

Mirage WQ-L

User Manual

020-101372-02

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NOTICES

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Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

- a. Problems or damage occurring during shipment, in either direction.
- b. Projector lamps (See Christie's separate lamp program policy).
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- e. Problems or damage caused by the use of any lamp, replacement part or component purchased or obtained from an unauthorized distributor of Christie lamps, replacement parts or components including, without limitation, any distributor offering Christie lamps, replacement parts or components through the internet (confirmation of authorized distributors may be obtained from Christie).
- f. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake or other natural disaster.
- g. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.
- h. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.
- i. Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.
- j. For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.
- k. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.
- l. Image retention on LCD flat panels.
- m. Defects caused by normal wear and tear or otherwise due to normal aging of a product.

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

PREVENTATIVE MAINTENANCE

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


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The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

CAN ICES-3 (A) / NMB-3 (A)

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Introduction

Safety Warnings and Cautions



Always power down and disconnect or disengage power before servicing or cleaning. Failure to comply could result in death or serious injury.



Risk Group 2: Possible hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes. Failure to comply could result in minor or moderate injury.



Laser radiation is emitted from the laser diode in the remote. Do not look directly into the laser beam. Failure to comply could result in minor or moderate injury.

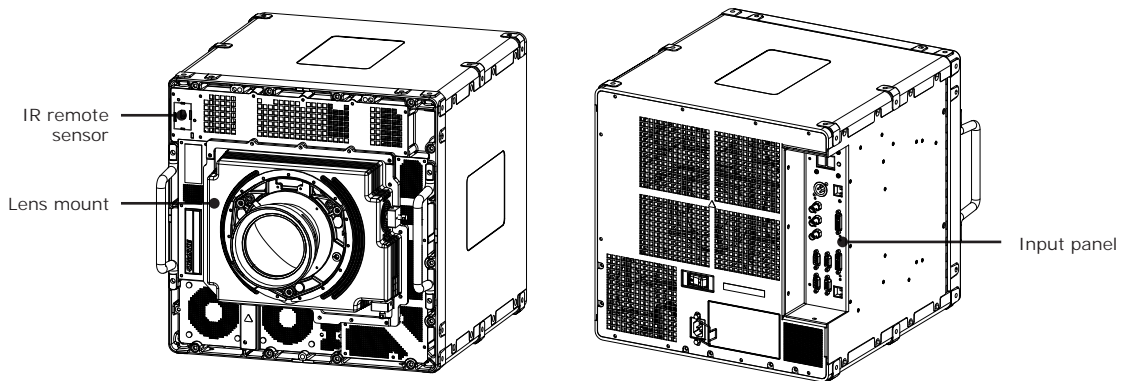


Failure to comply with the following may result in equipment damage:

- All installation procedures must be performed by accredited service technicians.
- The projector must be operated in an environment that meets operating specifications, as listed in the Specifications.

Projector Overview

projectors are professional quality WQXGA data projectors featuring the latest in DLP® display technology to achieve high brightness, high resolution video projection images. The modular design of the projectors makes them an ideal choice for the demanding needs of visualization applications.



Key Features

- Native WQXGA, 2560 x 1600 resolution single-chip DLP® light engine

- Solid-state (LED) illuminator
- ArrayLOC™ feature to maintain uniform color and brightness across multiple projectors
- Warp and blend of projected images
- Operates in any orientation
- Ruggedized for operation on motion platforms
- Compatible with Matrix StIM projection lens suite
- Air-cooled

List of Components



A User Kit is supplied with each projection system. Additional User Kits can be purchased separately.

Make sure these components were received with the projector:

- Warranty Card
- Web Registration Form
- Line Cord (appropriate for region)
- Air-cooled

Installation

This section explains how to install, connect and optimize the projector. Illustrations are graphical representations only and are provided to enhance the understanding of the written material. When designing a projection room for either a permanent or temporary installation, consider positioning the projector and screen for maximum audience coverage and space efficiency. For example, placing the screen along the larger wall in a rectangular room reduces audience coverage.

Other considerations:

- Operating single or multiple units.
- Room size.
- Lighting and audience seating.
- Distance between the audience and the display.
- Angle from which the display is viewed.

Unpack the projector

CAUTION

Failure to comply could result in minor or moderate injury.

- The projector should be lifted by two people.
- Use the designated handles to help lift and support the projector.
- Use a stable cart to transport the projector.

NOTICE

Do not place the projector onto a surface with the line cord retainer side down. Failure to comply may result in damage to the line cord retainer.



- Christie recommends you keep the packaging in the event that a projector must be returned to the factory for servicing.

Mount the Projector

CAUTION

Do not stack units. Failure to comply could result in minor or moderate injury.

NOTICE

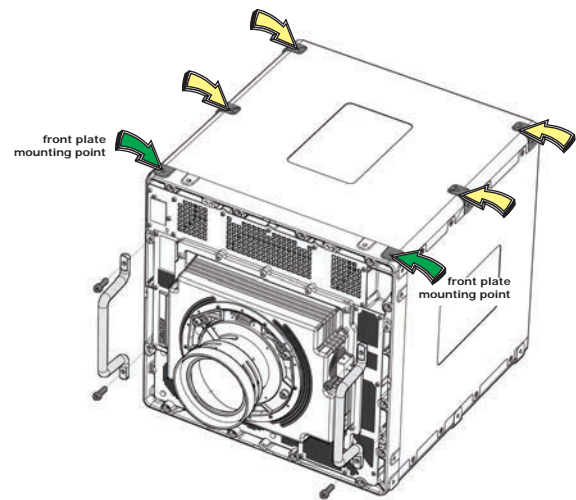
Failure to comply with the following may result in equipment damage:

- Air flows in through the front of the projector and out the rear of the projector. Insufficient airflow can cause the projector to overheat during operation and / or place stress on the source connections. When mounting the projector allow for up to 1100 CFM of airflow through the projector. Ambient temperature must stay below 40° C (95° F).
- Inlet air temperature must be below 40° C (95° F).
- Keep the projector away from all devices radiating electromagnetic energy. For example, motors and transformers, speakers, power amplifiers, and elevators.



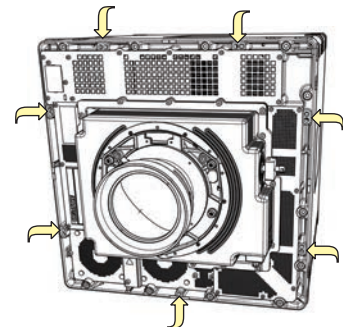
The mounting support system and the mounting surface must be evaluated and accepted by local authorities and must adhere to local standards and safety regulations.

Mounting points are available on all four sides of the projector, including the front face. Each side has six mounting points, two of which are on the front plate. The front plate has an additional seven front facing mounting points. Christie recommends that a minimum of four mounting points are used in any installation, with at least one of the mounting points being on the front plate. A 10mm thread engagement and a minimum torque of 30 in.-lbs (3.5 Nm) /maximum torque of 35 in.-lbs (4 Nm) is recommended. For some installations it may be necessary to remove the front handles once the projector is in its final location. To remove the handles use a 5 mm hex driver to loosen the two socket head cap screws.



Mount a ruggedized kit (Optional)

If you are mounting a ruggedized kit use the seven designated mounting points on the front of the projector. The handles will need to be removed to access four of these points. Christie does not provide the ruggedized kit or the hardware to secure a ruggedized kit. Christie recommends using M6 hardware with a 10 mm thread engagement, and a maximum torque of 4 Nm.



Install the Lens



Risk Group 2: Possible hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes. Failure to comply could result in minor or moderate injury.

NOTICE

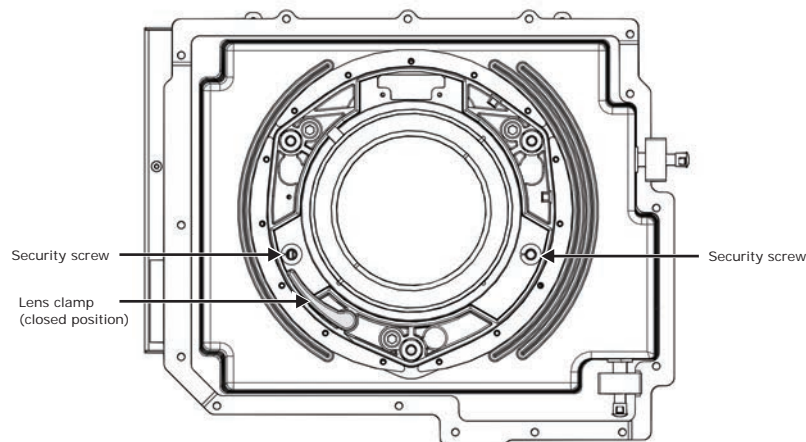
Failure to comply with the following may result in equipment damage:

- Do not insert the lens at an angle.
- Always replace the lens plug when transporting to protect the optical components.
- Always place the lens cap onto the lens when transporting to avoid scratching the lens.
- Never operate the projector without a lens.
- A small amount of dust or dirt on the lens has minimal effect on image quality. To avoid the risk of scratching the lens, clean only if absolutely necessary.



For some installations security screws are required on the lens.

1. Remove the lens plug from the lens opening.
2. Remove the rear lens cap from the lens.
3. Rotate the lens clamp to the open position.
4. Remove and retain the two security screws from the lens mount.
5. Align the lens interface plate with the lens mount. Fully insert the assembly straight into the lens mount opening without turning.
6. Rotate the lens clamp to the closed position before fastening the security screws.



Adjust lens focus

Calculate Throw Distance and Position

Throw distance is the distance measured from your projector to the screen. This calculation determines if there is enough room to install your projector with a desired screen size and if the image size will be the accurate size for your screen. To estimate the throw distance take the horizontal width of the screen and multiply it by the lens throw ratio. The result determines approximately the distance the projector should be positioned from the screen to project a focused image large enough to fill the screen. For example, using a 1.28 - 1.71 zoom lens set at its widest (1.2:1) throw ratio, throw distance would roughly be 1.2 x screen width.



Use the lens and screen size to calculate the precise throw distance. Due to lens manufacturing tolerances for lens focal length, actual throw distance can vary $\pm 2\%$ between lenses with the same nominal throw ratio.

Lens Throw Distance	Offset Percentage (Offset Pixels)		Specified Throw Distance Range					
			Horizontal		Vertical		Inches	
	left ¹	right ¹	up	down	Min.	Max.	Min.	Max.
0.68:1	$\pm 10\%$		$\pm 25\%$		28	83	0.7	2.1
1.28 – 1.71:1	60%	100%	150%	100%	59	213	1.5	5.4
0.80:1	60%	100%	100%	100%	28	102	0.7	2.6

- The left and right horizontal offset examples are based on the projector being in the normal landscape orientation and looking towards the front of the projector from the back (input panel side).



- Offsets are subject to $\pm 7\%$ centering tolerance.
- Image size outside the specified width range may result in reduced image quality.
- Throw distance is measured from the marked exit pupil position on the lens to the screen. Throw ratio is defined as:

$$\text{Throw ratio} = \frac{\text{throw distance} \pm 2\%}{\text{screen width}}$$

- 100% offset is defined as having all pixels shifted beyond the projector optical axis.

- Offsets are measured from the optical lens centre, which may not coincide with the mechanical centre. % offset is defined as:

$$\frac{\% \text{ Offset} = \# \text{ of pixels of offset}}{\text{half vertical panel resolution}} \times 100$$

Determine Vertical and Horizontal Position

The projection lens and the screen type determine the vertical and horizontal position of your projector in relation to the screen. Ideally, you should position the projector perpendicular to the screen to make the image appear rectangular instead of keystone (trapezoidal). You can offset vertical position of the image (move it above or below the optical axis) by adjusting the lens mount. The type of projection lens you install determines the amount of available vertical offset. Vertical offset can be expressed as the percent of half the image height or the number of pixels of shift from lens center.

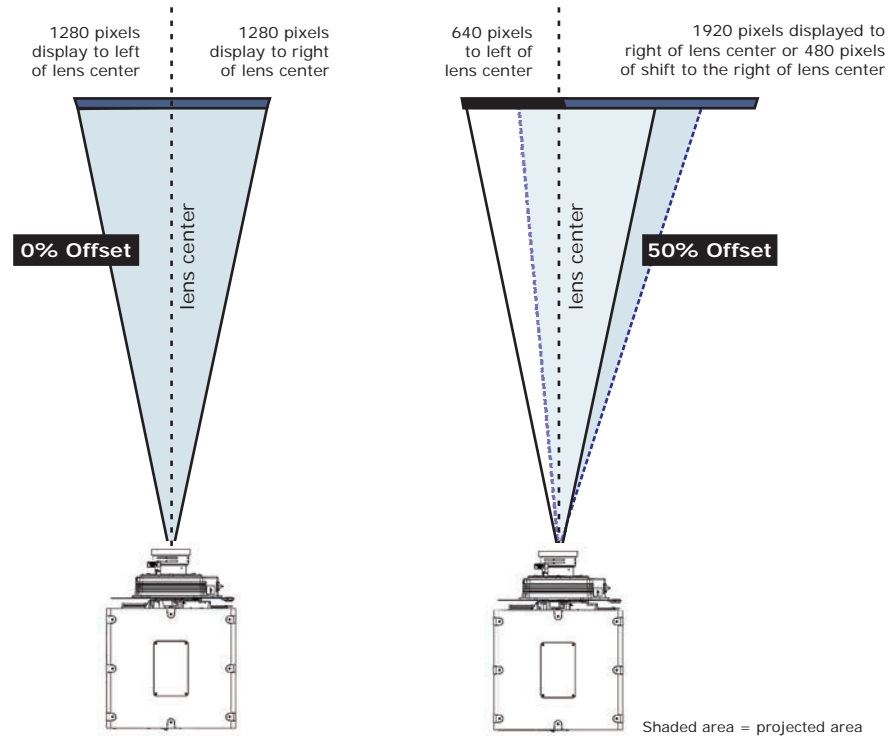


- Offsets are subject to $\pm 7\%$ centering tolerance.
- % offset is defined as:

$$\frac{\% \text{ Offset} = \# \text{ of pixels of offset}}{\text{half vertical panel resolution}} \times 100$$

The horizontal position of the image can also be offset (moved to the left or right of the optical center) by adjusting the lens mount. The amount of horizontal offset available depends on the lens

installed and if the image has already been vertically offset. Horizontal offset can be expressed as the percent of half the image width or the number of pixels of shift to one side of lens center.

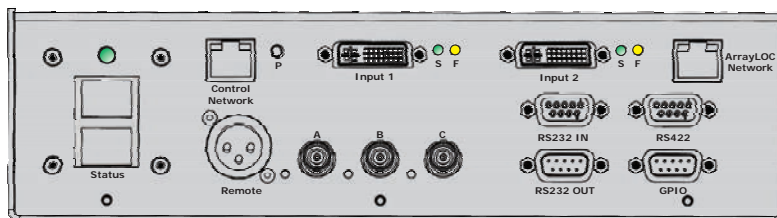


In this example, no offset is applied.
Therefore, half of the image appears to the left of lens center and half appears to the right.

In this example, 50% offset is applied.
Therefore, 3/4 or 75% of the image appears to one side of the lens center.

Connect a Source

All source connections are made to the input panel, located at the back of the projector. Each input is labeled for easy identification. Using the correct cable(s), connect your source. See [Network Setup for External Communications](#) on page 20.



Serial Port Connections



Use the RS422 port only if the device being used has this capability. Always consult with equipment literature before connecting.

RS232 and RS422 serial ports are both available on the projector. You can connect a device with a serial interface, such as a computer to either of these connectors (not both) and control the projector remotely by entering specific serial communication commands.

Two nine-pin D-sub connectors, labeled RS232 IN and RS232 OUT on the input panel, are dedicated to serial communication. Using the appropriate serial communication cables, connect the controlling source, such as a personal computer to the RS232 IN connector. Set the projector baud rate to match that of the computer.

To control the projector with a computer or other controlling device with RS422 capability, connect a RS422 serial communication cable between the controlling device and the RS422 port on the projector. RS422 is better suited than RS232, for serial communication over distances greater than 50 feet (15 m).

Control Network


For further information about setting up and using a projector connected via Ethernet see [Configure the Display](#) on page 46 and [Serial Communication](#) on page 62.

Inputs 1 and 2



Native WQ is required in order to receive a valid DVI-D signal.

