CP2000-XB

CHRISTIE®

3: Basic Operation

1 Introduction

This manual is intended for trained users authorized to operate professional high-brightness projection systems. Only qualified Christie trained 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.

1.1 Purchase Record and Service Contacts

Should a problem be encountered with any part of the projector, contact a dealer. If you have purchased the projector, complete the Purchase Record, below and keep with your records.

Table 1.1 Purchase Record

Dealer:	
Dealer Phone Number:	
Projection Head Serial Number:	
Ballast Serial Number:	
Purchase Date:	
Installation Date:	

NOTE*: Both serial numbers are located at the rear of the projector.*

Table 1.2 Ethernet Settings

Default Gateway:	
DNS Server:	
CP2000-XB **Projector Address**	
Projector:	
Subnet Mask:	

1.2 List of Components

Ensure the following components were received with the projector:

- ☐ Projection Head includes:
  - Line cord
  - Touch Panel Controller with mounting hardware and 3 ft. cable
  - Standard and high-security keys for lamp and igniter service access, plus assorted Allen keys
  - *CP2000-XB User Manual*
- ☐ Lamp Ballast (three-phase 7 kW for all lamps in all countries)
- ☐ Choice of lamp kit (incl. protective gear)
- ☐ Cable kit (incl. two lamp power cables and two communication/control cables)
- ☐ Extractor Kit, 50/60 Hz
- ☐ Choice of high-contrast or high brightness lenses (does not include auxiliary lens or mount—both optional)
- ☐ Optional FredFrame™ (includes fork lift rails for bottom).
- ☐ Optional Rack Stand

1.2.1 Power and Lamp Requirements

POWER LEVELS: The universal ballast in the *CP2000-XB* offers adjustable lamp power to suit the size of lamp currently in use. Software allows each lamp to be over-driven by approximately 10% of its maximum rating.

LAMPS: The *CP2000-XB* accommodates different lamps. Refer to *Section 8: Specifications of the CP2000-XB User Manual (020-100163-xx)* for a complete list of supported lamps.

OTHER: Optional Christie components include an auxiliary lens mount and lens, *DCP Librarian* setup software, and a 50-ft. TPC cable. Refer to the complete option list in *Section 8: Specifications of the CP2000-XB User Manual (020-100163-xx)*.

1.2.2 Software Requirements

DLP version 14 series or higher

TPC version 2.9 or higher

1.3   The Projector

1.3.1 New Features

- Motorized Lens Mount automates the process of setting the Focus, Horizontal (X) and Vertical (Y) Offset, and Zoom. **NOTE**: *TPC version 2.9 higher is required.*

1.3.2 List of All Features

- DLP Cinema™ 3-chip electronics with 2048 x 1080 native resolution (2D or 3D)
- Versatile electronic and optical scaling to fill wide screens
- 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™ local link encryption
- Dual DVI (Digital Visual Interface) connectors for alternative non-cinema content, used individually or simultaneously for high-speed dual-link processing.
- Can be rigged, flown and/or stacked with adjustable FredFrame™ rigging hardware
- Choice of 4 Xenon bubble lamp sizes and ratings
- Universal 3-phase 7 kW switching ballast for all lamps and countries
- Screen brightness: Up to 14 fL on 90 ft. screen
- Achievable contrast ratio 2000:1 full field on/off in center.
- *LampLOC™* motorized lamp alignment (automatic or custom bulb positioning)
- *LiteLOC™* for maintaining brightness over time
- Simple single-button **Start Feature** function via *Touch Panel Controller™*
- Auto-detection of a variety of SMPTE 292M input formats (incoming interlaced formats require proper 3:2 or 2:2 pull-down time code)
- Internal douser (shutter) for quick picture muting and cool stand-by mode
- Bit depth of 45 bits, 35.2 trillion colors.
- New ruggedized lens mount that accepts the new High Brightness (HB) lenses as well as previously available High Contrast (HC) lenses.
- Choice of High Brightness and High Contrast zoom lenses *(from 1.25:1 up to 8.5:1)*
- Optional Motorized Auxiliary Lens Mount (for 1.25x anamorphic or 1.26x wide converter lenses)
- Communication ports for remote control of the projector via PC or other controller
- High-security tamper-resistant lid lock with all access electronically monitored
- DC2K 3D Triple Flash functionality, capable of projecting full resolution 3D images under a 6:2 frame rate multiplication. **NOTE**: *DLP version 13 series or higher is required.*
- HDCP decryption on both DVI inputs allows display of copy protected alternate content.

1.4   Labels and Markings

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 8 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

⚠ WARNING **All installation procedures must be performed by a qualified technician in a restricted access location.**

NOTE: *The illustrations provided are to enhance the understanding of the written material. They are graphical representations only and may not represent your exact projector model.*

2.1 Quick Setup

Follow these steps for quick setup of the projector in a basic front mount position.

STEP 1 - Position the Projection Head

Locate the projection head at an appropriate throw distance (projector-to-screen distance) and vertical position. Refer to *Section 2.3 Projector Position and Mounting*. Make sure that the projector is level from side-to-side, and *do not invert*. Locate the lamp ballast so that its 4 cables can reach the rear of the projection head.

STEP 2 - Install the Touch Panel Controller (TPC)

Attach the *Touch Panel Controller*, pre-assembled with its ball joint base and mounting arm, to the matching ball joint base secured at the rear of the projector. Plug the TPC into the TPC port on the projector's rear connector panel using the standard 3-ft. cable provided.

Alternatively, mount the TPC in a remote location up to 50 feet away and attach to the rear of the projector using the optional long-distance cable.
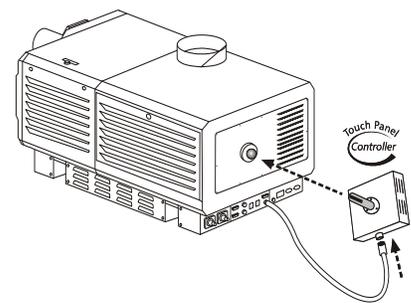
Figure 2-1 Installing the TPC

STEP 3 - Install Lens, Lamp and Heat Extractor

Refer to *Section 2.4 Installing a Lens, Lamp and Cooling*.

STEP 4 - Connect a Source

Connect your desired source to the appropriate HD-SDI (cinema) connector(s) on the *Communications and Source Connection Panel* at the rear of the projector. **NOTE**: *To connect other types of sources, such as alternative content through DVI or Christie's Cine-IPM 2K, you must remove the access panel located on the underside of the projector near the air filter. Drill an exit hole or leave the panel off.*
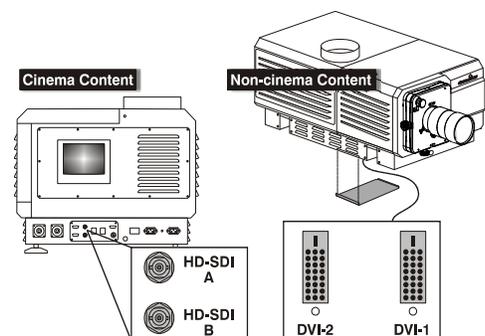
Figure 2-2 Access to Cinema and Non-Cinema Ports

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STEP 5 - Connect to Lamp Ballast and Power

⚠ WARNING **1) Connect all 4 cables to the projection head <u>prior</u> to turning the ballast breaker on. 2) Follow all labeling exactly.**

HEAD-TO-BALLAST: Connect all 4 ballast cables—two DC power cables and two communication/control cables—between the projector rear and lamp ballast. See **Figure 2-3**.

BALLAST-TO-AC: Connect the ballast's integral line cord to your AC supply (you may have to first modify the plug for the AC at your site). See **Figure 2-4**. **NOTE**: *Before connecting the ballast to AC, a qualified electrical technician must make sure the ballast's plug type and **Input Power Range Switch** match the line voltage available at the site. Remove the lamp ballast cover to access the switch and determine its setting—toggle **left** for **200 VAC** supplies, toggle **right** for **400 VAC** supplies (factory default=200 VAC). Modify the plug type as necessary—as a delta load with safety ground, it has no neutral.*

Confirm that the ballast's 3-phase status lights are on and that the adjacent voltmeter displays an acceptable AC level for your ballast and region. Then set the ballast AC ON/OFF switch to ON and listen for the internal cooling fan start-up. **NOTE**: *There is no other indication of ballast ON status*.
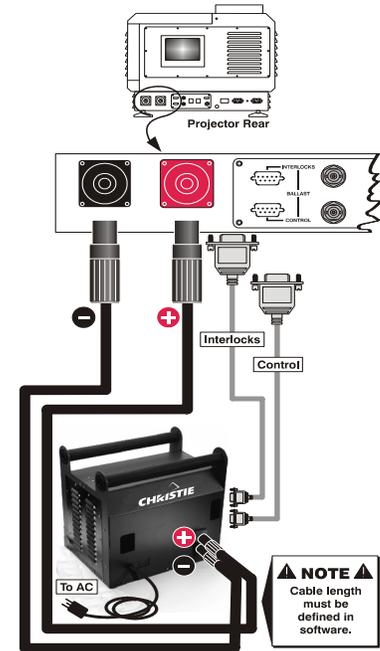
Figure 2-3 Connect Head to Ballast
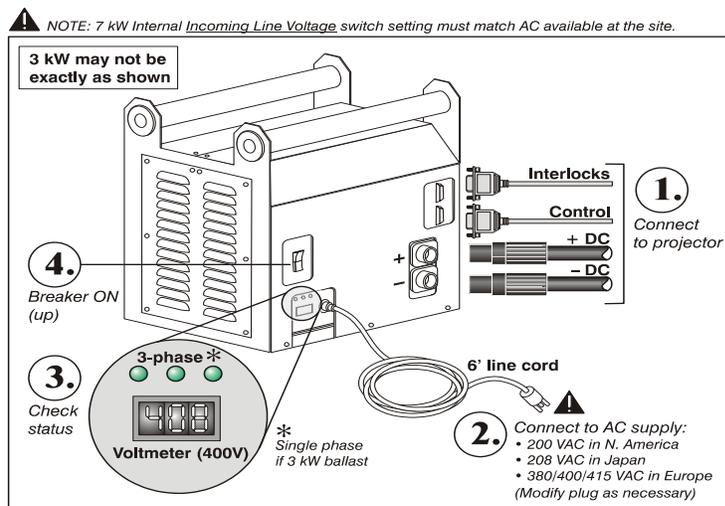
Figure 2-4 Ballast Connection

HEAD-TO-AC: Connect the Christie-supplied IEC 320 (220V) 15-amp line cord to a single phase 208V AC supply. Do not substitute other cords. Input power required is 200 - 240 VAC (±10%), 50 to 60 Hz @ 3 amps for 208 V. **Warning!** Do not attempt operation if the AC level is not within the specified voltage and power range for the projection head (180-265 AC).

EXTRACTOR: Also plug the extractor fan into the projector. Refer to *Section 2.4 Installing a Lens, Lamp and Cooling*.

At this point, the projection head is ready for use:

• The voltmeter should display the incoming voltage

• **PROJ. STATUS** light should be green

• Light engine compartment fans near the front should be running

• Remainder of projection head will be off

Projector Rear

To AC *200-240 VAC*   **Extractor Fan** *200-240 VAC*
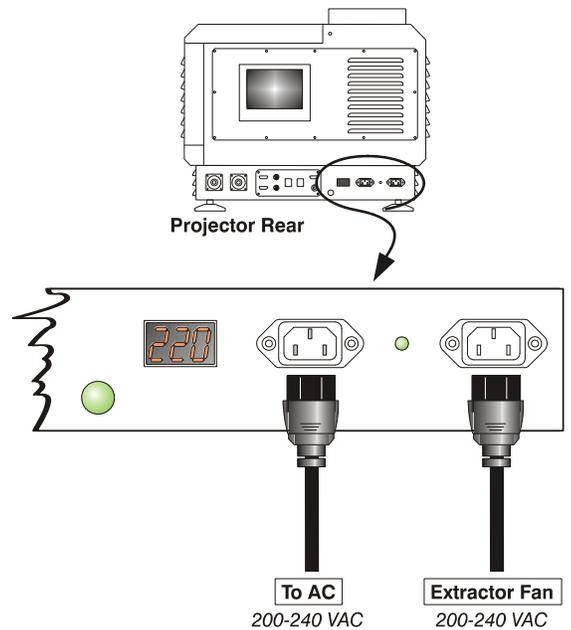
Figure 2-6 Connecting Projection Head to AC Supply

STEP 6 - Set Lamp Type and Cable Length

NOTE: *Service/installer required.*

⚠ **WARNING** Explosion hazard. Keep the projection head **OFF** until you have defined which lamp type is installed.

SET THE LAMP TYPE: Before powering up the projector and igniting the lamp, the installer must define in projector memory the size of lamp installed, otherwise you risk severely overdriving or underdriving a lamp.

At the TPC, go to the **Admin: Lamp** menu (password required). Enter the size of the lamp currently installed in the projector (factory default = 2.0 kW). Refer to *Section 3 Basic Operation* if you need help using the TPC menus. Also record the lamp type on the Lamp Installed label.
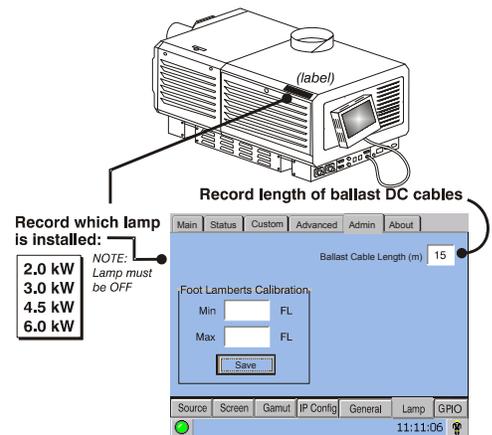
Figure 2-7 Cable Length

SET THE CABLE LENGTH: Still in the **Admin: Lamp** menu, use the **Cable Length (m)** text box to record the length of high-voltage DC cables connected between your lamp ballast and projection head. This value regulates the voltage drop that occurs over distance, and ensures that adequate voltage reaches the lamp. Particularly in projectors rented for temporary installations, the setting may have to be changed from its last use. Adjustment range is 2-30m (6½-100 ft.) in 1m increments.

STEP 7 - Ignite the Lamp and Select the Source

At the TPC **Main** menu, press the lamp button and hold for two seconds to ignite the lamp. Press the desired channel button on the **Main** menu. The source will be displayed according to pre-defined factory defaults for this channel. Adjust or apply new settings as described in *Section 3 Basic Operation*.

STEP 8 - Adjust the Lens

Turn the focus knob to sharpen the image. Adjust the zoom ring on the lens to increase or decrease image size. If desired, use the horizontal and/or vertical offset knobs to shift the image location. For other lens functions, refer to *Section 2.11 Offset and Boresight Alignment*.

2.2   Installation Considerations

Although the *CP2000-XB* is carefully engineered to deliver an exceptional quality high-brightness, high-resolution output, your final display results could still be compromised if the projector is improperly installed. This subsection discusses issues to consider before proceeding with a permanent installation. Read through to understand how good positioning will help ensure optimized images at any site.

