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Introduction

1.1 Overview

The *GraphXMASTER X-series* includes the RPMX-100U (38-GFX101-xx), CX50-100U (38-GFX003-xx), CX60-100U (38-GFX004-xx) and CX67-100U (38-GFX005-xx). All of these products are based on single-chip DLP™ (Digital Light Processing) technology with XGA resolution.

The *RPMX-100U* (Rear Projection Module) 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 featured especially for rear screen tiling applications.

The *CX50/CX60* and *CX67-100U* display cubes are an ideal choice for the demanding 24/7 control and operations center. The CX display cube offers the same alignment features as the RPMX along with uniform brightness and color matching controls, which are important when trying to display a large uniform image.

Key Features:

- XGA resolution (1024 x 768)
- UHP illumination system
- Variable brightness output
- Input pixel formats from 640 x 480 up to 1280 x 1024 (fully scaleable)
- 24-bit RGB display (16.8 million colors)
- Multi-frequency operation
- 40” to 70” inch diagonal image size with 4:3 aspect ratio
- Auto setup feature
- IR sensor for control via IR keypad
- Unique 6-axis geometry adjustment
- 100/120W UHP lamp operation
- 100V to 240V AC universal operation

For detailed product specifications, see Section 5.

How the projector works

The projector operates based on DLP™ technology by Texas Instruments. An external source provides the necessary XGA input signals accepted by the projector. An internal 120W UHP lamp generates light, which then travels through a rotating color wheel alternately passing red, green and blue light to the single 0.7" imaging panel (also called a digital micromirror device or DMD). Reflected light from the DMD then passes through the short throw projection lens and displays on the external display screen.

NOTE: Refer to Section 3, for a brief description the projector's main modules.

1.2 Components

Ensure you have received the following components with your projector or display cube:

For RPMX:

- Hardware
- Mounting bracket (*for lens vertical configuration*)
- Label (*for lens vertical configuration*)

For CX50/CX60/CX67:

- Hardware (*for mounting cube-to-cube and cube-to-pedestal*)

Each projector/display system is provided with a User's Kit, which includes components required in the setup and maintenance of the projector. Ensure you have received the following components in the User's Kit:

- User's Manual
- Installation Guide
- IR remote keypad with 2 AA batteries
- Assorted ball drivers (*for adjusting projection lens and adjuster*)
- CD (*includes test patterns for color matching*)

NOTE: Additional User's Kits can be purchased – reference CHRISTIE #38-804828-01 for RPMX and #38-804829-02 for CX50/CX60/CX67 when ordering.

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. 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's serial number is printed on the license label affixed to the mounting tray.

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

Source Setup

Introduction

This section provides details on how to connect various external sources to the projector. All connections are made to the main input panel of the Electronics Module (EM).

2.1 Source Connections

It is recommended that you connect your sources before powering up the projector.

RGBHV (5 BNCs) ➤

The top input interface provides 5 BNC connectors for connecting to a variety of sources such as VGA, SVGA, XGA, SXGA, Mac, PowerMac, DEC, Sun, SGI and others. This projector supports multiple sync types with RGB signals: sync-on-green, composite sync, and separate H & V syncs.

To properly connect RGB sources use the table and illustration below (Figure 2.1.).

RGB Source Outputs	5 BNC Connectors				
	Red	Green	Blue	Hor/Comp	Vert
sync-on-green	✓	✓	✓		
composite sync	✓	✓	✓	✓	
separate horizontal and vertical sync	✓	✓	✓	✓	✓

NOTE: Connect the Sync BNC inputs first.

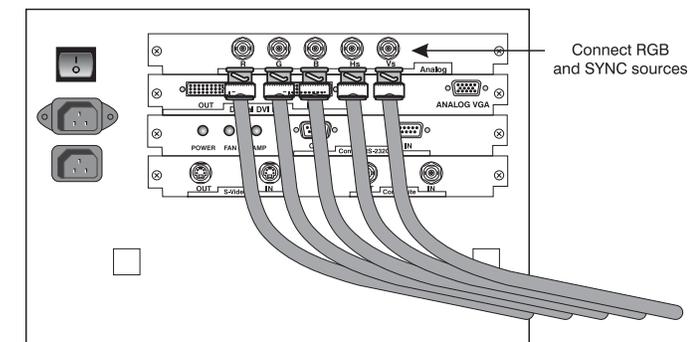


Figure 2.1. Connecting RGBHV sources

Analog VGA Signals ➤ Connect Analog VGA signals to the 15-pin HD D-sub connector on the second input interface. Figure 2.2.

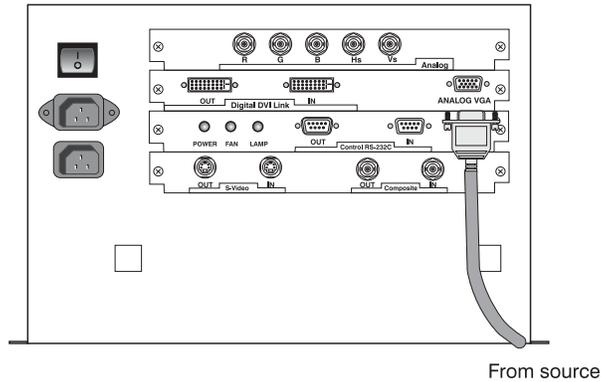


Figure 2.2. Analog VGA Connector

DVI Digital Video Signals ➤ The second input interface is dedicated to digital video input signals conforming to the DVI (Digital Visual Interface) standard.

To connect an incoming digital video signal to the projector, connect the cable running from the source to the DVI input connector - the DVI output adjacent to the DVI input connector remains empty. If you want to loop the source through to another display device, connect a cable from the DVI output connector (that was empty) to a DVI input connector on the digital display. See Figure 2.3.

To loop the DVI signal through a series of display devices continue looping connection in this manner – your last device will have an empty DVI output connector. See Figure 2.4. All projectors will display the same as the first projector, no matter what type of input signal is present for other projectors, even internal test patterns.

NOTES: 1) When looping a DVI input signal, all projectors will display the same data from that one source.

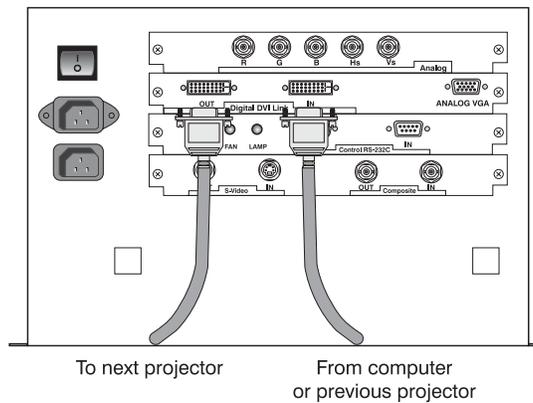


Figure 2.3. Connecting a Digital Video Input Signal

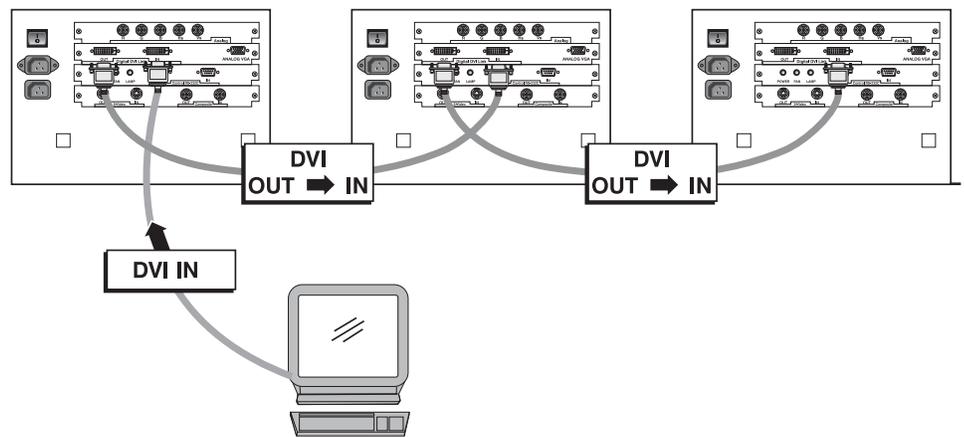


Figure 2.4. Loop Digital Video Input Signals

- Composite Video** ➤ Connect a composite video input to the Composite RCA jack labeled IN. The jack adjacent to it is left empty, unless you want to loop the composite video signal through to the next display device. Figure 2.5.

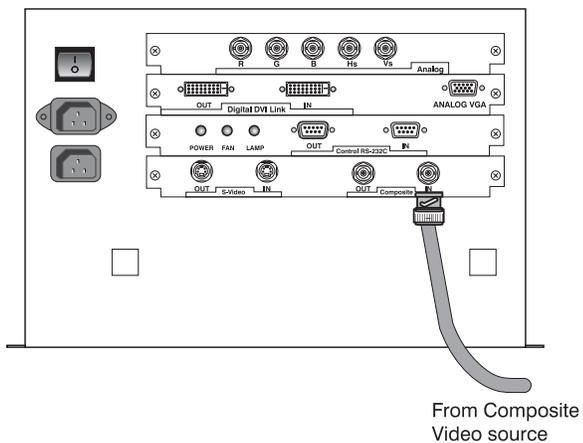


Figure 2.5. Connecting Composite Video Sources

Composite Video Loop Through

From your source, connect a composite video source signal to the Composite IN RCA jack. Take a second cable and connect it from the empty RCA jack labeled Composite OUT to the Composite IN connector of the next projector. Continue connecting projectors in this manner – the last projector will have an empty Composite OUT connector. Figure 2.6.

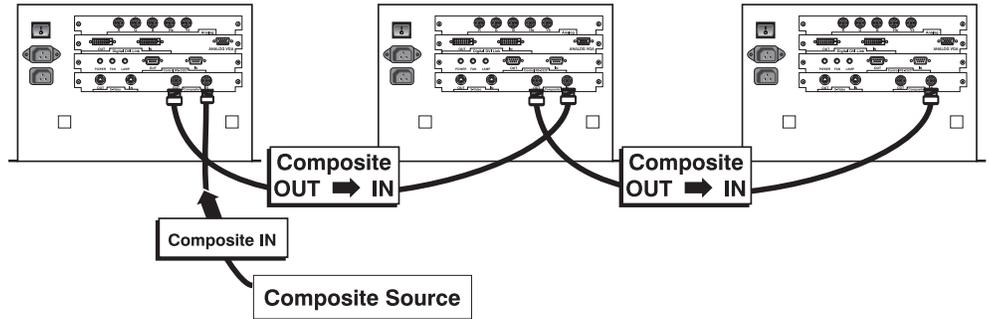


Figure 2.6. Composite Video Loop Through

- S-Video** ➤ Connect a S-Video source to the S-Video IN connector on the input panel. Leave the OUT connector empty, unless you want to loop the S-Video signal through to the next display device. Figure 2.7.

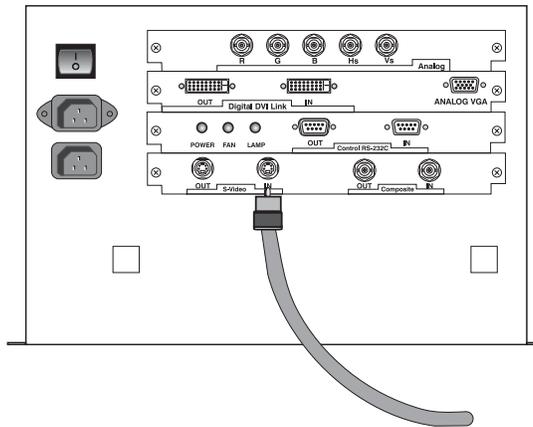


Figure 2.7. Connecting S-Video Sources

S-Video Loop Through

To loop the incoming S-Video signal to another projector or display device, use the empty connector adjacent to S-Video IN connector labeled.

From your source, connect a S-Video source signal to the S-Video IN connector. Connect a second cable from the empty S-Video OUT connector to the S-Video IN connector of the next projector. Continue this looping method for each projector – the last projector will have an empty OUT connector. Figure 2.8.

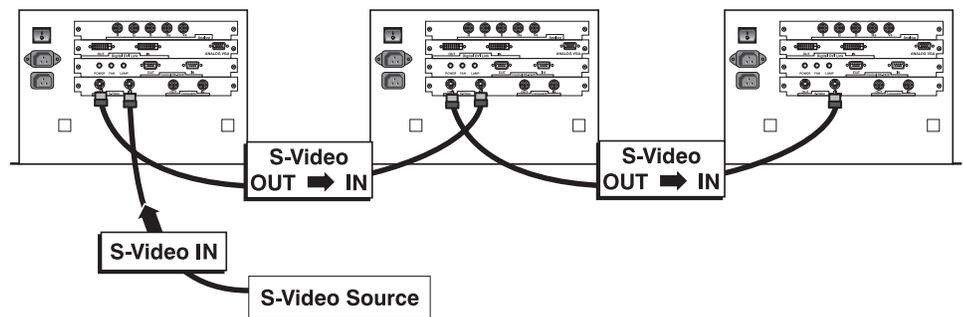


Figure 2.8. S-Video Loop Through

2.2 Serial Port Connections

There are two, 9-pin DIN connectors on the input panel dedicated to serial communication. These connectors allow you to connect your projector to an external controlling device with a serial interface, such as a personal computer, for the purpose of communicating without having to use the keypad.

If using a computer ► SINGLE PROJECTOR

Connection: Using the appropriate serial communication cable (*see Appendix D*), connect the controlling device (PC) to the serial port labeled **RS-232 IN**. (Figure 2.9.)

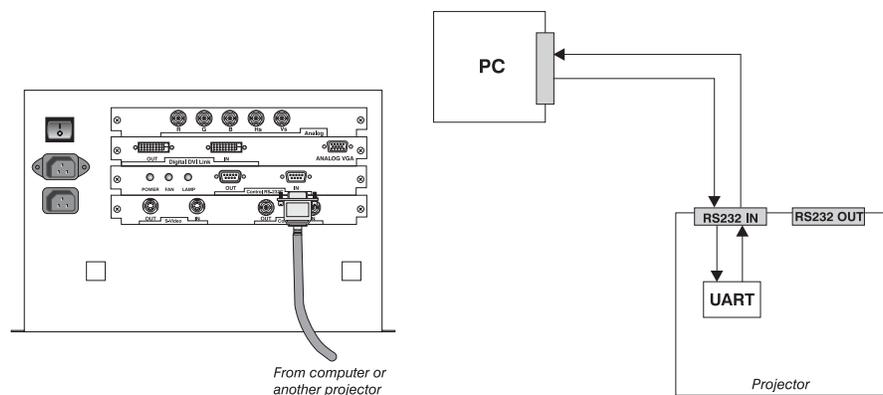


Figure 2.9. Single Projector Connection and Communication Schematic

MULTIPLE PROJECTORS

Connection: When connecting multiple projectors in a network, use an appropriate serial communication cable (*Appendix D*) and connect the controlling device (PC) to the **RS-232 IN** connector of the first projector in the network. With a second serial communication cable, connect the one end to the **RS-232 OUT** connector of the first projector and the other end to the **RS-232 IN** of the next projector. Continue this pattern of connection with all projectors (Figure 2.10.). The last projector in the network will only have a connection to the **RS-232 IN** connector. Then set the baud rate of all projectors to match that of the controlling device. Refer to *Communication* on page 3-19 for details on setting baud rate.

NOTE: 1) In Figure 2.10 and Figure 2.11, the controlling device can only send commands to the projector. It cannot query or receive any feedback from the projector. If feedback from the projector is required, an RS-232 switcher must be used and connected as shown in Figure 2.12. Call a Christie sales representative for more information.