Use Inputs 1 and 2 to connect the main and secondary input sources. The LEDs assigned to each input indicate the following:

	S indicator (signal)	F indicator (function)
	<p>Green: Indicates valid DVI-D source signal.</p> <p>Red: Indicates an invalid source signal. Check the connection and make sure the source is correct.</p> <p>Off: Indicates no signal detected on DVI port.</p>	<p>Green: Indicates the input is selected.</p> <p>Yellow: Indicates which of the two inputs is being used as the secondary input.</p> <p>Off: Indicates no input is selected.</p>

GPIO

The GPIO connector provides a method of interfacing a wide range of external I/O devices.

ArrayLOC Network

The ArrayLOC Network connector provides a method of interfacing multiple projectors in an array to manage preliminary color setup.

Network Setup for External Communications



Always power down and disconnect/disengage power before servicing or cleaning. Failure to comply could result in death or serious injury.

WARNING

Do not operate if the AC supply and cord are not within the specified voltage and power range. The North American rated line cord is supplied with this projector. For all other regions, use only a regionally approved line cord, power plug and socket. Do not use a damaged line cord. Failure to comply could result in death or serious injury.

NOTICE

In Norway, for IT power distribution systems, a dedicated protected earth wire must be installed on the projector before it can be connected to power. The dedicated earth wire must be installed by a Christie accredited service technician. To connect the projector to an IT power distribution system connect the building ground to the internal ground lug behind the AC input inside the projector. Christie recommends that you run the connection through the louvers on the projector. Failure to comply may result in equipment damage.



The appropriate regional line cords are shipped separately.

To complete the projector network setup you will also need to connect the projectors together for ArrayLOC communication and functions.

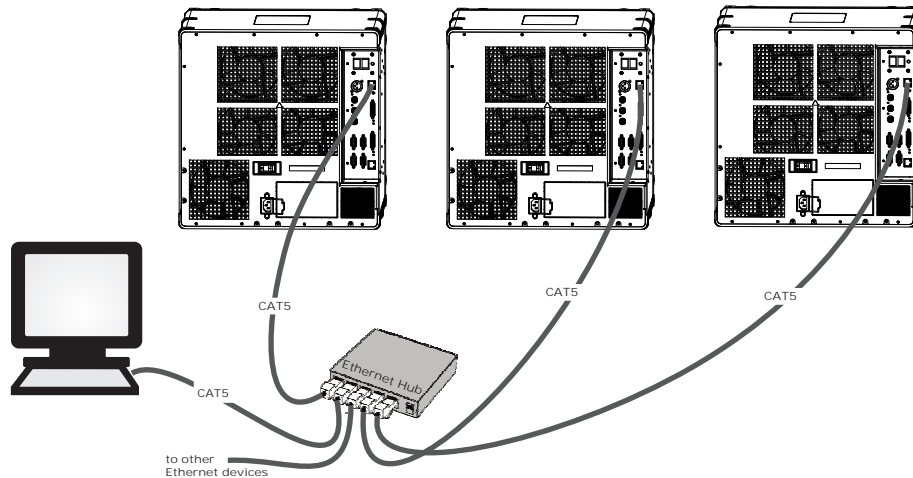
Ethernet (recommended)

In the Ethernet network the controller communicates with each projector separately.



Recommended for network administrators only.

1. Connect a standard CAT5 Ethernet cable between the controller (or Ethernet hub) and the Control Network port on the projectors input panel.



2. From the WebUI, set the IP address in **Configuration > Communications > Ethernet Settings**.
3. From the WebUI, in **Configuration > Communications** set network routing to **Separate**.

Mixed Network

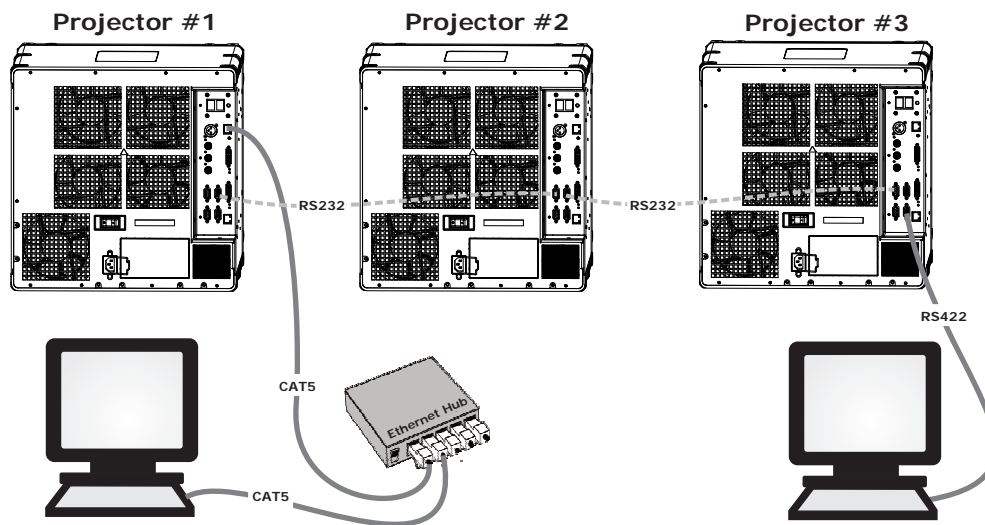
NOTICE

Using the wrong type of serial cable can damage the projector. RS232 communication cables must be of good quality and no more than 25 ft (7.62 m) in length. Failure to comply may result in equipment damage.

In a mixed network the controller can communicate with the first projector and the command can be relayed to each serially connected projector. This configuration is useful if you are using a non-RS232 controller with the RS232 linking available between these projectors. The image below shows both an RS422 compatible controller and an Ethernet-connected PC working with a network of projectors linked using their RS232 in/out ports.

1. Connect the controller to a projector with a standard CAT5 Ethernet cable between the controller (or Ethernet hub) and the **Control Network** port on the projectors input panel.
2. Connect an RS422 serial cable between the PC and the RS422 port on the projectors input panel.
3. Connect a serial cable between the RS232 OUT connector of the first projector and the RS232 IN connector of the next projector.
4. Connect the remaining projectors.

5. If the controller is connected via an Ethernet cable, set the IP address from the WebUI in **Configuration > Communications > Ethernet Settings**.
6. Set the serial options in **Configuration > Communications**.
7. From the WebUI, select **Configuration > Communications > Network Routing**.
 - To relay commands to all projectors set **Network Routing** to **All Joined**.
 - To isolate RS422 communications, select **RS232 and Ethernet Joined**. Only projector #3 will respond to the RS422 controller.
 - To isolate Ethernet communications, select **RS232 and RS422 Joined**. Only projector #1 will respond using Ethernet.



RS232 Network

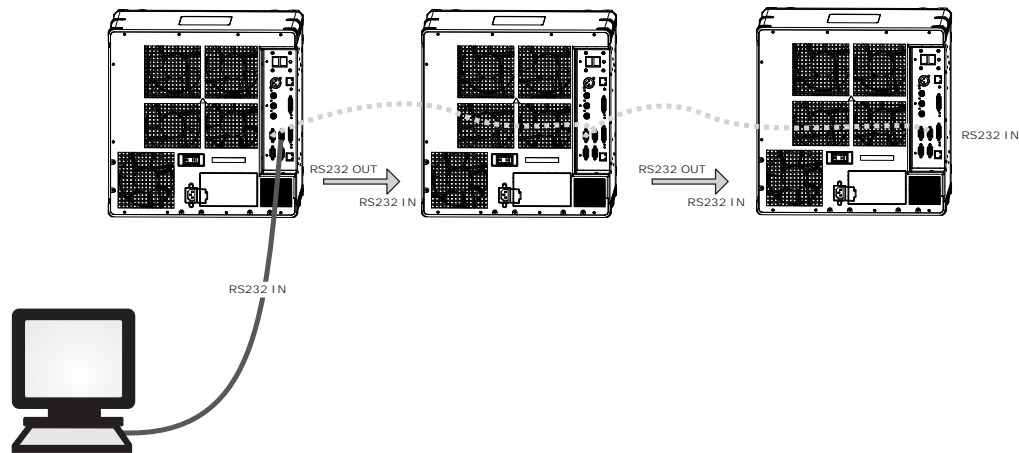
NOTICE

Using the wrong type of serial cable can damage the projector. RS232 communication cables must be of good quality and no more than 25 ft (7.62 m) in length. Failure to comply may result in equipment damage.

In an RS232 network the controller can communicate with the first projector and the command can be relayed to each serially connected projector.

1. Connect the controller to one projector by connecting a serial cable between the PC and the RS232 IN port on the input panel.
2. Connect a serial cable between the RS232 OUT connector of the first projector and the RS232 IN connector of the next projector.
3. Connect the remaining projectors.
4. Set the RS232 serial options in **Configuration > Communications > Serial (RS232 IN) Options**.

5. Set network routing in **Configuration > Communications > Network Routing** to **RS232 and RS422 Joined**.



Mixed Serial Network (RS232 and RS422)

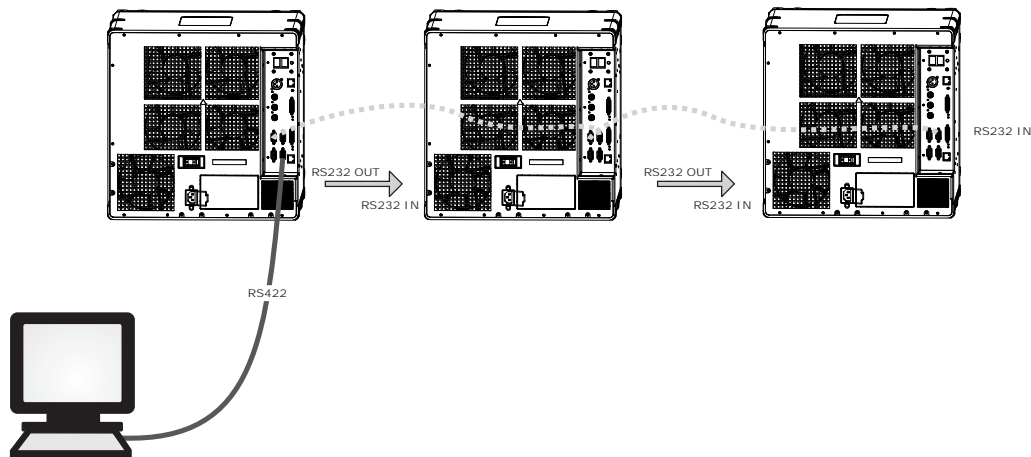
NOTICE

Do not connect incompatible equipment, including the wrong type of serial cable to the RS422 port. Failure to comply could cause equipment damage.

RS422 serial communication is better over long distances than RS232 communication. Use the RS422 port only if your device has RS422 capability. Always read the equipment literature before connecting. In the RS422 network the controller can communicate with the first projector and the command can be relayed to each serially connected projector.

1. Connect the controller to one projector by connecting an RS422 serial cable between the PC and the RS422 port on the input panel.
2. Connect an RS232 serial cable between the RS232 OUT connector of the first projector and the RS232 IN connector of the next projector. Connect the remaining projectors using RS232 cables.
3. Set the serial options in **Configuration > Communications**.

4. Set network routing in **Configuration > Communications > Network Routing** to **RS232 and RS422 Joined**.



ArrayLOC Network Configuration

Preliminary color setup is managed by ArrayLOC. ArrayLOC is enabled by default and configured to display a reasonably saturated gamut at the maximum brightness that all the projectors in the array can support.



A projector that is not connected via ArrayLOC functions as a single unit array.

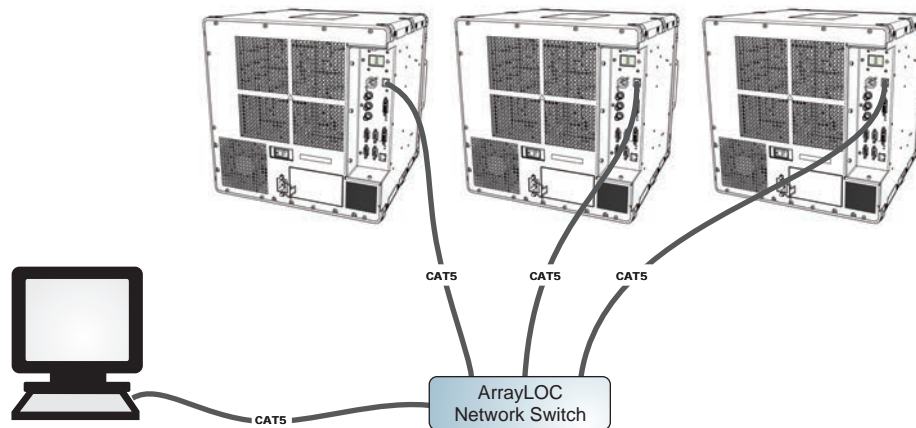
ArrayLOC over Control Network

Use the Control Network for ArrayLOC when you want to communicate with the projectors in the array over the same network.

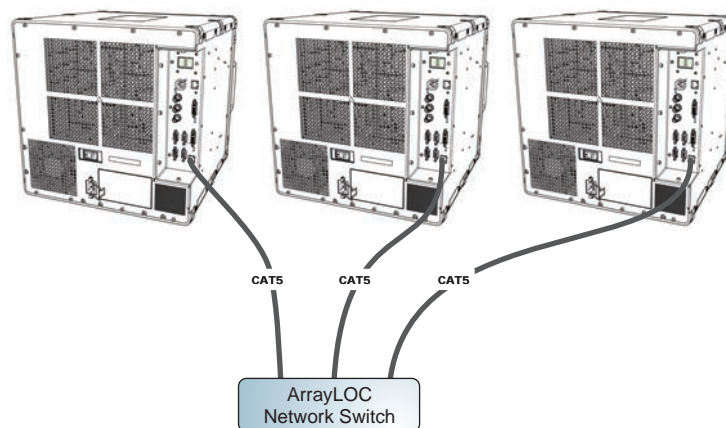
1. Connect the controller by connecting a CAT5 Ethernet cable between the PC and the ArrayLOC network switch.
2. Connect a standard CAT5 Ethernet cable between the ArrayLOC network switch and the Control Network port of each projector.
3. From the Main menu, select **ArrayLOC > ArrayLOC Configuration**.
4. From the ArrayLOC Network drop-down list select **Control Network**.



The length of the connections depends on ArrayLOC network switch placement within the array. It may be possible to reuse the Ethernet cable supplied with the projector for one of these connections, but at least one connection requires that you supply an additional Ethernet cable per projector.



Adjust Image Geometry and Optical Alignment



The length of the connections depends on ArrayLOC network switch placement within the array. It may be possible to reuse the Ethernet cable supplied with the projector for one of these connections, but at least one connection requires that you supply an additional Ethernet cable per projector.



This initial optical alignment is the foundation for optimizing images on the screen, and must be completed before final boresight adjustments. Only perform image alignment once the projector is fully assembled and powered up in its final location.

Basic Optical Alignment

1. Press **Test** on the IR remote to display a test pattern.

It is recommended to use the **Edge Blend** or **Grid** test pattern.

2. Perform a quick preliminary focus and (if available) zoom adjustment with the primary lens. Do not worry about consistency across the image at this point, just center focus. It is good practice to have the zoom adjustment collar and the focus adjustment collar in the center of its range.

3. Hold a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens perimeter. A full white field works best for this.
4. If necessary, center the image on the screen. If the projector is mounted off-center to the screen axis, then offset the lens as much as required. Aim the projector over slightly towards the center of the screen, but use caution, as too much tilt will cause excessive keystone distortion. Lens offset will not.
5. With the test pattern on screen, double-check projector leveling so the top edge of the image is parallel to the top edge of the screen. Make sure the projector is positioned in the throw distance range for the lens in use.

Folded Optics

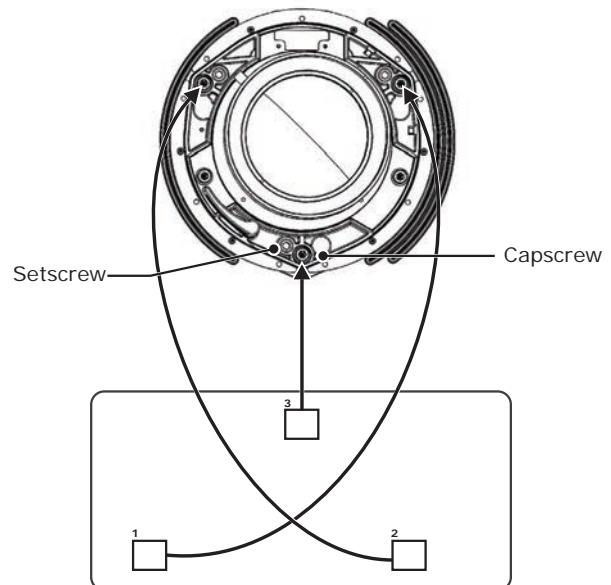
In rear screen applications where space behind the projector is limited, a mirror may be used to fold the optical path. The position of the projector and mirror must be accurately set—if considering this type of installation contact Christie Customer Support for assistance.

