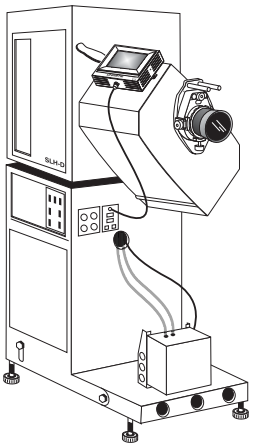
Table of Contents

Section 1

Introduction

1.1 The Projector



DCP *(SLH-D SHOWN)*

The DCP is a professional quality DMD™ projector utilizing *Digital Light Processing™ (DLP™) Cinema* technology from Texas Instruments to produce consistently unblemished full-screen cinema images perfect for theatres and other related applications. Easy-to-use and compatible with existing projection areas, DCP fills the screen with clean, high-contrast moving images that remain flawless from first release to final show, eliminating typical film artifacts of jump, weave, and flicker as well as degradation caused by fading, dirt and scratches. When used with an optional Cine-IPM, DCP expands for multimedia display of standard international video formats as well as graphics generated from IBM®-compatible PCs, Macintosh® computers or workstations.

Features

- *DLP™ Cinema* 3-chip electronics, optics and colorimetry
- Bit depth of 42 bits, 4.4 trillion colors
- Native display resolution of 1280 x 1024 (SXGA), with electronic and optical scaling to fill flat or scope screens
- Achievable brightness: 12 fL on 50 ft. screen (if DCP-H) or 40 ft. screen (if DCP-***i***)
- Achievable native contrast ratio, any model: 460:1 ANSI, 1350:1 full field
- Available in 2-4 kW or 4.5-7 kW models, with adjustable power to vary light output from any of 3 lamp options each.
- Two individually selectable SMPTE 292M inputs (BNCs) for cinema displays
- One DVI (Digital Visual Interface) connector for alternative "non-cinema" content
- Simple single-button "Start Display" function via programmable touch screen
- Auto-detects 1080p, 1080i, 1035i and 720p High Definition input formats *(note: incoming interlaced formats must be encoded with proper 3:2 or 2:2 pull-down)*
- Manual douser (shutter) for solid black screen and cool stand-by mode
- Can be incorporated into theatre automations such as the Christie *3Q*
- Standard lens mount with simple manual focus and offset adjustments
- Choice of high-contrast primary zoom lenses (2.0-3.2:1 or 3.2-5.6:1)
- Efficient swing-in-place adapter for two optional anamorphic lenses that produce 1.85:1 "flat" or 2.35:1 "scope" images
- Communication ports for remote control of the projector via PC or other controller
- High security locks
- Optional Cine-IPM module for connecting multiple video/graphics inputs

How The Projector Works

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

1.2 List of Components

Make sure that you have all of the following standard components (see Figure 3.1):

- ❑ Pedestal on casters *(4 feet packaged separately)*
- ❑ Lamphouse (small *SLI-D* model or large *SLH-D* model)
- ❑ Lamp
- ❑ Projector "Head" with lens mount *(installed)* and anamorphic adapter *(separate)*
- ❑ Touch Panel Controller with mounting hardware and cable
- ❑ Cooler with mounting hardware and 2 lengths of ¼" flexible tubing
- ❑ 1 Primary zoom lens (high-contrast)
- ❑ Assorted cabling and assembly hardware
- ❑ *DCP User's Manual*

Variations Between DCP Models

POWER SUPPLIES: All DCPs include the standard components shown above, however the type of pedestal—which includes the main power supply—depends on the lamphouse and your geographic region. Before assembling the DCP, make sure you have the correct pedestal for your installation and area:

North America:

- if SLI-D lamphouse ⇨ use 4 kW pedestal, 230 VAC (±10%).. **202100-010**
- if SLH-D lamphouse ⇨ use 7 kW pedestal, 230 VAC (±10%) **202100-040**

Japan:

- if SLI-D lamphouse ⇨ use 4 kW pedestal, 200 VAC (±10%).. **202100-020**
- if SLH-D lamphouse ⇨ use 7 kW pedestal, 200 VAC (±10%) **202100-050**

Europe/Asia:

- if SLI-D lamphouse ⇨ use 4 kW pedestal, 400 VAC (±10%).. **202100-030**
- if SLH-D lamphouse ⇨ use 7 kW pedestal, 400 VAC (±10%) **202100-060**

LAMPS: The two DCP lamphouses accommodate different sets of lamps:

SLI-D Lamps	SLH-D Lamps
1.6 kW	4.0 kW
2.0 kW	4.5 kW
3.0 kW	6.0 kW

OTHER: Optional components include anamorphic lenses, the *3Q* automation system, Cine-IPM and other modules. Refer to *Section 8* for a complete list.

1.3 Purchase Record and Service Contacts

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. Complete service manuals and updates are available to service technicians for all projectors.

Should you encounter a problem with any part of the projector and require assistance, contact your dealer or one of the Christie service depots listed on the back cover of this manual. In most cases, servicing is performed on site. If you have purchased the projector, fill out the information below and keep with your records.

Purchase Record

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

** NOTE: The projector serial number is located above the lamp control panel on the lamphouse.*

1.4 Who Should Use This Manual?

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

SERVICE: Only trained and qualified service technicians knowledgeable about all potential hazards associated with high voltage, ultraviolet exposure and high temperatures generated by the lamp and associated circuits can 1) install the projector and 2) perform service functions inside the product enclosures.

Section 2

Installation & Setup

This section explains how to install, set up, optimize and connect to the projector. It is assumed that the optional Cine-IPM and 3Q automation modules may both be present in the pedestal. *Note: Illustrations apply for either SLI-D or SLH-D model unless otherwise specified, and may not always include the Communication Panel and/or TPC.*

2.1 Mounting and Connecting Components

These instructions describe how to:

- position the pedestal (with lamphouse) relative to the screen
- mount the projector head and install all lenses
- connect exhaust ducting and install cooler
- align the reflector to the head
- install the lamp
- connect to a laptop controller, source and power

⚠ QUALIFIED TECHNICIAN REQUIRED ⚠
For all installation procedures!

Before You Begin

You will require the following before beginning Installation and Setup:

- Full understanding of all site requirements
- Christie “job box"
- Wrenches: 7/16”, 1/2” and 9/16”
- Lamp and protective clothing / safety gear
- Laptop computer with *DCP Librarian* software and standard RS-232 (or Ethernet) cable
- Elicent booster fan if building exhaust does not meet CFM rating (see Table 2.1)
- 3-phase (Y) plus separate single-phase hard-wiring to pedestal (electrician required)
- Vapor-free “dustoff type” compressed air can
- Polyethylene lab gloves
- Lens cleaning tissue and solution (see *6.3, Maintenance & Cleaning*)
- Standard Video Field Kit #199075-001
- Laser jig for aligning the reflector to the projector head

These and other tools should be provided in a complete installation kit at the site.

Pedestal & Lamphouse

1) Detach Lamphouse from Pedestal (IF NECESSARY):

If you can keep the pedestal-with-lamphouse assembly intact for safe transport and installation, skip to *2)Position Pedestal and Lamphouse Assembly* below. However, if you do not have access to an elevator and/or fork-lift at the installation site, you will likely need to separate and install the two components individually as follows:

Remove Lamphouse:

1.1 Remove the pedestal side panel.

1.2 From inside the pedestal, use a ½" shallow socket wrench to loosen and remove the 4 corner bolts (5/16") securing the lamphouse to its mounting plate above the pedestal.

1.3 Remove the rear panel of the lamphouse.

1.4 At the TB1 terminal on the *DC Input* module in the lamphouse, disconnect the harness routed through the large exit hole in the lamphouse base (left corner) as follows:

- Disconnect both lamp cables labeled "positive" and "negative"
- Disconnect remainder of harness—terminals W3 and W4, and terminals W7-W10. Do not disconnect wires unless they route through the exit hole.
- Carefully pull the harness from lamphouse (through bottom exit hole).

1.5 Remove lamphouse from pedestal and set aside.

Re-install Lamphouse (loosely, for now):

1.6 When the pedestal has been rolled to its permanent location (or nearby), lift the lamphouse on to the pedestal, aligning its 4 mounting holes somewhere along the 4 slots on the mounting plate. *NOTE: To allow clearance in front for adding the projector head, seat the lamphouse farther back rather than farther forward.*

1.7 *Loosely* install the 4 bolts (5/16"). Do not secure until the head is mounted and you have aligned the reflector—see *Align Reflector to Head* later in *Section 2*.

1.8 Feed lamphouse harness back up through the lamphouse hole and connect everything as before. ⚠ Connect and re-dress harness as shown. ***Do not connect to AC yet.***

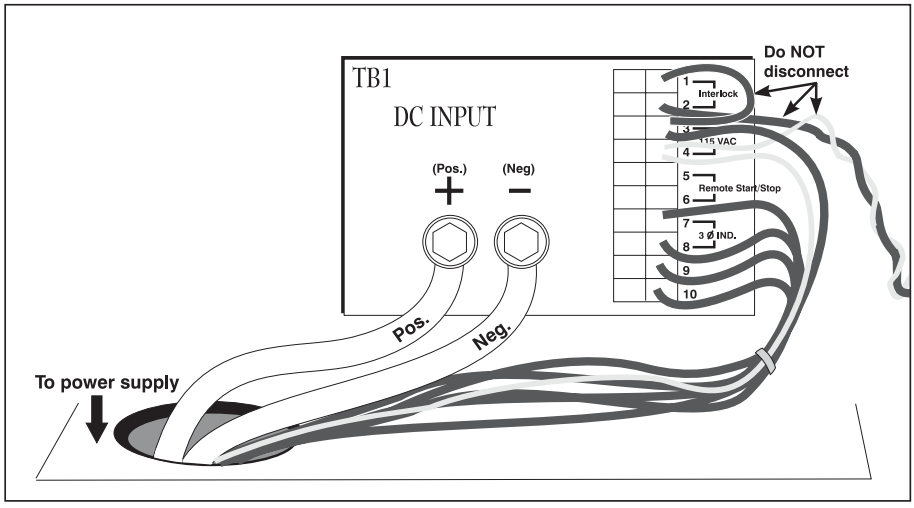


Figure 2.1. DC Input Connections

2) Position Pedestal & Lamphouse Assembly (APPROX.)

Roll the pedestal/lamphouse assembly to approximately 3 feet in front of port window. Center with the theatre screen (←→) as best you can for your installation area (Figure 2.2). If forced to be off-center, try to optimize *aim* as shown. This will create slightly keystoned images, but minimizes horizontal offset. In any case, the projector may likely be higher than the center of the screen. By compromising aim to be more parallel, some lens offset will reduce the keystone distortion.

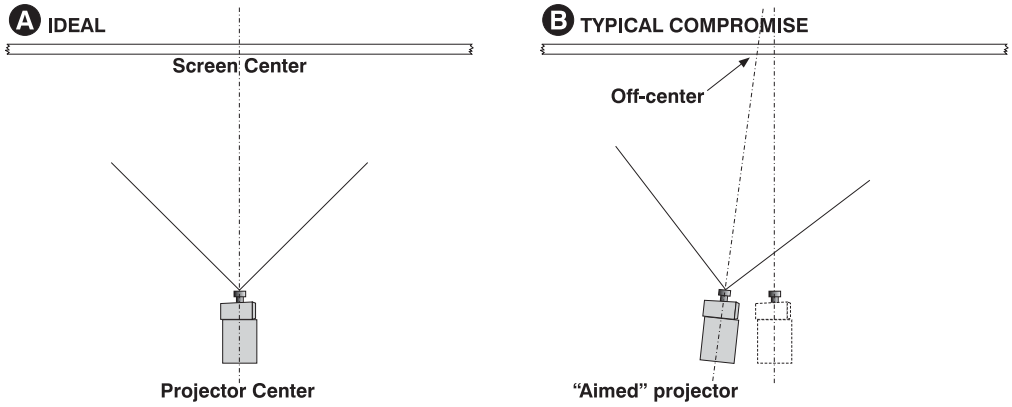


Figure 2.2. Centering ←→
(AERIAL VIEWS)

Note that for installations having a particularly short throw distance combined with a very wide screen, you may have to forfeit some aim and increase offset in order to reduce significant keystoning.

Later, when your projector is up-and-running, adjust precise image geometry and placement as described in *2.5, Basic Image Alignment*.

3) Install Feet

For permanent installations, install 4 feet by raising the pedestal with a fork-lift or similar. Screw one foot into each of the 4 corners until approximately 3½" of thread remains exposed. See Figure 2.3. *NOTE: For safety, it is recommended that you raise the whole pedestal, rather than tilting one side at a time.*

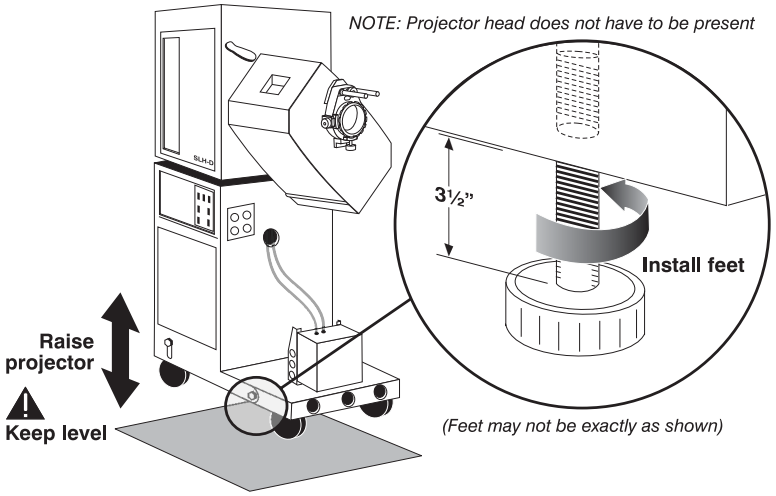


Figure 2.3. Raise Pedestal and Install Feet

Remove casters, if desired, and carefully lower projector back to the floor.

NOTE: There is no need to adjust leveling and/or tilt at this point—wait until all other components are mounted and refer to ***2.2, Adjusting Tilt and Leveling****.*

4) Install Internal Components and Cables within Pedestal

NOTE: These components are pre-installed in later units.

ETHERNET HUB (WITH BRACKET): The Ethernet hub seats on to a bracket that may be pre-installed near the ceiling of the pedestal.

1) Open both sides of the pedestal.

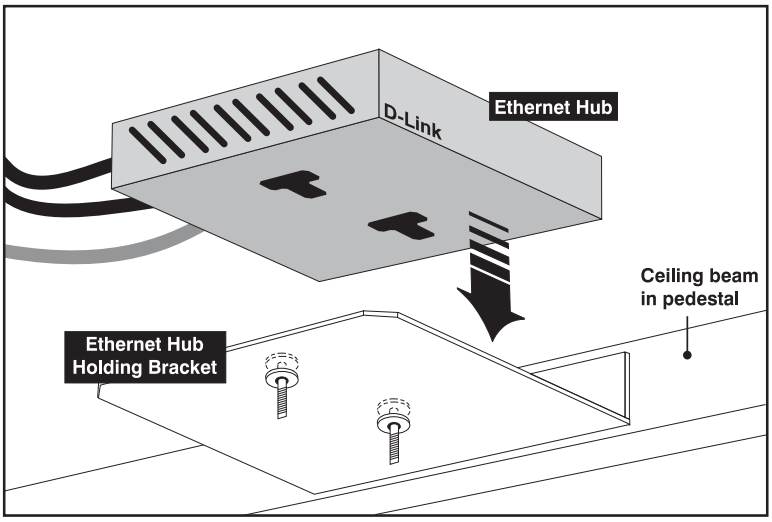
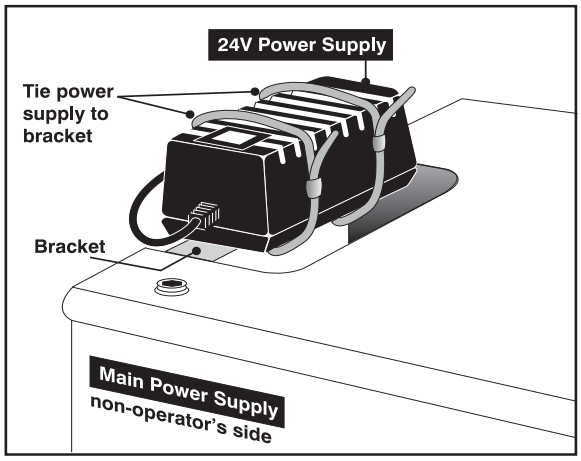


***Figure 2.4. Install Ethernet Hub in Pedestal** (NON-OPERATOR SIDE SHOWN)*

2) See Figure 2.4. Install the hub mounting bracket (if it is not already present), using 2 screws secured from the operator's side.
3) Align hub with bracket, and slide into place so that it seats on to the raised screw heads protruding from the floor of the bracket.

ETHERNET POWER SUPPLY: Plug the small power supply directly into outlet #2 on the front inside wall.

24V POWER SUPPLY FOR *Touch Panel Controller*: The *Touch Panel Controller* used with the DCP includes its own 24V power supply. Connect and mount this power supply as follows:



1) Open both sides of the pedestal.
2) Use 2-3 cable ties to fasten the 24V power supply securely to the bar at the front edge of the main DCP power supply.
3) Remove the plug from the end of the 24V power supply integral line cord, and hard wire the line cord directly to the AC terminal strip within the pedestal. *NOTE: Hard wiring ensures that the "head" and TPC power up together from the same source. Use of the convenience outlet is not recommended.*

INTERNAL COMMUNICATION CABLING: From within the pedestal, connect communication cables to the rear face of the Communication Panel adjacent to the convenience outlets. These cables will be part of the link running from external equipment such as the *Touch Panel Controller*, servers and PCs to the corresponding ports in the DCP "head".

1) Open both sides of the pedestal.
2) ***Touch Panel Controller cable:*** Connect to the top port on the panel.
3) ***RS-232 "A" and "B":*** Use 2 screws to secure these identical cables in place.
4) ***Ethernet:*** Plug in these identical cables.

Projector Head ' 5) Mount Projector Head to Pedestal

6.1 With 2 people holding the projector head "vertically straight" (i.e., with long edges vertical and lens opening on the right), slide head into place in front of the pedestal—its large rear hole will slip over protruding pedestal conduit. Make sure the head's rear plate is flush to the plate on pedestal, and do not attempt to feed any cabling/tubing through the conduit at this point.

6.2 See Figure 2.5. Carefully rotate the head counter-clockwise until its rear dowel pin seats into the matching notch or "stop" on the pedestal mounting plate. The head will now be loosely cantilevered into position, although not secured. ***Do not bump. Keep supported.***

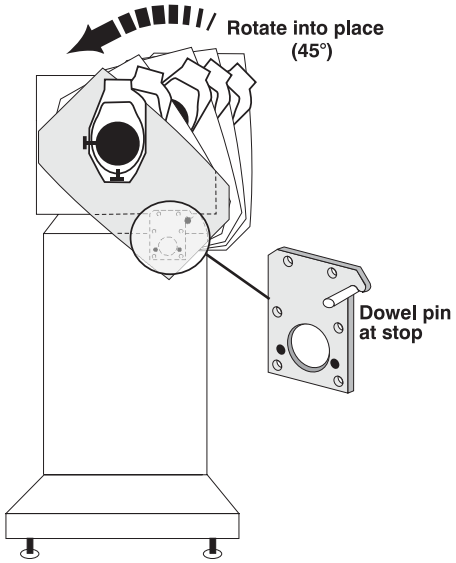


Figure 2.5. Positioning Head

6.3 Insert 4 bolts (provided) through the back of the pedestal's mounting bracket and into the head holes—2 holes are above the pedestal, 2 are inside the pedestal. Secure all with a 9/16" crescent wrench. The projector is now safely mounted to the pedestal.

6) Connect Within Head

7.1 Open the lid of the head by unlocking the top security lock and pivoting the lid down (and off). See Figure 2.12.

7.2 Near the bottom of the head, remove the air filter (pull down and out).

7.3 **CONNECT NON-CINEMA INPUT(S):** For optional "alternative" graphics or "non-cinema" operation, route the Cine-IPM cable through the notch in the main rib, ***by-passing the feed-through plate*** and connecting directly to the **DVI** port at the other side of the projector (under the card cage).

NOTES: The Cine-IPM is an optional ***DCP*** *component recommended for the display of alternative or "non-cinema" content such as graphics.*

Follow the steps shown in Figure 2.6.

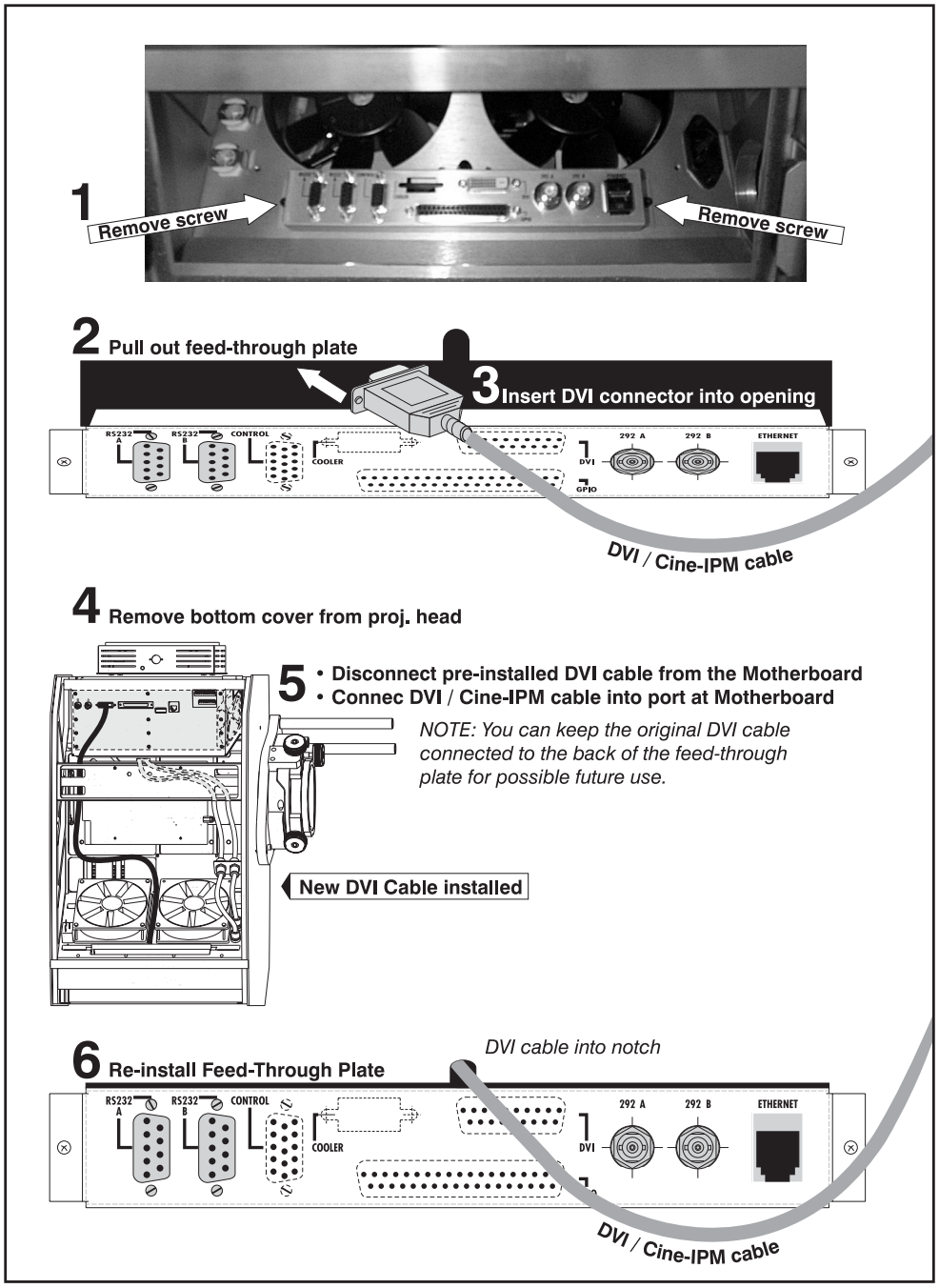


Figure 2.6. Special By-pass Required for DVI / Cine-IPM

7.4 **CONNECT CINEMA INPUT(S):** Connect the desired source cabling to the SMPTE 292 serial digital inputs **A** and/or **B** (cinema) as shown in Figure 2.7.

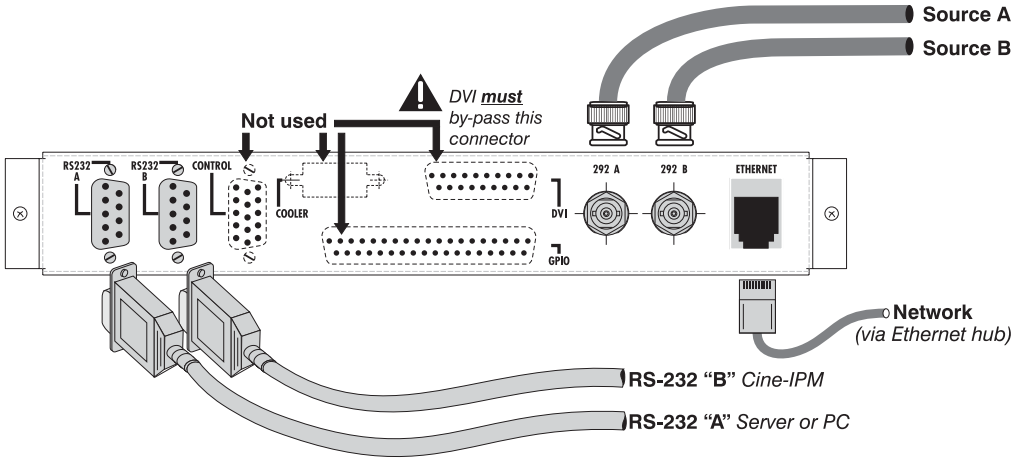


Figure 2.7. Head Connections at "Feed-Through" Plate

7.5 **CONNECT RS-232 CONTROL:** To control the projector via serial communications, connect RS-232 "A" and "B" from their respective RS-232 ports on the Communications Panel:

- RS-232 **A** = Server or computer (PC or laptop)
- RS-232 **B** = Cine-IPM only

Do not reverse these—"B" uses different protocol and is for Cine-IPM communications only. See Figure 2.7.

7.6 **CONNECT POWER:** Power is supplied to the head via a power cable connected to the AC receptacle near the feed-through plate in the projector head.

7.7 **CONNECT COOLER HOSES:** Connect both cooler hoses at the head, making sure the connectors "click" into place. NOTE: Make sure the "out" hose from the cooler connects to the "in" connector at the head, and vice versa. See Figure 2.8.

⚠ IMPORTANT ⚠

It is recommended that you label the cooler hoses at the opposite end, for proper connection to the cooler. See Figure 2.8.

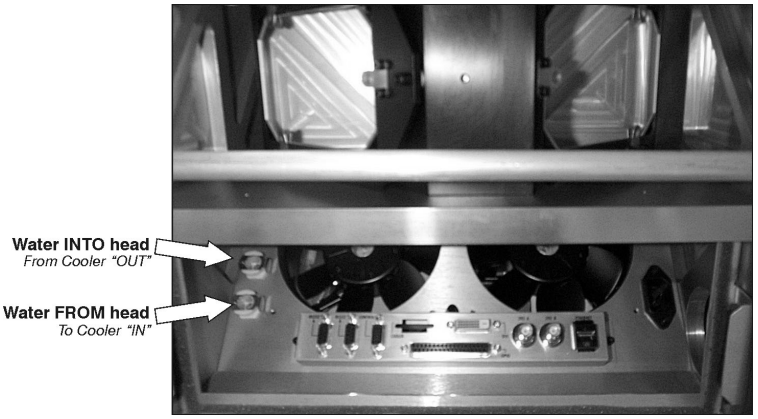


Figure 2.8. Connection of Cooler Hoses

7.8 **ROUTE EVERYTHING INTO THE CONDUIT:** Neatly route all cables and hoses into the conduit at the back of the projector head and into the pedestal. Then:

- **POWER CABLE**: Hard-wire to the terminal block in the pedestal. Verify 115V is present.
- **INPUT CABLING:** Route to the outside world via conduit in the pedestal toe.
- **CONTROL CABLING:** All control cabling (RS-232, Ethernet and *Touch Panel Controller* connected to the head as shown in Figure 2.7) should now also be connected to the internal ports on the Communication Panel.
- **COOLING HOSES:** Route both cooler hoses through the exit hole on the front of the pedestal (adjacent to the outlets).

7.9 Connect input cabling to your source(s). ***Do not connect to AC yet.***

7.10 Re-install the air filter.

7.11 Re-install the projector head lid.

7) Check Lead Dressing Within Pedestal

Once all cables from the outside world are connected and routed to the DCP "head", check the lead dressing within the pedestal and secure as neatly as possible to prevent extra cable lengths from dangling or touching other components, and to provide proper strain relief as necessary.

All Lenses ' Primary Lens

***HIGH-CONTRAST* PRIMARY LENSES:** High-contrast primary lenses include their own integral permanent adapter for use in the DCP. These lenses are:

- 2.0-3.2:1. Non-threaded.
- 3.2-5.6:1. Non-threaded.

To install a high-contrast lens:

1. Remove the external locking ring from the lens mount.
2. Orient the new high-contrast lens assembly so that its dowel pin is at the top, then insert the assembly straight into the lens mount.
3. Turn the lens clockwise as far as possible. This properly seats the lens pin in the groove of the adapter, correctly orienting the aperture of the lens.
4. Secure the lens assembly with the external notched ring, turning slowly to avoid cross-threading. Do not over-tighten.

Anamorphic Lens Installation (OPTIONAL)

Although the anamorphic lenses are not *used* at this point in the installation, it is important to add their weight—plus that of their adapter—before attempting critical alignments of components such as the lamp reflector-to-head, and before correcting for precise leveling, boresight and the like.

*NOTES: **1)** An anamorphic lens is needed in installations requiring wide images for either "flat" or "scope" cinema displays. **2)** Install the adapter on the projector **before** adding an anamorphic lens. **3)** Your adapter may differ slightly from the illustrations shown—basic installation and use do not.*

1. At the clamp on the anamorphic adapter, loosen 6 screws (3/16”)—2 on the top of the clamp, 4 on the bottom—so that the clamp is loose. See Figure 2.9.

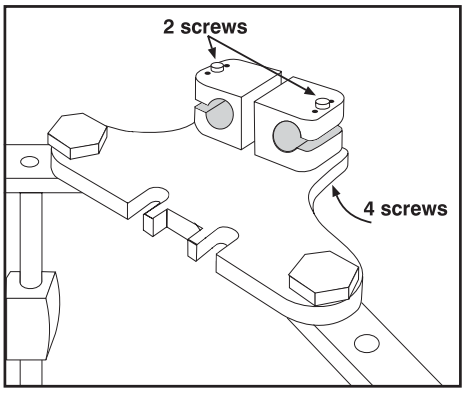


Figure 2.9. Loosen Clamp Screws

2. With clamp on top, slide the anamorphic adapter on to the adapting rods of the lens mount (Figure 2.10).

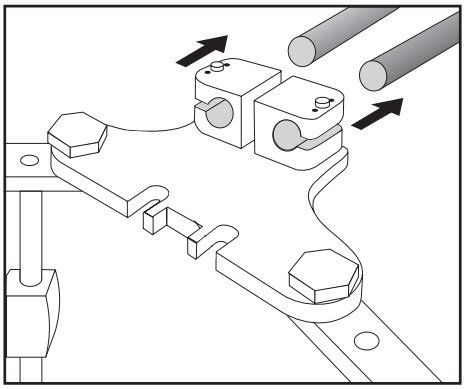


Figure 2.10. Slide adapter on to rods

See Figure 2.11. Make sure the rear surface of the clamp is the appropriate distance from the front surface of the projector head, given which primary lens is present. The ends of the rods should be recessed approximately ½” for use with the 2.0-3.2:1 primary lens.

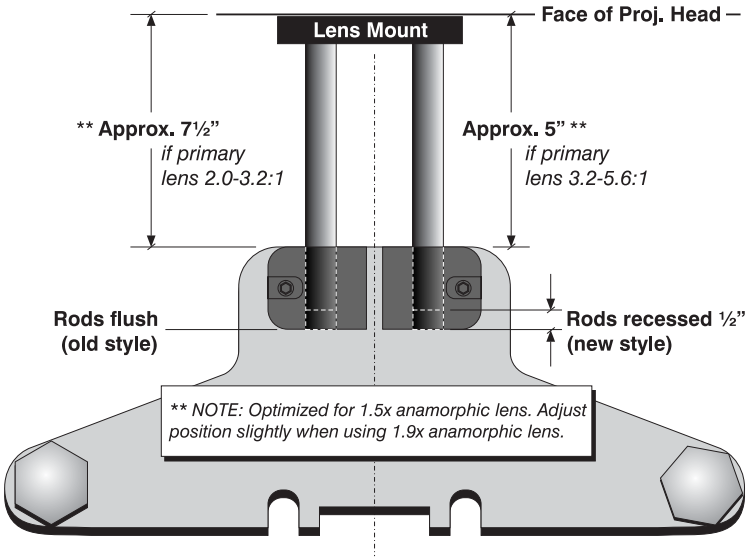


Figure 2.11. Position Adapter at Projector (AERIAL VIEW, not to scale)

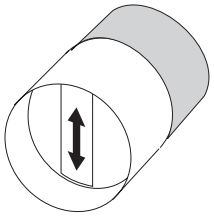
3. Center the anamorphic adapter from side-to-side.

4. Secure all screws (3/16")—2 on the top of the clamp, 4 on the bottom—just until snug, then tighten all.

5. **INSTALL ANAMORPHIC LENSES:**
   - ❑ Spread the anamorphic arms out fully, away from the primary lens.
   - ❑ Remove lens caps (front and back).
   - ❑ Standing behind either arm, face the screen and insert each anamorphic lens "rear first" into its proper side:

     1.5X LENS: Installs on the operator's side of the projector. Add a ¼" spacer ring (provided) at the back of the retaining ring, then insert the lens—although the 1.5x lens is smaller overall, its rear protrusion is longer and will strike the primary lens during use unless the lens is forced to be slightly "out" from the retaining ring.

     1.9X LENS: Installs on the ***non***-operator's side of the projector. Insert the 1.9x lens all the way into the adapter ring, to the back stop
   - ❑ Orient anamorphic lens as shown at right, with aperture positioned vertically. *NOTE: Precise orientation of the aperture is established later, rotating the lens while examining all edges of an image for perfect* ***leveling***.



Orientation

   - ❑ Carefully swing anamorphic arm so that lens is positioned approximately 1/8" in front of the primary lens —***do not bump the primary lens***. Note that if the anamorphic lens adapter has been installed in the proper position for the 1.9x anamorphic lens, the other lens (1.5x) will clear the primary lens only if it has been secured approximately ¼" from its retaining ring as described above.
   - ❑ Secure each lens with two lock-down screws (5/32") on each side of the lens when done.

6. **ADJUST POSITION**:
   - ❑ To move both anamorphic lenses closer to or further from the primary lens, loosen the 6 adapter clamp screws and slide the adapter along the rods. You might have to remove the anamorphic lens(es) first.
   - ❑ If necessary, re-adjust the left/right position of anamorphic adapter—it should be centered with primary lens if the projector is centered with the screen.

     NOTE: If the projector is off-center from the port window, it will require significant horizontal offset of the primary lens. The anamorphic lens may also have to be offset slightly to compensate and to prevent vignetting (corner cropping) in the image.
   - ❑ Re-secure 6 adapter clamp screws.
   - ❑ To move the anamorphic lens higher or lower to compensate for any vertical offset introduced (necessary when the projector is elevated in relation to the center of the screen), loosen the small screws securing the anamorphic locking ring to a pair of vertical rods, and slide the ring up or down as needed. Re-secure the ring to the vertical rods.

7. Use the large thumbwheel on top of the arm to secure the anamorphic lens in place.

Exhaust Ducting & Liquid Cooler

EXHAUST DUCTING: You must vent hot exhaust air from the DCP to the outside of the building. Connect your pre-installed outside-venting ductwork via 8" inside diameter flexible fireproof ducting material connected to the 8" exit port on the top of the lamphouse.

Make sure that 1) there are no obstructions or "kinks" within the ducting, 2) all air *intake* areas of the DCP are unobstructed, and 3) exhaust air flow is within the range shown in Table 2.1—use an air flow meter to measure the ft/min or ft/sec at various points along the length of the duct, then multiply the readings by the cross-sectional area of the 8" duct to calculate the cubic feet/min airflow.

HOW TO CALCULATE CFM in 8" DUCT: Measured linear ft/min x 0.34 = CFM

Table 2.1. Airflow Requirements

Model	*Lamp (kW)*	*Exhaust Airflow Rate*
SLI-D	1.6	250 – 350 ft^3/min.
	2	300 – 400 ft^3/min.
	3	350 – 450 ft^3/min.
SLH-D	4	450 – 550 ft^3/min.
	4.5	550 – 750 ft^3/min.
	6	750 – 900 ft^3/min.

NOTE: If the 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. ***Check airflow periodically****.*

INSTALL COOLER: Install the cooler on the front of the pedestal using the 2 mounting brackets and other hardware provided. Then:

1. Connect hoses: Press and release each hose connector tab so that they "click" into place at the cooler. NOTE: The head may not have labels for proper connection. The hose connected to the HIGHEST head connector is the cooler's OUT hose, and the hose connected to the LOWEST head connector is the coolers' IN hose.
2. Route the cooler's power cord into the pedestal via the knock-out hole.
3. Hard-wire the cord to a 120V terminal block within the pedestal. *NOTE: To prevent accidental disconnect, do* ***not*** *simply plug into an outlet.*
4. Fill the cooler with a 50/50 mix of distilled water and ethylene glycol.

Align Reflector to Head

Aligning the lamp reflector(s) to the head helps ensure that reflected light exiting the lamphouse is precisely aimed at the integrator within the head, resulting in optimized light output and performance. This alignment is recommended:

- For any DCP installation
- Whenever the lamphouse or projector "head" is moved/replaced
- Whenever the internal plenum (reflector housing) is moved/replaced
- To help ensure maximized brightness and contrast ratio from the DCP

Before You Begin

- The DCP must be fully assembled in its final location, with or without the lamp.
- Disconnect from AC.

⚠ WARNING ⚠

SHOCK HAZARD. Disconnect from AC at *both* wall breakers.

- The plenum (and/or lamphouse) must be loosened in order to move the reflector closer or further from the projector head.
- For new installations in which the lamphouse had to be separated from the pedestal, the lamphouse can remain loosely installed until you finalize the reflector position, as the alignment process may require slight movement of the lamphouse in relation to the pedestal.
- Requires Christie laser alignment jig.
- The mounted projector head should be 3/16" from the lamphouse snood (cone-shaped protrusion), and the back of the lens mount should be 2.5mm from the projector face.

⚠ QUALIFIED TECHNICIAN REQUIRED ⚠

Installation of laser jig

1. Unlock and remove the lid of the projector head.

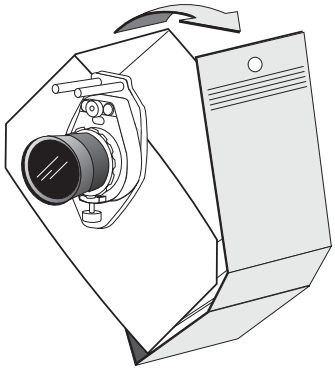


Figure 2.12. Remove lid

2. Remove the UV filter plate from the rear opening of the head (Figure 2.13).

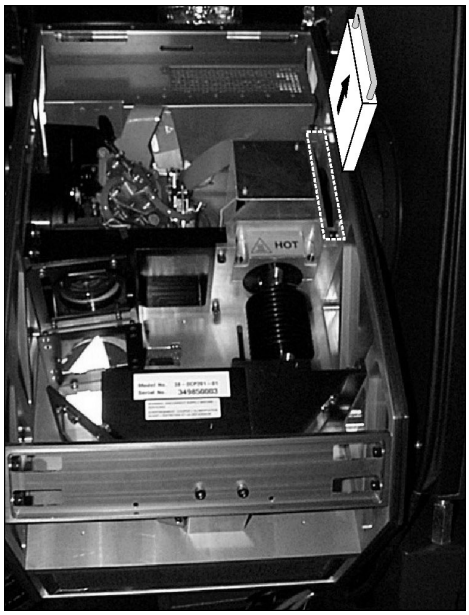


Figure 2.13. Remove UV Filter

3. Open/remove the lamphouse door on the operator's side. For complete access, also remove the sheet metal panel on the opposite side of the lamphouse, if possible.

   NOTE: SLH-D includes a removable door on the operator's side as shown—open and push down on the hinge spring to remove. The SLI-D has screw-mount sheet metal panels only.

⚠ WARNING ⚠
EXPLOSION HAZARD. Wear authorized protective clothing if lamp is present.

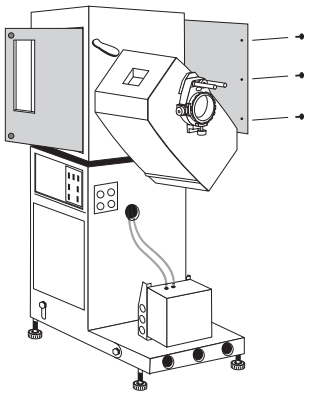


Figure 2.14. Open Lamphouse

4. Holding the jig with the 2 laser arms facing you, and with all 4 tabs positioned within the circumference of the jig without overlapping the edge, carefully move the jig into the lamphouse and insert fully into the projector head (any orientation). See Figure 2.15.

⚠ WARNING ⚠
Use extreme caution if lamp is present! Wear gloves.

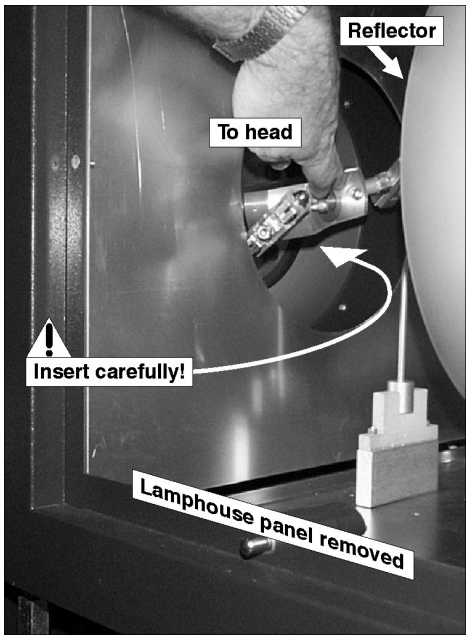


Figure 2.15. Insert jig into head

5. Reaching into the lamphouse, secure the jig in place with a 3/16" ball driver. A small turn will rotate each tab into place on the other side. Check each tab position with a flashlight and ***tighten fully***. See Figure 2.16.

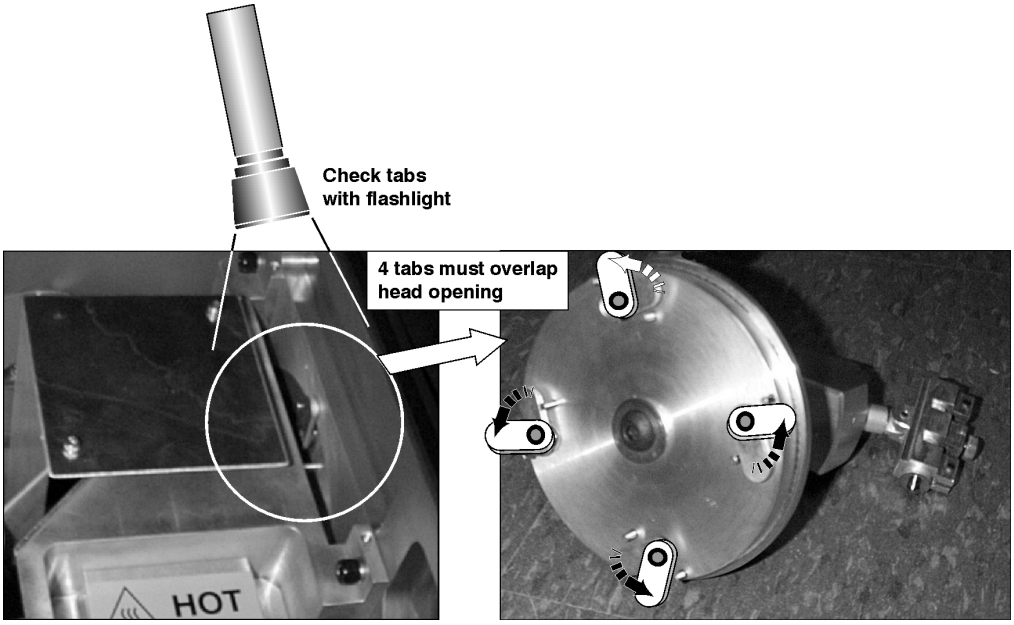


Figure 2.16. 4 tabs must secure jig to the projector "head"

Reflector Centering (1 laser)

6. Turn on ***one*** laser. Direct it very near the corner of the lip in one spot, then rotate the jig fully—if the beam remains the same distance from the corner of the lip as it travels along the complete circumference of the reflector, the reflector is well-centered on the "x" (horizontal) and "y" (vertical) axes, relative to the center of the head opening. See Figure 2.17.

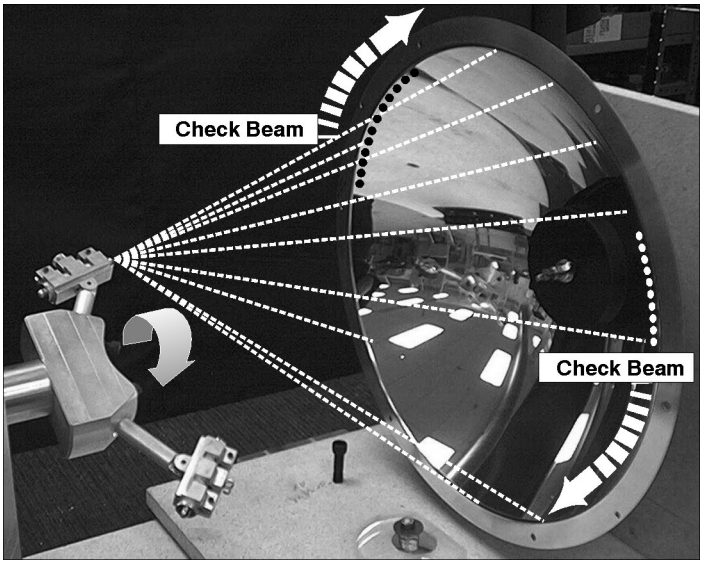


Figure 2.17. Check for x,y centering of the reflector (SIMULATION)

If the beam varies at any point(s), carefully adjust the reflector position by sliding the plenum left or right, and/or by adjusting the lamphouse lock-down bolts from within the pedestal to raise or lower the reflector.

Reflector Tilt (2 lasers)

7. Turn on both lasers and converge the beams on one spot very near the lip of the reflector. Observe the size/shape of this spot while rotating the jig fully—if the spot size/shape remains constant as it travels along the complete circumference of the reflector, the reflector is properly "aimed" along the optical axis (i.e., it is not tilted). See Figure 2.18.

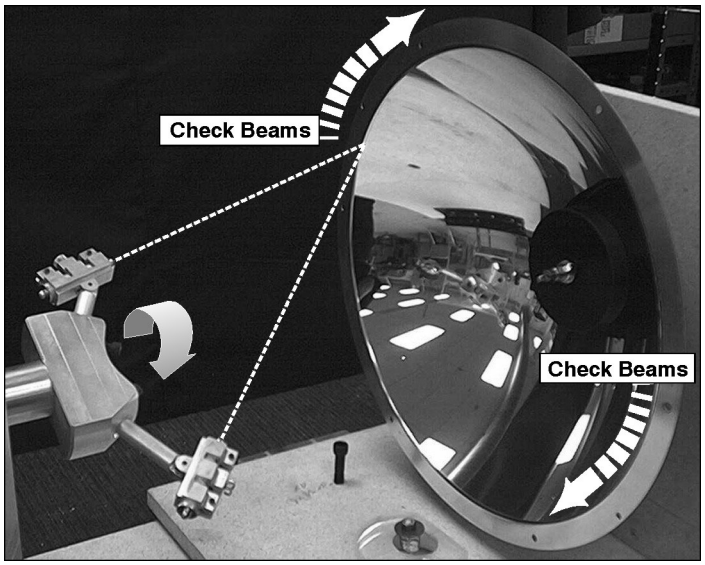


Figure 2.18. Check tilt of the reflector (SIMULATION)

   If the size/shape of the spot varies at any point(s), or if it separates into 2 beams, move the plenum and/or lamphouse as necessary to correct the tilt of the reflector (see Figure 2.19). It may take a few trials to get the spot exactly constant in size/shape.

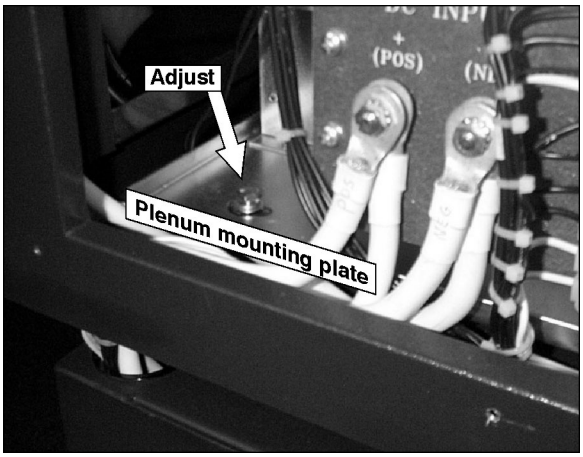


Figure 2.19. Plenum adjustments

8. **SLH-D MODEL ONLY**: Repeat Step 6 (centering) for the *spherical* reflector, if desired. To re-center this reflector, loosen the mounting screws and push to the center as needed. *The DCP-i model does not have this extra reflector.*

9. Remove the jig and close/replace all lamphouse doors and panels.

10. Replace the UV filter in the head, and lock the lid back in place.

⚠ WARNING ⚠

Never operate the projector without the UV filter.

Install Light Gasket and Lamp

' *NOTE: Metal UV ring is supplied with later* ***DCP*** *models only.*

Adhere foam (early models) or fasten the flexible sheet metal snood ring around the snood that bridges the gap between the lamphouse and projector head. This gasket will block escaping UV. Install the lamp as described in *Section 6*. Do not attempt to power-up or align yet.

At this point, all **DCP** main components—pedestal, lamphouse and head—are permanently secured and aligned to one another.

Connecting for Communications

Connect to a laptop or PC to one of the Communication Panel ethernet ports if possible. Or use a standard RS-232 cable to connect to the ***top*** RS-232 port (**A**) on the Communication Panel. If needed in your installation, connect other equipment as shown in Figure 2.20. For a complete explanation, see *2.9, Connecting Serial and Ethernet Communications* later in this section.

⚠ WARNING ⚠

Never connect a PC or computer to the lower RS-232 port. This port is for Cine-IPM use only.