2.2.1 Screen Types

Front Screen Installations

This projector is intended for use with flat or slightly curved screens, front or rear, ranging from about 5 meters (16 ft.) to 25 meters (82 ft.) wide. Although flat screens generally offer a low gain similar to a matte white wall paint—approximately 1 with a viewing angle just under 180°—and are considered most effective when ambient light is low, this difference in gain may be negligible given the very high light output from this projector. In addition, incident light reflects equally in all directions so the audience can see the display from more acute viewing angles. See **Figure 2-8**.
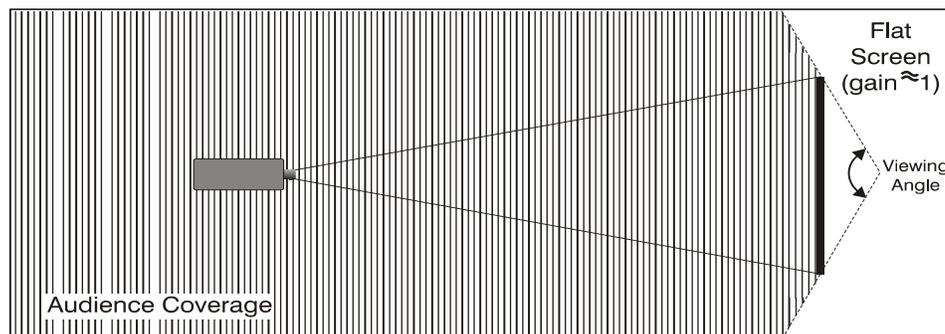
Figure 2-8 Audience Coverage with a Flat Screen

NOTE: *CP2000-XB high-contrast lenses are designed primarily for use with flat screens, but the projector's depth-of-field range allows the lens to be focused on mildly curved screens as well. While focus remains sharp in the corners, there may be significant pincushion distortion, primarily at the top of the screen.*

Rear Screen Installations

There are two basic types of rear screens: diffused and optical. A *diffused* rear screen has a surface that spreads the light striking it. Purely diffused screens have a gain of less than 1. The main advantage of the diffused screen is its wide viewing angle, similar to that of a flat screen for front screen projection. *Optical* rear screens take light from the projector and redirect it to increase the light intensity at the front of the screen. This reduces it in other areas, and creates a viewing cone similar to that of a curved front screen installation.

To summarize, optical screens are better suited for brightly lit rooms where the audience is situated within the viewing cone. Diffused screens may be better suited when a wide viewing angle is required but there is low ambient room lighting.

2.2.2 Screen Size

Screen size (image size) may be up to 145 feet across, depending on your lens and ambient light level. Choose a screen size appropriate for your lens and application. Keep in mind that if the projector will be used to display much text information, the image size must allow the audience to recognize all text clearly. The eye usually sees a letter clearly if eye-to-text distance is less than 150 times the height of the letter. In other words, small text that is simply located too far from the eye will be illegible no matter how sharply and clearly it is displayed. **NOTE**: *Screens/images are most described according to their horizontal (←→) screen width. Aspect ratio is also specified if it is anything other than 4:3 (see below). The older diagonal screen size typically used for 4:3 displays such as televisions and monitors is less commonly used for large projection screens.*

Table 2.1 Matching Lenses to Screen Size

Application	Screen Width
1.25 – 1.45:1 zoom	10-121 ft.
1.45 – 1.8:1 zoom	8-102 ft.
1.8 – 2.4:1 zoom	6-83 ft.
2.2 – 3.0:1 zoom	5-66 ft.
3.0 – 4.3:1 zoom	3-49 ft.
4.3 – 6.0:1 zoom	2.5-35 ft.
5.5 – 8.5:1 zoom	2-27 ft.

2.2.3 Screen Aspect Ratio

Aspect ratio describes the proportion of the display and is expressed as the ratio of width to height, such as 5:4 or 16:9. Typical aspect ratios range from 1.25 to 2.35—the higher the value, the wider or less square the image. See **Table 2.2**.

Table 2.2 Typical Aspect Ratios

Application	Aspect Ratio
SXGA	1.25 (5:4)
35mm filmstrip	1.32 (4:3)
NTSC Video//XGA	1.33 (4:3)
PAL Video/XGA	1.33 (4:3)
HDTV Video	1.78 (16:9)
Letter box Video/Flat	1.89 (2048 x 1080)
Cinemascope	2.35

Although image size and aspect ratio can be adjusted using projector controls, it is still ideal to use a screen with an aspect ratio that closely matches your likely source material. You can then more easily fill the screen with the image without restricting either image size or content. For example, standard video from a VCR has a 4:3 ratio (approximately) and can fill a 4:3 screen without side-to-side stretching, whereas a high-definition signal with a 16:9 aspect ratio is largest on a 16:9 screen.
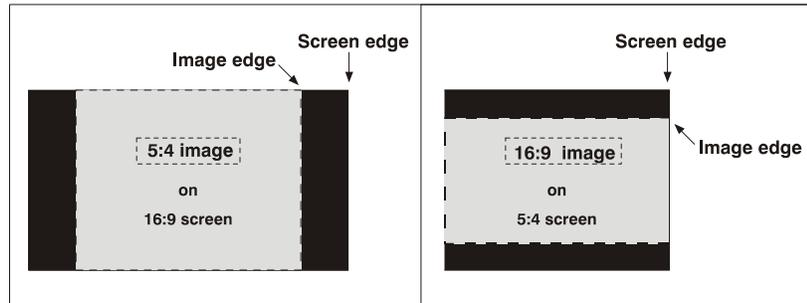
Figure 2-9 Aspect Ratios: Images vs. Screens

As shown in **Figure 2-9**, an obvious mismatch between source material and screen is characterized by black bars on both sides of the image (if the screen is wider than the source material) or above and below the image (if the source material is wider—typically called a *letter box* display). The black bars are unused display pixels and, in many installations such as theatres, are masked or hidden behind panels or curtains. Alternatively, if the area of unused pixels is considered minimal, you may prefer to use the projector's software control to slightly stretch the image either horizontally or vertically—enough to utilize the remaining pixels while not noticeably distorting the image.

Displaying Both Flat and Scope

As an example, two standard types of displays common in theatres—flat and scope—differ in their width-to-height aspect ratio as shown below:
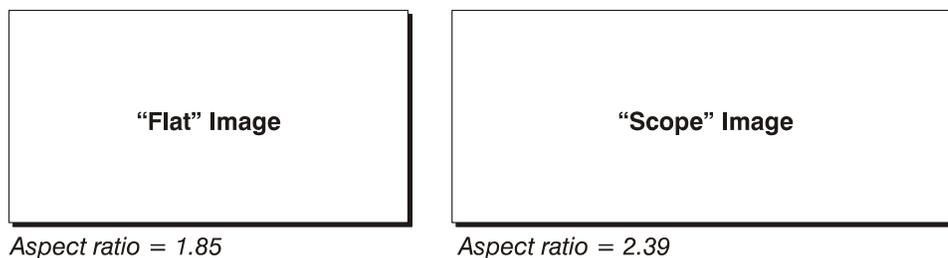
Figure 2-10 Typical Wide Formats

Achieving either of these displays from a variety of incoming source material (that may or may not be in a format matching that of the screen) depends on lenses, proper settings in the projector, and certain room conditions. Refer to *Section 4: Cinema Operation of the CP2000-XB User Manual (020-100163-xx)*.

2.2.4 Other Considerations

Other considerations and tips that can help improve your installation:

• Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry, which may affect performance.

• Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers, elevators, etc.

• Choose the best screen size for the application. Since more magnification reduces brightness, use a screen size appropriate for the venue but not larger than required. Installing a large screen in a small room is similar to watching television at a close range; too large a screen can overpower a room and interfere with the overall effect. A good rule of thumb is to be no closer than 1.5 times the width of the screen.

2.3 Projector Position and Mounting

Your installation site, the available screen, and ambient lighting all affect where the projector should be positioned. In addition, both *throw distance* (the distance between the projector and screen) and *vertical position* (the height of the projector in relation to the screen) must be determined for every new installation. Both depend on the screen size and lens type you are using. Make sure that the room can accommodate the required location of the projector for the chosen screen size.

2.3.1 Positioning at a Port Window

With the projection head secured on a suitable cart, position the unit so that the front bezel is less than 2 feet from the theatre's port window wall, or 3 feet if the optional auxiliary lens mount will be added. Center the projector with the theatre screen (←→) if possible (see **Figure 2-11 left**). If forced to be off-center (such as when a film projector is already present), try to optimize *aim* as shown in **Figure 2-11**. This will slightly increase side keystoning, but will minimize 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 it is significantly above the screen center.*
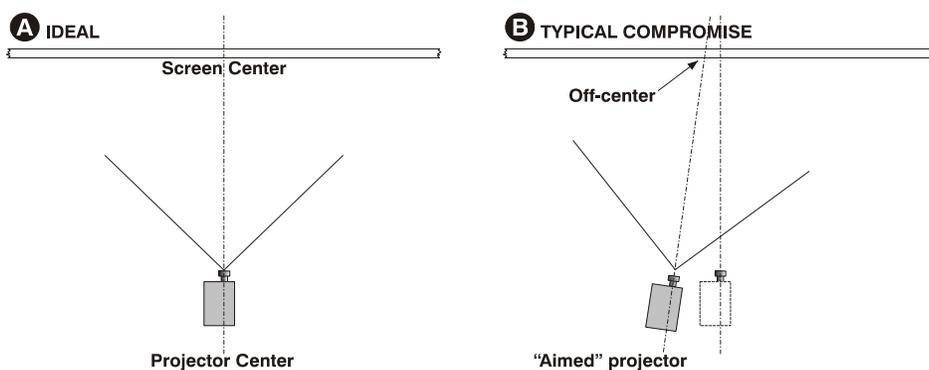
Figure 2-11 Centering <--> (Aerial Views)

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. Later, when your projector is up-and-running, adjust precise image geometry and placement as described in *Section 2.10 Basic Image Alignment*.

2.3.2 Throw Distance

Throw distance is the distance between the *projector* and the *screen* (**Figure 2-12**). For any installation, placing the projector at an accurate throw distance is necessary in order for the image size to closely match your screen – the farther the projector is from the screen, the larger the image. With zoom lenses, you'll want to know the approximate minimum and maximum image sizes possible from a given throw distance so that the most appropriate lens is installed at the site (throw distance / screen width = throw ratio of lens).

Calculating Throw Distance

Once you know the screen size and lens type present, calculate the required throw distance.
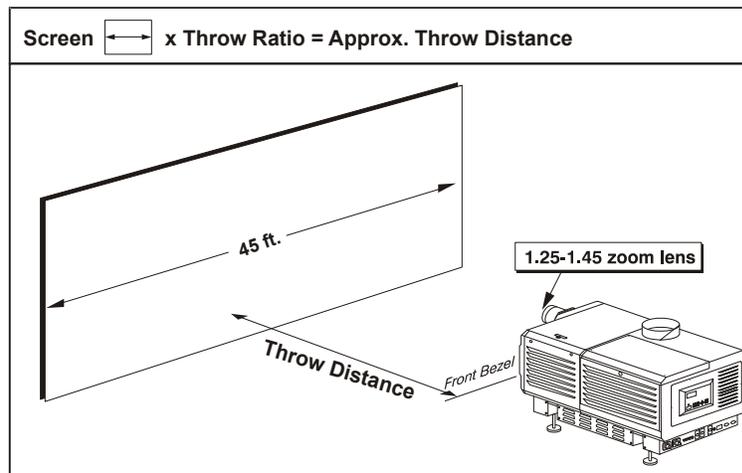
Figure 2-12 Estimating Throw Distance: Example

NOTES: 1) *If your projector is tilted up or down in relation to the screen, typical in large venues and/or elevated installation, throw distance still represents the smallest measurement between the screen and front bezel.* **2)** *Remember that throw distances are calculated from the screen to the **front bezel** of the projector rather than its foot centers. To figure throw distance from foot centers, add 8.74" (22.2 cm).*

As shown in **Figure 2-12**, *throw distance* is approximately equal to the full *horizontal width* of the screen multiplied by the *type of lens* you are using. For example, if you are using a 1.25:1 lens, the proper throw distance value will be approximately 25% more than that of the full screen width. Once you know your screen width and lens, you can estimate throw distance needed. Or, if you know the available throw distance beforehand, you can determine what images sizes are possible with a given zoom lens. **Important!** *For proper placement in any installation, use the throw distance formula provided for your lens. In addition, please keep in mind that due to lens manufacturing tolerances for lens focal length, actual throw distance can vary ±5% or more between lenses described as having the same throw ratio.*

Vertical and Horizontal Position

Refer to the offsets shown here for help in determining how high or low to install the projector in relation to the center of the screen, and/or how far off to one side.

Vertical Position

Describes the elevation of the projector in relation to the screen. For many typical large venue rental/staging installations and theatres, the projector will be above screen center. An ideal vertical position helps ensure that 1) images will be accurately rectangular in shape rather than distorted into a keystoned shape with non-parallel sides, and 2) focus and brightness will remain optimized.

Vertical position of the image can be offset—that is, placed higher or lower in relation to lens center—using the Up/Down Offset buttons from the **Main: Lens** menu. Starting with no offset, the 2048 x 1080 image from this projector can be moved by a maximum distance of 540 pixels, resulting in all of the image displayed above or below lens center (**Figure 2-13**).

Vertical Tilt

Describes the angle of the projector in relation to the screen. Ideally, the projector should be inclined to match the screen, so that the face of the lens and the surface of the screen are parallel to each other. To adjust to the height and level of the projector, extend or retract the feet by rotating them. Refer to **Figure 2-17**.
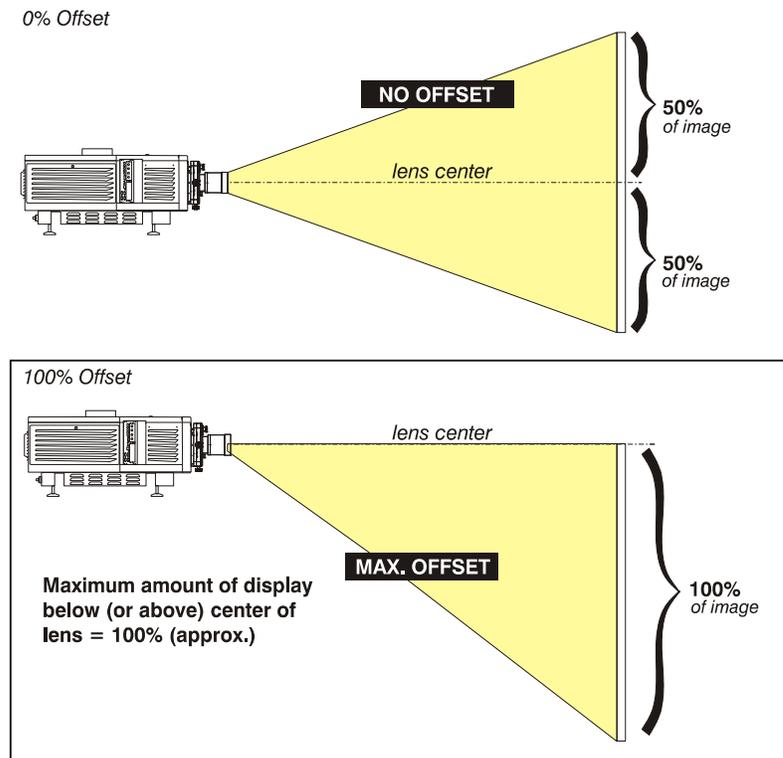
Figure 2-13 Vertical Offset Range

NOTES: **1)** *Assumes full 2048 x 1080 display.* **2)** *Recommended offset range can sometimes be exceeded, however this may affect image quality.* **3)** *Due to manufacturing tolerances, an offset range can vary ±5% or more between lenses described as having the same throw ratio, between projectors, and with any lens/projector combination.* **4)** *Simultaneous horizontal and vertical offset can limit the adjustment range of each, as can long throw distances.*

Alternative Method of Describing Vertical Offset

Offset can also be specified as the *distance traveled* from lens center (such as 270 pixels) and expressed as a percentage (270 pixels=50%) of *half of the image height*. This concept of image movement is illustrated in **Figure 2-14**.
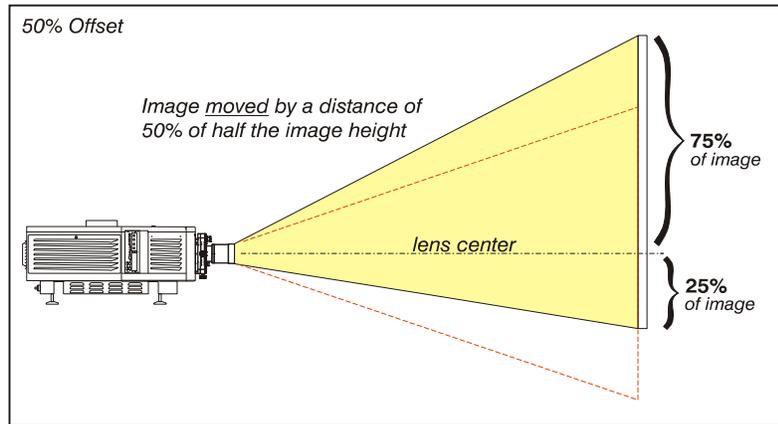
Figure 2-14 Example of Alternative Offset Specification

For any projector, if you find that you cannot raise or lower the image enough using mechanical vertical offset, try adjusting *V-Position* in the **Size and Position** menu when displaying at less than the minimum size. If images remain keystoned or exhibit uneven brightness, the projector may simply be too high or low in relation to the screen. Relocate for optimized performance.

