# CP2000-ZX

## USER MANUAL

020-100006-06

CHRISTIE®

# CP2000-ZX

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020-100006-06

**NOTICE**

This equipment 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 equipment is operated in a commercial environment. This equipment 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 this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

The equipment is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol  means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of this equipment appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

 Canadian manufacturing facility is ISO 9001 and 14001 certified. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are available at the time of printing. Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes without notice or obligation.

**WARRANTY**

For complete information about Christie's limited warranty, please contact your Christie Dealer. In addition to the other limitations that may be specified in Christie's limited warranty, the warranty does not cover:

a. Damage occurring during shipment, in either direction.

b. Projector lamps (See Christie's separate lamp program policy).

c. Damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp supplied by a supplier other than Christie.

d. Problems caused by combination of the equipment with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the equipment with any non-Christie interface device.

e. Damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.

f. Damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel.

g. For LCD projectors, the warranty period specified applies only where the LCD projector is in "normal use." "Normal use" means the LCD projector is not used more than 8 hours a day, 5 days a week. For any LCD projector where "normal use" is exceeded, warranty coverage under this warranty terminates after 6000 hours of operation.

h. Failure due to normal wear and tear.

**PREVENTATIVE MAINTENANCE**

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

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## Appendix B: SCCI Port

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## Appendix D: CDP Error Codes

# 1 Introduction

This section includes information on the following:


- *1.1 Using this Manual*
- *1.2 Purchase Record and Service Contacts*
- *1.3 Projector Overview*

## 1.1 Using this Manual

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

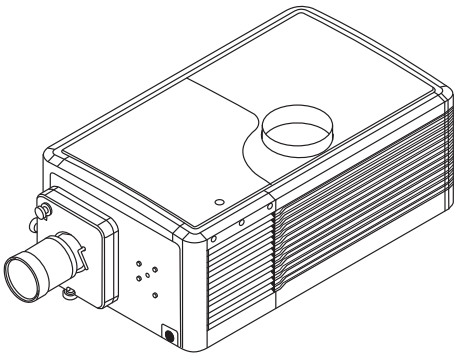
**SERVICE:** Only trained and qualified Christie service technicians knowledgeable about all potential hazards associated with high voltage, ultraviolet exposure and high temperatures generated by the lamp and associated circuits are authorized to 1) assemble/install the projector and 2) perform service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

**This manual contains the following sections:**


- *Section 1 Introduction*
- *Section 2 Installation & Setup*
- *Section 3 Operation*
- *Section 4 Maintenance*
- *Section 5 Troubleshooting*
- *Section 6 Specifications*
- *Appendix A: Serial API*
- *Appendix B: SCCI Port*
- *Appendix C: GPIO*
- *Appendix D: CDP Error Codes*


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

## 1.2 Purchase Record and Service Contacts



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

**Table 1.1 Purchase Record**

| |
|---|
| **Dealer:** |
| **Dealer Phone Number:** |
| **Projector Serial Number*:** |
| **Purchase Date:** |
| **Installation Date:** |

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

**Table 1.2 Ethernet Settings**

The following ethernet settings were defined during the installation of this projector.

| | |
|---|---|
| **Default Gateway** | |
| **DNS Server** | |
| **Projector Address** | |
| **Projector Mgmt IP Address** | |
| **Subnet Mask** | |

## 1.3 Projector Overview

The CP2000-ZX is a professional quality, easy-to-use Digital Micromirror Device (DMD) projector utilizing Digital Light Processing (DLP™) Cinema technology from Texas Instruments. It's all-in-one design integrates all components in a sleek projection head that can be table-top mounted or used with the optional rack stand. Integrating smoothly into traditional projection environments such as theatres and other wide screen exhibitor venues, the CP2000-ZX offers stunning wide screen, high-resolution cinema images that remain flawless from first release to final show.

CP2000-ZX interfaces with local networks typical in theatres throughout the world, and can be expanded even further by connecting non-cinema DVI source material for multimedia presentations from a variety of formats.

### 1.3.1 Key Features

- 2048 x 1080 native pixel format (DC2K)
- CineBlack™ and CinePalette™ for deep film-like blacks and superior colorimetry
- CineCanvas™ for flexible telecine-grade resizing, subtitling and other text and graphic overlays
- Two SMPTE 292M cinema inputs, used individually or simultaneously for high-speed, dual-link processing and each supporting CineLink™II local-link encryption
- Dual DVI (Digital Visual Interface) connectors for alternative "non-cinema" content, used individually or as a single-twin or dual-link input for high-speed processing
- *LiteLOC*™ feature for constant image brightness
- *LampLOC*™ for motorized three-axis lamp alignment (automatic or custom-bulb positioning)
- Electronically operated "quick" douser
- Choice of field-interchangeable zoom lenses and one optional anamorphic lens
- Optional lens mount for 1.25x anamorphic lens producing 2.39:1 "scope" image format
- Communication ports for remote control of the projector via PC or other controller
- Local user interface via Control Display Panel (CDP)
- Custom web user interface for controlling projector remotely, as well as remote diagnostics
- Service access panels lockable with medium-security locks
- Content protected by high-security locks on electronics compartment
- One 10/100BaseT Ethernet port for connection to in-theatre Ethernet hub
- Service port for additional flexibility
- Two RS-232 ports for communication with Christie-supported peripherals (except Cine-IPM 2K)
- One GPIO port for connection of automation
- One Simple Contact Closure Input (SCCI) for automated Lamp Start and Dowser operation
- HDCP decryption on both DVI inputs for display of copy protected alternate content.
- One USB port for direct laptop connection, useful during setup and local software downloads
- Health Status Output for operation status
- Triple Flash functionality, capable of projecting full resolution 3D images under a 6:2 frame rate multiplication.
- Motorized Lens Mount automates the process of setting the Focus, Horizontal (X) and Vertical (Y) Offset, and Zoom. **NOTE:** *PCM version 2.2 or higher is required.*

### 1.3.2 How the Projector Works

The CP2000-ZX accepts a variety of cinema or DVI-compatible "non-cinema" signals for projection on front screens typical in commercial theatre or other large screen applications. High-brightness light is generated by a short arc Xenon lamp, then modulated by three Digital Micromirror Device (DMD) panels responding to incoming data streams of digitized red, green and blue color information. As these digital streams flow from the source, light from the responding "on" pixels of each panel is reflected, converged and then projected to the screen through one or more front lenses, where all pixel reflections are superimposed in sharp full-color images.

### 1.3.3 User Interface Overview

The CP2000-ZX incorporates two basic user interface systems: the Control Display Panel and the Web User Interface.

The Control Display Panel (CDP) is a simple keypad with a small alphanumeric LCD display panel that can be backlit for easy viewing in dark projection rooms. It is used for a simple setup, local control of power, lamp douser control, channel selection, lamp installation and alignment, etc.

The Web User Interface is a Web-based interface produced internally by the projector, but displayed and controlled by a Web-based browser on a remote, local area Ethernet network or at a distance over internet protocol. The Web User Interface is a full function setup and diagnostic tool that can be set up via a wireless Ethernet connection for easy data entry and calibration from the theatre auditorium where the color measurements are taken.

### 1.3.4 List of Components

Make sure you have received the following components with your projector:

- ❒ Projector with Control Display Panel (CDP)
- ❒ Lens plug *(required for shipping when lens is not installed to prevent contamination of critical optical components)*
- ❒ Nylon safety strap with clip *(required to secure projector to tabletop or optional rack mount)*
- ❒ Warranty Card
- ❒ Web Registration Form

### 1.3.5 Software Requirements

**DLP** version 14 series or higher

**Projector Control Module (PCM)** version 3.0 or higher

## 1.4 Labels and Marking

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

**⚠ DANGER Danger symbols indicate a hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.**

**⚠ WARNING Warning symbols indicate a hazardous situation which, if not avoided, could result in death or serious injury.**

**⚠ CAUTION Caution symbols indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.**

**NOTICE!** *Addresses practices not related to personal injury.*

### 1.4.1 Typographical Notations

The following notations are used throughout this manual:

- Keypad commands and PC keystrokes appear in bold small caps, such as **POWER, INPUT, ENTER** etc.
- References to specific areas of the document appear italicized and underlined. When viewed online the text appears in blue indicating a direct link to that section. For example, *Section 6 Specifications*.
- References to other documents appear italicized and bold, such as ***Christie Service Manual.***
- References to software menus and available options appear bold, such as **Main Menu, Preferences.**
- User input or messages that appear on screen, in status display units or other control modules appear in Courier font. For example. **"No Signal Present", Login: christiedigital.**
- Error codes, LED status appear in bold, e.g. **LP**, **A1** etc.
- Operational states of modules appear capitalized, such as "power ON, power OFF".
- Signal words, such as **Warning**, **Caution** and **Notes** are used in this manual to point the reader to specific information or instructions that warn of safety related hazards which may be present and indicates how to avoid them.

# 2 Installation & Setup

This section explains how to install, connect and optimize the projector for delivery of superior image quality. **NOTE:** *The illustrations throughout this manual are provided to enhance the understanding of written material. They are graphical representations only and may not represent your exact projector model.*


- *2.1 Projector Installation*
- *2.2 Connecting Sources*
- *2.3 Re-wiring For Uninterruptible Power Supply (UPS)*
- *2.4 Adjusting Tilt and Leveling*
- *2.5 Initial Power Up*
- *2.6 Maximizing Light Output*
- *2.7 Basic Image Alignment*
- *2.8 Offset and Boresight Alignment*
- *2.9 Fold Mirror and Convergence Adjustments*
- *2.10 Calibrating the System*

## 2.1 Projector Installation

The following set of instructions explains how to install, connect and optimize the projector for smooth operation.

**⚠ WARNING QUALIFIED TECHNICIAN REQUIRED for all installations. This product must be installed in a restricted access location.**

**⚠ CAUTION Auto LampLOC™ must be run any time the projector is physically moved or when it has been leveled.**

Before you begin installation, it is important to fully understand all site requirements and characteristics, and that you have the following tools and components on hand. **NOTE**: *In general, fasteners are metric sizes and require metric tools. However, to complete lamp installation, imperial tools are required, which have been provided inside the lamp door of the projector.*

- ❒ 12” screwdrivers: Phillips #2 (magnetic) and flat
- ❒ 19 mm and 7/8” wrenches
- ❒ Assorted Allen keys (metric)
- ❒ Single-phase 30A connection of AC supply to the terminal block
- ❒ Installation site must have an easily accessible 30-32A breaker nearby
- ❒ Heat extractor (Refer to *STEP 5 - Connect Exhaust Ducting, on page 2-5* for requirements)
- ❒ Protective clothing / safety gear (required when handling the lamp)
- ❒ Lens cleaning tissue and solution

### STEP 1 - Carrying/Moving the Projector

**⚠ WARNING Four or more people are required to safely lift and hand-carry one projection head a short distance.**

**⚠ CAUTION Keep the projector as level as possible when lifting or carrying the projector. Avoid tilting the projector on the right side. This can introduce an air bubble within the coolant hoses that can lead to an air lock.**

### STEP 2 - (Optional) Install Projector on Rack Stand

**⚠ WARNING Use of the projector’s safety strap is MANDATORY to prevent the projector from tipping. Secure the strap between the projector and the optional rack-mount or any other surface it is mounted to.**

An optional rack stand (P/N 108-272101-01 or P/N 108-282101-01) and hold down clamp (P/N 116-100101-01) are available for use with the projector. If you intend to use this in your installation, refer to the instructions provided with the rack stand before proceeding with STEP 3.

## STEP 3 - Position the Projector

**⚠ WARNING 1) It requires four or more people to safely lift and hand-carry one projection head a short distance as required. 2) Use of the projector's safety strap is MANDATORY to prevent the projector from tipping. Secure the strap between the projector and the optional rack-mount or any other surface it is mounted to.**

1. Position the projector at an appropriate throw distance (projector-to-screen distance) and vertical position. Ideally, center the projector with the theatre screen. If competing for space with an already present film projector, aim the projector slightly off-center as shown in **Figure 2-1.** This will slightly increase side keystoning, but will minimize the horizontal lens offset required.

   **NOTE***: Unlike film projectors, it is best to keep the projector lens surface as parallel to the screen as possible, even if significantly above the screen center. When a particularly short throw distance combines with a very wide screen, you may have to forfeit some aim and stay more parallel to the screen. In such cases, some lens offset can reduce the keystone distortion.*

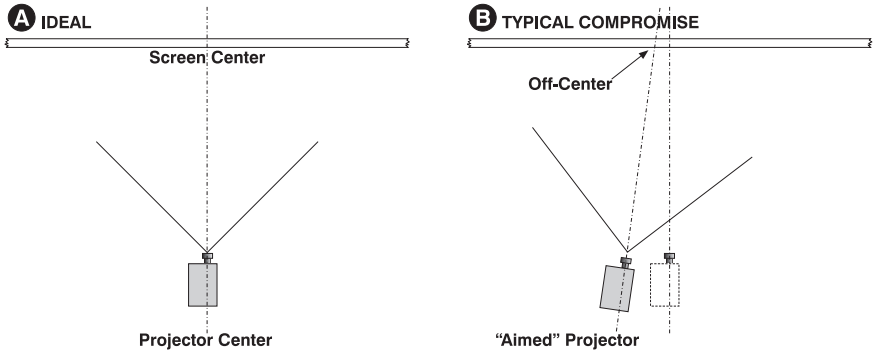



**Figure 2-1 Position the Projector**

2. Attach the supplied safety strap to the back of the projector and fasten it to the mounting surface. Use of this strap is MANDATORY to prevent the projector from tipping when a lens or auxiliary lens mount is installed. **NOTE***: It is also recommended that you use the optional hold down clamp (P/N 116-100101-01) be used to firmly secure the rear feet.*
3. Once you have completed the remaining installation steps and the projector is up-and-running, adjust precise image geometry and placement as described in *Section 2.7 Basic Image Alignment*.

## STEP 4 - (Optional) Mount the Control Display Panel

The projector is shipped with the Control Display Panel (CDP) fully assembled and installed to the back panel. For convenience, the display angle of the CDP can easily be modified for improved viewing or it can be removed and permanently mounted in another location within the projection room. **NOTE:** *The CDP is not recommended for use as a handheld remote.*

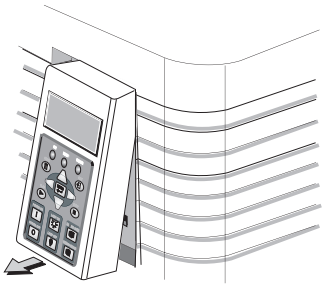


**Figure 2-2 Change Display Angle of CDP**

**To modify the CDP display angle:**

1. Place your hand under the bottom edge of the CDP and pull forward to the desired angle. Keep the back tab of the CDP fully engaged in the projector. See **Figure 2-2**.

**To remove the CDP for installation in another location:**

1. Grasp the CDP and slightly push it to one side. This creates a gap sufficient enough to release the CDP from the top mounting pin on that side. Then release the other side and pull forward to remove. See **Figure 2-3**.

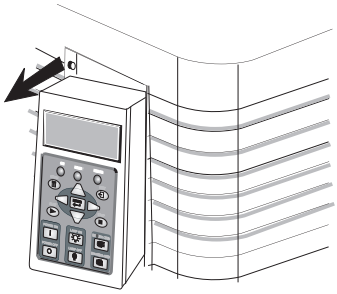


**Figure 2-3 Remove CDP**

2. When installing the CDP in a new location, be sure to keep the distance between the projector and the CDP within 6 ft (the max. length of the standard CDP harness). See **Figure 2-4**.

   **NOTE:** *An optional 25ft CDP harness kit is available if more length is required (P/N 108-283101-01).*

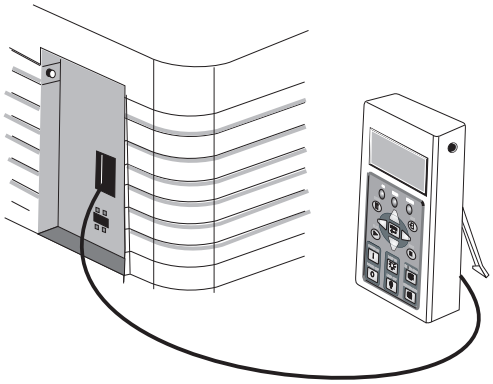


**Figure 2-4 CDP Mounting**

## STEP 5 - Connect Exhaust Ducting

The projector emits a constant stream of warm exhaust air, which must be vented to the outside of the building. Connect the pre-installed, outside-venting ductwork via the 8" inside diameter fireproof ducting material attached to the projector's top exit port. Confirm that 1) there are no obstructions or 'kinks" within the ducting, 2) all air intake areas of the projector are clear and exposed, 3) the vane switch at the exit duct is moving freely. The pre-installed outside-venting duct should be rigid at the projector and must also include a heat extractor/blower that maintains at least 450 CFM* when measured at the projector exhaust opening.

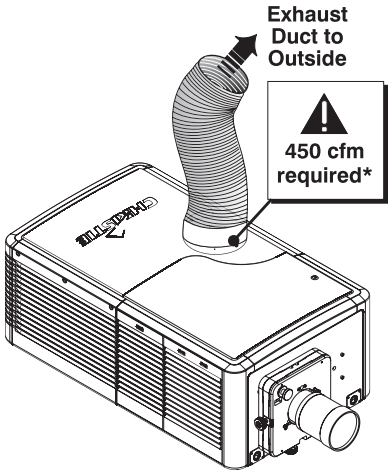



Figure 2-5 Connect Exhaust Ducting

**⚠ CAUTION * 600 CFM is required in projection rooms with ambient temperature above 25°C or elevation (above sea level) greater than 3000 feet.**

**⚠ WARNING At minimum, a 10" long, strong metal duct must be in place at the projector to prevent glass shards from exiting the duct in the event of a lamp explosion.**

**Calculating CFM in the 8" duct:** Use an airflow meter to measure the ft/min or ft/sec at the rigid end of the open duct that will connect to the projector. Make sure the measurement is taken right at the very end, without the projector connected. Then multiply the reading by the cross-sectional area of the 8" duct to calculate the cubic feet/min airflow. The formula is:

**Measured linear ft/min x 0.34 = CFM**

Calculations should show 450 CFM airflow in the 8" exhaust duct if operation is at 25°C or lower and installation is at or below 3000 feet altitude (above sea level). Add an extractor/boosters as needed for your site, as the vane switch will prevent the projector from operating if there is insufficient airflow. Do not mount the extractor on the projector as this may introduce some vibration into the image. **NOTE:** *If the duct becomes significantly blocked - or if a fan fails - the projector should trigger an alarm before becoming overheated or unsafe. Regardless, check airflow regularly.* **Caution!** *Never disable the vane switch. Attempting to operate the projector with inadequate airflow can result in dangerous overheating of the projector.*

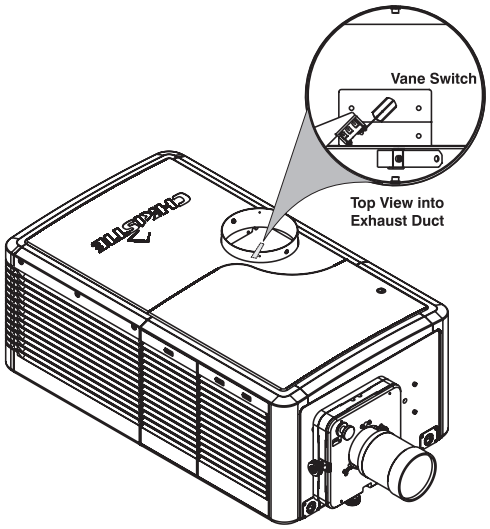



Figure 2-6 Exhaust Duct Vane Switch

## STEP 6 - Install Lens(es)

The lens seals the projector preventing contaminants from entering the area of the main front electronics. It is important a projector never be operated without a lens installed. The Motorized Lens Mount automates the adjustment of focus, horizontal/vertical offset and zoom for the primary lens.

***For Primary Zoom Lens Installation:***

1. Ensure the projector's rear safety strap is in place.
2. Turn the lens clamp to the OPEN position. See **Figure 2-7**.

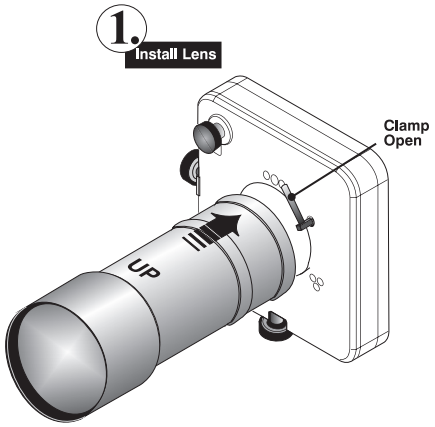



**Figure 2-7 Open Lens Clamp and Insert Lens**

3. Orient your high-contrast lens with its notches at the top. Fully insert the assembly straight into the lens mount opening without turning. When the lens is fully inserted, it will seat properly within the lens mount and the aperture will be oriented correctly. **NOTE:** *Insert a high-brightness lens in the same manner, with the UP label in the up position for consistency.*
4. Position the lens clamp DOWN to lock the lens assembly in place. See **Figure 2-8**.
5. Use of the optional lens safety strap is required if the projector is mounted in a high location where the lens could drop (if it becomes loose by vibrating) and cause physical injury. **NOTE:** *Use of this strap is optional if the projector is table-top mounted, but strongly recommended.*
6. Calibrate the lens. See *Section 2.7 Basic Image Alignment* for details.

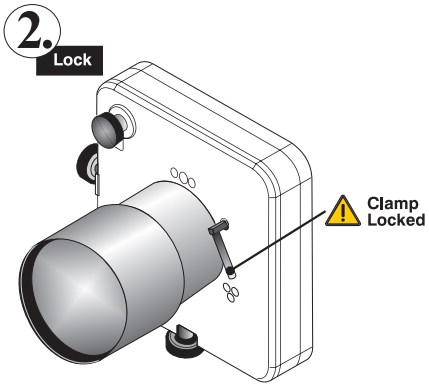



**Figure 2-8 Lock Lens In Place**

***For Auxiliary Lens Installation (Optional):***

To install a 1.26x Anamorphic lens or a 1.26x Wide Converter Lens (WCL) producing 2.39:1 "scope" images for large screens, install the auxiliary lens mount and lens to the projector using the hardware and instructions provided in the Auxiliary Lens Mount Kit (P/N 108-111101-02, P/N 108-111102-xx).

## STEP 7 - Install First Lamp

**⚠ DANGER Qualified technicians required! High-pressure lamp may explode if improperly handled. Always wear approved protective safety clothing whenever lamp door is open or while handling the lamp.**

1. **Open lamp door**

   Using the security key provided, open the lamp door and inspect the empty lamp cooling compartment. **Caution!** *Do not place heavy objects on the open lamp door.*

2. **Position anode yoke assembly according to lamp type**

   Check the position of the anode yoke assembly for the lamp type that will be used in the projector. **Table 2.1** lists all available lamp types for the CP2000-ZX and the position of the anode yoke assembly.

**Table 2.1 Lamp Types Available for CP2000-ZX and Anode Yoke Position**

| LAMP | TYPE | ANODE YOKE POSITION |
|---|---|---|
| 2.0 kW | CDXL-20 | Move the lamp cradle as far forward as possible (position closest to igniter) |
| 3.0 kW | CDXL-30 | Move the lamp cradle to the rear position, which is approximately 1” closer to the reflector. |
| 3.0 kW | CDXL-30SD (short arc) | |

3. **Install the lamp**. Refer to *Section 4.4 Replacing the Lamp* for lamp replacement instructions. Observe all warnings, and wear protective clothing and shielding.

**Important!** *The projector is shipped with a lamp extension nut fastened to the cathode end of the lamp holder. Use this nut with **CDXL-30SD** lamps only.* This will ensure proper placement of this lamp type. If you are installing any other lamp type, remove this nut and retain it for future lamp replacements. Leaving the extension nut on with the wrong lamp type can lead to extremely dim light output.

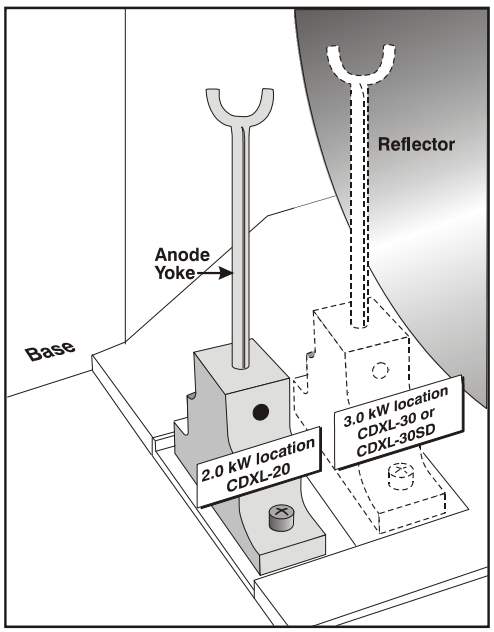



**Figure 2-9 Anode Yoke Location**

## STEP 8 - Connect to Power

CP2000-ZX is designed as a permanently wired connection **or** pluggable type B connection (P/N 116-102104-01). Connecting the projector to your AC supply can vary according to the country or state in which the projector is installed. For any installation, always follow the electrical code for your location.

**⚠ WARNING 1) Certified electrician required. 2) Ground (earth) connection is necessary for safety. Never compromise safety by returning the current through the ground. 3) Connect ground FIRST to reduce shock hazard from high leakage. 4) Protection from overcurrents, short circuits and earth faults must be part of the building installation. The disconnect device (double pole switch or circuit breaker with minimum 3mm contact gap) must be readily accessible within the projection room. 5) Do not use a wall breaker greater than 32SA.**

**⚠ CAUTION Use an appropriate strain relief connector on the AC supply cable to prevent the cable from rubbing against the projector knockout plate and becoming damaged.**

To install a permanent connection, refer to *Installing a Permanent Connection* below.

To install a Pluggable type B connection using a Nema-L630A 250V Power Plug, refer to *Installing a Pluggable Type B Connection.* below.

### Installing a Permanent Connection

Follow these guidelines:

- **A 30-32A double pole, UL listed wall circuit breaker is required**. It must be part of the building installation and easily accessible.
- Use 10AWG or 8AWG wiring: The distance between the wall circuit breaker and the projector must not exceed 20 metres using 10AWG cables or 30 metres using 8AWG cables.
- For North American installations, use at least 10AWG copper wires for the connection of the main AC supply to the projector's ground lug.
- Copper or aluminum are acceptable as conductor wiring material to the terminal block.

1. A small electrical access plate is located in the lower right corner of the projector faceplate. Loosen the two screws and slide the plate forward to expose the terminal block underneath. See **Figure 2-10**.

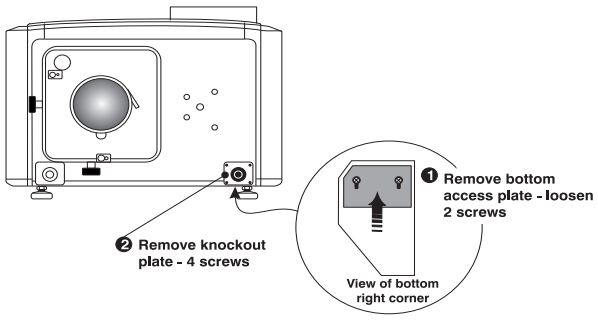



**Figure 2-10 Remove Access and Knockout Plates**

2. Remove the knockout plate located in the bottom right corner of the front bezel. The AC supply is routed to the terminal block through an appropriate strain relief mounted on this knockout plate.
3. Connect the AC power source to the terminal block, beginning with the ground lead first. See **Figure 2-11** for wiring details. Use an appropriately sized strain relief connector with the knockout plate provided to ensure adequate environmental sealing and to prevent the cables from wear and accidentally being torn out. **NOTES: 1)** *The terminal block accommodates up to an 8 AWG wire.* **2)** *If desired, a 90° strain relief connector can be used to route the power cable in a downward direction.*

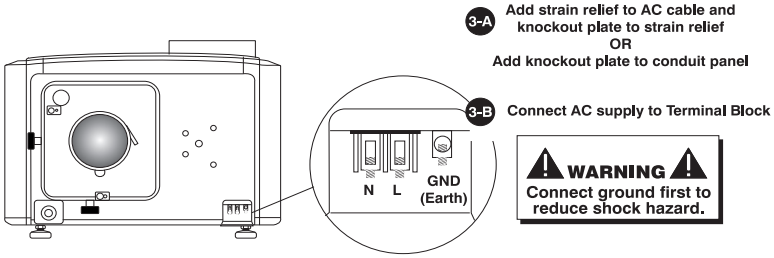



**Figure 2-11 Steps to Connect AC Power to Terminal Block**

4. Once all cables are connected, replace the knockout plate and the bottom access panel over the terminal block.

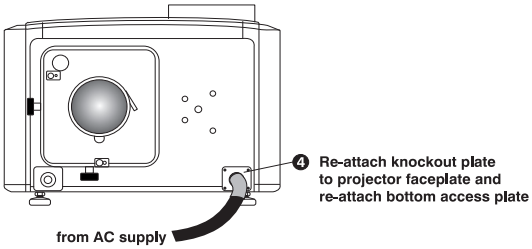



**Figure 2-12 Re-attach Knockout and Access Panel Plates**

## Installing a Pluggable Type B Connection

There must be easy access to the current protection device or breaker in the building. Follow these guidelines:

- ❒ Use 10AWG or 8AWG wiring: the distance between the wall circuit breaker and the projector must not exceed 20 metres using 10AWG cables or 30 metres using 8AWG cables.
- ❒ The socket-outlet is installed near the equipment and is easily accessible.
- ❒ The plug can be used as the device disconnect and is near the unit and easily accessible.

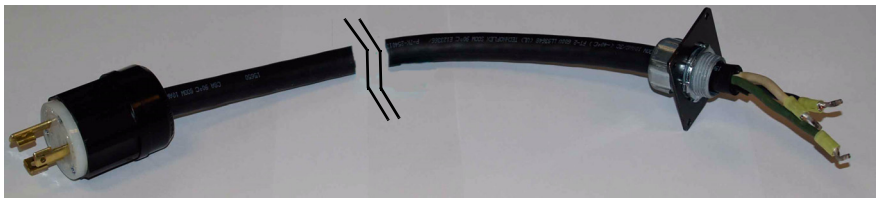


**Figure 2-13 Nema-L630A 250V Male Power Plug (116-102104-01) Actual Length 1.5 Meters**

1. A small electrical access plate is located in the lower right corner of the projector faceplate. Loosen the two screws and slide the plate forward to expose the terminal block underneath. See **Figure 2-14**.

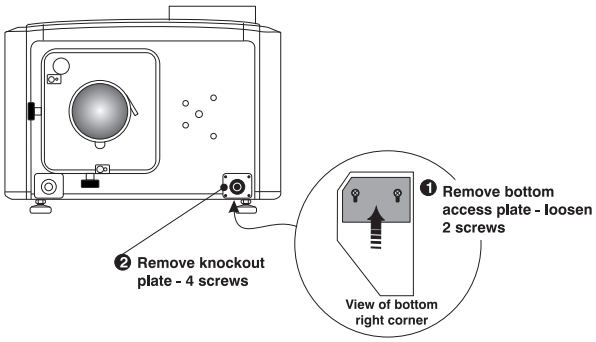



**Figure 2-14 Remove the Knockout Plate**

2. Remove the knockout plate (four screws) located in the bottom right corner of the front bezel.
3. Connect the AC power source to the terminal block, beginning with the ground lead first. See **Figure 2-15** for wiring details. Tighten screws securely.

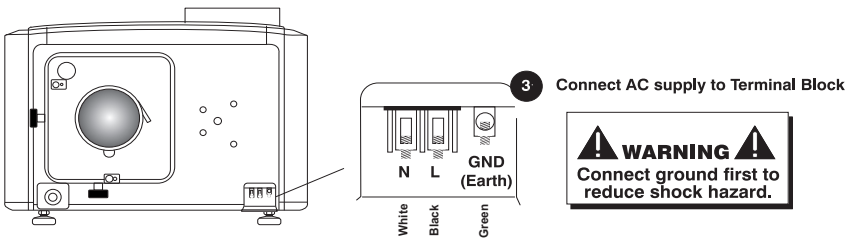



**Figure 2-15 Steps to Connect AC Power to Terminal Block**

4. Once all cables are connected, secure the knockout plate (four screws) and the bottom access panel (two screws) over the terminal block.

## STEP 9 - Connect Sources and Initial Power Up

Once the lamp is installed, the projector is essentially ready for operation. Although an image is not required at this time, it is recommended that external cinema servers and sources be connected. Refer to *Section 2.2 Connecting Sources*.

Before igniting the lamp for the first time, it is essential that you complete the following settings to ensure successful communication with the projector:

1. **Assign the projector with a unique IP address**. Each projector is given a default IP address, however if you are connecting the projector to an existing network you must give it a new IP address. For first time installations, assign the IP address in the **Configuration > Administrator** menu via the Control Display Panel (CDP). For more information on the CDP, refer to *Section 3.3 Using the Control Display Panel (CDP).*
2. **Set the baud rate**. In the CDP **Configuration** menu, set the baud rate to match the external device connected (such as a server). The projector's default baud rate is 9600 Kbps.
3. **Enter details of the lamp**. In the CDP **Lamp** menu, select **Lamp Change** and define the type of lamp installed, serial number and number of hours logged on the lamp (if any).
4. **Power-up the projector**. With all components installed and connected, power-up the projector as described in *Section 3.2.1 Powering Up the Projector*.
5. **Perform LampLOC™ alignment immediately on the newly installed lamp**. This ensures the lamp is positioned correctly to achieve maximum light output. Refer to *Section 2.5 Initial Power Up* for instructions.
6. **Perform initial optical alignment in order to optimize images displayed on screen**. These adjustments must be done before boresight adjustments. Refer to *Section 2.7 Basic Image Alignment* for instructions.
7. **Adjust optical components when needed**. In rare instances, the installer may have to adjust one or more optical components. Refer to *Section 2.9 Fold Mirror and Convergence Adjustments* for instructions.

## 2.2 Connecting Sources

Cinema servers, such as digital media storage devices or non-cinema sources such as PCs reside outside the projector and are connected to one of the ports on the Projector Control Module (PCM) located on the right hand side of the projector.

These communication ports are accessible by first removing the side access panel. When connecting sources or servers, route all cables along the channel ways located on the bottom of the projector and up through the opening in the frame to the communication connection port.

In most cases, it is recommended the access panel be replaced to ensure server and source connections remain secure. **NOTE: 1)** *To maintain radiated emissions compliance, do not connect I/0 cables to the projector without connecting the source or receiver at the other end.* **2)** *Right angle (75 Ohm) BNC adapters are provided which can be used when connecting to the 292A and 292B ports. This directs source cables downward and enables full closure of the PCM cover.*

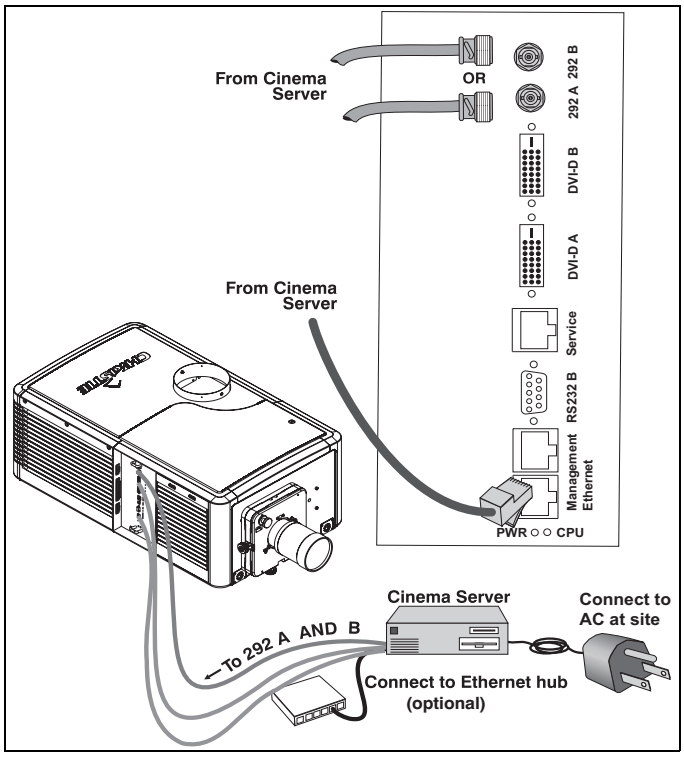



**Figure 2-16 Connecting an External Cinema Server/Source**

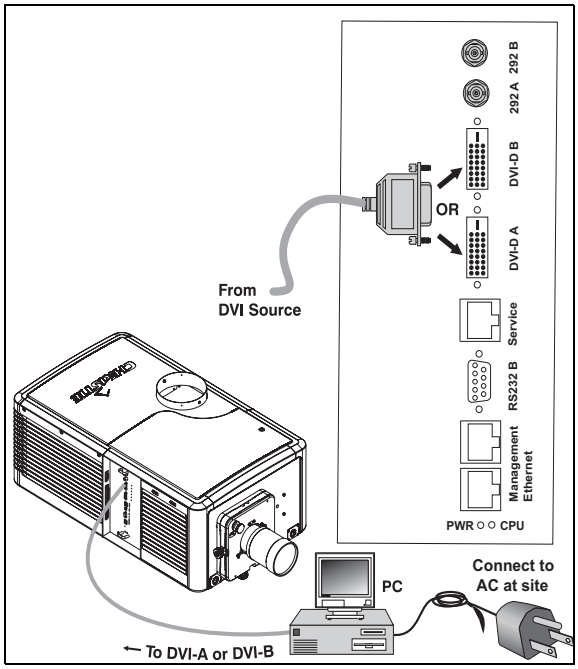



**Figure 2-16 Connecting Non-Cinema Servers/Sources**

## 2.2.1 Connecting for Communications

Many communications with the projector are initiated on the CDP controller, which is mounted at the rear of the projector. Depending on the installation, you may also need certain other serial and/or Ethernet links to the CP2000-ZX, such as from a server or PC functioning as a controller, or from an existing on-site network including other equipment. For applications or equipment utilizing serial communications, use the Christie-proprietary serial protocol to connect to the RS232 B port on the PCM (**Figure 2-17**). **Caution!** *The RS232 B port located on the PCM utilizes Christie-proprietary protocol and is intended for Christie accessories or automation controllers only. Do not connect other devices here.*

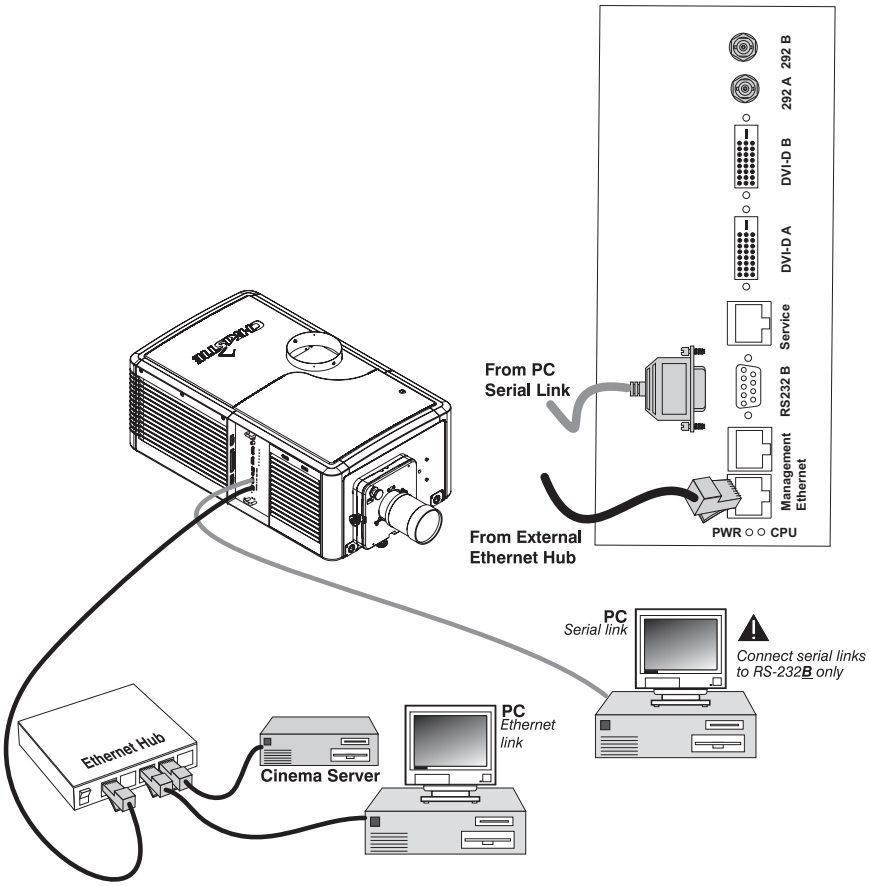



**Figure 2-17 Communication Links with Projector**

### Control Display Panel (CDP)

The CDP comes pre-installed and does not require further connection.

### PC/Laptop, Server or Network

To communicate with the projector from a computer, server or an existing network, connect the equipment to the Ethernet hub or switch at your site.

## 2.3 Re-wiring For Uninterruptible Power Supply (UPS)

**⚠ CAUTION Ensure power is disconnected before moving side panel.**

If the unit is to be configured for UPS backup of the Low Voltage Power Supply (LVPS) (and subsequently the electronics), rewiring is required.

1. Remove the plastic cover over the AC relay by pinching the top and bottom of the cover and removing it.
2. Using a #2 Phillips screwdriver, *loosen* terminal screws 4 & 8 on the AC Relay and remove the Blue and Brown wires coming from the LVPS. Leave the Black and White wires that lead into the base of the unit (main input wiring) attached.
3. Remove the UPS terminal block cover and loosen the LVPS L and N screws.
4. Take the Blue and Brown wires out of the L and N clips and re-route these wires to the UPS terminal block through the clip closest to it. Attach the Blue and Brown wires to the UPS terminal.
5. Take the Brown and Blue wires that were previously attached to the AC Relay and attach them to the LVPS terminal. Attach the Brown wire to the L terminal and the Blue wire to the N terminal as shown in **Figure 2-18**. Torque screws to 14 in/lbs. Use clips to secure wires. Reattach cover.
6. Remove the previously loosened screws of the AC Relay (terminals 4 & 8). Attach the unattached LED wires coming from the Ballast Power to the AC Relay terminals followed by Main Input wires. **NOTE:** *Order and orientation are important.*
   - Wire one LED terminal to the screw for terminal 4, followed by the White wire. Turn the terminals so that they are back-to-back with the White wire facing down and the L2 facing up.
   - Follow the same procedure for attaching the second LED lead and Black wire to terminal 8 of the relay.
7. Tighten to 14 in/lbs and reattach the plastic cover to the AC Relay.

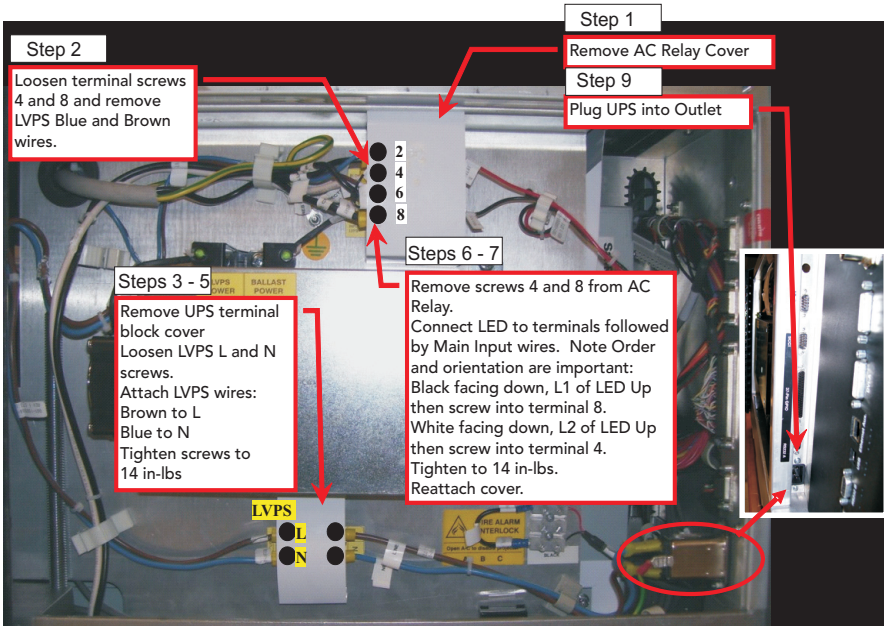



**Figure 2-18 Re-wiring for UPS**

8. Ensure the ground connection from the UPS input to the ground stud is secure.
9. Re-attach the side panel and plug an appropriate UPS that meets the required input specifications (refer to *Section 6.4.4 UPS Input*) into the IEC connector on the auxiliary panel.
10. Re-connect main power, turn on the UPS power and ensure that the projector operates normally.

## 2.4 Adjusting Tilt and Leveling

**⚠ WARNING Use of the supplied safety strap is MANDATORY to prevent the projector from tipping forward while being adjusted for tilt or when the optical auxiliary lens is installed.**

**⚠ CAUTION Disconnect the projector from the AC for these initial alignments. Images are not yet needed.**

For an ideal installation, the CP2000-ZX lens surface should be centered and parallel to the theatre screen. This orientation helps to ensure optimized lens performance with minimal offset. Choose a sturdy mounting surface that allows for this. If this position is not possible (such as when the projector is significantly higher than the center of the screen), it is better to rely on offset rather than extra tilt.

### 2.4.1 Adjusting Tilt

**Important!** *For best optical performance, avoid tilting the projector excessively. Use vertical offset of the lens instead.*

Check with theatre personnel for the degree of screen tilt or measure this incline with a protractor at the screen. Tilt the projector to match the screen tilt angle by extending or retracting the projector's four adjustable feet.