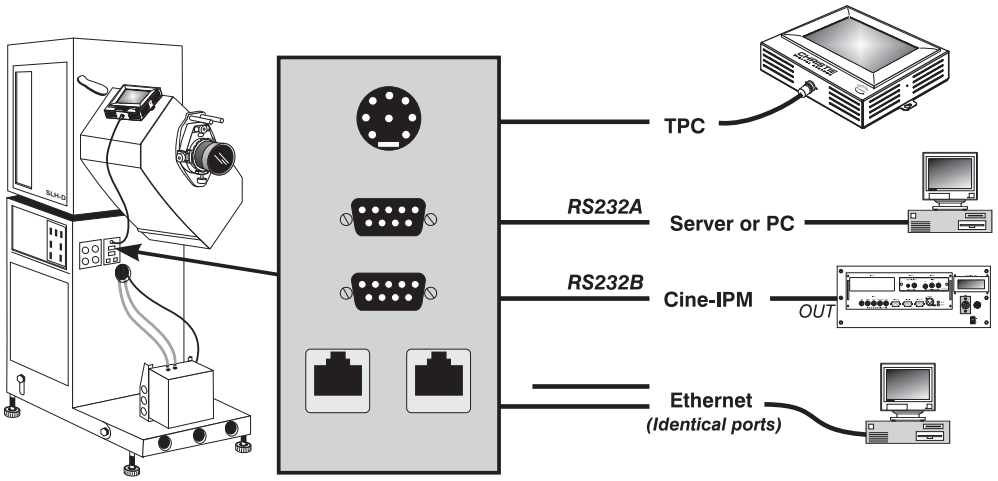


Figure 2.20. Communication Connections

Connecting to Power

1. Pull 3-phase wires, single-phase and ground wires through one of the knock-outs located on the foot of the pedestal.

2. Connect 3-phase ***and*** single-phase wires to the Input Terminal Board located on the non-operator side of the pedestal attached to the power supply.

3. Check the Schematic and/or your automation manual for wiring connection to any installed automation. These provide projector, audio, and auditorium functions.

4. Connect all wires/cables as required in above instructions.

Table 2.2. AC Wiring

AC Wiring Required					
AC Amperes	***Wire Diameter (AWG) per Cable Length***				
Per Phase	*50 ft.*	*100 ft.*	*150 ft.*	*200 ft.*	*250 ft.*
0-10	14	14	12	10	10
11-15	14	12	10	8	6
16-20	12	10	8	8	6
21-25	10	10	8	6	4
26-35	8	8	6	4	4
36-45	6	6	4	4	3
46-60	4	4	4	3	1
61-70	3	3	3	2	1
71-80	2	2	2	1	0/1

✻ *Note: Ground wire diameter must be ≥ largest wire used for AC connections*

2.2 Adjusting Tilt and Leveling

In an ideal installation, the **DCP** lens surface is *centered with* and *parallel to* the screen—this orientation helps to ensure optimized lens performance with minimal offset. You do not need to be connected to AC or projecting an image for these initial alignments.

Make sure the projector has been **CENTERED** (←→) with the theatre screen as best you can for your installation area (refer back to Figure 2.2).

YOU MUST TILT the projector to match your screen tilt angle (see Figure 2.21). Check with theatre personnel for this information, or measure the incline with a protractor at the screen. Then, as shown in Figure 2.22:

1) Loosen all 4 tilt hold-down bolts on the pedestal.

2) Push on the back of the pedestal until the projector tilt matches the incline of the screen.
3) Secure all 4 tilt hold-down bolts.

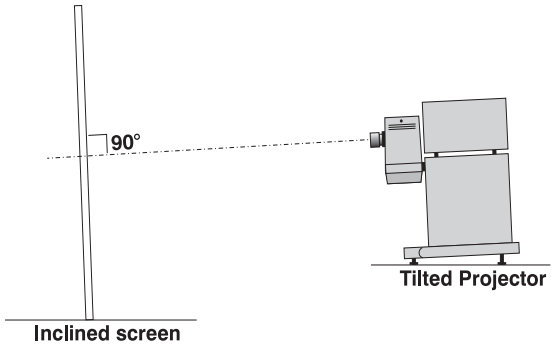


Figure 2.21. Tilt Projector to Match Screen

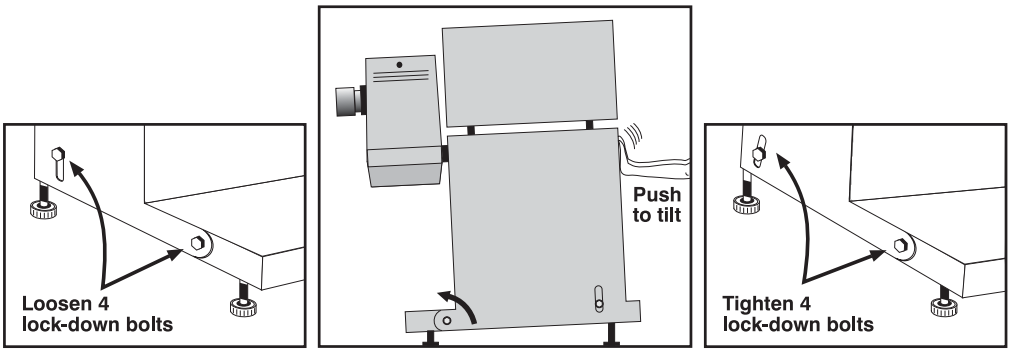


Figure 2.22. Adjusting Tilt

4) If necessary, adjust the leveling feet for side-to-side leveling or for additional tilt (Figure 2.23). Note that you may have to adjust level more precisely once an image is present.

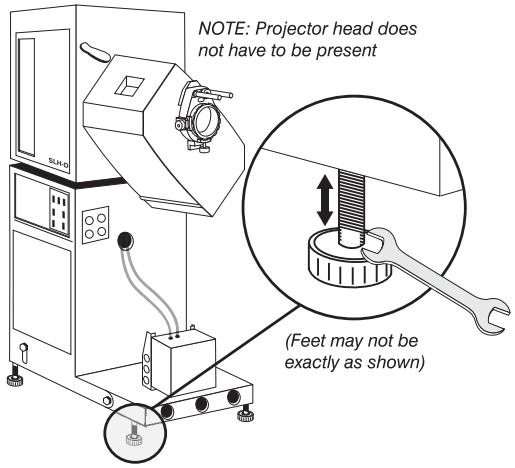


Figure 2.23. Adjust Feet for Leveling / Tilt

2.3 Initial Power-up & Display

With all components installed and connected, connect to AC and power-up the projector as described in *3.2, Power-up Procedure*.

⚠ IMPORTANT ⚠

Make sure the liquid cooler alarm sounds upon power-up, indicating it is ON. Also check for green "power" light on top of cooler.

Immediately apply the appropriate lamp current for your lamp and adjust the lamp position as described in *3.5, Working With the Lamp.*

2.4 Maximizing Light Output

Once the projector is powered up with a newly-installed/replaced lamp and a well-aligned reflector, adjust lamp (bulb) position to help ensure safe, optimized operation as well as peak brightness at the screen.

Using the 100% white internal test pattern, adjust the lamp as described in *3.5, Working With the Lamp (Adjusting Lamp Position)*. The lamp will then be well-centered and distanced correctly from the remainder of the illumination system. With a new lamp, optimized system, and well-aligned reflector, the *uncorrected color* light output—that is, light output that has ***not*** been reduced through color correction—should be fairly close to the expected maximum levels shown in Table 2.3:

Table 2.3. Maximum Achievable Brightness Levels *

Model	Lamp (kW)	Maximum Achievable Brightness (lumens)
SLI-D	1.6	3200
	2	4000
	3	6000
SLH-D	4	8000
	4.5	8500
	6	11000

* *Measured in front of the lens, not at screen.*
As with any lamp, brightness decreases as the lamp is used.

Keep in mind that performance depends on the age of the lamp, reflector alignment and lamp position—your light output measurement may be lower.

*NOTE: If peak light output remains **significantly** below the expected level for your lamp wattage, there may be a problem that must be resolved at this point concerning the reflector/head alignment or the lamp itself.*

2.5 Basic Image Alignment

*NOTES: **1)** Assumes projector is fully assembled and powered up in its final location. **2)** If you do not have the optional Cine-IPM, which offers a variety of test patterns for analyzing optical performance, you will need access to the TPC **Advanced** menu.*

The objectives of this procedure are to ensure the image from the DMDs is parallel to and well-centered with both the lens and screen. This initial optical alignment is the foundation for achieving the best image on screen, and must be completed before final boresight adjustments.

NOTE: Before you begin:

- The **DCP** must be properly positioned relative to the screen (refer back to Figure 2.2 and Figure 2.21).
- The reflector/head alignment must be correct. See *2.1, Mounting and Connecting Components*.

Basic Optical Alignment Procedure

1. Display a good test pattern appropriate for analyzing image focus and geometry. The projector's user test pattern (accessible from the TPC *Main* menu) or checkerboard pattern (accessible from the TPC *Advanced* menu) should be adequate, or use an external pattern.

2. **COARSE FOCUS:** Do a quick preliminary focus and zoom adjustment with the primary zoom lens only (see *3.6, Working with the Lens*). Do not worry about consistency across the image at this point, just center focus.

3. **CENTER THE IMAGE IN THE LENS:** Holding a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens.

4. **RE-CHECK SIDE-TO-SIDE LEVELING:** With a good test pattern on screen, double-check projector leveling (see 2.*2, Adjusting Tilt and Leveling*) so that the ***top edge*** of the image is parallel to the top edge of the screen. See right.

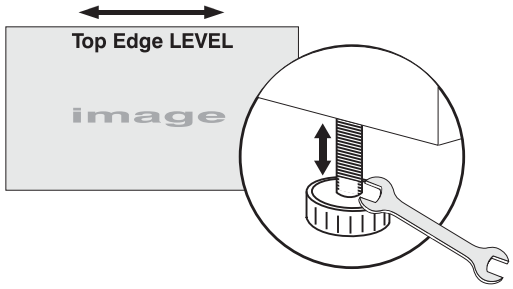


Figure 2.24. Level the TOP Edge

2.6 Boresight Alignment

*NOTE: Assumes projector is fully assembled and powered up in its final location. Install any anamorphic lenses first (see **All Lenses**, above), since their weight may alter boresight.*

To ensure consistently good focus in all areas of the screen, a primary zoom lens must be installed and its lens mount precisely adjusted in relation to internal optics as described below. If desired, an anamorphic lens can then be swung into place to widen images for "flat" or "scope" cinema displays.

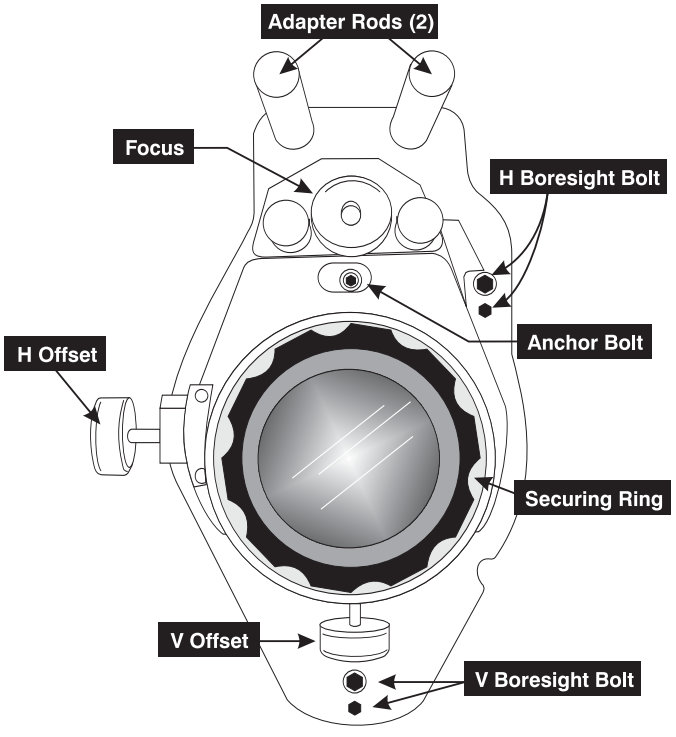


Figure 2.25. Anatomy of the Lens Mount

Refer to lens mount components illustrated in Figure 2.25 for these adjustments.

Check Clearance At Projector

' Using the gauge provided with the projector, check that the back of the lens mount clears the projector face by exactly 2.5mm. *If necessary*, adjust the anchor bolt to move the lens mount slightly closer or further from the projector. Re-check with 2.5mm gauge. See Figure 2.26.

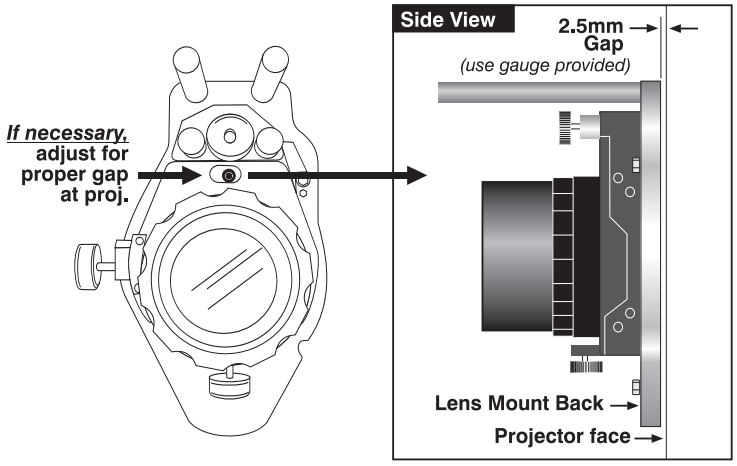


Figure 2.26. Check for 2.5mm clearance behind lens mount

Adjust Offset

' Project an image with the ***primary lens only***. Any optional anamorphic lens(es) should be mounted but swung aside.

Adjust horizontal and vertical offsets as necessary so that the image is square on screen ***but offset is minimal***. See Figure 2.27. Boresight should be adjusted only if offsets are already properly set.

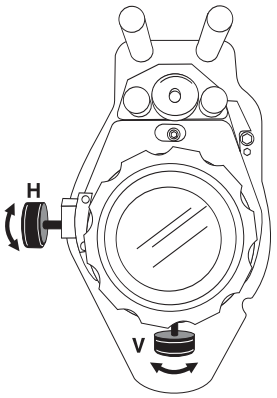


Figure 2.27. Offsets

Adjust Left/Right Boresight

' 1. Adjust focus at the far left center edge of the image (Figure 2.28). If possible, reduce image size for easier image analysis.

2. If the image appears well-focused on the left edge but not on the right, then the boresight currently differs from one side to the other—i.e., the right side of the image is well-focused either *in front of* or *behind* the screen surface rather than *on* it. To determine where the right side is focusing:

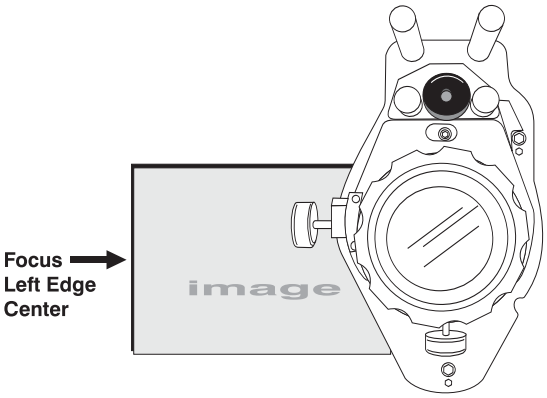


Figure 2.28. Adjust Focus at Left Edge

- Hold a piece of white paper approximately parallel to the screen surface at the right side (as close to the vertical center as possible), then move closer to the projector while watching the image on the paper.

  - *If focus on the paper improves*, this indicates that the right side of the image is focusing *in front of* the screen. See Figure 2.29.
  - *If focus on the paper worsens*, this indicates that the right side of the image is focusing *behind* the screen.

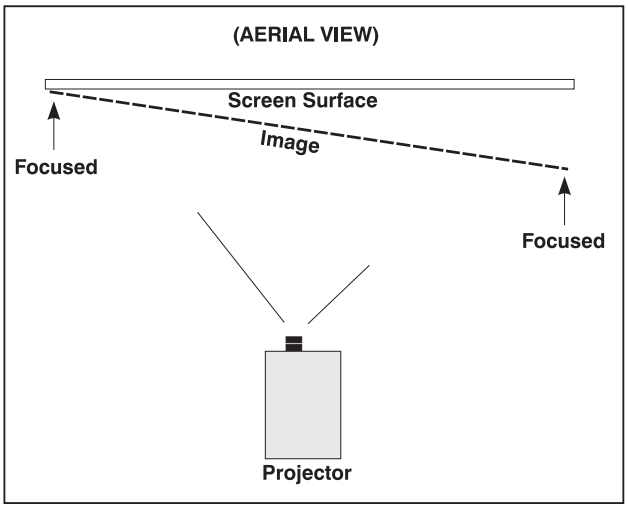


Figure 2.29. Example of Poor Left/Right Boresight

If the image comes into focus on both sides simultaneously, left/right boresight is fine—skip to Step 7.

3. Adjust the horizontal boresight bolt (Figure 2.30) as necessary to direct or "aim" the lens toward the side of the image which focused too close to the lens. When both sides appear equally blurry, re-focus on the left side of the screen.

4. Adjust horizontal offset to re-center the image on the screen.

5. Repeat Steps 4 and 5 until both sides of the are well-focused.

6. Adjust the "hold" screw to lock in place and check boresight again.

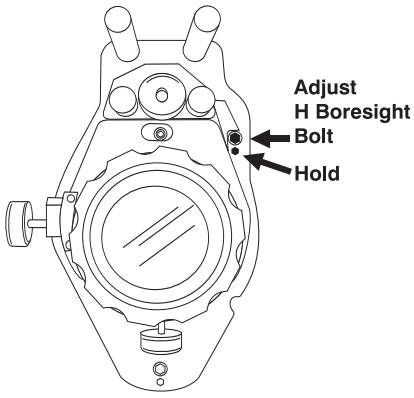


Figure 2.30. Adjust L/R Boresight

Adjust Top/Bottom Boresight

7. When the left/right boresighting is complete, focus the image at the top edge of the screen (Figure 2.31).

   If the bottom remains blurry while the top edge is focused, refer back to Step 2 but use a paper at the *bottom* of the screen to determine whether the bottom of the image is focused *in front of* the screen or *behind* the screen. If the bottom is well-focused, skip to Step 11.

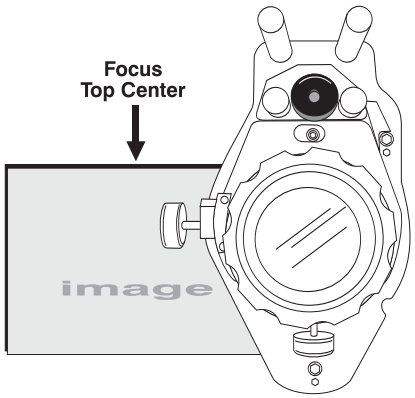


Figure 2.31. Adjust Top Focus

8. Adjust the vertical boresight bolt (Figure 2.32) using one allen key to hold the bottom hex screw and another to turn the adjustment bolt above it. Adjust as necessary to direct or "aim" the lens toward the edge of the image which focused to close to the lens. When both top and bottom appear equally blurry, re-focus at the top of the screen.

9. Adjust vertical offset to re-center the image on the screen

10. Repeat steps 8 and 9 until the top and bottom of screen are both well-focused.

11. **REFOCUS**: Although all sides of the image should now be in focus, the center of the image will be slightly blurry at this point. Refocus at center of image.

12. Adjust the "hold" screw to lock in place and check boresight again.

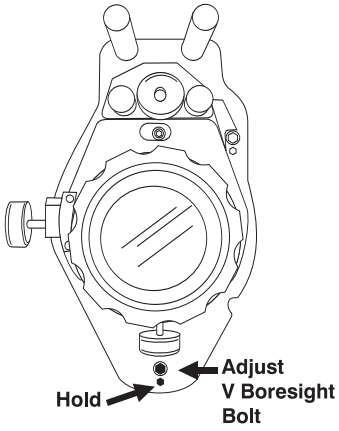


Figure 2.32. Adjust Top/Bottom Boresight

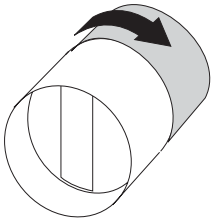
Add Anamorphic Lens

Swing the desired anamorphic 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 be vertically aligned to the screen. If the image is skewed, loosen the locking ring on the anamorphic lens and rotate the lens slightly until the wide image is horizontal.

1. **FOCUS PRIMARY LENS:** With the anamorphic lens in place, refocus the primary lens using focus knob.

2. **FOCUS ANAMORPHIC LENS:** If horizontal focus in the image needs improvement, focus the anamorphic lens too—rotate its barrel as needed.

3. Whenever using the anamorphic lens, secure it in place using the large thumbwheel located above the adapter arm and lens.



Focus (ANAMORPHIC)

2.7 Calibrating the System Using *DCP Librarian Setup Software*

DCP Librarian is a comprehensive Windows™-based software application used for calibrating image color performance and defining electronic screen masking required in your particular DCP installation, and for creating individual *Projector Configuration Files* (PCFs) necessary for proper display of source material. *DCP Librarian* also defines the system/network configuration for communication links to the projector, transmitting information to and from the DCP via an Ethernet or RS-232 connection, and is used for upgrading main projector software.

COLOR CALIBRATION: After the DCP 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, 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 theatre environment in the future (for example, a new screen is installed), the DCP should be re-calibrated.

ELECTRONIC SCREEN MASKING: *DCP Librarian* 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.

PCFs: Numerous settings collected into a single *Projector Configuration File* further define processing variables for optimized display of specific source material (such as a motion picture). Each PCF file, settings for which may be provided by the distributor or created as desired in *DCP Librarian*, defines color space, target color gamut, gamma (a.k.a. "degamma"), aspect ratio and screen position 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 DCP input connection and quickly applied via a controller such as Christie's *Touch Panel Controller*. No further adjustment in processing should be required.

Note that correction for proper color balance sometimes reduces overall light output. Increase LAMP CURRENT as necessary, making sure to stay within the range of acceptable power shown in Table 3.8.

2.8 Connecting Sources

All sources for the **DCP** connect to one of three ports within the projector head—this is typically done as part of installation (see *2.1, Installation, Projector Head).* To change or add any connection in the head, you must open the lid of the head.

For Cinema — PORT A (or B) —

For cinema displays, connect a digital media storage device to the SMPTE 292 serial digital input **A** or **B** within the **DCP** projector head. For any connection, limit cable length to 300 feet or less.

See *Section 4* for a list of compatible signals and for complete cinema operating details.

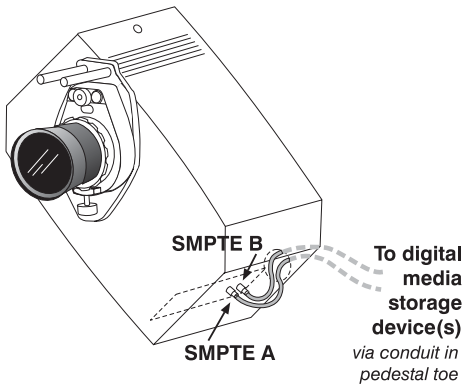


Figure 2.33. Ports A or B = Cinema

For Alternative or "Non-cinema" — DVI PORT —

*NOTES: **1)** Assumes a source connected via the optional Cine-IPM. **2)** The Cine-IPM may be installed at an external location, or directly into the rear or side of the **DCP** if desired—refer to the installation instructions provided with the Cine-IPM. **3)** Non-cinema sources 23-96 Hz can be connected directly to the **DCP** head if desired, but may sometimes lead to unexpected results in the display. For best results, use the Cine-IPM.*

To display a wide variety of no-cinema or "alternative content, connect your non-cinema source to the optional Cine-IPM as described in the following pages. Then connect the Cine-IPM to the projector head's **DVI** port.

See *Section 5* for complete non-cinema operating details.

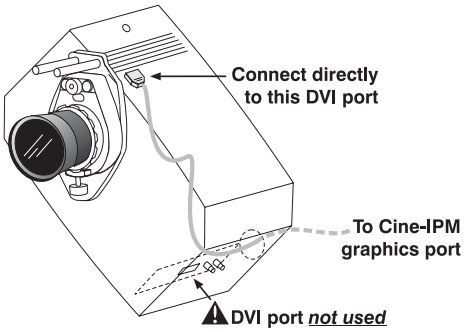


Figure 2.34. DVI Port = Non-Cinema

Connecting Sources to the Cine-IPM

For multiple non-cinema or "alternative content" sources, you can connect a variety of sources to input panels on **DCP's** Cine-IPM option. See Figure 2.35–the lower left area (**INPUT 1**) typically accepts an *RGB signal* from an external RGB source, or it can also be used for YPbPr signals or additional video sources. The upper right panel–the *Video Decoder Module*–accepts only *composite video* at **INPUT 3** or *S-video* at **INPUT 4** from devices such as VCRs, laser disk players or DVD players. There are also several optional interface modules available for connecting other sources at **INPUT 2.** Such a module installs in the upper left area of the Cine-IPM.

*NOTE: Connect only high-quality **shielded** cables.*

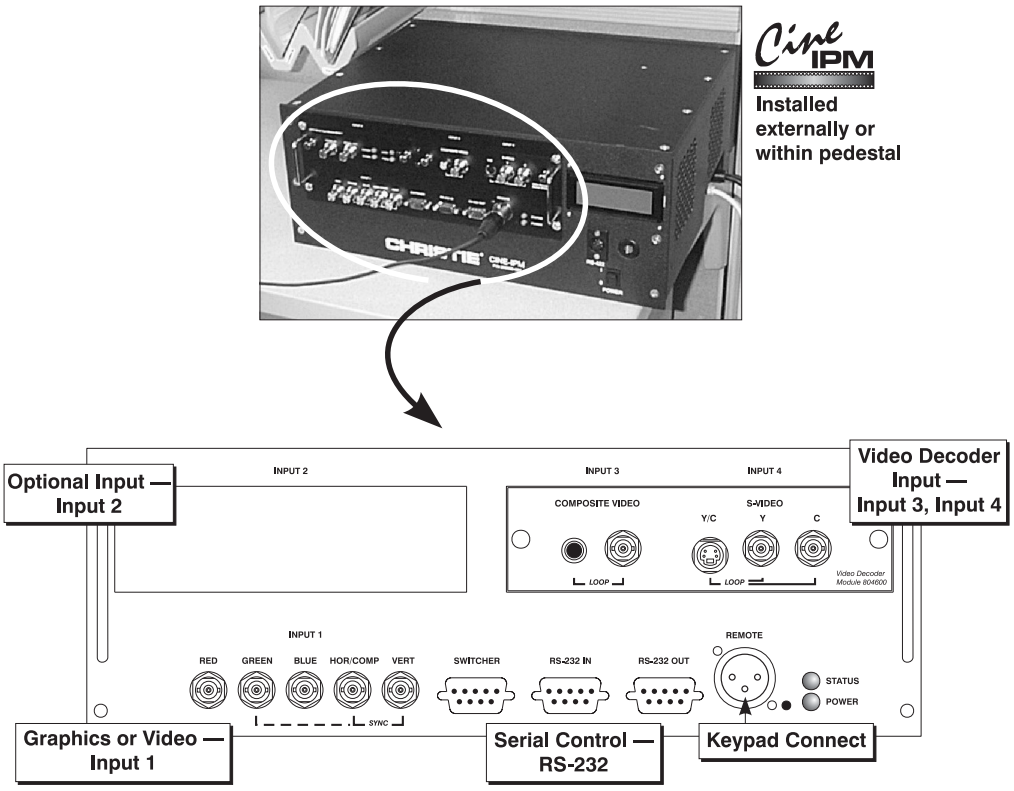


Figure 2.35. Cine-IPM Connector Panel

RGB Signals

NOTE: Requires Cine-IPM option.

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

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

Connect the **SYNC** BNC input(s) first. Then connect the red, green and blue source outputs to the **RED**, **GREEN**, and **BLUE** BNCs on the **INPUT 1** panel. If the source uses sync-on-green, only the red, green, and blue connections are required. If the source provides a composite sync output, connect it to the **SYNC** input labeled **HOR/COMP**. If the source provides separate horizontal and vertical sync outputs, connect horizontal sync to the **SYNC** input labeled **HOR/COMP** and connect vertical sync to **SYNC** input labeled **VERT**. See Figure 2.36.

*NOTES: **1)** If for some reason the projector fails to recognize a signal as an RGB signal, specify this **Color Space** option within the **Image Settings** menu. See **4.7, Adjusting the Image. 2)** To connect YPbPr signals–such as from DVD or analog HDTV sources–to **INPUT 1**, use the red, green and blue BNCs as described in **YPbPr Signals** later in this section.*

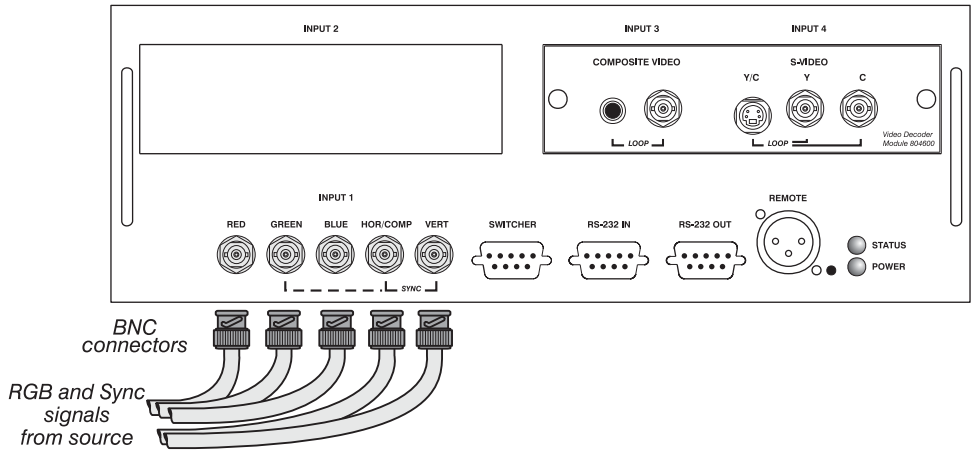


Figure 2.36. Connecting RGB Input

YPbPr Signals (COMPONENT VIDEO)

' *NOTE: Requires Cine-IPM option.*

Connect a YPbPr signal (*component video*) to **INPUT 1** as shown in Figure 2.37.

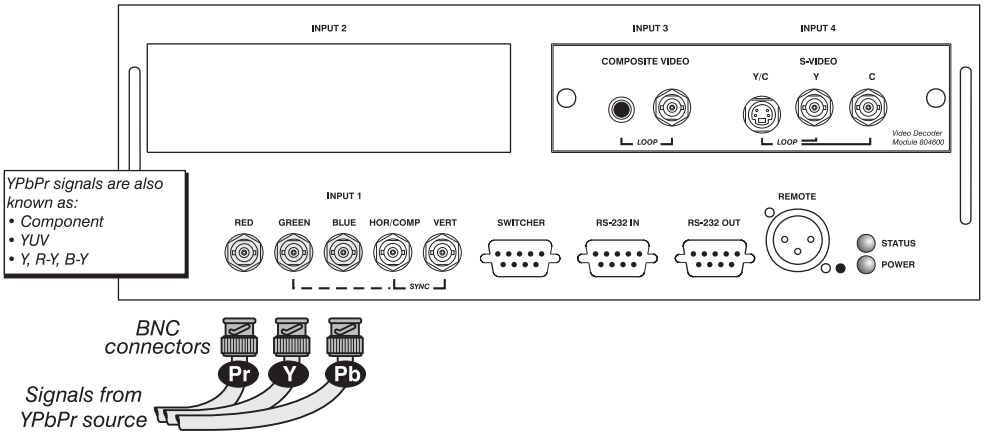


Figure 2.37. Connecting YPbPr Signal

*NOTES: **1)** If, for some reason, the projector fails to recognize a YPbPr signal, specify this **Color Space** option within the **Image Settings** menu. See 5.7**, Adjusting the Image**. **2)** Do not connect digital component signals (known as YCbCr) to* **INPUT 1**. *Use the appropriate digital interface installed at* **INPUT 2**.

Composite Video

' *NOTE: Requires Cine-IPM option.*

The video decoder input panel provides simultaneous connection of both a composite video source (**INPUT 3**) and an S-Video source (**INPUT 4**).

If connecting a composite video source, use the Composite BNC connector ***or*** the RCA phono jack at **INPUT 3**–do not use both as inputs. See Figure 2.38.

*NOTE: If you want to loop a composite signal through to another projector or display device, see **Video Loop Through** later in this section.*

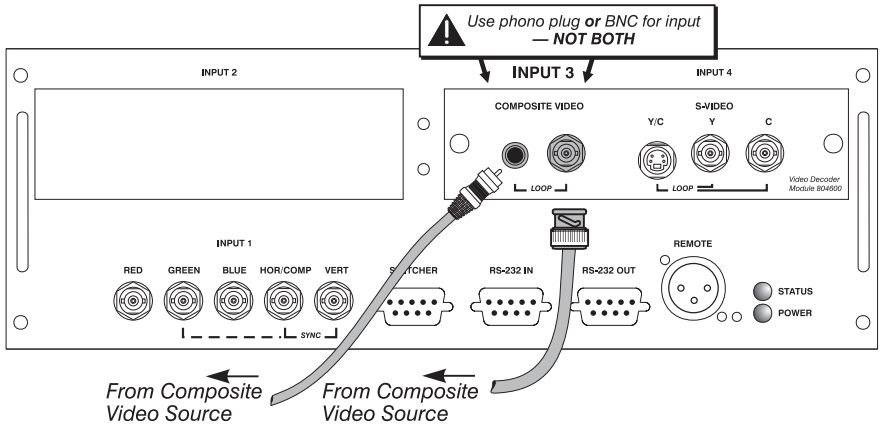


Figure 2.38. Connecting Composite Video

S-Video '

NOTE: Requires Cine-IPM option.

The video decoder input panel provides simultaneous connection of both a composite video source (**INPUT 3**) and an S-Video source (**INPUT 4**).

If connecting an S-Video source, use the 4-pin mini DIN connector ***or*** the Y and C BNC connectors (luma and chroma) at **INPUT 4–**do not use both as inputs. See Figure 2.39.

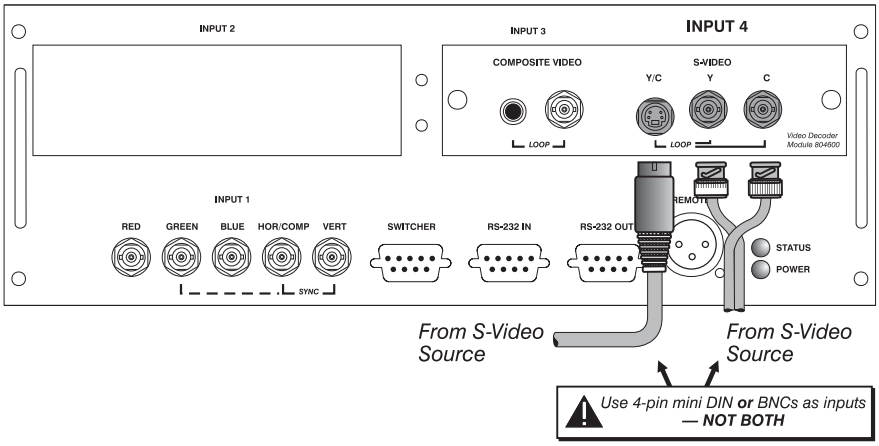


Figure 2.39. Connecting S-Video

NOTE: If you want to loop an S-video signal through to another projector or display device, see ***Video Loop Through*** *below.*

Video Loop Through

NOTE: Requires Cine-IPM option.

To loop a single incoming video signal input (connected at the video decoder) through to another projector or display device, use the empty connector(s) adjacent to this same input as described below.

Composite Video Loop Through

CONNECTIONS: See Figure 2.40. From your source, connect a composite video signal to **INPUT 3** using either the small phono plug or the adjacent BNC. Connect a second cable from whichever **INPUT 3** connector is free to one of the composite video inputs of the next display device or projector. Continue this looping method for each projector, using either the phono plug or the adjacent BNC as input into **INPUT 3,** then using the other connector as an output (i.e., loop through). Whether you use the BNC or the phono plug as input or output depends on the type of cable you have on hand and what type of connectors are on each end.

VIDEO TERMINATION: In *Image Settings / Video Options,* make sure "Video Termination" is checked for the final projector ***only***. All other projectors must have this option unchecked in order for the signal to continue. For other types of display devices in the chain, typically a "Hi-Z" switch position is needed.

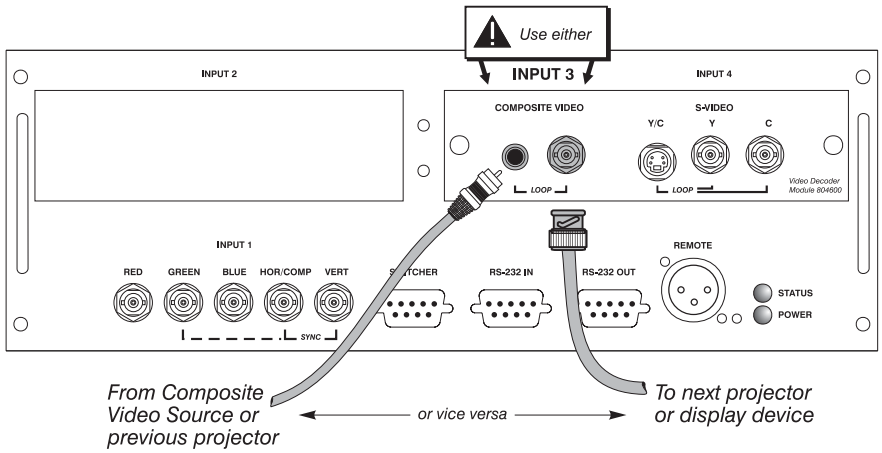


Figure 2.40. Connections for Composite Video Loop Through

S-Video Loop Through

CONNECTIONS: See Figure 2.41. From your source, connect an S-video source signal to **INPUT 4** using either the 4-pin mini DIN or the 2 adjacent BNCs labeled Y and C. Connect a second cable from whichever **INPUT 4** connector is free to one of the S-video inputs of the next display device or projector. Continue this looping method for each projector, using either 4-pin mini DIN or the 2 adjacent BNCs as input into **INPUT 4,** then using the other connector(s) as an output (i.e., loop through). Whether you use 4-pin mini DIN or the 2 adjacent BNCs as input or output depends on the type of cable you have on hand and what type of connectors are on each end.

VIDEO TERMINATION: In the *Image Settings / Video Options* submenu, make sure "Video Termination" is checked for ***only*** the final projector. All other Cine-IPMs present must have this option unchecked in order for the signal to continue. For other types of display devices in the chain, typically a "Hi-Z" switch position is needed.

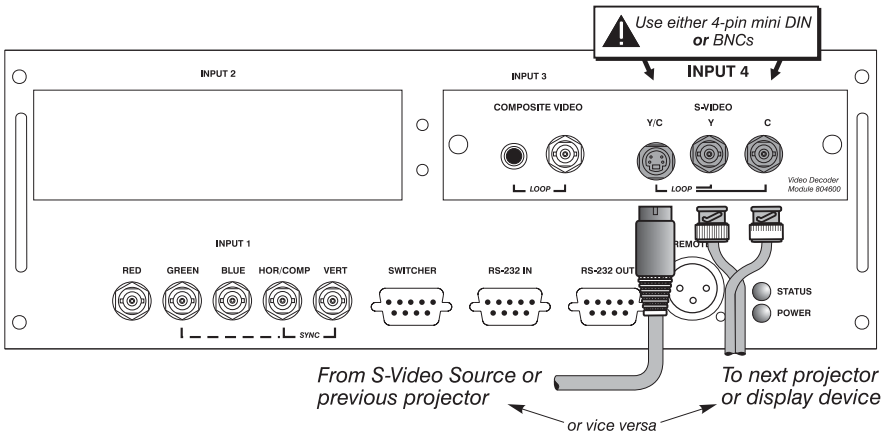


Figure 2.41. Connections for S-Video Loop Through

Extra Video – COMPOSITE OR S-VIDEO

' *NOTE: Requires Cine-IPM option.*

To use an extra video source in addition to the video source(s) connected at **INPUT 3** or **INPUT 4** connect either a Composite or S-Video source to **INPUT 1** as shown in Figure 2.42. Do not connect both types here simultaneously. *NOTE: For additional video inputs, install an optional Composite/S-Video Input Module at* ***INPUT 2****.*

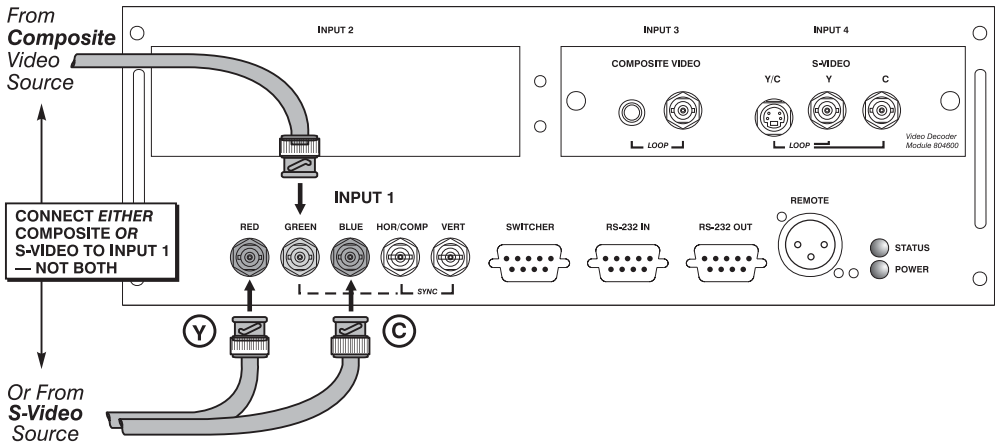


Figure 2.42. Connecting an Extra Video Source to Input 1

Optional Inputs

' *NOTE: Requires Cine-IPM option.*

Optional modules installed in the Cine-IPM increase the total number of inputs and/or accommodate different signal types, whether analog or digital. Any one of these modules can be installed in the area labeled **INPUT 2**. They include:

- RGB 500 Input Module
- RGB 400 Active Loop Thru Input Module
- RGB 400 Buffered Amplifier Input Module
- Composite/S-Video Input Module
- PC250 Analog Input Module
- Serial Digital Input Module
- Digital HDTV Module
- DVI/DFP Input Module

Alternatively, the analog interfaces (i.e., *non*-digital) can be installed in the *Marquee* switcher formerly manufactured by Christie, if desired, and used with the projector.

*NOTES: **1)** Connect analog HDTV signals directly to **INPUT 1** or to any "RBG" input module installed at **INPUT 2**. **2)** See **Appendix D, Optional Input Modules** for a brief description of each interface.*

Connecting a switcher

NOTE: Requires Cine-IPM option.

You may wish to use the *Marquee* switcher (formerly manufactured by Christie) to significantly increase the number of Cine-IPM sources you can select. If so, connect the switcher's RGB output to **INPUT 1** and connect an RS-232 serial communication cable between the switcher and the projector serial port labeled **SWITCHER** (see Figure 2.43). The switcher communication link (permanently set at 9600 baud) enables you to access inputs connected to the switcher in the same manner as those connected directly to the projector.

NOTE: Make sure a switcher connected directly to the projector is set as "Switcher #1". If it is not, unplug the switcher and set to "1" before plugging back in and connecting to the projector and/or network.

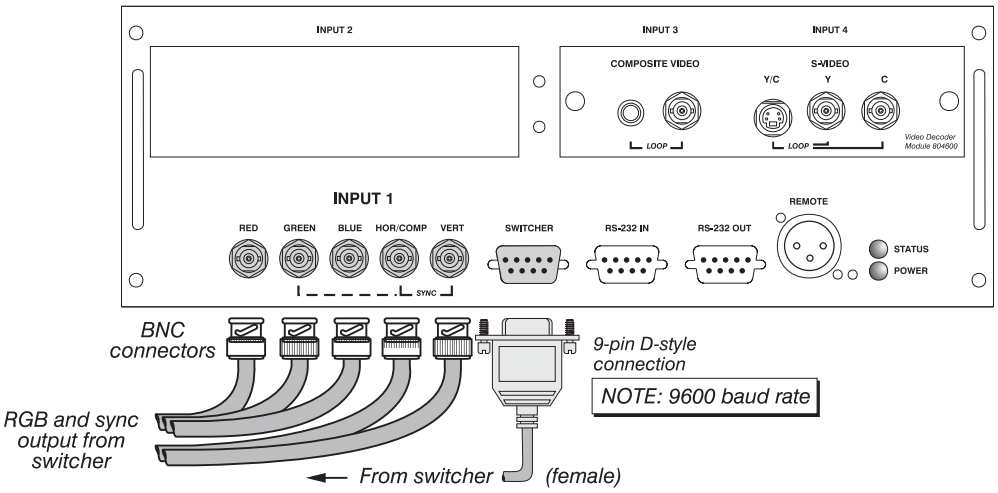


Figure 2.43. Connecting a Signal Switcher

Connecting Multiple Switchers

*NOTES: **1)** Requires Cine-IPM option. **2)** Requires the **Marquee** switcher formerly manufactured by Christie.*

If you are using more than one switcher, daisy-chain the RS-232 switcher inputs/outputs together to form a complete network of inputs accessible from the projector (you can network up to 9 switchers), and connect Switcher #1 to the Cine-IPM as shown in Figure 2.43. In addition, connect the RGB output from each switcher to its matching slot on switcher #1–for example, connect the RGB output from switcher #2 to slot #2 on switcher #1, and the RGB output from switcher #3 to slot #3 on switcher #1. Note that slots used in this manner on switcher #1 are no longer recognized as inputs to the projector–if you select a slot location that is connected to another switcher's RGB output, the projector will display the "no input signal" error message.

See *Section 5* for a list of compatible high-definition non-cinema signals and for complete non-cinema operating details.

2.9 Connecting Serial and Ethernet Communications

During installation, you will need certain communication links to the DCP. As with all head connections, these connections are typically done as part of installation as described earlier in *Section 2*. In some cases, the serial and/or ethernet links are needed only by the installer, and are disconnected after installation.

External

Connect external communication links as shown in Figure 2.44.

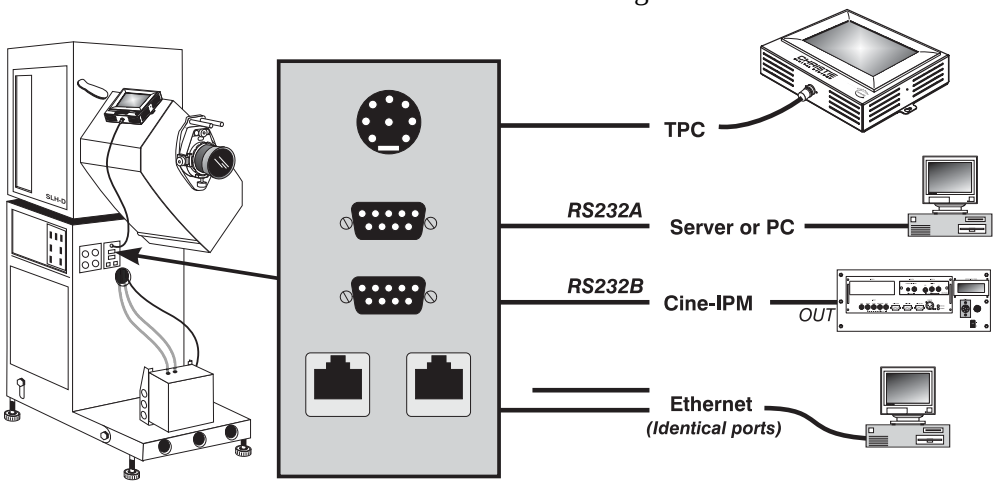


Figure 2.44. External Communication Links

Internal

COMPUTER OR SERVER: To communicate with the DCP from a computer or other controller such as the TPC, connect the equipment to either of the ethernet ports on the Communication Panel. Or, if ethernet is not available, connect a standard RS-232 communication cable between an external controller such as a PC or server and the single RS-232 "A" port. Comunications route to the projector head as shown in Figure 2.45.

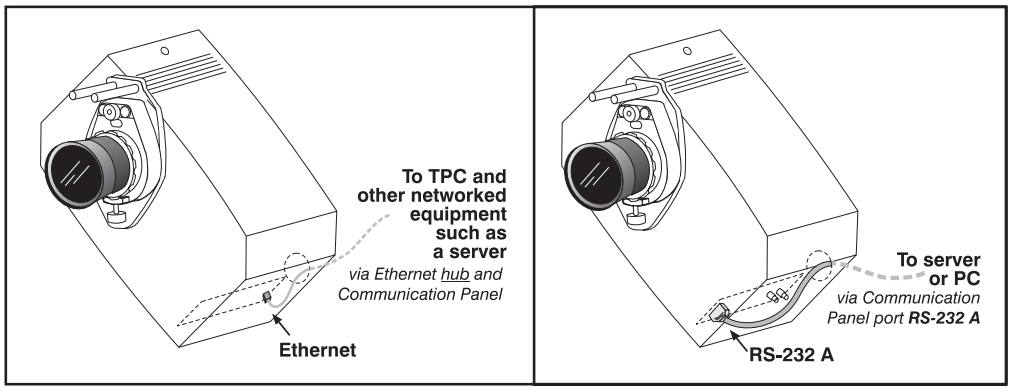


Figure 2.45. Possible Communication Link from DCP to PC or Server

*NOTES: **1)** The ethernet ports are identical, so use either port for any external equipment. **2)** For serial communication using a PC, laptop or server, use only the RS-232 **A** port—the other RS-232 port utilizes special protocol intended for Cine-IPM serial communications only. **3)** Depending on your installation, connect the TPC to either the dedicated 8-pin connector at the top of the Communication Panel or to one of the ethernet ports.*

Cine-IPM Serial Link

Installation must include the RS-232 connection shown at right.

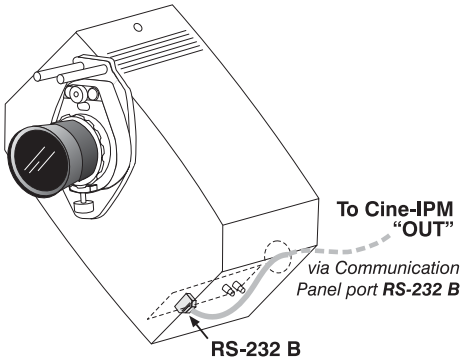


Figure 2.46. Cine-IPM RS-232

For serial control of the Cine-IPM, connect an appropriate serial communication cable between an external controller and either the Cine-IPM **RS-232 IN** port (9-pin D-connector) or, if you have a controller with RS-422 capability, the Cine-IPM **RS-422** port (6-pin XLR).

Then connect the Cine-IPM **RS-232 OUT** port (9-pin D-connector) to the Communication Panel on the projector (refer back to Figure 2.44). See *If Using a Computer with the Cine-IPM*, below.

If using a computer with the Cine-IPM

IF RS-232 PORT: Connect a standard RS-232 serial communication cable between the computer and the projector serial port labeled **RS-232 IN**—this 9-pin D connector port is located the Cine-IPM input panel (see Figure 2.47). Then set the Cine-IPM baud rate to match that of the computer (changing the Cine-IPM baud rate is described in *5.8, Configuring System Parameters*).

*NOTE: Refer to **Appendix D** for complete cable wiring details.*

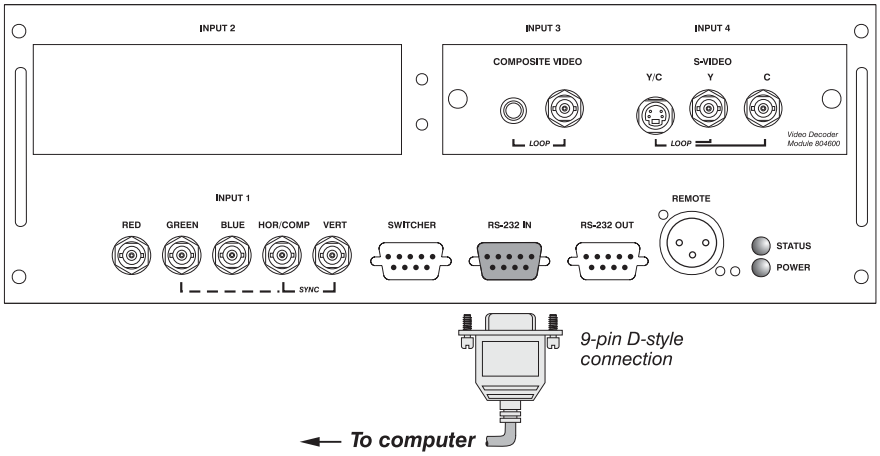


Figure 2.47. RS-232 Serial Connection: Cine-IPM to a Computer

IF RS-422 PORT: Some computers can relay *RS-422* serial communications (often through a plug-in adapter or external converter) rather than the less robust RS-232 communications. RS-422 communication has differential "transmits-and-receives" and is generally better suited for long distances than is RS-232. Note that RS-422 is *not* compatible with RS-232—connecting one to the other could damage the equipment at either end.

