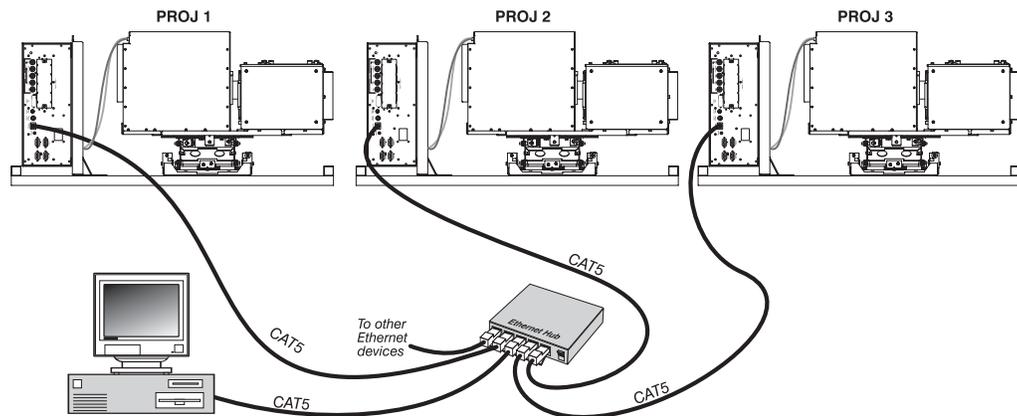


**Figure 2.9. Mixed Network**

Note that 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. In addition, set the Network Routing to “RS232 and RS422 Joined” if you want to reach all projectors.

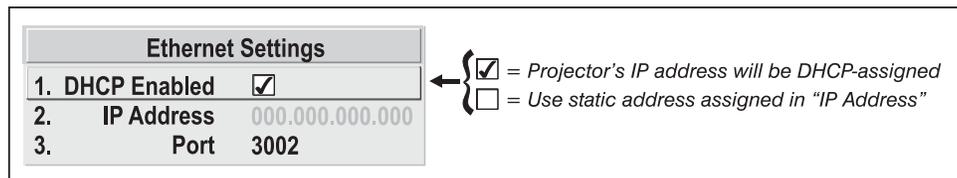
*NOTES: 1) To avoid damage, connect only properly wired serial communication cables. See Appendix C for details. 2) It is recommended that each RS232 communication cable be no more than 25 feet in length. Use high quality cables.*

**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 2.10.



**Figure 2.10. Typical Ethernet Network**

**SETTING THE PROJECTOR’S IP ADDRESS:** Upon connection to most Ethernet networks, each projector’s factory default IP address of 0.0.0.0 triggers the network’s DHCP (Dynamic Host Configuration Protocol) server function to automatically assign an IP address that is valid and unique for use on that network. Depending on the network, this DHCP-assigned IP address usually remains stable for a single session, but may change with subsequent power-ups and logins. On some networks, the address will remain stable from session to session. In all cases, the projector’s IP address and port appear in the *Status* menu as well as the *Ethernet Settings* submenu. See Figure 2.11



**Figure 2.11. Setting the Projector’s IP Address**

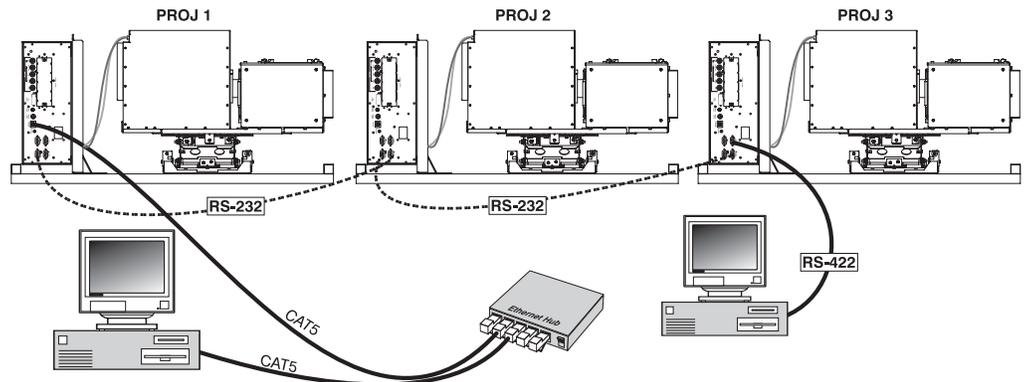
Note that if a projector’s IP address is anything *other* than 0.0.0.0 (shown as 000.000.000.000 in the *Ethernet Settings* menu) upon connection to an Ethernet network, or if DHCP is not available on the network, the automatic DHCP server function for supplying a valid and unique IP address to the projector 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.

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

**CHANGING THE PORT#:** On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new port number in the *Ethernet Settings* menu or include the new port# in an XIP serial command sent to the projector.

**Separating Networks** ➤ By default, communications originating from one type of serial controller—RS232 vs. RS422 vs. Ethernet—stay on the corresponding network path. This separation is indicated by a “Separate” setting 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”.

**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 2.11).



**Figure 2.12. Joining All Networks**

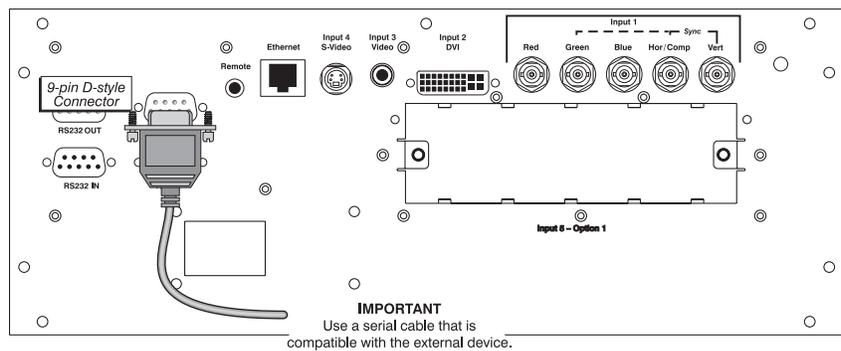
To isolate just RS422 communications, select “RS232 and Ethernet Joined”. In Figure 2.12, only projector #3 will respond to the RS422 controller. To isolate just Ethernet communications, select “RS232 and RS422 Joined”—only projector #1 will respond via Ethernet.

### 2.3 System Integration - GPIO Connector

#### General Purpose Input Output

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 E: System Integration* for complete details on pin configuration and how to program the various pins on the connector.



**Figure 2.13.**

## 2.4 Power Connection

Plug the line cord to the AC receptacle located in the bottom left corner of the Dual Lamp Module (DLM), and the 3-pronged end into a grounded AC outlet. The input voltage to the projector must be capable of 100 - 240 VAC. (See also *Section 6 – Specifications* for complete details on all power requirements.)

Use the approved North American-rated line cord supplied with the projector. If you are connecting to an area outside of North America make sure you are using an appropriately rated line cord.

**▲** *Always power down the projector before unplugging the AC line cord. Wait approximately 10 minutes for the lamps to cool sufficiently before unplugging the projector.*

### **▲ WARNINGS**

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

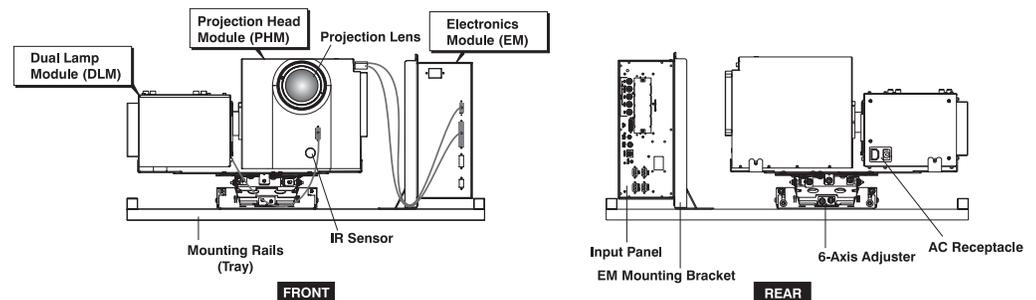
# Operation

This section explains how to effectively operate the projector once it has been installed. It is recommended that you read this section and familiarize yourself with the components and the available menu options before you begin using your projector for the first time.

Refer also to the *Installation Guide* provided with your projector for installation and setup information.

## 3.1 About the Projector

The projector's modular architecture is best suited for control room and mission critical environments where ease of servicing is a must and down time must be kept to a minimum. A brief description of each module has been provided in this section. Knowing your projector will help you in times where troubleshooting is necessary.



**Figure 3.1. Identifying Projector Components**

### **Projection Head Module (PHM)**

The PHM module is the centermost module of the projector. It contains the projection lens (0.7:1 or 1.16:1), IR sensor, color wheel, DMD and other optical components. It also provides the electrical interfaces required to drive these components.

The PHM is connected to the adjacent DLM module. As an assembly, the two modules are mounted to the 6-axis adjustment mechanism. With a quick changeover in mounting brackets the PHM can be removed, rotated 90°, and re-mounted for rear screen projection applications where a first surface optical mirror is used.

### **Dual Lamp Module (DLM)**

The DLM connects to the adjacent PHM module by a specially designed coupling that allows rotation of the PHM module only. This module houses the two 100W UHP lamps, two lamp drivers, a 390V high voltage power supply (HVPS) and cooling fans.

**▲** The DLM is designed to remain in a horizontal position and does not get rotated 90° like the PHM when the configuration of the projector is changed.

**AC RECEPTACLE** - Connect the appropriately rated line cord supplied with the projector to the AC receptacle on the DLM. Before unplugging a projector, allow the cooling fans to turn off.

**LAMPS** - Two, 100W UHP lamps are housed in this module and are accessible by opening the lamp doors located at the top. Before replacing a lamp, read the procedure and safety and warning guidelines provided in *Section 5*.

### **Electronics Module (EM)**

The EM module contains the main electronics and input connectors of the projector. It is vertically mounted to the tray using a separate mounting bracket. Also located on this module are two, 7-segment windows. The projector's status and any 2-digit error code will be displayed in this window. In addition to the numeric readout, there are two decimal points in the display: the right decimal point flashes when the projector *receives* a command, and the left point flashes when the projector *sends* a command.

### **6-Axis Adjuster**

The projector provides the ability of modifying the geometry of a displayed image using the uniquely designed 6-Axis adjustment mechanism. This mechanism is shipped from the factory in a nominal position and can be adjusted using a 3/16" ball driver. All adjustments made to the adjuster can be "locked" into place by tightening the lock screws and setscrews. Instructions and tools required to adjust the 6-axis can be found in the User's Kit.

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## **3.2 Using the Remote Keypad**

### **Keypad Commands** ➤

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

The projector is controlled via an IR remote keypad. The keypad accesses various menus in which settings can be changed and saved into memory (called channels). There are 50 channels in which you can store customized settings for various sources.

The IR remote keypad provided in the User's Kit provides the user with wireless control of the projector of up to 100 feet away. The most effective method of operating the projector is by facing and pointing the keypad directly at the screen. There is only one IR sensor that picks up the transmissions of the keypad and it is located just below the lens. It is important to keep the transmission path clear because any obstruction will limit if not prohibit transmission of commands.

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

**IR Remote** ➤ 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 keypad supplied with a TV or VCR. When making key presses, direct the keypad either 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.

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

- the lighting conditions are unsuitable for proper IR transmission
- you want to use a separate keypad for each projector in a group

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

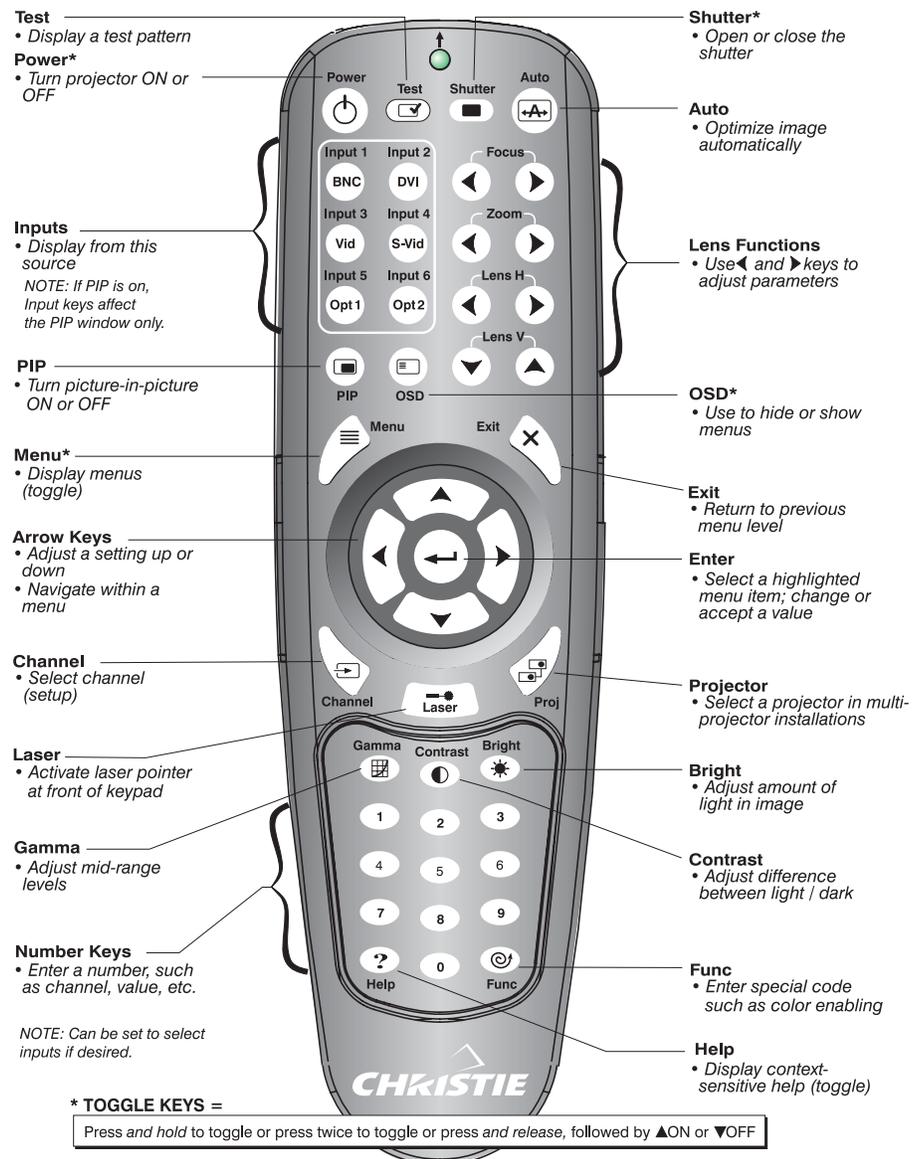


Figure 3. 2.

**Guide to Keypads** ➤ Keep in mind the following guidelines:

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

**Keypad Commands** ➤ Specific keypad commands are explained below:

 **Power ON/OFF**

Press and hold  briefly (or press two times quickly) to toggle the projector on or off with a single keystroke. Or press and release  followed immediately by  (on) or  (off) to guarantee the correct toggle (useful if you are unsure of the present state).

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

 **Test**

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

 **Auto**

Press  to initiate an automated process in which the projector optimizes critical display parameters such as size, position, pixel tracking, etc., for the current unlocked channel. These parameters are listed in Table 3.1. An *Auto Setup* can save time in perfecting a display, and you can further modify the settings as desired.

**Table 3.1. Auto Setup**

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

 **Channel**

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

**NOTE:** Channel () key behavior during a presentation depends on whether or not the **Display Channel List** option is enabled in the **Menu Preferences** menu. You can choose to use a scrollable list of channels when you press , or you may prefer to enter the desired channel number “blind”, i.e., without on-screen feedback. See **Menu Preferences** later in this section.

### **Input 1**

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

### **Input 2**

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

### **Input 3**

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

### **Input 4**

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

### **Input 5**

Press  to display from the **INPUT 5** interface module installed in the Option 1. If PIP is enabled, pressing this key changes the PIP source. If there are two inputs connected here, such as if the Dual SD/HD-SDI is installed, the second input (B) is considered **INPUT 7**. Press **INPUT 5** to access **INPUT 7** as follows:

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

### **Input 6 – no function**

### **Brightness**

Press  to increase or decrease 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 (i.e., “crushed”). Conversely, overly high brightness changes black to dark gray, causing washed-out images. See 3.5, **Adjusting the Image** (*Image Settings* subsection). **NOTE:** Always adjust brightness before contrast.

### **Contrast**

Press  to change 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 (i.e., “crushed”). Conversely, low contrast causes dim images. See 3.5, *Adjusting the Image* (*Image Settings* subsection).

 **Gamma**

*NOTE: This is the same as “Gamma” in the Image Settings Menu.* “Gamma” determines what gray shades are displayed between minimum input (black) and maximum input (white) for a given amount of signal. The proper setting helps maintain optimized blacks and whites while ensuring a smooth transition for the “in-between” values utilized in colors and grays. Thus, unlike brightness and contrast settings controls, the overall tone of an image can be lightened or darkened without changing the two extremes, and your images will be more vibrant yet with good detail in dark areas.

The normal gamma setting of 2.5 is correct for most signals and conditions. If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This will improve contrast ratio while maintaining good details for blacks.

 **Menu**

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

 **OSD (On-screen display)**

Press   to hide the projector’s menu system during use. To see the menus again, do one of the following:

- Press *and hold*  briefly
- Press and release followed immediately by 
- Press  

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

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

 **PIP**

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 sidebar is present, press  to toggle the current function to affect the other image.

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

 **Shutter**

**NOTE:** There is no shutter in these products. However, pressing the  key will blank the display (turns it black), while maintaining access to projector functions. Press the key again to restore the image..

### **Function Key**

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

**IF WITHIN A PRESENTATION:** Press  followed by a 2-digit number to enable a specific color or colors in the display (see right). For example,    will display only red and green data,    will display all color data. Eliminating one or more colors can help with certain diagnostics and setups, such as when accurately overlaying one image on top of another when stacking projectors.

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

**DEFINING OTHER USES:** Through ASCII messaging on a PC, you can also create special user functions for keys 1 – 5 and 7 – 9 and others. For example,  can be programmed to trigger RTEs (Real Time Events) or to display custom menus. Refer to the separate *Christie Serial Communications* publication.

### **Projector**

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

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

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

To broadcast to multiple linked projectors, press  and then  again *without* entering a projector number. Keypad commands will then affect all projectors in the chain.

**NOTES:** 1) 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 **2.14 Remote Keypad Protocols and Conversion**, and **3.6, Adjusting System Parameters and Advanced Controls**.

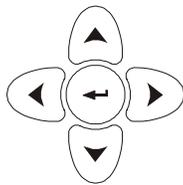
### **Enter**

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**

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

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



### Arrow Keys

Use the keys to change a slider value or to select a different option within a pull-down list without having to first scroll through options. These keys also jump to the next page in long menus. See also *Editing Text* later in *Section 3*.

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



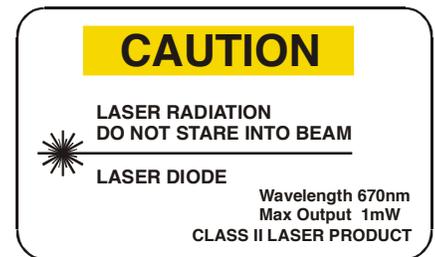
### Lens Focus, Zoom and Lens H, Lens V

There is no function when these keys are pressed – they require a motorized lens mount. Focus, zoom and lens offsets are manually adjusted in this projector.

In general, focus is adjusted by adjusting the rings on the projection lens and zoom, horizontal and vertical offsets can be achieved by adjusting the 6-axis adjuster. Refer to the *Installation Guide* provided with your projector for adjustment details.

### Laser

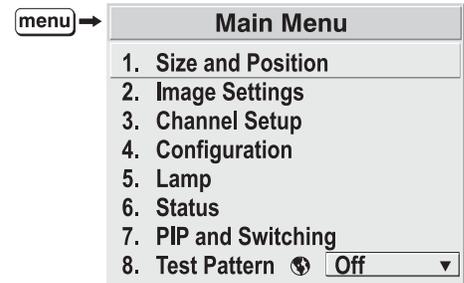
Press to activate the laser pointer on the remote. This feature is useful when making presentations - just point the remote at the screen to highlight an area of your presentation. The closer you are to the screen the brighter the laser beam appears. The laser pointer works best in an environment where ambient lighting can be controlled.



*NOTE: Leave batteries in the wired remote keypad for the key to work.*

## 3.3 Navigating the Menus

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



**Figure 3. 3. Entering the Menu System**

On the remote keypad, either enter the number corresponding to the function menu you wish to access, such as 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 then appear.

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

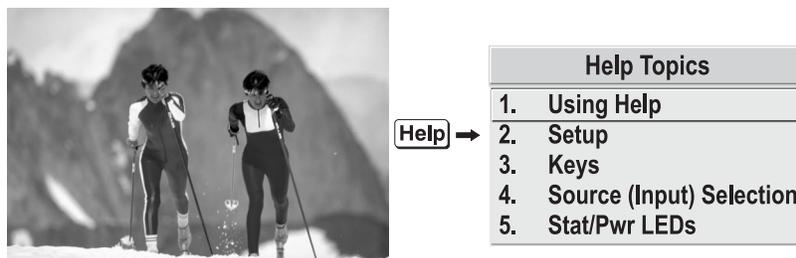
**NOTES:** 1) If there is no signal present, all source-dependent adjustments are disabled. 2) After 15 minutes of inactivity, the projector leaves the menu system and returns to the presentation. 3) The **Status** menu is read-only.

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

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

**On-line Help** ➤ If at any time you are uncertain what to do next, press **Help** to display summary information about the current menu or highlighted option. Press **Help** again to exit. In addition, a line of “hint” text is included at the bottom of some menus.

From presentation level, press **Help** to access general *Help Topics*. Scroll as necessary within a topic. Press **Help** or **Exit** to return to your presentation.



**Figure 3.4. Accessing General Help Topics**

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

**The Global Icon** ➤ Menu options that include this icon apply universally to any incoming signal.



**The PIP Icon** ➤ Menu options that include this icon apply to PIP (secondary) images only.



**Using Slidebars And Other Controls** ➤ Most of the function menus allow you to change settings by using slidebars, checkboxes, and pull-down lists. To select a sidebar, 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** from the main menu to select Vertical Stretch in the *Size & Position* menu).
- Or move the highlight to the option desired and press **Enter**.
- Or move the highlight to the option desired and press **Left** **Right** 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 keypress or numerical sequence of key presses.

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

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

**Slidebars in menus** – The current value for a given parameter, such as size or vertical stretch, appears to the left of its slider icon (adjustment window). This number often expresses a percentage, or it may have units associated with it (such as pixels, degrees Kelvin, etc.), depending on the specific option. Press   to gradually 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 slider text box for specific number entry via the keypad, then press  to save (or press  to cancel).



**“Direct” slidebars** - For quick access, you access Gamma, Brightness, and Contrast slidebars without traveling the menu system. For example, simply press  to immediately display the same contrast slider accessed with the **Contrast** option in the *Image Settings* menu.

Use the arrow keys to adjust a direct slider, or press  and enter a specific number from the keypad, then  or  or  to save (or  to cancel). When you are done, press  to return to your presentation.

*NOTES: 1) You can still adjust a direct slider as usual if the display is turned off (see  or **Menu Preferences** menu) — the slider just won't be visible. 2) A direct slider disappears if it is not used within 5 seconds.*

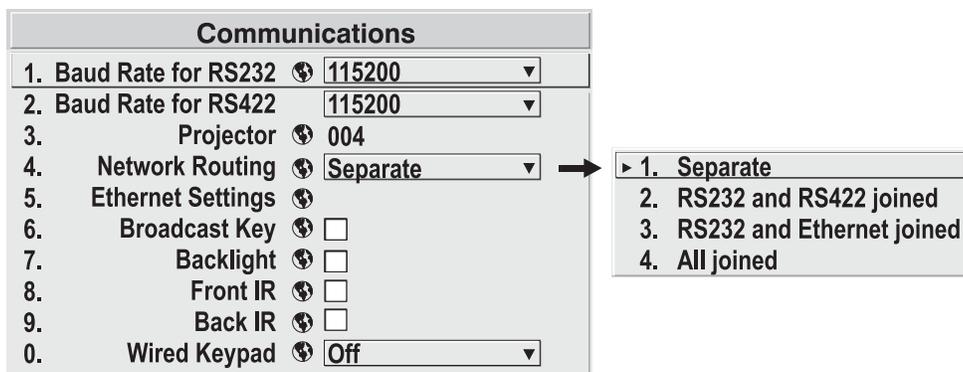
**Checkboxes** - Conditions are present if its adjacent checkbox contains a checkmark. To toggle the checkbox, simply highlight and press , or highlight and use  to check and  to uncheck. If a checkbox is numbered, simply enter its number to immediately toggle the checkbox.



**Pull-down lists** – To see a pull-down list of options available for a given parameter labeled with a ▼, you can:

- Highlight it and press  (Enter)
- Or enter the menu option number.

