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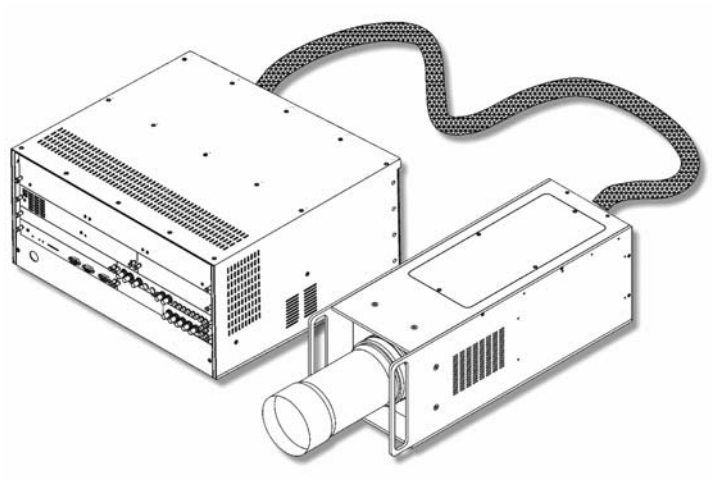
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7177 N. Atlantic Avenue, Cape Canaveral, Florida 32920-3719 USA

MARQUEE™ 8521 Ultra Green (HUD)
User's Manual

VDCDS P/N: 71180-01 / Revision 1.0 / July 2003



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Section 2	Installation & Setup
Section 3	Operation
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Section 1 Specifications / Dimensions

The Marquee 8521 Ultra Green (HUD) Series projectors utilize 8” high brightness, electromagnetic focus, high resolution CRTs. There are many applications which demand image quality that can only come from unpixelized CRT projection systems. The Marquee Ultra HUD meets these demands by providing consistently bright, high resolution images with true black levels and geometry distortion. When the ultimate in displays is required, call on VDCDS Marquee Ultra Series projectors to fulfill your requirements.

1.1 8521 Ultra Green (HUD) Specifications

VDCDS P/N: 69876-01

Optics
- High definition, low magnification F3.3 lens
- 6 line pairs per mm (lp/mm) resolution / 8 lp/mm at short conjugate
- Marquee Ultra electromagnetic focus CRTs
- Throw Ratio: 4.37:1

Resolution
- 2500x2000 addressability
- 1600x1200 ANSI pixels

Brightness
- 115 lumens

Cable Length
- The optics head of the projector is separated from the base electronics by a standard 6 ft (1.8 m) connection cable. For installations requiring extended range, there are options for up to 25 ft. (7.6 m) cable length.

ASR/ASI
- The projector will automatically update all parameters, including convergence contrast, brightness, keystone, phase, etc., when a new source is detected. The set-up is taken from a matching memory or interpolated from two adjacent memories.

Video Circuits
- 0.5 to 1.0 volts p-p, 75 ohms +/-1 % terminated
- Circuitry for improved video performance and gray-scale tracking
- 150 MHz bandwidth (-3dB); (accommodates 3 nanosecond pixels and digital dock rates over 300 MHz),
- Keyed clamp, better than 1 % accuracy

Sync and Deflection Circuits
- Input level: 0.3 to 5.0 volts pp., 75 ohms terminated

Geometry
- Rectilinear accuracy: 1.0 % maximum of picture height
- Horizontal Linearity: 2.0 % maximum
- Vertical Linearity: 1.0% maximum
- Top and bottom keystone control
- Vertical and horizontal skew control
- Vertical and horizontal bow control
- Special Extended Geometry Distortion Option available

Power Requirements
- 90 VAC to 264 VAC universal input
- Power 500 watts maximum (approx.)
- Line frequency 50 to 60 Hz nominal
- Power factor corrected

Control Features
- Multi-language software (user selectable)
- Built-in set-up tutorials
- 5 built-in test patterns
- Programmable Events and Real Time Clock
- Menu driven interface with on-screen help
- Auto power-up after interruption
- Internal frequency generator

Scope of Supply
- Optics head: 1 Green CRT and lens
- 6’ electronic cable with connectors (standard)
- Electronics base unit
- 2 fully functional programmable remote IR keypads.
- Users manual
- 10' AC line cord
- Tool Kit

Display
- Electronic geometry circuits separately correct top, bottom and sides of displayed image
- Color temperature adjustment for precise set-up
- S&C vertical and horizontal linearity
- Top, bottom, and side blanking
- Keystone circuitry to correct pictures angles up to ± 15° vertically from screen axis
- Scheimpflug adjustment for top, bottom and side to side focus
- Marquee Ultra has 9 zone electronic astigmatism correction and 8 zone contrast modulation control
- Automatically switches to separate Sync, composite sync or sync on green. Separate Sync and composite sync is automatically accepted in either polarity. (Sync on green limited to 180 Hz
- Smartlock™ processing circuitry for quick lock-in and ultra steady images

Vertical Deflection
- Frequency range: 39.5 Hz to 185 Hz. Size automatically regulated over frequency range and electronically adjustable over a 115 % range. Retrace time: less than 300 microseconds

Horizontal Deflection
- Frequency range:: 15 kHz to 152 kHz
- Size automatically regulated over frequency range. Retrace time compatible with signals having horizontal blanking times below 1.5 microseconds

Inputs/Outputs
- Built-in RGB input. Optional input modules can install in interface slot
- Built-in RS232 for computer control, with loop through for connection of multiple projectors

Contrast Modulation
- This feature adjusts the brightness in single or multiple zones for improved color and brightness uniformity. Standard on all Marquee Ultra models

Maximum Operating
- Temperature: 0° to 35" (32" to 95°F)
- Altitude. 0 to 3000 m (0 to 10,000 ft)
- Heat Dissipation. 2450 BTU/HR (approx.)
- Humidity: 0 to 90 % non-condensing
- Storage Temperature: -30° to 65"C (-22" to 149"F)

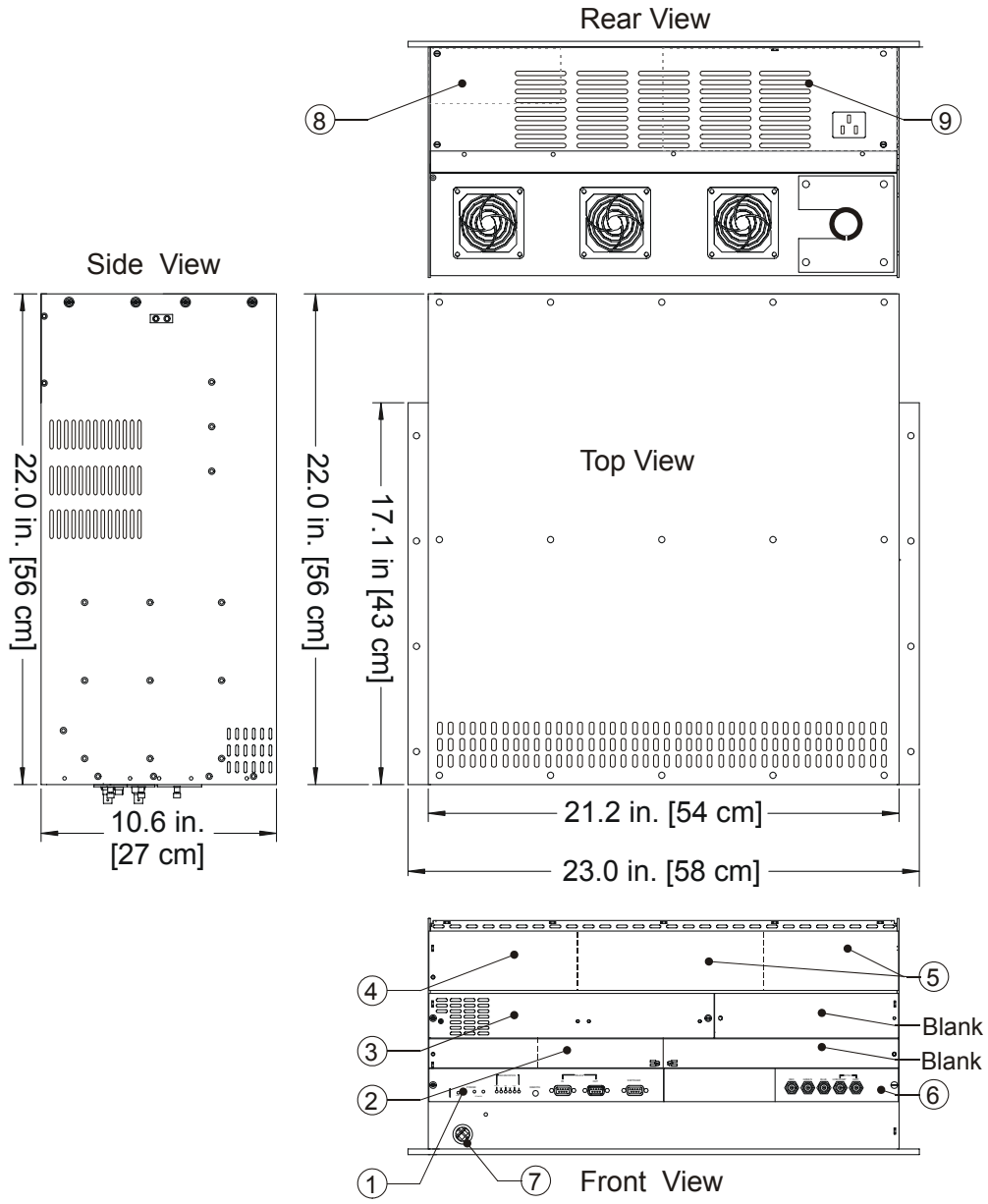
Weight
- Marquee Ultra HUD Series:
  - Electronic Chassis: 60 lbs. (27 kg)
  - CRT Head Assembly: 75 lbs. (34 kg)

Regulatory Approvals
- Meets FCC Class A, DHHS and HWC plus CSA / UL / EN 60 950 requirements
- EN55022 Class B and EU directives 73/23/EEC, 89/336/EEC (CE marked)

Due to constant research and development, product specifications are subject to change without prior notice.

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1.2 Electronic Chassis Main Assemblies and Dimensions

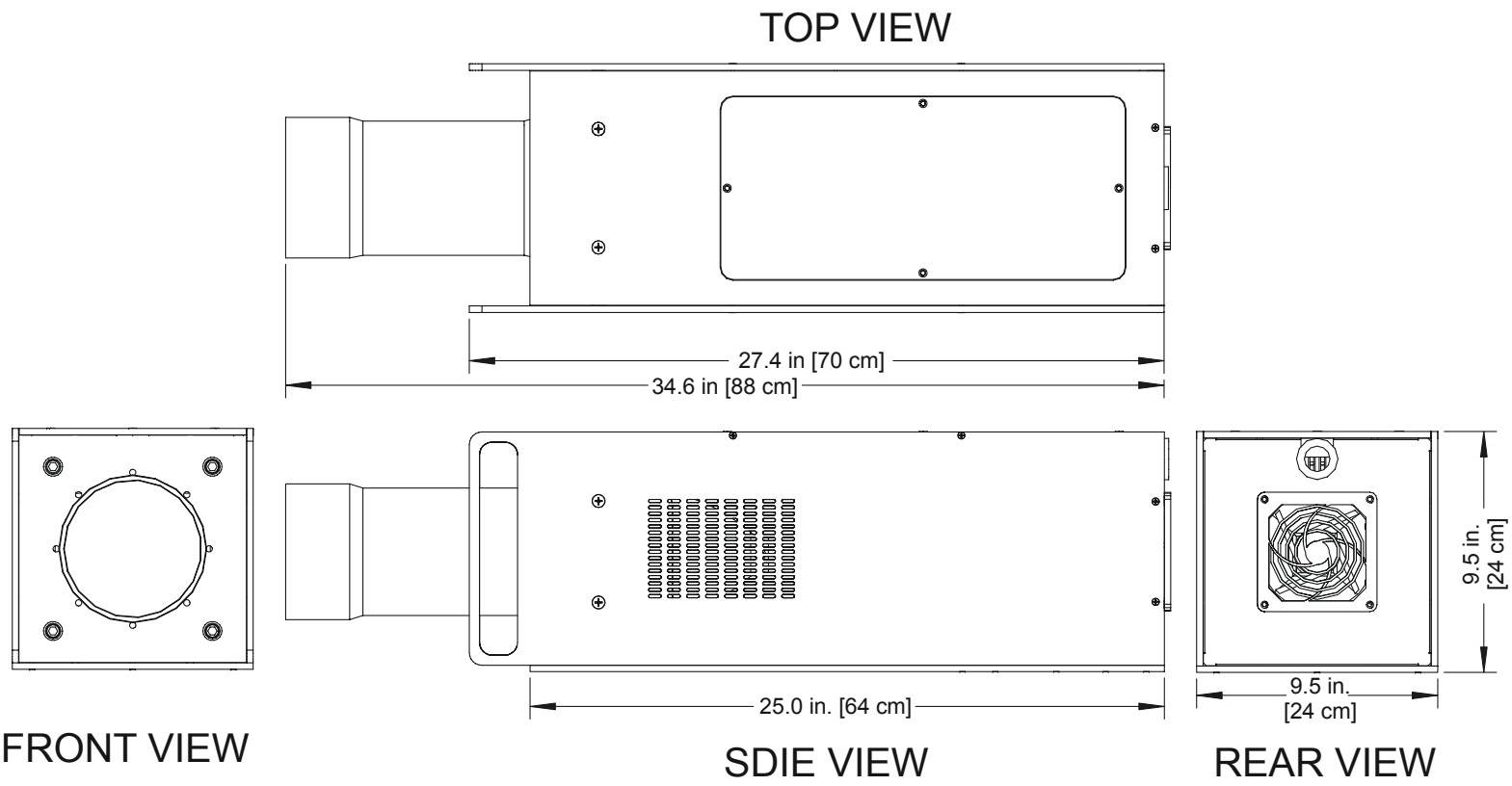


#	VDCDS P/N	DESCRIPTION	QTY
1	03-280336-07P	Control/DPB/Stig-Waveform	1
2	81722-01	Marquee Contrast Modulation	1
3	03-270354-04P	Module Focus & Geometry	1
4	03-271330-02P	Stigmator Module	1
5	03-270350-01P	Convergence Amp/Vertical Deflection Module	1
6	03-270335-05P	Video Input Module	1
7	03-000250-02P	IR Sensor	1
8	03-000310-02P	HVPS	1
9	03-000229-05P	LVPS	1
Ref	81721-01	Conv/Stig/Vert Adaptor, PCB	1
Ref	81730-01	HUD Mother Board, Elec. Chassis	1
Ref	81741-01	Vertical Load	2

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1.3 CRT Head Main Assemblies and Dimensions

VDCDS P/N	DESCRIPTION	QTY
03-007062-03P	CRT 8" MAG FOCUS GRN PANASONIC	1
03-270338-02P	VIDEO NECK MODULE 8520/8521	1
21-000687-04	STIGMATOR RING	1
21-000691-01	YOKE DEFLECTION 8"	1
21-000692-01	COIL, CONVERGENCE 8"	1
21-000695-01	FOCUS MAG WITH STIGMATOR 8"	1
59874-01	SPLITTER, 1 IN, 1 OUT	1
59879-01	LENS, LOW MAG, HUD	1
81731-01	HUD MOTHER BD, HEAD	1
81732-01	HUD HORIZ. DEFLECTION MODULE	1



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Section 2 Installation & Setup

This section explains how to install and set up the projector. If you are familiar with the projector and want to quickly set it up for temporary use, follow the Quick Setup instructions in Section 2.1. For a complete setup, skip Section 2.1 and follow the instructions and guides covered in the remaining subsections.

2.1 Quick Setup

Follow these 7 steps for quick set up of the projector:

Step 1. Position the Projector

To perform a quick setup, the projector must be positioned so that the throw distance is the same as that used during the most recent optical alignment; otherwise a detailed setup is required. The throw distance is the distance between the center lens on the projector and the center of the projection screen.

Note: If an optical lens alignment is required, refer to Section 2.5, Optical Alignment.

Step 2. Connect the Power Cord

Plug the AC line cord into the line input unit on the electronic chassis. Plug the three prong end of the line cord in a grounded AC outlet.

Note: Input voltage must be between 90 VAC and 264 VAC.

Note: Ensure the line cord is the proper type for the AC receptacle.

Step 3. Connect a Source

Connect a source to the projector's built-in RGB input (slot 1). Ensure the source is on and properly connected.

Step 4. Turn the Projector On

Press [**POWER**] on the keypad to turn the projector on. Hold down the power key for about one second.

Note: If the keypad has been configured for IR remote operation, point it towards the screen or the front of the electronic chassis.

Step 5. Select the Input

Press [**SOURCE**] [**0**] [**1**] to select the source connected to the built-in RGB input. Or, if installed with the optional image shift, press [**SOURCE**] [**0**] [**2**] to select the source connected to the Image Shifter input.

Step 6. Adjust the Display

Press [**HELP**] [**1**] to select the Guided Source Setup tutorial.

2.2 Keypad Operating Settings

The keypad includes its own memory to store keypad operating settings. With a few simple keystrokes you can over-ride the "hard wire" protocol setting (explained earlier) and enable or disable the backlit feature. Keypad battery life is increased if the backlit feature is disabled. The new operating settings are stored in the keypad until the batteries are replaced (IR remote keypad) or the keypad connection cable is unplugged (wired).

If the keypad is configured for IR remote operation, make sure the batteries are installed. If it is configured for wired remote operation, make sure its extension cable is properly connected to the projector. Perform the following keystroke sequences to change its operating settings:

- To toggle the keypad's protocol setting (A or B), press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**1**].
- To toggle the backlit feature (enable or disable), press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**3**].
- To return all configuration settings to the jumper settings, press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**0**].

Note: The projector will not respond to keypad commands if you press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**2**]. If pressed accidentally, press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**0**] to clear all keystroke settings.

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2.2.1 IR Remote Battery Replacement

Locate the battery compartment at the back side of the keypad. Squeeze the latch to open the door. Replace the batteries. For an IR remote keypad, place four AA size, 1.5V alkaline batteries in the compartment ensuring that the +/- orientation of each battery is correct. Position the compartment door into place.

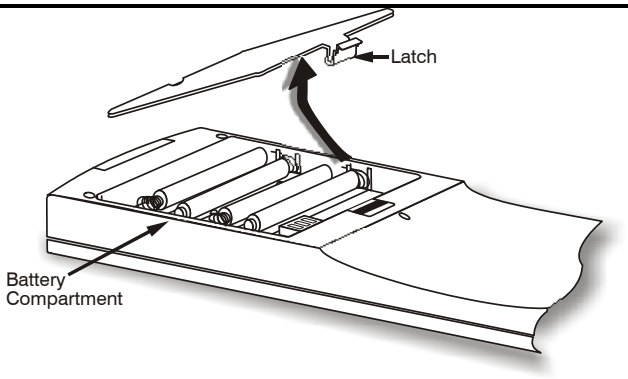


Figure 2-1. Remote Control Battery Replacement

! WARNING: DO NOT INSTALL BATTERIES IN THE KEYPAD IF A BUILT-IN OR WIRED REMOTE CABLE IS ATTACHED TO IT. THIS MAY CAUSE THE BATTERIES TO EXPLODE.

2.2.2 Remote Control Conversion or Protocol Setting Change

If converting the keypad to an IR remote or changing protocol, unplug the cable connector. Locate the jumper wires next to the cable connector location. The jumper wires control the keypad's operating settings.

JP1	3 2 1	PROTOCOL A
	3 2 1	PROTOCOL B
JP2	3 2 1	(ALWAYS)
JP3	3 2 1	(ALWAYS)
JP4	3 2 1	BUILT-IN OR WIRED KEYPAD
	3 2 1	IR REMOTE KEYPAD

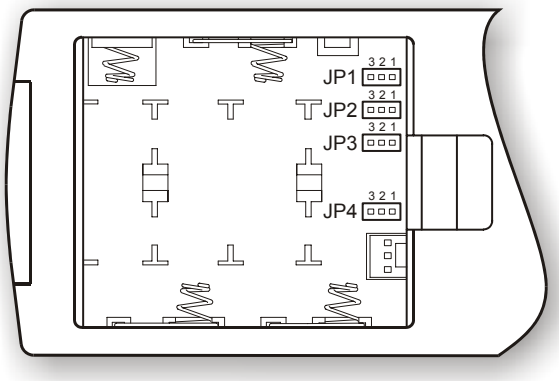


Figure 2-2 Remote Control Jumper Settings

JP1: This jumper setting is important if the keypad is configured for remote operation. There are two keypad protocols: A and B. These protocols are available to allow two projectors in the same room to be independently controlled by separate remote keypads. The protocol setting of the keypad must match that set in the projector's Keypad Options menu ([**UTIL**] [**6**] [**1**]). For more information about keypad protocols, refer to the Remote Control Options entry in Section 3.6, Utility Features.