If you wish to control Cine-IPM functions with a computer and/or other controlling device (such as the *Two-Way Controller*) having RS-422 capability, connect RS-422 serial communication cables between the computer (or other device) and the Cine-IPM serial port labeled **RS-422**—this 6-pin XLR connector port is located near the lower right corner of the Cine-IPM control panel (Figure 2.48). Use an **RS-422** port

only if your equipment has RS-422 capability—consult the documentation supplied with your equipment.

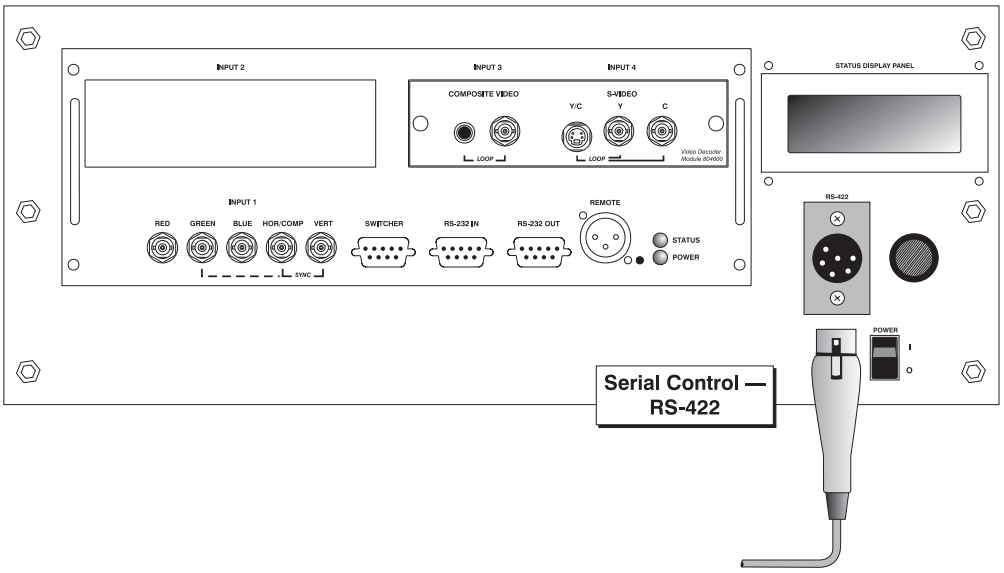


Figure 2.48. RS-422 Serial Connection: Cine-IPM to a Computer

⚠ WARNING ⚠

Do not use the RS-422 port unless you are using a computer/controller with RS-422 capability. The voltage levels of this signal can damage incompatible equipment.

CONNECTION TO DCP: Then connect the Cine-IPM to the DCP as shown in Figure 2.49. Regardless of whether or not you connect your controller to the Cine-IPM via RS-232 or RS-422, communications are looped out through this RS-232"OUT" port.

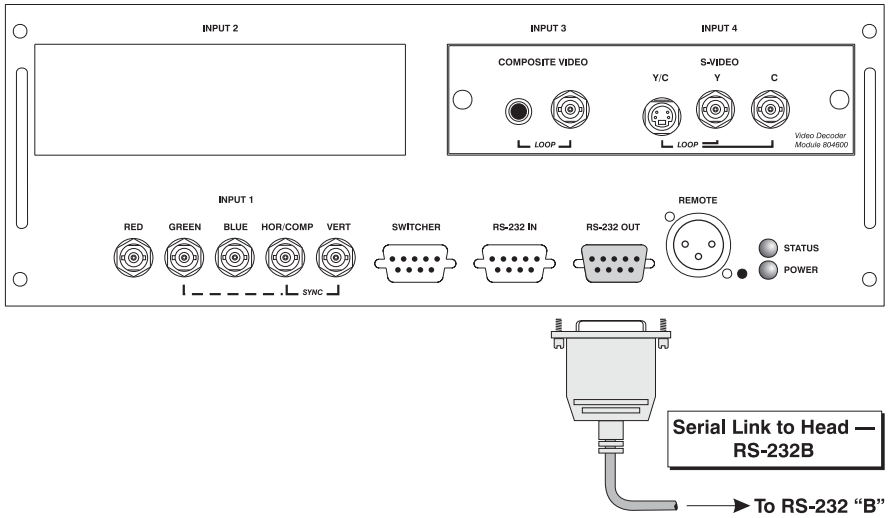


Figure 2.49. RS-232 Serial Connection: Cine-IPM to the DCP

*NOTE: Connect **only** the Cine-IPM to RS-2323 **B**. This port has special protocol.*

If using a switcher

You may wish to use the *Marquee* switcher formerly manufactured by Christie in order to significantly increase the number of Cine-IPM sources you can select. If so, connect the switcher's RGB output to **INPUT 1** on the Cine-IPM and connect an RS-232 serial communication cable between the switcher and the Cine-IPM serial port labeled **SWITCHER** (refer back to Figure 2.43). The switcher communication link, which is permanently set at 9600 baud, enables you to access inputs connected to the switcher in the same manner as those connected directly to the Cine-IPM.

*NOTE: See 2**.8, Connecting Sources**, **"Connecting a Switcher"** for complete details.*

NOTE: Requires Cine-IPM option.

2.10 Keypad Protocols and Conversion

Protocols

At manufacture, the Cine-IPM's remote keypad is assigned "A" as its default protocol, which simply means that it uses this recognized protocol to communicate with the Cine-IPM. Although a keypad's protocol can be changed to protocol "B", if desired, this is useful only for multiple-projector networks (in which a second Cine-IPM would also be changed to recognize only protocol "B")—protocol changes are rarely needed in typical cinema installations. For best results, do not change the default protocol for either the keypad or the Cine-IPM.

*NOTE: By default, the Cine-IPM recognizes both A and B protocols. This is set in the Communications menu as described in **Section 5**. For best results, do not change.*

Converting a Keypad

If desired, you can convert the Cine-IPM's wired keypad into an IR remote keypad, and vice versa. Simply open the keypad (Figure 2.50) and use tweezers or needle-nose pliers to set jumpers 3 and 4 as shown in Figure 2.51 (IR) or Figure 2.52 (wired). Add or delete the batteries or cable as required.

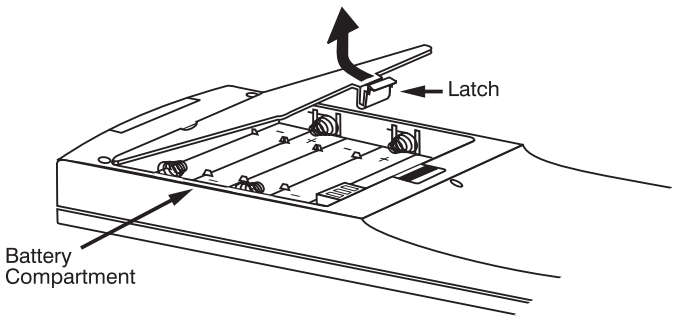


Figure 2.50. Open Keypad for Jumper Access

TO CHANGE FROM WIRED *TO INFRARED*:

- Unplug the keypad from the Cine-IPM.
- Open the keypad back and unplug the keypad cable.
- Wait 1-2 minutes.
- Install batteries.
- Set jumpers 3 and 4 for “IR” jumper settings as shown in Figure 2.51.
- Replace battery compartment cover.

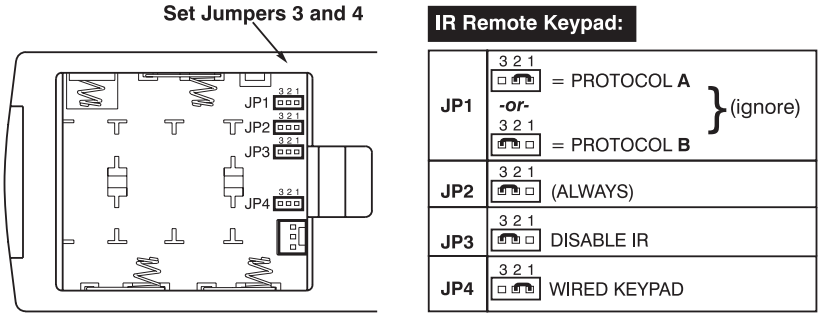


Figure 2.51. IR Jumper Settings

TO CHANGE FROM INFRARED *TO WIRED*:

- Remove battery compartment cover from back of keypad.
- Remove batteries.
- Wait 1-2 minutes.
- Plug the keypad cable (available separately) into the empty battery compartment. Make sure that the battery cover is smoothly notched to accommodate the cable.
- Set jumpers 3 and 4 for “wired” jumper settings, as shown in Figure 2.52.
- Replace battery compartment cover.
- Plug into the 3-pin XLR port on the Cine-IPM.

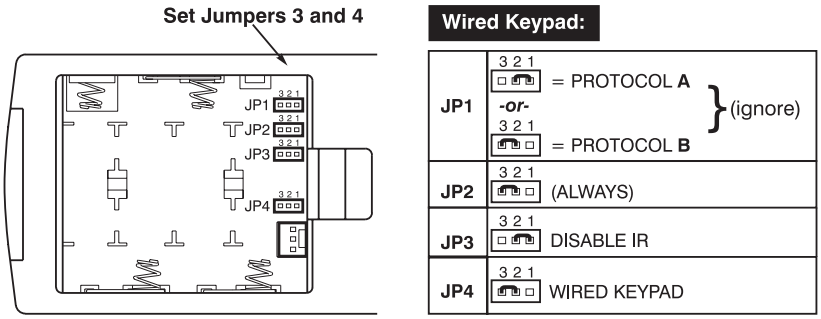


Figure 2.52. Wired Jumper Settings

Section 3

Basic Operation

3.1 Projector Basics

This section introduces controls and switches used for basic manual operation of the projector once it is properly installed, aligned and configured by a qualified service technician as described in *Section 2, Installation and Setup*.

Components/Features

Chief DCP components appear below *(note: SLH-D lamphouse shown).*

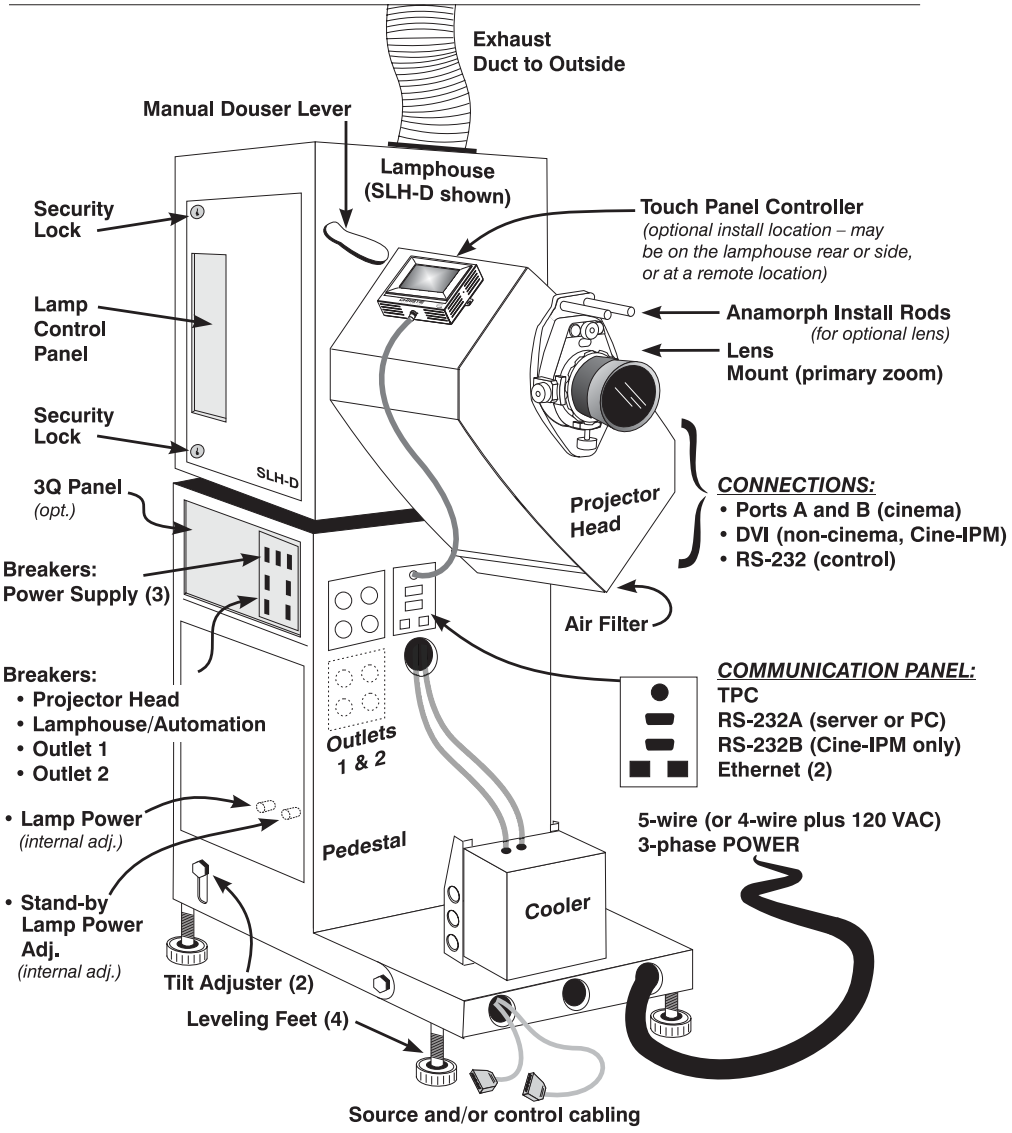


***Figure 3.1. Basic Projector Components** (SLH-D SHOWN)*

DCP components are briefly described and listed in alphabetical order below:

Air Filter

Intake air flows through the filter before circulating throughout the projector head for cooling. Replace the air filter whenever the lamp is replaced—or sooner in dusty/dirty environments. Check monthly. See *6.4, Replacing the Lamp & Filter*.

Breakers

Each circuit breaker on the pedestal serves two purposes: 1) it is a power switch for a component, and 2) it protects against over-current conditions. All breakers must be ON for normal DCP power-up and operation, enabling AC to reach the necessary components**.** If faulty or excessive AC is detected, a breaker will "trip" to OFF in order to prevent damage to the relevant component. Try moving the breaker ON again—if the breaker continues to trip OFF, the AC problem must be corrected. Breakers are:

- **XENON POWER SUPPLY (3-phase):** Turns DCP's main power supply on/off when the 3 switches are moved in tandem.
- **PROJECTOR HEAD:** Turns the projector head on/off. Also includes the cooler, if it is hard-wired within the pedestal
- **LAMPHOUSE/AUTOMATION:** Turns the lamphouse and optional 3Q automation system on/off, enabling subsequent manual or—if 3Q is present—automatic lamp ignition or power-off. *Despite its name, this breaker does not turn the lamp on/off.*
- **OUTLET 1:** Turns convenience outlet #1 at the front of the pedestal on/off.
- **OUTLET 2:** Turns convenience outlets #2 within the pedestal on/off.
  NOTE: Outlet 2 is located ***within*** *the pedestal.*

Communication Panel

The Communication Panel on the front of the pedestal provides convenient connection of the DCP to a variety of external equipment such as controllers—including the TPC—that can communicate with the projector "head" for numerous advanced service tasks (downloads of new configuration files and software upgrades, for example). Often only the TPC and Cine-IPM remain connected for general use.

Connections

Internal projector head connections are generally made at the time of installation, consisting of all inputs, communications, and cooling hoses. All cables and hoses route into the pedestal via conduit between the head and pedestal. Then, with the exception of projector head power, which is typically connected within the pedestal, everything loops back out through the pedestal front for connection to the appropriate component.

- **PORTS A and B (CINEMA):** Identical SMPTE 292M bit-serial interface standard BNCs for connecting a wide variety of high-definition cinema sources.
- **DVI PORT (ALTERNATIVE CONTENT):** Connection for a wide variety of non-cinema video and graphics sources used with the optional Cine-IPM.
  NOTE: ***1)*** *Do not connect sources directly to any DVI port in the* ***DCP*** *head.* ***2)*** *The Cine-IPM must by-pass the DVI port visible on the projector head's feed-through plate (near the air filter), and instead connect directly to the internal DVI port on the other side of the head.*

- **RS-232 A (SERVER OR PC):** Connection for external serial communication with a server or PC/laptop only. Use a standard serial/RS-232 cable.
- **RS-232 B (Cine-IPM):** Connection for external serial communication with the optional Cine-IPM only. Use a standard serial/RS-232 cable. ***NOTE: Do not use this port for any other equipment.***
- **ETHERNET:** Connection of a variety of networked equipment such as PCs and servers. These 2 ports are identical.

Adding or deleting any connection within the head requires opening of the lid, so you must be able to unlock the high security lock.

Cooler

The cooler is crucial for safe operation of the projector head, circulating liquid to the three DMDs via a ¼" diameter flexible hose loop approximately 4 feet long. It is permanently mounted to the pedestal toe and must be on and properly functioning for all **DCP** use, otherwise the DMDs in the projector head can overheat and fail. For best results, simply leave the cooler switch ON and always check before **DCP** power-up. For security, the cooler is usually hard-wired within the pedestal.

⚠ WARNING ⚠
Never operate the DCP without the cooler!

COOLER ALARM: The cooler alarm sounds under the following conditions:

- ***Power-up.*** The alarm sounds for 3-4 seconds at every **DCP** power-up. If it does not, make sure that the cooler's power switch as well as the circuit breaker labeled "Projector" are both ON. If the alarm still fails to sound, do not operate the **DCP** until the unit is serviced.
- ***Low level of liquid.*** This invariably indicates a leak, and requires immediate service.
- ***Poor flow.*** Usually caused by a blockage or kink in the tubing. Inspect and correct as necessary.

IF THE COOLER FAILS WHILE PROJECTOR IS RUNNING: If the cooler is forgotten (off) at power-up or if it has quietly failed for some reason during use of the **DCP**, the DMDs may become hot enough to fracture if you then suddenly run the cooler. As described in *3.4, Using the Touch Panel Controller*, use the **Status** menu to confirm that DMDs are 50°C or less before turning on a forgotten cooler. If any readings are currently over 50°C, power down the **DCP** and allow to slowly cool down to 50° C before powering up again.

⚠ WARNING ⚠
If any DMD is 50°C or higher, do not fast chill.
Turn off the DCP and cool slowly.

CHECKING COOLER FUNCTION: To confirm that the cooler is functioning normally, momentarily pinch one of its hoses while the **DCP** is running. If you hear a BEEP, the cooler is functioning normally. If there is NO beep, the cooler is either off or there is a problem with the flow.

FILLING THE COOLER: The cooler should require filling only once, when the DCP is installed (see *Section 2, Installation and Setup*). Fill with one liter of a 50/50 mix of distilled water and ethylene glycol.

Exhaust Duct

Exhaust air must vent to a properly installed exhaust duct routed to outside the building. For proper cooling of the lamphouse and maximum lamp life, airflow rates must match those provided in *Section 2, Installation and Setup*.

Lamp Control Panel

The lamp control panel provides switches for turning the lamp on/off and for optimizing lamp position to create the brightest and most uniform image possible.

Lamp Power / Stand-by Power Adjustments

Lamp power level is adjustable both for normal operation and for the stand-by mode activated whenever the manual douser (shutter) is closed. These separate adjustment knobs are located on the power supply within the pedestal, thus are protected by a security lock. Never exceed the lamp current levels shown in Table 3.8.

Lamphouse

Depending on your installation, the DCP uses either a 2-4 kilowatt lamphouse (SLI-D model) with an elliptical reflector, or a 4.5-7 kilowatt lamphouse (SLH-D) with a compound sphere/elliptical reflector. Lamphouses also contain an igniter and one of the following Xenon lamps:

SLI-D Lamps	SLH-D Lamps
1.6 kW	4.0 kW
2.0 kW	4.5 kW
3.0 kW	6.0 kW

The lamphouse is closed and locked for normal operation.

Lens Mount & Anamorphic Install Rods

The lens mount secures a primary zoom lens to the projector head and provides manual adjustment of focus, zoom and offsets. If desired, the anamorphic lens adapter (standard) slides on to the long protruding rods at the top of the lens mount. With one or more optional anamorphic lenses installed in the adapter “arms”, you can pivot an arm into place in front of the primary lens to quickly spread a squeezed 5:4 (SXGA) image horizontally into a wider anamorphic image.

Leveling Feet

The adjustable feet turn to increase or decrease projector height as needed for proper leveling and/or additional tilt. See *2.2, Adjusting Tilt and Leveling*.

Manual Douser (Shutter) Lever

The manual douser lever moves a douser blade into the light path to block the image (like a shutter). Using this lever also reduces lamp power to 30-70% (user adjustable) of its maximum rating, creating a cooler “stand-by” mode. Keep OPEN for normal operation.

Outlets 1 & 2

Outlet 1 allows convenient plug-in of external equipment you may be using in your installation. Outlet 1 is *not* intended for plugging in **DCP** system components such as the projector head or optional Cine-IPM—both of these should be plugged into the internal Outlet 2 at time of installation. *NOTE: To reduce the risk of accidental unplugging of the cooler, hard-wire the cooler within the pedestal, even if other outlets are present.*

Pedestal

The multi-purpose pedestal provides 1) housing for the main power supply and numerous harnesses, 2) a stable and adjustable base for the lamphouse, 3) mounting of the projector head, 4) a central location for connecting components, 5) connection of 3-phase "Y" AC and separate single-phase AC, and 6) normal and stand-by lamp power controls. The pedestal is closed and locked for normal operation.

Power Cord

In most cinema installations, the power cord emerging from the pedestal toe is hard-wired to the AC supply in your building. Note this AC connection is configured as 3-phase "Y" feed with a separate 15A single-phase feed. It provides power to the entire **DCP** system, and is disconnected only by turning off ***both*** breakers at the wall.

Projector Head

The projector head houses most of the critical illumination and optical components as well as the *DLP™ Cinema* technology responsible for combining light and incoming source signals into brilliant high-resolution digital displays. Processing is manually controlled via the *Touch Panel Controller* or other communications from a controller. All inputs route through conduit between the pedestal and head and connect internally to the projector head near its lowest corner (usually done during installation). The head is closed and locked for normal operation.

3Q Theatre Automation Panel (OPTIONAL)

The optional Christie *3Q* provides a simple way to start various scheduled theatre events—including the ignition of the **DCP** lamp and start of the selected feature—according to a single automation that begins at the press of the *3Q*'s AUTO START button. For a brief summary of *3Q* functions, see *4.3, Automated Control*.

NOTE: Alternatively, this location can accommodate the optional Cine-IPM or certain other theatre automation systems.

Security Lock

Access to all internal components and/or connections is protected by high security locks on the pedestal and head, and medium security locks on the lamphouse.

Source/Control Cabling

Flexible conduit within the pedestal "toe" provides safe routing for all source cabling (usually connected during installation). Use a route not currently occupied by the power cable.

Tilt Adjuster

For most cinema installations, the projector is slightly inclined (raised at the back) to match screen tilt and to reduce the amount of vertical offset required. See *2.2, Adjusting Tilt and Leveling* for complete instructions on setting the tilt adjuster.

Touch Panel Controller

The *Touch Panel Controller* is a touch-screen used primarily for selecting a specific source/input as defined in one of eight *display setups* created by the installer, and for checking basic status information. Navigation and use of the TPC—including password-protected options—is fully explained in *3.4, Using the Touch Panel Controller*. Depending on your installation, the portable TPC module may be mounted in one of several locations, and it can be tilted as needed. A small knob on the back provides a screen brightness adjustment.

3.2 Power-up Procedure

*NOTE: This is a manual power-up procedure. Cinema installations typically include an automation system such as the **Christie 3Q** that controls lamp ignition in conjunction with other theatre variables such as house lights, audio, and the eventual start of the feature from a digital media storage device/server.*

⚠ WARNING ⚠

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

1. Make sure that the breakers at the main wall panel for the system are switched **ON**.
2. Make sure that the manual douser (large handle on the front corner of the lamphouse) is **OPEN.**
3. Make sure the cooler's switch is **ON**.
4. At the pedestal, set all **DCP** circuit breakers to **ON**—these are the Xenon lamp supply (3-phase), the projector head, lamphouse/automation and Outlets 1 and 2 (all single-phase). The cooler's alarm will automatically sound for several seconds. Meanwhile, the internal lamp fan will start up and the projector head will initialize.

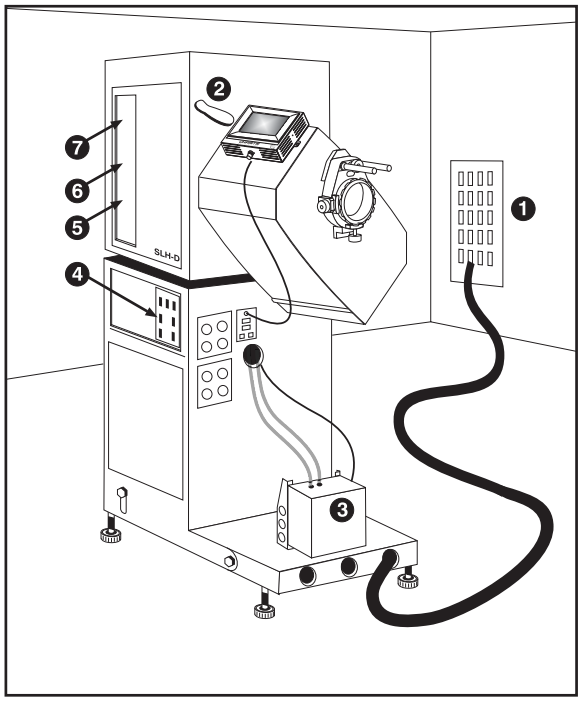


Figure 3.2. Power-up Procedure

5. After the head is initialized, set **DC POWER** to **ON** at the lamphouse—the lamp will ignite. Or press the **AUTO START** button on the optional 3Q automation panel—the lamp will ignite and a pre-programmed sequence of events will begin.

NOTE: If the lamp fails to ignite, momentarily press the **MANUAL IGNITION** *button or, if 3Q is present, either 1) set the* **DC POWER** *to* **ON** *or 2) move the 3Q's* **MANUAL LAMP** *switch to* **ON.** *Regardless of method, manually igniting the lamp will not affect remaining automated events.*

6. Make sure the **READY** light is green (see Figure 3.14)—this indicates that the lamp interlock circuit is properly closed and the lamp cooling system is functioning:
   - ❑ Lamphouse exhaust airflow OK
   - ❑ Lamphouse plenum airflow OK
   - ❑ Lamphouse door closed (SLH-D model only)

7. ⚠ **SET PROPER LAMP CURRENT**: Always drive the lamp within its range of acceptable power level as shown in Table 3.8, beginning at 80% for a new lamp (or higher, if desired for your application). As the lamp ages, increase power as necessary, always remaining within range for your lamp. See *3.5, Working with the Lamp* for details.

3.3 Power-down Procedure

1. At the lamphouse, set **DC POWER** to **OFF.**

   *NOTE: If you have the 3Q theatre automation system, the server will automatically send a pulse to the 3Q to trigger the lamp shut down (**DC POWER** to **OFF**).*

2. At the pedestal, set the **XENON POWER SUPPLY** circuit breakers to **OFF**.
3. Allow all fans to run for a full 10 minutes.
4. At the pedestal, set all remaining circuit breakers to **OFF**.

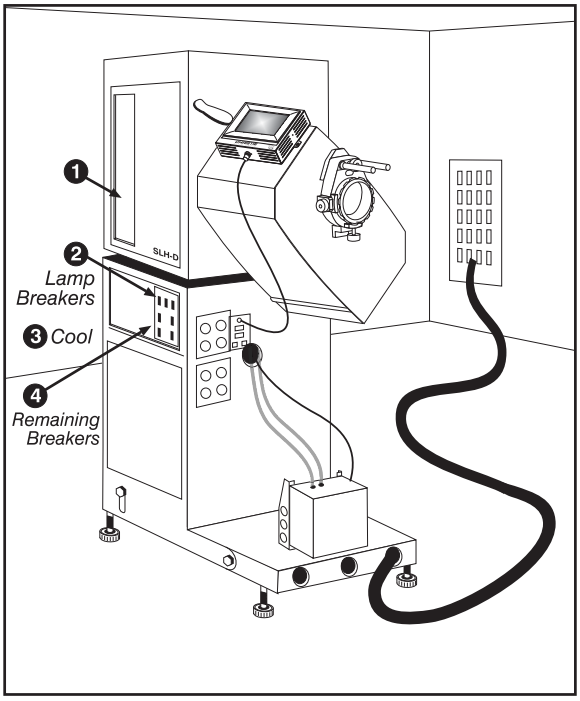
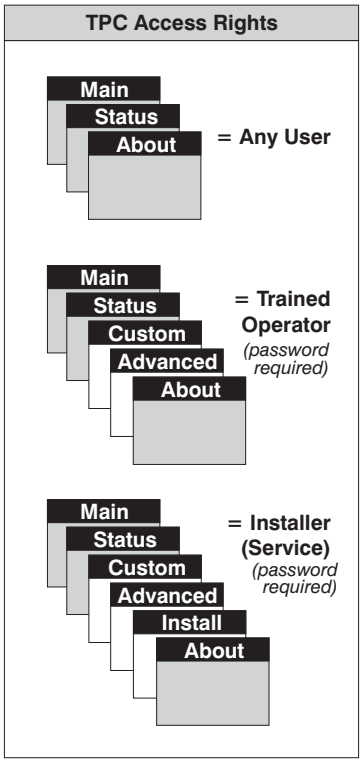


Figure 3.3. Power-down Procedure

3.4 Using the *Touch Panel Controller*

GENERAL USERS: For the general user, the *Touch Panel Controller* (TPC) provides three simple Windows™-based menus for 1) starting or changing any type of presentation, 2) obtaining basic status and/or diagnostic information about the projector, and 3) determining the versions of software components installed. A simple design and familiar menu icons help ensure that virtually any user can instantly display an accurate and fully optimized image by pressing a single button on the touch-screen, and that precisely configured presentations are protected from accidental or unauthorized change.

INSTALLERS and TRAINED OPERATORS: In addition to the three basic menus accessible to any user, the TPC offers two more password-protected levels of use. *Installers* can access three extra menus where they can define the eight display setups as well as processing paths, network addresses, and temperature read-out in Celsius or Fahrenheit. In most installations, a *trained operator* can adjust or re-define the eight display setups for subsequent new source material.



TPC Power-Up Defaults

When the **DCP** powers up (see *3.2, Power-up Procedure*), 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. When initializing is complete, all files are refreshed on the TPC and the system is in a ready-to-use default operating mode:

- It projects the most recently used source material
- The *Main* menu appears on the *Touch Panel Controller*, with the current display button depressed (darkened).

If the TPC fails to initialize and instead displays a communication error such as *No connection* or *Cannot locate Ethernet port*, there is likely a bad connection between the TPC and the rest of the projector. The projector will still operate and will display the last active input and settings. Check that TPC cabling is intact, and try again.

TPC Menus and Functions

The *Touch Panel Controller* software functions in a manner similar to other Windows™-based applications, all activated by touching the TPC screen.

- To go to a new menu, touch its tab at the top of the page.
- To see more options in pull-down menus, touch ▼ .
- To select an option in a list, touch the option text
- To "escape" without change from a pull-down list, touch a blank area of the menu
- Touch checkboxes to toggle on or off.
- Touch large "raised" buttons to activate a function such as the user test pattern, or to start a presentation or select a different icon. Such buttons may be rectangular or round, and may include text and/or an icon.
- Touch ◉ to jump to the *Status* menu at any time.

Menus are illustrated and explained below. *NOTE: Shown are SAMPLE menus—your specific text and/or icons may vary, and are dependent on settings in the password-protected menus. By default from the factory, the Main menu offers four display buttons each for cinema and non-cinema sources.*

***Main* Menu**

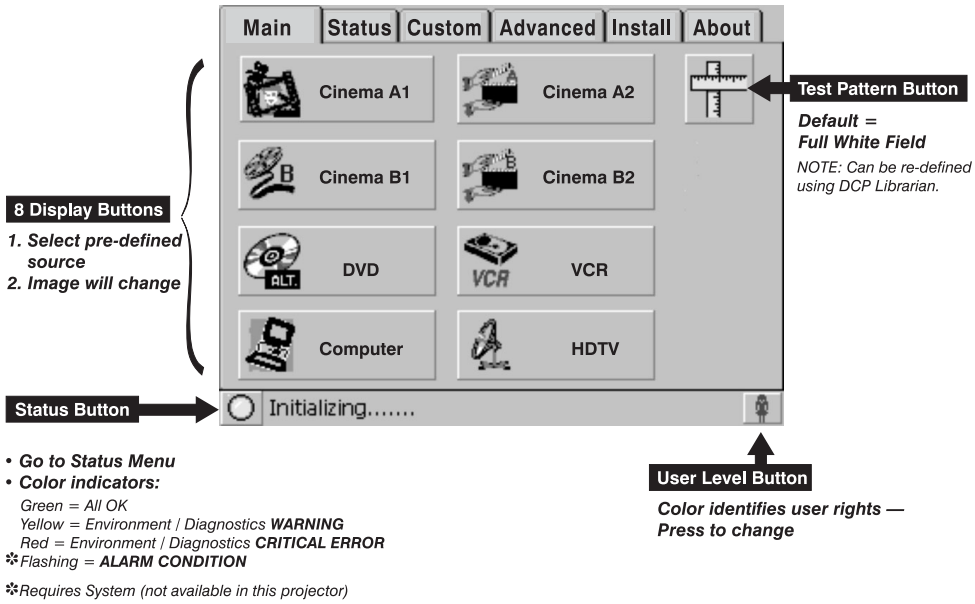


Figure 3.4. Main Menu Functions

FEATURES and PRESENTATIONS: To start a different feature or presentation, press its corresponding display button on the *Main* menu (Figure 3.4). If a test pattern was previously displayed, it will be turned off with the channel change. The small Status and User buttons in the corners do not affect the display.

"USER" TEST PATTERN: To access the simple user test pattern (default=full white field), press the Test Pattern button. To return to a presentation, toggle the Test Pattern button again or select one of the 8 display buttons.

*NOTES:**1)** Allow 2-3 seconds for the user test pattern to appear. **2)** If desired, anyone can re-define this test pattern using DCP Librarian (default=full white field). **3)** To examine other conditions in the display, a trained operator can choose from a full range of test patterns offered in the password-protected **Advanced** menu.*

Status Menu

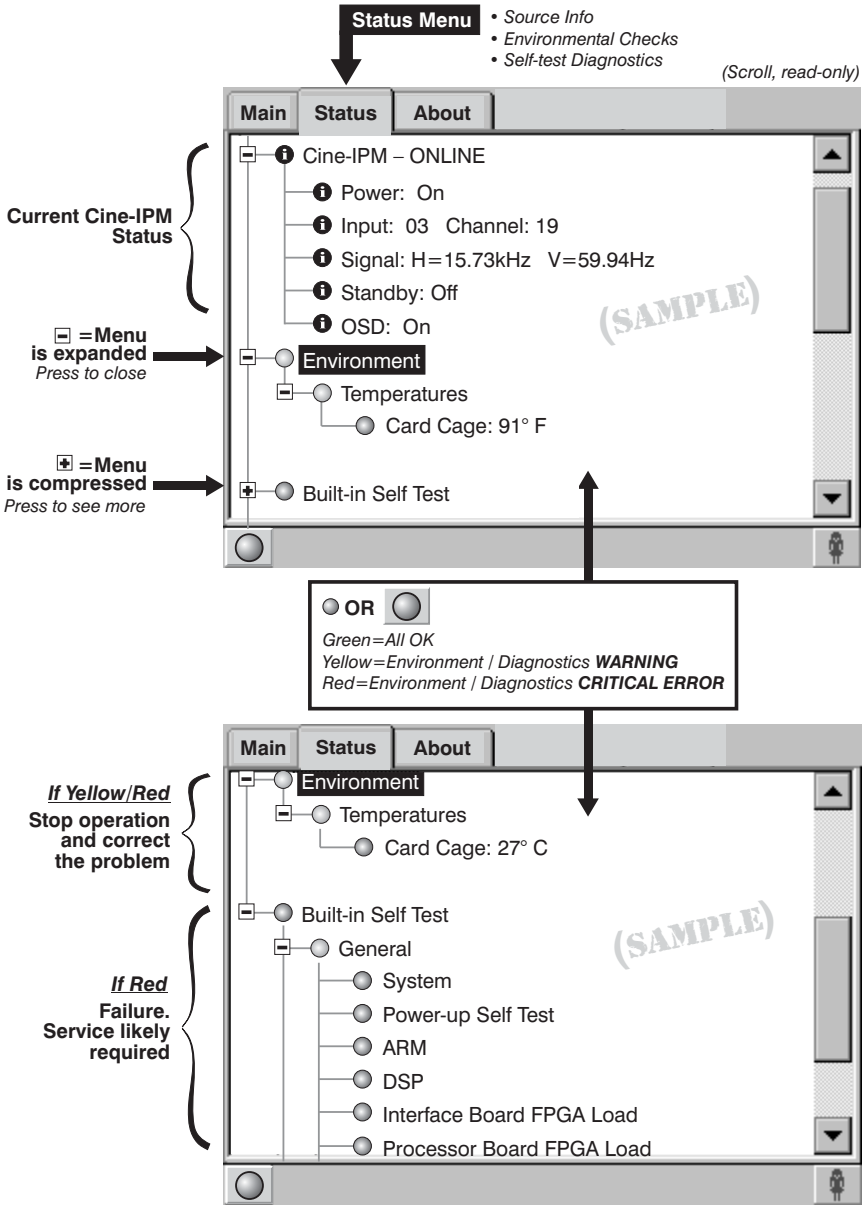


Figure 3.5. Status Menu (SAMPLE VIEWS)

See Figure 3.5. Navigate the *Status* menu as you would in Windows™ *Explorer* file manager, expanding or compressing directories as desired by pressing the corresponding small square buttons. To see more of the *Status* menu, drag the scroll bar up or down. This menu updates approximately every 30 seconds.

INFORMATION INDICATORS: As shown above, this blue symbol identifies information such as the connection port (input) and frequency pertaining to the incoming source signal currently highlighted. Default = current source.

ENVIRONMENT / DIAGNOSTIC INDICATORS: The small colored indicators or "virtual LEDs" for environmental and diagnostic information are green during normal operation. As shown above, these indicators can change to indicate a warning (yellow) or critical error (red) status.

- ***Yellow Warning*** indicates an unusual environmental condition. For example, the card cage temperature may be elevated and nearing its upper limit—correct the problem by checking all cooling systems, turning off the projector and cooling if necessary (make sure to follow the standard shut-down procedure). Service may be required in some cases.
- ***Red Error*** indicates that 1) the environment has a serious problem or 2) a specific electrical component is not detected or does not appear to be functioning properly. In some cases, a module may need re-seating. In others, service or replacement of a module may be required before the DCP can resume normal operation. Regardless, a red indicator requires immediate attention.
- Diagnostics showing a "**?**" icon indicate an unknown status caused by a problem during initialization. Try re-booting the projector

Note that if any of the small indicators are yellow or red, the main warning icon on the status bar changes accordingly so that problems are immediately detectable from any TPC menu.

Table 3.1. Summary of Status Menu

STATUS MENU ENTRIES	
Source	
Projector Input	Source connection (location) of current signal
Signal	Vert. Freq.
Cine-IPM	
Power	On/off
Input and Channel	Source connection (location) and channel#
Signal	Hor. & Vert. Freq. of current source
Standby	On/off *(NOTE: lamp remains on regardless)*
OSD	On/off screen display of Cine-IPM menus
Environment	
Temperatures	Monitors internal temperature of card cage only
Card Cage	Displays direct °C or °F read-out of temp. sensor. Yellow = temp. is at the high end of normal Red = temp. is out of range. Possible fan failure or blocked intake.
Built-in Self Test *NOTE: If any indicator is "red", service may be needed.*	
General	
System	
Power-up Self Test	
Security Lock Integrity	
Interface Board	
ARM	
FPGA Code Valid	
FPGA Initialize	
FPGA Load	
FPGA No-Load Jumper	
FPGA Done	
FPGA Register Read/Write	
UART 0	
UART 1	
I^2C	
Ethernet	
Synchronous Serial Port	
File Systems	
Formatter Board	
GPI Macro	
A/D Macro	
Processor Board	
FPGA Code Valid	
FPGA Initialize	
FPGA McBSP XRDY	
FPGA Load	
FPGA Done	
FPGA Register Read/Write	
Serial ID	
CLUT SRAM	
Overlay Framestore SDRAM	
Resizer FIR Chip	
Resizer FIFO	
Other	

About Menu

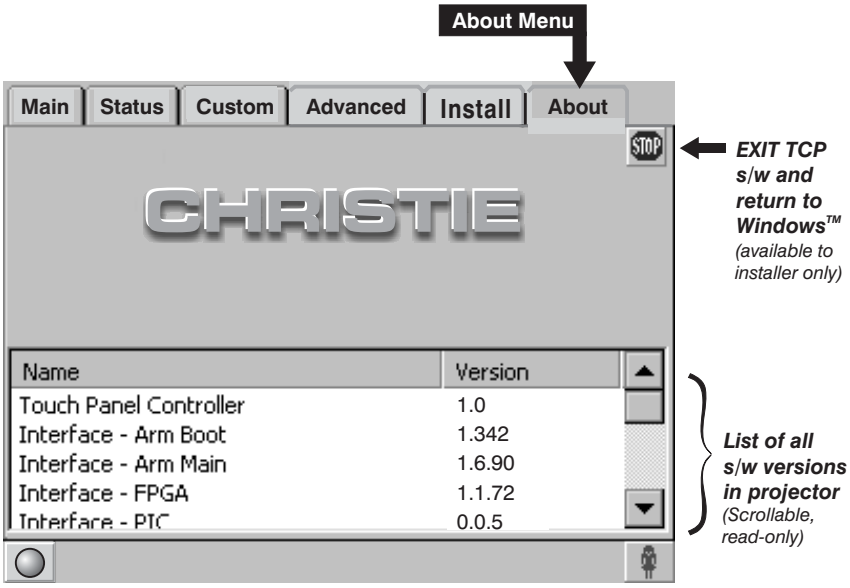


Figure 3.6. About Menu (SAMPLE)

The *About* menu lists all current software versions installed in the projector. As shown in Figure 3.6, this is a read-only menu for general users, and includes a button for installers/service to exit TPC software and return to Windows™.

Custom Menu

NOTE: Password-protected; For installers (service) and trained operators.

GENERAL DESCRIPTION: The TPC *Custom* menu enables installers and trained operators to tailor projector processing as they wish for any type of incoming source. Up to eight "display buttons" can be assigned for *Projector Configuration Files (PCFs)* files or "setups", each of which contains numerous custom settings that have either been pre-defined in Christie's *DCP Librarian* setup software, or created here in the TPC *Custom* menu. Each button then appears on the *Main* menu where any user can select it, thus offering a reliable way to quickly and correctly change the on-screen display. The *Custom* menu also offers control of parameters *not* contained in the PCFs: the physical location of the input connection (such as the cinema port or the DVI port), the screen format, the data format, and whether or not the image is to be horizontally scaled (compressed) rather than projected in its native format. These settings are also saved with the corresponding display button.

SAVING: Changes in the *Custom* menu are saved when you leave the menu.

As shown in Figure 3.7 and Figure 3.8, clearing or checking the "Use PCF" checkbox determines which *Custom* settings are available for use.

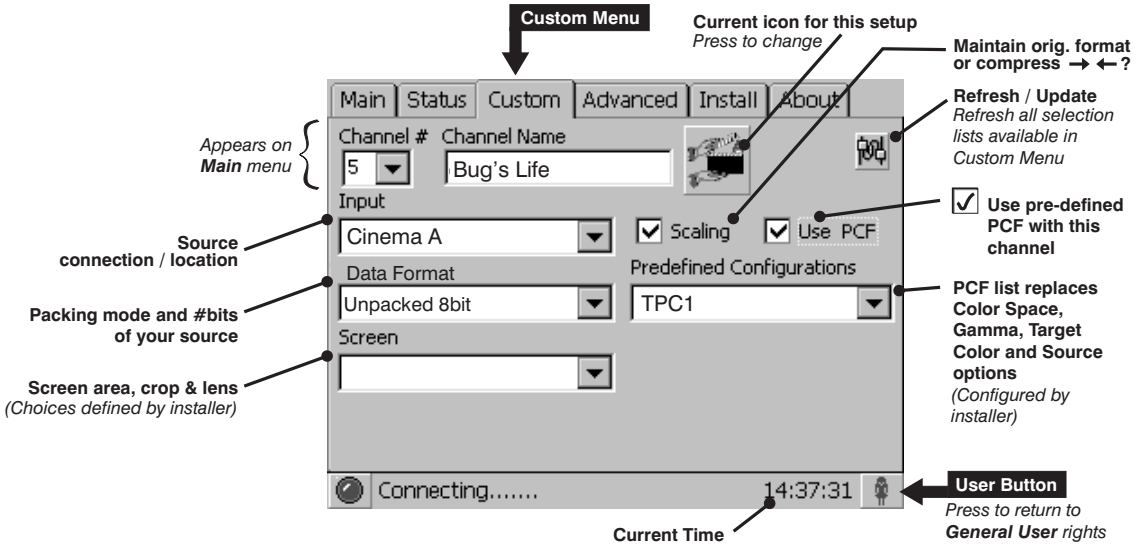


Figure 3.7. Custom Menu: Using Pre-defined Configurations

USE A PCF OR NOT? The number of functions offered in the *Custom* menu depends on whether you choose to utilize pre-defined configuration files (PCFs) already downloaded to projector memory (Figure 3.7), or whether you prefer to implement your own settings from within the *Custom* menu (Figure 3.8). Although pre-defined PCFs should be used for all cinema applications—i.e., feature presentations—so that the intended image quality is not compromised, other applications such as post production and "alternative" or "non-cinema" displays may wish to adjust one or more display parameters individually.

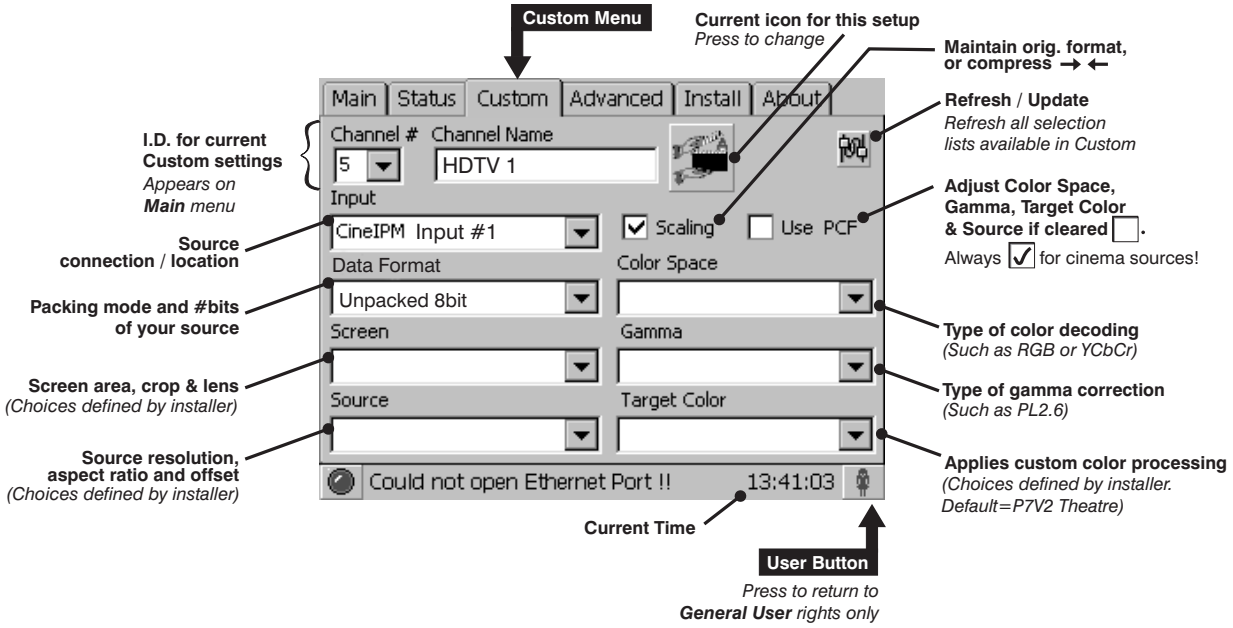


Figure 3.8. Custom Menu—Creating Custom PCFs and Other Settings

Table 3.2. Summary of Custom Menu Functions

CUSTOM MENU OPTIONS	
Button#	Identifies/sets button# 1-8 for current *Custom* menu settings for a source. To assign a new button# for the current *Custom* settings, select the desired # (display will change too) and press SAVE. Buttons appear in order on the *Main* menu.
Button Name	Current name or title for a source, such as a movie title or "DVD". Select to rename using pop-up keyboard. Up to 8 names can appear on the TPC *Main* menu.
Large Icon (button)	Shows the icon defined for the current source. Press to change to a different icon.
Refresh Button	Updates all *Custom* lists (such as *Gamma*, *Target Color*, etc.) to include any data newly added to projector memory via *DCP Librarian* setup software.
Image Scaling	Enter a check (✔) to compress the cinema image horizontally. Clear the checkbox to display the image using its full-size original format, such as 1920 x 1280. Not applicable for Cine-IPM sources.
Use PCF	Enter a check (✔) to use a pre-defined PCF for this source, and prohibit further *Custom* adjustments (recommended for all cinema use). A "✔" removes the PCF components—Source, color Space, Gamma and Target Color—from the *Custom* menu. Select the desired PCF from the "Predefined Configurations" list. Clear the checkbox if you wish to alter a PCF by selecting desired components from within the *Custom* menu.
Input	Identifies/sets the location/connection of the current source, such as cinema ports A or B, or the DVI graphics port.
Data Format	Specifies the source type (8-10-12-bit) and whether or not it is packed. The projector will process the incoming signal according to the data format selected here. Note that available data formats depend on which projector input is selected, and will reset to a default value if an input has not yet been selected. Data format settings are ***not*** included in a PCF.
Screen	Identifies/sets display area, masking (cropping), and expected lens for the current source. Choices are pre-defined using *DCP Librarian*.
✻ Source	Identifies/sets the expected incoming source resolution and aspect ratio such as "1920 x1080" or "Mk7 default". Choices are pre-defined using *DCP Librarian*.
✻ Color Space	Identifies/sets the method of color decoding for the current source. • Default = RGB for all Cine-IPM sources (DVI port) • Default = YCbCr for all cinema sources (SMPTE A or B ports)
✻ Gamma	Identifies/sets the desired gamma (a.k.a. "de-gamma") correction needed for proper tonal range of the source material—for example, a grayscale test pattern will be neutral and smoothly graduated. In theatres, the only gamma setting currently needed is PL2.6.
✻ Target Color	Identifies/sets the special color processing called *Target Color Gamut Data* established for a given presentation. Default=P7V2 Theatre.

✻ These components are part of the PCF (*Projector Configuration File*) that controls image processing for a given source. They are protected from change and disappear from the *Custom* menu when the "Use PCF" checkbox is checked (✔).

Advanced Menu

Password-protected; For Installers (service) only.