Use  or  keys to navigate up and down within the list (the current choice is noted with a small ▶). Press  to choose an option from the list, if desired.

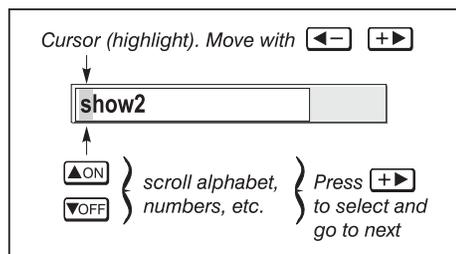


**Figure 3.5. Example of Pull-Down List**

**NOTES:** 1) Press  $\leftarrow$  or  $\rightarrow$  to jump between pages in an extra long pull down list.  
2) Press  $\text{Exit}$  while in a pull-down list to **cancel** any change.

**Editing Text** ➤ **ACTIVATE THE EDIT WINDOW:** To enter or edit text, highlight the desired parameter (such as a channel name) and press  $\leftarrow$  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.

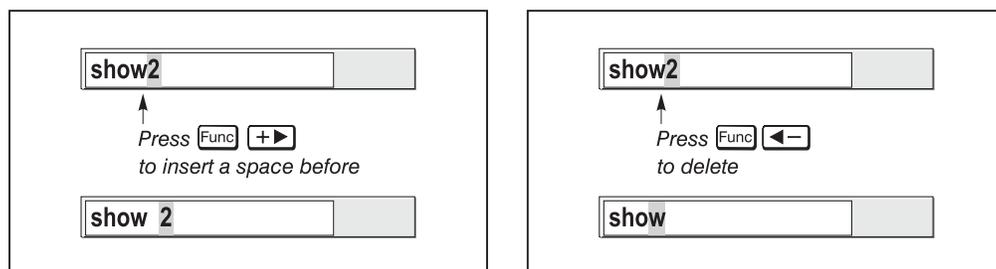
**NAVIGATE WITHIN THE EDIT WINDOW:** Press  $\rightarrow$  to move the cursor forward or  $\leftarrow$  to move the cursor backwards as desired.



**Figure 3.6. Entering Text**

**EDIT A CHARACTER:** To edit a highlighted character, use  $\uparrow$  and  $\downarrow$  to scroll through the alphabet, numbers, spaces and punctuation available. When the character you need appears, press  $\rightarrow$  to select it—the cursor will move to the next character of current text, if present. Note that you can also enter a number directly from the keypad—it will be accepted and the cursor will move on.

**ADD OR DELETE A CHARACTER OR SPACE:** To insert a space at the cursor location, press  $\text{Func} \rightarrow$ . To delete a highlighted character (or space), press  $\text{Func} \leftarrow$ .



**PRESS  $\leftarrow$  (ENTER) WHEN FINISHED:** To accept edits and leave the edit window, press  $\leftarrow$  (Enter).

**NOTE:** Press  $\text{Exit}$  at any time to cancel changes and return to the previously-defined text.

**Editing Numerical Values** ➤ Enter numbers directly from the keypad in order to specify numbers representing projectors, channels (source setups), or slots. As each digit is entered, it is displayed and the cursor moves on. Note that channel numbers are defined with 2 digits—for example, if you enter only a single digit (such as “7”) for a channel number, the channel will automatically be defined as “07”. Enter “07” to utilize this channel.

*NOTES: 1) Once you enter the first digit, this digit replaces all old digits. 2) If you press any non-numbered key, the number entered up to that point is accepted and updated as the new value. 3) Press  to cancel editing of numerical values.*

---

### 3.4 Using Inputs and Channels

*NOTE: See Section 2, **Installation and Setup**, for a full explanation of how to connect sources to the projector.*

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

**Do I Select an Input Or a Channel?** ➤ **INPUT** – An input is a source physically connected at the projector. , , , , or  describes the source signal according to which *input slot* it is connected.

**SWITCH TO AN INPUT IN EITHER ONE OF TWO WAYS** – Pressing the appropriate direct key — , , , , or — is a quick and seamless way to display from one of the five inputs connected to the projector. Or, if the “Numbers Select Main Image” option found in the PIP menu is enabled, press numbers 1-5 on the keypad. With either method, 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, and will automatically display an image according to default settings for such a signal. In general, the default fills the screen as fully as possible. 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).

*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.

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

*NOTES: 1) For more information on Numbers to Select Main Image, see 3.7, Working with PIP or Seamless Switching.*

**CHANNEL** - A channel is a collection of measurements, locations and settings that tailor the display of a signal to your specific needs. Since source types and applications can vary greatly, you will likely want to adjust and define a wide variety of parameters, such as brightness, contrast, size, etc., in order to customize and optimize the display from or for a particular source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or one signal may simply vary from another signal used previously through the same input location. Once you have adjusted a display parameter, such as pixel tracking or contrast, all current settings are collectively stored in the projector's memory as a unique 2-digit channel, such as  . You can have numerous distinct channels available for the same input, any of which can be selected by using the  key on the keypad followed by the 2-digit channel number.

Shown at right is a sample channel list as would be available from . This is typically called the *channel list*.

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

In order to access channels by using  on the keypad, you must first create the channels. See below.

		current channel#		
<input type="button" value="chan"/>		Channel: 02		
01	0,2	pDig	64.09k+	60.12+
02	0,1	i3LG	33.72-	59.94-
03	0,4	iSVid	15.73k-	59.94-
04	0,3	pCVid	15.73+	59.94+
05	0,1	p4WH	Fred's computer	

**Channel List**

### Creating a New Channel - AUTOMATIC -

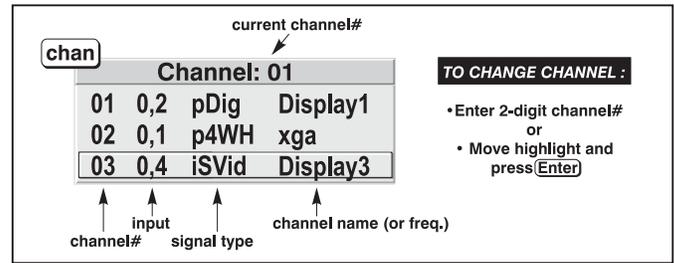
➤ To use a new source with the projector, a new channel must be added to projector memory so that the projector will respond properly to an input signal from that source in the future. A new channel can be created automatically, as described here, or it can be copied from an existing channel and then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

When you select a direct input (, , , , or ) , the projector's existing channels are searched for matching input and signal parameters. If no match to the incoming input signal 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 1-50.

*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 (see below). 2) If two channels have the same distinguishing source characteristics except for the reversal of sync connectors (i.e., H-sync and V-sync, are switched), they are still defined as distinct channels. 3) You cannot define a new channel without an incoming signal.*

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

**USING A CHANNEL:** You can normally select a channel at any time by pressing  (see right). If you want to prevent a channel from appearing in this list, you must edit the channel as described in *Channel Edit* later in this section. Such a channel can still be selected by entering its number as shown at right.

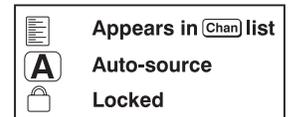


**NOTES:** 1) The current channel is highlighted upon entering the channel list, or, if this channel is not displayed here, the first channel in the list is highlighted. 2) Channels created automatically do not appear in the channel list unless a parameter for the channel has been changed.

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  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.

**WHAT APPEARS IN CHANNEL SETUP MENU?** This menu lists all channels defined so far and indicates where they connect on the projector's rear input panel. The far left column lists channel numbers currently defined. The values in the far right columns indicate horizontal and vertical frequencies—if a user has defined a name for this channel, it appears here instead. Remaining columns contain details pertaining to each channel setup, such as its switcher number (always 0 = projector), slot location (01-08), 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:** If you have more than a handful of channels, use  and  to see the remaining channels not visible in the initial display of channels.

**SIGNAL TYPE** — Either channel list, whether the  key list or the *Channel Setup* menu, identifies signal types in a shortened form as defined below. 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). See Table 3.2.

**Table 3.2. Abbreviations for Signal Type**

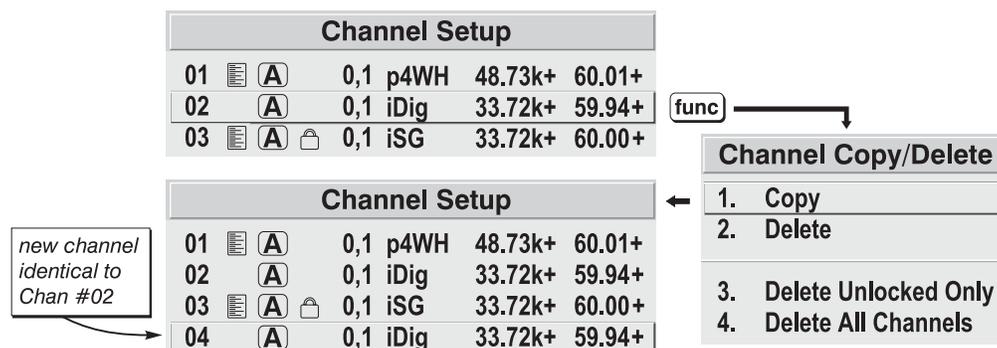
Abbrev.	Signal Type
4WH	Composite (4 wire) on HC input
4WV	Composite (4 wire) on V input
SG	Sync-on-green
5W	Separate H,V
5WR	Separate H,V swapped
SVid	S-Vid
CVid	Composite Video
Dig	Digital

**FUNCTIONS WITHIN THE CHANNEL SETUP MENU** —To copy, delete or edit a channel, highlight the desired channel in the *Channel Setup* menu and do one of two things:

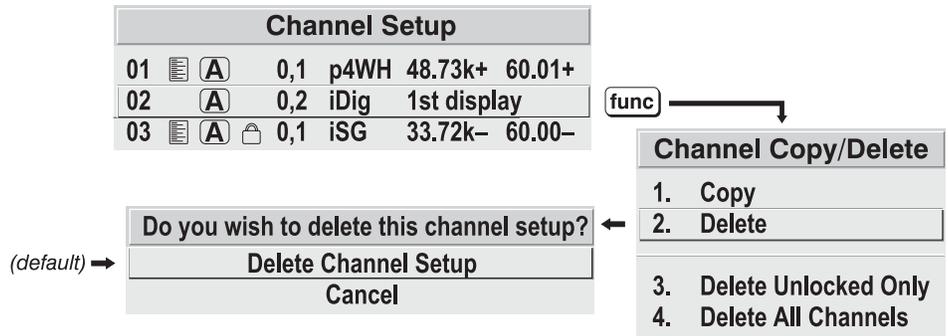
- Press **Func** if you want to copy the selected channel or delete this or other channels. See *Copying or Deleting a Channel* below.
- Press **←** if you want to edit channel setups (i.e., non-image related parameters) for the selected channel. See *Editing a Channel Setup*, below.

### Copying or Deleting Channels

➤ **TO COPY A CHANNEL**, highlight the desired channel in the *Channel Setup* menu, then press **Func** to go to the *Channel Copy/Delete* submenu. Select “Copy” and press **←**—a new channel will be created. It is identical to original, which still remains, but it is identified with the next available number from 01-50. If you change your mind and do *not* want to copy the current channel, press **Exit** to cancel and return to the previous menu. Copying channels is a quick method for creating numerous channels, each of which can then be edited and adjusted for a variety of presentations in the future.

**Figure 3.7. Copying A Channel**

**TO DELETE A CHANNEL**, highlight the desired channel in the *Channel Setup* menu, then press **Func** to activate the *Channel Copy/Delete* submenu. Select “Delete” and press **←**—a confirmation window will appear to make sure that you really want to delete this channel.



**Figure 3.8. Deleting a Channel**

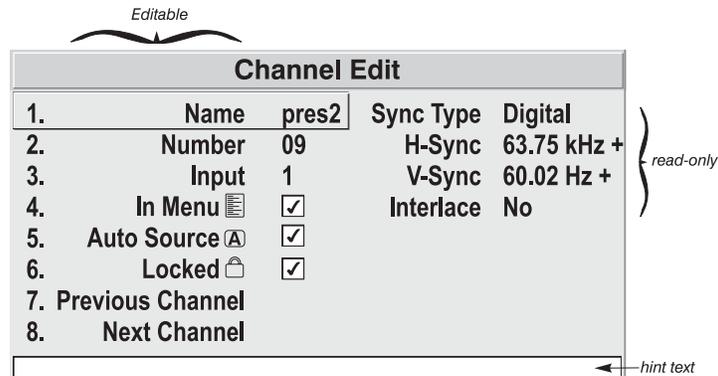
**TO DELETE MULTIPLE CHANNELS**, highlight any channel in the *Channel Setup* menu and press **Func** to go to the *Channel Copy/Delete* submenu. Select “Delete Unlocked Only” and press **←** to delete all unlocked channels. Or select “Delete All Channels” to delete all channels, even those that are locked. In either case, the current channel will remain but will be redefined from projector defaults.

*NOTE: For any deletion, a confirmation box appears to make sure that you really want to delete. Select “Cancel” if you don’t want to delete after all.*

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

**CHANNEL EDIT — STEP 1** 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.

**CHANNEL EDIT — STEP 2** To edit parameters shown in the *Channel Setup* menu, select the relevant channel and press **←**. The *Channel Edit* menu will appear similar to the sample shown in Figure 3.9.



**Figure 3.9. Channel Edit Menu (SAMPLE)**

**CHANNEL EDIT — STEP 3** If desired, review and/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. *NOTES: 1) If you enter a channel number that already exists, a dialog message appears*

indicating that this number is already in use—assign a different channel number.

2) You can define 50 channels.

- **INPUT:** 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  key is pressed. If unchecked, the channel must be accessed via the channel setup menu  “3” 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  on the keypad—and a change in input signal will *not* result in a channel change.
- **LOCKED:** If checked, all of the 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.

### 3.6 Adjusting the Image

The most commonly used options for image adjustments are accessed through two menus: *Size and Position* and *Image Settings*, both of which appear in the *Main* menu. From either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate sliders, checkboxes and pull-down lists.  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.

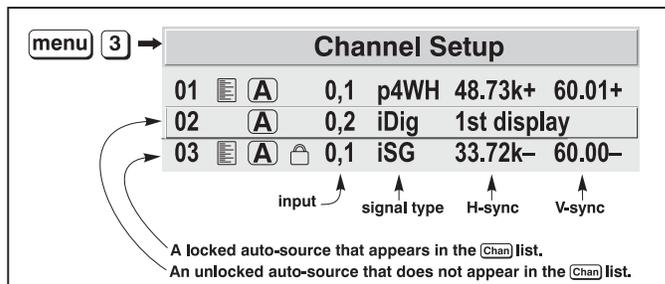
From your presentation, you can access any of the individual options in these menus by pressing  followed by the appropriate two-digit number representing their location in the menu system. For example, press  2 3 to quickly access the “Gamma” option in the *Image Settings* menu.

Note that for certain options, you may prefer to use a “direct key” from presentation level to go directly to a particular option without traveling through the menu system (*note: available for certain display parameters only*). For example, press  to access the “contrast” slider immediately. Press  to return to your presentation.

*NOTES: 1) To hide these “direct” sliders, disable the “Display Sliders” checkbox in the Menu Preferences menu. 2) To hide the entire menu system from view, turn off the on-screen display by pressing  .*

**Before You Begin** ➤ **Use Auto Setup** (Auto)

For a good and efficient first step in perfecting the image, press (Auto). This initiates an automated process in which the projector quickly optimizes critical display parameters for unlocked channels 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.



**Figure 3.10. All Channels Appear in the Channel Setup Menu**

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

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

Refer to “Using Slidebars and Other Controls” (earlier in this section) if you need help using any of the options and controls. Changes made in the *Size and Position* menu are applied immediately and are saved when you exit the menu (press (Exit) or (Menu)).

**Resize Presets**

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

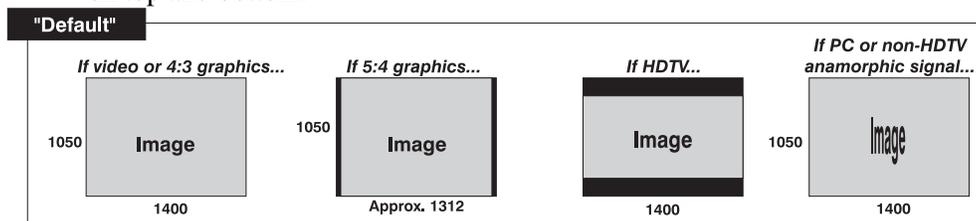
Resize Presets	
1. Default	= maximize for current source
2. No Resizing	= display in native resolution
3. Full Size	= fill the screen (regardless of source)
4. Full Width	= fill display width & keep aspect ratio
5. Full Height	= fill display height & keep aspect ratio
6. Anamorphic	= retain 16:9 aspect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

**WHAT IS THE RESIZING DEFAULT?** By default when displaying a new source, your image will utilize as much of the projector’s display area (1400 x 1050) as possible for the type of incoming source data. See *Select “Default”* below.

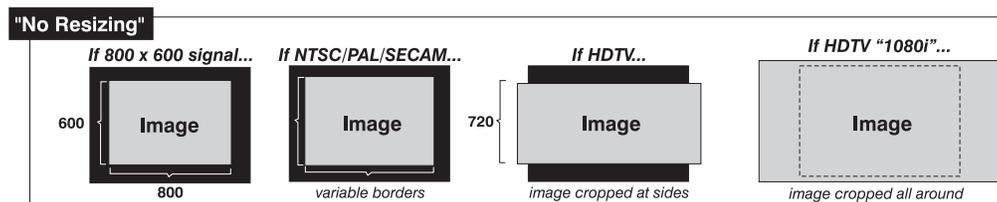
**WHEN “CUSTOM” APPEARS:** The “Custom” re-size descriptor automatically appears in the *Size and Position* menu when any of the values for *Size*, *Vertical Stretch*, *H-*

*Position*, *V-Position* or *Blanking* do not correspond to those for a preset. It is not a choice in the *Resize Presets* pull-down list.

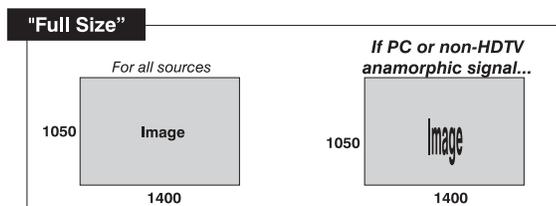
- Select “**DEFAULT**” for most sources (factory default). The image will be centered and displayed as large as possible *depending on the type of source*, as described below:
  - ✓ A **5:4 graphic image** will enlarge to fill the screen height, and be centered between narrow black side bars.
  - ✓ A **video image or 4:3 graphic image** will enlarge to fill the screen width.
  - ✓ An **HDTV (16:9) image** will fill the width and be centered between black bars on top and bottom.



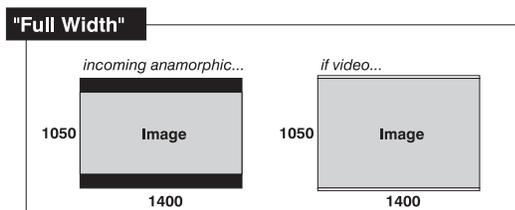
- Select “**NO RESIZING**” to display the image in its native resolution, which may be smaller than the projector’s 1400 x 1050 resolution. For example, for a source with a native resolution of 800 x 600, “No Resizing” will center a small image within a black border—the black border areas are unused areas. See below.



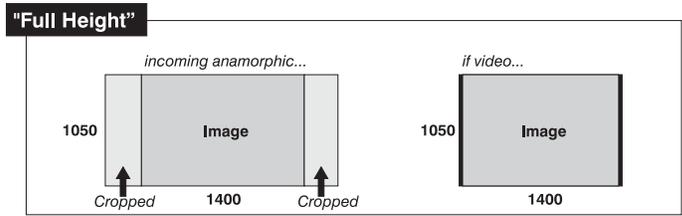
- Select “**FULL SCREEN**” to use *all pixels* (1400 x 1050) for displaying the image, regardless of source or original aspect ratio. Incoming source material having a different aspect ratio than the projector will be stretched for display.



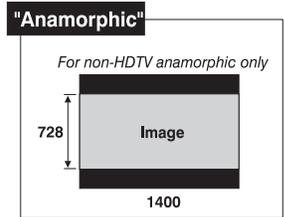
- Select “**FULL WIDTH**” to fill the projector’s display from left-to-right without changing the original aspect ratio of the image. Depending on the source, data at the top and bottom may be discarded (cropped), or the display may have black borders at the top and bottom (called “letterboxed”).



- Select “**FULL HEIGHT**” to fill the display from top-to-bottom. Depending on the source, this may create borders.



- Select “**ANAMORPHIC**” to display an anamorphic image in its native 16:9 aspect ratio. The image will fill the screen from side-to-side, and be centered between narrow black bars on top and bottom. This is used for DVD players that output widescreen images compressed into 4:3 NTSC format.



**Size**

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

**Vertical Stretch**

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

**Pixel Track**

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

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

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

**Pixel Phase**

*NOTE: Adjust “Pixel Phase” after “Pixel Tracking”.*

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

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar “half on, half off” graphic image, such as the Windows 2000 shutdown screen. Adjust the slider until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than 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.

### H-Position

This option moves the image right or left within the area of available pixels.

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

### V-Position

This option moves the image up or down within the area of available pixels.

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

### Advanced Size and Position — SUBMENU

This submenu consists of the following options:

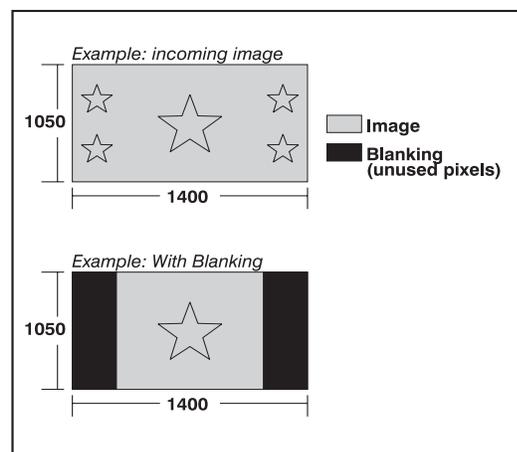
Advanced Size & Position			
Active Input Window		720x483	
1.	Top Blank	0	<input type="text"/>
2.	Bottom Blank	0	<input type="text"/>
3.	Left Blank	0	<input type="text"/>
4.	Right Blank	0	<input type="text"/>
5.	Plug & Display (EDID)		1280x1024x60Hz ▾
6.	PIP Border		Black ▾
7.	PIP Border Width		1 <input type="text"/>

**ACTIVE INPUT WINDOW:** This read-only value indicates the current size (i.e., area) of your displayed data or “region of interest” as defined by the blanking controls. By default, the projector automatically determines what portion of its full resolution to use,

and pixels in the surrounding borders are turned off. You can also specify a specific active input window size by adjusting one or more “Blank” settings. For example, if you have blanked (cropped) 100 pixels from both the left and right edges of an incoming source of 1400 x 1050, the remaining 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.

**BLANKING (TOP, BOTTOM, LEFT, and RIGHT):** Crop the image as desired so that unwanted edges are removed from the display (changed to black—see right). Blanking defines the size of the *Active Input Window*, or area of interest. Range of adjustment depends on the source resolution and other factors. After adjustment of blanking it may be necessary to perform a source switch.

*NOTE: Blanking a PIP image resembles zoom (Figure 3.12). For example, left Blanking zooms the right side of the PIP image; Right Blanking zooms the left side. There are no black*



**Figure 3.11. Blanking of a Primary Image**

bars.