Boresight Alignment



- Boresight alignment is an advanced feature and should only be performed by experienced users.
- You can also use the Grid or Edge blend test pattern to perform boresight alignment.

1. Display the **Boresight** test pattern by pressing **Test** on the IR remote and use the **Left** arrow key to cycle to Boresight.
2. Adjust the lens focusing ring until each square displayed in the Boresight test pattern is focused. If all three squares are in focus, no further action is required.
3. If boresight is required, see the image on the right to understand how the adjustment screws on the lens mount affect the corresponding squares on the test pattern.
4. Use a 5 mm hex key to loosen the three locking set screws on the lens mount. The set screws must be backed out several turns, so that they do not contact the inner lens mount plate.
5. Fine tune the focus of square one, by adjusting the appropriate cap screw. Adjust until the image is in focus with minimal flare.
6. Adjust square 2, by adjusting the appropriate cap screw. Adjust until the image is in focus with minimal flare.



7. Adjust square 3, by adjusting the appropriate cap screw. Adjust until the image is in focus with minimal flare.
8. Repeat steps 5 to 7, as required until all squares on the test pattern are equally focused. If the boresight is acceptable, continue to step 11. If the boresight does not appear to be converging to an acceptable level of image quality or if the lens will not focus over the correct range of throw distances, then the boresight requires coarse adjustment. See step 9.
9. The original factory boresight can be recovered approximately by positioning the three set screws. Position the set screws flush with the front face of the lens mount plate and in contact with the inner lens mount plate. This may require adjusting both set screws and cap screws.
10. If further action is required, repeat step 2.
11. Lock the set screws, and re-check the boresight quality. Tighten the set screws to prevent them from shifting.
12. When the image is focused, lock adjustments in place by tightening the adjustment screws until just tight.

Adjust Software to Optimize Image



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

1. Display an external signal.
2. Select **Screen Image Orientation** in **Configuration > Output Options** and change the orientation of the displayed image to suit the installation.
3. Assign projector ID number(s).
4. Make sure that ArrayLOC is enabled. From the Main menu select **ArrayLOC** and select **Enabled** from the **Bright/ColorLOC Mode** drop-down list. ArrayLOC automatically adjusts projector colors and brightness.
5. Adjust ArrayLOC color target.
Fine-tune ArrayLOC to compensate for system optics.

Web UI Overview

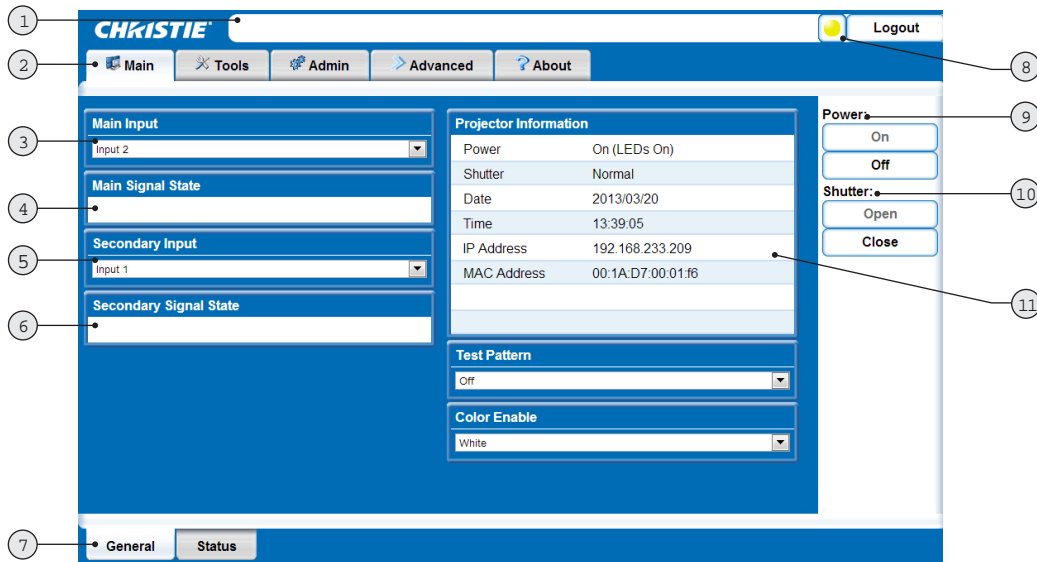
Login to WebUI

1. Open your web browser and enter the IP address (in the address bar) assigned to your projector.



The factory default IP address is 192.168.1.89. To change the default use the NET serial command through RS232.

2. Select the appropriate language from the **Language** drop-down list, located in the upper left-hand corner.
3. Enter your user name and password. Both entries are case-sensitive.
4. Click the **Login** button. The **Main** window appears.
- 5.



1	Status bar
2	Primary tabs
3	Main Input drop-down list
4	Main Signal State (read-only)
5	Secondary Input drop-down lists
6	Secondary Signal State (read-only)

7	Secondary tabs (specific to a primary tab) located along the bottom of the Main page.
8	Status indicator display
9	Power On/Off
10	Shutter Open/Close (powers LEDs On and Off to simulate shutter operation).
11	Projector information (read-only)

Navigate the WebUI

This section describes the controls and switches used for projector operation once it is properly installed and configured. The projectors can be controlled remotely, typically at a controller such as a PC, through a WebUI on an Ethernet Network. If there are concerns about network security, run the WebUI on a local area network only and install a firewall. Users are prompted to log in upon start-up. Use **admin** for both the user name and password. For an overview of the menus, see [WebUI Menu Tree](#) on page 77.



- After 15 minutes of inactivity, the projector closes the menu and returns to the presentation.
- To avoid losing your web connection, navigate using the application interface and related functionality detailed in this section rather than use the web browser's navigation tools.

From the WebUI:

- Select and setup an active input source.
- Manipulate the appearance of video content (Gamma, ArrayLOC).
- Display a test pattern.
- Configure the display (image orientation, calibration).
- View system information and alerts.

The Global Icon



Menu options that include this icon, apply globally. Menu options without this icon apply to the selected projector only.

Slidebars in Menus

The current value for a given parameter appears to the left of the sidebar icon. This number often expresses a percentage, or it may have units associated with it (such as pixels), depending on the specific option.

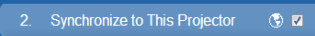


- Press the left / right arrow keys to gradually adjust the setting up or down. Hold for continuous adjustment.

- When you are finished making your adjustment, press **Enter** to save and return to your presentation. Press **Esc** to cancel any adjustments.
- Some settings automatically impose a test pattern or color change as part of making the adjustment. Press **Enter** to save the adjustment. Press **Esc** to cancel any adjustments.

Check Boxes

A condition is present if an adjacent check box contains a check mark. To select or clear the check box, highlight and press **Enter**, or highlight and use the right arrow key to select or left arrow key to clear.



Drop-down Lists

To see a list of options available for a given parameter:

- Highlight the menu option, and press **Enter**.
- Or:
- Enter the applicable menu option number to open the drop-down list or use your mouse pointer to make a selection.
 - Use the up /down arrow keys to navigate within the drop-down list or use your mouse pointer to make a selection. Press **Enter** to choose a highlighted option from the list.
 - To quickly scroll through a list without first pulling it down, highlight the menu option, and use the left / right arrow keys. Press **Enter** to select an item.
 - While in a drop-down list, press **Esc** to cancel any change.

Help Text



Help text is not available for disabled buttons.

You can move your mouse pointer over most buttons or fields to display related help information. When working with the projector menu system on the Tools tab, highlight the menu option and press **h**. To disable this feature, select the **Admin** tab and click on the **Hide** button underneath **Tooltip**.

Basic WebUI Operation

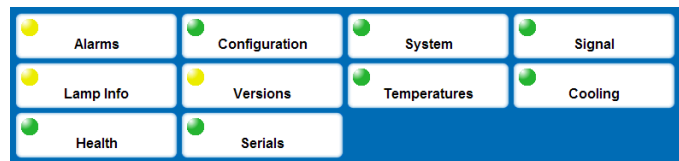
Five primary tabs are located along the top of the WebUI. Each primary tab also has related secondary tabs, which are located along the bottom of each tab.

Main Tab—General

Under the **Main** tab, select the **General** tab at the bottom of the window to view general information on inputs and projector status, and to activate a test pattern and color enable control.

Main Tab—Status

Under the **Main** tab, select the **Status** tab at the bottom of the window to view the ten category status lights which indicate the projector's highest critical state. For details, click on an individual button. See [System Warnings and Errors](#) on page 57.



The color of the status light indicates that it is in one of the following states:

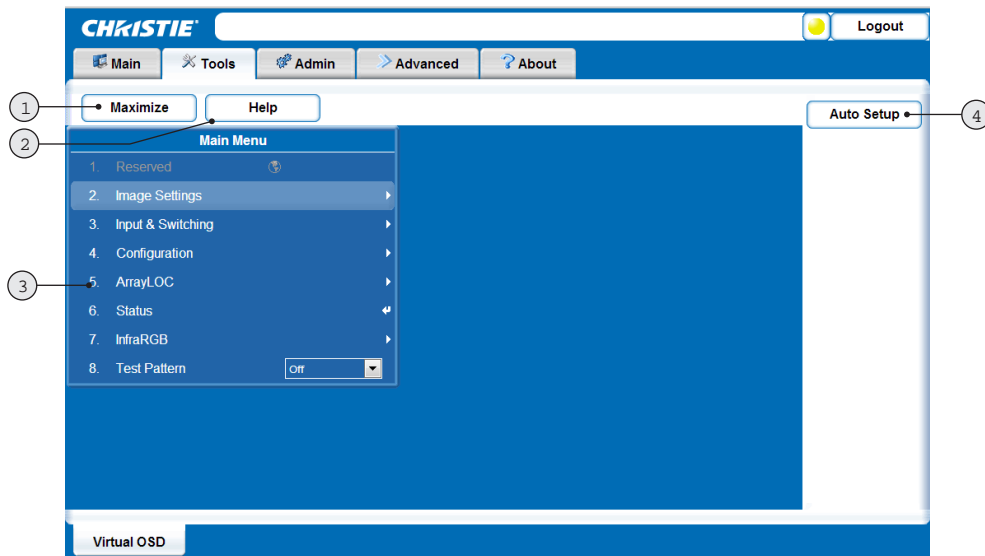
- Green = Good
- Yellow = Warning
- Red = Error

Tools Tab—Virtual OSD



When a menu option is modified through the Virtual OSD menu, the projector setting takes effect immediately.

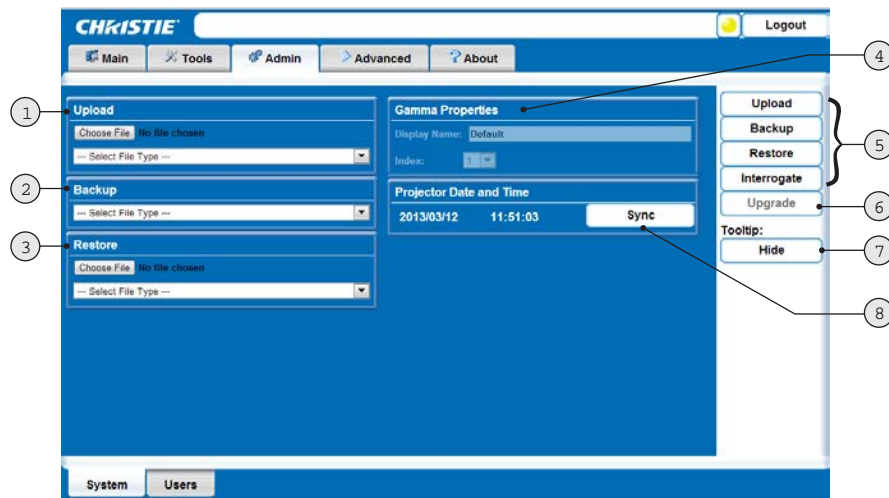
The **Tools** tab defaults to the secondary **Virtual OSD** tab. Selecting an option from a menu displays its associated window, showing related information and input fields. To return to the previous menu, click the menu's title bar or press **ESC**. Select **Maximize** to view the full screen. Various types of menu elements allow you to define projector settings including field entries, drop-down lists, check boxes, and sliders.



1	Maximize/Minimize toggle buttons.
2	The Help button presents a pop-up window, which provides information to help you navigate within the current menu.
3	The Virtual OSD tab presents the Main menu.
4	Auto Setup uses the manufacturer's default settings and displays the first available DVI input.

Admin Tab

Under the **Admin** tab, select the **System** tab at the bottom of the window to upgrade, upload, backup and restore specific files, change gamma properties, and interrogate the projector (creating a zip file of information).



1	The Upload feature allows you to select the file and file type you want to open.
2	The Backup feature allows you to select the file and file type you want to save.
3	The Restore feature allows you to select the file and file type that want to recover.
4	Gamma Properties becomes available when a Gamma file type is selected from the Upload section.
5	These buttons perform their respective functions, after the setting for the function is selected from the drop-down lists, and other fields on the left.
6	The Upgrade button is disabled when the projector is running. For details, see Upgrade Software on page 51.
7	The Hide button disables the help text.
8	The Sync button is used to set the projector date and time to match your computer.

Upload a Gamma File



The projector must be powered On to enable the Upload drop-down list.

1. Select **Gamma** from the **Upload** drop-down list.



Gamma files must have a .csv file extension with 1024 values (all colors same) or 1024 x 3 for individual colors.

2. To locate and select the file you want to upload, click **Choose File**.
3. Type a descriptive name in the **Display Name** field.
4. From the **Index** drop-down select which memory location the file should be stored to.
5. Click **Upload**.

Create a Backup File

1. From the **Backup** drop-down list, select from the following file types: **All**, **Preferences**, **Configuration**, **Users**, or **Real Time Events**.
2. To initiate the download, click **Backup**. Once finished, a **File Download** window appears.
3. Click **Save**.
4. Locate and select a folder where you want to save the file.
5. Click **Save**.

Restore a File

1. Select a file type (**All**, **Preferences**, **Configuration**, **Users** or **Real Time Events**) from the **Restore** drop-down list.



Do not select All unless transferring all files from one projector to another or cloning.

2. To locate and select the file to restore, click **Choose File**.
3. Click **Restore**. Once finished, a confirmation message appears.

Perform Diagnostic Test

1. To initiate the diagnostic test and download the diagnostic test results to your computer, click **Interrogate**. Once the download is complete, a **File Download** window appears.
2. To save the diagnostic test results file click **Save**.



Once the Interrogate function begins, you must allow it to run until completion.

Admin Tab—Users

Under the **Admin** tab, select the **Users** tab at the bottom of the window to add to, and delete users from accessing the projector, and change passwords. Creating user accounts does not allow you to assign specific privileges.




If capitalization is used for the username or password, it is automatically converted to lower case. Usernames can be a minimum of four and a maximum of 32 characters. Passwords can be a minimum of four and a maximum of 128 characters.

Advanced Tab—Real Time Events (RTE)

The **RTE** tab is where you can manage real-time events (such as add, delete, edit, copy and setup the GPIO).

Add a Scheduled Event

Scheduled events include a command or sequence of commands, for example, (PWR1) or (PWR1) (LSH1).

1. From the Advanced tab, click **Add** to open the **RTE Wizard**.
2. Select the **Scheduled Event** tab.
3. Select the frequency option for the event by selecting either **Once**, **Daily**, **Weekly**, or **Monthly**. **End Date** is enabled when **Daily**, **Weekly** or **Monthly** repeat options are selected. Depending on the selected frequency option, a related **Repeat Every** is highlighted on the tab. Use this area to enter the frequency of each event.
4. Click within the **Start Time** field to open a calendar pop-up window.
5. Navigate to and choose the desired date. The selected date populates the **Start Time** field.
6. In the field below the **Start Time** field, enter a start time in the format "hr:min:sec". The setting defaults to the current time.
7. Click **Sync** to set the computer and projector time to be the same; otherwise, the event runs based on the projector time.
8. Enter a description of the scheduled event in the **Description** field.
9. Enter a serial command or a sequence of serial commands, with which you want the projector to perform in the **Command String** field.
10. If a **GPIO** command string is needed, click the **GPIO Output Helper** button for instructions on how to create the command structure. The **Output** field contains seven blocks which refer to the seven I/O pins on the GPIO connector.
Pin 1 = +12V and Pin 5 = Ground. These are not included. Clicking a block toggles between H, L, and X. See [Serial Communication](#) on page 62 for details.
 Click Help for a description of special RTE commands available for adding loops and delays to the command sequence.
11. Click **Test** to run the entered command string. A green or red icon appears to the right side of the **Test** button to indicate whether the test passed or failed.
12. Click **Finish** to create the added event. The added event appears in the RTE Listing window. To activate or deactivate one or more RTEs listed in the window, select or clear each check box in the **Active** column.