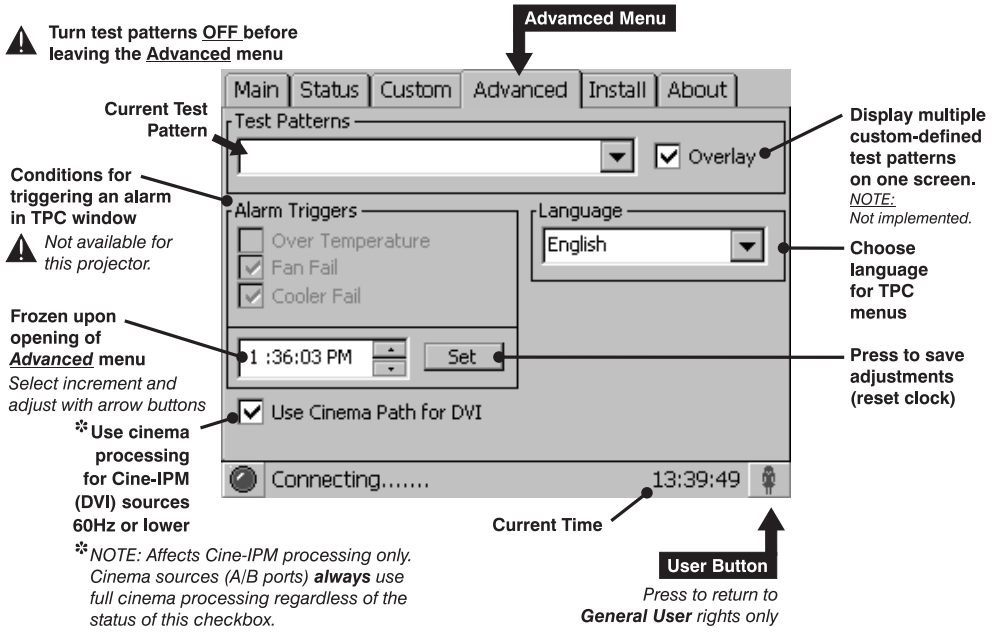


Figure 3.9. Advanced Menu Functions

GENERAL DESCRIPTION: The TPC *Advanced* menu enables installers to set the TPC language and time, change the projector's processing path, and display a variety of test patterns.

Table 3.3. Summary of Advanced Menu Functions

ADVANCED MENU OPTIONS	
Test Patterns	Display a test pattern or turn patterns off. Always turn off to resume normal operation.
Overlay	Non-functional. Do not use.
Language	Choose English or Chinese TPC menu text for next re-boot.
Use Cinema Path for DVI	Keep checked (✔) for most sources, ensuring that ***Cine-IPM (DVI)*** sources are processed using the complete cinema path. Uncheck only for DVI frame rates >60 Hz. Note that ***cinema*** sources (A/B projector inputs) always use the cinema path regardless of the status of this checkbox.
System Clock	Reset the system time as desired. Select the desired component (hour/minute/second) and adjust with arrows. Unrelated to the clock in *DCP Librarian* setup software.

Install Menu

Password-protected; For Installers (service) only.

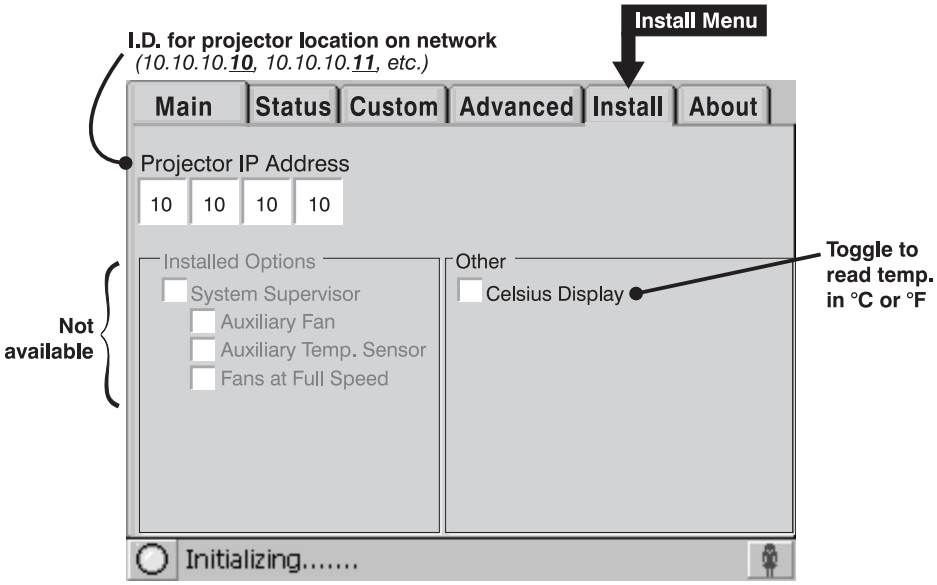


Figure 3.10. Install Menu Functions

GENERAL DESCRIPTION: The primary use of the *Install* menu is for defining the IP address for the projector with which the TPC is to communicate (default = 10.10.10.10). Installers can also set whether temperatures in Status menu are displayed in Celsius (default) or Fahrenheit.

*NOTE: The "**Installed Options**" System Supervisor Module (SSM) is not available for this projector—its checkbox should remain **cleared**. Entering a checkmark would force the DCP to unsuccessfully search for the SSM, triggering a TPC alarm screen that must be acknowledged, and requiring that the SSM checkbox be cleared in order to return to normal operation. The latter may take several minutes.*

Table 3.4. Summary of Install Menu Functions

INSTALL MENU OPTIONS	
Projector IP Address	Determines which projector the TCP controls, and always terminates in **10-99**. Keep at 10.10.10.**10** for single-projector installations.
Installed Options	Requires SSM (not available for this projector). **Do not use**.
Other	Choose Celsius or Fahrenheit temperature display for Status menu.

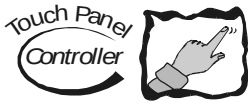
Selecting a Display (Starting a Presentation)

*NOTES: **1)** For manual operation (i.e., non-automated). **2)** In order to use the TPC software originally shipped with the projector, the installer typically connects a laptop and uses Christie's DCP Librarian setup software to download all necessary configuration files to the projector for use at the TPC.*

To change to a new source—i.e., a new presentation or display—do the following:

- Make sure the DCP and TPC are both powered up and operating normally
- On the *Touch Panel Controller (TPC)*, select the *Main* menu tab
- On the *Main* menu, press the desired display button—the image will update accordingly

See Figure 3.11.



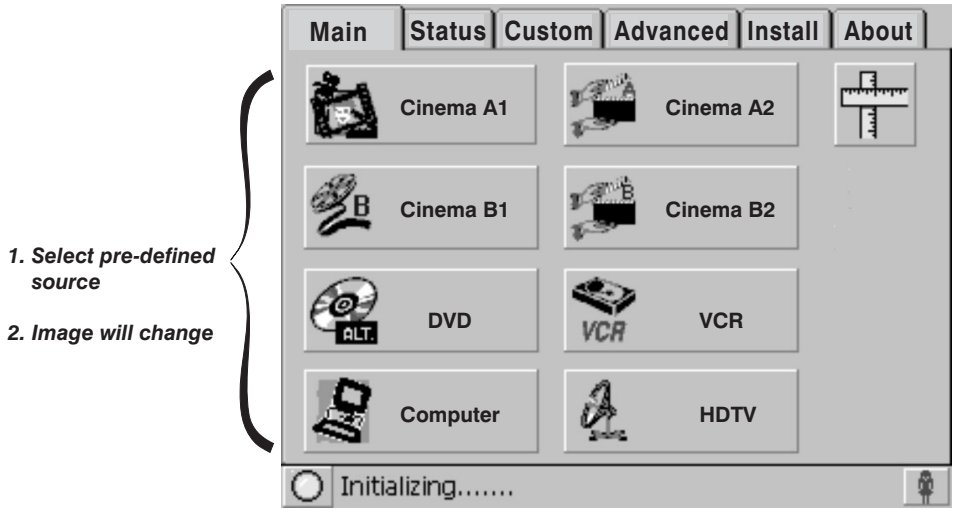


Figure 3.11. Source Selection on Main Menu (SAMPLE)

*NOTES: **1)** Depending on your expected needs, your installer may or may not have configured all eight buttons for use. **2)** Buttons may have any icon and/or text.*

WHAT HAPPENS WHEN A BUTTON IS SELECTED? For any display button on the *Main* menu, the projector interprets incoming signal data according to one of eight user-selectable *display setups* defined at the time of DCP installation (and/or with each subsequent release of a new digital cinema feature) and stored in projector memory. Each display setup consists of *Projector Configuration File (PCF)* information as well as additional processing, display parameters and screen settings optimized for a particular cinema feature or alternative content source. For proper processing and display of a source, press pre-assigned display button (see Figure 3.11) corresponding to the setup you wish to use—the button will then appear recessed and the projected image will update according to the display setup assigned to this button. No further adjustment of the image should be necessary. To change to a different presentation, select a different display button.

CINEMA VS. NON-CINEMA SOURCES — Display setups for digital cinema servers are carefully configured when the projector is installed, so that presentations will be automatically optimized and require no further adjustment. A user need only select the relevant display button. Displays of non-cinema or other “alternative content”, such graphics or video sources connected to inputs on the optional Cine-IPM, are also usually pre-configured for easy selection, but can then be readjusted and redefined a bit more freely if desired (for example, by using the Cine-IPM keypad). Consult *Section 5* for details about non-cinema applications and display adjustments.

Other Methods of Source Selection

Depending on your installation, you may be able to select a source via communication from a different controller.

Regardless of how the display file is selected, the feature will appear on screen according to the specific display settings recorded in that file. If the screen display does not appear as expected, this indicates that the display setup is incorrectly configured for the incoming source. Try a different display file. If the image is still incorrect, the display setup may first have to be re-configured with new settings. Contact the trained operator responsible for updating display setups.

Remote Control of the Touch Panel Controller

Some TPC projector functions can be controlled remotely, typically at a controller, via simple bi-directional ASCII messaging on an Ethernet communication link. Available functions are:

- Unicode/non-unicode enabling
- Channel switching
- Channel naming
- Saving to flash
- Picture mute (image blanking)

WHAT SETUP IS NEEDED? To control these TPC functions remotely via your own controller, you must open an Ethernet socket between your controller and the valid TPC address. Note that only one connection is permitted at any given time. See complete instructions in *Setup and Shutdown* later in this section.

Understanding ASCII Message Formats

All "remote control" information passes in and out of the TPC as simple messages consisting of command code and any data related to it. Such messages can be a command to ***set*** a projector parameter at a specific level, such as changing to a certain channel. Or the controller can ***request*** information, such as what channel is currently in use—the projector then returns the data in a ***reply*** message. Regardless of message type or origin, all messages use the same basic format and code (see Figure 3.12). Where applicable, a message can expand to include additional parameters of data.

	Message Format	Function	Examples
From Controller	(Code Data)	**SET** *(set channel to 103)*	(CHA 103) or (CHA103)
From Controller	(Code ?)	**REQUEST** *(what's current channel?)*	(CHA?)
From Projector	(Code ! Data)	**REPLY** *(channel is 106)*	(CHA!106)

Figure 3.12. The 3 Message Formats (SHADED MESSAGE IS FROM PROJ.)

Message Components and Structure

START AND END OF MESSAGE: Every message begins with the "**(**"character and ends with the "**)**" character. Note that if the start character is received before an end character of the previous message, the partial (previous) message is discarded.

FUNCTION CODE: The function you wish to work with, such as channel switching or picture mute, is represented by a three-character ASCII code (A-Z, upper or lower case). This function code appears immediately after the leading "**(**" that starts the message.

REQUEST/REPLY SYMBOL: If the controller is ***requesting*** information from the projector, a "**?**" question mark appears directly after the function code. If the projector is ***replying***, a "**!**" exclamation mark appears directly after the function code. For ***set*** messages, neither of these characters appear—the code is followed by the data itself (see next paragraph).

DATA: The value for a given projector parameter, such as channel number, appears in ASCII-decimal format directly after the request/reply symbol. Unless you add an optional space after the symbol (i.e., before the data) in a ***set*** message, data immediately follows the request/reply symbol without a space. Other details about data:

- All values returned by the projector (***reply*** messages) have a fixed length of either 3 or 5 characters regardless of the actual value—the value is padded with leading zeros as needed.
- Data in ***set*** messages does not require padding.
- For any given parameter, data length is always the same. E.g., the **picture mute** value, which is either "on" (1) or "off" (0) is always 3-digits: 001 or 000.
- Within one message, multiple parameters of data must be separated by one "**space**" character
- Text parameters such as channel names are enclosed in double quotes following the data, as in **"**Name**"**.

TEXT PARAMETERS: Most data is simply a numerical value, however some messages also require text. For example, a **channel naming** message typically includes a text-based name after the channel number—enclose this text in double quotation marks, as in **"**Tilt the Wagon**"**. Use all characters as desired *except* for the following special characters—these require a 2-character combination as shown:

Table 3.5. Special Characters for Text

If you want this…	Enter this…	Description
\	\\	Backslash
"	\"	Quote
(	\(	Left bracket
)	\)	Right bracket
0x0A	\n	New line - if the text can be displayed on more than one line, this will cause the next character to be displayed at the start of the line that follows the current one.
0x1B	\x	control code (ESC)

Sample Messages and Their Meaning

Table 3.6. Sample Messages

Desired Action	Message	Description
Get current Chan#	(CHA?)	Request by controller for current channel #
Chan# reply from proj.	(CHA!101)	Reply from proj. that current channel is 101
Set Chan#	(CHA 101)	Switch to the first channel on the TPC
Get picture mute status	(PMT?)	Request by controller for picture mute status
Picture mute reply from proj.	(PMT!000)	Reply from proj. that picture is mute is off.
Set picture mute	(PMT 1)	Turn the picture mute on (blank the image)

What is Actually Sent in a Message?

Although you will send and read all messages as strings of ASCII characters, the actual message travels as a sequence of bytes. Each character in a unicode message requires 2 bytes, whereas the non-unicode requires only 1 byte. See example below, which illustrates a "picture mute is off" reply from the projector:

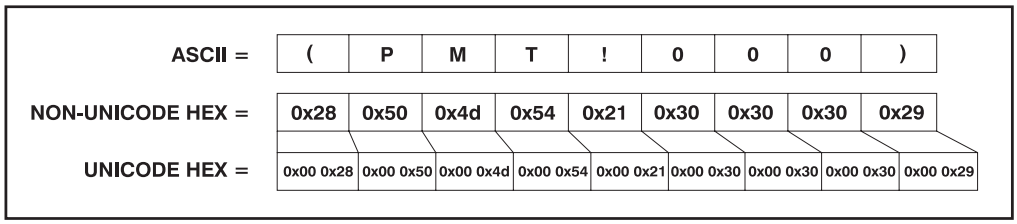


Figure 3.13. ASCII as Non-Unicode and Unicode

Codes for All Available Messages

The following commands can be used for remote control of the TPC:

Table 3.7. Available Messages

Function Code	Function
Unicode Enable	
(UNC 0)	Enable non-unicode communication *(default)*
(UNC 1)	Enable unicode communication *(non-Western languages)*
(UNC!000)	Reply from proj. that communications are in non-unicode
(UNC!001)	Reply from proj. that communications are in unicode
Channel Switch (CHA)	
(CHA ###)	Switch to channel ###, where ### is 101-108
(CHA?)	What is the current channel ?
(CHA!107)	Reply from proj. that current channel is 107
Channel Name (NAM)	
(NAM 108 “Tilt the Wagon”) or (NAM S108 “Tilt the Wagon”) *”S” not yet used. Later releases only.*	Name or rename a channel button. To save up to 8 channel names to flash, use SAV command.
Save (SAV)	
(SAV)	Save to flash (will save channel names)
Picture Mute (PMT)	
(PMT 0)	Turn off picture mute (show image)
(PMT 1)	Turn on picture mute (blank image)
(PMT?)	Is picture mute ON or OFF?
(PMT!000)	Reply from proj. that picture mute is OFF
(PMT!001)	Reply from proj. that picture mute is ON

Setup and Shutdown

SETUP:

1. Open an Ethernet socket to the TPC address (socket = 5000). By default, the TPC address is 10.10.10.**110**. If you have additional TPCs, the installer should have defined their addresses as 10.10.10.**111**, 10.10.10.**112**, and so on.

2. From the controller, issue the **UNC** command to recognize **non-unicode** (default) or **unicode** at the socket, as desired (see *Glossary*).

3. Wait for a response (**UNC!000** or **UNC!001**) before continuing with any other commands. This will ensure that your communication protocol is properly established.

⚠ **SHUTDOWN:** You must close the application and shut down the socket properly before shutting down the controller.

3.5 Working with the Lamp

Simple adjustments can help to optimize lamp performance and create the brightest, most uniform image possible. Commonly used lamp controls are located on the lamp control panel (Figure 3.14). Use a full white or grayscale field test pattern so that the meter does not over-range or saturate.

NOTE: The SLI-D lamp control panel has a slightly different layout from the SLH-D lamp control panel shown but offers the same controls.

Turning the Lamp on/off

With all breakers set to ON, ignite the lamp by setting **DC POWER** to **ON**—the lamp will ignite. Or press the **AUTO START** button on the optional 3Q automation panel—the lamp will ignite and a pre-programmed sequence of events will begin.

NOTE: If the lamp fails to ignite, momentarily press the **MANUAL IGNITION** *button or, if 3Q is present, either 1) set the* **DC POWER** *to* **ON** *or 2) move the 3Q's* **MANUAL LAMP** *switch to* **ON.** *Regardless of method, manually igniting the lamp will not affect remaining automated events.*

To turn the lamp off, set **DC POWER** to **OFF.** Allow fans to run for 10 minutes.

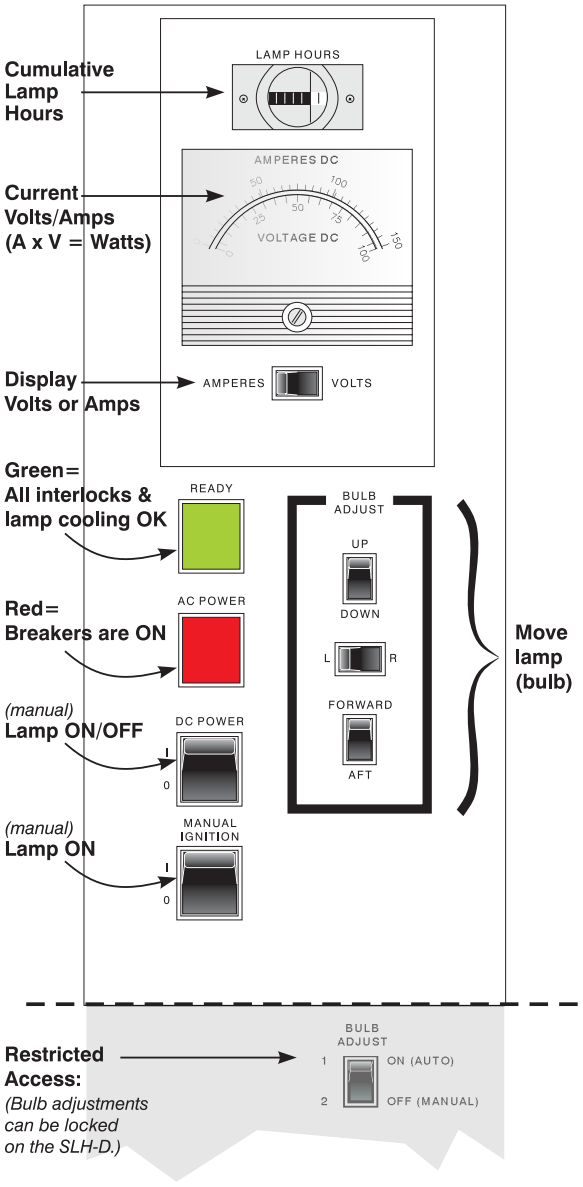


Figure 3.14. Lamp Control Panel
(SLH-D SHOWN)

Adjusting Lamp Position

⚠ ***CRITICAL RELIABILITY INFO*** ⚠

Immediately upon installation, a new lamp must be aligned to the projector head for safe operation, optimized lamp performance and peak brightness at the screen. As the lamp ages, small re-adjustments may be necessary to maintain the highest level of brightness possible. Use the BULB ADJUST rocker switches to move the lamp (bulb) as necessary, first obtaining peak readings using a light meter centered in front of the lens, then at the center of the screen. For each switch, continue in one direction, then back up when reading begins to decrease.

NOTES: ***1)*** *Display the 100% white internal test pattern.* ***2)*** *Use a tripod to center the light meter with the lens. Distance from the lens does not matter.* ***3)*** *Bulb adjustment switches may be disabled (locked) on SLH-D lamphouses, as determined by the AUTO/MANUAL bulb adjust switch located behind the locked lamp door.*

How to Adjust Lamp (Bulb) Position

1. Adjust forward/aft until the brightness reading in front of the lens is maximized.
2. Adjust left/right and up/down until the brightness reading in front of the lens is maximized
3. Re-adjust forward/aft as necessary.
4. Repeat Steps 1-3 as necessary.
5. Repeat Steps 1-4, but reading at the screen instead of at the lens.
6. Set correct LAMP CURRENT level (see Table 3.8).

If adjustments are made before the projector is fully warmed up, re-adjust after a 10-minute warm-up.

NOTE: You may have to re-adjust lamp current if color performance is ever changed via color correction. Repeat Step 6.

Setting Lamp Power

⚠ ***CRITICAL SAFETY INFO*** ⚠

*NOTES: **1)** On the amperes/voltage meter, the top numbers indicate amps, the bottom numbers indicate volts. Toggle with nearby rocker switch. **2)** Keep in mind the formula for calculating lamp power: Amperes x Volts = Watts.*

FOR NORMAL OPERATION: Your lamp power supply is adjustable, serving 3 different lamps in your **DCP**, and is actually capable of supplying more power to the lamp than is necessary. Always drive the lamp within its range of acceptable power level as shown in Table 3.8, beginning at approximately 80% power for a new lamp (or higher, if needed for your installation). As brightness declines over time, check the current power level indicated on the ammeter on the lamphouse panel and increase lamp current as necessary using the Lamp Current Adjustment knob (this knob may be on the lamp control panel in newer models, or on the power supply in the pedestal for older models). ***Never operate the lamp outside of its recommended range.***

***Table 3.8. Lamp Current Ranges** (NORMAL OPERATION)*

Model	*Lamp (kW)*	*Lamp Current Range (amps)*
SLI-D	1.6	45-70
	2.0	60-85
	3.0	80-110
SLH-D	4.0	100-140
	4.5	100-160
	6.0	110-170

⚠ WARNING ⚠

Stay within the range shown for your lamp.

FOR STAND-BY MODE: Closing the manual douser automatically puts the projector in a cooler stand-by mode in which lamp power is reduced to approximately 30-70% (user-set) of its maximum rating. To set the stand-by mode lamp power, close the douser and turn the "HALFCUR" knob as desired on the power supply within the pedestal (key required for access) while checking the power level indicated on the ammeter on the lamphouse panel. Select a stand-by level that is within the range of acceptable power level for your lamp, but which does not cause the lamp to flicker, wander or turn-off unexpectedly. Your HALFCUR setting will be in effect whenever the douser lever is closed.

Recording Lamp Hours

Note that the lamp meter near the top of the lamp control panel (labeled LAMP HOURS) shows *cumulative lamp power-up time* logged so far—it does not log time when the rest of the projector is on without the lamp, nor can it be reset for logging time on an individual lamp. You must log lamp hours for the installed lamp by manually recording the "Lamp Hours" value shown at the time of lamp replacement and estimating the next expected lamp expiring hour by adding the expected lamp life of your lamp (see *Section 8, Specifications*) to the current "Lamp Hours". Use Table 3.10 as your log sheet, if desired—or there may be a similar sheet posted on the rear of the lamphouse.

When to Replace the Lamp

Do not exceed the warrantied lamp lifetime by more than 20%, as an old lamp becomes increasingly fragile and more prone to sudden failure. These values appear in Table 3.9.

Table 3.9. When to Replace Your Lamp

Lamp (kW)	*Replace Before:*
1.6	1800 hours
2.0	2800 hours
3.0	1728 hours
4.0	1440 hours
4.5	1080 hours
6.0	600 hours

*NOTE: Hours shown here are **20% beyond** the pro-rated credit warrantied lifetimes (see page 8-3). Do not exceed.*

See *6.4, Replacing the Lamp & Filter* for instructions.

Table 3.10. Log for Lamp Hours

#Lamp Hours @ Lamp Replacement	Lamp Serial#	Why Replaced?	Installer's Initials	Next Lamp Replacement Expected At…
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
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Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours
Hours				Hours

How Old is My Lamp?

Calculate lamp age as follows:

Cumulative lamp hours (shown as 'LAMP HOURS" on the projector)
— **Last recorded "#Lamp Hours"** (column 1 in Table 3.10)
= **# Hours logged on the installed lamp**

3.6 Working with the Lens

NOTE: See Section 2, Installation and Setup for all lens installation and boresight instructions.

The **DCP** lens mount secures the primary zoom lens to the projector head. It provides 1) setup adjustments for correct boresight, 2) manually controlled offsets and focus for general use, and 3) two protruding rods for installing the anamorphic lens adapter.

One or more anamorphic lenses can be installed into the adapter, then either lens can be swung into place in front of the primary lens to widen a "squeezed" 5:4 image into a larger and properly proportioned "flat" or "scope" anamorphic cinema display.

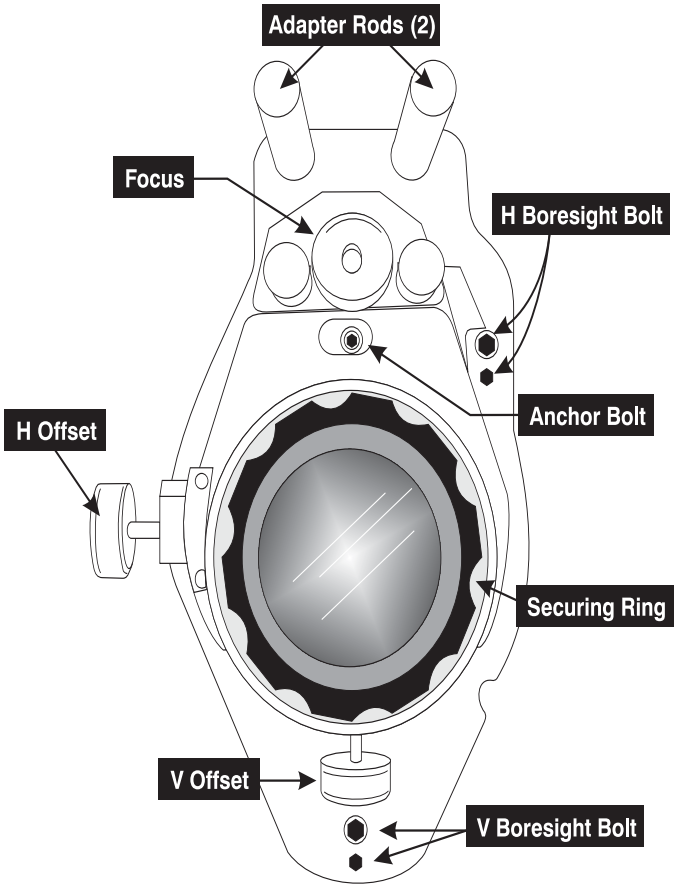
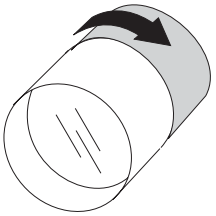


Figure 3.15. Anatomy of the Lens Mount

Zoom

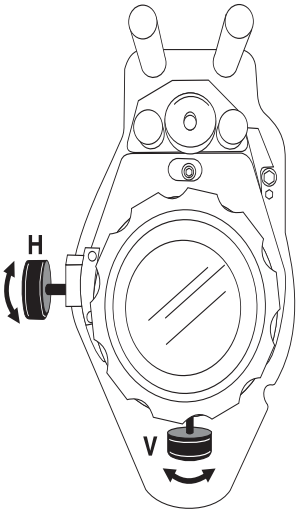
' With the projector in its permanent location, turn the lens zoom ring on the **DCP** primary lens to enlarge or shrink the image in each direction as necessary.



Offsets

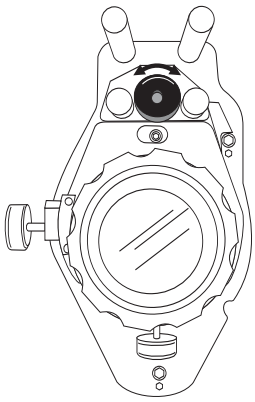
' With the projector in its permanent location, turn the horizontal and/or vertical offset knobs as necessary so that the image is square on the screen—particularly at the top— with no keystoning. For best results, ***offsets should be minimal***.

If you find that vertical offset is significant, it is possible that **DCP's** mechanical TILT should be changed to help compensate for significant differences in screen and lens height. Refer back to *Section 2*.



Focus

For overall focus improvement, rotate the focus adjustment knob near the top of the lens mount. For best results, use a crosshatch test pattern or similar, and focus on the center of the image.



If the focus quality differs from edge-to-edge (whether top, bottom, left or right), the boresight of the lens mount likely needs correction (see *Section 2, Installation and Setup*).

Anamorphic Lenses

*NOTE: See **2.1, Mounting and Connecting Components (All Lenses)** if you need to install or replace an anamorphic lens.*

Swing an anamorphic lens into place to widen a “squeezed” image into a large and more correctly proportioned image for a “flat” or “scope” theatre screen—use the 1.5x anamorphic for 1.85:1 images (flat), and 1.9x anamorphic for 2.39:1 images (scope). The latter lens is useful only for cinema sources.

*NOTE: The optional Cine-IPM offers a variety of re-sizing functions that can be used in conjunction with the 1.5x anamorphic lens to create 1.85:1 non-cinema images. See **5.9, Creating Wide Displays**.*

Section 4

Cinema Operation

This section explains how trained operators can use the projector for presenting cinema events such as first-run movies stored on a digital media storage device. Please read through these pages before displaying cinema for the first time. An understanding of all cinema functions and how to access them will help you to run an event smoothly and easily, whether controlling manually or via automation.

NOTE: Before attempting operation, the projector must be properly installed, aligned and configured by a qualified service technician as described in ***Section 2, Installation and Setup****. Read also* ***Section 3, Basic Operation****.*

4.1 Compatible Cinema Sources

Make sure a digital media storage device is connected to one of the HD (high definition) input ports **A** or **B** within the **DCP** head—see Figure 4.1. These identical ports use the SMPTE 292M bit-serial interface standard and will auto-detect source formats shown in Table 4.1.

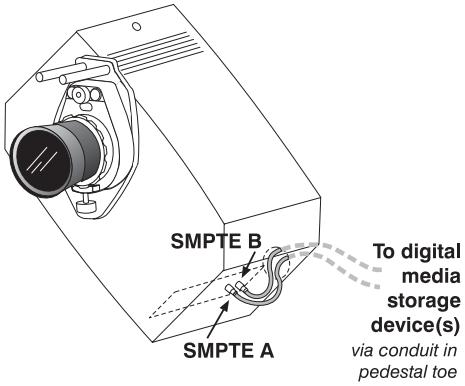


Figure 4.1. Ports A or B = Cinema

Table 4.1. Compatible Formats for Cinema (all High Definition)

Source Standard	*Orig. Format*	*Vert. Freq.*	*Scan Type*	*Display Format*
SMPTE 274M	1920 x 1080	60 Hz	✻ Interlaced	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1080	59.94 Hz	✻ Interlaced	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1080	50 Hz	✻✻ Interlaced	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1080	30 Hz	Progressive	1280 x 1024; 30 Hz; Progressive
“ “	1920 x 1080	29.97 Hz	Progressive	1280 x 1024; 29.97 Hz; Progressive
“ “	1920 x 1080	25 Hz	Progressive	1280 x 1024; 25 Hz; Progressive
“ “	1920 x 1080	24 Hz	Progressive	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1080	23.98 Hz	Progressive	1280 x 1024; 24 Hz; Progressive
SMPTE RP 211	1920 x 1080	30 Hz	Segmented Frame	1280 x 1024; 30 Hz; Progressive
“ “	1920 x 1080	29.97 Hz	Segmented Frame	1280 x 1024; 29.97 Hz; Progressive
“ “	1920 x 1080	25 Hz	Segmented Frame	1280 x 1024; 25 Hz; Progressive
“ “	1920 x 1080	24 Hz	Segmented Frame	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1080	23.98 Hz	Segmented Frame	1280 x 1024; 24 Hz; Progressive
SMPTE 295M	1920 x 1080	50 Hz	✻✻ Interlaced	1280 x 1024; 25 Hz; Progressive
SMPTE 260M	1920 x 1035	60 Hz	✻ Interlaced	1280 x 1024; 24 Hz; Progressive
“ “	1920 x 1035	59.94 Hz	✻ Interlaced	1280 x 1024; 23.97 Hz; Progressive
SMPTE 296M	1280 x 720	60 Hz	Progressive	✻✻✻ 1280 x 720; 60 Hz; Progressive
“ “	1280 x 720	59.94 Hz	Progressive	✻✻✻ 1280 x 720; 59.94 Hz; Progressive

✻ *Signal must include 3:2 pull-down encoding and Ancillary Time code information.*
✻✻ *Signal must include 2:2 pull-down encoding, and assumes field one (1) dominance.*
✻✻✻ *Image will be centered vertically on screen by default. Zoom with lens to enlarge.*

Image Formats

Formatting and other processing parameters are determined in the setup software *DCP Librarian*. Image formatting is summarized below.

TYPICAL CINEMA FORMATTING: Note in Table 4.1 that, with the exception of a 1280 x 720 source, original cinema formats are pre-scaled to precisely fit **DCP's** pixel area of 1280 x 1024 (SXGA). Since this shrinking is most significant in the horizontal direction, it produces a "squeezed" 5:4 image when projected though the primary lens only. Adding an anamorphic lens then widens the image into a correctly proportioned "flat" (if 1.5x lens) or "scope" (if 1.9 lens) cinema display without affecting the image height. See Figure 4.2.

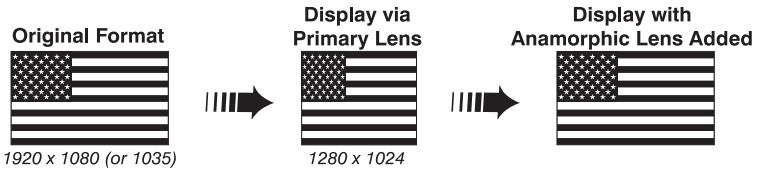
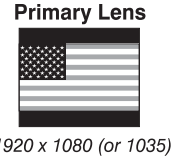


Figure 4.2. Cinema Re-Formatting

Always use the correct anamorphic lens for the incoming cinema source.

OTHER FORMATTING (RARE): Although rarely done for theatre applications, an installer or trained operator may configure cinema source processing to produce a complete and centered letterboxed image in its original aspect ratio (but only 1280 pixels wide) for display *without* an anamorphic lens.



4.2 Selecting the Cinema Source

*NOTE: For details regarding all TPC functions, refer to **3.4, Using the Touch Panel Controller**.*

Via Touch Panel Controller

As described in *3.4, Using the Touch Panel Controller*, **DCP** displays are pre-configured so that any user can correctly display a desired feature simply by selecting the corresponding button on the Main menu of the *Touch Panel Controller*. There are a maximum of 8 display buttons available at any one time, and most users are locked out of processing controls available in other *Touch Panel Controller* menus. For cinema sources in particular, which are displayed according to strict parameters pre-defined by the producers of the feature and implemented in the projector by a **DCP** installer or trained operator, this simplicity ensures that the intended appearance can be selected quickly and easily by any user.

To change to a new feature, do the following:

- Make sure the **DCP** and TPC are both powered up and operating normally
- On the *Touch Panel Controller*, select the *Main* menu tab
- On the *Main* menu, press the desired display button—the image will update accordingly.

Refer back to *3.4, Using the Touch Panel Controller* for other operating details.

1. *Select pre-defined source*

2. *Image will change*

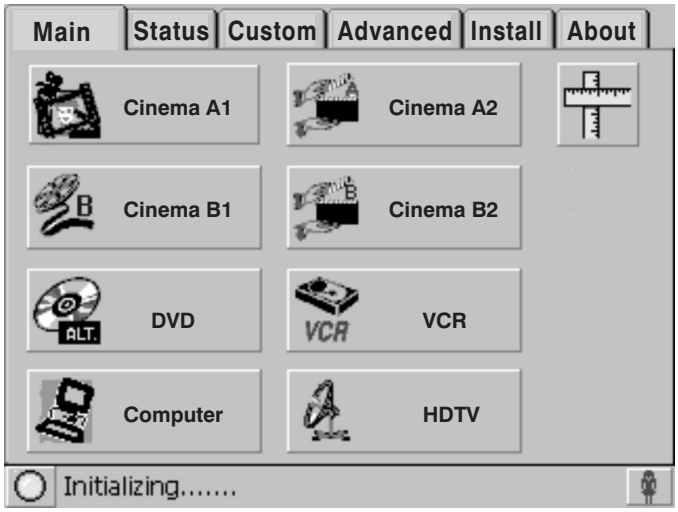


Figure 4.3. Select the Desired Cinema Source

NOTES: ***1)*** *Depending on your expected needs, your installer may or may not have configured all eight buttons for use.* ***2)*** *Buttons may have any icon or text.*

Other Methods ' Depending on your installation, you may be able to select a source (and setup) via communication from a different controller.

Regardless of how the display file is selected, the feature will appear on screen according to the specific display settings recorded in that file. If the screen display does not appear as expected, this indicates that the display setup is incorrectly configured for the incoming source. Try a different button. If the image is still incorrect, the source may have to be re-configured.

4.3 Automated Control

NOTE: This is an ***introduction only*** *for the optional 3Q Automation that may be present in your projector. Consult your* ***3Q*** *(or other) documentation for full automated operation details as configured by your installer.*

Your installation may rely on a theatre automation system such as the optional *3Q* to smoothly orchestrate certain booth and auditorium tasks. Once all DCP breakers are on and the correct display button pressed on the TPC, and once all other system components (servers, etc.) are powered up, pressing the AUTO START button on the *3Q* begins a sequence of pre-programmed theatre events such as DCP lamp ignition, lowering of house lights, audio format selection (usually included in the mastering), and the eventual start of the desired feature display from a digital media storage device/server connected to the projector. The server will then likely initiate the reverse sequence of events at the end of the feature, i.e. raising the house lights, turning audio off, and—through its simple link to the *3Q*—shutting down the DCP lamp. Specific events and scheduling depend on your application needs, what the installer has programmed in the automation scripts, and which script you choose to run. An automation starts a feature only if the feature has first been selected on the *Touch Panel Controller*—if the wrong display button is pressed beforehand, the automated feature will not appear.

Sample 3Q Automation

*NOTES: **1)** Assumes **DCP** breakers are on and other theatre components are powered up, and that the correct feature is selected on the TPC. **2)** 3Q sample only—your sequence of tasks/events may differ, and/or they may be run by a different automation system.*

1. Press the 3Q AUTO START button—the lamp ignites and 3Q sends a pulse to the server via “dry contacts” for “Start Playback”.
2. Server returns a pulse to the 3Q for “Start Cue”, dimming house lights halfway and selecting proper audio format.
3. Pause for rolling stock or previews.
4. Server returns a pulse to the 3Q for “Feature Cue”, dimming house lights all the way and starting the feature on the **DCP**.
5. Feature runs. When credits begin, server repeats the “Start Cue” pulse to the 3Q, raising house lights halfway.
6. After the credits, server sends a pulse to the 3Q for “Show End Cue”, raising house lights to full, selecting non-sync format and sending another pulse to the 3Q to shut down the **DCP** lamp (DC POWER OFF).

If An Automation Is Interrupted

*NOTES: **1)** Specific performance may vary with the type of server and other system components. **2)** If the lamp was ignited manually using the DC POWER switch on the Lamp Control Panel, the lamp will **not** shut off in an emergency or even a standard automation. Press the 3Q STOP button.*

FIRE ALARMS: When an automation stops in the event of fire alarm, the **DCP** lamp will shut down (assuming it had been powered up automatically), the *3Q* indicator light will be red, the house lights will come on, and the server may either pause (if Grass Valley server) or return to the beginning of the automation (if Qbit server). Depending on how your server and other components have been configured, your automation—including lamp ignition—should run normally once you press the *3Q* AUTO START button again. If necessary, cue the server up to the point where it stopped.

POWER FAILURE: A power failure causes all affected components (servers, dimmers, audio, projector, etc.) to reset. When power is restored, press the *3Q* AUTO START button to resume the automation and turn on the lamp. Note that you must manually input cues that have already been passed for lighting and audio.

OTHER EMERGENCIES: Press the *3Q* STOP button at any time to stop an automation—the lamp will turn off. Turn on the house lights manually, if necessary.

3Q Component Functions

Control panel switches and their intended functions are described in Table 4.2. Note that using a functioning manual switch overrides a *3Q* automated event.

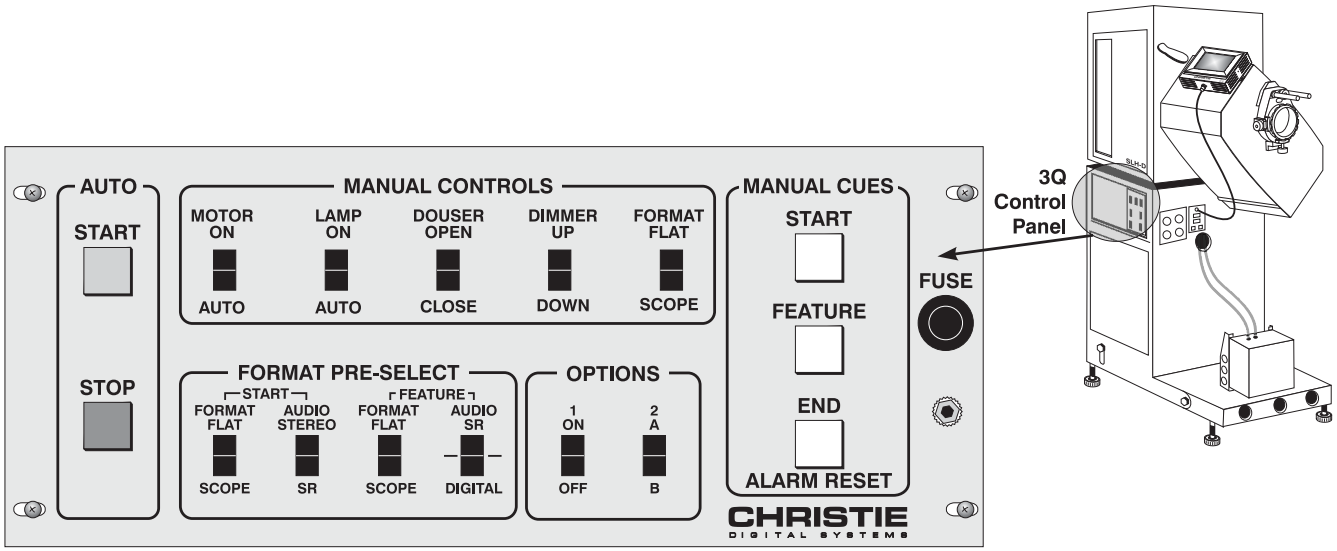


Figure 4.4. 3Q Control Panel

Table 4.2. Basic 3Q Control Panel Intended Functions

CONTROL	*FUNCTION*	*SWITCH TYPE*
AUTO		
Start *(green light)*	Starts automation: Latches Start Relay, engaging lamp. Masking to Start format. Sets audio to non-sync. Will not start if fail-safes are down. Illuminated green when on.	Momentary
Stop *(red light)*	Stops automation: Disengages Start Relay and lamp (off). Illuminated red, or if fail-safes down.	Momentary
MANUAL CONTROLS		
Motor	Manual motor control	Latch
Lamp	Manual lamp control	Latch
Douser	Not applicable—there is no quick douser available in this model	Momentary
Dimmer	Manual house lights on/off	Momentary
Format	Manual control of masking	Momentary
FORMAT PRE-SELECT		
Start Format	Selects flat or scope format for trailer	Latch
Start Audio	Selects stereo or SR audio for trailer *(note: audio is usually part of mastering, i.e. "external")*	Latch
Feature Format	Selects flat or scope format for feature	Latch
Feature Audio	Selects stereo, SR, or digital audio for feature *(note: audio is usually part of mastering)*	Latch (3-pos.)
OPTIONS		
Option 1	ON/OFF switch. May be used for interlock activation.	Latch
Option 2	May be used for manual curtain control.	Momentary
MANUAL CUES		
Start Cue	Manual Show Start Cue. Active only when Start Relay is latched. Brings house lights to MID, audio to Mono/Stereo, opens curtain.	Momentary
Feature Cue	Manual Feature Cue. Active only when Start Relay is latched. Brings house lights to LOW, audio to Stereo/SR, feature format to flat or scope.	Momentary
End Cue (Alarm Reset)	Manual Show End Cue and Alarm Cancel. Brings house lights UP, audio to non-sync, closes curtain, feature format to flat or scope.	Momentary
OTHER		
Fuse	Automation main fuse (2 amp, 3 AGC)	n/a
Buzzer *(under fuse)*	Sounds alarm, usually wired to theatre's fire alarm. Lamp will turn off, server stops/pauses.	n/a

4.4 Adjusting the Cinema Display

For general users, only the *selection* of a digital cinema feature is accessible. The precise processing affecting cinema image quality is predefined in its display file—these settings are password-protected and accessible by trained operators or installers only.

If you feel the cinema display is incorrect or faulty, contact the trained operator in your theatre who can correct or further customize the display file settings.

Section 5

Non-cinema Operation

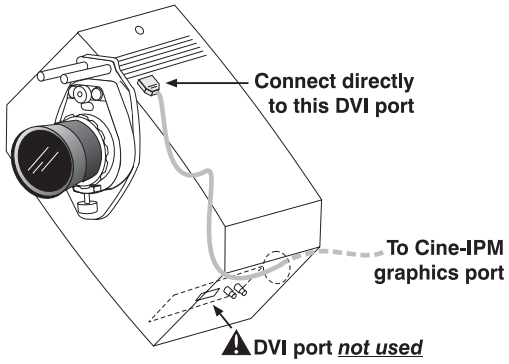
This section explains how to display and work with "alternative content" originating from a non-cinema source such as a PC or other graphics device. Such a source routes to the DVI (Digital Visual Interface) port in the **DCP** projector head, usually via the **DCP's** optional Cine-IPM, which processes incoming 23-96 Hz signals for use in the projector.

⚠ WARNING ⚠

Use the correct Cine-IPM power cord (120 or 220 VAC) for your installation. See *Section 8, Specifications*.

5.1 Compatible Non-cinema Sources

1. Make sure that the optional Cine-IPM is connected to the 20-pin DVI (Digital Visual Interface) port in the **DCP** projector head, and to AC. See right.



2. Make sure the desired non-cinema source is connected to one of 4 inputs available on the Cine-IPM. See *2.8, Connecting Sources* for installation details.

Generally, the Cine-IPM now accepts—and outputs—non-cinema 23-96 Hz sources.

NOTE: Although the projector can auto-detect a number of 23-96 Hz graphics sources connected directly to the DVI port—i.e., bypassing the Cine-IPM—such a connection may sometimes lead to unexpected results in the display. Use of the Cine-IPM is recommended for maximum flexibility and best results from all non-cinema or "alternative" content.

5.2 Selecting the Source

For any display, the projector interprets incoming signal data according to one of eight user-selectable *display files* defined at the time of **DCP** installation (and/or with each subsequent release of a new digital cinema feature) and stored in projector memory. Each file is essentially a collection of processing/display settings optimized for a particular cinema feature or alternative non-cinema content, enabling consistent presentations with minimum further adjustment. Each file is represented by an assigned "display button" which is selectable on the *Touch Panel Controller*. Depending on your installation, you may have 0-8 different non-cinema sources defined.

TO SELECT A NON-CINEMA SOURCE: With a non-cinema source connected to the **DCP** via the Cine-IPM, use the main menu on the *Touch Panel Controller* to select the display button representing the desired non-cinema source. Once selected, the button will darken and the projected display will change according to the corresponding file settings. See *3.4, Using the Touch Panel Controller* if you need help.

If desired, use the Cine-IPM keypad and menu system to further adjust the display as described in the remainder of *Section 5*.

TO RETURN TO CINEMA MODE, use the *Touch Panel Controller* to select one of the cinema display buttons pre-configured for a cinema source input at port **A** or **B** —the **DCP** will now ignore the DVI port and respond to the new display file activated by this button.

5.2 Basic Cine-IPM Components

Depending on your installation, application and specific display file settings, you may find that the pre-configured display file generates an adequate display from your non-cinema source. However, additional Cine-IPM functions and image adjustments are accessible through remote wired keypad commands that either control the display from the Cine-IPM directly or through a system of menus—these settings override those in the active display file. Variations in preferences and image settings can be defined and retained in the Cine-IPM's internal memory as a custom *channel*, with up to 99 different channels possible. *NOTE: The **DCP** must first be using the Cine-IPM.*

Components/Functions

Basic Cine-IPM components and functions are illustrated in Figure 5.1 and explained below.

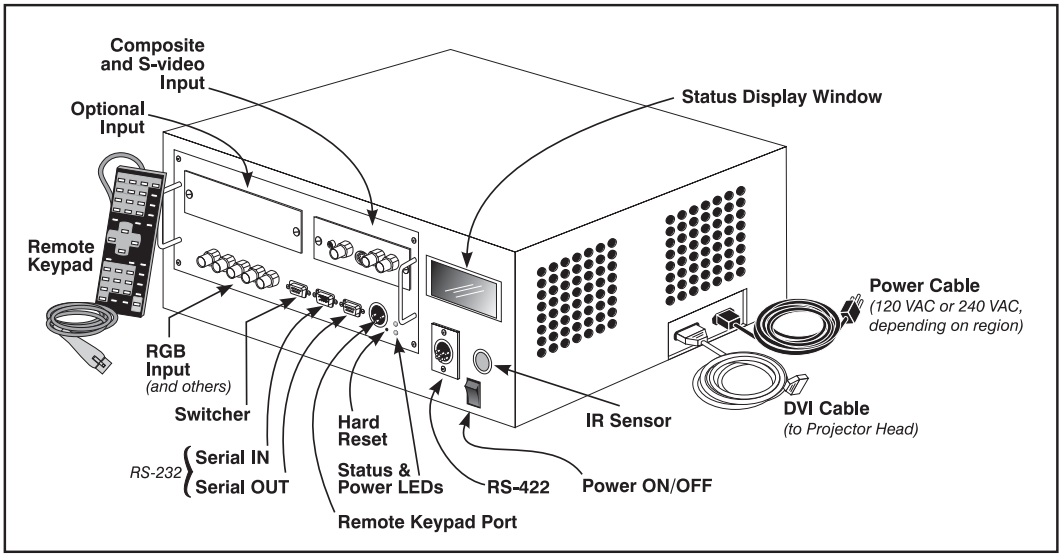


Figure 5.1. Basic Cine-IPM Components

COMPOSITE/S-VIDEO INPUT - Accepts a composite video and S-Video signal from devices such as VCRs.

RGB INPUT - Accepts RGB and sync signals from devices such as computers, as well as composite video, S-Video or YPbPr component signals.

RS-232 SERIAL INTERFACES (WITH LOOP THROUGH) - Allows one or more Cine-IPMs to be remotely controlled by a computer or other controller, and provides a communication connection for the *Marquee* switcher formerly manufactured by Christie. The “OUT” port connects to the **DCP** projector.

RS-422 SERIAL INTERFACE (WITH LOOP THROUGH) - Allows one Cine-IPM to be remotely controlled by an RS-422 compatible computer or controller (such as the *Two-Way Controller* accessory). RS-422 communications can travel greater distances than can RS-232 communications, but require RS-422 compatible equipment.