**NOTE:** *The front-to-back tilt of the projector must not exceed 15°. This limit ensures safe lamp operation and proper position of the liquid cooling reservoir in the projector.*

### 2.4.2 Adjusting Feet/Leveling

To adjust the height or level of the projector, extend or retract the adjustable feet located on the bottom of the projector by rotating them. Once the required adjustment is made, tighten the lock nut. See **Figure 2-19**. **NOTE:** *Make sure the projector's rear safety strap is in place before adjusting.*

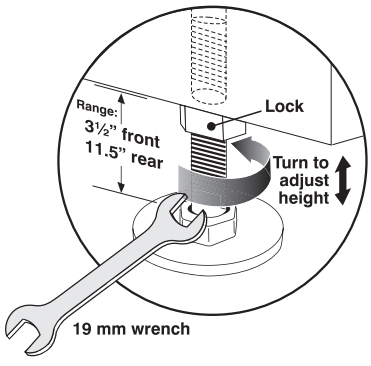



**Figure 2-19 Adjust Feet**

### 2.4.3 Carrying/Moving the Projector

**⚠ WARNING *Four or more people are required to safely lift and hand-carry one projection head a short distance.* It is strongly recommended the projector be kept as level as possible when carrying up stairs or lifting it onto a table.**

**⚠ CAUTION *Keep the projector as level as possible when lifting or carrying the projector. Avoid tilting the projector on the right side. This can introduce an air bubble within the coolant hoses that can lead to an air lock.***

## 2.5 Initial Power Up

This is a manual power-up procedure. Some cinema installations may include an automation system that controls lamp ignition in conjunction with other theatre variables such as house lights, audio and the start of the feature from a digital media storage device/server. **Warning!** *Do not attempt operation if the AC supply is not within the specified voltage range.*

1. Ensure the projector's wall circuit breaker is ON. The "Ready" status LED will illuminate in solid yellow.
2. On the CDP, press **POWER ON** to fully power up the projector in preparation for igniting the lamp, which takes approximately 2 minutes. **NOTE***: If "lamp on" is selected while the projector is still in Standby mode, the power will be turned on before the lamp.*
3. On the CDP, press **LAMP ON** to ignite the lamp. The "On" status LED will illuminate green and begin flashing slowly until the lamp is ignited, then it turns solid. The "Ready" status LED will turn off when the lamp is ON.

**If the lamp fails to ignite:**

- If a safety interlock switch is open (i.e., lamp door is open), the lamp cannot be struck until the interlock problem is resolved. The "Error" LED will illuminate in red and flash.
- If the lamp fails to ignite even though the interlock system is ok, the projector will automatically re-try ignition using 100% of the maximum power acceptable for the installed lamp. If this re-try fails, a new lamp is likely required.

## 2.6 Maximizing Light Output

To ensure optimal operation and peak screen brightness, activate LampLOC™ to adjust the lamp position whenever a new lamp is installed in the projector. Once LampLOC™ adjustment is complete, the lamp will be well-centered and distanced correctly from the remainder of the illumination system.

Before adjusting LampLOC™, ensure the following criteria are met:

- ❒ The lamp is installed with the anode yoke in the correct location for the lamp type. Refer to **Figure 2-9**.
- ❒ The correct use of the lamp extension nut with CDXL-30SD lamps is met. **NOTE:** *This nut must be removed if you're not using a CDXL-30SD lamp.*
- ❒ The lamp must be on and the douser (shutter) is opened during adjustment.
- ❒ Perform a white test pattern. This is recommended to allow you to view LampLOC™ progress on screen.

To automatically adjust LampLOC™, do the following:

1. From the CDP, select **Lamp > LampLOC** > **LampLOC Auto**.

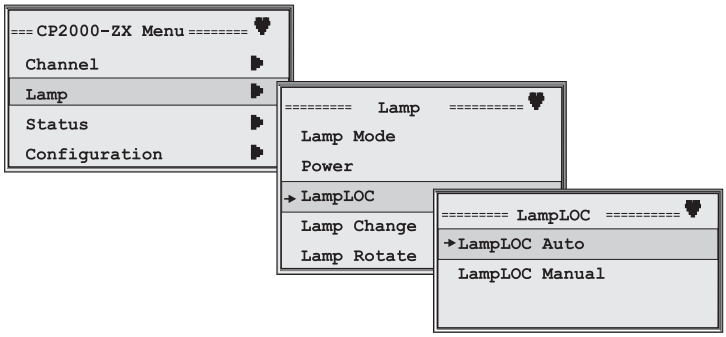



**Figure 2-20 Adjusting LampLOC™ From CDP Menu**

2. Let a few minutes pass to allow the LampLOC™ mechanism to establish the best lamp position and optimize the light output. You will see 100% displayed on the screen when the operation is complete.
   **NOTE:** *LampLOC™ can also be adjusted manually using the Lamp > LampLOC > LampLOC Manual menu option in the CDP, or Advanced: Lamp menu from the web user interface. For more details, refer to* *Advanced: Lamp Menu, on page 3-33.*

## 2.6.1 Calibrating Screen Brightness (fL)

In order to determine the screen brightness in footlamberts (fL), you must measure the screen brightness at both extremes of the lamp power (minimum and maximum) for a given lamp type and record these two readings in the **Admin: Lamp** menu in the web user interface. See **Figure 2-21**. These measurements establish a range (stored in memory) from which the projector can interpolate all other lamp power settings by converting them to approximate footlamberts for display in the menus. Repeat the calibration if you switch to a different lamp type/size.

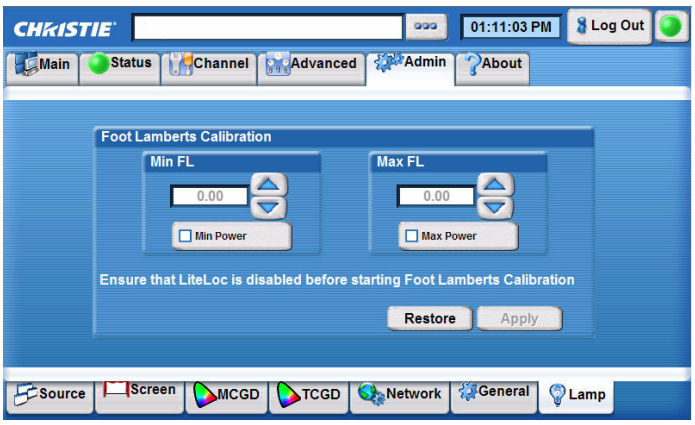



**Figure 2-21 Calibrating Screen Brightness Via Web UI**

## 2.7 Basic Image Alignment

**NOTE:** *Assumes projector is fully assembled and powered up in its final location.*

This procedure ensures that the image reflected from the DMDs is parallel to and well-centered with the lens and screen. This initial optical alignment is the foundation for optimizing images on the screen and must be completed before final boresight adjustments. To save the focus, offset and zoom settings to the channel, you must make the adjustments using the motorized lens mount adjustment features from the **Lens Control** menu in the CDP or via one of two menus from the Web UI - the **ILS** screen launched from the **Main** menu or the **Channel: Lens** menu. Using the knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary use and will therefore be lost once the channel changes. Ensure the CP2000-ZX is properly positioned relative to the screen before you begin.

### 2.7.1 Basic Optical Alignment Procedure

1. Display a good test pattern appropriate for analyzing image focus and geometry, such as the "framing" test pattern showing the crosshair centered across the image.
2. **Course focus:** Do a quick preliminary focus and (if available) zoom adjustment with the primary lens only (Refer to *Section 3.7 Working with the Lenses*). Do not worry about consistency across the image at this point, just center focus.
3. **Center the image in the lens:** Holding a piece of paper at the lens surface, adjust the offsets as necessary until the image is centered within the lens perimeter. A full white field works best for this.
4. **Re-check side-to-side leveling:** With the framing pattern on screen, double-check projector leveling (refer to *Section 2.4 Adjusting Tilt and Leveling*) so the ***top edge*** of the image is parallel to the top edge of the screen.

## 2.8 Offset and Boresight Alignment

To ensure proper offset for your site and consistently good focus in all areas of the screen, a primary lens must be installed and its lens mount precisely adjusted in relation to internal optics as described below. If desired, an auxiliary lens can then be added to widen images for scope cinema displays. **Warning! 1)** *If the Motorized Auxiliary Lens Mount (MALM) is present, ensure to move the MALM to the OUT position before performing any lens calibrate or reset functions on the Motorized Primary Lens Mount to prevent collision between the projection lens and the MALM.* **2)** *Hazardous moving parts. Keep fingers and other body parts away.* **NOTES: 1)** *Projector must be fully assembled and powered up in its final location.* **2)** *Keep clear of rotating parts. Remotely operated motors may start to spin without warning.* **3)** *Avoid long hair, jewelry, and loose clothing exposure to the knobs during manual adjustment.* **4)** *In case of emergency, unplug the line cord to immediately halt movement of the lens mount.*

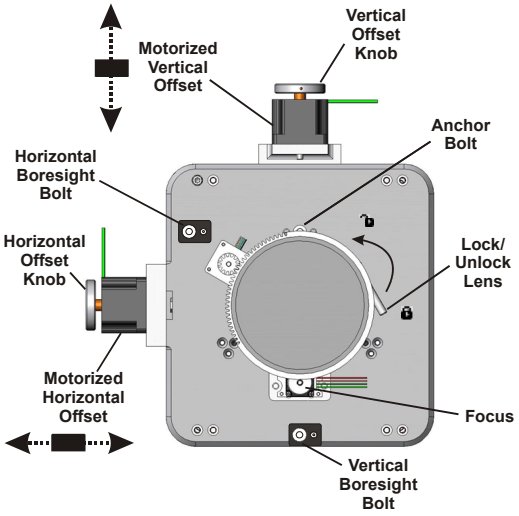



**Figure 2-22 Anatomy of the Lens Mount**

### 2.8.1 Adjust Offset

Project an image with the **primary lens only.** Always adjust offset before boresight. **Important!** *Ensure the correct lens is selected in the **Advanced: Lens** menu before calibration to ensure you will remain within the applicable boundary of the installed lens.* **NOTE***: When adjusting the Focus, Offset, and Zoom, you may experience a slight delay in the response rate of the lens upon selecting the buttons.*

1. From the **Main** menu, click **ILS**.
2. Ensure **Automatic ILS** is selected. See **Figure 2-23**. **NOTE**: *Enabling **Automatic ILS** will over-write the pre-defined settings for this channel. To perform a temporary lens adjustment, uncheck **Automatic ILS** and adjust the lens by clicking the necessary buttons or manually adjusting the focus, offset, and/or zoom knobs. All temporary adjustments will be lost when **Automatic ILS** is selected again or if the channel changes.*
3. Using the framing test pattern, adjust the **Offset** by clicking the up/down/left/right buttons on the ILS menu (**Figure 2-23**) as necessary to display a square image on the screen. **NOTES: 1)** *You can also hold the buttons down for continuous movement. A pending status message appears on screen until the changes have been applied.* **2)** *For best optical performance, make sure to minimize keystone error by using offset more than aiming to center the image in off axis installations.* **3)** *Avoid extreme tilts or offsets. Corner vignettes on a white test pattern indicates extreme offset that should be avoided using mechanical alignment.*

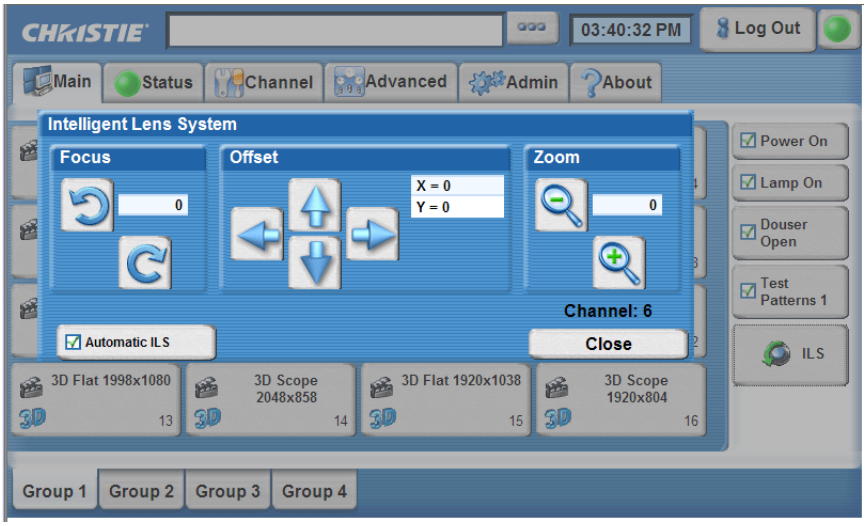



**Figure 2-23 Intelligent Lens System**

### 2.8.2 Adjusting Left/Right Boresight

The goal for left/right boresight alignment is to adjust the lens mount until both sides of the image focus on the screen simultaneously. Projectors are aligned properly at the factory, but due to mechanical tolerances in the alignment between the projector and the screen, the left and right sides of the image come into focus at different times. By focusing on the left side of the screen, we need to determine if the right side of the image focuses in front or behind the screen relative to the left side. **NOTE**: *Use a test pattern with a single pixel vertical and horizontal line and perimeter frame such as DC2K Framing or RGB Alignment.*

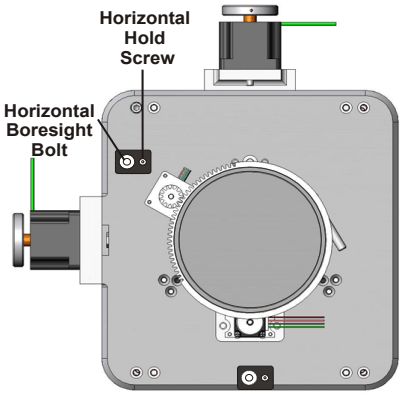



**Figure 2-24 Horizontal Boresight**

1. The Horizontal Hold Screw acts as counter-resistance to hold the lens mount in place once set. Before adjusting the boresight, loosen the **Horizontal Hold Screw**. See **Figure 2-24.**
2. Extend the lens focus completely.
3. Adjust the **Focus** to retract the lens using the counter-clockwise button on the **ILS** screen (**Figure 2-25**). Watch the image at the left edge of the screen until it comes into focus. If the image appears well-focused on the left edge but not on the right, we need to determine if the right side focuses in front of or behind the screen. If the entire screen come into focus, skip to step 7.

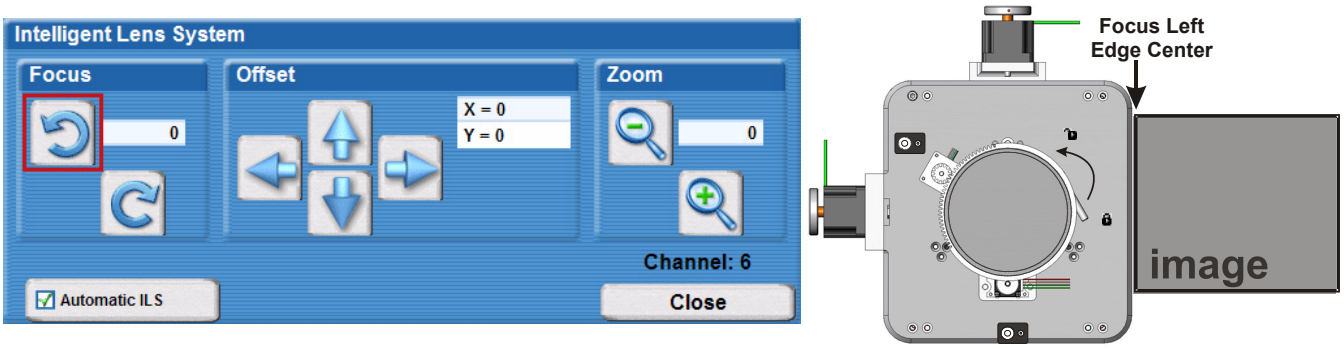



**Figure 2-25 Adjust Focus**

4. Continue retracting the lens.
   a. If the right side of the image comes into focus before the lens is completely retracted, then the image focuses in front of the screen. See **Figure 2-26.** To correct this problem, adjust the **Horizontal Boresight Bolt** to direct or aim the lens mount towards the LEFT to balance out the left/right edges. See **Figure 2-24**.
   b. If the right side of the image fails to come into focus then the image focuses behind the screen. To correct this problem, direct the lens mount to the RIGHT by adjusting the **Horizontal Boresight Bolt** accordingly.

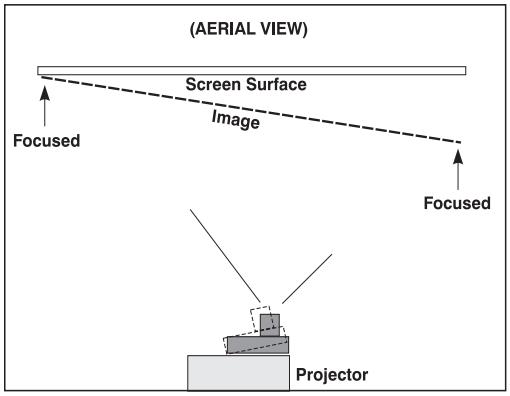



**Figure 2-26 Aerial View Illustrating Misaligned Boresight**

5. When both sides appear equally blurry, adjust the **Offset** by clicking the up/down/left/right buttons on the **ILS** menu to re-center the image on the screen.
6. Repeat Steps 1 - 5 until both sides of the image are well focused.
7. Adjust the **Horizontal Hold Screw** to lock adjustments in place. Check boresight again. See **Figure 2-24**.

## 2.8.3 Adjust Top/Bottom Boresight

When the horizontal boresight is complete, focus the image at the top edge of the screen.

1. Loosen the **Vertical Hold Screw**. See **Figure 2-27**.
2. Extend the lens focus completely.
3. Adjust the **Focus** to retract the lens using the counter-clockwise button on the **ILS** screen.Watch the image at the top edge of the screen until it comes into focus. If the image appears well-focused on the top edge but not on the bottom, we need to determine if the bottom edge focuses in front of or behind the screen. If the entire screen come into focus, skip to step 8.
4. Continue retracting the lens.
   a. If the bottom edge of the image comes into focus before the lens is completely retracted, then the image focuses in front of the screen. To correct this problem, adjust the **Vertical Boresight Bolt** to direct or aim the lens mount UP towards the top of the screen to balance out the top/bottom edges.
   b. If the top edge of the image fails to come into focus then the image focuses behind the screen.To correct this problem, adjust the **Vertical Boresight Bolt** to direct or aim the lens mount DOWN towards the bottom of the screen.
5. When both sides appear equally blurry, adjust the **Offset** by clicking the up/down/left/right buttons on the **ILS** screen to re-center the image on the screen.
6. Repeat Steps 2 - 5 until the top and bottom of the screen are both well-focused.
7. **Refocus:** Although all sides of the image should now be in focus, the center of the image may be slightly blurry at this point. Re-focus the center of the image. The goal is for good focus at the center and on all sides.
8. Adjust the **Vertical Hold Screw** to lock the lens mount in place and check boresight again (**Figure 2-27**).

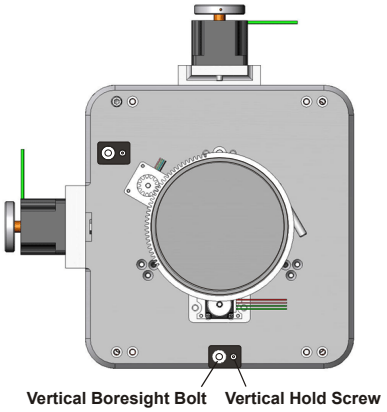



**Figure 2-27 Vertical Boresight**

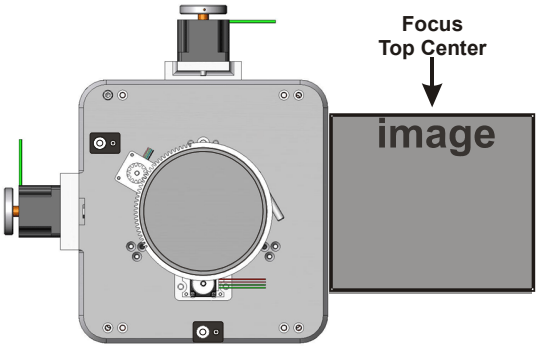



**Figure 2-28 Adjust Vertical Boresight**

For more information on ILS and channel setups, refer to *Section Channel: Lens Menu, on page 3-30*.

## 2.8.4 Copy the Channel Settings To Another Channel

Once the basic image alignment for a channel is complete, you can copy this setting between channels.

- From the **Channel: Lens** menu, use the drop-down menu to select a particular channel and click **Copy** for the changes to affect the selected channel. Repeat for every channel that requires the same ILS values.

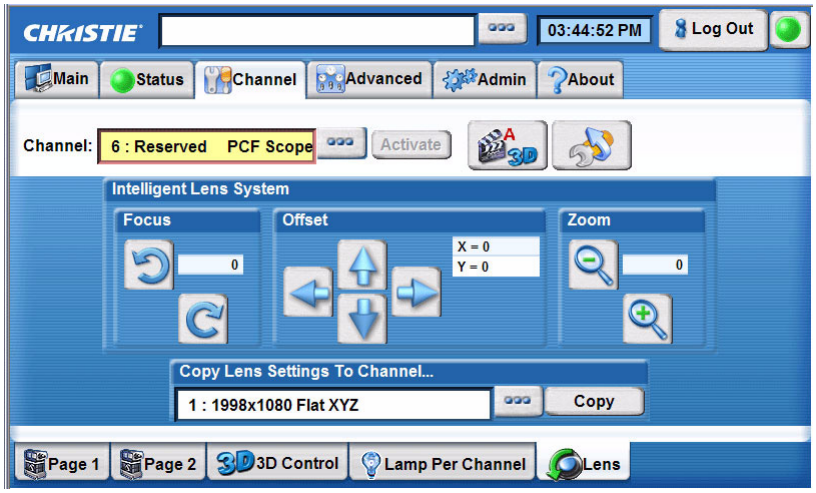



**Figure 2-29 Copy Channel Settings**

## 2.8.5 Add Anamorphic Lens

1. Install the Auxiliary Lens Mount according to instructions provided in the kit. Make sure to optimize your primary lens first for best optical alignment, offset and boresight.
2. **Image geometry distortion:** Loosen the holding clamp on the auxiliary lens mount. Adjust the rotation of the anamorphic lens so the image remains perfectly square with anamorphic in and out.
3. **Image shift:** Adjust the location of the anamorphic lens so that the image does not shift left or right with the anamorphic lens in and out.
4. **Vignetting:** Adjust the location of the anamorphic lens so the image passes through the center as much as possible without vignetting, reducing side or corner brightness, especially in wide angle projection.
5. **Focus primary lens:** With the anamorphic lens **not** in place, re-focus the primary lens using the **FOCUS** knob. The goal is for good focus at the center and on all sides. Now add the anamorphic lens and check focus again.
6. **Focus anamorphic lens:** If center-to-edge horizontal focus in the image needs improvement, focus the anamorphic lens by rotating its focus barrel as needed.

## 2.8.6 Wide Converter Lens

1. Install the Auxiliary Lens Mount and Wide Converter Lens (WCL) according to instructions provided in the kit. Make sure to optimize your primary lens first for best optical alignment, offset and boresight.
2. **Image shift:** Adjust the vertical and horizontal position of the WCL to align it with the already adjusted prime lens.
3. **Pitch Adjustment:** Adjust pitch, either up or down to equalize the top and bottom clearance to the prime lens barrel.
4. **Yaw Adjustment:** Adjust yaw to make the clearance between both lens barrels equal from side-to-side.

## 2.9 Fold Mirror and Convergence Adjustments

In rare instances, shipping and handling may affect the precise factory alignments of one or more optical components. As a final step of installation, the installer may have to adjust the fold mirror and/or convergence of the DMDs.

### 2.9.1 DMD Convergence

A convergence problem is evident when one or more projected colors (red/green/blue) appears mis-aligned when examined with a proper convergence test pattern. Normally, the three colors should overlap precisely to form pure white lines throughout the image. One or more poorly converged individual colors may appear adjacent to some of the lines. Qualified service technicians can correct the problem by following the instructions on the color label provided on the inside of the front top lid.

### 2.9.2 Fold Mirror Adjustment

If a corner or edge of the image is missing (after prime lens offset is ruled out), this may indicate the fold mirror has become misaligned with the rest of the optical system, resulting in cropping of data. To correct this issue, use the two adjustment screws that are accessible through the base of the projector. See **Figure 2-30**.

- To raise or lower the image, adjust the screw closest to the operator's side (right side, when facing screen).
- To move the image left or right, adjust the screw furthest from the operator's side.

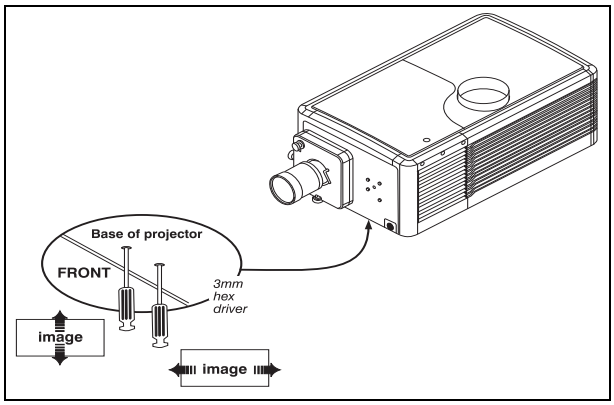



**Figure 2-30 Fold Mirror Adjustment**

## 2.10 Calibrating the System

It is recommended to use the web user interface for calibrating the image color performance and defining electronic screen masking. This is required in your particular installation for creating individual Projector Configuration Files (PCFs) and specific source files necessary for proper display of incoming material. Through the web user interface, you can also define the system/network configuration for communication links to the projector and transmit information to and from the CP2000-ZX via an Ethernet or RS-232 connection.

### 2.10.1 Color Calibration

After the CP2000-ZX is installed and all components are mechanically aligned for optimized light output and geometry, its electronic system processing must be *calibrated* to ensure accurate color display in the new environment. In this one-time global calibration, the installer measures initial colors at the screen from the center of the viewing audience location, also called SMPTE seats, and enters this data—called **Measured Color Gamut Data (MCGD)**—into the web user interface. The software then calculates precise corrections needed for regaining the desired color performance—called **Target Color Gamut Data (TCGD)**—and essentially compensates for the type of port window (if present), screen, lens, light output, ambient light and other current environmental factors that affect color performance. Results are defined in a file, activated, and downloaded to the projector memory to be used as a basis for all future displays.

If there are changes to the environment in the future (for example, a new screen is installed), the CP2000-ZX should be re-calibrated. Also note that correction for proper color balance sometimes reduces overall light output.

**NOTE:** *Onsite MCGD files are not provided with the projector and must be created by the installer. Multiple gamut files can be saved for use in different situations, such as when an auxiliary lens is swapped on and off the projector. These saved gamut files are accessible from the* ***Channel: Page 2*** *menu on the web user interface or from the* ***Edit Channel: Measured Color*** *submenu using the CDP.*

## 2.10.2 Electronic Screen Masking

Image edge blanking can be corrected using the masking tool for precision cropping in the web user interface **Admin: Screen** menu. The effect is similar to aperture plate filing typically done for correcting images from film projectors. **NOTE:** *Masking adjustments are global. Multiple screen formats can be saved for use with various sources. These saved screen formats are selectable from the* **Channel: Edit Channel** *in the web UI or the* ***Edit Channel: Screen Format*** *using the CDP.*

## 2.10.3 Projector Configuration Files (PCFs)

Numerous settings collected into a single Projector Configuration File (PCF) further control processing variables for optimized display of specific source material. Each PCF pre-defines color space, target color gamut, source aspect ratio (resolution), and gamma settings for a cinema or non-cinema source. Once the collected settings are downloaded to the projector's internal memory, their PCF can be assigned to the corresponding CP2000-ZX input connection and quickly applied by selecting it either from the CDP **Channel > PCF File** option or through the web user interface **Admin: Page 2** menu. No further adjustment in processing should be required. **NOTE:** *Scope and Flat files must be created by the installer since they are not provided with the projector.* Additionally, if the projector is to be set up for 3D operation, 3DFlat and 3DScope files must also be created.

# 3 Operation

This section describes how to use controls and switches for basic operation of the projector once it is properly installed, aligned and configured by a qualified service technician. **NOTE:** *These illustrations provided are to enhance the understanding of the written material and may not represent your exact projector model.*


- *3.1 About Projector Components*
- *3.2 Powering Up/Powering Down the Projector*
- *3.3 Using the Control Display Panel (CDP)*
- *3.4 Using the Web User Interface*
- *3.5 Upgrading and Downgrading Software*
- *3.6 Working with the Lamp*
- *3.7 Working with the Lenses*
- *3.8 Working with 3D*
- *3.9 Cinema Operation*
- *3.10 Non-Cinema Operation*

# 3.1 About Projector Components

## 3.1.1 Air Filter

Intake air flows through the filter before circulating in the front compartment to cool the main electronics. Replace the air filter whenever the lamp is replaced - or sooner in dusty/dirty environments. Check the condition monthly. Refer to *Section 4.5 Replacing the Filter* for complete instructions.

## 3.1.2 Control Display Panel (CDP)

The CDP is conveniently mounted to the rear of the projector to provide local control of the projector. It's simple, adjustable snap-on-mount allows it to be removed and mounted to other locations on or off the projector; whatever suits the current projector application.

With an easy-to-read 4-line backlit character display, color coded LED status indicators and menu navigation buttons, the CDP provides the user with instant information on the projector's current status, and allows the user to perform such tasks as turning the lamp ON or OFF, selecting a source and optimizing various source settings.

Navigation and control of the projector is provided later in this section.

## 3.1.3 Douser

Use the douser control buttons on the CDP to blank the display for instant picture muting. Closing the douser rotates a shutter blade in front of the illumination system and reduces lamp power to 2kW, if above this value, to conserve lamp life.

## 3.1.4 Exhaust Duct

Located at the top of the projector is an exit port where warm air from the projector is exhausted. Connect the projector's 8" top exhaust opening to an outside heat extraction system with at least 10" of the last portion of the duct in rigid metal at the projector. The duct will also need a heat extractor providing at least 450 CFM* airflow at the projector exhaust opening. Refer to *Section 3 Operation*.

**⚠ CAUTION * In non-climate controlled projection rooms of 25°C or warmer, or above 3000 feet altitude (above sea level), 600 CFM is required.**

## 3.1.5 Adjustable Leveling Feet

For most cinema installations, the projector is inclined slightly forward to match screen tilt and to minimize the amount of vertical offset required. Turn the adjustable feet to increase or decrease the projector height as needed for proper leveling and/or slight tilt. Refer to *Section 2.4.2 Adjusting Feet/Leveling.*

### 3.1.6 Lamps

The CP2000-ZX can be used with either a 2.0kW or 3.0kW lamp, which is located on the non-operator's side of the projector (right side).

**Table 3.1 Lamp Type**

| Type | Description |
|---|---|
| 2.0 kW | CDXL-20 |
| 3.0 kW | CDXL-30 |
| 3.0 kW | CDXL-30SD |

The lamp door must remain closed and locked for all normal operation. Only trained operators can access the lamp via a security key.

### 3.1.7 Lens Mount and Motorized Auxiliary Lens Mount

The lens mount secures and seals a primary zoom lens within the projector and provides automatic adjustments of focus, zoom and offset. Adjacent to the primary mount is an optional auxiliary lens mount that may be added providing for positioning a 1.25x Anamorphic lens or a 1.26x Wide Converter lens in front of the primary lens. The Wide Converter lens "zooms" the image from flat to scope image formats. The Anamorphic lens horizontally spreads the image back into its wider 2.39:1 "scope" image and is most typically used in side-masking theatres or on larger screen sizes.

### 3.1.8 Security Locks

Critical internal components and/or connections are protected by various security locks on projector covers/access panels. The projector's panels cannot be removed with standard tools unless the key locks are open. This safeguard enables only authorized personnel to access and service components in these restricted areas.

Panels with high-security lock: Front Optical Access Panel (top)

Panels with mid-security lock: Lamp Door

No locks: Air Filter Access Panel, Projector Control Module Input Panel

### 3.1.9 Source and Communication Panel

Projector Control Module (PCM) located on the right hand side of the projector. Located on the operator's side of the projector (left side) is a communication panel that provides connection of external devices such as servers and a controller. The eight ports on the panel include:

- **292 A** and **292 B** - Connect a variety of high-definition cinema sources to these SMPTE 292M bit-serial standard interface BNCs. **NOTE***: Use the right angle BNC connectors provided when connecting to these ports. This allows the communication access panel to close.*
- **DVI-D A** and **DVI-D B ports** - Connect a variety of non-cinema video and graphics sources to either of these identical single-link DVI ports. These are single-link ports for single-link cables/connectors only. Using this dual-link pair of ports requires a special adapter.
- **Service** - Ethernet port to be used only by Service personnel.
- **RS232 B -** Utilizes Christie-proprietary protocol and is intended for Christie accessories or automation controllers only.

- **Management Ethernet**- Connect to this 10/100 Ethernet port for control, key management, subtitles, etc. Since both ports are part of an Ethernet switch, each port can be used interchangeably or two devices can be connected simultaneously. The IP address of the projector can be found from the CDP under **Status** > **Config Status** > **Mgmt IP address**.
- **PWR -** A solid green LED indicates that main power for the projector is on. **NOTE**: *Does not indicate standby power.*
- **CPU** - Blinking green LED indicates the CPU is running. It should be blinking when in standby power and when main power is on.
- **Reset** - Use a bent paper clip to reset the PCM via the pin hole. If you reboot with the Lamp ON, resetting the PCM keeps the Lamp ON, Fans ON, and the content may or may not continue playing depending on the time it takes to reboot. Used only by Service personnel.

### 3.1.10 Auxiliary Panel

Located next to the main communication panel is an auxiliary panel that provides connection of external devices. The three ports on the panel include:

- **SCCI** - A Simple Contact Closure Interface (SCCI) port that provides the following functions upon a simple dry contact closure: Power On/Off, Lamp On/Off and Douser Open/Closed. Refer to *Appendix B: SCCI Port* for SCCI pinouts.
- **37-Pin GPIO** - Connect external I/O devices, such as the Christie Automation Controller Theatre, for remote control of a limited number of projector functions. Refer to *Appendix C: GPIO* for GPIO pinouts.
- **RS232 A** - Connect a PC or laptop for direct DLP communication. Trained users required.

## 3.2 Powering Up/Powering Down the Projector

### 3.2.1 Powering Up the Projector

This is a manual power-up procedure. Some cinema installations may include an automation system that controls lamp ignition in conjunction with other theatre variables such as house lights, audio and the start of the feature from a digital media storage device/server. **Warning!** *Do not attempt operation if the AC supply is not within the specified voltage range.*

1. Ensure the projector's wall circuit breaker is ON. The "Ready" status LED will illuminate in solid yellow.
2. On the CDP, press **POWER ON** to fully power up the projector in preparation for igniting the lamp, which takes approximately 2 minutes. **NOTE***: If "lamp on" is selected while the projector is still in Standby mode, the power will be turned on before the lamp.*
3. On the CDP, press **LAMP ON** to ignite the lamp. The "On" status LED will illuminate green and begin flashing slowly until the lamp is ignited, then it turns solid. The "Ready" status LED will turn off when the lamp is ON.

#### If the lamp fails to ignite:

- If a safety interlock switch is open (i.e., lamp door is open), the lamp cannot be struck until the interlock problem is resolved. The "Error" LED will illuminate in red and flash.
- If the lamp fails to ignite even though the interlock system is ok, the projector will automatically re-try ignition using 100% of the maximum power acceptable for the installed lamp. If this re-try fails, a new lamp is likely required.

### 3.2.2 Powering Down the Projector

1. On the CDP, press **LAMP OFF**. **NOTE**: *The projector is still in "power on" mode, which allows for a fast lamp on response, if needed.*
2. On the CDP, press **POWER OFF**. The lamp will power off first and then the projector automatically enters a cool down mode where the fans and electronics stay on for 15 minutes. After this cool down period, the projector enters standby mode and all fans and most electronics will power down.
3. If you will be servicing or removing any projector cover, disconnect AC.

### 3.2.3 Projector Power States

The following table identifies what occurs when the CDP's Power and Lamp keys are selected during any of the projector's four main power states. Refer to **Table 3.2**.

**Table 3.2 Projector Status when any CDP Lamp or Power Key Selected**

| | | Projector's Current State: | | | |
|---|---|---|---|---|---|
| | | **Standby Power Mode** | **Power On / Lamp Off** | **Power On / Lamp On** | **Cooling Down Mode** |
| **CDP Key Pressed** | **Power On** | To full power ON (boot delay) | No action | No action | Cancels cool down, goes into full power |
| | **Power Off** | No action | Power OFF immediately | To cool down mode | No action |
| | **Lamp On** | To power ON and lamp ON (boot delay) | To lamp ON (immediately) | No action | To lamp ON (immediately) |
| | **Lamp Off** | No action | No action | Lamp OFF (immediately) | No action |

**NOTES**: **1)** *The green status LED flashes while the yellow LED is on steady during "Boot Delay".* **2)** *Both green and yellow status LEDs flash during cool down.* **3)** *To ensure activation of the CDP Power or Lamp buttons, press firmly for 1/2 second.*

#### Fast Boot Mode

There are two ways to initiate fast boot mode:

1. When the projector boots up, the CDP shows the failsafe signal where all 3 LEDs flash 3 times. After about 25 seconds, the greed LED labeled "ON" will flash 3 times. Push and hold the **Power On** button while the ON LED is flashing turns both TI and the Lamp ON.
2. The projector saves the last power status in flash memory. If the power goes off while the projector is in Full Power or Lamp ON mode, the software will automatically put the projector in Full Power mode when it boots up again where everything is turned on except the lamp.

Fast boot mode can speed up about one minute of the projector startup time.

#### Fast Cool Mode

During cooling down mode, pressing the POWER OFF button 3 times will set the projector to standby mode. This feature allows you to quickly shut down the projector. It is not recommended unless the projector needs to be shut down immediately.

## 3.3 Using the Control Display Panel (CDP)

The CDP provides fast and easy local operation and monitoring of various projector functions. It is located on the back panel of the projector, but for convenience can be removed and installed in an alternate location in the projection room. **NOTES: 1)** *Do not use the CDP as a handheld remote. It is designed for fixed installation only.* **2)** *An optional 25ft extension cable kit (P/N 108-283101-01) is available to allow installation of the CDP in another location.*

In most cases, the CDP will be the primary interface with the projector. For more sophisticated setup and diagnostic controls, refer to *Section 3.4 Using the Web User Interface.*

### 3.3.1 CDP Key Descriptions

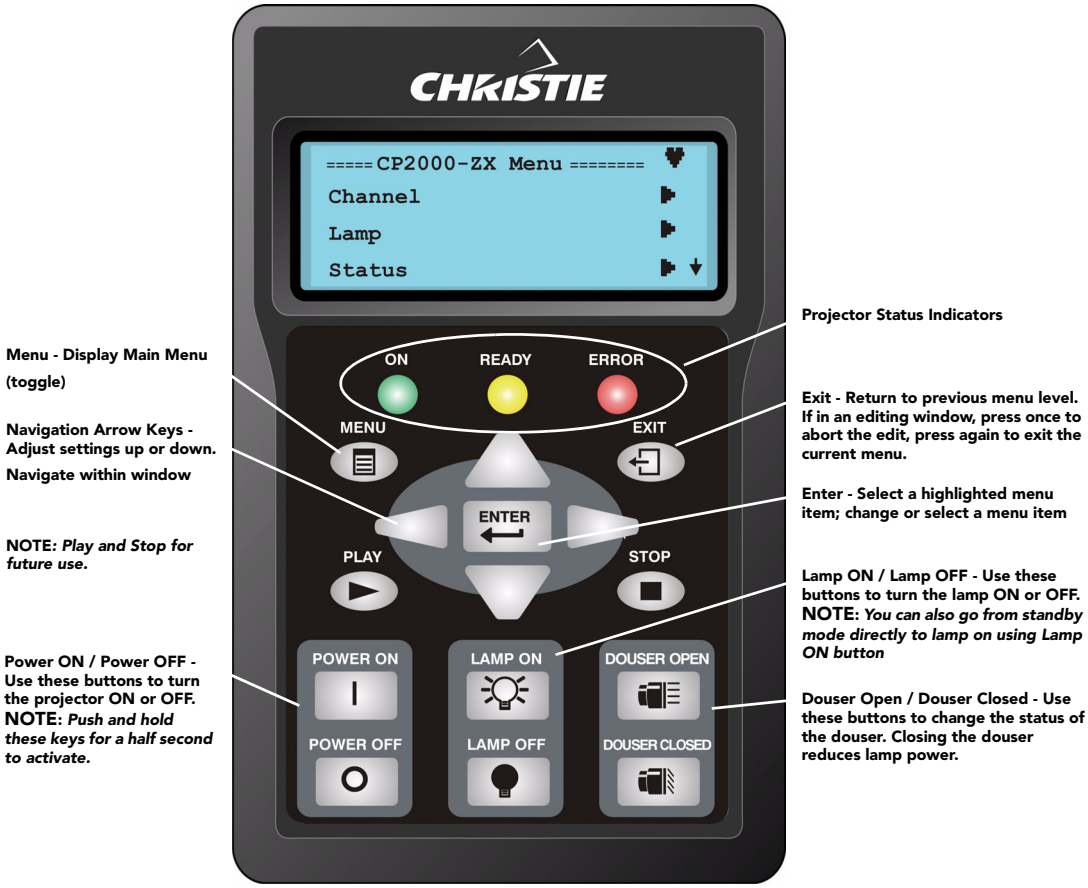



**Figure 3-1 CDP Features**

### Guidelines for Using the CDP

- Press keys one-at-a time; there are no simultaneous key combinations required or allowed.
- Pause briefly between key presses to allow the projector to respond to the previous action.
- Hold the navigation keys for continuous adjustment or movement in one direction.
- If no key is pressed within 5 minutes while in a menu, the system will return to the **Main** menu. If editing text or entering a numerical value, the entry will also be lost.
- Press **EXIT** once to cancel a selection or go back one level in the menu.
- If the back light turns OFF, push any key to turn it ON again.

## 3.3.2 Navigating the CDP Menus

Most basic controls of the projector are accessed from within the projector's menu system. There are several groups of related functions with each group selectable as a menu item in the **Main** menu as shown in the figure to the right. Press **MENU** at any time to display the **Main** menu. With the **Main** menu displayed, use the arrow keys to highlight the desired option, then press **ENTER** to make your selection. The corresponding function menu or pull-down list of further options will then appear.

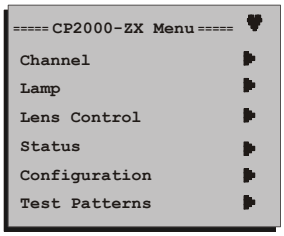



**Figure 3-2 CDP Main Menu Options**

Extra long menus are indicated by a small arrow in the bottom right corner of the display. To scroll through a list of items, use the down arrow key. Once past the four line limit of the display, another arrow will appear in the upper left corner to allow scrolling of the menu in both directions.

Press **EXIT** once when you want to return to the previous level of options.

Other navigation icons used in menus are as follows:

| | |
|---|---|
| | Additional menu items available, press **ENTER** to view. |
| ● | Menu option is enabled (ON). |
| ○ | Menu option is disabled (OFF). |

### Icons

Various status icons are used in the CDP display to convey projector status. With the exception of the status icon, all other CDP icons will appear on the display as the functions are enabled or disabled.

| Icon | Description |
|---|---|
| **Status** | This icon always appears in the upper right hand corner of the CDP display to indicate the communication status of the projector. When flashing, active communication is taking place. When solid, it can mean that communication is temporarily stalled (i.e. too many keypresses entered at one time) or that communication with the projector has failed. |
| **Service** | This icon appears on the CDP display whenever the following functions are ON: Lamp Change, Lamp Rotation or Filter Change. |
| **Power** | This icon appears on the CDP display when power to the projector is in "power on" mode (not in standby). |
| **Error** | This icon appears on the CDP display whenever a critical error occurs. |
| **Lamp On** | This icon appears on the CDP display when the lamp is ON. |
| **Lamp Off** | This icon appears on the CDP display when the lamp is OFF. |
| **Douser Open** | This icon appears on the CDP display when the douser is OPEN. |
| **Douser Closed** | This icon appears on the CDP display when the douser is CLOSED. |

### Pull-Down Lists

Press **ENTER** to see a pull-down list of options available for a given parameter. Then use the arrow keys to scroll through a list of options or to adjust settings. Press **EXIT** while in a pull-down list to cancel.

## Using Slide Bar Controls

In some cases, the current value of a given parameter can be adjusted. Depending on the parameter, the number displayed may have units associated with it or may be expressed as a percentage. Press the **LEFT/RIGHT** arrow keys on the CDP to adjust the setting up or down. Alternatively, press **ENTER** to switch to edit mode, where you can alter a value using the **UP/DOWN** arrow keys. After altering a value, press **ENTER** again to accept.

## Editing Text or Numerical Values

Some options allow editing of text or numerical values. When you enter one of these editing windows, the first character will begin flashing, indicating the option for editing. Use the **UP/DOWN** arrow keys to scroll through the list of alphanumeric characters. The longer you keep the arrow key depressed the faster scrolling occurs. Use the **LEFT/RIGHT** arrow keys to move along the text line. Spaces are included in the character selection. Incorrect characters cannot be deleted, you must type a new character over it.

## Channel Menu

Use the **UP/DOWN** arrow keys to scroll through a list of available channels. To select a desired channel, press **ENTER**. To further edit a channel, select **Edit Channel**. This activates another menu of options to tailor the projector processing for any type of incoming source, including 3D material, and collect these settings into a unique channel that any user can select using the CDP or through the *web user interface* **Main** menu. A maximum of 64 channels can be defined.

**NOTE:** *Only selected "active" channels can be edited though the CDP.*

Refer to *Section 3.4 Using the Web User Interface* for a general description of the same controls accessible via the web user interface.

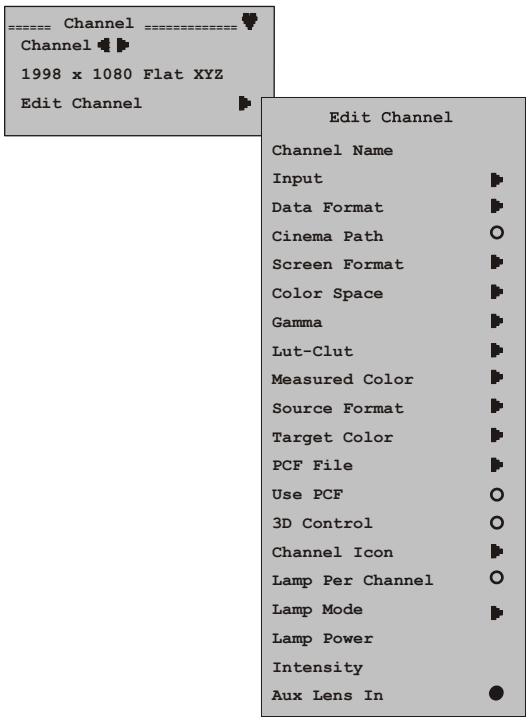



**Figure 3-3 CDP Channel Menu Options**

## Lamp Menu

The **Lamp** menu provides controls for optimizing lamp alignment (LampLOC™), maintaining a consistent light output over time (LiteLOC™), or setting a precise power level for the lamp. Two read-only areas display related lamp performance details - the side bar graph represent the current light output and, if LiteLOC™ is enabled, a heavy line shows the chosen LiteLOC™ setting.