Horizontal Position

The Horizontal Position of the image can be offset—that is, shifted left or right of lens center—using the Left/Right Offset buttons from the **Main: Lens** menu. Starting with no offset, the 2048 x 1080 image from this projector can be moved by a distance of 410 pixels, resulting in up to 70% of the image displayed on one side of lens center (**Figure 2-15**).

Note that the positioning shown at right is often mistakenly referenced as 70% offset but it *is not*—it is 40% offset derived as 410/1024 x 100. A 70% offset is explained below and shown in **Figure 2-16**.
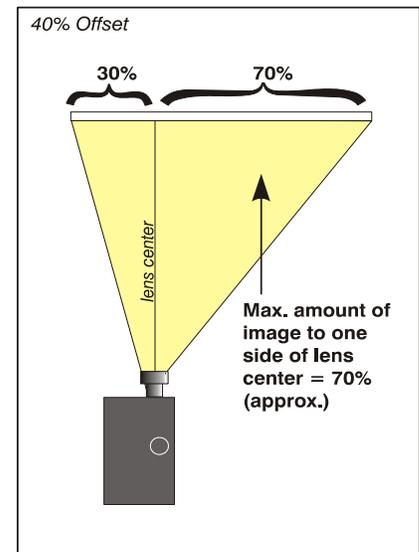
Figure 2-15 Horizontal Offset Range

Alternative Method of Describing Horizontal Offset

Horizontal offset can also be specified as the _distance_ traveled from lens center and expressed as a percentage of _half of the image width_. For example, an offset spec of 70% means a centered image can be moved by a distance of 717 pixels, resulting in 85% of the image projected to one side of lens center and 15% on the other. See **Figure 2-16**. **NOTE**: _Example only. Beyond range for this projector._

70% Offset

15%   85%

lens center

Image moved by a distance of 70% of half the image width

NOTE: Not possible with this projector.
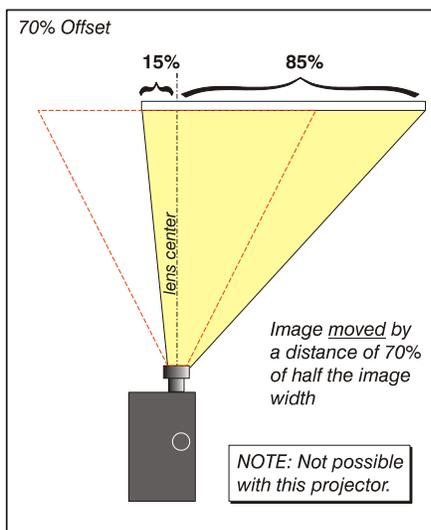
Figure 2-16 Alternative Offset Specification

2.3.3 Floor Mounting and Leveling

For front projection without suspending, mount the projector on a strong supporting structure or cart. Take special care if using a mobile cart—avoid sudden stops, force and uneven surfaces that may cause the top-heavy cart to lurch and overturn.

Make sure your mounting structure is reasonably level then adjust one or more projector feet as necessary to fine-tune. **Warning!** _Do not invert this projector._

Adjusting the Feet

For installations on a floor or suitable supporting structure, a single projection head should rest firmly on its feet. There is no need for the FredFrame™ unless stacking with another projector, or unless you decide to rig and fly the projector. To adjust the height and level of the projector, extend or retract the feet by rotating them. See **Figure 2-17**.
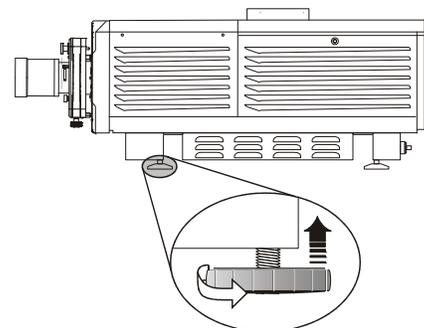
Figure 2-17 Adjusting the Feet

2.3.4 Tilting and Special Orientation

Tilting

In an ideal installation, the lens surface is parallel to the screen. This orientation helps to ensure optimized lens performance with minimal offset. If this position is not possible (such as when the projector is significantly higher than the center of the screen), rely on offset to compensate. To avoid keystoned images, keep the projector as orthogonal to the screen as possible. See **Figure 2-18**.
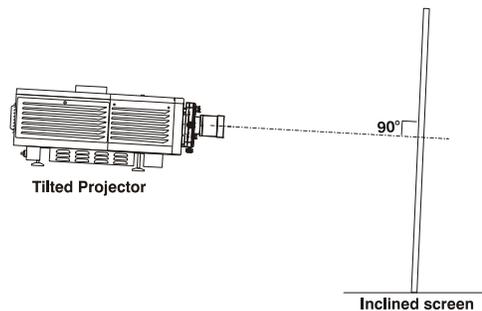
Figure 2-18 Tilt Projector to Match

Check with theatre personnel for the degree of screen tilt, or measure this incline with a protractor at the screen. Then TILT the projector to closely match this screen tilt angle. For any installation, you can tilt the front end of the projector up or down as much as 15° (see **Figure 2-19**).Likewise, side-to-side tilt must not exceed 15° (see **Figure 2-20**). This limit ensures safe lamp operation and proper position of the liquid cooling reservoir in the projector. **Warning!** *Tilt only as shown.*
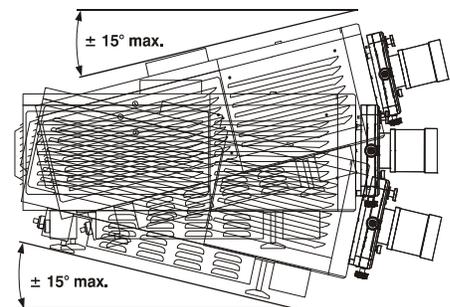
Figure 2-19 Maximum Tilt
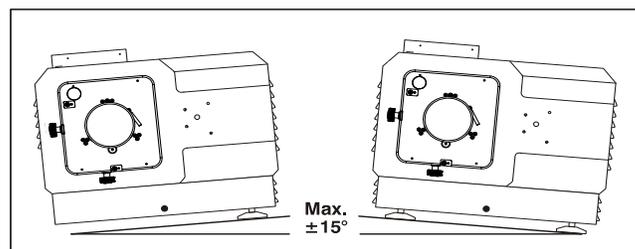
Figure 2-20 Side-to-Side Tilt

Special Orientations

Since this projector cannot be inverted or tilted beyond 15° during use, all installations are front-mount and require the Normal Front Image Orientation setting in the **Admin: General** menu. For shipping, remove lamp and rotate the projector box as needed.

2.3.5 Hoisting and Stacking

For some installations such as large venue rental/staging applications, you will likely have to safely lift or hoist this projector—or a stack of 2 projectors—into place. Keep in mind the following *critical safety* guidelines for all handling of the projector.

Carrying/Moving the Projection Head

⚠ **WARNING** **Four or more people can lift and hand-carry one projection head (with or without a FredFrame™) a short distance as required. Never attempt to carry a stack by hand. To use equipment such as a forklift to move the projection head, always install a FredFrame™ first.**

Using a Forklift

⚠ **WARNING** **Do not attempt to use a forklift without first installing the fork lift rails on the bottom of the FredFrame', otherwise the base of the projector may crush and damage internal components.**

Strong extruded rails that mount to the bottom of the FredFrame™ accommodate forks from a forklife, and are mandatory for this method of transport. Do not lift the projection head equipment unless the FredFrame™ and forklift rails are installed. Always follow the instructions provided with the FredFrame™ kit.

Using the FredFrame™

To hoist, stack and/or fly projectors, you must properly secure each projection head within a FredFrame™ and use appropriate rigging and safety cables to raise and/or suspend this assembly. If desired, the lamp ballast can also be hoisted and flown from its integral rigging bars. Follow the instructions provided with the FredFrame™ kit. **Warning! 1)** *Use straps and/or cabling with load capacity adequate for the total projection head frame weight.* **2)** *Remove the lens before hoisting.*

NOTE: *Never exceed the Load Rating specified in the FredFrame™ Stacking & Rigging Kit instructions. Critical safety.*

Refer to the complete instructions for using the FredFrame™. These include all installation instructions as well as mechanical adjustment procedures for proper image alignment.

Stacking

To stack two projection heads together, you must first secure each head within a FredFrame™, then secure all corners of the frames together using 4 stacking pins (provided in the FredFrame™ kit). You must also use the *Side-Venting Exhaust Adapter* to route exhaust air from the bottom projector away from the top projector (not required with a side-by-side projector row). Never stack more than 2 projection heads together, and do not attempt to move stacked projectors without proper transport equipment.

2.4 Installing a Lens, Lamp and Cooling

Before or after you have positioned the projector in its permanent or temporary location, install the remaining components: the lens, lamp and external extractor fan.

2.4.1 Install Lens(es)

Primary Lens

1. Fully insert the assembly straight into the lens mount opening *all the way back without turning*. With the lens fully back, it will seat properly within the lens mount. **NOTE**: *High Contrast lenses (only) have a flat on the rear flange. Rotate the lens so that the flange clears two screws in the mount. Also ensure that the UP label is at the top to ensure proper aperture orientation.*

2. Lock the lens assembly in place with lens clamp DOWN.

3. Secure lens safety ring, and tether to projector (not required if projector is floor-mounted). **NOTE**: *The lens seals the projector head, preventing contaminants from entering the area of main electronics. Never attempt to operate the projector without a lens installed.*

Auxiliary Lens Installation (Optional)

NOTE: *The optional auxiliary lens mount is required for use of the 1.25x anamorphic or 1.26x Wide Converter lens, producing 2.39:1 scope images.*

If the auxiliary lens will be used, it is recommended that you add the lens—and its mount—before final leveling, boresight adjustment and the like. Install only for those installations requiring full-size 2.39:1 scope display (mostly side-masking screens) obtained by optically stretching a pre-squeezed image.

INSTALL THE AUXILIARY LENS MOUNT ON THE PROJECTOR: At the front of the projector, install the auxiliary lens mount hardware as described in the instructions provided with Christie's *Auxiliary Lens Mount Kit*.

INSTALL THE 1.25x ANAMORPHIC or 1.26x WIDE CONVERTER LENS: Clamp the 1.25x anamorphic or 1.26x Wide Converter lens mount in place, following the instructions provided with the auxiliary lens mount kit.

2.4.2 Install First Lamp

⚠ WARNING **1) Protective gear required. 2) Qualified service technician required.**

Remove the lamp door and open the empty lamp-cooling compartment.
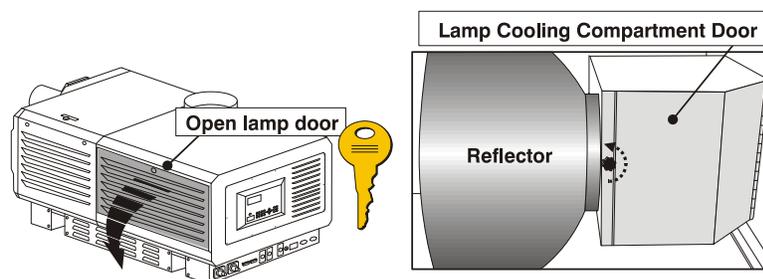
Figure 2-21 Open Lamp Door and Cooling Compartment

STEP 1: Check Lamp Cradle (Anode End) Location for Your Lamp

The *CP2000-XB* accommodates different lamps. Refer to the *CP2000-XB User Manual (020-100163-xx)* for a complete list of supported lamps.

- For 4.5 or 6.0 kW lamps, the lamp cradle must be as far forward as possible (factory default).
- For 2.0 or 3.0 kW lamps, move the cradle to the rear position, i.e., approximately 1" closer to the reflector. See **Figure 2-22**.

STEP 2: Install Lamp

Refer to *Section 4.3 Filter Replacement* , steps 7-11. Observe all warnings, and wear protective clothing and shielding.

Don't forget to properly mark the **Lamp Installed** label on the lamp door to indicate current lamp size. Also set the Lamp Type in the TPC **Lamp** menu (service/installer login required) before turning on the projector.

2.4.3 Cooling

Extractor Fan and Duct
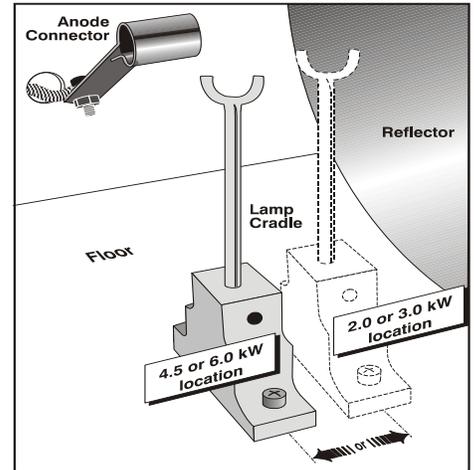
Figure 2-22 Move Cradle Back for 2.0 or 3.0 kW Lamps

For any *CP2000-XB* with any lamp, install the Christie extractor fan and duct to pull warm exhaust air from the projector at a minimum rate of 450 CFM (for 2 or 3 kW lamps) or 600 CFM (for 4.5 kW or higher lamps). Use either the 6-in. or the 6-ft. long duct in one of the configurations shown in **Figure 2-23**.
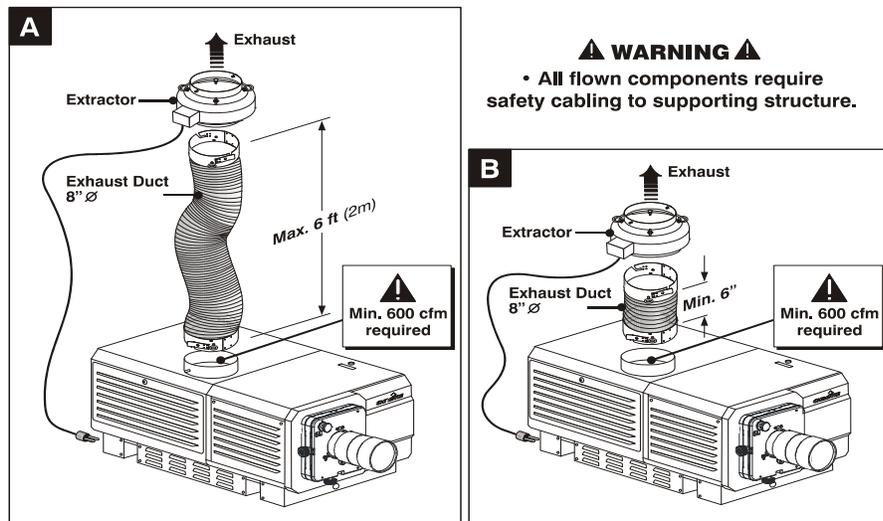
Figure 2-23 Extractor Fan Configurations
(MANDATORY SAFETY CABLING NOT SHOWN)

Direct the exhaust, as necessary, to keep ambient air temperature within operating spec. If the projector is used for extended periods, particularly in a confined space, routing to the outside of the building may be required. In all cases, maintain either 450 or 600 CFM at the projector's top exit port.