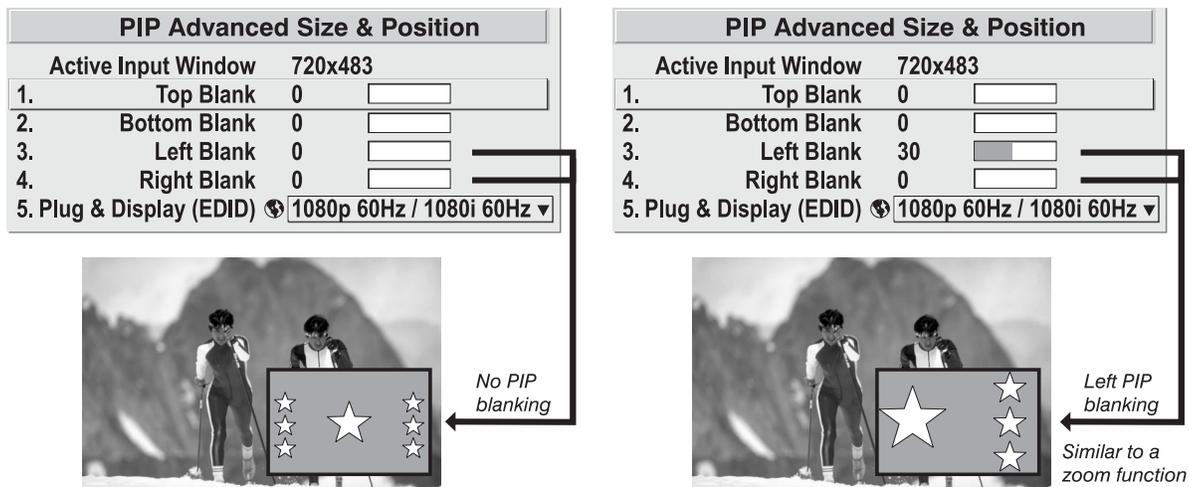


Figure 3.12. Blanking of a PIP Image

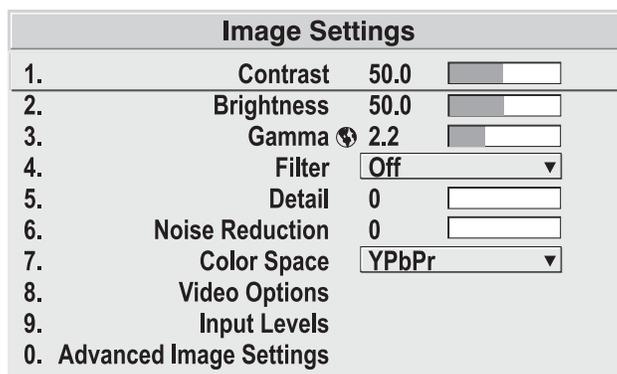
**PLUG & DISPLAY (EDID):** By default, a *Plug & Play (EDID)* source outputs a signal according to the EDID information provided by the projector. To override this information and display in a different format (for example, if your *Plug & Play [EDID]* device does not support the projector’s resolution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

- 1. 1400x1050x60Hz
- ▶ 2. 720p (1280x720x60Hz)
- 3. DC2K (2048x1080x60Hz)
- 4. 1024x768x116Hz 3D
- 5. 1280x1024x110Hz 3D
- 6. 1400x1050x102Hz 3D
- 7. 1080p 60Hz / 1080i 60Hz
- 8. 1080p 50Hz / 1080i 50Hz
- 9. 1080p 24Hz / 1080i 30Hz

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

EDID = Extended Display Identification Data standard.

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



**Contrast**

(**SHORT CUT:** Press **Contrast** and adjust the sidebar.)

“Contrast” increases or decreases the perceived difference between light and dark areas of your image (0-100). For best results, keep close to 50. If 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. For best results, start with a low value and increase so that whites remain bright but are not distorted or tinted, and that light areas do not become white (i.e., are “crushed”).

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

### Brightness

**(SHORT CUT:** Press  and adjust the slidebar.)

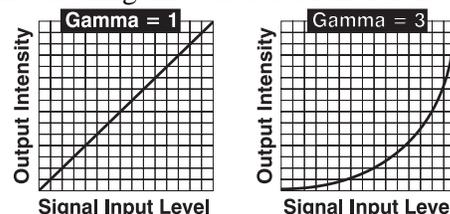
“Brightness” increases or decreases the amount of black in the image (0-100). For best results, keep close to 50. Start with a high value and decrease so that dark areas do not become black (i.e., are “crushed”). Conversely, high brightness changes black to dark gray, causing washed-out images.

*NOTE: Adjust brightness before adjusting contrast, since the brightness setting will have an affect on contrast.*

### Gamma

**(SHORT CUT:** Press  and adjust the slidebar.)

“Gamma” is a global setting that determines what gray shades are displayed between minimum input (black) and maximum input (white) for all signals. A good gamma setting helps to optimize blacks and whites while ensuring smooth transitions for the “in-between” values utilized in other colors. Thus, unlike “Brightness” and “Contrast” controls, the overall tone of your 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.



Gamma is used to fine tune the gamma table currently in use, ranging from 1 – 3 (2.5 = default). If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This will improve contrast while maintaining good details for blacks. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting. In high ambient light conditions, lower gamma may produce better results than higher gamma. Gamma of 2.5 (default) indicates the gamma table has not been adjusted. For more information, refer to *Advanced Image Settings, Gamma Table* submenu. Again, good gamma improves contrast while maintaining good details for blacks.

### Filter

The proper filter setting is automatically set for virtually all signals, and rarely needs to be changed. It applies a low pass filter for noise reduction in the incoming input signal, particularly for HDTV or SDTV. Applied in the analog domain before sampling, this filtering removes high frequencies and thus reduces pixel phase noise (note this also reduces signal bandwidth). Override only if standard pixel tracking and phase adjustments do not adequately clear up a “noisy”

- |          |
|----------|
| ▶ 1. Off |
| 2. HDTV  |
| 3. SDTV  |

video signal, or if a graphics signal appears overly “soft”. Both instances indicate that “Filter” may be set to the wrong option.

### **Detail**

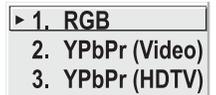
“Detail” adjusts the sharpness of a video image so that edges remain clearly defined. It can be particularly useful if a significant “Noise Reduction” adjustment has caused the image to appear too soft. Adjust until the display is as sharp as desired, keeping in mind that because “Detail” adds some high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

### **Noise Reduction**

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

### **Color Space**

“Color Space” determines how the color components of an analog input signal are decoded for accurate color in the display.



Selecting a color space option is useful only for analog signals and certain digital sources connected to **INPUT 1, INPUT 2, or**

**INPUT 5**. Although color space for these analog signals is automatically determined by the projector, in some circumstances you may wish to override this and manually set a specific color space.

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

The current color space appears in the *Image Settings* menu. Press **Enter** 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 initially recognize them as RGB and will incorrectly decode their color information as YPbPr (video). These signals can include:*

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

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

### Video Options — SUBMENU

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

**ENABLE DECODER AGC:** Automatic Gain Control (AGC) affects decoded video images only. 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.

Video Options	
1. Enable Decoder AGC	<input checked="" type="checkbox"/>
2. Video Standard	(A)?
3. Input Video Black	0 IRE
4. Color	50.0
5. Tint	50.0
6. Decoder Luma Delay	35.0

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

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

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

**Table 3.3. 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: Generally, use “Auto” for all instances EXCEPT: 1) a poor quality input signal or 2) a black-and-white video signal. In order to detect and display such signals, select the relevant standard from the list.*

**INPUT VIDEO BLACK:** This control compensates for incoming elevated black levels present in certain video signals, and ensures that blacks in the display are neither crushed (i.e., where dark grays appear black) nor excessively elevated (i.e., where blacks appear dark gray). By default, the projector automatically determines the best setting according to the type of incoming video signal:

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

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

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

**COLOR:** This sidebar adjusts the color saturation level, i.e. the *amount* of color in a video image. Lower settings produce less saturated colors — for example a setting of “0” produces a black and white image. If the color level is too high, colors will be overpowering and unrealistic.

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

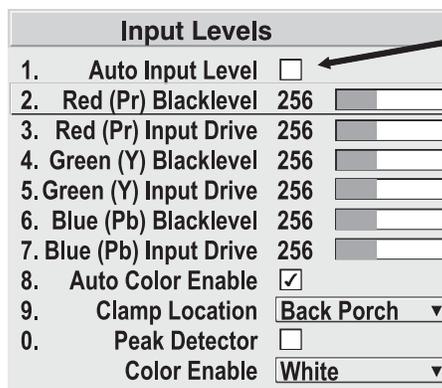
**DECODER LUMA DELAY:** This control affects any incoming composite or S-video signal, delaying the luma signal (intensity) in relation to the chroma (color). In the image, increasing the luma delay will move luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in 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.

**Input Levels — SUBMENU**

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

Good RGB or input levels—that is, the *drives* and *blacklevels* for each of the three colors, red, green and blue—ensure that images from analog sources other than decoded video have maximum contrast without crushing black or white. By default (and in an “Auto Setup”), the projector automatically determines the best input levels by

monitoring image content and adjusting the controls appropriately—further adjustment is typically not required to obtain proper blacks or whites. *NOTE: This automatic adjustment requires at least 6-12 consecutive white pixels in the image. Without these pixels, input levels may produce skewed colors, particularly in non-video images.*



Turn OFF before leaving menu.

Levels adjust automatically and correctly.

**NOTE:** Image must have at least 6-12 adjacent white pixels for “auto” to work.

However, for a very unusual source exhibiting one or more overly high blacklevels (typically caused by a noisy source causing blacklevel spikes), an experienced user

may prefer to use the *Input Levels* menu (shown above). These adjustments, which together serve as a calibration process compensating for differences in sources and cabling, enable an experienced user to perfect the source image input levels and eliminate the “overshoot” and “undershoot”. Note that *Input Levels* are of limited use with digital signals, but do offer some ability to tweak poorly mastered source materials.

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

**AUTO INPUT LEVEL** – Temporarily enter a checkmark *only* if you are an experienced user and you have an unusual source that you feel needs further color temperature and/or input level adjustment. This compensates for incoming out-of-range drives (white) and blacklevels (black) that would cause “crushing” of light and dark colors in the image. After entering a checkmark, wait for the six slider values to stabilize, then delete the checkmark and exit. The Auto Input Level is automatically turned off upon exiting the Input Levels menu.

**BLACKLEVELS AND DRIVES** – To check your image levels and adjust these controls:

1. Make sure overall “Contrast” and “Brightness” settings are both set to near 50. *NOTE: Not required for “Auto” adjustment.*
  -  = 50 (approx.)
  -  = 50 (approx.)
2. Check the color temperature setup using an internal grayscale test pattern, making sure to obtain a neutral grayscale. *NOTE: Not required for “Auto” adjustment.*
3. Confirm that you are using an analog source *not* connected to **INPUT 3** or **INPUT 4**, as Input Levels are not applicable for digital sources or sources going through the decoder. A grayscale is recommended.
4. If the blacks and/or whites appear OK, input levels do not need adjustment. If black levels are too high (and/or whites are too low, which is rare), you likely have a noisy source that is producing skewed input levels. Continue with Step 5.
5. Temporarily enable “Auto” in the *Input Levels* submenu. Wait for all 6 values to stabilize. Alternatively, do *not* use “Auto”—reduce blacklevels manually instead. Judge by eye and 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 (described below).
6. Delete the “Auto” checkmark and leave the *Input Levels* menu.

**IMPORTANT:** *Do not use Input Levels to adjust color temperature. This will distort Contrast and Brightness functions as well as color temperature.*

**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, or to enable a different specific color through the Color Enable Control.

**CLAMP LOCATION** – This option (formerly known as *sync tip clamping*) can brighten the image produced from certain high-resolution high-frequency graphic sources. For almost all sources, the best clamp location is automatically selected by the projector.

- |                 |
|-----------------|
| ▶ 1. Back Porch |
| 2. Sync Tip     |
| 3. Tri Level    |

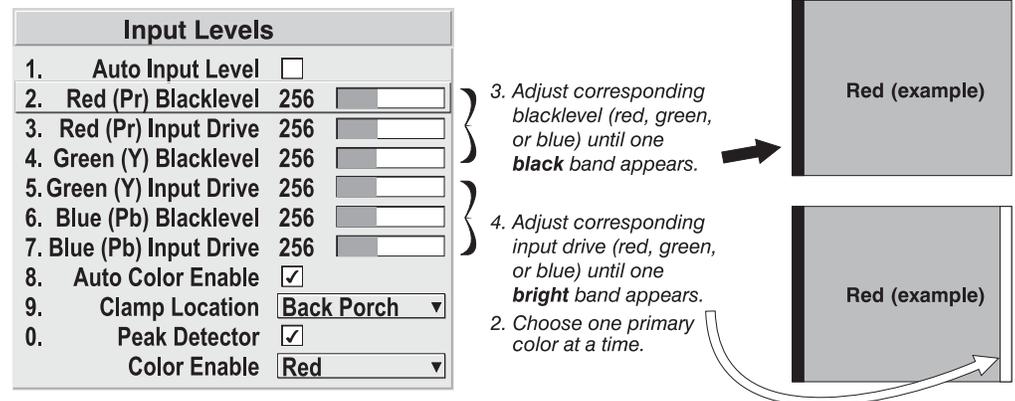
Use the normal *Back Porch* location if the image is either sufficiently bright or overly bright. Select *Sync Tip* if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. This moves the clamping pulse from the normal backporch location (which is likely too short) to the tip of the horizontal sync pulse. *Tri Level* is typically needed for an HDTV source.

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

**PEAK DETECTOR** – The Peak Detector is a tool to assist with defining individual input levels, enabling you to accurately set the Input Levels for any particular source with the appropriate image. Enabling the Peak Detector activates a special operating mode for detecting *only* pixels that are considered black or white—all other levels are displayed as a mid-level gray. When used with a smooth grayscale pattern in which black and white are known to be at opposite edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives until both black and white edges are *just* visible and distinguished from neighboring pixels. Images from this source will then display correct blacks and whites without crushing.

See Figure 3.13. *Adjusting Input Levels Using the Peak Detector:*

1. Display a 16-level grayscale test pattern from the desired external source, and enter a checkmark in the Peak Detector checkbox. *NOTE: The “Peak Detector” will initially render the grayscale as a uniform gray field before adjustment or extreme crushing.*
2. Display one primary color. *NOTE: Selecting Auto Color Enable ensures the correct color is displayed for each setting.*
3. For the current color, adjust its corresponding “Blacklevel” slider *just* until a single band of black appears at one edge of the screen. This band represents the first band of the grayscale pattern, which should be 100% black. Do not adjust too far.
4. With the same color still active, adjust its corresponding “Input Drive” slider *just* until a single band of color appears at the opposite edge of the screen. This band represents the last band of the grayscale pattern, which should be 100% white (or the current color, if a certain color is enabled). Do not adjust too far.
5. It may be advantageous to go back and check the black band—adjust the blacklevel slider if necessary. *NOTE: Readjusting blacklevels at this point affects the gain; only readjust when absolutely necessary.*
6. Repeat Steps 3-5 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.

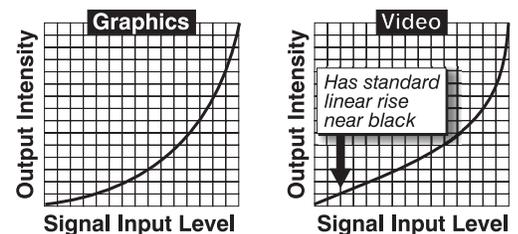
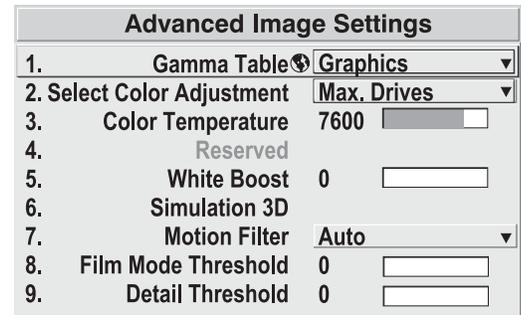


**Figure 3.13. Adjusting Input Levels Using the Peak Detector (RED EXAMPLE SHOWN)**

### Advanced Image Settings — SUBMENU

Use the *Advanced Image Settings* submenu to make the adjustments necessary for lesser-used but more specialized applications on your projector.

**GAMMA TABLE:** This control applies a default *video* or *graphics* gamma table or “curve” to your images, controlling the intensity of midlevel colors and producing maximum contrast, brightness and color performance. As shown at right, the graphics curve is a simple power curve while the video curve has a linear segment near black to compensate for increased blacklevels typical of video signals. Although the projector automatically applies either the graphics or video curve according to what type of incoming signal is detected, in some cases you may wish to override this default and use *graphics* gamma for a video source or *video* gamma for a graphics source. Alternatively, if neither default is ideal, you may prefer to apply a user-defined custom gamma curve that has been created externally, named, and downloaded to the projector (requires separate PC-based *Arbitrary Gamma* and *KoRE Librarian* software applications). If any of these special user curves have been installed, their names will appear in the Gamma Table pull-down list.



Keep in mind that any *Gamma Table* choice sets the related *Gamma* value (shown in the *Image Settings* menu) to a 2.5 default, where it can be fine-tuned as desired. Different values (1-3) here indicate that the original gamma table has been adjusted with either the *Gamma* slidebar or direct key.

**NOTES:** 1) If no user curves have been defined and downloaded to projector memory, only the “2.5, Graphics/Video Normal” default gamma curve is available here – adjust as desired using gamma in the main *Image Settings* menu. 2) Some graphic

*material will look best with the video setting while some video material is best with the graphic setting.*

**SELECT COLOR ADJUSTMENT:** In “Select Color Adjustment”, choose an overall color palette for all images. The “Max Drives” factory default simply drives all 3 colors at their maximum level so that they are fully on and cannot be changed. The two other pre-defined color adjustment choices—*SD Video* and *HD Video*—apply a color gamut optimized for video sources (standard or high-definition). Alternatively, you can specify a color temperature. This enables the adjacent Color Temperature slidebar and applies its current setting (default = 6500K). If none of the pre-defined “Select Color Adjustment” options or color temperatures suit your application, select one of four 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 precisely set the hue and intensity of each color component in the *Color Adjustment by X/Y* or *Color Saturation* submenus. It is most often needed with multiple-projector applications. Select the color adjustment producing the best color accuracy for your application and installation.

- |                      |
|----------------------|
| 1. Max. Drives       |
| 2. Color Temperature |
| ▶ 3. SD Video        |
| 4. HD Video          |
| 5. User 1            |
| 6. User 2            |
| 7. User 3            |
| 8. User 4            |

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

*NOTES: 1) “Color Temperature” defaults to 6500K until changed. All four “User” options default to SD Video unless they have been redefined by the user. 2) Factory-defined color primaries, which ensure consistent color gamut from projector-to-projector, can be calibrated in the **Service** menu only. If you suspect alteration, the factory settings can be recovered with selection of **Reset to Factory Defaults?** in the **Color Primary Settings** submenu within 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 (reddish or bluish) in images—the lower the temperature, the more reddish the cast; the higher the temperature, the more bluish the cast. Note that the slidebar is enabled only if you have a source connected and have selected “Color Temperature” in the adjacent “Select Color Adjustment” pull-down list in the *Advanced Image Settings* menu.

**RESERVED** — No function.

**WHITE BOOST** — White boost is a source dependent setting that enables you to recapture some of the lost light from the transition between segments in the color wheel as it’s spinning. For NTSC, HDTV, PAL and SECAM signals the white boost defaults to “2” and for graphic signals or when a test pattern is selected it’s “10”. When white boost is set to zero, it is off and the option grays out in the menu. As you increase the value of white boost you will notice that the image becomes increasingly brighter and a little less saturated.

*NOTES: 1) White Boost is automatically disabled (grayed out in menu) when you enable Brightness Uniformity, Edge Blending or select a color adjustment (Select Color Adjustment) other than “Max Drives”. The grayed out value you see is the last value loaded before being disabled. 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.

### Simulation 3D — SUBMENU OF ADVANCED IMAGE SETTINGS

This submenu allows you to adjust the timing between the input signal and its appearance on screen. This is most useful in applications where you want to match the timing of the projector to other equipment, such as a video recording device in broadcasting environments.

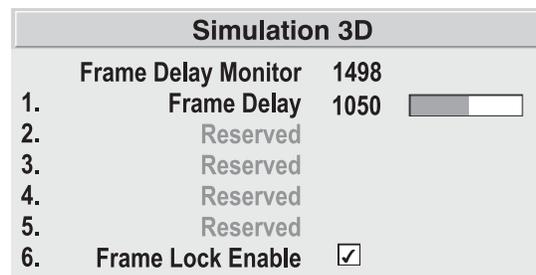


Figure 3.14.

**FRAME DELAY MONITOR** — This value changes as it monitors the latency between input and output. The value should remain fairly constant and close to the value of the Frame Delay, indicating that timing of input and output frames is locked; the Frame Delay Monitor value should stay within 5-10 lines or so of the Frame Delay setting. If a frame is lost or “dropped”, the values will change significantly, indicating that the frame input is no longer equal to the output.

**FRAME DELAY** — Set the number of lines delayed between the input signal and its appearance on screen, keeping in mind that projector processing always *adds one frame of delay* to the frame delay setting. For applications, where the feeling of “real time” image response is a priority, a minimum setting is usually preferable. If set too high or low, frame locking will not be possible—most sources require approximately 50 lines of delay to ensure frame locking.

**FRAME LOCK ENABLE**—When checked, the output image frame rate is locked to the input signal frame rate when possible. When the images are not locked, the input and the output will run as close to the same rate as possible, but frames may occasionally be duplicated or dropped.

By default, this option is checked.

### Advanced Image Settings continued — SUBMENU

**MOTION FILTER** — This control is most useful for smoothing out moving images from interlaced sources. In most cases the proper Motion Filter setting is automatically determined according to the type of incoming source signal. However, if your source is jittery and/or tearing you may wish to “force” a setting to ensure stable processing for this source—if desired, override the default “Auto” setting by selecting 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** — This setting determines how sensitively the projector can detect if an incoming video signal originated from film or not. It should not require adjustment.

**DETAIL THRESHOLD** — Use “Detail Threshold” to define at what frequency level the “Detail” control will begin to magnify high frequencies, which adds details back into the image. Raise the threshold to *ignore* more of these high frequencies, and lower the threshold to *magnify* more of these frequencies. A setting of “0”, for example, means no noise 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.

### 3.6 Adjusting System Parameters and Advanced Controls

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

Configuration	
1.	Language  English ▼
2.	Image Orientation  Front ▼
3.	Reserved
4.	Auto Power Up  <input type="checkbox"/>
5.	Set Date & Time
6.	Menu Preferences
7.	Communications
8.	Geometry and Color
9.	Diagnostics and Calibration
0.	Service
Option 1 Card: Dual SD/HD-SDI	

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

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

#### System Configuration ► — GENERAL —

The first six options in the *Configuration* menu are explained below:

##### **Language**

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

##### **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.

##### **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.

### Set Date & Time

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

### Menu Preferences — SUBMENU

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

**LARGE MENU FONT** — Enter a checkmark to enlarge menus and their text. You may have to adjust “Menu Location” to accommodate the increased menu area.

Menu Preferences	
1.	Large Menu Font <input checked="" type="checkbox"/>
2.	Menu Location 4:3 Top/Left ▼
3.	Horizontal Shift 261 <input type="text"/>
4.	Vertical Shift 204 <input type="text"/>
5.	Display Channel List <input type="checkbox"/>
6.	Display Slidebars <input type="checkbox"/>
7.	Display Error Messages All ▼
8.	Splash Screen Setup Always on ▼

**MENU LOCATION** — Use the pull-down list to choose a pre-defined default or customized location for the display of all on-screen menus.

To create a custom menu location quickly, choose a preset that is closest to the desired location. Then adjust “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** — Enter a checkmark if you want to see a scrollable channel list whenever you press  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  key. If you prefer to hide the channel list and input dialog box while switching channels and sources during a presentation clear the checkbox.

*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 sidebar over the current image whenever an adjustable parameter is selected directly with a key such as  or . If “Display Slidebars” is unchecked, these slidebars can still be accessed, but will be hidden during adjustment. This option does not affect slidebars in menus.

**DISPLAY ERROR MESSAGES** — Choose how you want to be notified of errors detected in either the incoming signal or projector. Select “Screen” or “All” (default) to see brief on-screen messages. This is particularly recommended during setup or testing of the projector. Or select “RS232” to receive messages via RS232 (or RS422) serial communication only. To hide error message displays, such as during shows and presentations, select “Off” or “RS232”.

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

- Always Off = A splash screen never appears

- Always On = A splash screen is always on behind the current display image, similar to wallpaper.
- Startup Only – The splash screen logo appears at projector startup only.
- Startup And No Signal – A splash screen appears at startup only if there is no source signal.

To replace the default “Christie logo” splash screen (or other) with one of your own, use *KoRE Librarian* to download the desired .bmp to the projector. This will overwrite the current splash screen content in projector memory.

**System Configuration** ➤  
— COMMUNICATIONS —

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

**Baud Rates**

The baud rate setting determines the speed of communication to and from the projector on the RS232 or RS422 links. The maximum rate for the RS232 is 115200; for RS422 it is 19200.

Set the baud rate to match that of your controlling device, such as your PC. If you are unsure about what baud rate to choose, refer to the documentation for the controlling device. In an existing network of projectors, if you discover that a projector has a different baud rate, make sure to use the 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.