Add a System Event

1. From the Advanced tab, click **Add** to open the **RTE Wizard**.
2. Select the **System Event** tab.
3. Select a type of event from the **System Event** drop-down list.

Depending on the selection made, additional selections are available in the second drop-down list located underneath (such as **Input Change # > Slot 1, Input 1**).

Add a GPIO Event

1. From the Advanced tab, click **Add** to open the **RTE Wizard**.
2. Select the **GPIO Event** tab.
3. For the **GPIO Event** option define the **Input Condition** field as required.

The **Input Condition** field contains seven blocks, which refer to the seven I/O pins on the GPIO connector. Pin 1 = +12V and Pin 5 = Ground are not included or changed. Clicking a block toggles between H, L and X.

See [Serial Communication](#) on page 62 for details.

Add a Function Key Event

1. From the Advanced tab, click **Add** to open the **RTE Wizard**.
2. Select the **Function Key Event** tab.
3. Select a function from the drop-down list.

Advanced Tab—Serial

1. From the Advanced tab, select the secondary Serial tab.
2. Enter a serial command in the **Serial Command** field. See [Serial Communication](#) on page 62.
3. Click **Send** to add the serial command.

Operation

This section explains how to correctly setup and operate the projector.

Using the IR Remote



Laser radiation is emitted from the laser diode in the remote. Do not look directly into the laser beam. Failure to comply could result in minor or moderate injury.



The IR remote is included with the User Kit (P/N: 130-103105-xx), which is shipped separately.

The standard IR remote can be used as a wired or wireless control. Under optimal conditions, the wireless keypad can communicate with a projector over a 30 foot (10 m) distance. In wireless mode, the standard IR remote communicates with a battery-powered infrared (IR) transmitter. A laser pointer is built into the standard IR remote.

- Press keys one-at-a-time; there are no simultaneous key combinations required.
- Arrow keys are held down for continuous adjustment/movement in the related key direction.
- In serial networks, pause briefly between adjustments to make sure that distant displays can keep pace with the commands. If you press a key while the display is still responding to the previous action, such as during a power-up, the second key press may not take effect.
- For a description of the keys, see [IR Remote Commands](#) on page 37.

Wired Remote

The wired remote is recommended when the lighting conditions are unsuitable for proper IR transmission. You can convert the standard IR remote into a wired remote using an optional cable. Connect one end into the standard IR remote, and the other into the designated port on the input panel. Batteries are only needed for the wired remote if the laser pointer is required.

To use the wired remote, make sure it is enabled on the display that it is connected to. To check wired remote status select **Configuration > Communications > Wired Keypad Enabled**.

To use the wired remote to control multiple projectors in an ArrayLOC network, make sure that wired remote support is enabled on the controlling display, and that key synchronization is enabled on the controlling display and on all the receiving projectors. To synchronize go to **ArrayLOC > ArrayLOC Configuration > Synchronize Keys, Test Pattern, Color Enable**.

IR Remote Commands

Power

Press and hold the **Power** button for two seconds or press twice quickly to power the projector On or Off. Or, press and release the **Power** button followed immediately by the up arrow key (On) or

the down arrow key (Off) to guarantee the correct action. This is useful if you are not sure of the current state of the projector.

Shutter

The **Shutter** button powers the LEDs On and Off to simulate shutter operation. Press and hold the **Shutter** button to move between simulated shutter states in the following order: Open–Closed–Open. Or, press and release the **Shutter** button followed immediately by the up arrow (closed) or down arrow (open) to guarantee the correct state. The shutter is open upon power-up. Close the shutter to block the displayed image while maintaining access to projector functions. Opening the shutter restores the image. The LED status display on the projector displays **SH** when the shutter is in black mode.

Input

Press **Input** to select the main input. Press the button again to select the secondary input. See [Select Inputs](#) on page 39.

Input Slots

Press **Slot 1** to assign Input 1 to the Main Input or press **Slot 2** to assign Input 2 to the Main Input. Press **Slot 3** to display interleaved video (120 Hz). Press **Slot 4** to display InfraScene.

Swap

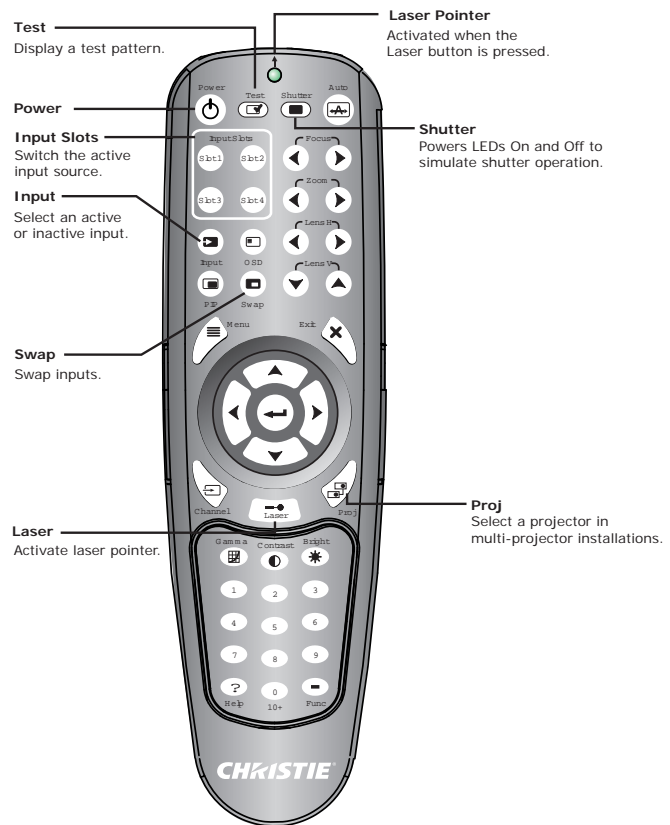
Press **Swap** to quickly switch the inputs between the main and secondary. See [Select Inputs](#) on page 39.

Test

Steps forward through all internal test patterns. After stepping past the last test pattern, the menu returns to the current input. Press **Test** and then cycle through the test patterns by pressing the left / right arrow keys. Press **Exit** to return to the current input.

Proj

Press **Proj** to display the current IP and projector number on screen.



Enter

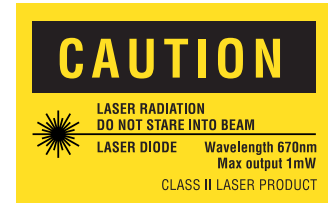
Press **Enter** to select a highlighted item, to toggle a check box, or to accept a parameter adjustment and return to the previous menu or image.

Exit

Press **Exit** to return to the previous menu.

Laser

Press the **Laser** button to activate the laser pointer on the remote.



Select Inputs



You can use the IR remote to setup your inputs; however, Christie recommends that inputs are setup through the WebUI.

An input is an input source physically connected to the projector. Input describes the source signal to which it is connected. For a full explanation of how to connect sources to the projector, see [Connect a Source](#) on page 18.

1. From the Main menu, select **Input & Switching**.
2. From the **Main Input** drop-down menu specify the source of the image. Select from **Input 1** and **Input 2**.
3. If the projector(s) are to operate with InfraScene, the source of the image for the secondary input must be specified through the **Secondary Input** drop-down menu.



- To quickly and easily swap your inputs select Swap Main and Secondary Inputs.
- To adjust the gamma settings for the secondary input select Secondary Image Settings. See [Adjust Gamma Settings](#) on page 45.

4. **Frame Locking** is enabled by default. This feature is used to select how the projector controls the output frame timing based on the input signal. When set to **Frame Lock**, output image frames are locked to the input if possible. When locked, the output is always locked to the main input. When working with two inputs you can select input 2 as the lock source for the output by selecting **Frame Lock Secondary**. See [Control Frame Locking](#) on page 47.

ArrayLOC

Mirage WQ-L projectors use ArrayLOC to display a common gamut and brightness across an array of projectors. ArrayLOC monitors the projector array and adjusts settings automatically. The following section outlines how to manage color using ArrayLOC.



ArrayLOC is enabled by default.

Take Control of the Array

Use this menu to set up array color and brightness. By default ArrayLOC is configured to display the EBU gamut at the maximum brightness the array can support.

1. On the projector you want to work with, access the ArrayLOC menu: **Main Menu > ArrayLOC.**
2. Check **Synchronize to This Projector** to make the current projector the master.

Changes you make in the **Array Color Target**, **Bright/ColorLOC Configuration**, and **RGB** and **IR Brightness Targets** on the master projector are broadcast to the other projectors in the array.

The master projector has access to most settings under the Bright/ColorLOC Configuration and Array Color Target submenus. These settings are greyed out on the other projectors in the array to prevent conflicting information from being sent.



While working in the ArrayLOC menu and submenus, ArrayLOC displays a warning if adjusted settings fall outside the range the system can adjust for.

Warnings include:

- Minimum brightness not met (BCLOC disabled)
- Minimum brightness not met (Warning)
- Min Gamut not met (BCLOC disabled)
- Min Gamut not met (Warning)

3. Enable **Bright/ColorLOC Mode** to automatically achieve and maintain a target gamut and brightness. See [Configure Bright/ColorLOC](#) on page 40.



A projector with Bright/ColorLOC mode disabled ignores BCLOC changes from the master projector. If at any point you are working with a slave projector you may not be able to change some settings as they are locked (grayed out). To change which projector is the master check the Synchronize to This Projector option on another projector.

4. **RGB** and **IR Brightness Target** fields are typically only enabled on the master unless the system is not synchronized.

See [Configure ArrayLOC](#) on page 43.

5. Select **Auto Color Enable** and **Test Pattern Enable**. The system (background) color changes to the target color being adjusted.

For example:

- Red/green/blue part of red changes the system color to red.
- Red/green/blue part of green changes the system color to green.
- Red/green/blue part of blue changes the system color to blue.

All other menu options change the system color to white as long as **Test Pattern Enable** is checked. The color resets automatically when you exit the menu.

Configure Bright/ColorLOC

This menu is used to configure the warning and minimum brightness and gamut thresholds.

1. From the Main menu, select **ArrayLOC > Bright/ColorLOC Configuration** to access and work with the capabilities of the projectors in the array.
2. Set the **Minimum Brightness** value (as a percentage of the target brightness). This setting indicates the minimum brightness that the array targets, and the threshold for alerts from projectors that cannot achieve the minimum.



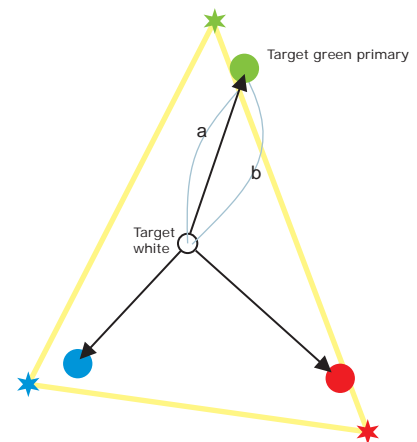
Projectors that fall below the minimum are excluded from the calculations of the common gamut and common brightness. If the projector falls below the minimum, the projector operates at its current brightness and gamut. LED drive level changes and electronic color correction is not done.

3. Set the **Minimum Gamut** value (as a percentage of the target gamut). This setting indicates the minimum gamut that the array displays, and the threshold for alerts from projectors that cannot achieve the specified minimum.

Projector Capability identifies the projector capability with respect to the array common color gamut as defined by **Color Target** and **Brightness Target**. 100% indicates the projector meets the target. A greater number indicates that the projector can exceed the target. A smaller number indicates how much the projector falls short of meeting the target.

The failure point for maintaining minimum gamut is calculated as: $\frac{a}{b} < \text{minimum gamut}$

For example: Where b is the length of the line from the target white point to the target color primary, and a is the length of the line from the target white point to the intersection of the projector capability gamut line and the line from the target white point to the target color primary.



4. Set the **Warning Brightness Threshold** as a percentage of the brightness target. Making changes to this option, recalculates the internal brightness warning level, and if warnings are enabled checks the current common brightness capability against the brightness warning level. When the common brightness reaches the warning level, all projectors in the BCLOC group issue the warning message, *Projector fails to meet warning brightness threshold of xx%; capability xx%*.
5. Set the **Warning Gamut Threshold** as a percentage of the target gamut. Making changes to this option, recalculates the internal gamut warning level, and if warnings are enabled, checks the current common gamut against the gamut warning level. When the common gamut falls below this level, all projectors in the BCLOC group issue the warning message, *Projector fails to meet warning gamut threshold of xx%; capability Rxx% Gxx% Bxx%*.

Adjust Projected White and Primary Colors for the Array

User-defined target color spaces allow color primaries and white points to be adjusted independently. For example, you can select the target color space **User 1**, copy the values from the target color space **Factory**, leave the color primaries, and adjust only the white point. All the settings for a user-defined color space are editable.

Use this menu on the master projector to configure the target color space settings. This is the recommended way to control the color space for the projector and array. The settings apply to the projectors in the same ArrayLOC group. These settings are enabled on master projectors only.

1. From the Main menu, select **ArrayLOC > Array Color Target**.
2. From the **Target Color Space** drop-down list, select a user-defined color space. Once selected the last saved red/green/blue/xy values associated with the selection are displayed.
3. **Target Red x/y, Target Green x/y, Target Blue x/y** displays the color values associated with the selected target color space. Only values for user defined color spaces (**User 1** through **4**) can be changed. Changes to these values update the associated color space chromaticity. To use another color space as a starting point, select a source color space from the Copy Color Space From list. When **Target Color Space** is set to **Maximum**, the values reflect a color space larger than capable for the best array color saturation. The values may not reflect real-world colors



- ColorLOC Status displays ColorLOC warnings and errors.
- Array Capability indicates the current projector capability with respect to the selected color target and the target white point. The information format is:
 - R/G/B: Indicates the percentage achieved of the red, green, and blue target gamut.
 - W: Indicates the percentage achieved of the product of the RGB brightness, and the target brightness.

4. To set the white point for the array using one of the following methods:
 - Select a user-defined white point from the **Select White Point** drop-down list. Changing this option un checks the **Set White to Color Temperature** check box and updates the **Target White x/y** values and the **White Color Temperature**.
Target White x/y displays the white x/y values associated with the **Select White Point** option. Only values for user defined white points (**User White 1** through **4**) can be changed. When **Set White Color to Color Temperature** is checked, the values are calculated based on the specified **White Color Temperature**.
 - Check the **Set White to Color Temperature** check box to recalculate **Target White x/y** values based on the specified standard **White Color Temperature**. This option is available only when **Select White Point** is set to one of the user-defined options, **User White 1** through **4**. This option is unchecked automatically when you change the **Select White Point** option.



Copy White Point From updates the Target White x/y values based on the white point selected from the list. This option is available only when the Select White Point option is set to one of the user-defined options, User White 1 through 4.

5. From the **Copy Color Space From** drop-down list select a user-defined color space. The **Target Red x/y, Green x/y, Blue x/y** values are updated based on the color space selected from the list. This option is available only when **Target Color Space** is set to one of the user-defined options, **User 1** though **4**.
6. To adjust the target brightness for the array, adjust **RGB Brightness Target** on the master projector. For maximum brightness, set the value to a large number, such as 40,000.

7. If the array appears matched across all projectors for color and brightness, color setup is complete.

If further adjustment is required, see *Fine-tune Whites, White Brightness, or Primary Colors* on page 43.

Fine-tune Whites, White Brightness, or Primary Colors

The Projector Color Adjustment menu lets you fine-tune color or brightness for individual projectors to accommodate any projector-specific optical elements (for example projection lens, fold mirrors, screen properties or ambient lighting). The following steps outline color adjustments using projector color settings until the colors appear to match the rest of the projectors in the array. Color adjustments are evaluated by eye; however, a color meter can help determine the change required. For information about using a color meter with this procedure, see *Fine-tune Projector Colors with a Color Meter* on page 44.