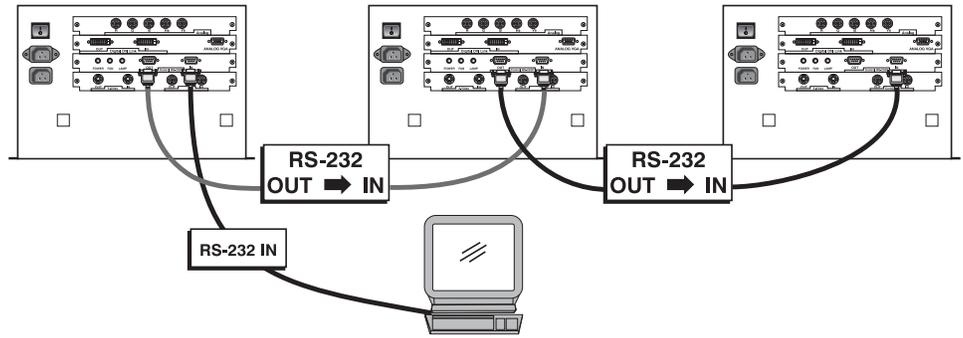


Figure 2.10. Multiple Projector RS-232 Connection

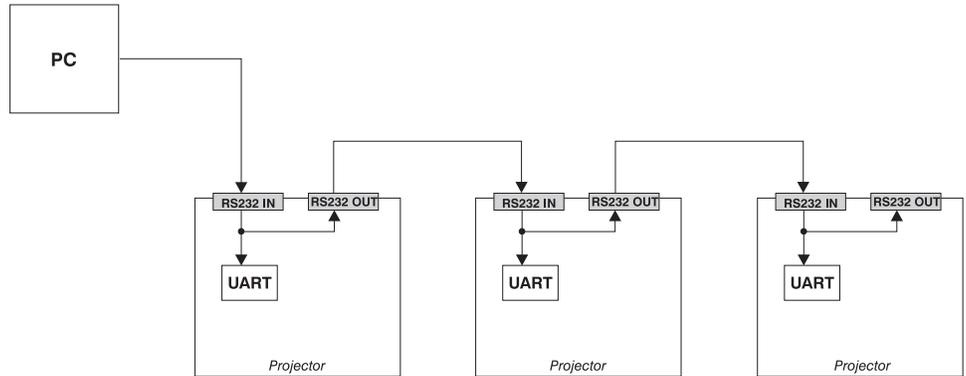


Figure 2.11. Multiple Projector RS232 Communication Schematic

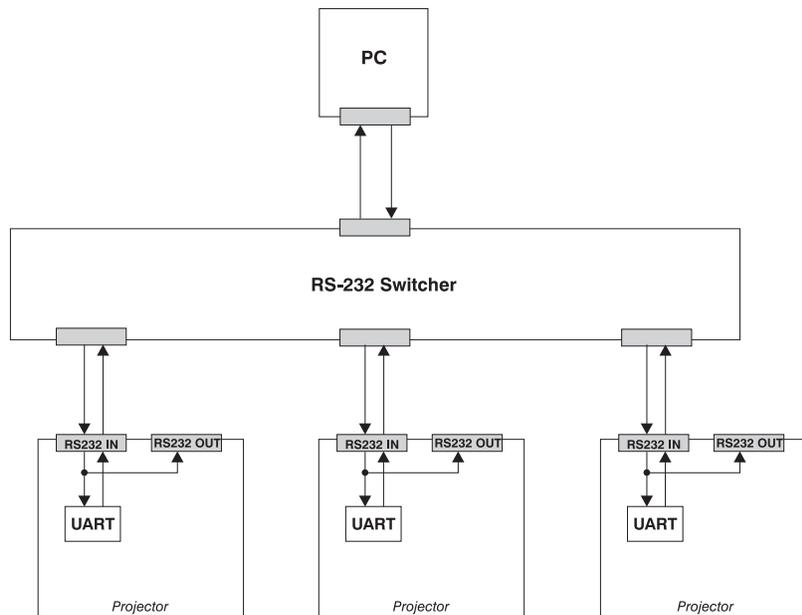


Figure 2.12. Communication Schematic Using RS232 Switcher

2.3 Power Connection

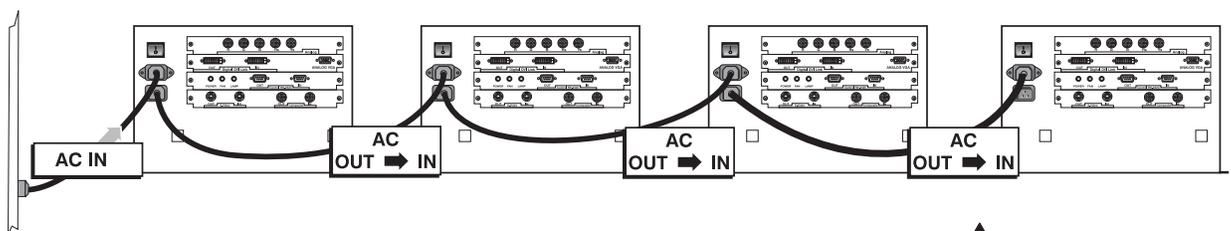
There are two AC receptacles on the EM. To plug in a single projector, plug the power cord into the top AC receptacle (labeled INLET). Then plug the 3-pronged end of the power cord into a grounded AC outlet.

If you want to connect multiple projectors (up to a maximum of 4), connect a second power cord to the AC receptacle (labeled OUTLET) on the left side of the first projector and the other end to the AC receptacle (INLET) of the next projector. Continue connecting power cords in this manner until you reach the last (or 4th) projector in the chain. The last projector will have an empty AC receptacle OUTLET. See Figure 2.13.

⚠ Input voltages must be capable of 100-240 VAC. Use an appropriately rated AC power cord with the projector. The power cord supplied is approved for North American use only. See *Section 5, Specifications* for all power requirements.

WARNING

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



⚠ WARNING

AC LOOP 4 PROJECTORS MAXIMUM

Figure 2.13. AC Loop

Operation

This section provides a general description of the projector's main components. It also provides details on the projector's software menu system.

3.1 Projector Overview

The modular design of the projector allows the user to access and service specific components of the projector, such as the lamp, quickly and easily without having to disassemble the entire projector.

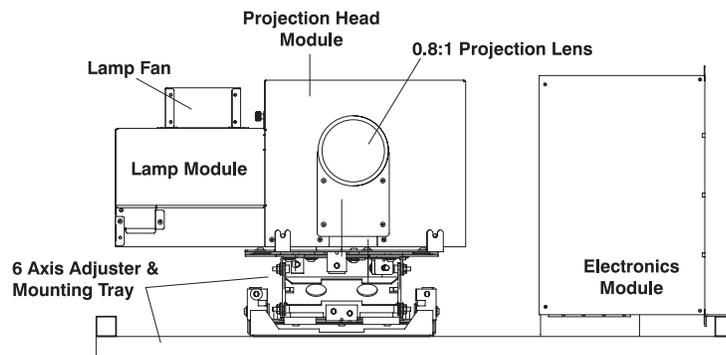


Figure 3.1. The Projector (shown in lens horizontal configuration)

Projection Head Module (PHM) ➤ The PHM is the largest module of the projector. It contains all the main optical components of the projector such as the short throw projection lens, color wheel, DMD and lamp.

In the RPMX projector, the PHM is shipped in a 0 degree (lens horizontal) configuration. With a quick changeover of mounting brackets, the module can be flipped to a 90-degree (lens vertical) position for rear screen projection applications using an optical fold mirror. (In CX50/CX60/CX67 products the projector is already in the 90-degree position.)

Located on the top of the PHM is a small red switch that allows you to switch the lamp power from 100W to 120W. It is recommended that you choose the 100W setting when you are performing setup procedures for the first time.

Electrical Module (EM) ➤ The EM is the main control unit of the projector. It is mounted independently from the PHM to the mounting tray. It is the module where all source connections are made and where the main power switch is located.

The EM contains the majority of PCB's, such as the Control PCB, BNC Input PCB, Video Input PCB and Control RS-232C PCB. In general, these boards are responsible for the video processing and communication requirements of the projector. It also houses the IR sensor PCB and the Power PCB.

Located on the input side of the EM are 3 LEDs. These LEDs will illuminate in patterns, which represent the status of the projector and/or any error conditions that may be present. Refer to Table 3.1. for the status of the LEDs during normal operation and at the end of this section for system error codes.

Table 3.1 Normal LED Status

System State	Power LED	Fan LED	Lamp LED	Description & Condition
AC off	Off	Off	Off	Projector OFF.
AC on	Red	Off	Off	In stand-by
AC on	Green	Green	Off	Projector power ON, but lamp not
AC on	Green	Green	Green	Projector ON
Entering Stand-by Mode	Flashing Red	Green	Off	Projector in "cool down" mode after powering down
	Red	Off	Off	After 30 seconds, the fan stops and the projector returns to stand-by.

6-Axis Adjuster ➤ You can correct the geometry of a displayed image by adjusting the uniquely designed 6-axis adjustment mechanism. The PHM can be mounted to this mechanism in a lens horizontal (0 degree) or a lens vertical (90 degree) orientation. The mechanism, which is manually adjusted, can be adjusted to correct any geometric misalignment between the projector and the screen. Typically, this mechanism only requires adjustment during the initial setup of the projector. Adjustments can be locked in place to avoid tampering and the need for re-adjustment.

The 6-axis adjuster and EM are mounted to a welded frame called the mounting tray. The purpose of this tray is to keep the modules together and makes the installation process easy. It can be installed on any sturdy, flat surface as long as all four mounting points are used to secure it in place.

Refer to the separate *Installation Guide* provided in the User's Kit for installation instructions and how to adjust the 6-axis adjuster.

NOTE:  Do not ceiling mount this projector.

NOTES: 1) Avoid turning the projector on and off without waiting at least 52 seconds in between. In general, hot re-strikes reduce lamp life. 2) It is recommended that you do not unplug the projector until the cooling fan is off – the FAN LED will no longer be illuminated.

STANDBY

Press **STANDBY** to blank the display while keeping the projector in a warmed-up and ready state. Note that the lamp and electronics remain ON in standby mode, even though the image turns to black and most functions are disabled. To leave standby press **Exit** or **Menu**. *NOTE: The POWER LED is illuminated red.*

MENU

Press **Menu** to display the *Main* menu. A list of several options appears for access to specific functions, such as *Configuration* or *Image Settings*. Press **Menu** again or **Exit** to exit all menus and return to presentation level.

ENTER

Press **Enter** to select a highlighted item or to accept a parameter adjustment and return to the previous menu or image.

EXIT

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

ARROW KEYS **▲ON**, **▼OFF**, **◀-**, **+▶**

The arrow keys have a variety of functions depending on the situation. The most common uses are described below.

- Use the **▲ON** or **▼OFF** to move through the options in a menu or submenu.
- Use **◀-** or **+▶** to change a slider value—hold as desired for continuous adjustment

CONTRAST

Press **Contrast** to change the amount of white in your images. Use **◀-** and **+▶** 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., are “crushed”). Conversely, low contrast causes dim images. See *Image Settings*.

BRIGHTNESS

Press **Brightness** to increase or decrease the amount of black in the image. Use **◀-** and **+▶** 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., are “crushed”). Conversely, high brightness changes black to dark gray, causing washed-out images. See *Image Settings*.

PROJECTOR

Press **Projector** to access options for communication with a specific projector or all projectors within a network.

All Projectors – You can toggle the setting for this option using the **Enter** key. Set **All Projectors** to **YES** if you have a single stand-alone unit or want to enable broadcast control to multiple projectors in a network. In this case, when you send a command using the IR keypad all projectors will respond.

Projector ID – This option is not selectable when **All Projectors** is set to **YES**. When **NO** is selected, you can choose which projector in the network you want exclusive communication with by entering the two-digit projector ID number.

Refer to 3.7 Using Multiple Projectors for more details.

PIXEL

Press **Pixel** to access the pixel tracking and pixel phase double sidebar. Adjust pixel tracking first: use **←** and **→** to increase or decrease the frequency of the pixel sampling clock to correct consistency of the image. For proper phase, use **▲ON** and **▼OFF** to increase or decrease pixel phase so that any shimmer disappears and the image is stable throughout. See *Size and Position* for a complete explanation of tracking and phase.

POSITION

Press **Position** to move the image using the double sidebar. Use **←** and **→** to move the image left or right, use **▲ON** and **▼OFF** to move the image up or down.

TEST P

Press **Test P** to display one of the available test patterns. Press **Test P** again to display the next available pattern in the sequence. Press **Exit** to stop cycling through the internal test patterns and return to presentation level.

*NOTE: You can also access test patterns from the Diagnostics and Service menu. Select **Test Patterns** and from the drop down list highlight the test pattern you want to display. Press **Enter** to select.*

STATUS

Press **Status** to display the current status information of the projector.

FREEZE

Use this key to freeze and unfreeze the image. This key is only functional if enabled through the *Diagnostics and Service* menu.

DISPLAY

Use **Display** to toggle the on screen display on or off.

INPUT KEYS

Press one of the following keys, **BNC** **VGA** **DIGITAL** **VIDEO** **S-VIDEO** to select the input you want to display.

Navigating the Menus ➤ Most of the controls for the projector are accessed from within the projector’s menu system. The *Main Menu* is accessible by pressing the **[Menu]** key on the remote keypad. This menu is accessible at any time during operation. From it you can access various other “submenus” with related functions.

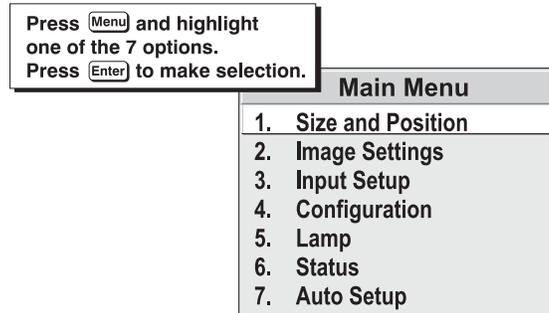


Figure 3.2. Accessing the Main Menu

To select a submenu, use the **[▲ON]** **[▼OFF]** keys to highlight the desired option and press **[Enter]**. Alternatively, press the # key for the item you want, once it’s highlighted press **[Enter]**.

Once you have a submenu displayed, navigate in a similar manner – use the **[▲ON]** **[▼OFF]** or # keys to highlight another option and press **[Enter]** to select. Items that are locked out or do not pertain to the current action appear in yellow text and cannot be selected.

NOTES: 1) If there is no signal present, the menus are inaccessible. 2) The Status menu is read-only.

When finished with a submenu, do one of the following:

- Press **[Exit]** to return to the previous screen
- Press **[Menu]** twice or **[Menu]** then **[Exit]** to return to presentation level.

Adjusting Slidebars

The current value for a given option, such as size or vertical stretch, appears to the left of its sidebar icon. This number may express a percentage or specific units (such as pixels, degrees Kelvin, etc.), depending on the option. Press **[←]** or **[→]** to gradually adjust the setting up or down—both the number and the length of the bar change accordingly (for continuous adjustment, hold down the desired arrow key).

DIRECT SLIDEBARS

There are a set of direct keys available on the keypad that allow you to quickly access often used sliders without having to travel the menu system. For example, simply press **Contrast** to immediately display the same contrast slider as if selected from the *Image Settings* menu.

The following direct sliders are available:

- Contrast, **Contrast**
- Brightness, **Brightness**

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

DOUBLE SLIDEBARS

In double sliders, such as “position” (see Figure 3.3.), adjust the top slider with **←** or **→** as desired. When you have finished with the top slider (whether changed or not), adjust the bottom slider with **▲ON** or **▼OFF**. When you are done, press **Exit** to return to your presentation. For fast continuous adjustments, hold down the desired arrow key.

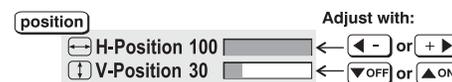


Figure 3.3. Using Double Sliders

The following double sliders are available:

- H-Position or V-Position, **Position**
- Pixel Tracking or Phase, **Pixel**

3.3 Adjusting an Image

There are two menus from which you can access most of the options required to make an image adjustment: *Size and Position* and *Image Settings*. Both of these items are accessible from the *Main* menu.

To select one of these menus from your presentation, press **Menu**, and using the arrow keys, highlight the menu you want to access and press **Enter** to make the selection. In the same manner, use the arrow keys to highlight an option you wish to access and possibly change its current setting.

Instead of traveling through the menu system for some of the most common image adjustment options, you can quickly access them by using the “direct” keys on the keypad. When selected, the slider for the option immediately appears on the screen for modification. (*NOTE: Not available for all display options.*)

For example, to quickly modify the contrast of an image, press **Contrast** on the keypad and use **←** and **→** to move the slider until the desired contrast setting is achieved. The value that appears to the left of a slider is the current value for that option.

Size and Position ➤ Use the options in the *Size and Position* menu (Figure 3.4.) to adjust the size of the displayed image so that it fits the screen to best suit the application. Other related options, such as **Pixel Track** and **Pixel Phase** are used to refine the image.

Size and Position		
1.	Resize Presets	
2.	Size	1024 <input type="text"/>
3.	Vert. Stretch	768 <input type="text"/>
4.	Pixel Track	1346 <input type="text"/>
5.	Pixel Phase	2 <input type="text"/>
6.	H-Position	101 <input type="text"/>
7.	V-Position	31 <input type="text"/>

Figure 3.4. Size and Position Menu

Resize Presets

Use this menu to access a submenu that allows you to quickly display the image in its native resolution or to choose automatically other options that will resize your image to fit your screen. Highlight the option you want and press **Enter**, the image will automatically be resized (Figure 3.5.).