⚠ ***AC LINE CORD INPUT -*** Power required for the Cine-IPM is 100 - 240 VAC, 50 to 60 Hz. ***Use the proper line cord for your AC supply. See Cine-IPM Manual.***

⚠ WARNING ⚠

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

STATUS/POWER LEDS - Two LEDs (light emitting diodes) located in the lower right corner of the connector panel indicate projector "Status" (top) and "Power" (bottom). During normal operation, the "Power" light is steady green and the "Status" light flashes green each time a keypad key is pressed or when the Cine-IPM receives a serial command. Use the following as a guide:

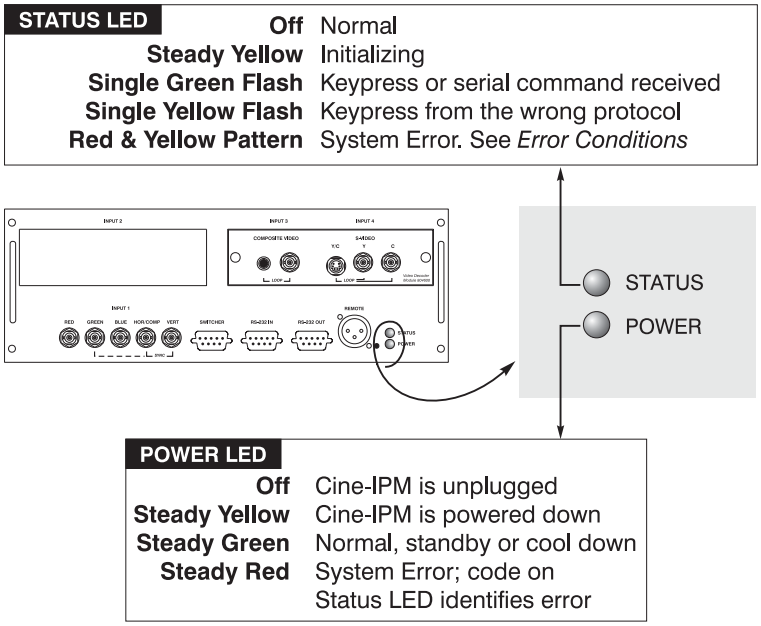


Figure 5.2. Reading the Status LEDs

NOTE: A steady red power light accompanied by a coded pattern of red and yellow flashes from the status light indicates an internal system error related to the Cine-IPM. Consult the rear Status Display window for an explanation, and see ***5.11, Error Conditions****. If the problem persists, contact a qualified service technician available through your dealer.*

REMOTE WIRED KEYPAD CONNECTOR (3-pin XLR) - For tethered remote control of the Cine-IPM / projector functions, such as accessing particular Cine-IPM inputs and adjusting their display parameters.

STATUS DISPLAY WINDOW – Visual feedback for monitoring projector activities and status.

INFRARED SENSOR - Receives infrared signals from an optional IR keypad for remote untethered control of Cine-IPM / projector functions.

HARD RESET - Emergency access for powering down the Cine-IPM in the event of a failure. Insert a pen point or small screwdriver.

POWER ON/OFF – Turns the Cine-IPM ON/OFF. If left ON, a Cine-IPM connected to the **DCP** will power up with the rest of the projector.

5.4 Using the Keypad

Use either of two remote keypads with the Cine-IPM. While they are identical in layout and provides complete control of the projector, you may find one keypad more convenient than another for your specific installation and application.

See Figure 5.3.

Wired Remote

The wired remote keypad connects to the Cine-IPM's 3-pin XLR jack via a 50 ft. cable. It comes standard with the Cine-IPM.

*NOTE: For extra long distances, you may prefer to use an optional remote **Two-Way Controller** to control the projector. For operating details, please see the **Two-Way Controller User's Manual** included with this accessory.*

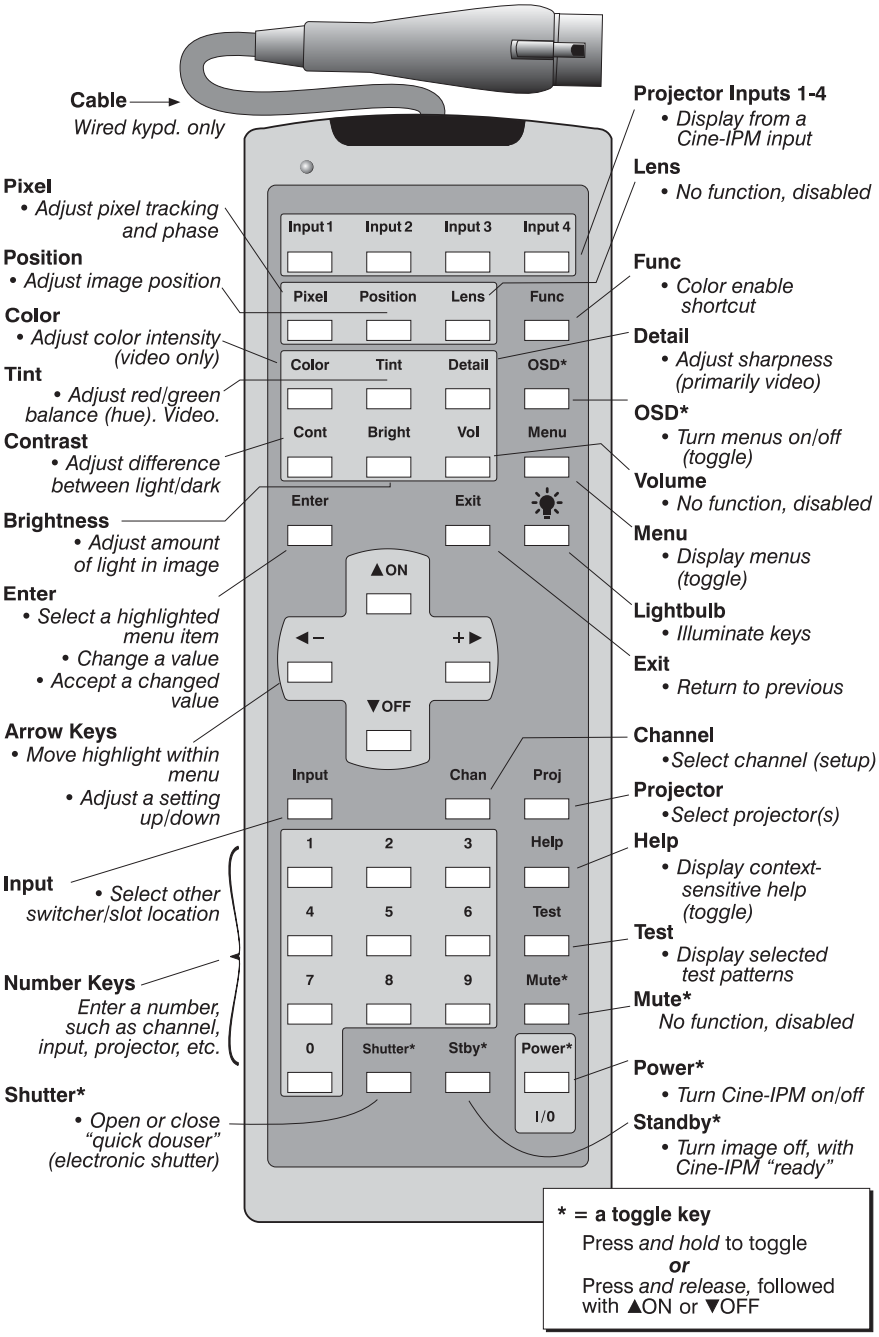


Figure 5.3. Keypad for Cine-IPM Control

IR Remote — *OPTIONAL* —

The optional IR (InfraRed) remote keypad controls the Cine-IPM by way of wireless communications from a battery-powered infrared (IR) transmitter. Use the IR remote keypad the same way you would use a remote keypad supplied with a TV or VCR. When making key presses, point the keypad toward the IR sensor on the Cine-IPM. The sensor will detect the signals and relay commands for internal processing.

Guide to Keypads

Keep in mind the following guidelines:

1) Press keys one-at-a-time; there are no simultaneous key presses required.

2) For any key having an "*" (Power*, for example), hold the key for approximately 1 second in order to toggle the function with a single key press. For other keys (or

to use a "*" key in conjunction with [▲ON] or [▼OFF]), a momentary press similar to a mouse click is sufficient.

3) Press the "lightbulb key" to temporarily illuminate the backlight for the keys without sending any other command.
4) [◄–] , [+►] , [▲ON] , [▼OFF] and repeat their "arrow" actions when held down. For other keys, release and press again to repeat an action. In a network, pause between adjustments to ensure that the last projector can "keep up" with the commands.
5) If you press a key while the projector is busy with another action, the key press may not take effect.

When you first access the Cine-IPM, it begins operating at *presentation level*, displaying an image from the most recently used source signal. The projector temporarily leaves presentation level whenever you use the keypad to work with control settings, display menus, or on-line help. For example, pressing [Menu] after startup displays the main menu—presentation level is no longer active, although the image still appears in the background. Press [Menu] again (or [Exit]) to return or leave the menu system and return to presentation level.

Keypad Operating Settings (Protocol)

Both remote keypads store operating settings (called a *protocol*) in memory. Although you can change your keypad protocol from "A" to "B" (or vice versa) for controlling two projectors independently, such a change is unnecessary in a single-projector cinema installation—simply keep your keypads set to the default "A". See *2.10, Keypad Protocols and Conversion* for complete instructions.

Keypad Operating Settings (Protocol)

Both remote keypads store operating settings (called a *protocol*) in memory. Although you can change your keypad protocol from "A" to "B" (or vice versa) for controlling two projectors independently, such a change is unnecessary in a single-projector cinema installation—simply keep your keypads set to the default "A". See *2.10, Keypad Protocols and Conversion* for complete instructions.

Keypad Commands

Specific keypad commands are explained below:

[Power*] ### *Power ON/OFF*

NOTE: If the power switch is OFF, [Power] key does nothing.*

With the main Cine-IPM power switch on, press and hold [Power*] for approximately 1 second to turn the Cine-IPM off with a single key press (it is a "soft" off—Cine-IPM will still be powered by AC). Repeat to toggle power ON again. Or press [Power*] followed immediately by [▲ON] or [▼OFF] if you want to guarantee the correct toggle (useful if you are unsure of the present status).

[Input1] ### *Input 1*

Press [Input1] to select the source connected to **INPUT 1** on the Cine-IPM (data input). This is the same as entering [Input] [0] [1].

[Input2] ### *Input 2*

Press [Input2] to select the source connected to **INPUT 2** on the Cine-IPM (an optional interface). This is the same as entering [Input] [0] [2].

Input3 *Input 3*

Press Input3 to select the source connected to **INPUT 3** on the Cine-IPM (composite video). This is the same as entering Input 0 3.

Input4 *Input 4*

Press Input4 to select the source connected to **INPUT 4** on the Cine-IPM (S-Video). This is the same as entering Input 0 4 .

Input *Input*

Press Input *n* *n* when you want to display from a specific source location, such as a switcher connected serially to the Cine-IPM's switcher port. The first digit represents the number you have assigned to your switcher (usually 1-9, or "0" for one of the four inputs on the projector). The second digit represents the switcher's slot number (1-9). For example:

Input 1 2 = display data from switcher 1, slot 2.

NOTES: ***1)*** *Although you don't need to use the input key unless a switcher is connected to the Cine-IPM, you can also use* Input *to access the four input "slots" on the Cine-IPM itself: use* 0 *as the first digit (representing the Cine-IPM as the switcher), then* 1, 2, 3 , *or* 4 *as the second digit (the desired input slot number).* 0 *in combination with higher numbers is an invalid entry.* ***2)*** *See* ***5.6, Using Inputs and Channels*** *for a detailed explanation of inputs.*

NOTE: Input *key behavior during a presentation depends on whether or not the* ***Display Channel List*** *option is selected in the* ***Menu Preferences*** *menu. You can choose to have on-screen feedback when you press* Input *, or you may prefer to enter the desired source location "blind", i.e., without on-screen feedback. See* ***Menu Preferences*** *later in this section.*

Chan *Channel*

Press Chan to select a specific source setup (*channel*) defined and stored in Cine-IPM memory. Once you enter a 2-digit channel number (or, if there is a list displayed, highlight it and press Enter), the display will automatically change and update according to the numerous setup parameters defined for that channel.

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

Stby* *Stand-by*

Press Stby* and hold for approximately 1 second to blank all display while keeping the projector in a warmed-up and ready state. Or quickly press and release Stby* and follow immediately by ▲ON or ▼OFF if you want to guarantee the correct toggle (useful if you are unsure of the present status). Note that the lamp and electronics remain ON in stand-by mode, even though the image turns to black and most functions are disabled. To leave stand-by press and hold Stby* again (or use Stby* ▼OFF). Or simply press Exit or Menu. Unrelated to the manual douser lever!

Menu

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

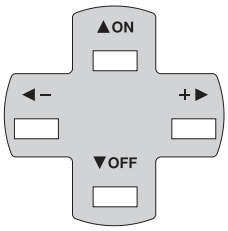
Enter

Press Enter to select a highlighted item, to toggle a checkbox (checked vs. unchecked), or to accept a parameter adjustment and return to the previous menu or image.

Exit

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

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



Arrow Keys

The arrow keys have a variety of functions depending on the situation. Some typical uses are described below. See also *Editing Text* later in *Section 5.* Use ◄– or +► to:

- Change a slidebar value—hold as desired for continuous adjustment (*note the adjustment increments and range depend on the parameter being adjusted*).
- Change to a different option within a pull-down list without having to display the list first
- Jump between "pages", such as in *Help* or lengthy pull-down lists.

▲ON *or* ▼OFF

Use the ▲ON or ▼OFF keys to navigate within a menu, pull-down list or text box, or to increase or decrease the value in the second (bottom) slidebar of a double slidebar.

You can also use ▲ON or ▼OFF in conjunction with certain *toggle* keys—i.e., those including an asterisk symbol—to ensure a toggle *only* in the desired direction. When turning the Cine-IPM on with a remote keypad, for instance, you may be too far from the projector to know whether the Cine-IPM is already on. If you press Power* and hold it for approximately 1 second in hopes of turning the Cine-IPM *on*, the Cine-IPM will actually turn *off* if it was already on. Instead, to avoid the risk of toggling in the wrong direction, quickly press *and release normally* the function key you wish to toggle (in this case Power*). Then immediately (within 2 seconds) press either ▲ON or ▼OFF as desired. The specific toggle will occur.

Toggle keys are labeled with an asterisk on the keypad. They are listed below:

- Shutter* + ▲ON = *disabled*
  Shutter* + ▼OFF = *disabled*
- Stby* + ▲ON = put the Cine-IPM in stand-by mode
  Stby* + ▼OFF = leave Cine-IPM stand-by
- Power* + ▲ON = turn the Cine-IPM on
  Power* + ▼OFF = turn the Cine-IPM off (a "soft" off. AC still present.)
- Mute* + ▲ON = *disabled*
  Mute* + ▼OFF = *disabled*
- Menu + ▲ON = turn the menu system on
  Menu + ▼OFF = turn the menu system off

Color

Press Color to adjust the color saturation level, i.e. the amount of color in a video image. Lower settings produce less saturated colors — a setting of "0" produces a black and white image, for example. If the color level is too high, colors will be overpowering and unrealistic. Use ◄– and +► until the desired color saturation level is displayed.

Tint

Press Tint to adjust the red/green color hue for true color reproduction of NTSC video signals or HDTV signals. For best results, adjust tint while displaying a proper external test pattern from the source — otherwise, it is recommended that tint remain at its default setting. Use ◄– and +► until the desired tint is displayed.

Detail

Press Detail to adjust the sharpness of a video image (it is of limited use for non-video). Use ◄– and +► until the display is as sharp as desired, keeping in mind that any level of detail above 3 will also introduce a certain degree of noise in the image. Set below 3 to filter the signal and remove noise from a noisy source.

Contrast

Press Cont to change the amount of white in your images. Use ◄– and +► until you reach the desired level of contrast—for best results, start low and increase so that whites remain bright but are not distorted or tinted, and that light areas do not become white (i.e., are "crushed"). Conversely, low contrast causes dim images. See *5.7, Adjusting the Image (Image Settings* subsection).

Brightness

Press Bright to increase or decrease the amount of black in the image. Use ◄– and +► until you reach the desired level—for best results, start high and decrease so that dark areas do not become black (i.e., are "crushed"). Conversely, high brightness changes black to dark gray, causing washed-out images. See *5.7, Adjusting the Image (Image Settings* subsection).

Volume

No function.

Projector

NOTE: Rarely used in single-projector installations.

Press Proj when you want to see if the projector is listening, or when you want to access a specific projector within a network. The number appearing in the "Enter Number" window indicates which projector is currently listening to commands, and will match the projector number that has been defined in its *Communications* submenu.

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

To use a specific projector, enter the 3-digit number assigned to the projector you want to use. Press [Enter] to select, press [Exit] to cancel. If you switch to a projector other than the one your are currently using, the checkmark will be deleted.

To broadcast to multiple projectors, press [Proj] and then [Proj] again without entering a projector number. Keypad commands will then affect all projectors present.

*NOTE: The "Broadcast Keys" option in the Communications menu must be selected for **one** (any) projector in a serial network. The keypad in use must be OFF (disabled) for the remaining projectors. See **2.10 Keypad Protocols and Conversion**, and **5.8, Configuring System Parameters**.*

[Pixel] ***Pixel***

Press [Pixel] to access the pixel tracking and pixel phase double slidebar. Adjust pixel tracking first: Use [◄–] and [+►] to increase or decrease the frequency of the pixel sampling clock to correct consistency of the image. For proper phase, use [▲ON] and [▼OFF] to increase or decrease pixel phase so that any shimmer disappears and the image is stable throughout. See *5.7, Adjusting the Image (Size and Position* subsection) for a complete explanation of tracking and phase.

[Position] ***Position***

Press [Position] to move the image using the double slidebar. At the slidebar, use [◄–] and [+►] to move the image left or right, use [▲ON] and [▼OFF] to move the image up or down.

[Lens] ***Lens***

No function.

[Shutter*] ***Shutter***

*NOTES: **1)** Electronic shutter only—unrelated to any mechanical douser/shutter function. **2)** To prevent accidental blanking of the image, this key does nothing if the Cine-IPM is connected to the **DCP** via RS-232.*

If the Cine-IPM is *not* connected to the **DCP** via RS-232, press and hold [Shutter*] for approximately 1 second to toggle the "electronic shutter" *ON* or *OFF* with a single key press—a closed shutter (ON) blanks the image, an open shutter (OFF) allows normal display. Or quickly press and release [Shutter*] and follow immediately with [▲ON] or [▼OFF] if you want to guarantee the correct toggle (useful if you are unsure of the present status). Close the shutter whenever you want to mute all display yet maintain access to Cine-IPM functions. Open the shutter to regain the display. [Shutter*] only blanks the image electronically—the blanking is not quite as black as when a mechanical shutter blade physically blocks the lens.

*NOTES: **1)** The status of this function is shown in the LCD window on the Cine-IPM. **2)** Upon power-up, the electronic shutter is open. **3)** Does not affect lamp power.*

[Mute*] ***Mute***

No function.

[Func] ***Function Key***

From presentation level, press [Func] followed by a 2-digit number to enable a specific color or colors in the display. For example, [Func] [6] [4] will display only red and

green data, Func 6 7 will display all colors data. The list of available color combinations is shown below and also appears on the back of the remote keypad. Color enabling can also be accessed through the menu system rather than these shortcuts.

Func 6 1 = Red
Func 6 2 = Green
Func 6 3 = Blue
Func 6 4 = Red and Green
Func 6 5 = Green and Blue
Func 6 6 = Red and Blue
Func 6 7 = All colors (same as Exit)

NOTE: Once Func is pressed in presentation level, the projector will not respond to non-numeric entry until 2 digits have been entered or until 5 seconds of inactivity have elapsed.

Use of the Func key within the menu system is noted with the appropriate topic elsewhere in *Section 5*. For example, press Func in the *Channel Setup* menu to enable deletion or copying of a channel.

OSD* *OSD (On-screen display)*

Press and hold OSD* for approximately 1 second to toggle menus on or off (i.e., visible or hidden). Or press OSD* followed immediately by ▲ON or ▼OFF to guarantee the correct toggle direction (useful if you are unsure of the present status). Note that hidden menus are fully functional.

*NOTES: **1)** With OSD on, you can still mute menus, error messages, slidebars, etc. with the appropriate setting in the **Menu Preferences** menu. **2)** The status of OSD* is displayed in the LCD window on the rear panel of the projector.*

Help *Help*

Press Help for detailed information about any current menu and highlight. Press Help again to exit. From presentation level, press Help to access the *General Help* menu consisting of *Using Help, Setup, Keys, Source (Input) Selection, Stat/Pwr LEDs* and *Using 3D.* Press Help to leave *General Help* and return to presentation level.

Test *Test*

Press Test to display one of the available Cine-IPM test patterns. Press Test again to display the next available pattern in the sequence. Test will exit after the last pattern, or press Exit at any time to remove the current test pattern from the screen and return to presentation level.

*NOTE: For a complete list of all Cine-IPM test patterns, see the **Diagnostics and Calibration** submenu description later in Section 5.*

5.5 Navigating the Menus

Most of the controls for non-cinema operation are accessed from within the Cine-IPM's menu system. There are several groups of related *functions*, with each group selectable from the *Main* menu as shown at right. Press Menu at any time to display the *Main* menu.

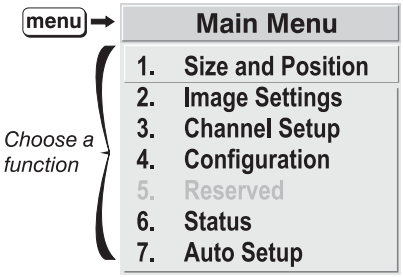


Figure 5.4. Main Menu

On the keypad, either enter the number corresponding to the function menu you wish to access, such as 2 for the *Image Settings* menu, or use the ▲ ▼ keys to highlight the desired option and press Enter. The function menu you selected will then appear. If you select "Auto Setup", this will not activate a separate function menu but rather begin an automated process of optimizing critical display parameters such as size, position, pixel tracking, etc. for your current display.

Once you have a function menu displayed, navigate in a similar manner—enter a menu option number for any numbered option, or use ▲ ▼ to move the highlight and press Enter at the desired option. Extra long menus have a scroll bar on the right–use the arrow keys to see the remainder of the menu. Items that are locked out, not applicable, or irrelevant to the current action appear dimmed and cannot be selected, such as *Lamp* in the *Main* menu.

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

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

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

On-line Help

If at any time you are uncertain what to do next, press Help to display detailed information about the current menu or highlighted option. A scroll bar appears on the right-hand side of a help window if there is additional text–use the arrow keys to scroll. Press Help again to exit.

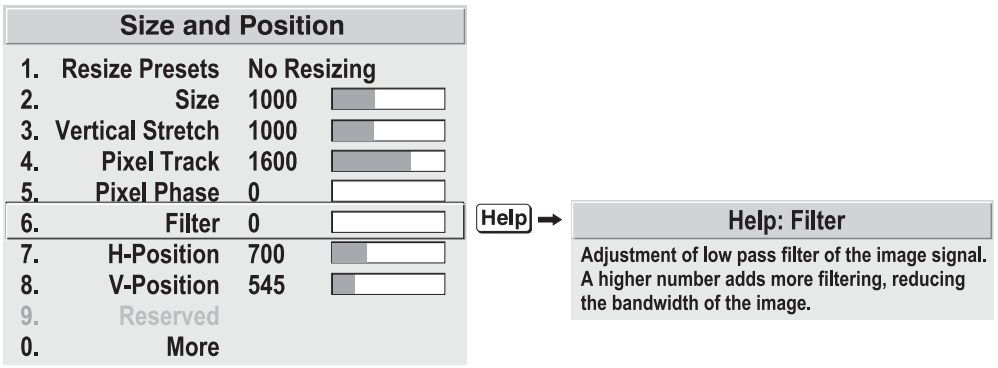


Figure 5.5. Example of On-line Help

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

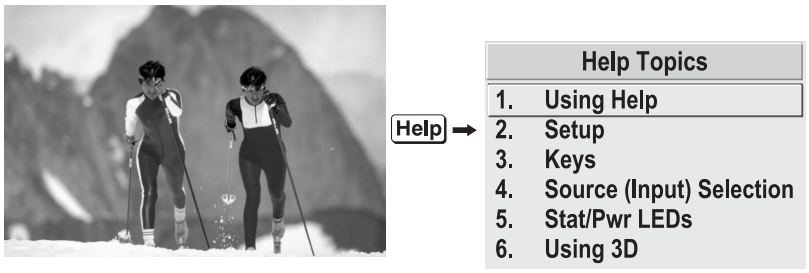


Figure 5.6. Accessing General Help Topics

At the bottom of some menus, a line of hint text also appears.

Time-outs

Whenever the projector is not at presentation level, such as when there is a slidebar, menu, message or test pattern displayed, you have limited time in which to make a keypad entry before the projector returns to presentation level and the graphic disappears. These time-outs vary depending on the current display, as shown in the following chart:

TIME-OUTS	
Slidebar (from pres.)	5 seconds
Slidebar (from menu)	15 minutes
Lamp Timer Msg.	30 seconds
Channel entry	5 seconds
Other	15 minutes

The Global Icon

If a menu option includes this icon, settings for the option apply universally to any incoming signal.

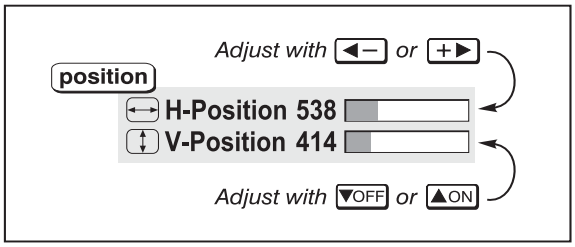
Using Slidebars and Other Controls

Most of the function menus allow you to change settings by using slidebars, checkboxes, and pull-down lists. To select a slidebar, toggle a checkbox status, or view a pull-down list, do one of the following within the function menu:

- Enter the menu option number corresponding to the setting you wish to change (for example, press 2 for Vertical Stretch in *Size & Position* menu).
- Or move the highlight to the desired parameter and press Enter.
- Or move the highlight to the option desired and press ◄– or +► .
- Or bypass menus entirely and use a single key to immediately access an adjustment (*note: applies only to options having their own key, such as Color, Tint, Detail, Contrast, Brightness, Pixel and Position*).

Once selected, change the setting as desired (see below) and press Enter to save and return to the current function menu.

Slidebars in menus - The current value for a given option, such as size or vertical stretch, appears to the left of its slidebar icon. This number may express a percentage or specific units (such as pixels, degrees Kelvin, etc.), depending on the option. Press ◄– or +► to gradually adjust the setting up or down—both the number and the length of the bar change accordingly (for continuous adjustment, hold down the desired arrow key). Or press Enter to activate a slidebar text box for specific number entry via the keypad, then press ◄– or +► and Enter to save (or press Exit to cancel).



Double slidebars - In double slidebars, such as the pixel tracking/pixel phase double slidebar, adjust the top slidebar with ◄– or +► as desired. When you have finished with the top slidebar (whether changed or not), adjust the bottom slidebar with ▲ON or ▼OFF. When you are done, press Exit to return to your presentation. For fast continuous adjustments, hold down the desired arrow key.

"Direct" slidebars - For quick access, you can often use a slidebar (or double slidebar) without traveling the menu system. For example, simply press Cont to immediately display the same contrast slidebar accessed with the **Contrast** option in the *Image Settings* menu. Direct slidebars are listed below.

LIST OF DIRECT SLIDEBARS	
H-Position or V-Position	Position
Pixel Tracking or Phase	Pixel
Contrast	Cont
Brightness	Bright
Color	Color
Tint	Tint
Detail	Detail

Use the arrow keys to adjust a direct slidebar, or press Enter and enter a specific number from the keypad , then Enter or ◄– or +► to save (or Exit to cancel). When you are done, press Exit to save and return to your presentation.

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

Checkboxes - Conditions are present if its adjacent checkbox contains a checkmark. To toggle the checkbox, simply highlight and press Enter, or +► to check and ◄– to uncheck. For a checkbox that is numbered, simply enter the number of the option to toggle the checkbox.

5. Broadcast Keys ☑

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

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

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

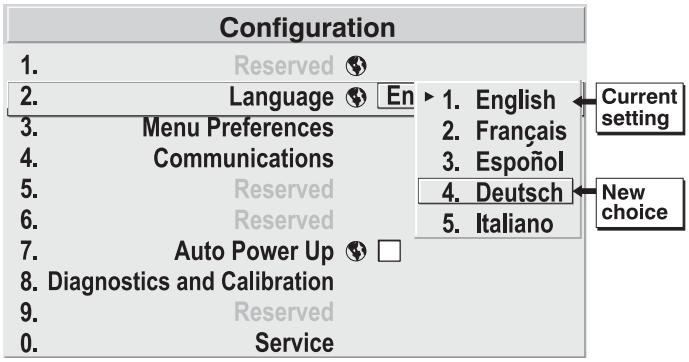


Figure 5.7. Example of Pull-Down List

Or, of you prefer to quickly scroll through a list without first pulling it down, highlight the option and use ◄– or +►. Press Enter when the desired choice appears.

*NOTES: **1)** Press ◄– or +► to jump between "pages" in an extra long pull-down list. **2)** Press Exit while in a pull-down list to **cancel** any change.*

Editing Text

ACTIVATE THE EDIT WINDOW: To enter or edit text, highlight the desired parameter (such as a channel name) and press Enter to activate its adjacent edit window. Any previously entered text is displayed with its first character highlighted in a square cursor, signifying that this character is ready for editing.

NAVIGATE WITHIN THE EDIT WINDOW: Press +► to move the cursor forward or ◄– to move the cursor backwards as desired.

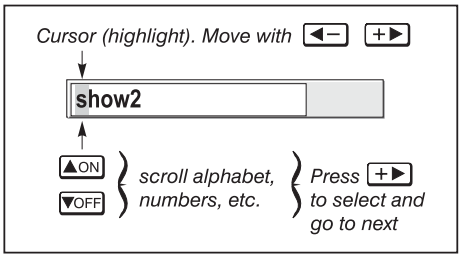
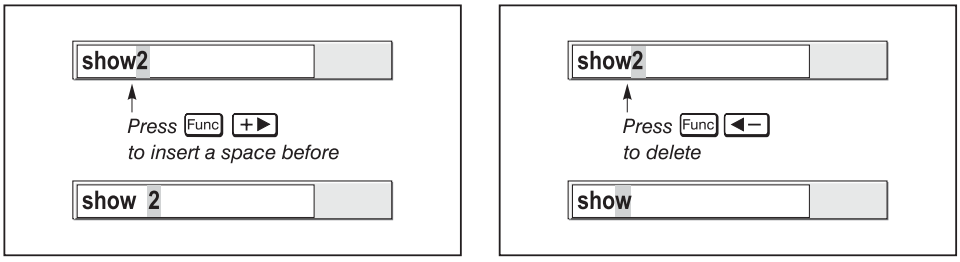


Figure 5.8. Entering Text

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

ADD OR DELETE A CHARACTER OR SPACE: To insert a space at the cursor location, press Func +►. To delete a highlighted character (or space), press Func ◄–.



PRESS Enter WHEN FINISHED: To accept the edits and move out of the edit window, press Enter.

NOTE: Press Exit at any time to cancel changes and return to the previously-defined text.

Editing Numerical Values

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

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

5.6 Using Inputs and Channels

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

The Cine-IPM stores and automatically recalls up to 99 different channels (source setups) for a variety of inputs. This memory feature allows you to define and conveniently use a wide variety of customized setups rather than having to repeatedly re-configure for different presentations. Each physical source (i.e., *input* connected at the Cine-IPM) can have numerous different channels associated with it.

Do I Select an Input Or a Channel?

INPUT - An input simply describes a physical location for an incoming signal connection. These connections are always either on the Cine-IPM itself (one of the four inputs) or on a switcher connected to the Cine-IPM switcher port. Input describes the source signal according to two specific criteria only—to which *switcher* it is connected and to which *slot* it is connected—and is identified by a 2-digit number entered on the keypad. The first digit specifies the switcher (0-9), the second specifies the slot (1-9). Note that the Cine-IPM is always considered "switcher #0".

EXAMPLES:

Input 1 3 = use source connected to switcher #1, slot #3

Input 0 1 = use source connected to the Cine-IPM, slot #1 (i.e., Input1)

You can switch to an input in either one of two ways. Pressing the appropriate direct key on the keypad — Input1, Input2, Input3 , or Input4 — is a quick and seamless way to display from one of the four inputs connected at the rear of the projector. Or, if your Cine-IPM has a switcher connected to it at the **SWITCHER** port, press the general Input key and enter the 2-digit number representing the switcher and slot location for the desired signal (note there is no on-screen feedback for entering these numbers).

Regardless of which method you use to select a source/input, the image will be displayed according to the following:

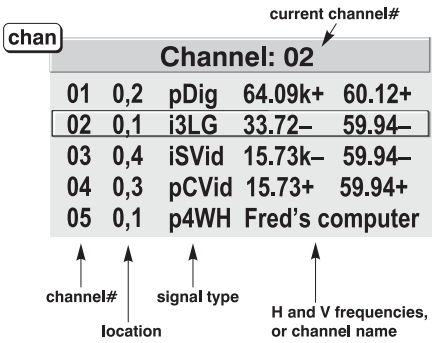
If it is the first time you have used the source/input (or if you used the input but did not define a channel by adjusting anything), the Cine-IPM will recognize the new input signal based on its frequencies and polarities, and will automatically display an image according to default settings for such a signal. Note that a graphic source will resize into a full-screen image, whereas video or HDTV sources will resize as much as possible while maintaining their aspect ratio.

If you used the source at least once before and changed a display parameter such as contrast, V-Position etc., then a channel was automatically created and still exists in Cine-IPM memory (see below). Using an Input key will automatically recall this channel—and all its setup parameters—and update the display accordingly.

If more than one channel exists for the input, the image will be displayed according to the setup parameters for the first channel with matching characteristics.

CHANNEL - A channel is a collection of measurements, locations and settings that tailor a display to your specific needs. Since source types and applications can vary greatly, you will likely want to adjust and define a wide variety of parameters, such as brightness, contrast, tint, size, etc., in order to customize and optimize the display coming from a particular source. For example, the display settings you choose for a VCR source may be very different from those you choose for a high resolution computer source, or one signal may simply vary from another signal used earlier through the same input location. Once you have adjusted a display parameter, such as pixel tracking or contrast, all current settings are collectively stored in the Cine-IPM's memory as a unique 2-digit channel, such as 0 9. You can have numerous distinct channels available for the same input, any of which can be selected by using the Chan key on the keypad followed by the 2-digit channel number.

*NOTE: The Chan key may display a channel list or not, depending on what you have defined within the **Menu Preferences** menu (see **Menu Preferences** later in this section). Shown at right is a sample channel list available from Chan.*



Channel List (Chan)

In order to use channels (Chan on the keypad), you must first create them. See below.

Creating a New Channel — AUTOMATIC —

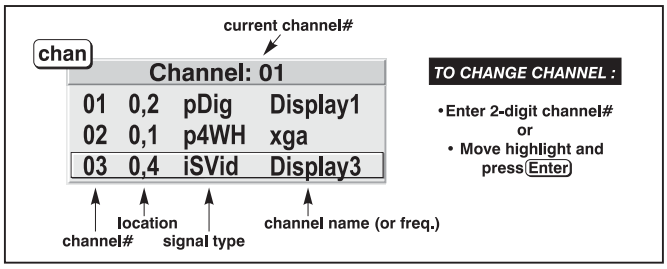
To use a new non-cinema source, a new channel must be added to Cine-IPM memory so that the projector will respond properly to an input signal from that source in the future. A new channel can be created automatically, as described here, or it can be copied from an existing similar channel and then edited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

When you select a direct input (press Input or Input1, Input2, Input3, or Input4) the existing channels in the Cine-IPM are searched for matching input and signal parameters. If no match to the incoming input signal is found in the currently defined channels, a new channel is temporarily created based on factory-defined defaults for this signal. The *channel number* assigned to this channel is the lowest available number from 01-99.

*NOTES: **1)** An automatic channel will be discarded unless one or more of its parameters are changed, and will not appear in the **Channel List** (see below). **2)** If two channels have the same distinguishing source characteristics except for the reversal of sync connectors (i.e., H-sync and V-sync, are switched), they are still defined as distinct channels. **3)** You cannot define a new channel without a signal present.*

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

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



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

What Channels Are Defined So Far?

All available channels are listed in the *Channel Setup* menu, which describes how each channel can be accessed and which serves as the gateway for editing, copying and deleting channels.

From the presentation level press Menu to display the *Main* menu. To display the *Channel Setup* menu, press 3, or move the highlight to the *Channel Setup* option and press Enter. The *Channel Setup* menu will appear (see sample at right), with the active channel highlighted.

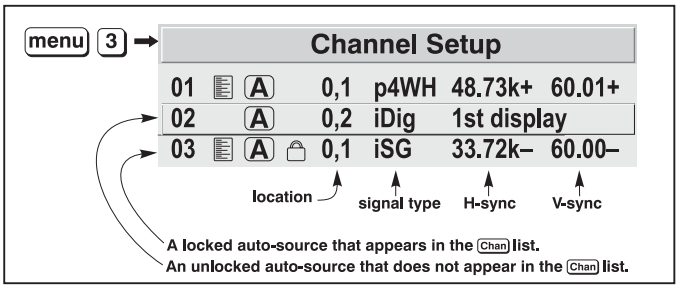


Figure 5.9. All Channels Appear in the Channel Setup Menu

WHAT APPEARS IN THE CHANNEL SETUP MENU? As shown in Figure 5.9, this menu lists all channels defined so far and indicates how they are connected to the Cine-IPM. The far left column contains current channel numbers defined. The values in the far right columns indicate horizontal and vertical frequencies—if a name has been defined for this channel, it appears here instead. Other columns contain details pertaining to each channel setup, such as its switcher number, slot location, a variety of icons indicating access to the channel, and an abbreviated description of each signal type. See *Editing a Channel Setup* for details.

SIGNAL TYPE — Either channel list, whether the Chan key list or the *Channel Setup* menu, identifies signal types in a shortened form as defined below. These descriptors indicate what signal information the Cine-IPM used to identify a match for a given channel, and are preceded by either an "**i**" (interlaced signal) or "**p**" (progressive signal). See Table 5.11.

Table 5.11. Abbreviations for Signal Type

Abbrev.	Signal Type
4WH	Composite (4 wire) on HC input
4WV	Composite (4 wire) on V input
SG	Sync-on-green
SR	Sync-on-red
5W	Separate H,V
5WR	Separate H,V swapped
SVid	S-Vid
CVid	Composite Video
3LH	Tri-Level on HC input
3LV	Tri-Level on V input
3LG	Tri-Level on green
E3LH	European Tri-Level on HC input
E3LV	European Tri-Level on V input
E3G	European Tri-Level on green
Dig	Digital

If you have more than a handful of channels, use ◄– and +► to see the remaining channels not visible in this initial display.

To copy, delete or edit any of the channels listed in the *Channel Setup* menu, highlight the desired channel and do one of two things:

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

Copying or Deleting Channels

TO COPY A CHANNEL, highlight the desired channel in the *Channel Setup* menu, then press Func to go to the *Channel Copy/Delete* submenu. Select "Copy" and press Enter—a new channel will be created. It is identical to original, which still remains, but it is identified with the next available number from 01-99. If you change your mind and do *not* want to copy the current channel, press Exit to cancel and return to the previous menu. Copying channels is a quick method for creating numerous channels, each of which can then be edited and adjusted for a variety of presentations in the future.

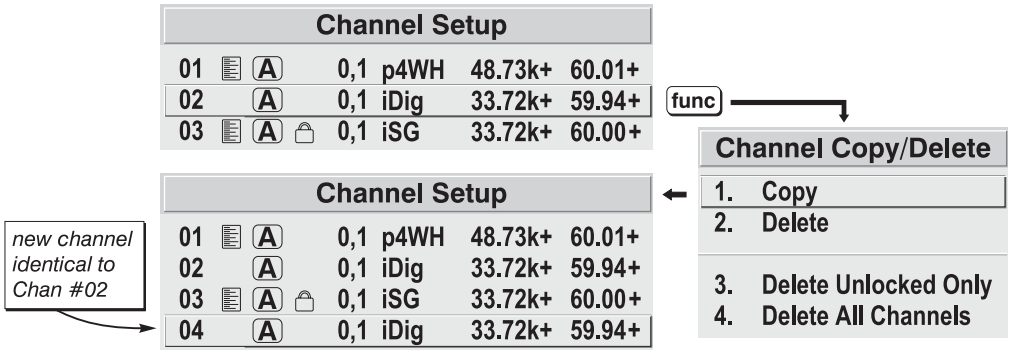


Figure 5.10. Copying a Channel

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

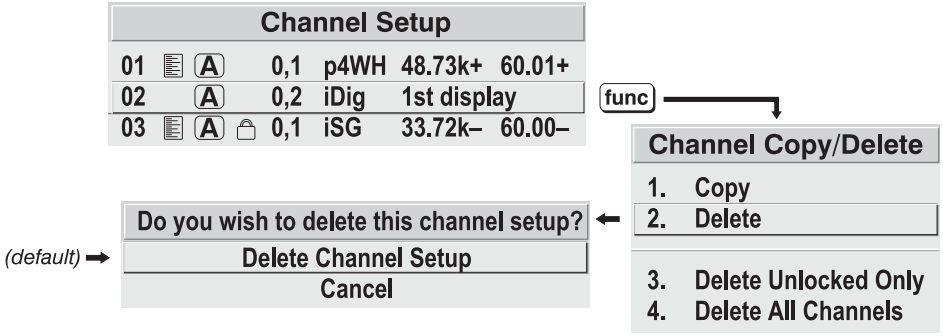


Figure 5.11. Deleting a Channel

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

NOTE: For any deletion, a confirmation box appears to make sure that you really want to delete. Select "Cancel" (default) if you don't want to delete after all.

Editing a Channel Setup

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

CHANNEL EDIT — STEP 1

From the presentation level press Menu to display the main menu. To display the *Channel Setup* menu, press 3 , or move the highlight to the *Channel Setup* option and press Enter. The *Channel Setup* menu will appear.

CHANNEL EDIT — STEP 2

To edit parameters shown in the *Channel Setup* menu, select the relevant channel and press Enter. The *Channel Edit* menu will appear similar to the sample shown in Figure 5.12.

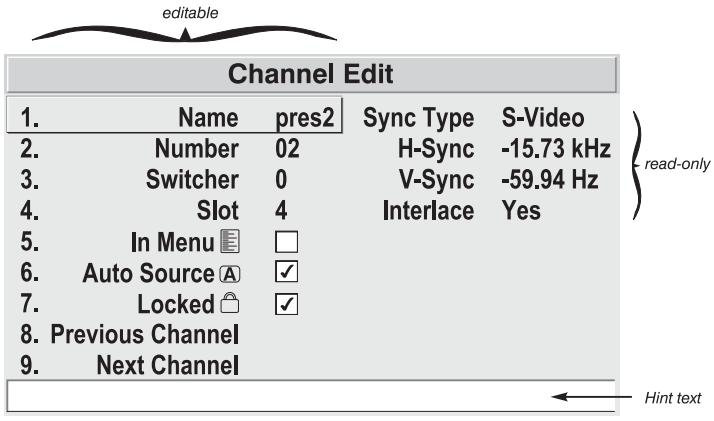


Figure 5.12. Channel Edit Menu (SAMPLE)

CHANNEL EDIT — STEP 3

If desired, edit the following channel parameters in the *Channel Edit* menu:

- **CHANNEL NAME:** An alpha-numeric label can be defined and/or changed here. Channel names can be up to 12 characters in length.
- **CHANNEL NUMBER:** A channel number from 01 to 99 can be changed here. *NOTE: If you enter a channel number that already exists, a dialog message appears indicating that this number is already in use–assign a different channel number.*
- **SWITCHER NUMBER:** "0" represents the Cine-IPM itself. Or, if the input source is connected via a switcher, the default will be the lowest switcher number available (from 1-9)–change here as desired.
- **SLOT:** 1 (Input1), 2 (Input2), 3 (Input3), or 4 (Input4) for Cine-IPM inputs, or current slot number (1-9) if the source is connected to a switcher.
- **LOCKED:** If checked, all of the image settings for this channel are disabled. If unchecked (default), all available image settings can be adjusted as desired. You cannot use Auto Setup with a locked channel.
- **IN MENU:** If checked (default, except for automatically defined channels with unchanged parameters), this defined channel will then appear in the list available when Chan key is pressed. If unchecked, the channel must be accessed via Chan on the keypad or via the Auto Source function. *NOTE: On-screen display of the channel list is an option that must be set in the **Menu Preferences** menu.*
- **AUTO SOURCE:** If checked, (default), the Cine-IPM can automatically locate this channel when an incoming input signal matches. If not checked, the Cine-IPM can locate the selected channel only when it is directly selected via Chan on the keypad—and a change in input signal will *not* result in a channel change.
- **PREVIOUS CHANNEL:** Select this option to see or change *Channel Edit* settings for the previous channel in the *Channel Setup* list.
- **NEXT CHANNEL:** Select this option to see or change *Channel Edit* settings for the next channel in the *Channel Setup* list.

5.7 Adjusting the Image

Most options for non-cinema image adjustments can be accessed through two menus: *Size and Position* (Menu 1) and *Image Settings* (Menu 2), both of which appear in the *Main* menu. While in either of these two menus, you can change settings affecting the image from the current channel by working with the appropriate slidebars, checkboxes and pull-down lists. Exit will always return to the previous menu (or to the presentation, if from the *Main* menu) and accept any changes you may have made. Or you may prefer to begin with an automated setup in which the projector quickly defines certain display parameters for you—select *Auto Setup* from the *Main* menu. These settings can then be fine-tuned in *Size and Position* and *Image Settings* at any time.

From your presentation, you can access any of the individual options in these menus by pressing Menu followed by the appropriate two-digit number representing their location in the menu system. For example, press Menu 2 6 to quickly access the "Color Setup" option in the *Image Settings* menu.

For certain options, you may prefer to use a "direct key" from presentation level to go directly to a particular option rather than traveling through the menu system at all (*note: this is not available for all display parameters*). For example, press Cont to access the "contrast" slidebar immediately. Press Exit to return to your presentation.

NOTE: *1) To hide the "direct" slidebars only, make sure the Display Slidebars option in the* ***Menu Preferences*** *menu is unchecked. 2) To hide the entire menu system from view, toggle the on-screen display OFF: press and hold the OSD* key.*

Auto Setup

If you want the Cine-IPM to quickly set up the image for you, select "Auto Setup" from the *Main* menu. A confirmation box will ask if you really want to continue, in which case display parameters listed in the Table below will be set for you. An "Auto Setup" can save time in setting up an excellent image, and you can also make further adjustments as desired. You must have an unlocked channel present to use Auto Setup.

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

Size and Position

The two-page *Size and Position* menu allows you to increase or decrease the size of your image, change its proportion (aspect ratio), move the image to a specific area of the screen, and refine other related parameters. Use *Size and Position* controls to match the image precisely to the screen size and aspect ratio needed for your application.

Refer to *"Using Slidebars and Other Controls"* (earlier in this section) if you need help using any of the following slidebars or pull-down lists to alter your image. Changes made to the *Size and Position* menu are applied immediately and are saved when you exit the menu (press Exit or Menu).

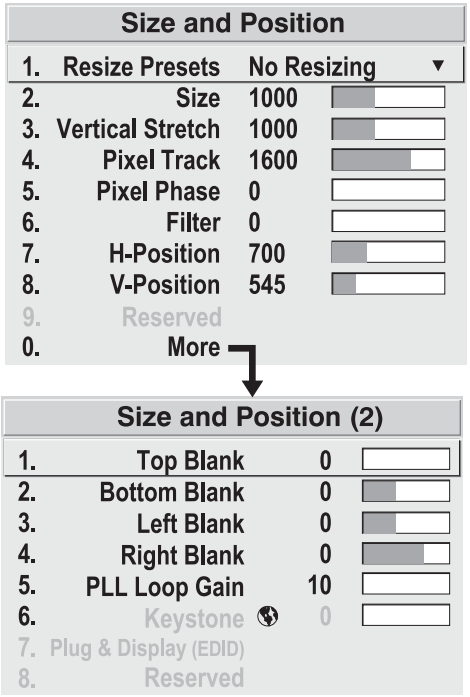


Figure 5.13. Size and Position Menu

Resize Presets

Use *Resize Presets* to quickly display an image in its native resolution (including anamorphic) or to automatically resize an image to closely fit the screen. The value for *Size*, *Position* and *Blanking* parameters (described later) will, in turn, change as necessary without your having to set them manually.

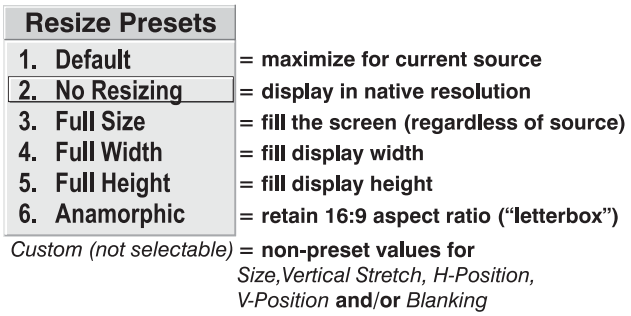


Figure 5.14. Resize Presets Submenu

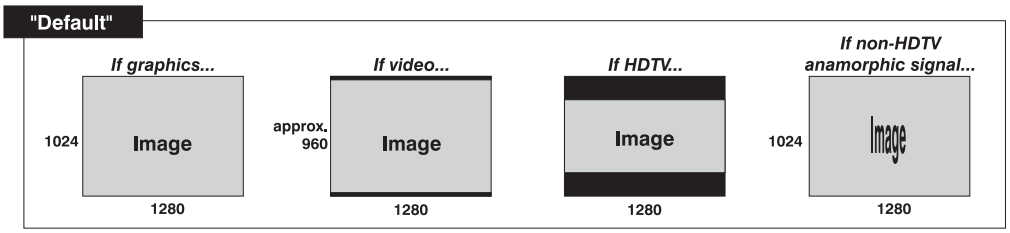
WHAT IS THE CINE-IPM'S DEFAULT? When displaying a new source, by default your image will fill the screen as fully *as possible* for the type of source present. See *Select "Default"* below.

WHEN "CUSTOM" APPEARS: The "Custom" descriptor automatically appears in the *Size and Position* menu when any of the values for *Size*, *Vertical Stretch*, *H-Position*, V-*Position* or *Blanking* do not correspond to those for a preset. It is not an option in the *Resize Presets* pull-down list.

- **SELECT "DEFAULT"** (default) for most images. This option will center and display your image as large as possible *for the current source* as described below:

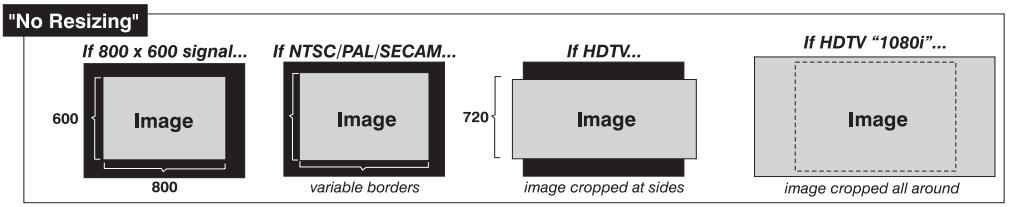
  - ✓ ***A graphic image*** will resize to fill the screen, regardless of its original aspect ratio. For example, 1024 x 768 becomes 1280 x 1024.
  - ✓ ***A video image*** will resize to fill the screen while still maintaining its aspect ratio (assumed to be 5:4).
  - ✓ ***An HDTV wide-screen (16:9) image*** will resize to fill the screen horizontally while maintaining its 16:9 aspect ratio—i.e., there will be black borders at top and bottom, commonly called "letterboxed".
  - ✓ ***A non-HDTV anamorphic (16:9) image***, typical of DVDs, will be stretched vertically.