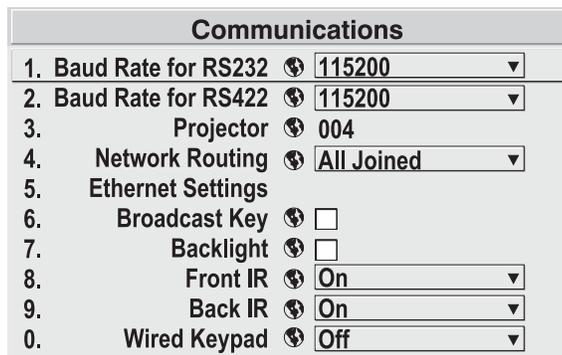


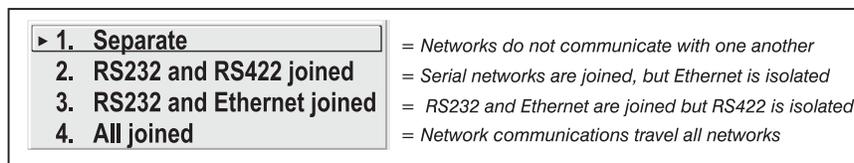
Figure 3.15. Communications

**Projector**

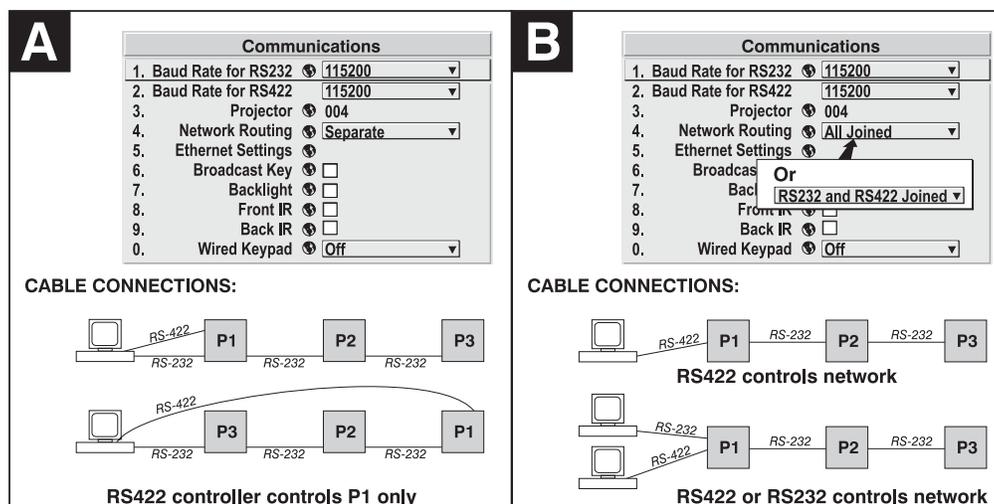
Enter a three-digit number (such as “001”) to assign or change a number to the projector currently in use. If the current projector already has a number assigned, that number will appear here (for example, “004” in Figure 3.15, above). Numerical identity for projectors enables you to communicate with a single projector within a multiple-projector application (see also **Proj** key in 3.2, *Using the Remote Keypad*). If you make a mistake in assigning or changing the projector number, press **Exit** to cancel.

**Network Routing**

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



**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 3.16A, RS422 controls only the projector to which it is connected. In Figure 3.16B, either RS232 or RS422 will control the network.



**Figure 3.16. Using the “Network Routing” Option**

**RS232 AND RS422 JOINED:** Messages originating from an RS232 or RS422 controller will be relayed to all RS232 or RS422 ports. Any Ethernet communication, however, will not.

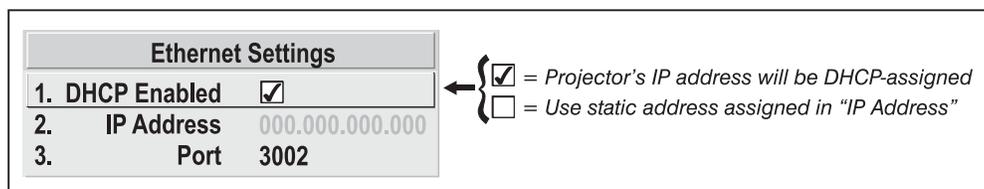
**RS232 AND ETHERNET JOINED:** Messages to and from the RS232 ports will also be relayed to the Ethernet port, and vice versa. Any RS422 communications will be isolated.

**ALL JOINED:** All messages reach all ports, regardless of type.

### Ethernet Settings – SUBMENU

*NOTES: 1) 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 simply override the automatic DHCP server function, delete the checkmark and enter the new “IP Address” settings desired. Remember that only a 0.0.0.0 address will trigger the DHCP addressing service, and only when the DHCP checkbox is enabled.



**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.

### Broadcast Key

Enter a checkmark if you want keypad commands sent to one projector to be relayed to all projectors in a serial network. Note that the **(Proj)** key will temporarily “override” the effect of a broadcast setting and allow you to control a specific projector when necessary. Disable the setting for all but one (any) projector in a network.

### Backlight

Toggle to turn the built-in keypad backlighting on and off.

### Front IR / Back IR

As needed for your application, set to “on” so that the front and/or rear IR sensor locations on the projector respond to the IR keypad. Set to “off” to disable.

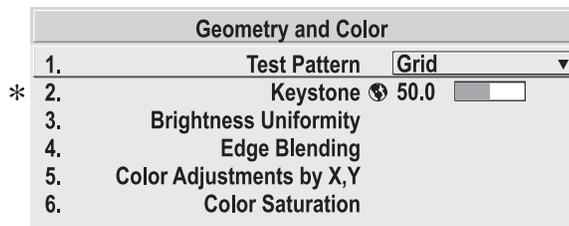
To disable *both* IR sensors, you cannot use the IR remote keypad to select the second **OFF** setting. This safeguard prevents accidentally disabling an IR keypad while you are using it. Instead, use either the built-in keypad or a wired remote (optional) to set the remaining active sensor to **OFF**. The projector will no longer respond to an IR remote keypad.

### Wired Keypad

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

### System Configuration **►** — GEOMETRY & COLOR —

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



\* *Keystone and Warping if ChristieTWIST warping module is present (standard in Matrix models, optional in all others).*

### Test Pattern

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

### Keystone

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



Figure 3.17. Keystone Adjustment

### Brightness Uniformity — SUBMENU

*Brightness Uniformity* provides further refinement of displays already matched for their primary colors and overall light output. Use *Brightness Uniformity* to create an exceptionally smooth image in which no area appears brighter and/or more red, green or blue than another. In the *Brightness Uniformity* menu, 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. To disable the *Brightness Uniformity* function, delete the “Uniformity Enable” checkmark.

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

### Edge Blending — SUBMENU

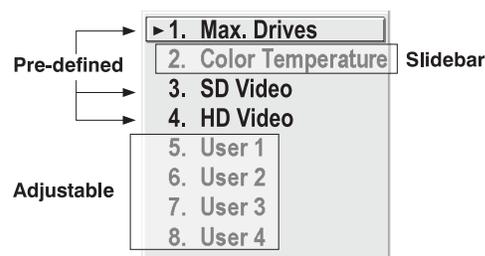
The *Edge Blending* submenu provides a range of controls for smoothing together the overlapping bright edges of multiple adjacent projected images to create a single larger “seamless” image. These controls, which primarily affect whitelevels, are typically used in conjunction with mechanical lens blinders (optional), which are installed on the front of the projector and which primarily affect blacklevels. *NOTE: There is a center line (both horizontal and vertical) in the Edge Blending test pattern. The intersection of these lines is the true center of the projector’s display area.*

*NOTE: See also 3.10, Using Multiple Projectors.*

### Color Adjustments by X/Y, and Color Saturation — SUBMENUS

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

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



**Figure 3.18. Color Gamut Choices**

**DEFINING “USER” COLOR GAMUTS:** In some cases, you may find that none of the pre-defined “Select Color Adjustment” options exactly suit your needs. For example, you may require a unique color gamut (range) for a single projector or application, or you may need to precisely match colors across multiple adjacent displays. In such cases, use the *Color Adjustments by X,Y* or *Color Saturation* submenu to define the precise *hue* of each primary color component (red, green, blue, and white) used to generate

the millions of colors produced in displays. You can create up to four custom color gamuts (User 1, 2, 3, or 4) with these adjustments.

Note that the two menus differ only in their user interface, so use whichever menu best suits your needs and application. A color meter can help with adjustments.

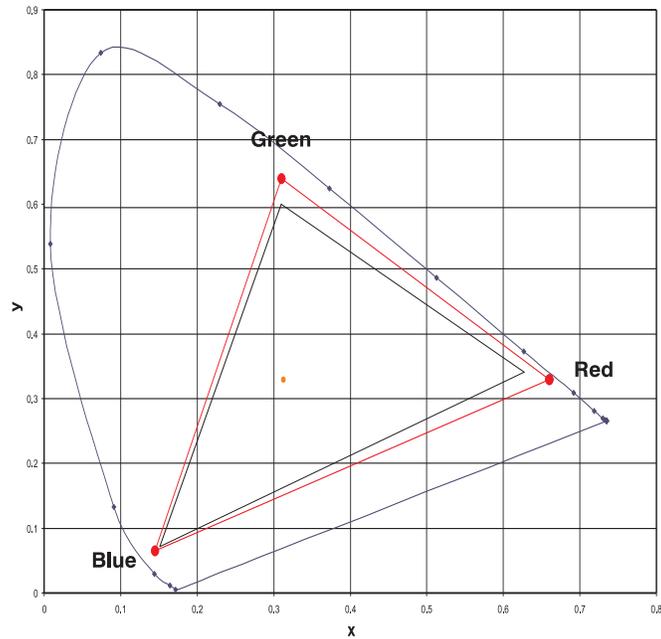
- Color Adjustments by X,Y — Enter known x/y coordinates from the chromaticity graph.
- Color Saturation — Adjust color slidebars and judge image color by eye or meter.

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

**COLOR ADJUSTMENT BY X,Y:** Use this submenu if you want to create, alter 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 3.19)—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 may move the color closer to orange or closer to violet, which 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 at any time in the *Advanced Image Settings* menu.

Color Adjustments by X,Y			
1.	Select Color Adjustment	User2	
2.	Color Temperature	6521	<input type="text"/>
3.	Red X	0.655	<input type="text"/>
4.	Red Y	0.341	<input type="text"/>
5.	Green X	0.332	<input type="text"/>
6.	Green Y	0.575	<input type="text"/>
7.	Blue X	0.144	<input type="text"/>
8.	Blue Y	0.093	<input type="text"/>
9.	White X	0.320	<input type="text"/>
0.	White Y	0.330	<input type="text"/>
Auto Color Enable		<input checked="" type="checkbox"/>	

**Figure 3.19. Customize Color**



**Figure 3.20. CIE 1931 Chromaticity Diagram**

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

**PROCEDURE FOR X,Y ADJUSTMENTS:** See 3.10, *Using Multiple Projectors*.

**COLOR SATURATION:** Use this submenu if you do not have specific color coordinates in mind and will simply judge color performance by eye or meter. Like the *Color Adjustment by X,Y* submenu, each color control actually defines new x/y coordinates for that color and changes its hue—it is just a different interface.

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.

Color Saturation		
1.	Select Color Adjustment	User 4
2.	Color Temperature	6521 <input type="text"/>
3.	Red Color Adjustment	
4.	Green Color Adjustment	
5.	Blue Color Adjustment	
6.	White Color Adjustment	
7.	Auto Color Enable	<input type="checkbox"/>
8.	Color Enable	White <input type="text"/>
9.	Copy From	Color Temperature <input type="text"/>
0.	Lamp	

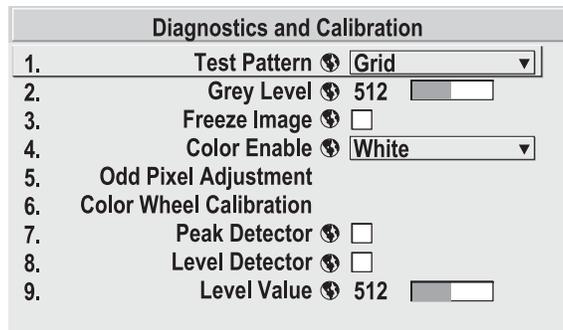
**Figure 3.21. Customize Color**

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

**System Configuration** ➤ **Test Pattern**  
**DIAGNOSTICS / CALIBRATION**

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

*NOTE: There is a center line (both horizontal and vertical) in the Edge Blending test pattern. The intersection of these lines is the true center of the projector's display area.*



**Test Pattern Grey Level**

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

**Freeze Image**

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

**Color Enable**

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

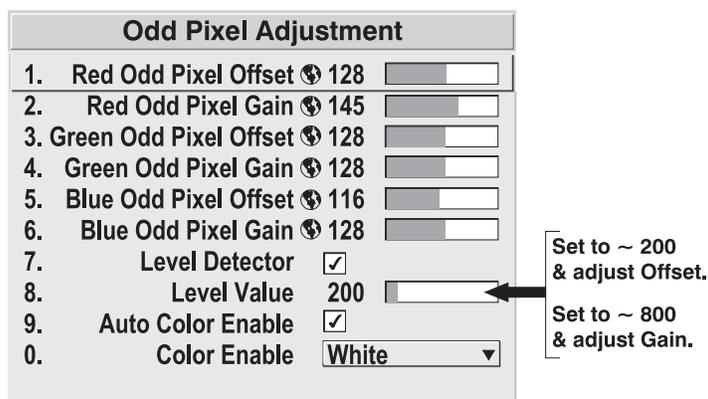
**Odd Pixel Adjustment**

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

When using certain RGB sources, you may need to adjust the normal gain or offset of odd pixels in relation to even pixels. This will smooth out very narrow (1-pixel wide) “checks” or vertical stripes that indicate adjacent “on” and “off” pixels. Using the Level Detector simplifies this process (see Figure 3.22):

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*. Half of the pixels will move, the other half will not.
5. Adjust until the two transition regions overlap. The stripe of noise will be minimized, defined by the value in the sidebar.
6. Set “Level Value” to ~800. The image should now be black-and-white.
7. Repeat Steps 4 and 5, but adjusting *gain*.
8. Repeat Steps 3-7 for all remaining colors. Your RGB source should now be OK.

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



**Figure 3.22. Using “Odd Pixel Adjustment”**

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

### **Color Wheel Calibration — SUBMENU**

The *Color Wheel Calibration* submenu allows you to set the timing of the color wheel in the projector. It is important the color wheel is correctly calibrated for the colors and shades in the displayed image to appear the same. Incorrectly calibrated, the colors will appear in various unmatched shades throughout the image. *This adjustment is typically only required when the color wheel is replaced.*

To calibrate a color wheel, do the following:

1. Select the *Color Wheel Calibration* submenu. *NOTE: The display automatically changes to the red/blue ramp pattern, which shows the difference in shades of color between two corners most prominently.*
2. Move the “Color Wheel Delay” slider in either direction until opposite corners of the display are matched.
3. Verify this setting by selecting a new color through “Color Enable” – corners should remain well matched.
4. Perform a final calibration check, by displaying white. The display should appear without any hint of red, green or blue.

### **Peak Detector**

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

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

### **Level Detector**

The “Level Detector” checkbox enables specific thresholds for blacks and whites—input levels that fall below a specified *Level Value* (see below) are displayed as black, and all others are displayed as white. It aids in Odd Pixel Adjustment. To use:

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

### **Level Value**

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

### **System Configuration** ➤ **OPTIONAL INPUT MODULES**

The single “Option Card” entry in the *Configuration* menu identifies which optional input module (a.k.a. *cards*) is present at **INPUT 5** (Option 1). If the option slot is empty, the corresponding read-only menu entry does nothing. If there is a module installed, the corresponding menu entry may activate a submenu of further options pertaining to that module.

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

---

### **3.7 Working with PIP or Seamless Switching**

PIP (Picture-in-Picture) and Seamless Switching are independent but related projector features that both utilize two image processing paths within the projector. In the case of Picture-in-Picture, this double processing enables you to display two different images simultaneously – typically a smaller “secondary” image within a large “primary” background. In a seamless switch, the double processing essentially 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 as desired so that the current image appears to dissolve or “fade” into the new image.

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

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

Signal Type	Description (Input Location)
#1	5 BNCs (RGBHV or YPbPr)
#2	DVI - I (analog or digital)
#3	Decoded signals (Input 3, Input 4, Composite video, S-Video, or any video signal via Input 1 BNC connectors or via an analog option card).
#4	Analog Option Cards
#5	Digital Option Cards
#6	Digital Option Cards

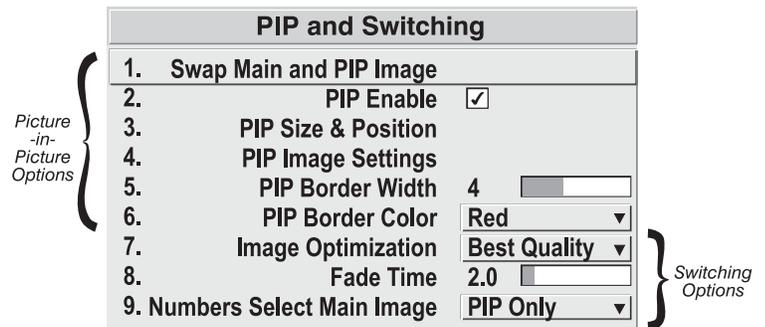
\* HD interlaced sources are not recommended for the PIP window.

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

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

**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.*

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  on the remote.

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**

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:

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

**POSITION PRESETS** –Set the location of the PIP (secondary) image in the display.

**ASPECT RATIO PRESETS** – Choose the desired aspect ratio for your PIP window. A “Default” aspect ratio matches that of the projector, whereas “Anamorphic” will be a widescreen window. Choose according to your incoming source material.

**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 in order to work with Seamless Switching. 3) Disable PIP and Best Switching for Interlaced sources > 35kHz.*

**Working with Seamless Switching** ➤

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

**Tips for best source switching:**

- Make sure a channel has been configured for each source.
- Progressive digital and analog sources are recommended.
- Set Image Optimization to Best Switching (see below).
- For best results, use the same frame rate and gamma setting for each.

*NOTE: Avoid using two Interlaced sources.*

**Image Optimization**

Choose whether to use Best Switching or whether you prefer to optimize image quality, whichever best suits your needs. When Best Switching is selected, sources are switched almost instantaneously without a dark state in between images. Eight-bit processing is used to maximize the opportunity for a seamless transition. Best Switching is recommended only when seamless switching is necessary. Best Quality maximizes allocated resources to maintain image quality by using 10-bit processing and a single source only. If selected, there may be a brief dark state between images.

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

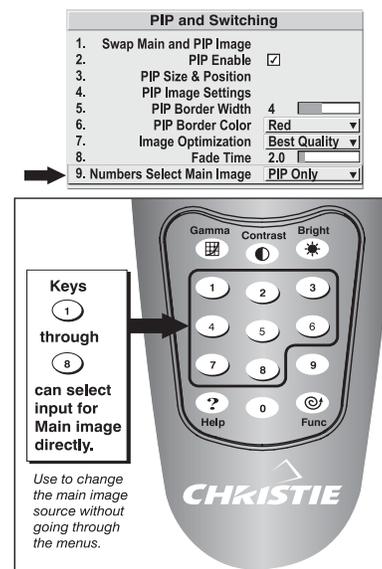
### Fade Time

Set how long (in seconds) it takes to gradually dissolve one image into another for a source switch when Image Optimization is set to Best Switching. *NOTE: PIP must be disabled for Fade Time to take effect. Also, the PIP window must be closed to activate it.*

### Numbers Select Main Image

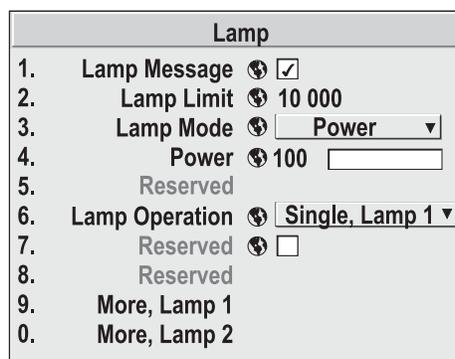
Use *Numbers Select Main Image* to use the numeric keys #1-8 as input keys. This remapping of the keypad (see right) can be particularly useful with PIP displays, providing a convenient shortcut for changing the primary (background) image without first having to return to the *Main* menu. To use the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

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



## 3.8 Working with the Lamp

Use the options in the *Lamp* menu when you want to view lamp specific, read-only information, such as lamp status, serial number and lamp hours or to select lamp specific operation and power modes.



**LAMP MESSAGE** – Enter a checkmark to enable the display of a warning message when the lamp reaches the user-specified lamp limit. *NOTE: This message will only appear upon powering up the projector. You can press **[Exit]** to temporarily cancel it, but it will appear the next time you power up or until a new lamp is installed. It is strongly recommended this option remain enabled.*

Delete the checkmark if you do not wish to receive these messages. Lamp status and the number of lamp hours should be monitored manually.

**LAMP LIMIT** – Enter the number of hours you expect to log on the current lamp before replacing it. *NOTES: 1) If you change modes over the life of a lamp, the lamp limit you originally expected may no longer be possible. 2) Turning the lamp on and off can reduce lamp life significantly, as will other factors.*

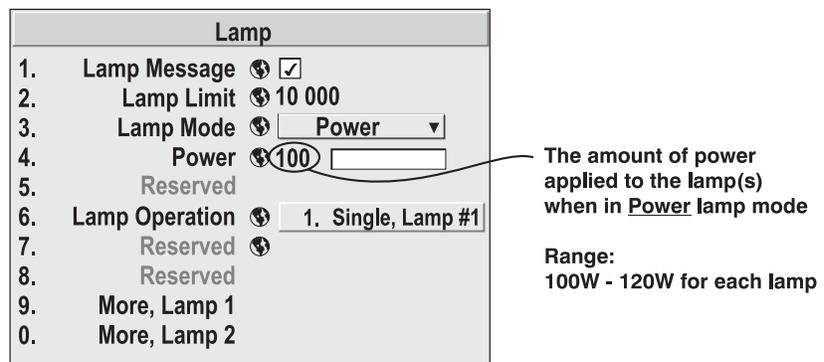
**LAMP MODE** - Use the pull down list to select the *Lamp Mode* (power level) of the projector. This option gives you the ability to control the light output of the projector. Although there are some exceptions, typically the life span of the lamp is shortened the higher you set the light output or power setting of the projector.



- **Max Brightness:** Select this option when you want the lamp to always burn as brightly as possible. The **Power** option (slidebar) in the *Lamp* menu will read as 120W in Single or Dual Lamp mode. Keep in mind that the maximum brightness for any lamp gradually diminishes with age and the image becomes dimmer over time.
- **Power:** Select this option to set the amount of power (in watts) supplied to the lamps (single or both). The power level remains constant throughout the life of the lamp.

**POWER** – Use the **Power** slidebar (Figure 3.23.) to set the power level (in watts) that will be applied to each of the lamps during operation. **Power** can be set at 100W – 120W for each of the lamps. When you are operating in Single Lamp mode, power is increased or decreased incrementally for the selected lamp. In Dual Lamp mode, power changes for alternating lamps (also in increments) until the desired power level is reached for both lamps. The power level you select will remain constant throughout operation. In general, dimmer images are produced when power levels are low.

Specifying the maximum power level (120W) in this mode is the same as operating in **Max Brightness** mode.



**Figure 3.23.**

**LAMP OPERATION** - One of the key features of the projector is that it can be operated with one or two lamps on. From the pull down list, select the lamp operation mode you want to operate the projector in. **Dual Lamp** is the default.

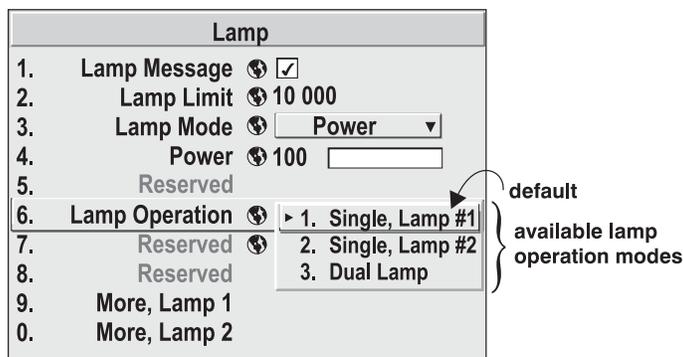


Figure 3.24.

- Dual Lamp** – Select this option to operate the projector with both lamps on. In this mode, you can achieve maximum brightness output by the projector. If *one* lamp fails in this mode, the projector automatically switches to the single lamp mode of operation for the lamp that is still operational. This transition in lamp operation modes does not interrupt the current presentation, but creates an immediate dimming of the image. If *both* lamps fail at the same time, an error is reported and the projector automatically turns off.
- Single, Lamp #1** or **Single, Lamp #2** – Select either one of these options if you want to operate the projector with only one lamp on and the other lamp in “reserve”. If a lamp fails in this mode, the projector automatically responds by switching to the other single lamp mode of operation. In this case, continuous operation is maintained. When you access the *Lamp* menu, the **Lamp Operation** option reads that of the new lamp.