Figure 3.5. Resize Presets

*NOTE: If you select a preset and then manually change its size, using the options in the Size and Position menu, you will see that an additional option appears in Resize Presets called **Custom**. This item is not numbered in the menu and appears because you have changed the parameters of the preset. To return to the preset value, you must re-select it from the menu.*

DEFAULT

By default, when displaying a new source the image will fill the screen as fully as possible for that source type. In general, select **Default** for most sources. This will automatically display your image, centered, and as large as possible. See Figure 3.6.

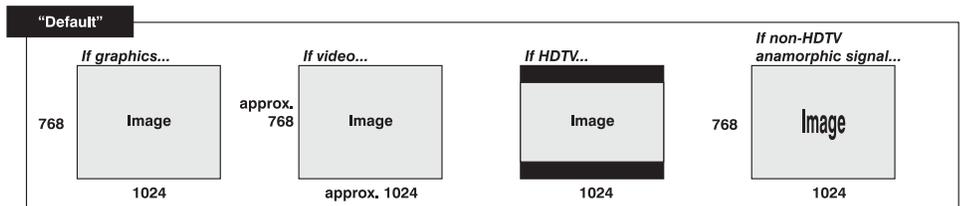


Figure 3.6. Applying Default Resizing to Various Source Types

NO RESIZING

Select **No Resizing** to display the image in its native resolution. The values for the options in the top level *Size and Position* menu will change accordingly.

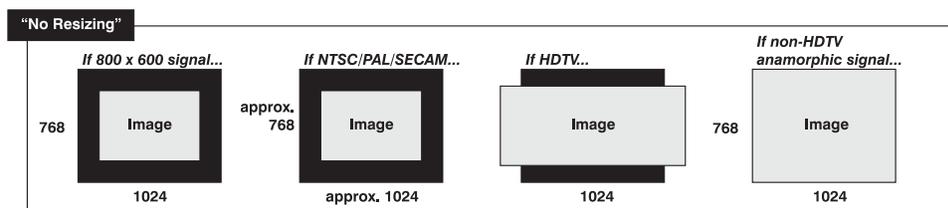


Figure 3.7. No Resizing

FULL SCREEN

Select **Full Screen** when you want to display the image using all the pixels available regardless of the source and original aspect ratio.

FULL WIDTH

Select **Full Width** when you want to fill the screen from left-to-right. Based on the source, the top and bottom of the screen may not be filled and appear black, similar to a 16:9 image.

FULL HEIGHT

Select **Full Height** when you want to fill the screen from top-to-bottom. Based on the source, the left and right side of the screen may not be filled and appear black.

ANAMORPHIC

Select **Anamorphic** when you want to display a non-HDTV “wide screen” image in its native 16:9 aspect ratio. This is known as letterbox, and the image will fill the screen from left-to-right and may not use all vertical pixels, leaving the top and bottom portion of the screen black. If you choose not to use the **Anamorphic** option when displaying a non-HDTV anamorphic source, the image will be stretched vertically to fill the screen as much as possible leading to a distorted image. If you are using HDTV, selecting the default preset will give you the same result as if choosing **Anamorphic**.

Examples using a single display:

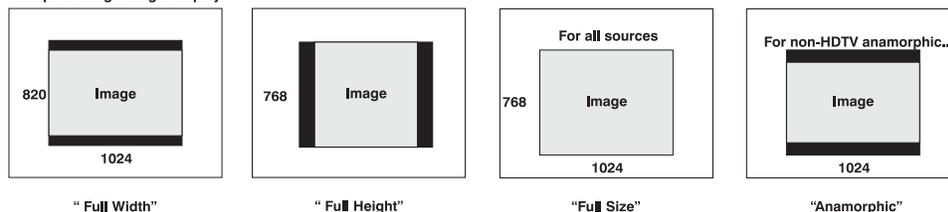


Figure 3.8. Other Resize Presets

“Tiled” Resize Presets

A number of preset options do not appear in the list, until the array is defined in the *Tiling Setup* window found in the *Configurations* menu. Options include

Tiling Full Screen, Tiling Full Width, Tiling Full Height and **Tiling Anamorphic**. These options are essentially the same as the ones described above except they expand across displays in the defined array. See 3.7 Using Multiple Projectors later in this section.

Examples using a 2x2 defined array:

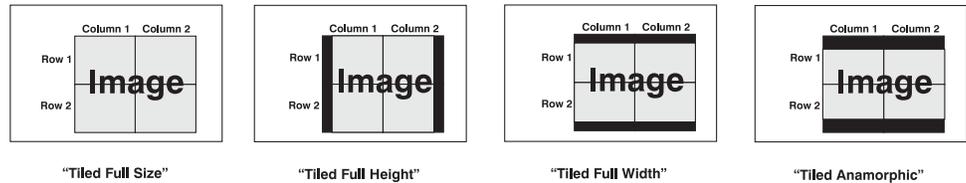


Figure 3.9. “Tiled” Resize Presets

“CUSTOM” RESIZE PRESETS

Custom appears in the list of available resize presets as an unnumbered option. It occurs only when the values for **Size** and **Vert Stretch** (in the *Size and Position* menu) are altered.

The values you choose for **Custom** will remain in the projector’s memory for the current source, until they are modified.

*NOTES: 1) When you are using your projector for the first time, **Custom** will not appear in the list of *Resize Presets* or “Tiled” presets. This option only appears when the values for **Size** and **Vert Stretch** are modified.*

Size

Adjust **Size** when you want to change the image width and height simultaneously, while maintaining the current aspect ratio of data from the incoming signal. As you adjust the sidebar for **Size**, you will notice the value for **Vert Stretch** changes accordingly and image proportion is maintained.

Vert Stretch

Adjust **Vert Stretch** (short for “Vertical Stretch”) when you want to adjust the height of the image while maintaining the width of the image. By adjusting this option, you will change the aspect ratio of the image. *NOTE: Adjusting this option does not change the value for **Size**.*

Pixel Tracking

Use this option to adjust the frequency of the pixel sampling clock, indicated by the number of pixels per line, so that all pixels generated by a particular source are sampled. Proper pixel tracking ensures that the image quality – whether good or not – is consistent across the screen, that aspect ratio is correct and that pixel phase can be optimized.

Pixel tracking is adjusted most effectively using a good test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar “one pixel on, one pixel off” graphic image, such as the *Windows* shutdown screen. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Adjust the sidebar until the stripes broaden

to the point where one large stripe fills the image. Again, the image may still exhibit some noise.

*NOTE: 1) By default, the projector will sample at the correct frequency for most sources. 2) Not available for video sources. 3) **SHORT CUT:** Press  and adjust the top slidebar.*

Pixel phase

Use this option to adjust the phase of the pixel sampling clock relative to the incoming signal. It is used primarily for adjusting RGB inputs.

Adjust pixel phase when the image (usually from an RGB source) shows shimmer or “noise”. Pixel phase adjustment is done most effectively using a proper test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar graphic image, such as the *Windows* shutdown screen. Adjust this option until the image is stable and each dot is clearly defined. Using the numbers on the slidebar as a guide, you will notice that you can actually 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 select either setting.

*NOTE: 1) Adjust pixel phase **after** pixel tracking is properly set. 2) Not applicable for video sources. 3) **SHORT CUT:** Press  and adjust the bottom slidebar.*

H-Position

Use this option to move the image to the left or to the right.

SHORT CUT: Press  and adjust top slidebar.

V-Position

Use this option to move the image up or down.

SHORT CUT: Press  and adjust bottom slidebar.

Image Settings ➤ Use the options in the *Image Settings* menu to alter the image for brightness, contrast etc. Options that are not available will appear in yellow text. Any changes made to the option under this menu are immediately applied and saved upon exiting the menu. (Figure 3.10.)

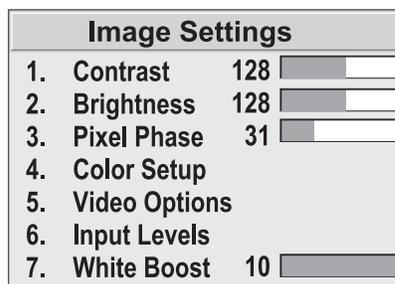


Figure 3.10. Image Settings Menu

Contrast

Select **Contrast** when you want to increase or decrease the perceived difference between light and dark areas of your image (0-255). If contrast is set too high, the light parts of the image loses detail and clarity. If the value is set too low, the light areas will not be as bright as they could be and the resulting image will appear dim. 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., are “crushed”). For best results, keep close to 128 for graphics (mid-range value).

SHORT CUT: Press  and adjust the sidebar.

Brightness

Select **Brightness** when you want to increase or decrease the amount of black in the image (0-255). Start high 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. For best results, keep close to 128 for graphics (mid-range value). The value will differ for video sources.

SHORT CUT: Press  and adjust the sidebar.

Pixel Phase

This is the same option that appears in the *Size and Position* menu and can be adjusted in the same manner.

Color Setup

From the **Color Setup** submenu you can access options that will have an effect on the color of the displayed image, such as **Color** saturation, **Tint**, **Detail**, **Gamma** and **Color Temperature**. These options are only available for video sources. See Figure 3.11.

Color Setup		
1. Color	128	
2. Tint	128	
3. Detail	2	
4. Gamma		
5. Select Color Temperature		

Figure 3.11. Color Setup Menu

COLOR

Color adjusts the color saturation level or the amount of color in a video image. When set to “0” the image appears black and white and when set too high the colors appear unrealistic. Use  and  to adjust **Color** until the desired saturation level is displayed. *NOTE: This option is only available when using a video source.*

TINT

Tint adjusts color hue to obtain true color reproduction of NTSC video signals or HDTV signals. Use  and  until the desired balance or red-to-green is displayed in your image. **Tint** is only available when an external

test pattern is displayed. *NOTES: 1) This option is only available when using a video source. 2) This option is not available when using an internal test pattern.*

DETAIL

Detail adjusts the sharpness of the video image. Use **◀-** or **+▶** until the display is as sharp as possible, keeping in mind that any level of detail above 3 (default) increases the level of detail as well as introduce some level of noise in the image. Set below 3, to filter the signal and remove noise from a noisy source. Keep at 3, to apply no detail. *NOTE: This option is only available when using a video source.*

GAMMA

The **Gamma** option affects the shape of the curve determining what gray shades are available for a given amount of signal input between minimum (black) and maximum (white). Different curves can improve performance for certain kinds of source input and applications. Generally the best gamma curve is one that produces maximum contrast, brightness and color performance for the current signal and ambient lighting conditions. There are four preset gamma curves to choose from. They are: **Photographic, Enhanced Photographic, Enhanced Graphics/Video or Max. Brightness**. See Figure 3.12. *NOTE: The option that appears highlighted in the list of preset gamma curves is the current gamma curve applied to the incoming signal.*

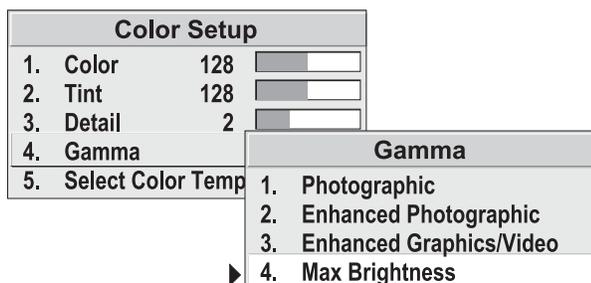


Figure 3.12. Gamma options

SELECT COLOR TEMPERATURE

Select **Select Color Temperature** to apply a preset color temperature (3200K, 5400K, 6500K, or 9300K) and/or to create a custom color temperature (User1 or User2).

All temperatures are measured in degrees Kelvin and represent the “coloration” (reddish or bluish) of the whites displayed by the projector. Whites appear more reddish when a low color temperature is selected and more bluish when a higher color temperature is selected. *NOTE: 6500K is the default color temperature.*

User1, User2 - Select **User1** or **User2** if you want to create a custom color temperature or to apply an already defined one. When you select either **User1** or **User2**, a separate window appears with **Red, Green** and **Blue** as options that are fully adjustable to create or modify a custom color temperature.

To create or adjust a user defined (custom) color temperature:

NOTE: Use an external test pattern when adjusting color temperature. (Figure 3.13.)

1. Select **User1** or **User2** and adjust **Red**, **Green** and **Blue** slidebars until the desired color temperature is achieved.
2. Exit the menu to save settings.

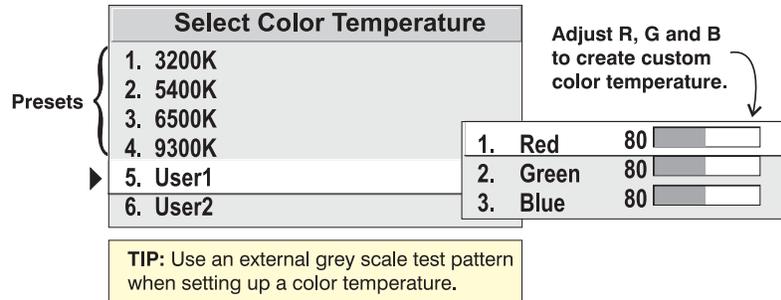


Figure 3.13. Creating a Custom Color Temperature

Video Options

Select *Video Options* from the *Image Settings* menu to choose a video standard for which to process the incoming signal or to adjust incoming black levels in certain video signals.

VIDEO STANDARD

The projector automatically detects the video standard present and displays the name of this standard in this window (Figure 3.14.). Press **Enter** to view or select a different video standard from a complete list available to the projector. When you select a specific standard from the list available forces the projector to process the current incoming signal according to this standard.

*NOTE: The default for Video Standard and the option that is recommended for use for most signals is **Auto**. If you are using a poor quality signal or a black-and-white signal Auto may not be the best selection to detect and view these signals, instead, select a relevant standard from the list.*

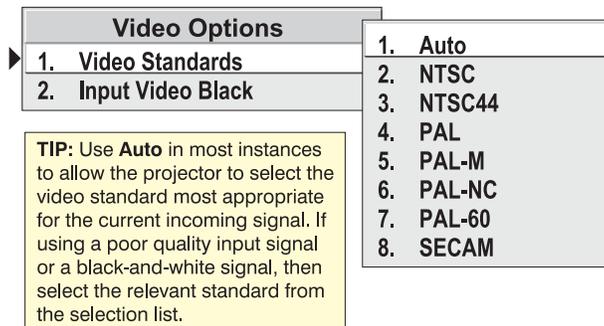


Figure 3.14. Selecting a Video Standard

INPUT VIDEO BLACK

This control compensates for incoming elevated black levels that are present in certain video signals. It ensures that the blacks on screen appear as neither

“crushed” nor excessively elevated. By default, the projector automatically determines the correct setting according to the type of incoming video signal:

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

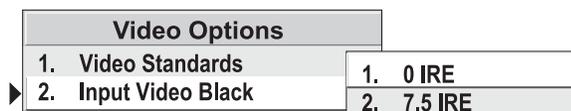


Figure 3.15. Input Video Black

NOTE: You can override the setting for some types of video. The control is disabled for other types of video, and also for graphics sources.

Input Levels (for experienced users only)

The projector automatically optimizes input levels for all but the most unusual of sources. Before attempting an input level adjustment make sure brightness and color temperature settings are properly set. It is also recommended that you keep the **White Boost** option OFF (0).

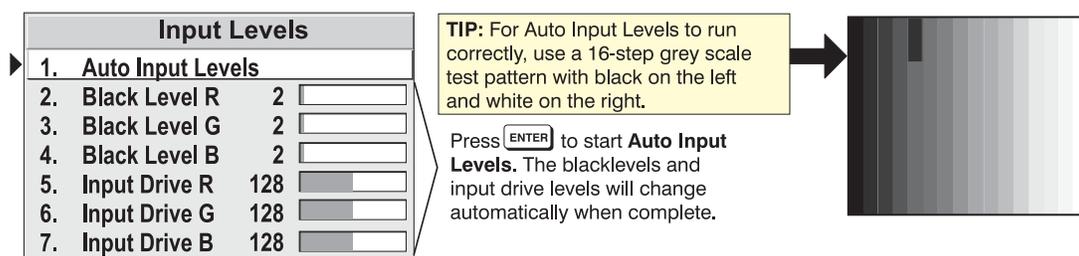


Figure 3.16. Input Levels

Good RGB or input levels – that is, the drives and black levels 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 when performing an **Auto Setup** from the *Main* menu), the projector automatically determines the best input levels by monitoring image content and adjusting the controls appropriately. Typically, further adjustment is not required in order to obtain proper black or whites.

AUTO INPUT LEVELS

The **Auto Input Levels** option is useful when an unusual source is used that may require further color temperature and/or input level adjustment. For the **Auto Input Level** feature to work you must use a 16-step grey scale test pattern with black on the left and white on the right.

With this option highlighted, press **ENTER** and wait for the six remaining values in the menu to stabilize indicating the process is complete. (Figure 3.16.)

NOTE: It is recommended Contrast and Brightness settings remain at their default when adjusting Auto Input Levels.