1. From the Main menu, select **ArrayLOC > Projector Color Adjustment**.
2. Use the **Target Color Space** option to change the color space. Changing this option applies the red/green/blue x/y values associated with the selected option. It also updates the red/green/blue components of each color on this menu. Selecting one of the user-defined color spaces displays the last saved adjustment values.



- The Target Color Space option is enabled only on the master projector. All other projector-specific color adjustments on this menu are available on all projectors at all times.
- ColorLOC Status displays ColorLOC warnings and errors.

3. Use the Red Part/Green Part/Blue Part of “x” options to make projector specific color adjustments to the selected **Target Color Space**.
4. Use the **Copy Adjustments From** drop-down menu to copy the adjustment values from the selected color space to the current color space.

Adjustments are specific to the target color space. If the color space is changed for the array, projector adjustments can be copied from the old target color space and fine-tuned again.

5. Use the **White Brightness Adjustment** option to adjust the RGB brightness for the projector.



- If at any time you want to reset the color values to the color adjustment default values (0 or 100) select Clear Adjustments.
- To reset the red part / green part / blue part of each color to the default values set at factory select the Reset Current Adjustments to Default option.

Configure ArrayLOC

Select the projector-to-projector communication network configuration for all Ethernet messages related to ArrayLOC functions, including ArrayLOC messages, and BCLOC messages. Make sure all projectors in an array are operating on the same network, either the Control Network or the ArrayLOC Network. See *ArrayLOC Network Configuration* on page 24.

1. From the Main menu, select **ArrayLOC > ArrayLOC Configuration**.

2. From the **ArrayLOC Network** drop-down list select from **ArrayLOC Network** or **Control Network**.
3. Assign an **ArrayLOC Group** to the array. Only projectors in the same ArrayLOC group automatically achieve a common gamut and brightness.
4. Use the **Synchronized keys, Test Pattern, Color Enable** option to set the projector to listen for remote keystrokes through the ArrayLOC network and the master projector. All synchronized projectors respond to the same keystrokes. Double key strokes may not register correctly, use alternate key commands instead.

A synchronized projector automatically starts listening to its IR receiver if the master projector becomes unavailable, for example if it goes into Standby mode. Independent indicates that the projector listens to its own IR remote receiver. It is the default option. Change this setting for each projector individually.



ArrayLOC network communication overrides RS232 serial communication for keys.

5. When you want to sync the particular feature for all the projectors in the ArrayLOC group, set fields 4 to 7 to **Synchronized**.

Use the **Independent** setting to make changes to each projector individually independent of the master projector. The default setting for each selection is **Synchronized**.

Fine-tune Projector Colors with a Color Meter

To use a color meter for projector color adjustments, follow the instructions in *Fine-tune Whites, White Brightness, or Primary Colors* on page 43. Use the information below and a color meter for the XXX Part of YYY adjustments.

1. To note the xy color values reported for the common gamut, navigate to **Main Menu > ArrayLOC > Array Color Target**.
2. Measure the projected primary color with the meter and compare the metered values to the common gamut values.

Use the adjustment guide to determine how to adjust the **Projector Color Adjustment** values to correct the differences. The adjustment guides are color coded. The suggested corrections are also color coded, and reflect the direction of the change, + or -. For example, if the measured red is 660, 325 and the Common Gamut value is 640, 330 then the measured x is high (High X) while the measured y is low (Low Y). The corresponding quadrant of the RED guide indicates +G (increase green) to correct the mismatch with other projectors.

Once you have made an adjustment, re-measure and refer to the guide for the next adjustment. Repeat until the desired color accuracy is achieved.

Red	High Y	-G	+B
	Low Y	-B	+G
	Low X	High X	

Green	High Y	+R	+B
	Low Y	-B	-R
	Low X	High X	

Blue ¹	High Y	+R	-G	-R
	Low Y	+R	+G	-R
	Low X	High X		

White	High Y	+R	+B	+B	
	Low Y	+R ²	+G	+G ³	-R
	Low X	High X			

- ¹ some corrections require both red and green adjustments.
- ² alternative: decrease blue (-B) instead of increasing red and green.
- ³ alternative: increase blue (+B) and increase green (+G) instead of decreasing red and increasing green.

Image Settings

Adjust Gamma Settings



To access the gamma settings for your secondary input select Input and Switching > Secondary Image Settings > Secondary Gamma Settings.

To access the Gamma Settings, select **Image Settings > Gamma Settings**. The system offers two types of gamma correction. Gamma correction can be applied to a specific source to correct for luma encoding. This is the **Gamma** control. The system also provides a global **Gamma Correction** control. The global control offers an offset applied to all displays. This offset is used to compensate for changes in ambient conditions, such as ambient light in the room and projected material.

Gamma Correction



Gamma correction should only be adjusted to compensate for ambient conditions.

Gamma Correction applies a global offset to all gamma settings for each input. This offset is used to compensate for changes in ambient conditions, such as ambient light in the room and projected material. It affects the shape of the curve by performing a linear transform toward a gamma curve of 1.0 while the control is increasing and likewise a linear transform toward a gamma of 3.0 as the control is decreasing. To correct a particular source only, use the **Gamma** control.

Select Gamma

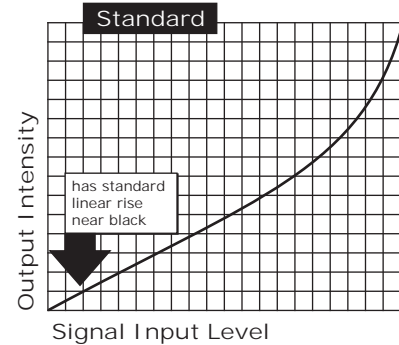
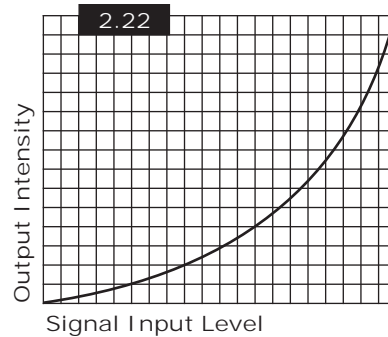
Select the base gamma table for a given source. Select from one of the standard tables, a custom gamma function, or select an arbitrary gamma table that has been downloaded to the projector. A separate PC utility is needed to do this.

The 2.22 curve is a power curve typically used to

encode graphics and video sources. The **Standard** curve (auto setup default) is a modified 2.22 curve with a small linear section in the black that enhances the detail in darker areas of the projected content. Typically **Standard** or **2.22** is used for all sources. Alternatively, if neither default is ideal, apply a simple gamma curve by defining a custom power function and slope. Select **Gamma Function** to enable the function and slope controls.



For complex non-standard gamma curves, a user-defined curve created externally and downloaded to the projector can be used (requires separate PC-based Arbitrary Gamma software application to create the table, and the WebUI to download it). If any of these special user curves have been installed, their names appear in the Gamma drop-down list.



Gamma Function

Defines the base gamma power curve used when **Gamma** is set to **Gamma Function**. This value, combined with the **Gamma Slope** setting determines the base Gamma table to be used as the custom base table. The curve is generally a power curve with a small linear segment at the bottom defined by the slope.

Gamma Slope

This control defines a slope to be used for the base custom Gamma table for a small section at the bottom of the curve. This slope can be used to bring in or out the low level blacks in the image. This slope, combined with the gamma function, defines the custom Gamma table.

Configure the Display

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

Output Options

Change Screen Image Orientation

1. From the Main menu, select **Configuration > Output Options**.
2. From the **Screen Image Orientation** drop-down select from front, rear, front inverted, and rear inverted.

Control Frame Locking

Use frame locking to select how the projector controls the output frame timing based on the input signal.



Frame locking on projectors in a ArrayLOC network can be controlled from one projector. See [Configure the Display](#) on page 46.

1. From the Main menu, select **Configuration > Output Options**.
2. From the **Frame Locking** drop-down menu select **Frame Lock** to lock output image frames to the primary input or select **Frame Lock Secondary** to lock output images to the secondary input.

Set Frame Delay

This control delays the output signal timing relative to the input signal timing by a fraction of a frame. In a multi-projector system this control may be used to adjust the output timing relative to the input so that all the projectors display the image at the same time. This allows for a seamless display across projectors.

Actual Frame Delay

This control indicates the dynamically calculated, effective minimum frame delay for the projector.

Power Management

To access the Power Management menu select **Configuration > Power Management** from the main menu.

Auto Power Up

If there is an AC power interruption while **Auto Power Up** is enabled, the projector resumes operation in the same state as it left off. If the light engine is On and an image showing when AC power is lost, the projector automatically powers back up, and an image shows when AC is restored.

Auto Shutdown Enable

When **Auto Shutdown Enable** has been selected, and no projector activity has been seen for the activation time-out period, the projector enters a power-saving mode in which the light engine dims and the shutter closes. If this condition persists for an additional time-out period, the projector

automatically goes into Standby mode. The presence of any activity within this combined interval cancels auto shutdown and returns the projector to normal operation.

Turn Off Image After (min)

This sets the activation interval (in minutes) for auto shutdown. If all activity (input signals, Web or Serial port activity key presses) is lost for this length of time, and auto shutdown is enabled, an auto shutdown cycle begins.

Enter Standby After (min)

This sets the interval (in minutes) between starting Auto Shutdown and entering Standby mode. Once Auto Shutdown has been entered, and all activity continues to be absent for this interval, the projector automatically enters power Standby mode.

Stealth Mode

Check this option to operate the projector with the status LED display on the input panel powered Off. The status LED is powered Off during operation only. In Standby mode, the status LED displays codes normally. Operating in Stealth mode is recommended when images are displayed using only non-visible (IR) light. In this mode any visible light from the projector can noticeably reduce image contrast as seen through NVG devices.

Fan Assist

If necessary, use the slide bar to increase projector fan control. An increase to this setting makes the fans quicker to react and run at a higher intensity. The default setting is 0. Increase the setting when operating in high ambient conditions. This may help ease thermal problems in such environments. Fan assist increases noise levels.

Change Date and Time

To change the current year-month-day, hour-minute-second go to **Configuration > Date and Time**. Changes made reset the projector real-time clock.

Communications

The Communications menu allows you to define and control how single or multiple projectors are linked with each other and with a controlling device. See [Serial Communication](#) on page 62. To access this menu select **Configuration > Communications** from the Main menu.

Serial Options

Baud Rate: Determines the speed of communication to and from the projector on the RS232 or RS422 links. The maximum rate for RS232 is 115200; for RS422 it is 19200. Set the baud rate to match that of your controlling device, such as your PC. See the documentation for the controlling device to determine the baud rate. In an existing network of projectors, if you discover that a projector has a different baud rate, use the pull-down list and select the correct baud rate. Serial communication is always eight data bits, no parity.

Serial Flow Control: Determines whether software flow control or no flow control is used when transmitting and receiving data on the serial port.

Serial Mode: Select the serial data mode. The mode includes the number of bits, the parity and the number of stop bits.

Serial Protocol: Select the protocol used on the serial communications port.

Projector Address

Enter a number up to three-digits in length (such as "001") to assign or change a number to the projector currently in use. If the current projector already has a number assigned, that number appears here. Numerical identity for projectors enables you to communicate with a single projector within a multiple-projector application. See *Proj* on page 38. If you make a mistake in assigning or changing the projector number, press **Exit**.

Network Routing



Network routing is not available when there is no serial network being used.

Separate: Select (factory default) to keep RS232, RS422, and Ethernet messages on their respective paths instead of being broadcast to the other types of ports.

RS232 and RS422 Joined: Messages originating from an RS232 or RS422 controller are relayed to all RS232 or RS422 ports. Any Ethernet communication, however, does not.

RS232 and Ethernet Joined: Messages to and from the RS232 ports are also be relayed to the Ethernet port, and vice versa. Any RS422 communications is isolated. In the case of multiple Ethernet sessions over the single Ethernet connector, input on the RS232 port is relayed to all Ethernet sessions; however, input from any Ethernet session is only relayed to the RS232 ports.

All Joined: All messages reach all ports, regardless of type. In the case of multiple Ethernet sessions, input on one Ethernet session is relayed to all other Ethernet sessions, as well as to the RS232 and RS422 ports.

Ethernet Settings



Recommended for Network Administrators only.

To access the Ethernet Settings window select **Configuration > Communication > Ethernet Settings** from the Main menu.

IP Address: Enter a valid and unique IP address for use on the network to which the projector is currently connected. This address overwrites any previous IP address such as the projector factory-defined default. It takes approximately ten seconds for the projector to respond to its new address.

TCP Port: On some Ethernet networks, firewall restrictions may require that the port number of the projector be changed from its default of 3002. If so, enter a new valid port number here. It is highly recommended not to use a port number below 1000, as these ports are typically reserved for and used by common IP applications.

Subnet Mask: Subnet Mask determines the subnet mask for the IP address and must be set manually.

Gateway: This is the IP address of the gateway used to reach any non-local IP addresses; it must be set manually.

Host Name: Set the hostname for the device.

Domain Name: Set the domain for the device.

MAC Address: Displays the MAC address of the projector (read-only).

Broadcast Keys

Use Broadcast Keys to relay all key presses received by the projector to all other projectors on the network.

Front IR Enabled

Check this option to enable the front IR sensor.

Wired Keypad Enabled

Check this option to use the wired keypad.

Display Error Messages

Choose how you want to be notified of errors detected in either the incoming signal or projector. Select **Serial Ports** to receive messages using RS232 or RS422 serial communication only. To hide error message displays, such as during shows and presentations, select **Off**.

Language

Choose the available language to use in the projector menus. The change takes effect immediately.

Diagnostics and Calibration

To access this menu select **Configuration > Diagnostics and Calibration**.

Select a Test Pattern

1. From the **Test Pattern** drop-down select the desired internal test pattern or select **Off** to disable.

Set Grey Level

Use the slide bar to set the level of grey for displaying in the full grey field test pattern.

Freeze Light Engine Image

Check this option to freeze an incoming image on a single frame to examine details. For example, in moving images it is sometimes difficult to observe artifacts such as external de-interlacing/resizing and signal noise. Uncheck to return to normal.

Select a Color

From the **Color Enable** drop-down select a color while working with color temperature, input levels or other setup parameters.

Select a Light Engine Test Pattern

From this drop-down select 1 of four light module test patterns. Choose from **White, Grey Scale 16, Horizontal Ramp, No Test Pattern**.

Upgrade Software

The upgrade package is a single file, which comprises all the firmware and software needed to operate the projector. The upgrade process updates the firmware files as necessary. Hardware that is up-to-date is not upgraded.

Requirements

- Version: 1.0.0 or higher
- Internet Explorer 6.0/7.0 (IE7 is recommended)
- Ethernet connection to projector
- Workstation that can connect to the projector using Ethernet



Christie recommends that the projector be in Standby Mode before starting the upgrade procedure.

1. Apply power to projector.
2. Open Internet Explorer and browse to `http://<ipaddress>` where `<ipaddress>` is the IP address of the projector. The login screen appears.
3. Log in using the admin account. If you are unable to login under admin it may be that the password has been changed. Check with the projector maintainer for the correct password.
4. Select the **Admin** tab.
5. Click **Upgrade**.



If the Upgrade button is greyed out the projector may not be in Standby mode. Select the Main tab and look under the Power field to verify the current mode. If the projector is not in Standby mode, power the project Off and try again.

6. To reboot the projector in Fail Safe mode, click **Yes** from the pop-up window.
7. The Fail Safe mode displays the current versions of the projector firmware.
8. To locate the upgrade file, click **Browse**. Double-click the file to select it.
9. To upload the file to the projector, click **Upgrade**. A progress bar indicates the status of the upload. After a successful upload, the upgrade starts automatically.
 - The top two lines of the window display the current action.

- The Upgrading progress bar indicates the status of the current action.
 - The upgrading process takes between 15 and 30 minutes.
10. Click Reboot to re-starts the projector in Normal mode.
If you are unable to see the WebUI after the upgrade delete the cache and cookies, and press CTRL+F5.



If the message, Main update failed xxx, see log for details is displayed copy the upgrade log and send it to Christie technical support.

Warp and Blend Images

The digital image warp and blend functionality combines multiple projector images into a single image. Use the Christie's Twist™ and AutoCal applications to adjust the image so it fits different screen shapes. Adjustments can be made to correct keystone on flat screens or fit an image to spherical, cylindrical, curved, or arbitrary screen shapes.

Digital blend definitions allow images from multiple projectors to be overlapped to create a single image.