JP2: This jumper must always be set between pins 1 and 2 as shown; otherwise, the projector will not respond correctly to keypad commands.

JP3: This jumper must always be set between pins 1 and 2 as shown; otherwise, the backlit feature will be disabled and the projector will not respond correctly to keypad commands.

JP4: The JP4 jumper setting sets the keypad type. If you are converting the keypad to an IR remote, move the JP4 jumper from between pins 2 and 3 to pins 1 and 2.Power Connection

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2.3 Source Connections

To apply power to the projector, plug the AC line cord into the line input socket located at the front panel of the projector. Plug the three prong end of the line cord in a grounded AC outlet. Input voltage to the projector must be between 90 and 264 VAC, 50 or 60 Hz. The power source must supply 650 watts of power to the projector.

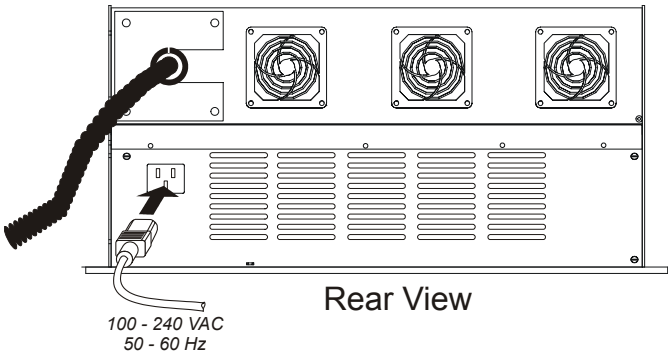


Figure 2-3. Power Connection

The projector includes a built-in RGB input interface (Video Input Module) for connection of external RGB sources. This input interface is shown in Figure 2-4 The built-in interface is required for normal operation.

The standard and optional RGB interfaces provide connection of an RGB source having one of the following sync types: sync on green (3-wire), composite sync (4-wire), or separate H & V sync (5-wire). To connect a source, connect the red, green, and blue outputs to the RED, GREEN, and BLUE inputs on the interface. If the source uses sync on green, no additional cables are required. If the source provides a composite sync output, connect it to the HOR/COMP input. If the source provides separate horizontal and vertical sync outputs, connect the horizontal sync signal to the HOR/COMP input, and connect the vertical sync input to the VERT input. Interconnection cables must be terminated with BNC connectors. Figure 2-4 show source connections for the built-in interface.

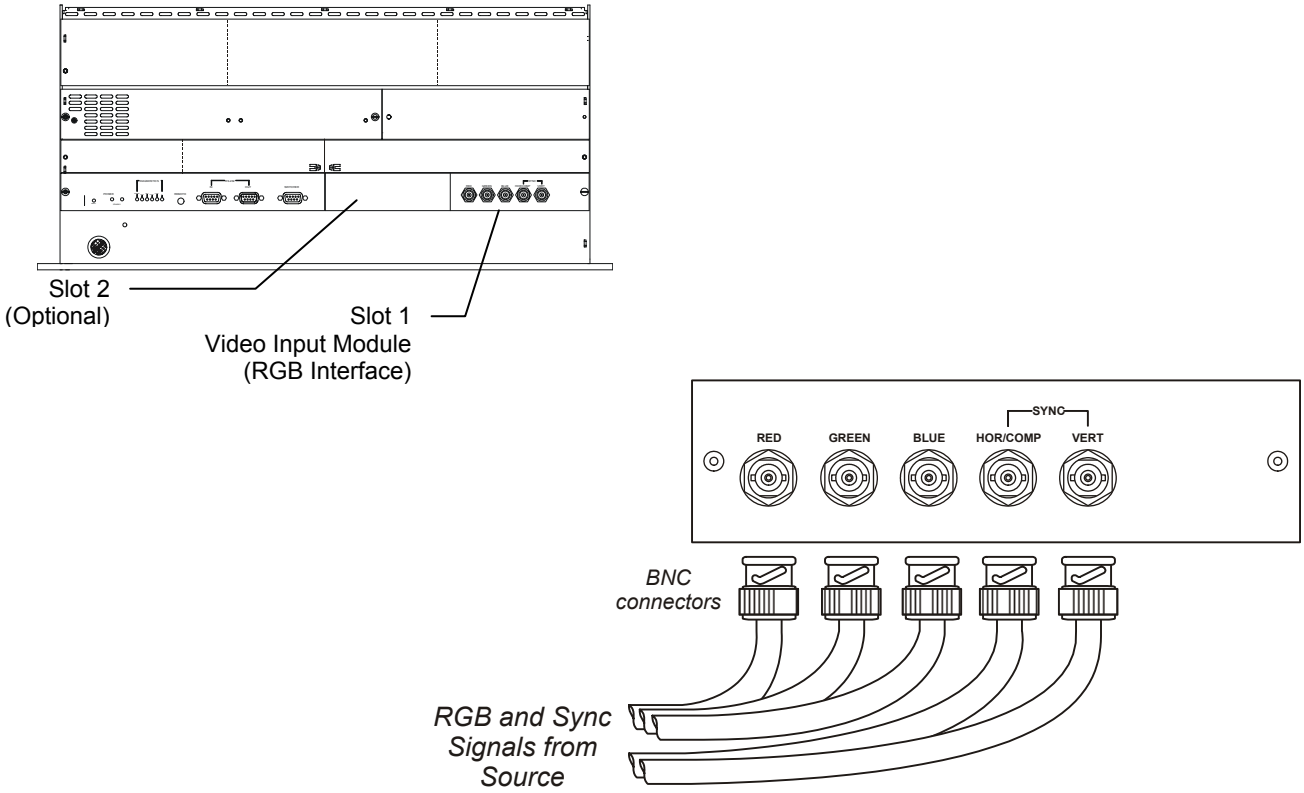


Figure 2-4. Built-in RGB Interface Connections (Video Input Module-VIM)

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2.4 Serial Port Connections

Serial port connections are required when:

1. Using a Marquee signal switcher with the projector or
2. The system is to be controlled by a computer/third-party controller.

The projector's serial ports are located on the Control Module at the front panel of the electronic chassis. See Figure 2-5.

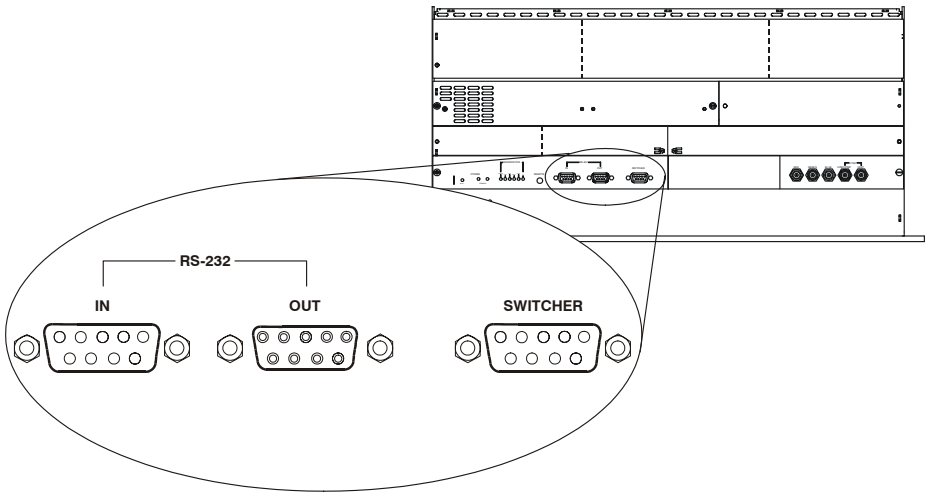


Figure 2-5. Serial Port Connections

If using the system with a Marquee signal switcher, connect an RS-232 serial communication cable between the switcher and the projector serial port labeled "SWITCHER". If the system is to be controlled by a computer or third-party controller which has an RS-232 serial port, connect an RS-232 serial cable between the computer and the projector serial port labeled "IN". After the connection is made, set the serial port baud rate as described in the Projector Setup entry in Section 3.6.

Note: All serial connections require a 9 pin D connector at the projector end. Refer to Appendix D for cable wiring requirements.

Note: For computer/controller control, PC software is required.

Note: The RS-232 serial port labeled "OUT" is provided for projector networking applications.

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2.5 Optical Alignment

Optical alignment is required when the throw distance changes or the projector cannot be focused using the focus controls. The projector is optically aligned at the factory at a fixed screen size and a fixed projector-to-screen distance. If the throw distance has changed since the last setup, proceed as follows:

Note: The projector must be warmed up for at least 45 minutes prior to performing optical alignment.

Note: Optical alignment is both a mechanical and electrical adjustment. Electrical adjustments are stored in the current setup memory. After alignment is complete, setup memories which were previously set up (if any) must be set up again. Memory setup is explained in Section 2.7.

Note: Factory alignment is performed using the internal crosshatch with a 61.8 kHz signal applied.

It is recommended that optical alignment be performed using the projector's Guided Mechanical Setup tutorial. This tutorial displays step-by-step instructions during the alignment. The instructions in this section require use of the Guided Mechanical Setup tutorial.

To access and use the Guided Mechanical Setup tutorial, turn on the projector [**POWER**] then press [**HELP**] at presentation level. The Help menu is displayed. Next press [**2**] to select Guided Mechanical Setup. The first page of the guide will be displayed on the projection screen. When using the guide, press [**HELP**] to display the next page, press [**RECALL**] to display the previous page. When complete, press [**EXIT**] to end Help.

HELP

```
Help

1. Guided Source Setup
2. Guided Mechanical Setup
3. Source Selection Guide
4. Keypad Guide
5. -
6. Using Help

For all menus:
Press a number or use ⇧ ⇩
then <ENTER> to select item.
<HELP> for assistance
<RECALL> to go back one level
<EXIT> to return to picture
```

Examine the lens and hardware as shown in Figure 2-6. The lens consists of a single focus barrel. The lens is secured in place with a lens locking ring. Additionally, the lens consists of a metal lens cover which is screwed in-place. To remove the lens cover, rotate the cover counterclockwise (CCW) and place in a secure location for reuse. To focus the lens, loosen the lens locking ring. Note; the lens locking ring employs fine threads and requires multiple turns. Once loosen, rotate the lens barrel until the desired focus is achieved.

The CRT is attached to its lens by four (4) socket head Allen screws located on the lens mounting plate. The upper right screw (when facing the lens) adjusts the focus between the top and bottom of the picture, and the lower left screw adjusts the focus between the left and right sides of the picture. See Figure 2-6.

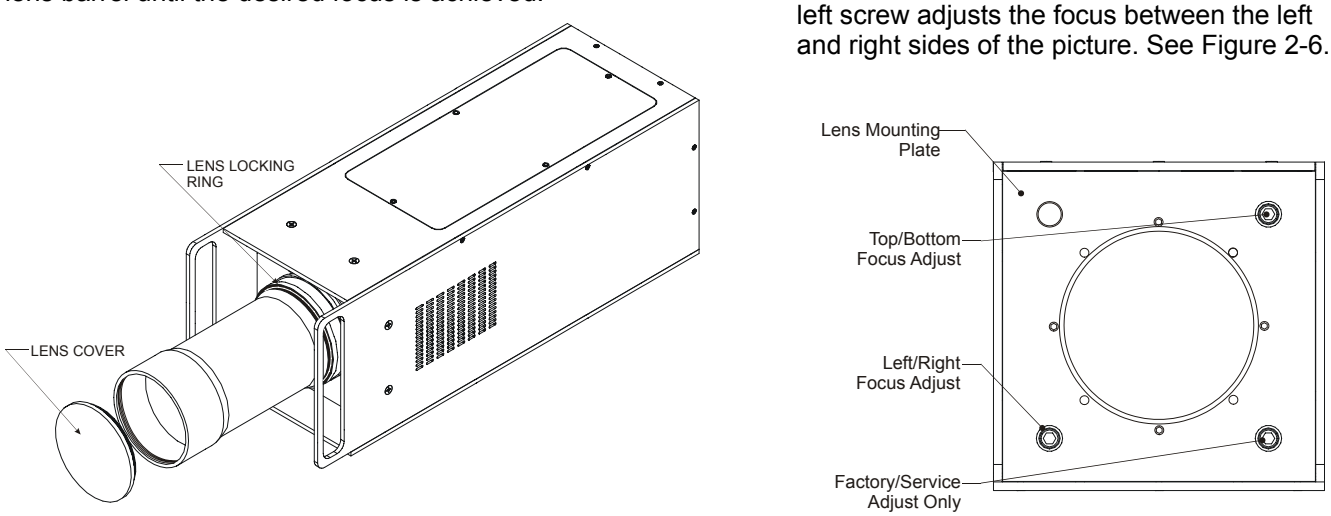


Figure 2-6. 8521 Lens Assembly

Step 1. Loosen the lens locking ring. Rotate the lens using until the picture is focused. Tighten the locking ring.

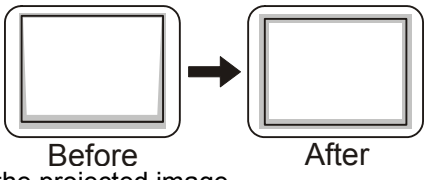
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Step 2. Step 3 requires that you look directly into the lens for adjustment. Before you continue, press [▼] to reduce contrast to a low level (≥10%).

! WARNING: DO NOT LOOK INTO THE LENSES IF CONTRAST IS SET TO NORMAL VIEWING LEVEL.

Step 3. Look directly into the lens. Press [▲], [▼], [◄] or [►] to center the displayed crosshatch on the face of the picture tube.

Step 4. Press [▲] to increase contrast to a normal viewing level.

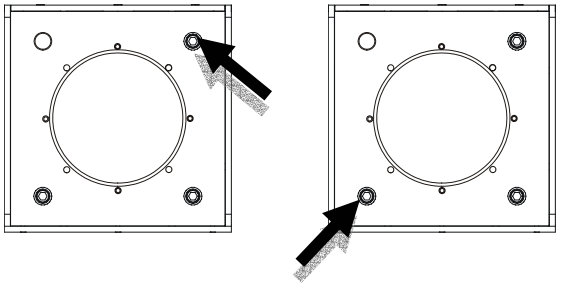


Step 5. Press [▲] or [▼] to adjust for best electrical focus of the projected image.

Step 6. An image is displayed. Loosen the lens locking ring and slightly defocus the center of the picture.

a) Adjust the large Allen head bolt located at the upper right corner of the lens mounting plate. Turn the bolt head until the top and bottom areas of the picture are equally defocused.

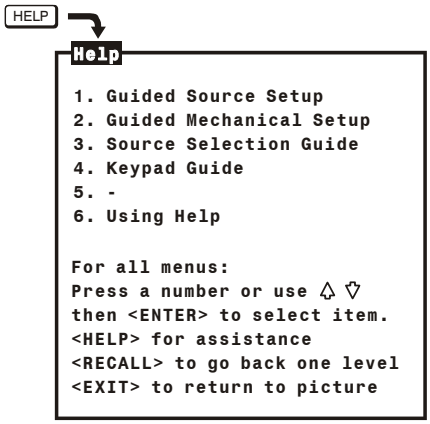
b) Adjust the large Allen head bolt located at the lower left corner of the mounting plate. Turn the bolt head until the left and right sides of the picture are equally defocused.



Step 7. Readjust the lens focus for optimal overall focus. Tighten the lens locking ring.

2.6 Source Setup

This section gives step-by-step instructions for quick setup of the projector for a selected external source. For a complete setup, repeat these steps as required for each source connected to the projector.



Before starting, ensure that the projector is optically and mechanically aligned. If optical alignment is required, follow the setup instructions in Section 2.5. Select the source to be set up using the Source command, and make sure it is visible on the projection screen.

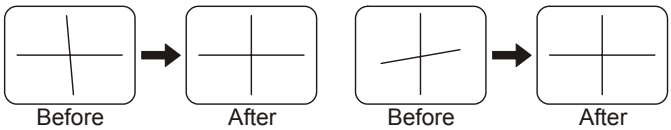
To make setup easier, it is recommended that you use the projector's Guided Source Setup tutorial. It provides source setup instructions on screen to guide you through the adjustments. To access the tutorial, first press [**HELP**] at presentation level. The Help menu is displayed. Next press [**1**] to select Guided Source Setup. The first page of the guide will be displayed on the projection screen. When using the guide, press [**HELP**] to display the next page, press [**RECALL**] to display the previous page. When complete, press [**EXIT**].

Step 1. Press [**BRITE**] then [▲] or [▼] to increase or decrease the brightness setting until black areas in the image just disappear.

Step 2. Press [**CONT**] then [▲] or [▼] to adjust the contrast of the image to a suitable level.

Step 3. Press [▲] or [▼] to adjust electrical focus for best overall sharpness.

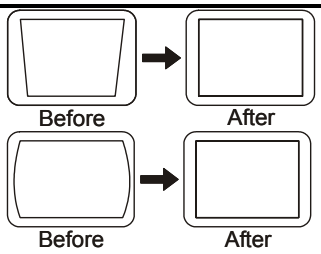
Step 4. Press [▲] or [▼] to adjust skew until the vertical line through the center of the image is not tilted (perpendicular to the horizontal line). Press [◄] or [►] until the center horizontal line is perpendicular to the vertical.



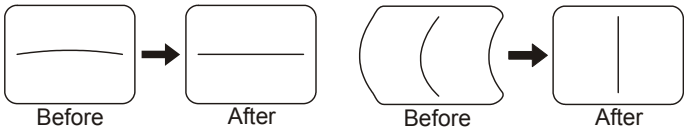
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Step 5. Press [◄] or [►] to adjust keystone until the width at the top of the picture is equal to the width at the bottom.

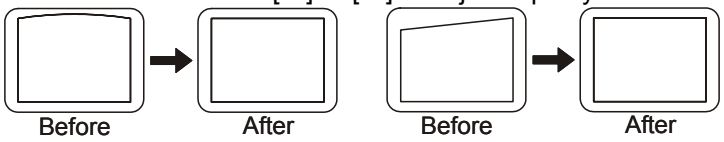
Step 6. Press [◄] or [►] to adjust side pincushion until the left and right sides of the picture are straight and not curved.



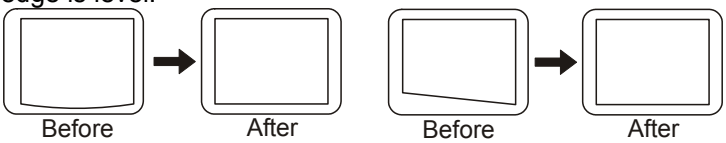
Step 7. Press [▲] or [▼] to adjust vertical bow until the horizontal line at the middle of the picture is straight. Press [◄] or [►] to adjust horizontal bow so that the vertical line at the middle of the picture is straight.



Step 8. Press [▲] or [▼] to adjust top pincushion until the horizontal line at the top of the picture is straight and not curved. Press [◄] or [►] to adjust top keystone so that the top edge is level.



Step 9. Press [▲] or [▼] to adjust bottom pincushion until the horizontal line at the bottom of the picture is straight and not curved. Press [◄] or [►] to adjust bottom keystone so that the bottom edge is level.



Step 10. Adjust C linearity as follows:

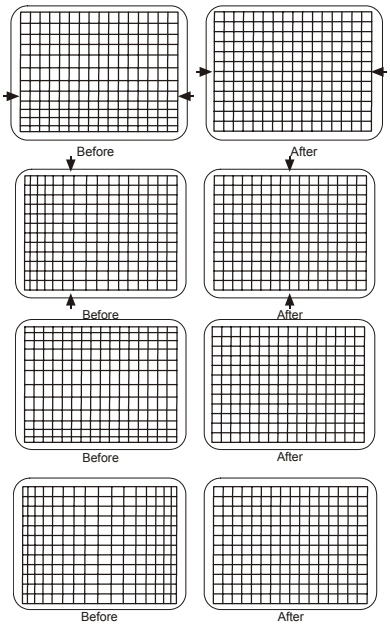
⇒ Press [▲] or [▼] until the horizontal line through the center of the crosshatch is equally distant from the lines at the very top and bottom.