Table 2.3 Airflow Requirement

Lamp (kW)	Minimum Exhaust Airflow Rate
2.0	450 ft^3/min.
3.0	450 ft^3/min.
4.5	600 ft^3/min.
6.0	600 ft^3/min.

INSTALLATION

Follow the installation guidelines provided below; securing all components in the order that best suits your site and installation requirements. **Warning!** *Do not operate the projector without Christie Extractor components installed.*

INSTALL DUCT ON PROJECTOR

See **Figure 2-24**. Align either the 6-inch or 6-foot long duct at the projector's top exit port, twisting to secure flaps over projector pins. Confirm that 1) there are no obstructions or kinks within the ducting, 2) all air intake areas of the projector are clear and exposed, and 3) the vane switch at the exit duct moves freely..
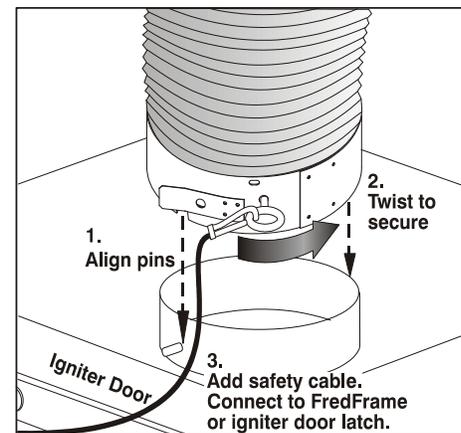
Figure 2-24 Securing Duct to Projector

ADD EXTRACTOR

See **Figure 2-25**. Connect the other end of the duct to the Christie heat extractor/blower, twisting to secure flaps over pins on the fan. Make sure that the _**grille**_ end of the fan faces _**down**_. For longer exhaust runs at your site, add extractors/boosters as necessary—the vane switch at the projector's top exit port will trigger a projector shutdown if the airflow is inadequate. To prevent possible transfer of fan vibration to the image, do not mount the extractor directly on the projector—include at least 6" of duct.

Warning! *Do not exceed 6-ft. duct length without adding additional extractors*.

To suspend the projector/fan assembly, always use appropriate rigging hardware and secure to adequate support structures at your site.

- The Christie 6-ft. duct-with-fan weighs approximately *22 lb*.
- The Christie 6-in. duct-with-fan weighs approximately *15 lb*.

Use third-party extractors only if the minimum of 600 CFM airflow can be maintained.
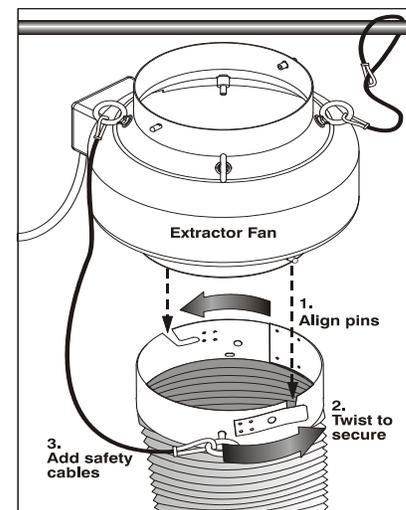
Figure 2-25 Securing Extractor to Duct

SECURE SAFETY CABLES

Three safety cables are provided, and are all mandatory whenever the fan/duct assembly is suspended. These cables prevent components from falling if your rigging equipment fails. **Figure 2-26** shows the safety cable required between the cooling assembly and projector in any installation, flown or not. Attach remaining safety cables between the 1) duct and fan, and 2) fan and supporting structure.

⚠ WARNINGS ⚠

• Always use a safety cable between projector and duct/fan

• Minimum of 3 cables required for 6' duct and/or any flown installation

• Minimum of 1 cable required for floor-mount with 6" duct.

Flown projector
Rigging hardware not shown

Secure safety cable to FredFrame™

Front mount projector with no FredFrame™

Secure safety cable to igniter door latch

Interior view

Latch

Top edge of igniter door
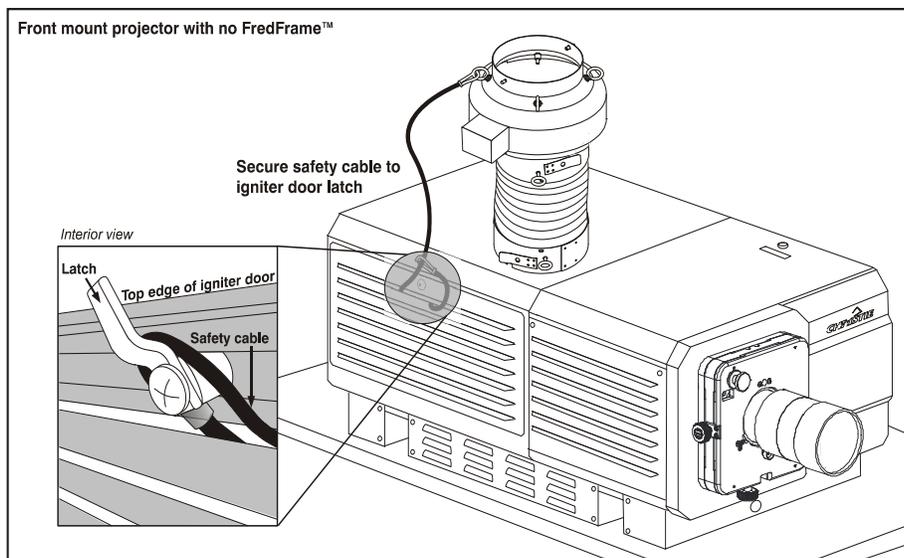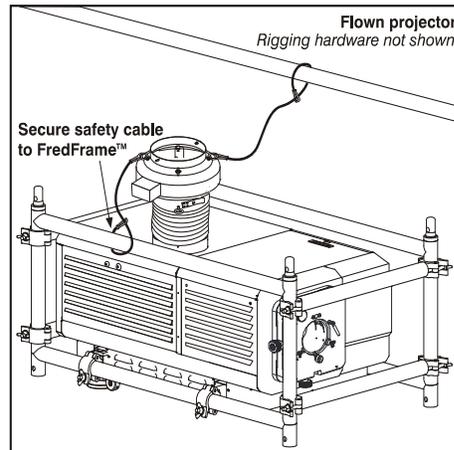
Safety cable

Figure 2-26 Safety Cable at Projector—Flown or Front Mount

CONNECT TO POWER

Connect the line cord of the extractor fan to the Extractor Fan outlet on the rear panel of the projector. Use appropriate extension cords if necessary. The fan will power-up with the projection head, and will run for a 10-minute cool-down period after the projection head is powered off. This ensures proper lamp cooling.

CALCULATE CFM IN 8" DUCT

Use an air flow meter to measure the ft/min or ft/sec where the duct connects to the projector (measure _**at this end only**_). Then multiply the reading by the cross-sectional area of the 8" duct (0.34) to calculate the cubic feet/min airflow. The formula is: **Measured linear ft/min x 0.34 = CFM**. **NOTE**: _If the duct becomes significantly blocked – or if a fan fails – the projector should trigger an error message before becoming overheated or unsafe. Regardless, check airflow regularly._

⚠ WARNING **Never disable a vane switch. Attempting to operate the projector without monitoring airflow can result in dangerous overheating of the projector.**
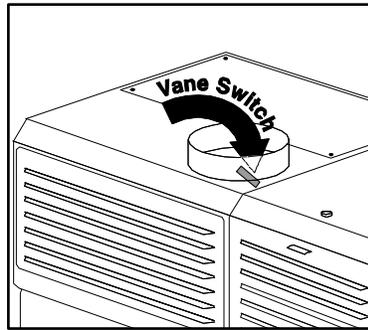
Figure 2-27 Vane Switch

Side-Venting Duct (Adapter)

All stacks require a special side-venting duct adapter between projectors, otherwise the top projector blocks exhaust from the top of the bottom projector. This _Side-Venting Exhaust Adapter Kit_ is required on any bottom projector used in an upright stack of two.

Liquid Cooling

During operation, a closed loop of flexible tubing circulates liquid coolant from a small reservoir to critical electronic components located near the front of the projection head. The coolant should fill slightly more than half of the reservoir to ensure adequate circulation. Use only the Christie approved coolant Jeffcool E105 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._ The reservoir, which is located in the igniter compartment, is factory-filled and does not require draining before projector transit. Top up as necessary. **Warning!** _Check regularly for leaks and proper liquid level._

2.5   Installing and Connecting Sources

NOTE: *To maintain radiated emissions compliance, do not connect I/0 cables to the projector without connecting the source or receiver at the other end.*

2.5.1 Cinema

Connect your server/source to either the **HD-SDI A** or **HD-SDI B** connector on the *Communications and Source Connection Panel* at the rear of the projector. Connect two independent sources, or connect a single source to both ports to create a dual-link cinema input.
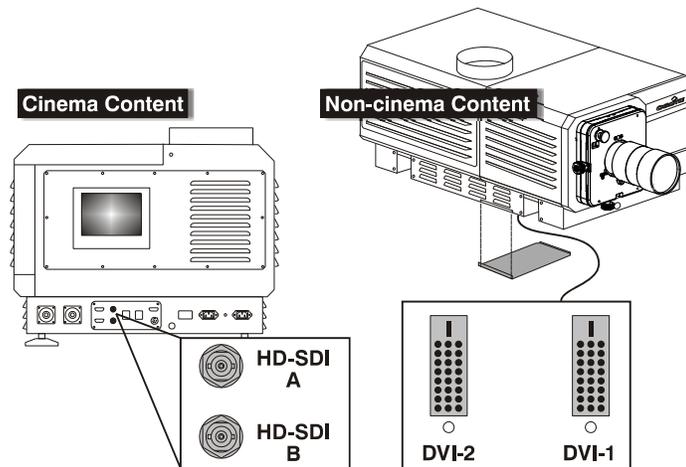
Figure 2-28 Connecting Cinema and Non-Cinema Sources

2.5.2 Non-Cinema

To display alternative content from a DVI source or from Christie's *Cine-IPM 2K*, remove the access panel located on the underside of the projector near the air filter. Connect two independent sources, or connect the *Cine-IPM 2K* to both ports for 10-bit processing. Add an exit hole to the panel, or leave the panel off.

2.6   Connecting for Communications

Many communications with the projector are initiated on the TPC mounted at the rear of the projector. Depending on the installation, you may also need certain other serial and/or Ethernet links to the projector, such as from a server or PC functioning as a controller, or from an existing on-site network including other related equipment. These system connections are typically done at time of installation, but are fully accessible and can be changed at any time. In rare cases, serial and/or Ethernet links are needed only during installation, and are disconnected afterwards.

Connect your devices to the *Communications and Source Connection Panel* at the rear of the projection head.
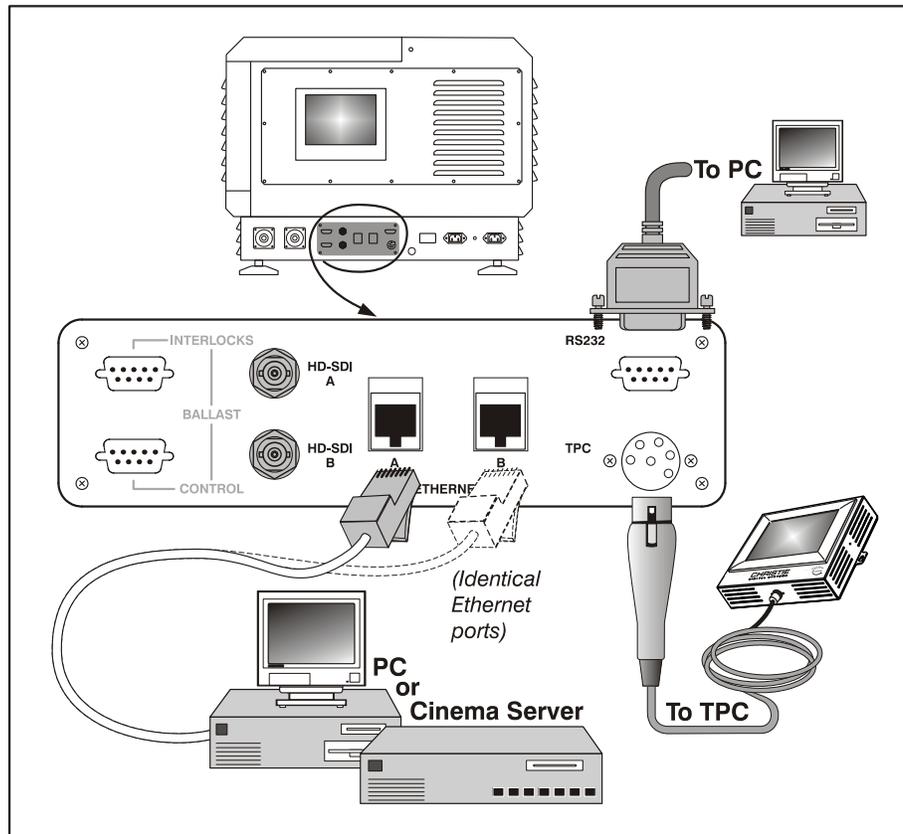
Figure 2-29 Communication Links with Projector

TPC

Connect the TPC cable to the 6-pin XLR connector. This connector then routes to an internal 5-port Ethernet hub connected to the projector's main processing electronics.

PC/Laptop, Server or Network

To communicate with the *CP2000-XB* from a computer, server or an existing network, connect the equipment to **Ethernet A** or **Ethernet B**. Both ports route to the 5-port Ethernet hub connected to the projector's main processing electronics. If Ethernet is not available at your site, connect a standard serial cable to the **RS232** port instead—note this communication link is acceptable for using a PC/laptop to run Christie's *DCP Librarian* or to download new software, but is too slow for server communications and does not support ASCII messaging to the TPC (which requires Ethernet).

2.7 Connecting the Ballast

Do not connect the ballast to AC unless the projection head and ballast are already connected to each other, otherwise the exposed live ends of the heavy ballast cables could be a serious hazard. **Warning!** *Connect the ballast to the projector __FIRST__, and then connect to AC.*

2.7.1 Configuring the Ballast for Incoming AC

AC power levels vary from region to region throughout the world, with 400 VAC common in some countries (such as those in Europe and Asia), and 200 VAC common elsewhere (such as in North America and Japan). To accommodate both possibilities, the ballast includes an internal *Input Power Range Switch* for toggling to the level of AC available at the installation site, i.e. either 200 or 400 VAC. The line cord plug must also match.

From the factory, the ballast switch and line cord are both set for 200 VAC use. Used/rented ballasts shipped from other installation sites may be set to either, depending on where they were last used—check the status of the line cord plug and switch before attempting to connect to AC. **Warning!** *Check the plug and internal switch before connecting to AC. Qualified electrical technician required.*

Figure 2-30 Setting Up the 7kW Ballast

1. A visual inspection of the plug can indicate 200 or 400 VAC status. Modify as necessary for your site—as a delta load with safety ground, the plug has no neutral.