Dual pipeline input support provides the ability to select Warp and Blend files independently for each of the two projector input channels. This allows different warps to be applied for visible and IR channels (in Infrascene), or for different view perspectives to be displayed. In this mode (WRP+ESPL), the time to enable the warps is longer, approaching 10 seconds.

For information about creating and managing warps and blends, please refer to the Twist™ User Manual (P/N: 020-100143-xx) or the AutoCal 3.0 User Manual (P/N: 020-100985-xx).

Adjust Geometry Correction Settings

1. Select **Configuration > Geometry Correction**.
2. In the **Geometry Correction** list select the warp file previously uploaded to the projector from Twist™ or AutoCal.
It can take several seconds to load a warp file.
3. In the **Edge Blending** list, select the edge blending file.
4. In the **Black Blend Enable** list, select the black blend file (supported with Twist™ 2.0).
5. To visualize the effect of the selected warp or blend file, select a projector test pattern from the **Test Pattern** list.
6. To adjust the settings for the secondary input (in dual-input mode), repeat steps 1 through 5.

3D Operation of Mirage Projectors

Images generated from a stereo 3D video source consist of a series of images or frames that alternate quickly between two slightly different viewpoints, corresponding to our left and right eyes.

When these frames are displayed fast enough and viewed with special glasses synchronized to the left or right changes, the resulting image appears to have the same depth and perspective as reality.

To display stereoscopic 3D video, you must connect the Mirage WQ-L projector to additional hardware such as stereo emitters and glasses. The type of 3D glasses can be active or passive depending on the type of stereo controller and screen used.

3D System Timing

When configuring the projector for 3D operation, consult the documentation for your glasses or polarization filter and keep their specifications in mind. The projected video must be optimized for the glasses' shutter speed or polarization filter performance to prevent "ghosting" of the video content (known as cross-talk in stereo 3D applications) or other more subtle color artifacts. Visual performance can be optimized by adjusting the Dark Interval and the 3D Sync Delay settings.

3D Input Video Configurations

The stereo 3D input video stream is sent from the content server to the projector using 3D direct or dual-input.

3D Frame Doubled Input

The Mirage projector supports a WQXGA 60Hz (30 Hz per eye) video input over a single DVI-D cable. In this configuration a single video stream is provided by the video server, with the left eye and right eye frames supplied as alternate frames. The display is frame doubled by the projector resulting in 120 Hz projection. A 3D Input Sync must be used to identify the left eye frames.

3D Dual-Input 120Hz native output

The Mirage projector supports two WQXGA 60Hz video inputs, with the left eye frames supplied by one video input and the right eye frames supplied by the other. The video streams must be frame locked and supplied concurrently. The 3D dual-input video streams are supplied by two DVI Dual Link connections.

3D Requirements

To control the projector's processing, synchronization, and display of the stereoscopic 3D source material, stereo 3D applications require a stereo 3D-capable source, special hardware and software, and the settings of the projector.

Hardware Requirements for Stereo 3D Applications

- Christie Digital Systems Mirage WQ-L Series projector .
- 3D stereo sync cable (for 3D frame doubled mode) .
- A source, usually a computer with a 3D graphics card or specialized video server.

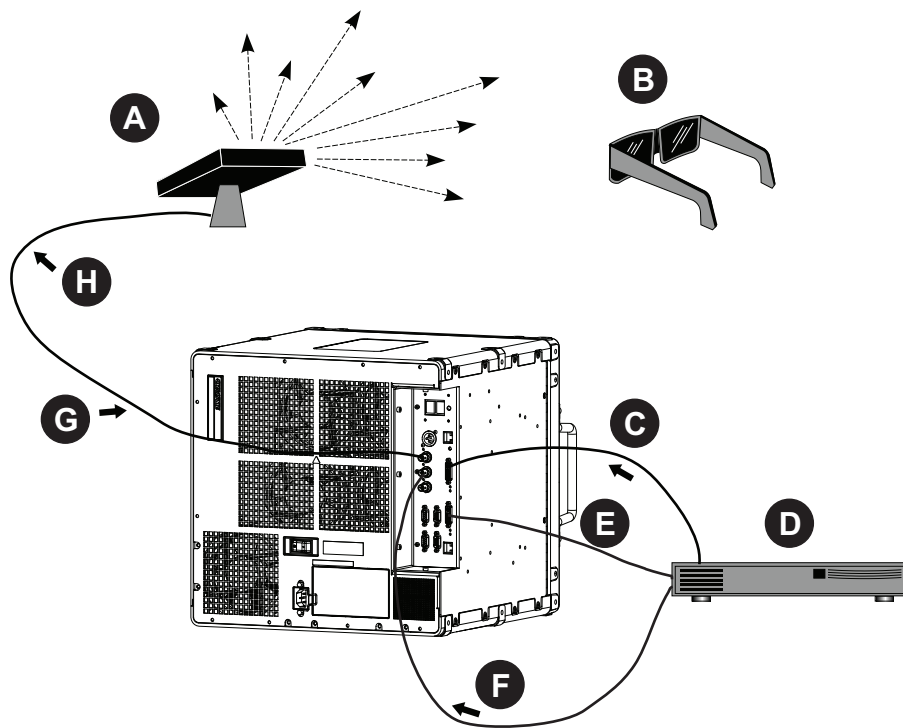
- Emitter for controlling active shutter glasses, or a qualified device that mounts in front of the lens of the projector to process the light from the lens into a passive polarized light for passive glasses. Contact your Christie dealer for more information.

Software and Content Requirements for Stereo 3D Applications

- Any 3D computer software that supports 3D stereo on a supported computer(s) with associated graphic cards. Suggested cards include ATI or NVIDIA.
- A video stream from a video source prepared to be sequential content (for 3D frame doubled) or two video streams from a video source that has been prepared to be supplied left eye and right eye concurrently and frame locked (3D dual-input).

Active Stereo 3D Configuration

This diagram shows the typical hardware configuration for active stereo 3D systems:



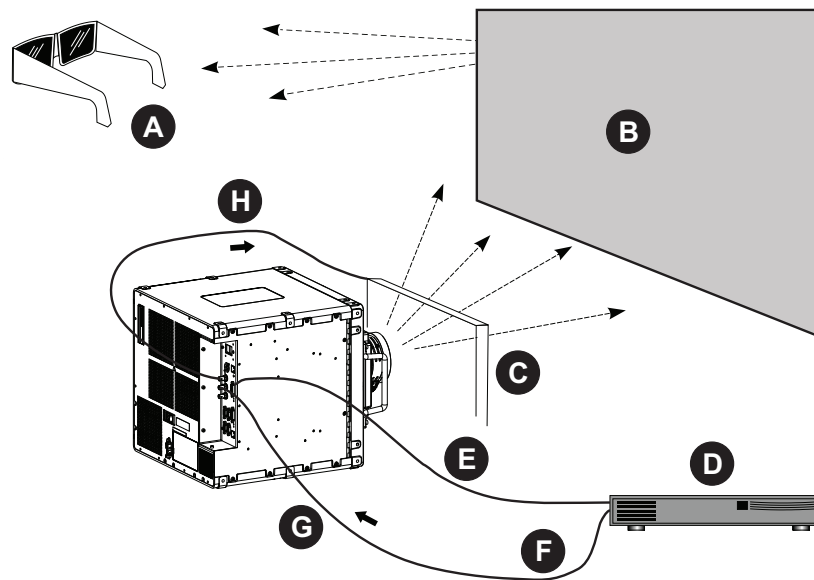
A	Infrared emitter
B	Active Glasses
C	DVI
D	Server with Stereo 3D-capable graphics card
E	Secondary input (only required with Dual Input mode)

F	Left/Right synchronization signal (only required for Frame Doubled input)
G	3D Stereo Sync Cable
H	Output

In response to the 3D Sync Out signal from the projector (BNC A), the infrared emitter emits a signal to the receiver in the active 3D shutter glasses. This synchronizes the active glasses to open and close for the active stereo 3D content. The left/right synchronization signal is connected to BNC B on the projector, which is necessary for 3D frame doubled input configurations.

Passive Stereo 3D Configuration

This diagram shows the typical hardware configuration for passive stereo 3D systems:



A	Passive Polarizing Glasses
B	Polarization Maintaining Screen
C	Active Filter Cell
D	Server with Stereo 3D-capable graphics card
E	DVI
F	3D Stereo Sync Cable
G	Left/Right Synchronization Signal
H	Output

For operation with passive glasses, a 3D polarization filter is placed in front of the lens and is synchronized to the projected frames with the 3D Sync Out signal (BNC A). The left/right synchronization signal is connected to BNC B on the projector, which is necessary for 3D frame doubled input configurations.

Set Up the Mirage WQ-L to Display 3D Content

The projector must be installed to correctly display 2D content (optically aligned, focused, etc.) before configuring the 3D content:

1. Connect the 3D equipment to the projector using the instructions provided with the 3D equipment.
2. Click **Main Menu > Image Settings > 3D Settings**.
3. Select **3D Mode** as **Dual Input** or **Frame Doubled**, according to how the source is connected to the projector.
4. Configure your 3D source.
5. For Dual Input mode, use the **Main Input** field and select **Input 1** or **Input 2** for the left eye and set the **Secondary Input** to the other input for the right eye.
6. For 3D Frame Doubled mode, set the **3D Sync Input** to the **External** if a sync signal is connected, or **Internal** if no 3D sync signal is connected to the projector.
7. To enable the 3D Sync output, set the **3D Sync Output** to the **To Emitter** selection, or **To Next Input** for a projector array.
8. Set the last projector in the array to **To Emitter**.
9. Display the **3D Test Pattern**.
If you can see both a grid and a checkerboard test pattern superimposed with each eye, increase the **Dark Interval** until a different test pattern is visible on the left eye and the right eye.
10. To minimize the ghosting of the two patterns with respect to one another, adjust the **3D Sync Output** delay as necessary.
The delay adjusts when the sync pulse is sent to the emitter with respect to the dark time transition on the DMDs.
11. To reverse the left and right eye images, select **Invert 3D Input**.

Troubleshooting



- Read, understand, and observe all warnings and precautions when diagnosing and servicing.
- If a solution cannot be found in this guide, contact your dealer for assistance.
- A Christie accredited service technician is required when opening an enclosure to diagnose any probable cause.

- Make sure the projector is plugged in.
- Make sure all cables are connected and not damaged.
- Power down the projector, wait 90 seconds to allow for cooling, and then power the projector back up. Check for a normal power up sequence.
- Check the projector status for error conditions and correct any issues if possible.

See *System Warnings and Errors* on page 57.

- Check source reliability. Switch sources if possible.
- Use RS232 serial communications to communicate with the projector during diagnosis.

System Warnings and Errors

When the projector finds a system malfunction, it displays a *System Warning* or a *System Error* message. System warnings show that a system malfunction exists. The projector remains operational, but the message shows a possibly serious problem that must be reported to the manufacturer. Reset the projector by powering it Off and On again, cooling when necessary.

System errors indicate that a serious malfunction exists and must be reported to the manufacturer as soon as possible. The projector no longer operates. Reset the projector by powering it Off and On again, cooling when necessary.

Status and error information is available through:

- The status display on the input panel of the projector. See *Status Display* on page 58.
- The read-only Status window from the Main menu. Check this window for a list of the standard and optional components detected in the projector. Check the Status window for versions of installed hardware and software, the hours logged, and projector model name and serial number.

Status			
● FCB HW version	-1.1-1	● QD FPGA version	25 (0x1a)
● Control PLD version	7 (0x7)	● ColorLOC Brightness	Min Not Met (DCLOC Disabled)
● OPC FPGA version	17 (0x11)	● Feedback Sensor Calibration	Uncalibrated
Projector model	Mambo	Projector subtype	Main: S8M
Projector serial number	E12320019	Light Engine native resolution	WQXGA 2560 x 1600
Hours on projector	387:01 (h:m)	Frame Lock	Free Run
Output Frequency	60.30kHz	DVI Link Configuration	N/A
Main Signal State	N/A	Secondary Signal State	N/A
Main Input Frequency	N/A	Secondary Input Frequency	N/A
Main Sync Type	N/A	Secondary Sync Type	N/A
Main Pixel Rate	N/A	Secondary Pixel Rate	N/A

Status Display

Projector status is indicated by a single three-color LED adjacent to a two-digit status display. Refer to the table below for a description of the variations that indicate operation status. A solid red LED indicates a system error and the corresponding error code indicates what the error is.

Status	Two-Character Display	Description
● Solid Yellow	Rotating	Warming up.
	PR (Programming Time)	
	FS (Failsafe mode)	The projector is in Failsafe mode. See Upgrade Software on page 51.
	— —, static	Standby mode.
	— —, moving up and down	Brief cool down period.
● Solid Green	<ul style="list-style-type: none"> • BO (Booting) when power first applied. • B1 (Boot phase 1) starting main script • B2 (Boot phase 2) starting projector code • B3 (Boot phase 3) about to initialize connections 	
	SH (Shutter Mode)	LEDs are disabled to shutter the projector.
★ Flashing Green		Keypad command sent — command received.
● Solid Red	System error. See Error Codes on page 58.	
blank	Rotating	Initializing hardware and performing Power On Self Test.

Error Codes

If the status display window shows any of the codes in the table below you may need a Christie accredited service technician to repair the component identified by the error code.

Error codes are displayed in a three-phase format:

- First two digits represent the component or error category
- Second two digits represent the specific problem
- Display off

This cycle repeats. The LED shows red while the error code is displayed.

Acknowledge and clear the error by pressing **Exit** twice. If the error recurs then try resetting the projector by powering Off and On again. Contact the dealer if the problem persists or if you see a code not listed in the table below.

Error Code (7-segment display)	Description
Light Engine	
LE	Light engine error Engine error (typically during power-up)
Link	
LI	Link down Communication link status (internal communication error)
Temperature Sensor	
SP	Temperature sensor error (index number following tracks SST response IDs)
41	Air inlet error
42	Power supply 0
43	Power supply 1
44	FCB board
45	QD board
46	DMD
47	QD FPGA
48	QPC board
49	QPC CPLD
50	QPC FPGA
51	Red SAM
52	Green SAM
53	Blue SAM
54	IR SAM
55	Red driver
56	Green driver
57	Blue driver
58	IR driver
59	Red SAM Junction Temp
60	Green SAM Junction Temp
61	Blue SAM Junction Temp
Fan Error	
FP	Fan stall error (index number following tracks SST response IDs)

Error Code (7-segment display)	Description
20	Power supply fan
21	SAM drive fan
22	Intake fan
23	QD fan
24	Red IR fan
25	Green fan
26	Blue Green fan 1
27	Blue Green fan 2
Miscellaneous	
ES	Emergency stop due to a thermal overtemp (holds for about 30 seconds and then reverts back to standby --y)

Maintenance

Cleaning the Lens

Check periodically. A small amount of dust or dirt on the lens has minimal effect on image quality. To avoid the risk of scratching the lens, **clean only if absolutely necessary.**

Remove Dust

1. Brush most of the dust from the lens with a camel-hair brush or blow dust away with a dust-free blower.
2. Fold a microfibre cloth smooth and gently wipe remaining dust particles from the lens. Wipe evenly with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers – use the tension in the folded cloth itself to collect dust.
3. If significant dust is still bound to the surface, dampen a clean microfibre cloth with coated optics cleaning solution (damp, not dripping). Wipe gently until clean.

Remove Fingerprints, Smudges, or Oil

1. Brush away most of the dust with a camel-hair brush and/or blow away using a dust-free blower.
2. Roll a lens tissue around a swab and soak it in coated optics cleaning solution. The tissue should be damp, but not dripping.
3. Gently wipe the surface using a figure-eight motion. Repeat this motion until the blemish is removed.

Serial Communication

This document describes the serial communication protocol, consisting of ASCII text messages, used to control a Mirage WQ-L projector remotely.

For a list of the available serial commands, refer to the Mirage WQ-L Serial Commands Guide (020-101420-xx).

Connection and Use



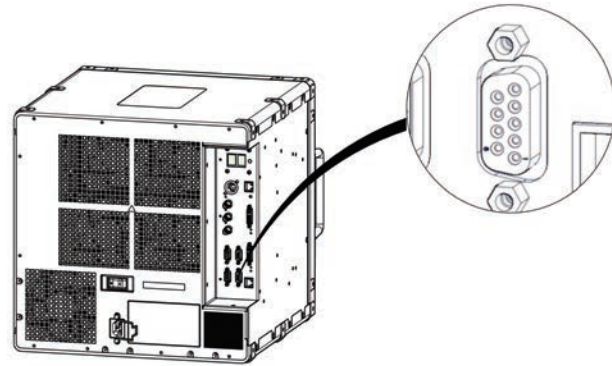
For all cable requirements and other connection details, see [Specifications](#) on page 80. Some commands are operational only when projector is powered On.