So with the exception of HDTV (16:9), the "Default" setting produces an aspect ratio that is either almost or exactly 5:4. See examples below.

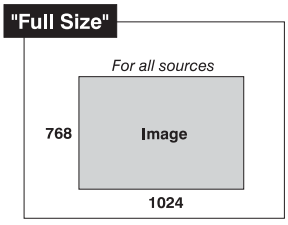


- **SELECT "NO RESIZING"** to display the image in its native resolution, which may be smaller or larger than the native resolution of the projector. All *Size*, *Vertical Stretch*, *H-Position*, *V-Position* or *Blanking* values will change accordingly. For example, when displaying a source with a native resolution of 800 x 600, "No Resizing" will center a small image within a black border. Conversely, an HDTV image is wider than 1280 and will be cropped on the sides—or, in the case of "1080i" HDTV, cropped at top and bottom too. With "No Resizing", signals with

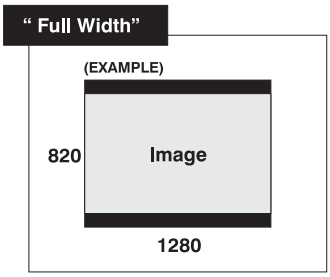
non-square pixels, such as video connected to **INPUT 3** or **INPUT 4**, produce distorted images that are too tall or too wide. See below.



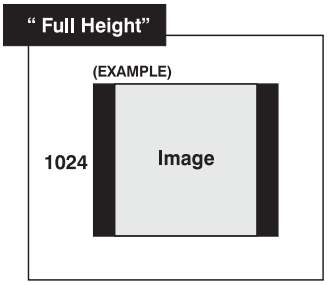
- **SELECT** "**FULL SIZE**" to use *all pixels* (1280 x 1024) to display the image, regardless of source or original aspect ratio. See right.



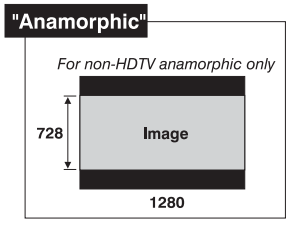
- **SELECT** "**FULL WIDTH**" to fill the display from left-to-right. Depending on the source, this may create top and bottom borders.



- **SELECT** "**FULL HEIGHT**" to fill the display from top-to-bottom. Depending on the source, this may create side borders.



- **SELECT** "**ANAMORPHIC**" to display an entire ***non***-HDTV "wide screen" (anamorphic) image in its native 16:9 aspect ratio. Known as letterbox, the image will fill the screen from left-to-right, but will not use all vertical pixels available (top and bottom will be black). If you do not choose "Anamorphic" when a non-HDTV anamorphic image is present, the default image will be stretched vertically, characterized by obvious distortion and "thin people".



NOTES: ***1)*** *Use "Anamorphic" for regaining a 16:9 display of* ***non****-HDTV anamorphic sources only (typically found on some DVDs, for example). For HDTV, the "Default" setting will produce the same result.* ***2)*** *See also,* ***5.9, Creating Wide Displays****.*

Size

Size controls both the image *width* and *height* in tandem, maintaining the original aspect ratio (proportion) of data from the incoming signal.

Vertical Stretch

Vertical stretch adjusts the *height* of the image while keeping the *width* constant. Use Vertical Stretch to display data from the incoming signal in a different aspect ratio.

Pixel Track

(SHORT CUT: Press Pixel and adjust the top slidebar.)

Pixel tracking adjusts the frequency of the pixel sampling clock, indicated by the number of pixels per line, so that all pixels generated by a particular source are sampled. Proper pixel tracking ensures that the non-cinema image quality–whether good or poor–is *consistent* across the screen, that aspect ratio is correct, and that pixel phase can be optimized (see *Pixel Phase*, below).

NOTE: By default, the Cine-IPM will sample at the correct frequency for most sources.

Pixel tracking is adjusted most effectively using a good test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar “half on, half off” graphic image, such as the *Windows* shutdown screen. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Adjust the slidebar until the stripes broaden to the point where one large stripe fills the image. Again, the image may still exhibit some noise. See *Pixel Phase*.

Pixel Phase

(SHORT CUT: Press Pixel and adjust the bottom slidebar.)

Pixel phase adjusts the phase of the pixel sampling clock relative to the incoming signal. It is used primarily for adjusting RGB inputs.

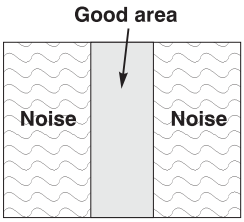
*NOTE: Adjust pixel phase **after** pixel tracking is properly set.*

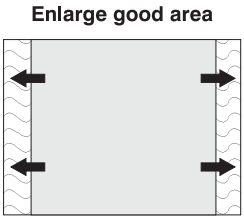
Adjust pixel phase when the image (usually from an RGB source) shows shimmer or “noise”. Pixel phase adjustment is done most effectively from within a proper test pattern, such as a smooth gray consisting of a clear pattern of tiny black and white dots, or a similar graphic image, such as the *Windows* shutdown screen. Adjust until the image is stable and each dot is clearly defined. Using the numbers on the slidebar as a guide, you will notice that you can actually stabilize the image at more than one point—i.e., you may find that the image appearance at "11" is identical to the image appearance at "38", thus you can select either setting.

Filter

Filter applies a low pass filter to the input signal. This removes high frequencies which can improve pixel phase noise but which also reduces signal bandwidth. Note that most signals will not require any filter adjustment—use the filter option only if standard pixel tracking and phase adjustments do not adequately clear up a “noisy” signal. For best results:

1. Optimize *Pixel Tracking* and jot down the value.
2. Optimize *Pixel Phase*
3. If the image is still too noisy, return to *Pixel Tracking* and "mis-adjust" so that 2 vertical bands of noise appear, separated by a good center band. See right.
4. Adjust *Filter* to maximize the width of the good area. See right.
5. Return *Pixel Tracking* to its correct setting from Step 1.
6. Readjust Phase.





NOTE: "Filter" affects only the current signal.

H-Position

(SHORT CUT: Press Position and adjust the top slidebar.)

This option moves image right or left.

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

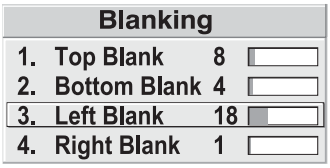
V-Position

(SHORT CUT: Press Position and adjust the bottom slidebar.)

This option moves the image up or down.

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

Blanking: Top, Bottom, Left or Right



These slidebars *blank* (turn to black) the top, bottom, left, or right edge of the image so that any unwanted information is cropped from view. For example, when displaying native size video you may want to blank out a few of the top lines.

PLL Loop Gain

This control changes the relative offset to the default gain. The default PLL (Phase Lock Loop) Loop Gain setting of 10 is set automatically with a Pixel Tracking adjustment and is correct in most cases. In rare instances, such as when your image exhibits "tearing" or "flag-waving", increase the PLL loop gain setting as necessary. Or, if your image is unstable and "breaks up", this may indicate that the PLL loop gain setting is either too high or too low. PLL Loop Gain affect the current channel only.

Keystone

No function.

Plug & Display (ESID)

NOTE: Requires optional DVI/DFP Input Module. Disabled for all other inputs.

By default, the Plug & Display option detects an incoming digital flat panel video signal and displays it in the native resolution of the projector. To use a different resolution (for example, if your graphics card does not support the current resolution), select a different Plug & Play setting from the list.

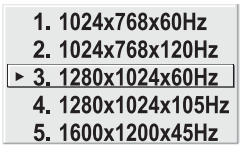


Image Settings

Use options in the two-page Image Settings menu to alter your image in ways that do not affect its size or position. Changes made to the *Image Settings* menu are applied immediately and are saved when you exit the menu (press Exit or Menu). Options that are currently unavailable in your projector (such as those that require an optional module) are disabled and appear dimmed. "Reserved" options can be ignored.

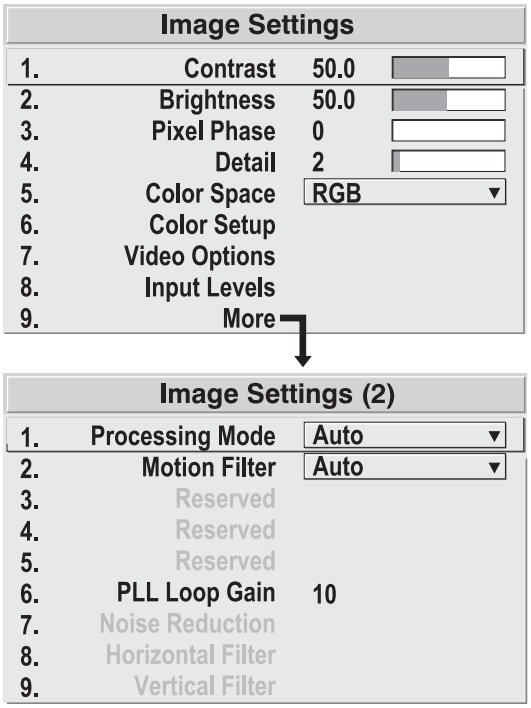


Figure 5.15. Image Settings Menu

Contrast

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

"Contrast" increases or decreases the perceived difference between light and dark areas of your image (0-100). If contrast is set too high, the light parts of the image lose detail and clarity. If set too low, the light areas will not be as bright as they could be and the image will be dim. Start low and increase so that whites remain bright but are not distorted or tinted, and that light areas do not become white (i.e., are "crushed"). ***For best results, keep close to 50.***

NOTE: If environment lighting changes, it may be necessary to re-adjust.

Brightness

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

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

NOTE: If environment lighting changes, it may be necessary to re-adjust.

Pixel Phase

(SHORT CUT: Press Pixel and adjust the bottom slidebar.)

See description in *Size and Position* section, above.

Detail

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

"Detail" adjusts the sharpness of the video image. Use ◄– or +► until the display is as sharp as possible, keeping in mind that any level of detail above 3 (default) will increase the level of detail as well as introduce some level of noise in the image. Set below 3 to filter the signal and remove noise from a noisy source. Keep at 3 to apply no detail.

Color Space

This option determines how the color components of an input signal are decoded for accurate color in the display. Selecting a color space option is useful only for analog signals connected to **INPUT 1** or **INPUT 2.** Although the color space for such a signal is automatically determined by the Cine-IPM, in some circumstances you may wish to override this and manually set a different color space.

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

The current color space appears in the *Image Settings* menu. Press Enter to select a different option:

- Select **RGB** *unless* you are using component video at **INPUT 1** or **2.**
- Select **YPbPr (Video)** with a standard definition televised signal (SDTV)
- Select **YPbPr (HDTV)** with a high definition televised signal (HDTV).

NOTE: When certain RGB signals are first connected, the Cine-IPM may not initially recognize them as RGB and will incorrectly decode their color information as YPbPr (video). These signals can include:

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

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

Color Setup

Select this submenu to work with aspects of color—adjust for saturation and overall hue in video signals, or adjust color temperature in any signal.

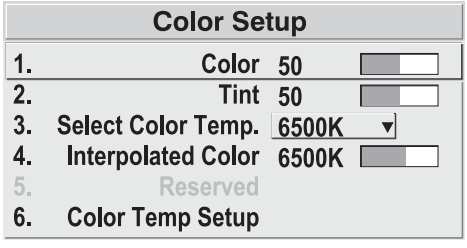
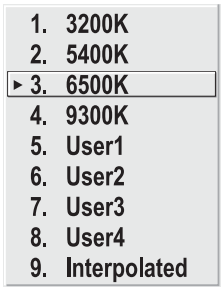


Figure 5.16. Color Setup Submenu

COLOR — "Color" adjusts the color saturation level or the amount of color in a video image. When set to "0' the image appears black and white, and when set too high the colors appear overpowering and unrealistic. Use ◄– or +► to adjust "Color" until the desired saturation level is displayed. For a shortcut to "Color" slidebar, press Color at any time.

TINT — "Tint" adjusts color hue to obtain true color reproduction of NTSC video signals or HDTV signals. Use ◄– and +► until the desired balance or red-to-green is displayed in your image. It is best to adjust tint while displaying an external test pattern—otherwise, it is recommended that tint remain at its default setting. For a shortcut to "Tint" slidebar, press Tint at any time.

SELECT COLOR TEMP — "Select Color Temp" applies either a preset color temperature (3200K, 5400K, 6500K or 9300K) or any previously "User" defined color temperature. Color temperatures are measured in degrees Kelvin and represent the "coloration" (reddish or bluish) of the whites displayed by the projector—the lower the temperature, the more reddish the whites; the higher the temperature, the more bluish the whites.



*NOTE: The custom temperatures "User" or "Interpolated Color" can be defined in the **Color Temperature Setup** menu. Until defined, these custom choices all default to 6500K.*

INTERPOLATED COLOR — Use this option if you need a specific color temperature that lies somewhere between one preset color temperature and another. Adjust the slidebar to define a new temperature which will be interpolated from the neighboring presets (for example, 7841 is interpolated from 6500 and 9300). This slidebar is disabled unless you have a source connected and have selected "Interpolated Color" in the "Select Color Temp" pull-down list.

RESERVED — No function.

COLOR TEMPERATURE SETUP — Use the *Color Temperature Setup* submenu to apply, alter, add, or copy a color temperature, or if you want to use an unaltered factory default color temperature.. This menu is duplicated in other locations.

By default, the Cine-IPM can utilize any of four calibrated factory-set color temperatures: 3200, 5400, 6500 or 9300 (expressed in degrees Kelvin). For most applications, these temperatures will display accurate and realistic colors from a variety of sources. They can be selected at any time from the "Select Color Temp" list in the *Color Setup* submenu.

However, if you require extra color temperatures, you can also add up to five custom color temperatures—four "User" and one "Interpolated Color"—by defining them within the *Color Temperature Setup* menu (each defaults to 6500K until then). Any "User" or "Interpolated Color" temperature created here is immediately applied, or it can be selected at any time from the *Color Setup* menu as usual, regardless of your source or channel. Use of the *Color Temperature Setup* menu is described below.

NOTE: For best results, use an internal grayscale test pattern when working with color temperature.

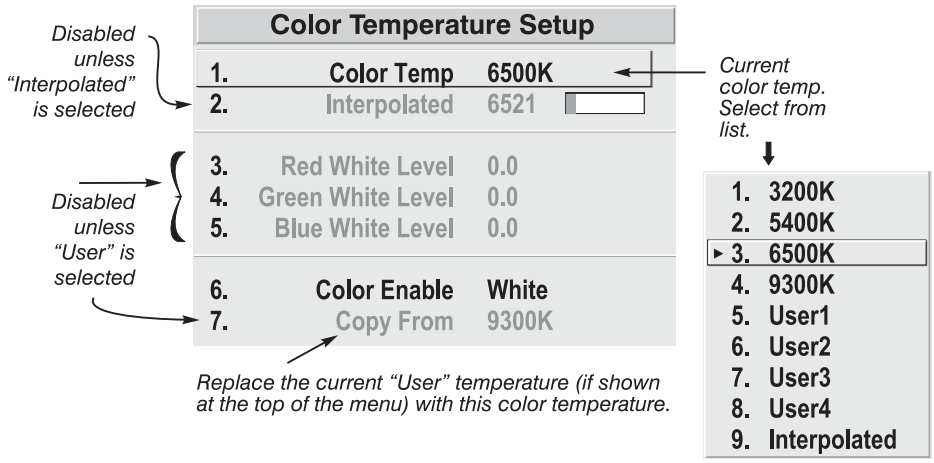


Figure 5.17. Using the Color Temperature Setup Menu

SELECT COLOR TEMP – See Figure 5.17. Upon opening the *Color Temperature Setup* menu, the current temperature appears as the top option. You can change to a different color temperature here as desired, just as in the *Image Settings* menu. Note that selecting a "User" color temperature, enables the "White Level" options in the *Color Temperature Setup*—you can adjust them as desired to define or change a "User" color temperature (see "White Levels", below). Likewise, selecting "Interpolated Color" here activates the "Interpolated Color" slidebar for defining or changing an interpolated color temperature for a connected source.

INTERPOLATED COLOR – Select this option if you need a specific color temperature that lies somewhere between one preset color temperature and another. Adjust the slidebar to define a new temperature which will be interpolated from the neighboring presets (for example, 7841 is interpolated from 6500 and 9300). It can be used any time and appears as a 4-digit temperature when in use. NOTE: This option is disabled unless you have a source connected and have selected "Interpolated Color" in the "Select Color Temp" pull-down list.

WHITE LEVELS –These 3 controls are adjustable only if a "User" choice is selected (in which case "User 1, 2, 3 or 4" appears at the top of the *Color Temperature Setup* menu). Their current values are shown for the active color temperature. Changing a white level here changes the drive (contrast) for that color, essentially creating a new color temperature that is "warmer" or "cooler" etc. ***For maximum overall brightness, always keep at least one white level at 100.*** When you are satisfied with the new "User" temperature, it can be used immediately upon exit or it can be selected from either the *Image Settings* menu or the *Color Temperature Setup* menu as usual. You can re-define a "User" color temperature at any time using the *Color Temperature Setup* menu.

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

COPY FROM – Use this option to replace the currently selected "User" color temperature setup with that of another. This function can be particularly useful as a starting point for a new "User" color, or for accessing an unaltered factory default. It is disabled for all color temperatures *except* "User". See Figure 5.18.

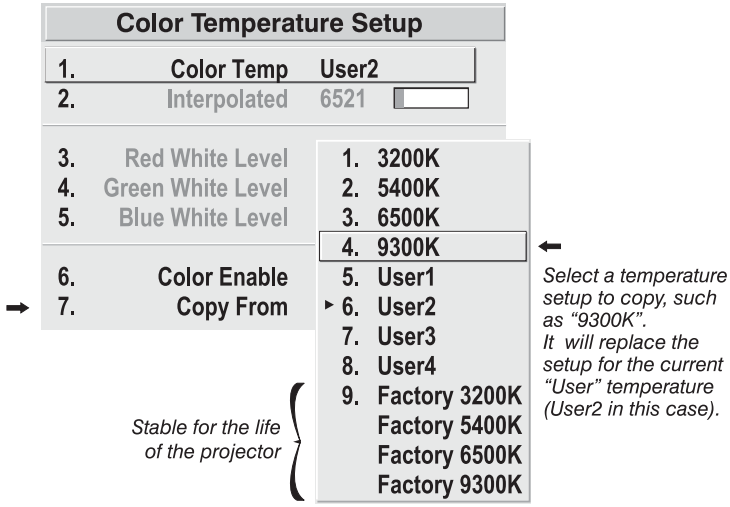


Figure 5.18. Using "Copy From"

To create a starting point: To set a starting point for a new custom user color temperature, select a user temperature, then highlight "Copy From" and select a temperature that is similar to what you want. Adjust white levels from there as desired.

To use a factory default: The preset color temperature setups (3200K, 5400K, 6500K and 9300K) can be altered from within the password-protected *Service* menu only—note that although such an alteration changes the *setup and appearance* for a preset, it does not change its *name*. If you suspect that you are using a preset temperature that has been altered and you want instead to use the original factory-calibrated color temperature without clearing the entire projector memory, you can use the "Copy From" option in the *Color Temperature Setup* menu to set up a "User" temperature with settings from a permanent factory preset:

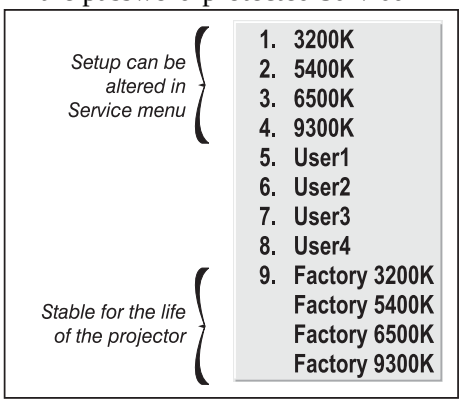


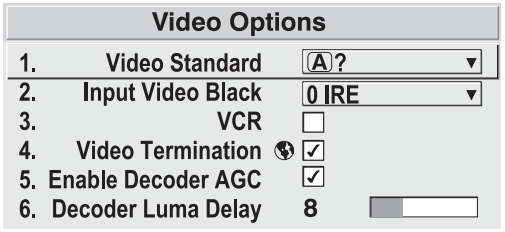
Figure 5.19. Presets and "Factory" Presets

1. Select the "User" color temperature you wish to update at the top of the *Color Temperature Setup* menu, such as "User 2".
2. From the "Copy From" list, select the matching temperature labeled "Factory" (such as "Factory 5400K"). These are the calibrated color temperatures set at manufacture—they remain intact for the life of the projector.
3. The setups for the "User" color temperature you selected at the top of the *Color Temperature Setup* menu will now be updated/replaced by those for the permanent factory calibrated temperature you selected in the "Copy From" list. Again, a "User" temperature can be altered at any time, if desired.

Video Options

Not available to graphics sources.

Use the *Video Options* submenu to precisely control processing parameters that are unique to video signals.



VIDEO STANDARD – The Cine-IPM automatically detects the video standard present and displays the name of this standard here. Press Enter to view or select a different video standard from a complete list available to the Cine-IPM (some will appear disabled, depending on the current incoming signal). Selecting a specific standard forces the Cine-IPM to process the signal according to this standard.

NOTE: Keep at "Auto" for all instances EXCEPT: 1) a poor quality input signal or 2) a black-and-white video signal. In order to detect and display such signals, select the relevant standard.

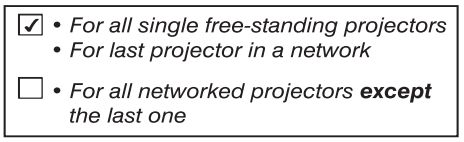
INPUT VIDEO BLACK – This control compensates for elevated incoming black levels–called "setup"–that are present in certain video signals, and ensures that blacks on screen are neither crushed (i.e., with dark gray appearing black) nor excessively elevated (i.e., with black appearing dark grey. By default, the Cine-IPM automatically determines the correct setting according to the type of incoming video signal:

- **0 IRE** – For DVD output with "enhanced black", SECAM, most PAL standards, and Japanese NTSC.
- **7.5 IRE** – For most NTSC video signals.

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

VCR – This control determines to what degree the Cine-IPM tolerates signal disturbances. The correct setting is automatically determined and set according to the type of incoming source signal–for instance, there should be a checkmark for all VCR sources. The VCR option may require a change from its auto setting in very rare circumstances only, such as if you are having difficulty switching between two unusual and almost identical VGA computer sources. Otherwise, it is not necessary to change this option.

VIDEO TERMINATION – Enter a checkmark to terminate the video inputs 3 and 4 (75 Ω). The input should be terminated unless the signal loops through (continues) to another Cine-IPM or display device, in which case only the last device in the chain should be terminated.



ENABLE DECODER AGC – The "automatic gain control" affects decoded video images only. Enter a checkmark (default) for most decoded video sources—this activates the AGC circuit to ensure properly bright images. Delete the checkmark if a decoded

video image exhibits strange color artifacts such as stripes in highly saturated colors, indicating an incompatibility between this source and the AGC.

DECODER LUMA DELAY – This control affects any incoming composite or S-video signal, delaying the luma signal (intensity) in relation to the chroma (color). In the image, increasing the luma delay will move luma (seen as a shadow where colors overlap) to the right slightly, with colors remaining in place. Decreasing this delay will move the shadow slightly to the left. If necessary for your current source, adjust so that no shadows occur with adjacent colors.

Input Levels

*NOTES: **1)** The Cine-IPM automatically optimizes input levels for all but the most unusual of sources—it is recommended that only experienced users use the **Input Levels** menu—. **2)** Keep overall contrast and brightness settings near 50 **and** ensure that color temperature is properly set up on an internal grayscale test pattern before attempting an input level adjustment. **3)** There must be at least one white pixel present in the image for proper "Auto Input Level" function. Leave this control **off**.*

Good RGB or input levels—that is, the *drives* and *blacklevels* for each of the three colors, red, green and blue—ensure that images from analog sources other than decoded video have maximum contrast without crushing black or white. By default (and in an "Auto Setup" from the *Main* menu), the Cine-IPM automatically determines the best input levels by monitoring image content and adjusting the controls appropriately—further adjustment is typically not required to obtain proper blacks or whites. *NOTE: This automatic adjustment requires at least **1 white pixel** in the image. Without a white pixel, input levels may produce skewed colors, particularly in non-video images.*

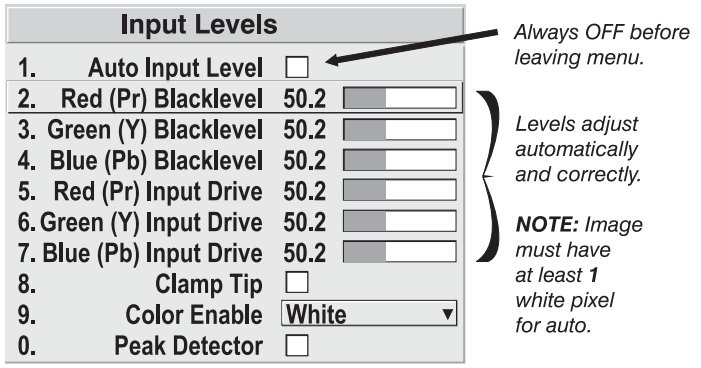


Figure 5.20. Input Levels Submenu

However, for a very unusual source exhibiting overly high blacklevels (most often caused by a noisy source that causes blacklevel spikes), an experienced user may prefer to use the *Input Levels* menu (see Figure 5.20). These adjustments, which are actually a calibration process to compensate for differences in sources and cabling, enables an experienced user to perfect the source image input levels. Note that *Input Levels* are of limited use with digital signals, but offer some ability to tweak poorly mastered source materials.

AUTO INPUT LEVEL – Keep off for virtually all sources (default). Temporarily enter a checkmark *only* if you are an experienced user and you have an unusual source that you feel needs further color temperature and/or input level adjustment. After entering a checkmark, wait for the six values to stabilize, then delete the checkmark and exit.

BLACKLEVELS AND DRIVES - To check your image and adjust these controls:

1. Make sure overall Contrast and Brightness are both set to near 50. *NOTE: Not required for "Auto" adjustment.*

   Cont = 50 (approx.)

   Bright = 50 (approx.)
2. Check the color temperature setup using an internal grayscale test pattern, adjusting as desired to obtain a neutral grayscale. *NOTE: Not required for "Auto" adjustment.*
3. Make sure you are using an analog source ***not*** connected to **INPUT 3** or **INPUT 4**, as Input Levels are not applicable for digital sources or sources going through the decoder. A grayscale is recommended.
4. If the blacks and/or whites appear OK, input levels do not need adjustment. If black levels are too high (and/or whites are too low, which is rare), you likely have a noisy source that is producing skewed input levels. Continue with Step 5.
5. Temporarily enable "Auto" in the *Input Levels* submenu. Wait for all 6 values to stabilize. Alternatively, do *not* use "Auto"—reduce blacklevels manually instead. Judge by eye and change one or more of the six levels as necessary to obtain proper blacks and whites. You may want to see only a certain color while adjusting—use the "Color Enable" option (described below).
6. Delete the "Auto" checkmark and leave the *Input Levels* menu.

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

CLAMP TIP – This option (full name *sync tip clamping*) can brighten the image produced from certain high resolution, high frequency graphic sources. Enter a checkmark if the image appears unusually dim, if there are horizontal streaks across the image, or if there is significant color drift. Delete the checkmark if the image is either sufficiently bright or overly bright.

NOTE: The sync tip clamping option is not used for video sources or any RGB source with sync information on the video (e.g., sync-on-green).

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

PEAK DETECTOR – The Peak Detector is fast method of defining individual input levels, and may improve the accuracy of input levels set by the Auto Input level function. Enabling the Peak Detector activates a special operating mode that detects ***only*** pixels that are considered black or white—all other levels are displayed as a mid-level gray. When used with a 16-step grayscale pattern, where the black and white bands are known to be at the edges of the image, you can watch these isolated areas while adjusting individual blacklevels and input drives as necessary. Images from this source will then display correct blacks and whites without crushing.

See Figure 5.21.

1) Display a 16 level grayscale test pattern from the desired external source, and enter a checkmark in the Peak Detector checkbox. *NOTE: The "Peak Detector" will initially render the grayscale as a uniform gray field before adjustment.*
2) Display one primary color (use *Color Enable* to select).

3) For the current color, adjust its corresponding "Blacklevel" slidebar ***just*** until a single band of black appears at one edge of the screen. This band represents the first band of the grayscale pattern, which should be 100% black. Do not adjust too far.

4) With the same color still active, adjust its corresponding "Input Drive" slidebar ***just*** until a single band of white appears at the opposite edge of the screen. This band represents the last band of the grayscale pattern, which should be 100% white. Do not adjust too far.

5) Go back and check the black band—adjust the blacklevel slidebar if necessary. Adjustments are related, so you may have to go back and forth until both bands are ***just*** optimized.

6) Repeat Steps 2-5 with the other two remaining primary colors. When each primary color shows ***one*** optimized black band and white band, the input levels for this source are correctly set. Upon exiting the *Input Levels* menu, the Peak Detector checkbox will clear.

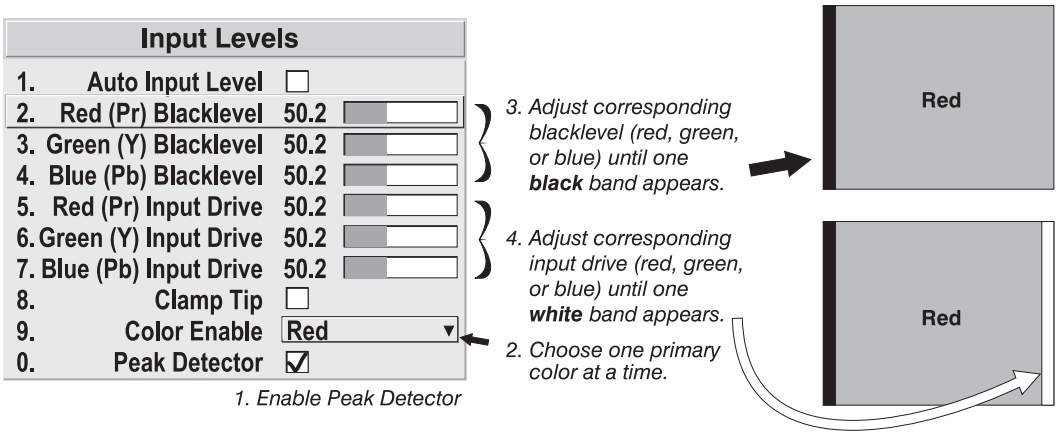
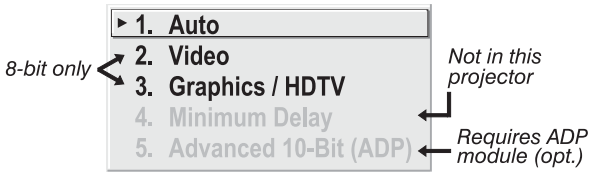


Figure 5.21. Adjusting Input Levels Using the Peak Detector
("RED" EXAMPLE SHOWN)

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

Processing Mode

This control determines the incoming signal's processing route in the projector.



1. **AUTO** (default): The projector will automatically select the correct processing mode according to what input signal it detects. Use "Auto" unless you want or need to override its performance and apply a specific mode instead.
2. **VIDEO:** Performs 15 kHz NTSC/PAL video de-interlacing, regardless of signal type. Note that this option utilizes 8-bit processing.
3. **GRAPHICS / HDTV:** Performs basic de-interlacing and scaling, regardless of signal type. Note that this option utilizes 8-bit processing.
4. **MINIMUM DELAY:** Not used in this projector.
5. **ADVANCED 10-BIT (ADP):** Not functional in this projector.

Motion Filter

This control is most useful for smoothing out moving images from interlaced sources. In most cases the proper Motion Filter setting is automatically determined according to the type of incoming source signal. However, if your source is noisy and/or inconsistent you may wish to "force" a setting to ensure stable processing for this source—if desired, override the default "Auto" setting by selecting the appropriate motion filter:

1) **AUTO:** The Cine-IPM will automatically use the correct motion filter according to the incoming signal. Note that the "Still" filter will be applied for RGB *non*-HDTV interlaced signals, and the "Motion" filter will be applied for RGB HDTV interlaced sources.
2) **STILL:** For static images with no motion, such as graphics from a CD. *Note: Applied for RGB* ***non****-HDTV interlaced signals.*
3) **VIDEO:** For video images that did not originate from film, or for moving computer-generated images. *NOTE: Applied for RGB HDTV interlaced signals.*
4) **FILM:** For video images that originated from film. This will optimize image quality and stability.

   NOTES: ***1)*** *For 60 Hz video standards: NTSC, NTSC 4.4, PAL M, PAL 60.* ***2)*** *Signals can be from RGB video, composite video or S-video sources.*

Noise Reduction

Not functional in this projector.

Horizontal Filter

Not functional in this projector.

Vertical Filter

Not functional in this projector.

PLL Loop Gain

See description in ***Size and Postion***.

Reserved (8)

No function.

5.8 Configuring System Parameters

Use the *Configuration* menu to display and/or alter global Cine-IPM operating parameters that typically apply regardless of source, or to work with other settings that are not unique to the current incoming source.

NOTE: For experienced users/technicians only.

System Configuration And Diagnostics

In the *Configuration* menu, you can define a variety of general Cine-IPM system parameters to suit your preferences, run certain diagnostic tests, and access the Cine-IPM *Service* menu (password required). Settings in the *Configuration* menu will typically apply regardless of the type of source you are using.

Reserved

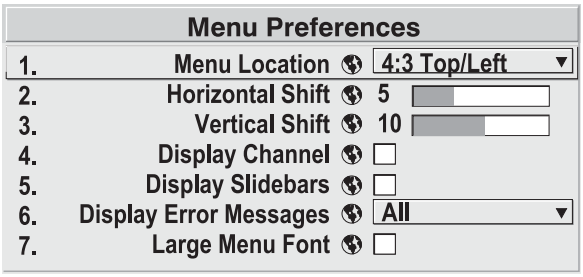
No function.

Language

Choose from English, French, Spanish, German and Italian language. The menus will change immediately upon selection of a new language.

Menu Preferences

Choose the options in this menu to adjust the appearance, content and/or location of on-screen menus displayed in presentation level.



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

To create a custom menu location, choose a preset that is closest to the desired area. Then adjust the slidebars of *Horizontal Shift* and *Vertical Shift* to move the menu to the desired location. To prevent cropping of larger menus, avoid locations too close to a corner or edge.

HORIZONTAL SHIFT AND MENU SHIFT — Shift your menus as desired, creating a customized menu location.

DISPLAY CHANNEL LIST — Enter a checkmark if you want to see a scrollable channel list whenever you press Chan from your presentation. These channels must be marked with a list icon in the *Channel Setup* menu. This option also enables on-screen feedback when using the Input key. If you prefer to hide the channel list and input dialog box while switching channels and sources during a presentation, do not enter a checkmark.

NOTE: The Channel List and input dialog box cannot be hidden when a menu is displayed.

DISPLAY SLIDEBARS — Enter a checkmark to superimpose a small slidebar over the current image whenever an adjustable parameter is selected directly with a key (the option does not affect slidebars in menus) such as Cont, Position, Pixel or Bright. If "Display slidebars" is unchecked, these slidebars can still be accessed, but will be hidden during adjustment.

DISPLAY ERROR MESSAGES — Choose in what way you want to be notified of errors detected in either the incoming signal or Cine-IPM. Select "Screen" or "All" to see a brief on-screen messages or select "RS232" to be see messages via RS232 and RS-422 serial communication only. To disable error message display, select "Off".

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

Communications

This submenu of the *Configuration* menu is fully described in a separate *System Communications* subsection later in *Section 5*.

Reserved (#5 and 6)

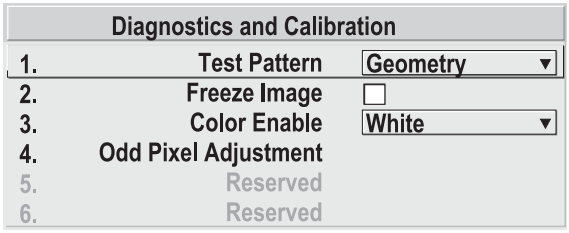
No function.

Auto Power Up

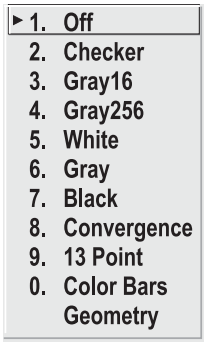
By default, the Cine-IPM powers up automatically whenever its main power switch is ON and AC is supplied. To prevent an auto power-up, delete the checkmark.

Diagnostics and Calibration

From the *Diagnostics and Calibration* submenu you can access several options for testing and setup. You can work with test patterns and specific colors, freeze an image for inspection, and/or access the *Odd Pixel Adjustment* menu for precision settings of offset and gain.



TEST PATTERN — Use the pull-down list to select and display an internal Cine-IPM test pattern. Select OFF to turn off the test pattern display.

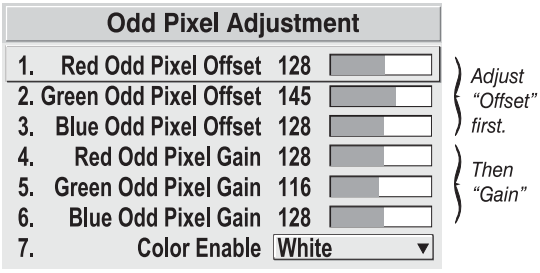


(SHORTCUT: Use [Test] key to scroll through patterns.)

COLOR ENABLE — Refer to description under *Image Settings*.

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

ODD PIXEL ADJUSTMENT – *For sources with Color Space set to RGB only.*



When using certain RGB sources with still images, you may need to adjust the normal gain or offset of odd pixels in relation to even pixels. This will smooth out very narrow (1-pixel wide) "checks" or vertical stripes that indicate adjacent "on" and "off" pixels. You can remove these patterns as follows:

1) Use an external grayscale test pattern with both dark and light gray areas.
2) Display the image in its native resolution – select "*No Resizing*" by accessing *Resize Preset* in *Size and Position menu.*
3) Display a single color—choose from a "*Color Enable*" list or use the keypad shortcuts indicated on the back of the keypad.

4) Examine an area of darkest gray (but not black). If there is a 1-pixel wide pattern present, adjust "*Odd Pixel Adjustment*" ***offset*** for the current color. Stop when the pattern disappears and the area is smooth.

5) Examine an area of lightest gray (not white). If there is a 1-pixel wide pattern present, adjust "*Odd Pixel Adjustment*" ***gain*** for the current color. Stop when the pattern disappears and the area is smooth.

6) Repeat for each color, adjusting offset then gain for each.

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

Reserved

No function.

Service

The *Service* submenu offers the ability to enable or disable Cine-IPM service passwords, and to work with factory-defined color temperatures and other functions for the Cine-IPM. This submenu is password-protected and intended for use by qualified service technicians only.

System Communications

Use the checkboxes and pull-down lists in the *Communications* menu to alter the methods or types of communication to and from the Cine-IPM. Changes made to the *Communications* menu will be saved when you exit the menu.

*NOTE: With the exception of baud rate, **Communications** menu options are needed in multiple-Cine-IPM/projector installations only.*

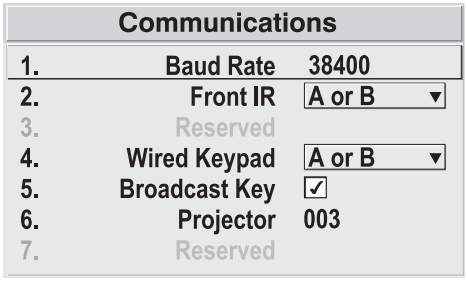
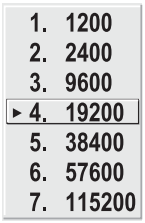


Figure 5.22. Communications Menu

Baud Rate

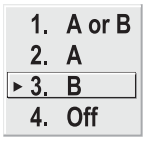
The baud rate setting determines the speed of communications to and from the Cine-IPM. By default, the Cine-IPM baud rate is set to 19200. Setting the correct speed is important when you are controlling the Cine-IPM with an external device such as a computer (or another Cine-IPM) via an RS-232 or RS-422 port. Set the Cine-IPM baud rate at these ports to match the baud rate of the controlling device. If you are unsure about which baud rate to choose, refer to the documentation for the controlling device. In an existing network, if you discover that a Cine-IPM has the wrong baud rate, make sure to use the pull-down list and select the correct baud rate with the Enter key—do not just scroll this control with ◄– and +► .



(Default)

*NOTE: **1)** The baud rate setting does not affect the switcher port, which is always 9600 baud. **2)** See **2.9, Connecting Serial and Ethernet Communications** and **Appendix D** for more information about cable connections between devices.*

Front IR



As described in *Section 2*, the optional IR remote keypad is capable of sending data to the Cine-IPM in either one of two protocols called **A** or **B**. Likewise, the sensor on the Cine-IPM can be set to accept IR data accordingly, responding to **A**, **B** or both. The Cine-IPM's **A or B** default is adequate for most single-projector cinema installations and should not be changed. Select a specific protocol only to prevent interference when you are controlling two protectors in the same area and want to work with one projector at a time. *For use with a single Cine-IPM/**DCP**, it is recommended that you do not change protocol for keypads or sensors.*

As a safeguard, you cannot accidentally select an option in the "Front IR" list that would disable the IR keypad during use—such options are automatically disabled in the list. In other words, you cannot switch directly to the opposite protocol or select **OFF** using the IR keypad. Instead, to disable the IR keypad or change the Cine-IPM's sensor to the opposite protocol, you must use the *wired* remote keypad to execute the change. The Cine-IPM will no longer recognized the IR keypad protocol previously in use.

*NOTES: 1) The IR remote keypad is set at manufacture to "Protocol A". See **2.10, Keypad Protocols and Conversion** for information about changing the keypad protocol. 2) A key press from a conflicting protocol will cause a single yellow flash on the Status LED located in the lower right corner of the Cine-IPM connector panel.*

⚠ IMPORTANT ⚠
Keep at "A OR B" (default) unless you are sure of the current IR keypad protocol.

Reserved

No function.

Wired Keypad

NOTE: This function is used in multiple-projector installations only.

Like the IR remote keypad, the wired keypad is either a "Protocol **A**" keypad (default) or a "Protocol **B**" keypad. Likewise, the Cine-IPM can be set to accept wired keypad data accordingly, responding to **A** and/or **B**. The Cine-IPM's **A or B** default is adequate for most single-projector cinema installations and should not be changed. Select a different protocol only to prevent interference when you are controlling two protectors in the same area and want to work with one projector at a time. *For use with a single Cine-IPM/**DCP**, it is recommended that you do not change protocol for keypads or sensors.*

*NOTE: The wired keypad for this projector is set at manufacture to "Protocol A". See **2.10, Keypad Protocols and Conversion** for information about changing the keypad protocol.*

ADDING A PROTOCOL: To add a protocol, select the **A or B** option.

CHANGING A PROTOCOL: As a safeguard, you cannot accidentally select an option in the "Wired Keypad" list that would disable the wired keypad during use—such options are automatically disabled in the list. In other words, you cannot switch to the opposite protocol or select **OFF** using the wired keypad. Instead, if you want to

quickly change to the other protocol, you may find it more convenient to use the IR remote to execute the protocol change for the wired keypad. The Cine-IPM will now recognize only the opposing wired keypad protocol. Or, if you prefer, use the wired keypad to safely change its own protocol:

1. Select the **A or B** option. This will ensure that once your keypad protocol is manually changed (see Step 2), it will still be recognized by the projector.
2. Unplug the keypad and change the protocol in the keypad as desired. Do this either by entering the short-cut software command or by hard-wiring the keypad as described in *2.10, Keypad Protocols and Conversion*.
3. Plug the keypad back into the projector. Return to the *Communications* menu and select the new protocol you have just set up in the wired keypad. The Cine-IPM will now recognize this new wired keypad protocol only.

TURNING OFF THE WIRED KEYPAD: Use the IR remote keypad to select **OFF** in the "Wired Keypad" list. The Cine-IPM will no longer respond to the wired keypad.

Broadcast Keys

NOTE: This function is used in multiple-projector installations only.

Enter a checkmark if you want the Cine-IPM to relay keypad commands to all other Cine-IPMs/projectors in a network. Note the Proj key will temporarily "override" the effect of a broadcast setting and allow you to control a specific projector when necessary.

Projector

NOTE: This function is used in multiple-projector installations only.

Enter a three-digit number (such as "001") to assign or change a number to the Cine-IPM/projector currently in use–if the current Cine-IPM/projector already has a number assigned, that number will appear here. Numerical identity for projectors is required whenever you want to communicate with a single projector within a multiple-projector application (see Proj key description in *5.4 Using the Keypad*). If you make a mistake in assigning or changing the projector number, press Exit to cancel.

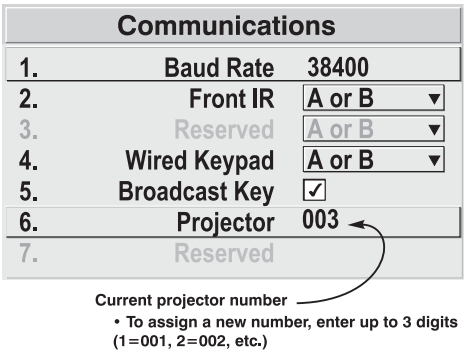


Figure 5.23. Projector Number

For complete information about controlling multiple projectors, see *Section 5.10.*

Reserved

No function.

Status ' This read-only menu lists a variety of details about the standard and optional components currently in use or installed in the Cine-IPM. Refer to the *Status* menu for versions of hardware (left side) and software (right side) installed, and for your

Cine-IPM serial number. In addition, the *Status* menu identifies the current channel, switcher, slot and frequencies present.

Use arrow keys to scroll for additional *Status* information.

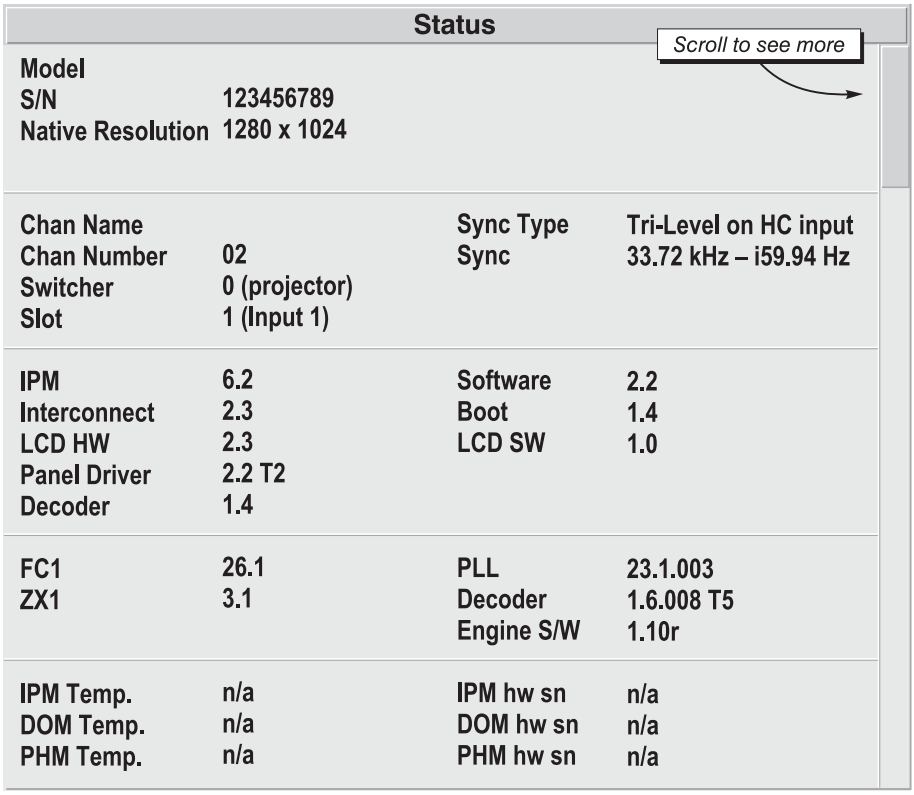


Figure 5.16. Status Menu (SAMPLE)

5.9 Creating Wide Displays

To create large wide-screen displays of non-cinema material such as HDTV and anamorphic video (likely from a DVD), you can work with the Cine-IPM's *Size* and *Vertical Stretch* controls in conjunction with your 1.5x anamorphic lens. Essentially you must first reduce *Size* to shrink the original display to within the SXGA width available to the projector (or less), then increase *Vertical Stretch* to elongate the image up to the maximum height of 1024 lines. When projected through the anamorphic lens, this "tall-and-thin" distorted image will widen back into a normal large image having the original aspect ratio.

The specific degree of adjustment for *Size* and *Vertical Stretch* depends on the original aspect ratio of your source material. See Table 5.1 as a guide.

Table 5.1. Modifying Size & Stretch for Use with 1.5x Anamorphic Lens

Original Source Type	#Pixels ↔	#Lines ↕
16:9 *(HDTV or anamorphic DVD)*	1215	1024
4:3 *(video or PC)*	910	1024
5:4 *(anything 1280 x 1024)*	853	1024
16.9 letterbox in 4:3 frame	1215	1024
1.85:1 letterbox in 4:3 frame	1280	1024
2.35:1 letterbox in 4:3 frame *	1280	806

** 2.35:1 letterbox does not fill the screen vertically*

NOTE: For non-cinema, use the 1.5x anamorphic lens only—the 1.9x is intended for source material that is already modified for cinema "scope" displays.

5.10 Multi-Unit Installations

In very rare cases, you may need to work with two or more adjacent **DCPs** for non-cinema "alternative" displays. You may want each projector to stand alone, or you may prefer to use the Cine-IPM RS-232 serial ports to chain the projectors together in a network that you control from either a keypad or a computer/controller (*see 2.9, Connecting Serial and Ethernet Communications*). You can switch back and forth between broadcasting to all projectors or controlling each projector individually.

Assigning a "Projector#"

Assign a unique projector number to each Cine-IPM/projector present—this number will be required in order get the exclusive attention of an individual projector. To assign a projector number:

Press Menu and select the *Communications* menu. In the *Communications* menu, scroll down to "Projector#" and enter a three-digit number (000 to 999) for identifying the current projector. Press Enter to accept the entry, or Exit to cancel.

Repeat for each projector, using a unique three-digit number for each. Once every projector has its own number, you can begin to control the network.

Controlling One Projector

If using an IR remote, make certain that only ***one*** (any) networked projector has its "Broadcast Keys" option selected (checked) and IR sensors enabled — the remaining projectors must have the "Broadcast Keys" option unchecked and their keypads disabled (do this in *Communications* menu). The "Broadcast Keys" projector will then relay keypad commands to the other projectors. If using a wired remote, make sure to select the "Broadcast Keys" option for the projector to which the wired remote is connected.

To work with a single projector, press Proj to display an editable window from each projector. Enter the three-digit number you have assigned to the projector you wish to control. All subsequent keypad commands will then affect this projector exclusively until you press Proj again and enter a different number, or until you switch to broadcast mode (below).

NOTE: If you are using a computer or controller to issue commands, use the correct RS-232 software command to gain control of a single projector.

Broadcasting to All Projectors Proj Proj

First make certain that only ***one*** (any) networked projector has its "Broadcast Keys" option selected (checked) — the remaining projectors must have the option unchecked and their keypads disabled (do this in *Communications* menu). The "Broadcast Keys" projector will then relay keypad commands to the others. If using a wired remote, make sure to select the "Broadcast Keys" option for the projector to which the wired remote is connected.

On either the IR remote or wired keypad, press Proj to display the projector box. Press Proj again *without* entering a number — the keypad commands will now affect all projectors.

NOTE: If you are using a computer or controller to issue commands, use the correct RS-232 software command to broadcast.

5.11 Error Conditions

Occasionally the Cine-IPM may encounter an error condition that interrupts normal operation. Such a condition can be caused by an invalid user entry, an input signal error (most common) or other system error.