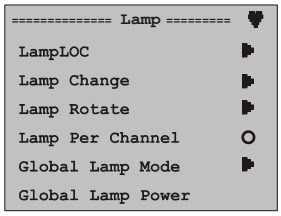



**Figure 3-4 CDP Lamp Menu Options**

### Perform Lamp Change using the CDP

1. From the **Lamp > Lamp Change** menu, select **Lamp S/N**.
2. Enter the lamp serial number.
3. From the **Lamp > Lamp Change** menu, select **Hours Used**.
4. Enter the lamp hours on the bulb.
5. Select **"Press Enter to Change Lamp"** to accept the lamp info entered in the steps above. **NOTE:** *If "Press Enter to Change Lamp" is not selected before leaving the Lamp Change menu, changes will not take effect.*

Refer to *Section 3.6 Working with the Lamp* as well as *Section 3.4.7 Advanced Menu* for a description of similar controls accessible via the *web user interface*.

## Lens Control Menu

**⚠ WARNING 1) If the Motorized Auxiliary Lens Mount (MALM) is present, ensure to move the MALM to the OUT position before performing any lens calibrate or reset functions on the Motorized Primary Lens Mount to prevent collision between the projection lens and the MALM. 2) Hazardous moving parts. Keep fingers and other body parts away.**

The **Lens Control** menu enables users to adjust focus, Horizontal (X) and Vertical (Y) offsets, and zoom of the lens. It also provides the option to reset and calibrate the lens, enable the intelligent lens system (ILS) and perform adjustments in MANUAL mode. Refer to *Channel: Lens Menu, on page 3-30* for a general description of the same controls accessible from the web user interface. **NOTES: 1)** *Using the knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary use and will therefore be lost once the channel changes.* **2)** *Only Advanced users can modify channel settings.* **3)** *Keep clear of rotating parts. Remotely operated motors may start to spin without warning.* **4)** *Avoid long hair, jewelry, and loose clothing exposure to the knobs during manual adjustment.* **5)** *In case of emergency, unplug the line cord to immediately halt movement of the lens mount.*

### Lens Adjustment

This menu enables users to adjust the Horizontal (X) and Vertical (Y) offsets of the lens motors, as well as adjust focus and zoom. To view the changes, ensure a test pattern is displayed. Once the adjustments are adequate for the particular application, the settings can be saved to the specific channel. To adjust **Focus** and **Zoom** use the right/left arrow buttons to adjust the min./max values. The **Horizontal (X)** and **Vertical (Y)** values are fixed to ±2050 to ensure the motor offsets are not overridden.

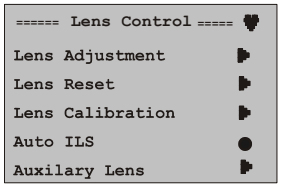



**Figure 3-5 CDP Lens Control Menu Options**

### Lens Reset

The **Lens Reset** feature automatically moves the lens to a central location (mechanical center) before moving back to the original position. This feature is useful for initiating an auto lens reset. Each motor can either be reset individually or select **All Axes** to reset the four motors in succession. When **Idle** is active it indicates **Lens Reset** is currently inactive. Typically, the lens must be reset if it has been physically bumped, when manual adjustments have been made to zoom and focus, or if a power outage or brown-out occurred during a channel change. **NOTE:** ***Idle*** *must be inactive in order for* ***Lens Reset*** *to work.*

### Auto ILS

Auto ILS is a per channel setting that is stored with the channel so that when a channel is made active the lens will automatically move to the saved or default position agreed to that channel. If Auto ILS is inactive, a manual adjustment of the lens is required and any channel change will not adjust the lens.

### Lens Calibration

Since the CP2000-ZX can accommodate a number of different lenses, which all contain specific motor travel ranges, it is essential that lens calibration be performed each time a lens is installed. Calibration is critical for lens accuracy - it corrects system backlash and detects motor range for the installed lens. Typically, the lens must be calibrated when a new or different lens has been installed, when the lens mount has been replaced or if ILS settings are drifting within a short period of time. Once lens calibration is completed, the results for the current lens are saved to the system. To adjust individual motors, select from **Focus**, **Zoom**, **Vertical** and/or **Horizontal**. To calibrate all motors in sequence select **All Axes**. When **Idle** is active it indicates lens calibration is currently inactive. **NOTE:** ***Idle*** *must be inactive in order for* ***Lens Calibration*** *to work.* When changing lenses, you must select the lens from the Lens Table in the **Advanced: Lens** menu and then perform a lens calibration. This will adjust the ranges so that you get full range use for the selected lens.

## Configuration Menu

The **Configuration** menu provides controls for adjusting the contrast and brightness settings of the CDP, run diagnostic controls, select the use of the auxiliary lens as well as provide you with controls to define and change various Ethernet settings, such as the projector's network address.

Similar controls are also available through the *web user interface*. Refer to *Section 3.4.4 Status Menu* for a description of Interrogator controls. **Warning!** *Never run Interrogator during a show as this could cause image disruption.* Refer to *Section 3.4.8 Admin Menu* for description of similar Administrator controls available through the web user interface.

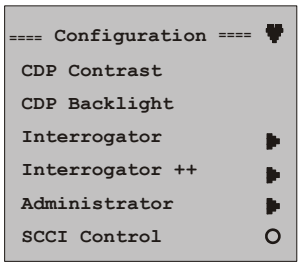



**Figure 3-6 CDP Configuration Menu Options**

## Status Menu and Alarm Conditions

There are three status LEDs on the CDP for the purpose of indicating projector status. **Table 3.3** details the various conditions of the LEDs and their meaning. In addition to the visual indicator of the LEDs, you can check the status of specific projector components through the CDP **Status** menu. Refer to *Section 3.4.4 Status Menu* and *Section 3.4.5 Alarm Window* for similar controls available through the *web user interface*.


**Figure 3-7 CDP Status Menu Options**

**Table 3.3 Status LEDs: Indicating Projector Status**

| ON (GREEN) | READY (YELLOW) | ERROR (RED) | DESCRIPTION |
|---|---|---|---|
| Solid Green | Solid Yellow | Solid Red | Initial Power ON. |
| Flashing Green | Flashing Yellow | Flashing Red | Flashes 3 times. Press and hold. Power OFF button to stay in Failsafe Mode. |
| Flashing Green | Solid Yellow | OFF | Warm Up (to Standby Mode) |
| OFF | Solid Yellow | OFF | Standby Mode. Power is OFF. Lamp is OFF. |
| Solid Green | Solid Yellow | OFF | Power is ON. Lamp is OFF. |
| Solid Green | OFF | OFF | Power is ON. Lamp is ON. |
| Flashing Green | Flashing Yellow | OFF | Cool Down (to Power On or Standby Mode). |
| On or Off | On or Off | Flashing Red | New alarm condition detected (such as critical warning detected by DMD temperature sensors). |
| On or Off | On or Off | Solid Red | Alarm condition exists, but has been acknowledged in the *web user interface* or CDP. |

If the projector encounters a system error or malfunction, the red **ERROR** LED will begin flashing. At this point, press **ENTER** to display the alarm message on the CDP display. This acknowledges that you have seen the message and the **ERROR** LED will turn a solid red. The **ERROR** LED will remain in this state until the problem is resolved or a new error is encountered by the projector. If a safety interlock, content security lock or DMD over-temperature fault occurs during operation, the **ERROR** LED will illuminate in the same way, however power to the lamp will automatically be turned OFF and the lamp button will remain disabled until the problem is fixed. **NOTE:** *Refer to Section 3.4.4 Status Menu and Section 3.4.5 Alarm Window for more information on projector status and alarm conditions using the web user interface.*

## Test Patterns Menu

The Test Patterns menu enables users to disable the test pattern feature or select from a list of test patterns used for troubleshooting and setup purposes.

## 3.4 Using the Web User Interface

In addition to using the CDP, most projector functions can be controlled remotely, typically at a controller such as a PC, via 1) a web user interface on an Ethernet network or 2) via serial API over the **MANAGEMENT ETHERNET** port.

If you are on a segregated network (isolated network), performance will greatly be optimized if you use HTTP instead of HTTPS (SSL) when connecting your web browser to the projector to display the web user interface. Use HTTPS (SSL) when there are concerns about the security of your network. If using HTTPS (SSL), it is essential that you use Internet Explorer 7 as your web browser since it has significant performance improvements over Internet Explorer 6 when handling SSL connections.

This section of the manual details the web user interface. For more information on controlling the projector via serial API, refer to *Appendix A: Serial API*. **NOTE:** *Sample menus are shown throughout this section - text and/or icons may vary according to settings recorded in the password-protected menus.*

### 3.4.1 User Access and Rights

Accessing different *web user interface* menus and functions depend on login. There are five distinct password-protected levels of use as identified in **Table 3.4**. Each level has the rights of lower levels, plus additional rights as shown.

**Table 3.4 User Security Levels**

| User Security Levels | Access to Menus | |
|---|---|---|
| | Level 1 Menu > Level 2 Tab | More details |
| **User** | **Status**<br>> System<br>**About** | Any user can view basic projector status, diagnostic information and software version information. |
| **Operator** | **Main**<br>**Status**<br>> System<br>**Advanced**<br>> Lamp<br>**About** | Operators can view additional projector information such as serial number, software version, and also turn the lamp ON or OFF. |
| **Operator Advanced**<br>(lamp change is available to this user) | **Main**<br>**Status**<br>> System<br>**Advanced**<br>> Lamp<br>**excludes LiteLOC*<br>> Lamp History<br>> Lens<br>**About** | This level of operator can view the same menus as the Operator level, but with the ability to add a new lamp in the **Advanced: Lamp History** menu. |

| | | |
|---|---|---|
| **Advanced** | **Main**<br>**Status**<br>> System<br>**Channel**<br>> Page 1<br>> Page 2<br>> 3D Control<br>> Lamp Per Channel<br>> Lens<br>**Advanced**<br>> Preference<br>> Lamp<br>**includes LiteLOC*<br>> Lamp History<br>> Lens<br>> Test Pattern<br>> User<br>** can only set levels/users from it's level & below*<br>**About** | Advanced Operators can access two additional menus (Channel and Advanced) where they can define all display setups, configure 3D displays, optimize light output, record lamp changes, activate test patterns and set certain system parameters. **NOTE**: *Advanced Operators can add users and set user access rights from its level and below only.* |
| **Administrator** | **Main**<br>**Status**<br>> System<br>**Channel**<br>> Page 1<br>> Page 2<br>> 3D Control<br>> Lamp Per Channel<br>> Lens<br>**Advanced**<br>> Preference<br>> Lamp<br>> Lamp History<br>> Lens<br>> Test Pattern<br>> User<br>** can only set levels/users from it's level & below*<br>**Admin**<br>> Source<br>> Screen<br>> MCGD<br>> TCGD<br>> Network<br>**About** | Administrators can also access Admin menus which allow them to define setup files as selectable choices for processing a variety of incoming signals. This can include setting source resolution, aspect ratio, image cropping, color gamut information and defining new Ethernet settings (IP network address). **NOTE**: *Administrators can add users and set user access rights from its level and below only.* |

| | | |
|---|---|---|
| **Service** | **Main**<br>**Status**<br>> System<br>> Test<br>> Status Summary<br>> SMPTE Errors<br>> Interrogator<br>**Channel**<br>> Page 1<br>> Page 2<br>> 3D Control<br>> Lamp Per Channel<br>> Lens<br>**Advanced**<br>> Preference<br>> Lamp<br>> Lamp History<br>> Lens<br>> Test Pattern<br>> User<br>** can only set levels/users from it's level & below*<br>**Admin**<br>> Source<br>> Screen<br>> MCGD<br>> TCGD<br>> Network<br>> General<br>> Lamp<br>**About** | Installers and other service personnel can access additional menus from the **Status** and **Admin** menus. This allows them to view detailed diagnostic logs for in-depth troubleshooting, view server errors, determine light level at the screen and define remote access rights. |

## 3.4.2 Navigating the Web User Interface

### Main Toolbar

Each screen in the *web user interface* system has the same top toolbar from which you can do the following:

- Select a specific projector from within a network and see the assigned IP address.
- View current time.
- Change user level.
- Close the screen and logout of the *web user interface*.
- See current status of the selected projector.

## 3.4.3 Main Menu

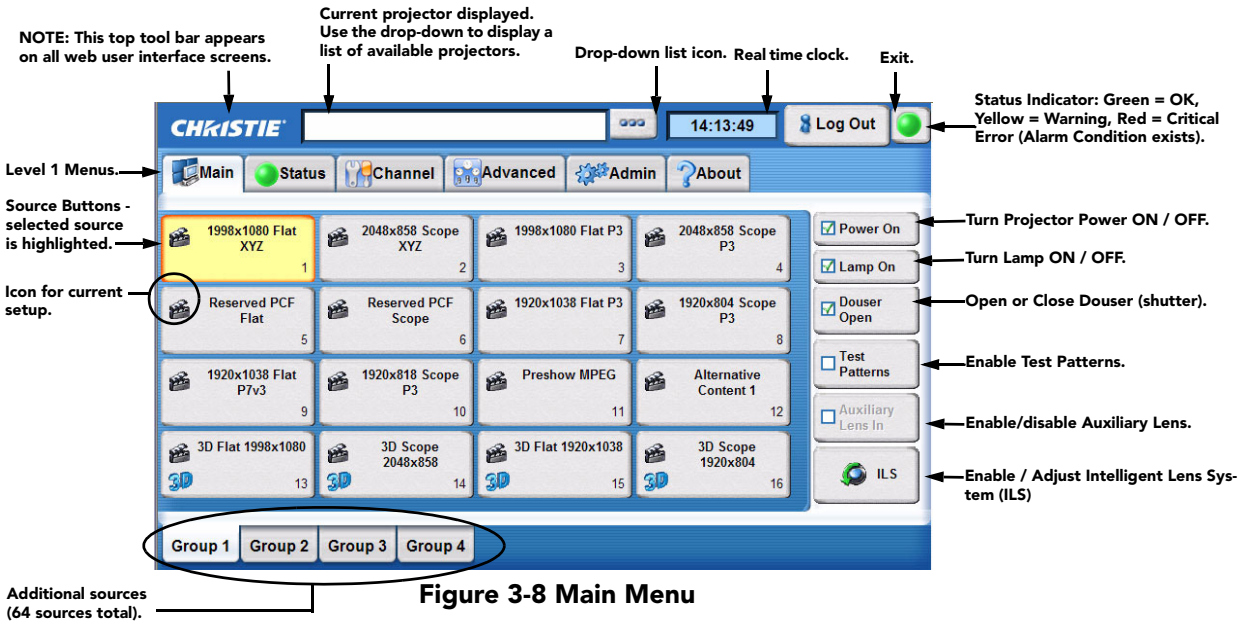



**Figure 3-8 Main Menu**

### Power ON or OFF

Enable **Power On** to enter STANDBY mode. Power to projector components is present. Deselect checkbox to turn power OFF.

### Turn the Lamp ON or OFF

Enable **Lamp On** to turn the lamp ON. If an error exists, which will not allow the lamp to turn ON, the button will be greyed out. Deselect checkbox to turn the lamp OFF.

### Open or Close the Douser (Shutter)

Enable **Douser Open** to open the douser. Deselect checkbox to close the douser.

### Display a Test Pattern

Enable **Test Patterns** to display the set of test patterns pre-selected from the **Advanced: Test Pattern** menu. If more than one test pattern is programmed, selecting it again obtains the next test pattern in the sequence. To return to the program, select a Channel button again.

### Move the Auxiliary Lens

Toggle the current location of the optional motorized auxiliary lens mount; position it either in front of the primary lens (enable **Auxiliary Lens** checkbox), or move it out (disable **Auxiliary Lens** checkbox).

## Intelligent Lens System (ILS)

The **ILS** button launches a control screen used to adjust the Focus, Horizontal (X) and Vertical (Y) Offset, and Zoom of the lens. See **Figure 3-9**. All settings on this screen are in real-time. This menu also enables you to manually override the intelligent lens system settings.

When the channels are changed, the ILS automatically moves the lens to adjust the focus, Horizontal (X) and Vertical (Y) offset, and zoom based on the pre-defined settings. All manual override settings are lost. This feature should only be used to make quick changes. Proper adjustments should be made in the **Channel: Lens** menu when time permits.

When ILS is enabled (**Automatic ILS** is checked) and the channel has been specified, it begins adjusting each motor. The proper lens type must be selected from the **Advanced: Lens** menu beforehand. The position of each motor is then saved onto the system in the specific channel file. This is not a global feature - instead it is controlled on a per channel basis. When this feature is enabled, the ILS for the currently selected channel is turned ON. **NOTES: 1)** *Using the knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary use and will therefore be lost once the channel changes.* **2)** *Only Advanced users can modify channel settings.* **3)** *Keep clear of rotating parts. Remotely operated motors may start to spin without warning.* **4)** *In case of emergency, unplug the line cord to immediately halt movement of the lens mount.*

### To Enable ILS Per Channel

1. From the **Main** menu, select one of the available channels.
2. Enable **Test Patterns** checkbox to select a test pattern.
3. Select the **ILS** button from the Main menu to launch the ILS screen (**Figure 3-9**).
4. Select **Automatic ILS** to automatically apply the per channel settings.

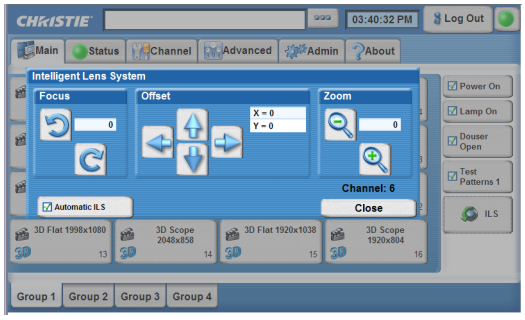



**Figure 3-9 Intelligent Lens System**

### To Edit Active Channel ILS Settings

1. Ensure **Automatic ILS** is checked.
2. Adjust the focus, Horizontal (X) and Vertical (Y) offset or zoom one step at a time by clicking the applicable button or hold the button down for continuous movement. If you hold a button down, a Pending message will display until you release the button. **NOTE**: *This over-writes the intelligent lens system settings.*

### To Temporarily Alter the Active Channel ILS Settings

1. De-select the **Automatic ILS** checkbox.
2. Adjust the focus, Horizontal (X) and Vertical (Y) offset, and zoom. **NOTE**: *This does not over-write the system settings for the ILS.*
3. To revert back to the ILS settings, check **Automatic ILS**.

### Start Features or Presentations

To start a different feature or presentation, click its corresponding display **Channel** button. **NOTE:** *By clicking a channel button, test patterns are automatically turned OFF to present show content.*

## 3.4.4 Status Menu

The  menu provides an overall view of the projector's status.

### Status: System Menu

The **Status: System** menu (**Figure 3-10**) provides status information on various projector components. Small indicators are green during normal operation, but can change color to indicate a warning or critical error status.

A ***yellow*** indicator signifies an unusual environmental condition, such as the lamp has reached a set limit of hours in use, as indicated by the user. It can also indicate a temperature has reached a higher than normal but not critical level.

A ***red*** indicator can signify that **1)** the environment has a serious problem or **2)** a specific electrical component is not detected or does not appear to be functioning properly. These errors require immediate attention.

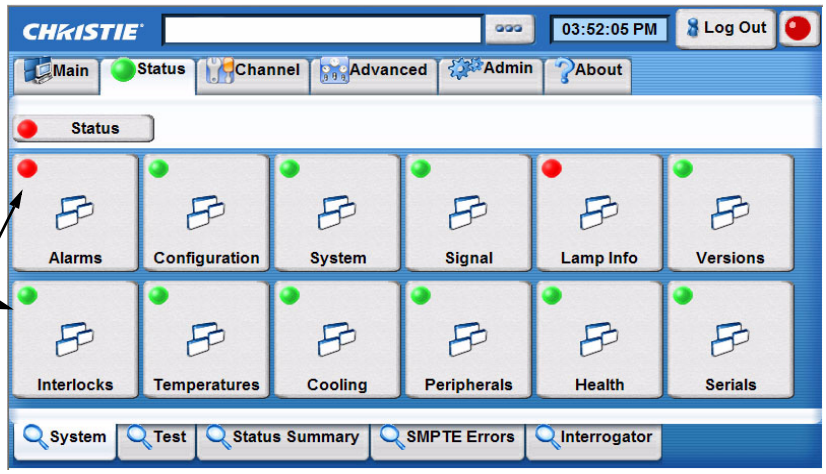



**Figure 3-10 Status: System Menu**

**Table 3.5 Summary of Status: System Components**

| **Alarms** | |
|---|---|
| EDID checksum test | |
| Lamp needs rotation | Displays number of hours logged on current lamp |
| Lamp expired status | Displays number of hours logged on current lamp |
| **Configuration** | |
| Projector model | Displays projector model |
| Projector serial number | Displays projector serial number |
| Date of manufacture | Displays manufacture date |
| Projector subtype | |
| Projector subtype ID | |
| Light engine native resolution | 2048 x 1080 |
| Ballast ID | |
| Mgmt ID Address | |
| DLP IP Address | |
| Subnet Mask | |
| Gateway | |
| Aux IP Address | |
| Aux Subnet Mask | |

| System | |
|---|---|
| Hours on projector | |
| Ballast state | |
| DLP state | |
| Internal 3.3V voltage rail | |
| Internal 5V voltage rail | |
| Internal 12V voltage rail | |
| Internal 5V standby voltage rail | |
| **Signal** | |
| Input frequency | |
| **Lamp Info** | |
| Lamp ID | |
| Lamp Serial No. | |
| Lamp power | Lamp power in watts |
| Lamp current | Lamp current in amps |
| Lamp voltage | Lamp voltage in volts |
| Luminance | Luminance in Footlamberts |
| Lamp intensity | Current light intensity reading |
| Lamp expired status | Total number of hours on current lamp |
| Lamp needs rotation | Total number of hours on current lamp |
| Total hours on installed lamp | Total number of hours on current lamp |
| Lamp error state | Number of recorded errors with current lamp |
| **Interlocks** | |
| AC blower interlock status | OK/Failed. Failure also triggers an alarm window |
| Extractor fan interlock status | OK/Failed. Failure also triggers an alarm window |
| Fire alarm interlock status | OK/Failed. Failure also triggers an alarm window |
| Lamp door interlock status | OK/Failed. Failure also triggers an alarm window |
| Ballast fan status | OK/Failed. Failure also triggers an alarm window |
| Ballast temperature | OK/Failed. Failure also triggers an alarm window |
| **Security** | |
| Cardcage tamper switch status | |
| Security enclosure installed | |
| Security enclosure armed | |
| Security enclosure tamper | |
| Component side tamper lid open | |
| Non-component side tamper lid open | |
| Security enclosure communication fail | |
| Security enclosure battery low | |
| **Versions** | |
| Main SW version | |
| TI SW package version | |
| Boot SW version | |
| Failsafe SW version | |
| PCM Type, Rev, Hw Mod | |
| Motherboard Type, Red, Hw Mod | |
| Stepper driver board rev, Hw Mod | |
| Stepper driver firmware rev | |
| Interface boot version | |
| Interface main version | |
| Interface FPGA version | |
| Interface A/D Pic | |
| Processor Boot version | |
| Processor Diag version | |
| Processor Main version | |
| Processor FPGA version | |
| EFIB Boot version | |
| EFIB BitSequence software | |
| Red Formatter Boot version | |
| Red Formatter Main version | |
| Red Formatter Config version | |
| Red Formatter Gamma version | |
| Red Formatter BitSequence version | |
| Green Formatter Boot version | |
| Green Formatter Main version | |
| Green Formatter Config version | |
| Green Formatter Gamma version | |
| Green Formatter BitSequence version | |
| Blue Formatter Boot version | |
| Blue Formatter Main version | |

| | |
|---|---|
| Blue Formatter Config version | |
| Blue Formatter Gamma version | |
| Blue Formatter BitSequence version | |
| Blue Formatter Gamma version | |
| **Temperatures (degrees Celsius)** | |
| Prism temperature | 60 °C = warning, ≥70 °C = critical |
| Red DMD temperature | 63 °C = warning, ≥ 68 °C = critical |
| Green DMD temperature | 63 °C = warning, ≥ 68 °C = critical |
| Blue DMD temperature | 63 °C = warning, ≥ 68 °C = critical |
| Integrator temperature | 90 °C = warning, ≥ 100 °C = critical |
| Ambient air temperature | 40 °C = warning, ≥ 45 °C = critical |
| Exhaust air temperature | 65 °C = warning, ≥ 75 °C = critical |
| Motherboard temperature | |
| PCM temperature | |
| I2C Bus A temperature | |
| I2C Bus C temperature | |
| I2C Bus D temperature | |
| I2C Bus E temperature | |
| **Cooling** | |
| Main Inlet 1 fan | RPMs of internal fan #1. Failure triggers an alarm window. |
| Main Inlet 2 fan | RPMS of internal fan #2. “0RPM” = device failure, “FAIL” = sensor failure |
| Main Inlet 3 fan | RPMs of internal fan #3. “0RPM” = device failure, “FAIL” = sensor failure |
| Card cage fan | RPMs of electronics card cage fans |
| Laminar air device (LAD) | RPMs of laminar airflow device for DMDs |
| Liquid pump | RPMs of liquid cooling pump |
| **Peripherals** | |
| Auxiliary Lens Installed Status | |
| ILS Install Status | |
| ILS Online Status | |
| ILS Power Status | |
| ILS Temperature | |
| ILS X Sensor Status | |
| ILS Y Sensor Status | |
| ILSILS Focus Sensor Status | |
| ILS Zoom Sensor Status | |
| ILS Board ID | |
| ILS Boot Version | |
| ILS Software Version | |
| ILS Hardware Version | |
| **Health** | |
| 292-A Total SMPTE error count | |
| 292-A Recent SMPTE error count | |
| 292-B Total SMPTE error count | |
| 292-B Recent SMPTE error count | |
| DDR memory test | |
| Flash memory test | |
| EDID checksum test | |
| FPGA checksum test | |

## Status: Test Menu

The **Status: Test** menu provides controls for testing or confirming subtitling and/or metadata commands supplied with presentation content from the site's controlling cinema server. The relevant .xml files-one for subtitling, one for metadata-can be searched and examined for errors in content or in transmission from the server. Reported errors can then help point to potential problems with the server, the .xml file, or the communication link to the projector. Note that controls in the **Server** menu do **not** activate or turn OFF metadata or subtitling. Controls are diagnostic tools only.

To verify the subtitling/meta-file of a movie, first begin playing the movie then access the **Status: Test** menu. The Meta File URI and Subtitling URI (XML files) will display in their respective fields, if the files exist for that content.

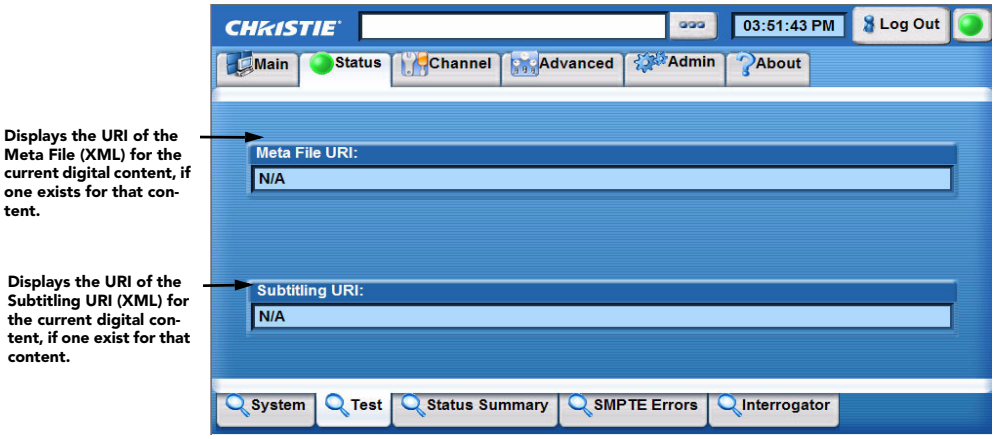



**Figure 3-11 Status: Test Menu**

**TEST METADATA (.xml):**

Enable the **Meta File** button to test a supplied .xml file required for auto-configuring display parameters such as colors, aspect ratio, watermarks, etc., in certain distributed content. Such metadata—a.k.a. "data about data"—is embedded in the video stream content and should be modified only by the distributor, but the test may result in errors pointing to problems in metadata content or its transmission from the server.

**TEST SUBTITLING FILE (.xml)**

Enable the **Subtitling** button to test an .xml file supplied with content for control of performance parameters such as synchronization with content, language, font type, font color, position, etc., in the current presentation. Define the desired URI (Uniform Resource Identifier)—i.e., cinema server or distributor—providing the subtitling .xml file you wish to examine, then select **Enable** to begin the test. Any errors encountered in file content or transmission from the server (for example, a lost file, a server crash, loss of communication with the server, etc.) will appear in the window, and the **Enable** checkbox will clear.

## Status: Status Summary Menu

This menu provides status information about the projector's components and log files for each device to be saved for diagnostics.

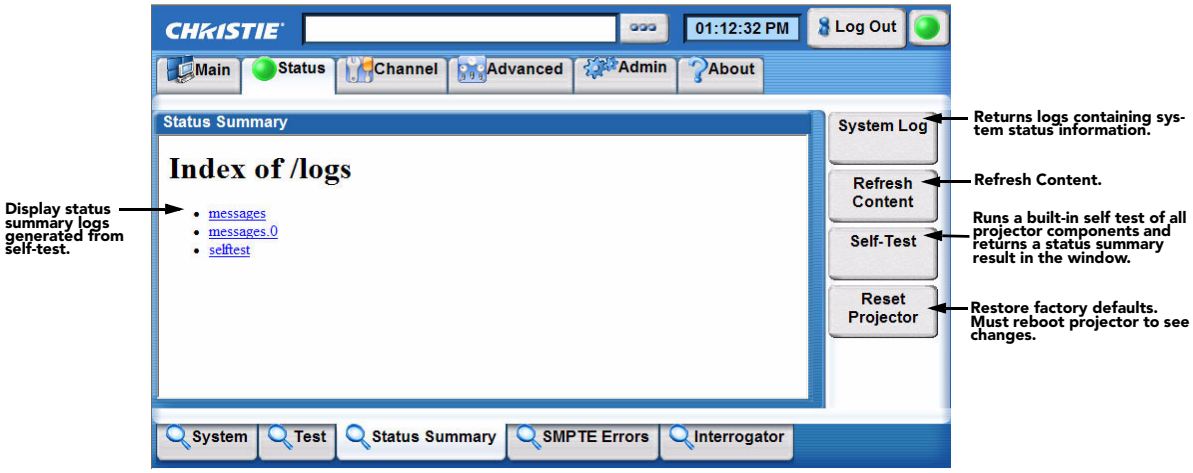



**Figure 3-12 Status: Status Summary**

## Status: SMPTE Errors Menu

The **Status: SMPTE Errors** menu provides status information about projector components and the current cinema source, and enables log files for each device to be saved to memory for further diagnostics. These errors can be cleared, which will also clear the error count and free up memory for future logs.

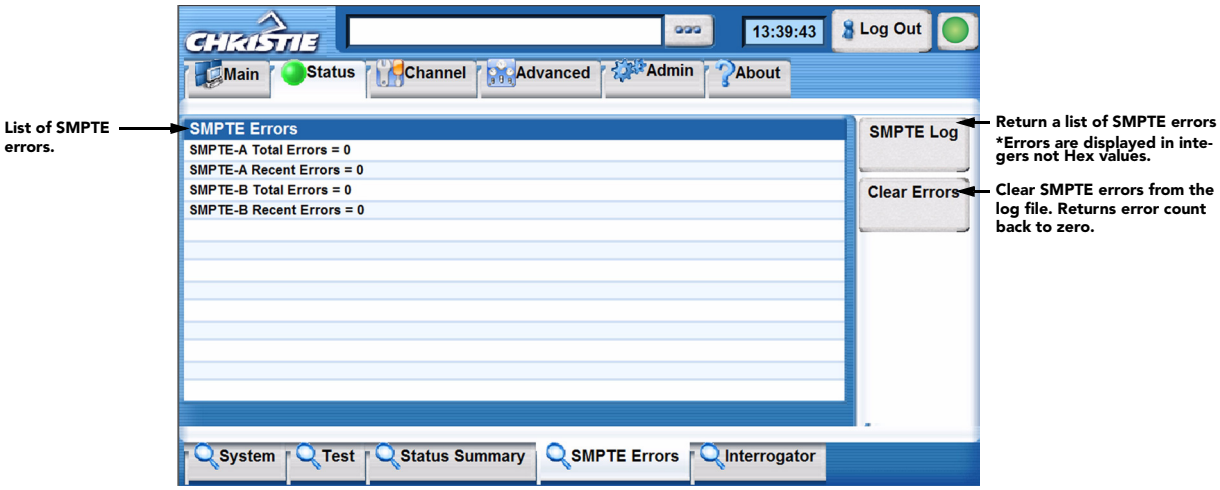



**Figure 3-13 Status: SMPTE Error Menu**

### Status: Interrogator Menu

The password-protected **Status: Interrogator** menu enables the collection of advanced-level status information that can assist in the diagnostics of projector components. **Interrogator** can be run in two modes: **Basic Mode** which enables the collection of log files only or **Enhanced Mode** which creates log files plus registered batch files. These files are then stored wherever you specify on your PC. **Warning!** *Never run Interrogator during a show as this could cause image disruption.*

**NOTES: 1)** *For **Interrogator** to successfully retrieve these diagnostic files, the projector must remain in its "failed" state (with incorrectly displayed image on screen).* **2)** *Always run Interrogator first before power cycling the projector, otherwise important diagnostic files will be unusable.* **3)** *It can take 5-10 minutes for Interrogator to complete its function.* **4)** *There is no way of stopping Interrogator once a request to run it is applied.* **5)** *Interrogator is also accessible through a separate login and password (different from the service login). Contact Christie tech support for assistance and password.*

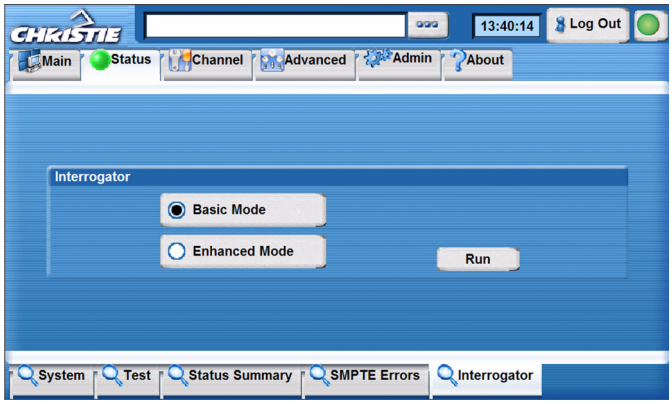



**Figure 3-14 Status: Interrogator Menu**

After you run Interrogator, you will be prompted to specify a location on your PC to save the Interrogator file. Depending on your browser's security settings, the downloaded file may be blocked. See **Figure 3-15**. If you click the "Click here for options" message, you will be given an option to approve downloading the file. As soon as you do this, the page refreshes and you are forced to log in again where you will need to duplicate this process. Instead of running Interrogator again, go to **http://IP_address/backup/** (remember to include the ending slash). Right-click a file that ends in .tar.enc or .tar.tar and select "Save Target As...". Select the location on your computer where you would like to save this file.

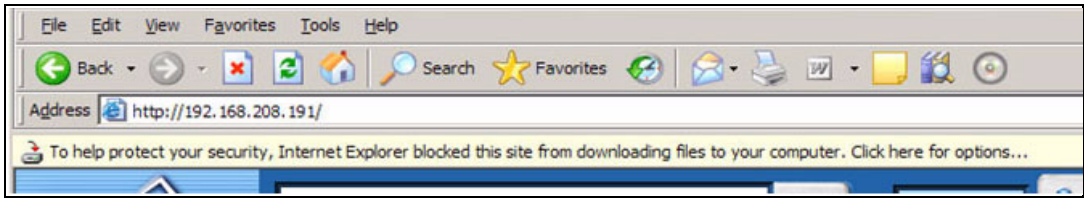



**Figure 3-15 Blocked Files Warning Message**

## 3.4.5 Alarm Window

In addition to the status indicator in the main toolbar of any *web user interface* window, a full-screen red alarm window appears if one of the alarm conditions are encountered (**Figure 3-16**). This window displays a description of the alarm condition. If an interlock failure occurs, power will no longer reach the lamp and the **LAMP ON** button on the **Main: System** screen as well as on the CDP will be disabled.

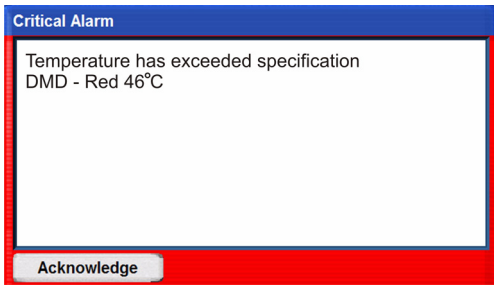



**Figure 3-16 Alarm Window**

## How to Respond to an Alarm Window

Click **ACKNOWLEDGE** to hide the window and enable access to solve the problem. Each alarm window indicates a new condition. The alarm window does not reappear for a condition that you have acknowledged and not yet solved, however, if you cycle the projector OFF and ON again, any persisting alarm condition will trigger the alarm window again. Refer to **Table 3.6**.

## Setting Alarm Triggers

From the **Advanced**: **Preferences** menu, you can enable or disable certain alarm triggers. Although it is highly recommended that the monitored over-temperature and fan conditions always be enabled (default), these triggers can be turned off if desired by disabling the appropriate **Alarm Triggers** checkbox. Once disabled, such conditions will only trigger a change of the status indicator in the main toolbar and not display the alarm window. It is recommended all alarm triggers remain enabled for normal operation.

Failed interlocks, communication faults, DMD over-temperature and lamp failures always result in an alarm window. These conditions cannot be turned off.

**Table 3.6 Alarm Conditions and Solutions**

| ALARM CONDITION | HOW TO CORRECT |
|---|---|
| **FAILED INTERLOCK** | |
| Failed heat extractor (for external duct at the top of the projector) | May not be turned ON. 450 CFM* required (refer to *Section STEP 5 - Connect Exhaust Ducting*). Replacement heat extractor may be required. |
| Failed AC Lamp Blower (little or no air-flow detected) | Check for interference at vane switch. Replace fan. |
| Lamp door is open | Check that lamp door is securely shut. |
| Failed auxiliary interlock (usually for fire alarms or automation systems) | Check auxiliary switch wiring. Check the external controlling device. |
| Failed high-security lock (tamper switch - cinema use will be disabled) | Ensure the front, top lid is securely shut and locked. |
| **OVER-TEMPERATURE** | |
| Prism is too hot | Power down & cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooling fan. |
| Red DMD too hot | Power down & cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooling fan. |
| Green DMD too hot | Power down & cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooling fan. |
| Blue DMD too hot | Power down & cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooling fan. |
| Integrator too hot | Power down & cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooling fan. |
| Exhaust airflow temperature too hot | Is heat extractor working? Ensure 450 CFM*/212 L/s* level achieved (refer to *Section STEP 5 - Connect Exhaust Ducting*). Replacement heat extractor may be required. |
| **FANS** | |
| A main fan (#1, #2 or #3) is too slow or stopped | "0RPM" = device failure, "FAIL" = sensor failure. Replacement fan/sensor may be required. |
| A card cage fan (#6 or #7) is too slow or stopped | Replacement fan may be required |
| Laminar airflow is too slow or stopped | LAD fan may need replacement |
| Liquid cooling pump fan too slow or stopped | Replacement pump may be required |
| **LAMP** | |
| Lamp needs rotation | Lamp has reached half of its set lamp limit, turn 180° to improve lamp life. |
| Lamp life has expired | Recommend lamp replacement |
| **LENS MOUNT** | |
| ILS Online Status No | Ensure the serial cord is plugged in. Serial cord may be damaged. |
| ILS Power Status No | Ensure the power supply is plugged in. Power supply may be damaged. |
| **SECURITY KIT** | |
| | |
| | |

## 3.4.6 Channel Menu

The **Channel** menu is a password-protected screen requiring Advanced, Admin or Service permission.

In general, the options available through the **Channel** menu enable users to tailor projector processing for any type of incoming source, including 3D material and collect these settings into a unique channel that any user can select from the **Main** menu. Up to 64 channels can be defined.

### Channel: Page 1 and Page 2 Menus

These two screens consist of numerous display settings that can be adjusted and collectively saved as a custom setup or channel. Once a channel is defined, it appears as a button on the main screen where it can be quickly selected by a user to change the on-screen display to suit the source content.

### Channel: Page 1 Menu

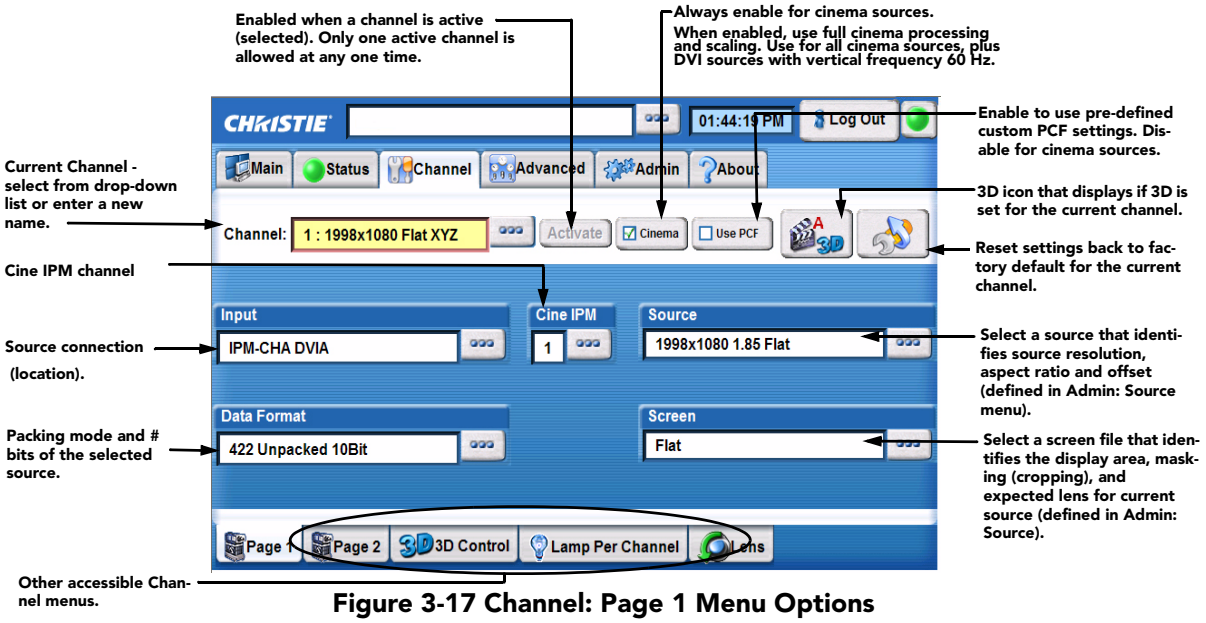



**Figure 3-17 Channel: Page 1 Menu Options**

**Table 3.7 Summary of Channel: Page 1 Menu Options**

| CHANNEL: PAGE 1 MENU OPTIONS | |
|---|---|
| **Channel** | Select the current channel from the drop down list and display the settings for this channel. Choose from 64 channels. **Important!** *Selecting a channel from the* ***Main*** *menu will not activate the current channel settings in the* ***Channel: Page 1*** *or* ***Page 2*** *window. You must manually select the channel from the drop down list to see settings for this channel.* Ensure **Active** is enabled to ensure the settings for the current channel and not the previous are being viewed. |
| **Cinema** | Keep checked for most sources (default), ensuring that incoming data is processed using the complete cinema path and scaled to fill the screen where possible. Cinema sources (292 A/292 B projector inputs) should always utilize the cinema path and scaling. Uncheck only for incoming DVI having a frame rate >60 Hz (if SXGA) or >48 Hz (if 2048 x 1080), as the cinema pixel clock rate is limited to 110 MHz. |
| **Use PCF** | Enable the Use PCF checkbox to use a pre-defined PCF for this source and prohibit further Channel adjustments (the PCF components of Target Color, Color Space, Gamma, LUT-CLUT in the Channel: Page 2 menu will disappear), then select the desired PCF from the Predefined Configurations list. Clear the checkbox if you wish to adjust the Channel settings - this is currently recommended for all cinema use. |
| **Input** | Identifies/sets the connection (location) of the current source, such as cinema port 292 A, 292 B or a DVI graphics port. |
| **Data Format** | Identifies the source type (8-10-12 bit) and whether or not it is packed. The projector will process the incoming signal according to the data format selected here. **NOTE:** *Available data formats depend on which projector input is selected and will reset to a default value if an input has not yet been selected.* Data format settings are not included in a PCF. |
| **Cine-IPM** | Select the Cine-IPM channel. |
| **Source*** | Identifies/sets the expected incoming source resolution and aspect ratio such as 1198x1080 Flat. The list of available sources are defined using the **Admin: Source** menu. |
| **Screen** | Identifies/sets display area, masking (cropping) and expected lens for the current source. Choices are pre-defined using the **Admin: Source** menu. Screen settings are not included in a PCF. |

* **NOTE***: Components marked with an asterisk (*) are part of any pre-defined PCF that controls image processing for a given source. When the "Use PCF" checkbox is checked, these components disappear from the Channel menu and are protected from further change.*

### When to Use Cinema Processing?

The **Cinema** checkbox determines if the incoming signal is processed using the projector's full cinema path, which enables image scaling and color correction, but restricts resolution-and-frequency combinations. If unchecked, most of the projector's Processor Board functionality is by-passed—this disables scaling and color correction, but is compatible with higher resolution-and-frequency combinations. Generally, use non-cinema processing with DVI sources having high resolution-and-frequency combinations. Refer to *Section 3.10 Non-Cinema Operation* for a list of compatible non-cinema DVI sources.