BLACK LEVELS & INPUT DRIVES

An experienced user can manually adjust the black levels and input drives for a source that exhibits high black levels. By adjusting the slidebars here, you can refine the image source input levels. *NOTE: Input levels are of limited use with digital signals.*

To check an image and manually adjust black levels and input drives:

1. Make sure overall **Contrast** and **Brightness** (in *Image Settings*) are both set close to mid-range.
2. Check the color temperature setup using an external 16-step grey scale test pattern with black on the left and white on the right.
3. Make sure you are using an analog source – input levels are not applicable for digital sources or sources going through a decoder.
4. If the blacks and/or whites of an image appear okay, input levels do not need adjustment. If the 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. Initialize **Auto Input Levels** and wait for all 6 values to stabilize. Alternatively, do not use the Auto Input Levels option and instead reduce black levels manually. Judge by eye and change one or more of the six levels as necessary to obtain proper blacks and whites.

IMPORTANT

**Do not use Input Levels to adjust color temperature.
This will distort Contrast and Brightness settings as
well as Color Temperature.**

White Boost

This option allows you to recapture some of the lost light from the transition between segments in the color wheel when it is spinning. Use the slider to increase the value of **White Boost** from 0 to 10. When set to a value of “0” the option is OFF. As you increase the value, you will notice the image becomes slightly brighter and a little less saturated.

*NOTE: It is recommended **Auto Setup** and **Auto Input Levels** be adjusted prior to applying **White Boost** for new sources. 2) For NTSC, HDTV, PAL and SECAM video and graphics signals the default is set to “10”. 3) **White Boost** is disabled when an internal test pattern is displayed – the option appears in yellow text. 4) It is recommended **White Boost** remain at 0 when adjusting input levels.*

Input Setup ► From this menu, you can select an input instead of using the direct keys on the keypad. You can also view the settings of the current incoming signal.

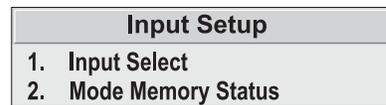


Figure 3.17. Input Setup Menu

Input Select

Use **Input Select** to select from a list of available input signals that can be displayed by the projector. (Figure 3.18.) Highlight the option and press **Enter**, to select an input. *NOTE: You can make the same selection using the “direct” keys on the keypad.*

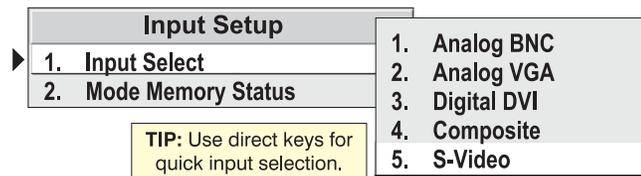


Figure 3.18. Selecting an Input

Mode Memory Status

This read only window displays the current information on the incoming signal, such as source, resolution and horizontal and vertical frequencies (Figure 3.19.)

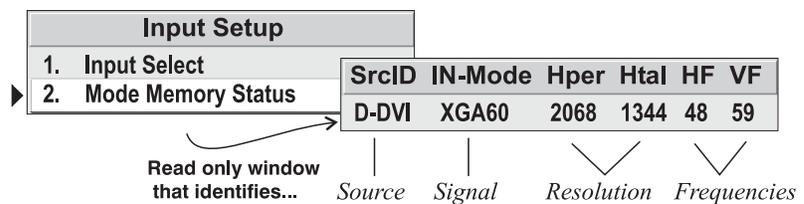


Figure 3.19. Mode Memory Status

Configuration ➤ From the *Configuration* menu, you can access various options and submenus that allow you to customize how you view and use your projector, such as menu location and language. You can also assign a projector ID number and define its location in a multiple display wall. Other options provide you with the ability to adjust primary colors and select various internal test patterns.

Configuration	
1.	Image Orientation
2.	Language
3.	Menu Preference
4.	Communication
5.	Tiling Setup
6.	Color and Uniformity
7.	Diagnostics & Service

Figure 3.20. Configuration Menu

Image Orientation

Select this option if you want to change the orientation of the image so that it suits your application. For example, selecting **Inverted Rear** from this menu flips and inverts the image so that it views correctly in a rear screen application where a first surface optical mirror is used. The default setting is **Rear** – applicable for all direct, rear screen applications.

1.	Front
2.	Rear
3.	Inverted Front
4.	Inverted Rear

Figure 3.21.

Language

Select this option if you want to view the menus in a different language. The default is **English**. Highlight an option and press **Enter** to select. All menus selected after this will appear in the chosen language. (Figure 3.22.)

Configuration	
1.	Image Orientation
2.	Language
3.	Menu Preference
4.	Communication
5.	Tiling Setup
6.	Color and Uniformity
7.	Diagnostics & Service

1.	English
2.	Francais
3.	Espanol
4.	Deutsch
5.	Italiano
6.	<u>Chinese</u>

Figure 3.22.

Menu Preference

Select this option when you want the menus to appear in a different location on the screen. By default, the menus appear in the top left corner of the screen. You can adjust the menu location vertically and horizontally by selecting and adjusting the slidebars, as described below. (Figure 3.23.)

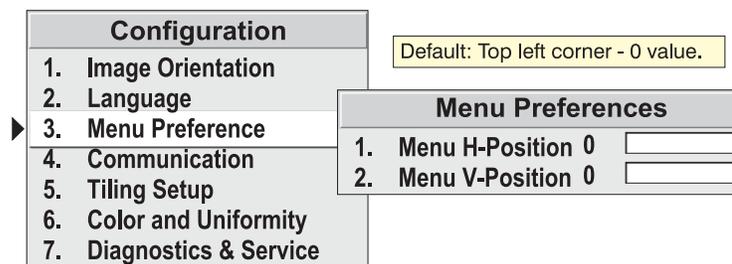


Figure 3.23. Menu Preferences

MENU H-POSITION

Adjust this sliderbar to move the menu from left-to-right. The higher the value the further right the menu will move.

MENU V-POSITION

Adjust this sliderbar to move the menu from top-to-bottom. The higher the value the lower the menu will appear on screen. *NOTE: The menu moves across the screen as adjustments are being made. The position of the menu is saved upon exiting the menu.*

Communication

Select **Communication** to view a submenu where you can select a baud rate or assign a projector ID number. (Figure 3.24.)

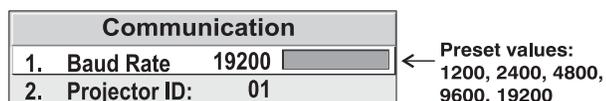


Figure 3.24. Communication Menu

BAUD RATE

Selecting a **Baud Rate** determines the speed of communication to and from the projector. By default, the projector is set to 19200. It is important that the correct speed is selected when you are controlling the projector with an external device, such as a computer or another projector via an RS-232 port.

You must set the projector's baud rate at these ports to match the baud rate of the controlling device. If you are unsure about what baud rate to choose, refer to the documentation for the device you're using. Use the **←** and **→** arrow keys to select and automatically apply one of the preset baud rates: 1200, 2400, 4800, 9600 or 19200.

When using multiple projectors in a network, set all projectors with the same baud rate to prevent any communication issues. The recommended setting for projectors in a network is 19200.

PROJECTOR ID

Use this option to set a specific 2-digit ID number for the projector. In a network environment, having the ability to control one or all projectors is very important. Assigning ID numbers to each projector in a network allows you to do this.

To assign an ID number using the option in the *Communications* menu, select the option **Projector ID**. Press **ENTER** twice until you see two dashed lines, “- -”. Using the numbered keys on the keypad, enter a unique 2-digit ID number for the current projector. Press **ENTER** to accept and save the entry and/or **EXIT** to exit the menu or cancel. See Figure 3.25. Press **STATUS** to check that the ID number for your projector was successfully changed. Continue this process for each projector if you’re working in a network.

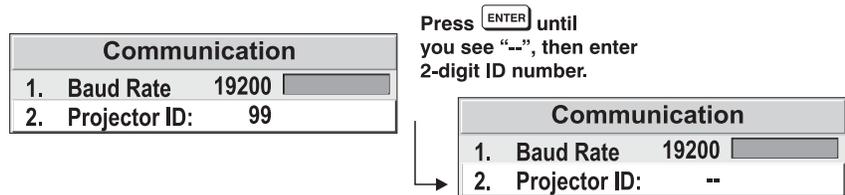


Figure 3.25. Assigning Projector ID

For additional information on switching communication control from a single projector to multiple projectors (called “broadcast control”), see 3.7 *Using Multiple Projectors*.

Tiling Setup

Use the options in the *Tiling Setup* menu when working with multiple projectors in a display wall. The options provided allow you to define the size of the array and identify the location of the current projector. *NOTE: If you are using a stand-alone unit, the values for each of the first four options should be set to 1.*

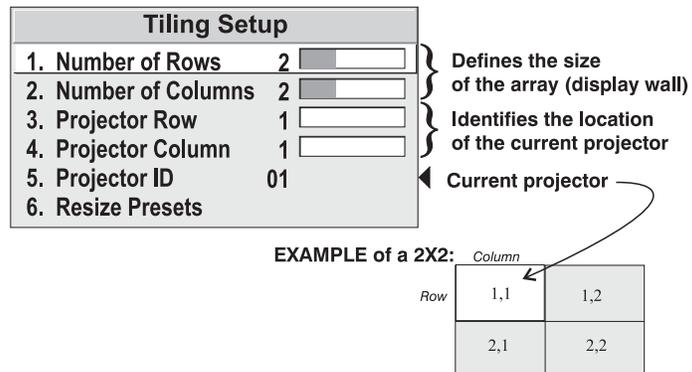


Figure 3.26. Tiling Setup

NUMBER OF ROWS & NUMBER OF COL

Enter the total number of rows and columns in the display wall by adjusting the sidebar for each of these menu items. See Figure 3.26.

PROJECTOR ROW & PROJECTOR COL

Enter the specific row and column number for the current projector.

Although you can identify projectors in any pattern in a wall, it is common to

start numbering in the top-left corner (this display will be 1,1) and work across and down until you reach the bottom right corner. See Figure 3.26.

PROJECTOR ID

This is a read only item that shows the ID of the projector for which you are defining its location in the *Tiling Setup* menu. See Figure 3.26., item 5.

RESIZE PRESETS

This is the same option that appears in the *Size and Position* menu. It appears again here for convenience. Figure 3.27. shows the “tiling” presets available when an array is defined using the items in the *Tiling Setup* menu.

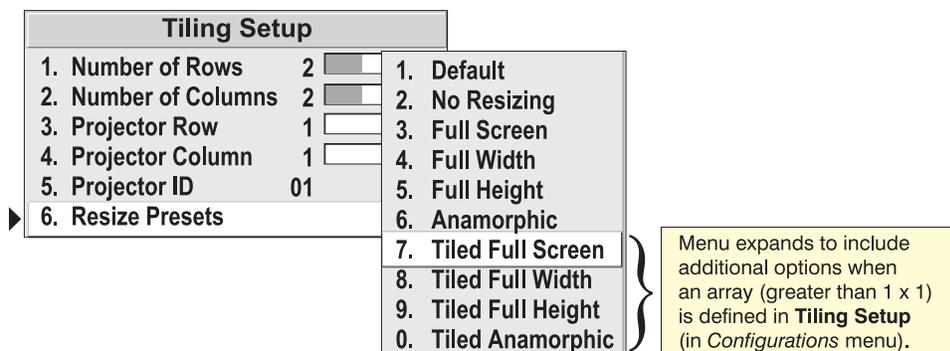


Figure 3.27. Expanded Options in Resize Presets

Color and Uniformity

Select this submenu to access **Color Temperature** and **Adjust Primary Colors (CSC)** options.

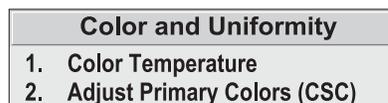


Figure 3.28.

COLOR TEMPERATURE

Select the **Color Temperature** option if you want to apply, alter, or add a color temperature. The **Select Color Temperature** window appears – this same window appears when selected from *Image Settings > Color Setup > Select Color Temperature*.

Refer to *select color temperature* on page 3-13 for details on how to apply a preset color temperature or create a custom one.

ADJUST PRIMARY COLORS

Select **Adjust Primary Colors (CSC)** to access options for setting up primary colors and intensity. This is particularly important in multiple screen installations where the color and intensity of one screen must precisely match all other adjacent screens to create a seamless image. Primary color adjustments affect all sources.

Refer to *Matching Colors of Multiple Projectors* for a step-by-step procedure on adjusting primary colors

Diagnostics & Service

Select this submenu to access various internal test patterns and/or freeze the displayed image for diagnostic and setup purposes.

TEST PATTERN

Nine internal test patterns are available from this menu. You can highlight and press **Enter** to select a desired test pattern or you can cycle through the available patterns using the direct key **Test P** on the keypad. For each key press made, another test pattern appears. The name of the test pattern is displayed in the top left corner.

When **Off** is selected, no test pattern displays.

*NOTES: 1) If you previously used **Test P** to select a test pattern and again wanted to use the direct key to access another pattern. It will begin cycling through the patterns from where you previously left off. 2) Some menu items are not available when an internal test pattern is displayed, such as Auto Setup. Unavailable menu items are in yellow text.*

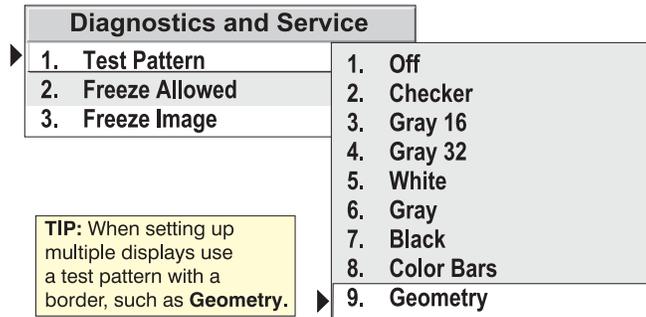


Figure 3.29.

FREEZE ALLOWED

You can enable or disable the function of the **Freeze** key with this option. Select **Allow** to enable the use of the **Freeze** key. When **Disallow** is selected the **Freeze** key will not function when pressed.

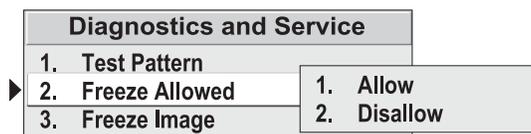


Figure 3.30.

FREEZE IMAGE

You can freeze/unfreeze the displayed image by manually selecting **Enable** or **Disable** from the **Freeze Image** option. Select **Enable** to freeze the image and **Disable** to unfreeze it.

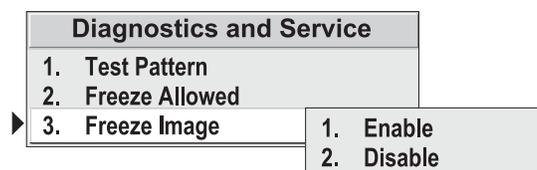


Figure 3.31.

3.4 The Lamp Menu

At any time during operation you can select the *Lamp Menu* to view the number of hours the lamp has been in use. Typically, as the lamp ages it begins to get dimmer. It is recommended that you check the number of hours the lamp has been in use as a good indicator as to whether or not it requires replacement. Other lamp specific read-only information includes the **Lamp S/N** (lamp serial number).

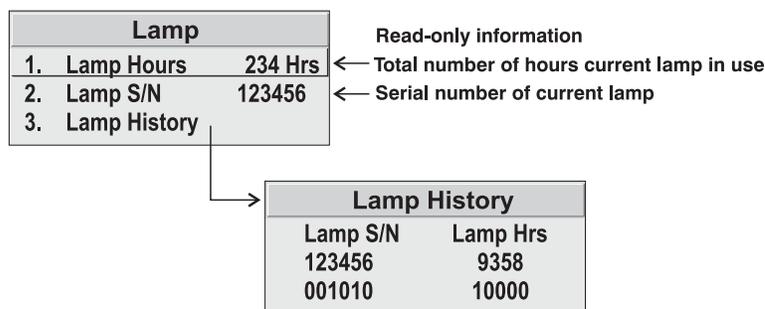


Figure 3.32.

Enter the lamp serial number for each new lamp installed and used in the projector. The serial number can be up to 13 characters in length and can be entered using the RS232 command LPC. For example: (LPC AAAA123456789). Once a new serial number is entered the lamp timer is reset back to zero.

Select **Lamp History** to access a smaller dialog box with read-only information about the history of previous lamps installed and recorded. The serial number and number of hours logged for each lamp is displayed. The **Lamp 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: 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) The lamp serial number can be found on the lamp itself.*

Choosing a Lamp Power

A switch, located on the PHM, allows you to select the power level (in watts) that you wish to apply to the lamp. (Figure 3.33.) You can choose from two settings – 100W and 120W (*100W is default*). It is important to keep in mind that the power level you choose affects light output and possibly the life span of the lamp.