⇒ Press [◄] or [►] until the center of the crosshatch is equally distant from the vertical lines at the left and right edges.

Step 11. Adjust S linearity as follows:

⇒ Press [▲] or [▼] until the height of each crosshatch square is equal from the top to the bottom.

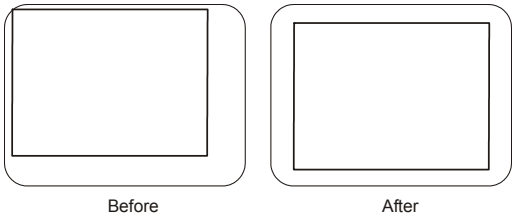
⇒ Press [◄] or [►] until the width of each crosshatch square is equal from the left to the right.



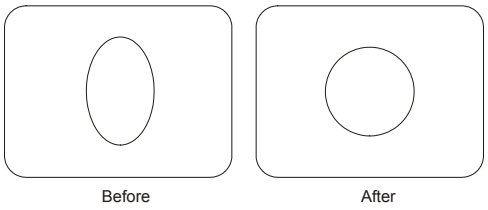
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Note: The source connected to the currently selected input should now be visible. If there is no picture, check to see if the source is active.

Step 12. Press [▲] or [▼], [◄] or [►] to adjust phase until the picture is centered on the screen.



Step 13. Press [▲] or [▼], [◄] or [►] to adjust the size of the picture. Ensure that objects in your picture have the correct shape. For example, if there is a circle in your picture, size should be adjusted until the circle is round, not oval.



Note: Remember that all of the adjustments above should be repeated for other sources in the system.

2.7 Memory Setup

This section explains how to set up projector memories to improve the performance of the projector's ASI and ASR features. If you are not familiar with setup memories, read 0, prior to memory setup; in particular, read Section3.3, Setup Memories, and the ASI with Save and Turn ASR On/Off entries in Section 3.6, Utility Features. If the projector's setup memories are properly set up, the projector will be easier to use and operate.

Note: Memory setup should be performed when the projector is in its final operating position. If the physical position of the projector changes, memory setup must be repeated.

Here is a brief summary of the setup memory, ASR, and ASI discussions in 0

2.7.1 About Setup Memories

The projector has 80 setup memories for storing display settings of different sources. Multiple setup memories are required since display settings usually vary amongst sources. There are two types of setup memories: Input and Recall. Both memory types store the same parameters. The only difference is that Input memories store display settings for a particular physical input (e.g., switcher 0, slot 1) while Recall memories can be used with any input.

At any one time, one setup memory is the current setup memory. The display settings in the current setup memory are used for the current display. When a source is selected by entering its input number, the Input memory for the selected input becomes the current setup memory*. If a Recall memory is selected, it becomes the current setup memory*. Display adjustments are automatically saved in the setup memory which is current at the time of adjustment (unless the setup memory is locked).

Note: If the ASR feature (explained below) is turned on during setup memory selection, the selected memory may not be the current setup memory.

To display the Recall memories stored in the projector, press [**UTIL**] [**3**]. Press [**UTIL**] [**4**] to display the Input memories. (Unused setup memories are not displayed).

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2.7.2 About ASI and ASR

ASI (Automatic Source Interpolation) is a feature which automatically adjusts display settings based on the settings of other setup memories stored in the projector. When a setup memory is first created, ASI automatically generates its initial display settings. These settings will be created by copying another setup memory or by interpolating multiple setup memories.

ASI is activated when:

- A new setup memory is created.
- An ASR is performed and its logic has activated an ASI.
- An "ASI with Save" is specified by the user (see Section 3.6).

ASR (Automatic Source Recall) is a feature which, when turned on for a given input, provides automatic Recall memory selection or ASI adjustment. ASR processing can activate when:

- a change in scan frequencies is detected at the input,
- an input is selected,
- a Recall memory is selected, or
- a channel is selected.

This feature is primarily intended for use when many different sources must share the same input (via a third party switcher, for example) or when a signal source can output several different scan frequencies (e.g., a SVGA card). When a source switch is made, the projector may automatically select a Recall memory with matching scan frequencies or create the display settings based on the settings in other setup memories.

2.7.3 Input Memory Setup

Follow these steps to prepare an Input memory for a source.

Note: To assure proper setup of an existing Input memory, ASR must be off (default) for the memory.

Step 1. Connect the source to the input to be set up, and then select the input using the Source command. For example, if the source is connected to slot 1 of the projector, press [**SOURCE**] [**0**] [**1**]. If the Input memory did not previously exist, it will be created automatically.

Step 2. The source should be displayed on the projection screen. If much adjustment is required, press [**UTIL**] [**1**] [**2**] to perform an ASI with Save. The display appearance may improve based on the settings stored in other setup memories. (If the Input memory is new, ASI with Save will have

Step 3. Make display adjustments as required. Adjustment changes will automatically be saved in the

2.7.4 Recall Memory Setup

Follow these steps to prepare a Recall memory.

Step 1. Select the input connected to the source. For example, if the source is connected to switcher 1, slot 5, press [**SOURCE**] [**1**] [**5**]. The source should be displayed on the projection screen.

Step 2. To assure proper setup of a Recall memory, ASR must be off (default) for the current input.

Step 3. Select a Recall memory as the current setup memory. For example, to make Recall memory 03 the current setup memory, press [**RECALL**] [**0**] [**3**]. If the Recall memory did not previously exist, it will be created automatically.

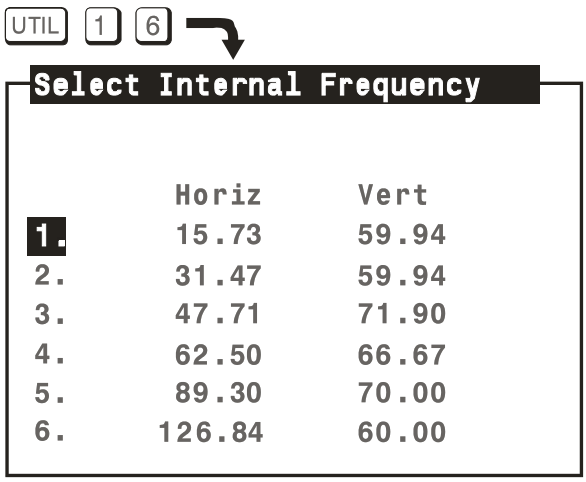
Step 4. If much adjustment is required, press [**UTIL**] [**1**] [**2**] to perform an "ASI with Save". (If the Recall memory is new, ASI with Save will have already been performed when the memory was

Step 5. Make display adjustments as required. Adjustment changes will automatically be saved in the Recall memory.

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2.7.5 ASI Improvement

If the projector will be used with many sources, or new sources will be frequently added to the system, it is recommended that five or six setup memories be created expressly for the purpose of improving ASI accuracy. ASI accuracy improves as more setup memories are created and stored, and the variations amongst horizontal and vertical scan frequencies increases. For example, if you always use the same input and you never use Recall memories (thus only one setup memory has ever been created), ASI will not be effective. However, if many Input and Recall memories have been used and adjusted for a variety of sources, the projector has more "knowledge" in its database for performing an ASI. As this "knowledge" increases, ASI accuracy improves.



An easy way to add setup memories at various scan frequencies is to use the projector's internal frequency generator. The internal frequency generator can display a test pattern using the scan frequencies you select. When display adjustments are made, the display settings are stored in the current setup memory. Prepare a Recall memory using the generator as follows:

Step 1. Select a Recall memory to be the current setup memory. For example, to make Recall memory 90 the current setup memory, press [**RECALL**] [**9**] [**0**]. (Recall memory numbers may be any number from 01 to 99). If the selected Recall memory did not previously exist, it will be created automatically.

Step 2. Press [**UTIL**] [**1**] [**6**] to access the Internal Frequency Selection menu. Items one to six contain preset scan frequencies covering the scan range of the projector. It is recommended that Recall memories be created for each. To make a selection, enter an item number or use [▲] and [▼] to move the cursor bar to the item you want, then press [**ENTER**].



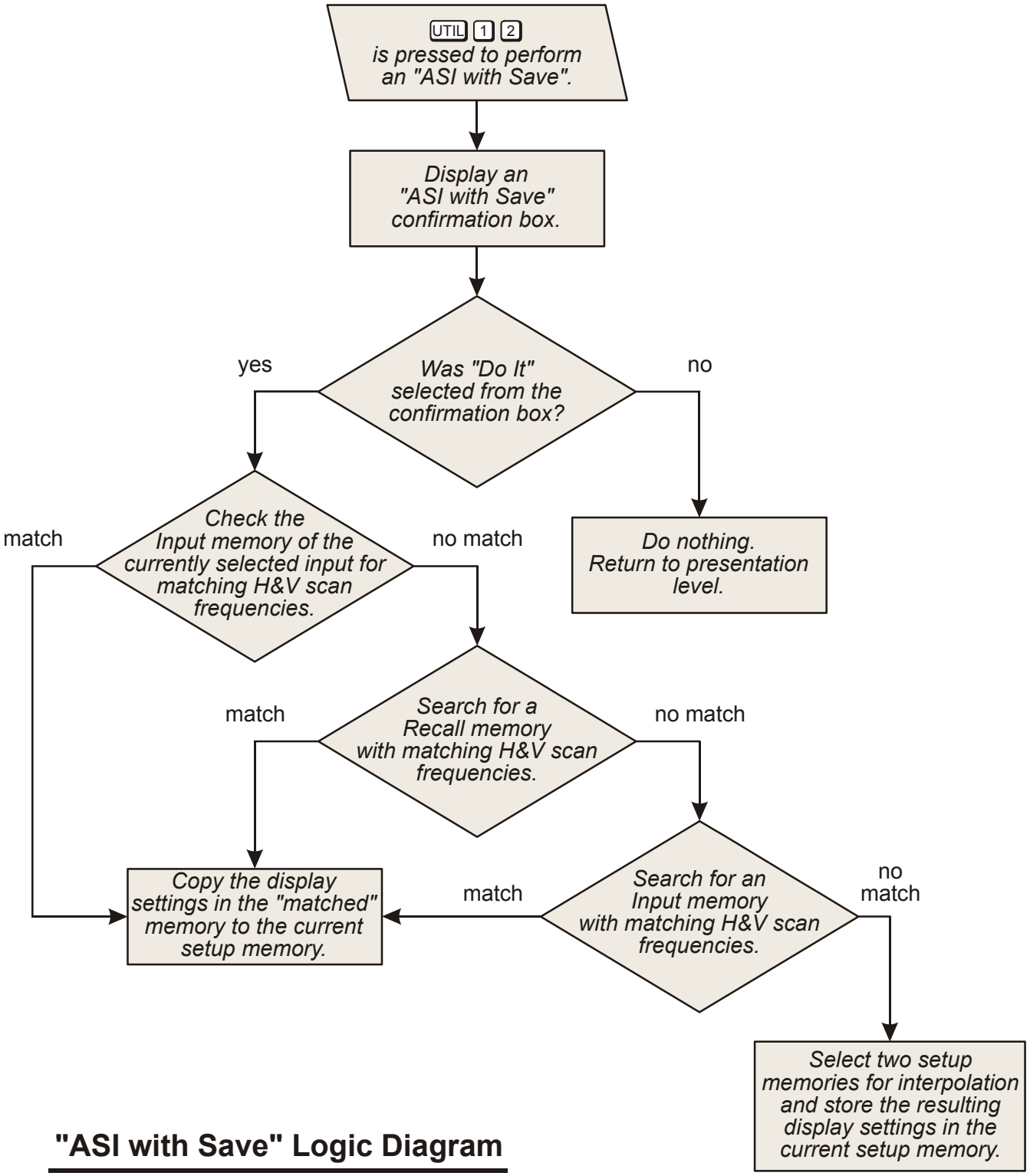
It is recommended that Recall memories for the two extreme frequencies be set up first (Items 1 and 4). When other Recall memories are created, their initial display settings will be based on the settings already stored in memory.

Step 3. At this point, a test pattern is displayed. Make display adjustments as required. All display settings will be stored in the Recall memory. To create another Recall memory, repeat the above steps. To return to the external source, press [**EXIT**] while only the test pattern is displayed.

(You may notice that as new Recall memories are created, fewer display adjustments are required. This is because ASI is using other setup memories to create the initial settings of the new memories.)

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2.7.6 ASI with Save Logic Diagram



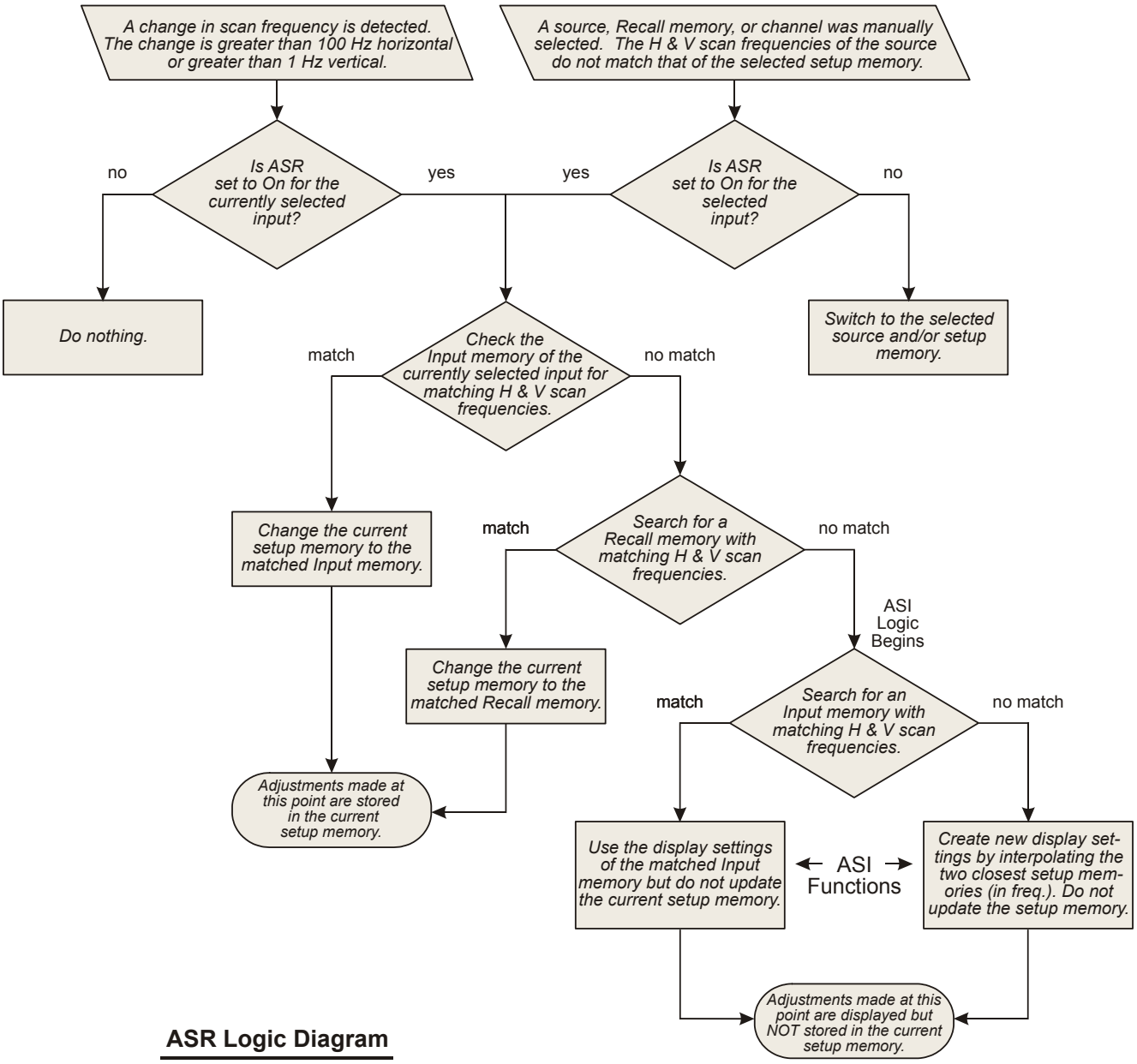
"ASI with Save" Logic Diagram

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2.7.7 ASR Setup

This subsection provides two examples of how the ASR feature may by used and set up.

2.7.7.1 *ASR Logic Diagram*



ASR Logic Diagram

2.7.7.2 *ASR Example #1*

A computer is connected to slot 1 of the projector. The graphics adapter in the computer can operate at different frequency modes to accommodate various software applications. The ASR feature may be used until when the frequency mode of the computer changes, the projector setup also changes to match that of the new mode.

Source w/multiple scan rates / operating modes.

MODE	TYPE	FREQ. (H)	RECALL#
1	Text	31.5kHz	01
2	Graphics	35.6kHz	02
3	Graphics	64.0kHz	03
4	Graphics	110.0kHz	04

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To prepare setup memories for the above system, follow these steps:

Step 1. Select the input using the Source command. Press [**SOURCE**] [**0**] [**1**] to select projector slot 1.

Step 2. Press [✶] twice to display the Current Input Parameters status page. Check to see if ASR is off for the current input. If it is on, press [**UTIL**] [**1**] [**4**] to turn ASR off for the input. (It is usually easier to prepare setup memories when ASR is turned off.)

Step 3. At the computer, switch to an application which uses one of the graphics adapter operating modes. Select an unused Recall memory as the current setup memory. For example, to make Recall memory 01 the current setup memory, press [**RECALL**] [**0**] [**1**]. Make display adjustments as required. The display settings for the current graphics mode will be stored in the Recall memory. Repeat this step for the remaining graphics adapter operating modes, storing adjustments for them in Recall memories 02, 03 and 04. It is recommended that the two extreme frequencies be set up first.

Step 4. Press [**SOURCE**] [**0**] [**1**] to make Input memory 01 the current setup memory then press [**UTIL**] [**1**] [**5**] to display the Clear Setup dialog box. Move the cursor to "Do It" then press [**ENTER**] to clear the display and frequency settings of the input. Now Input memory 01 will not be used during an ASR search.

Step 5. Press [**UTIL**] [**1**] [**3**] to lock Input memory 01 to prevent display or frequency changes to the Input memory.

Step 6. Press [**UTIL**] [**1**] [**4**] to turn ASR on for the input. Now, each time the computer's graphics adapter switches operating modes, the projector will automatically adjust its display settings to suit the new mode.

2.7.7.3 *ASR Example #2*

Six different sources are connected to a third party (non-Reseller) signal switcher. Unlike the Marquee signal switcher, this third party switcher is not controlled by the keypad. Under normal circumstances, the projector is not aware of source switches made by the switcher. However, if ASR is turned on for the input, and a Recall memory has been set up for each source device, the projector will detect the external source switch and automatically select the appropriate Recall memory. Even if Recall memories have not been set up but ASR is on, ASR will try to adjust the display settings based on the settings of other Input or Recall memories.

To prepare setup memories for this system, follow these steps:

Step 1. Connect the output of the signal switcher to a projector input or a Marquee signal switcher input. Select the input using the Source command. For this example, press [**SOURCE**] [**0**] [**1**] to select projector slot 1.

Step 2. Press [✶] twice to display the Current Input Parameters status page. Check to see if ASR is off for the current input. If it is on, press [**EXIT**] then press [**UTIL**] [**1**] [**4**] to turn ASR off for the input.

Step 3. At the switcher, switch in one of the source devices. Select an unused Recall memory as the current setup memory. For example, to make Recall memory 01 the current setup memory, press [**RECALL**] [**0**] [**1**]. Make display adjustments as required. The display settings for the selected device will be stored in the Recall memory. Repeat this step for the remaining devices.

Step 4. Press [**UTIL**] [**1**] [**5**] to display the Clear Setup dialog box. Move the cursor to "Do It" then press [**ENTER**] to clear the display settings and frequency settings of the input. By doing this, Input memory 01 will not be used during an ASR search.

Step 5. Press [**UTIL**] [**1**] [**3**] to lock Input memory 01 to prevent display or frequency changes to the Input memory.

Step 6. Press [**UTIL**] [**1**] [**4**] to turn ASR on for the input. The projector's display settings will automatically adjust to match the source selected by the switcher.

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Section 3 Operation

3.1 Overview

This section explains how to operate the projector once it has been installed and is ready for use. If you have not yet set up the projector, refer to Section 2, Installation and Setup.

Before using the projector for the first time, it is recommended that you read through this section of the manual. Although the projector is easy to use, there are many advanced features which allow you to enhance performance and operation. By understanding these features, and how to use them, you will soon be able to take full advantage of the projector's extensive capabilities.