### When to Use a PCF?

The availability of functions in the **Channel: Page 1** menu depends on whether you choose to utilize predefined Projector Configuration Files (PCFs) already downloaded to projector memory, or whether you prefer to implement your own settings. PCFs can be created using the DLP Application then downloaded to the projector. By enabling the **Use PCF** checkbox, you can select and implement a predefined PCF.

Most applications such as cinema, post production and "alternative" or "non-cinema" displays require one or more display parameters to be individually adjusted. In this case, clear the **Use PCF** checkbox.

## Channel: Page 2 Menu

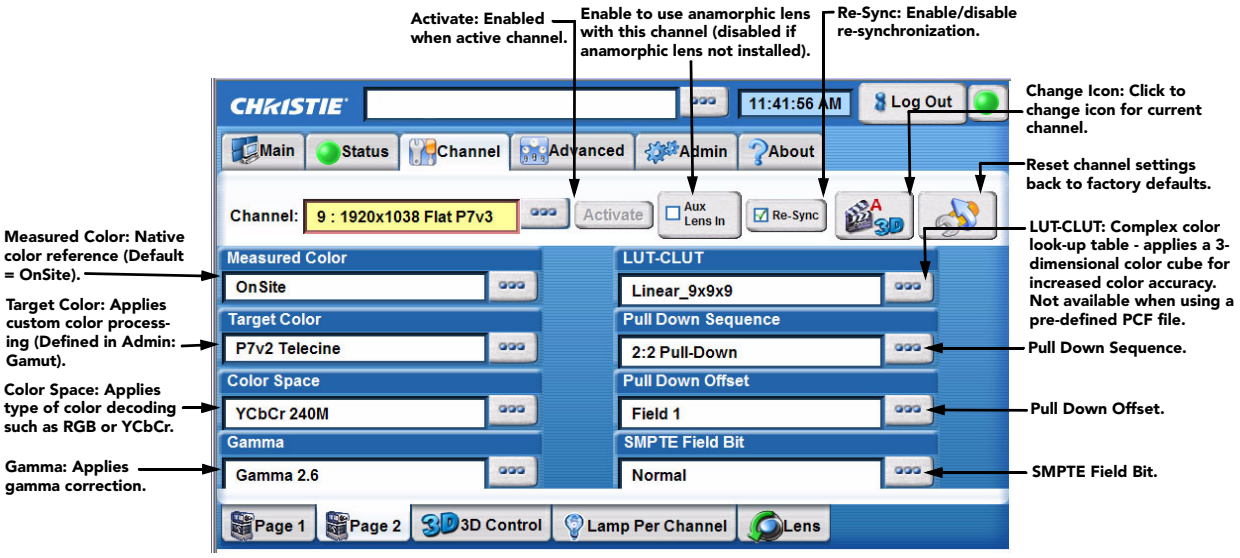



**Figure 3-18 Channel: Page 2 Menu Options**

### Table 3.8 Summary of Channel: Page 2 Menu Options

| CHANNEL: PAGE 2 MENU OPTIONS | |
|---|---|
| **Measured Color** | For a given channel/source, select the desired Measured Color Gamut Data (MCGD) file representing native "uncorrected" colors to use as a reference for calculating target color processing. MCGD files are defined in the **Admin: MCGD** menu. |
| **Target Color*** | Identifies/sets the special color processing called Target Color Gamut Data (TCGD) established for a given presentation. |
| **Color Space*** | Identifies/sets the method of color decoding for the current source. Default = RGB for all DVI sources. Default = YCbCr for all cinema sources (i.e., SMPTE 292 A or 292 B ports). |
| **Gamma*** | Identifies/sets the desired gamma (a.k.a. "de-gamma") correction needed for proper tonal range of the source material—for example, a grayscale test pattern will be neutral and smoothly graduated. |
| **LUT-CLUT*** | A "Complex Look-up Table" retrieved from internal electronics. No information available. |
| **Pull Down Sequence** | Applies the pull down sequence, which is typically a 2:2 Pull Down sequence. Pull down is used to distribute file content to video. Since film is projected at 24 frames per second and video typically at 60 pictures per second, the film content must be converted to video for optimal display. |
| **Pull Down Offset** | Identifies and sets the frame offset from Fields 1 to 5. |
| **SMPTE Field Bit** | Use the drop-down menu to select the field offset polarity. |

* **NOTE**: *Components marked with an asterisk (*) are part of any pre-defined PCF (Projector Configuration File) that controls image processing for a given source. When the "Use PCF" checkbox is checked, these components disappear from the Channel menu and are protected from further change.*

## Channel: 3D Control Menu

This screen provides numerous controls for adjusting and synchronizing incoming 3D signals (always dual L/R HD-SDI signals at the SMPTE 292 A and 292 B ports with each other and with external 3D equipment such as screens, emitters and glasses.)

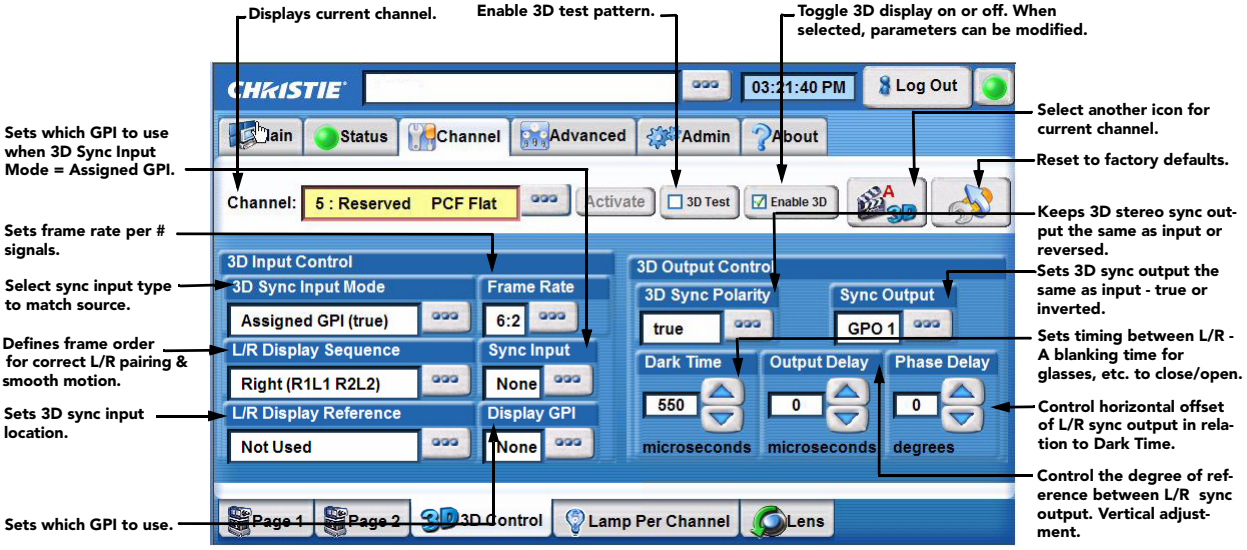



**Figure 3-19 Channel: 3D Control Menu Options**

### Table 3.9 Summary of Channel: 3D Control Menu Options

| CHANNEL: 3D CONTROL MENU OPTIONS | |
|---|---|
| **3D Sync Input Mode** | Keeps 3D stereo sync output the same as input (true), or reversed (inverted). See *3D Sync Input Mode Notes* below. |
| **L/R Display Sequence** | Defines frame order (L-R or R-L) required for 3D perspective. Correct setting ensures smooth motions and depends entirely on the original source mastering. |
| **L/R Display Reference** | Always set as **Not Used** unless a separate 3D stereo sync input is at GPIO connector. See *L/R Display Reference Notes* below. |
| **Frame Rate N:M** | Increase the display frame rate to reduce flicker from your source(s). See *Frame Rate N:M Notes* below. |
| **3D Sync Polarity** | Keeps 3D stereo sync output the same as input (true) or reversed (inverted). True: 3D L/R sync output from GPO will match L/R sync input. Inverted: 3D L/R sync output from GPO will be the opposite of sync input (left = right, right = left). |
| **Sync Output** | Define your GPO sync output for 3D devices (glasses, z-screen polarization or filter wheel), using GPO 1 to GPO 5 depending on wiring to the output device. |
| **Dark Time** | Create a blank time interval between left and right frames to allow for LCD shutter glasses on/off. Helps synchronize the output to the viewing. See *Dark Time and Output Delay Notes* below. |
| **Output Delay** | Offset (in µ) 3D stereo sync output in relation to dark time interval. Positive offset = delay, negative offset = start early. See *Dark Time and Output Delay Notes* below. |
| **Phase Delay** | Controls the degree of reference between the L/R sync output. A vertical adjustment is typically required when using a z-screen. |

### 3D SYNC INPUT MODE NOTES

Select the option matching your source type and how the 3D sync is supplied:

- **A = Left, B = Right:** Select if your 3D source provides separate left and right data via 2 cables at the 292 A and 292 B SMPTE ports. This assumes the 3D stereo sync signal is included with the image data inputs rather than supplied separately at the GPIO port.
- **White Line or Blue Line:** Select only if using a single 3D input signal in which an embedded white or blue line at the bottom of each frame identifies left vs. right, and an additional separate 3D stereo sync input at the GPIO port is not present. Short line = Left, Long line = Right.
- **Assigned GPI:** Select only if using a single 3D signal requiring a separate 3D stereo sync input at the GPIO.

### L/R DISPLAY REFERENCE NOTES

Select the option matching your *3D Sync Input Mode* above.

- If your 3D source provides separate left and right data via 2 cables at the **A** and **B** SMPTE ports, simply select the desired frame order (either L-R or R-L).
- If your single 3D source provides a separate sync connected at the GPIO, or if the single 3D source includes an embedded 3D sync signal code, the Input Frame Dominance choice should match that of the *3D Sync Input Mode* (default) or, if necessary, be inverted. **NOTE**: *Requires single input; not currently supported.*

### FRAME RATE N:M NOTES

These N:M ratios define how many frames to display per number of frames that form one complete image. For all 3D use, the denominator is 2, indicating that two frames (left and right) are combined into every complete display frame. For non-3D, it is 1 frame. Set to the highest rate possible without image cropping.

Example:
$4{:}2 = \frac{\text{4 frames displayed}}{\text{2 frames per image}}$

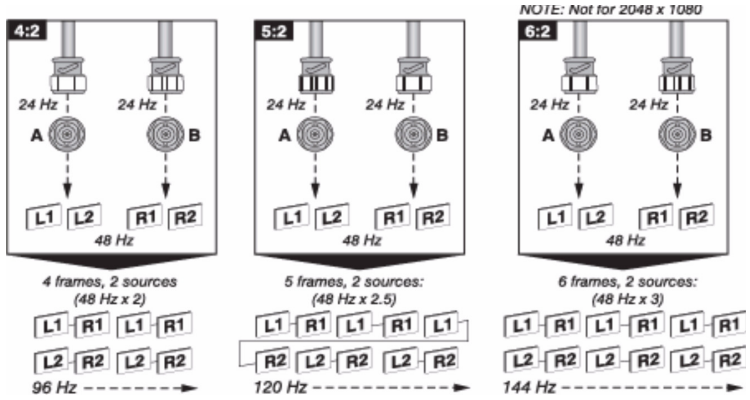



**Figure 3-20 Examples of Frame Rate N:M**

### DARK TIME and OUTPUT DELAY NOTES

The dark time between incoming L/R frames provides a brief interval of non-image time (in microseconds) for your switching device (such as shutters in glasses) to complete its switch. When this interval is properly set and exactly suits the speed of your device, neither eye sees image data intended for the other eye. This helps to prevent color artifacts and ghosting while ensuring that each eye sees all intended data. **NOTE**: *Because the dark time interval essentially increases frame rate, increasing this setting beyond its range for the current frame rate factor will cause image breakup. 2048 x 1080 displays may be cropped. A setting less than the minimum is not supported and will simply revert to the minimum interval*. The output delay setting shifts the 3D sync in relation to the Dark Time interval, starting each frame slightly earlier (-) or later (+). Adjust only as necessary—too much offset can cause "bleed-through" where each eye sees some data that is intended for the other, or causes color cropping since some DMD sequences may be clipped.

## Channel: Lamp Per Channel Menu

**NOTE:** *This menu only becomes active if the channel is active (**Activate** button has been clicked).*

The **Channel: Lamp Per Channel** menu provides controls for maintaining a specific light output over time (LiteLOC™), or setting a precise power level for the lamp. A read-only area on the screen displays lamp performance details. The side bar graph represents the current light output and, if LiteLOC™ is enabled, a heavy line shows the chosen LiteLOC™ setting.

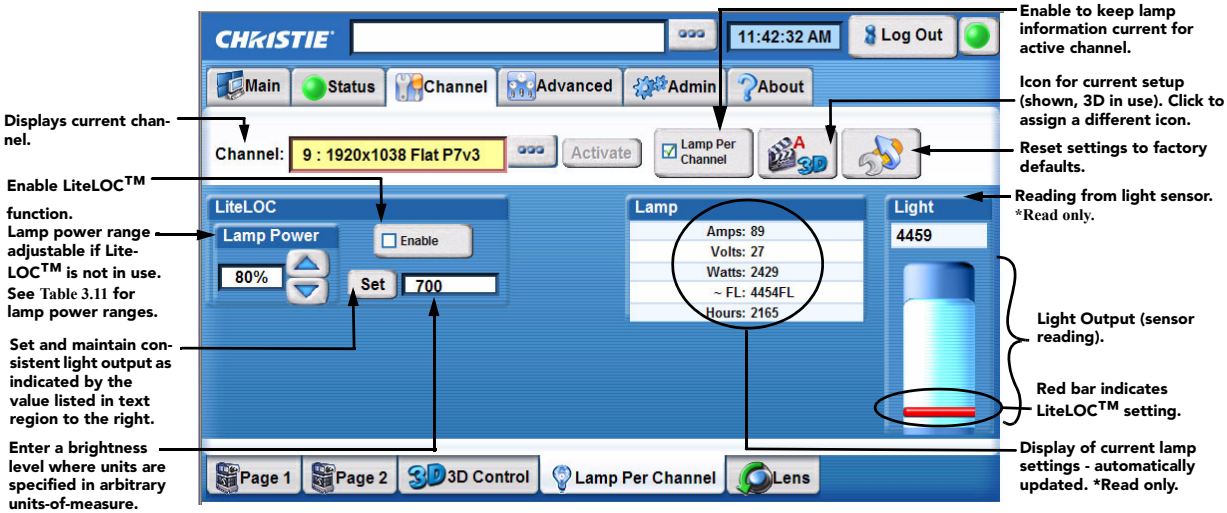



**Figure 3-21 Channel: Lamp Per Channel Menu Options**

### Table 3.10 Summary of Channel: Lamp Per Channel Menu Options

| CHANNEL: LAMP PER CHANNEL MENU OPTIONS | |
|---|---|
| **Lamp Power** | Indicates the percentage of power to supply to the lamp and automatically overrides the LiteLOC™ setting that may be in effect. Please refer to **Table 3.11** for the valid Lamp Power ranges for specific lamp types. Adjusting the Lamp Power causes the bar graph to rise or fall as **Lamp Power** increases or decreases. The LiteLOC™ red line and Lamp values will not change unless **Set** is clicked. This defines a new LiteLOC™ setting and enables the LiteLOC™ checkbox. Lamp Power is enabled only when LiteLOC™ is disabled, by de-selecting the Enable button. |
| **Enable** | Click **Enable** to use LiteLOC™ for the current channel based on the value in the text box to the right of the **Set** button. |
| **Set (Brightness)** | Automatically enables LiteLOC™ and maintains the current brightness level (shown in the Lamp region) as long as possible. Arbitrary units-of-measure shown in the text region to the right of the **Set** button, not lumens or fL. |
| **Lamp (Read Only)** | Indicates the amps (amps), voltage (volts), watts (lamp power) and current lamp age (hours). |
| **Light (Read Only)** | This is a meter reading from the projector's light sensor. Indicates the current light output (vertical bar) and LiteLOC™ level set (red horizontal line). The value at the top of the meter is shown in arbitrary units-of -measure and does not represent actual lumens or fL. |

### Table 3.11 Minimum and Maximum Lamp Power by Lamp Type

| Lamp Type | Lamp Size | Min Lamp Power | Max Lamp Power |
|---|---|---|---|
| CDXL-20 | 2kW | 1000W (50%) | 2200W (110%) |
| CDXL-30 / CDXL- 30SD | 3kW | 1000W (33%) | 3000W (100%) |

Christie provides a wide lamp power range to give flexibility in meeting different exhibition configurations. However, older lamps may not always strike at the lowest power settings.

## Channel: Lens Menu

This menu is used to modify the Intelligent Lens System settings for a particular channel. Adjust the Focus, Horizontal (X) and Vertical (Y) Offset, or Zoom by clicking the respective buttons in a step-wise manner or holding the button down for continuous movement. You may experience a slight delay in the response rate of the lens upon selecting the buttons. Position values on the menu will change in real-time. When holding down a button for continuous movement, the lens will begin to accelerate until the maximum velocity is reached. A pending message appears on screen. **NOTES: 1)** *Using the knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary use and will therefore be lost once the channel changes.* **2)** *Only Advanced users can modify channel settings.* **3)** *Keep clear of rotating parts. Remotely operated motors may start to spin without warning.* **4)** *Avoid long hair, jewelry, and loose clothing exposure to the knobs during manual adjustment.* **5)** *In case of emergency, unplug the line cord to immediately halt movement of the lens mount.*

**⚠ WARNING 1) If the Motorized Auxiliary Lens Mount (MALM) is present, ensure to move the MALM to the OUT position before performing any lens calibrate or reset functions on the Motorized Primary Lens Mount to prevent collision between the projection lens and the MALM. 2) Hazardous moving parts. Keep fingers and other body parts away.**

To adjust ILS settings for a particular channel:

1. Select a channel from the drop-down list.
2. Use the designated buttons to adjust Focus, Horizontal (X) and Vertical (Y) Offset, and Zoom.
3. Click **Activate** to save the settings to the particular channel.

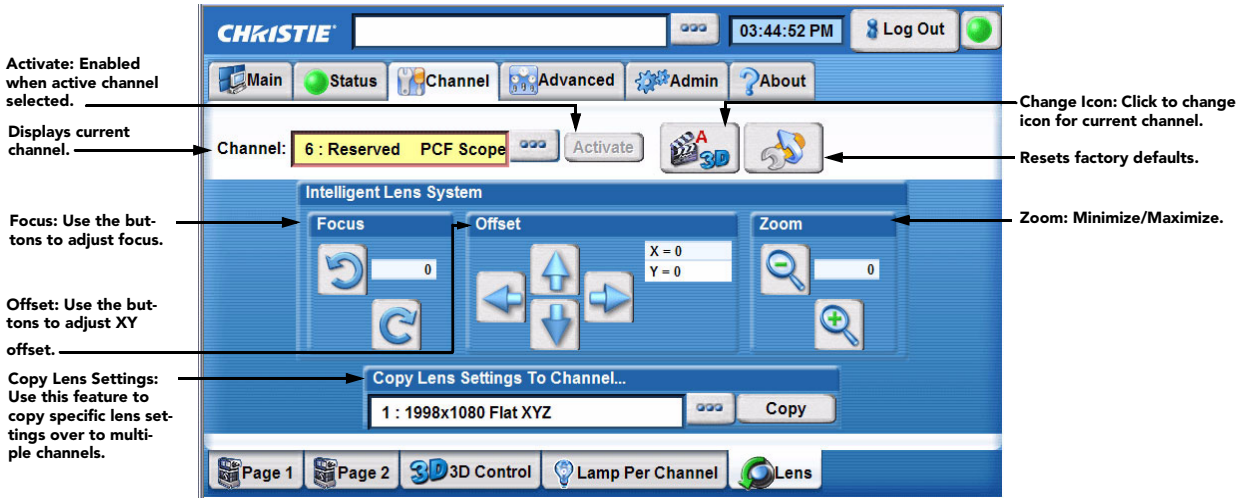



**Figure 3-22 Channel: Lens Menu Options**

**Table 3.12 Summary of Channel: Lens Menu Options**

| CHANNEL: LENS MENU OPTIONS | |
|---|---|
| **Focus** | Click the clockwise/counter-clockwise buttons to adjust the focus. |
| **Offset** | Click the up/down/left/right buttons as necessary to adjust the image and make it square on the screen. |
| **Zoom** | Click the buttons to automatically minimize or maximize zoom. |
| **Copy Lens Settings to Channel** | Use the **Copy Lens Settings to Channel** feature to easily copy the settings from the current active channel to another channel. Select the channel from the drop-down list and click **Copy** to apply the changes. Repeat for every channel that requires the same ILS values. |

## Channel: Lens Menu Disabled

The **Channel: Lens** menu is grayed out when the **Automatic ILS** feature of the **Main** menu is not selected.

In the instance that an ILS is not installed on the projector or if the **ILS Installed** option in the **Advanced: Lens** menu is not selected, an ILS Not Installed label is displayed. See **Figure 3-23**.

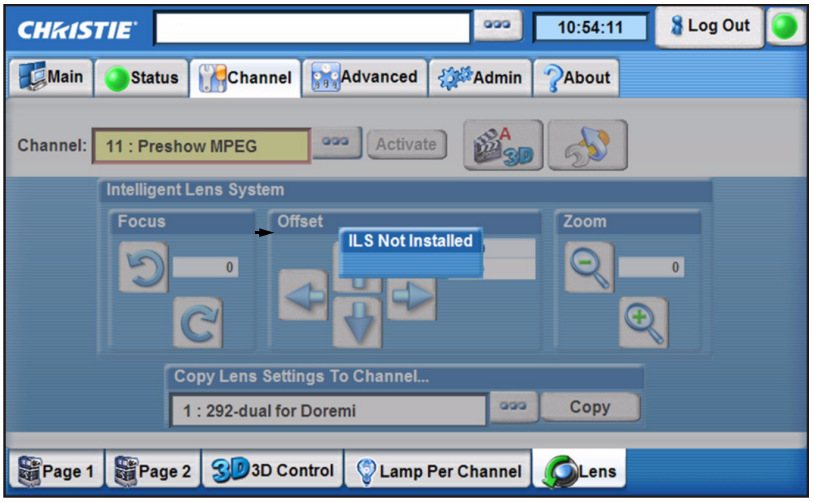



**Figure 3-23 Channel: Lens Menu Disabled**

## 3.4.7 Advanced Menu

The **Advanced** menu consists of six menus that enable advanced operators, administrators and installers to define numerous operating parameters, work with lamp settings, ad a new lens, load and/or display test patterns, set up users and define their access rights.

### Advanced: Preferences Menu

The **Advanced: Preferences** menu provides access to various system parameters, as shown in **Figure 3-24**. This is further described in **Summary Advanced: Preferences Menu Options** below.

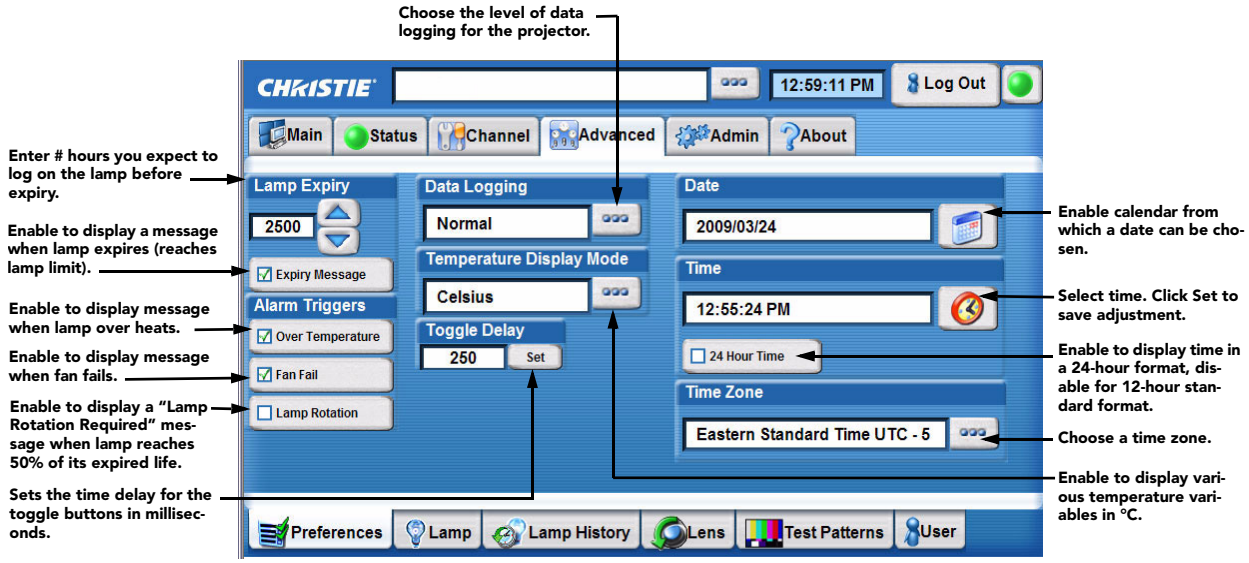



**Figure 3-24 Advanced: Preferences Menu Options**

**Table 3.13 Summary of the Advanced: Preferences Menu Options**

| ADVANCED: PREFERENCES MENU OPTIONS | |
|---|---|
| **Lamp Expiry** | Enter the number of hours (0 - xxxx) that are expected to be logged on the current lamp. |
| **Expiry Message** | When checked, an alert window displays when the lamp expiry is reached. |
| **Alarm Triggers** | Choose the conditions you want to trigger an Alarm Window (in addition to interlocks, communication faults, DMD over-temperature and lamp failures which are all permanent triggers). It is strongly recommended all triggers remain enabled during normal operation. Disable only in rare emergencies when the alarm appears to be malfunctioning without real errors. |
| **Toggle Delay** | Sets the time delay for the toggle buttons. Time is recorded in milliseconds. |
| **Language** | Choose a default language for all web UI screens. The login window will also display in this language, but can be modified at any time. |
| **Data Logging** | Choose the level of data logging for the projector. Options include **Minimal, Normal,** and **Debug**. |
| **Temperature Display Mode** | Select whether to display temperature in Celsius or Fahrenheit. |
| **Date** | Reset date as desired. Click the calendar icon to display a calendar from which you can select a date. |
| **Time** | Click the clock icon to reset the displayed time. Choose from 24-hour or standard 12-hour formats. Time is always displayed on each window in the chosen format. Time Zone - Choose the time-zone. |

## Advanced: Lamp Menu

The **Advanced: Lamp** menu provides controls for optimizing lamp alignment (LampLOC™), maintaining a consistent light output over time (LiteLOC™), or setting a precise power level for the lamp. Two read-only areas display related lamp performance details - the side bar graph represent the current light output and, if LiteLOC™ is enabled, a heavy line showing the chosen LiteLOC™ setting.

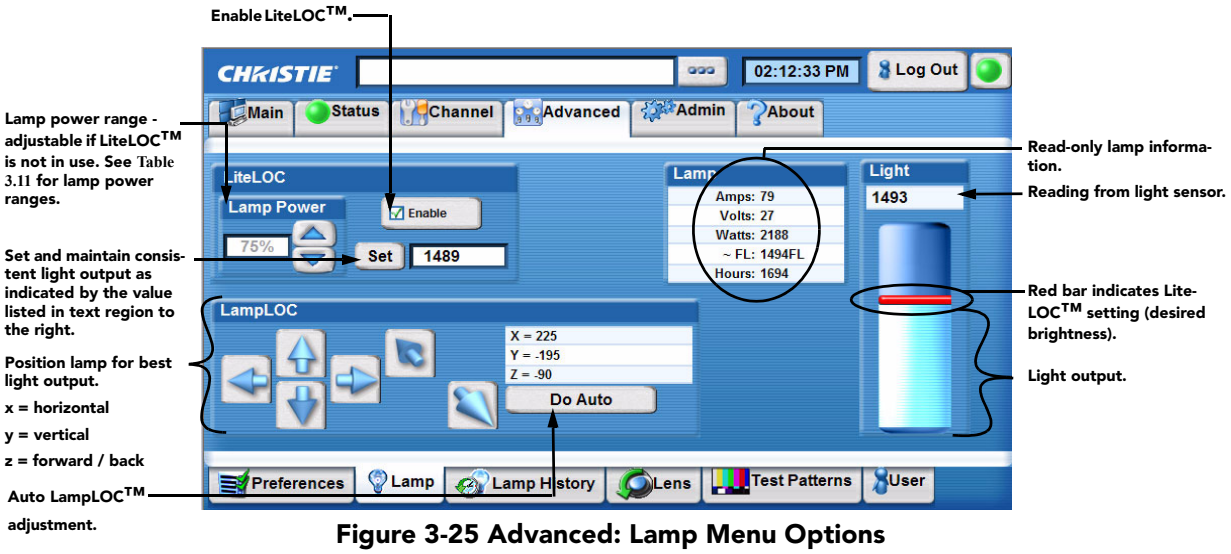



**Figure 3-25 Advanced: Lamp Menu Options**

### Table 3.14 Summary of Advanced: Lamp Menu Options

| ADVANCED: LAMP MENU OPTIONS | |
|---|---|
| **Lamp Power** | Indicates the percentage of power to supply to the lamp and automatically overrides the LiteLOC™ setting that may be in effect. Please refer to **Table 3.11** for the valid Lamp Power ranges for specific lamp types. Adjusting the Lamp Power causes the bar graph to rise or fall as **Lamp Power** increases or decreases. The LiteLOC™ red line and Lamp values will not change unless **Set** is clicked. This defines a new LiteLOC™ setting and enables the LiteLOC™ checkbox. Lamp Power is enabled only when LiteLOC™ is disabled, by de-selecting the Enable button. |
| **Enable** | Click Enable to use LiteLOC™ for the current channel based on the value in the text box to the right of the **Set** button. |
| **Set (Brightness)** | Automatically enables LiteLOC™ and maintains the current brightness level (shown in the Lamp region) as long as possible. Arbitrary units-of-measure shown in the text region to the right of the **Set** button, not lumens or fL. |
| **LampLOC™** | LampLOC™ buttons activate motors that reposition the bulb in the projector for optimized light output. Click **Do Auto** (recommended) or the individual buttons. **NOTES: 1)** *Lamp must be ON to begin. If it is turned off during a re-positioning, the bulb will return to its former position.* **2)** *Douser opens and remains non-functional during a LampLOC™ adjustment.* |
| **Lamp (Read Only)** | Indicates the current lamp amps (amps), voltage (volts), watts (lamp power) and age (hours). |
| **Light (Read Only)** | This is a meter reading from the projector's light sensor. Indicates the current light output (vertical bar) and LiteLOC™ level set (red horizontal line). The value at the top of the meter is shown in arbitrary units-of -measure and does not represent actual lumens or fL. |

## Advanced: Lamp History Menu

The **Advanced: Lamp History** menu displays the last 8 recorded lamp serial numbers, along with the entry date and the number of hours logged. This is a read-only menu unless adding a new lamp or acknowledging the lamp rotation. When adding a new lamp, a separate screen displays with editing boxes to record a new lamp type, serial number and the number of hours already logged on the lamp, if any. **Important!** *Ensure the projector is in full power mode when adding a new lamp in Lamp History. If done in stand-by mode, lamp information may be lost.*

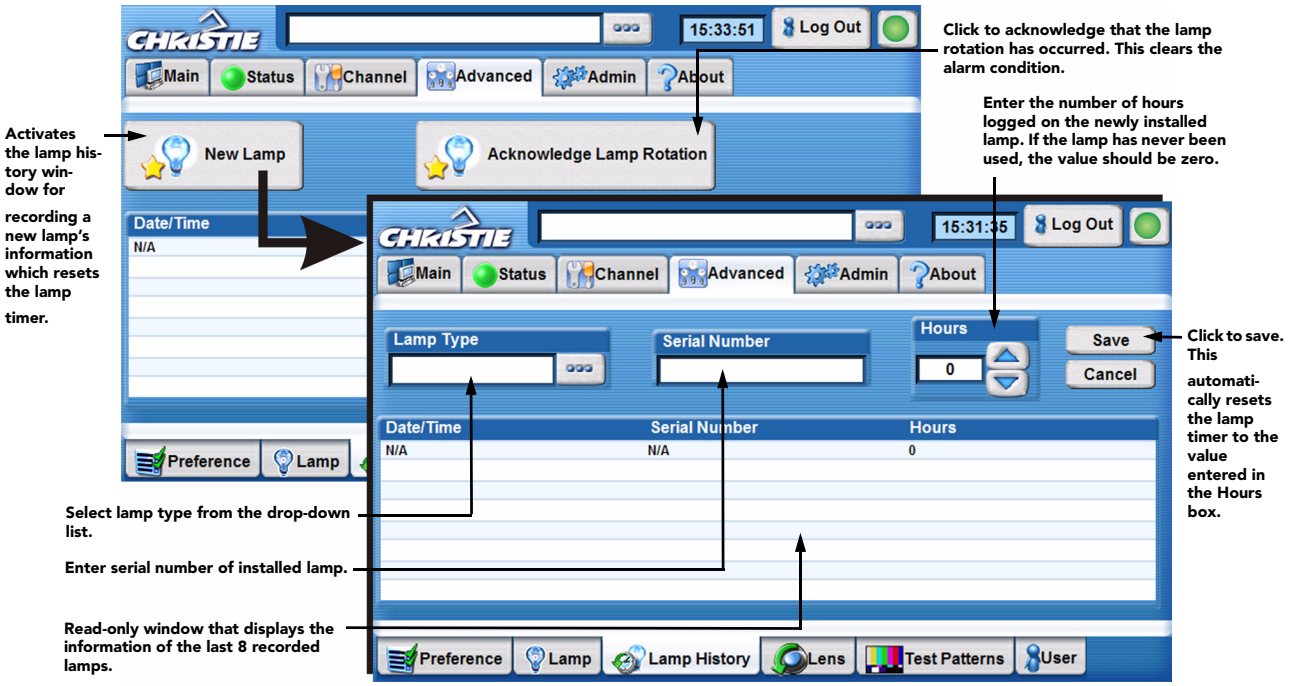



**Figure 3-26 Advanced: Lamp History Menu Options**

**Table 3.15 Summary of Advanced: Lamp History Menu Options**

| ADVANCED: LAMP HISTORY MENU OPTIONS | |
|---|---|
| **New Lamp** | Activates the lamp history window and text editing box for recording a new lamp's serial number, which resets the lamp timer. |
| **Lamp Type** | Select from a list of available lamp types: CDXL-20, CDXL-30, CDXL-30SD, Other. |
| **Serial Number** | Enter the serial number of the newly installed lamp. |
| **Hours** | Enter the number of hours logged on the newly installed lamp. If the lamp has never been used the value should be "0". |

## Detailed Lamp Logging

Detailed lamp operation information is captured in a log file located in the /var/log/ directory which is accessible from the Web UI. The log file name consists of "lamp_" text, followed by the lamp serial number and log file index number. For example, lamp_serialno_001.txt. If the lamp log file is over 500KB, the file will be compressed and archived (e.g., lamp_serialno_001.gz). Lamp information will then get logged to a new file where the index number gets incremented. When changing to a new lamp, the old log file will be compressed and a new log file with the new lamp serial number will be created. In total, 20 compressed files will remain in the /var/log directory where older compressed files will be deleted when this number is reached.

## Advanced: Lens Menu

The **Advanced: Lens** menu allows you to setup the primary lens, auxiliary lens and the ILS.

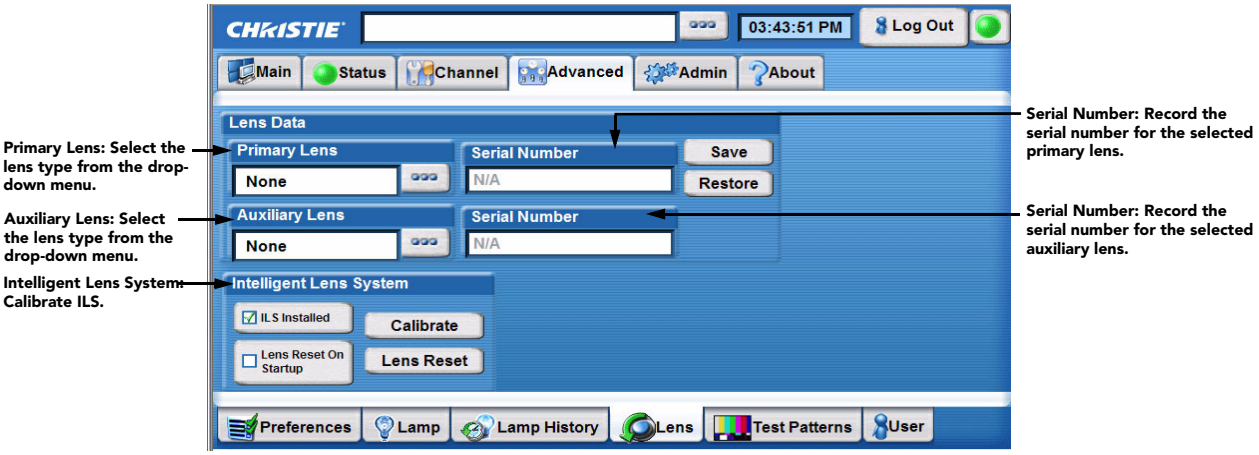



**Figure 3-27 Advanced: Lens Menu Options**

### Table 3.16 Summary of Advanced: Lens Menu Options

| ADVANCED: LENS MENU OPTIONS | |
|---|---|
| **Primary Lens** | From the drop-down menu, select the type of primary lens installed on the projector. |
| **Auxiliary Lens** | If an auxiliary lens is installed, select it from this drop-down list. The selections include anamorphic and wide converter lens. This selection is grayed-out when there is no auxiliary lens connected. |
| **Save** | Click to save the current serial number. |
| **Restore** | Cancel new (unsaved) settings and restore previous settings. |
| **ILS Installed** | Enables/disables the Intelligent Lens System (ILS). **NOTE**: ***ILS Installed*** *must be checked in order to use the ILS functionality.* |
| **Lens Reset on Startup** | Select this checkbox for the ILS to locate the sensor flags and the backlash of each motor at the same time. Keep checked if you need to reset the lens often. |
| **Calibrate** | Click **Calibrate** to calculate the amount of backlash for each motor and make the necessary adjustments to ensure proper motor range. Calibration should only be used when changing lenses and is a necessary step at that time. |
| **Lens Reset** | When **Lens Reset** is clicked, the motors on the lens move to a central location (mechanical center) before moving back to the original position. This feature is useful for initiating an auto lens reset. Each motor can either be reset individually or select All Axes when prompted to reset the 4 motors in succession. |

## Advanced: Test Patterns Menu

The **Advanced: Test Patterns** menu enables the management and organization of all available test patterns. Use the double window region to organize and manage the master list of RGB test patterns. Patterns in the **Selected Test Pattern** window (right) are available to the user via the **Test Pattern** button on the **Main** menu. The **Test Pattern** window (left) contains an alphabetical list of all available test patterns you can scroll through and select.

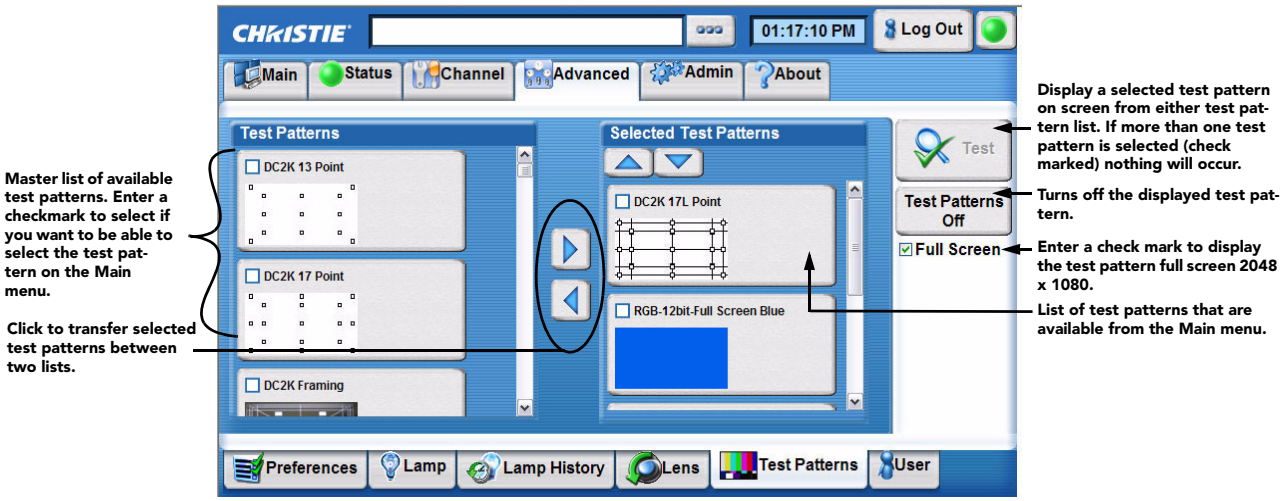



**Figure 3-28 Advanced: Test Pattern Menu Options**

## Advanced: User Menu

The **Advanced: User** menu provides options for the management of users, passwords and user access rights. Depending on your login level, you will be able to manage users having the same or fewer access rights as you.

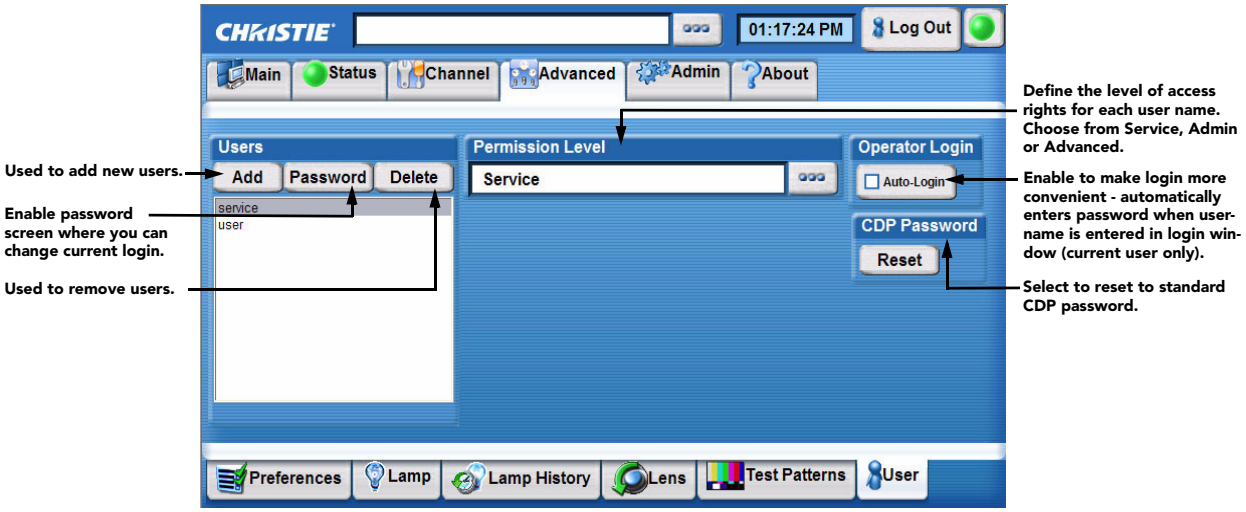



**Figure 3-29 Advanced: User Menu Options**

### Table 3.17 Summary of Advanced: User Menu Options

| ADVANCED: USER MENU OPTIONS | |
|---|---|
| **Add** | Click **Add** and enter the new username in the **Add User** interface using *small letters* only. **NOTE**: *Entering a name in capitals is not accepted.* Next, enter a password to be used with this username and click **OK**. See **Figure 3-30 (Left)** |
| **Password** | Select a username from the **Users** list and click **Password**. In the **Edit Password** interface, enter the new password and click **OK**. |
| **Delete** | Select a user from the **Users** list and click **Delete**. **NOTE**: *cannot be current user.* |
| **Permission Level** | Select a user from the **Users** list. **NOTE**: *cannot be current user.* From the **Permission Level** drop-down list, select a new permission level. See **Figure 3-30 (Right).** |
| **Operator Login** | Enable to automatically enter the password when a user name is entered in the login window. |
| **CDP Password** | Resets the standard CDP password. |


**Figure 3-30 Add User and Alter Permission Level Features**

## 3.4.8 Admin Menu

The seven **Admin** menus (**Source**, **Screen**, **MCGD**, **TCGD**, **Network**, **General** and **Lamp**) offer a broad range of options used primarily for defining how the projector responds to incoming sources in the given environment. There are also options for adjusting a major system parameter affecting overall performance.

### Admin: Source Menu

Incoming sources can vary widely in their current resolution and original aspect ratio. The projector must be able to respond to the myriad of possible combinations, projecting full images of the desired size, content, and proportion in every case. This consistency is achieved by creating a variety of source files in projector memory, each of which indicates the following for the projector:

- Incoming **resolution** (i.e., #pixels across, #pixels top-to-bottom)
- Desired **offset** (i.e., amount of data to discard. Rare.)
- Desired **aspect ratio** (i.e., the original display format to be recovered)

Although in rare cases, the content distributor may include this source information as part of a pre-defined Projector Configuration File (PCF) applied by using the PCF in the projector, alternatively these variables can be defined from the **Admin: Source** menu. With a good collection of assorted source files available in memory, the proper file can then be quickly chosen from within the **Channel: Page 1** menu for implementation in the projector whenever a matching input signal is encountered. **NOTE:** *For any source, the projector relies on Source file settings as well as Screen file settings. Refer to* *Admin: Screen Menu, on page 3-40*.