Flipping the switch to 100W produces slightly dimmer images than if the setting was at 120W. And although there are exceptions, in most lamps, the higher the light output or power setting, the shorter the life span of the lamp.

It is recommended that you power down the projector before switching to a different lamp power setting.

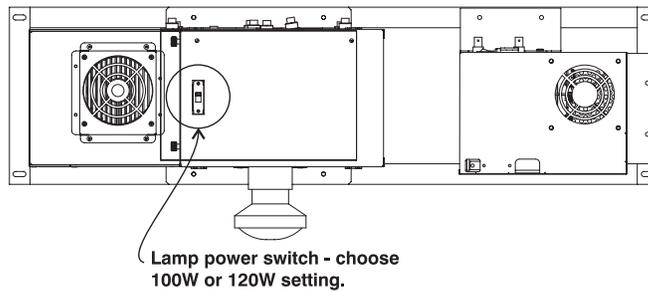


Figure 3.33.

3.5 System Status

This is a read-only window accessible from the *Main* menu that lists system information, such as projector model and serial number, projector ID, current input source, resolution, frequencies and current software version.

Status
Model: RPMX-100U
Serial No.: 120202
Projector ID: 01
Input Source: RGB1
Resolution: 1024x768
H. Freq.: 48KHz +
V. Freq.: 75Hz. +
Software Ver.: PP09+MP07

Figure 3.34. Status Menu

3.6 Auto Setup

You can select **Auto Setup** from the *Main* menu to enable the projector to automatically set up an image by optimizing the following display options:

What an "Auto Setup" Does	
OPTIMIZES:	SETS TO DEFAULT:
Pixel Tracking	Contrast & Brightness
Pixel Phase	Auto Input Level (off)
Size	Blanking
Vertical Stretch	Detail (if video source)
Position	Filter
Input Levels (if analog source)	Luma Delay

Selecting **Auto Setup** can save you some time in setting up an image, and you can also make further adjustments as desired. You must have an unlocked channel present to use this option. When you select **Auto Setup**, a separate window appears requesting confirmation to proceed. This allows you to cancel the process before any changes are made to the display parameters.

NOTES: 1) Auto Setup is not available with video signals. 2) Additional manual adjustments may still be required after Auto Setup.

3.7 Using Multiple Projectors

There are two methods of communicating with multiple projectors, using the IR keypad or RS-232 serial communication. These methods are not interchangeable. It is recommended that you choose the method which will best suit your installation and setup your network for this type of communication.

For details on how to operate the projector using RS-232 commands, go to www.christiedigital.com and download the latest RS-232 communications document for RPMX/CX50/CX60 and CX67 products.

Assigning a Projector ID Number

- Make sure you have assigned a unique projector ID number for each projector present – this number is required in order to get the exclusive attention of an individual projector with the IR keypad or by RS-232 serial communication. To assign a projector number:
 1. Press **Menu** to see the *Main* menu.
 2. Highlight and select **Communications**. The *Communications* menu appears.
 3. Scroll down to **Projector ID**. The two-digit number is the ID currently assigned to the projector. To assign a new number, press **Enter** to see two dashed lines, “- -” and enter the new two-digit ID number using the numeric keys on the keypad.
 4. Press **Enter** to accept the entry and/or **Exit** to exit the menu or cancel. See Figure 3.25, earlier in this section.
 5. Press **Status** to verify that the ID number for the projector was changed. Continue this for each projector in your network.

Broadcasting to All Projectors (with keypad)

- When you want to communicate to all projectors in a network, press **Projector** and ensure the option **All Projectors** is set to **YES** for each projector. (Press **Enter** to toggle the setting, if required.) Exit the menu and verify that all projectors will respond to a command by pressing a key, such as **Menu** on the keypad.

Controlling One Projector (with keypad)

- You can switch between communicating with all projectors and one specific projector by pressing **Projector** and toggling the option **All Projectors** from **YES** to **NO**. With **All Projectors** set to **NO**, the **Projector ID** option is selectable. The number here identifies the projector that is currently listening to IR keypad commands. All keypad commands you enter will then affect this projector exclusively until you enter another ID number or switch back to broadcasting to all projectors. If you want to specify another projector, highlight **Projector ID** and press the **Enter** key until a double dashed line appears “- -”. Using the numerical keys on the keypad enter the 2-digit ID number of the projector you want to communicate with. Press **Enter** to save the new ID number before exiting.

*NOTE: All projectors will respond to the **Projector** key even when **All Projectors** is set to **NO**. The number under **Projector ID** is not necessarily the ID of that projector but that of the last projector you had exclusive communication with. Press **Status** to see the ID number assigned to a projector.*

Defining the Size of a Display Wall ➤ Use the *Tiling Setup* submenu to define the size of a wall (number of rows and columns), and identify the location of each projector in the wall. If you are operating a stand-alone unit, enter “1” for items 1 to 4.

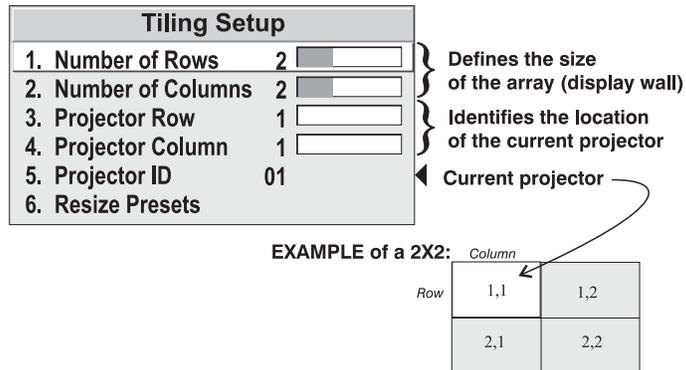


Figure 3.35.

Matching Colors of Multiple Projectors ➤ For the image on a display wall to appear seamless, color and brightness must be precisely matched from screen to screen. This requires the adjustment of the projector’s primary colors from the *Adjust Primary Colors* menu.

NOTE: Projectors manufactured later than August 2005 are color-adjusted at the factory to reduce adjustment time at site. Thus projectors should closely color-match following installation. Only minor adjustment should be required. Use the procedure below to ensure you achieve a uniform display.

When matching screens in a display wall, do the following:

NOTES: 1) It is recommended that you begin this procedure with all projectors at the same power level - 100W recommended setting. 2) Look at the center of the screen when performing this procedure. 3) A color meter can be used, but is not required to successfully perform this procedure. 4) Color matches are optimized for graphic sources. If using video sources with over-adjusted primary colors, you may notice a slight posterized or banded effect in images. 5) It is recommended that you look at the white color temperature again after installing a new lamp.

Step 1: Preliminary Setup

- 1a) **Setup and optimize all projector settings** – Optimize projector settings without trying to match color temperature or perceived light output at this point. E.g. Adjust size, position, and geometry.
- 1b) **Assign projector ID numbers** – Make sure each projector is assigned a unique 2-digit number. This allows you to switch between communicating to one projector or all projectors.
- 1c) **Display a 16-step grey scale test pattern** with black on the left and white on the right with 16 equal sized levels and run the **Auto Input Level** option.
NOTE: Test patterns are provided on the CD found in the User’s Kit.

- Wait for the 6 values (black levels and drives) to stabilize.
- Leave the *Input Levels* menu. Input levels should now be correct for the source.

Step 2: Enable Primary Color Adjustment

In the *Adjust Primary Colors* menu, select **APC Enable**, highlight and select **Enable** to enable the option so that primary colors controls can be adjusted and applied to the image. *NOTE: If at any time you decide not to use or apply the APC Enable option, select Disable – this disables Red, Green and Blue Primary controls.*

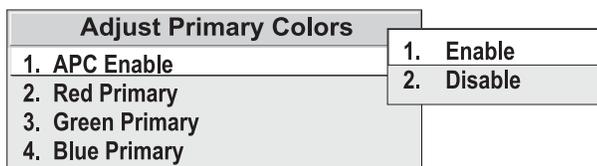


Figure 3.36.

Step 3: Primary Color Adjustment

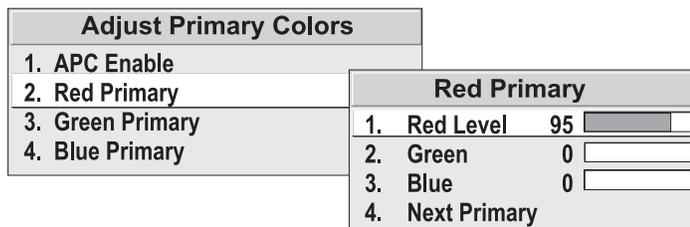


Figure 3.37.

- 3a) **Select Red Primary from the *Adjust Primary Colors* menu.** The *Red Primary* menu will appear and all screens will turn to a full red field.
- 3b) **Set Red Level on all screens to 100**
- 3c) **Match red light output** – Compare red fields and choose the dimmest. For each remaining projector, adjust Red Level until red light output is closely matched.
- 3d) **Match reds** – Compare red fields and choose the least saturated red. In the *Red Primary* menu for each projector – starting with the adjacent projector – adjust green or blue until all red fields match the first, both in color and light output. In some cases, all projectors will need some color and in other cases only green or blue may be required.
- 3e) **Adjust next primary in all projectors** – When all reds match, select **Next Primary** to quickly advance you to the *Green Primary* menu. The *Green Primary* menu will appear and your screens will turn to a full green field. Repeat steps 3b) to 3d) for green and then blue. For each primary adjustment, add other “secondary” colors as necessary.
- 3f) **Recheck all colors and adjust if necessary.**
- 3g) **Exit the *Adjust Primary Colors* menu.**

Step 4: Adjust Color Temperature

- 4a) **Select a “User” color temperature (User 1 recommended)**
- 4b) **Display internal white test pattern.**

- 4c) **Adjust color temperature to match whites between screens (keep White Boost at 0)** – View all white fields and adjust Red, Green, Blue in the *Color Temperature* window.

When matching light output of individual projectors it may be necessary to adjust the White Boost level. Start with White Boost at 0 and match to the dimmest display.

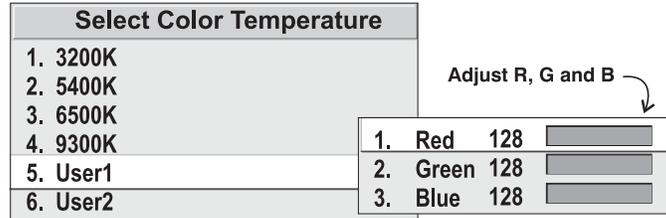


Figure 3.38.

Step 5: Re-adjust Input Levels, if necessary - “fine-tune” input black levels to match grey scale color. Refer to *Black Levels and Input Drives* on page 3-16 for instructions.

All color screens should now be color matched. For each projector, the settings define your chosen *User* color temperature. For best results, keep all projectors at the same lamp power – the light output from each will be maintained over time to within 10% of the current level.

3.8 Error Codes

Occasionally the projector encounters error conditions, which interrupt normal operation. These can be caused by invalid user entry, an input signal error (most common) or some other system error. You will automatically be notified of such errors on-screen and via serial communications.

Invalid User Errors ➤ Invalid user entry errors trigger an on-screen message to appear (usually in the bottom right corner of the screen) describing the problem. Press **[Exit]** to confirm the message and close the message box.

Input Signal Errors ➤ Input signal error messages appear when you are in presentation level (ie. When there are no menus present) and have selected an input on which the projector detects a problem. While menus remain operational and pressing any key will temporarily remove the message from the screen, you must resolve the signal problem in order to permanently eliminate the message.

System Warnings/Errors ➤ A system warning message indicates that a system malfunction has been detected (see *Status LED Codes*, below). It 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 serious problem that should be reported to the manufacturer. You can press **[Exit]** to remove the message, but for best results you should reset the projector—power the projector down and up again with the **[Power]** key.

Status LED Codes

There are three LEDs on the EM that are used to convey the current state of the system and report any error conditions that may be present.

If the POWER LED on the back of the projector repeatedly flashes a pattern of yellow and red light, you have likely encountered a system error requiring the

attention of a qualified service technician. The specific pattern of flashing indicates the 2-digit code identifying the type of problem encountered—the number of yellow flashes represents the first digit and the number of red flashes indicates the second digit. Consult Table 3.2 for a description of the error. Press **Exit** on the keypad to acknowledge the error - the POWER LED will stop flashing and go to a solid green color. Try resetting the projector by powering it off and on again, cooling when necessary. Service the projector, if necessary. Contact your dealer if the problem persists.

Table 3.2. Error LED Status

Error Code	Power LED	Fan LED	Lamp LED	Description
12	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Flashing green</i>	DMD error
21	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Off</i>	Lamp strike failure, Lamp failure, Ballast error, Lamp shut off unexpectedly
24	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Flashing green</i>	Lamp door open (interlock)
37	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Off</i>	General EMfailure
51	 <i>Flashing yellow and red</i>	 <i>Flashing green</i>	 <i>Off</i>	Fan failed or not connected (<i>applies to all fans</i>)
71	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Off</i>	EEPROM failure
81	 <i>Flashing yellow and red</i>	 <i>Solid green</i>	 <i>Off</i>	Decoder failure

NOTE: Press **Exit** to acknowledge the error – the power LED will stop flashing and remain a steady green.

Maintenance

4.1 Warnings and Guidelines

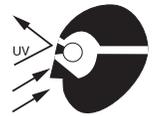
The projector is an international regulatory agency approved product designed for safe and reliable operation. To assure complete safety at all times it is important to acknowledge the following precautions while operating the projector.

WARNING

Never look directly into the projector lens. The extremely high brightness of this projector can cause permanent eye damage.

WARNING

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



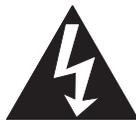
CAUTION

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 specifications in *Section 5, 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** ➤ The projector is designed to operate with a 120W UHP lamp. A lamp that has reached the end of its life or has failed should be replaced with a good lamp as soon as possible.

⚠ WARNING

Turn off the projector before replacing a lamp. Wait approximately 5 minutes to allow the lamp to cool before removing.

The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Always allow the lamp to cool before handling and/or powering down and unplugging the projector.

Use only the lamp specified and supplied by CHRISTIE in the Lamp Replacement Kit.



The lamp operates at a very high temperature and pressure. Failure to allow the lamp to sufficiently cool prior to handling could result in an explosion causing personal injury and/or property damage. Wait at least 5 minutes before unplugging the projector. This provides enough time for the internal lamp cooling fans to cool the lamp and to automatically shut off. Allow the lamp to cool completely before handling.

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

⚠ WARNING

Use an appropriately rated AC power cord with the projector. The power cord supplied is approved for North American use only.

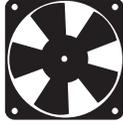
Do not attempt operation if the AC supply is not within the specified voltage and power range.

Do not allow anything to rest on the power cord. Locate the projector where the power cord cannot be abused by persons walking on it or objects rolling over it.

Operate the projector at the specified voltage. Do not overload power outlets and extension cords as this can result in fire or shock hazards.

The projector is equipped with a three-wire plug having a third (grounding) pin. This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to have the outlet replaced. Do not defeat the safety purpose of the grounding-type plug. **⚠ 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, unplug the projector from the power outlet and refer service to qualified service personnel.



- The power cord has been damaged.
- The internal cooling fans do not come on when the projector is first turned on.
- Liquid has been spilled into the projector.
- The projector has been exposed to excessive moisture.
- The projector does not operate normally.
- The projector has been dropped or the case has been damaged.
- Projector performance has deteriorated.

⚠ WARNING

Do not attempt to service the projector yourself. All servicing must be performed by CHRISTIE qualified 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.

Replacing Keypad Batteries ➤

The keypad works on 2 AA size alkaline batteries. Periodically these batteries require replacement.

To replace batteries:

1. Turn the keypad over to access the small battery compartment cover.
2. Push the small tab in and up at the same time - lifting the cover completely off.
3. Remove and discard the old batteries from keypad.
4. Orient and place each new battery into the compartment as indicated by the diagram etched into the compartment.

Insert the bottom edge of the cover into the rim of the compartment and gently push the upper portion of the cover down until it snaps into place. If you don't hear a "click" the cover is not in position. Remove the cover and try again ensuring the bottom edge of the cover gets inserted into the rim.

4.3 Lamp Replacement

The projector operates using a 120W UHP lamp. Typically, aging lamps gradually decrease in their intensity. You can check the number of hours the lamp has been in use by checking **Lamp Hours** in the *Lamp* menu. It is recommended that you be aware of the number of hours the lamp has been in use and the quality of light output produced by the lamp. These are good indicators as to when the lamp requires replacement. If the lamp burns out, because it has reached the end of its life or it has failed for some other reason, it should be replaced with another lamp.