3.1.1 Projector Basics

Notice that the projector has no knobs or moving parts to make adjustments or change control settings. This is because all user adjustments are digitally controlled via the projector's keypad. Adjustment settings are retained in the projector's internal memory, even when the projector is unplugged.

3.1.2 Keypads

Four types of keypads may be used with the projector: built-in, IR remote, wired remote, and Presenter's. The projector includes a multi-use, full function, backlit keypad which is factory configured for use as a built-in keypad. It can easily be reconfigured for use as an IR remote keypad or a wired remote keypad. Use the keypad type which is most appropriate for your application.

Note: For information on how to reconfigure the keypad, refer to Section 2.2.2. To convert the keypad to a wired remote keypad, an optional accessory cable (#03-001106-02P) is required.

Note: Additional keypads are available from your reseller and VDC Display Systems.

3.1.3 IR Remote Keypad

When the keypad is configured for IR remote operation, you can control the projector from a distance without a wired connection to the projector. The keypad includes a battery powered infrared (IR) transmitter.

3.1.4 Wired Remote Keypad

When the keypad is configured as a wired remote keypad, you can control the projector from a distance by way of a 25 ft extension cable (accessory cable required). Wired remote keypad operation is recommended when:

1. the location of the keypad with respect to the projector or screen is inadequate for IR remote keypad operation
2. the projector is in a lighting environment which is unsuitable for IR remote keypad operation, or
3. there are multiple projectors in the same room and you want each projector to be controlled by its own remote keypad

3.1.5 Presenter's Keypad (optional)

The Presenter's Keypad is similar to the IR remote keypad (above) except that it is not a full function keypad; it contains only frequently used keys. Presenters may find this keypad is easier to use than a full function keypad. For more information about the Presenter's Keypad, call your reseller or VDC Display Systems.

Figure 3-1 shows the projector functions which are accessible from the multi-use (full function) keypad. As you may notice from the illustration, some keys provide direct access to specific functions (such as [**POWER**] to turn the projector on or off), and some keys provide indirect function access via menus. Functions which are less frequently accessed are provided through on-screen menus.

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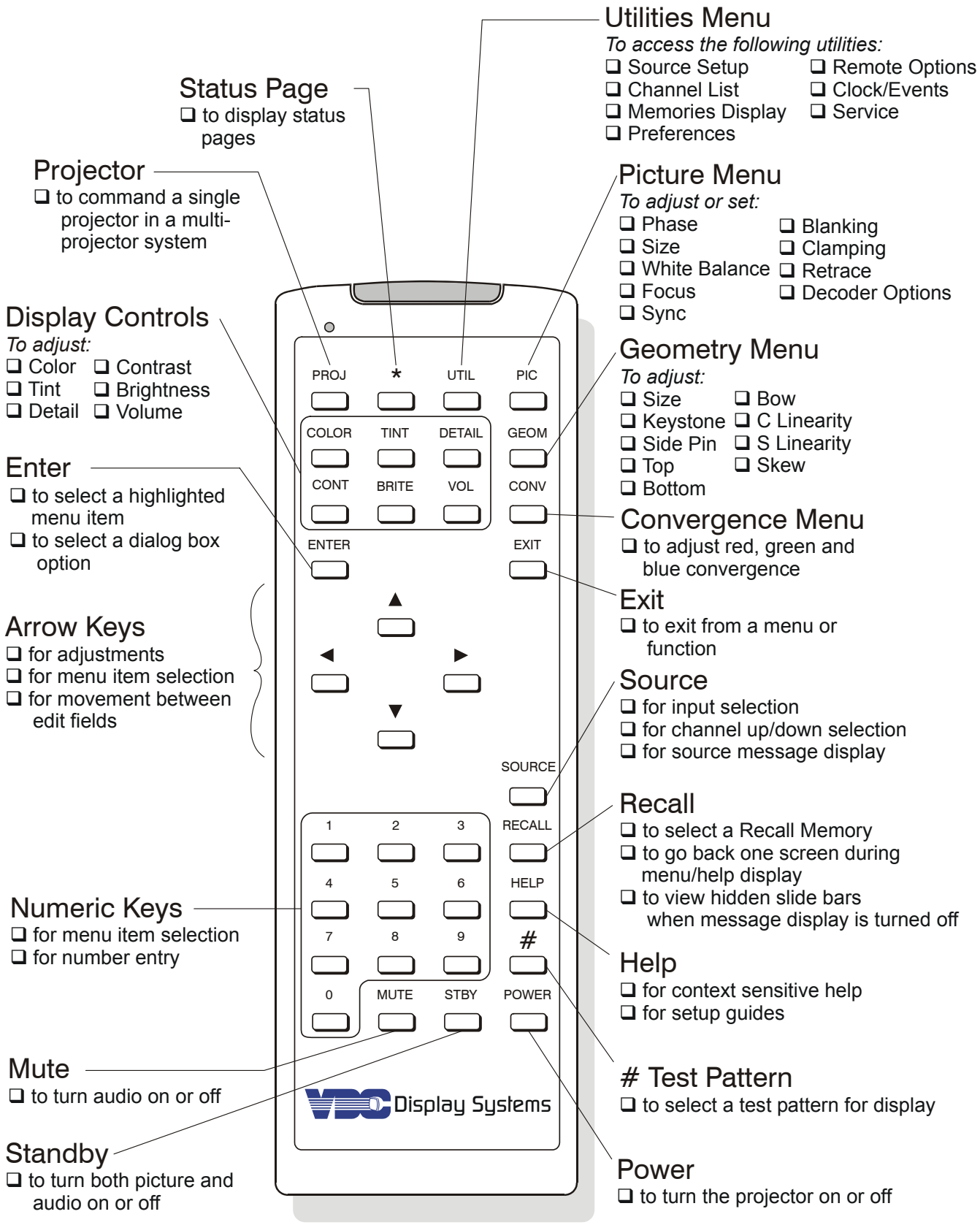


Figure 3-1. Full Function Keypad

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3.1.6 Keypad Usage

The keypad is used the same way you would use a remote keypad supplied with a TV or VCR. There are only a few general key press rules to keep in mind:

Key Press Rules

1. All key presses are in sequence; no functions require simultaneous key presses.
2. [**POWER**] and [**STBY**] are the only keys which require an extended hold-down for function activation (about one second). For all other keys, a momentary press will activate the key's function.
3. [▲], [▼], [◄] and [►] are the only keys which repeat when held down. For all other keys, the key must first be released then pressed again for repeated activation.
4. Pressing [**EXIT**] always exits the current function, operation, menu, or dialog box.

Note: To toggle the keypad's backlit display (enable or disable), press [✶] [**BRITE**] [**TINT**] [**DETAIL**] [**3**] See Section 2.2 for details.

Note: If keys are pressed at a time when the projector is busy (such as during power-up), the key presses may not take effect.

When the projector is turned on, it begins operation at Presentation Level. Presentation level is the normal level of operation at which a source image is (or may be) displayed. The projector temporarily leaves presentation level when menus are displayed, control settings are changed, or online help is accessed. The screen display changes to reflect the operation or function being performed. One or more of the following may be displayed:

Slidebar - to make adjustments to display settings.

Menu - to select projector functions or change projector settings.

Dialog Box - to select an action such as confirm or cancel an operation.

Message Box - to display messages.

Help Page - to display help and provide assistance.

Test Pattern - to assist during setup.

Note: The display of slidebars and messages can be suppressed if desired. For more information, refer to Section 3.6, Utility Features).

Each of the above are explained in the following entries. As you read through the explanations, note the following:

In most cases...

[**EXIT**] brings you back to presentation level,

[**RECALL**] brings you back to the previous page or menu,

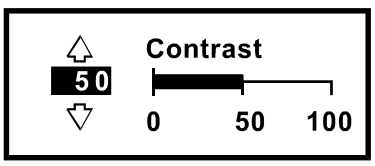
[**ENTER**] is pressed to make a selection, and

[**HELP**] provides context-sensitive help.

3.1.7 Slidebars

When an adjustment is made, a slidebar is superimposed on the projection screen. The slidebar displays the adjustment setting on a percentage scale. To make an adjustment, use the arrow keys indicated by the slidebar. Press [**EXIT**] to end an adjustment or, for a slidebar accessed from a menu, press [**ENTER**]. If no keys are pressed within 5 seconds while a slidebar is displayed, the slidebar disappears.

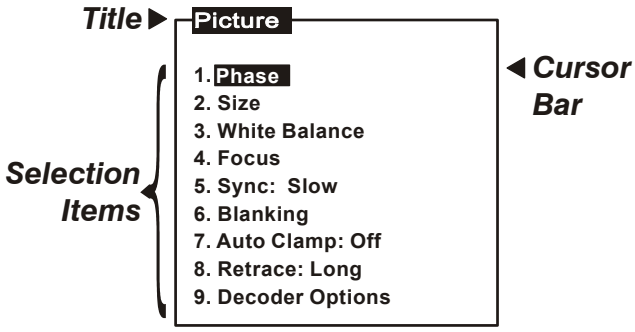
For example, if [**CONT**] is pressed, the Contrast slidebar is superimposed on the image. The slidebar shows that contrast is set to 50%. Press [▲] or [▼] on the keypad to change the contrast level. When complete, press [**EXIT**].



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3.1.8 Menus

When a menu key is pressed or a menu is selected, a menu with a list of selection items is superimposed on the projection screen. Each menu consists of a title, selection items, and a cursor bar. Selection items may include adjustment functions, control settings or other menus.



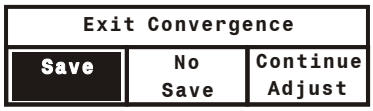
To make a selection from the menu, either:

1. press the number key corresponding to the item number, or
2. press [▲] or [▼] to move the cursor bar to the desired item, then press [**ENTER**]

If a menu item includes control options, for example, items 5, 7 and 8 above, the control option setting can be changed by pressing the number key or by pressing [**ENTER**] when the item is highlighted.

Note: Pressing [**RECALL**] while in a sub-menu returns you to the previous menu.

3.1.9 Dialog Boxes



Dialog boxes are displayed when the projector requires an action to be chosen by the user.

For example, after a convergence registration is performed, a dialog box is displayed to confirm that the new convergence settings are to be saved in memory. Press [◀] or [▶] to highlight one of the actions then press [**ENTER**] or [**EXIT**] to perform the action. If [**ENTER**] is pressed, the previous menu is then displayed. If [**EXIT**] is pressed, the projector returns to presentation level.

3.1.10 Message Boxes

Message boxes display brief messages on the screen to indicate a status, condition, or error. Messages are overlaid on the displayed source image and in most cases remain on the screen for about five seconds. To remove a message box prior to the five second display period, press [**EXIT**].

3.1.11 Help Pages

Help pages provide assistance when you need it. There are various forms of help available, all accessible by pressing [**HELP**]. For information about using help, refer to the Using Help entry in this section.

To advance one page when using help, press [**HELP**].To go back one help page, press [**RECALL**]. To exit from a help page, press [**EXIT**].

3.1.12 Test Patterns

The projector has an internal generator which can display several different types of test patterns to assist you during projector setup. Press [**#**] to display the first test pattern – the external source. Each subsequent press of [**#**] changes the test pattern as shown below. If a test pattern is the only graphic displayed (i.e., no overlaid text), pressing [**EXIT**] returns the display to the external image.

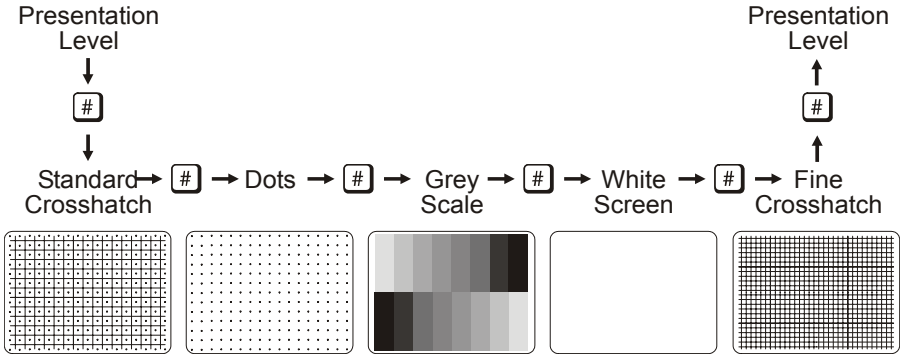


Figure 3-2. Test Patterns and Selection

Note: Test patterns are normally generated at the scan frequencies of the current input signal.

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3.1.13 Using Help

The projector includes an extensive online help system. The help system provides operation guidance and assistance. There are two types of online help: Context Sensitive Help and Guided Help.

3.1.13.1 *Context Sensitive Help*

Context Sensitive Help provides help on how to use a specific function.

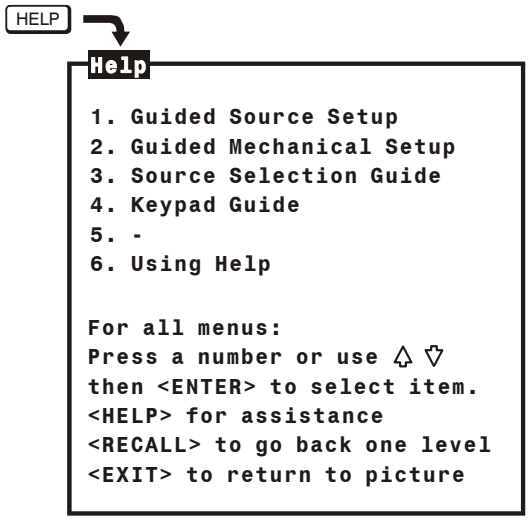
To view help pertaining to a dedicated key function, press the key then press [**HELP**]. For example, to view a help page which describes how to use the brightness function, press [**BRITE**] [**HELP**].

To view help pertaining to a menu selectable function select the function then press [**HELP**].

To view help describing a menu, press [**HELP**] while the menu is displayed.

If multiple pages are available, press [**HELP**] to advance to the next page. Press [**RECALL**] to go back to the previous page. To end help, press [**EXIT**].

3.1.13.2 *Guided Help*



Guided Help provides several online tutorials which explain how to operate the projector and assist you during installation and setup.

To access the tutorials, press [**HELP**] at presentation level. The Help menu is displayed. When using tutorials, press [**HELP**] to display the next tutorial page, press [**RECALL**] to display the previous page, press [**EXIT**] to end help.

1. Guided Source Setup

The Guided Source Setup tutorial provides step-by-step instructions for quick setup of the projector with the currently selected external source. Setup may be performed while proceeding through the tutorial.

Note: During the tutorial, [**RECALL**] displays the previous page and [**EXIT**] returns you to presentation level (this includes when slidebars are displayed).

Note: If the display cannot be focused, ensure that the throw distance is correct. If the screen distance is correct but the display cannot be focused, follow the Guided Mechanical Setup tutorial.

2. Guided Mechanical Setup

   The Guided Mechanical Setup tutorial provides step-by-step instructions for mechanical and optical setup of the projector. This setup is necessary during initial installation and also when the screen size changes, the throw distance changes, or the display image does not focus using the focus control. For more details, refer to Section 2.5.

3. Source Selection Guide

   The Source Selection Guide explains various source selection methods.

4. Keypad Guide

   The Keypad Guide explains how to use the keypad.

5. Using Help

   Using Help provides instructions on how to use the help system.

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3.1.14 Power-on

To turn on the projector, press [**POWER**] on the keypad. Hold [**POWER**] down for about one second. If using an IR remote keypad, point the keypad at the projection screen or the front of the projector. During power-on, the projector proceeds through a series of internal diagnostic tests which last approximately 9 seconds. Once complete, an input image should be displayed on the projection screen. If no image is displayed, press [**SOURCE**] to display the source message. The source message displays the currently selected input. Check that the correct source is indicated on the display.

If there is no display when [✶] is pressed, check the LEDs (Light Emitting Diodes) on the projector front panel. Only the green POWER LED should be lit. If any of the red diagnostics LEDs are lit, call your reseller for assistance.

Note: Allow the projector to warm up for 45 minutes before use. Critical adjustments should be performed after the warm-up period.

Note: Turning the projector off via a remote or built-in keypad places the projector in a "wait to operate" mode. To remove power from the projector, unplug the power cord.

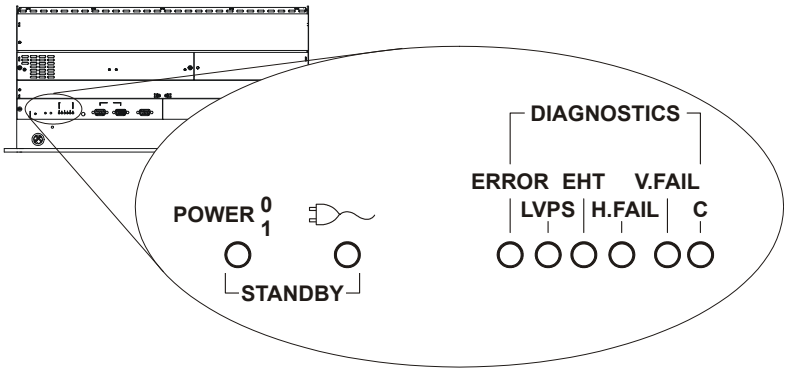


Figure 3-3. Rear Panel LEDs

3.1.15 Standby Mode

Standby Mode allows you to blank the display and mute the audio output while keeping the projector in a warmed-up and ready state.

To enter standby mode, hold down [**STBY**] for about one second while at presentation level. The display blanks. Both the green POWER LED and the yellow LED are lit. To leave standby mode, hold down [**STBY**] or [**EXIT**] for one second. The display is then restored and the ⏻ LED is turned off.

Note: During presentations, the standby feature is useful when you want to direct audience attention away from the projection screen.

Note: To prolong CRT life, it is recommended that the standby feature be used when the display is not required.

3.1.16 Audio Functions

The Marquee 8521 does not support the audio feature

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3.1.17 System Status Pages

The projector's current operating settings may be displayed by pressing [✶] while at presentation level. Each time [✶] is pressed, one of three main status pages is displayed. To return to presentation level, press [**EXIT**].

Page 1; displays general projector information and operating settings which include identity, software version, date and time, keypad type, scan configuration, auto power-up setting, message display setting, switchers (numbers) connected, installed options, and mute setting. Operating settings are explained in the following entries in this section.

Page 2; displays current input parameters. These parameters (defined later in this section), relate specifically to the currently selected input.

Page 3; lists the display settings currently in use. Note: If the current setup memory is locked or an ASI has occurred, the display settings shown may not be identical to those stored in the setup memory.

Note: To view help pages pertaining to the status pages and their contents, press [**HELP**] during status page display. "Time" does not update on-screen.

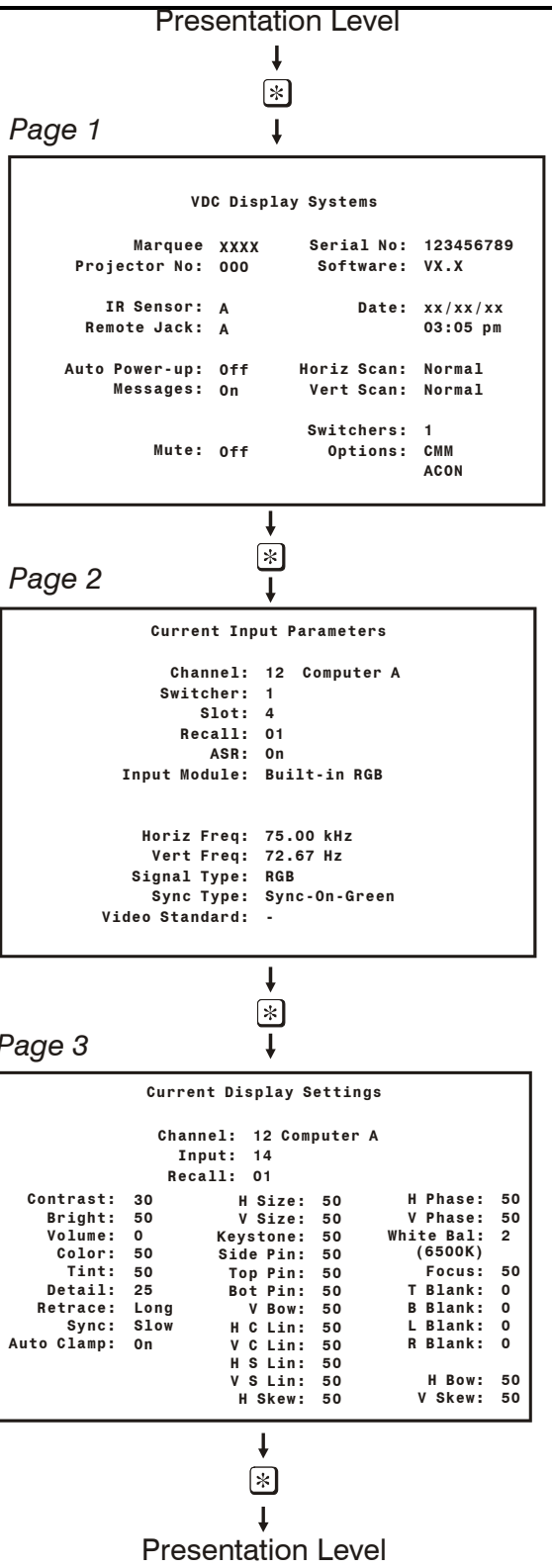


Figure 3-4. System Status Pages

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3.2 Source Selection

The projector includes a built-in RGB input interface to accept a single input. With optional accessories such as a Marquee Multi-standard Decoder, and the use of one or more external switchers, the number of inputs can be significantly increased. Because of this large capability, three source selection methods are available: Input Selection, Direct Channel Selection, and Up/Down Channel Selection. Sources are selected at presentation level.