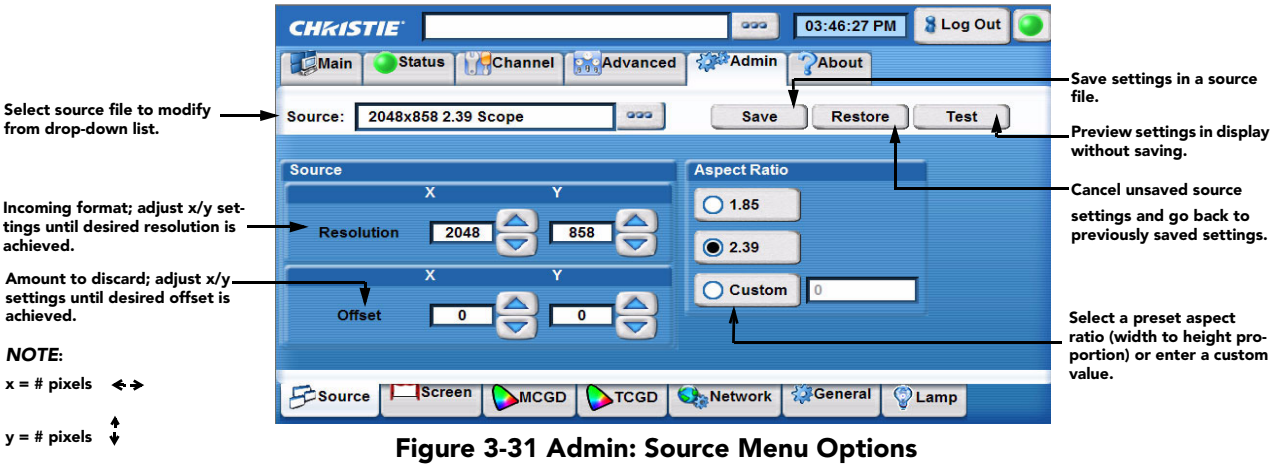



**Figure 3-31 Admin: Source Menu Options**

**Table 3.18 Summary of Admin: Source Menu Options**

| ADMIN: SOURCE MENU OPTIONS | |
|---|---|
| **Resolution** | Record the x/y resolution of your incoming signal, such as 2048 (x) and 1080 (y), or 1920 (x) and 1080 (y). Note that resolution must match the incoming signal format (assuming you want to display all of it), and may differ from the original resolution that you want to recover. See *Resolution Notes* below. |
| **Offset** | Record how much incoming data you wish to discard, essentially delaying the "starting" point for processing. Leave at "0" to process all available data. See *Offset Notes* below. |
| **Aspect Ratio** | Select an apect ratio (width-to-height proportion) of the original cinema format you are trying to recover, usually 2.39 or 1.85. See *Aspect Ration Notes* below. |
| **Save** | Save current settings as the selected source file, which will be accessible from the **Channel: Page 1** menu. |
| **Restore** | Cancel new (unsaved) source settings of resolution, offset and aspect ratio. |
| **Test** | Apply current settings to the image without saving. |

## RESOLUTION NOTES

*To capture/process all of the incoming data*, enter the full resolution of the incoming source material or leave at "0" (default). Regardless of whether or not the original material has been "squeezed" for use with an anamorphic lens, enter the current incoming resolution. Depending on how the source was formatted before distribution, this may not necessarily match the resolution of the projector or the original filmed material. For example, an original 2048 x 1080 native source supplied pre-squeezed as 1920 x 1080 requires a source file indicating this incoming 1920 x 1080 resolution.

*To capture only a portion of an incoming image full-screen—like a "zoom" function—*, enter the approximate horizontal width and vertical height defining the area of the image to zoom in on. The projector automatically scales a center area of this size so that it fills the projector's 2048 x 1080 display. The remaining data is ignored. It may be necessary to experiment with the values to accurately zoom in on a precise area. **Offset** must also be defined to zoom in on an area other than the center.

## OFFSET NOTES

Offsetting an image is achieved by defining how much horizontal width and vertical height to discard. Offset coordinates can be particularly useful when zooming in on a portion of the image—they establish the top left corner location of the zoom area, with **Resolution** determining the size of the area. Leave offset at "0" - processes *all* incoming data or to zoom in at the *center* of the image.

- A positive "x/y" value - discards image data from top and/or left.
- A negative "x/y" value - discards image data from bottom and/or right.

## ASPECT RATIO NOTES

In the event your source material is pre-scaled or compressed, click **Custom** and enter the desired aspect ratio. Adding the 1.25x anamorphic lens widens a "squeezed" image back to its original "scope" aspect ratio. For sources that are not pre-squeezed, aspect ratio can be left at "0" (nothing selected in menu).

## Admin: Screen Menu

The **Admin: Screen** menu defines the portion of the projector's display panel you wish to use and any cropping that is needed to disguise possible keystoning or other geometric aberrations. Once saved, a screen file can be used with any incoming source as desired. Screen data is not included in a PCF and is independent of source settings. Consider screen files as convenient compensations for physical limitations in the environment. You will typically need one or two screen files per site.

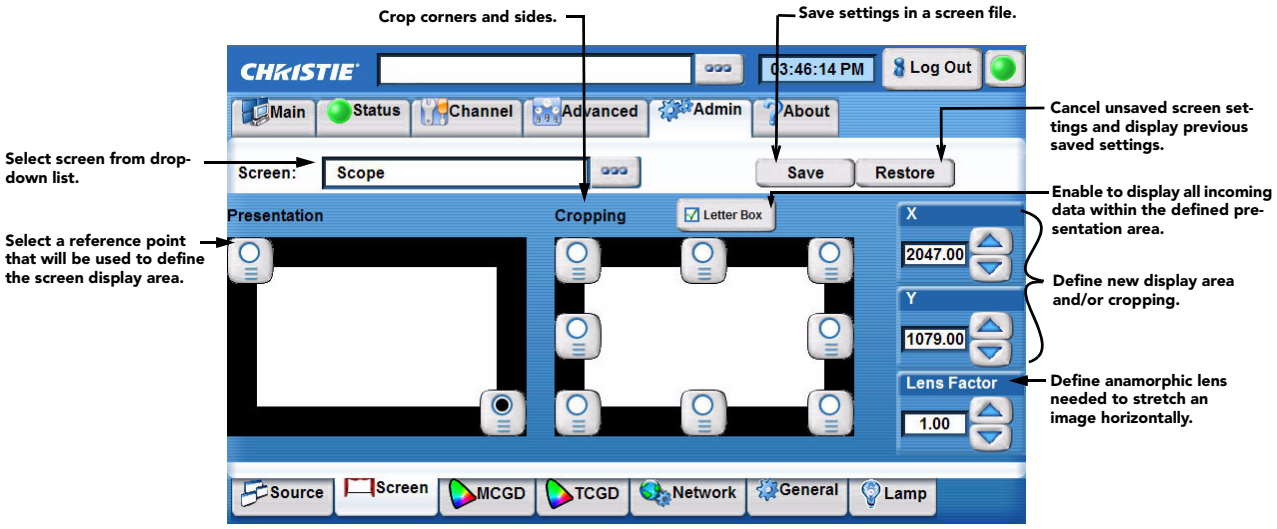



**Figure 3-32 Admin: Screen Menu Options**

### Table 3.19 Summary of Admin: Screen Menu Options

| ADMIN: SCREEN MENU OPTIONS | |
|---|---|
| **Presentation** | Presentation points define what region of the projector's available display area responds to incoming data, i.e. the display size and location. By default, the projector uses its complete display area (a full 2048 x 1080 panel). See *Presentation Notes* below. |
| **Cropping** | Cropping hides unwanted data, useful if the image appears keystoned, etc. See *Cropping Notes* below. |
| **Letter Box** | Letterboxing ensures that all image data is displayed and its aspect ratio is maintained. See Letter Box Notes below. |
| **Lens Factor** | Define the anamorphic lens needed to stretch an image horizontally. Leave at "1" (default) if no anamorphic lens is needed. |
| **Screen** | Select a screen file name from the drop-down list for which to modify settings or create a new screen file with a different name. |
| **Save** | Save current settings as a *Screen* file which can be accessed through the **Channel: Page 1** menu. **Important!** *If you wish to save your settings to a new screen file, make sure to edit the screen file name before you save. Otherwise, you will overwrite the settings of the loaded screen file. Restore will not cancel a Save.* |
| **Restore** | Cancel new (unsaved) screen settings and return to previously saved settings. |

## PRESENTATION NOTES

Presentation points define what region of the projector's available display area respond to incoming data. By default, the projector uses its complete display area, scaling the incoming data as necessary. If for some reason you want to limit the display area, enter the desired upper left and lower right presentation coordinates (or adjust the up and down arrows for the x and y coordinates). You can define a smaller rectangular area in which the left and right top corners will always share the same **y** coordinate and the top and bottom left corners will share the same **x** coordinate. Thus upper right and lower left coordinates are not available to define the area. Incoming data then automatically resizes to fill the reduced rectangular area defined by the new coordinates and any display pixels outside of this area remain off (black).

## CROPPING NOTES

Cropping is the digital equivalent of filing aperture plates in a film projector to perfect the image "square-ness". For example, if the bottom of the image appears slightly wider than the top, select the bottom left or right cropping point and change the coordinates to crop or bring in the corner(s) of the image slightly. Either enter the specific coordinates or adjust using the up and down arrows.

**NOTE:** *This is cropping, not electronic keystone adjustment.* In most cases, cropping assumes that the entire projector display area is in use, thus the coordinates initially define pixel locations on the projector's 2048 x 1080 display area. Images that are significantly smaller in format may actually lie beyond the range of one or more cropping adjustments, thus you will not see evidence of cropping on the edges.

To correct a "bowed" edge so that it appears straight in the display, activate one of the cropping "bow" points between two corner points and adjust the up and down arrows or enter the specific x or y value.

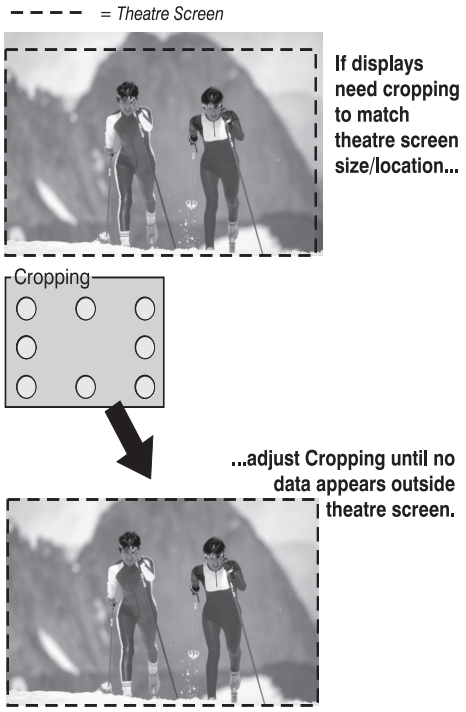



**Figure 3-33 Simple Cropping Example**

## LETTER BOX NOTES

Letter boxing ensures that all image data is displayed and its aspect ratio is maintained. Use letterbox for virtually all normal operation. It ensures that all incoming data displays within your defined presentation area and nothing is discarded. If desired, any "black bars" (unused pixels) could then be cropped off using the cropping control. Although disabling the letterbox control also fills the defined presentation area, any extra data beyond this area—whether top-and-bottom or left-and- right—will be discarded. **NOTE***: Check Letter Box for all cinema presentations.*

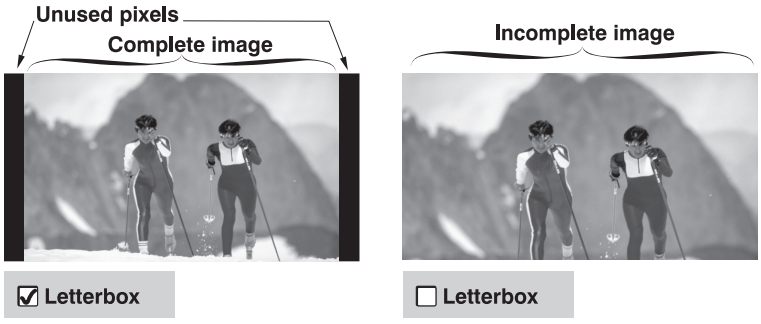



**Figure 3-34 Letter Box vs. Non-Letter Box**

## Admin: MCGD Menu

The **Admin: MCGD** menu allows you to record measurements for currently projected "uncorrected" colors.

Recording the projector's uncorrected color performance is typically completed as a final step (like a calibration) after installation. For this one-time procedure, the installer measures initial "native" (i.e., uncorrected) colors at the screen, enters the data as Measured Color Gamut Data (MCGD) and typically saves an MCGD file called "OnSite". By default, the projector uses this MCGD to calculate and implement precise processing modifications needed to achieve any target color gamut on screen, essentially compensating for the type of port window, screen, lens, light output, ambient light and other current environmental factors influencing on-screen colors. These various industry standards for color performance Target Color Gamut Data (TCGDs) will then be consistently achieved from source-to-source and from site-to-site. If the environment degrades or changes (such as if an anamorphic lens is swapped on and off) or if an internal optical module is replaced, create one or more new MCGD files. To use an MCGD file as the reference file for target color processing (such as with a certain source and/or lens), select it in the **Channel: Page 2** menu.

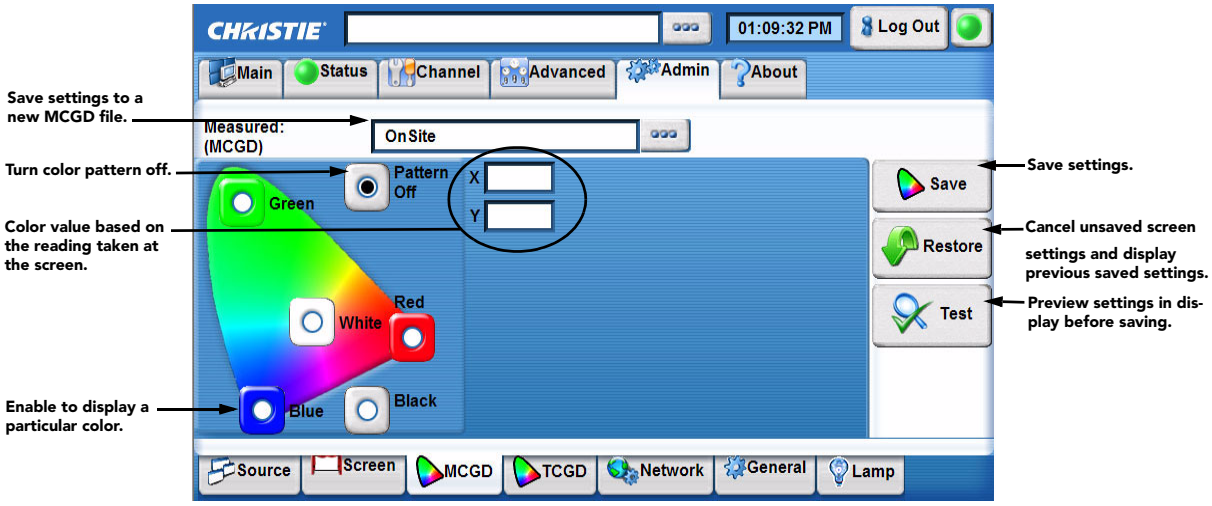



**Figure 3-35 Admin: MCGD Menu Options**

**Table 3.20 Summary of Admin: MCGD Menu Options**

| ADMIN: MCGD MENU OPTIONS | |
|---|---|
| **Measured MCGD** | Activate each color which projects a special full-field test pattern and enter the x/y coordinates measured at the screen with a PR650 Spectrometer. See *Measured MCGD Notes* below. |
| **Save** | This button collects the current color values entered for Measured (MCGD), where you can save them as a new "OnSite" MCGD file or as a different MCGD file with a different name. **NOTE:** *A new "OnSite" overwrites any previously defined "OnSite" file and becomes the default reference point for all future color processing. The old "OnSite" file cannot be recovered.* See *Save Notes* below. |
| **Restore** | This button enables you to return to the gamut menu settings that were present when you opened the menu. See *Restore Notes* below. |

### MEASURED MCGD NOTES

For each color (Red, Green, Blue and White), record the native "uncorrected" x/y color coordinates measured at the screen. These values simply represent the currently viewable primary colors and collectively (when saved) defines the raw color performance "reference point" for this projector in the current environment. Each radio button activates the corresponding full-field YCbCr test pattern of this native color so that measurements can be taken. For example, to measure the red coordinates, click the **Red** radio button to change the screen display to full-field red and measure coordinates at the screen. Repeat for each color and record them in the nearby **X** and **Y** text boxes. After all colors have been measured and recorded, click **Pattern Off** to leave the special test pattern mode. To cancel changes and return to the previous MCGD coordinates, leave the menu without saving.

### SAVE NOTES

By default, the projector refers to "OnSite" data to calculate the corrections needed to achieve a known target color performance standard in the future. However, if the site requires more than one set of native MCGD values (such as when an anamorphic lens is swapped in or out), you can create a new MCGD file with a different file name. Each setup (channel) can then use any desired MCGD file as the basis for the color corrections needed for a target color. MCGD files are chosen in the **Channel: Page 2** menu. **NOTE:** *User created MCGD files can be deleted only by using Christie's licensed DLP Control Application software.*

### RESTORE NOTES

The **Restore** button is disabled unless you have selected the **Test** button. To cancel new MCGD settings that were tested (via the **Test** button) but not yet saved, you can either leave the menu and cancel the settings as requested by the dialogue box, or attempt to save but cancel out of it. If you have already saved a new OnSite file, the old OnSite file cannot be restored.

## Admin: TCGD Menu

The **Admin: TCGD** menu allows you to modify or create custom Target Color Gamut Data (TCGD) files for new color gamut performance and set how closely you want to match the target white.

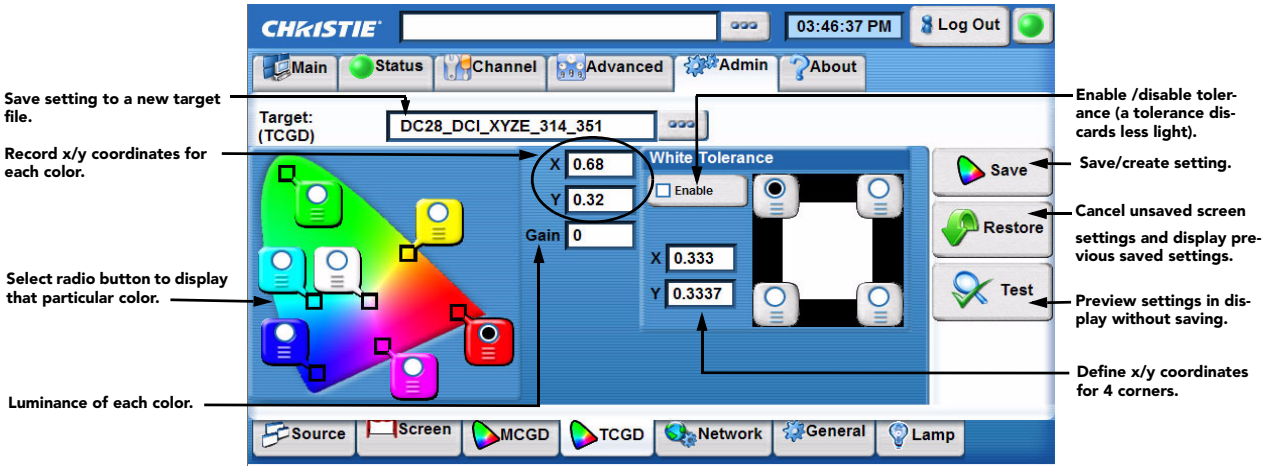



**Figure 3-36 Admin: TCGD Menu Options**

**Table 3.21 Summary of Admin: TCGD Menu Options**

| ADMIN: TCGD MENU OPTIONS | |
|---|---|
| **TCGD** | The Target (TCGD) color fields show the corresponding x/y color coordinates defined for the current target color gamut in use. See *TCGD Notes* below. |
| **Gain** | Gain indicates the luminance (a.k.a. brightness or intensity) of each color as compared to full-on white, ranging from 0 (0%) to 2 (100%). You may want to modify one or more gain values to precisely match color levels in other adjacent displays or to accommodate a studio's internal color management technique. Gain would rarely, if ever, be adjusted for theatre use. |
| **White Tolerance** | The chosen target for white coordinates (White XY) under Target (TCGD) may be relaxed by establishing a small "tolerance box" around it. This box represents four coordinates (0-1-2-3) plotted on a 1931CIE Chromaticity graph and may vary from TCGD to TCGD. See *White Tolerance Notes be*low. |
| **Restore** | Restore returns the gamut menu settings that were present when you opened the menu, assuming Save was not selected. To restore a TCGD file, click **Restore** button any time before saving. |

## TCGD NOTES

You can create a new custom target by defining different coordinates for one or more TCGD colors or simply by changing the tolerance state and this saving as a new TCGD file. **NOTE:** *Industry-defined TCGD standards, such as P7v2 and others, are write-protected and cannot be changed—modifications to such a target must be saved under a new TCGD file name entirely.* Once you have created a new TCGD file, it appears in the **Channel:Page 2** menu where it can be selected for use in the display.

For most applications, TCGD values are used simply to verify that displayed colors actually do match the standard—i.e., you can measure each color at the screen and compare its coordinates to those appearing in the TCGD fields to confirm that the projected colors are accurate. For special applications in which you want to create a unique target color standard, enter new TCGD coordinates as desired and then save as a new TCGD file. Apply as usual from the **Channel: Page 2** menu.

### WHITE TOLERANCE NOTES

If desired, define new tolerance coordinates for the current TCGD to increase or decrease this tolerance area or to change its shape or location. Larger boxes relax the tolerance reducing the loss of light caused by precise matching. If the projector's whites must precisely match the target white point (typical for telecine use) defined for the current TCGD, ensure **Enable** is not selected. If this match can be anywhere within the tolerance box (typical for theatre use), click **Enable**. The checkbox status is saved with the TCGD. Keep in mind that some light is usually discarded for an exact match, resulting in a dimmer image—it is recommended that you enable the tolerance box for all applications requiring maximum brightness, such as in theatres. Do *not* enable the tolerance box if exact color performance is more crucial than overall image brightness, such as in telecine applications.

## Admin: Network Menu

Use the **Admin: Network** menu when you need to define or change the Ethernet settings—i.e., network address of the projector. **NOTE:** *Record any new settings on page 1-3 of this manual.*

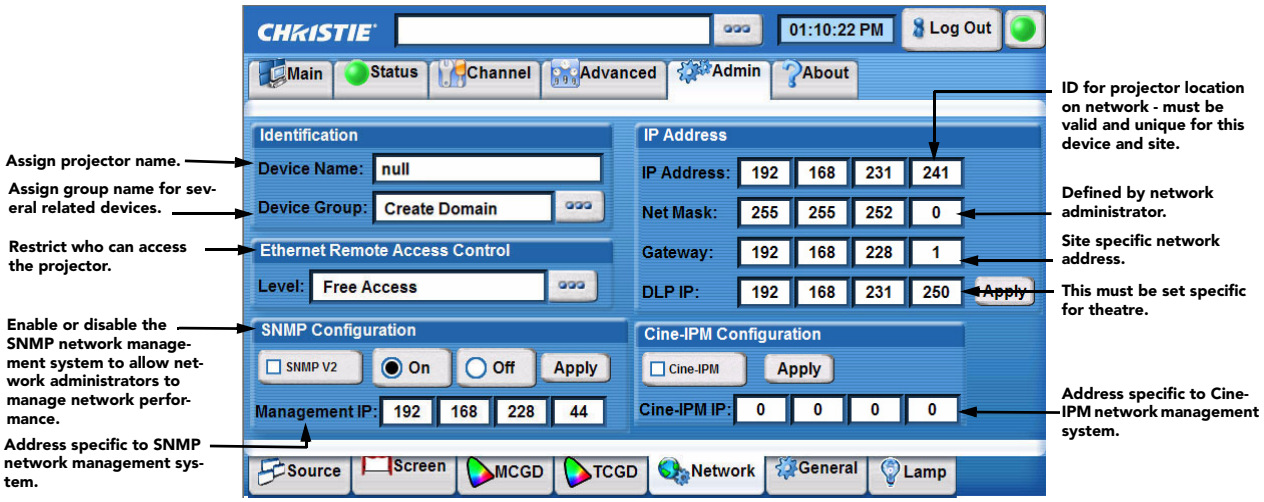



**Figure 3-37 Admin: Network Menu**

**Table 3.22 Summary of Admin: Network Menu Options**

| ADMIN: NETWORK MENU OPTIONS | |
|---|---|
| **Device Name** | Assign a specific name for a device in the network. |
| **Device Group** | Assign a name to a group of related devices on a network. |
| **Ethernet Remote Access Level** | Apply restrictions on who can access the projector remotely (using serial commands). Options include No Access, Login Required or Free Access. |
| **SNMP V2** | Select to enable Simple Network Management Protocol (SNMP) V2. |
| **On / Off** | Enable or disable SNMP V1. |
| **Apply** | Implement SNMP configuration settings. |
| **Management IP** | This is a specific address related to SNMP Configuration assigned by network administrators. |
| **IP Address** | Also called the Management IP Address in the CDP, this is a unique address assigned for a specific device and site. The first three octets of the IP address identify the network to which the device belongs; the last octet identifies the specific device. |
| **Net Mask** | All IP addresses for a network belong to the same Net Mask (also called Subnet Mask in CDP), as defined by the network administrator. |
| **Gateway** | This is a site specific network address. Use the same address for Ethernet Management and Service ports. |
| **DLP IP** | This is a specific address assigned to a theatre by a network administrator. This address rarely requires modification. **NOTES**: **1)** *Use the CDP or Web UI to change. Do NOT use the DLP Control Application.* **2)** *If the DLP IP address is changed, a DLP Communication warning message appears for approximately 2 minutes while the electronics reset. Once this occurs, the message disappears and you can continue communicating with the projector.* |
| **Apply** | Implement current Ethernet configuration settings. |
| **Cine-IPM** | Select to enable Cine-IPM on Ethernet connection only. |
| **Apply** | Implement Cine-IPM configuration settings. |
| **Cine-IPM IP** | Enter the Cine-IPM IP address. |

## Admin: General Menu

The **Admin: General** menu gives the installer options for creating backups of various system settings and defining site specific parameters.

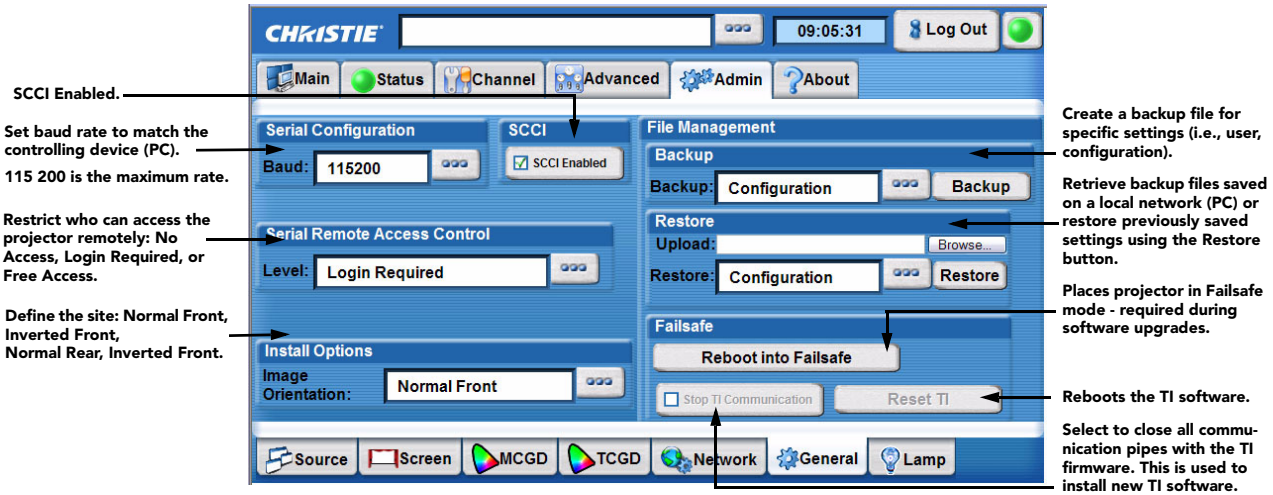



**Figure 3-38 Admin: General Menu Options**

## Admin: Lamp Menu

From the **Admin: Lamp** menu, installers can record minimum and maximum footlambert readings to define a range from which other lamp readings are interpolated.

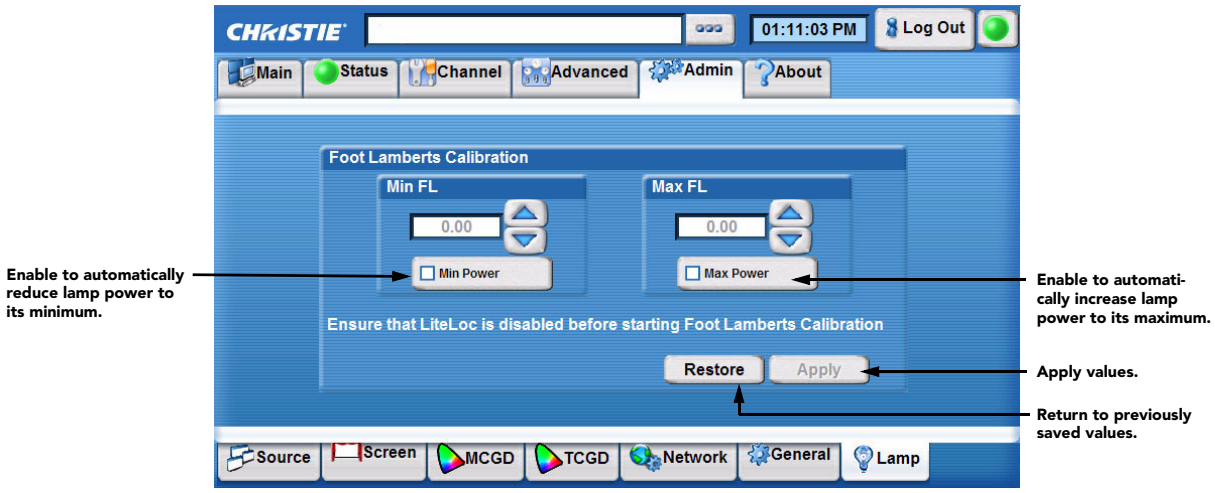



**Figure 3-39 Admin: Lamp Menu Options**

### To Set FootLamberts Calibration

1. Ensure the lamp is turned ON.
2. Click **Min Power** to set the lamp power to its lowest value for the installed lamp. **NOTE:** *If enabled, LiteLOC™ is disabled when Min Power is clicked to allow setting minimum power for the lamp. Once the value is applied, LiteLOC™ returns to its original state.*
3. Enter the FootLamberts measured for the minimum lamp power in the **Min FL** text box by entering the value or using the up/down arrow buttons.
4. Click **Apply** to save the **Min FL** value. Once **Apply** is clicked, the **Min Power** button becomes unchecked, and the **Apply** button becomes greyed-out. Lamp power returns to the lamp power that it was before **Min Power** was clicked.
5. Click **Max Power** to set the lamp power to its highest value for the installed lamp. **NOTE:** *If enabled, LiteLOC™ is disabled when Max Power is clicked to allow setting maximum power for the lamp. Once the value is applied, LiteLOC™ returns to its original state.*
6. Enter the FootLamberts measured for the maximum lamp power in the **Max FL** text box by entering the value or using the up/down arrow buttons.
7. Click **Apply** to save the **Max FL** value. Once **Apply** is clicked, the **Max Power** button becomes unchecked and the **Apply** button becomes greyed-out. Lamp power returns to the lamp power it was before **Max Power** was clicked.

### 3.4.9 About Menu

The **About** menu is a read-only screen that lists important information about the projector such as its serial number, the current level of software and critical hardware components, and the manufacture date.

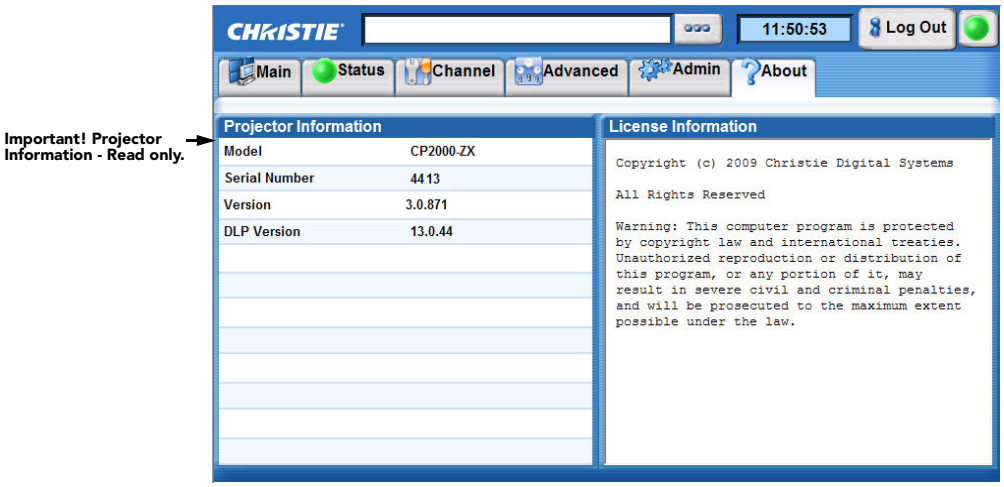



**Figure 3-40 About Menu**

## 3.5 Upgrading and Downgrading Software

### Upgrading to v2.x

This change affects users upgrading to v2.x from an earlier release of software. The memory layout of the projector software has changed between v2.0 and earlier versions of projector software. This requires a one-time software upgrade to the flash memory in the projector. At the end of the v2.0 install, the following message is displayed, ***Please reboot to finalize upgrade to 64 MB flash***. When you reboot, the system prepares the new flash memory. This process takes approximately 10 minutes during which time there is no feedback to the user. At the end of the 10 minutes, the system starts up normally. **NOTE***: If you are currently using v1.0, you must upgrade to v1.1 before loading v2.x or higher.*

### Upgrading to v3.0

The v3.0 software includes drivers for the new flash drive (Numonxy). This software can be safely installed on boards with the old flash drive (it is backwards compatible). **NOTE**: *If you are currently using v1.1, you must upgrade to v2.x before loading v3.0. This needs to be done because the memory layout changed between v1.1 and v2.x.*

### 3.5.1 Steps to Upgrade

#### BOOT INTO FAILSAFE MODE

a. From the web user interface access the **Admin: General** menu.

b. Click **Reboot into Failsafe**. It takes approximately 1 minute for the projector to enter failsafe mode. At this time, the interface will refresh and a Failsafe web screen will appear (**Figure 3-41**). **NOTE***: The CDP will also display "Failsafe".*

### TRANSFER THE SOFTWARE UPGRADE PACKAGE TO THE PROJECTOR VIA FTP

a. From your desktop, open the folder containing the software upgrade package. The upgrade package ends with the extension **.shar**. **NOTE***: If you are currently using v1.0 you must upgrade to v1.1 before loading v2.x or higher.*

b. Open a separate web browser window and go to the address: ***ftp://xxx.xxx.xxx/*** (where *"xxx.xxx.xxx"* represents the IP address of the projector being upgraded). A blank ftp window will appear.

c. Drag the upgrade package from your desktop and drop it into the blank ftp window. Allow the file to copy over.

### INSTALL THE SOFTWARE UPGRADE PACKAGE TO THE PROJECTOR.

a. From the Failsafe web screen, click **Reload** to display the .shar upgrade package that was transferred to the projector in the above step. The .shar file will appear in the **Upgrade Packages** region, as shown in **Figure 3-41**.

b. Select the .shar file and click **Upgrade** to begin the upgrade. Allow approximately 15 minutes for the upgrade. A status window will appear to show percentage complete. Click **Close** to continue.

### REBOOT THE PROJECTOR INTO APPLICATION MODE.

a. Once the upgrade is complete, click **Reboot** from the Failsafe web screen. This reboots the projector back into application mode and the login screen will appear. Allow approximately 2 minutes to complete.

## 3.5.2 Downgrading from v2.x to v1.1

If you downgrade from v2.x to an earlier version (v1.1), the loading procedure must be performed twice. This is due to a change in the memory structure of the firmware that occurred in v2.0. **NOTE***: This procedure cannot be completed remotely. You must have physical access to the projector in order to activate the* ***Power OFF*** *button on the Control Display Panel (CDP).*

1. Perform the regular software load to go from v2.x to v1.1. Once the downgrade is complete, reboot the projector by clicking the **Reboot** button in the failsafe web application. (**Figure 3-41**).

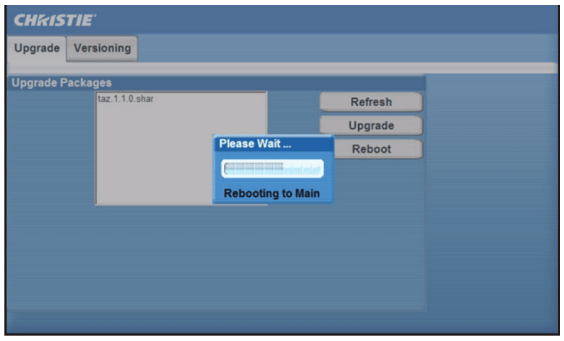



**Figure 3-41 Failsafe Web Application**

2. Wait for the three LEDs on the CDP to flash. While the LEDs are flashing, press and hold the **Power OFF** button on the CDP to enter into failsafe. Failsafe is displayed on the CDP once you are in FAILSAFE mode. **NOTE***: If you failed to correctly complete this step, you must reboot the projector and repeat this step again (wait for the three LEDs to flash and press/hold the* ***Power OFF*** *button). To reboot the projector, use a small object such as a paperclip to press in the reboot button on the PCM.* (**Figure 3-42**).
3. Once in failsafe, FTP the v1.1 software to the projector and open a web browser to connect to the failsafe web application. Once you are connected to the projector through the web browser, you should be in the failsafe web application. Select the v1.1 package to upgrade to and then click **Upgrade** (this is your second downgrade to the v1.1 software package.) **NOTE***: When a downgrade has been performed only once, the projector will no longer be able to boot into Main code. Failsafe mode is the only thing you will be able to successfully do.*

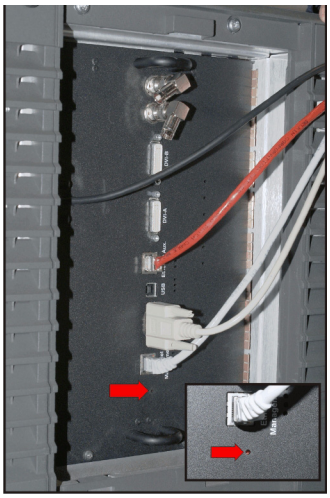


**Figure 3-42 Reboot**

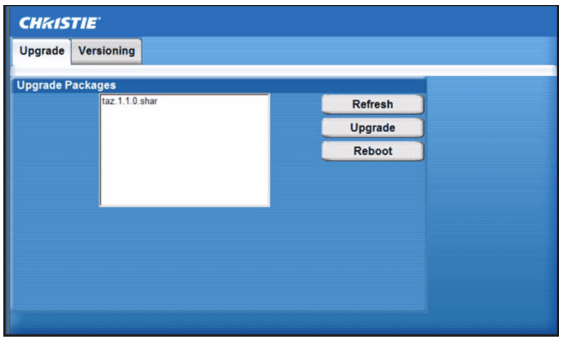



**Figure 3-43 Upgrade**

4. Once the downgrade is complete, reboot the projector by clicking the **Reboot** button in the failsafe web application. The downgrade from 2.x to 1.1 is now complete.

## Downgrading from v3.0 to v2.X

On new boards (17.4.2), the software cannot be downgraded because older versions do not include support for the new flash driver. The software can be safely downgraded on boards with the old flash drive though. The failsafe UI will prevent downgrades if it detects a new board.

## 3.6 Working with the Lamp

Simple software controls and adjustments can help to optimize lamp performance and ensure the brightest, most uniform image possible for the life of the lamp. These controls are located in the **Advanced: Lamp** and **Admin: Lamp** menus. For more information, refer to *Advanced: Lamp Menu, on page 3-33*, and *Admin: Lamp Menu, on page 3-47*. These controls are also available on the CDP.

### 3.6.1 Turning the Lamp ON or OFF

#### Using the Web User Interface

**ON:**

1. Make sure the wall circuit breaker is ON.
2. From the **Main** menu, select ✓ **Power On**, ✓**Lamp On** and ✓**Douser Open.** Wait several minutes for the lamp to turn on. (**Figure 3-45**)

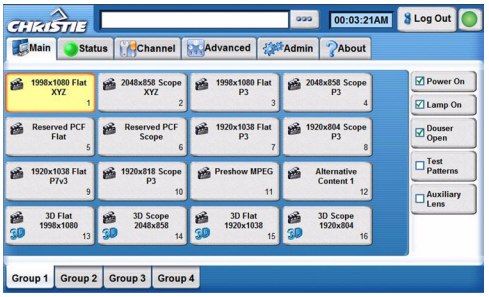



**Figure 3-45 Turn the Lamp On Using the Web User Interface**

**OFF:**

1. De-select **Lamp On**. Then **wait** for fans to run for 10 minutes to cool the lamp and other components.
2. De-select **Power On** to turn the projector off.
3. Turn wall circuit breaker OFF.

#### Using the CDP

**ON:**

With the wall circuit breaker ON, press and hold the **POWER ON** button for approximately 1/2 second to power the projector on. Then press **LAMP ON** to ignite the lamp.

**OFF:**

Press **LAMP OFF**. The screen goes dark, but the projector's cooling fans will keep running. **Wait** for fans to run for 10 minutes to cool the lamp and other components completely. Then press **POWER OFF** to power down the projector. Turn wall circuit breaker OFF to disconnect power.

#### If the Lamp Fails to Ignite

The projector automatically re-tries ignition after 10 seconds using 100% of the maximum power acceptable for the lamp. If this re-try also fails, and there is no interlock problem such as an open lamp door, a new lamp is likely needed. The power reverts back to what was originally defined in the menus by the user.

## 3.6.2 Adjusting Lamp Power (LiteLOC™ or Manually)

There are two different lamp modes for general operation - maintain a specific brightness level (LiteLOC™) or a specific lamp power level. **NOTES: 1)** *Requires Advanced user permissions.* **2)** *Keep in mind the formula:* **Current (Amperes) x Voltage (Volts) = Lamp Power (Watts).** **3)** *Adjust LiteLOC™ before or after adjustment of lamp position.*

### Using LiteLOC™

Maintain a specific brightness level from your lamp over time as follows:

1. In the **Advanced: Lamp** menu, adjust **Lamp Power** until the desired light output is reached at the screen (typically 14 fL). Any LiteLOC™ will automatically be disabled.
2. Click **Set** to record the current brightness reading in memory. **NOTE:** *arbitrary units-of-measure are shown above the light output bar.*
3. **Enable** LiteLOC™. As the lamp ages and loses efficiency, the projector gradually and automatically supplies more current to the lamp as necessary to maintain your chosen level of light output for as long as possible (the light level is read from an internal light sensor). To change your LiteLOC™ setting, adjust the Lamp Power as desired and then click **Set**. The LiteLOC™ function automatically begins to maintain this new setting.

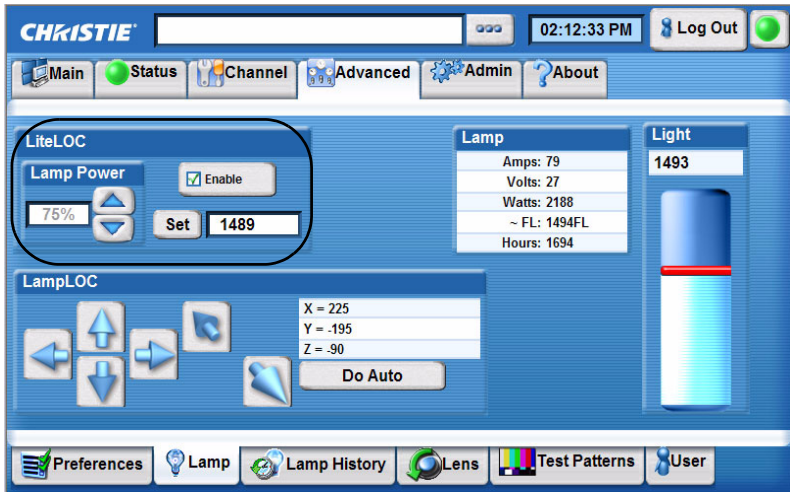



**Figure 3-46 Enable LiteLOC**

#### When should I use LiteLOC™?

Typically, most theatre installations would use LiteLOC™ for daily operation, since it need only be set once for each lamp install and ensures consistent worry-free brightness at the screen for as long as possible. If desired, reset LiteLOC™ to a different level at any time or override with a specific lamp power setting.

#### How long can I maintain brightness?

Software can maintain a LiteLOC™ setting until the required power exceeds the maximum rating for the lamp (2.0 or 3.0 kW) by approximately 10%. The lower your LiteLOC™ setting, the longer it takes to reach this "over-drive" threshold and the longer you can maintain the desired brightness.

### Adjusting Lamp Position (LampLOC™)

Align a newly-installed lamp as soon as possible to ensure optimized lamp performance and peak brightness at the screen for the life of the lamp. **NOTES: 1)** *Before adjusting, a 10-minute warm-up is recommended. Also make sure to follow all the criteria specified in* *Section 2.5 Initial Power Up*. **2)** *You can adjust lamp position either before or after adjustment of Lamp Power or LiteLOC™.*

### Use the "Do Auto" Button for LampLOC™

For best results in all installations, align the lamp by clicking the **DO AUTO** button in the **Advanced: Lamp** menu. The motors and sensors in the projector will work together to precisely position the lamp for optimized performance and brightness, utilizing filtering to eliminate signs of lamp flicker. Once aligned, this LampLOC™ setting can be considered fairly stable for the life of the lamp. **TIP***: You can improve on-screen uniformity after using Do Auto by manually adjusting the z-axis motor. However, brightness efficiency will be decreased by a very small amount when this is done*.

### When to use the individual LampLOC™ buttons

The individual LampLOC™ arrow buttons, each of which moves the lamp in one axis only, are provided as a reassuring back-up should the **DO AUTO** button fail or if you feel a manual, operator-assisted lamp optimization results in more output or improved brightness uniformity. Either measure your results with a light meter at the lens and screen or simply watch the light output gauge in the **Advanced: Lamp** menu. **NOTE:** *These buttons may attain a slightly higher peak than with the **DO AUTO** button, but the peak may not be centered on the lamp curve and lamp performance may not be optimized. Also, the **DO AUTO** button utilizes filtering to eliminate the effects of any lamp flicker. In general, use the individual buttons only when you feel it is unavoidable.*

### How to adjust (if using a light meter)

Obtain peak readings on a light meter centered in front of the lens, then at the center of the screen. For each button, continue in one direction and then back up when reading begins decreasing. **NOTES: 1)** *Display a 100% white internal test pattern.* **2)** *Use a tripod to center the light meter with the lens. Distance from the lens does not matter. You may need an attenuator or wish to construct an internal foil aperture first.* **3)** *This is an optional procedure—use the light output gauge in the Advanced: Lamp menu if preferred.* **4)** *After performing LampLOC™ (Do Auto), brightness uniformity may also be improved on some lamps by manually adjusting the z-axis motor control. In some instances, this may cause a reduction in overall brightness.*

1. Adjust forward/aft (Z) until the brightness reading in front of the lens is maximized.
2. Adjust left/right (X) and up/down (Y) until the brightness reading in front of the lens is maximized.
3. Re-adjust forward/aft (Z) as necessary.
4. Repeat Steps 1-3 as necessary.
5. Repeat Steps 1-4, but reading at the screen instead of at the lens.
6. Reset Lamp Power or LiteLOC™ if desired.