⚠ Before you proceed with lamp replacement....

- Read the Lamp Replacement procedure in its entirety before you begin.
- Always power down and unplug the projector before servicing. Allow the cooling fans to turn off before unplugging the unit.
- Allow the lamps to cool sufficiently before removing. Recommended wait period is 5 minutes after the fans have turned off.
- Do not touch the glass surface of the lamp. Handle the lamp by its housing only. Intense heat can accumulate in areas where fingerprints exist, creating "hotspots" and a potential safety hazard. Wearing clean cotton gloves, and handling the lamp by its housing will prevent getting fingerprints on the glass surface.

To replace a lamp, do the following:

NOTE: The graphics used to illustrate the lamp removal procedure show the PHM module only. The PHM does not require removal from the mounting tray to perform this procedure.

STEP 1 – Power down the projector and unplug – Press **Power** to turn the projector off. Allow the fans to stop before unplugging it from the AC outlet.

⚠ WARNINGS

It is recommended that you allow the lamp to cool for approximately 5 minutes before removing it from the lamp module.

STEP 2 – Access the lamp module

- (a) Loosen the 2 screws securing the lamp door to the side of the PHM module. (Figure 4.1.)

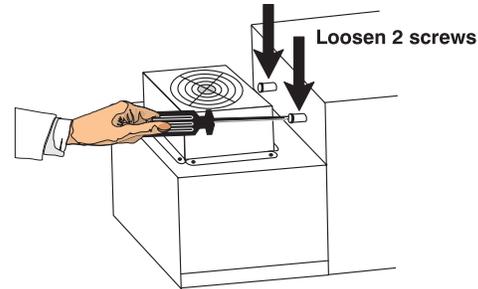


Figure 4.1.

- (b) Swing the lamp door open. (Figure 4.2.) *NOTE: The lamp door is hinged to the base of the module.*

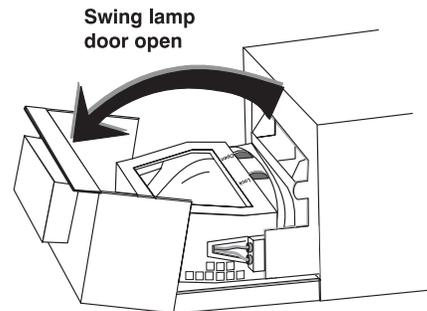


Figure 4.2.

STEP 3 - Remove the lamp

⚠ WARNINGS

Do not touch the glass surface of the lamp when removed from the lamp module. Set it aside for proper disposal once it has cooled down.

Keep lamp level when removing from lamp module to prevent damaging the terminal block.

Do not touch the surface of the optical integrator. Fingerprints or scratches can damage this optical component.

- (a) Turn the lock ring to the OPEN position. (Figure 4.3.)

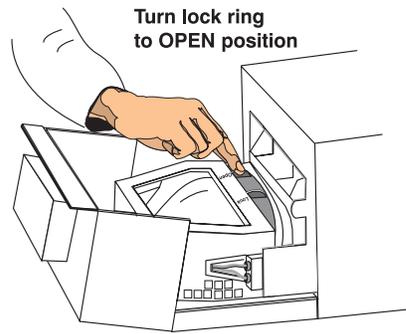


Figure 4.3.

- (b) Firmly, grasp the lamp module and pull straight out. Keep the lamp level when doing this so that it easily disconnects from the terminal block. (Figure 4.4.)

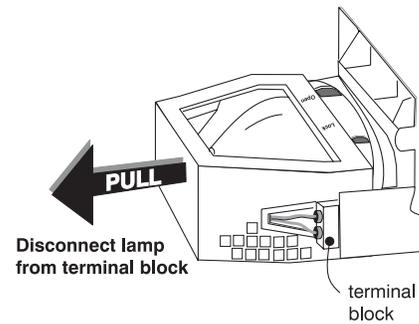


Figure 4.4.

STEP 4 – Install a new lamp

- (a) Slide the new lamp into the lamp module so it fully connects into the terminal block.
- (b) Turn the lock ring to the LOCK position.

STEP 5 – Close lamp door and record new lamp serial number

- (a) Swing the lamp door up and re-tighten the 2 screws loosened in Step 2.
- (b) Plug the projector back into the AC outlet and power it up to continue with operation.
- (c) Reset lamp hours and enter a new serial number, using the serial command LPC. For example: (LPC AAAA123456789) *NOTE: You can enter a serial number up to 13 characters (maximum).*

See also, 3.4 The Lamp Menu in Section 3.

4.4 Projection Lens Focus

The projection lens can be adjusted to focus a displayed image. Typically, the projection lens only requires focusing during the installation and setup of the projector.

⚠ Do not look directly into the projection lens when adjusting for focus.

For RPMX (38-GFX101-01), CX67 (38-GFX005-01):

(Figure 4.5.)

1. Loosen the lock screw (C) on the lock ring (A).
2. Loosen the lock ring (A), until the lens barrel (B) can easily be turned.
3. Turn the lens barrel (B) clockwise and/or counter-clockwise until the image on the screen appears clear.
4. Re-tighten the lock ring to lock the focus adjustment.
5. Re-tighten the lock screw to prevent possible tampering with the focus adjustment.

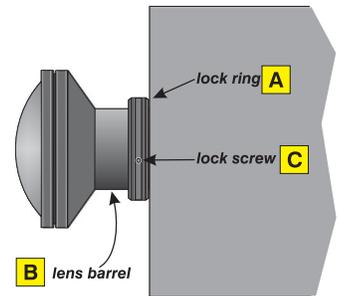


Figure 4.5.

For CX50 (38-GFX003-02/05/06), CX60 (38-GFX004-02), CX67 (38-GFX005-06/07), RPMX (38-GFX101-02 or higher):

1. Loosen the lock screw on the barrel of the lens.
(Figure 4.6, *top*)
2. Grasping the lock screw, slide it to the left and right until the desired focus is achieved.
(Figure 4.6, *bottom*)
3. Tighten the lock screw to lock the focus adjustment.

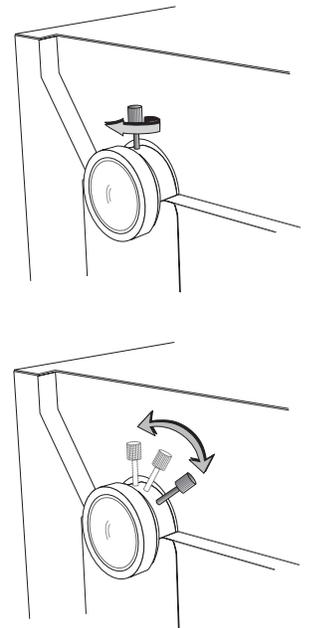


Figure 4.6

4.5 Troubleshooting

Use the following as a guide in identifying general operating problems, the cause and how they can be corrected. Most of these problems can be corrected by a user and do not require the assistance of a qualified technician. Problems that are more technically related do require the attention of a qualified technician. These are identified in the service manual.

Symptom ➤ **The projector does not power on when the  key is pressed.**
CAUSE/REMEDY:

1. Make sure the AC power cord has been plugged in and the AC power switch is on.
2. To power up make sure you press the power key for at least 1 second.
3. Check the status of the LEDs on the input panel (electronics module). Are they lit? If not, check the connection of the power cord to the wall outlet.
4. Make sure you are pointing the keypad at the screen and are within the 7.5m IR reception range. Also ensure there is nothing blocking the reception path.
5. Replace the keypad batteries. See the instructions in this section.

Symptom ➤ **The projector is on, but no image is displayed.**
CAUSE/REMEDY:

1. Make sure the lens cap has not been left on.
2. Is the projector in stand-by mode? The “power” LED is red and the “Fan” and “Lamp” LEDs are off. Press  to strike the lamp and start operation.
3. Is an active source connected properly? Check all cable connections made to the input panel on the electronics module.
4. Are there test patterns or menus present? (Press  or  to check.) If yes, check your source connections again.
5. Make sure the room lighting is not too bright. Reduce light reflections as much as possible.
6. Increase contrast and/or brightness of image.
7. Make sure the projector is not too far away from the screen.
8. Is the “Power” LED flashing a pattern of yellow and red lights? This indicates an internal system error that may be preventing the projector from operating. If the problem persists contact a qualified service technician.

Symptom ➤ **The projector does not respond to the infrared remote keypad...**
CAUSE/REMEDY:

1. Make sure there is nothing blocking the transmission path between the keypad and IR sensor.
2. Check keypad batteries. Refer to the instructions in this section if they need replacement.
3. Keep ambient lighting to a minimum. This may be interfering with the transmission.
4. Make sure the keypad has not been disabled for use with this projector. Check that you have broadcast control of all projectors. Press  and the item **All Projectors** is set to **YES**. Or have you indicated the correct projector ID number for the projector you want to control.

Symptom ➤ **The display is jittery or unstable...****CAUSE/REMEDY:**

1. If the display is jittery, or if it disappears and reappears erratically check that the source is properly connected and that its signal is of adequate quality for detection. For example, if the projector scans the default input for a signal to display, and poor quality or a source is improperly connected, the projector briefly and repeatedly attempts to display an image. If no source is connected, the “no signal” error message appears over a blank display. Correct the source connection.
2. The horizontal or vertical scan frequency of the input signal may be out of range of the projector.
3. The sync signal may be inadequate. Correct the source problem.
4. The input signal type may conflict with the input module. Install/use the correct module for the source.
5. Pixel tracking and phase may need more adjustment.

Symptom ➤ **The display is faint...****CAUSE/REMEDY:**

1. Check the settings under the *Input Levels* menu. Try using the **Auto Input Level** option.
2. Brightness and/or contrast may be set too low. Adjust as necessary.
3. Gamma setting may be inadequate. It is recommended that you use the default gamma setting from most sources.
4. The room may be too bright. Limit the amount of light reflecting off the screen.
5. Ensure the projector is not too far from the screen.
6. Is the screen being viewed from the best angle? Check seating plans and viewing angles.

Symptom ➤ **The display is reversed and/or upside down...****CAUSE/REMEDY:**

1. Image orientation is not set correctly. Access **Image Orientation** in the *Configuration* menu and select the option to suit your installation. See *Section 2*.

Symptom ➤ **Portions of the display are cut off or warped on the opposite edge...****CAUSE/REMEDY:**

1. Resizing may need some adjustment. Adjust until entire image is visible and centered.
2. Check 6-axis adjustments.

Symptom ➤ **The display appears compressed or stretched...****CAUSE/REMEDY:**

1. The frequency of the pixel sampling clock is incorrect for the current source.
2. *Size and Position* options may be adjusted incorrectly for the incoming source.

Symptom ➤ **The image appears to drift from good to bad and visa versa...****CAUSE/REMEDY:**

1. The operating temperature of the projector may be fluctuating. Watch that the projector is not located too close to heating/air conditioning vents.
2. The source input signal may be of low quality.
3. The horizontal or vertical frequency of the input may have changed at the source end.

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

1. You may have accidentally pressed the **Freeze** key on the keypad. Press **Freeze** again or press **Exit** to cancel the function.

Symptom ➤ *The display is not sharp or clean...*

CAUSE/REMEDY:

1. More display adjustments may be required – focus, brightness, contrast, pixel tracking, and pixel phase.
2. If you are using a BNC T-connector, try using a distribution amplifier to boost signal levels.
3. The source input signal may be of low quality. Try another source.

Symptom ➤ *Colors in the display are inaccurate...*

CAUSE/REMEDY:

1. The color, gamma, and color temperature settings may require adjustment. Review all settings.
2. Check cable connections. Make sure red is red, etc.

Symptom ➤ *The display is “noisy”...*

CAUSE/REMEDY:

1. Display adjustment may be required. Adjust pixel tracking and phase for graphic sources only. Noise is particularly common on YPbPr signals from a DVD player.
2. The signal cables carrying the input signal may be of poor quality. Use only good quality signal cables.

Specifications

NOTES: 1) Due to continuing research, specifications are subject to change without notice. 2) Specifications apply to all models unless otherwise noted. 3) CX50/CX60 data with use of High Gain screen and CX67 with Wide Angle screen. 4) CX50/CX60/CX67 screens are sold separately.

Display ➤ **Display Resolution**

XGA resolution, 1024 X 768 pixels

Brightness (typical)

100W with White Boost OFF (0)	400 ANSI lumens
100W with White Boost ON (10)	500 ANSI lumens
120W with White Boost OFF (0)	480 ANSI lumens
120W with White Boost ON (10)	600 ANSI lumens

Contrast Ratio (typical)

1000:1 full field ON/OFF

Gray Scale and Color Resolution

8 bits resolution
16.8 million displayable colors

Color Temperature (for RPMX-100U)

Default	(100% white) not to exceed 8500K
Range of adjustment	3200K – 9600K

Brightness Uniformity

> 90% (center to corner)

Source Input Compatibility ➤ **Analog RGB**

Horizontal frequency range	15-85 kHz
Vertical frequency range	50-85Hz
Scan format	Interlaced or progressive
Pixel clock rate (maximum)	135 MHz max.
DC offset	+/- 1V
Nominal Impedance	75 ohms

Sync (interlaced or progressive scan formats)

Horizontal frequency range	15-85 kHz
Vertical frequency range	50-85Hz
Scan format	Interlaced or progressive
Sync types	Separate H and V Composite Sync-on-green
Nominal impedance	75 ohms
Polarity (N/A to sync-on-green)	positive or negative
DC operating range	0-5V

Composite Video and S-Video (requires optional Video Decoder Module)

Signal formats	Composite video (CVBS), S-Video (Y/C),
Video standards	NTSC, NTSC 4.43, PAL, PAL M, PAL N
DC offset	+/-5V
Nominal impedance	75 ohms

DVI Input

Horizontal frequency range	15-85kHz
Vertical frequency range	50-85Hz
Scan format	interlaced or progressive <i>NOTE: Interlaced on DVI not supported.</i>
Pixel clock rate	115MHz max.

Control Signal Compatibility ➤ **Infrared (IR) Control Input**

Number of sensors: 1
IR reception range using keypad supplied: 7.5m

RS-232

RS-232 ports	1 female DB9 connector (RS232 IN) 1 male DB9 connector (RS232 OUT)
Baud rate	19,200 default
Maximum number of projectors daisy chained without external buffering	6

Picture Offset and Adjustment Range ➤ *Unless otherwise stated, ranges apply to both 0° and 90° orientations.*

Range of Motion

Horizontal (side to side)	+1.0"/-1.0" from nominal ± 0.05"
Vertical (up/down)	+ .85"/- .85" from nominal ± 0.006"
Translation (toward and away from screen)	{ +1.2"/-1.2" from nominal ±0.05" { + .85"/- .85" from nominal (for 90° position)
Yaw (horizontal keystone)	+3°/-3° from nominal ±1/4°
Pitch (vertical keystone)	+5°/-5° from nominal ±1/4°
Roll (image tilt)	+5°/-5° from nominal ±1/4°

* Adjuster's nominal position is factory set.