Note: For systems with only one or two source connections, direct input selection may be the only method you will use. If your system includes many sources, all methods will be of interest.

Note: Internal sources are also selectable for use during setup and testing. To select an internal source, refer to Section 3.1.12, and Section 3.6.

3.2.1 Input Selection

This method is the most basic of the three source selection methods. A source is selected by specifying the input to which the source is connected, defined by a switcher number and slot number. For the purposes of input selection, the projector is considered to be a type of switcher. Projector slots are illustrated in Figure 3-5 below. Each slot can accept one external input signal for display.

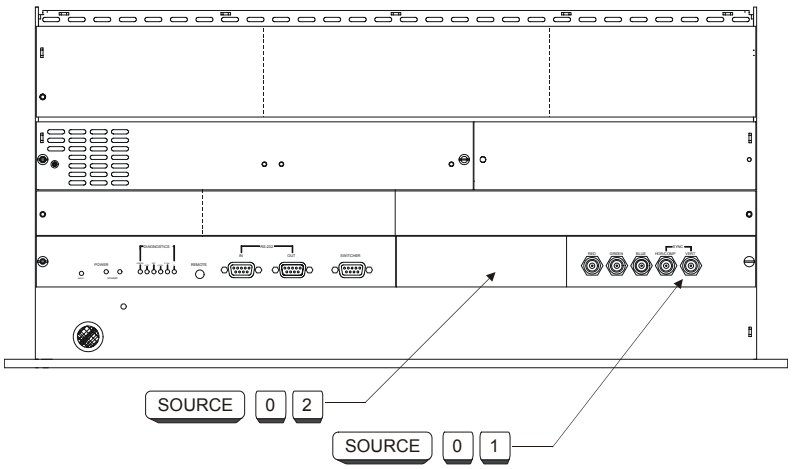


Figure 3-5. Projector Slots

To select an input:

Press [**SOURCE**] [***m***] [***n***] at presentation level.

where: ***m*** = 0 (projector) or 1-9 (switcher 1, 2, ... 9)

n = 1-9 (slot number)

The projector switches to, and displays, the source connected to the input selected. The projector also uses the display settings previously set in memory for that input. If the selected input is invalid, a warning message is displayed. An example of an invalid input might be "0 1" when a switcher is connected to slot 1 of the projector. Another example of an invalid input would be to select a switcher which does not physically exist.

Example 1

Slot 1 on the projector has the output from a computer workstation connected to it. To display the workstation output, press [**SOURCE**] [**0**] [**1**].

Example 2

A single Marquee signal switcher is connected to the projector and a computer is connected to slot 3 of the switcher. To display the computer output, press [**SOURCE**] [**1**] [**3**].

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3.2.1.1 *Direct Channel Selection*

This method of source selection takes advantage of the Channel List feature explained in Section 3.6, Utility Features. The Channel List allows you to assign a source to a 2-digit number, from 01 to 99.

Once you have assigned channel numbers to your sources, and the projector is at presentation level, you can select a source by pressing the 2-digit channel number associated with it.

To select a channel, press [***m***] [***n***].

where: ***m*** = the 1st digit of the channel number

n = the 2nd digit of the channel number

The projector switches to, and displays, the source assigned to the channel number. If an invalid switcher or slot number is assigned to the channel, a warning message is displayed.

Example

Channel 08 in the Channel List was programmed to select a source connected to slot 5 on switcher 3. To select this source, simply press [**0**] [**8**].

Note: Note: If the Channel Select option in the Preferences menu ([**UTIL**] [**5**] [**4**]) is set to either "1 digit only " or "1 or 2 Digits", the preceding zero shown in the example above does not have to be entered. For more information, refer to the Preferences entry in Section 3.6.

3.2.1.2 *Up/Down Channel Selection*

This method of source selection also takes advantage of the Channel List feature. It lets you quickly switch between channels programmed in the Channel List by using the up and down arrow keys on the keypad.

To make a selection:

Press [**SOURCE**] followed by [▲] or [▼].

Each time an arrow key is pressed, a channel number (and name) is displayed on the screen. When the channel number you want is displayed, simply wait to allow the projector to switch to the source defined by the channel.

Note: If a channel specifies a switcher which does not exist, the channel is considered invalid.

Note: The Channel List utility allows you to flag the channels to be used by the Up/Down Channel selection feature. For more information, refer to the Channel List entry in Section 3.6, Utility Features.

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3.2.1.3 *The Source Message*

When [**SOURCE**] or [**RECALL**] is pressed at presentation level, and/or a source switch is made, a source message is briefly overlaid on the projection screen. The source message displays current source information.

Note: 1) If screen messages are turned off via the Preferences menu ([**UTIL**] [**5**] [**2**]), the source message is not displayed. 2) During input selection or Recall memory selection (explained later), the message box displays numeric keypad entries as they occur. In both cases, two digits must be entered. If only one digit is entered, the message box will remain displayed until a second digit is entered or the selection is cancelled by pressing [**EXIT**]. 3) When an internal source is in use, an internal source message is displayed.

Channel Number

If a channel has been selected, the channel number is displayed; otherwise this line is blank.

Source Name

If a channel was selected and a source name was defined for it in the Channel List, the name is displayed here; otherwise this line is blank.

Input Number

The switcher and slot number of the active input is displayed. If the switcher number is 0, the input is on the projector (versus on a switcher). The slot number may indicate a projector slot or a switcher slot.
If the Input memory for the input is in use and locked, a key icon ( ) is displayed. Setup memories which are locked are not affected by adjustments to display settings. For an explanation of Input memories and locked memories, refer to Section 3.3.

Recall Memory Number

When a Recall memory is in use, the Recall memory number is displayed; otherwise this line is blank.
If the Recall memory is locked, a key icon ( ) is displayed. Setup memories which are locked are not affected by display adjustment changes. For an explanation of Recall memories and locked memories, refer to Section 3.3.Setup Memories

ASI Message

If the ASR feature is set to ON for the Input memory, and an ASI has occurred, an ASI message is displayed; otherwise this line is blank. The message indicates which memories were used for interpolation to produce the current display settings. When this line is visible, adjustments to display settings will NOT be stored in the current setup memory. For more information about the ASR feature and ASI, refer to the Source Setup entry in Section 3.6, Utility Features.

3.3 Setup Memories

3.3.1 Memories

The projector has 80 setup memories which store display settings. Multiple setup memories are needed because display settings are usually different for different sources. For example, the display settings (brightness, contrast, convergence, etc.) when using a VCR may be very different than the settings for a high resolution computer output. When display adjustments are made, the new settings are automatically saved in one of the projector's setup memories.

There are two types of setup memories: Input and Recall. Both memory types store the same parameters. The only difference is that Input memories store display settings for a particular physical input (e.g., switcher 0, slot 1) while Recall memories can be used with any input.

At any one time, one setup memory is the current setup memory. The display settings in the current setup memory are used for the current display. When a source is selected by entering its input number, the Input memory for the selected input becomes the current setup memory (unless ASR is on and is triggered). If a Recall memory is selected, it becomes the current setup memory. Display adjustments are automatically saved in the setup memory which is current at the time of adjustment (unless the setup memory is locked – explained later).

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3.3.2 Input Memories

As mentioned above, Input memories store display settings for each physical input (i.e., switcher 0, slot 1). When an input is selected, the Input memory for that input becomes the current setup memory and its display settings are used (unless ASR is on and is triggered). If the input is being selected for the first time, a new Input memory is created.

3.3.3 Recall Memories

Recall memories provide an alternative to using the display settings stored in the Input memory of the selected source. For example, you may want to temporarily disconnect a computer connected to the projector's RGB input and in its place, connect another computer with different signal characteristics. Since the connection is only temporary you don't want to change the display settings stored in the Input memory. Instead, you can select a Recall memory which has the settings you want for the new input. If there are many devices which will be sharing the same input, many Recall memories can be created to store the display settings for each. On the other hand, if there are many sources on different inputs with exactly the same signal characteristics, it may be possible for them to share the same Recall memory.

Recall memories are identified by a two digit number. Any number from 01 to 99 can be assigned, although only 80 memory spaces exist.

To select or create a Recall memory:

Press [**RECALL**] [***m***] [***n***].

where: ***m*** = the 1st digit of the Recall memory number

n = the 2nd digit of the Recall memory number

For example, to select Recall memory 01, press [**RECALL**] [**0**] [**1**]. Recall memory 01 will then be the current setup memory and its settings will be used for the currently selected source. If this is the first time that the Recall memory number is used, a new Recall memory is created. Any display adjustments you make will be stored in the Recall memory.

Setup Memory Parameters

Memory Identification
- Input or Recall
- Switcher No & Slot No., or Recall Switch

Memory Status
- Locked or Unlocked
- ASR last used

Signal Frequencies
- Horizontal Frequency
- Vertical Frequency

Picture Parameters
- Phase
- Size
- White Balance
- Focus
- Sync
- Blanking

Primary Display Parameters
- Color
- Tint
- Detail
- Contrast
- Brightness

Geometry Parameters
- Size
- Keystone
- Side Pin
- Top
- Bottom
- Bow
- Linearity
- Skew

Convergence Parameters
- Convergence settings at all 45 zones

Control Settings
- ASR On/Off (input memories)
- Video Format (decoder only)
- Signal Route
- Volume (audio
- Clamping and Retrace

3.3.4 Memory Allocation

Each time a setup memory is selected the projector checks its memory bank to see if the selected memory exists. If it does exist, it uses the memory and its display settings. If it does not exist, a small portion of memory is allocated for the new setup. Space is available for up to 80 setup memories. When the last space is used up, a warning message is displayed. If this happens, call for servicing to delete memories which you no longer use to make room for new memories.

3.3.5 Locking Setup Memories

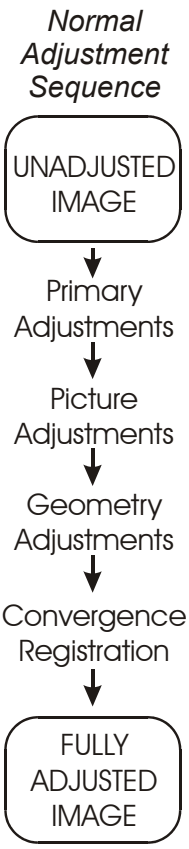
Setup memories may be locked or unlocked. Locking a setup memory prevents adjustments to display settings from being saved in that memory. For example, if Recall memory 08 is locked and selected, then brightness is adjusted, the new brightness setting is only temporary. If the setup memory is then reselected, the original brightness setting will be restored.

Note: When a locked setup memory is selected, a key icon ( ) is displayed in the Source Message.

To lock or unlock the current setup memory, select option 3 from the Source Setup menu ([**UTIL**] [**1**] [**3**]). Option 3 indicates the current setting.

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3.4 Display Adjustments



This section describes the projector's display adjustment functions. To access all display functions, a full function keypad is required. If you are using the optional Presenter's Keypad, only the primary display functions are available. There are four types of display adjustment functions: Primary, Picture, Geometry, and Convergence.

1. Primary Display functions include Brightness, Contrast, Detail, Color and Tint. These functions are accessed directly from the keypad.
2. Picture functions are used to adjust display settings that affect the projected image. These functions include Phase, Size, White Balance, Focus, Sync, Blanking, Clamping, Retrace, and Decoding. Picture functions are accessed via the Picture menu which is selected by pressing [**PIC**] on the keypad.
3. Geometry functions adjust geometric distortions of the display such as its size, keystone, pincushion, bow, linearity, and skew. Access Geometry functions via the Geometry menu—press [**GEOM**] on the keypad.
4. Convergence is used to align the red, green, and blue color components of the image. It is described in Section 3.5, Convergence Registration.

Most adjustment functions, when selected, display a slidebar overlaid on the source image. The slidebar displays the current setting and indicates which arrow keys to use for making the adjustment. Adjustment settings are stored in the current setup memory (Input or Recall). There are two exceptions: 1) If the current setup memory is locked, new adjustment settings are shown but not stored; they are discarded when another setup memory is selected. 2) If ASR is on for the current input and an ASI is performed, the settings are only temporary and are not saved in the current setup memory.

For new images, where much adjustment is required, it is recommended that adjustments be made using the sequence illustrated above. When making picture or geometry adjustments, follow the sequence displayed in the adjustment menu.



When making many picture or geometry adjustments, press [**ENTER**] after each adjustment to return the cursor back to its previous menu item position.

3.4.1 Primary Display Adjustments

3.4.1.1 *Brightness*

The Brightness function is used to adjust the black level of the image.

To adjust brightness, press [**BRITE**] then [▲] or [▼]. If video or data is displayed with a black background, adjust until the background just disappears (black becomes a very dark grey).

Note: If room lighting changes, it may be necessary to re-adjust brightness.

3.4.1.2 *Contrast*

The Contrast function is used to adjust the contrast between the light and dark areas of the display image.

To adjust contrast, press [**CONT**] then [▲] or [▼]. If contrast is set too high, the image loses detail and clarity. If set too low, it may be difficult to distinguish between foreground and background information.

Note: For best results, adjust brightness before contrast.

Note: If room lighting changes, it may be necessary to re-adjust contrast and brightness.

Note: An excessively high contrast level can reduce the life of the CRTs.

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3.4.1.3 *Detail*

The Detail function is used to adjust the picture sharpness of video signals when using the optional Marquee Multi-standard Decoder.

To adjust detail, press [**DETAIL**] then [▲] or [▼] until the sharpest display is attained. Detail level should be roughly proportional to input signal quality. Higher levels of detail improve good quality signals. Lower levels of detail reduce noise in poor quality signals.

3.4.1.4 *Color*

1. The Color function is used to adjust color saturation levels when using the optional Marquee Multi-standard Decoder.

   To adjust color, press [**COLOR**] then [▲] or [▼] until the desired color saturation level is displayed. If Color is set to a 0% level, the result will be a black and white picture. If Color is set too high, the color levels in the picture will be over-powering.

2. The Color function also allows you to turn on or off the red, green and/or blue color components of the picture.

   Press [**COLOR**] followed by a number (***n***) to select the color components you want turned on. The chart shown here shows the selection variations.

3.4.1.5 *Tint*

The Tint function is used to adjust color hue to obtain true color reproduction of NTSC signals when using the optional Marquee Multi-standard Decoder.

To adjust tint, press [**TINT**] then [▲] or [▼] until an optimum display is attained. It is best to adjust tint while displaying an image with natural flesh tones.

Note: Tint is not adjustable for PAL or SECAM video sources.

3.4.2 Picture Functions

Picture functions are accessed through the Picture menu. To display this menu, press [**PIC**].

Picture

1. Phase
2. Size
3. -
4. Focus
5. Sync: Slow
6. Blanking
7. Auto Clamp: Off
8. Retrace: Long
9. -

3.4.2.1 *Phase [**PIC**] [**1**]*

The Phase function is used to move the picture up, down, left, or right within the picture display area.

To adjust phase, select Phase from the Picture menu. Two slidebars are displayed: a Horizontal Phase slidebar and a Vertical Phase slidebar.

Press [▲], [▼], [◄] or [►] to move the picture in the direction of the arrows so that the entire picture is visible and centered.

Note: If the picture cannot be made entirely visible, an adjustment to blanking or retrace time may be required; refer to the blanking and retrace entries in this section.

3.4.2.2 *Size [**PIC**] [**2**]*

The Size function is used to adjust the horizontal and vertical size of the display image. (This adjustment is also available through the Geometry menu.)

To adjust size, select Size from the Picture menu. Two slidebars are displayed: a Horizontal Size slidebar and a Vertical Size slidebar. Press [▲] or [▼] to adjust vertical size and [◄] or [►]to adjust horizontal size until the objects within your picture have the proper shape. For example, if there is a circle in your picture, size should be adjusted so that the circle is round, not oval.

Note: The Size function should not be used to compensate for aspect ratio mismatches between source images and the projection screen. Not all sources use the same aspect ratio therefore it may not always be possible to fill the entire screen. ("Aspect Ratio" is defined in Appendix A).

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3.4.2.3 *Focus [**PIC**] [**4**]*

The Focus function is used to adjust the electrical focus of the combined red, green, and blue color components.

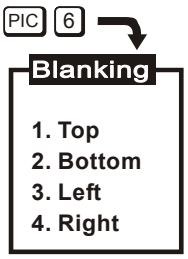
To adjust focus, select Focus from the Picture menu then use [▲] and [▼] until the center of the display appears the sharpest. If the displayed image cannot be adequately focused, a service adjustment to the electrical focus may be required or an optical focus adjustment is necessary. Refer to the Section 2.5 for optical focus instructions.

3.4.2.4 *Sync (Fast/Slow) [**PIC**] [**5**]*

The Sync function is used to minimize horizontal jittering, "flag waving" or tearing at the top of the display image. This effect sometimes occurs when the source is a VCR or video signal. The function changes the synchronization mode of the projector from fast to slow, or slow to fast.

To toggle between fast and slow sync, select item 5 from the Picture menu. Item 5 indicates the current synchronization mode.

3.4.2.5 *Blanking (Top/Bottom/Left/Right) [**PIC**] [**6**]*



The Blanking selection item is used to hide or blank out unwanted information or noise at the top, bottom, left, or right of the display image. Blanking adjustments may be required when the source is a VCR or video signal.

To adjust blanking, select Blanking from the Picture menu. From the Blanking menu, select item 1, 2, 3 or 4 to adjust the amount of blanking at the top, bottom, left, or right of the display (respectively). A blanking slidebar is displayed for each adjustment. A 0% level on the slidebar indicates no blanking. For top and bottom adjustments, use [▲] and [▼] to adjust the amount of blanking. For left and right adjustments, use [◄] and [►] to adjust the amount of blanking. After completing each adjustment, press [**ENTER**] to return to the Blanking menu, or press [**EXIT**] to return to the picture.

3.4.2.6 *Auto Clamp (On/Off) [**PIC**] [**7**]*

The Auto Clamp function is used to turn automatic signal clamping on or off. For most input signals, auto clamp should be on. However, if one or more of the red, green, or blue color components is abnormally bright, turn auto clamp off. An abnormally bright color component can occur if the input signal contains more than one sync type (e.g., both sync on green, and composite sync). If you are using a composite video source with ASR and are connected to an RGB interface, turn the Auto Clamp off.

To toggle auto clamp on or off, select item 7 from the Picture menu. Item 7 indicates the current Auto Clamp setting.

3.4.2.7 *Retrace (Short/Long) [**PIC**] [**8**]*

This function is used to set the projector's horizontal retrace time. Retrace time affects the width and display of the picture. A short retrace time may be required if information is missing or "cut off" at the left or right sides of the picture. A long retrace time may be desired if the picture is significantly smaller than the raster.

To toggle between short and long retrace, select item 8 from the Picture menu. Item 8 indicates the current retrace setting.

Note: Check phase, left blanking, and right blanking from the Picture menu before changing retrace time.

Note: Long retrace is not available at all scan frequencies.

3.4.3 Geometry Functions [GEOM]



Geometry functions are accessed through the Geometry menu. To display this menu, press [**GEOM**].

Note: It is usually easier to adjust display geometry while a test pattern ([**#**]) is displayed.