## 3.6.3 Age of a Lamp

### When to Replace a Lamp

When a new lamp is installed and its serial number recorded in the **Advanced: Lamp History** menu, the lamp timer resets to "0" and begins logging time for the new lamp. All lamp information is displayed in the **Advanced: Lamp History** menu including the last eight lamp logs.

Assuming the lamp **Expiry Message** checkbox has been enabled in the **Advanced: Preference** menu (recommended), an expiry message will appear as an alarm window when the lamp has reached its defined **Lamp Expiry** limit and should be replaced. **DANGER! 1)** *It is recommended that you set Lamp Expiry based on the average lifetime of the lamp, as older lamps become increasingly fragile and more prone to sudden failure or even explosion, which can be damaging and dangerous.* **2)** *Lamp replacement must be performed by qualified service technicians only.* These maximum limits appear in the table below:

**Table 3.23 Lamp Expiry Hours**

| Lamp Type | Replace BEFORE |
|---|---|
| CDXL-20 (2.0 kW) | 3500 hours |
| CDXL-30 (3.0 kW) | 2500 hours |
| CDXL-30SD (3.0 kW) | 2000 hours when operating at 2.5 kW<br>1100 hours when operating at 3.0 kW |

### Lamp Rotation

When the lamp reaches mid-life, a Lamp Rotation message will appear as an alarm window to indicate the bulb should be physically rotated 180° to ensure an even burn of the lamp. Rotating the lamp improves its performance and life expectancy.

Lamp rotation requires removal of the quartz bulb and therefore the same safety precautions as lamp replacement must be taken. Lamp rotation must be performed by qualified service technicians only.

You must acknowledge that lamp rotation has taken place before beginning normal operation again via the web user interface **Advanced: Lamp History** menu or CDP **Lamp** menu.

### Maintaining Footlamberts

Over time, as the theatre screen ages and dust and dirt collects on the port window, the theatre may no longer be achieving the expected footlamberts as reported. It is a good idea to periodically recalibrate footlamberts (**Figure 3-39**).

## 3.7 Working with the Lenses

The lens mount secures the primary zoom lens to the projector and provides setup adjustments for correct boresight, and controlled focus, zoom and offsets for general use. To save the focus, offset and zoom settings to the channel, you must make the adjustments using the motorized lens mount adjustment features. These adjustments can be made from the **Lens Control** menu from the CDP or via one of two menus from the Web UI: the **ILS** screen launched from the **Main** menu or the **Channel: Lens** menu. Using the knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary use and will therefore be lost once the channel changes. **NOTE**: *After any manual adjustment, click **Lens Reset** in the **Advanced: Lens** menu to ensure ILS settings are properly recalled.*

An optional anamorphic lens (1.25x) can be installed into the optional auxiliary lens mount, then swung into place in front of the primary lens to widen a “squeezed” image into a properly proportioned “scope” anamorphic cinema display. It is typically used in theatres having side masks that are retracted for “scope” images, or in theatres having fixed side masking but a very short throw ratio. Refer to *Section 2.8 Offset and Boresight Alignment* for all lens installation and boresight instruction. Refer to *Section  Channel: Lens Menu, on page 3-30* for ILS and channel setups.

### 3.7.1 Lens Mount Functions

**⚠ WARNING 1) If the Motorized Auxiliary Lens Mount (MALM) is present, ensure to move the MALM to the OUT position before performing any lens calibrate or reset functions on the Motorized Primary Lens Mount to prevent collision between the projection lens and the MALM. 2) Hazardous moving parts. Keep fingers and other body parts away.**

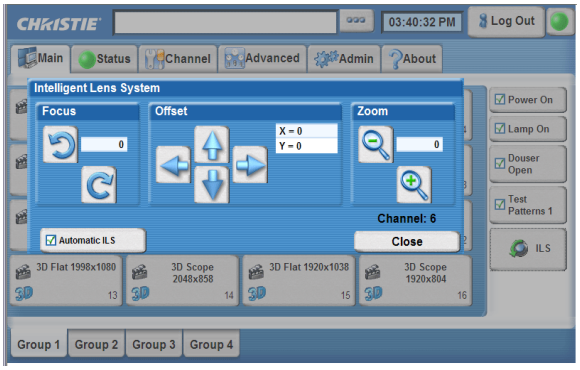



**Figure 3-47 Intelligent Lens System**

**NOTES: 1)** *Projector must be fully assembled and powered up in its final location.* **2)** *Keep clear of rotating parts. Remotely operated motors may start to spin without warning.* **3)** *Avoid long hair, jewelry, and loose clothing exposure to the knobs during manual adjustment.* **4)** *In case of emergency, unplug the line cord to immediately halt movement of the lens mount.* **5)** *When adjusting the Focus, Offset, and Zoom, you may experience a slight delay in the response rate of the lens upon selecting the buttons.*

#### Focus

- From the **Main** menu, click **ILS**. Click the clockwise/counterclockwise buttons as necessary for overall focus improvements.

#### Offsets

- From the **Main** menu, click **ILS**. Click the up/down/left/right buttons as necessary to adjust the image and make it square on the screen. For best results, avoid extreme tilts or offsets. Corner vignettes on a white test pattern indicates extreme offset that should be avoided. If you need more vertical offset range, you can mechanically adjust tilt to help compensate for significant differences in screen and lens height.

#### Zoom

- From the **Main** menu, click **ILS**. Click the zoom in/out buttons to enlarge or shrink the image in each direction as necessary.

## 3.8 Working with 3D

A single projector can display 3D images as described below. Such images require a 3D-capable source as well as additional hardware and cabling to correctly display and interpret in a typical stereo 3D viewing environment. Images generated from a 3D-cinema source consist of a series of images (frames or fields) that alternate quickly between two slightly different viewpoints corresponding to the physical separation of our left and right eyes (called parallax). When these frames are displayed with enough speed and viewed with special glasses synchronized with the left/right (L/R) frame sequencing, the resulting "single" perceived image appears with much the same depth and perspective we sense in the real world. The new full resolution triple flash hardware (Brilliant3D) includes an FPGA Formatter Interface Board (FFIB) which allows for full 2K resolution using a 6:2 frame rate multiplication (Triple Flash). Triple Flash 3D is reference to a frame rate that is of a high enough frequency to eliminate flicker as noticeable by the eye. The standard frame rate for most 2D D-Cinema content is 24 frames per second (FPS) as it is for film. For 3D, the server splits the 3D content (video signal) into 2 interleaved signals of 24 FPS each by the server, for a total of 48 FPS input into the projector. The projector's frame rate multiplication is set to 6:2, meaning the input frame rate is multiplied by 3 (Triple) for a total frame rate of 144 frames per second (Hz or FPS). For the Brilliant3D hardware, the TI DLP version 13.1 or higher is required.

After connecting signals to the projector, use the web user interface **Channel: 3D Control** menu to define and control the signal processing, synchronizing and output for devices used in your stereographic 3D display. Refer to *Channel: 3D Control Menu, on page 3-27*. These settings ensure critical ordering and timing of the incoming left/right frames so they merge correctly into a convincing artifact-free 3D display without cross-talk, ghosting or other artifacts.

### 3.8.1 Requirements for 3D

To display 3D, the CP2000-ZX requires a 3D capable SMPTE source and a few special hardware / software setups as described below:

- ❒ CP2000-ZX projector (includes all standard 3D components)
- ❒ Two HD-SDI cinema signals (left and right) connected to the projector's SMPTE ports **292-A** and **292-B**. **NOTE:** *Use of a single input consisting of both left and right data is not currently supported.*
- ❒ Sync output device:
  - IR emitter for controlling the L/R gating (switching) of active glasses

OR

  - Pi-Cell polarizer for controlling a screen that has a silver polarization-preserving surface for use with passive glasses

OR

  - Filter Wheel for controlling the spectrum of light for use with passive glasses

- ❒ Custom 3D sync output cable (GPIO) such as available from RealD:
  - For routing the projector's output sync to your sync output device (connect from the projector's GPIO to the emitter, filter wheel controller or polarizer). **NOTE***: The GPIO connector can be accessed from the right side of the projector. Refer to* *Appendix C: GPIO* *for GPIO pinout information.*
- ❒ Power supply for your sync output device, typically wired with the custom GPIO cable.
- ❒ Proper 3D configuration defined in the **Channel: 3D Control** menu. Use an internal test pattern for best results.

## 3.8.2 Hardware Setup

Refer to the illustrations provided for the general hardware configuration supported. Use either an IR emitter to control gating in active glasses, a polarizing cell and Z-screen with passive glasses or filter wheel with passive glasses.

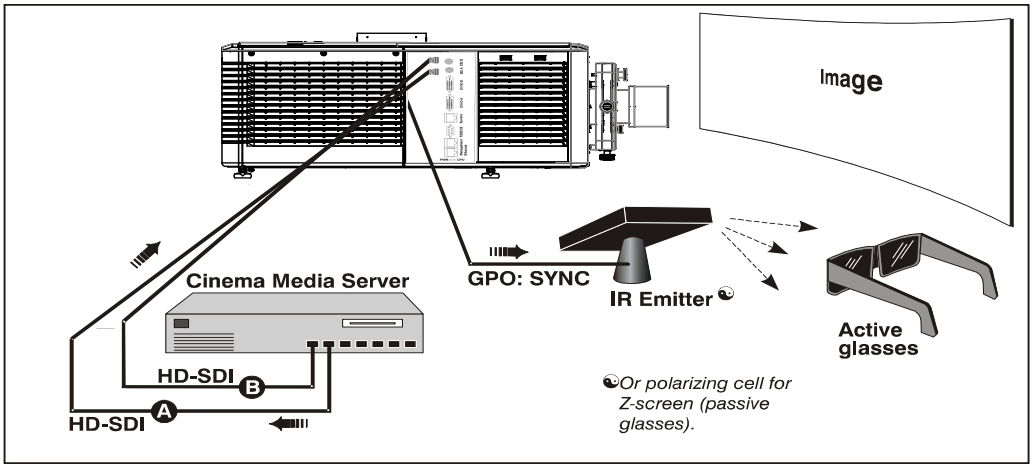



**Figure 3-48 3D Hardware Setup**

## 3.8.3 3D Instructions

**NOTES:** ***1)*** *Assume a full 2048 x 1080 display and 3D enabled in the* ***Custom: 3D Control*** *menu.* ***2)*** *3D stereo sync or "reference signal" is part of input signal, matching the vertical sync.*

### Hardware Instructions

1. Connect two HD-SDI signals from a 3D media server to the projector's SMPTE cinema ports **292-A** and **292-B**. One carries left eye data, the other right eye data. Connect to either port. You will configure the projector to multiply and interleave the L/R signals properly.
2. Connect GPIO (output). From the projector's GPIO port, connect your 3D stereo sync cable to your 3D controlling device such as an emitter, filter wheel or polarizer. **NOTE***: Use Dolby supplied cable for Dolby filter wheel, otherwise RealD 3D sync cable recommended*.

### Web User Interface Instructions

1. Click **Enable 3D**.
2. **SET THE FRAME RATE: NOTE:** *6:2 can now be used for 3D content in flat (1998 x 1080) or scope (2048 x 858) displays.*

   Both incoming frame rates are likely too slow for flicker-free 3D viewing and need to be increased within the projector for at least 96Hz output. For example, a typical HD-SDI rate of 24Hz is still only 48Hz when L/R are combined. In the **Channel: 3D Control** menu (**Figure 3-49**), set the desired **Frame Rate N:M** ratio or number of frames displayed per number of frames for complete data. For example, a setting of 6:2 creates 6 frames from 2 inputs (=144Hz). **NOTE:** *Frame rate multiplication less than 6:2 may flicker at slow incoming frame rates.*

3. **DEFINE THE 3D SYNC INPUT MODE**:

   For dual inputs,

   • Set **3D Sync Input Mode** to **Active Port: A/B = L/R** or vise versa

   This setting tells the rest of your system that incoming 3D stereo sync information is included with the two L/R image data inputs rather than routed separately to the GPIO port.

   For future single-input 3D sources where the server supplies a separate 3D stereo sync to the projector's GPIO port instead, set **Sync Input** according to the input # used (i.e. according to your GPIO cable wiring.)

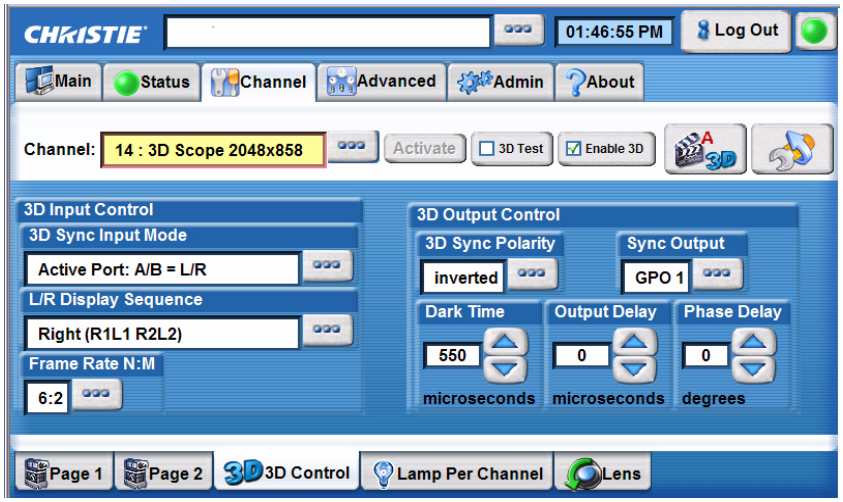



**Figure 3-49 Setup for 3D**

4. **DEFINE L/R DISPLAY SEQUENCE:**

   • Set **L/R Display Sequence** to **Right (R1L1R2L2)** or vise versa

5. **DEFINE SYNC OUTPUT:**

   • Set **3D Sync Polarity** to **inverted**. **NOTE**: *If the display appears reversed, i.e. background appears close and foreground appears at a distance, you will need to make sure that the cable connecting server output A is connected to projection input A and the cable connecting server output B is connected to projection input B.*

## 3.8.4 3D Troubleshooting

### 3D Test Pattern

Use the 3D internal test pattern to confirm 3D mode, L/R orientation and your sync output setting. This pattern automatically activates 3D mode and increases frame rate by a factor of 6:2. **NOTE:** *The test pattern will flicker significantly due to its low frame rate and is not recommended for synchronizing projector processing with your 3D device.*

### Image Breakup

Increasing the **Dark Time** beyond its maximum may cause image breakup.

### No 3D Effect

Certain settings in the **Channel: 3D Control** menu are likely reversed.

### Ghosting / Cross-talk

Ghosting or cross-talk indicates that the eyes are detecting portions of the opposing frame due to an "out-of-sync" system. Adjust **Dark Time** or **Output Delay** so that the projector's display output is synchronized with the gating (switching) of your glasses.

### Motion Artifacts

If the image seems to jump back and forth during horizontal pans, the **L/R Display Sequence** is likely backwards. Try reversing the current setting.

### Single 3D Input Not Working

A single source signal containing both left and right data is not currently supported.

# 3.9 Cinema Operation

This section explains how trained operators can use the projector for presenting cinema events such as first-run movies stored on a digital media storage device. Please read through these pages before displaying cinema for the first time. A good understanding of all cinema functions and how to access them will help you to run an event smoothly and easily. **NOTE:** *Before attempting cinema use, the projector must be properly installed, aligned and configured by a qualified service technician as described in Section 2 Installation & Setup.*

## 3.9.1 Compatible Cinema Sources

Make sure a digital media storage device or cinema server is connected to one of the 292A or 292B input ports. These connections are typically made at the time of projector installation. Refer to **Figure 2-16**.

**Table 3.24 Standard Single-link SMPTE 292M Formats**

| Source Standard | Original Source Resolution | Vertical Frequency (Hz) | Scan Type | Display Resolution | Display Frame Rate (Hz) |
|---|---|---|---|---|---|
| SMPTE 296M | 1280 x 720 | 29.97 / 30 | Progressive | 1920 x 1080 | 29.97 / 30 |
| SMPTE 296M | 1280 x 720 | 50 | Progressive | 1920 x 1080 | 50 |
| SMPTE 296M | 1280 x 720 | 59.94 / 60 | Progressive | 1673 x 941 | 59.94 / 60 |
| SMPTE 260M | 1920 x 1035 | 59.94 / 60 | Interlaced * | 1920 x 1080 | 23.98 / 24 |
| SMPTE 274M | 1920 x 1080 | 23.98 / 24 | Progressive | 1920 x 1080 | 23.98 / 24 |
| SMPTE 274M | 1920 x 1080 | 25 | Progressive | 1920 x 1080 | 25 |
| SMPTE 274M | 1920 x 1080 | 29.97 / 30 | Progressive | 1920 x 1080 | 29.97 / 30 |
| SMPTE 274M | 1920 x 1080 | 59.94 / 60 | Interlaced * | 1920 x 1080 | 23.98 / 24 |
| SMPTE 295M | 1920 x 1080 | 50 | Interlaced ** | 1920 x 1080 | 25 |
| SMPTE RP 211 | 1920 x 1080 | 23.98 / 24 | Progressive (sF) | 1920 x 1080 | 23.98 / 24 |
| SMPTE RP 211 | 1920 x 1080 | 25 | Progressive (sF) | 1920 x 1080 | 25 |
| SMPTE RP 211 | 1920 x 1080 | 29.97 / 30 | Progressive (sF) | 1920 x 1080 | 29.97 / 30 |

**NOTES**: **1)** *Vertical rates shown as M/N where M = N/1.001.* **2)** ** Signal must include 3:2 pull down encoding.* **3)** *** Signal must include 2:2 pull down encoding.*

**NOTE:** *When both 292M inputs are used together in a dual-link configuration, they will support all the formats listed in* **Table 3.24** *in 4:4:4 YCbCr or RGB format with 10 or 12 bits per component. Also supported is the 4:2:2 YCbCr progressive input with 10 bits per components and a pixel format of 1920 x 1080 at 47.96 or 48fps.*

## 3.9.2 Image Formats

Two standard types of cinema displays — flat and scope — differ in their width-to-height aspect ratio as shown below:

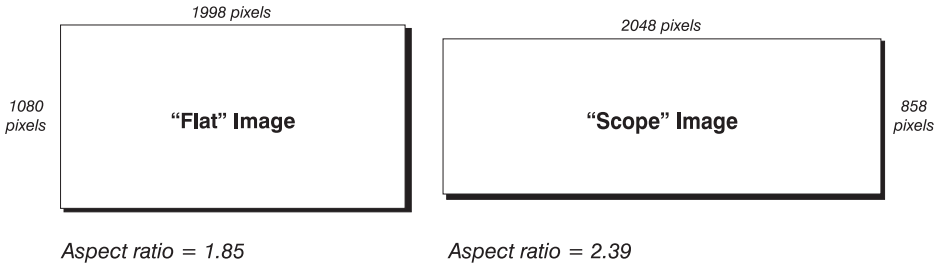



**Figure 3-50 Standard Cinema Formats**

Achieving either of these displays from a wide variety of incoming source material depends on proper settings in the projector as well as certain theatre conditions.

### Projector Variables: Using an Anamorphic Lens

Because the native resolution / format of the projector closely matches the flat aspect ratio (the native resolution being only slightly wider, at 1.89), the projector can essentially show incoming "flat" images through its standard zoom lens. "Scope" source material can be resized electronically to fill the DMD and then its pixels are stretched through the anamorphic lens so that the full 2.39 image width appears on screen.

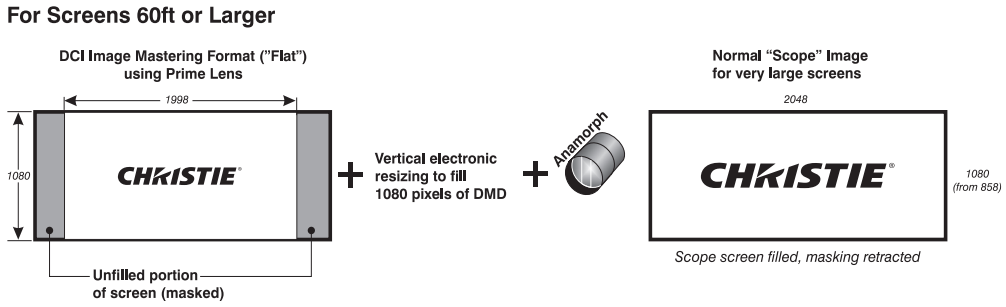



**Figure 3-51 Using Anamorphic Lens to Achieve "Scope" for Large Screens**

## Projector Variables: Using a Wide Converter Lens

The optional Wide Converter Lens acts similar to a zoom lens. It magnifies a “flat” image format of 1.85:1 to a “scope” image of 2.39:1, while maintaining the full resolution of the source material.

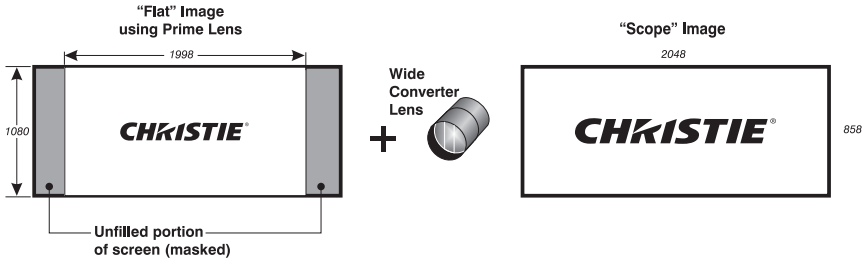



**Figure 3-52 Using Wide Converter Lens to Achieve “Scope” with No Resizing**

## Theatre Variables: Masking

In order to present either type of feature on a single screen, a theatre typically uses masking to conceal any unused edges(s) of the screen. These movable flat black panels, or black curtains, are most commonly installed along the top edge of the screen changing the height of the screen but not its width.

### Top Masking

- Add top masking for “scope”
- Raise top masking for “flat”

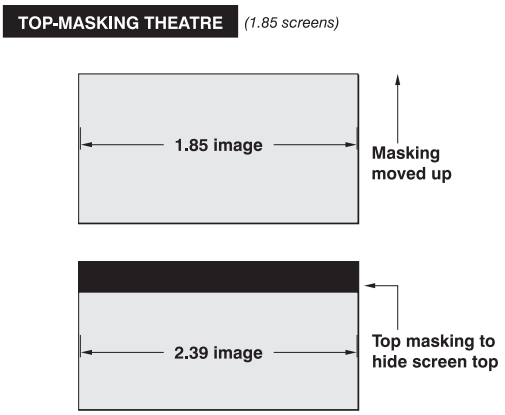



**Figure 3-53 Top Masking for Scope**

### Side Masking

Alternatively, curtains (masks) may be installed at each side of the screen in order to change the width of the screen but not its height.

- Bring in masking from sides for “flat”
- Open masks for “scope”

In some cases, a theatre has both side and top/bottom masking installed. This arrangement is the most flexible of all.

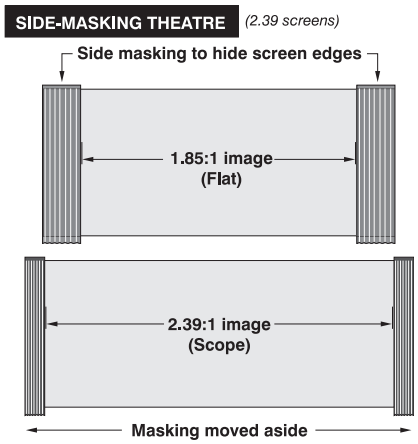



**Figure 3-54 Side Masking for Flat**

## 3.10 Non-Cinema Operation

This subsection explains how to display alternative content originating from standard definition or high definition non-cinema sources such as a PC or other graphics devices.

Connect your non-cinema DVI source to the DVI-1 and DVI-2 ports. Each DVI port accepts and will auto-detect the progressive scan, digital RGB sources (**Table 3.25**) displaying them in their original incoming format. Currently, DVI signals cannot be scaled to a different size and/or aspect ratio. **NOTE**: *Each DVI port is a single-link port for a single-link cable/connector only. Using this pair of ports as a higher-bandwidth dual-link or twin-link pair requires additional hardware and is not currently supported.*

**Table 3.25 Compatible Non-Cinema DVI Sources**

| Incoming Format | Vertical Frequency (Hz) | Processing Path Required |
|---|---|---|
| 1024 x 768 | 23-85 Hz | Non-cinema |
| 1280 x 1024 | 23-85 Hz | Non-cinema |
| 1400 x 1050 | 23-60 Hz | Non-cinema |
| 1920 x 1080 | 23-48 Hz | DLP Cinema |
| 1920 x 1080 | 23-62 Hz | Non-cinema |
| 2048 x 1080 | 23-48 Hz | DLP Cinema |
| 2048 x 1080 | 23-58Hz | Non-cinema |

**NOTE:** *Also compatible with HDCP-encrypted DVI signals.*

### 3.10.1 Selecting a Source

For any display, the projector interprets incoming signal data according to one of 64 user-selectable display files defined at the time of installation (or with each subsequent release of a new digital cinema feature) and stored in projector memory. Each file is essentially a collection of processing/display settings optimized for a particular cinema feature or non-cinema content, which enables consistent presentations with minimum further adjustment. Each file is represented by an assigned "channel button" selectable over several pages of the **Main** menu from the web user interface. Depending on your installation, you may have 0-64 different non-cinema sources defined for use. For more information, refer to *Section 3.4.3 Main Menu*.

**SELECT A NON-CINEMA SOURCE:** With a non-cinema source connected to the projector, select the desired non-cinema source display button from the **Main** menu or by scrolling through a **CHANNEL LIST** on the CDP. Once selected, the projected display changes according to the corresponding file settings.

**RETURN TO A CINEMA SOURCE:** Select one of the cinema display buttons pre-configured for a cinema source input at port 292A or 292B from either the **Main** menu or from the **CHANNEL LIST**—the projector now ignores the DVI ports and responds to the cinema source selected.

# 4 Maintenance

This projector is designed with safe and reliable operation in mind. However, safe operation is not assured by design alone; installers, service technicians, trained operators and all other users must maintain a safe operating environment at all times. Read through this section in its entirety and understand all warnings and precautions before attempting to operate the projector. This section contains:


- *4.1 Safety Warnings and Guidelines*
- *4.2 Maintaining Proper Cooling*
- *4.3 Maintenance and Cleaning*
- *4.4 Replacing the Lamp*
- *4.5 Replacing the Filter*
- *4.6 Replacing the Lens*

# 4.1 Safety Warnings and Guidelines

## 4.1.1 Labels and Marking

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

The exclamation point within the equilateral triangle indicates related operating/maintenance instructions in the documentation accompanying the projector.

The lightning flash and arrowhead symbol within the equilateral triangle indicates non-insulated “dangerous voltage” within the projector's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

## 4.1.2 General Precautions

Be aware of the following general precautions in all CP2000-ZX installations:

**Warnings! 1)** *Never look directly into the projector lens or at the lamp. The extremely high brightness can cause permanent eye damage.* **2)** *For protection from ultraviolet radiation, keep all projector housings intact during operation. Protective clothing and safety goggles are recommended.*

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

**Warnings! 1)** *FIRE HAZARD. Keep hands, clothes, and all combustible material away from the concentrated light beam of the lamp.* **2)** *Position all cables where they cannot contact hot surfaces or be pulled or tripped over.*

This projector must be operated in an environment that meets the operating range specification in *Section 6 Specifications*.

### 4.1.3 AC / Power Precautions

Installation of this projector requires that an electrician hard-wire (permanent-wire) a single-phase feed from the projector to the AC supply at the building site. Operate the projector at the specified voltage. **Warnings! 1)** *Do not attempt operation is the AC supply is not within the specified voltage range.* **2)** *This product does not include a built in AC breaker. A 30-32A double pole, UL listed wall circuit breaker is required. It must be part of the building installation and easily accessible.* **3)** *Do not use a wall breaker greater than 32A. This could result in severe damage to the projector in the event of a failure.* **4)** *Protection from over-currents, short circuits and earth faults must be part of the building installation. A disconnect device (double pole switch or circuit breaker with minimum 3 mm contact gap) must be readily accessible within the projection room.* **5)** *Disconnect projector from AC before opening any enclosure.*

- Do not allow anything to rest on the power cord. Locate the projector where the cord cannot be abused by persons walking on it or objects rolling over it. Never operate the projector if the power cable appears damaged in any way.
- Do not overload power outlets and extension cords as this can result in fire or shock hazards.
- Note that only qualified service technicians are permitted to open any enclosure on the product and only if the AC has been fully disconnected from the product.

### 4.1.4 Lamp Precautions

Any Xenon arc lamp used in the CP2000-ZX is under high pressure and must be handled with great care at all times. Lamps may explode if dropped or mishandled. **DANGER!** *EXPLOSION HAZARD -Wear authorized protective clothing whenever the lamp door is open!*

#### Wear Protective Clothing

Never open the lamp door unless you are wearing authorized protective clothing such as that included in a Christie Protective Clothing Safety Kit P/N 598900-095.

Recommended protective clothing includes, but may not be limited to a polycarbonate face shield, protective gloves, latex lab gloves and a quilted ballistic nylon jacket or a welder's jacket.

**NOTE:** *Christie's protective clothing recommendations are subject to change. Any local or federal specifications take precedence over Christie recommendations.*

#### Cool the Lamp Completely

The arc lamp operates at a high pressure that increases with temperature. Failure to allow the lamp to sufficiently cool prior to handling increases the potential for an explosion causing personal injury and/or property damage. After turning the lamp OFF, it is crucial that you ***wait at least 10 minutes*** before disconnecting AC and opening the lamp door. This provides enough time for the cooling fans to properly cool the lamp. Ensure the lamp is completely cooled before handling and **always** wear protective clothing! **DANGER! 1)** *Lamp may explode causing bodily harm or death. Always wear protective clothing whenever lamp door is open or while handling lamp. Ensure those within the vicinity of the projector are also suited with protective clothing.* **2)** *Never attempt to access the lamp while the lamp is on. Wait at least 10 minutes after the lamp turns OFF before powering down, disconnecting from AC and opening the lamp door.* For all other precautions critical for safe removal and replacement of the lamp, refer to *Section 4.4 Replacing the Lamp*.

## 4.2 Maintaining Proper Cooling

The CP2000-ZX high-intensity lamp and electronics rely on a variety of cooling components to reduce internal operating temperatures. Regular checking and maintenance of the entire cooling system is critical to prevent overheating and sudden projector failure and helps to ensure reliable operation of all projector components over time.

### 4.2.1 Ventilation

 Vents and louvers in the projector covers provide ventilation, both for intake and exhaust. Never block or cover these openings. Do not install the projector near a radiator, heat register or within an enclosure. To ensure adequate airflow around the projector, keep a minimum clearance of 19.69” on the left, right and rear sides of the projector from any walls or other obstructions.

### 4.2.2 Air Filter

#### CHECK: Monthly

It is recommended the air filter (located on the right side of the projector near the input connection panel) is replaced whenever the lamp is replaced, or sooner in dusty or dirty environments. A clogged air filter reduces air flow and can lead to overheating and failure of the projector. Check monthly by inspecting its color through the side vent grille with a flashlight. A grey colored filter should be replaced. Refer to *Section 4.4 Replacing the Lamp* for instructions. It is also recommended that you visually check the laminar airflow device (LAD) filter located just beyond the air filter opening using a flashlight. The LAD filter should be nearly white or light gray in color. See also *Laminar Airflow Device (LAD), on page 4-8*.

### 4.2.3 Liquid Cooler

#### CHECK: Every 6 months

The liquid cooler system circulates liquid to and from the DMD heatsinks in the CP2000-ZX reducing the DMD operating temperature to an acceptable level. Check the coolant level every 6 months, by removing the air filter door and viewing it through the grille. Shine a flashlight through the grille if necessary. Make sure the level of coolant remains between the two level indicators (preferably closer to the top indicator). (Refer to *Section 4.5 Replacing the Filter* for instructions on removing the air filter.)

If the liquid cooling system should fail, an over-temperature alarm window will display. If an over-temperature state remains for more than one minute, the lamp will turn OFF.

### Filling the Coolant Reservoir

Top up the coolant level using the Christie approved coolant Jeffcool E105 and refill bottle with the nozzle provided in the Liquid Coolant Fill Service Kit (P/N 003-001837-02). **Danger!** *HAZARDOUS SUBSTANCE - The coolant used in this product contains ethylene glycol. Use caution when handling. Do not ingest.* **Warnings!** *Do not use coolants other than that specified by Christie with your projector. Using unapproved coolant can result in projector damage and will also void projector warranty.* When refilling, use caution not to spill or let any of the coolant drip on or near the electronics. Fill the coolant reservoir only to its maximum fill line (top level indicator). Do not fill it more than this. **NOTE:** *After filling the reservoir, check the coolant hoses to ensure no kinks have been introduced that may restrict fluid flow.*

**TIP**: In the event coolant drips on any electronics or other nearby components, blot the affected area using a dust-free optical grade tissue. It is recommended you blot a few times, discard the tissue and use a new tissue to blot the area again. Keep repeating this cycle until the coolant is cleaned up. Then lightly moisten a new tissue with de-ionized water and blot the area again. Use a dry tissue to dry the area off. Repeatedly using clean tissue and blotting the area should successfully remove coolant spills.

## 4.2.4 Exhaust Duct and Lamp Fan Interlocks

### CHECK: Every 6 months

Check and maintain the projector's two vane switches every 6 months. One is located in the exhaust duct and the other is near the lamp fan. Check operation as follows:

1. Turn power to the projector ON, but do not turn lamp on.
2. Turn OFF extractor fan.
3. Confirm that the extractor fan vane switch has indicated an extractor error message either through the CDP or web user interface **Status: Interlocks** menu. Turn extractor fan back on.
4. Block air intake at rear of the projector.
5. Confirm that the lamp fan vane switch has indicated a "blower error" either through the CDP or the web user interface **Status: Interlocks** menu. Clear the air intake to correct the issue.

**NOTE***: If the exhaust duct becomes significantly blocked, or if a fan fails, the projector's airflow sensor should trigger a shutdown before the projector becomes overheated or unsafe. Regardless,* ***check the airflow periodically***.

# 4.3 Maintenance and Cleaning

To help ensure optimized performance and reliability, regularly check electrical, optical and other components as described below. **DANGER!** *Electrical SHOCK HAZARD. Disconnect from AC when servicing. Ensure the proper protective clothing is worn during maintenance.*

## 4.3.1 Lamp

### CHECK: Every 60 days or 500 hours

Do the following (always disconnecting from AC first, and wearing authorized protective clothing):

- Check the contact surfaces of anode (positive) and cathode (negative) connections for cleanliness.
- Clean electrical contact surfaces as necessary to prevent contact resistance from scorching connectors.
- Verify that all electrical and lamp connections are tight.

## 4.3.2 Optical

Unnecessary cleaning of optics can be more harmful than helpful, increasing the risk of degrading delicate coatings and surfaces. In this projector, check only the lens and lamp reflector. Maintenance of other optical components requires a qualified service technician. Check these components periodically in a clean, dust-free environment using a high-intensity light source or flashlight. Clean them only when dust, dirt, oil, fingerprints or other marks are obvious. Never touch an optical surface with your bare hands. Always wear latex lab gloves.

### Optical Component Cleaning Supplies

- Soft camel-hair brush
- Dust-free blower - filtered dry nitrogen blown through an anti-static nozzle
- Dust-free lens tissue such as Melles Griot Kodak tissues (18LAB020), Optowipes (18LAB022), Kim Wipes or equivalent
- *For lens only.* Lens cleaning solution such as Melles Griot Optics Cleaning Fluid 18LAB011 or equivalent
- *For reflector only.* Methanol
- Cotton swabs with wooden stems only
- Lens cleaning cloth/microfibre such as Melles Griot 18LAB024 or equivalent

## 4.3.3 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**.

Dust:

1. Brush most of the dust off the lens with a camel-hair brush and/or blow dust away with compressed air.
2. Fold a microfibre cloth smooth and gently wipe remaining dust particles off the lens. Make sure to 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.

Fingerprints, smudges, or oil present:

1. Brush most of the dust off with a camel-hair brush and/or blow dust away with compressed air.
2. Roll a lens tissue around a swab and soak it in the coated optics cleaning solution. 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.

### 4.3.4 Cleaning the Reflector

#### CHECK: Check during each lamp replacement

Inspect the mirror surface (reflector) for cleanliness only during a lamp replacement when the lamp is already removed. Wear protective clothing while inspecting or cleaning. It is normal for the color on the reflector surface to vary.

Dusty:

1. Brush most of the dust off the lens with a camel-hair brush and/or blow dust away with compressed air.
2. If some dust remains, leave as is. Since the air circulating at the lamp is unfiltered, some dust is inevitable. Avoid unnecessary cleaning.

Fingerprints, smudges, or oil is present:

1. Brush most dust off of the lens with a camel-hair brush and/or blow dust away with compressed air.
2. Fold a clean microfibre cloth and dampen with methanol. Make sure to wipe evenly with the smooth portion of the cloth that has no folds or creases. **Do not apply pressure with your fingers.** Use the solution in the cloth to collect the dirt.

### 4.3.5 Other Components

In a normal operating environment check, clean and treat the components listed below every 6 months or so to help ensure proper lamp and projector function.

#### Lamp Fan

**⚠ CAUTION Do not bend the impeller blades or loosen the balancing weights.**

A clogged lamp fan impeller or motor can reduce air flow leading to possible overheating and lamp failure of the lamp.

1. Vacuum loose dirt from the lamp fan impeller.
2. If necessary, use a brush with hot water and suitable detergent.

#### Igniter

Clean the high voltage terminal and insulator to remove accumulated dust or dirt.

### Airflow Interlocks

The CP2000-ZX uses two airflow interlocks; a lamp fan vane switch and an extractor vane switch.

The lamp fan vane switch is located within the lamp cooling compartment. The extractor vane switch is located just inside the top duct on the projector lid. Check and clean the switches to remove accumulated dust or dirt that could impede movement if necessary. Within the exhaust duct connected at the top of the projector, adequate airflow must be maintained and routed outside of the building. Inspect regularly and confirm that 1) there are no obstructions or "kinks" within the ducting, 2) all air intake areas are unobstructed, and 3) exhaust airflow is at least 450 CFM* (measured at the rigid end of the duct when not connected to the projector). Refer to *Section 4.2 Maintaining Proper Cooling*.

**⚠ CAUTION * 600 CFM is required in projection rooms with ambient temperature above 25°C or elevation (above sea level) greater than 3000 feet.**

### Laminar Airflow Device (LAD)

Whenever checking/replacing the air filter on the side of the projector, also visually check the small square laminar airflow device (LAD) filter just beyond the filter opening. The LAD filter should be nearly white in color. If it appears a dark gray color (rare) it will require replacement by a qualified technician only. Contact Christie or your dealer.

## 4.4 Replacing the Lamp

**⚠ DANGER 1) Lamp replacement must be performed by a qualified service technical only. 2) EXPLOSION HAZARD. Wear authorized protective clothing whenever the lamp door is open and when handling the lamp. Never apply a twisting or bending force to the quartz lamp body. Make sure to use the correct wattage lamp supplied by Christie. 3) Ensure those within the vicinity of the projector are also wearing protective safety clothing 4) Never attempt to remove the lamp when it is hot. The lamp is under a great deal of pressure when hot and may explode, causing personal injury or death and/or property damage. Allow lamp to cool completely.**

#### STEP 1: Turn OFF Main AC

Press **POWER OFF** from the CDP to turn the lamp OFF. Allow the fans to run for at least 10 minutes for cooling.

#### STEP 2: Unplug the Projector

When the cooling fans stop, turn the projector's main switch OFF and unplug. Always power down and unplug the projector prior to servicing. Allow the lamp to cool before handling.

#### STEP 3: Open the Lamp Door

Wearing protective clothing and face shield, unlock the lamp door and open it. If desired, release the latch mechanism to remove the door entirely.

### STEP 4: Remove the Old Lamp and Inspect the Reflector

a. Remove the front lamp duct to reveal the cathode end (-) of the lamp.

b. Loosen set screws from negative/cathode (rear, 7/64”) and positive/anode (front, 3/16”) lamp connectors. Make sure to apply minimal torque and DO NOT STRESS the quartz tube. (**Figure 4-1**).

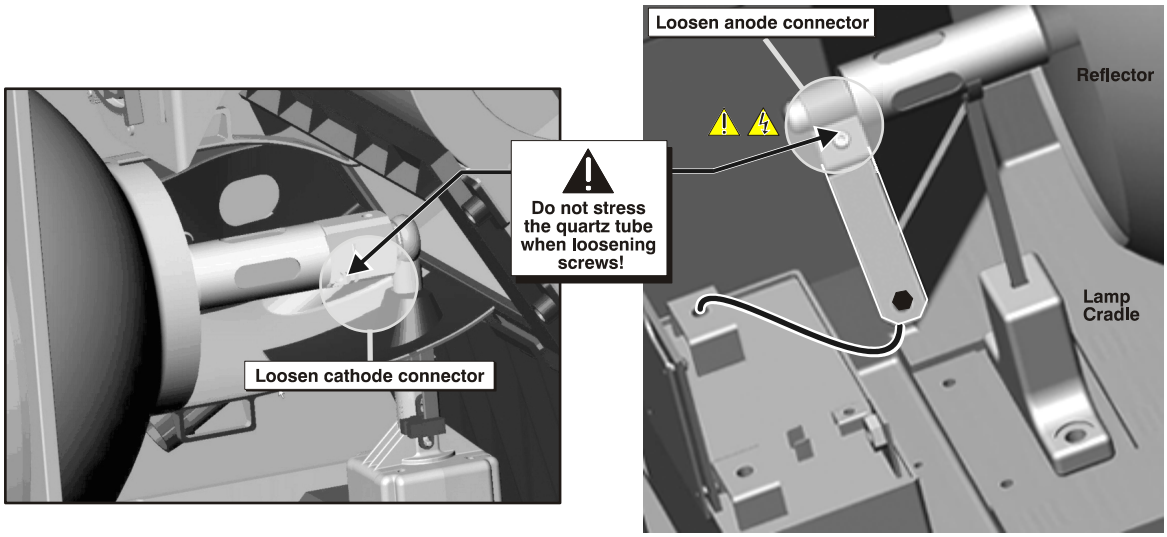



**Figure 4-1 Loosen Cathode (-) and Anode (+) Connectors to Remove Bulb**

c. Carefully slip the positive anode connector off the front of the lamp.

d. Handling by the cathode end only, unscrew the lamp from the rear connector. Carefully remove the lamp from the projector and immediately place it inside the protective cover or original packaging. To complete the procedure, place the lamp on the floor where it cannot fall or be bumped. **Warning!** *Handle box with extreme caution - the lamp is hazardous even when packages. Dispose of lamp box according to safety regulations for your area.*

e. With the lamp removed, visually inspect the reflector for dust. Clean the reflector if necessary as described earlier in *Section 4.3.4 Cleaning the Reflector*.

### STEP 5: Remove the Protective Cover from the New Lamp

Remove tape, knurled nut and locking star washer securing the lamp within its cover.

### STEP 6: Install New Lamp

a. If you are installing a different type of lamp from the original, ensure the correct position of the anode yoke. Refer to **Figure 2-9**.

b. If installing a 3.0 kW CDXL-30SD lamp, make sure the lamp extension nut, supplied with the projector, is installed on the cathode end connector. If you are installing any other lamp type, make sure this extension nut is removed. The purpose of the extension nut is to correctly position the lamp for optimal light output.

c. Insert the threaded cathode (-) end of the lamp into the negative lamp connector nut located in the rear of the lamp compartment. Using both hands, hand-tighten this end into the threaded nut. **Caution! 1)** *Handle the lamp by the cathode/anode end shafts only, never the glass. DO NOT over-tighten. DO NOT stress the glass in any way.* **2)** *Check leads. Make sure the anode (+) lead between the lamp and igniter is well away from any projector metal such as the reflector or firewall.*

d. Rest the anode (+) end of the lamp on the lamp cradle and slip the positive lamp connector over the bulb end. Using the 3/16" Allen key, squeeze together with the anode clamp making sure not to place any torque on the lamp quartz tube. **Important!** *For CDXL-30SD lamps, make sure the "flat" part of the anode end of the lamp (if applicable) is facing in the 10 or 2 o'clock position once the lamp finger is installed in the 14mm threads and the cross screw is tightened. For all other lamp types, keep the "flat" part of the anode end of the lamp facing up.*

e. Tighten set screws in both negative and positive lamp connectors. See **Figure 4-2**. **Important!** *Proper electrical contact prevents resistance in the lamp connectors.* **Caution! 1)** *Handle the lamp by the cathode/anode end shafts only, never the glass. DO NOT over-tighten. DO NOT stress the glass in any way.* **2)** *Check leads. Make sure the anode (+) lead between the lamp and igniter is well away from any projector metal such as the reflector or firewall.*

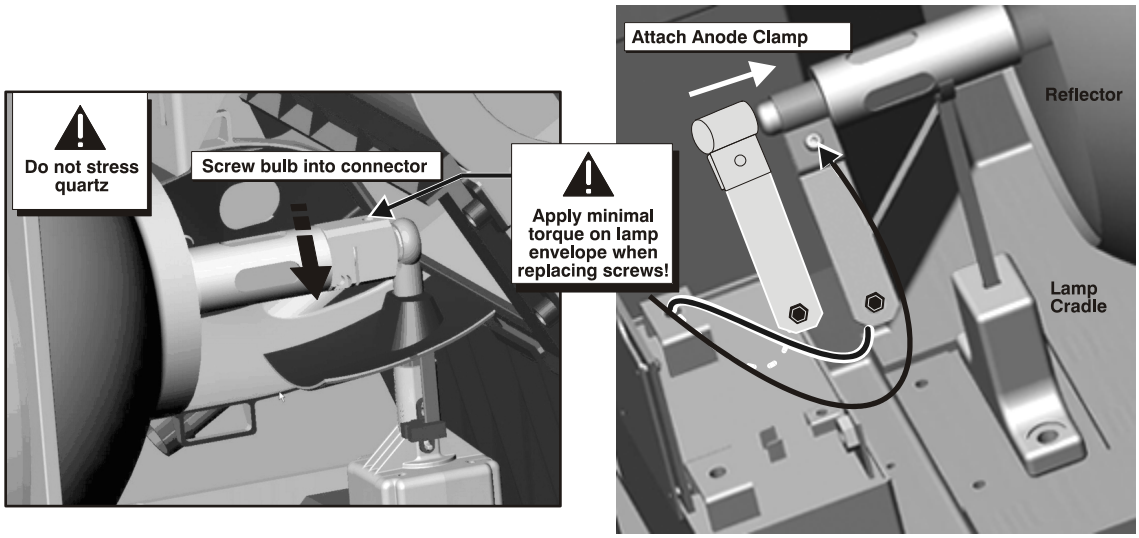



**Figure 4-2 Install New Lamp**

## STEP 7: Re-install the Front Lamp Duct

**Critical!** As you install the front lamp duct, lift the small light shield on the rear lamp duct cover (**Figure 4-3**) so that it does not get jammed between the two pieces when they come together. To ensure a good fit between the two pieces, squeeze the top and bottom cover snaps to ensure they are locked in place. The light shield should move freely to the touch.