*NOTES: 1) By default, the projector is set for Dual Lamp mode. 2) The projector automatically shuts down if it detects that both lamps have “failed” (this includes lamp not installed). 3) Once the “failed” lamp is replaced, the lamp operation mode does not automatically change back to the previous mode. It must manually be selected. 4) It takes several seconds for a lamp to reach full brightness when it is first turned on.*

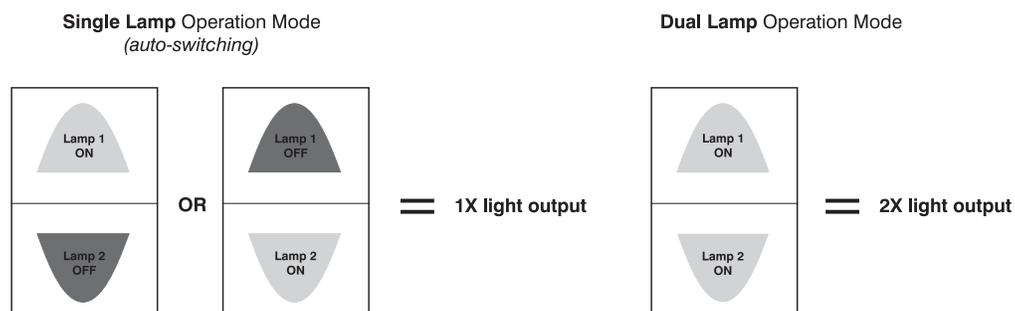


Figure 3.25. Relation between Lamp Operation Modes and Brightness

#### A Note About Switching Lamp Operation Modes

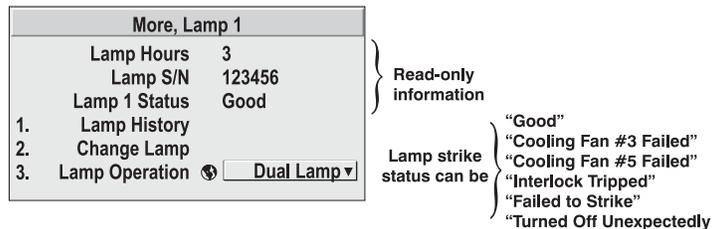
The projector is designed with two lamps so that it can potentially maintain constant light on the wall. It automatically detects a failed lamp and responds by switching lamp operation modes and turns the other lamp on. You may see a brief period of no light on the wall until the new lamp is ignited and a gradual increase to full brightness.

When you manually select a new lamp operation, the lamp turns off only after the new lamp has successfully been turned on. On rare occasions, a lamp will not strike on the first attempt. The projector, in this instance, has been designed to attempt a re-strike of the lamp. With the current lamp still on, the projector waits 30 seconds before initiating another lamp strike. During this time, on-screen messages will appear until the lamp is successfully turned on. The projector attempts to re-strike a lamp up to 3 times after the initial change in lamp operation modes. With the 30-second wait period in between each attempt, the projector may seem like it is not responding for up to a total of two minutes. You can press any key during this time to cancel and return to the original lamp operation mode. If you cancel the operation or the attempts to strike the lamp have failed, the lamp is declared, “failed to strike” and the projector remains in the original mode.

The same occurs if you are attempting to switch from Single to Dual lamp mode; the projector reverts to the single lamp mode for the lamp that is working.

**More, Lamp 1 or More, Lamp 2 – SUBMENU**

There are two separate lamp submenus that can be accessed from the *Lamp* menu. Each submenu is dedicated to one lamp – you can view specific lamp information, such as lamp hours, lamp history and the current status of the lamp. You can also record a new serial number for a new lamp and change lamp operation modes. (Figure 3.26.)



**Figure 3.26.**

**LAMP HOURS** – This read-only information indicates the number of hours logged on the current lamp. Whenever you record a new lamp serial number, this value automatically resets to “0”, where it begins to log time for the new lamp. *NOTE: You can also check Lamp Hours in the Status menu.*

**LAMP S/N** – This read-only information displays the serial number recorded for the current lamp. When you install a new lamp and enter its serial number (9-digits), the number will appear here in the *Lamp* menu.

**LAMP 1 (OR 2) STATUS** – This read-only information displays the current status of the lamp (1 or 2). An extremely valuable piece of information for troubleshooting, the **Lamp Status** can be any one of the six following states: “Good”, “Cooling Fan #3 Failed”, “Cooling Fan #5 Failed”, “Interlock Tripped”, “Failed to Strike” and “Turned Off Unexpectedly”. You can view the status of a lamp anytime during operation by accessing its submenu.

**LAMP 1 (OR 2) HISTORY** - Select this numbered item to access a smaller dialog box with read-only information about the history previous lamps installed and recorded. The serial number and number of hours logged for each lamp is displayed. The Lamp

Lamp 1 History	
S/N	Hours
1234	1999
5679	23

History is automatically updated whenever the serial number for a new lamp is recorded. The information for the new lamp is added to the bottom of the list.

*NOTE: If you remove lamps from the projector it is important to replace them back into the compartment from which they were removed. This ensures accurate lamp information is maintained. Each lamp compartment is labeled Lamp 1 and Lamp 2.*

**CHANGE LAMP** – Select this option to record a serial number of up to 9 digits/characters for every newly installed lamp. When selected, a **Lamp S/N** window appears. Use the number text entry keys to record the new lamp serial number and press **Enter** again to accept the change. See *Using Slidebars and Other Controls* if you need help entering the number. Once entered, the new lamp serial number will be added to the **Lamp History** menu and the **Lamp Hours** timer will reset to “0”. **Lamp Mode** and **Lamp Limit** remain as they were for the previous lamp, and can be changed at any time.



*NOTES: 1) Enter a serial number **only** if you have just installed a new lamp. This will help ensure the lamp timer is not reset on an old lamp and that the number of hours logged on the lamp will be accurate. 2) Lamp serial number can be found on the lamp itself.*

### IMPORTANT

**Always record the serial number of a NEW lamp.**

**LAMP OPERATION** – This option is the same as in the *Lamp* menu. It appears again in the submenu for convenience.

## 3.9 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 (size) of lamp, the hours logged in total and for a specific period (such as a rental period), and for your projector model name and serial number. In addition, the *Status* menu identifies the current channel, its location, its frequencies and other details.

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

## 3.10 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. See 2.6, *Connecting Multiple Projectors* for full routing details.

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

**Matching Colors  
In Multiple Screens**

- In a multiple-projector wall, you will likely want to precisely match color and intensity from image-to-image so that the full wall is as uniform as possible. This matching is typically done in conjunction with brightness uniformity and edge blending.

**Preliminary Calibration**

As a final part of the manufacturing process, all primary colors in the projector are precisely set to pre-established values to ensure that overall color performance is optimized and is as accurate as possible (refer back to Figure 3.20). 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 corrected 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; however, is not critical for all installations.

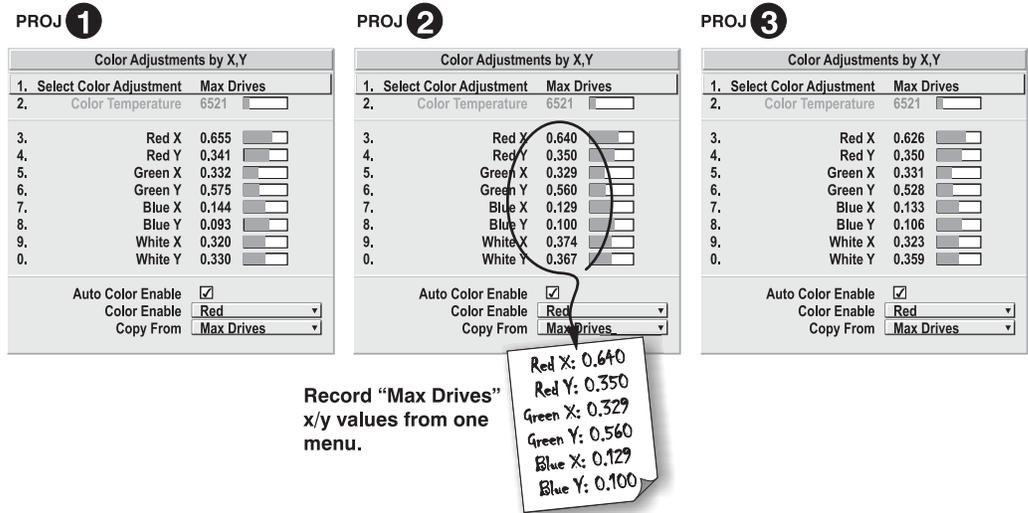
To return to the factory-set color primaries, such as when a projector is moved to different site, you must access the *Service* menu (password-protected). Select the *Reset to Factory Defaults?* option in the *Color Primaries* submenu. Then repeat the calibration process describe above, if desired, and continue with matching of colors.

**Color Adjustment Procedure**

Once the *Color Primary Settings* are calibrated for the site (see above), use the *Color Adjustments by X,Y* 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.

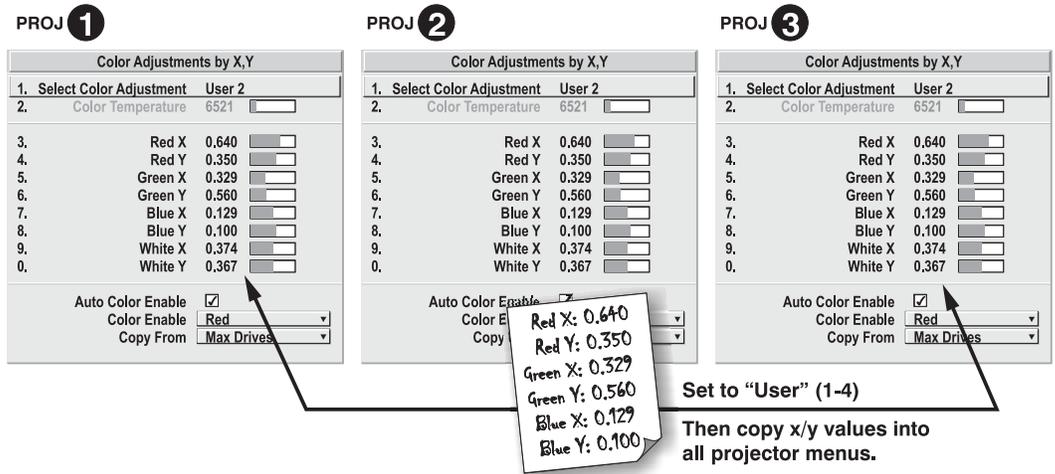
1. Set up and optimize all projector settings. You can ignore color temperature, since you will be redefining color performance in this procedure, but do optimize each projector in every other aspect. Closely align all screen edges.
2. Assign projector numbers to make communications easier. Use desired 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 and Optical Aperture 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. Jot down the values shown in one (any) of the displays. See Figure 3.27. Or use the “Copy From” function to copy them into a “User” gamut in one projector.



**Figure 3.27. Jot Down a Set of “Max Drives” X/Y Values**

5. In each projector, select a “User” color adjustment (1-4) to enable *Color Adjustments by X,Y* changes. Then enter your recorded x/y values into each menu (Figure 3.28).



**Figure 3.28. 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.

IN ALL PROJECTORS:

Color Adjustments by X,Y			
1.	Select Color Adjustment	User 2	
2.	Color Temperature	6521	<input type="text"/>
3.	Red X	0.637	<input type="text"/>
4.	Red Y	0.350	<input type="text"/>
5.	Green X	0.329	<input type="text"/>
6.	Green Y	0.552	<input type="text"/>
7.	Blue X	0.130	<input type="text"/>
8.	Blue Y	0.104	<input type="text"/>
9.	White X	0.374	<input type="text"/>
0.	White Y	0.367	<input type="text"/>
Auto Color Enable <input checked="" type="checkbox"/>			
Color Enable <span style="border: 1px solid black; padding: 0 2px;">Red</span>			
Copy From <span style="border: 1px solid black; padding: 0 2px;">Max Drives</span>			

Reduce Red X  
 Reduce Green Y  
 Increase Blue X and Y

*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.*

Alternatively, use the Color Saturation menu for these adjustments or to fine tune.

These coordinate adjustments move the three color points closer together (refer back to the chromaticity chart shown in Figure 3.20.) 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 and they will remain matched upon exit from the menus. Apply this new “User” gamut to a source at any time by selecting it in the “Select Color Adjustment” list accessed in the *Advanced Image Settings* menu.

### Using the Color Saturation Menu for Color Matching

You may prefer to use the *Color Saturation* menu to match colors across multiple screens. In the three *Color Adjustment* submenus (Red, Green, Blue—see right), set all main values to 100 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.

For best results, use this menu after doing the color adjustment procedure.

Red Color Adjustment			
1.	Select Color Adjustment	User2	
2.	Color Temperature	6521	<input type="text"/>
3.	Red Part of Red	100	<input type="text"/>
4.	Green Part of Red	7	<input type="text"/>
5.	Blue Part of Red	10	<input type="text"/>
6.	Green Color Adjustment		
7.	1.	Select Color Adjustment	User2
	2.	Color Temperature	6521 <input type="text"/>
	3.	Red Part of Green	3 <input type="text"/>
	4.	Green Part of Green	100 <input type="text"/>
	5.	Blue Part of Green	4 <input type="text"/>
	Blue Color Adjustment		
	1.	Select Color Adjustment	User2
	2.	Color Temperature	6521 <input type="text"/>
	3.	Red Part of Blue	1 <input type="text"/>
	4.	Green Part of Blue	6 <input type="text"/>
	5.	Blue Part of Blue	100 <input type="text"/>
	6.	Next Color	<span style="border: 1px solid black; padding: 0 2px;">White</span>
	7.	Copy From	<span style="border: 1px solid black; padding: 0 2px;">Max. Drives</span>

Set to 100  
 Judge by eye and adjust all as needed

Set to 100  
 Judge by eye and adjust all as needed

Set to 100  
 Judge by eye and adjust all as needed

**Figure 3.29. Color Matching Using Color Saturation Menu**

## Achieving 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 checklist 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**—Make sure each “Lamp Power” setting is as high as possible for your application while still maintaining a good overall match of light output from screen-to-screen. By nature, achieving a *uniform* brightness will require a slightly reduced *overall* brightness—this reduction will help ensure that you have enough range of adjustment when examining brightness variables more closely from screen-to-screen, and will help prevent premature “maxing out” when trying to match to a certain color, zone or projector.
- ❑ **USE A “USER” COLOR TEMPERATURE**—Always adjust Brightness Uniformity for a *User* color temperature defined when you matched primary colors, and continue to use it for all sources displayed on the wall. Your other color temperatures will not necessarily be matched from screen-to-screen.
- ❑ **WHITE UNIFORMITY SLIDEBARS**—White Uniformity slider values may not reduce to “0”. Each slider 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 slider to stop earlier than expected.
- ❑ **JUDGE BY EYE OR USE A METER**—Good brightness uniformity can be achieved with either.

**Step 1: General Setup**

- 1a) Adjust primary colors (see *Matching Colors in Multiple Screens*) to ensure matched overall color temperatures and light output between screens.



**Double-check that all WHITES and LIGHT OUTPUT are well-matched.**

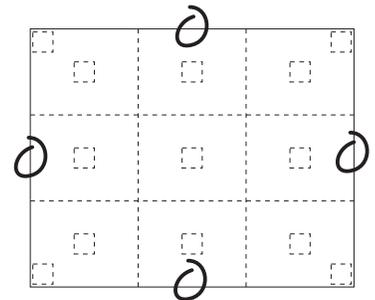
- 1b) Enable the *Brightness Uniformity* checkbox. This will enable access to the uniformity controls and will apply the settings to your image.

Brightness Uniformity	
1.	Uniformity Enable <input checked="" type="checkbox"/>
2.	Test Pattern <span>Off</span>
3.	Left Uniformity
4.	Right Uniformity
5.	Top Uniformity
6.	Bottom Uniformity
7.	White Uniformity
8.	Color Adjustment by X,Y
9.	Color Saturation
0.	Lamp

← Enable adjustment of options #3-7

- 1c) 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.*



- 1d) In either *Color Adjustments* menu, select a “User” color. Then:

- *If you have created a “User 1” color gamut* (recommended) for a well-matched wall, continue to Step 1e.
- *If you prefer maximum brightness* rather than a particular color temperature, select “Max Drives”.



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

- 1e) In the *White Uniformity* menu, set the “Overall” output level to **50.0** and all remaining slidebars to **0.0**. This decreases the light output *just enough* throughout the screen so that any color level can then be *increased* later as necessary for matching light output from zone-to-zone. Do not exceed **50.0** for “Overall”—a higher level will likely interfere with achieving brightness uniformity and is not recommended.

White Uniformity		
1.	Left Side	0.0 <input type="text"/>
2.	Right Side	0.0 <input type="text"/>
3.	Top Edge	0.0 <input type="text"/>
4.	Bottom Edge	0.0 <input type="text"/>
5.	Top Left Corner	0.0 <input type="text"/>
6.	Top Right Corner	0.0 <input type="text"/>
7.	Bottom Left Corner	0.0 <input type="text"/>
8.	Bottom Right Corner	0.0 <input type="text"/>
9.	Overall	50.0 <input type="text"/>
Adjust light output of entire screen.		

← Set to 50.0

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) At this point, ignore the **brightness** of individual zones. 2) Always ignore menu colors.

- 2a) 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.
- 2b) 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 3.30.

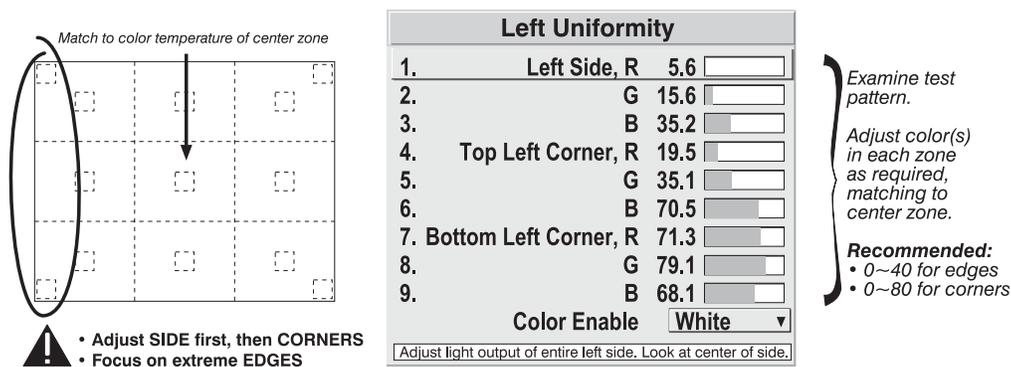


Figure 3.30. Match Zones to Center Color Temperature

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

- 3a) For each screen, compare the light output of each *edge* and *corner* to that of the *center*. If any of the areas differ, use the *White Uniformity* menu to match edges and corners to the center as described below (see Figure 3.31). Begin with the screen exhibiting the most obvious variations in light output.
- Adjust **edge White Uniformity** first—note that each edge adjustment also affects the rest of the screen slightly. Keep all edges just slightly *lower* than the center light output rather than matching light output precisely. Otherwise, it may not be possible to brighten the corners (typically the dimmest areas of the screen) enough. I.e., the best uniformity is a compromise between the brightest and darkest areas of the screen.

- Adjust **corner White Uniformity** last—each corner adjustment affects only this quadrant.
- Repeat for each screen.

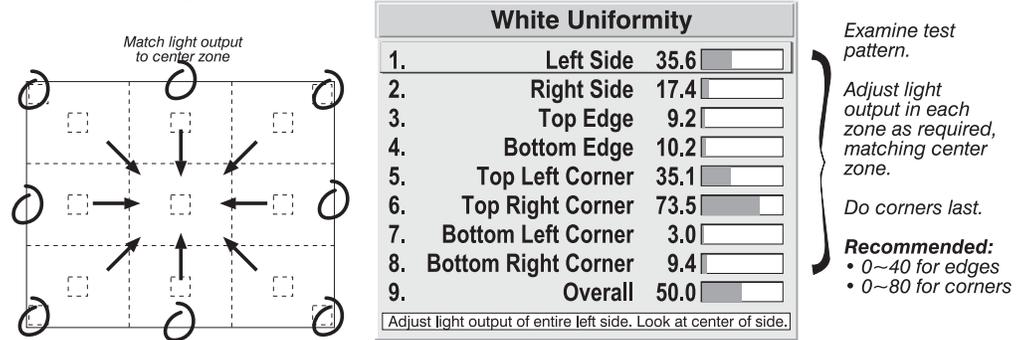


Figure 3.31. Match Zones to Center Light Output

**Step 4: Readjust Color Temperature (level of red/green/blue) in 8 Zones**

4a) 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.

**Edge Blending** ➤ Christie *Edge Blending* is an innovative set of software functions that can quickly and easily blend the edges of multiple adjacent full screen images to create a single seamless larger image.

**What is a Blend?**

In simple terms, a blend appears as a gradient strip along an edge of a projected image. It is darkest along the extreme edge of the image, and lightens nearer to the rest of the image (see right). This area runs along the edge of the projector’s internal DMDs (display area); it cannot be located on interior pixels.

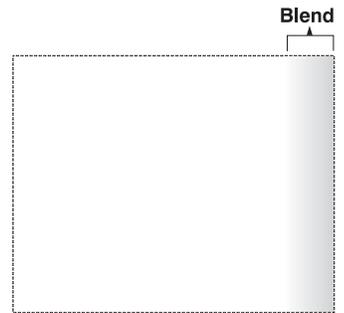


Figure 3.32

**How Are Blends Used?**

In multiple-projector walls, complementary blends between neighboring images can compensate for the extra “brightness” or intensity where these edges overlap. By controlling blend width and other properties, you can achieve uniformity across the group of images. Visible overlaps will disappear as illustrated in Figure 3.33.

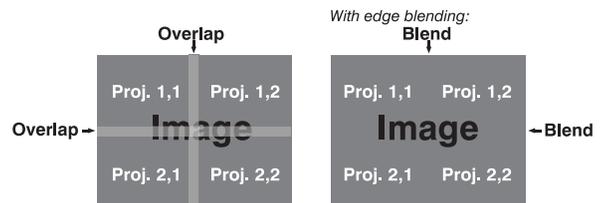


Figure 3.33. Edge Blending Concept  
(NOTE: TILING DONE AT SOURCE)

For best results, use the same projector model and type throughout your display wall. In addition, avoid high-gain screens whenever possible—the optical performance of such screens demands minimal image offset, thus projectors must be located very close to one another. Note too that the requisite tiling of the image—with data repeated along internal edges that will overlap—must be correctly done by your source.

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

### Main Functions

Use standard 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. Slider 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. 34). Decreasing the *Blend Shape* setting slows the rate of change so that *more* of the region appears mid-gray. For most applications, this subtle control is best left close to 50.

(NOTE: Simulation shown darker for printed page)

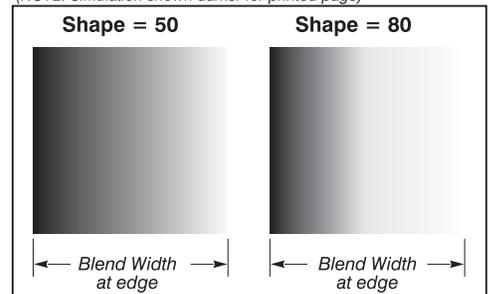


Figure 3. 34. “Shape” Examples

- **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.

(NOTE: Simulation shown darker for printed page)

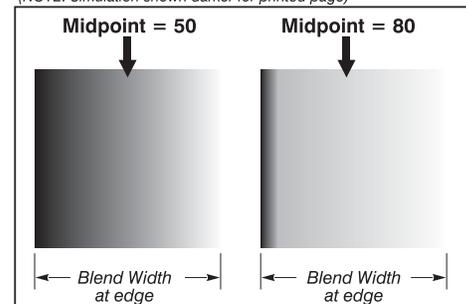


Figure 3. 35. “Midpoint” Examples

- ❑ **Show Blending Overlap** turns your defined blend width area to solid gray so that two adjacent images can be seamlessly aligned simply by overlapping their gray bars, if needed. Toggle the *Show Blending Overlap* off to reactivate the blend effect.

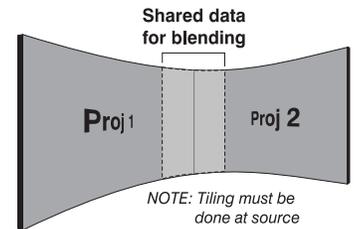
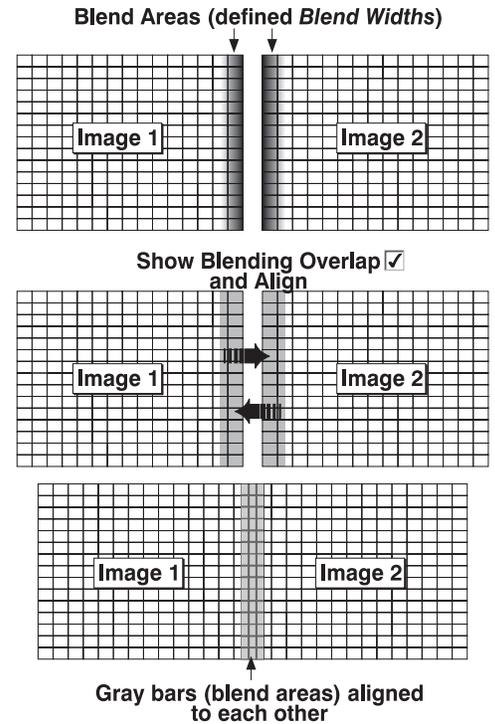
**Other Functions**

For convenience, the *Edge Blending* submenu also includes related options for enabling a specific color and/or test pattern, or for working with colors or the lamp. Such functions duplicate those provided elsewhere in the menu system.

**Edge Blending Procedure**

**BEFORE YOU BEGIN:** Make sure your source hardware and/or software can supply a *tilted* image for the number of projector in use, and that the tiling includes overlapping data of approximately 12.5-25% along shared edges (see Figure 3.36). Tiling not a projector feature.

Physically align the projectors and images from your intended external source, then match colors and Brightness Uniformity.