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3.4.3.1 *Size [**GEOM**] [**1**]*

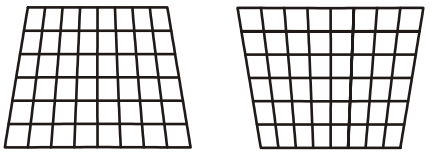
The Size function is used to adjust the horizontal and vertical size of the display image. (This adjustment is also available through the Picture menu).

To adjust size, select Size from the Geometry menu. Two slidebars are displayed: a Horizontal Size slidebar and a Vertical Size slidebar. Press [▲]or [▼] to adjust vertical size, and [◄] or [►] to adjust horizontal size until the objects within your picture have the proper shape. For example, if there is a circle in your picture, size should be adjusted so that the circle is round, not oval.

Note: The Size function should not be used to compensate for aspect ratio mismatches between source images and the projection screen. Not all sources use the same aspect ratio therefore it may not always be possible to fill the entire screen. ("Aspect Ratio" is defined in Appendix A).

3.4.3.2 *Keystone [**GEOM**] [**2**]*

The Keystone function adjusts side keystone geometry distortion. Adjust keystone to change the width at the top of the display in relation to the width at the bottom. The displays below demonstrate keystone adjustment.

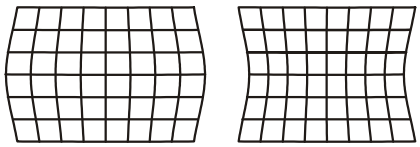


To adjust keystone, select Keystone from the Geometry menu then press [◄] or [►] to adjust the top and bottom widths of the display as desired.

3.4.3.3 *Side Pin [**GEOM**] [**3**]*

The Side Pincushion function adjusts pincushion of the sides of the display image.

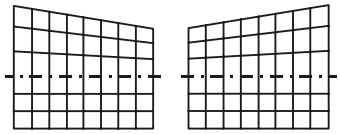
The two displays shown below demonstrate side pincushion adjustment.



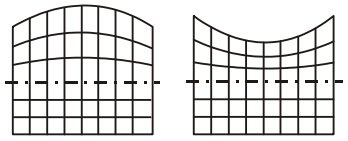
To adjust side pincushion, select Side Pin from the Geometry menu then press [◄] or [►] until the sides of the image are as curved or as straight as desired.

3.4.3.4 *Top [**GEOM**] [**4**]*

The Top function adjusts the level (Top Key) and pincushion (Top Pin) of the top half of the display image. The four displays shown here demonstrate Top adjustments.

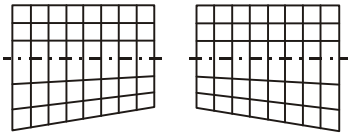


To stretch the upper left or right corner up or down, select Top from the Geometry menu and press [◄] or [►]. To adjust top pincushion, press [▲] and [▼] until the top half of the image is as curved or as straight as desired.

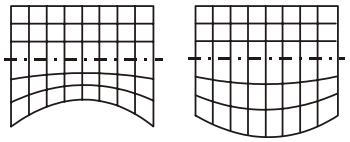


3.4.3.5 *Bottom [**GEOM**] [**5**]*

The Bottom function adjusts the level (Bottom Key) and pincushion (Bottom Pin) of the bottom half of the display image. The four displays shown at right demonstrate Bottom adjustments.

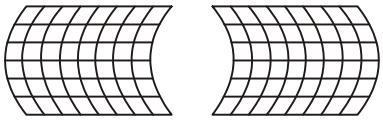


To stretch the lower left or right corner up or down, select Bottom from the Geometry menu and press [◄] or [►]. To adjust bottom pincushion, press [▲] and [▼] until the bottom half of the image is as curved or as straight as desired.

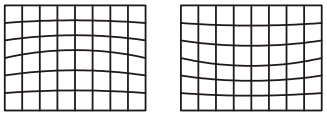


3.4.3.6 *Bow [**GEOM**] [**6**]*

The Bow function adjusts horizontal bowing (H Bow) across an image. It also adjusts vertical curvature (V Bow) in the middle of the picture. The four displays at right demonstrate H Bow and V Bow adjustments.



To adjust H bow, select Bow from the Geometry menu then press [◄] or [►] until the image appears as desired. To adjust V Bow, press [▲] and [▼] until the center of the picture is as curved or as straight as desired.

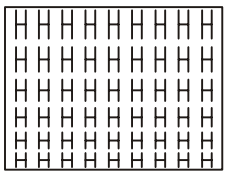


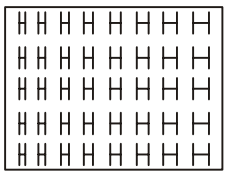
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3.4.3.7 *C Linearity [**GEOM**] [**7**]*

The C Linearity function corrects for gradual non-linearity between the top and bottom or left and right sides of the display image. Examples are shown below. In the first example the top of the image increases in vertical size while the bottom decreases in vertical size. In the second example the right side of the image increases in horizontal size while the left side decreases in horizontal size.

Select C Linearity from the Geometry menu. It is best to have a screen full of characters displayed. Or use one of the internal test patterns available by pressing [**#**]. If there is a vertical non-linearity, press [▲] and [▼] until the characters at the top, middle, and bottom of the screen have the same vertical size. If there is a horizontal non-linearity, press [◄] or [►] until the characters at the left, middle, and right of the screen have the same horizontal size.

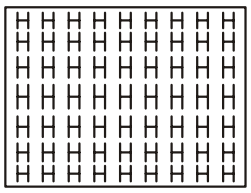


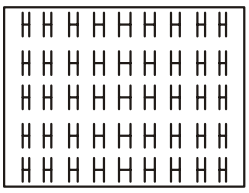


3.4.3.8 *S Linearity [**GEOM**] [**8**]*

The S Linearity function corrects for vertical and horizontal non-linearity's which extend from the center of the display to the top and bottom or left and right. Examples are shown below. Notice how the top and bottom or left and right characters are much smaller in size than the center characters.

Select S Linearity from the Geometry menu. It is best to have a screen full of characters displayed. Or use one of the internal test patterns available by pressing [**#**]. If there is a vertical non-linearity, press [▲] and [▼] until the characters at the top, middle, and bottom of the screen have the same vertical size. If there is a horizontal non-linearity, press [◄] or [►] until the characters at the left, middle, and right of the screen have the same horizontal size.

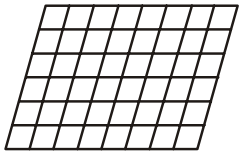


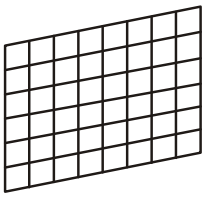


3.4.3.9 *Skew [**GEOM**] [**9**]*

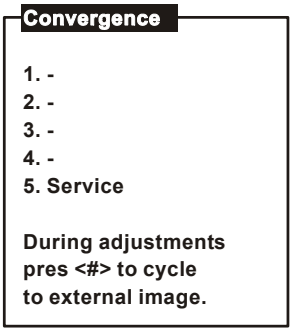
The Skew function adjusts the display image so that the sides of an image appear to be leaning to one side and/or shifted up or down. The two displays below demonstrate skew adjustment.

To adjust H Skew, select Skew from the Geometry menu then use [▲] and [▼] until the image is slanted from side to side as desired. For V Skew, press [▲] and [▼] to slant up or down.





3.5 Convergence Registration

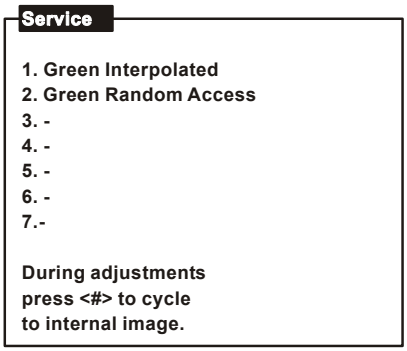


With three-CRT systems normal convergence registration is the process of aligning the red, green, and blue color components on the projection screen. The Marquee 8521 Ultra Green (HUD) projector is a single CRT/Lens system, as the name applies and therefore requires only green geometry correction. Correction settings can also be saved in Recall memories.

To Perform a Convergence:

Begin by selecting the input source to be converged. Convergence settings will be saved in the current setup memory. Next, press [**CONV**] to display the Convergence menu. Select one of the convergence options from the menu.

[**5**]: The Service selection is used to access the convergence service utilities. These utilities are provided for qualified service personnel only. (Password access is required).

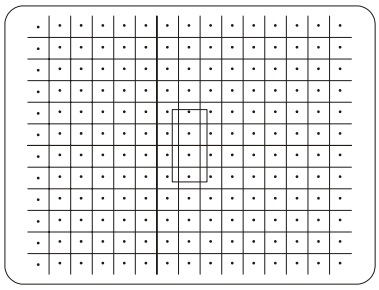


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3.5.1 Green Interpolated

The Green Interpolated adjustment allows you to quickly and easily adjust the geometry of the green raster at 45 zones in the image. Zones are accessed in a predetermined order, and like Interpolated Convergence, adjustments affect more than one zone. To begin Green Interpolated adjustment, press **[1]** from the Convergence Service menu. An internally generated green crosshatch is displayed for the alignment. If you prefer to use the external input, press **[#]** repeatedly to cycle to the external image.

Initially, a rectangular box surrounds the center zone. When the box is at the center zone, adjustments are "static" and move the entire raster. Use **[▲], [▼], [◄]** or **[►]** to adjust the position of the image on the screen. Press **[ENTER]** to move the box to the next zone and begin dynamic adjustments. After each adjustment press **[ENTER]** to move to the next zone. If you need to go back to a previous zone, press **[✸]**. Also, the following reset functions are available:



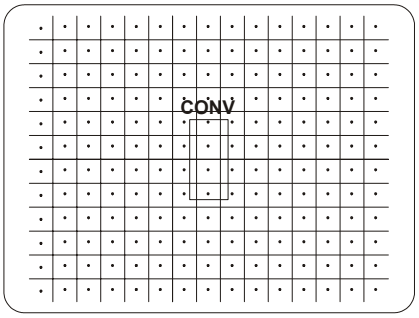
- Press **[0]** to reset static and dynamic values.
- Press **[1]** to reset static values only.
- Press **[2]** to reset dynamic values only.

Once all 45 zones have been set up, or **[EXIT]** is pressed, an Exit dialog box is displayed. When first displayed, the cursor is positioned on "Save". Press **[ENTER]** or **[EXIT]** to save the new settings; returns to the Service menu and returns to presentation level. To continue, move the cursor to "Continue Adjust" then press **[ENTER]** or **[EXIT]**. To discard your changes, move the cursor to "No Save" then press **[ENTER]** or **[EXIT]**.

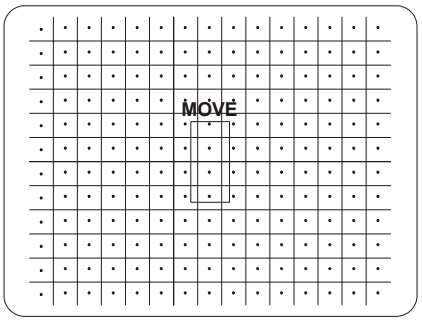
Exit Convergence		
Save	No Save	Continue Adjust

3.5.2 Green Random Access

The Green Random function lets you access and adjust the green geometry at any one of the 45 zones individually in any order. To begin Green Random Access adjustment, press **[2]** from the Convergence Service menu. An internally generated green crosshatch is displayed for the alignment. If you prefer to use the external input, press **[#]** repeatedly to cycle to the external image. Initially, a rectangular box surrounds the center zone. When the box is at the center zone, adjustments are "static" and move the entire raster. Above the box, "CONV" indicates that the zone is ready for adjustment. Use **[▲], [▼], [◄]** or **[►]** to adjust the position of the image on the screen.



To move to another control point, press **[ENTER]**. The caption above the box changes to "MOVE". Use the arrow keys to move to another zone for convergence. Press **[ENTER]** again to change the caption to "CONV" and adjust the raster within the zone using the arrow keys. As with the Green Interpolated function, the following reset functions are available:



- Press **[0]** to reset static and dynamic values.
- Press **[1]** to reset static values only.
- Press **[2]** to reset dynamic values only.

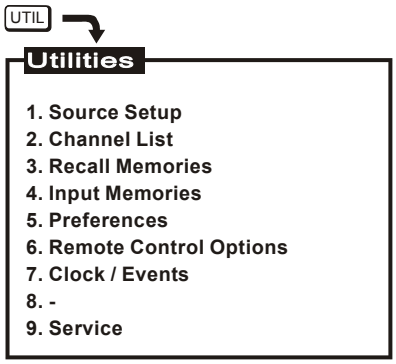
When adjustment is complete, press **[EXIT]** to display the Exit dialog box. Press **[ENTER]** or **[EXIT]** to save the new settings; returns to the Service menu and returns to presentation level. To continue adjustment from where you left off upon exit, move the cursor to "Continue Adjust" then press **[ENTER]** or **[EXIT]**. To discard your changes, select "No Save".

Note: For large scale adjustments to the green raster, use Green Interpolated first then use Green Random Access to fine tune if required.

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3.6 Utility Features

The projector's utility features allow you to customize operation of the projector to suit your application and preferences. To access these features, press [**UTIL**]. The Utilities menu is displayed.



Item 1, Source Setup, provides utilities for setup memory manipulation and selection of internal sources.

Item 2, Channel List, allows you to program the Channel List.

Item 3, Recall Memories, displays a listing of the Recall memories stored in the projector.

Item 4, Input Memories, displays a listing of the Input memories stored in the projector.

Item 5, Preferences, lets you set various operational settings which affect the behavior of the projector, according to your preferences.

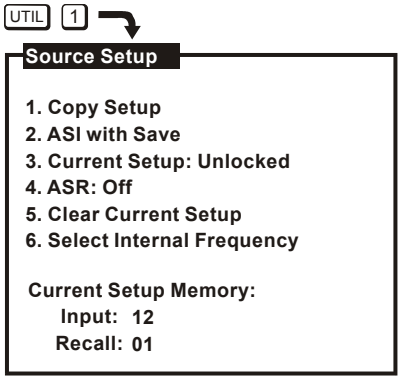
Item 6, Remote Control Options, allows you to modify the projector's communication settings for communication with external control devices such as remote keypads.

Item 7, Clock/Events, allows you to set the projector's real-time clock/calendar and program up to twelve individual projector control events to be automatically executed at specified times or intervals.

Item 8, N/A

Item 9, Service, provides service utilities for use by authorized service personnel. (Password access is required.)

3.6.1 Source Setup [UTIL] [1]

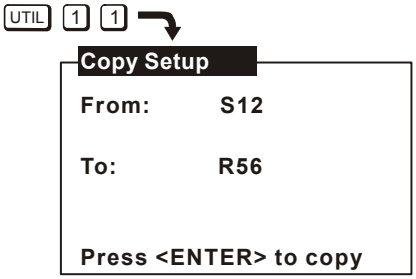


Source Setup utilities are accessed by pressing [**1**] from the Utilities menu. Six source related utilities are available.

3.6.1.1 *Copy Setup [**UTIL**] [**1**] [**1**]*

The Copy Setup utility is used to copy stored display settings from one setup memory to another. When a copy is made, the originating memory remains unchanged and the destination memory is overwritten with the settings of the originating memory.

To copy a setup memory, press [**1**] from the Source Setup menu. A dialog box is displayed. Enter the setup memory you want to copy from and the setup memory you want to copy to. Input memories are entered by pressing [**SOURCE**] followed by a switcher and slot number. Recall memories are entered by pressing [**RECALL**] followed by a two digit Recall memory number (01 to 99).



Once complete, press [**ENTER**] to proceed with the copy. A "Copy Complete" message is briefly displayed to indicate a successful copy. When you are finished copying setup memories, press [**EXIT**] to return to presentation level.

3.6.1.2 *ASI with Save [**UTIL**] [**1**] [**2**]*

ASI (Automatic Source Interpolation) is a feature which automatically adjusts display settings based on the settings of other setup memories stored in the projector. The "ASI with Save" utility performs an immediate ASI on the current source and saves the resulting display settings in the current setup memory. The new settings are created by either copying the settings from another setup memory which has matching scan frequencies or by interpolating between "the two closest" setup memories. This feature is very useful when adding a new source to the system and/or when much adjustment is required. By using the "ASI with Save" feature, the projector can do most of the required adjustments for you.

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To perform an "ASI with Save", press [**2**] from the Source Setup menu. A dialog box is displayed. Press [◄] to move the cursor bar to "Do It" then press [**ENTER**]. New display settings will immediately be calculated and saved in the current setup memory. The only exception is when the current setup memory is locked. If locked, display settings will not be modified. If "Cancel" is selected from the dialog box, the operation is stopped. For more information about the ASI logic process, refer to Appendix C, ASR/ASI Logic Diagrams.



Notes about the ASI feature...

ASI works better when there are many setup memories in the system. For example, if you always use the same input and you never use Recall memories (thus only one setup memory has ever been created), ASI will not be effective. However, if many Input and Recall memories have been used and adjusted for a variety of sources, the projector has more "knowledge" in its database for performing an ASI. As this "knowledge" increases, ASI accuracy improves.

3.6.1.3 *Current Setup (Locked/Unlocked)* ***[UTIL] [1] [3]***

This utility allows you to lock or unlock the current setup memory. Locking a setup memory prevents changes to display settings from being saved in that memory. For example, if a locked Recall memory is selected and then brightness is adjusted, the new brightness setting is only temporary. If the Recall memory is reselected, the original brightness setting will be restored.

Note: When a locked setup memory is selected, a key icon (🔑) is displayed in the Source Message.

To lock or unlock the current setup memory, press [**3**] from the Source Setup menu. Item 3 in the menu indicates the current setting.

3.6.1.3.1 *ASR (On/Off) [UTIL] [1] [4]*

The ASR (Automatic Source Recall) feature provides automatic Recall memory selection or ASI (Automatic Source Interpolation) for inputs which have ASR set to On.

To turn ASR on or off for the current input, press [**4**] from the Source Setup menu. Item 4 in the menu indicates the current setting.

When ASR is on, the projector monitors the current input for horizontal and vertical scan frequency changes. When a frequency change occurs, the current Input memory and all Recall memories are scanned in search of a memory with matching scan frequencies. If one exists, this memory becomes the current setup memory. If a matching memory is not found, an ASI is performed. ASI automatically adjusts display settings based on the settings of other setup memories stored in the projector. The new settings created by ASI are either a copy of the settings from another setup memory which has matching scan frequencies or an interpolation between "the two closest" setup memories.

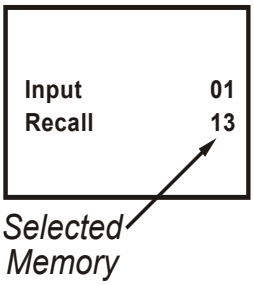
ASR is also performed when:

a) You switch to an input which has ASR set to On.
b) You select a Recall memory and ASR is set to On for the current input.
c) A channel is selected which specifies an input which has ASR set to On.
d) The source frequencies are different than the frequencies in the setup being selected.

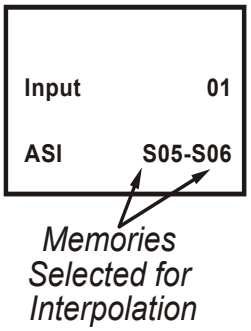
When ASR selects a setup memory, a source message is briefly displayed to indicate which memory was selected. If the new memory settings (Input and Recall) match that of one of the channels in the Channel List, the matching channel is used and displayed in the source message. Display adjustments, if made, are stored in the new memory (unless it is locked).

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If, on the other hand, an ASI is performed, a source message is briefly displayed which includes an ASI message to indicate the action taken. If an Input memory with matching scan frequencies was found by ASI, its settings are used and its identity is displayed. If an interpolation was performed, the two setup memories selected for the interpolation are displayed and the resulting settings are used. If adjustments are made to settings created by the ASI feature, the new settings will NOT be saved in the current setup memory; a message is displayed to indicate this. To perform an ASI and have the adjustments saved in the current setup memory; press [**UTIL**] [**1**] [**2**] to select the ASI with Save utility.



Note: To avoid selection/use of the current Input memory settings when it is desired that Recall memories be ASR selected when a source change occurs, clear the current Input memory ([**UTIL**] [**1**] [**2**]) to reset its scan frequency settings to null values, then immediately lock the memory ([**UTIL**] [**1**] [**2**]) so that its settings cannot be modified.



When to use the ASR feature...

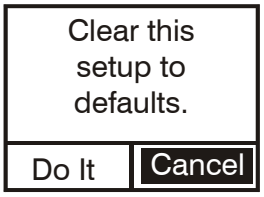
The ASR feature is intended for use when many different sources must share the same input (via a third party switcher, for example) or when a signal source can output several different scan frequencies (e.g., a SVGA card).