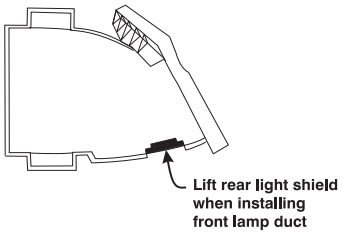



**Figure 4-3 Lift Light Shield**

### STEP 8: Close Lamp Door

### STEP 9: Turn Wall Circuit ON

### STEP 10: Web UI Adjustments

In the **Advanced: Lamp History** menu of the web user interface, select **New Lamp** and record lamp type, serial number and number of the hours logged on to the lamp. If the lamp has not been previously used, enter 0.

### STEP 11: Turn Lamp ON

Press **LAMP ON** on the CDP.

### STEP 12: Adjust LampLOC™

**Immediately adjust lamp position (LampLOC™)** via the CDP **Lamp** menu or the **Advanced: Lamp** menu in the web interface (refer to *Section 3.4.7 Advanced Menu*). By adjusting lamp position, you can achieve optimized light output by centering the lamp with the reflector and obtaining correct distancing from the center of the illumination system.

## 4.5 Replacing the Filter

**⚠ WARNING Use only special, high efficiency Christie approved filters. Never operate the projector without the filter installed.**

**⚠ CAUTION Always discard used air filters.**

Replace the air filter whenever the lamp module is replaced or sooner if operating the projector in a dusty or dirty environment. Check monthly in all cases. The filter is located on the inputs side of the projector behind the air filter cover. To replace:

1. Release two tabs on the air filter cover and remove.
2. Slide the air filter out and discard. Insert the new air filter with the airflow indicator facing toward the projector. **NOTE**: *Never reuse an old air filter. The air filters in this product cannot be cleaned thoroughly enough for reuse and can lead to the contamination of optical components.*
3. Replace the air filter cover by inserting the two bottom tabs into place and then snapping the door closed.

## 4.6 Replacing the Lens

A variety of primary lenses can accommodate different throw distances and specific types of installations. Refer to *Section 6 Specifications*. Turn the lens clamp to the OPEN/UP position.

1. Release the lens locking lever (UP position).
2. Pull out the lens and replace it with a different high-brightness or high-contrast lens. **NOTE***: Always install the lens with "UP" label in the top position. This will assist in achieving consistent boresight alignment each time the lens is replaced.* Refer to *Section  STEP 6 - Install Lens(es), on page 2-6*.
3. Secure the lens with the lens locking lever (DOWN position).
4. Calibrate the lens. Refer to *2.7 Basic Image Alignment* for details.

# 5 Troubleshooting

If the projector does not appear to be operating properly, note the symptoms present and use the following guide to assist you. If you cannot resolve the problems yourself, contact your dealer for assistance. **NOTE:** *A qualified service technician is required when opening an enclosure to diagnose any probable cause.*


- *5.1 Power*
- *5.2 Lamp*
- *5.4 Ethernet*
- *5.5 Cinema Displays*
- *5.6 Non-Cinema Displays*

# 5.1 Power

## 5.1.1 Projector Will Not Start

1. Check the status of the LEDs on the CDP. If there is no activity (ON and READY not initially flashing), check the wall circuit breaker to see if it's ON.
2. Look through the rear, right side grill. If the unit does not contain a UPS, only the left green LED should illuminate. If the unit has been rewired for a UPS, two green LEDs should illuminate.
3. If there is a problem with the wall circuit breaker "tripping" OFF, have a certified electrician investigate any electrical problem.

# 5.2 Lamp

## 5.2.1 Lamp Does Not Ignite

1. Is there an interlock failure? From the CDP **Status** menu, check the **Alarms** and **Interlocks** submenu. From the web user interface, check the **Status: System** menu.
2. If there is any indication through the **Status** menu of a ballast communication problem, re-boot the projector and try turning the lamp on again.
3. If the DMD temperature is too high, the lamp will not ignite. Cool the projector and try again.
4. If the lamp does not ignite after the second try, replace the lamp.
5. Listen for a "clicking" noise to indicate the igniter is attempting to strike the lamp. If you do not hear anything, it may indicate a problem with the igniter (Christie service required).
6. If you hear a brief "click", but no light appears, the lamp likely needs replacement.

## 5.2.2 Lamp Suddenly Goes Off

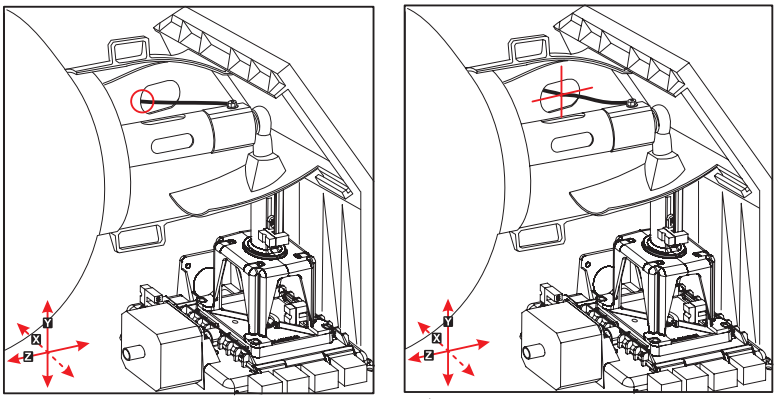
1. Check lamp power through the CDP **Lamp** menu or from the web user interface **Advanced: Lamp** menu. Try increasing lamp power. **NOTE***: Older lamps may not reliably operate at significantly lower than rated power.*
2. The DMDs may be overheated. Check for an alarm condition.
3. An interlock may be interrupting lamp function.
4. Replace the lamp.

## 5.2.3 Flicker, Shadows Or Dimness

1. Ensure the douser is open.
2. LampLOC™ may need re-adjustment.
3. LampLOC™ may be in the middle of its adjustment. Wait approximately 2-3 min.
4. Adjust LampLOC™ motors manually via the CDP. Confirm all stepper motors are operational by watching on screen with a full white test pattern while adjusting.
5. Increase lamp power, if possible. Lamps which are near end of life may not operate reliably at lowest power range.
6. Fold mirror misalignment (Christie service required).

### 5.2.4 LampLOC™ Does Not Seem to Work

1. If the **Do Auto** LampLOC™ function does not work, try adjusting the lamp position manually via the **Lamp > LampLOC** > **Manual Adjust** menu. Watch the light level for changes indicating lamp movement, both on the CDP readout and on screen with a white test pattern.
2. If the motors do not respond, you can position the lamp manually. **UV danger. Qualified service technician only.**
3. If the lamp runs dim or the image displays poor uniform brightness, do the following:
   - Check that the anode yoke is in the correct position.
   - Check that the lamp extension nut is used with CDXL-30SD lamps only. You must remove the nut for all other lamp types.
   - Check that the flat part of the anode end of the lamp (if applicable) faces up in the anode yoke. For CDXL-30SD lamps, the flat part of the anode end of the lamp should be positioned at the 2 or 10 o'clock position.
   - Check the position of the cathode lead. (**Figure 5-1**) **UV danger. Qualified service technician only.**




☑ CHECK
When the LampLOC Z-adjustment is fully forward, the cathode lead should touch the front, center edge of the oval cutout in the rear duct, as shown.

☑ CHECK:
When the LampLOC mechanism is centered vertically, the cathode lead should also be centered vertically within the oval cutout in the rear duct, as shown.

**Figure 5-1 Check Position of the Cathode Lead**

### 5.2.5 LiteLOC™ Does Not Seem to Work

1. Make sure LiteLOC™ is enabled in the **Advanced: Lamp** menu of the web user interface.
2. Changing the **Lamp Power** setting in the **Advanced: Lamp** menu disables LiteLOC™.
3. If the lamp power has increased to its maximum in order to maintain a LiteLOC™ setting, LiteLOC™ is automatically terminated. If the values shown in the **Advanced: Lamp** menu indicate that the lamp power has reached this "over-drive" state, either reduce your LiteLOC™ setting or install a new lamp.

# 5.3 CDP

## 5.3.1 Blank Screen, No Menu Displaying

Is CDP contrast set so low that you can't tell the display is ON? Navigate to the **Configuration** menu and select **CDP Contrast**. Use the right arrow key to increase the contrast value until something appears.

## 5.3.2 Projector ON, but No Light at the CDP

1. Confirm the harness is plugged into the back of the CDP.
2. Touch any key - the backlight for the displays and keys should be present.

# 5.4 Ethernet

## 5.4.1 Trouble Establishing Communication with Projector

1. From the CDP, **Configuration > Administrator > Mgmt Ethernet** submenu, check the DLP IP address and Mgmt IP address with the Subnet Mask. Ensure these belong to the same network.
2. From the CDP, **Configuration > Administrator > Auxiliary Ethernet** and **Mgmt Ethernet** submenus, check Mgmt IP address and Auxiliary Ethernet IP address with the Subnet Mask. Ensure these do not belong to the same network.
3. Make sure the Ethernet settings are valid for your site. All devices should have the *same* subnet mask yet *unique* IP addresses. Refer to **Figure 3-37**. **NOTES***: 1)The DLP IP address rarely requires modification and must be different from the projector's IP address (Mgmt IP address)*. The *DLP IP address should be modified by an experienced network administrator. On the rare occasion this address is modified, wait 2 minutes to allow the electronics to reset. The DLP communication error which appears during this time will clear indicating the electronics have reset. 2) Although the Gateway IP address is defined only once in the web user interface, it should be the same for both Ethernet controls when defined via the CDP Mgmt Ethernet and Auxiliary Ethernet menus.*

# 5.5 Cinema Displays

## 5.5.1 Blank Screen, No Display of Cinema Image

1. Confirm all power connections are still OK.
2. Ensure the lens cap is not on the lens.
3. Ensure the douser/shutter is OPEN. Push **DOUSER OPEN** on the CDP. Check the douser switch knob at the rear of the projector to see that it is pointing to "open".
4. On the web user interface **Main** menu, **Douser Open** should be enabled (✓).
5. Ensure a full black test pattern **is not** selected for display.
6. Is the correct display file selected?
7. Verify the correct cinema port is connected for this display file.

### 5.5.2 Severe Motion Artifacts

Most likely there is a synchronization problem with reversed 3-2 pull-down in 60Hz-to-24Hz film-to-digital conversion in your source. The display file needs correction.

### 5.5.3 Image Appears Vertically Stretched or 'Squeezed' into Center of Screen

Source data converted from film and "pre-squeezed" for CP2000-ZX display format may require use of the anamorphic lens (or resizing) to regain full "scope" image width and proper proportions.

### 5.5.4 No Image, Just Pink Snow

1. Make sure the projector's lid is not open. In the event it is open, close the lid and pause or stop the show on the server. Then, press play on the server and wait several seconds for the projector to receive the set of decrypting keys (from the server). If after 30 seconds the projector doesn't recover, pause or stop the show and try playing again. If this doesn't work, try resetting the server.
2. Check the CDP for a "tamper" warning. If lamp door is closed, the tamper switch may be faulty.
3. Make sure the IP octets for the projector and the server (Eth1 port) match.
4. CineCanvas does not have the correct projector IP address. Check the IP address of the projector and server and change if necessary. They should match.

## 5.6 Non-Cinema Displays

The following troubleshooting entries assume the use of 3rd-party input source for displaying alternative "non-cinema" material. As a first step, always consult the documentation supplied with the external equipment.

### 5.6.1 The Projector is On but there is No Display

1. Ensure AC power is connected.
2. Make sure the lens cover is removed from the lens.
3. Make sure the douser is **OPEN**.
4. If the lamp is not ignited, press **Lamp ON** from the CDP.
5. Ensure the correct DVI display button is selected in the channel setups.
6. Is an active source connected properly? Check the cable connections and make sure the alternative source is selected.
7. Can you access test patterns? If so, check your source connections again.

### 5.6.2 The Display is Jittery or Unstable

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

### 5.6.3 The Display is Faint

1. The source may be double terminated. Ensure the source is terminated only once.
2. The source (if non-video) may need sync tip clamping.

### 5.6.4 The Upper Portion of the Display is Waving, Tearing or Jittering

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

### 5.6.5 Portions of the Display are Cut Off or Warp to the Opposite Edge

Resizing may need adjustment. Adjust until entire image is visible and centered.

### 5.6.6 The Display appears Compressed (Vertically Stretched)

1. The frequency of the pixel sampling clock is incorrect for the current source.
2. Sizing and positioning options may be adjusted poorly for the incoming source signal.
3. Use an anamorphic lens for typical HDTV and anamorphic DVD sources that have been re-sized and vertically stretched via 3rd-party software.

### 5.6.7 Data is Cropped from Edges

To display the missing material, reduce image size to fill the display area available in the projector, then stretch vertically to fill the screen from top to bottom. Add the anamorphic lens to regain the image width.

### 5.6.8 Display Quality appears to Drift from Good to Bad, Bad to Good

1. The source input signal may be of low quality.
2. The H or V frequency of the input may have changed at the source end.

### 5.6.9 The Display has Suddenly Froze

If the screen blacks out inexplicably, it is possible that excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Power down the projector and then power back up again.

### 5.6.10 Colors in the Display are Inaccurate

The color, tint, color space and/or color temperature settings may require adjustment at your input source, or on the web user interface **Channel > Page 2** setup menu. Ensure the correct PCF, TCGD and/or Color Space file for the source is used.

### 5.6.11 The Display is Not Rectangular

1. Check leveling of the projector. Ensure the lens surface and screen are parallel to one another.
2. Is the vertical offset correct? Adjust as necessary using the vertical offset knob.
3. Is the anamorphic lens straight? Rotate to orient aperture correctly.

### 5.6.12 The Display is "Noisy"

1. Display adjustment at your input source may be required. Adjust pixel tracking, phase and filter. Noise is particularly common on YPbPr signals from a DVD player.
2. The video input may not be terminated. Ensure the video input is terminated (75 S). If it is the last connection in a loop-through chain, the video input should be terminated at the last source input only.
3. The input signal and/or signal cables carrying the input signal may be of poor quality.
4. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
5. If the source is a VCR or off-air broadcast, detail may be set too high.

### 5.6.13 There are Random Streaks on the Bottom of the Image

1. If a 24Hz or 25Hz HD-SDI signal, or a 50 Hz SDI digital PAL signal is used, ensure non-cinema processing is selected. This can be implemented via the **Channel: Page 1** menu of the web user interface by disabling the **Cinema** checkbox. **NOTE***: This is password-protected*.

# 6 Specifications

This section provides detailed CP2000-ZX specifications, including:


- *6.1 Display*
- *6.2 Inputs*
- *6.3 Control Display Panel (CDP)*
- *6.4 Power Requirements*
- *6.5 Lamps*
- *6.6 Physical Specifications*
- *6.7 Regulatory*
- *6.8 Environment*
- *6.9 Optional Components*
- *6.10 Lamp Components*
- *6.11 Standard Components*


*Due to continuing research, specifications are subject to change without notice.*

# 6.1 Display

## 6.1.1 Panel Resolution and Refresh Rate

| | |
|---|---|
| Pixel format (H pixels x V pixels) | 2048 x 1080 |
| DLP Cinema® Processing | 23.97 - 48Hz |
| Non-cinema Processing | 23.97 - 85Hz |
| 3D (24 fps per eye input, DLP Cinema® Processing) | |
| Full Image (2048 x 1080) | 144 Hz (frame doubled) |

## 6.1.2 Achievable Brightness (Measured at Screen Center)

| | |
|---|---|
| 2.0kW (CDXL-20) | 9,000 lumens |
| 3.0kW (CDXL-30) | 14,000 lumens |
| 3.0 kW Short Arc Lamp (CDXL-30SD) | 17,000 lumens |

## 6.1.3 Achievable Contrast Ratio

450:1 ANSI, 2000:1 Full Field ON/OFF

## 6.1.4 Color and Gray Scale

| | |
|---|---|
| Displayable colors | 35.2 trillion |
| Gray Scale resolution | 45 bits total linear, 15 bits each per RGB component |

## 6.1.5 White Point

| | |
|---|---|
| Nominal White *(full white, after calibration to Telecine mode*)* | $x$ = 0.314 +/- 0.002 |
| | y = 0.351 +/- 0.002 |

## 6.1.6 Gamma

| | |
|---|---|
| Review Rooms (nominal) | 2.6 +/-2% |
| Theater (nominal) | 2.6 +/-5% |

# 6.2 Inputs

## 6.2.1 Cinema Inputs

- Number of inputs: 2
- Standard supported: SMPTE 292M bit-serial
- Connector type: BNC

### 6.2.2 Non-Cinema DVI Inputs (for Alternate Content)

| | |
|---|---|
| • Number of inputs | 2 |
| • Standard supported | VESA Digital Visual Interface (DVI-D) |
| • Connector type | 24-pin female DVI-D |

### 6.2.3 Control Ports

| | |
|---|---|
| Ethernet connector (2): RJ-45 female | 100 Base-TX, 100 Mbps max. |
| RS232 A Port: | PC communication (non-serial API) for direct DLP communication |
| | 9-pin D female |
| | 38,400 bps (default) |
| RS232 B Port: | Christie proprietary protocol intended for Christie accessories or automation controllers |
| | 9-pin D female |
| | 9600 bps (default) |
| GPIO (1): 37-pin D female | 16-8 inputs, 8 outputs, opto-isolated connection |
| USB (1): USB device standard size | 38.4 kbps |
| Ballast Control Port (1): Not a user port | 9-pin D male, RS-232 with proprietary communication protocol |
| Ballast Interlock Port (1): Not a user port | 9-pin D female, +5V TTL-compatible, opto-isolated at ballast end |
| SCCI: | 9-pin D female, Contact closure pairs +5VDC and Opto LED |
| MALM: | 9-pin D male, control signals opto-coupled |

## 6.3 Control Display Panel (CDP)

| | |
|---|---|
| Type | 4 lines x 20 character LCD backlit |
| Display Size | 2 inch diagonal |
| Display Resolution (H x V pixels) | 122 x 32 pixels |
| Integrated Operating System | LCDPROC |
| Dimensions (W x H x D) | 10.6 cm x 15.7 cm x 3.1 cm |
| Communication interface with projector | RS232 |
| Power Requirement: | |
| LCD display with status light | 0.25 A max. at 5VDC +/- 10% |
| Keypad Backlight | 0.060 A max. at 5VDC +/- 10% |
| Interface Connector | 9-pin DB9 |

## 6.4 Power Requirements

### 6.4.1 Projection Compartment AC

| | |
|---|---|
| Voltage Range: | 200 - 240 VAC |
| | 100 -120 VAC (if rewired for UPS) |
| Line Frequency: | 50 Hz - 60 Hz nominal |
| Inrush Current: | 45 A max. (LVPS or Ballast) |
| Current Consumption: | 23 A max. (at 200 VAC) |
| Power Consumption: | 4500 W max. |
| Current Rating of AC Input: | 30 A max. (specified wall breaker) |

### 6.4.2 Lamp Ballast AC Input

| | |
|---|---|
| Voltage Range: | 200 - 240 VAC |
| Line Frequency: | 50 Hz - 60 Hz nominal |
| Inrush Current: | 45 A max. (LVPS or Ballast) |
| Current Consumption: | 23 A max. (at 200 VAC) |
| Power Consumption: | 4500 W max. |
| Current Rating of AC Input: | 30 A max. (specified wall breaker) |

### 6.4.3 DC Input for Lamp

| | |
|---|---|
| Operating Voltage Range: | 22 - 38 Volts |
| Start-up Voltage: | 80 V min., 107 V max. |
| Current: | 110 A max. |
| Power: | 1.0 kW min. to 3.0 kW max. |

### 6.4.4 UPS Input

| | |
|---|---|
| Voltage Range: | 100-240 VAC |
| Line Frequency: | 50 Hz - 60 Hz sinusoidal |
| Current: | 10 A |
| Power: | 1000 W min. (**NOTE**: *VA rating is not equivalent to Watts)* |

## 6.5 Lamps

| | |
|---|---|
| Type: | Xenon bubble |
| Power (software adjustable): | |
| CDXL-20: | 1000 - 2200 Watts |
| CDXL-30: | 1800 - 3300 Watts |
| CDXL-30SD: | 1800 - 3300 Watts |
| Average Life: | |
| CDXL-20: | 3500 |
| CDXL-30: | 2500 |
| CDXL-30SD: | 2000 hours at 2.5kW / 1100 hours at 3 kW |
| Wait time between lamp strikes: | 2 minutes |

## 6.6 Physical Specifications

| | |
|---|---|
| Size *(overall, including lens mount, stack and feet)*: | 25 inches (width) x 46.5 inches (length) x 19 inches (height) |
| Weight: | 247 lb with lens installed |
| Operating Position: | |
| Rotation about projection axis | +/- 15 degrees maximum |
| Tilt of projection axis from horizontal | +/- 15 degrees maximum |

## 6.7 Regulatory

This product conforms to the following regulations related to product safety, environmental requirements and electromagnetic compatibility (EMC):

- FCC Part 15, Subpart B Class A; CISPR22/EN55022; CISPR24/EN55024
- UL 60950-1 First Edition; CAN/CSA-C22.2 No 60950-1-03 First Edition;
- IEC60950-1:2001
- 2002/95/EC RoHS

## 6.8 Environment

**Operating Environment**

| | |
|---|---|
| Temperature | 10°C to 35°C (50°F to 95°F) |
| Humidity (non-condensing) | 20% to 80% |
| Altitude | 0 - 3000 meters |
| Maximum ambient temperature | 35°C |

**Non-Operating Environment**

| | |
|---|---|
| Temperature | -25°C to 65°C (-13°F to 149°F) |
| Humidity (non-condensing) | 0% to 95% |

## 6.9 Optional Components

| Primary Zoom Lenses (High Contrast) | Part # | Max. % of Image Below or Above Lens Center* |
|---|---|---|
| 1.25 - 1.45:1 | 38-809079-51 | 100% (vertical), 70% (horizontal) |
| 1.45 - 1.8:1 | 38-809061-51 | 100% (vertical), 70% (horizontal) |
| 1.8 - 2.4:1 | 38-809052-51 | 100% (vertical), 70% (horizontal) |
| 2.2 - 3.0:1 | 38-809053-51 | 100% (vertical), 70% (horizontal) |
| 3.0 - 4.3:1 | 38-809069-51 | 100% (vertical), 70% (horizontal) |
| 4.3 - 6.0:1 | 38-809081-51 | 100% (vertical), 70% (horizontal) |
| 5.5 - 8.5:1 | 38-809080-51 | 100% (vertical), 70% (horizontal) |

| Primary Zoom Lenses (High Brightness) | Part # | Max. % of Image Below or Above Lens Center* |
|---|---|---|
| 1.25 - 1.45:1 | 108-274101-01 | 100% (vertical), 70% (horizontal) |
| 1.45 - 1.8:1 | 108-275101-01 | 100% (vertical), 70% (horizontal) |
| 1.45 - 2.05:1 | 108-335102-01 | 100% (vertical), 70% (horizontal) |
| 1.6 - 2.4:1 | 108-336103-01 | 100% (vertical), 70% (horizontal) |
| 1.8 - 2.4:1 | 108-276101-01 | 100% (vertical), 70% (horizontal) |
| 1.8 - 3.0:1 | 108-337104-01 | 100% (vertical), 70% (horizontal) |
| 2.15 - 3.6:1 | 108-338105-01 | 100% (vertical), 70% (horizontal) |
| 2.2 - 3.0:1 | 108-277101-01 | 100% (vertical), 70% (horizontal) |
| 3.0 - 4.3:1 | 108-278101-01 | 100% (vertical), 70% (horizontal) |
| 4.3 - 6.0:1 | 108-279101-01 | 100% (vertical), 70% (horizontal) |
| 5.5 - 8.5:1 | 108-280101-01 | 100% (vertical), 70% (horizontal) |

| Opt. Auxiliary Lenses | Part # |
|---|---|
| 1.25x Anamorphic<br>*requires Motorized Auxiliary Lens Mount* | 38-809054-51 |
| 1.26x Wide Converter<br>*requires Motorized Auxiliary Lens Mount* | 108-281101-01 |
| Motorized Auxiliary Lens Mount | 108-111102-xx |

## 6.10 Lamp Components

| CDXL Lamps (kW) | Part # |
|---|---|
| 2.0kW CDXL-20 | 003-000598-02 |
| 3.0kW CDXL-30 | 003-000599-02 |
| 3.0kW CDXL30SD | 003-001165-01 |

## 6.11 Standard Components

- Control Display Panel with interface cable
- CP2000-ZX User's Manual
- Interconnect Drawing

| Other | Part # |
|---|---|
| Protective Clothing Kit (for opening of lamp door) | 598900-095 |
| DLP Cinema Firmware Installation Program | |
| Rack Stand, no panels | 108-272101-02 (inactive) |
| Rack Stand, including panels | 108-282101-02 |
| Rack Panel Kit | 108-273101-02 (inactive) |
| Rack Stand End Shroud Kit | 108-307101-01 (inactive) |
| Bracket Foot Lock | 116-100101-01 |
| Power Plug Cord | 116-102104-01 |
| Replacement Air Filter - 5 pack | 003-001184-01 |
| Cooling Liquid Kit | 003-001837-02 |
| CDP Extension Harness | 108-283101-01 (preliminary) |
| Service Documentation | 020-100008-xx |

# Appendix A: Serial API

### Table A.1 Function Codes

| Address (ADR) | |
|---|---|
| **DESCRIPTION -** Set/Query Device Address on ASCII Protocol network. Required only for RS - 232 connections that are daisy chained to allow directed messages. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>Valid Address range is 0 to 999. Reserved broadcast address is 65535. |
| **EXAMPLES:**<br>(0 ADR 5) Set first device with an address of 0 to 5.<br>(65535 ADR 0) Set all devices to address 0.<br>(65535 1001ADR ?) Query address for all devices and return results to address 1001.<br>Expected response to previous query (01001 00005ADR!005). | |
| **Auxiliary Motorized Lens (AML)** | |
| **DESCRIPTION -** Control the motorized auxiliary lens (anamorphic or converter lens). | |
| **SUBCODE**<br>CALI | **DESCRIPTION OF USE**<br>1, Send command to find the center position of the sensor for MALM. |
| CSTA | 0-100%, read-only command for returning the status of MALM calibration. |
| Cxxx | Replace xxx with channel number. Valid range from 101 - 164. |
| INST | 0-1, the flag to indicate if MALM is installed. |
| LENI | steps, The steps to move MALM to lens in position where (AML1) is set |
| LENO | steps, The steps to move MALM to lens out position where (AML0) is set |
| MAXS | Read-only command, gets the maximum speed to move MALM by FPGA |
| MINS | Read-only command, gets the minimum speed to move MALM by FPGA |
| NONE | Set auxiliary lens position 0 - lens removed from optical path 1 - lens inserted in optical path |
| POSI | Read-only command which returns where MALM is located |
| **EXAMPLES:**<br>(AML?) Get the current status of auxiliary lens<br>(AML+C108 1) Use auxiliary lens on channel 108.<br>(AML+C108?) Query auxiliary lens setting for channel 108.<br>(AML+C108!001) Response form previous query.<br>(AML+INST 1) Set flag for using MALM, otherwise MALM is ignored<br>(AML+LENI -300) Move lens to -300 for lens in position<br>(AML+LENO 6000) Move lens to 6000 for lens out position<br>(AML+POSI ?) Query where the lens is<br>(AML+CSTA ?) Query how much percent the MALM calibration is running | |

| Backup (BAK) | |
|---|---|
| **DESCRIPTION -** This control backs up various parts of the system. Files are zipped, date/time stamped and placed in the /var/www/backup directory. | |
| **SUBCODE**<br>CFIL | **DESCRIPTION OF USE**<br>Retrieve the name of the last sucessful configuration backup. Read only sub code. |
| CHAN | Meaningless value. Simply used to trigger. Use 1. |
| CONF | Meaningless value. Simply used to trigger. Use 1. |
| HFIL | Retrieve the name of the last sucessful channel file |
| IFIL | Retrieve the name of the last sucessful interrogator file |
| INTR | A value of 0 will launch the interrogator in normal mode. This collects the common logs in the system. A value of 1 will launch the interrogator in enhanced mode. Enhanced mode offers additional debug info as well as provides the normal info. |
| ISTA | Retrieve the current state of the interrogator. 0 means not running. |
| PFIL | Retrieve the name of the last sucessful preference backup. Read only sub code. |
| PREF | Meaningless value. Simply used to trigger. Use 1. |
| UFIL | Retrieve the name of the last sucessful user backup. Read only sub code. |
| **USER** | Meaningless value. Simply used to trigger. Use 1. |
| **EXAMPLES:**<br>(BAK+CONF 1) Backup all configuration controls<br>(BAK+USER 1) Backup all users<br>(BAK+INTR 1) Run interrogator enhanced<br>(BAK+INTR 0) Run interrogator normal<br>(BAK+CFIL?)(BAK+CFIL!"http:192.168.0.0/backup/config_model_sub_serial_date_time.tar")<br>(BAK+CHAN 1) - Backup all channel controls | |
| **Baud Rate (BDR)** | |
| **DESCRIPTION -** Set the baud rate for a serial communications port. | |
| **SUBCODE**<br>PRTA | **DESCRIPTION OF USE**<br>Set the baud rate on port A. Rates can be 1200, 2400, 9600, 19200, 38400, 57600 or 115200 |
| **EXAMPLES:**<br>(BDR+PRTA 6) Set baud rate on port A to 115200 bits per second<br>(BDR+PRTA?) Get baud rate (BRD+PRTA!006 “115200”) | |
| **Emergency Stop (BGT)** | |
| **DESCRIPTION -** Emergency Stop for commands that are running in a separate thread. | |
| **SUBCODE**<br>STOP | **DESCRIPTION OF USE**<br>Action command (no argument required) |
| **EXAMPLES:**<br>(BGT+STOP) Stop any currently running control threads | |

| Control Display Panel Settings (CDP) | |
|---|---|
| **DESCRIPTION -** Enable error messages. | |
| **SUBCODE**<br>BACK | **DESCRIPTION OF USE**<br>0 - 100. CDP Backlight Brightness level (both screen and key backlights). 0: disable backlight. |
| CONT | 0 - 100. CDP Contrast level |
| PASS | This will set new password for CDP |
| **EXAMPLES:**<br>(CDP+CONT 60) Change the contrast level to 60%<br>(CDP+CONT?) Requests current contrast level. Example response is (CDP+CONT!50)<br>(CDP+BACK 0) Disable the backlight<br>(CDP+BACK 100) Set the backlight to full brightness<br>(CDP+PASS "CHRISTIE") Set CDP password to "CHRISTIE" | |
| **Channel (CHA)** | |
| **DESCRIPTION -** Select Channel configuration to use. Channel range is 101 to 164. Channel configuration sets the input routing and image processing options for input signals. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>Select Channel. Valid range 101 - 164 |
| **EXAMPLES:**<br>(CHA?) Get current active channel<br>(CHA 108) Set channel 108 as active channel | |
| **Channel Icon (CHI)** | |
| **DESCRIPTION -** Set icon file name and path for the specified channel. This selects the icon to be displayed on web UI for the channel button. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number.Valid range is 101 - 164. |
| None | Select icon for the current channel |
| **EXAMPLES:**<br>(CHI+C108 "/etc/data/icons/ch108.ico") Use ch 108.ico for channel 108<br>(CHI+C108 ?) Get icon file name and path for channel 108 | |
| **Color Space (CSP)** | |
| **DESCRIPTION -** Color space control, color space file will be set when PCF in Use (PIU) is OFF. This control describes the source colorimetry information. Can use index or text string to set control. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select color space for the current channel |
| **EXAMPLES:**<br>(CSP+C108 "RGB Unity") Use file "RGB Unity" on channel 108<br>(CSP+C108?) Get color space file name on channel 108<br>(CSP?L) List all entries of color space control | |

**Defaults (DEF)**

**DESCRIPTION -** This control will reset all preference and configuration settings in the device to their default values. The value of 111 must be sent with each of the sub codes as well as the default. The number 111 helps prevent accidental use of this control.

| SUBCODE | DESCRIPTION OF USE |
|---|---|
| CHAN | Restore default channels. 0 defaults all |
| CONF | Set configuration controls to default |
| PREF | Set preference controls to default |
| UNSV | Set unsaved controls to default |
| USER | Clears all users and restores the factory default user. Most UI's will require you to log in again after issuing this command. |

**EXAMPLES:**
(DEF 111) - Restore all preference, configuration, option, and unsaved controls to default
(DEF+USER 111) - Clear all users and restore factory default user
(DEF+CONF 111) - Reset all configuration controls
(DEF+PREF 111) - Reset all preference controls
(DEF+UNSV 111) - Reset all unsaved controls
(DEF+CHAN 101) - Restore Channel 101
(DEF+CHAN 0) - Restore all channels
(DEF+CHAN?) - Shows last channel defaulted or -1 on failure

**Data Logging (DLG)**

**DESCRIPTION -** Set data logging level.

| SUBCODE | DESCRIPTION OF USE |
|---|---|
| None | There are 3 levels for data logging. |

**EXAMPLES:**
Levels are:
0 = Minimum logging of activities. Logging system errors and power ON/ OFF, lamp ON/OFF, user login/logout only.
1 = Standard logging (errors plus select operations - shutter ON/OFF, changing channels)
2 = Maximum logging. All activities are logged.
(DLG1) Set current logging level to 1
(DLG?) Get current logging level. Response is (DLG!001)

**Data Format (DTF)**

**DESCRIPTION -** Select data packing format for selected input. Available data formats depends on current input port (as selected by SIN).
**NOTE**: *Valid options when SIN = 0 ("292-A") or 1 ("292-B"): 000 "422 Unpacked 10Bit" 001 "422 Packed 12Bit" 002 "444 Packed 10Bit" 003 "444 Packed 12 Bit".*
*Valid optiosn when SIN=2 "292-Dual": 010 "422 Unpacked 10Bit O/E Pixels" 011 "422 Unpacked 10Bit, O/E Lines" 012 "422 Packed 12Bit, O/E Pixels" 013 "422 Packed 12Bit, O/E Lines" 014 "444 Unpacked 10Bit" 015 "444 Packed 10Bit, Mixed" 016 "444 Packed 10Bit, O/E Pixels" 017 "444 {acked 12Bit" 018 "422 Unpacked 10Bit O/E Frames"*
*Valid options when SIN=3 ("DVI-A") or 4 ("DVI-B") 020 "Unpacked 8Bit" 021 "Packed 10Bit" 022 "Packed 12Bit"*
*Valid options when SIN=5 ("DVI-Twin"): 030 "Twin packed 10Bit"*

| SUBCODE | DESCRIPTION OF USE |
|---|---|
| Cxxx | Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select data format for current channel |

**EXAMPLES:**
(DTF?) Get current data format
(DTF?L) Show entries on the list
(DTF 1) or (DTF "422 Packed 12Bit") Set current data format to 1 (292: 422 Packed 12Bit)
(DTF+C108?) Get data format on channel 108
(DTF+C108 20) or (DTF+C108 "Unpacked 8Bit") Use data format 20 (DVI: Unpacked 8Bit) on channel 108

| Enable Error Messages (EME) | |
|---|---|
| **DESCRIPTION -** Enable error messages. | |
| **SUBCODE**<br>FANF | **DESCRIPTION OF USE**<br>0 - No Fan Fail warning will be generated; 1 - Fan Fail warning will be generated. |
| NONE | 0 - disable broadcast; 1 - enable broadcast of error messages to all connected serial ports and telnet sessions. |
| TEMP | 0 - No Over Temperature warning will be generated; 1 - Over Temperature will be generated. |
| **EXAMPLES:**<br>(EME 1) enable broadcasting error messages<br>(EME+FANF 0) disable fan fail alarm warnings<br>(EME?) requests current state of broadcast. Example response is (EME!001) | |
| **Lens Focus Direction (FCD)** | |
| **DESCRIPTION -** Get/set the current focus direction. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>(FCD {1 \| -1}) |
| **EXAMPLES:**<br>(FCD 1) set focus direction to positive<br>(FCD?) return current focus direction (1 or -1) | |
| **Focus Lens Position Adjustment (FCS)** | |
| **DESCRIPTION -** Adjust lens to specific focus position.<br><br>Use command without subcode:<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will move to specified steps, do not save data to the active channel<br><br>Use FCS with Subcode CXXX (active channel):<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will not move, save data to the active channel.<br><br>Use FCS with Subcode CXXX (inactive channel):<br>Just save data to specified channel, no hardware movement. | |
| **SUBCODE**<br>CXXX | **DESCRIPTION OF USE**<br>Lens to specific focus position on channel CXXX. |
| BACP | Motor backlash in positive direction, read-only for ILS. |
| BACN | Motor backlash in negative direction, read-only for ILS. |
| RNGP | Motor moving range in positive direction, read-only for ILS |
| RNGN | Motor moving range in negative direction, read-only for ILS |
| **EXAMPLES:**<br>(FCD -1) Set negative direction<br>(FCS 500) Move lens to position 500 at focus motor<br>(FCS+CXXX -500) Set lens to position of channel XXX to -500 at focus motor<br>(FCS ?) Return current motor position | |

| Gamma Control (GAM) | |
|---|---|
| **DESCRIPTION -** Gamma control, gamma file will be set when PCF in Use (PIU) i s off. This control describes the gamma response curve for the source signal. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select gamma for the current channel. |
| **EXAMPLES:**<br>(GAM+C108 “gamma 2.6”) Use file “gamma 2.6” on channel 108<br>(GAM+C108?) Get gamma file name on channel 108<br>(GAM?L) List all entries of gamma control | |

| Lamp History (HIS) | |
|---|---|
| **DESCRIPTION -** Retrieve the history of installed lamp entries, including the current lamp. There is an individual entry for each lamp in the history. The format for each entry is: (HIS!AAA “BBBB/BB/B” “C” “D” EEE FFF GGG HHH III JJJ).<br><br>A = Lamp Number<br>B = Date Installed<br>C = Serial Number<br>D = Type<br>E = Strikes<br>F = Failed Strikes<br>G = Failed Restrikes<br>H = Unexpected Lamp Off<br>I = Pre-installed Hours<br>J = Lamp Hours | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>None |
| **EXAMPLES:**<br>(HIS?)<br>(HIS!000 “N/A” “N/A” “N/A” 000 000 000 000 000 000)<br>(HIS!001 “2007/05/21” “qa-1” “CDXL-30” 000 000 000 000 020 020)<br>(HIS!002 “2007/05/21” “qa-2” “Other-30” 000 000 000 000 015 015)<br>(HIS!003 “2007/05/21” “qa-3” “Other-20” 000 000 000 000 000 000) | |

| Serial Help (HLP) | |
|---|---|
| **DESCRIPTION -** Query a list of all available serial commands with brief descriptions and current enabled states. | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>Request entire command help listing or list for a single command |
| **EXAMPLES:**<br>(HLP?) Retrieve entire command help listing<br>(HLP? “BRT”) Retrieve all subcodes/descriptions/enables for BRT control | |

| Intelligent Light System Config (ILS) | |
|---|---|
| **DESCRIPTION -** Enable/disable the Intelligent Lens System in specified channel. | |
| **SUBCODE**<br>ACLB | **DESCRIPTION OF USE**<br>Enable/disable the Auto Lens Mount and Lens reset feature. Once ACLB is turned on, lens mount and lens system will be reset automatically when system is powered on. |
| BACE | Backlash enable flag (0/1). The default value is 1 (enabled). |
| CALB | Calibrate travel range and backlash on specified motor. 1-Horizontal Offset, 2-Vertical Offset, 3-Zoom, 4-Focus, 5-All above. |
| CSTS | Motor calibration status (0-100%) |
| RSET | Move motor to center flag, the move back to current position. 1-Horizontal Offset, 2-Vertical Offset, 3-Zoom, 4-Focus, 5-All above |
| RSTS | Motor reset status (0-100%) |
| NONE | (1/0) Enable/Disable the Intelligent Lens System for each channel |
| **EXAMPLES:**<br>(ILS 1) Enable ILS, lens will be moved to the position in each channel<br>(ILS 0) Disable ILS, position data in each channel will not be used. Moving lens will not affect any channel setting<br>(ILS+CALB 5) Calibrate all axes of the lens<br>(ILS+RSTS 5) Reset all axes of the lens<br>(ILS+ACLB 1) Reset lens automatically when power on | |
| **CineIPM Input or Channel (IPM)** | |
| **DESCRIPTION -** Set CineIPM input or channel when CineIPM is selected on input control (SIN), data range 1 - 25. This control is valid only when SIN is bigger than 5. CineIPM has 1 - 25 channels, but the input number is limited by input cards. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164 |
| NONE | Select input or channel number for current channel |
| **EXAMPLES:**<br>(IPM ?) Get current CineIPM setting<br>(ITP 1) Set CineIPM to Input-1 (when SIN is 6 - 8), Channel-1 (when SIN = 9 - 11)<br>(IPM+C108?) Get CineIPM setting on channel 108<br>(IPM+C108 5) Set CineIPM to Input-5 (when SIN is 6 - 8), Channel-5 (when SIN = 9 - 11) on channel 108 | |

| Internal Test Pattern (ITP) | |
|---|---|
| **DESCRIPTION -** List and select internal test patterns. This command also create the customized test pattern list from the internal test patterns. The list of available test patterns is determined by what files are loaded on the TI cinema electronics. | |
| **SUBCODE** | **DESCRIPTION OF USE** |
| FULL | Set(1)/Reset(0) full screen size |
| KEEP | When KEEP=1, don't disable test pattern when changing channels |
| NOCR | NOCR set non-correction test patterns for measured color, range is 0 to 6 |
| NONE | Select test pattern from full list of defined test patterns |
| RFSH | Set (1) to refresh files, 0 do nothing |
| SETP | Select test pattern from user defined test pattern list |
| USER | |
| **EXAMPLES:**<br>(ITP ?) Get current test pattern, 0 means no test pattern is used.<br>(ITP 4) or (ITP " ") Use number or string to set test pattern<br>(ITP+USER 4) or (ITP+USER " ") Use number of string to set test pattern from user's test pattern list.<br>(ITP+FULL 1) Use full screen size<br>(ITP+FULL 0) Use active channel screen file<br>(ITP+NOCR 1) Set non-correction test patterns for measured color you can use<br>(ITP+RFSH 1) Refresh TI file list<br>(ITP+STUP "DC2K Framing Green, DC2K Framing Red") Add these two test patterns to the user list | |
| **Lens Mount Keepout Range (KOT)** | |
| **DESCRIPTION -** Set Lens Mount Keepout Range number. Keepout area is read-only control for ILS. It is set by the lens table. | |
| **SUBCODE** | **DESCRIPTION OF USE** |
| SATX | Satellite Board X, input range 0 - 2050 steps |
| SATY | Satellite Board Y, input range 0 - 2050 steps |
| TIRX | Prism cover X, input range 0 - 2050 steps |
| TIRY | Prism cover Y, input range 0 - 2050 steps |
| **EXAMPLES:**<br>(KOT+TIRX 500) Set lens mount prism cover keepout X range number as 500. | |

| Lamp Intensity Calibration (LCA) | |
|---|---|
| **DESCRIPTION -** This control is used to calibrate (correlate) the intensity feedback mechanism to footlamberts. Note the minimum/maximum power are used to pick two points on the curve. These points will not stay consistent over the life of the lamp, but the conversion algorithm will extrapolate the conversion beyond the range of the two end points. Footlamberts for minimum/maximum power are converted to integer by multiplying 100 because serial commands protocol does not support floating point number. **NOTE**: *Changing the lamp or lamp alignment will require re-calibration.* | |
| **SUBCODE**<br>MAXF | **DESCRIPTION OF USE**<br>Set footlamberts at maximum lamp power, the value should be (footlamberts * 100) |
| MAXS | Set sensor value at maximum lamp power |
| MINF | Set footlamberts at minimum lamp power, the value should be (footlamberts * 100) |
| MINS | Set sensor value at minimum lamp power |
| NONE | Not Available |
| **EXAMPLES:**<br>(LCA+MINF 10) Set 10 footlamberts as measured brightness at minimum lamp power<br>(LCA+MINF?) Get footlamberts on minimum lamp power<br>(LCA+MINS 5000) Set 5000 as reading value from the light sensor at minimum lamp power<br>(LCA+MAXF 17) Set 17 footlamberts as measured brightness as maximum lamp power<br>(LCA+MAXF?) Get footlamberts at maximum lamp power<br>(LCA+MAXS 15000) Set 15000 as reading value from the light sensor on maximum lamp power | |
| **LUT CLUT Control (LCT)** | |
| **DESCRIPTION -** Set Look up Table (LUT) Color Look Up Table (CLUT) file for the specified channel. The CLUT is used during color processing in the cinema electronics. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select CUT for the current channel |
| **EXAMPLES:**<br>(LCT+C108 “Linear_9x9x9”) Set LUT CLUT file name to “Linear_9x9x9” on channel 108<br>(LCT+C108?) Get LUT-CULT file name on channel 108<br>(LCT?L) List all entries of LUT-CLUT control | |