Once you have connected your computer to either the RS232 IN or RS422 IN port (depending on which standard is supported by your computer) or to the Ethernet port on a projector, you can remotely access projector controls and image setups, issue commands or queries, and receive replies. Use these bi-directional messages to:

- Control multiple projectors
- Obtain a projector's status report
- Diagnose performance problems

RS422 Port

RS422 Pins		
Pin #	Signal	Direction
Pin 1	DNC	N/A
Pin 2	RXD-	IN
Pin 3	TXD-	OUT
Pin 4	RXD+	IN
Pin 5	TXD+	OUT
Pin 6	DNC	N/A
Pin 7	GND	N/A
Pin 8	NC	N/A
Pin 9	+12V (500mA)	OUT



Message Formats

- **Set:** A command to set a projector parameter at a specific level, such as changing to a certain input.
- **Request:** A request for information, such as what input is currently in use.
- **Reply:** The projector returns the data in response to a request or as confirmation of a command.

All "Remote Control" information passes IN and OUT of the projector as a simple text message, consisting of a three letter command code, an optional four-letter subcode, and any related data. When a parameter for a specific source is being accessed, the four-letter subcode are added on to the Command code. A number of optional features (message acknowledges, checksums, and network addressing) can be included.

Generally, most commands include 0 or 1 data fields or parameters. Where applicable, a message may expand to include additional parameters of related details.

The smallest step size for any parameter is always 1. Some controls, such as Size, the value displayed on the screen has a decimal point. (for example, 0.200 to 4.000) In this case, the values used for the serial communications is an integer value (for example, 200 to 4000), not the decimal value seen on the screen.

Regardless of message type or origin, all messages use the same basic format and code. Opening and closing round brackets (parentheses) surround each message.

Message Formats

Source	Message format	Function	Examples
From controller	(Code Data)	SET (set gamma function of main image to 222)	(BGF500) or (BGF 500)
	(Code+Subcode Data)	SET (set gamma function of image to 222)	(BGF+SECD222) or (BGF+SECD222)
From controller	(Code ?)	REQUEST (what is current gamma function?)	(BGF?) or (BGF ?)
	(Code+Subcode ?)	REQUEST (what is current gamma function?)	(BGF+SECD?) or (BGF+SECD ?)
From projector	(Code Data)	REPLY (gamma function is 222)	(BGF!222)
	(Code+Subcode Data)	REPLY (gamma function is 222)	(BGF+SECD!222)

Basic Message Structure

The following component fields comprise a standard ASCII message. Optional fields, such as extra characters for special modes, restrictions or added functionality, are shown in italics, with the exception of Notes.

Start and End of Message



If the start character (left bracket) is received before an end character of the previous message, the partial (previous) message is discarded.

Every message begins with the "(" (left bracket) character and ends with the ")" (right bracket) character.

Prefix Characters (optional)

For acknowledgement that the projector has responded, and/or to maximize message integrity, insert one or two special characters before the three-character Function code:

Special Character	Description
\$	Simple Acknowledgment, which causes a '\$' character to be sent back from the projector when it has finished processing the message. See Maximize Message Integrity on page 69.
#	Full Acknowledgment, which causes an echo of the message as a reply to be sent back from the projector when it has finished processing the message. See Maximize Message Integrity on page 69.
&	Checksum, which allows a checksum to be put as the last parameter in the message for verification at the projector. See Maximize Message Integrity on page 69.

Projector Numbers (optional)

To control a selected projector or controller within a group, include its assigned number or address just before the three-character ASCII Function code. See [Network Operation](#) on page 71.

Function Code

The projector function you want to work with, such as input selection or gamma, is represented by a three-character ASCII code (A-Z, upper or lowercase). This Function code appears immediately after the leading "(" (left bracket) that starts the message. In messages sent to the projector that do not have a Subcode, a space between the Function code, and the first parameter (or special character) is optional.

+Subcode

The projector function you want to work with may have one or more subcodes that allow you to select a specific source, image, input or subfunction. The Subcode is represented by a four-character ASCII code (A-Z, upper or lowercase, and 0-9). This Subcode appears immediately after the Function code, with a "+" character to separate the code, and subcode. If there is no Subcode, the "+" (plus sign) is also omitted. In messages sent to the projector that do have a subcode, a space between the subcode and the first parameter (or special character) is optional.

Request/Reply Symbols

If the controller is requesting information from the projector, a "?" (question mark) appears directly after the *Function* code. If the projector is replying, an "!" (exclamation mark) appears directly after the *Function* code. For **Set** type messages sent to the projector, neither of these characters appear. Data directly follows the code and subcode.

Other Special Functions (optional)

To add functionality to the current message, include one or more of the following special characters between the Function code/Subcode, and the first parameter. If more than one, add them in any order. See *Flow Control* on page 70.

C	Control Class Inquiry
D	Default value/Text
E	Enable Control Inquiry
G	Access Group Inquiry
H	Return the Help text for a control
L	Return a list of options for 'list' controls
M	Find min/max adjustments (such as range)
N	Return the name of the control
T	Return the type of control (such as Slidebar and so on)

Data

The value for a given projector state, such as "ON" or "OFF", appears in ASCII-decimal format directly after the request/reply symbol. You can add an optional space after the symbol (that is, before the data) in a set message, but data in replies follow the "!" (exclamation) symbol without a space. Other details to remember about data:

- All values returned by the projector (reply messages) have a fixed length, regardless of the actual value. For a specific parameter, the length is always the same (for example, contrast is always returned as three characters, projector number is always returned as five characters). The minimum parameter size is three characters. Values that are less than the pre-defined size are padded with leading zeros as needed. Parameters which have negative signs (-) are zero padded after the negative sign, and have one less digit to make space for the sign.
- If entering a negative number, there must be a space between the code/subcode, and the value. For example, (CRM3) and (CRM 3) can both be used when the number is positive. (CRM -2) is acceptable, but (CRM-2) is not.
- Data in set messages to the projector do not require padding with zeros.
- Within each message, multiple parameters of data must be separated by one "space" character.
- Text parameters are enclosed in double quotes following the data, as in "Name".

Text Parameters

Most data is simply a numerical value, however some messages also require text. Enclose this text in double quotation marks, as in *"Tilt the Wagon"*. Use all characters as desired except for the following special characters shown in the left column below. These special characters require a two-character combination. See [Sample Messages and their Meaning](#) on page 67.

Special Text Characters

to get this....	type this....	Description
\	\\	Backslash
"	\"	Quote
(\(Left Bracket
)	\)	Right Bracket
0x0A	\n	New line - if the text can be displayed on more than one line, this sets the line break.
	\h##	Sends one arbitrary code defined by the two hexadecimal digits ##

Sample Messages and their Meaning

Single Projector

Message Format	Function	Example
(Code Data)	SET (set gamma function of main image to 222)	(BGF222)
(Code+Subcode Data)	SET (set gamma function of secondary input to 222)	(BGF+SECD222)
(Code?)	REQUEST (what is current gamma function?)	(BGF?)
(Code+Subcode?)	REQUEST (what is current gamma function of secondary input?)	(BGF+SECD?)
(Code!Data)	REPLY (gamma function is 222)	(BGF!222)
(Code+Subcode!Data)	REPLY (gamma function of secondary image is 222)	(BGF+SECD!222)
(\$Code Data)	SET AND ACKNOWLEDGE MESSAGE (message processed?)	(\$BGF222)
(&Code+Subcode Data Checksum)	SET WITH CHECKSUM	(&BGF222 171)

Specific Projector in a Network with one Controller

Message Format	Function	Example
(Dest Addr Code Data)	SET (turn projector #5 on)	(5pwr1)
(\$Dest Addr Code Data)	SET AND ACKNOWLEDGE MESSAGE (message processed?ffr55)	(\$5pwr1)

Specific Projector in a Network with Multiple Controllers

Message Format	Function	Example
(Dest Addr Src Code?)	REQUEST (get gamma function from projector #5 to controller #2)	(5 2BGF?)
(\$Dest Addr Src Code Data)	SET AND ACKNOWLEDGE MESSAGE (is message from controller #2 processed by projector #5)	(\$5 2BGF?)
(Dest Addr Src Code!Data)	REPLY (from projector #5 to controller #2: gamma function is 222)	(002 005BFG!222)

What is Actually Sent in a Message?

Although you send and read messages as strings of ASCII characters, the actual message travels as a sequence of bytes. Each character in this sequence requires one byte. The example below illustrates a “gamma function 222” reply from the projector.

ASCII =	(B	G	F	!	2	2	2)
HEX =	0x28	0x42	0x47	0x46	0x21	0x32	0x32	0x32	0x29

Maximize Message Integrity

For additional reassurance and/or maximum message integrity, you can insert one or two special characters:

- **Acknowledgements:** If you want assurance from the projector (or group of projectors) that a set message has been processed, request an acknowledgement. An acknowledgement is returned after a message has been received and fully executed by the projector (such as in the case of a source switch it is not sent until the switch is complete). If a message is not able to execute for some reason (such as invalid parameters, timeout, and so on) a NAK is returned instead (Not-Acknowledge). Note that requesting an acknowledgement serves no purpose when included in a request message, since the acknowledgement is redundant to the actual reply from the projector. However, if requested, the "\$" acknowledgement from the projector follows the reply.

There are two types of acknowledgements:

- **Simple Acknowledgements:** Insert a "\$" character just after the start code "(" . This only return a '\$'. This only return a '\$' on success, or a '^' on failure (NAK).
- **Full Acknowledgements:** Insert a "#" character just after the start code "(" . This returns the message sent, as a reply.

This is a quick way to confirm success with set messages, and is particularly useful with long-distance communication links or where the projectors and/or images are not visible from the controller. Acknowledgements can also be a type of flow control.

Checksums: For maximum message integrity, add a checksum character "&" just after the start code "(" . You must then also include the correct checksum total (0-255) just before the ")" end code. Make sure to add a space before the calculated checksum to separate it from the last data parameter:

The checksum is the low order byte of the sum of the ASCII values of all characters between the "(" and the beginning of the checksum, but not including either. It does include the space in front of the checksum. Calculate the checksum for the above "set contrast to 64" command as follows:

```
CHECKSUM EXAMPLE = & + B + G + F + 2 + 2 + 2 + 'space'
= 26h+42h +47h +46h +32h +32h +32h+20h
= 01ABh
= ABh when only the low byte is used
= 171
```

The projector collects all of the message bytes as defined in the first byte of the message, then creates its own checksum value for comparison with the checksum included in the controller's message. If the values match, the message is considered to have been correctly received—otherwise the message is discarded.



'h' indicates a hex number. If a "request" message has a checksum so will the reply. If using both "acknowledge" and "checksum", either character can occur first.

Access Specific Inputs

For several commands (for example, BGC, Base Gamma Curve) you can direct the message to particular input or image. To do this, include a subcode after the function code.

Example:

(BGC 1) Select 2.22 gamma curve for main input.

(BGC+MAIN 1) Select 2.22 gamma curve for main input.

It is only possible to set parameters from a specific input if that parameter is stored separately for each input. This function cannot be used for parameters that are specified for the projector as a whole such as projector address. The serial commands listed in the document specify which subcodes are applicable to each function.

Flow Control



Xon and Xoff controls apply to both directions of communication. The projector does not send more than three characters after it has received a 13h (Xoff) code.

Normally messages can be sent to the projector before processing of earlier messages is complete—the projector just stores messages in a buffer until ready to process. However, if a series of messages is sent the projector may not be able to process them as fast as they arrive and the buffer becomes full. If this happens, the projector sends the 13h (Xoff) code to instruct the controller (or any devices preparing to transmit) to cease transmission. At this point, the controller must respond immediately and send no more than ten extra characters or they may be lost (such as, the projector is able to accommodate the receipt of up to ten more bytes after it sends 13h (Xoff)). When the buffer is once again available, the projector sends a 11h (Xon) command to resume transmission.

Network Operation

Up to 1000 projectors can be linked together in a chain with the 'OUT' port on one connected to the 'IN' port on the next. A controller connected to the 'IN' port on the first projector can control them all, either by broadcasting messages which have no address and are thus seen by all projectors, or by directing messages to specific projector addresses.

To work with a specific projector in a group, the projectors must first be assigned a unique I.D.—either a projector number or an Ethernet IP address. Insert the number of the target projector between the starting '(' and the three-character ASCII code.

Message for Specific Projector

(Addr Code Data)

Each projector compares the message address with its own address and, if matching, responds and processes the message. If the address does not match, the message is passed on until it reaches the intended projector.

Although messages without an address are always broadcast, you can also broadcast by including the reply destination address 65535. This ensures that replies go to a specific controller address rather than being broadcast. The projector also includes its address.

Message for Projector from a Specific Controller

(Dest Src Code Data)

If you have more than one controller on a network, ensure to include both a source address and a destination address. With a single controller on the network, its address is never required. Place the source address between the destination address and three-character code, including a space before and after as shown. **NOTE:** *Replies from a projector do not contain an address unless the request message includes both a destination address and a source address—such as, a reply to a request having only a destination address does not have any source address.*

(Dest Src Code Data)

Examples

Command	Message from Controller	Reply from Projector
Turn Projector #5 on.	(5pwr1)	{ none }
What is the gamma function in Projector #30?	(30BFG?)	(BFG!222)
Return gamma function from Projector #30 to Controller #2.	(30 2BFG?)	(00002 00030con!127)

Description Of Control Types

Subclasses

- **Power Down Controls:** These controls are accessible when the projector is in Standby power mode (such as power off) as well as when powered on.
- **Power Up Controls:** These controls are only accessible when the system electronics are fully powered (not necessarily lamp on).

Control Groups

- **Unsaved Controls:** These controls are not saved to flash. The settings are not maintained between power sessions.
- **Saved Controls:** These controls are saved to flash. The settings are persistent between power sessions.
- **Preference Controls:** These controls are transferable from one projector to another. Example: NET+SUB0 (projector subnet).
- **Configuration Controls:** These controls are projector specific settings. They are non-transferable between projectors. Example: NET+ETH0 (projector IP address).

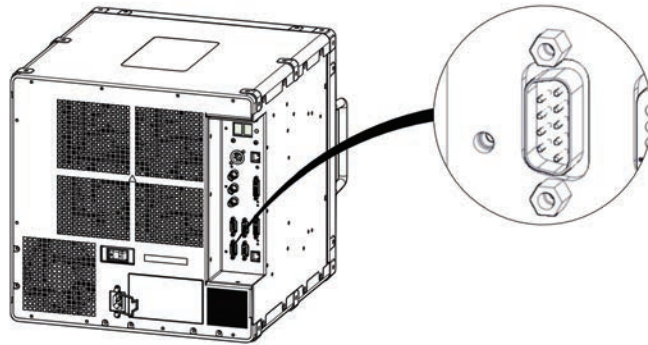
Access Levels

- **Operator:** Command is available at the operator level log in.
- **Advanced:** Command is available at the advanced operator level log in.
- **Admin:** Command is available at the administrator level log in.
- **Service:** Command is available at the service level log in.

GPIO Port

This section explains how to use a GPIO link from the projector to external equipment, such as devices for 3D synchronizing. The GPIO port located on the input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector. There are seven GPIO pins available on the nine pin D-Sub GPIO connector, which are configurable through RS232 commands. The other two pins are reserved for ground and power — see table below for pin identification. The serial cable required for connecting the external device to the projector's GPIO connector, must be compatible with the external device.

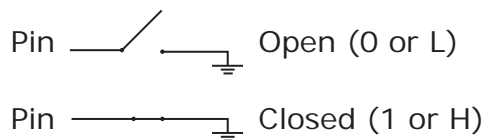
GPIO Pins	
Pin #	Signal
Pin 1	+12V (200 mA)
Pin 2	GPIO 2
Pin 3	GPIO 4
Pin 4	GPIO 6
Pin 5	Ground
Pin 6	GPIO 1
Pin 7	GPIO 3
Pin 8	GPIO 5
Pin 9	GPIO 7



Configure GPIO

The GPIO connector can be configured to automate any number of events using the serial command code `GPIO`. See *GPIO—General Purpose Input/Output* on page 6. Each pin is defined as either an input or output depending on the desired outcome. Configure the pin as an input if you want the projector to respond to something the device does and as an output if you want the external device to respond to an action taken by the

projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is powered On. By using the `GPIO` command, you can also set the state of each output pin as high or low. By default, the state of each pin is high. The voltage applied to pins in the high state is +3.3 V. A low state (or value of 0) will be read on an input pin if the circuit attached to the pin is open. A high state (or value of 1) will be read on an input pin if the circuit attached to the pin is shorted to ground. This corresponds to a switch closing event.