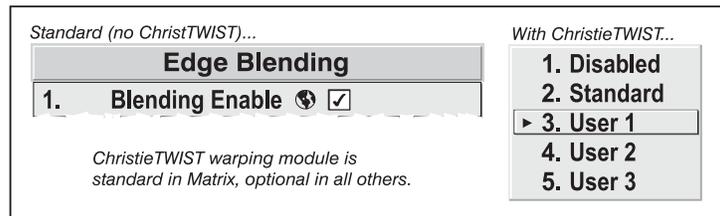


**Figure 3.36. Tiling Example**

**! IMPORTANT !**

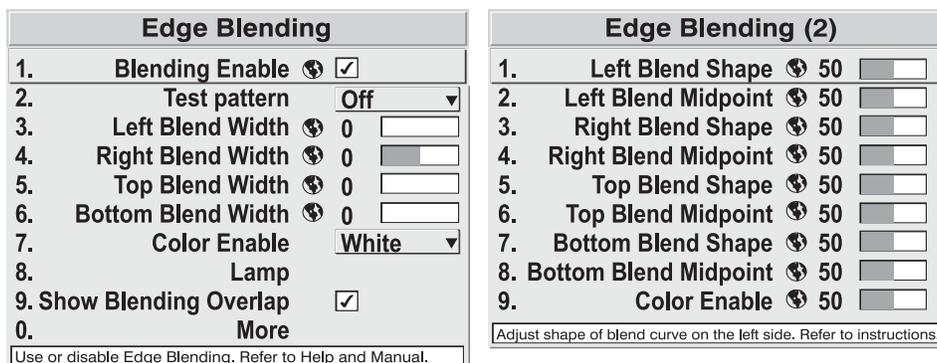
**For a shared edge, the following *Blend* procedures and settings should be identical on BOTH projectors.**

1. Start with 2 full-screen projector images overlapped by approximately 12/5%-25% each. Display full white field test pattern from both.
2. In the *Edge Blending* submenu, enable the top checkbox to activate all controls.



**3. SET STARTING POINTS FOR ADJUSTMENT:**

- Set all blend widths to 0.
- Go to “More” and set everything in the *Edge Blending (2)* menu to 50.

**Figure 3.37. 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 *just* changes to very light gray. For the shared edge, use the same *Blend Width* setting on each projector. If the best effect appears to be between two settings, choose the wider setting for both projectors.
6. **CHECK BLEND:** If the blended region appears too dark or light in relation to the rest of the image:
  - Increase *Blend Midpoint* in both projectors to “lighten” the overall blend, decrease to “darken” the overall blend.
  - Adjust *Blend Shape* in both projectors to fine-tune change the amount of mid-gray intensity (as opposed to black/white) in the blend.
7. Repeat with remaining projectors / overlaps.
8. Check completed display wall with the desired external signal.
9. Adjust mechanical alignment if necessary to maintain perfect pixel-on-pixel alignment over time.

In applications where you are projecting only white or light images, the *Blend Width* may be slightly higher—set according to how much overlap you have between images.

### 3.11 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 1) simple bi-directional ASCII messaging on an Ethernet or serial communication link or 2) a web interface or “ChristieNET” on an Ethernet network.

**VIA ASCII MESSAGING** — Connect a serial link between your controller and the RS232 or RS422 port (recommended), or open an Ethernet socket (i.e., Telnet) between your controller and the valid projector address. Valid ASCII codes and messages are documented in the *Christie Serial Communications* document available at the Christie website.

**VIA WEB INTERFACE** — Connect your PC to the projector’s Ethernet port. In your web browser (*Internet Explorer*, for example), enter the IP address of the projector you wish to control. This will start a password-protected ChristieNET application—enter the factory default “**ccm7**” login and password to open the program. If the projector is powered up, you can access assorted menu options and slidebars.

Repeat for remaining networked projectors as desired. Keep in mind that multiple units can be controlled from one PC, but each unit will be in its own ChristieNET interface (web browser) at the PC. Likewise, you can make up to five separate web locations to a single projector.

The default login provides access to security settings, where you can define other users with the same or fewer rights. Use “unlimited” rights for most applications. For all logins, the *Service* menu is still protected with its own password.

NOTES: **1)** Any proxy server settings that interfere with this type of link should be disabled for using ChristieNET. Disable through Internet Explorer’s < Tools> <Internet Options> <Connections> <LAN Settings>. **2)** Your PC must be Java-enabled to v1.4.2 or higher to run ChristieNET. **3)** Depending on your projector model, certain controls provided through ChristieNET are non-functional.

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### 3.12 Error Conditions

Occasionally the projector will encounter an error condition that can interrupt normal operation. Such a condition can be caused by a simple invalid keypad entry, an input signal error (most common) or a system error. The manner in which users are to be notified of error conditions is set in the *Menu Preferences* menu:

- To see error messages displayed on-screen, select the “**Screen**” or “**All**” 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**”.

Note that a two-digit error code appears in the status LED display window located on the input panel (Electronics Module). Normal operation is indicated by the “On” status code.

#### **User Errors** ➤ **Invalid User Entry**

A keypad entry not recognized by the projector triggers a short on-screen error message identifying the problem. For example, if you specify a channel number that is not available, the message “*Invalid Channel*” will appear. Or if you try to enter the wrong password, you’ll see “*Invalid Password*”. Press  or  to clear the message and try again.

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

**Input Signal Errors** ➤ An input signal error message occurs if you are in presentation level (i.e., there are no menus present) and have selected an input on which the projector detects a problem. While menus remain operational and any key press will temporarily remove any displayed error message, you must resolve the signal problem in order to permanently eliminate the message.

**No Signal**

The message “*No signal*” occurs when there is no source signal detected at the selected input—both HSYNC and VSYNC are inactive and the screen background is black. Connect or correct the signal, or try another input.

**Bad Sync**

The message “*Bad Sync*” occurs when HSYNC or VSYNC are active but the signal cannot be displayed. Such a condition occurs when only one of the two sync signals is present or when either sync signal is unstable or of the wrong frequency. Correct the signal or select another input.

**Other Signal Error Messages**

In addition to the common “*Bad Sync*” and “*No Signal*” errors, you may encounter a signal error message indicating that HSYNC and/or VSYNC are either too fast or too slow. When such a message appears, check the frequencies shown in the *Status* menu. If they are correct, then the 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.

**System Warnings / Errors** ➤ When the projector encounters a system malfunction, either a *System Warning* message or a *System Error* message may appear. Both types of messages are accompanied by a numerical error code on the status LED display. A system malfunction can be cleared with   from presentation level, but may indicate the need for service by a qualified service technician.

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

**System Warnings**

A system *warning* indicates that a system malfunction has been detected (see *Status LED Codes*, below). A system warning message replaces any input signal message and disappears when the input signal status changes. While the projector will remain operational, the message indicates the presence of a potentially serious problem that should be investigated. You can press   to remove the message, but for best results you should reset the projector—power the projector down and up again with the  (power) key.

**System Errors**

A system *error* message indicates that a serious malfunction has been detected and must be investigated as soon as possible (see *Status LED Codes*, below). The projector will no longer operate and must be reset—power the projector down and up again with the  (power) key.

**Status Display**

If the status window shows one of the following values, you have encountered a likely system error requiring the attention of a qualified service technician (see *System Warnings* and *System Errors*, above). Acknowledge and clear the error with   from presentation level, or try resetting the projector by powering it off and on again, cooling when necessary. Consult **Table 3.5** and contact your dealer if the problem persists.

The specific code number identifies the source of the error detected, and is particularly useful in cases where the projector is far away. For example, the code “27” means the lamp could not be turned on. Error codes for this projector are listed in *Table 3.5* below.

**Table 3.5 Error Codes**

Code	Description
<b>GENERAL</b>	
12	Software bug. Contact dealer/factory.
13	CRC error in flash ROM. Download new software.
14	Engineering-only programming is complete. Call Christie, replace TIPM.
15	Attempting to download code without being in boot mode
16	Invalid interrupt. Power off/on. If it persists, contact dealer/factory.
17	User forced system to stay in boot mode
18	Jumper for programming boot not installed
<b>LAMP FAILURES</b>	
20	Lamp on before enabled
24	Both lamps failed
26	Lamp 1 Interlock: lamp door open, lamp not installed
27	Can't turn lamp on
28	Lamp turned off unexpectedly
29	Lamp ballast overheated
2C	Lamp 1 driver UART communication failure
2E	Unable to read valid Lamp ID
31	Lamp 2 not installed
32	Unable to turn Lamp 2 on
33	Lamp 2 shut off unexpectedly
36	Lamp 2 driver failure
<b>POWER AND COOLING</b>	
4C	Projector shutdown due to critical error
51	TIPM fan failed (Fan 1)
53	Lamp 1 fan failed (Fan 3)
54	Lamp 2 fan failed (Fan 4)
55	DMD fan failed (Fan 5)
56	Optional auxiliary fan failed (Fan 6)
<b>TIPM (Image Processor)</b>	
60	Boot code CRC failed
61	Unable to program DigMux PLD
62	Unable to program Control PLD
63	Unable to program BUBKS PLD
64	Unrecognized ROM type
65	Write to flash ROM failed
66	TIPM failure
67	Downloaded code will not fit
68	Scaler communication problem
<b>BUILT-IN KEYPAD</b>	
70	Unable to access EEPROM on the built-in keypad
71	EEPROM memory re-initialization on the built-in keypad
<b>PANEL DRIVER AND FORMATTER</b>	
80	Unrecognized Panel Driver
81	Unable to program device on Panel Driver
82	TI flash download failure
83	TI flash download failure
84	TI flash download failure
85	TI-I2C write failure
86	Communications failure
<b>MISCELLANEOUS</b>	
A0	Unable to program the optional module
A1	Unable to power the optional module
A2	Unable to program the Dual Slot Backplane Module (DSBP)
A3	Unable to program the optional Post Processing Module (Warp module)

Clear system errors with  . If necessary, try resetting the projector by powering it off and on again (cooling if necessary). For detailed information, monitor the RS232 IN port. Contact dealer/factory if error persists. Codes omitted from this table should not appear in your projector.

# Maintenance

## 4.1 Warnings and Safety Guidelines

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

### **WARNING**

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



### **WARNING**

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

### **CAUTION**

**Installation should be performed by qualified personnel.**

**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.**

**Instructions** ➤ **Read all operating instructions prior to using the projector.**

**Projector Location** ➤ Operate the projector in an environment, which meets the operating range 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.

- Lamp Replacement** ➤ You will notice a significant change in the performance of the lamp when it is nearing the end of its life. It is important that the changes in lamp performance are noted and the number of hours the lamp has been in use is considered to effectively maintain the continuous operation of your projector. If a lamp reaches its end of life or has failed during operation it should be replaced as soon as possible.



**It is strongly recommended lamp replacement occur after the projector is powered down and the lamp is cool.**



**Never attempt lamp replacement soon after shutdown. The lamp is under great pressure when hot and may explode causing physical injury and/or property damage. Always allow the lamp to cool completely before handling.**

**During a hot swap, it is strongly recommended power be cut to the lamp that requires replacement – this requires switching lamp modes.**

**Never look or stick hands inside an empty lamp compartment while the other lamp is still ON to prevent injury from U.V. light and heat.**

**Use only the lamps specified and supplied by the manufacturer.**

- Power Cord and Attachments** ➤ Use only the attachments and/or accessories recommended by the manufacturer. Use of others may result in the risk of fire, shock or personal injury.



**Use only the AC power cord supplied by the manufacturer. Do not attempt operation if the AC supply is not within the specified voltage and power range.**

- ◇ Do not set or rest items on the power cord. Locate the projector in an area where the projector cord cannot be abused or damaged by persons walking on it or by objects rolling over it.
- ◇ Operate the projector at the specified voltage only. Do not overload power outlets and extension cords as this can result in fire or shock hazards.
- ◇ The projector is equipped with a three-wire plug having a third grounding pin. This is a safety feature – if you are unable to insert the plug into an outlet contact an electrician to have the outlet replaced. Do not defeat the safety purpose of this grounding-type plug. *NOTE: The power cord supplied with the projector is approved for North American use only. An appropriately rated power cord with IEC320 type plug is required for European and other countries.*

- Ventilation** ➤ Slots and vents in the projector provide ventilation. Never block or cover these openings. This ensures reliable operation of the projector and prevents overheating.
- ◇ Do not place the projector over a radiator or heat register. The projector should not be placed in an enclosure unless proper ventilation is provided.
  - ◇ Do not “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 of any kind into the projector. Should an accidental spill occur, immediately unplug the projector and have it serviced by a qualified service technician.
- Servicing** ➤ If any of the following conditions exist, immediately unplug the projector from the power outlet and ask a qualified service technician to look at it.
- ◇ The power cord has been damaged.
  - ◇ The internal cooling fans do not start operating when the projector is first turned on. (*NOTE: Fans in the lamp ballast will start once lamp is ignited.*)
  - ◇ Liquid has been spilled into the projector.
  - ◇ The projector has been 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) has been badly damaged.

 **WARNING**

**Do not attempt to service the projector yourself. All servicing must be performed by manufacturer accredited service technicians.**

**Use replacement parts that are manufacturer-approved only. Use of any other part other than the ones specified by the manufacturer can result in fire, electric shock or risk of personal injury and irreparable equipment damage.**

## 4.2 Cleaning and Maintenance

The projector itself requires little or no cleaning if it is operated in an environmentally controlled environment. However, if you find that the projector may need some cleaning based on its performance call a qualified service technician.

The table below provides cleaning instruction for those items on the projector that may require periodic cleaning.

 **WARNING**

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

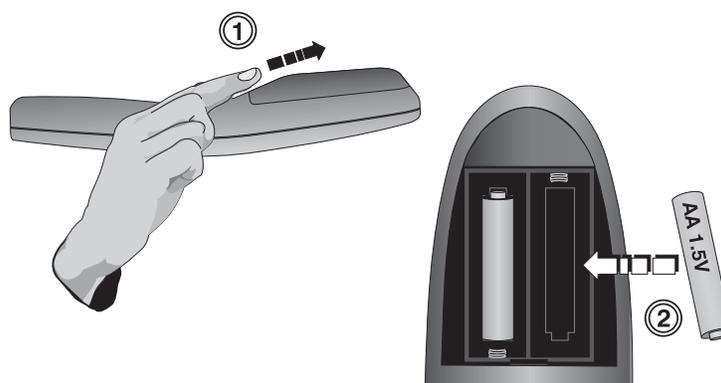
**Table 4.1. Maintenance Guide**

Part Description	Frequency	How to clean
<b>Lens</b>	<i>As required</i>	Clean if absolutely necessary. A small amount of dust on the lens has very little affect on picture quality. <b>To clean:</b> Apply a solvent such as Acetone, Alcohol or Vinegar sparingly to clean, lint-free lens tissue. Wipe in single sweep across the surface of the lens. Do not scrub or rub tissue in circular motion, this will scratch the lens. Do not reuse tissue. Do not use cleaning tools treated with Ether. If particles still appear on the lens, try using compressed air to remove.
<b>Lamp (cleaning)</b>	<i>Clean as required</i>	Clean if absolutely necessary. Never touch the glass surface of the lamp. Any oil (left by fingerprints) will seriously degrade lamp performance or cause “hotspots” which can lead to an accumulation of intense heat in the touched area and cause the lamp to shatter. <b>To clean:</b> Wait until lamp is cool. Moisten a clean, lint-free cotton cloth with isopropyl alcohol and gently rub the surface of the glass in a circular motion until clean.
<b>Lamp (replacement)</b>	<i>As required</i>	Since the projector can be operated in several lamp modes – lamp replacement intervals may vary. If you notice a significant change in the projector’s performance over a short period of time check the lamp hours and status of your lamps. <i>See “Lamp Replacement” later in this section for more details and a complete procedure on lamp replacement.</i>
<b>Adjuster</b>	<i>As required</i>	Remove dust and debris using a clean, lint-free cloth.
<b>Exterior Module Covers</b>	<i>As required</i>	Clean dust from external module covers using a clean, lint free cotton cloth as required. <i>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.</i>

### 4.3 Replacing Remote Batteries

The optional IR remote uses two AA size, 1.5V alkaline batteries. To replace the batteries simply turn the remote over and push out the cover using the finger groove, as shown in (1) Figure 4.1.

Remove and properly discard the old batteries. Insert new batteries in the proper positive/negative orientation as shown etched in the bottom of the compartment (2). Replace the cover by inserting the tabbed end into the opening and snapping the opposite end into place.



**Figure 4.1. Replacing remote batteries (underside of keypad shown)**

### 4.4 Lamp Replacement

The projector uses two identical 100W UHP (Ultra High Pressure) lamps and can be operated with both lamps ON (Dual Lamp Operation mode) or with one lamp ON (Single Lamp Operation mode). One of the projector's main features is that it automatically switches modes, if possible, to maintain continual operation. It is really important to be aware of your projector's status to effectively maintain continuous operation. Another feature of the projector is that you can replace an expired or faulty lamp without having to power the projector down or disrupt your current presentation – this is called “hot-swap”.

*For more information on the lamp operation modes and other options in the Lamp menu, see 3.7 Working with the Lamp.*

#### WHEN SHOULD LAMPS BE REPLACED?

Typically, aging lamps decrease slightly in their intensity. You can check the number of hours each lamp has been in use by checking **Lamp Hours** in individual lamp submenus. From the *Lamp* menu, you can also set a **Lamp Limit** and enable the projector to send a lamp replacement, warning message when it's powered on.

At anytime during operation, you can check the status of a lamp by checking the **Lamp Strike Status** in individual lamp submenus – *More, Lamp 1* or *More, Lamp 2*. You will see one of six states: “Good”, “Cooling Fan #3 Failed”, “Cooling Fan #5 Failed”, “Interlock Tripped”, “Failed to Strike” and “Turned Off Unexpectedly”. A status of “failed to strike” or “turned off unexpectedly” indicates a failure that requires further investigation and may or may not be directly related to the lamp.

If you have ruled 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 for some other reason (check status LEDs and/or error codes through RS-232, if

possible). Burned out lamps or lamps that have failed due to some characteristic flaw should be replaced, as soon as possible.

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

### **About the Lamp Hot-Swap Feature**

A single lamp can be replaced without having to power down the projector. In this case, it is ***strongly recommended*** that you cut power to the lamp you want to replace by switching to the single lamp mode for the lamp you are not replacing. For example, if you want to replace Lamp 1, switch to Single Lamp 2 operation mode. When the lamp is successfully turned on you can proceed with replacement. It may take a minute for the lamp just turned on to reach full brightness, but your presentation will not be interrupted.

*NOTE: When a lamp is removed the safety interlock is “open”. As an added safety feature, a lamp (functional or not) must be installed within two minutes of removing an old lamp, otherwise the projector will automatically power down.*

### **CAN “LIVE” LAMPS BE REPLACED?**

Live lamps (lamps that are still on) can be hot-swapped out of the projector. However, this is not common practice and it is ***strongly recommended*** that you cut power to the lamp you are about to replace by switching Single Lamp modes, as described above.

**▲** If you still want to continue with replacing a “live” lamp it is important to remember that when the lamp is removed the power supply for that side of the module is still active. **Do not stick your hands in the empty lamp compartment!**

*NOTE: If you pull the only “live” lamp out in Single Lamp mode, the projector automatically tries to turn the other lamp on. If this lamp was previously declared as a failed lamp, then the projector automatically powers down.*

### **▲ Before you proceed with lamp replacement.**

- ◇ Read, and make sure you understand the Lamp Replacement procedure before you begin.
- ◇ **▲** Do not stick hands into an empty lamp compartment while the projector is still plugged into an AC outlet.
- ◇ Use caution when handling lamps. Lamps, even those that have been through a cool down period, are still hot due to the temperature emitted by the other operational lamp.
- ◇ **▲** Do not touch the glass surface of the lamp. Handle the lamp by its handle only. Intense heat can accumulate in areas where fingerprints exist. These “hotspots” can lead to an accumulation of intense heat, which may result in the lamp exploding. Wearing clean cotton gloves when handling the lamp will prevent getting fingerprints on the glass surface.

**Replacing a Lamp:**

- Step 1 ➤ Turn the projector off** – If your presentation allows, it is strongly recommended that you power down the projector prior to replacing a lamp. Press **Power** to power down the projector. The projector fans will continue to operate for a short cool-down period. It is recommended that you wait approximately 5 minutes to allow lamps to cool before replacing.

**⚠ WARNING ⚠**

**It is strongly recommended that you allow the lamp to cool before replacing – approximately 5 minutes.**

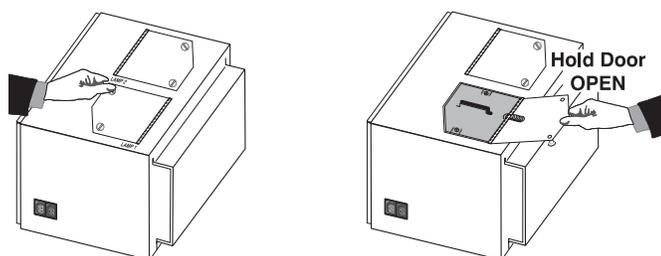
**HOT-SWAP ALTERNATIVE**

***Read About Lamp Hot-Swap on the previous page before proceeding.***

If you choose to replace a lamp without disrupting the current presentation, it is recommended that you switch to the Single Lamp mode for the lamp you are not going to replace. Then proceed with Step 2. *NOTE: The projector will not automatically return to its original Lamp Mode after lamp replacement. This must be done manually, if desired.*

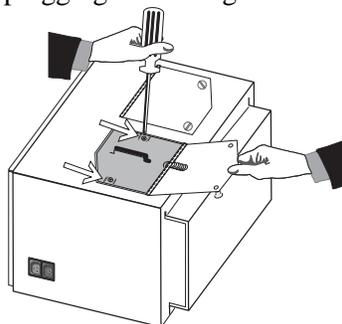
- Step 2 ➤ Open lamp compartment** – Loosen the two screws on the lamp door you want to open. Swing the door open. (Figure 4.2.) *NOTE: Each lamp door is spring-loaded and needs to be held open during lamp replacement.*

*CSP70 – To access the lamp in these units, first remove the rear access panel.*



**Figure 4.2.**

- Step 3 ➤ Remove lamp** – Loosen the two screws securing the lamp in the lamp module. Holding the lamp door open with one hand, grasp the lamp handle and pull straight up to remove the lamp. (Figure 4.3. and Figure 4.4.) (The lamp disconnects from the terminal block much like unplugging something from an outlet.)



**Figure 4.3.**

**⚠ WARNING**

**DO NOT touch the glass surface of the lamp. Set it aside for proper disposal once it has cooled down.**

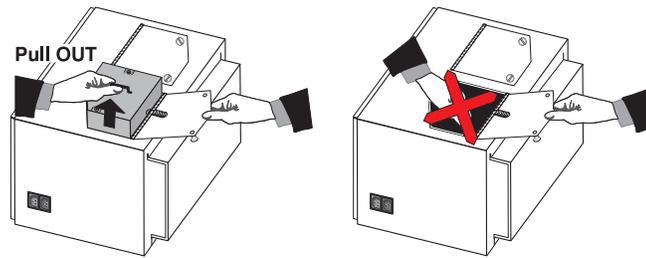
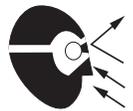


Figure 4.4.

**⚠ WARNING ⚠**



**Never look or stick hands inside an open lamp compartment while the other lamp is still ON. Power is still present in the lamp module and the heat and U.V. light from the remaining operational lamp could cause physical injury.**



**Step 4 ➤ Insert new lamp**

- a) Hold the new replacement lamp above the lamp compartment. Align the two holes on the lamp module with the locating pins located on the edge of the lamp compartment. See Figure 4.5.
- b) Slide the lamp all the way down until it is fully seated into the compartment. See Figure 4.6.
- c) Tighten the two screws on the lamp module just until snug to hold it in place.