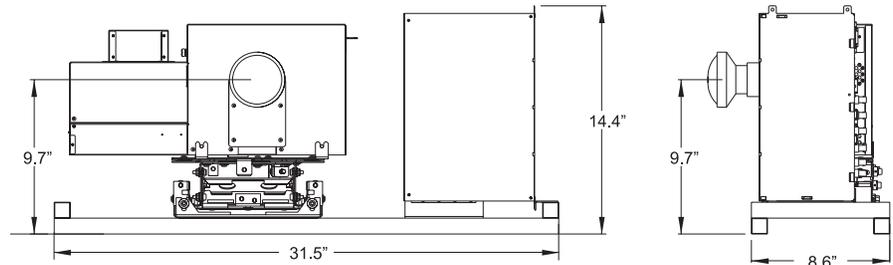
Viewing Angle ➤ (to half gain)	FOR CX50-100U	Horizontal	± 38 degrees ± 2.0 degrees
		Vertical	± 9.5 degrees ± 1.0 degrees
	FOR CX60-100U	Horizontal	± 25 degrees ± 3.0 degrees
		Vertical	± 9 degrees ± 1.0 degrees
	FOR CX67-100U	Horizontal	± 35 degrees ± 3.0 degrees
		Vertical	± 35 degrees ± 3.0 degrees
Power Requirements ➤	Voltage range		100 - 240 VAC
	Line frequency		50 Hz – 60 Hz nominal
	Inrush current		65A max @120V 135A max @ 240V
	Current rating		2.5A @ 100V (typical), 1.05A @ 240V (typical)
	Power consumption		250W @ 100V maximum 250W @ 240V maximum
Lamps ➤	Type		120W UHP
	Power (user selectable)		100W / 120W
	Warm-up to full brightness		<5 minutes
	Operating position		full rotation allowed about the lamp axis
Lens ➤	0.8:1 short throw		
	Image size range: 40" to 70" diagonal		
Environmental Conditions ➤	Operating Temperature		10°C to 35°C
	Humidity (for RPMX)		20% to 90%
	(for CX50/CX60)		25% to 65%
	(for CX67)		40% to 60%
	Altitude		0 to 4000 meters, 10°C to 35°C
	(for CX67)		0 to 3000 meters, 17°C to 31°C
	Non-operating Temperature		-20° to 60°C
	Humidity (for RPMX)		20% to 95%
	(for CX50/CX60)		20% to 65%
	(for CX67)		35% to 65%
	Altitude (for RPMX)		0 to 15,000 meters, -20°C to 60°C
	(for CX50/CX60/CX67)		0 to 15,000 meters, -20°C to 35°C

Physical Characteristics ➤ *NOTE: 1) Dimensions apply to all models, unless specified otherwise. 2) Screen dimensions can vary based on environmental conditions. 3) All dimensions in inches and for reference only. Adjuster in nominal position.*

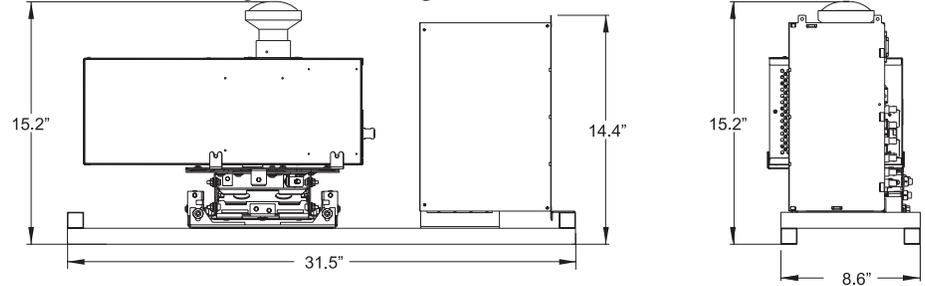
**For RPMX-100U
(38-GFX101-01)**

➤ *Weight (including adjuster) < 44lb.
shipping weight includes packaging <100lb.
Size (includes lens, adjuster and mounting rails)*

Lens Horizontal Configuration (0 degree)



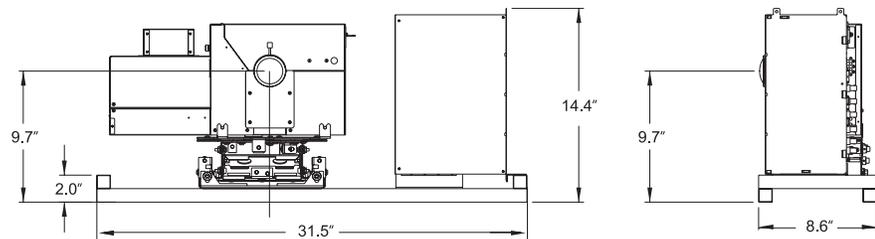
Lens Vertical Configuration (90 degree)



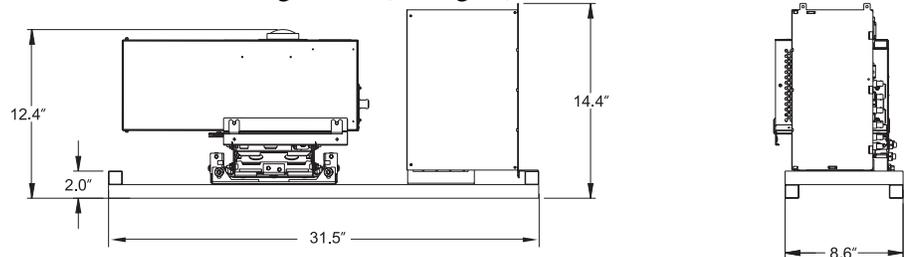
**For RPMX-100U
(38-GFX101-02)**

➤ *Size (includes lens, adjuster and mounting rails)*

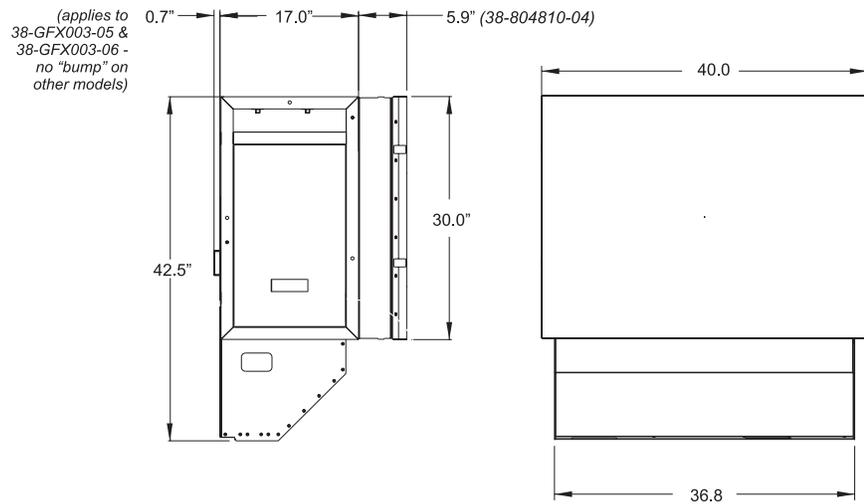
Lens Horizontal Configuration (0 degree)



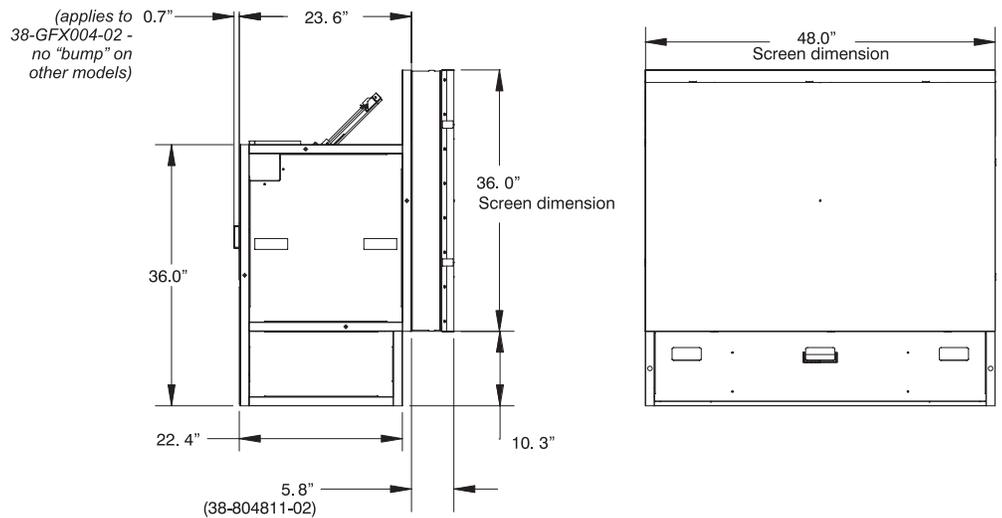
Lens Vertical Configuration (90 degree)



For CX50-100U (38-GFX003-xx) ➤ Weight (without screen, top cover, pedestal and packaging) 125lb.
Size



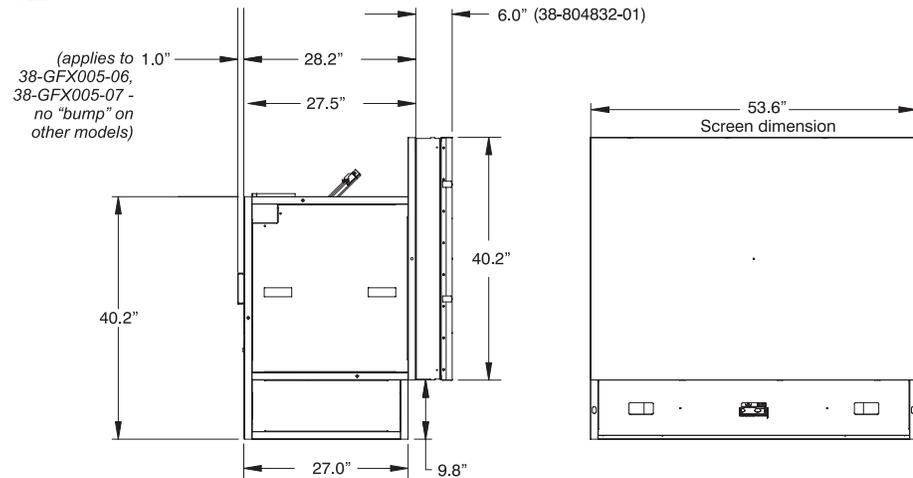
For CX60-100U (38-GFX004-xx) ➤ Weight (without screen, top cover, pedestal and packaging) 150lb.
Size



**For CX67-100U
(38-GFX006-xx)**

Weight (without screen, top
cover, pedestal and packaging)
Size

171lb.



**Safety and
Regulatory Compliance**

▶ CAN/CSA C22.2 No. 60950-00
ANSI/UL 60950 3rd Edition
EN60950: 2000 European Norm, Safety of Information Technology Equipment
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
EN55024 (CISPR 24) specific to Information Technology Equipment (all parts),
under which are;
EN61000-3-2 Induced Harmonic Distortion
EN61000-3-3 Induced Voltage Fluctuations (Flicker)
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

- Accessories (optional) ►**
- User's Kit (38-804828-01 for RPMX) and (38-804829-02 for CX50 / CX60 / CX67), includes user/installation manuals, IR remote with batteries, assorted ball drivers
 - High Gain Screen (38-804810-01 for CX50) and (38-804811-02/03 for CX60)
 - Wide Angle Screen (38-804832-02 for CX67)
 - Pedestal Kit (38-804802-02 for CX50, 38-804814-02 for CX60, 38-804831-02 for CX67)
 - Pedestal Side Panel Kit (38-804803-01 for CX50, 38-804818-01 for CX60, 38-804835-01 for CX67)
 - Top Cover Kit (38-804805-02 for CX50, 38-804813-02 for CX60 and 38-804833-01 for CX67)
 - Eyebolt Kit for CX50 hoisting (38-804838-01)
 - Eyebolt Kit for CX60/CX67 hoisting (38-804839-01)

Glossary

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.
- Aspect Ratio** ➤ The ratio of the width of an image to its height, such as the 4:3 aspect ratio common in video output.
- 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 at which serial communications travel from their origin. In this projector, the RS-232 or RS-422 default baud rate of 19200 can be changed to match a controlling device. The switcher baud rate of 9600 cannot be changed.
- 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 99 channels.

- Checkbox** ➤ A menu item that indicates whether an option is currently in effect (checked) or not (unchecked).
- 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.
- 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.
- DMD™** ➤ Digital Micromirror Devices™ used in this projector for processing red, green, and blue color data.
- Decoder** ➤ 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.
- Flicker** ➤ A very rapid variation in image brightness caused by a frame rate that is too slow. (See *Interlace*) See also *Lamp Flicker*.
- 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.
- 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.
- 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.

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- Help Screen** ➤ 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 this projector, this value is expressed as the maximum percentage 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 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.
- 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.
- 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. 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.
- Loophrough (Loophru)** ➤ 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.
- 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.
- 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.
- Rise Time** ➤ The time required by the video amplifier of the projector to increase its output from 10% to 90% of the maximum value.

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- 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 Rate** ➤ The horizontal or vertical frequency at which images are generated.
- Scan Line** ➤ One horizontal line on the display.
- SECAM** ➤ A video output format of some video tape and disk players (used primarily in France). SECAM (Sequential 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.
- Sliderbar** ➤ A sliderbar 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. See also *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:
- "Composite sync": the horizontal and vertical components are together on one cable.
 - "Sync-on-green": the sync is part of the green video.
 - "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.
- 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.
- 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 this projector, this value is expressed as the maximum percentage 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 bypasses the video decoder in this projector.
- YUV** ➤ See *YPbPr*.

Acceptable Signal Types

Format Type	Mode	H. Freq	V. Freq	Input Resolution	Sync polarity	Scan Type	Input Terminal
NTSC@RGBHV	NTSC	15.734	59.94		N/N	Interlaced	RGB IN
PAL/SECAM @RGBHV	PAL	15.625	50.00		N/N	Interlaced	RGB IN
HDTV@RGBHV	HDTV	33.75	60.00		N/N	Interlaced	RGB IN
NEC PC98 Std @56Hz	NEC24k	24.82	55.90	640X400	N/N	Non-Interlaced	RGB IN
VGA Graphics 350 lines @70Hz	TEXT70	31.47	70.09	640X350	P/N	Non-Interlaced	RGB IN
VGA Graphics 400 Lines@70Hz	TEXT70	31.47	70.09	640X400	N/P	Non-Interlaced	RGB IN
VGA Text 350 Lines @70Hz	TEXT70	31.47	70.09	720X350	P/N	Non-Interlaced	RGB IN
VGA Text 400 Lines @70Hz	TEXT70	31.47	70.09	720X400	N/P	Non-Interlaced	RGB IN
VESA 640X350 @85Hz	TEXT 85	37.861	85.08	640X350	P/N	Non-Interlaced	RGB IN
VESA 640X400 @85Hz	TEXT 85	37.861	85.080	640X400	N/P	Non-Interlaced	RGB IN
VESA 720X400 @85Hz	TEXT 85	37.927	85.039	720X400	N/N	Non-Interlaced	RGB IN
VESA 640X480 @60Hz	VGA60	31.469	59.940	640X480	N/N	Non-Interlaced	RGB IN
VESA 640X480 @72Hz	VGA72	37.861	72.809	640X480	N/N	Non-Interlaced	RGB IN
VESA 640X480 @75Hz	VGA75	37.50	75.00	640X480	N/N	Non-Interlaced	RGB IN
VESA 640X480 @85Hz	VGA85	43.269	85.008	640X480	N/N	Non-Interlaced	RGB IN
MacIntosh 13 inch Mode @67Hz	MAC13	35.000	66.667	640X480	-/-	Non-Interlaced	RGB IN
VESA 800X600@56Hz	SVGA56	35.156	56.250	800X600	P/P	Non-Interlaced	RGB IN
VESA 800X600 @60Hz	SVGA60	37.879	60.317	800X600	P/P	Non-Interlaced	RGB IN
VESA 800X600 @72Hz	SVGA72	48.077	72.188	800X600	P/P	Non-Interlaced	RGB IN
VESA 800X600 @75Hz	SVGA75	46.875	75.00	800X600	P/P	Non-interlaced	RGB IN

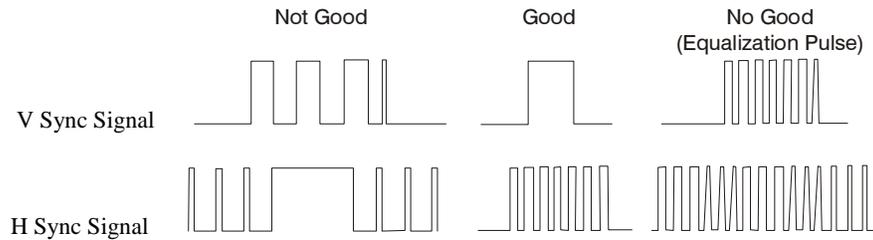
Appendix B: Signal Types

Format Type	Mode	H. Freq	V. Freq	Input Resolution	Sync polarity	Scan Type	Input Terminal
VESA 800X600 @85Hz	SVGA85	53.674	85.061	800X600	P/P	Non-Interlaced	RGB IN
MacIntosh 16inch Mode @75Hz	MAC16	49.725	74.550	832X624	-/-	Non-Interlaced	RGB IN
VESA 1024X768 @43Hz	XGA43	35.522	43.479	1024X768	P/P	Interlaced	RGB IN
VESA 1024X768 @60Hz	XGA60	48.363	60.004	1024X768	N/N	Non-Interlaced	RGB IN
VESA 1024X768 @70Hz	XGA70	56.476	70.069	1024X768	N/N	Non-Interlaced	RGB IN
VESA 1024X768 @75Hz	XGA75	60.023	75.029	1024X768	P/P	Non-Interlaced	RGB IN
VESA 1024X768 @85Hz	XGA85	68.677	84.997	1024X768	N/N	Non-Interlaced	RGB IN
MacIntosh 19 Inch Mode@75Hz	MAC19	60.135	74.700	1024X768	N/N	Non-Interlaced	RGB IN
WK Std 1280X1024 @60Hz	SXGA	64.00	60.000	1280X1024	N/N	Non-Interlaced	RGB IN
1028X1024 @75Hz	SXGA	79.976	75.025	1280X1024	P/P	Non-Interlaced	RGB IN

Note 1: In composite sync or sync-on-green signal, H sync signal must be inserted into V sync signal.



Note 2: In H/V separation sync signal, V sync signal must not include H sync signal or equalization pulse. And, H sync signal must not include V sync signal and equalization pulse.