If you would like to be notified on-screen of such errors, select the “Screen” option from the “Display Error Messages” pull-down list (in *Menu Preferences* menu). If you would like to be notified via a serial communication only, select the “RS-232” option instead. To receive both notifications, select “All”. To disable error messages (except for invalid user entries), select “Off”.

NOTE: Error messages also always appear at the LCD on the Cine-IPM.

User Errors

Invalid User Entry

Any keypad entry not recognized by the Cine-IPM will trigger an on-screen error message describing the problem. For example, if you specify a channel number that has not been defined, the message “*Invalid Channel* will appear. Or if you try to enter the wrong password, you’ll see “*Invalid Password*”. Press Enter or Exit to confirm the message and eliminate the message box.

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

Input Signal Errors

Input signal errors messages appear when you are in presentation level (i.e., when there are no menus present) and have selected an input on which the Cine-IPM detects a problem. While menus remain operational and pressing any key will temporarily remove the message from the screen, you must resolve the signal problem in order to permanently eliminate the message.

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

No Signal

The message *"No signal"* appears when there is no signal detected at the selected input. Both HSYNC and VSYNC are inactive and the screen background is black. Connect or correct the signal, or select another input.

Bad Sync

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

Other Signal Error Messages

In addition to the common *"Bad Sync"* and “*No Signal*” errors, you may encounter a signal error message indicating that Hsync and/or Vsync are either too fast or too slow. When such a message appears, check the frequencies shown in the *Status* menu. If they are correct, then the signal is not recognized by the projector. On some PCs you may be able to change the settings to generate a compatible signal. If the frequencies shown in the *Status* menu are incorrect, check the cabling to see where the problem is.

System Warnings / Errors

When the Cine-IPM encounters a system malfunction, either a System Warning message or a System Error message may appear. Both types of messages are accompanied by a steady red "Power" LED and a flashing red-and-yellow error code on the "Status" LED. This condition indicates the need for service by a qualified service technician.

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

System Warnings

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

System Errors

A system *error* message indicates that a serious malfunction has been detected and must be reported to the manufacturer (see *Status LED Codes*, below). The Cine-IPM will no longer operate and must be reset—power it down and up again with the Power* key.

The Status LED Codes

If the "Status" LED on the Cine-IPM connector panel repeatedly flashes a pattern of yellow and red light while the "Power" LED glows a continuous red, you have encountered a likely system error requiring the attention of a qualified service technician (see *System Warnings* and *System Errors*, above). Try resetting the Cine-IPM by powering it off and on again, cooling when necessary. Consult Table 5.12 and contact your dealer if the problem persists.

The specific pattern of flashing indicates the 2-digit code identifying the type of problem encountered—the number of yellow flashes represents the first digit and the number of red flashes indicates the second digit. For example, a pattern of "yellow-yellow-yellow" (3 flashes) "red-red-red-red-red-red-red" (7 flashes) is "Code 37", meaning there is a general IPM failure. These codes are listed in Table 5.12.

Table 5.12. System Error Codes

Code	Description
GENERAL	
12	Software bug. Contact dealer/factory.
13	CRC error in flash ROM. Download new software.
14	Replace IPM
15	Attempting to download code without being in boot mode
16	Invalid interrupt. Power off/on. If persists, contact dealer/factory.
IMAGE PROCESSOR MODULE	
31	Boot code CRC failed
32	Unable to program the Sync Xilinx part
33	Unable to program a device on Altera programming bus
34	Unable to program a device on JTAG programming bus
35	Unrecognized ROM type
36	Write to flash ROM failed
37	General IPM failure
38	Code being downloaded will not fit in ROMs
LIGHT ENGINE ELECTRONICS	
41	Unrecognized Panel Driver Module (PDM)
42	Unable to program a device on Panel Driver programming bus
43	Panel Driver/optical system communication problem
44	Red Formatter/flex cable problem
48	Download failure in display engine
POWER & COOLING	
55	Low voltage power supply failed to turn on
INTERCONNECT OR CHASSIS I.D.	
71	Unable to access EEPROM on the ICM
72	EEPROM memory has re-initialized
VIDEO DECODER MODULE (INPUT 3 OR 4)	
81	Unable to program the video decoder (VDM)
OPTIONAL INTERFACE MODULE	
91	Unable to program the option card

If you encounter a system error, try resetting the Cine-IPM by powering it off and on again. Contact dealer/factory if error persists.

Section 6

Maintenance

6.1 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.

Labels and Markings

' Observe and follow all warnings and instructions marked on the projector.

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

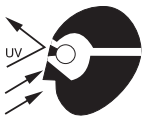
The lightning flash and arrowhead symbol within the equilateral triangle indicates non-insulated "dangerous voltage" within the projector's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

General Precautions

' Be aware of the following general precautions in all **DCP** installations:

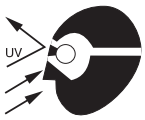
⚠ WARNING ⚠

Never look directly into the projector lens or at the lamp. The extremely high brightness can cause permanent eye damage.



⚠ WARNING ⚠

For protection from ultraviolet radiation, keep all projector housings intact during operation. Protective clothing and safety goggles are recommended.



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

⚠ WARNING ⚠

FIRE HAZARD. Keep hands, clothes, and all combustible material away from the concentrated light beam from the lamp.

⚠ WARNING ⚠
Position all cables where they cannot contact hot surfaces or be pulled or tripped over.

This projector must be installed on the floor only, and operated in an environment which meets the operating range specifications in *Section 8, Specifications.*

⚠ WARNING ⚠
Opening or removing a projector cover requires a qualified service technician.

AC / Power Precautions

Installation of this projector requires that an electrician hard-wire a 3-phase (Y) feed ***and*** a separate 15A single-phase feed from the pedestal toe to the AC supply in your building. You must also use ***only*** the correct pedestal for your geographic area as described in *Section 1*. Operate the projector at the specified voltage.

⚠ WARNING ⚠
Do not attempt operation if the AC supply and pedestal are not within the specified voltage range.

Do not allow anything to rest on the power cord. Locate the projector where the cord cannot be abused by persons walking on it or objects rolling over it. Never operate the projector if the power cable appears damaged in any way.

Do not overload power outlets and extension cords as this can result in fire or shock hazards.

Note that ***qualified service technicians only*** are permitted to open any enclosure on the product, and ***only if AC has been fully disconnected at BOTH wall breakers***.

⚠ WARNING ⚠
SHOCK HAZARD. Disconnect from AC before opening any enclosure. Disconnect at *BOTH* wall breakers.

Lamp Precautions

Any Xenon arc lamp used in the DCP is 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 lamphouse unless you are wearing authorized protective clothing such as that included in a *Christie Protective Clothing Safety Kit #598900-095*. Recommended protective clothing includes—but may not be limited to—protective gloves, polyethylene 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 lamphouse is open!

⚠ WARNING ⚠
Never attempt to remove the lamp directly after use. The lamp is under increased pressure when hot and may explode, causing personal injury and/or property damage.
Allow to cool completely.

*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 lamphouse. 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 ⚠

• Never attempt to open the lamphouse while the lamp is on
• Wait at least 10 min. after lamp shut-off before powering down, disconnecting from AC and opening the lamphouse.

⚠ WARNING ⚠

SHOCK HAZARD. Disconnect from AC at *BOTH* wall breakers before opening the lamphouse.

For all other precautions critical for safe removal and replacement of the lamp, refer to *6.4. Replacing the Lamp & Filter*.

6.2 Maintaining Proper Cooling

The DCP 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.

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.

Air Filter

It is recommended that you replace the air filter located near the bottom of the projector 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. See *6.4, Replacing the Lamp & Filter* for instructions.

Liquid Cooler

The liquid cooler circulates liquid to and from the DMDs in the DCP projector "head", reducing their operating temperature to an acceptable level. To confirm that the cooler is functioning normally, momentarily pinch one of its hoses while the DCP is running. If you hear a BEEP, the cooler is functioning normally. If there is NO beep, the cooler is either off or there is a problem with the flow.

FILLING THE COOLER: The cooler should require filling only once, upon installation (see *2.1, Mounting and Connecting Components*). Fill with one liter of a 50/50 mix of distilled water and ethylene glycol.

*NOTE: See **3.1, Projector Basics** for all cooler operating details.*

Lamp Fan & Airflow Interlocks ' Check/maintain both of these every 6 months as described in *6.3, General Maintenance and Cleaning*.

Exhaust Duct ' Adequate airflow must be maintained within the exhaust duct connected at the top of the lamphouse and routed to outside of the building. Inspect regularly and confirm that 1) there are no obstructions or "kinks" within the ducting, 2) all air *intake* areas of the **DCP** are unobstructed, and 3) exhaust airflow is within the range shown in Table 2.1.

*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. **Check the airflow periodically**.*

6.3 Maintenance and Cleaning

To help ensure optimized performance and reliability, regularly check electrical, optical and other components as described below.

⚠ WARNING ⚠

SHOCK HAZARD. Disconnect from AC at *BOTH* wall breakers.

Electrical '

AC Connections

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.

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 polyethylene 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 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 the color of the reflector surface may vary—this 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:

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

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:

1. Brush most of the dust off with a camel-hair brush and/or blow dust away with compressed air.
2. 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.

Other Components

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

LAMP FAN — A clogged lamp fan impeller or motor can reduce air flow, leading to possible overheating and failure of the lamp and lamphouse. 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 — Check and, if necessary, clean the "intake" and "exhaust" airflow interlock vanes to remove accumulated dust or dirt. The intake interlock vane assembly is located within the plenum, near the top. The exhaust interlock vane assembly is located near the roof of the exhaust duct.

6.4 Replacing the Lamp & Filter

The high brightness of your projector is provided by a Xenon lamp mounted at two ends within a reflector and housed in a locked lamphouse. When the lamp approaches the end of its life, it must be replaced—do not exceed warrantied lamp life by more than 20%, as an old lamp becomes increasingly fragile.

The DCP does not track a lamp's age automatically. To determine the age of your current lamp, consult the lamp log sheet posted near the projector (log sheet also provided in *3.5, Working With the Lamp*).

It is recommended that you replace the air filter with every lamp replacement, or sooner in dusty or dirty environments. Check monthly.

Lamp Replacement Procedure

*NOTES: 1) For this procedure you will need a compatible Christie Xenon CXL lamp as shown in **Section 8, Specifications**. Never install a lamp intended for a different DCP model or lamphouse. 2) Refer to Figure 6.1 for identification of lamp components.*

⚠ WARNING ⚠
Make sure to use the correct wattage lamp supplied by Christie.

⚠ WARNING ⚠
Lamp replacement is to be done by a qualified service technician only.

⚠ WARNING ⚠
EXPLOSION HAZARD —Wear authorized protective clothing whenever the lamphouse is open! Never apply a twisting or bending force to the quartz lamp body.

Read and follow all other general lamp precautions in *6.1, Warnings and Guidelines*.

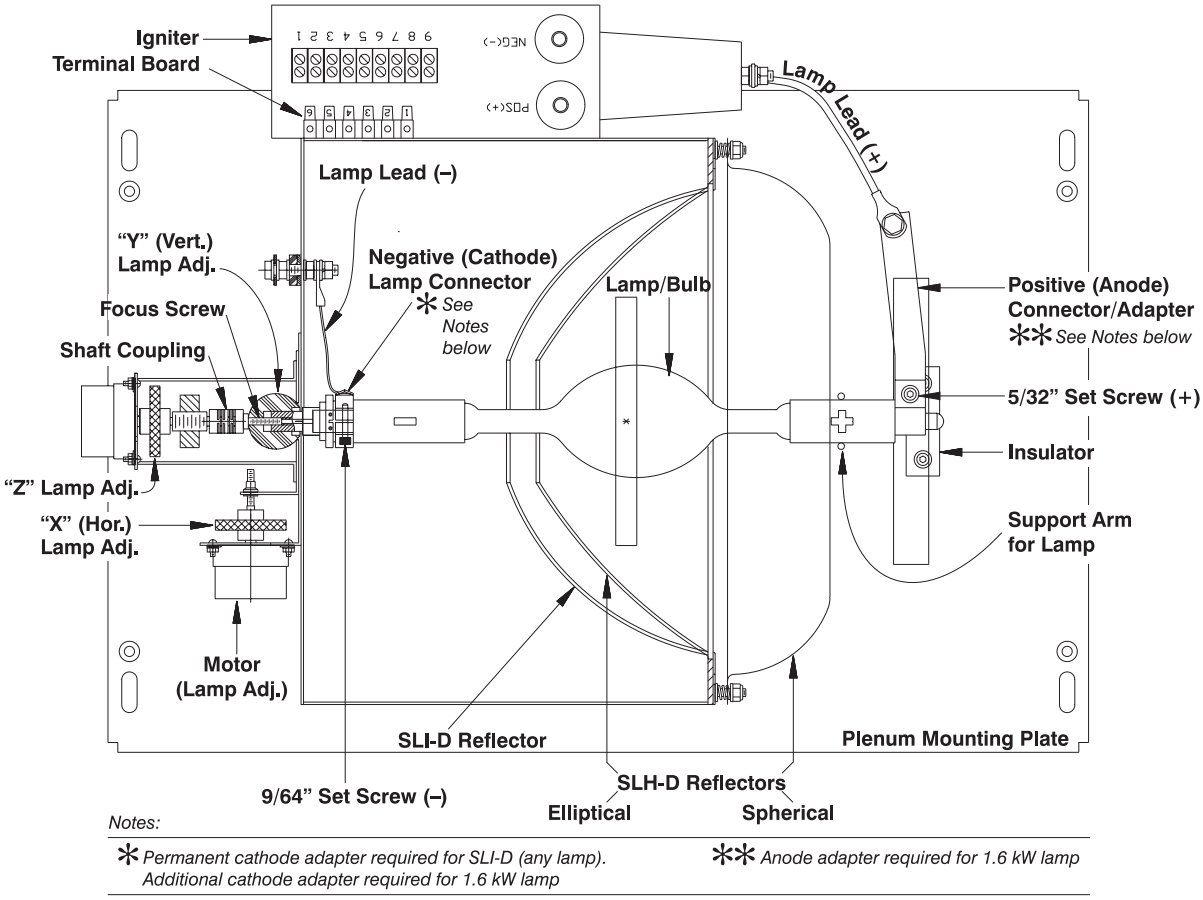


Figure 6.1. Top View of Plenum (i.e. Lamp Area)

Before You Begin (NOTES FOR SLI-D MODEL)

The SLI-D lamphouse includes a permanent "adapter" attached to the rear (cathode) connector, essentially shortening the lamp space. Do not remove this adapter—it is required for all SLI-D lamps. In addition, be aware of the following other hardware configurations when installing a lamp in the SLI-D lamphouse (Table 6.1), particularly if you are switching from one size lamp to another:

Table 6.1. Special Needs for SLI-D Lamps

SLI-D Lamps	Other Adapters? ✻	Spacers?
1.6 kW	2 *(1 at each end)*	no
2.0 kW	no	no
3.0 kW	no	yes ✻

✻ *NOTE: For any lamp, the permanent common adapter must be **present** in the SLI-D.*

LOCATION OF SPACERS: Figure 6.2 illustrates the 2 different locations for rear spacers in any SLI-D lamphouse—depending on their location, these spacers move the horizontal adjustment box closer to or further from the opposing connector (anode) so that each of the three different-sized SLI-D lamps fit in the lamphouse. For 1.6 kW or 2.0 kW lamps, locate the spacers as shown in Figure 6.2A. For a 3.0 kW lamp, locate the spacers *in front* of the horizontal adjustment box as shown in Figure 6.2B, essentially moving this box backwards to accommodate the extra length of this lamp. To move the spacers:

- Remove the rear panel of the SLI-D lamphouse.

- Remove the ④ *nut* and ③ *washer* securing the ② *spacers* with the ① *horizontal adjustment box*.
- Move all three spacers (②) as shown for your specific lamp in Figure 6.2.
- Re-secure all ④ *nuts*, ③ *washers*, ① *horizontal adjustment box* and ② *spacers* to the ⑤ *horizontal adjustment plate.*
- Re-install the rear panel of the SLI-D lamphouse.

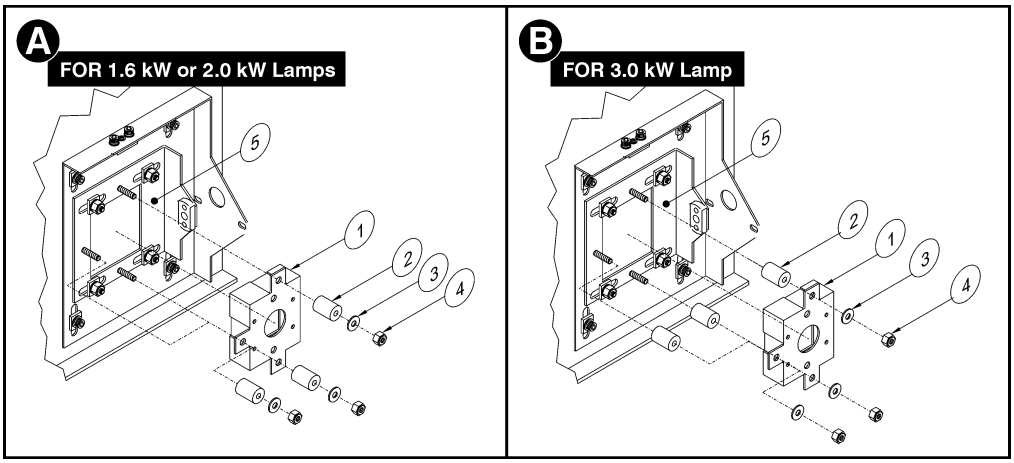


Figure 6.2. Location of Spacers for SLI-D Lamps

EXTRA ADAPTERS FOR 1.6 kW LAMP: The smallest SLI-D lamp—the 1.6 kW—requires a unique adapter at each end to provide extra length. They are not provided with the 1.6 kW so must be ordered separately:

Cathode adapter: Christie Part# 193605-001
Anode adapter: Christie Part# 193604-001

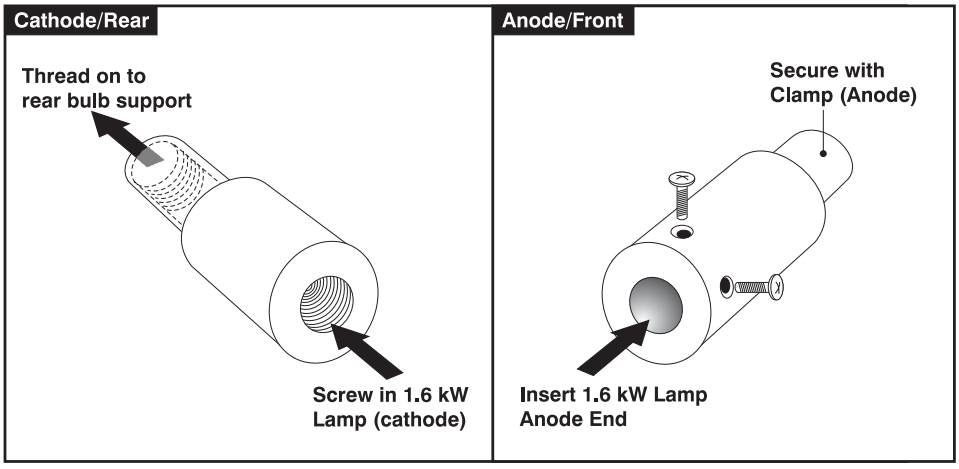


Figure 6.3. Two Extra Adapters Needed for 1.6 kW Lamp

The rear adapter can remain in place when you are replacing one 1.6 kW lamp with another. Make sure to remove both of the 1.6 kW adapters from the SLI-D lamphouse if you are switching from a 1.6 kW to either of the larger lamps—but always keep the *permanent* "adapter" secured to the cathode connector in the SLI-D lamphouse.

STEP 1 ' Turn off the lamp & power supply

- At the lamphouse, set **DC POWER** to **OFF**.

- ❑ At the pedestal, set the 3-phase **XENON POWER SUPPLY** circuit breaker to **OFF.**
- ❑ 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 ' Turn off remaining circuit breakers

After running the fans for at least 10 minutes, turn off all remaining circuit breakers at the pedestal.

STEP 3 ' Disconnect from AC

⚠ WARNING ⚠

SHOCK HAZARD. Disconnect from AC at *BOTH* wall breakers.

STEP 4 ' Open the lamphouse door

With protective clothing on, unlock (SLH-D) or remove screws (SLI-D).

For better access, remove the SLH-D lamphouse door entirely by pressing down on the spring-loaded pin hinge, and/or remove the panel on the opposite side.

STEP 5 ' Remove the plenum access cover (2 screws)

STEP 6 ' Remove the old lamp and inspect reflector

6.1. Loosen set screws from positive (front, 5/32") and negative (rear, 9/64") lamp connectors.

6.2. Slip the positive anode connector off. *If 1.6 kW lamp, also remove the adapter present (refer back to Figure 6.3).*

6.3. Unscrew the lamp from the rear connector *(or from the adapter, if SLI-D—refer back to Figure 6.2 and Figure 6.3),* and carefully remove the lamp from the lamphouse. ***Immediately*** place the lamp inside the protective cover (saved from previous installation) or in a heavy carton on the floor where it cannot fall.

6.4. With the lamp removed, visually inspect the reflector for dust and clean if necessary as described in *6.3, Maintenance and Cleaning.*

STEP 7 ' Remove new lamp from protective cover

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

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

STEP 8 ' Install new lamp

8.1. ***With protective gloves on,*** insert the threaded cathode (–) end of the lamp into the negative lamp connector (or adapter, if SLI-D model) located in the rear of the plenum and screw in fully. Do not over-tighten.

⚠ IMPORTANT ⚠
Handle by the cathode/anode shafts only, never the glass.

8.2. Rest the anode (+) end of the lamp on the front support arm (wire cradle).

8.3. Install the positive lamp connector over the anode (+) end of the lamp. If installing a 1.6 kW lamp, make sure to include its adapter (Figure 6.3).

8.4. Tighten set screws in both positive and negative lamp connectors.

⚠ 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 *6.3, Maintenance and Cleaning*.

STEP 9 ' ***Check Leads***

Make sure that the anode (+) lead between lamp and igniter does not touch or run close to any metal parts of the lamphouse or reflector.

⚠ IMPORTANT ⚠
Leads too close to metal parts will cause arcing during starting pulse, and the lamp may not ignite.

STEP 10 ' ***Replace the plenum cover and lamphouse door***

The projector will not operate unless the door is shut.

STEP 11 ' ***Power up the projector and adjust LAMP CURRENT***

Power up normally and adjust the lamp current to the appropriate level for the wattage of the new lamp (refer back to Table 3.8).

STEP 12 ' ***Adjust lamp position***

Adjust the lamp within the projector as described in *3.5, Working With the Lamp*. This ensures that the lamp (bulb) is well-centered with the reflector and is distanced correctly from the remainder of the illumination system.

Filter Replacement Procedure ' 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 near the bottom of the projector head, in front of the internal connector panel.

STEP 1 ' ***Power down and disconnect from AC***

Follow steps 1-4 from the *Lamp Replacement Procedure*, above.

STEP 2 ' ***Remove top frame***

On the top frame of the filter, pull side latches away from each other to release. Pull the top filter frame firmly away from projector.

STEP 3 ' Replace the air filter

Remove and discard the old air filter. Insert the new air filter into the top frame, following the "This Side Faces IN" labeling. There should be no labeling visible when the air filter is correctly installed.

STEP 4 ' Re-install top frame

With the filter in place, snap the top frame on to the bottom frame. Side latches must be fully engaged to provide the necessary seal around the air filter. Make sure there is no labeling visible after installation.

⚠ WARNING ⚠
Use only Christie filters. Never operate the projector without the filter installed.

6.5 Replacing a Lens

A variety of lenses can accommodate different throw distances and specific types of installations (see *Section 8, Specifications*).

To Replace a Primary Lens

IF HIGH-CONTRAST PRIMARY LENSES: High-contrast primary lenses include their own integral adapter. To replace such a lens:

1. Remove the external notched locking ring.
2. Turn the lens counterclockwise as far as possible.
3. Pull out and replace with a different high-contrast primary lens.

IF EITHER OF THE ANAMORPHIC LENSES (rare), remove the entire anamorphic lens mount and the anamorphic lens you wish to replace. Install a different anamorphic lens as described in *2.1, Mounting and Connecting Components (All Lenses)*. Once installed, make sure to adjust its precise position and orientation at the projector—note that the 1.5x must be pulled out approximately ¼" to properly clear the primary lens during use.

Section 7

Troubleshooting

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

*NOTE: A **qualified service technician** is required when opening an enclosure to diagnose any "probable cause".*

7.1 Power

Power Supply Does Not Start

	Probable Cause	*Corrective Action*
A	No AC (3-phase) voltage at TB2.	Check disconnect switch or ***both*** circuit breakers at AC distribution panel.
B	Phase voltages are unequal at TB2.	Measure TB2-L1, L2, and L3 for missing or low voltage; correct loose or damaged wire.
C	"READY" light is not on, interlock or blower switches not functioning.	Check that all switches are closing properly. Continuity each switch if necessary.

Power Supply is Low or Fluctuating

	Probable Cause	*Corrective Action*
A	One phase open or low at input terminals.	Inspect all DC and AC connections. Measure voltages at input to power supply. Check AC source or repair circuit.
B	Failed SCRs	Swap SCR with new/known good devices.

7.2 Lamp

Lamp Does Not Ignite

	Probably Cause	*Corrective Action*
A	"READY" light does not come on.	Check interlock or blower switch circuits. In SLH-D, make sure lamphouse door is closed.
B	DC supply is not set to proper value.	Increase lamp current by adjusting power supply tap switch.
C	Failed power supply.	With DC power switch ON (open circuit), measure across igniter (+) and (-) positions for 85VDC minimum. If minimum voltage is not present, check power supply output.
D	Failed igniter	Listen for igniter buzz when manual start button is pushed. If buzz is heard, replace spark gap or AC transformer in igniter.
E	Igniter relay has failed.	Listen for relay to pull in as start button is pushed. If relay does not activate, measure coil voltage and/or check relay circuit. If no output voltage, replace defective relay.
F	Lamp failed.	Inspect lamp and replace.
G	Stand-by flicker, wander, lamp failure	Increase HALFCUR setting at power supply

7.3 Cinema Displays

Symptom ' ***Blank screen, no display of cinema image…***

CAUSE/REMEDY:

1. Confirm all power connections are OK, there is no lens cap installed, and that the manual shutter is OPEN.
2. Is the correct display file selected? Check the *Touch Panel Controller*.
3. Is the correct port connected for this display file? Check head connections.

Symptom ' ***Severe motion artifacts…***

CAUSE / REMEDY:

1. 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.

Symptom ' ***The fields in the cinema image appear to be swapped…***

CAUSE / REMEDY:

1. This is generally seen in 1920 x 1080 60i sources, where field bit polarity is undefined. Toggle the **SMPTE FIELD BIT** setting (choices are "Normal" or "Invert").

Symptom ' ***Image appears "squeezed" or vertically stretched into center of screen***

CAUSE / REMEDY:

1. Source data converted from film is "squeezed" for **DCP's** SXGA display format and requires use of an anamorphic lens to regain image width. Make sure you are using the 1.5x anamorphic lens for 1.85:1 flat screens, or the 1.9x anamorphic lens for 2.39:1 scope screens.

7.4 Non-Cinema Displays

The following troubleshooting entries assume that you are using Christie's optional Cine-IPM for displaying alternative "non-cinema" material.

Symptom ' ***The Cine-IPM will not turn on when [Power*] is pressed…***

CAUSE / REMEDY:

1. The [Power*] key does nothing if the main Cine-IPM on/off switch is OFF.
2. Make sure to hold [Power*] for approximately one second. Or press [Power*] quickly and release, and follow with [▲ON].
3. Do both Cine-IPM LEDs come on? Check that the power cord is properly connected and that you are using the correct cable provided with the module.
4. Does the green "Status" LED flash with each key press? If not, the Cine-IPM is not receiving the keypad's signals. Make sure that IR sensor is not blocked, or check keypad cable for wired keypad.
5. The batteries in the IR remote keypad may need to be replaced.
6. The keypad may have been disabled by a change in protocol. See *2.10, Keypad Protocols and Conversion* and *5.8, Configuring System Parameters*.

Symptom ' ***The Cine-IPM and projector are both on but there's no display...***

CAUSE / REMEDY:

1. Was a lens cover accidentally left on? Remove lens cover.
2. Is the correct AC power source connected? See *Section 8, Specifications.*
3. Is the manual douser (lever) in Closed position? Is the projector in stand-by?
4. Is the correct button selected on the *Touch Panel Controller*?
5. Is an active source connected properly? Check the cable connections. And is the correct alternative source selected? Press [Input1], [Input2], [Input3], or [Input4] to select. See *2.8, Connecting Sources* and *5.6, Using Inputs and Channels* for details.
6. Are there test patterns or menus present? If so, check your source connections again.
7. Is the Cine-IPM "Status" LED flashing a pattern of yellow and red lights while the "Power" LED is steady red? This indicates a Cine-IPM error that may prevent it from operating. If the problem persists contact a qualified Christie service technician.

Symptom ' ***The projector does not respond to the infrared remote keypad...***

CAUSE / REMEDY:

1. Does the wired keypad work? If so, check that the IR keypad is enabled (in the *Communications* menu).
2. Does the green "Status" LED flash each time a key is pressed? If not, the projector is not receiving the keypad's IR signals. Ensure the keypad is directed toward the IR sensor on the Cine-IPM, or toward an optional remote sensor, and that the path is not blocked.
3. The keypad batteries may need to be replaced.

4. There may be unusual lighting conditions in the room affecting IR keypad operation. Determine if such conditions exist and correct.
5. When broadcasting in a network, enter numbers directly on the keypad rather than holding [◄–] or [+►] to change slidebar settings. Numeric entry eliminates the time delay to distant Cine-IPMs, ensuring all units receive the commands.
6. The IR keypad may have been disabled. See *2.10, Keypad Protocols and Conversion* and *5.8, Configuring System Parameters.*

Symptom ' ***The display is jittery or unstable…***

CAUSE / REMEDY:

1. If the display is jittery or if it disappears and reappears erratically, check that the source is properly connected and that its signal is of adequate quality for detection. For example, if the Cine-IPM scans the default input for a signal to display, and a poor quality or improperly connected source is connected, the projector will briefly and repeatedly attempt to display an image. If no source is connected, the "No signal present" error message appears over a blank display. Correct the source connection.
2. The horizontal or vertical scan frequency of the input signal may be out of range for the Cine-IPM. Refer to *Section 8, Specifications* for scan frequency ranges.
3. The sync signal may be inadequate. Correct the source problem.
4. The input signal type may conflict with the input module you're using. Install/use the correct module for the source.
5. Pixel tracking, phase, filter, etc. may need more adjustment.

Symptom ' ***The display is faint…***

CAUSE / REMEDY:

1. Check *Input Levels* option–turn Auto input Level to "off", then "on" again.
2. Brightness and/or contrast may be set too low. Adjust as necessary.
3. The source may be double terminated. Ensure the source is terminated only once.
4. The source (if non-video) may need sync tip clamping. Enter a check in the "Clamp Tip" box found in the *Input Levels* submenu.

Symptom ' ***The upper portion of the display is waving, tearing or jittering…***

CAUSE / REMEDY:

1. This can sometimes occur with video or VCR sources. If you are using a VCR, make sure that the "VCR" option is checked (in *Video Options* submenu).

Symptom ' ***Portions of the display are cut off or wrap to the opposite edge…***

CAUSE / REMEDY:

1. Reduce top, bottom, left or right blanking from within the *Size and Position* menu. Check size and position adjustments.
2. Resizing may need adjustment. Adjust until entire image is visible and centered.

Symptom ' ***The display appears compressed (vertically stretched)…***

CAUSE / REMEDY:

1. The frequency of the pixel sampling clock is incorrect for the current source.
2. The *Size and Position* options may be adjusted poorly for the incoming source signal. See *5.7, Adjusting the Image.*
3. Use an anamorphic lens for typical HDTV and anamorphic DVD sources that have been re-sized and vertically stretched through Cine-IPM software.

Symptom ' ***Data is cropped from the top and bottom edges from 1080i image***

CAUSE / REMEDY:

1. To display the missing material, reduce image *Size* and increase *Vertical Stretch* to fill the screen from top to bottom, then add a 1.5x anamorphic lens to regain the image width.

Symptom ' ***Display quality appears to drift from good to bad, bad to good…***

CAUSE / REMEDY:

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

Symptom ' ***The display has suddenly frozen, or an unknown menu has appeared…***

CAUSE / REMEDY:

1. You may have selected the "Freeze Image" option or you may have accidentally entered a special engineering code using the Func key in combination with certain numbers. Press Exit until presentation goes back to normal.
2. 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. Turn the projector off, wait for the lamp fans to stop, and unplug. Plug in again and power up as usual.

Symptom ' ***The display is not sharp or "clean"…***

CAUSE / REMEDY:

1. More display adjustment may be required–focus, brightness, contrast, pixel tracking, pixel phase, and detail.
2. If you are using a BNC T-connector, try using a distribution amplifier to boost signal levels.
3. Is the video input signal properly terminated? Set in *Video Options* submenu.
4. The source input signal may be of low quality. Try another source.

Symptom ' ***Colors in the display are inaccurate…***

CAUSE / REMEDY:

1. The color, tint, color space and/or color temperature settings may require adjustment. Review all settings, and refer to *5.7, Adjusting the Image* and *5.8, Configuring System Parameters*.

Symptom ' ***The display is not rectangular…***

CAUSE / REMEDY:

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. Check pixel tracking.

Symptom ' ***The display is "noisy"…***

CAUSE / REMEDY:

1. Display adjustment 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 (75 S). If it is the last connection in a loop-through chain, the video input should be terminated at the *last* Cine-IPM 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 Cine-IPM 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. Keep near 4 for most sources.

Symptom **' *There are random streaks on the bottom of the image***

CAUSE / REMEDY:

1. If a 50 Hz HDSDI signal, use ***cinema*** processing by entering a checkmark in the "Use Cinema Path for DVI" checkbox in the *Touch Panel Controller's* <u>*Advanced*</u> menu. *NOTE: password-protected.*
2. 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 "Use Cinema Path for DVI" checkbox in the *Touch Panel Controller's* <u>*Advanced*</u> menu. *NOTE: password-protected.*
3. Or, if you do not have access to the *Touch Panel Controller*'s <u>*Advanced*</u> menu and cannot adjust the processing path, adjust the *Cine-IPM* bottom blanking until the streaks disappear. This control is located on the second page of the *Cine-IPM's Size and Position* menu. See *5.7, Adjusting the Image*.

Section 8

Specifications

8.1 Specifications

DCP-I* / *DCP-H

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

Display

Panel Resolution and Refresh Rate

Pixel format (H x V) on 3 DMD panels	1280 x 1024 (SXGA)
Refresh rate	23.97 – 78 Hz (SMPTE 292M) 60 Hz (296M input) 50 or 60 Hz ±1 Hz (non-cinema)

Achievable Brightness *requires maximum output conditions*

12 foot lamberts on 50-ft. screen (DCP-H) or 40-ft. screen (DCP-***i***)

Achievable Contrast Ratio

460:1 ANSI
1350:1 full field

Colors and Gray Scale

Displayable colors	4.4 trillion
Gray scale resolution	14 bits each per RGB component (linear)

Color Temperature

Nominal white *(full white after calibration, telecine mode)*	x = 0.314 ± 0.002 y = 0.351 ± 0.002

Gamma

2.65 (nominal)

Lenses

Primary Zoom Lenses (Hi-contrast)	Part #	Max. % of Image Offset from Lens Center ✻
2.0 – 3.2:1	38-809029-01	75% in any direction
3.2 – 5.6:1	38-809030-01	75% in any direction
Opt. Anamorphic Lenses ✻✻	**Part #**	**Max. % of Image Offset from Lens Center**
1.5x (for 1.85:1 “flat” screen)	38-809034-01	75% in any direction
1.9x (for 2.39:1 “scope” screen)	38-809035-01	75% in any direction

✻ *Maximum offsets are reduced when simultaneously offsetting horizontally and vertically*
✻✻ *Anamorphic lenses install in the anamorphic adapter (standard) and are used in conjunction with a primary lens.*

High Definition Inputs

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

✱ *NOTE: All supported cinema formats are listed on page 4-1.*

Graphics Input
(i.e, NON-CINEMA for CINE-IPM)

Number of inputs	1
Standard supported	VESA Digital Visual Interface (DVI), 23-96 Hz
Connector Type	20-pin female DVI

✱ *NOTE: Supported non-cinema formats are listed on page 5-1. Cine-IPM option recommended.*

Control Ports

RS-232 connectors (2): 9-pin D	A=Server or PC communication B=Cine-IPM communication
Ethernet connectors (2): RJ-45	Stnd. 100 base T Fast, D-link DSS-5+
TPC connector (1): ethernet	24 VDC & ground

Power Requirements ⚠

Projector Head

Voltage range	100 to 120 VAC ±10%
Line frequency	50 – 60 Hz nominal
Max. inrush current	38 amps
Max. current consumption	2.2 amps @ 100V
Max. power consumption	220 W
Max. current rating of AC input	15A

SLH-D Pedestals

Voltage range	• 200 VAC ±10% (Japan) • 230 VAC ±10% (N. America) • 400 VAC ±10% (Europe / Asia)
Line frequency	50 Hz – 60 Hz nominal
Inrush current (max.)	• 250 A (N. America / Japan) • 111 A (Europe / Asia)
Current consumption (max.)	• 37 A @ 200 VAC (Japan) • 32 A @ 230 VAC (N. America) • 22 A @ 400 VAC (Europe / Asia)
Power consumption (max.)	12.5 kVA (9.0 kW) in any region
Current rating of 3-phase AC input	• 40 A (N. America / Japan) • 30 A (Europe / Asia)
Current rating of 1-phase AC input	15A

SLI-D Pedestals

Voltage range	• 200 VAC ±10% (Japan) • 230 VAC ±10% (N. America) • 400 VAC ±10% (Europe / Asia)
Line frequency	50 Hz – 60 Hz nominal
Inrush current (max.)	• 113 A (N. America / Japan) • 71 A (Europe / Asia)
Current consumption (max.)	• 24 A @ 200 VAC (Japan) • 21 A @ 230 VAC (N. America) • 11 A @ 400 VAC (Europe / Asia)
Power consumption (max.)	8.0 kVA (5.8 kW) in any region
Current rating of 3-phase AC input	• 30 A (N. America / Japan) • 20 A (Europe / Asia)
Current rating of 1-phase AC input	15A

AC Wiring Requirements

AC Wiring Required ✻					
AC Amperes	**Wire Diameter (AWG) per Cable Length**				
Per Phase	*50 ft.*	*100 ft.*	*150 ft.*	*200 ft.*	*250 ft.*
0-10	14	14	12	10	10
11-15	14	12	10	8	6
16-20	12	10	8	8	6
21-25	10	10	8	6	4
26-35	8	8	6	4	4
36-45	6	6	4	4	3
46-60	4	4	4	3	1
61-70	3	3	3	2	1
71-80	2	2	2	1	0/1

✻ *Note: Ground wire diameter must be ≥ largest wire used for AC connections.*

Lamps

Model	CXL Lamp (kW)	Lamp Current Range (amps)	Lamp Life (warranty hrs.)
SLI-D	CXL-16S (1.6)	45-70	750 full / 1500 pro-rated
	CXL- 20 (2.0)	60-85	1200 full / 2400 pro-rated
	CXL- 30 (3.0)	80-110	720 full / 1440 pro-rated
SLH-D	CXL- 40 (4.0)	100-140	60 full /1200 pro-rated
	CXL- 45 (4.5)	100-160	50 full / 900 pro-rated
	CXL- 60 (6.0)	110-170	50 full / 500 pro-rated

Type	Xenon
Stand-by lamp power level (via manual douser lever)	30-70% of maximum current rating (adjustable)
Motorized adjustment of position	3-axis, 0.5” range for each
Reflector(s) type	SLI-D: single (elliptical) SLH-D: double (elliptical-plus-spherical)

Safety

C.S.A. C22.2. No. 950 (M94), U.L. 1950 and **EN60950**

EMC Emissions

- **FCC Part 15 Class A** Conducted and Radiated Emissions
- **CISPR 22 Class A** Conducted and Radiated Emissions

EMC Immunity

- **EN55024** (all)

Operating Environment

Temperature	10°C to 40°C (50°F to 104°F)
Humidity (non-condensing)	20% to 80%
Altitude	0 – 3000 meters

Non-Operating Environment

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

Size & Weight

SLH-D (W x L x H) *NOTE: Includes anamorphic mount extended on one side*	24.5 (62.2 cm) x 62” (157.5 cm) x 72.8” (184.9 cm)
SLI-D (W x L x H) *NOTE: Includes anamorphic mount extended on one side*	24.5 (62.2 cm) x 62” (157.5 cm) x 60.9” (154.7 cm)
Weight, approx. (no packaging) *NOTE: Includes projector head with anamorphic lens mount (100 lb.), lamphouse (180 lb.) and pedestal (410-640 lb.)*	848 lb. (385 kg) 920 lb. (417 kg)

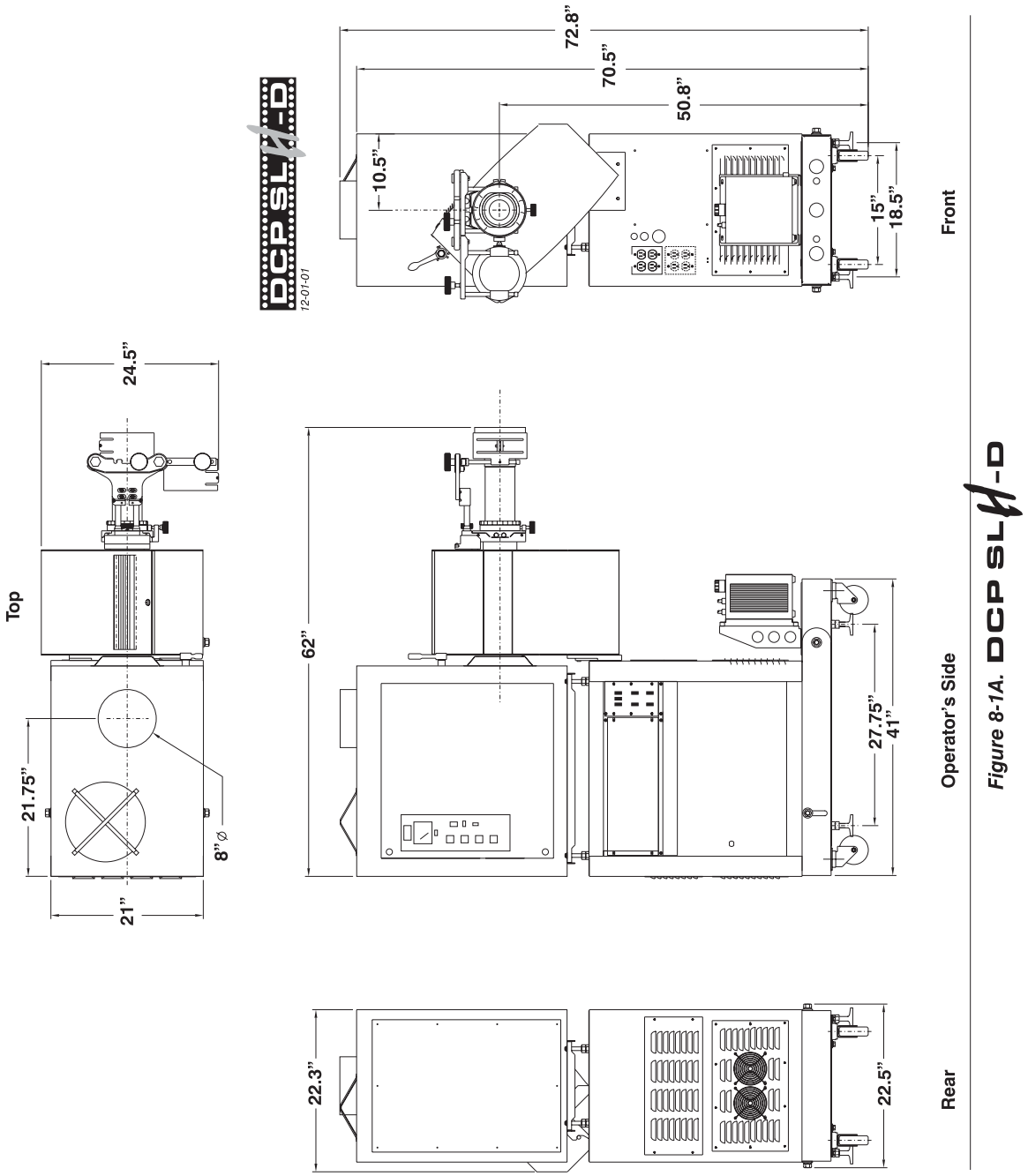


Figure 8-1A. **DCP SL-D**

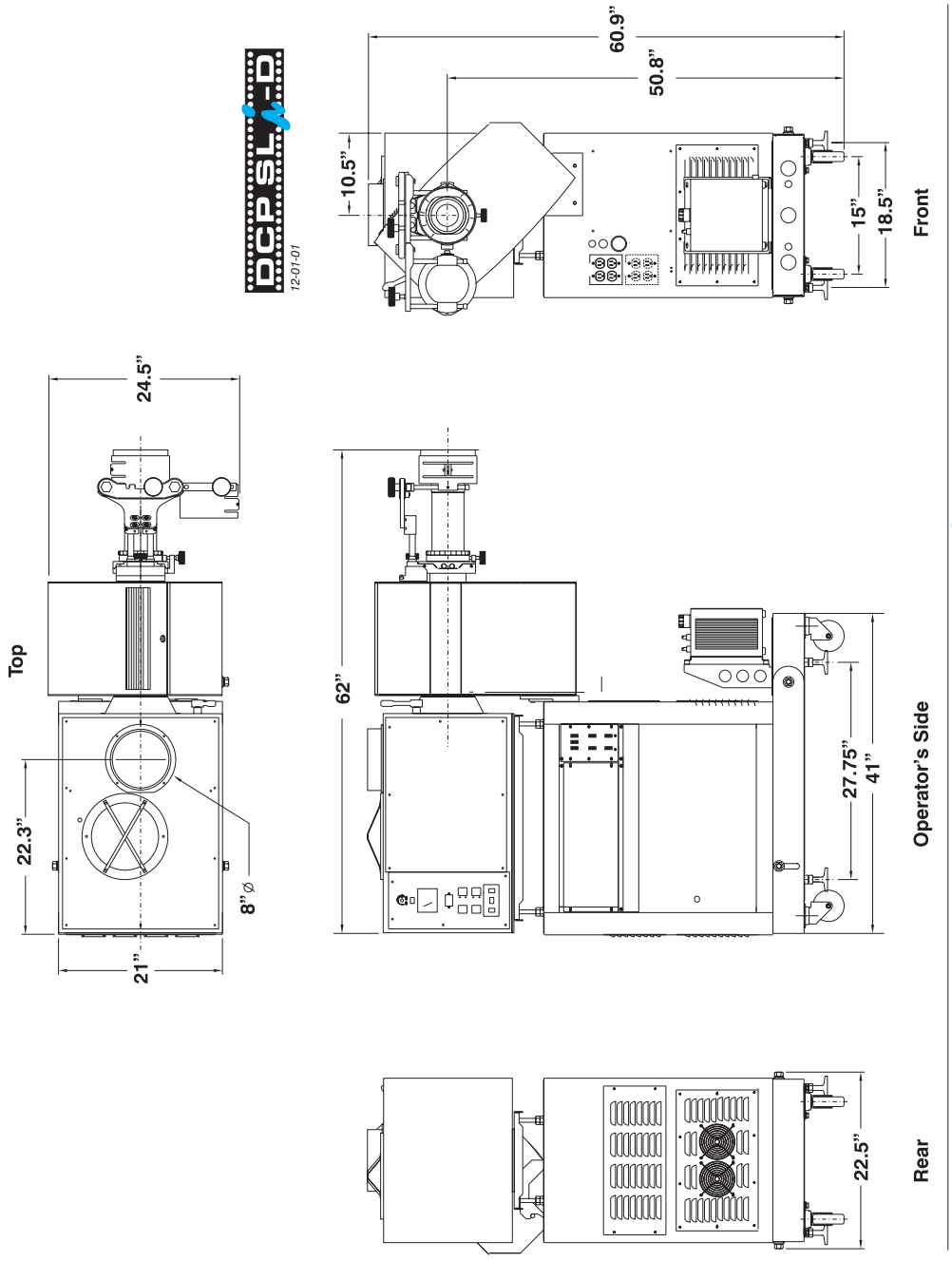


Figure 8-1B. **DCP SL i-D**

Standard Components

Pedestal on casters *(4 feet packaged separately).* See page 1-2 for models.
SLI-D or SLH-D Lamphouse (*SLI-D* model includes lamp adapter)
Lamp
Projector "Head" with lens mount, anamorphic adapter and TPC
Cooler with mounting hardware and 2 lengths of ¼" flexible tubing
1 primary zoom lens (high-contrast; choice of 2)
Assorted cabling and assembly hardware
DCP User's Manual

Options '

Accessories

Cine-IPM (includes wired remote keypad). Options for Cine-IPM:

- 2-Way Controller
- IR Remote Keypad
- IR Remote Sensor (5V)
- *DCP Librarian* for projector software setups
- Optional Input Modules:
  - *RGB500 Input Module*
  - *RGB400 Active Loop-Through Input Module*
  - *RGB400 Buffered Amplifier Input Module*
  - *Composite/S-Video Input Module*
  - *PC250 Analog Input Module*
  - *Serial Digital Input Module*
  - *Digital HDTV Input Module*
  - *DVI / DFP Input Module*

Anamorphic Lenses *(choice of two; see page 8-1)*

High-contrast primary lenses *(choice of two—supplied with projector.)*

- 2.0-3.2:1 HC — part# 38-809029-01
- 3.2-5.6:1 HC — part# 38-809030-01

Adapters for 1.6 kW lamp installation

- Cathode: #193605-001
- Anode: #193604-001

Protective Clothing Safety Kit #598900-095 *(for opening of lamphouse)*

DCP Librarian Setup Software *(for calibration of DCP by Christie installer.)*

Appendix A

Glossary

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

3:2 Pulldown ' A frame sequence used to map 24 fps film to 30 fps video (or 24/1.001 to 30/1.001 fps) in which every second film frame is represented by three video fields instead of two, the third being a repeat of the second. This leads to a set of ten video fields for each four film frames.

Active Line Time ' The time, inside one horizontal scan line, during which video is generated.

Active Picture ' The area of a video *frame* which carries image information. As an example, a total frame size of 1125 x 2200 *pixel*s may have an active picture of 1280 active lines and 1920 samples per active line. Compare to *production aperture*.

Alternative Content ' Program material such as concerts, plays, sporting events, and potentially corporate training or conferencing, presented in theatres in addition to motion picture exhibition.

Ambient Light Rejection ' The ability of a screen to reflect ambient light in a direction away from the "line of best viewing". Curved screens usually have good ambient light rejection. Flat screens usually have less ambient light rejection.

Analog Video ' The video output of most computers and video tape machines. Analog video can generate a large number of colors.

Anamorphic ' Having or requiring a linear distortion, generally in the horizontal direction. DCP's anamorphic lenses restore a 'scope' (CinemaScope) or 'flat' format film frame to the correct appearance by increasing its horizontal proportion.

Answer Print ' A print made from the cut original (camera) negative with proposed final color timing and soundtracks, furnished by the printing lab to the producer for acceptance of image and sound before screenings and manufacturing begin. A check print is similar, but is made from the *internegative*. A blacktrack answer print has no soundtracks.

Aspect Ratio ' The ratio of the width of an image to its height, such as the 4:3 aspect ratio common in video output.

Authoring ' The process, tools, and working environment by which content elements and functions are compiled, formatted, coordinated, and tested for presentation on target systems. *Comment*: Authoring in the context of digital cinema does not necessarily result in inseparably married or muxed content components. Rather, reference is made to a virtual answer print, the elements of which may subsequently be

subdivided or combined, encrypted in whole or part, and packaged in various ways for distribution of the title, a version of the title, or an update for revision of the title in the field.