Example

A system has six different sources. Source "A" is a video camera. Source "B" is a VCR. Sources "C" through "F" are various computers. All sources are connected to a 3rd party (non-Electrohome) signal switcher. The switcher is connected to projector slot 1. For each source, a Recall memory is created to store its display settings. No two sources have the same frequencies.

[**UTIL**] [**1**] [**4**] is pressed to turn on the ASR feature for the projector's slot 1 input. When ASR is on and a source is selected by the switcher, the projector automatically adjusts its display settings for the new source by switching to the Recall memory set up for that source.

3.6.1.3.2 *Clear Channel Setup [**UTIL**] [**1**] [**5**]*

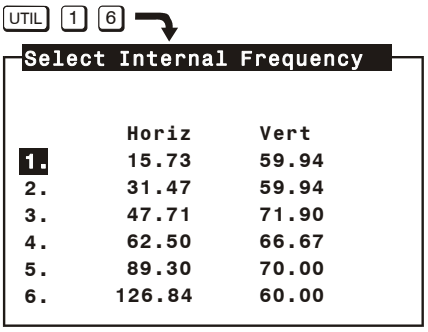


This utility is used to clear the current setup memory to the factory default display settings.

To clear the current setup memory, press [**5**] from the Source Setup menu. A dialog box is displayed. Move the cursor to "Do It" then press [**ENTER**] to clear the memory. If you press [**ENTER**] with the edit cursor on "Cancel", the clear operation is not performed. When the clear operation is complete, the Source Setup menu is returned.

Note: Note: Clearing a setup memory does not "delete" it from the system. If the projector's 80 memory spaces are used up, and you need to delete unused memories to make room for new memories, call your dealer for assistance.

3.6.1.3.3 *Select Internal Frequency [UTIL] [1] [6]*



This utility allows you to use the projector's internal signal generator. The internal signal generator is provided to assist users and technicians during projector setup. By using the internal generator, a setup memory can be adjusted for a particular set of horizontal and vertical scan frequencies without requiring an external source. Six preset horizontal and vertical frequencies are provided.

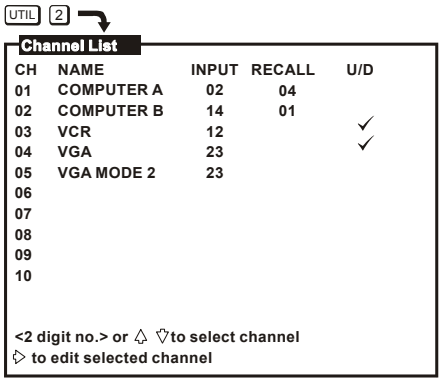
If one of the preset frequency sets closely match a source you will be using, you can set up an Input or Recall memory for the source before it is available for connection to the projector. When the source becomes available, few adjustments will be required. Another reason to use the internal generator is to improve the accuracy of the ASI feature. By setting up various memories at different scan frequencies, ASI has more information to choose from when making interpolations between setups.

To select an internal frequency, press [**6**], "Select Internal Frequency" from the Source Setup menu. The resulting menu allows you to choose the scan frequencies of the internal generator. Select one of the displayed items.

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To make a selection, enter an item number or use [▲] and [▼] to move the cursor bar to the item you want then press [**ENTER**]. When a selection is made, a crosshatch test pattern is displayed. All subsequent adjustments are saved in the current setup memory. To select one of the projector's other test patterns, press [**#**]. Each press of [**#**]produces a different test pattern. To return to the current external source, press [**EXIT**] while only the test pattern is displayed.

3.6.1.3.4 *Channel List [UTIL] [2]*



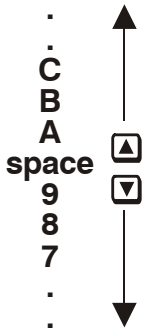
The Channel List utility allows you to display and program the projector's Channel List. The Channel List is a user-programmable list of sources and projector setups. Sources added to the list can be quickly switched to and displayed by entering their assigned two-digit channel number. Channels may also be selected using the keypad's up and down arrow keys. Channel selection is described in Section 3.2.

To display and/or program the Channel List, press [**2**] from the Utilities menu. The initial display shows the first ten channels in the list. Up to 99 channels can be displayed. For each channel a name, input number (switcher and slot number), Recall memory number, and up/down list may be programmed.

Program a channel as follows:

When the Channel List is first displayed, the cursor is positioned in the channel number column. While in the channel number column, press [▲] or [▼] to highlight the channel you want. Alternatively, you can highlight the channel you want by entering the channel number on the keypad. Entering the channel number also allows you to select/display/edit channels beyond the first ten.

Next, press [►] to move the cursor to the Name field. While in the Name column, [▲] and [▼] change the character at the cursor position and [▲] and [▼] move the position of the cursor. Once a source name has been entered, move the cursor to the Input field by pressing [**ENTER**] or by using [►]. Edit the Input, Recall, and Up/Down (U/D) fields. See below for field definitions. To exit the channel list, press [**RECALL**] or [**EXIT**].



Note: When the cursor is positioned on an edit field, the field may be cleared by pressing [✶].

If a channel is selected and ASR is on for the same input, and the incoming frequency does not match the selected setup memories frequency, it may cause the following: ASR may be triggered, the setup memory may change and the channel number may be changed to reflect the new memory.

Example: If Channel 4 shows input (1,3) and no recall number and input (1,3) switcher 1 slot 3 is selected and recall memory 55 is currently selected then the Source Message box will show that Channel 4 is selected unless there is another channel with input (1,3) and recall 55.

The Name Field

The Name field stores the names of the sources in the list. Source names may be up to 11 characters in length. It is recommended that source names be entered to make it easier to keep track of the sources. Source names are briefly displayed when channels are selected.

Note: Digits may be entered using the number keys on the keypad or selected using the [▲] and [▼] keys.

Note: If [✶] is pressed during name editing, all characters in the field to the right of the cursor will be cleared.

The Input Field

The Input field contains the switcher and slot number of the input to be switched to when the channel is selected. If the input is a direct projector input, the input number is a 0 followed by the projector slot number. If the input is from a switcher, the input number is a number from 1 to 9 (switcher number) followed by the switcher slot number.

The Recall Memory Field

The Recall Memory field contains the number of the Recall memory to be used when the channel is selected. If the field does not contain a number (a blank or dash is shown), no Recall memory will be used.

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The Up/Down Field (U/D)

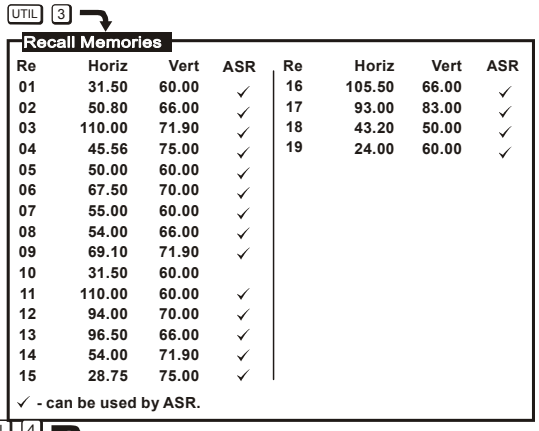
The Up/Down field specifies the channels which are accessible when using up/down channel selection (explained in Section 0). If the field does not contain a check mark, the channel is ignored. To enter a check mark, press a number key (0-9). To clear a check mark, press [✶].

Note: Channels should contain valid inputs. For example, do not specify switcher 1 if switcher 1 does not exist in the system.

3.6.1.4 *Recall Memories (Listing) **[UTIL] [3]***

The Recall Memories utility provides a list of the Recall memories stored in the projector. (Recall memories are explained in Section 3.3.3). The list includes the scan frequencies of each Recall memory. A check mark (✓) is displayed in the ASR column next to the memories which ASR may use. If two or more Recall memories have identical scan frequencies, only the memory last adjusted will have a check mark.

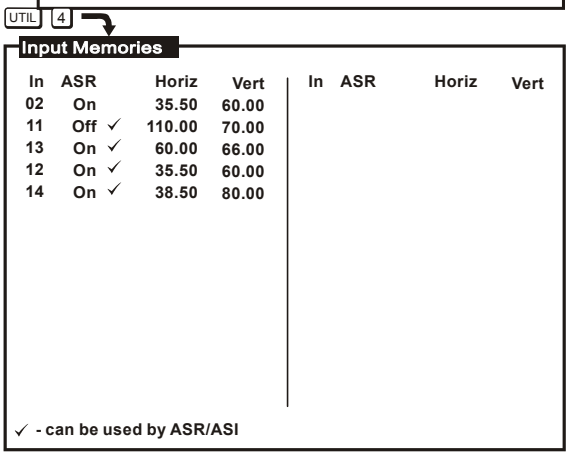
To list the Recall Memories, press [**3**] from the Utilities menu. If more than 30 Recall memories exist, press [**ENTER**] to display the remaining memories.



3.6.1.5 *Input Memories (Listing) **[UTIL] [4]***

The Input Memories utility provides a list of the Input memories stored in the projector. (Input memories are explained in Section 3.3). The list includes the scan frequencies of each Input memory. The ASR column indicates if the ASR feature is on or off for each memory. A check mark (✓) is displayed in the ASR column next to the memories which may be chosen for use by ASI during an ASR. If two or more Input memories have identical scan frequencies, only the memory last adjusted will have a check mark. (ASR is explained in Section 3.6, Utility Features.)

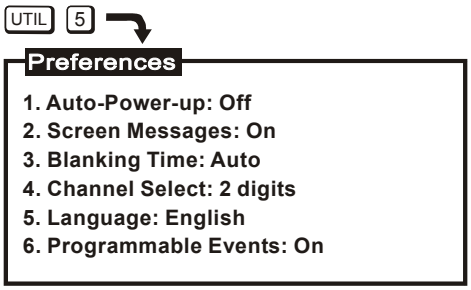
To list the projector's Input Memories, press [**4**] from the Utilities menu. If more than 30 Input memories exist, press [**ENTER**] to display the remaining memories.



3.6.1.6 *Preferences **[UTIL] [5]***

The Preferences utility allows you to set various preferences which affect the behavior of the projector.

Six preference items are displayed with their current settings. Select an item to change its setting. (Defaults shown.)



3.6.1.6.1 *Auto Power-up (On/Off) [UTIL] [5] [1]*

If Auto Power-up is set to On, the projector automatically powers itself up when line power is removed then re-applied. For example, if power is temporarily interrupted due to a storm, the projector will automatically power back up when power returns. If Auto Power-up were set to Off, the projector would require a manual power-on.

Note: Upon automatic power-up, the most recent display adjustments may be lost if they were not yet saved in the current setup memory.

3.6.1.6.2 *Screen Messages (On/Off) [UTIL] [5] [2]*

The Screen Messages preference allows you to choose whether screen messages will be displayed, such as slidebars, error and warning messages, the [**SOURCE**]. [**RECALL**], [**PROJ**], and [**MUTE**] messages, and the [**PIC**] and [**GEOM**] menus. For most applications, it is recommended that Screen Messages be left on. However, if during a presentation you want to make subtle display adjustments without drawing attention to your actions, Screen Messages should be set to Off.

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Note: It is still possible to display a screen message, such as a slidebar, while Screen Messages is set to Off. To do this, press [**RECALL**] just before selecting the function.

3.6.1.6.3 *Blanking Time (Auto, 0.5s to 5.0s) [UTIL] [5] [3]*

When a source is selected, the projector blanks the screen for a short period of time. You can set the blanking time to Auto, which allows the projector to determine the best blanking time automatically, or program a particular blanking time. Time periods from 0.5 second to 5.0 seconds are available. Select the Blanking Time item in the menu to change its setting.

3.6.1.6.4 *Channel Select (1 Digit Only, 2 Digits, 1 or 2 Digits) [UTIL] [5] [4]*

There are three different ways the projector can respond to channel numbers entered during direct channel selection: 1 Digit Only, 2 Digits, and 1 or 2 Digits. Select the Channel Select item in the menu to change its setting.

"1 Digit Only" allows only one digit to be entered after which the projector switches immediately to the selected channel. This method can select only channels 1 to 9. "2 Digits" requires two digits to be entered. Both digits must be entered within 5 seconds. Channel 1 is entered as 01, etc.

"1 or 2 Digits" allows either one or two digits to be entered. If a second digit is not entered within 5 seconds of the first, the first digit is accepted as the channel number.

3.6.1.6.5 *Language (English, French, German, Spanish, Italian) [UTIL] [5] [5]*

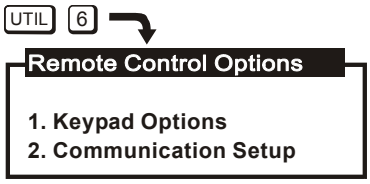
Menus and text can be displayed in English, French, German, Spanish or Italian. To change the language, select the Language item in the menu until the desired language is shown.

3.6.1.6.6 *Programmable Events (On/Off) [UTIL] [5] [6]*

This item allows you to enable or disable the Programmable Events feature. If Programmable Events is set to On, the events flagged as "ENABLED" in the Programmable Events feature box ([**UTIL**] [**7**] [**2**]) are automatically executed at the dates and times specified. If Programmable Events is set to Off, programmable event execution is disabled.

(For information about event programming, refer to the Clock/Events entry in this subsection.)

3.6.2 Remote Control Options [UTIL] [6]

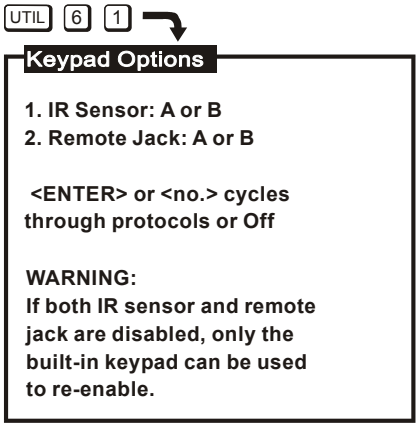


Remote Control Options allow you to modify the projector's communication settings for operation with remote keypads and control devices.

To select the Remote Control Options menu, press [**6**] from the Utilities menu. Two selection items are displayed: Keypad Options and Communication Setup.

3.6.2.1 *Keypad Options [**UTIL**] [**6**] [**1**]*

Press [**1**] from the Remote Control Options menu to display the Keypad Options menu. Use the menu to select the keypad protocol type the projector will respond.



3.6.2.1.1 *IR Sensor*

This setting determines how the projector responds to IR remote keypads aimed at the projector's built-in IR sensor. Select the IR Sensor menu item to change the current setting. Four settings are available: A or B, A, B, and Off. If set to A, the projector will only respond if the keypad is set for protocol A operation. If set to B, the projector will only respond if the keypad is set for protocol B operation. If set to "A or B", the projector will respond to both protocol settings. If set to Off, the projector will not respond to IR keypad commands.

The reason for having two protocols available is to allow two projectors in the same room to be independently controlled by separate remote keypads. See Figure 3-6.

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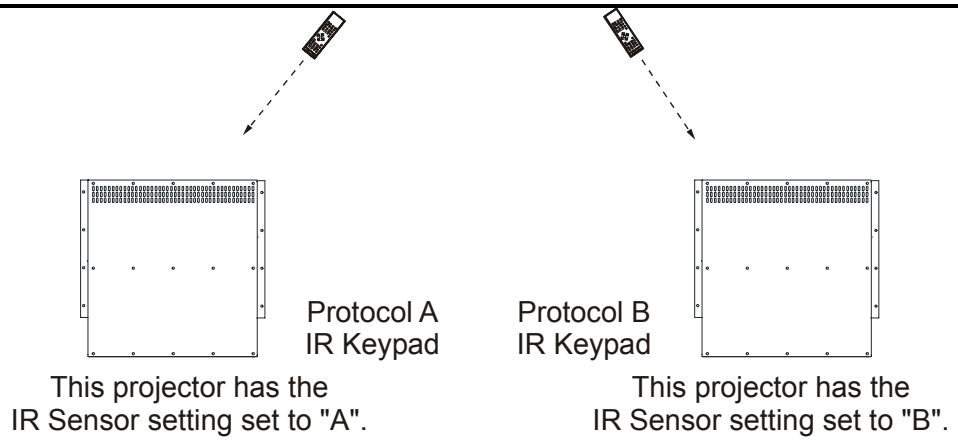


Figure 3-6. Independent IR Keypad Control

CAUTION: The keypad you are using may become inoperative if its protocol does not match its setting in the menu.

3.6.2.1.2 *Remote Jack*

This setting determines how the projector responds to devices connected to the REMOTE jack on the projector's rear panel. This jack can accept input from a wired keypad or remote IR sensor. Four settings are available: A or B, A, B, and Off. If set to A, the projector will only respond if the keypad using the REMOTE jack is set for protocol A operation. If set to B, the projector will only respond if the keypad using the REMOTE jack is set for protocol B operation. If set to "A or B", the projector will respond to both protocol settings for keypads using the REMOTE jack. If set to Off, the REMOTE jack is disabled.

3.6.2.2 *Communication Setup **[UTIL] [6] [2]***

UTIL 6 2

Communication Setup

Projector: 000
Baud Rate: 9600

<no.> to change

Press [**2**] from the Remote Control Options menu to set the projector identification number and the RS-232 serial port baud rate.

Projector

This item contains the projector's identification number. The projector's identification number allows IR remote control of a single projector in a multi-projector installation. To set the projector identification number, select item 1 then enter a three digit number from 000 to 999. If there is only one projector in the installation, 000 is the recommended projector number. For more information about multi-projector control, refer to Section 3.7, Multi-projector Functions.

Baud Rate

This item contains the projector's RS-232 serial port baud rate. The RS-232 serial port, located at the back of the projector, provides a means to control the projector using a computer or another projector. The serial port baud rate setting must match the operating baud rate of the controlling device. Baud rate may be set to 300, 600, 1200, 2400, 4800, or 9600. To set the baud rate, select item 2 from the menu until the desired baud rate is displayed.

Note: If unsure of your computer's baud rate setting, refer to the system documentation provided with the computer.

Note: For information about cable connections between devices, refer to Appendix D.

3.6.2.3 *Clock/Events **[UTIL] [7]***

Clock/Events allows you to set the projector's real-time clock/calendar and program up to twelve individual projector control events to be automatically executed at specified times or intervals.

To select the Clock/Events menu, press [**7**] from the Utilities menu. Two selection items are available: Set Clock and Programmable Events. The current time and date setting is displayed at the bottom of the menu.

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3.6.2.3.1 *Set Clock [UTIL] [7] [1]*

Press [**1**] from the Clock/Events menu to display the Set Clock menu. Use the menu to set the current time and date and their format.

Time

To edit the time stored in the real time clock/calendar, press [**1**] from the Set Clock menu. This puts you in time editing mode. A flashing cursor is positioned at the first digit of the time field. Use the number keys to enter the current time (hours and minutes), using the format displayed in item 3. For 12 hour format, enter "01" to "12" for the hours and use [▲] or [▼]to toggle between a.m. and p.m.. For 24 hour format, enter "00" to "23" for the hours. Enter "00" to "59" for the minutes. When the proper time has been entered and is displayed, press [**ENTER**] to accept the changes and leave time editing mode.

Note: On entry of the last digit of minutes, you automatically leave time editing mode

Note: Years from 1990 to 2089 are assumed and handled.

Date

To edit the date stored in the real time clock/calendar, press [**2**] from the Set Clock menu. This puts you in date editing mode. A flashing cursor is positioned at the first digit of the date field. Use the number keys to enter the current date per the format displayed in item 4 (month/day/year, day/month/ year or year/month/day). When the proper date has been entered and is displayed, press [**ENTER**] to accept the changes and leave date editing mode.

Note: On entry of the last digit, you automatically leave date editing mode.

Time Format

Press [**3**] from the Set Clock menu to change the time display format. The format may be 12 hours (12h) or 24 hours (24h). All references to time by the projector will use the format displayed (this includes the time displayed in item 1.)

Date Format

Press [**4**] from the Set Clock menu to change the date display format. The format may be month/day/year (MM/DD/YY), day/month/year (DD/MM/YY) or year/month/day (YY/MM/DD). All references to date by the projector will use the format displayed (this includes the date displayed in item 2).

3.6.2.4 *Programmable Events **[UTIL] [7] [2]***

Press [**2**] from the Clock/Events menu to display the Programmable Events feature box. The Programmable Events feature box allows you to program a list of up to twelve events to occur at specified times and intervals. For example, you can program the projector so that at the same time each day, standby mode is turned off and Source 01 is displayed. See the example below.