Note 3: When composite sync or sync-on-green signal is supplied, horizontal frequency must be 31kHz or higher.

Note 4: Sync signal: Horizontal..... Positive or Negative
 Minimum H. Sync width: 1Ms
 Vertical..... Positive or Negative
 Minimum V. Sync width: 2H

Acceptable RGB Input Signal Timing

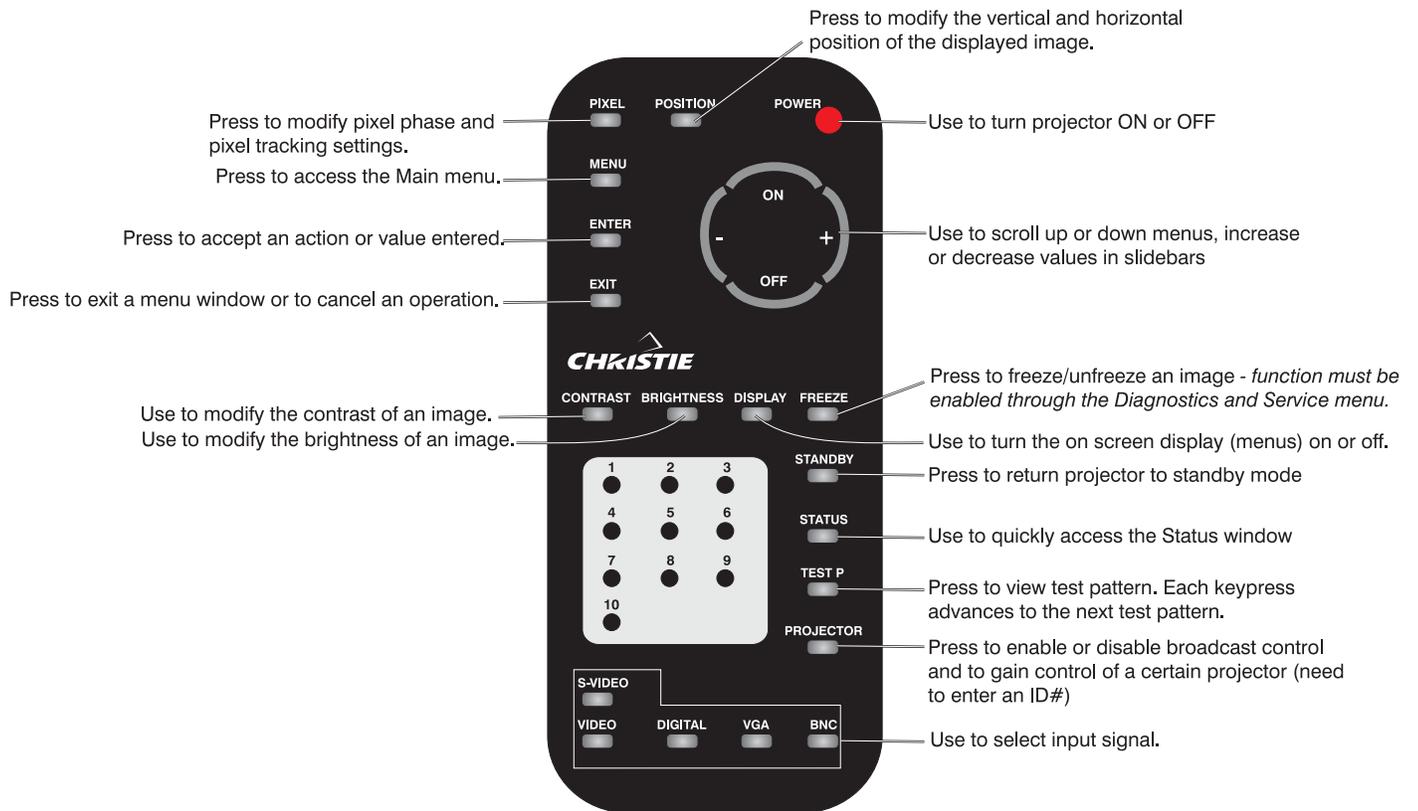
The following table lists acceptable RGB input signals. If you are using a signal similar to one of the ones listed it may be accepted, however some projector settings may need some adjustment.

Mode	Input Res.	A Pixel	B	C	D	E	FH KHz	fV Hz	Clock MHz	G Line	H	I	J	K
NTSC							15.734	59.94	16.521					
PAL							15.625	50	16.406					
HDTV							33.75	60	67.264					
NEC24k	640X400	85	640	59	64	848	24.82	55.9	21.047	25	400	7	8	440
TEXT70	640X350	48	640	14	96	800	31.47	70.09	25.176	60	350	38	2	449
TEXT70	640X400	48	640	14	96	800	31.47	70.09	25.176	35	400	13	2	449
TEXT70	720X350	54	720	18	108	900	31.47	70.09	28.323	60	350	38	2	449
TEXT70	720X400	54	720	18	108	900	31.47	70.09	28.323	35	400	13	2	449
TEXT85	640X350	96	640	32	64	832	37.861	85.08	31.50	60	350	32	3	445
TEXT85	640X400	96	640	32	64	832	37.861	85.08	31.50	41	400	1	3	445
TEXT85	720X400	108	720	36	72	936	37.927	85.039	35.50	42	400	1	3	446
VGA60	640X480	40	640	24	96	800	31.469	59.94	25.175	25	480	18	2	525
VGA72	640X480	120	640	32	40	832	37.861	72.809	31.50	20	480	17	3	520
VGA75	640X480	120	640	16	64	840	37.50	75	31.50	16	480	1	3	500
VGA85	640X480	80	640	56	56	832	43.269	85.008	36	25	480	1	3	509
MAC13	640X480	96	640	64	64	864	35	66.667	30.24	39	480	3	3	525
SVGA56	800X600	128	800	24	72	1024	35.156	56.25	36	22	600	1	2	625
SVGA60	800X600	88	800	40	128	1053	37.879	60.317	40	23	600	1	4	628
SVGA72	800X600	64	800	56	120	1040	48.079	72.188	50	23	600	37	6	666
SVGA75	800X600	160	800	16	80	1056	46.875	75	49.5	21	600	1	3	625
SVGA85	800X600	152	800	32	64	1048	53.674	85.061	56.25	27	600	1	3	631
MAC16	832X624	224	832	32	64	1152	49.725	74.55	57.283	39	624	1	3	667
XGA43	1024X768	56	1024	8	176	1264	35.522	43.479	44.9	40	768	0	8	816
XGA60	1024X768	160	1024	24	136	1344	48.363	60.004	65	29	768	3	6	806
XGA70	1024X768	144	1024	24	136	1328	56.476	70.069	75	29	768	3	6	806
XGA75	1024X768	176	1024	16	96	1312	60.023	75.029	78.75	28	768	1	3	800
XGA85	1024X768	208	1024	48	96	1376	68.677	84.997	94.5	36	768	1	3	808
MAC19	1024X768	172	1024	34	96	1328	60.135	74.7	79.86	30	768	4	3	805
SXGA60	1280X1024	248	1280	48	112	1688	63.981	60.02	108	38	1024	1	3	1066
SXGA75	1280X1024	248	1280	16	144	1688	79.976	75.025	135	38	1024	1	3	1066

Note1: The clock pulse is made in projection unit automatically. External clock input is not equipped.

Note2: When 15kHz NTSC/PAL signal is supplied to the RGB input terminal, the Digital Signal Link function is not guaranteed for correct signal transfer.

Keypad Reference

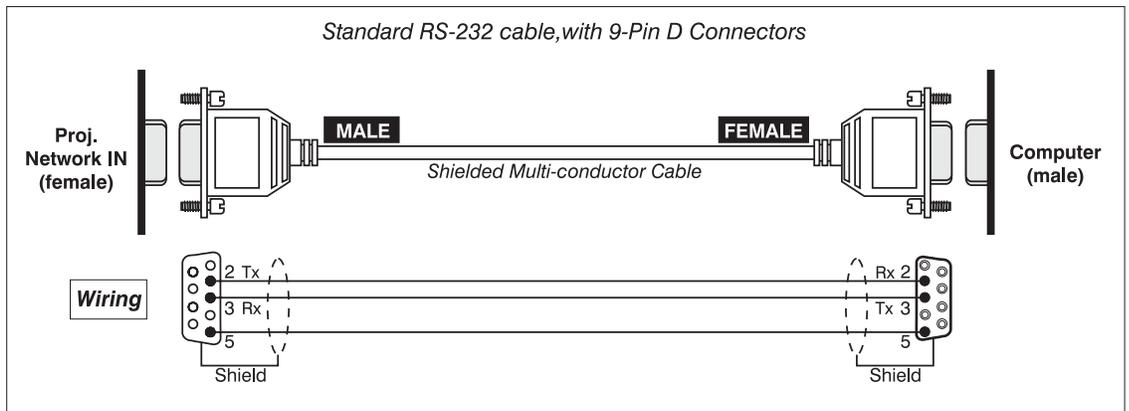


Serial Communication Cables

When connecting projector to a computer or another projector use the appropriate serial communication shielded cabling as illustrated.

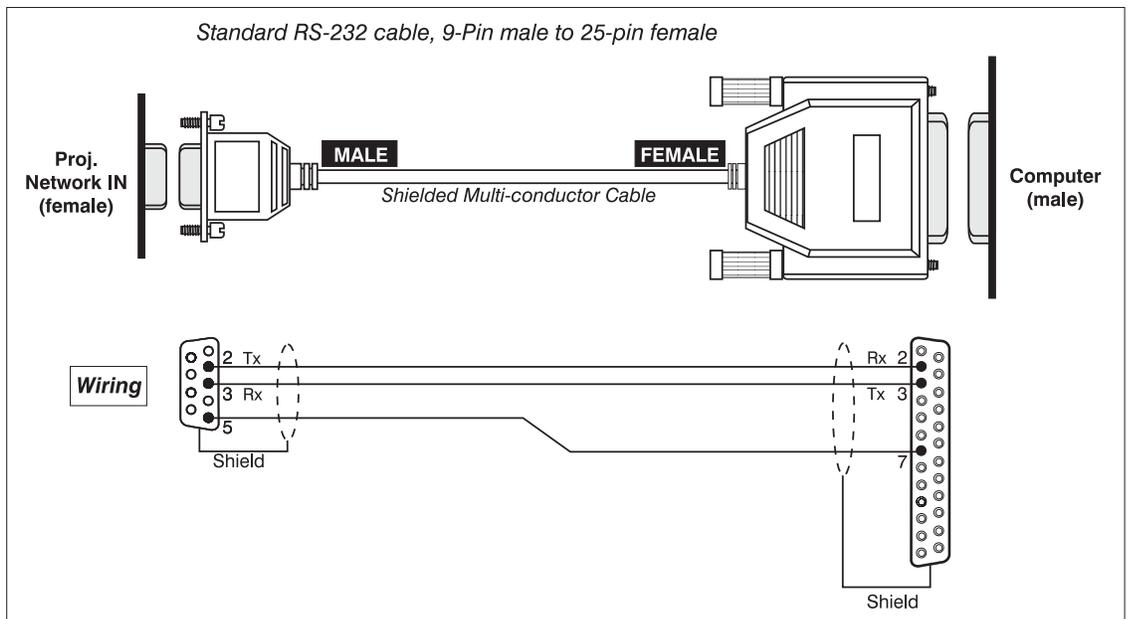
□ **From projector to computer (RS-232)**

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

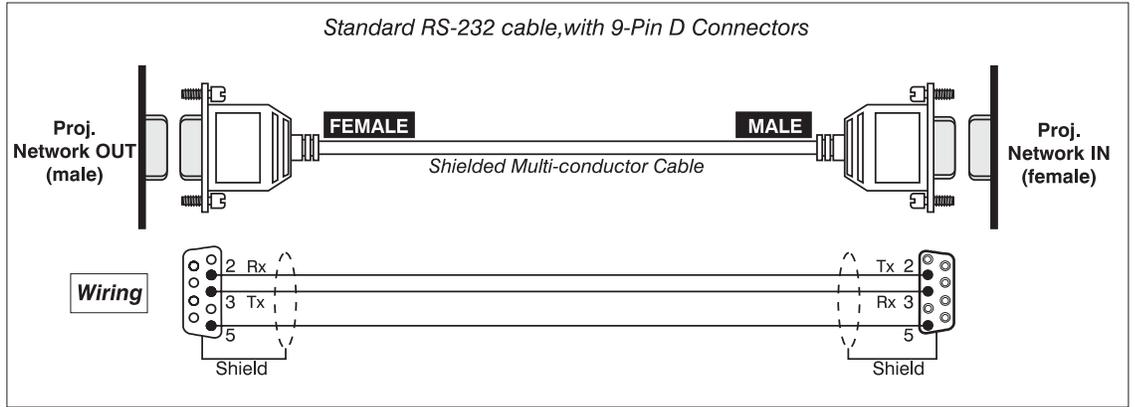


□ **From projector to computer (RS-232)**

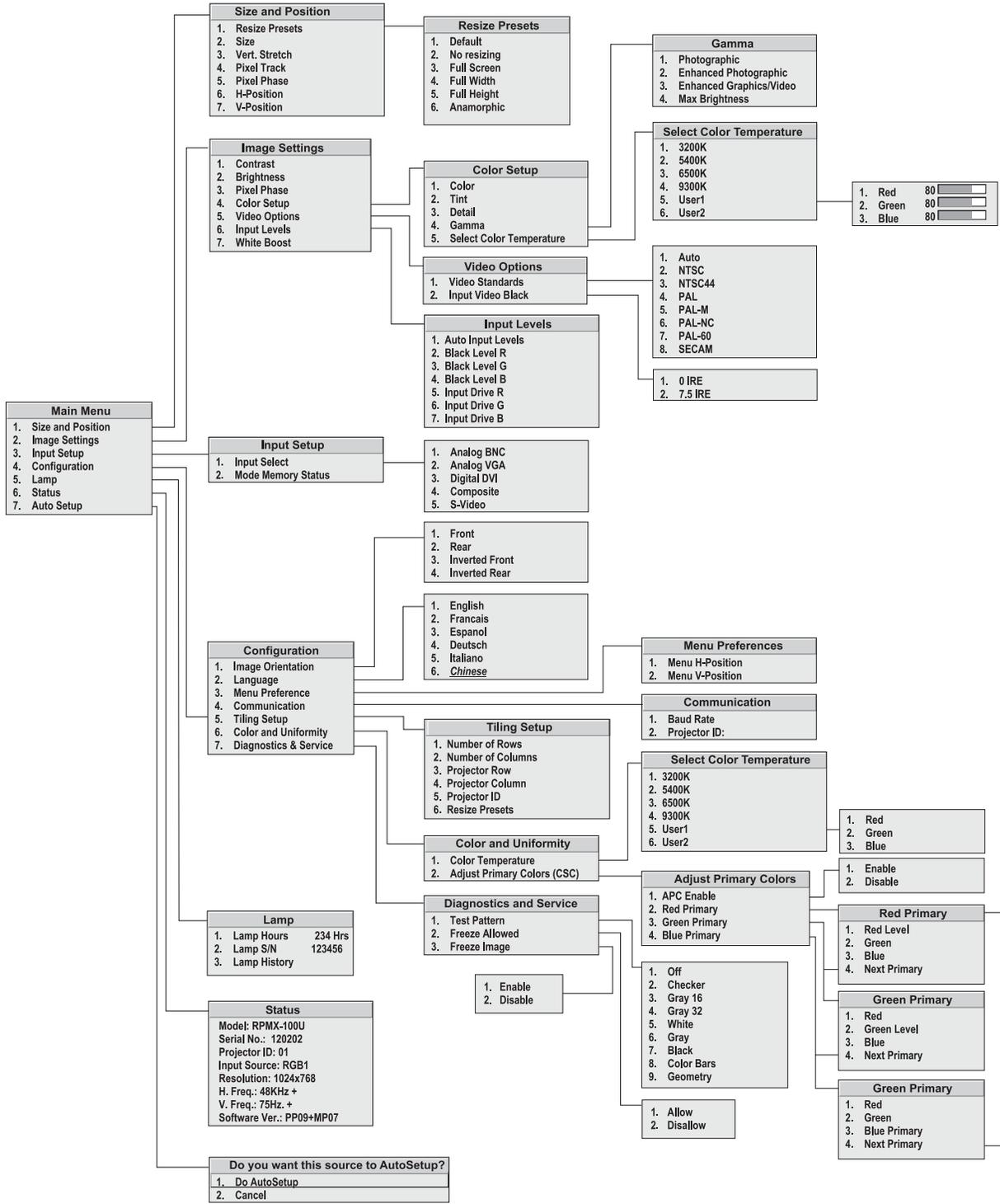
For computers having a 25-pin serial port



□ **From projector to projector (RS-232)**



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