Automation ' A system such as Christie's 3Q used in a theatre projection booth that responds to cues and commands and then controls various elements of presentation, including:

- picture format and corresponding lens (flat or scope).....sound format and corresponding cinema processor settings
- curtain movement and position
- lighting level in the auditorium
- non-sync play and fade in/out
- digital cinema projector

Auto Source ' The ability of the projector to automatically recognize and synchronize to the horizontal and vertical scan frequencies of an input signal for proper display.

Backlash Zone ' The extra travel distance required for accurate lens mount positions in a *Roadster*, *Vista* or *Mirage* projector having a motorized lens mount.

Bandwidth ' The frequency range of the projector's video amplifier.

Baud Rate ' The speed at which serial communications travel from their origin. In this projector, the RS-232 or RS-422 default baud rate of 19200 can be changed to match a controlling device. The switcher baud rate of 9600 cannot be changed.

Bit Depth ' The total number of bits available to represent each pixel or color sample in a digital imaging system, or the bits available to represent each sample in a digital audio system. Using linear binary coding, the total number of resolution steps available is equal to 2 raised to the power of the bit depth.

Blanking Time ' The time inside one scan line during which video is not generated. The blanking time of the input signal must be equal to or greater than the retrace time of the projector.

Brightness ' In projection, brightness usually describes the amount of light emitted from a surface such as a screen. It is measured in foot-lamberts or candelas per square meter.

Candela or Candle ' Unit of measure for measuring intensity of light.

Channel ' A collection of measurements stored by the projector for a given input source, including frequencies, pulse width, polarity, syncs, channel number and location, user-adjustable display settings, etc. Use channels to switch between a variety of setups quickly, automatically recalling previously defined display parameters.

Channel List ' A list/menu of previously-defined channels available in projector memory.

Channel Number ' A number that uniquely identifies a specific channel retained in projector memory. The projector can retain up to 99 channels.

Checkbox ' A menu item that indicates whether an option is currently in effect (checked) or not (unchecked).

Chrominance ' The signal representing the color information (hue and saturation) when the image is represented as separate chrominance and *luminance*. Same as "chroma".

Clean Aperture ' The fraction of a motion picture *frame* image that is intended to be viewed by the audience. The clean aperture is subjectively free of edge artifacts and lies within the screen area framed by curtains in a cinema. Aspect ratio is often referenced to the clean aperture.

Color Gamut ' The range of colors allowed in a specific system, as defined within a triangular area located on the CIE color locus diagram whose corners are the three primaries of the system. Same as color space.

Color Shift ' A change in the tint of a white field across an image.

Color Temperature ' The coloration (reddish, white, bluish, greenish, etc.) of white in an image, measured using the Kelvin (degrees K) temperature scale. Higher temperatures output more light.

Component Video ' See *YCbCr* or *YPbPr*.

Composite Video ' The output of video tape players and some computers, characterized by synchronization, luminance and color signals combined on one output cable.

Contrast (ratio) ' The degree of difference between the lightest and darkest areas of the image.

Convergence ' The alignment of the red, green, and blue elements of a projected image. In this projector, convergence can be adjusted by Christie service personnel only.

Curved Screen ' A projection screen which is slightly concave for improved screen gain. Curved screens usually have screen gains which are greater than 1 but viewing angles much less than 180°. Curved screens are not recommended for use with this projector.

DCDM ' Digital Cinema Distribution Master. A file or collection of files formatted for exhibition and comprised of all the components of the *title*. A reference size of about 200 GB per title is likely.

DDI ' A "direct digital interface" signal can be supplied to the projector via an optional digital input module installed in **INPUT 2**. For example, you can input an SMPTE-259M signal using a *Serial Digital Input Module* or input an SMPTE-272M signal from a *Digital HDTV Serial Input Module*.

DMD™ ' Digital Micromirror Devices™ used in this projector for processing red, green, and blue color data.

DSM ' Digital Source Master. A title's native source files in acquisition format, edited to create the distribution master and for reformatting for NTSC, HDTV, DVD, etc., and potentially archived.

Decoder ' Located at **INPUT 3** and **INPUT 4**, this device converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M, or SECAM to RGB video.

Detail ' The sharpness of a display from a video source.

Diffused Screen ' A type of rear-projection screen which spreads the light striking it. Screen gain is less than 1 but audience viewing angles are increased.

Digital Cinema ' Professional public presentation of theatrical content by electronic means, particularly emphasizing projectors whose image source is digital data. Also known as d-cinema, e-cinema.

Display Setting ' An adjustment that affects the display of an image. Such display settings include contrast, brightness, tint, blanking, size, offsets, and others.

E-stop ' Emergency stop of the presentation due to equipment failure, a commotion in the audience, or any trigger from the theatre's life safety system that could require stopping the show, raising the house lights, and enabling a PA announcement.

Flicker ' A very rapid variation in image brightness caused by a frame rate that is too slow. (See *Interlace*.)

Frame Rate ' The frequency at which complete images are generated. For non-interlaced signals, the frame rate is identical to the vertical frequency. For interlaced signals, the frame rate (also known as field rate) is one half of vertical frequency.

Foot-candle ' The intensity of visible light per square foot.

Foot-lambert ' The luminance (brightness) which results from one foot-candle of illumination falling on a perfectly diffuse surface. 1 fL = 3.423 candela per square meter (cd/m^2). Note that SMPTE RP 98 calls for theatre screen luminance of **12** to 22 fL; 16 +/- 2 fL (55 +/- 7 cd/m^2) is the open gate target according to SMPTE 196M. For cinema applications, *xenon lamp* wattage is approximated to achieve this level using 12 W/ft^2 x (screen height squared) or 5 W/ft^2 of total 'scope image area, for matte screens and typical lenses.

Gain or Screen Gain ' The ability of a screen to direct incident light to an audience. A flat matte white wall has a gain of approximately 1. Screens with gain less than 1 attenuate incident light; screens with gain more than 1 direct more incident light to the audience but have a narrow viewing angle. For example: An image reflecting off a 10 gain screen appears 10 times brighter than it would if reflected off a matte white wall. Curved screens usually have larger gain than flat screens.

GVG Grass Valley Group (formerly part of Tektronix). More specifically, a file format used for compressed video, audio, and timecode stream transfer in the Profile video server products and which is being proposed for standardization by SMPTE and as a primary component of *MXF*. Initially implemented on *Fibre Channel* using *FTP* with *TCP/IP* but extensible to XTP or other protocols. Previously called GXF: General Exchange Format.

Help Screen ' A display of help information regarding the current task or presentation.

Horizontal Frequency ' The frequency at which scan lines are generated, which varies amongst sources. Also called horizontal scan rate or line rate.

Horizontal Offset ' The difference between the center of the projected image and the center of the projector lens. For this projector, this value is expressed as the maximum percentage of the image that can be projected to one side of the lens center without degrading the image quality. Horizontal offset ranges can be affected by the type of lens in use, and whether or not the image is offset vertically at the same time.

Hot Spot ' A circular area of a screen where the image appears brighter than elsewhere on the screen. A hot spot appears along the line of sight and "moves" with the line of sight. High gain screens and rear screens designed for slide or movie projection usually have a hot spot.

ILS™ ' The *Intelligent Lens System*™ describes the ability of projectors having a motorized lens mount to automatically return to lens settings previously defined for a particular channel.

Input ' A physical connection route for a source signal, described by a 2-digit number representing 1) its switcher/projector location and 2) its slot in the switcher/projector.

Input Signal ' Signal sent from a source device to the projector.

Interface ' A device, such as the *Serial Digital Input Module*, that accepts an input signal for display by the projector.

Interlace ' A method used by video tape players and some computers to double the vertical resolution without increasing the horizontal line rate. If the resulting frame/field rate is too low, the image may flicker depending on the image content.

Keypad ' A hand-held push-button device connected to the Cine-IPM. It controls most Cine-IPM functions. For more information, refer to *5.4, Using the Keypad.*

Keystone ' A distortion of the image which occurs when the top and bottom borders of the image are unequal in length. Side borders both slant in or out, producing a “keyhole” shaped image. It is caused when the screen and lens surface are not parallel.

Life Safety A safety control system integrated into the HVAC, fire alarm, and other infrastructure components of the theatre as well as the presentation system. *Comment*: In the event of a fire, for example, the life safety system may turn on the auditorium lighting to full intensity, cancel the presentation audio and replace it with a PA microphone or pre-recorded announcement, move a douser to block the lamphouse output, flash warning lights, and so forth. Every jurisdiction may have different statutory requirements for life safety systems.

Linearity ' The reproduction of the horizontal and vertical size of characters and/or shapes over the entire screen.

Line of Best Viewing ' When light from a projector is incident on a screen, the light reflects from the screen such that the angle of reflection equals the angle of incidence. The Line of Best Viewing is along the line of reflection.

Loopthrough (Loopthru) ' The method of feeding a series of high impedance inputs from a single video source with a coaxial transmission line in such a manner that the line is terminated with its characteristic impedance at the last input on the line.

Lumen ' The unit of measure for the amount of visible light emitted by a light source.

Luminance ' The signal representing the measurable intensity (comparable to brightness) of an electronic image when the image is represented as separate *chrominance* and *luminance*. Luminance also expresses the light intensity of a diffuse source as a function of its area; measured in lumens or candles per square foot (1 lumen per

square foot = 1 *foot-Lambert*). SMPTE RP 98 calls for a luminance of 12 to 22 foot-Lamberts for theatre screens. See: *foot-Lambert*.

Lux ' The amount of visible light per square meter incident on a surface. *1 lux = 1 lumen/square meter = 0.093 foot-candles*

Menu ' A list of selectable options displayed on the screen.

NTSC Video ' A video output format of some video tape and disk players. There are two types of NTSC (National Television Standards Committee) video: NTSC 3.58 and NTSC 4.43. NTSC 3.58 is used primarily in North America and Japan. NTSC 4.43 is less commonly used.

Non-Sync ' Audio played in a theatre, generally from a CD, when the cinematic presentation is not running, such as during intermissions and prior to the start of film presentation.

Non-unicode ' The non-unicode method of encoding produces a concise character set of 256 alpha-numeric characters typically used in for ASCII messaging in most Western languages. A limited number of TPC functions can be executed remotely via non-unicode (default) or unicode messaging. See also *unicode*.

Optical Screen ' A type of rear-projection screen which re-directs light through the screen to increase image brightness in front of the screen. Screen gain is usually greater than 1 but audience viewing angles are reduced.

PAL Video ' PAL (Phase Alternating Line) video is a 50 Hz standard with 768 x 576 resolution. It is found on some video tape and disk players (used primarily in Europe, China and some South American and African countries).

PCF ' Projector Configuration File, or Presentation Control File. A small file created by the content owner or installer that controls the presentation of the elements and data subdivisions constituting a single version of a title. The human readable component may identify the name of the title, its owner, its length, event points, and other attributes. The PCF specifies color space, target color gamut, gamma (a.k.a. “degamma”), aspect ratio and screen position settings. It does not include masking (cropping) information. Every presentation or feature uses a PCF.

Pincushion ' A distortion of the image shape characterized by concave or convex borders.

Pixel (picture element) ' The smallest discernible element of data from a computer-generated image.

Pixel Phase ' The phase of the pixel sampling clock relative to incoming data.

Pixel Tracking ' The frequency of the pixel sampling clock, indicated by the number of pixels per line.

Play List ' A small file or script typically created by the exhibitor or installer that specifies the sequence of presentation of programs, including features and trailers.

Playout ' The equipment in a digital cinema theatre which delivers previously recorded signals in real time to the *playback* system. The playout may also receive, store, and process these signals prior to delivering them.

Post Production ' The phase in film making occurring primarily after production ends; its processes include picture editing, sound effects editing and mixing, ADR, Foley, titles and

opticals, dubbing and print mastering, CGI and visual effects, and scoring. Post production culminates in acceptance of the original negative *answer print*. Even though post production officially begins on the last day of principal photography, post production facilities such as editorial are utilized from very early in the production phase in order to save time.

Presentation Level ' The projector is at presentation level when an image from a source is displayed without the presence of a slidebar, menu, pull-down list, or error message.

Production Aperture ' The area (in pixels, for digital images) that constitutes the entire motion picture frame image. Compare: *active picture*.

Projector-to-Screen Distance ' The distance between the projector's front feet centers and the screen. Also called "Throw Distance".

Protocol ' The type of code format such as the “A” or “B” formats utilized by the Cine-IPM keypad(s). The default protocol set at manufacture is Protocol “A”. By using two different keypad protocols, multiple Cine-IPMs can be controlled independently with their remote IR keypads.

Pull Up (Pull Down) ' Shifting the frequency, sample rate, or frame rate to as to achieve a target frequency or time relationship with another signal, most commonly by +/- .1%–the ratio of NTSC to B&W TV frame rates. See: *3:2 pulldown*.

Pull-down List ' A selectable menu item that unfolds into a list of options pertaining to it.

QuVis ' A manufacturer of a digital video recorder/player/server, QuBit, frequently used for providing digital cinema data to the **DCP**. QuVis image compression uses a proprietary technology called Quality Priority Encoding, based on *wavelets*, in which the user selects a quality level based on *signal-to-noise ratio*. The data rate varies to efficiently maintain that quality level. Frames are coded individually.

Rear Screen ' A translucent panel for screen projection. Incident light travels through the incident surface of a rear screen and forms an image on the other surface.

Release Print ' Composite positive motion picture prints, generally made from *internegative*s, intended for distribution to exhibitors.

Resizing ' The ability to manipulate through software commands the physical size, placement and/or aspect ratio of an image.

Resolution (lens) ' The maximum number of alternate white and black horizontal lines that can be distinguished on a screen when a photographic target is placed between the lens and a light source and illuminated by that source.

Resolution (projector) ' The maximum number of pixels that the projector can display horizontally and vertically across an image, such as 1024 x 768 (called XGA).

Retrace Time (Horizontal) ' The minimum time required for a CRT projector to move the position of the scanning spot from the right edge to the left edge.

Rise Time ' The time required by the video amplifier of the projector to increase its output from 10% to 90% of the maximum value.

RGB Video ' The video output (analog or digital) of most computers. Analog RGB video can have 3, 4, or 5 wires — one each for red, green, and blue, and either none, one or two for sync. For three-wire RGB, the green wire usually provides sync. (See TTL Video).

RS-232 ' A common asynchronous data transmission standard recommended by the Electronics Industries Association (EIA). Also called serial communication.

RS-422 ' A less common asynchronous data transmission standard in which balanced differential voltage is specified. RS-422 is especially suited to long distances.

S-Video ' The output from certain video tape players and video equipment. S-Video separates sync and luminance from color information, typically producing a higher quality display than composite video.

Scan Frequency ' The horizontal or vertical frequency at which images are generated.

Scan Line ' One horizontal line on the display.

SECAM ' A video output format of some video tape and disk players (used primarily in France). SECAM (Sequential Couleur á Mémoire) signals are similar in resolution and frequency to PAL signals. The primary difference between the two standards is in the way color information is encoded.

Show Script ' A small file consisting of *automation cues* in addition to a play list, triggering theatre events (action data), and possibly including parameters that allow the program to be tailored for a specific venue or engagement. A show script is created by the exhibitor or installer and provides automated presentations.

Slidebar ' A slidebar is a graphical display of an adjustable setting. The numerical setting often represents a percentage but can be a specific unit such as degrees Kelvin.

Source ' The device, such as a computer or VCR, connected to the projector or Cine-IPM for display. For example, a source is identified at the *Cine-IPM* as Input1, Input2, Input3, or Input4 , or as other user-defined numbers. A source may have numerous corresponding channels defined and recognized by the projector. See *Input*.

Source Setup ' See *Channel*.

Spot Size ' The diameter of the smallest dot that can be generated by a CRT projector. This projector has a fixed spot (pixel) size.

Switcher ' A signal selector—specifically, the *Marquee Signal Switcher* formerly manufactured by Christie—can be connected for adding more sources to a projector.

Sync ' This term refers to the part of the video signal that is used to stabilize the picture. Sync can occur in three forms:

1) "Composite sync": the horizontal and vertical components are together on one cable.
2) "Sync-on-green": the sync is part of the green video.
3) "Separate sync" or "H.SYNC and V.SYNC": the horizontal and vertical components of the sync are on two separate cables.

Sync Width ' The duration of each sync pulse generated by a computer. The sync width is part of the blanking time.

TTL Video ' A type of RGB video with digital characteristics.

Terminated ' A wire connecting a single video source to a display device, such as a projector, must be terminated by a resistance (usually 75S for video).

Throw Distance ' The distance between the front feet of the projector and the screen. Also called "Projector-to-Screen Distance". Always use the correct Christie throw distance formula to calculate the proper throw distance (±5%) required for your lens.

Tint ' Balance of red-to-green necessary for realistic representation of NTSC signals.

Trailer ' Motion picture material presented prior to screening of the feature, so called because they were originally presented following the feature. Trailers are generally manufactured and created by the distributor in close cooperation with the producer; they are distributed by trailer specialists at no charge. Types of trailers include previews, teasers, house and/or policy trailers, advertisements, and public service announcements.

Unicode ' The Unicode method of encoding produces a very large character set typically required for ASCII messaging in non-Western languages such as Chinese, Russian, etc. In unicode, every number (code) is unique to a single character. A limited number of TPC functions can be executed remotely via unicode or non-unicode (default) messaging. See also *non-unicode*.

Variable Scan ' The ability of a projector to synchronize to inputs with frequencies within a specified range.

Vertical Frequency ' The frequency at which images are generated. Vertical frequencies vary amongst sources. Also called vertical scan rate.

Vertical Offset ' The difference between the center of the projected image and the center of the projector lens. For this projector, this value is expressed as the maximum percentage of the image that can be projected above or below the lens center without degrading the image quality. Vertical offset ranges depend on the type of lens in use, and whether or not the image is offset horizontally at the same time.

Video ' The signal that is used by display devices (such as projectors) to generate an image. This term also refers to the output of video tape/disk players and computers.

Video Decoder ' An optional device that converts NTSC 3.58, NTSC 4.4, PAL, PAL-N, PAL-M or SECAM to RGB video.

Video Standard ' A specific type of video signal, such as NTSC, PAL, SECAM. This projector can automatically recognize and interpret the incoming standard and display accordingly.

Viewing Angle ' Screens do not reflect equally in all directions. Most light is reflected in a conical volume centered around the "line of best viewing". Maximum brightness is perceived if you are within the viewing cone defined by the horizontal and vertical viewing angles.

Watermark ' Data embedded in essence that serve different purposes and that are either imperceptible or obvious, robust or fragile. Their usual purpose is for legal support of copyright, and they may also be components of copy control schemes.

White Balance ' The color temperature of white used by the projector.

White Field ' The area of an image that is white only. For example, a full white field is an image that is white everywhere. A 10% white field is a white area (usually rectangular) that occupies 10% of the image; the remaining 90% is black.

YCbCr ' A high-end *digital* component video signal.

YPbPr ' A high-end *analog* component video signal. Sometimes called YUV, Component, or Y, R-Y, B-Y, the YPbPr signal by-passes the video decoder in this projector.

YUV ' See *YPbPr*.

Zoom ' The adjustment of image size by means of a zoom lens.

Appendix B

Schematics

See next page.

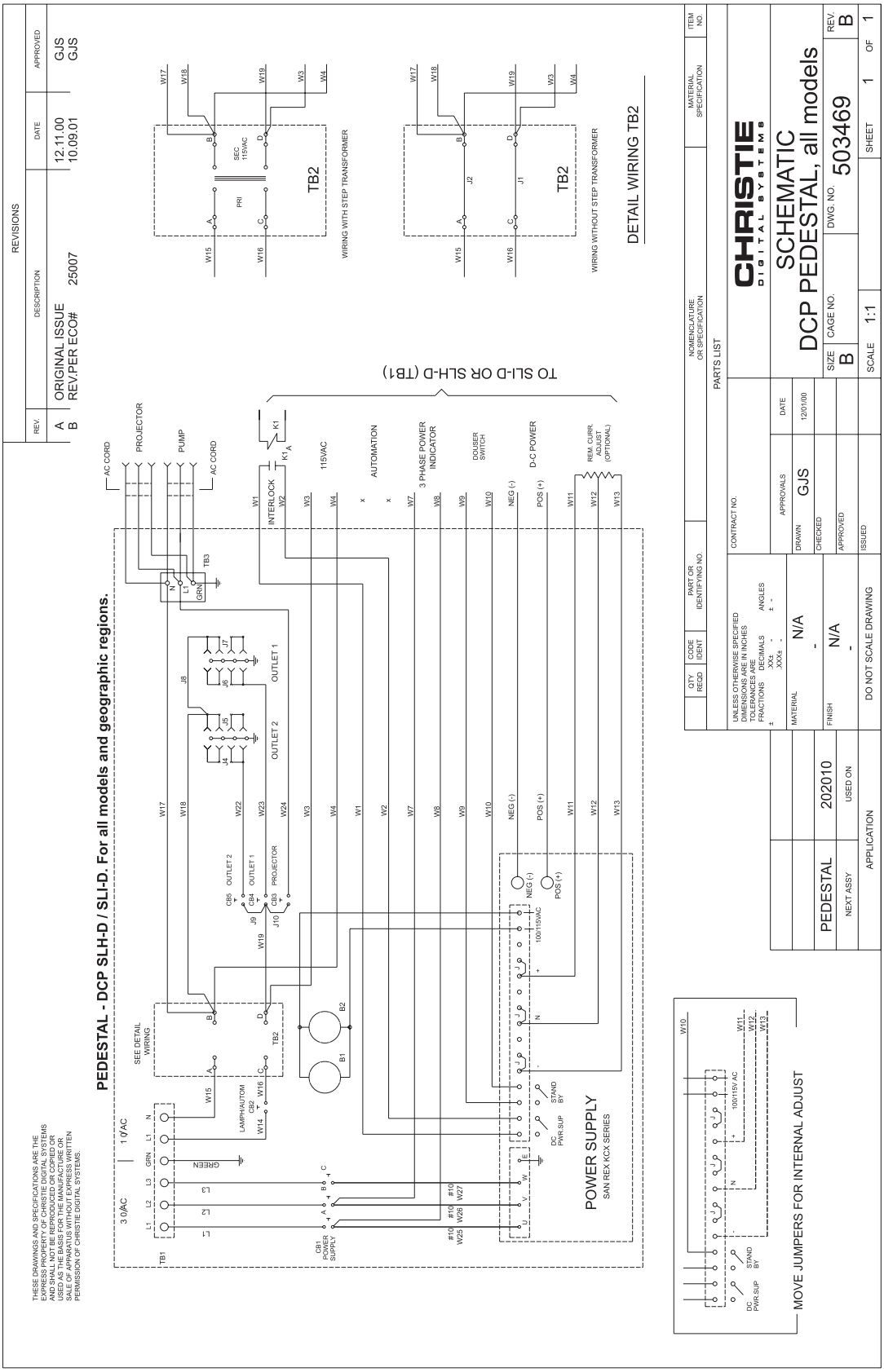


Figure B-1. DCP Pedestal Schematic, All Models

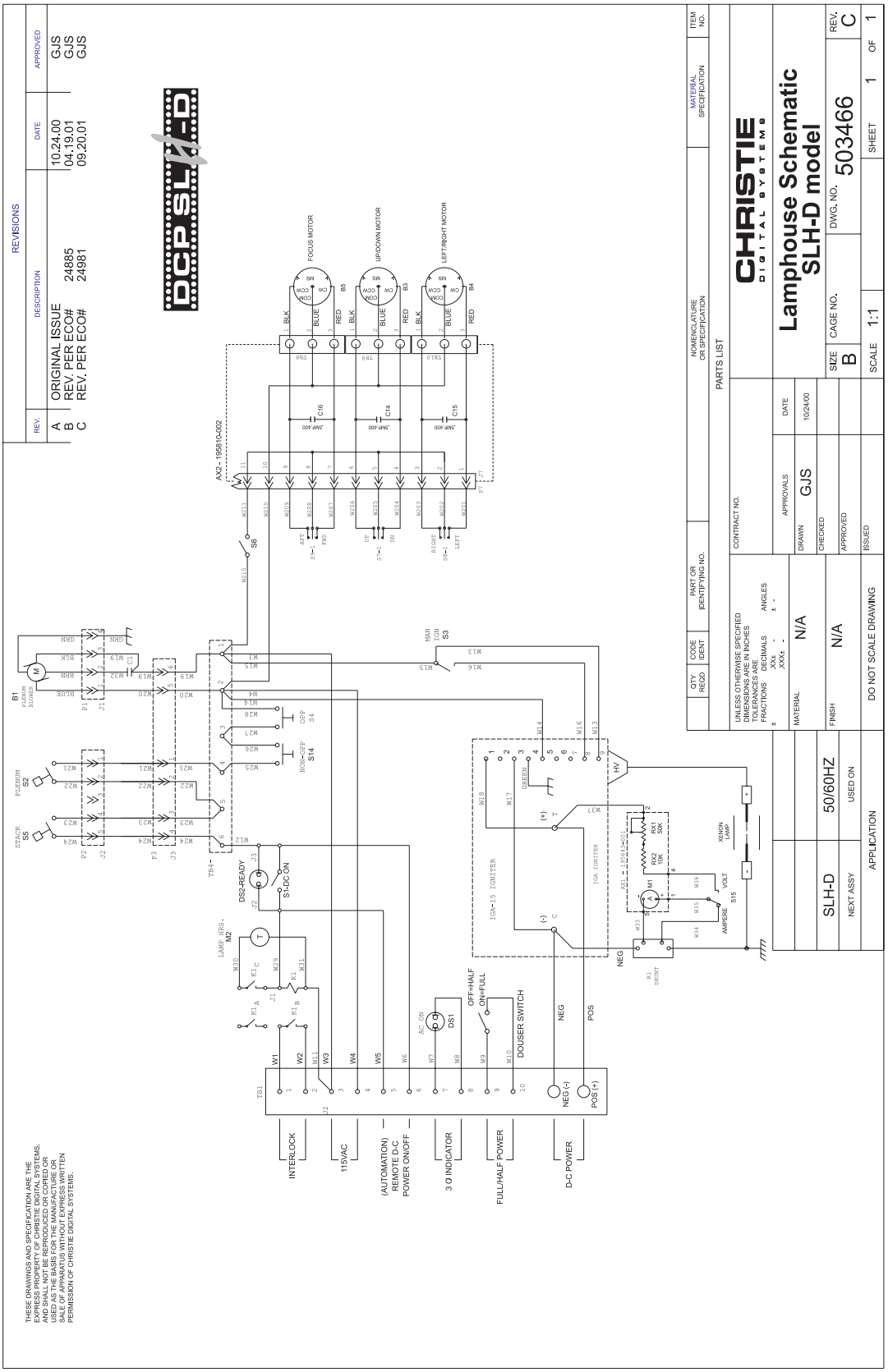


Figure B-2. DCP Lamphouse, SLH-D Model

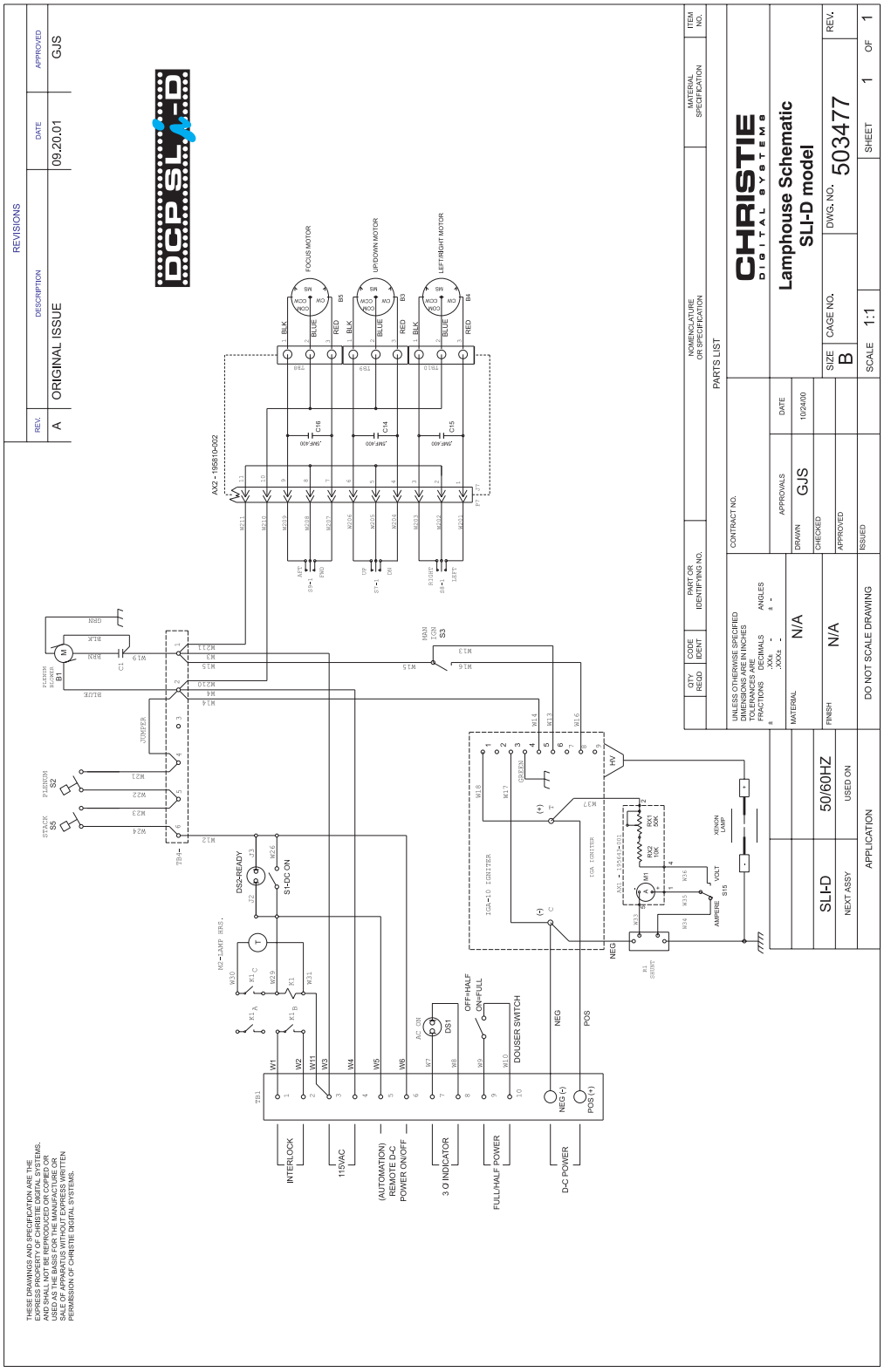


Figure B-3. DCP Lamphouse, SLi-D Model

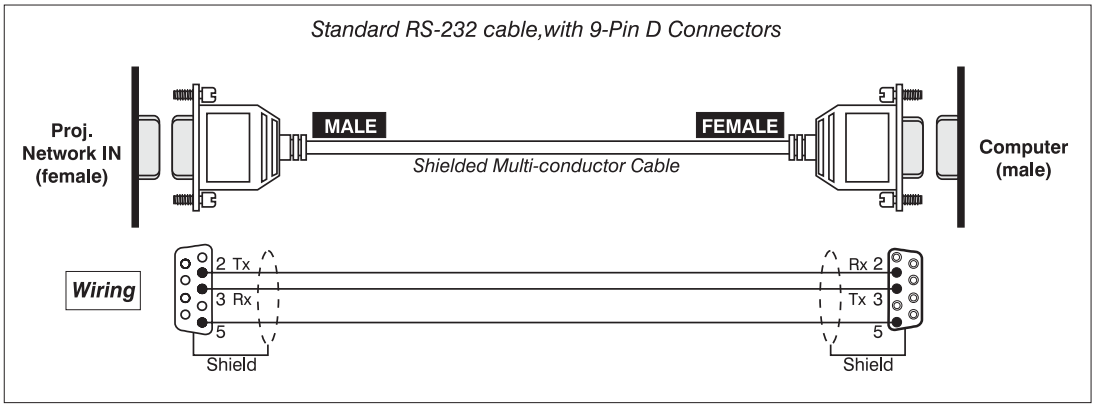
Appendix C

Serial Communication Cables

Serial Links to Cine-IPM ' When connecting the Cine-IPM to a computer, another Cine-IPM, or the *Marquee Signal Switcher* formerly manufactured by Christie, use the appropriate serial communication shielded cabling as illustrated.

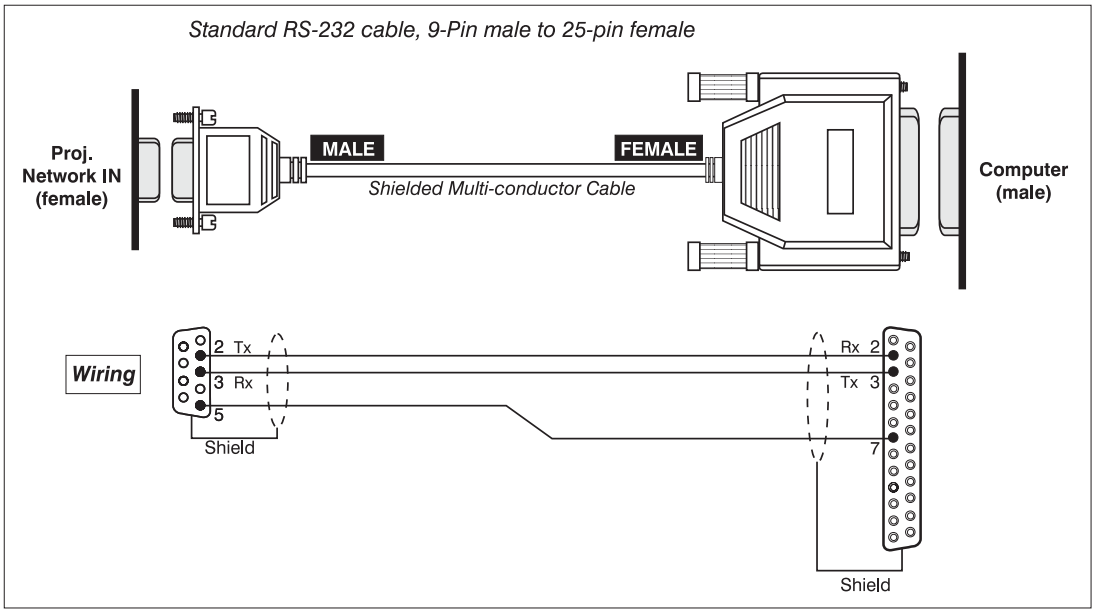
❑ *From Cine-IPM to computer (RS-232)*

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

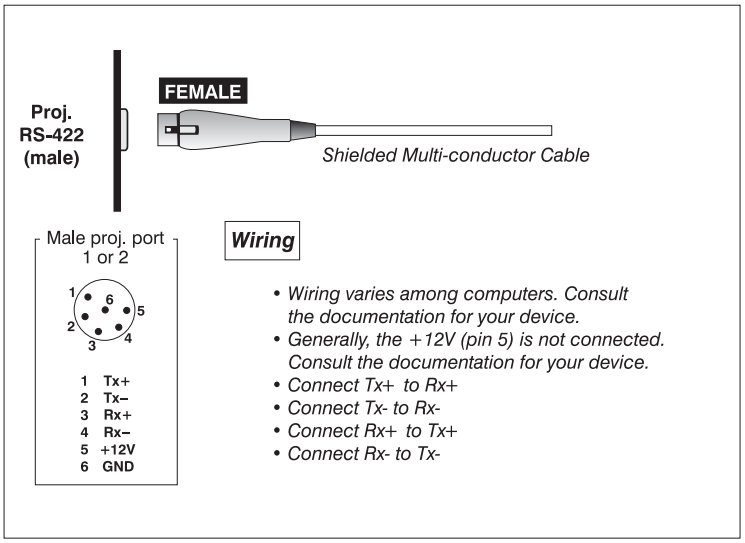


❑ *From Cine-IPM to computer (RS-232)*

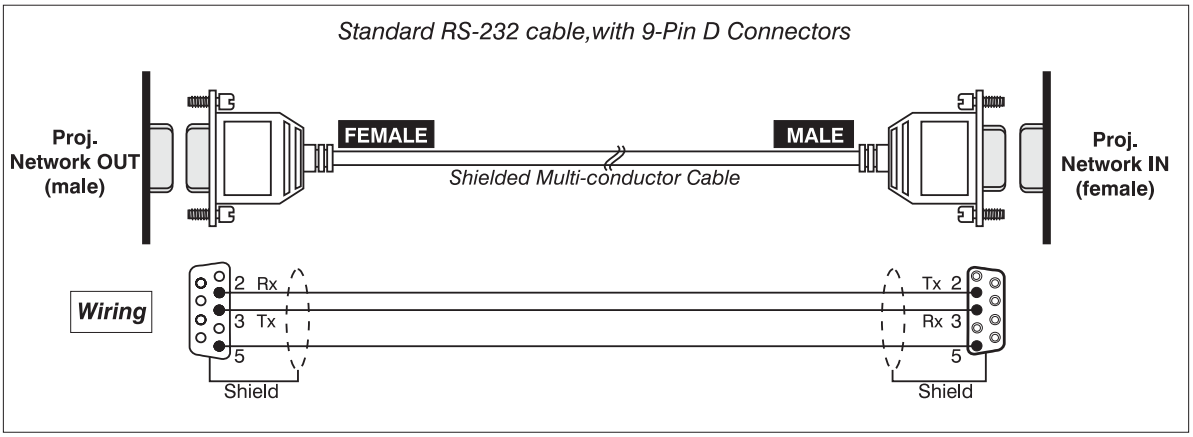
For computers having a 25-pin serial port



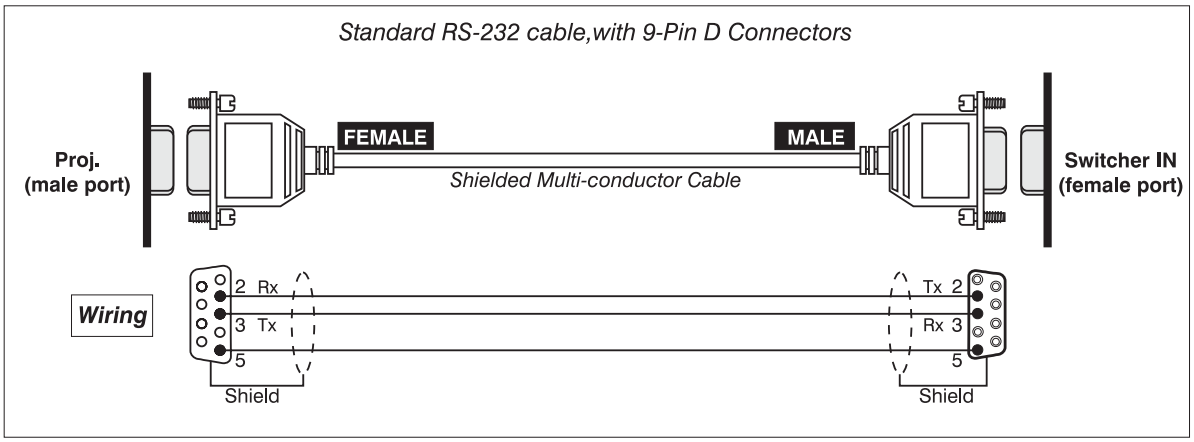
❑ *From Cine-IPM to RS-422 compatible computer*



❑ *From Cine-IPM to Cine-IPM (RS-232)*



❑ *From Cine-IPM to switcher*



Serial Links to Projector

From a PC or server, connect a standard 9-wire RS-232 serial cable (CTS/RTS) to the top **DCP** serial communication panel port labeled “PC or Server”. Do not use a 2-signal cable as shown in the preceding illustrations.

From the Cine-IPM, connect either a standard 9-wire RS-232 serial cable (CTS/RTS) or a special 2-wire cable to the bottom **DCP** serial communication panel port labeled “Cine-IPM”. See preceding illustrations.

Appendix D

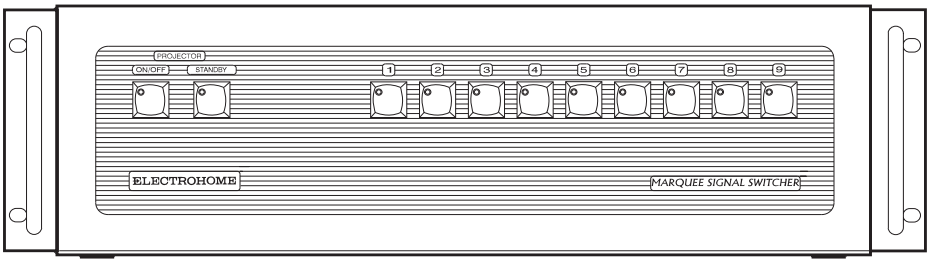
Optional Input Modules

There following input modules and accessories are compatible for use with the optional Cine-IPM.

Marquee Signal Switcher

' *NOTE: No longer manufactured by Christie.*

The *Marquee Signal Switcher* formerly manufactured by Christie is a rack-mountable signal selector which can greatly increase the number of analog sources (inputs) available to the Cine-IPM. Connected to **INPUT 1**, a single switcher provides up to 9 more sources. Additional *Marquee Signal Switchers* can be connected to the first, with their input locations (switcher#,slot#) selectable through the Input key on the keypad. Switcher inputs can also be selected at the switcher by pressing the appropriate front panel push-button, or through serial communications. See *Section 2*.

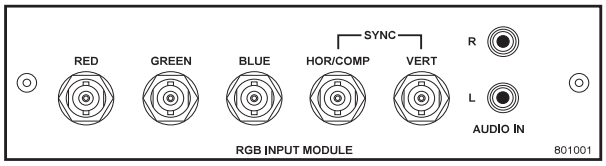


Marquee Signal Switcher Features

- ◊ simple connection and push-button control
- ◊ easy to see, illuminated indicators
- ◊ 9 slots for analog interface modules
- ◊ RS-232 serial interface
- ◊ input for a wired remote keypad
- ◊ universal power input
- ◊ up to 9 switchers can be daisy-chained together with a Cine-IPM

RGB500 Input Module 38-804606-xx

' The *RGB500 Input Module* may be installed in the Cine-IPM, a *Marquee Signal Switcher* formerly manufactured by Christie, or a *Case/Power Supply*. The module receives analog RGB input signals from computers or other RGB source devices.



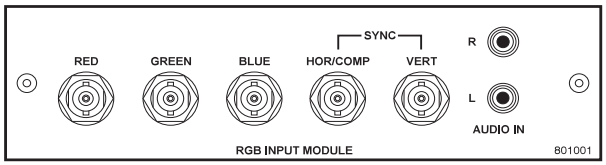
RGB500 Features

- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync), up to 500 MHz bandwidth
- ◊ BNC connectors for RGB signal inputs

*NOTE: The audio connectors are not functional. Connect audio to the projector's **IN 2** audio port, if available (standard on **Vista** models only).*

RGB400BA Input Module 38-804610-xx

The *RGB400 Buffered Amplifier Input Module* may be installed in the Cine-IPM, in a *Marquee Signal Switcher* formerly manufactured by Christie, or a *Case/Power Supply*. Connect three-, four-, or five-wire RGB video signals of up to 400 MHz bandwidth, signals typically produced by high-resolution computer or workstations. The buffering capability of the module enables the incoming signal to be sent to a remote destination. Inputs are 75Ω terminated.



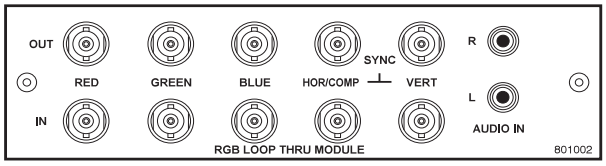
RGB400BA Features

- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◊ BNC connectors for RGB signal inputs
- ◊ Buffered signals to a remote destination

NOTE: The audio connectors are not functional.

RGB400 Active Loop-Thru Input Module 38-804607-xx

The *RGB400 ALT Input Module* may be installed in the Cine-IPM, a *Marquee Signal Switcher* formerly manufactured by Christie, or a *Case/Power Supply*. The module receives analog RGB input signals from computers or other RGB source devices. Video inputs are 75Ω terminated. Video outputs provide buffered loop-through to another display device.



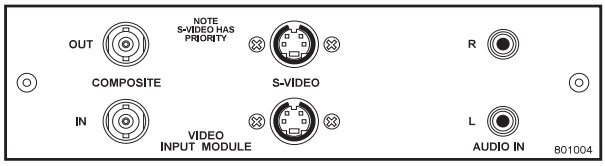
RGB400ALT Features

- ◊ accepts 3, 4, or 5 wire RGB video (sync-on-green, composite sync, or separate horizontal and vertical sync)
- ◊ BNC connectors for RGB signal inputs
- ◊ buffered loop-through video outputs

NOTE: The audio connectors are not functional.

Composite / S-Video Input Module 38-804608-xx

The Composite/S-Video Input Module may be installed in the Cine-IPM, a *Marquee Signal Switcher* formerly manufactured by Christie, or a *Case/Power Supply*. The module receives either composite video or S-video input signals from tape or disk players (do not connect both types of signals simultaneously). Video inputs are 75S terminated. Video outputs are provided for buffered loop-through to another display device.



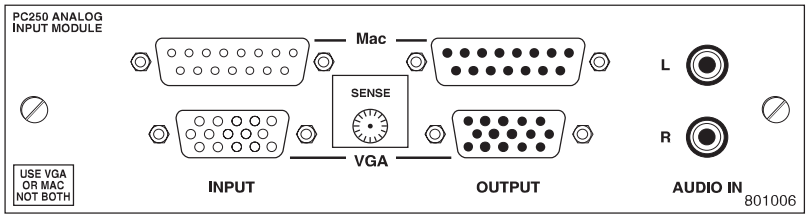
Composite/S-video Features

- ◊ BNC connectors for composite RGB signals
- ◊ 4-pin mini-DIN connectors for S-Video signals
- ◊ buffered loop-through video outputs

*NOTES: **1)** This interface is not a decoder. NTSC, PAL, or SECAM signals must connect to the video decoder installed at **INPUT 3** / **INPUT 4**. **2)** The audio connectors are not functional. **3)** For use with this projector, do not connect **both** composite video and S-video signals to the Composite / S-Video Input Module–connect one or the other, even when plugged into a switcher.*

PC250 Analog Input Module 38-804609-xx

The *PC250 Analog Input Module* may be installed in the Cine-IPM a *Marquee Signal Switcher* formerly manufactured by Christie, or a *Case/Power Supply*. The module receives analog RGB input signals from IBM PC compatibles or Macintosh computers. Video inputs are 75S terminated. Video outputs are provided for buffered loop-through to another display device.



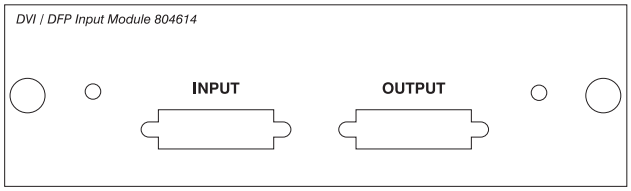
PC250 Analog Features

- ◊ accepts VGA or MAC RGB video
- ◊ 15 pin D connectors for video
- ◊ active loop-through video outputs

*NOTES: **1)** This interface does not accept VGA and MAC signals simultaneously. 2**)** The audio connectors are not functional. **3)** Trademarks are the rights of their respective owners.*

DVI / DFP Input Module

The DVI/DFP Input Module can be installed in the Cine-IPM to display digital video input signals conforming to the DVI (Digital Visual Interface) standard (single-channel) or the DFP (Digital Flat Panel Port) specification.

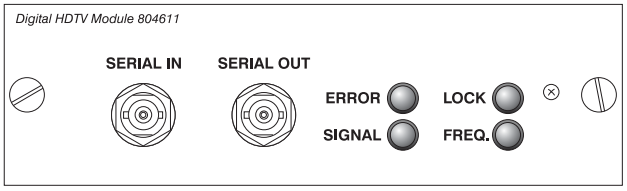


Features

- ◊ Supports Digital Visual Interface (DVI) single-channel and Digital Flat Panel Port (DFP) standards
- ◊ Supports VESA® Extended Display Identification Data (EDID™)
- ◊ Provides an active-loop-through using a 20-pin MDR connector (conforming to DFP Specifications)

Digital HDTV Input Module 38-804611-xx

The *Digital HDTV Input Module* can be installed in the Cine-IPM at **INPUT 2**, where it accepts a digital 4:2:2 component HDTV signal (YCbCr) via a single **SERIAL IN** BNC connector. The signal can loop through the **SERIAL OUT** BNC out to another device (such as another projector). Inputs are 75S terminated.

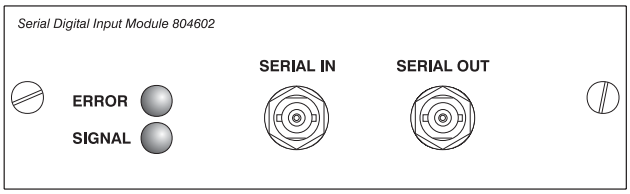


Features

- ◊ accepts a variety of digital HDTV 4:2:2 component signals (YCbCr), and de-serializes into a parallel 20-bit 4:2:2 component signal (10 bits each for Y and CbCr)
- ◊ SMPTE 292M compatible
- ◊ Two data rates: 1.485 Gb/sec or 1.485/1.001 Gb/sec.
- ◊ provides both a **SERIAL IN** and a **SERIAL OUT** BNC connector
- ◊ includes 4 status LEDs

Serial Digital Input Module 38-804602-xx

The *Serial Digital Input Module* (*SDI*) can be installed in the Cine-IPM at **INPUT 2**, where it accepts a serial digital 4:2:2 component video signal (YCbCr) via a single **SERIAL IN** BNC connector. The signal can loop through the **SERIAL OUT** BNC out to another device (such as another Cine-IPM). Inputs are 75Ω terminated.

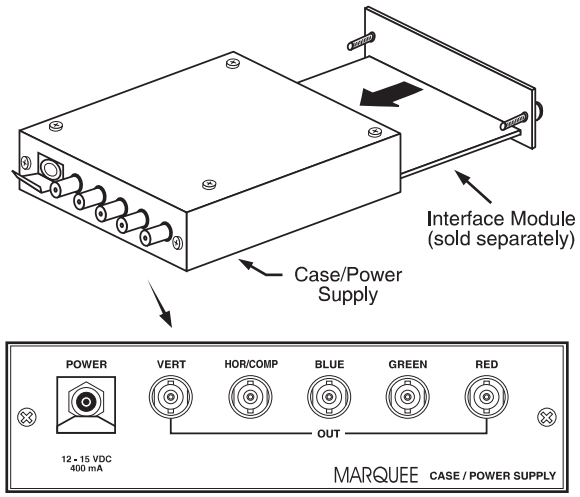


SDI Features

- ◊ accepts serial digital 4:2:2 component video (YCbCr)
- ◊ provides both a **SERIAL IN** and a **SERIAL OUT** BNC connector
- ◊ includes status LEDs for signal and error

Marquee Case/Power Supply 38-801023-xx 38-801026-xx

The *Marquee Case/Power Supply* enables you to use an analog input module as a stand-alone interface. Two supplies are available: one for use with 120 volt line voltage (38-801023-XX), and the other for use with 220 volt line voltage (38-801026-XX). Both models include a 15 VDC, 500 *m*A AC adapter.



Marquee Case/Power Supply Features

- ◊ easy installation — no tools required
- ◊ the *Marquee Case/Power Supply* accepts the following input modules for use with the Cine-IPM: *RBG500, RGB400 Active Loop-Thru, RGB400 Buffered Amplifier, Composite/S-Video,* and *PC Analog.* Digital inputs cannot be used.
- ◊ retaining clip to secure AC adapter
- ◊ non-slip feet
- ◊ supplied with 110 or 220 volt AC adapter

Index

D

E

F

G

H

N

O

P

R

S

T

U

V

W

Y

Z