**⚠ DO NOT over-tighten lamp screws as it could potentially damage the lamp module.**

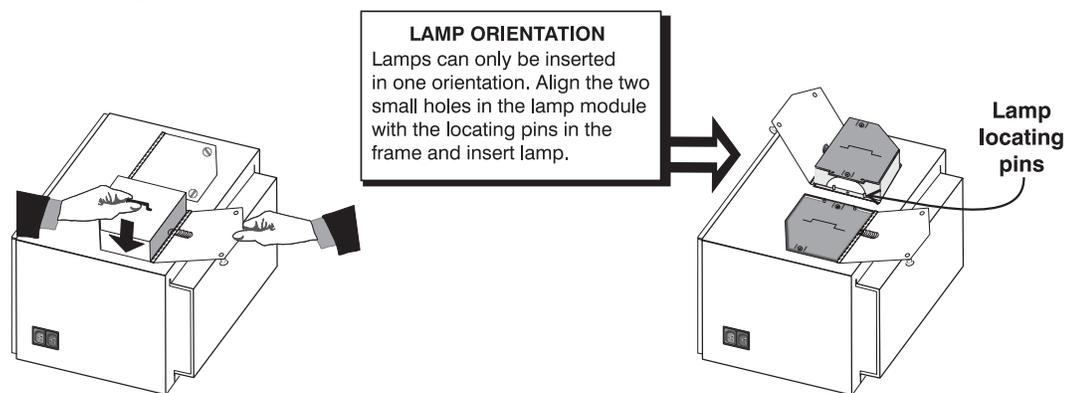
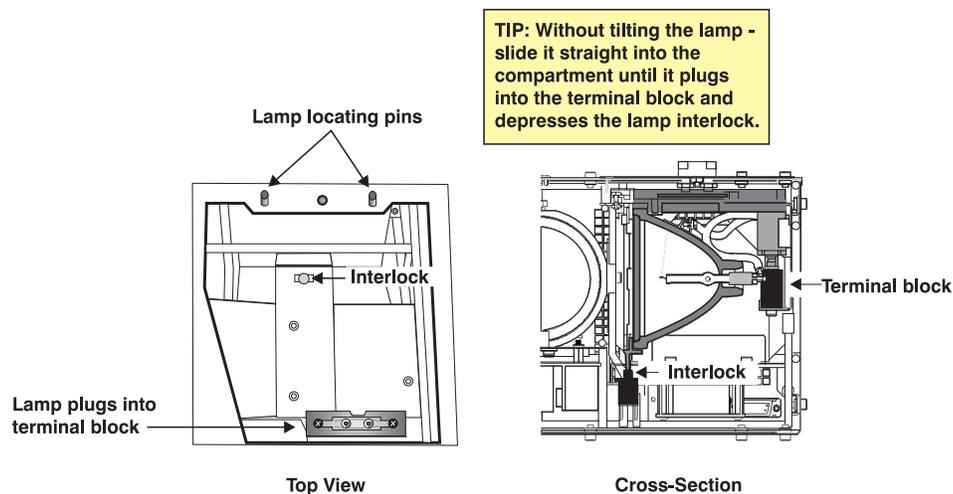


Figure 4.5



**Figure 4.6. Inside the Lamp Compartment**

- Step 5** ➤ **Close lamp door** – Once the lamp is inserted, carefully close the spring-loaded lamp door and lock it by tightening the two lamp door screws.

**⚠ Watch your fingers! The lamp door is spring-loaded and will snap close. Keep fingers clear from the lamp compartment opening when closing the lamp door.**

- Step 6** ➤ **Turn the Projector on (if applicable) or Switch back to the original Lamp Operation Mode** – Press **Power** to turn the projector on. If you performed a hot-swap, use the *Lamp* menu to return to the original lamp operation mode you were in.

- Step 7** ➤ **Reset Lamp Hours** – Access the *Lamp* menu (item 5. in *Main Menu*) and select the submenu for the lamp that you are replacing – *More, Lamp 1* or *More, Lamp 2*. From the submenu, select the **Change Lamp** option. Enter the new serial number in the **Lamp S/N** text box. When the new number is recorded, the lamp timer will automatically reset to “0” hours and begin to log time.

*NOTES: 1) Once entered, the new lamp serial number is also automatically added to the Lamp History submenu (read-only). 2) Lamp life data is required for warranty claims.*

### **IMPORTANT**

**If you fail to enter a serial number the lamp timer will not automatically reset to “0” and inaccurate lamp hours will be shown in the Status menu. The lamp life limit may then expire prematurely.**



# Troubleshooting

If the projector does not appear to be operating properly, note the symptoms present and use the following guide to assist you. If you cannot resolve the problems yourself, contact your dealer for assistance.

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

## 5.1 Power

### **Symptom** ➤ **The projector is on but there’s no display...**

#### **CAUSE / REMEDY:**

1. Was a lens cover accidentally left on? Remove lens cover.
2. Is the lamp ignited? Check for interlock problems such as an open lamp door OR check for light spillage out the back.
3. Is the correct input selected? Check cable connections.
4. Check if menus appear on screen.
5. Can you access test patterns? Make sure there is not a full black test pattern selected for display—press   to access test patterns, then cycle patterns with   keys. Check your source connections again.
6. Is there an error code present? An internal system error can prevent the projector from operating. Check the status display for an error code. If the problem persists, contact a qualified service technician.

### **Symptom** ➤ **The projector does not respond to the IR remote keypad...**

#### **CAUSE / REMEDY:**

1. Check keypad batteries.
2. Make sure the transmission path between the IR remote and projector is not block in any way.
3. Keep ambient lighting to a minimum.
4. Make sure the keypad has not been disabled for use with this projector. Press  to broadcast to all projectors.

### **Symptom** ➤ **The projector powers down unexpectedly...**

#### **CAUSE / REMEDY:**

1. Check status display for an error code.
2. Have the lamps reached their end of life? Check lamp hours using the RS-232 command. Replace lamp(s) if necessary.
3. Ensure lamp fans are operational. Lamps will shut down if a fan fails during operation. Check status display for any error code.

4. The projector will power down if the lamps were installed incorrectly or have failed. If the projector powers down during lamp replacement, it likely indicates the interlock has been in the open state for more than the allowed 2-minute time frame. During a hot swap, make sure to install a lamp (good or bad) back into the lamp compartment within 2 minutes otherwise the projector will power down.

---

## 5.2 Displays

**Symptom** ➤ **Image appears “squeezed” or vertically stretched into center of screen**

**CAUSE / REMEDY:**

1. Check your Resizing selection.

**Symptom** ➤ **The display is jittery or unstable...**

**CAUSE / REMEDY:**

1. If the display is jittery or blinking erratically, ensure that the source is properly connected and of adequate quality for detection. With a poor quality or improperly connected source, the projector will repeatedly attempt to display an image, however briefly.
2. The horizontal or vertical scan frequency of the input signal may be out of range for the projector. Refer to *Section 6, Specifications* for scan frequency ranges.
3. The sync signal may be inadequate. Correct the source problem.

**Symptom** ➤ **The display is faint...**

**CAUSE / REMEDY:**

1. Brightness and/or contrast and/or gamma may be set incorrectly.
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. Check if the lamp operation mode has changed. Check RS-232, status display and lamp status for an indication of whether a lamp failed, or if a fan failed.

**Symptom** ➤ **Turning White Boost ON appears to dim image...**

**CAUSE / REMEDY:**

1. For all new sources, perform **Auto Setup** (Main menu) and enable **Auto Input Levels** before applying White Boost. Auto Setup should automatically optimize your Input Levels for the most common sources. Only trained technicians should modify Input Levels if further adjustment is required.

**Symptom** ➤ **The display suddenly went dim...**

**CAUSE / REMEDY:**

1. Check to see if the lamp operation mode changed from Dual Lamp to Single lamp – this could be due to a lamp failure, fan failure or if the lamp has expired.

**Symptom** ➤ **The upper portion of the display is waving, tearing or jittering...**

**CAUSE / REMEDY:**

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

**Symptom** ➤ **Portions of the display are cut off or wrap to the opposite edge...**

**CAUSE / REMEDY:**

1. Resizing and/or blanking may need adjustment.
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.

**Symptom** ➤ **The display appears compressed ...**

**CAUSE / REMEDY:**

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.

**Symptom ➤ Data is cropped from edges****CAUSE / REMEDY:**

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.

**Symptom ➤ Display quality appears to drift from good to bad, bad to good...****CAUSE / REMEDY:**

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.

**Symptom ➤ The display has suddenly frozen...****CAUSE / REMEDY:**

1. It's 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.

**Symptom ➤ Colors in the display are inaccurate...****CAUSE / REMEDY:**

1. Try Auto Setup.
2. The color, tint, color space, color temperature and/or other settings may require adjustment.
3. Ensure signal connections are correct.
4. Make sure you are using the proper channel for this source.

**Symptom ➤ Values in Color Saturation slidebars vary over time...****CAUSE / REMEDY:**

1. Once defined, *Color Saturation* slider values fluctuate over time and will likely be different upon subsequent visits to this menu. This is normal and should be ignored, as these changes do not redefine the x/y coordinates or color gamut.

**Symptom ➤ The display is not rectangular...****CAUSE / REMEDY:**

1. Check leveling of the projector. Make sure 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.

**Symptom** ➤ **The display is “noisy”...**

**CAUSE / REMEDY:**

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. Make sure the video input is terminated (75Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the *last* source input only.
3. The input signal and/or signal cables carrying the input signal may be of poor quality.
4. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
5. If the source is a VCR or off-air broadcast, detail may be set too high.

**Symptom** ➤ **The display suddenly went dim...**

**CAUSE / REMEDY:**

1. Lamp operation mode switched from Dual Lamp to Single Lamp – check the Lamp menu to confirm lamp status and operation mode. A lamp may require replacement.

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**5.4 Ethernet**

1. Make sure the Ethernet settings are valid for your site—all network devices should have the *same* subnet mask and *unique* IP addresses.
2. Make sure to save any address change, and re-boot to implement.  
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.

# Specifications

## 6.1 Specifications

*NOTES: 1) Due to continuing research, specifications are subject to change without notice. 2) Specifications apply to all models unless otherwise noted.*

### Display ➤ Display Resolution

SXGA+ resolution, 1400 x 1050 pixels

### Brightness (typical)

Product	Lamp Mode	100W UHP		120W UHP	
		Standard Mode	Boost Mode	Standard Mode	Boost Mode
<b>RPMSP</b>	<i>Single</i>	315 lumens	450 lumens	375 lumens	550 lumens
	<i>Dual</i>	630 lumens	900 lumens	750 lumens	1100 lumens
<b>CSP70 (Wide Angle Screen 102-106001)</b>	<i>Single</i>	54 cd/m <sup>2</sup>	77 cd/m <sup>2</sup>	64 cd/m <sup>2</sup>	94 cd/m <sup>2</sup>
	<i>Dual</i>	108 cd/m <sup>2</sup>	154 cd/m <sup>2</sup>	129 cd/m <sup>2</sup>	189 cd/m <sup>2</sup>

### Contrast Ratio

1100:1 full field on/off

### Gray Scale and Color Resolution

8 bits resolution

16.8 million displayable colors

### Color Temperature

Default

White Boost ON, 100% white 5500K ± 500K

White Boost OFF, 100% white 5300K ± 500K

Range of adjustment 3200K – 9600K

### Brightness Uniformity (dual lamp mode)

*RPMSP*

➤ 90%, adjustable to 100% uniformity

**Wide Angle Screen (102-106001)**

CSP70

Horizontal viewing angle	180° viewing range, ½ gain angle, ± 35°
Vertical viewing angle	180° viewing range, ½ gain angle, ± 35°
On-axis peak gain	0.82±0.1
Type	Fresnel/Lenticular (black bead)
Surface finish	Low reflective

**Picture Offset and Adjustment Range\*(6-axis)**

Horizontal (side to side)	+1.0”/-1.0” from zero ± 0.05”
Vertical (up/down)	+0.85”/-0.85” from zero ± .006”
Translation (toward/away from screen)	+1.2”/-1.2” from zero ± 0.05”
Yaw (horizontal keystone)	+3.0°/-3.0° from zero ± 1/4°
Pitch (vertical keystone)	+5.0°/-5.0° from zero ± 1/4°
Roll (image tilt)	+5.0°/-5.0° from zero ± 1/4°

*\*Note: Zero position is factory set.*

**Source Input Compatibility ► Analog RGB (interlaced or progressive scan formats)**

Horizontal frequency range	15 – 120 kHz
Vertical frequency range*	23.97 – 150Hz
Scan format	Interlaced or progressive
Pixel clock rate	13 – 210 MHz maximum
Input Levels	
R, G, B – with sync	1.0Vp-p ±2dB (0.79Vpp-1.26Vpp)
R, G, B – without sync	0.7Vp-p ±2dB (0.56Vpp-0.88Vpp)
Pb, Pr	0.7Vp-p ±2dB (0.56 Vpp-0.88Vpp)
DC Offset	±2V
Nominal Impedance	75 ohms

*\*Specifies rate for 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. (i.e., frames will be dropped)*

**Sync (interlaced or progressive scan formats)**

Horizontal frequency range	15 – 120 kHz
Vertical frequency range*	23.97 – 120Hz
Scan format	Interlaced or progressive
Sync Types	Separate H and V Composite (bi-level, tri-level, XOR) Sync-on-green/luma (bi-level, tri-level) MarcoVision™
Polarity**	positive or negative
Input Level**	0.5Vp-p – 4.0Vp-p
Nominal Impedance**	75 ohms
Horizontal Sync Duty Cycle	3% min, 20% max

*\* Specifies rate for 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.*

*\*\* Does not apply to sync-on-green/luma*

**Composite Video and S-Video**

Signal Formats	Composite (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 (incl. sync tip)
S-video luma (Y)	1.0Vp-p±3dB (incl. sync tip)
S-video chroma (C)	630mV nominal (burst)
DC Offset	±2V
Nominal Impedance	75 ohms
Maximum return loss (VSWR)	20dB min (1.2:1 max) @ 6 MHz

**DVI Analog**

Input Characteristics	The same as Analog RGB except as noted :
Formats	RGB or YPbPr – video signal cannot be routed to the decoder
Sync Types	Separate H and V, direct or swapped Bi-level – TTL levels only Composite (XOR, OR) Sync on green Serrations and/or Equalization pulses MacroVision™ for standard & progressive video
Analog Sync Input Impedance	1kΩ

**DVI Digital**

Signal Characteristics	Meets the DVI specification
Max cable length	5m
Max pixel rate	165 Mpix/s
EDID	supported
HDCP	supported

**Control Signal Compatibility**

➤ **Built-in Status Display**

Display Twin 7 segment display

**Remote Control (with laser)**

Type IR with wired ability  
 Carrier frequency 38kHz  
 Range 30 m  
 Number of sensors 1 (*located below lens*)  
 Laser Pointer included  
 Battery Type (2 required) AA, 1.5V Alkaline

**Wired Control Input**

Wired connector type 3.5mm plug  
 Input Levels High 2.2V min, Low 0.9V max.

**Serial Ports**

RS232 1 male DB9 connectors (RS232 out)  
 1 female DB9 connector (RS232 in)  
 RS422 1 female DB9 connector

**Networking**

Ethernet 1 RJ45 connector

**Power Requirements**

➤ **▲ General**

Voltage Range 100 – 240 VAC nominal  
 Line Frequency 50Hz – 60Hz nominal  
 Inrush current 68 A max  
 Current rating *One lamp ON*  
 2.5A @ 100V (typical), 1.1A @ 240V (typical)  
*Two lamps ON*  
 4.0A @ 100V (typical), 1.7A @ 240V (typical)  
 Power Consumption One lamp ON – 250W nominal  
 Two lamps ON – 400W nominal

**▲ Line Cord**

*North American* heavy duty 10', 125VAC 15A

**▲ Plug**

*North American* NEMA 5-15P

<b>Lamps</b> ➤	Type	100/120W UHP
	Power	100/120 Watts
	Warm up to full brightness	5 minutes
	Operating position	± 20 degrees tilt from horizontal plane

<b>Lens</b> ➤	0.7:1 for RPSMP (38-GFX010-01) and CSP70 (102-002001)
	1.16:1 for RPMSP (38-GFX011-01)

<b>Color Wheel</b> ➤	Type	4 segment (R, G, B, W)
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**Operating Environment** ➤ **Operating RPMSP**

Temperature	6°C to 35°C
Humidity	20% to 80% non-condensing
Altitude	0 to 3000 meters
Storage	-20 to 50°C, 20% to 80% relative humidity, non-condensing

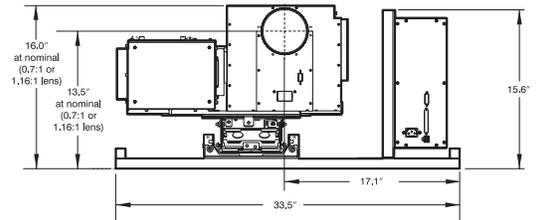
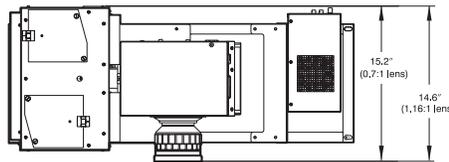
**CSP70 with Wide Angle Screen**

Temperature	17°C to 31°C
Humidity	40% to 60% non-condensing
Altitude	0 to 3000 meters
Storage	-20 to 35°C, 35% to 65% relative humidity, non-condensing

**Size & Weight** ➤ **RPMSP**

Weight < 77lb.  
(Unpacked without lens and including adjuster)

Size  
(includes lens, adjuster and mounting rails – lens horizontal position shown)

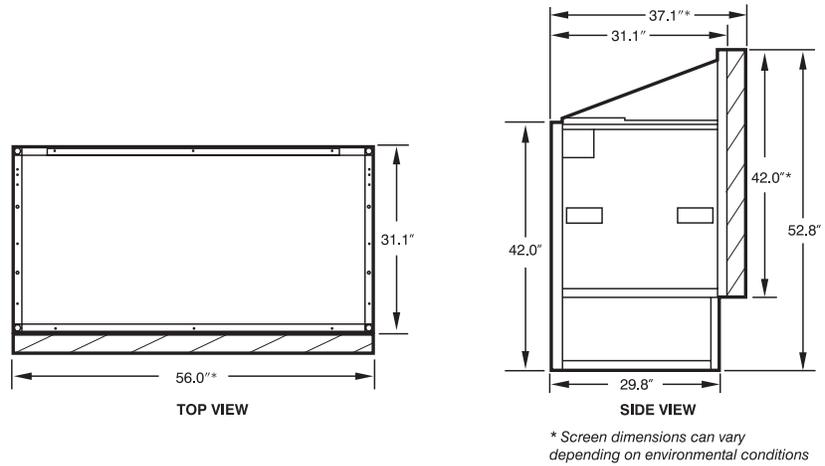


**CSP70**

Weight 220 lbs  
(without screen, top cover, pedestal or packaging)

Stacking Limit - Vertical ▲ 4 max – NOTE: External support necessary to ensure stability and prevent tipping.

Size



**Regulatory** ➤ **Safety and Regulatory**

- CAN/CSA C22.2 No. 60950-00
- ANSI/UL 60950 3<sup>rd</sup> Edition
- UL 1950 3<sup>rd</sup> Edition
- EN60950, 2000 European Norm, Safety of Information Technology Equipment
- China Compulsory Certificate (CCC)

**Electro-Magnetic Compatibility (E.M.C) 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)

**Electro-Magnetic Compatibility (E.M.C) 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

**Optional Accessories** ➤ **Optional Interfaces**

- RGB 500 Input Module (38-804606-xx)
- RGB 400 Active Loop Thru Input Module (38-804607-xx)
- RGB 400 Buffered Amplifier Input Module (38-804610-xx)
- PC250 Analog Input Module (38-804609-xx)
- Serial Digital Input Module (38-804602-xx)
- Digital HDTV Input Module (38-804611-xx)
- Video Decoder Module (38-804600-01)
- Dual SD/HD/SDI (38-804656-01)

**RPMSP**

User's Kit 102-108001

*(includes user and installation manuals, setup tools, and IR remote keypad)*

**CSP70**

70" Wide Angle LG Screen 102-106001

Pedestal 102-107001

Pedestal Side Panel Kit 102-104001

Top Cover Kit 102-105001

Eyebolt Kit 38-804839-01

User's Kit 102-108001

*(includes user and installation manuals, setup tools, and IR remote keypad)*



# Glossary

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This appendix defines the specific terms used in this manual as they apply to this projector. Also included are other general terms commonly used in the projection industry.

- Active Line Time** ➤ The time, inside one horizontal scan line, during which video is generated.
- Ambient Light Rejection** ➤ The ability of a screen to reflect ambient light in a direction away from the "line of best viewing". Curved screens usually have good ambient light rejection. Flat screens usually have less ambient light rejection.
- Analog Video** ➤ The video output of most computers and videotape machines. Analog video can generate a large number of colors.
- Anamorphic** ➤ Having or requiring a linear distortion, generally in the horizontal direction. Anamorphic lenses can restore a 'scope' (CinemaScope) or 'flat' format film frame to the correct wide-screen appearance by increasing its horizontal proportion.
- ANSI** ➤ The American National Standards Institute is the organization that denotes the measurement standard for lamp brightness.
- Aspect Ratio** ➤ The ratio of the width of an image to its height, such as the 4:3 aspect ratio common in video output. Can also be expressed as a decimal number, such as 1.77, 1.85 or 2.39. The larger the ratio or decimal, the wider and "less square" the image.
- Auto Source** ➤ The ability of the projector to automatically recognize and synchronize to the horizontal and vertical scan frequencies of an input signal for proper display.
- Bandwidth** ➤ The frequency range of the projector's video amplifier.
- Baud Rate** ➤ The speed (bits-per-second) at which serial communications travel from their origin.
- Blanking Time** ➤ The time inside one scan line during which video is not generated. The blanking time of the input signal must be equal to or greater than the retrace time of the projector.
- Brightness** ➤ In projection, brightness usually describes the amount of light emitted from a surface such as a screen. It is measured in foot-lamberts or candelas per square meter.
- Candela or Candle** ➤ Unit of measure for measuring intensity of light.
- Channel** ➤ A collection of measurements stored by the projector for a given input source, including frequencies, pulse width, polarity, syncs, channel number and location, user-adjustable display settings, etc. Use channels to switch between a variety of setups quickly, automatically recalling previously defined display parameters.
- Channel List** ➤ A list/menu of previously-defined channels available in projector memory.

- Channel Number** ➤ A number that uniquely identifies a specific channel retained in projector memory. The projector can retain up to 50 channels.
- Checkbox** ➤ A menu item that indicates whether an option is currently in effect (checked) or not (unchecked).
- Chrominance** ➤ The signal representing the color information (hue and saturation) when the image is represented as separate chrominance and *luminance*. Same as “chroma”.
- Color Gamut** ➤ The range of colors allowed in a specific system, as defined within a triangular area located on the CIE color locus diagram whose corners are the three primaries defined in the system. Also known as color space.
- Color Shift** ➤ A change in the tint of a white field across an image.
- Color Temperature** ➤ The coloration (reddish, white, bluish, greenish, etc.) of white in an image, measured using the Kelvin (degrees K) temperature scale. Higher temperatures output more light.
- Component Video** ➤ See *YCbCr* or *YPbPr*.
- Composite Video** ➤ The output of video tape players and some computers, characterized by synchronization, luminance and color signals combined on one output cable.
- Contrast (ratio)** ➤ The degree of difference between the lightest and darkest areas of the image.
- Convergence** ➤ The alignment of the red, green, and blue elements of a projected image so that they appear as a single element.
- Curved Screen** ➤ A projection screen which is slightly concave for improved screen gain. Curved screens usually have screen gains, which are greater than 1 but viewing angles much less than 180°. Curved screens are not recommended for use with this projector.
- DDC** ➤ The Display Data Channel VESA standard enables communication between PCs and monitors, and is based on E-EDID protocol.
- DDI** ➤ A “direct digital interface” signal can be supplied to the projector via an optional digital input module installed in **INPUT 5**. For example, you can input an SMPTE-259M signal using a *Serial Digital Input Module* or input an SMPTE-272M signal from a *Digital HDTV Serial Input Module*.
- DMD™** ➤ Digital Micromirror Devices™ used in this projector for processing red, green, and blue color data.
- Decoder** ➤ Located at **INPUT 3** and **INPUT 4**, this device converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M, or SECAM to RGB video.
- Detail** ➤ The sharpness of a display from a video source.
- Diffused Screen** ➤ A type of rear-projection screen which spreads the light striking it. Screen gain is less than 1 but audience viewing angles are increased.
- Display Setting** ➤ An adjustment that affects the display of an image. Such display settings include contrast, brightness, tint, blanking, size, offsets, and others.

- Dot Clock** ➤ The maximum frequency of the pixel clock. Also known as pixel clock rate.
- E-EDID** ➤ The Enhanced Extended Display Identification Data standard, established by VESA, enables properties (such as resolution) of a display device to be detected by the display card in a controlling device such as a PC. The PC, in turn, can then output in a matching format to fill the display. Some sources used with the projector are VESA E-EDID reported.
- Flicker** ➤ A very rapid variation in image brightness caused by a frame rate that is too slow. (See *Interlace*) See also *Lamp Flicker*.
- Foot-candle** ➤ The intensity of visible light per square foot.
- Foot-lambert** ➤ The luminance (brightness) which results from one foot-candle of illumination falling on a perfectly diffuse surface.
- Frame Rate** ➤ The frequency at which complete images are generated. For non-interlaced signals, the frame rate is identical to the vertical frequency. For interlaced signals, the frame rate (also known as field rate) is one half of vertical frequency.
- Gain or Screen Gain** ➤ The ability of a screen to direct incident light to an audience. A flat matte white wall has a gain of approximately 1. Screens with gain less than 1 attenuate incident light; screens with gain more than 1 direct more incident light to the audience but have a narrow viewing angle. For example: An image reflecting off a 10 gain screen appears 10 times brighter than it would if reflected off a matte white wall. Curved screens usually have larger gain than flat screens.
- GPIO** ➤ General Purpose Input Output, used for remote control of a limited number of programmable functions by direct signal or dry-contact connection.
- HDTV** ➤ High-definition Television (1035, 1080 and 1125 lines interlace, and 720 and 1080 line progressive formats with a 16:9 (i.e. 1.77) aspect ratio.
- Help Text** ➤ A display of help information regarding the current task or presentation.
- Horizontal Frequency** ➤ The frequency at which scan lines are generated, which varies amongst sources. Also called horizontal scan rate or line rate.
- Horizontal Offset** ➤ The difference between the center of the projected image and the center of the projector lens. For clarity, offset is often expressed as the maximum amount of the image that can be projected to one side of the lens center without degrading the image quality. Horizontal offset ranges can be affected by the type of lens in use, and whether or not the image is offset vertically at the same time.
- Hot Spot** ➤ A circular area of a screen where the image appears brighter than elsewhere on the screen. A hot spot appears along the line of sight and "moves" with the line of sight. High gain screens and rear screens designed for slide or movie projection usually have a hot spot.
- Input** ➤ A physical connection route for a source signal, described by a 2-digit number representing 1) its switcher/projector location and 2) its slot in the switcher/projector.
- Input Signal** ➤ Signal sent from a source device to the projector.