2. Remove the ballast cover to access and read the *Input Power Range Switch*.

3. Toggle the switch *left* for use with 200 VAC supplies, or toggle *right* for 400 VAC supplies.

4. Attach the ground lug to Earth Ground.

5. Re-install the ballast cover.

2.7.2 Connect to Projector

Connect all 4 ballast cables—two DC power cables, and 2 communication/control cables—to the rear of the projector and to the lamp ballast. Refer to **Figure 2-3**.

2.8 Initial Power-up

When the ballast has been properly configured (refer to *Section 2.7 Connecting the Ballast*) and connected to the projection head, connect its integral line cord to AC. Then:

2.8.1 Set Lamp Type

NOTE: *Service/installer required.*

⚠ **WARNING** **Explosion hazard. Keep the projection head OFF until you have defined which lamp type is installed.**
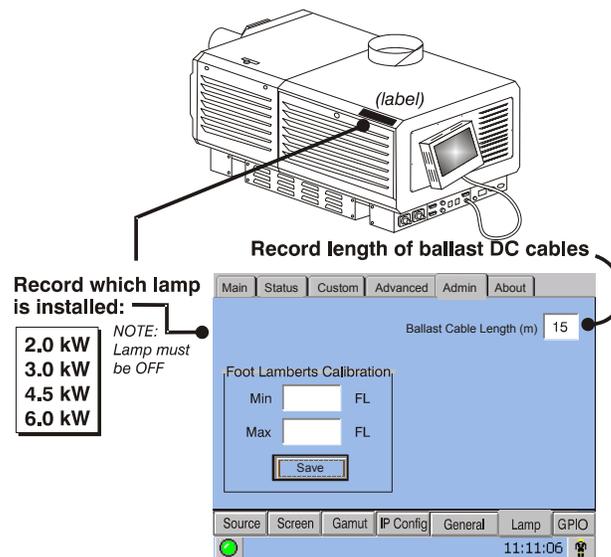
Figure 2-31 Cable Length

Before powering up the projector and igniting the lamp, the installer must define in projector memory which size lamp is installed; otherwise you risk severely overdriving or underdriving a lamp.

At the TPC, go to the **Admin: Lamp** menu (password required). Enter the size of the lamp currently installed in the projector (factory default = 2.0 kW). Refer to *Section 3 Basic Operation* if you need help using the TPC menus. Also record the lamp type on the **Lamp Installed** label.

2.8.2 Set Cable Length

Still in the **Admin: Lamp** menu (see **Figure 2-31**), use the **Cable Length (m)** text box to record the length of high-voltage DC cables connected between your lamp ballast and projection head. This value regulates the voltage drop that occurs over distance, and ensures that adequate voltage reaches the lamp. Particularly in a projector rented for temporary installation, the setting may have to be changed from its last use. Adjustment range is 2-30m (6½-100 ft.).

2.8.3 Power-up

Power up the *CP2000-XB* system as described in *Section 3.3 Power-up Procedure*.

2.9 Maximizing Light Output

Upon powering up the projector with a newly-installed/replaced lamp, adjust lamp position to help ensure optimized operation as well as peak brightness at the screen—you do not need an image displayed yet. Once you have done this LampLOC™ adjustment, the lamp will be well centered and distanced correctly from the remainder of the illumination system.

Figure 2-32 Align the Lamp

At the TPC, automatically optimize lamp position by pressing the **DO AUTO** button in the **Advanced: Lamp** menu. Watch the gauge on this menu. After 2-3 minutes, with the projector using an internal light sensor, the best lamp position will be established and the **DO AUTO** button will no longer be disabled. At this point, light output is optimized. **NOTE**: *Lamp must be on and the shutter open during LampLOC™ adjustment, however the projector does not need to be displaying an image.*

2.9.1 Determining Screen Brightness (fL)

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

For more information about menus and footlamberts, refer to *Section 3 Basic Operation*.

2.10 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 both 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 in the **Main: Lens** menu or **Custom: Lens** menu from the TPC. Using the Emergency Override knobs on the lens mount to adjust these positions does not save the settings to the channel. They are designed for temporary/emergency use therefore hone reference settings will be lost once the channel changes. If used, click **Lens Reset** from the **Advanced: Lens** menu to ensure ILS settings are properly recalled. Ensure the CP2000-XB is properly positioned relative to the screen before you begin.

2.10.1 Basic Optical Alignment Procedure

1. Display a good test pattern appropriate for analyzing image focus and geometry, such as a single crosshair centered across the image.

2. **COARSE FOCUS:** Do a quick preliminary focus by rotating the focus adjustment knob directly under the lens. For best results, use a crosshatch test pattern or similar, and focus on the center of the image. If available, zoom adjustment with the primary lens only. Do not worry about consistency across the image at this point, just center focus.

Figure 2-33 Level the TOP Edge

3. **CENTER THE IMAGE IN THE LENS:** Holding a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens perimeter. A full white field works best for this.

4. **RE-CHECK SIDE-TO-SIDE LEVELING:** With a good test pattern on screen, double-check projector leveling (refer to *Section 2.3 Projector Position and Mounting*) so that the ***top edge*** of the image is parallel to the top edge of the screen. See **Figure 2-33**.

2.11 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.*
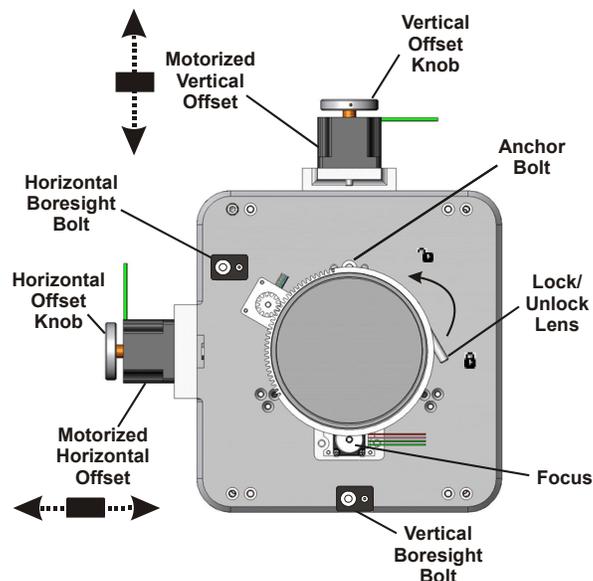
Figure 2-34 Anatomy of the Lens Mount

2.11.1 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. Ensure **Auto ILS** is selected from the **Main: Lens** menu. **NOTE**: *Enabling **Auto ILS** will over-write the pre-defined settings for this channel. To perform a temporary lens adjustment, uncheck **Auto 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 **Auto ILS** is selected again or if the channel changes.*

Figure 2-35 Intelligent Lens System

2. Using a DC2K Framing test pattern (DC2K Framing.tga is recommended), adjust the **Offset** by clicking the up/down/left/right buttons on the **Main: Lens** menu (**Figure 2-35**), as necessary to display a square image on the screen. **NOTES: 1)** *You can also hold the buttons down for continuous movement.* **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)** *For best results, avoid extreme tilts or offsets. Corner vignettes on a white test pattern indicates extreme offset that should be avoided using mechanical alignment.*

The maximum vertical offset is shown in **Figure 2-36** (bottom illustration). **NOTES: 1)** *Horizontal offset is just a few dozen pixels, resulting in a maximum of 52% of the image displayed on one side or the other of the lens.* **2)** *Maximum offsets are slightly less when offsetting in both directions (H and V) at once.*
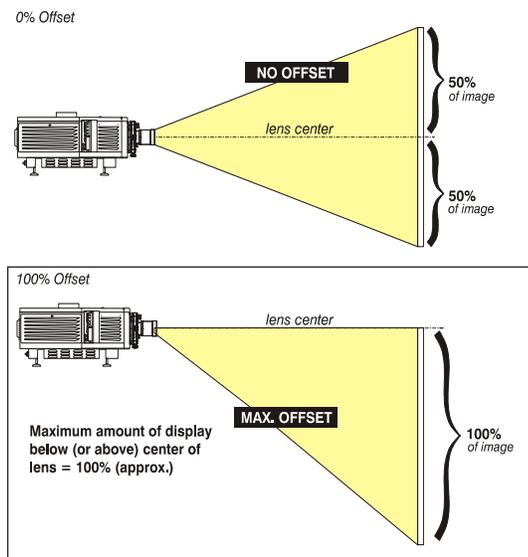
Figure 2-36 Vertical Offset Range

2.11.2 Adjust 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.*

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 2-37**.
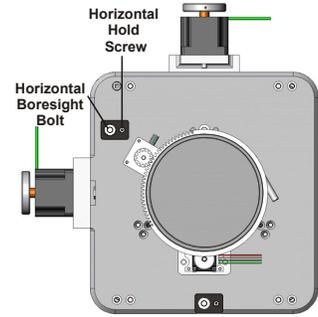
Figure 2-37 Horizontal Boresight

2. Extend the lens completely.

3. Adjust the **Focus** to retract the lens using the down arrow on the **Main: Lens** menu. See **Figure 2-38**. 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, determine if the right side focuses in front of or behind the screen. If the entire screen come into focus, skip to step 7
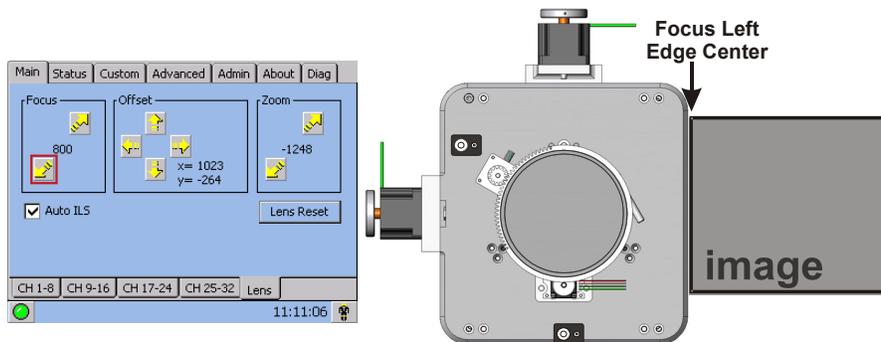
Figure 2-38 Adjust Focus

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 2-39.** 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 2-37**.

   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 towards the RIGHT by adjusting the **Horizontal Boresight** accordingly.

5. When both sides appear equally blurry, adjust the **Offset** by clicking the up/down/left/right buttons on the **Main: Lens** menu to re-center the image on the screen.
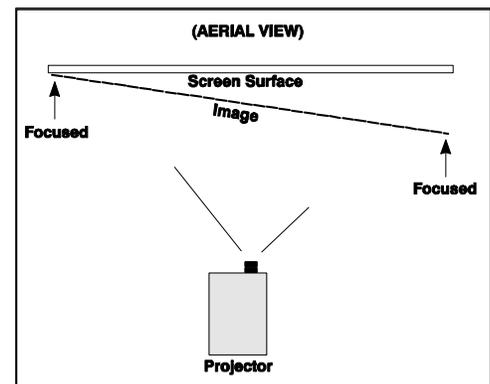
Figure 2-39 Aerial View Illustrating Misaligned Boresight

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 2-38**

2.11.3 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 2-40**.

2. Extend the lens focus completely.

3. Adjust the **Focus** to retract the lens using the down arrow on the **Main: Lens** menu. 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, adjust the Vertical Boresight. If the entire screen come into focus, skip to step 8.

Vertical Boresight Bolt   Vertical Hold Screw
Figure 2-40 Vertical Boresight

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 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, direct the lens mount DOWN by adjusting the **Vertical Boresight** accordingly.

Focus Top Center
image
Figure 2-41 Adjust Vertical Boresight

5. When both sides appear equally blurry, adjust the **Offset** by clicking the up/down/left/right buttons on the **Main: Lens** menu 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. 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. Check boresight again. See **Figure 2-41.**

For more information on ILS and channel setups, refer to **Section 3: Operation of the CP2000-XB User Manual (020-100163-xx)**.

2.11.4 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 **Custom: 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.
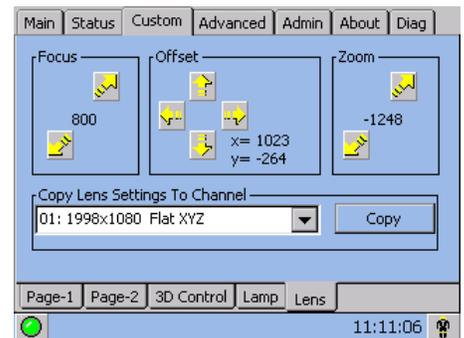
Figure 2-42 Copy Channel Settings

2.11.5 Add Auxiliary Lens

If present, swing the auxiliary lens in position in front of the primary lens. It should magnify in the horizontal direction only, stretching the image straight across the screen—this requires that its aperture (visible within the lens) be *vertically* aligned with the screen. If the image appears skewed, loosen the locking ring on the auxiliary lens and rotate the lens as necessary until the wide image is horizontal.

FOCUS PRIMARY LENS: With the auxiliary lens in place, re-focus the primary lens using focus knob. The goal is good focus at center and on all sides.

FOCUS AUXILIARY LENS: If horizontal focus in the image needs improvement, focus the auxiliary lens too—rotate its barrel as needed.

2.12 Fold Mirror and Convergence Adjustment

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 as described here.

Figure 2-43 Fold Mirror Adjustment

Fold Mirror Adjustment

If a corner or edge of the image is missing, this may indicate that the fold mirror has become misaligned with the rest of the optical system, resulting in cropping of data. Correct as described below:

Locate the fold mirror access plate secured to the underside of the projection head, just below the lens. It has 2 access holes along the front edge, through which you can carefully adjust the fold mirror screws:

- To raise or lower the image, adjust the screw closest to the left side (exhaust side of projector).
- To move the image left or right, adjust the screw closest to the right side (lamp side).

Proper fold mirror adjustment is shown at right, with the whole image well centered between the projected edges of the integrator. **NOTE**: *Use full white test pattern.*

Figure 2-44 Proper Fold Mirror Adjustment

DMD Convergence

A convergence problem is evident when one or more projected colors (red/green/blue) appears misaligned when examined with a proper convergence test pattern—where normally the 3 colors should overlap precisely to form pure white lines throughout the image, one or more poorly converged individual colors may appear adjacent to some or all of the lines. Qualified service technicians can correct as described on the color label provided inside the projection head. **NOTE**: *Custom Convergence Kit required (available separately).*

2.13 Calibrating the *CP2000-XB* System

NOTE: *DCP Librarian described here is licensed software intended for Christie installers only. Many of its functions are now available at the TPC.*

<u>DCP Librarian</u> is a comprehensive Windows™-based software application used for calibrating image color performance and defining electronic screen masking required in your particular installation, and for creating individual *Projector Configuration Files* (PCFs) and specific source files necessary for proper display of incoming material. <u>DCP Librarian</u> also defines the system/network configuration for communication links to the projector, transmitting information to and from the **CP2000-XB** via an Ethernet or RS-232 connection. Chief functions, many of which can be done at the TPC, are introduced below.