Example

Turn room lighting on when the projector is powered Off (assumes a control/automation unit is configured to power the lights On when pin 2 of its input goes high).

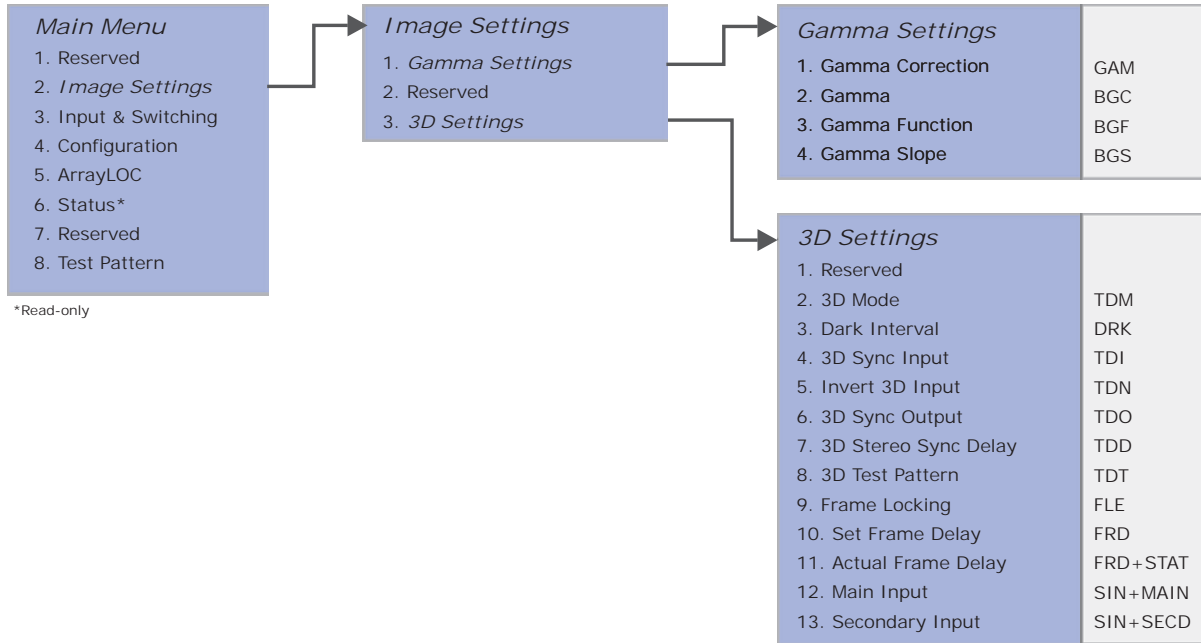


The strings in the commands refer to pins 2, 3, 4, 6, 7, 8, 9 in order from left to right.

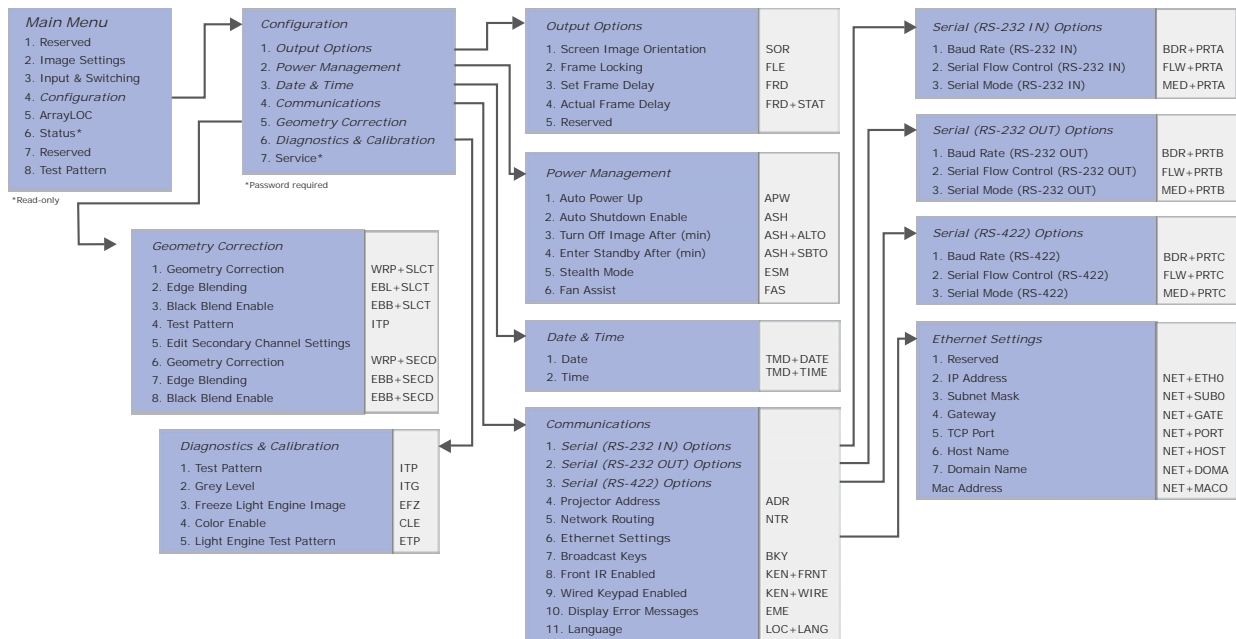
(<code>GIO+CNFG "OOOIIII"</code>)	Set pin #2, 3 and 4 configuration to output and pin 6, 7, 8 and 9 to input.
(<code>GIO+STAT "HLXXXXX"</code>)	Set pin #2 to high, pin 3 to low and the state of all other pins unchanged.
Query Command	
(<code>GIO+STAT</code>)	Request the state of all pins.
(<code>GIO+STAT "HLLHLLH"</code>)	Reply of pin states - H means pin is high, L means pin is low.
(<code>GIO+CNFG</code>)	Request the configuration of all pins.
(<code>GIO+CNFG "IIII0000"</code>)	Reply of pin configurations - pins #2, 3 and 4 are inputs, pins 6, 7, 8 and 9 are outputs.

WebUI Menu Tree

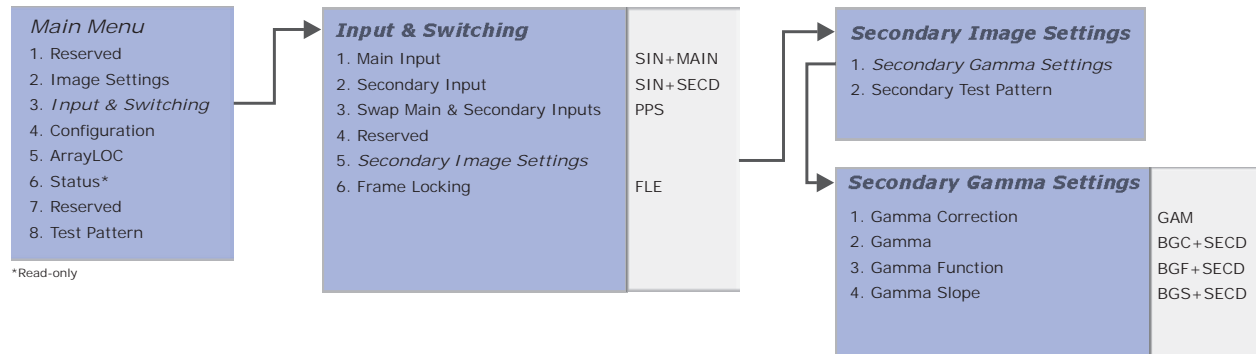
Image Settings



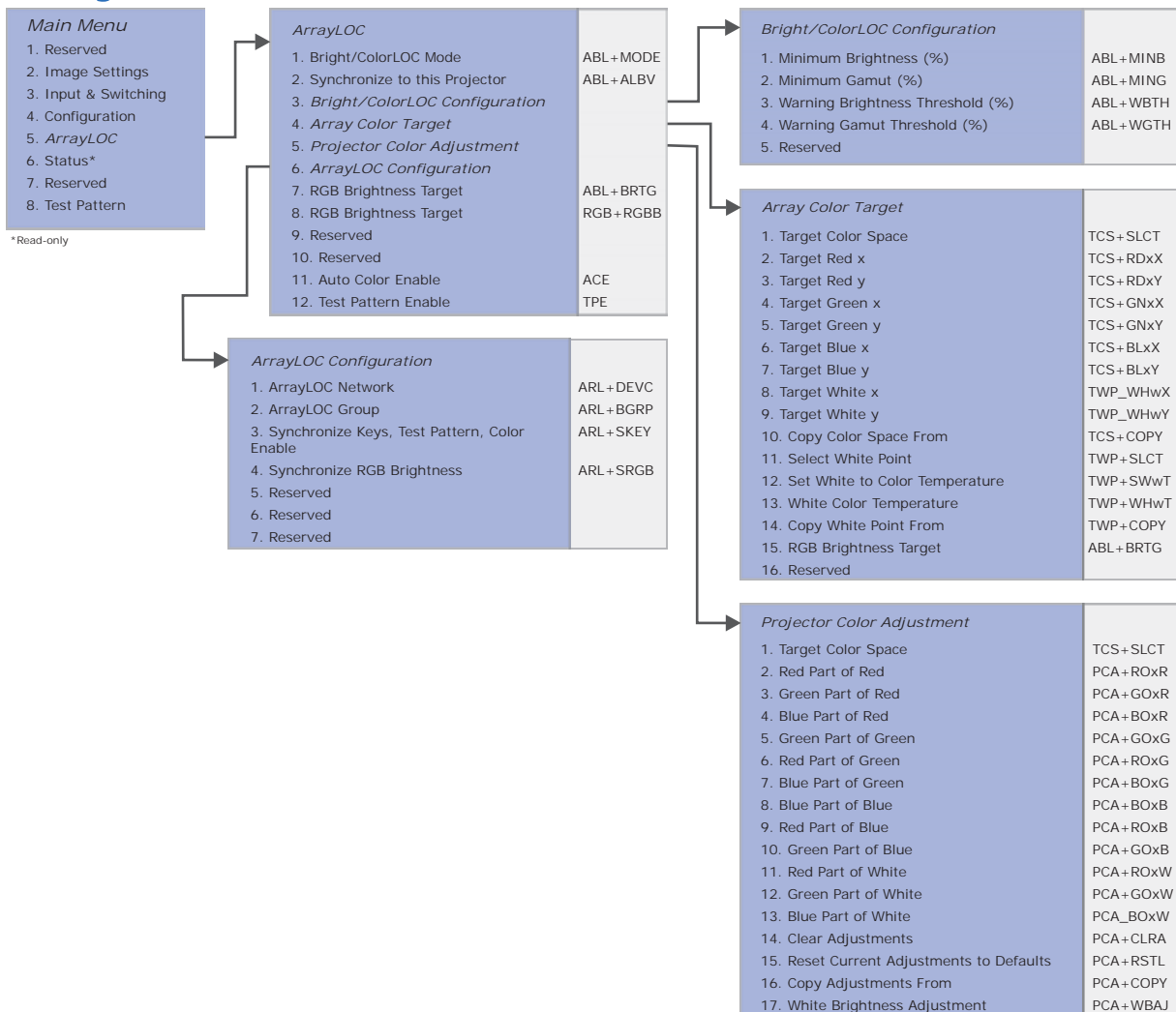
Configuration



Input & Switching



ArrayLOC



Specifications

Mirage WQ-L (P/N: 130-001102-xx)		
Image	luminous flux	800 ANSI lumens
	contrast	10,000:1 dynamic contrast (under LED control) No mechanical iris required
	uniformity	95% brightness and color uniformity after electronic adjustment
Display technology	type	Revolutionary solid state projector using a single T1 Darkchip 3™ DMD with a solid state illumination engine (no color wheel) and sealed optics
	native resolution	2560 x 1600 WQXGA
	output frame rate	<ul style="list-style-type: none"> • 60Hz (2D) or 120 Hz (3D Frame Doubled and Dual Input modes)
	latency	<ul style="list-style-type: none"> • 1 frame + 15 lines (no warp applied) • 1 frame + 20 lines + number of lines of upwards translation due to vertical warp
Inputs / outputs, control and networking	inputs	<ul style="list-style-type: none"> • On-board Ethernet control capabilities • Additional Ethernet connections for Christie ArrayLOC™ network • IR/wired remote control as part of optical user kit • 2 x RS232 ports and 1 x RS422 port
	input phase offset	<ul style="list-style-type: none"> • ± 60 60 lines for 2 x DVI-D frame locked operation
Optical system	lens mount	<ul style="list-style-type: none"> • Mechanical, horizontal and vertical lens shift • No shutter required • No iris required – user programmable illumination parameters (eliminates the need for a mechanical shutter)
	illumination	<ul style="list-style-type: none"> • Solid state illumination • Illumination lifetime greater than 50,000 hours (to 50 % output)
	ArrayLOC™	Manages the brightness and color levels of all projectors within an array to a common level, in real-time with no additional latency
Lenses	fixed	<ul style="list-style-type: none"> • 0.68:1 fixed, optimized for IR and visible light • 0.80:1 fixed, optimized for IR and visible light
	zoom	1.28-1.71:1 zoom, optimized for IR and visible light
	offsets asymmetric	<ul style="list-style-type: none"> • 0.68:1 lens features ±10% (horizontal) and ±25% (vertical) offset when mounted in landscape orientation¹ • 0.80:1 lens features 60% (right) / -85% (left) and 140% (up) / -110% (down) offset when mounted in landscape orientation¹ • 1.28-1.71:1 lens features 60% (right) / -85% (left) and 140% (up) / -110% (down) offset when mounted in landscape orientation¹
Input	signal format	2560 x 1600 WQXGA (VESA RB)
	input frame rate	<ul style="list-style-type: none"> • 60 Hz with single input or 2 x 60 Hz with dual input

Mirage WQ-L (P/N: 130-001102-xx)		
Operating environment	temperature	40 - 95° F (5-40° C)
	humidity	20 - 80 % non-condensing
Operating orientation		portrait and landscape
Accessories	standard	Line cord
	optional	<ul style="list-style-type: none"> • User kit (includes manual, IR remote) • Rugged Motion Platform kit² to withstand 5g shock load (purpose-built) • Ruggedized transit case • Remote IR sensor • Christie AutoCal™³ • Christie MotoBlend™ optical blending³
Enhanced feature sets		<ul style="list-style-type: none"> • Minimum Processing Latency (MPL™) • Auto power up • Menus in five languages • Christie ArrayLOC—automatic, continuous management of brightness and color space levels of all projectors in the array to a common level, in real-time • Warp and blend with Christie's Twist™ and AutoCal™ • 3D stereoscopic projection
Power requirements	operating voltage	100 - 240 VAC 50/60 Hz
	operating current	12A max (lower in normal operational modes)
	dissipation	2316 BTU/hr max (lower in normal operational modes)
Dimensions	size	400 x 400 x 406 mm (without lens)
	weight	36 kg (without lens)
	shipping weight	45 kg (without lens)
Regulatory approvals / markings		<ul style="list-style-type: none"> • Directives (EC) 2002/95/EC (RoHS) • 2002/96/EC (WEEE) • Regulation (EC) No. 1907/2006 (REACH) • CAN/CSA C22.2 No. 60950-1 • UL 60950-1 • IEC 60950-1 • FCC, Part 15, Subpart B, Class A • EN55022/CISPR22 Class A • EN55024 / CISPR24 ; ICEES003 / NMB003 (A) • Certifications marks and product approvals (check with Christie for latest update): cULus (Canada & US), CE (EU), CCC (China), GoST-R (Russia), KC (Korea), PSE (Japan), C-Tick (Australia & New Zealand); South Africa; Mexico
Limited warranty		<ul style="list-style-type: none"> • Standard warranty: 2 years parts and labor • Extended warranty options available • Contact an authorized Christie representative for full details of our limited warranty

¹Each offset is specified with the other at zero. Simultaneous horizontal and vertical offsets may limit the adjustment range of each.

²Mirage WQ-L is available with a Ruggedized Motion Platform kit. These are purpose built to interface with customers' motion platform structures and available on a build-to-order basis. For details, please contact your Christie sales representative.

³For details, please contact your Christie sales representative.



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