| Lens Type (LEN) | |
|---|---|
| **DESCRIPTION -** Define model and serial number for primary installed lens and auxiliary lens. | |
| **SUBCODE**<br>(AMOD) | **DESCRIPTION OF USE**<br>auxiliary lens model |
| (ASER) | auxiliary lens serial number |
| (MMOD) | main lens model |
| (MSER) | main lens serial number |
| None | Not available |
| **EXAMPLES:**<br>(LEN+MMOD?L) List supported lens model<br>(LEN+AMOD?L) List supported auxiliary lens model<br>(LEN+MMOD 1 Set lens model<br>(LEN+MSER “xxxx”) Set lens serial number | |

| Lens Horizontal Direction (LHD) | |
|---|---|
| **DESCRIPTION -** Get/set the current horizontal direction. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>(LHD {1 \| -1}) |
| **EXAMPLES:**<br>(LHD 1) set horizontal direction to positive<br>(LHD?) return current horizontal direction (1 or -1) | |

| Lens Horizontal Offset Adjustment (LHO) | |
|---|---|
| **DESCRIPTION -** Adjust lens offset to specific horizontal position. Lens movement range -2050 to 2050.<br><br>Use command without subcode:<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will move to specified steps, do not save data to the active channel<br><br>Use LHO with Subcode CXXX (active channel):<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will not move, save data to the active channel.ILS<br><br>Use LHO with Subcode CXXX (inactive channel):<br>Just save data to specified channel, no hardware movement. | |
| **SUBCODE**<br>BACN | **DESCRIPTION OF USE**<br>Motor backlash in negative direction, read-only for ILS. |
| BACP | Motor backlash in positive direction, read-only for ILS. |
| CXXX | Moving lens mount to a specified horizontal position. Data range is -2050 to 2050. |
| RNGP | Motor moving range in positive direction, read-only for ILS |
| RNGN | Motor moving range in negative direction, read-only for ILS |
| **EXAMPLES:**<br>(LHD -1) Set positive direction<br>(LHO 500) Move lens to position 500 at horizontal motor<br>(LHO+CXXX -500) Set lens to position of channel XXX to -500 at horizontal motor | |

| Lamp ID (LID) | |
|---|---|
| **DESCRIPTION -** Set or Get lamp type (ID) for the currently installed lamp. Supports read back of the list of supported lamp types. | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>Set Lamp ID for current lamp. This is read-only control. Lamp ID can be changed with LPC (lamp change) command only. |
| **EXAMPLES:**<br>(LID?L) List supported lamp IDs<br>(LID?) Get the lamp id for installed lamp | |
| **LampLOC™ Module (LLM)** | |
| **DESCRIPTION -** Allows adjustment of lamp position to optimize intensity and uniformity of the optical system. This is referred to as the LampLOC™ feature and can be done automatically or manually. | |
| **SUBCODE**<br>AUTO | **DESCRIPTION OF USE**<br>Set to 1 to do LampLOC™ automatically. It will do calibration first, then moving x, y, z-motor to find the maximum brightness. Set to 0 to cancel auto adjustment, it will restore the previous position. Reset to 0 when it has finished. |
| CALI | Set to 1 calibrate all 3 motors, i.e. move all 3 motor to default position. Reset to 0 when it has finished. |
| MTRX | Moving X-axis motor manually. Data range from - 500 to 500. |
| MTRY | Moving Y-axis motor manually. Data range from - 500 to 500. |
| MTRZ | Moving Z-axis motor manually. Data range from - 500 to 500. |
| NONE | Not Available |
| STAT | Provides feedback (status) on the progress of the Auto mode. Read-only command. Data range from 0 to 100, where 100 indicates the LampLOC™ is finished. |
| **EXAMPLES:**<br>(LLM+MTRX 100) Move motor-X to position 100<br>(LLM+AUTO 1) Do LampLOC™ automatically<br>(LLM+AUTO 0) Abort LampLOC™, it will restore the motors to previous position automatically<br>(LLM+AUTO?) Get running status. (LLM+AUTO!000) indicates finished, (LLM+AUTO!001) indicates running<br>(LLM+CALI 1) Motor calibration<br>(LLM+CALI ?) Returns 1 if calibration is running and 0 if calibration is finished<br>(LLM+CALI 0) Do nothing. Can not cancel calibration | |
| **Adjust All Lens Position Parameters Simultaneously (LMV)** | |
| **DESCRIPTION -** Adjust all lens position parameters simultaneously. | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>(LMV <lho><lvo><zom><fcs>)<br>where <lho>, <lvo>, <zom>, and <fcs> represent the horizontal, vertical, focus, and zoom position information. |
| **EXAMPLES:**<br>(LMV 1000 1500 500 -500) | |

| Local Settings (LOC) | |
|---|---|
| **DESCRIPTION -** Set the localization options such as Language and display options for temperature units. | |
| **SUBCODE**<br>LANG | **DESCRIPTION OF USE**<br>Set the primary language. 0 - English. (Choices are Deferred past V1.0) |
| TEMP | Set the temperature units. 0 - Celsius. (Choices are Deferred past V1.0) |
| TIME | Set Time format. 0 - 24 hour, 1 - 12 hour. |
| **EXAMPLES:**<br>(LOC+TIME 1) Set time zone to standard 12 hour<br>(LOC+TIME?1) Get list of formats<br>(LOC+TIME?)(LOC+TIME!001) Get time format<br>None | |
| **Lamp Changed (LPC)** | |
| **DESCRIPTION -** Record current lamp information into the lamp history, then start a new entry. Set lamp information of a new lamp type ID, serial number, and pre-used hours. | |
| **SUBCODE**<br>LPID | **DESCRIPTION OF USE**<br>Set lamp type ID for the new lamp |
| PREV | Set lamp previous lamp hours for the new lamp |
| SERL | Set lamp serial number for the new lamp |
| **EXAMPLES:**<br>(LPC+LPID 2) Set lamp type ID<br>(LPC+SERL “CDX30-001”) Set lamp serial number<br>(LPC 1) Save information to lamp history<br>(LPC 1) Consecutive lamp changes requires 5 - 10 second time difference as writing to EEPROM is involved. | |
| **Lamp Hours (LPH)** | |
| **DESCRIPTION -** Read only control, get information on installed lamp. | |
| **SUBCODE**<br>FLSK | **DESCRIPTION OF USE**<br>Return Total failed lamp strikes on the installed lamp |
| FRSK | Return Total failed lamp restrikes on the installed lamp |
| LPOF | Return Total lamp unexpected off times on the installed lamp |
| NONE | Return Lamp usage for current lamp in hours. |
| TLSK | Return Total lamp strikes on the installed lamp |
| **EXAMPLES:**<br>(LPH?) Get usage in hours<br>(LPH+FLSK?) Get lamp strikes | |

| Lamp Intensity (LPI) | |
|---|---|
| **DESCRIPTION -** Set lamp intensity set point. The value is used when lamp mode is set to LiteLOC™. The projector will adjust the Lamp Power to maintain this intensity. **NOTE**: *This control depends on the state of the Power Per Button (PPB) control. When PPB is on, the lamp hardware will be set according to the channel specific value of LPI. When PPB is off, the lamp hardware uses the global (GLOB) value for LPI.* | |
| **SUBCODE** | **DESCRIPTION OF USE** |
| Cxxx | Replace xxx with the channel number. Valid range is 101 - 164. |
| GLOB | Set lamp intensity for all channels when PPB is off. |
| NONE | Set lamp intensity for the current channel. |
| **EXAMPLES:**<br>(LPI+GLOB 4500) Set lamp intensity to 4500 for global<br>(LPI+C101 4500) If channel 101 active, same as (LPI 4500)<br>(LPI+C102 4500) If channel 102 INactive, set lamp intensity to 4500 for channel 102, regardless of PPB.<br>(LPI+GLOB 4500) Set lamp intensity to 4500 for global. All channels with PPB off will use this value. If current channel's PPB is off, the lamp will adjust immediately.<br>(LPI+C108?) Get lamp intensity for channel 108, regardless of PPB | |

| Lamp Life (LPL) | |
|---|---|
| **DESCRIPTION -** Set or get expected lamp life in hours. The default hours will be used if lamp life is 'not set'. Lamp expiry message will be sent out when lamp usage is over the lamp life. | |
| **SUBCODE** | **DESCRIPTION OF USE** |
| LIFE | 0 - No warning will be generated. 1 - Lamp Life Expiry Warning will be generated when lamp hours extends past lamp life. Warning will be reported in SST. Warning will be cleared by extending lamp life or changing the lamp. |
| None | Set or get expected lamp life. |
| ROTA | Set to 1 acknowledge the Lamp Rotation Warning. Will auto clear at lamp life or on lamp change. |
| ROTW | 0 - No warning will be generated. 1 - Lamp Rotation Warning will be generated when lamp hours extents past 1/2 lamp life. Warning will be reported in SST. Warning will be cleared by LPL+ROTA or changing the lamp. |
| **EXAMPLES:**<br>(LPL 1500) Set lamp life limit to 500 hours<br>(LOL 0) Set lamp life limit to default hours based on the lamp type<br>(LPL ?) Get lamp life limit<br>(LPL+LIFE 1) Enable lamp expired message.<br>(LPL+LIFE 0) Disable lamp expired message.<br>(LPL+ROTW 1) Enable lamp rotation message.<br>(LPL+ROTA 1) Acknowledge that lamp was rotated. | |

| Lamp Mode (LPM) | |
|---|---|
| **DESCRIPTION -** Set lamp mode to constant power or LiteLOC™ for global and per channel. **NOTE**: *This control depends on the state of the Power Per Button (PPB) control. When PPB is on, the lamp hardware will be set according to the channel specific value of LPM. When PPB is off, the lamp hardware uses the global (GLOB) value for LPM.* | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| GLOB | Set lamp mode for global. |
| NONE | Set lamp mode for the current channel. |
| **EXAMPLES:**<br>(LPM 1) Set constant power mode for current channel.<br>(LPM+C101 1) If channel 101 active, same as (LPM 1).<br>(LPM+GLOB 0) Set Lamp Intensity mode for global. All channels with PPB off will use this value. If current channel's PPB is off, the lamp will adjust immediately.<br>(LPM+C108 ?) Get lamp mode for channel 108, regardless of PPB. | |

| Lamp Power (LPP) | |
|---|---|
| **DESCRIPTION -** Set lamp power to be used when in Constant Power Mode. **NOTE**: *This control depends on the state of the Power Per Button (PPB) control. When PPB is on, the lamp hardware will be set according to the channel specific value of LPP. When PPB is off, the lamp hardware uses the global (GLOB) value for LPP.* | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| GLOB | Set lamp power for all channels when PPB is off. |
| MINI | Read-only value, get nominal minimum lamp power for the current lamp |
| NONE | Set lamp power for the current channel. |
| **EXAMPLES:**<br>(LPP 2500) Set lamp power to 2500 for current channel<br>(LPP+C101 2500) If channel 101 active, same as (LPP 2500)<br>(LPP+C102 2500) If channel 102 INactive, set lamp power to 2500 for channel 102, regardless of PPB.<br>(LPP+GLOB 2500) Set lamp power to 2500 for global. All channels with PPB off will use this value. If current channel's PPB is off, the lamp will adjust immediately.<br>(LPP+C108 ?) Get lamp power for channel 108, regardless of PPB | |

| Lens Vertical Direction (LVD) | |
|---|---|
| **DESCRIPTION -** Get/set the current vertical direction | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>(LVD {1 \| -1}) |
| **EXAMPLES:**<br>(LVD 1) set vertical direction to positive<br>(LVD?) return current vertical direction (1 or -1) | |

| Lens Vertical Offset Adjustment (LVO) | |
|---|---|
| **DESCRIPTION -** Adjust lens offset to specific vertical position. Lens movement range -2050 to 2050.<br><br>Use command without subcode:<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will move to specified steps, do not save data to the active channel<br><br>Use LVO with Subcode CXXX (active channel):<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will not move, save data to the active channel.<br><br>Use LVO with Subcode CXXX (inactive channel):<br>Just save data to specified channel, no hardware movement. | |
| **SUBCODE**<br>BACN | **DESCRIPTION OF USE**<br>Motor backlash in negative direction, read-only for ILS. |
| BACP | Motor backlash in positive direction, read-only for ILS. |
| CXXX | Moving lens mount to a specified horizontal position. Data range is -2050 to 2050. |
| RNGP | Motor moving range in positive direction, read-only for ILS. |
| RNGN | Motor moving range in negative direction, read-only for ILS. |
| **EXAMPLES:**<br>(LVD -1) Set negative direction<br>(LVO 500) Move lens to position 500 at vertical motor<br>(LVO+CXXX -500) Set lens to position of channel XXX to -500 at vertical motor<br>(LVO ?) Return current motor position | |
| **Measured Color (MCG)** | |
| **DESCRIPTION -** Select the Measured Color Gamut file. This file describes the native colorimetry for the projector as installed and is required for accurate color processing in the cinema electronics. This control is per channel to allow for different colorimetry for applications such as 3D. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select measured color gamut for the current channel. |
| RFSH | Set (1) to refresh files, 0 do nothing |
| TEMP | Select the measured color file as DLP active file, do not change channel settings. |
| **EXAMPLES:**<br>(MCG+C108 “Nominal”) Use file “Nominal” on channel<br>(MCG+C108?) Get measured color file name on channel 108<br>(MCG?L) List all entries of measured color control<br>(MCG+TEMP “Nominal”) Use file “Nominal” as DLP active file<br>(MCG+RFSH 1) Refresh TI file list | |

| Channel Name (NAM) | |
|---|---|
| **DESCRIPTION -** Set the descriptive channel name for the specified channel | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select channel name for the current channel |
| **EXAMPLES:**<br>(NAM+C108 “Scope 2.39”) Set channel name for channel 108<br>(NAM+C108?) Get channel name for channel 108 | |
| **Network Setup (NET)** | |
| **DESCRIPTION -** Set the network parameters for Eth0, Eth1, DLP, Gateway, CineIPM, Subnet 0 and Subnet 1. | |
| **SUBCODE**<br>CIPM | **DESCRIPTION OF USE**<br>Define IP address for the Cine-IPM ethernet controller |
| DLP0 | IP address for the Cinema Electronics |
| EIPM | Enable/disable Cine-IPM. When enabled projector will add 6 entries to SIN command. Data format will use DVI mode for Cine-IPM port. |
| ETH0 | Set the IP address for the MGMT ethernet controller |
| ETH1 | Set the IP address for the AUX ethernet controller |
| GATE | IP Gateway for the MGMT, AUX and Cinema Electronics |
| MAC0 | Gets the MAC address of the MGMT ethernet controller |
| MAC1 | Gets the MAC address of the AUX ethernet controller |
| SUB0 | Set the network subnet mask for the MGMT ethernet controller & Cinema Electronics |
| SUB1 | Set the network subnet mask for the AUX ethernet controller |
| **EXAMPLES:**<br>(NET+ETH0 "192.168.1.35") - Set new IP address on the MGMT ethernet controller<br>(NET+ETH1 "192.168.1.36") - Set new IP address on the AUX ethernet controller<br>(NET+GATE "192.168.0.1") - Set the gateway<br>(NET+SUB0 "255.255.255.0") - Set the subnet mask on the MGMT ethernet controller<br>(NET+HOST "MyHostName") - Set the host name<br>(NET+DOMA "MyDomainName") - Set the domain name<br>(NET+ETH0 ?) - Retrieve IP address from MGMT controller. (NET+ETH0! 192.168.1.35)<br>(NET+ETH1 ?) - Retrieve IP address from AUX controller. (NET+ETH1! 192.168.0.100)<br>(NET+MAC0 ?) - Retrieve MAC address from MGMT controller. (NET+MAC0! 00:12:3F:7B:76:B4)<br>(NET+MAC1 ?) - Retrieve MAC address from AUX controller. (NET+MAC1! 00:12:3F:7B:76:B5)<br>(NET+GATE ?) - Retrieve default gateway. (NET+GATE! 192.168.0.1)<br>(NET+DLP0 "192.168.206.10") - Set Cinema IP address.<br>(NET+DLP0? ) (NET+DLP0! "192.168.206.010") Query Cinema IP address and response | |
| **Network Routing (NTR)** | |
| **DESCRIPTION -** Set routing for ASCII messages | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>Used to enable or disable daisy chaining |
| **EXAMPLES:**<br>(NTR ?1) List routing options.<br>(NTR 0) Each connection is routed separately.<br>(NTR 3) Full daisy-chaining | |

| Projector Configuration File (PCF) | |
|---|---|
| **DESCRIPTION -** Set Projector Configuration File (PCF) file for the specified channel. This file is used to configure many aspects of the cinema electronics. It will only be used if PCF in use (PIU) control is set. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select PCF file for the current channel |
| RFSH | Set (1) to refresh files, 0 do nothing |
| **EXAMPLES:**<br>(PCF+C108 "SCOPE 2.39") Use PCF file "Scope 2.39" on channel 108. File used when PIU is on<br>(PCF?L) List all entries of PCF control<br>(PCF+RFSH 1) Refresh TI file list | |
| **Pull-down Offset (PDO)** | |
| **DESCRIPTION -** Set pull-down Offset. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select pull-down Offset for the current channel |
| **EXAMPLES:**<br>(PDO?L) List all entries on pull-down offset control<br>(PDO+C101 1) Set pull-down offset to 1 on channel 101<br>(PDO+C101?) Get pull-down offset on channel 101 | |
| **Pull-down Resync (PDR)** | |
| **DESCRIPTION -** Set pull-down resync. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select pull-down resync for the current channel. 0 - enable, 1 - disable. The default value is 0 (enabled). |
| **EXAMPLES:**<br>(PDR+C101 1) Disable pull-down resync on channel 101<br>(PDR+C101 0) Enable pull-down resync on channel 101<br>(PDR+C101?) Get pull-down resync on channel 101 | |
| **Pull-down Sequence (PDS)** | |
| **DESCRIPTION -** Set pull-down Sequence. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select pull-down Sequence for the current channel. |
| **EXAMPLES:**<br>(PDS?L) List all entries on pull-down sequence control<br>(PDS+C101 1) Set pull-down sequence on channel 101<br>(PDS+C101?) Get pull-down sequence on channel 101 | |

| PCF In Use (PIU) | |
|---|---|
| **DESCRIPTION-** Select whether to use the PCF file or not. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select Use PCF for the current channel |
| **EXAMPLES:**<br>(PIU?) Get the current status of PCF file<br>(PIU+C108 1) Use PCF file on channel 108<br>(PIU+C108 0) do not use PCF file on channel 108 | |

| Ping (PNG) | |
|---|---|
| **DESCRIPTION -** This command returns basic projector information to the user which includes the type of device & main software version. Note that some devices have multiple CPUs each with its own software version. Only the software version of what is considered to be the master CPU is returned here. The return parameters are: Type, Major, Minor, Beta. The beta value is optional meaning its an engineering build and has not been validated. **NOTE***: List of devices: 40= ACT, 41 = Cinema, 42 = CinemaMini, 43= MediaBlock, 44 = CoreIII* | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>None |
| **EXAMPLES:**<br>(PNG?)(PNG!41 001 00 0) -- Indicates 'Cinema' type, software: 1 major, 0 minor, 0 beta | |

| Power Per Button (PPB) | |
|---|---|
| **DESCRIPTION -** Control whether lamp power settings are configured per channel or global. **NOTE**: *See also other lamp commands LPI, LPP, LPM* | |
| **SUBCODE**<br>Cxxx<br>None | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101-164<br>Select Power Per Button for the current channel |
| **EXAMPLES:**<br>(PPB 0) Don't use Power Per Button for current channel, use global settings instead.<br>(PPB+C108 1) Use Power Per Button for channel 108<br>(PPB+C108?) Get Power Per Button state for channel 108<br>(PPB?) Get Power Per Button state for current channel | |

| Processing Mode (PRM) | |
|---|---|
| **DESCRIPTION -** Select whether to use cinema processing mode. Cinema processing uses extended image pixel depth and color processing algorithms. Alternative content is not intended to use cinema processing. 0 - do not use Cinema Processing, 1 - use Cinema Processing. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with channel number. Valid range is 101 - 164. |
| None | Select processing mode for the current channel |
| **EXAMPLES:**<br>(PRM+C108 1) Use cinema processing mode on channel 108<br>(PRM+C108 0) Do not use cinema processing mode on channel 108<br>(PRM?) Get current processing mode | |

| Serial Port (PRT) | |
|---|---|
| **DESCRIPTION -** Get a list of serial ports available on the device. | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>NONE |
| **EXAMPLES:**<br>(PRT?1) Get list of ports | |

| Power (PWR) | |
|---|---|
| **DESCRIPTION -** Change the power state of the projector. Data can be:<br>3 - Power OFF - all electronics power OFF except Projector Control Module (PCM). It's also called standby mode.<br>1 - Power ON - projector is powered ON with lamp ON<br>0 - Full power mode - projector is ready for lamp ON.<br>11 - Warm up. Read only, it's middle status between standby and full power mode.<br>10 - Cool down. Read only, projector will stay in cooling down mode for 15 minute after lamp is turned OFF. | |
| **SUBCODE**<br>COOL | **DESCRIPTION OF USE**<br>Read only status of current cooling down timer. |
| NONE | Select power state. |
| STAT | Read only Status of current power state. |
| **EXAMPLES:**<br>(PWR+STAT?) - Get projector power status<br>(PWR+COOL?) - Get how many seconds left on cooling down mode<br>(PWR3) - Set the projector to standby mode<br>(PWR0) - Turn the projector ON and lamp OFF<br>(PWR1) - Turn the projector ON and lamp ON<br>(PWR?) - Get the last command sent to projector (target power state) | |

**Table A.2 Projector Power Modes**

| | Projector Power Modes | | | |
|---|---|---|---|---|
| ASCII POWER Codes Issued | STANDBY (Yellow) | POWER ON LAMP OFF (Green + Yellow) | POWER ON LAMP ON (Green) | COOLING DOWN MODE (Green + Yellow) |
| PWR0 (Power ON Lamp Off) | To: Full POWER ON (Boot Delay) | ---- | To: LAMP OFF (Immediately) | Cancels COOL DOWN goes to FULL POWER |
| PWR1 (Power ON Lamp ON) | To: POWER ON + LAMP ON (Boot Delay) | To: LAMP ON (Immediately) | ---- | To: LAMP ON (Immediately) |
| PWR3 (Standby Mode) | ---- | To: STANDBY | To: LAMP OFF then Cool Down Mode | ---- |

**NOTES**: *1) The green status LED flashes while the yellow LED is on steady while in "Boot Delay". 2) Both green and yellow status LEDs flash during "Cool Down.*

| Remote Access Level (RAL) | |
|---|---|
| **DESCRIPTION -** Set the remote serial protocol access level for a serial communications port. **NOTE***: Valid sections are 0 - No Access, 1 - Login Required, 2 - Free Access* | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>Set the access level on Ethernet all ports. |
| PRTA | Set the access level on RS232 port A. |
| **EXAMPLES:**<br>(RAL 0) Disable remote serial protocol access for all Ethernet ports<br>(RAL?) Get access level for Ethernet ports (RAL!0)<br>(RAL+PRTA 2) Set remote serial protocol access level on port A to free access<br>(RAL+PRTA?) Get access level (RAL+PRTA!2) | |
| **SCCI Settings (SCC)** | |
| **DESCRIPTION -** Enable/disable the SCCI control. | |
| **EXAMPLES:**<br>(SCC1) Enables the SCCI control | |
| **Screen Format (SCF)** | |
| **DESCRIPTION -** Select Screen format file which describes the geometry for the output image. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select screen file for the current channel. |
| RFSH | Set (1) to refresh files, 0 do nothing. |
| TEMP | Select the screen file as DLP active file, do not change channel settings. |
| **EXAMPLES:**<br>(SCF+C108 “FLAT”) Use file “FLAT” on channel 108<br>(SCF+C108?) Get screen file name on channel 108<br>(SCF?L) List all available entries of screen control<br>(SCF+TEMP “FLAT”) Use file “FLAT” as DLP active file<br>(SCF+RFSH 1) Refresh TI file list | |
| **SMPTE Field Bit (SFB)** | |
| **DESCRIPTION -** Set SMPTE Field Bit | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Set SMPTE Field Bit for the current channel. |
| **EXAMPLES:**<br>(SFB?L) List all entries on SMPTE Field Bit control<br>(SFB+C101 1) Set SMPTE Field Bit to 1 on channel 101<br>(SFB+C101?) Get SMPTE Field Bit on channel 101 | |

| Shutter/Douser (SHU) | |
|---|---|
| **DESCRIPTION -** Open/Close shutter/douser | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>Select douser position 0 - douser removed from optical path 1 - douser blocking optical path |
| STEP | Change the steps for open/close douser on CP2000-ZX. The default value is 50. |
| **EXAMPLES:**<br>(SHU 1) Close shutter<br>(SHU 0) Open shutter<br>(SHU?) Get current status of shutter | |

| Select Input (SIN) | |
|---|---|
| **DESCRIPTION -** Select Input Port. Selecting input port will reset the list and default data of DTF control. Use index number or text description to select input port. Available options are: 000 “292-A” 001 “292-B” 002 “292-Dual” 003 “DVI-A” 004 “DVI-B” 005 “DVI-Twin” 006 “IPM-INP DVIA” 007 “IPM-INP DVIB” 008 “IPM-INP DVIT” 009 “IPM-CHA DVIA” 010 “IPM-CHA DVIB” 011”IPM-CHA DVIT” | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select input for current channel |
| **EXAMPLES:**<br>(SIN?) Get current input port<br>(SIN?L) Show entries on the list<br>(SIN 1) or (SIN “292-B”) Set current input port to 292-B<br>(SIN+C101 ?) Get input port on channel 101<br>(SIN+C101 1) or (SIN+C101 “292-B”) Set input on channel 101 | |

| SNMP Agent Configuration (SNM) | |
|---|---|
| **DESCRIPTION -** This control will set the various configuration options for SNMP Agent | |
| **SUBCODE**<br>ENVT | **DESCRIPTION OF USE**<br>Enables/Disables SNMP version 2 |
| LEXT | Gets/Sets the Lamp Expire Trap Flag for the SNMP Agent |
| LHLT | Gets/Sets the Lamp Half Life Trap Flag for the SNMP Agent |
| TSIP | Sets the Trap IP address for the SNMP agent |
| **EXAMPLES:**<br>(SNM+TSIP “xxx.xxx.xxx.xxx”) Sets the Trap IP address to xxx.xxx.xxx.xxx<br>(SNM+TSIP “0.0.0.0”) Setting the IP address to 0.0.0.0 will stop SNMP Agent from sending the traps.<br>(SNM+LHLT 1) Setting this flag to 1 will disable any future lamp half life traps<br>(SNM+LEXT 1) Setting this flag to 1 will disable any future lamp expire traps<br>(SNM+ENVT?) Get the flag to see if V2 is enabled (1) or disabled (0)<br>(SNM+ENVT 1) Enable SNMP V2<br>(SNM+ENVT 0) Disable SNMP V2 | |

| Screen Orientation (SOR) | |
|---|---|
| **DESCRIPTION -** Set screen orientation. This allows for flipping the screen orientation to allow for various mounting options of the projector including the use of mirrors and front or rear screen projection. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>Select Orientation. 0 - Normal Front, 1 - Inverted Rear, 2 - Normal Rear, 3- Inverted Front |
| **EXAMPLES:**<br>(SOR?L) List orientation options<br>(SOR?) Get the orientation status<br>(SOR0) Set orientation to front | |

| Select Source Format (SRF) | |
|---|---|
| **DESCRIPTION -** Select the Source format file. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select source format for the current channel |
| RFSH | Set (1) to refresh files, 0 do nothing |
| TEMP | Select the source file as DLP active file, do not change channel settings. |
| **EXAMPLES:**<br>(SRF+C108 “XXX”) Use file “XXX” on channel 108<br>(SRF+C108?) Get source file name on channel 108<br>(SRF?L) List all entries of source control<br>(SRF+TEMP “XXX”) Use file “XXX” as DLP active file<br>(SRF+RFSH 1) Refresh TI file list | |

| System Status (SST) | |
|---|---|
| **DESCRIPTION -** Retrieve the various system status groups. | |
| **SUBCODE**<br>ALRM | **DESCRIPTION OF USE**<br>Returns a summary of any active alarms |
| CONF | Returns configuration data - model, sn, build date, etc |
| COOL | Returns cooling data - cooling fans, air flow, etc |
| HLTH | Returns system health |
| INTE | Returns interlock data |
| LAMP | Returns LAMP operational data. |
| None | Returns information on all status groups, with one message per item. |
| PERI | Returns peripherals data - Cine-IPM, etc |
| SIGN | Returns signal data - freq, etc. |
| SYST | Returns system data - power, hours of use, shutter open, etc |
| TEMP | Returns temperature data |
| VERS | Returns version numbers |
| **EXAMPLES:**<br>(SST+ALRM?) returns (SST+ALRM!000 002 “101” “Prism temperature”)<br>where parameters are P1=index number, P2=error level, P3=value, P4=description.<br>Error level is 0=no errors or warnings, 1=warning, 2=error, 3=error and warning | |
| **Stop DLP Communication (STP)** | |
| **DESCRIPTION -** Stop communications to DLP Cinema Electronics temporarily, i.e. for DLP software upgrading. | |
| **SUBCODE**<br>NONE | **DESCRIPTION OF USE**<br>0 - restart DLP communications; 1 - stop DLP communications. |
| **EXAMPLES:**<br>(STP 0) Restart DLP communication<br>(STP 1) Stop DLP communication<br>(STP?) Request current state. Example response if (STP!000) | |

| Projector Platform and Motherboard-related Information (SYS) | |
|---|---|
| **DESCRIPTION -** Stores the projector platform and motherboard related information. | |
| **SUBCODE**<br>MCBI | **DESCRIPTION OF USE**<br>0/1 - Set software flag to use/not use ILS on CP2000-ZX. |
| MOTH | Read motherboard revision of the projector. |
| PLAT | Read platform ID of the projector. |
| **EXAMPLES:**<br>(SYS+PLAT?) Gets the platform of the projector.<br>(SYS+MOTH?) Gets the motherboard revision of the projector.<br>(SYS+MCBI 1) Set flag to use ILS on CP2000-ZX. | |
| **Target Color Gamut (TCG)** | |
| **DESCRIPTION -** Set the Target Color Gamut file. This file describes desired output colorimetry from the projector. For this control to function the Measured Color Gamut Data must be accurate. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select target color gamut for the current channel. |
| RFSH | Set (1) to refresh files, 0 do nothing |
| TEMP | Select the target color file as DLP active file, do not change channel settings. |
| **EXAMPLES:**<br>(TCG+C108 “Altanis”) Use file “Altanis” on channel 108<br>(TCG+C108? ) Get target color file name on channel 108<br>(TCG?L) List all available entries of target color control<br>(TCG+TEMP “Altanis”) Use file “Altanis” as DLP active file<br>(TCG+RFSH 1) Refresh TI file list | |
| **Enable 3D (TDC)** | |
| **DESCRIPTION -** Enable/Disable 3D on the specified channel. This controls the frame rate multiplication features that allow for simulated three dimensional image projection. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select 3D enable for the current channel |
| **EXAMPLES:**<br>(TDC+C108 1) Enable 3D on channel 108<br>(TDC+C108?) Get 3D setting on channel 108<br>(TDC?) Get current 3D status | |

| Display Reference GPI (TDI) | |
|---|---|
| **DESCRIPTION -** Setup Display Reference GPI for 3D control. This signal selects the input signal that will be used as a reference to synchronize multiple projectors so that the gating technology so that the images can be targeted to the correct eyes. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select display GPI for the current channel |
| **EXAMPLES:**<br>(TDI?L) List all entries on Display Reference GPI control<br>(TDI+C101 1) Set Display Reference GPI to 1 on channel 101<br>(TDI+C101?) Get Display Reference GPI on channel 101 | |
| **3D Dark Time (TDK)** | |
| **DESCRIPTION -** Setup Dark Time for 3D control. This controls how much time between displayed images the output remains dark to allow for the glasses on other gating mechanism to flip between the eyes. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select dark time for the current channel |
| **EXAMPLES:**<br>(TDK+C101 1) Set Dark Time to 1 on channel 101<br>(TDK+C101?) Get Dark Time on channel 101 | |
| **Output Reference Delay (TDP)** | |
| **DESCRIPTION -** Setup Output Reference Delay phase for 3D control. Additional control for output timing relative to input timing. The data range is -180 to 180. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select output reference delay phase for the current channel |
| **EXAMPLES:**<br>(TDP+C101 1) Set Output Reference Delay phase to 1 on channel 101<br>(TDP+C101?) Get Output Reference Delay phase on channel 101 | |
| **3D Display Reference (TDR)** | |
| **DESCRIPTION -** Setup display reference timing signal for 3D control. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select display reference for the current channel |
| **EXAMPLES:**<br>(TDR?L) List all entries on display reference control<br>(TDR+C101 1) Set display reference to 1 on channel 101<br>(TDR+C101?) Get display reference on channel 101 | |

| Output Reference Delay (TDT) | |
|---|---|
| **DESCRIPTION -** Setup Output Reference Delay_Time for 3D control. Controls how much delay between the input and output reference timing. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select reference delay for the current channel |
| **EXAMPLES:**<br>(TDT+C101 1) Set Output Reference Delay Time to 1 on channel 101<br>(TDT+C101?) Get Output Reference Delay Time on channel 101 | |
| **Input Frame Dominance (TFD)** | |
| **DESCRIPTION -** Setup Input Frame Dominance for 3D control. This selects which signal is considered first in the source signal, the left or the right. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select frame dominance for the current channel |
| **EXAMPLES:**<br>(TFD?L) List all entries on Input Frame Dominance control<br>(TFD+C101 1) Set Input Frame Dominance to 1 on channel 101<br>(TFD+C101?) Get Input Frame Dominance on channel 101 | |
| **3D Frame Rate Multiple (TFR)** | |
| **DESCRIPTION -** Setup frame rate multiple for 3D control | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select 3D frame rate for the current channel. |
| **EXAMPLES:**<br>(TFR?L) List all entries on the frame rate multiple factor<br>(TFR+C101 1) Set frame rate multiple to “4:2” on channel 101<br>(TFR+C101?) Get frame rate multiple on channel 101 | |
| **Input Reference GPI (TGI)** | |
| **DESCRIPTION -** Setup Input Reference General Purpose Input for 3D control. Selects the signal to be used to synchronize the video processing so the system knows which eye the images are targeted for. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select Input reference GPI for the current channel |
| **EXAMPLES:**<br>(TGI?L) List all entries on Input Reference GPI control<br>(TGI+C101 1) Set Input Reference GPI to 1 on channel 101<br>(TGI+C101?) Get Input Reference GPI on channel 101 | |

| TI Certificate and Tracking Key (TIG) | |
|---|---|
| **DESCRIPTION -** Gets the TI certificate and tracking key | |
| **EXAMPLES:**<br>(TIG+CERT?) Gets the TI certificate<br>(TIG+TKEY?) Gets the TI tracking key | |
| **Input Reference (TIR)** | |
| **DESCRIPTION -** Setup Input timing Reference for 3D control | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| None | Select input reference for the current channel |
| **EXAMPLES:**<br>(TIR?L) List all entries on Input Reference control<br>(TIR+C101 1) Set Input Reference to 1 on channel 101<br>(TIR+C101?) Get Input Reference on channel 101 | |
| **Time/Date (TMD)** | |
| **DESCRIPTION -** Set the time zone | |
| **SUBCODE**<br>DATE | **DESCRIPTION OF USE**<br>Set the date in the form yyyy/mm/dd |
| TIME | Set the local time in the form hh:mm:ss. **NOTE**: Time must be set using 24 hr clock (regardless of LOC+TIME setting) |
| ZONE | Set the time zone |
| **EXAMPLES:**<br>(TMD+ZONE 20) Set time zone to EST<br>(TMD+TIME “17:50:45”) Set new local time<br>(TMD+DATE “2007/02/30”) Set the local date<br>(TMD+TIME?) Get local time (TMD+TIME! 17:50:45) | |
| **Output Reference GPO (TOO)** | |
| **DESCRIPTION -** Setup Display Reference GPO for 3D control. This signal selects the output signal that will be used as a reference to the gating technology so that the images can be targeted to the correct eyes. | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select GPO for the current channel |
| **EXAMPLES:**<br>(TOO?L) List all entries on Output Reference GPO control<br>(TOO+C101 1) Set Output Reference GPO to 1 on channel 101<br>(TOO+C101?) Get Output Reference GPO on channel 101 | |

| Output Reference Polarity (TOP) | |
|---|---|
| **DESCRIPTION -** Setup Output timing signal reference polarity for 3D control | |
| **SUBCODE**<br>Cxxx | **DESCRIPTION OF USE**<br>Replace xxx with the channel number. Valid range is 101 - 164. |
| NONE | Select output reference polarity for the current channel |
| **EXAMPLES:**<br>(TOP?L) List all on Output Reference Polarity control<br>(TOP+C101 1) Set Output Reference Polarity to 1 on channel 101<br>(TOP+C101? Get Output Reference Polarity on channel 101 | |
| **User ID (UID)** | |
| **DESCRIPTION -** Allows users to login to the serial interface. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>None |
| **EXAMPLES:**<br>(UID) “username” “password”) Login a user<br>(UID) Logout the current user, also happens automatically when a new user logs in<br>(UID?)(UID! “username” 01) Display the current logged in user and their access level | |
| **Lens Zoom Direction (ZOD)** | |
| **DESCRIPTION -** Get/set the current zoom direction. | |
| **SUBCODE**<br>None | **DESCRIPTION OF USE**<br>(ZOD {1 \| -1}) |
| **EXAMPLES:**<br>(ZOD 1) set zoom direction to positive<br>(ZOD?) return current zoom direction (1 or -1) | |

| Zoom Lens Position Adjustment (ZOM) | |
|---|---|
| **DESCRIPTION -** Adjust lens to specific zoom position.<br><br>Use command without subcode:<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will move to specified steps, do not save data to the active channel<br><br>Use ZOM with Subcode CXXX (active channel):<br>If ILS is on, motor will move to specified steps and save data to the active channel.<br>If ILS is off, motor will not move, save data to the active channel.<br><br>Use ZOM with Subcode CXXX (inactive channel):<br>Just save data to specified channel, no hardware movement. | |
| **SUBCODE** | **DESCRIPTION OF USE** |
| BACN | Motor backlash in negative direction, read-only for ILS. |
| BACP | Motor backlash in positive direction, read-only for ILS. |
| CXXX | Move lens mount to a specified zoom position. |
| RNGP | Motor moving range in positive direction, read-only for ILS. |
| RNGN | Motor moving range in negative direction, read-only for ILS. |
| **EXAMPLES:**<br>(ZOD -1) Direction from the left<br>(ZOM 500) Move lens to position 500<br>(ZOM+CXXX -500) Set lens to position of channel XXX to -500<br>(ZOM ?) Return current motor position | |

# Appendix B: SCCI Port

**Table B.1 SCCI Connector Pinouts**

| PIN | SIGNAL NAME | DIRECTION | DESCRIPTION |
|---|---|---|---|
| 1 | +5V Standby | Out | Current limited 5VDC supply |
| 2 | Lamp ON | In | Projector at **Power On** mode, lamp is ON |
| 3 | +5V Standby | Out | Current limited 5VDC supply |
| 4 | Lamp OFF | In | Projector at full power, lamp is OFF |
| 5 | +5V Standby | Out | Current limited 5VDC supply |
| 6 | Douser Closed | In | Close douser |
| 7 | Douser Open | In | Douser open |
| 8 | Health Output | Out | Open Connector Low = Lamp OFF, Open Connector High = Lamp ON |
| 9 | Ground | Out | Ground |

**NOTE**: *All SCCI inputs require a pulse input of 50ms to several seconds to operate reliably. Inputs are 5V resistor current limited LED's inside of optocouplers.*

# Appendix C: GPIO

# C.1 The GPIO Port

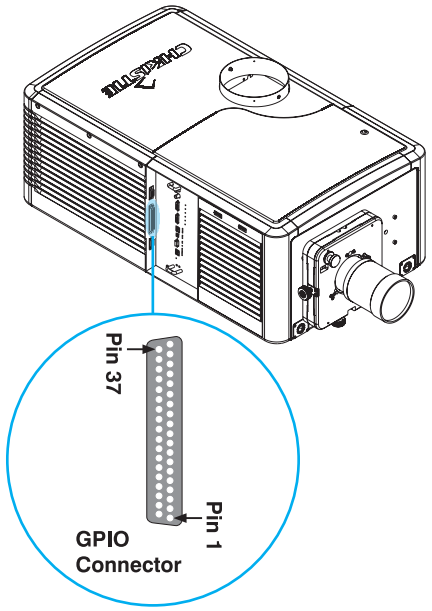
The 37-pin GPIO connector is located on *Auxiliary* panel next to the main communication panel on the operator's side of the projector. It provides a flexible method of interfacing a wide range of external I/O devices to the projector, often so that an event on one device automatically triggers an event on the other. The pins that are configurable on this connector are done through the **Advanced: 3D Control** menu.

**NOTE:** Pins not shown in the figure below are reserved for other uses and cannot be specified.

**Table C.1 GPIO Connector Pinouts**

| Inputs | Positive | Negative |
|---|---|---|
| GPI #1 | Pin 1 | Pin 20 |
| GPI #2 | Pin 2 | Pin 21 |
| GPI #3 | Pin 3 | Pin 22 |
| GPI #4 | Pin 4 | Pin 23 |
| GPI #5 | Pin 5 | Pin 24 |
| GPI #6 | Pin 6 | Pin 25 |
| GPI #7 | Pin 7 | Pin 26 |
| GPI #8 | Pin 8 | Pin 27 |

| Outputs | Positive | Negative |
|---|---|---|
| GPO #1 | Pin 9 | Pin 28 |
| GPO #2 | Pin 10 | Pin 29 |
| GPO #3 | Pin 11 | Pin 30 |
| GPO #4 | Pin 12 | Pin 31 |
| GPO #5 | Pin 13 | Pin 32 |
| GPO #6 | Pin 14 | Pin 33 |
| GPO #7 | Pin 15 | Pin 34 |




As shown above, each available pairing of pins (+/–) is defined as either an ***input*** or ***output***. Configure a pin as an input if you want the projector to respond to an incoming signal, or as an output if you want an external device to respond to the projector. For example, configure the pin as an output in order to drive an external IR emitter for 3D glasses, or to automatically reduce room lighting when the projector is turned on.

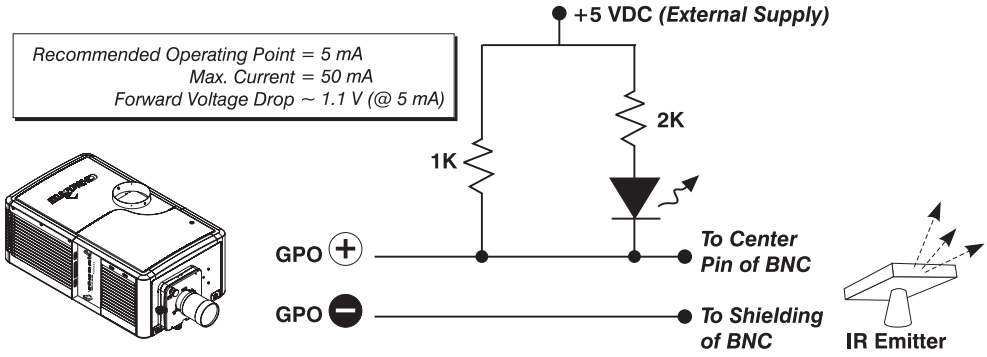



**Figure C-1 Circuit for Power Supply**

If you are wiring your own GPIO cable for use with a server or 3D device such as an IR emitter or a polarizer, follow the circuit diagram **Figure C-1**, above.

# Appendix D: CDP Error Codes

### Table D.1 CDP Error Codes

| Interlocks | | |
|---|---|---|
| Component | Condition | Error Message |
| AC Blower | Open | Interlock Open |
| Extractor | Open | Interlock Open |
| Fire Alarm | Open | Interlock Open |
| Ballast Fan | Fail | Ballast Fan Failed |
| Tamper | Open | Interlock Open |
| **Ballast** | | |
| Component | Condition | Error Message |
| Ballast | N/A | Ballast No Communication |
| **Thermal Sensors and Fan Speeds** | | |
| Component | Condition | Error Message |
| DMD-Red | SFail | Sensor Failed By No I2C Communication |
| DMD-Green | SFail | Sensor Failed By No I2C Communication |
| DMD-Blue | SFail | Sensor Failed By No I2C Communication |
| Prism | SFail | Sensor Failed By No I2C Communication |
| Integrator | SFail | Sensor Failed By No I2C Communication |
| Ambient | SFail | Sensor Failed By No I2C Communication |
| Exhaust | SFail | Sensor Failed By No I2C Communication |
| Motherboard | SFail | Sensor Failed By No I2C Communication |
| PCM | SFail | Sensor Failed By No I2C Communication |
| Inlet 1 | SFail | Failed By No I2C Communication |
| Inlet 2 | SFail | Failed By No I2C Communication |
| Inlet 3 | SFail | Failed By No I2C Communication |
| LAD | SFail | Failed By No I2C Communication |
| Pump | SFail | Failed By No I2C Communication |
| **Lamp Errors** | | |
| Component | Condition | Error Message |
| Lamp | StrikeFail | Lamp Strike Failed |
| Lamp | UnexpectedOff | Lamp Unexpected Off |
| **System Self Test** | | |
| Component | Condition | Error Message |
| EDID Checksum | Failed | EDID Checksum Failed on TI or PCM |
| Flash memtest | Failed | PCM Flash Memory Test Failed |
| FPGA Checksum | Failed | FPGA Code Checksum Failed |
| DDR memtest | Failed | DDR Memory Test Failed |
| **TI State** | | |
| Component | Condition | Error Message |
| DLP State | NoComm | TI No Communication |
| DLP State | Pause | TI Communication is Paused by (STP1) Command |
| DLP State | Sopen | Open TI Serial Port Error |
| DLP State | SLogin | Login to TI by Serial Port Error |
| DLP State | EOpen | Open TI OEM Ethernet Port Error |
| DLP State | ELogin | Login to TI by Ethernet Port Error |
| DLP State | Selftest | TI Powerup Self Test Error |
| DLP State | RDRAM | TI RDRAM Signature Test Error |
| DLP State | FmtBrd | TI Formatter Board Error |

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