Color Calibration

After the **CP2000-XB** is installed and all components are mechanically aligned for optimized light output and geometry at the screen, 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 and enters this data—called *Measured Color Gamut Data*—into Windows™-based *DCP Librarian* software installed on a laptop. The software then calculates precise corrections needed for regaining the desired color performance—called *Target Color Gamut Data*—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 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-XB** should be re-calibrated. Also note that correction for proper color balance sometimes reduces overall light output. **NOTE**: *Most gamut functions are also now available in the TPC Gamut menu (password required). Multiple MCGD files can be saved for use in different situations, such as when an anamorphic lens is swapped on and off the projector.*

Electronic Screen Masking

<u>DCP Librarian</u> also provides a powerful masking tool for precision cropping of the image to correct for geometry problems such as a keystoned image. The effect is similar to aperture plate filing typically done for correcting images from film projectors. As in the calibration of color, screen-masking adjustments are global—that is, you can create a variety masks and download them to projector memory for use with sources as desired. Mask settings are distinct from aspect ratio or screen position settings. **NOTE**: *Most screen functions are also now available in the TPC* **Screen** *menu (password required).*

Projector Configuration File

Numerous settings collected into a single *Projector Configuration File* further control processing variables for optimized display of specific source material. Each PCF file, typically created in <u>DCP Librarian</u>, pre-defines color space, target color gamut, source aspect ratio (resolution), and gamma (a.k.a. degamma) 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-XB** input connection and quickly applied via a controller such as Christie's *Touch Panel Controller*. No further adjustment in processing should be required.

Refer to the <u>DCP Librarian User's Manual</u> for all *DCP Librarian Setup Software* operating details and procedures.

3 Basic Operation

NOTE: *The illustrations provided are to enhance the understanding of the written material. They are graphical representations only and may not represent your exact projector model.*

3.1 Safety Warnings and Guidelines

This projector is designed for safe and reliable operation. However safe operation is not assured by design alone; installers, service technicians, trained operators and all other users must maintain a safe environment *at all times*. Please read through and understand all warnings and precautions before attempting to operate the projector.

3.1.1 General Precautions

Be aware of the following general precautions in all installations:

⚠ **WARNING** 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.**

⚠ **WARNING** 1) **FIRE HAZARD. Keep hands, clothes, and all combustible material at least 1m 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.**

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.*

This projector must be installed on the floor only, and operated in an environment which meets the operating range specifications. Refer to the *CP2000-XB User Manual (020-100163-xx)* for details.

3.1.2 AC/Power Precautions

⚠ **WARNING** Do not attempt operation if the AC supply is not within the specified voltage range

Do not allow anything to rest on the power cords. Place the projector in a location where the cords cannot be abused by persons walking on them or objects rolling over them. Never operate the projector if a 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 AC has been fully disconnected from the projection head and ballast.** **Warning!** *SHOCK HAZARD. Disconnect projection head and ballast from AC before opening any enclosure.*

3.1.3 Lamp Precautions

Xenon arc lamps are under high pressure and must be handled with great care at all times. Lamps may explode if dropped or mishandled.

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—protective gloves, latex lab gloves, double-layer 0.040" acetate face shield, and a quilted ballistic nylon jacket or a welder's jacket. **Warning!** *EXPLOSION HAZARD —Wear authorized protective clothing whenever the lamp door is open!* **NOTES: 1)** *Christie's protective clothing recommendations are subject to change.* **2)** *Any local or federal specifications take precedence over Christie recommendations.*

Cool the Lamp Completely

The arc lamp operates at a very 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 turning off the rest of the projector breakers, disconnecting AC and opening the lamp door. This provides enough time for the internal lamp cooling fans to properly cool the lamp. Cool *completely* before handling. Again, *always* wear protective clothing! **Warning! 1)** *Never attempt to access the lamp while the lamp is on.* **2)** *Wait at least 10 min. after lamp shut-off before powering down, disconnecting from AC and opening the lamp door. 3) SHOCK HAZARD. Disconnect projection head and ballast from AC before opening the lamp door.* For all other precautions critical for safe removal and replacement of the lamp, refer to *Section 4.1 Maintenance and Cleaning*.

3.2 Maintaining Proper Cooling

The 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.

3.2.1 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 or heat register, or within an enclosure.

3.2.2 Air Filter

It is recommended that you replace the air filter (located on the lamp side of the projection head) whenever you replace the lamp—or sooner, in dusty or dirty environments. A clogged filter reduces air flow, and can lead to overheating and failure of the projector. *Check monthly.* Refer to *Section 4.1 Maintenance and Cleaning* for instructions. It is also recommended that you visually check the laminar airflow device (LAD) located nearby. The LAD should be nearly white or light grey in color.

3.2.3 Liquid Cooler

The liquid cooler system circulates liquid to and from the DMDs in the *CP2000-XB* projection head, keeping their operating temperature at an acceptable level. Periodically check the coolant level visible by removing the igniter grille (rear side grille adjacent to the side input panel)—check for 1) leaks and 2) proper liquid level.

NOTE: *A failure of the liquid cooling system will trigger an over-temperature alarm condition, clearly indicated with status displays/lights at the rear of the projector.*

FILLING THE COOLER: The cooler should require filling only upon projector installation. Fill with Christie approved coolant Jeffcool E105 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.* Top up as necessary, making sure not to over fill. Coolant does not need to be drained for transit.

3.2.4 Exhaust Duct and Lamp Fan Interlocks

After installation, check/maintain operation of both vane switches—one in the exhaust duct and one near the lamp fan—as follows:

1. Turn projector ON (lamp is not needed).
2. Turn your extractor fan OFF.
3. Confirm in LCD status display shows that the extractor fan vane switch has failed. Turn fan back ON to correct.
4. Block air intake at rear corner (input side) of projection head.
5. Confirm in LCD status display shows that the lamp fan vane switch has failed. Clear air intake to correct.
6. Repeat all steps every 6 months in permanent installations.
7. Maintain vane switches as described in *Section 4.1 Maintenance and Cleaning*.

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.*

3.3 Power-up Procedure

NOTE: *This is a typical manual power-up procedure. Cinema installations may include an automation system for controlling projector start-up and lamp ignition in conjunction with other variables such as lighting, audio, etc.*

⚠ WARNING **Do not attempt operation if the AC supply is not within the specified voltage range.**

1. Make sure that ballast is properly configured for the AC at your site, and that it is connected via 4 cables to the projection head. Refer to *Section 2.7 Connecting the Ballast*.

2. Connect the heat extractor fan to the projection head. Refer to *Section 2.4 Installing a Lens, Lamp and Cooling*.

3. Connect the head to AC. The voltmeter on the back of the projector will indicate the incoming level of AC, and the main **PROJ STATUS** light on the rear of the projector should glow a steady green. At this point, only the light engine fans will be running.

4. Connect the ballast to AC. The ballast's 3-phase LEDs and voltmeter should light up.

5. Turn the ballast breaker switch to **ON**. The internal ballast fan should start up. (**NOTE**: *There is no other indication of whether the ballast is on or not.)*

6. At the TPC, go to the **Admin: Lamp** menu (password required). Enter the size of the lamp currently installed in the projector (factory default = 2.0 kW).

7. Still in the **Admin: Lamp** menu, set **Cable Length (m)** to match the length of DC cables currently connected between your lamp ballast and projection head. (range is 2-30m, or 6½-100 ft).

8. On the **Main** menu, press the lamp button and hold for 2 seconds. The lamp should ignite (and full power is maintained for 15 seconds). Press the desired channel button on the **Main** menu. The source will be displayed according to pre-defined factory defaults for this channel. Adjust or apply new settings as described in *Section 3.5 Introduction to the Touch Panel Controller (TPC)*.

IF THE LAMP DOES NOT IGNITE

• If a safety interlock switch is open (such as when the lamp door is ajar), the lamp cannot be struck. The **PROJ STATUS** light on the rear of the projector will be red and the error will be indicated on the status display and LCD window.

• 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 also fails, a new lamp is likely needed. **NOTE**: *For complete power-up troubleshooting, refer to *Section 5 Troubleshooting*.*

3.4 Power-down Procedure

NOTE: *Manual shut-down only. Your system may include automation.*

1. Press the lamp button on the **Main** menu to turn the lamp OFF. You must hold the button down briefly.

2. Cool the lamp. **Warning!** *Wait at least 10 minutes so that fans completely cool the lamp.*

3. Set the ballast breaker to **OFF**.

3.5   Introduction to the Touch Panel Controller (TPC)

Most users will use the *Touch Panel Controller* (TPC) as their main interface with the projector. Depending on the installation, this Windows™-based touch-sensitive screen is typically mounted on the rear of the projector or at some other convenient nearby location. Installers must pre-program it appropriately for use at the specific site.

3.5.1 User Access and Rights

Whether or not you can access specific TPC menus and functions depends on how you have logged on to the TPC. See **Figure 3-1**.

General Users

For the general user having no username or password, the *Touch Panel Controller* (TPC) offers three menus providing:

- ON/OFF toggling of the lamp, shutter, user test patterns, and pre-configured displays.
- Basic status and/or diagnostic information about projector components.
- Versions of software components currently installed.
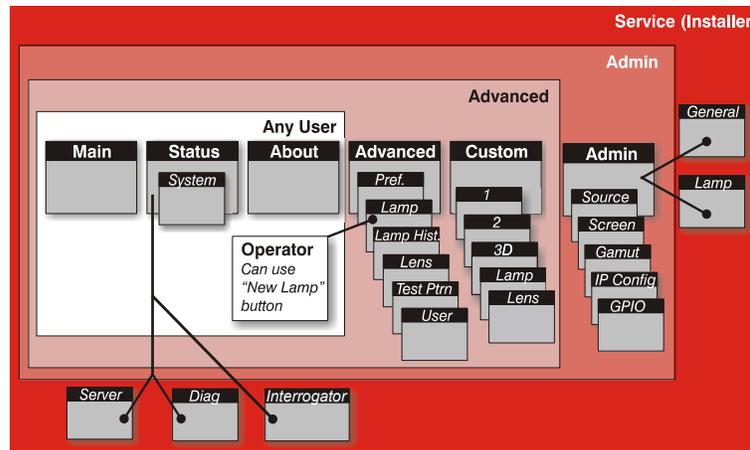
Figure 3-1 Map of TPC User Access Rights

A simple design with familiar menu icons enables a novice user to display an accurate and fully optimized image by pressing a single button on the touch-screen, while protecting precisely configured presentations from accidental or unauthorized change.

Trained Operators, Advanced Users, Administrators and Installers

In addition to the basic user rights shown in the Any User above, the TPC offers four distinct password-protected levels of use (shown in shaded areas in **Figure 3-1**). Each has all of the rights of lower levels, plus additional rights as described below:

- *Trained Operators* can also access the **New Lamp** function required when replacing the lamp.

- *Advanced* users can access two additional menus (**Custom** and **Advanced**) where they can define all display setups and set the DVI processing path, configure 3D displays, optimize light output, record lamp changes, activate test patterns and set certain system preferences.

- *Administrators* can also use four **Admin** submenus—**Source**, **Screen**, color **Gamut** and **IP Config**—to define setup files as selectable choices for processing a variety of incoming signals. **Source** files set incoming resolution, offset (rare) and desired final aspect ratio, **Screen** files determine image cropping (masking), size of display area, and type of lens, and color **Gamut** information ensures color display standards are properly met in the current environment. In the **IP Config** menu, the administrator can define new Ethernet settings (IP network addresses) for the projection head and TPC.

- *Installers* and other service personnel can access two additional configuration menus (**General***,* and **Lamp***)* as well as three more **Status** submenus (**Server, Diag** *and* **Interrogator**). The installer can define system operating parameters such as which projector is controlled by the TPC, and critical lamp parameters such as installed lamp type, fan speed and light level at the screen. Installers can also establish temperature scale preference, remote access rights, test pattern access rights, and extent of data logging. An installer can see ID and error information for servers, as well as a detailed diagnostics log for in-depth troubleshooting.

3.5.2 TPC Power-up Defaults

When the *CP2000-XB* powers up, the *Touch Panel Controller* will begin the steps of **Initializing…, Attempting to log on…***,* and **Updating status**, displaying its progress on the TPC status bar at the bottom of the screen. When initializing is complete, all files are refreshed on the TPC and the system is in a ready-to-use default operating mode:

- The **Main** menu appears on the *Touch Panel Controller,* where you can press the lamp button to turn on the lamp.

- The most recently used channel button is depressed (darkened). Upon turning on the lamp, the image will appear.

3.5.3 Failed TPC Connection

If the TPC fails to initialize and instead displays a communication error such as **No connection** or **Cannot locate Ethernet port** or **Waiting to Connect**, there is likely a bad connection or address between the TPC and the rest of the projector. Check that TPC cabling is intact, and try again. Review *Section 5 Troubleshooting* and, if the problem persists, contact your network administrator.

3.5.4 TPC Alarm Window
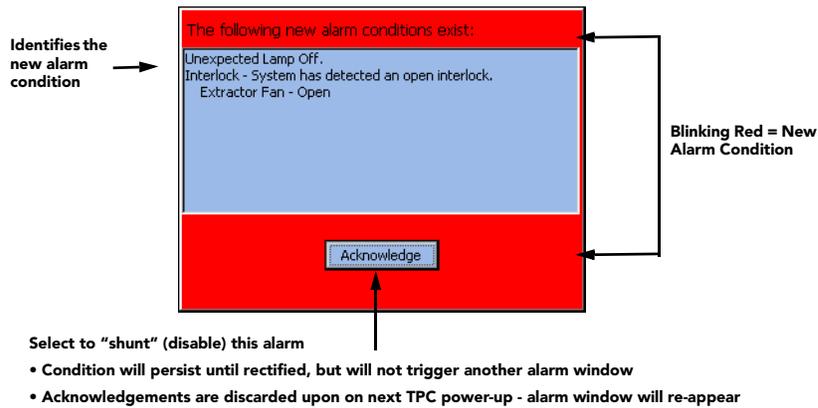
Figure 3-2 Flashing Alarm Window

In addition to the status bar at the bottom of any TPC screen, a full-screen red alarm window flashes if one of the alarm conditions shown in the left column of **Table 3.1** is encountered. If it is an interlock failure, power will no longer reach the lamp (DC output is stopped), and the lamp button on the TPC **Main** menu will be disabled.

Table 3.1 Alarm Conditions and Solutions

FAILED INTERLOCK *	
Lamp door is open	Make sure the lamp door is securely shut. Note that if the projector has been wired to the fire alarm at the site, the Lamp Door alarm can indicate a fire alarm interlock failure. Check auxiliary switch wiring.
Failed lamp fan	Check for interference at vane switch. Make sure the 220V connection near Panel C at the rear of the projector head (on the underside) is still plugged in. Replace fan.
Failed heat extractor (for external duct at the top of the projector)	May not be turned on. 600 CFM required. Replacement heat extractor may be required.
High current ballast cables not connected, or ballast not turned on.	Check the DC cable connections at the ballast and projection head, and make sure ballast is on.
Failed high-security lock (cinema use disabled)	Lock the projector lid. If still failed, double-check the high-security lock itself, plus all related harnessing. Make sure a Type 3 interface board is installed and that you are using main software v10.0.30 or higher

OVER-TEMPERATURE	
Card cage is too hot	Power down and cool projector. Ambient temperature may be too high. Check air filter and fan.
Prism is too hot	Power down and cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooler fan.
Integrator is too hot	Power down and cool projector. Reduce lamp power. Ambient temperature may be too high. Check air filter and sensor. Check liquid cooler fan.
Red DMD is too hot	Power down and cool projector. Reduce lamp power. Ambient temperature may be too high. Check fluid flow and level. Check air filter. Check liquid cooler fan.
Blue DMD is too hot	Power down and cool projector. Reduce lamp power. Ambient temperature may be too high. Check fluid flow and level. Check air filter. Check liquid cooler fan.
SSM is too hot	Power down and cool projector. Reduce lamp power. Ambient temperature may be too high. Check fluid flow and level. Check air filter.
Ballast is too hot and has shut down	Cool, then cycle the projector down-and-up normally. If the over-temp recurs, there is a cooling problem in the ballast that may require service. Check ballast fan.
OTHER FANS TOO SLOW	
A primary fan is too slow or stopped	Replacement fan may be required.
Card cage fan is too slow or stopped	Replacement fan may be required.
Laminar airflow is too slow or stopped	Replacement LAD filter or fan may be required.
LAMP PROBLEMS	
Lamp Life has expired	Replacement of the lamp is recommended.
Unexpected lamp off	Increase Lamp Power. Check that DMDs have not overheated. An interlock may have momentarily tripped. Lamp may have to be replaced.
Lamp strike failed	If interlocks are OK, make sure the 220V connection near Panel C at the rear of the projector head (on the underside) is still plugged in. If lamp re-try still fails, replace the lamp.
OTHER	
SSM Communication Error	Check cabling. Cycle projector power for a normal start-up. Check LEDs on card cage boards, which can indicate a light engine problem instead. Check LVPS/Processor voltages. Also, if shutter or lamp are functioning normally, SSM likely OK.
I^2C Communication Error	There may be a power problem with the main electronics (I^2C). Check LVPS/Proc. voltage adjustments.
LENS MOUNT	
A communications error with the ILS motor control board has occurred. Please ensure that all cabling is correctly connected.	Check cabling. Cycle projector power for a normal start-up.
ILS Motor Control Board - Sensor Failure	This error will only be detected on a lens reset or lens calibrate. Check the sensors. It is cleared by cycling the projector power or performing a lens reset.
ILS Motor Control Board - In Boot/Program Mode	If this message remains for longer than 4 seconds, try re-powering the TPC or upgrading the MCB software.
ILS Motor Control Board - Main Code CRC	Upgrade MCB software.