- Interface** ➤ A device, such as the *Serial Digital Input Module*, that accepts an input signal for display by the projector.
- Interlace** ➤ A method used by video tape players and some computers to double the vertical resolution without increasing the horizontal line rate. If the resulting frame/field rate is too low, the image may flicker depending on the image content.
- Keypad** ➤ A small push-button device for controlling most projector settings and operation. For more information, refer to 3.3, *Using the Keypad*.
- Keystone** ➤ A distortion of the image which occurs when the top and bottom borders of the image are unequal in length. Side borders both slant in or out, producing a “keyhole” shaped image. It is caused when the screen and lens surface are not parallel, or (in “X” models) by poor Keystone adjustment.
- Lamp Flicker** ➤ As the lamp ages, the shape of two anodes may change from two points to a flattened state. When this occurs, the arc jumps across the gap from varying points. This is seen as image flicker. Turning the Lamp Conditioning feature ON will pulse the lamp and gradually “condition” the two anodes back to two points. Lamp Conditioning may take seconds, minutes or hours to reach full effectiveness. NOTE: Lamp flicker can occur at any time in the lamp's life. The length of time, over which flicker may occur varies considerably and unpredictably. This behavior is inherent in UHP lamps.
- Linearity** ➤ The reproduction of the horizontal and vertical size of characters and/or shapes over the entire screen.
- Line of Best Viewing** ➤ When light from a projector is incident on a screen, the light reflects from the screen such that the angle of reflection equals the angle of incidence. The Line of Best Viewing is along the line of reflection.
- LiteLOC™** ➤ A Christie software feature where samples of output light from a projector trigger automatic adjustments in the lamp ballast power in order to maintain a constant light output over time. Also known as brightness tracking.
- Loophrough (Loophtru)** ➤ The method of feeding a series of high impedance inputs from a single video source with a coaxial transmission line in such a manner that the line is terminated with its characteristic impedance at the last input on the line.
- Lumen** ➤ The unit of measure for the amount of visible light emitted by a light source.
- Luminance** ➤ The signal representing the measurable intensity (comparable to brightness) of an electronic image when the image is represented as separate *chrominance* and *luminance*. Luminance also expresses the light intensity of a diffuse source as a function of its area; measured in lumens or candles per square foot (1 lumen per square foot = 1 *footlambert*). SMPTE RP 98 calls for a luminance of 12 to 22 footlamberts for theatre screens. See: *Footlambert*.
- Lux** ➤ The amount of visible light per square meter incident on a surface.  
*1 lux = 1 lumen/square meter = 0.093 foot-candles*
- Menu** ➤ A list of selectable options displayed on the screen.

- 
- NTSC Video** ➤ A video output format of some video tape and disk players. There are two types of NTSC (National Television Standards Committee) video: NTSC 3.58 and NTSC 4.43. NTSC 3.58 is used primarily in North America and Japan. NTSC 4.43 is less commonly used.
- Optical Screen** ➤ A type of rear-projection screen which re-directs light through the screen to increase image brightness in front of the screen. Screen gain is usually greater than 1 but audience viewing angles are reduced.
- PAL Video** ➤ PAL (Phase Alternating Line) video is a 50 Hz standard with 768 x 576 resolution. It is found on some video tape and disk players (used primarily in Europe, China and some South American and African countries).
- Pixel** ➤ The smallest discernible element of data from a computer-generated image.
- Pixel Phase** ➤ The phase of the pixel sampling clock relative to incoming data.
- Pixel Tracking** ➤ The frequency of the pixel sampling clock, indicated by the number of pixels per line.
- Presentation Level** ➤ The projector is at presentation level when an image from a source is displayed without the presence of a slidebar, menu, pull-down list, or error message.
- Projector-to-Screen Distance** ➤ The distance between the projector's front feet centers and the screen. Also called "Throw Distance".
- Protocol** ➤ The type of code format called "A" or "B" utilized by the remote keypad(s). The default protocol set at manufacture is Protocol "A". By using two different keypad protocols, adjacent projectors can be controlled independently with their remote IR keypads.
- Pull-down List** ➤ A selectable menu item that unfolds into a list of options pertaining to it.
- QuVis** ➤ A manufacturer of a digital video recorder/player/server, QuBit, frequently used for providing digital cinema data. QuVis image compression uses a proprietary technology called Quality Priority Encoding, based on *wavelets*, in which the user selects a quality level based on *signal-to-noise ratio*. The data rate varies to efficiently maintain that quality level. Frames are coded individually.
- Rear Screen** ➤ A translucent panel for screen projection. Incident light travels through the incident surface of a rear screen and forms an image on the other surface.
- Resizing** ➤ The ability to manipulate through software commands the physical size, placement and/or aspect ratio of an image.
- Resolution (lens)** ➤ The maximum number of alternate white and black horizontal lines that can be distinguished on a screen when a photographic target is placed between the lens and a light source and illuminated by that source.
- Resolution (projector)** ➤ The maximum number of pixels that the projector can display horizontally and vertically across an image, such as 1024 x 768 (called XGA).
- Retrace Time (Horizontal)** ➤ The minimum time required for a CRT projector to move the position of the scanning spot from the right edge to the left edge.
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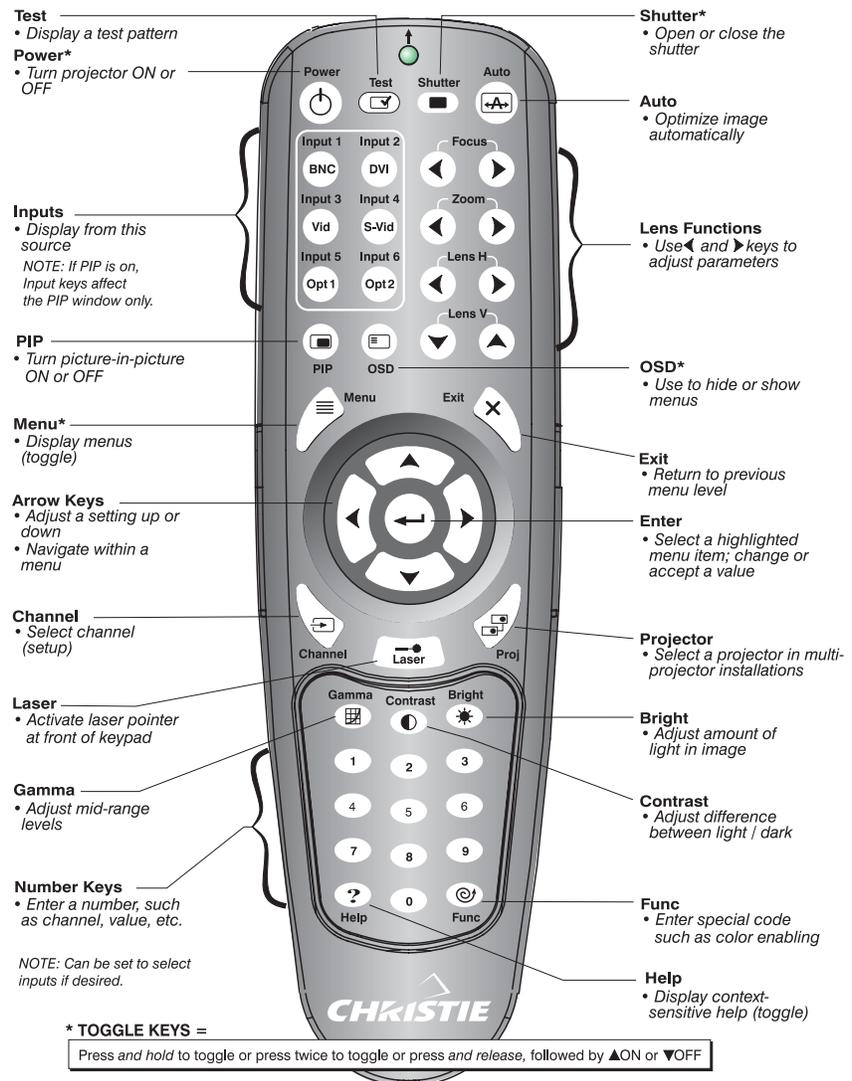
- Rise Time** ➤ The time required by the video amplifier of the projector to increase its output from 10% to 90% of the maximum value.
- RGB Video** ➤ The video output (analog or digital) of most computers. Analog RGB video can have 3, 4, or 5 wires — one each for red, green, and blue, and either none, one or two for sync. For three-wire RGB, the green wire usually provides sync. (See TTL Video).
- RS-232** ➤ A common asynchronous data transmission standard recommended by the Electronics Industries Association (EIA). Also called serial communication.
- RS-422** ➤ A less common asynchronous data transmission standard in which balanced differential voltage is specified. RS-422 is especially suited to long distances.
- S-Video** ➤ The output from certain video tape players and video equipment. S-Video separates sync and luminance from color information, typically producing a higher quality display than composite video.
- Scan Frequency** ➤ The horizontal or vertical frequency at which images are generated. Also known as scan rate or refresh rate.
- Scan Line** ➤ One horizontal line on the display.
- Scan Rate** ➤ The horizontal or vertical frequency at which images are generated.
- SECAM** ➤ A video output format of some video tape and disk players (used primarily in France). SECAM (Sequentiel Couleur à Mémoire) signals are similar in resolution and frequency to PAL signals. The primary difference between the two standards is in the way color information is encoded.
- Slider** ➤ A slider is a graphical display of an adjustable setting. The numerical setting often represents a percentage but can be a specific unit such as degrees Kelvin.
- Source** ➤ The device, such as a computer or VCR, connected to the projector for display. A source may have numerous corresponding channels defined and recognized by the projector. See *Input*.
- Source Setup** ➤ See *Channel*.
- Switcher** ➤ A signal selector that can be connected to a projector for the purpose of adding more sources.
- Sync** ➤ This term refers to the part of the video signal that is used to stabilize the picture. Sync can occur in three forms:
  1. "Composite sync": the horizontal and vertical components are together on one cable.
  2. "Sync-on-green": the sync is part of the green video.
  3. "Separate sync" or "H.SYNC and V.SYNC": the horizontal and vertical components of the sync are on two separate cables.
- Sync Width** ➤ The duration of each sync pulse generated by a computer. The sync width is part of the blanking time.
- TTL Video** ➤ A type of RGB video with digital characteristics.

- 
- Terminated** ➤ A wire connecting a single video source to a display device, such as a projector, must be terminated by a resistance (usually  $75\Omega$  for video).
- Throw Distance** ➤ The distance between the front feet of the projector and the screen. Also called "Projector-to-Screen Distance". Always use the correct Christie throw distance formula to calculate the proper throw distance ( $\pm 5\%$ ) required for your lens.
- Throw Ratio** ➤ Throw ratio = throw distance / screen width. Typically used to differentiate lenses.
- Tint** ➤ Balance of red-to-green necessary for realistic representation of NTSC signals.
- Variable Scan** ➤ The ability of a projector to synchronize to inputs with frequencies within a specified range.
- Vertical Frequency** ➤ The frequency at which images are generated. Vertical frequencies vary amongst sources. Also called vertical scan rate.
- Vertical Offset** ➤ The difference between the center of the projected image and the center of the projector lens. For clarity, offset is often expressed as the maximum amount of the image that can be projected above or below the lens center without degrading the image quality. Vertical offset ranges depend on the type of lens in use, and whether or not the image is offset horizontally at the same time.
- Video** ➤ The signal that is used by display devices (such as projectors) to generate an image. This term also refers to the output of video tape/disk players and computers.
- Video Decoder** ➤ An optional device that converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M or SECAM to RGB video.
- Video Standard** ➤ A specific type of video signal, such as NTSC, PAL, SECAM. This projector can automatically recognize and interpret the incoming standard and display accordingly.
- Viewing Angle** ➤ Screens do not reflect equally in all directions. Most light is reflected in a conical volume centered around the "line of best viewing". Maximum brightness is perceived if you are within the viewing cone defined by the horizontal and vertical viewing angles.
- White Balance** ➤ The color temperature of white used by the projector.
- White Field** ➤ The area of an image that is white only. For example, a full white field is an image that is white everywhere. A 10% white field is a white area (usually rectangular) that occupies 10% of the image; the remaining 90% is black.
- YCbCr** ➤ A high-end *digital* component video signal.
- YPbPr** ➤ A high-end *analog* component video signal. Sometimes called YUV, Component, or Y, R-Y, B-Y, the YPbPr signal by-passes the video decoder in this projector.
- YUV** ➤ See *YPbPr*.
- Zoom** ➤ The adjustment of image size by means of a zoom lens.



# Keypad Reference

*NOTE: The IR remote is a standard component provided with the projector. Use the extension cable also provided to convert the IR remote to a wired remote, if desired. Refer to Section 3 for a specific description of each key and how to use them correctly.*



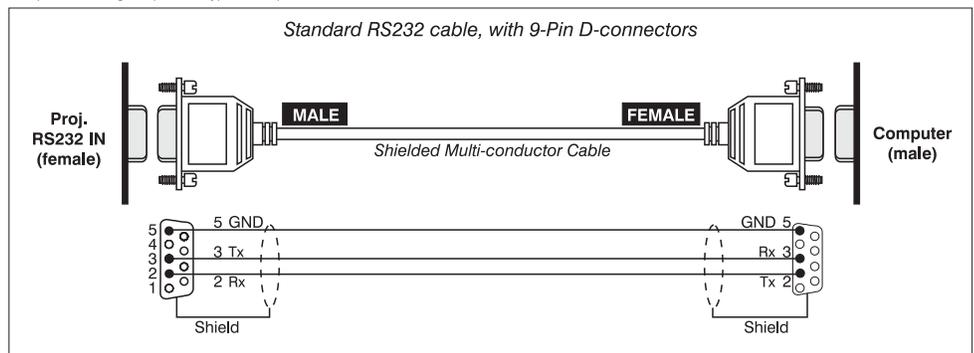


# Serial Communication Cables

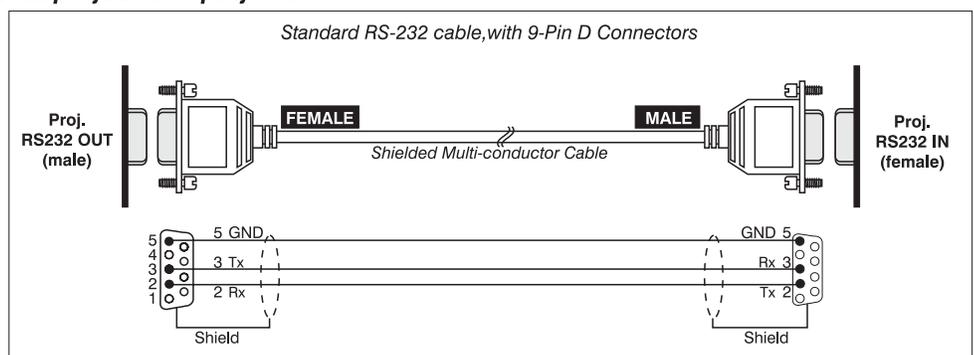
A serial link of RS232 or RS422 enables ASCII communication with the projector so that it can be controlled remotely from a PC or other controller. From a PC, connect a standard 9-wire RS232 serial cable to the **RS232 IN** port. Or, for long-distance (>100 ft.) links with an RS422-compatible PC or controller, connect RS422 cable to the **RS422** port.

## □ From projector to computer (RS232)

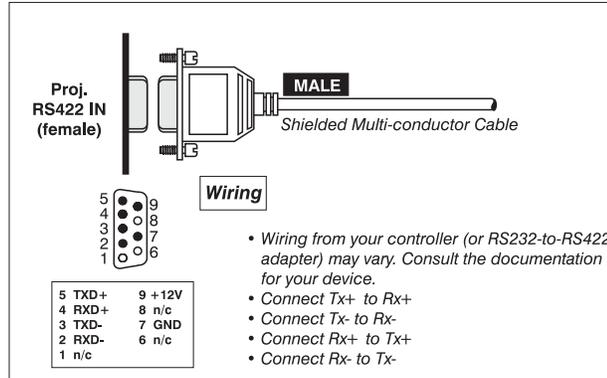
*For computers having a 9-pin "AT" type serial port*



## □ From projector to projector



□ From projector to RS422 compatible computer



# Auxiliary Fan Connector

## About the Auxiliary Fan Connector

The auxiliary fan connector, located on the rear input panel of the Electronics Module, allows you to connect a separate external cooling fan to the projector. This extra fan may be useful and necessary in applications where the projector is mounted within an enclosure and more airflow is required.

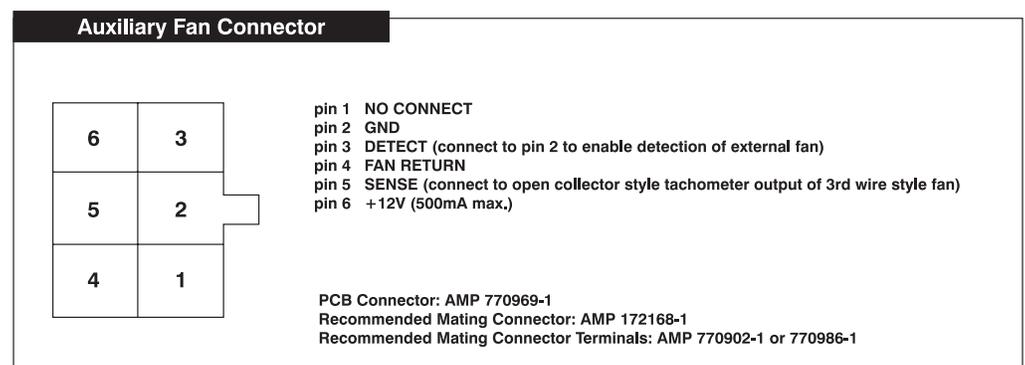
To use this fan, send the commands listed below through the serial command interface. By sending these commands the fan will automatically be turned on or off whenever the projector is turned on or off.

(RTE S 1 1 "(DGN 4 4 \0x0401 \0xffff)")      *turn fan on upon projector power up*  
 (RTE S 1 0 "(DGN 4 4 \0x0400 \0x0000)")      *turn fan off when projector powers down*

Send the following commands if you no longer require the fan to function in this manner:

(RTE ?0)      *ask for list of all RTE commands*  
 (RTE X \*)      *delete all RTE entries*  
 (RTE X 1)      *to delete entry one (where Number = delete the event with the given number from list)*

*NOTE: Refer to the Serial Communications document on the Christie website for other RTE information.*

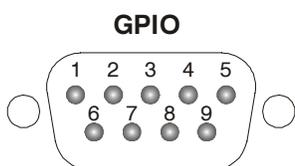


**Figure D-1 Auxiliary Connector Pin Out Details**



# System Integration

The GPIO (General Purpose Input Output) connector located on the input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector. There are 7 GIO pins available 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 below for pin identification.



GPIO Pins	
Pin #	Signal
1	+ 12V (200mA)
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	Ground
6	GPIO 4
7	GPIO 5
8	GPIO 6
9	GPIO 7

The serial cable required for connecting the external device to the projector's GPIO connector, whether it's a standard serial cable or a custom one, must be compatible with the external device.

## 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 external device does and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is turned on.

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 it's 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! "HLLHLH" "OOIOOOI") *Reply of pin state and configuration*
- (GIO? C2) *Request configuration for pin #2*
- (GIO! C2 O) *Reply with pin #2 configuration as output*
- (GIO? 2) *Request the state of pin #2*
- (GIO! H) *Reply with pin #2 state as high*

**Real Time Event**

Use the serial command **RTE** to specify an action that is initiated at a particular time or based on an external stimulus.

**For General Purpose IO "G"**

Parameter	Name	Value
P1	RTE type	G (Real Time I/O Event)
P2	I/O bit	1-7
P3	Pin state (1 Character) (String)	H = High L = Low "LHXXXHL" Combine multiple inputs and trigger occurs when all conditions are met
P4	Commands	Any valid serial protocol command for the device

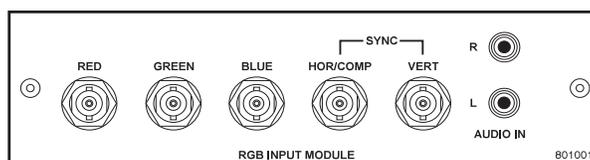
**Example 2.** Projector powers up when a switch on the external device is turned on.

- (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*

# 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.

- 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.

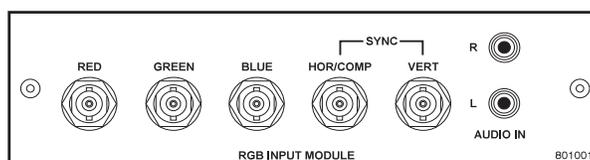


## RGB500 Features

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

*NOTE: The audio connectors are not functional.*

- 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.



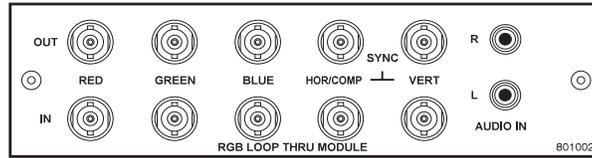
## RGB400BA Features

- ◇ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◇ accepts YPbPr, composite (on green) and Y/C (on red/blue)
- ◇ BNC connectors for RGB signal inputs
- ◇ Buffered signals to a remote destination

*NOTE: The audio connectors are not functional.*

**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.



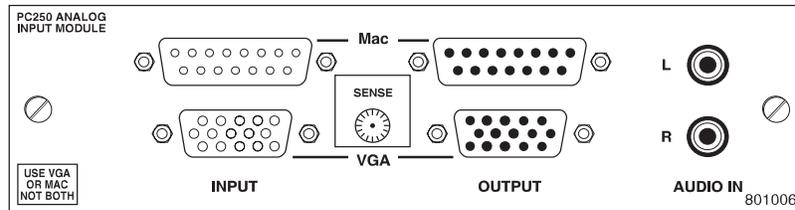
**RGB400ALT Features**

- ◇ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◇ accepts YPbPr, composite (on green) and Y/C (on red/blue)
- ◇ BNC connectors for RGB signal inputs
- ◇ buffered loop-through video outputs

*NOTE: The audio connectors are not functional.*

**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.

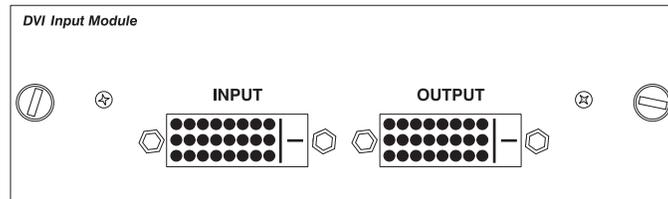


**PC250 Analog Features**

- ◇ 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.*

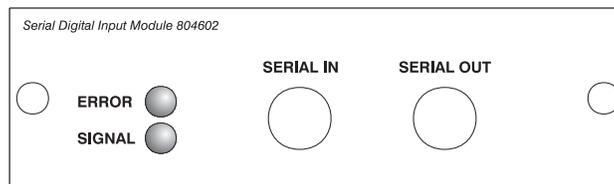
- DVI Input Module 38-804635-xx** ➤ This module can display digital video input signals conforming to the DVI (Digital Visual Interface) single-channel standard.



#### 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)

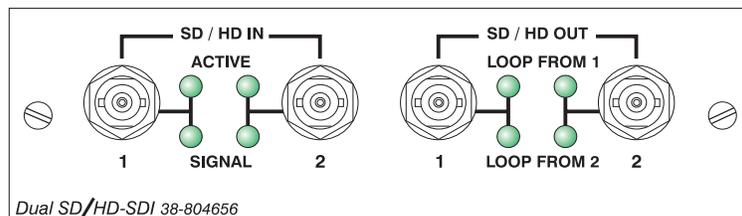
- Serial Digital Input Module 38-804602-xx** ➤ The module accepts a serial digital 4:2:2 component video signal (YCbCr) via a single **SERIAL IN** BNC connector. The signal can loop through the **SERIAL OUT** BNC out to another device (such as another projector). Inputs are 75Ω terminated.



#### 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
- ◇ SMPTE 259M compatible

- Dual SD/HD-SDI Module 38-804656-xx** ➤ The *Dual SD/HD-SDI Module* enables incoming serial digital (SD or HD) 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
- ◇ SMPTE 259M compatible



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