* 1) A failed interlock automatically prevents power from going to the lamp and disables the lamp button on the TPC Main menu. Since most interlock alarm conditions are triggered by switches, check the operation of these switch levers. 2) When you have restored interlock integrity, the lamp button on the TPC Main menu is automatically re-enabled.

3.6 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 in order to be displayed and interpreted correctly 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 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 input of 48 FPS into the projector. The projector's frame rate multiplication is set to 6:2, meaning the input frame 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.

3.6.1 What Do I Need for 3D?

The *CP2000-XB* requires a 3D-capable SMPTE source and a few special hardware/software setups described below. Essentially you will connect two signals (one left eye, one right eye) to the projector, then use the TPC's **Custom: 3D Control** menu options to define and control the signal processing, synchronizing and output for devices used in your stereographic 3D display. These settings ensure critical ordering and timing of the incoming L/R frames so that they merge correctly into a convincing artifact-free 3D display without cross-talk, ghosting or other artifacts.

System Requirements

- *CP2000-XB* projector. Includes all standard 3D components
    - FFIB (FPGA Formatter Interface Board)
    - TPC software v2.3c or higher
    - Main projector software v8.0 or higher
- Two HD-SDI cinema signals (left and right) connected to the projector's SMPTE ports **A** and **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
- 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, a*ccessed from underside of the projector) to the emitter or polarizer.* Refer to the *CP2000-XB User Manual (020-100163-xx)* for GPIO pinouts and other 3D sync cable details.
- Power supply for your Sync Output Device, typically wired with the custom GPIO cable.
- Proper 3D configuration defined in the TPC's **Custom 3D Control** menu. For best results, use the 3D internal test pattern. Refer to the *CP2000-XB User Manual (020-100163-xx)* for more information.

3.6.2 Supported Hardware Setup

Figure 3-3 shows the general hardware configuration currently supported. Use either an IR emitter to control gating in active glasses, or a polarizing cell and Z-screen with passive glasses.

NOTES: **1)** *All configurations require a custom 3D Sync Cable, such as supplied by RealD, for the GPIO port.* **2)** *A pull-up power supply (not shown) is also required for the IR emitter or polarizing cell.* **3)** *Refer to the* **CP2000-XB User Manual (020-100163-xx)** *for cabling details.*
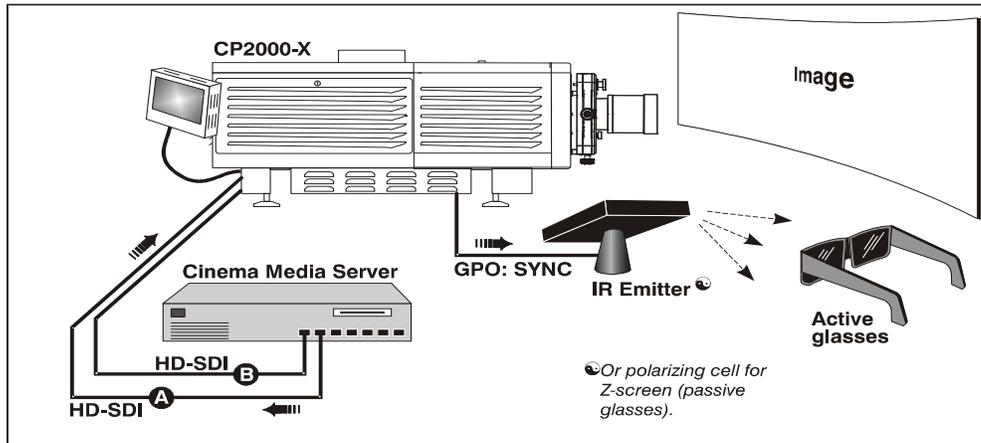

Figure 3-3 Typical Dual-Input 3D System (SHOWN WITH ACTIVE GLASSES)

3.6.3 3D Instructions

NOTES: **1)** *Assumes 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

Connect two HD-SDI signals from a 3D media server to the projector's SMPTE cinema ports **A** and **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.

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 96 Hz output. For example, a typical HD-SDI rate of 24Hz is still only 48 Hz when L/R are combined (see **Figure 3-4**). In the **Custom: 3D Control** menu, set the desired **Frame Rate N:M** ratio—or number of frames displayed per number of frames for complete data. For example, a 6:2 setting creates 6 frames from 2 inputs (=144 Hz). The resulting frame rate cannot exceed the maximum frame rate possible in the projector—with 24 Hz full-screen incoming signals, use a maximum factor of 5:2. **NOTE**: *Frame rate multiplication less than 6:2 may flicker at slow incoming frame rates.*

3. **DEFINE SYNC INPUT LOCATION:**

   For dual inputs,

   • Set the **L/R Input Reference** option to **Active Port: A/R = L/R** (or vice versa).

   • Set the **Input GPI** to **None**.

   These two settings tell the rest of your 3D 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 **Input GPI** according to which input # is used (i.e., according to your GPIO cable wiring).

Figure 3-4 Setup for 3D

4. **DEFINE L/R DOMINANCE:**

   Choose the leading frame, left or right. Correct order depends on the cameras used during filming, and is needed to ensure smooth motions. An incorrect setting creates motion artifacts.

5. **DEFINE SYNC DISPLAY LOCATION:**

   • Set **L/R Display Reference** to **Not Used**.

   • Set **Display GPI** to **None**.

6. **DEFINE SYNC OUTPUT:**

   • Set **L/R Output Polarity** to **Inverted**. **NOTE**: *If the display appears inverted, 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.*

   • Set **Output GPO** according to which of the projector's GPIO outputs is currently wired to your emitter or polarizer.

7. **CONNECT GPIO (OUTPUT):**

   From the projector's GPIO port, connect your 3D Stereo Sync cable to your 3D controlling device such as an emitter or polarizer. **NOTE**: *RealD 3D sync cable recommended.*

8. **ADJUST DISPLAY, SCREEN, ETC.:**

As desired, adjust the image color, etc.
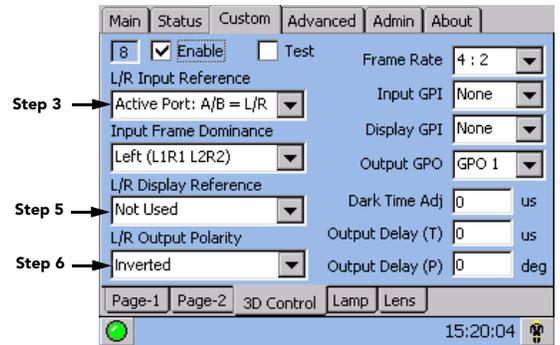
4 Maintenance

NOTE: *The illustrations provided are to enhance the understanding of the written material. They are graphical representations only and may not represent your exact projector model.*

4.1 Maintenance and Cleaning

To help ensure optimized performance and reliability, regularly check electrical, optical and other components as described below. **Warning!** *SHOCK HAZARD. Disconnect <u>projection head</u> and <u>ballast</u> from AC at <u>BOTH</u> wall breakers.*

4.1.1 Electrical

Do the following every 60 days or 500 hours (always disconnecting from AC first):

• Check the contact surfaces of positive (anode) 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.

4.1.2 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 or other marks are obvious. Never touch an optical surface with your bare hand—always wear latex lab gloves.

When to Check

LENS: A small amount of dust or dirt on the lens has minimal effect on image quality—to avoid the risk of scratching the lens, clean the lens ***only*** if absolutely required. See *Section Cleaning the Lens* below.

LAMP REFLECTOR: Inspect the mirror surface (reflector) for cleanliness ***only*** during a lamp replacement, when the lamp is out. If necessary, clean as described below—make sure to ***wear protective clothing*** while inspecting or cleaning. Note that color variation on the reflector surface is normal.

Supplies

For cleaning off dust and/or grease, you will need:

• 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) or Kim Wipes or equivalent

- Lens cleaning solution such as Melles Griot Optics Cleaning Fluid 18LAB011 or equivalent. *For lens only*
- Methanol. For reflector only
- Cotton swabs with wooden stems only
- Lens cleaning cloth/microfibre such as Melles Griot 18LAB024 or equivalent.

Cleaning the Lens

IF DUSTY:

Brush most of the dust off with a camel-hair brush and/or blow dust away with compressed air.

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 the dust.

IF FINGERPRINTS, SMUDGES, OIL:

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 in lens cleaning solution. Tissue should be damp but not dripping.
3. Gently wipe the surface using a figure-8 motion. Repeat until blemish is removed.

Cleaning the Reflector

IF DUSTY:

Brush most of the dust off with a camel-hair brush and/or blow dust away with compressed air.

1. If some dust remains, just leave as is—air circulating at the lamp is unfiltered, so some dust is inevitable. Avoid unnecessary cleaning.

IF FINGERPRINTS, SMUDGES, OIL:

1. First brush dust off 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.

4.1.3 Other Components

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

LAMP FAN - A clogged lamp fan impeller or motor can reduce air flow, leading to possible overheating and failure of the lamp. Clean/treat the impeller as follows:

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

Important! *Do not bend the impeller blades or loosen the balancing weights.*

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

AIR FLOW INTERLOCKS - 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, if necessary, clean the switches to remove accumulated dust or dirt that could impede movement. Within the exhaust duct connected at the top of the projector, adequate airflow must be maintained and routed away from the operating area surrounding the projector (or any nearby projectors). Inspect regularly and confirm that 1) there are no obstructions or kinks within the ducting, 2) all air *intake* areas of the projection head and ballast are unobstructed, and 3) exhaust airflow at the top vent is 600 CFM. Make sure lamp wiring does not interfere with vane switch operation. Refer to *Section 4.1 Maintenance and Cleaning*.

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) just beyond the filter opening. The LAD should be nearly white in color—if very dark (rare), it may have to be replaced by a qualified service technician. Contact Christie or your dealer.

4.2 Lamp Replacement

NOTE: *For this procedure you will need a compatible Christie Xenon CDXL or CXL lamp as shown in the CP2000-XB User Manual (020-100163-xx)—never install a lamp intended for a different model or projector.* **Warning! 1)** *Make sure to use the correct wattage lamp supplied by Christie.* **2)** *Lamp replacement is to be done by a qualified service technician only.* **3)** *EXPLOSION HAZARD —Wear authorized protective clothing whenever the lamp door is open! Never apply a twisting or bending force to the quartz lamp body.*

BEFORE YOUR BEGIN

Read and follow all other general lamp precautions in *Section 3.1 Safety Warnings and Guidelines*.

STEP 1 - Turn OFF the Projector

Allow the fans to run at least 10 minutes for cooling. **Warning!** *Never attempt to remove the lamp when it is hot. The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Allow to cool completely.*

STEP 2 - Set Ballast Breaker

Set the ballast breaker (power switch) to **OFF.**

STEP 3 - Disconnect from AC

Disconnect projection head and ballast from AC supply. **Warning!** *SHOCK HAZARD. Disconnect both components from AC.*

STEP 4 - Open Lamp Door

   a. Open the lamp door.

   b. ***With protective clothing and shield on***, unlock the lamp door and open it. Refer back to **Figure 2-21 Open Lamp Door and Cooling Compartment, on page 2-14**. If desired, release the latch mechanism to remove the door entirely.

STEP 5 - Open Cooling Compartment

Turn knob to open the inner lamp-cooling compartment and reveal the cathode end (–) of the lamp.

STEP 6 - Remove the Old Lamp and Inspect Reflector

a. Loosen set screws from negative/cathode (rear, 7/64") and positive/anode (front, 3/16") lamp connectors. These screws are shown in **Figure 4-2**. *__Make sure to apply minimal torque and DO NOT STRESS the quartz tube.__*

b. *__Carefully__* slip the positive anode connector off the front of the lamp.

c. Handling by the *__cathode end only__*, unscrew the lamp from the rear connector and carefully remove from the projector. *__Immediately__* place the lamp inside the protective cover (saved from previous installation) and then seal it in a heavy carton on the floor where it cannot fall or be bumped. **Warning!** *Handle box with extreme caution—the lamp is hazardous even when packaged. Dispose of lamp box according to safety regulations for your area.*

d. With the lamp removed, visually inspect the reflector for dust. Clean if necessary as described in *[Section 4.1 Maintenance and Cleaning](#)*.

STEP 7 - Remove New Lamp from Protective Cover

a. Remove tape, knurled nut and locking star washer (if present) securing the lamp within its cover.

b. Handling at the ends only, extract the lamp from the cover. Set aside the protective cover for re-use in your next lamp disposal or for warranty return of an expired lamp.

STEP 8 - Install New Lamp

a. With protective clothing and shield on, insert the threaded cathode (–) end of the lamp into the negative lamp connector nut located in the rear of the lamp compartment and screw in fully (**Figure 4-1**, left). Hand-tighten only. **Important!** *Handle by the cathode/anode end shafts only, never the glass. Do __not__ over-tighten. Do __not__ stress the glass.*

b. Rest the anode (+) end of the lamp on the lamp cradle as shown in **Figure 4-1**, right, and slip the positive lamp connector over the bulb end.
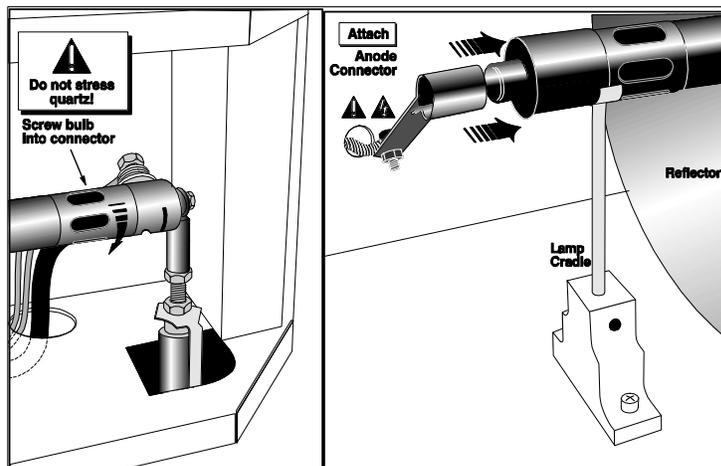

Figure 4-1 Install Bulb

c. Tighten setscrews in both negative and positive lamp connectors (**Figure 4-2**). **Important!** *Proper electrical contact prevents resistance in the lamp connectors.* If you accidentally touch the quartz body of the lamp with your bare hands, clean it as described in *Section 4.1 Maintenance and Cleaning*.

Figure 4-2 Secure Bulb at Cathode (–) and Anode (+) Connectors

STEP 9 - Check Leads

Make sure that the anode (+) lead between lamp and igniter is well away from any projector metal such as the reflector or firewall. **Warning!** *Leads too close to metal parts will cause arcing during starting pulse. This is a SAFETY HAZARD and the lamp may not ignite.*

STEP 10 - Close Cooling Compartment and Lamp Door

The projector will not operate unless the louvered door is locked shut.

STEP 11 - Record the Lamp Installed

With a blue dot label or dry-erase pen, mark the lamp door's LAMP INSTALLED label (**Figure 4-3**) to indicate the size of the newly installed lamp — 2.0, 3.0, 4.5, or 6.0 kW. A supply of blue dot labels is secured inside the front cover of this manual.
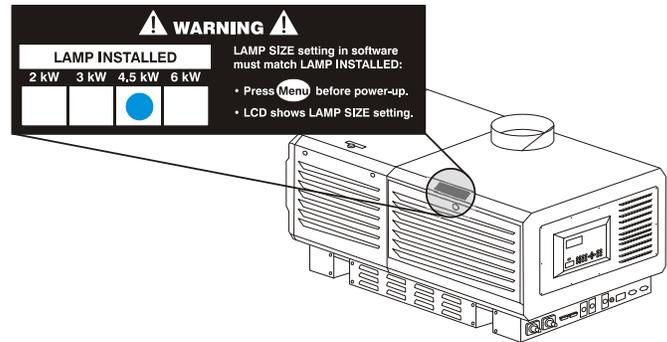

Figure 4-3 Always Mark the Lamp Installed Label (EXAMPLE)

STEP 12 - Re-Connect to AC and Turn Breaker to On

Re-connect the projection head and the ballast to AC (refer to *Section 2.1 Quick Setup*), then set the ballast breaker to ON.

STEP 13 - Set Proper Lamp Type (Power)

NOTE: *Skip this step if your new lamp is the same size as the old lamp—the Lamp Type will still be correct in the* **Install** *menu.*

Important! *Requires access to TPC* **Install: Lamp** *menu (authorized access only).*

If your new lamp is larger or smaller than the old lamp, record the new lamp type (2.0, 3.0, 4.5 or 6.0 kW) in the *Touch Panel Controller*'s **Install: Lamp** menu *before igniting the new lamp*. This setting establishes the proper range of power available for the installed lamp, ensuring that the new lamp is neither underpowered nor over-driven. **Warning!** *Do not attempt to ignite the lamp until its type (kW) is correctly set in the* Install *menu.*

STEP 14 - Turn the Lamp On

Press and hold the lamp button on the TPC **Main** menu.

STEP 15 - Adjust Lamp Position

Using the TPC, adjust the lamp position (LampLOC™) within the projector. In the **Advanced: Lamp** menu, select **Do Auto**. This ensures maximum performance, with the lamp (bulb) well centered with the reflector and distanced correctly from the rest of the illumination system.

STEP 16 - Record the Serial Number of the New Lamp

1. In the **Advanced: Lamp** menu, select **New Lamp**.

2. In the **Lamp History** submenu, enter the serial number in the text box.

Save to record the number and to reset the lamp timer. The timer will now begin to log time for the new lamp.

4.3   Filter Replacement

Replace the air filter whenever the lamp module is replaced, or more frequently if operating the projector in a dusty or dirty environment. ***Check monthly in all cases.*** The filter is located on the operator's side of the projection head, near the front. See **Figure 4-4**.

Before You Begin - Power Down and Disconnect From AC

Read and follow all other general lamp precautions in *Section 3.1 Safety Warnings and Guidelines*.

STEP 1 - Turn OFF Main AC

a. Allow the fans to run at least 10 minutes for cooling.

b. At the breaker panel on the projector, set the 3-phase **MAIN AC** circuit breaker to OFF. **Warning!** *Never attempt to remove the lamp when it is hot. The lamp is under great pressure when hot and may explode, causing personal injury and/or property damage. Allow to cool completely.*

STEP 2 - Turn OFF Remaining Circuit Breakers

After allowing the fans to run for at least 10 minutes, turn OFF the remaining **INTERNAL** and **PROJEC- TOR** circuit breakers located on the breaker panel of the projector.

STEP 3 - Disconnect Projector From AC Supply

Warning! *SHOCK HAZARD. Disconnect from all AC at <u>ALL</u> wall breakers.*

STEP 4 - Open/Remove Filter Door

Open filter door by loosening 2 corner screws (flat screwdriver), and lift off door (1. and 2. in **Figure 4-4**).

STEP 5 - Replace Air Filter

Slide the filter up and discard. Insert the new air filter, following the labeling for proper inside/outside ori- entation. Slide all the way down into its slot (3. and 4. in **Figure 4-4**). **Warning!** *Use only Christie filters. Never operate the projector without the filter installed.*

STEP 6 - Close/Replace Filter Door

With the filter in place, insert the bottom tabs of the filter door into the corresponding slots, close the filter door, and secure with 2 screws (5. and 6. in **Figure 4-4**).
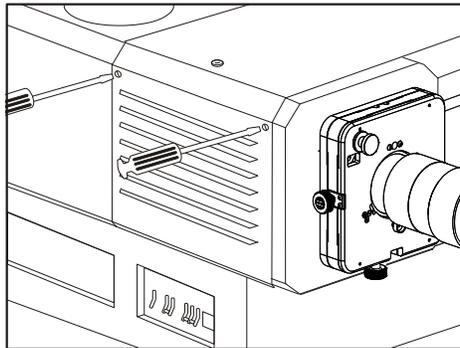
1. Open filter door (2 screws)
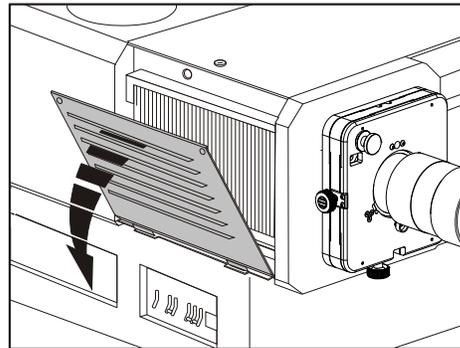
2. Open (or remove) door
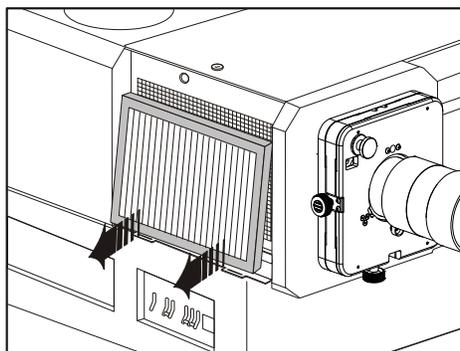
3. Remove old filter
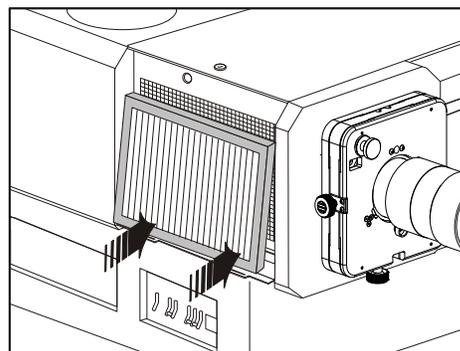
*4. Install new filter according to printing.*
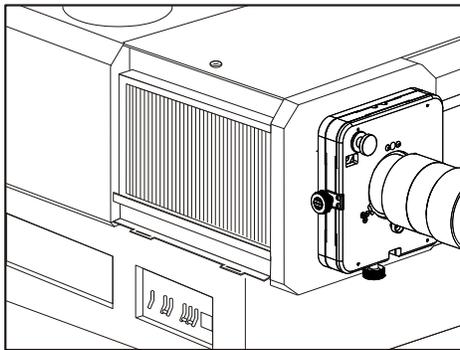
5. Filter installed.
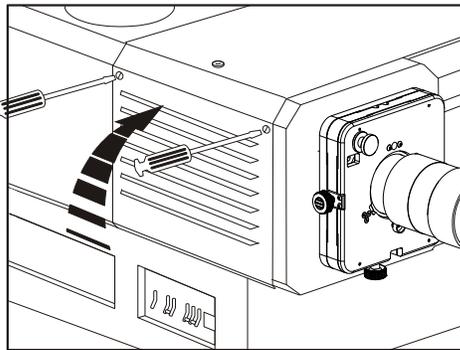
6. Secure filter door (2 screws)

Figure 4-4 Replacing the Air Filter

4.4   Replacing a Lens

A variety of primary lenses can accommodate different throw distances and specific types of installations—refer to section 6 of the ***CP2000-XB User Manual (020-100163-xx)***. To replace or change a lens:

1. Release the lens-locking lever (UP position).

2. Pull out lens and replace with a different primary lens as described in *Section 2.4 Installing a Lens, Lamp and Cooling*.

3. Secure with lens locking lever (down position).

4. Calibrate the lens. See *Section 2.10 Basic Image Alignment* for details.

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5 Troubleshooting

5.1 Power

5.1.1 Projector Will Not Start

1. Check for green **Main AC** light on projector. If not on, check all breakers on projector and at the wall. There are single-phase and 3-phase.

2. Are the CP breakers staying on when enabled? If they are tripping to OFF position, there is an electrical problem requiring investigation by a certified electrician.

5.2 Lamp

5.2.1 Lamp Does Not Ignite

1. If the lamp button is entirely disabled (not selectable at the TPC **Main** menu, indicated by a red **X** on the lamp button), there is an interlock failure such as an open lamp door, failed lamp fan, etc. A flashing red alarm window also indicates this. Refer back to solutions listed in the *CP2000-XB User Manual (020-100163-xx)*.

2. For SSM communication failures, re-boot and try again.

3. If a DMD temperature is too high (DMD over critical temp limit), the lamp will not ignite. Cool the projector and try again.

4. If the Status menu indicates a ballast communication problem, re-boot and try again.

5. If the lamp does not ignite after a second try, replace the lamp.

6. If there is no buzzing indicating that the igniter is attempting ignition, there may be a problem with the igniter (Christie service required).

7. If there is a brief buzz attempting ignition but a lamp does not ignite, the lamp likely needs to be replaced.

5.2.2 Lamp Suddenly Goes Off

1. Try increasing the lamp power (TPC **Advanced Lamp** menu).

2. The DMDs in the projection head may be overheated (this also triggers an alarm window at the TPC).

3. An interlock may be interrupting lamp function.

4. Make sure the 220V connection near Panel C at the rear of the projector head (on the underside) is still plugged in.

5. Replace the lamp.

5.2.3 No Lamp Current Reading

With this communication error, the lamp will be powered by the last lamp power setting in effect.

5.2.4 Flicker, Shadows or Dimness

1. LampLOC™ may need re-adjustment.

2. LampLOC™ may be in the middle of its adjustment. Wait approximately 2 min.

3. Increase lamp power, if possible.

4. Determine if it is mid-level gray scale flicker (beating)—adjust 3-phase balancing for minimized ripple (requires qualified service technician).

5.2.5 LampLOC™ Does Not Seem to Work

1. In the TPC **Advanced Lamp** menu, try adjusting lamp position using one button at a time—watch light level for changes indicating lamp movement.

2. If the motors do not respond via any TPC buttons, you can position the lamp manually within the projection head. *UV danger. Qualified service technician only.*

5.2.6 LiteLOC™ Does Not Seem to Work

1. Make sure *LiteLOC™* is set and enabled in the **Advanced: Lamp** menu.

2. Changing the **Lamp Power** setting 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   TPC

1. If the TPC fails to initialize, re-boot the projector and try again.

2. A failed TPC usually indicates a system failure requiring service.

3. A TPC communication failure (crash) while displaying a test pattern requires that the projector be cycled OFF and ON again.

4. If the TPC response becomes sluggish, try re-booting the projector. If it persists, the installer may have set the TPC **Data Logging** option to **Detailed**, which taxes memory and performance. For best results and normal operation, this setting should be reduced to **Errors** or **Standard**.

5. Erratic TPC behavior or an error message such as "`Could not write to file`" can also indicate an internal memory shortage. Make sure to regularly delete back-up files or corrupt files from the IPSM and/ or Compact Flash memory card. Save backups to a PC/laptop only, not the TPC (contact your administrator).

6. If the locations of button presses on the screen seem to be misinterpreted, the TPC screen may need recalibrating.

5.4 Ethernet

1. If the TPC stalls at "`Waiting to Connect`", you have 30 seconds in which to enter a service login. Make sure the Ethernet settings are valid for your site—all devices should have the same subnet mask but unique IP addresses.

2. Be sure to save any address changes, and re-boot to implement all changes.

3. IP address shown in TPC **Admin** menu must match that of the projector.

4. If you still have trouble establishing communications with a projector added to an existing Ethernet network, the projector's IP address is likely in conflict with another address already in use. Contact your network administrator.

5.5 Cinema Displays

5.5.1 Blank Screen, No Display of Cinema Image

1. Confirm all power connections are still OK.

2. Make sure there is no lens cap present.

3. Make sure the douser/shutter is OPEN (button is on TPC **Main** menu).

4. Make sure there is not a full black test pattern selected for display.

5. Is the correct display file selected? Check the *Touch Panel Controller*.

6. Is the correct cinema port connected for this display file? Check connections.

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 Squeezed or Vertically Stretched into Center of Screen

Source data converted from film and pre-squeezed for *CP2000-XB's* display format may require use of the auxiliary lens 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 decryption 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. Make sure the IP octets for the projector and the server (Eth1 port) match.

3. 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 that you are using a 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's No Display

1. Was a lens cover accidentally left on? Remove lens cover.

2. Make sure the douser is OPEN.

3. Is the lamp ignited? Press the lamp button on the Touch Panel Controller.

4. Is the correct DVI channel button selected on the Touch Panel Controller?

5. Is AC power connected?

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 of the ***CP2000-XB User Manual (020-100163-xx)*** for scan frequency ranges.

3. The sync signal may be inadequate. Correct the source problem.

5.6.3 The Display is Faint

1. Brightness and/or contrast may be set too low.

2. The source may be double terminated. Ensure the source is terminated only once.

3. 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 Wrap 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 auxiliary 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 auxiliary 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 Frozen

If the screen blacks out inexplicably, it is possible that excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Power down the projector (refer to *Section 3.4 Power-down Procedure*) and unplug. Then plug in again and power up as usual (refer to *Section 3.3 Power-up Procedure*).

5.6.10 Colors in the Display are Inaccurate

1. The color, tint, color space and/or color temperature settings may require adjustment at your input source.

2. Make sure you are using the proper PCF, TCGD and/or CSC file for this source.

5.6.11 The Display is Not Rectangular

1. Check leveling of the projector. Make sure that 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 auxiliary 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. Make sure the video input is terminated (75Ω). If it is the last connection in a loop-through chain, the video input should be terminated at the last source input only.

3. The input signal and/or signal cables carrying the input signal may be of poor quality.

4. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.

5. If the source is a VCR or off-air broadcast, detail may be set too high.

5.6.13 There are Random Streaks on the Bottom of the Image

1. If a 24Hz or 25Hz HDSDI signal or a 50 Hz SDI digital PAL signal, make sure to use non-cinema processing—delete the checkmark for **Cinema** checkbox in the Touch Panel Controller's **Advanced** menu. **NOTE**: *password-protected.*

2. Or, if you do not have access to the Touch Panel Controller's **Advanced** menu and cannot adjust the processing path, use your 3rd-party input source to crop off the streaks.