Each line contains a type of event, a frequency of occurrence (interval), a start time and an enable/disable flag.

To program or modify an event, first use the arrow keys to move the cursor to the field you want to modify (for example, the Type field). Next use [**ENTER**] and/or the number keys to modify that field. Details for field modification are provided on the following pages. Modify each field in the row as necessary making sure all fields for the event are valid and logical.

When all modifications have been made, press [**EXIT**] to display the Exit dialog box. When the Exit box is first displayed the cursor bar is positioned on "Save". Press [**ENTER**] or [**EXIT**] to save the new changes. To return to the Programmable Events feature box, move the cursor bar to "Continue Change" then press [**ENTER**]. To discard your changes, move the cursor bar to "No Save" then press [**ENTER**] or [**EXIT**]. [**ENTER**] returns you to the Clock/Events menu. [**EXIT**] returns you to presentation level.

The Type Field

The Type field shows the event to take place. With the cursor positioned on the Type field press [**ENTER**] to cycle through the available events. Press [✶] to clear the entire event line. Events are described in Table 3-1 below.

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Table 3-1. Type Field Events

EVENT	DESCRIPTION	NOTES
None	No programmed event.	
Standby On	Turn Standby mode on.	
Standby Off	Turn Standby mode off.	
Power Off	Turn Power off.	
channel selection	Select a channel from the Channel List.	* Use the number keys to enter the channel#.
source selection	Select an input.	* Use the number keys to enter the switcher# & slot#.
ACON (Full)	Perform an ACON (full) auto-convergence.	ACON option is required.
ACON (Touchup)	Perform an ACON (touchup) auto-convergence.	ACON option is required.
ACON (Center Only)	Perform an ACON (center only) auto-convergence.	ACON option is required.
Channels Up	Switch to the next available channel from the Channel List.	Cycles back to the first channel after last channel is selected.
Channels Down	Switch to the prior available channel from the Channel List.	Cycles to the last channel after the first channel is selected.
Warm up	Perform a warm-up sequence: 1. Turn Standby mode off (if on). 2. Set Contrast to 20%, Brightness to 50%, HSize to 80%, VSize to 80% and master static focus to 100%. 3. Display white field for 15 min. 4. Restore original display settings.	Exit from warm-up occurs after 15 minutes or when the EXIT key is pressed. Other keys which stop warm-up are PROJ, *, UTIL, CONV and RECALL. When warm-up stops, all original display settings are restored.

* Only valid entries are accepted.

The Interval Field

The Interval field shows a date or interval at which the event is to take place. With the cursor positioned on the Interval field press [**ENTER**] to cycle through the available options. See Table 3-2 below for details.

Table 3-2. Interval Field Options

EVENT INTERVAL	ACTIVATES THE EVENT	NOTES
specific date	At a specific calendar date	* Use number keys for date entry per the format defined by the Set Clock utility.
Daily	Every day.	
Mon-Fri	Monday through Friday.	
Sat-Sun	Saturday and Sunday.	
Mondays	Monday.	
Tuesdays	Tuesday.	
Wednesdays	Wednesday.	
Thursdays	Thursday.	
Fridays	Friday.	
Saturdays	Saturday.	
Sundays	Sunday	
min./sec. interval	Repeatedly at a specified time interval, in minutes and seconds, starting at the time set in the Start field. (Applies to Channel Up/Down events only.)	* Use the number keys to enter minutes and seconds. The seconds interval must be an even number, e.g., 02, 04, 06, etc.

* Only valid entries are accepted.

The Start Field

The Start field shows the start time of the event. With the cursor positioned on the Start field use the number keys to enter the start time. Use the notation previously defined by the Set Clock utility (12 hour or 24 hour). If using a 12 hour clock, press [**ENTER**] to toggle between a.m. and p.m.

Note: Only valid entries are accepted. For example, if "4" is entered as the first digit of the Start time it will not be accepted. The first digit must be either "0" or "1" when using a 12 hour clock, and "0", "1" or "2" when using a 24 hour clock.

The Enabled Field

The Enabled field allows you to enable or disable a programmable event. When enabled, the event is performed as programmed. When disabled, the programmed event is ignored. A check mark indicates that the event is enabled. With the cursor positioned on the Enabled field press [**ENTER**] to toggle display of the check mark.

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General Notes about Programmable Events

- All events are ignored if Programmable Events is set to Off in the Preferences menu ([**UTIL**] [**5**]).
- The projector must be turned on for programmable events to take place.
- Be careful not to schedule two events so close to each other such that the second event is scheduled to begin before the first event is complete; otherwise the second event may be ignored. For example, do not schedule an event to take place one minute after a full ACON auto-convergence. A full ACON convergence takes longer than one minute to complete.
- If the projector is not at presentation level when an event is scheduled to begin, that event will be ignored unless presentation level is returned within the minute that that event is to take place.
- An error or "invalid" message is temporarily displayed at the bottom of the feature box when an entry is invalid or does not make sense.
- "Error" in an Enabled field indicates an invalid entry for that event.
- Events scheduled at the same time are performed in the order listed in the Programmable Events feature box. Events never occur simultaneously.

About Channel Up/Down Events...

Channel Up/Down events are handled differently than other events. A Channel Up or Channel Down event is continuously repeated at the time interval set by the Interval field. The process begins at the start time set by the Start field. This feature is provided for applications such as surveillance or status display systems where multiple sources are sharing one projection display. For example, a bus terminal may use this feature to display a number of different bus schedules, each displayed for ten seconds at a time.

To use this feature, a number of video sources must be fed to the projector or a connected switcher. Each source is assigned to a channel in the Channel List. The U/D status of each of these channels must be enabled in the list - see the Channel List entry in this section for details. Within the Programmable Events feature box, the event type is set to Channel Up or Channel Down. The interval and start time is entered and the event is enabled by setting a check mark in the Enabled field. When the event is enabled and the start time is reached, the projector begins cycling through the enabled channels in the Channel List. Each channel-defined source is displayed for the set interval period then the next lower or higher channel enabled in the Channel List is displayed. This continues until the event is disabled or the projector is turned off.

Note: If during Channel Up/Down cycling you press a key to make an adjustment or change a projector setting, the channel cycling process pauses until you return to presentation level. If you manually select a different channel, channel cycling will resume from that channel.

3.7 Multi-projector Functions

In a multi-projector installation it is usually desired to have a single IR keypad control all the projectors in the system. This section explains the special control functions available for such installations.

3.7.1 The Projector

The Projector function allows you to select which projector in a group will respond to IR keypad commands. To use this function, each projector in the installation must first be assigned a unique projector number. Projector numbers are assigned through the Communication Setup menu which is accessed by pressing [**UTIL**] [**6**] [**2**] on a built-in keypad or a wired remote keypad. Once each projector has its own unique projector number, projectors in the installation can be individually controlled using the same IR keypad.

To select a projector to solely respond to commands from an IR keypad, press [**PROJ**] followed by the projector's identity number. The specified projector will be the only projector which will respond to the keypad.

To enable ALL projectors to listen to the IR keypad, press [**PROJ**] [✶]

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4.1 Warnings and Guidelines

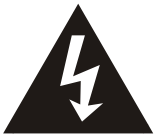
The Marquee projection system is CSA approved and is designed for safe and reliable operation. However, safe operation cannot simply be assured by design; installers, maintainers, and users must maintain a safe operating environment for the system. This section covers warnings and guidelines which promote the safe usage of the projector. Please read through and understand these warnings and guidelines.

4.1.1 Labels and Markings

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



The exclamation point within the equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the projector.



The lightning flash with arrowhead symbol, within the equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the projector's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

4.1.2 Projector Location

Operate the projector in an environment which meets the operating range specifications in the specifications. Do not operate the projector close to water – for example, near a swimming pool.



Do not place the projector on an unstable cart, stand or table. If the projector is to be ceiling mounted, only use an VDC Display Systems approved ceiling mount fixture.

The projector and cart combination should be used with care. Quick stops, excessive force, and uneven surfaces may cause the projector and cart combination to overturn.

4.1.3 Power Cord and Attachments

Only use attachments or accessories recommended by VDC Display Systems. Use of others may result in the risk of fire, shock or personal injury.

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.

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

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

4.1.4 Ventilation Slots

Slots and openings in the projector provide ventilation. To ensure reliable operation of the projector and to prevent overheating, these openings must never be blocked or covered. The projector should never be placed near or over a radiator or heat register. The projector should not be placed in an enclosure unless proper ventilation is provided.

Do not push objects of any kind into the projector through the ventilation openings. They may touch dangerous voltages or short-out parts resulting in a fire or shock hazard. Do not spill liquids of any kind into the projector. Should an accidental spill occur, immediately unplug the projector and have it serviced by a qualified service technician.

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4.1.5 Servicing

If any of the following conditions exist, unplug the projector from the power outlet and refer service to qualified service personnel.

- The power cord has been damaged.
- Liquid has been spilled into the projector.
- The projector has been exposed to excessive moisture.
- The projector does not operate normally.
- The projector has been dropped or the case has been damaged.
- Projector performance has deteriorated.

Do not attempt to service the projector yourself. All servicing must be performed by a qualified VDC Display Systems service technician. If replacement parts are required, it is important that only VDC Display Systems approved parts are used. Other parts may result in fire, electric shock or risk of personal injury.



WARNING: THE PROJECTOR IS INTERNALLY SHIELDED TO PROTECT THE USER FROM EXPOSURE TO SOFT X-RAY RADIATION. IMPROPER SERVICING OR SHIELD REMOVAL MAY RESULT IN PERSONAL INJURY.



CAUTION: In rare instances, flashing lights can trigger an epileptic seizure. During ACON usage persons with epilepsy should look away from the screen.

4.2 Cleaning

Clean the projector when required. Before cleaning, always unplug the projector from the power outlet.

4.2.1 Lens Cleaning

To avoid the risk of scratching the lenses, only clean the lenses if absolutely required. A small amount of dust on the lenses will have very little effect on picture quality. If the lenses must be cleaned, use a DRY soft cotton cloth. Rub gently in a circular motion.

4.2.2 Case Cleaning

Clean the case with a soft dampened cloth. Use a mild commercial cleaner. Do not use liquid or aerosol cleaners.

4.3 Trouble-shooting

If the projector is not operating properly, note the symptoms of the problem and use the following guide to assist you. If you cannot resolve the problem yourself, contact your dealer for assistance.

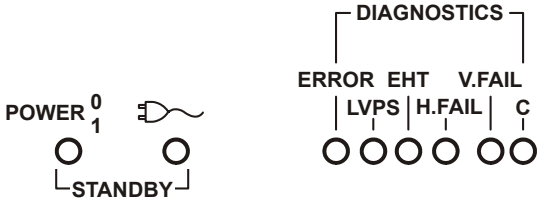


Figure 4-1. Rear Panel LEDs

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4.3.1 Projector Response Problems

Refer to the following if the projector is not responding to keypad commands.

Symptom:

The projector will not turn on when [**POWER**] is pressed. All back panel lights are off. See Figure 4-1.

Cause/Remedy:

1. The power cord may be disconnected. Check the power cord connection at the wall outlet and the projector.

Symptom:

The projector will not turn on when [**POWER**] is pressed. Only the amber  LED on the back panel is lit.

Cause/Remedy:

1. [**POWER**] may not have been held down long enough to initiate projector power-up. Hold down [**POWER**] for at least one second to initiate power-up.
2. If using an IR keypad, ensure it is pointed at the screen or the front of the projector. If the keypad is configured for built-in or wired usage, make sure it is properly connected to the projector.
3. If using an IR keypad, the batteries may need replacement. Remove the batteries from the battery compartment on the back side of the keypad. Install new batteries as described in the Section 0.
4. The keypad may be damaged. If the back panel C LED does not flash when [**POWER**] is pressed, the projector is not responding to the keypad. Try using a different keypad.
5. If using a remote keypad (IR or wired), the keypad's protocol (A or B) might not match the projector's IR protocol setting. Refer to Section 0 for instructions on how to check and change the keypad's protocol setting. However, if the projector's setting is "Off", the remote keypad will not respond. You may have to configure the keypad for built-in operation to gain control of the projector.

Symptom:

The projector will not turn on when [**POWER**] is pressed. One or more of the following red LEDs are lit: **ERROR, LVPS, EHT, H.FAIL, V.FAIL**.

Cause/Remedy:

1. An internal failure has occurred. Projector servicing may be required. Contact your reseller or VDC Display Systems for assistance.

Symptom:

The projector's green *POWER LED* is lit and all other LEDs are off yet no picture is displayed.

Cause/Remedy:

1. Contrast or brightness may be set too low. Press [✶]to activate the status screen. If there is no display, press [✶]then increase contrast ([**CONT**]) and brightness ([**BRITE**]) until the crosshatch is displayed. Adjust contrast and brightness to their proper settings.
2. The room lighting may be too bright.
3. The projector may be too far from the screen. Move the projector closer to the screen. The maximum throw distance is 25 feet.
4. Were the lens covers accidentally left on? Remove the lens covers.

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Symptom:

While in use, the projector suddenly become non-responsive to keypad commands, even when using a built-in keypad.

Cause/Remedy:

1. Although rare, it is possible that an internal software error occurred which has put the software in a non-ending loop. This might occur if a power spike interfered with the projector's internal processor system. To fix this problem, leave the projector plugged in and using a small screw driver or ball point pen, press the recessed RESET button on the back panel. This operation will reset the projector's processor without affecting memories or display settings.

Symptom:

The projector does not respond to the [**STBY**] or [**MUTE**] keys.

Cause/Remedy:

1. You may not be holding down the key long enough to initiate the action. Like [**POWER**], [**STBY**] and [**MUTE**] must be pressed down for at least one second.

Symptom:

The projector does not respond to an IR Remote keypad.

Cause/Remedy:

1. The projector's IR keypad listening status may be turned off. Press [**PROJ**] [✶]to turn on the listening status of all projectors, or press [**PROJ**] followed by the projector's identity number to turn on the listening status of the projector you want to respond.
2. The keypad's protocol (A or B) might not match the projector's IR protocol setting. Refer to Section **Error! Reference source not found.** for instructions on how to check and change the keypad's protocol setting. However, if the projector's setting is "Off", the remote keypad will not respond. You may have to configure the keypad for built-in operation to gain control of the projector.
3. The IR keypad may be too far away from the projector or screen. Use the IR keypad closer to the projector or screen. Also ensure the keypad is pointed directly at the screen or the front of the projector.
4. The viewing path between the IR keypad and the projector (or screen or switcher) may be restricted. Ensure there is a clear line-of-sight between the keypad and the projector (or screen or switcher).
5. The sensor may be disabled per the Keypad Options menu ([**UTIL**] [**6**] [**1**]).
6. The batteries in the IR keypad may be weak. Replace the batteries in the keypad. See Section 1.1.1 for battery installation instructions.
7. There may be unusual lighting conditions in the room which effect IR keypad operation. Determine if such conditions exist and correct.

Symptom:

The display is jittery or unstable.

Cause/Remedy:

1. The horizontal or vertical scan frequency of the input signal may be out of range. Check the specifications in Section 1 for scan frequency ranges.
2. Synchronization signals from the source may be inadequate. Correct the source problem.
3. The input signal type may not match the signal type required by the input module. Install the correct input module/interface to match the signal type of the source.

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Symptom:

The upper portion of the display is waving, tearing, or jittering.

Cause/Remedy:

1. This sometimes occurs when the source is a VCR or video signal. Change the sync mode by selecting the fast/slow sync option from the Picture Adjust menu ([**PIC**] [**5**]).

Symptom:

The upper or lower portions of the display are cut off.

Cause/Remedy:

1. A top or bottom blanking adjustment may be required. Select the appropriate blanking adjustment option from the Picture Adjust Menu ([**PIC**]) then adjust the amount of blanking.

Note: A 0% slidebar level indicates no blanking.

2. A phase adjustment may be required. Select Phase from the Picture Adjust menu ([**PIC**]). Adjust phase so that the entire picture is visible and centered.

Symptom:

One side of the display is cut off.

Cause/Remedy:

1. A left or right blanking adjustment may be required. Select the appropriate blanking adjustment option from the Picture Adjust menu ([**PIC**]) then adjust the amount of blanking. A 0% slidebar level indicates no blanking.
2. A phase adjustment may be required. Select Phase from the Picture Adjust menu ([**PIC**]). Adjust phase so that the entire picture is visible and centered.
3. The retrace time of the projector may be longer than the horizontal blanking time of the signal. Press [**UTIL**] [**1**] [**8**] to change projector retrace time to Short.

Symptom:

Transitions between colors are fuzzy.

Cause/Remedy:

1. Convergence may require adjustment. Perform a convergence on the selected source.
2. The projector may not be optically aligned for the installation. Has the throw distance changed significantly since the last optical alignment? If so, have the projector re-aligned. Refer to Section 2.5..

Symptom:

The display is very faint.

Cause/Remedy:

1. Contrast or brightness settings may be set too low.
2. The projection room may be too bright. Lower the intensity of projection room lighting. Reduce light reflections as much as possible.
3. The projection room walls and ceilings may be too reflective. Reflective ceilings, walls, and floors should be kept to a minimum. The best projection rooms are dark with matte finishing.
4. The projector may be too far from the screen.
5. The location of the audience with respect to the screen may not be adequate. Make sure the audience is within the viewing angle set by the projector and screen position, and the screen type.
6. The phase setting may require adjustment. Select Phase from the Picture Adjust menu ([**PIC**]) then determine if adjustment improves the display.
7. The source may be double terminated. Ensure the source is terminated (75Ω) only once.

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Symptom:

The display appears to be folded.

Cause/Remedy:

1. The phase setting may require adjustment. Select Phase from the Picture Adjust menu ([PIC]) then determine if adjusting the phase improves the display.

Symptom:

The display is reversed or upside down.

Cause/Remedy:

1. The projector scan configuration is not set correctly for the installation type.

Symptom:

The display is not sharp or "clean".

Cause/Remedy:

1. Display adjustment may be required. Adjust the brightness, contrast, focus, and detail settings.
2. Is a BNC T connector being used? Use a distribution amplifier to boost signal levels.
3. Is the input signal properly terminated?
4. The screen size may be too large. As screen size increases, magnification increases which reduces brightness. This then reduces the contrast ratio which affects legibility. Sharp defined edges become soft and fuzzy.
5. The source input signal may be of low quality.

Symptom:

Display quality seems to drift (from good to bad, bad to good, etc.).

Cause/Remedy:

1. The operating temperature of the projector may not be constant. Is the projector close to heating and/or air conditioning vents? The ambient temperature after warm-up should be kept constant below 35 °C (95 °F). Make sure none of the projector ventilation slots are obstructed.
2. The source input signal may be of low quality.
3. The horizontal or vertical frequency of the input may have changed at the source end. For the selected source, set ASR to on. The projector will then try to use display parameter settings which are best matched for the source.

Symptom:

Colors on the display are not accurate (when using the Marquee Multi-standard Decoder).

Cause/Remedy:

1. Color and tint settings may require adjustment.

Symptom:

The display is not rectangular in shape.

Cause/Remedy:

1. The geometry settings may not be set correctly. Adjust the display geometry settings. (Press [**GEOM**] for the Geometry menu).

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Symptom:

The display is "noisy".

Cause/Remedy:

1. The input may not be terminated. Make sure the input is terminated (75Ω). If it is the last connection in a loop-through chain, it should be terminated at the projector (only).
2. The signal cables carrying the input signal may be of poor quality. Use only good quality signal cables. VDC Display Systems cables are recommended.
3. The distance between the input source device and the projector may be too great. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
4. There may be interference from other equipment. Keep the projector away from devices which radiate electromagnetic energy such as motors and transformers. Common sources of these are slide projectors, speakers, power amplifiers, elevators, etc. Keep 35 mm slide projectors at least 2 feet away from the projector.
5. The input signal may be of poor quality.
6. If the source is a VCR or off-air broadcast, detail may be set too high

Symptom:

Modified display settings are not being saved in the active setup memory.

Cause/Remedy:

1. Is the active setup memory locked? Press [**SOURCE**] to display the Source Message. If a  is displayed, unlock the setup. (Press [**UTIL**] [**1**] [**3**])
2. ASR is set to On for the current input memory and an ASI was automatically performed due to mismatched scan frequencies.

Symptom:

The display is OK when displaying the crosshatch test pattern ([✶]) or status screen ([✶]) but when trying to display a source, nothing is visible.

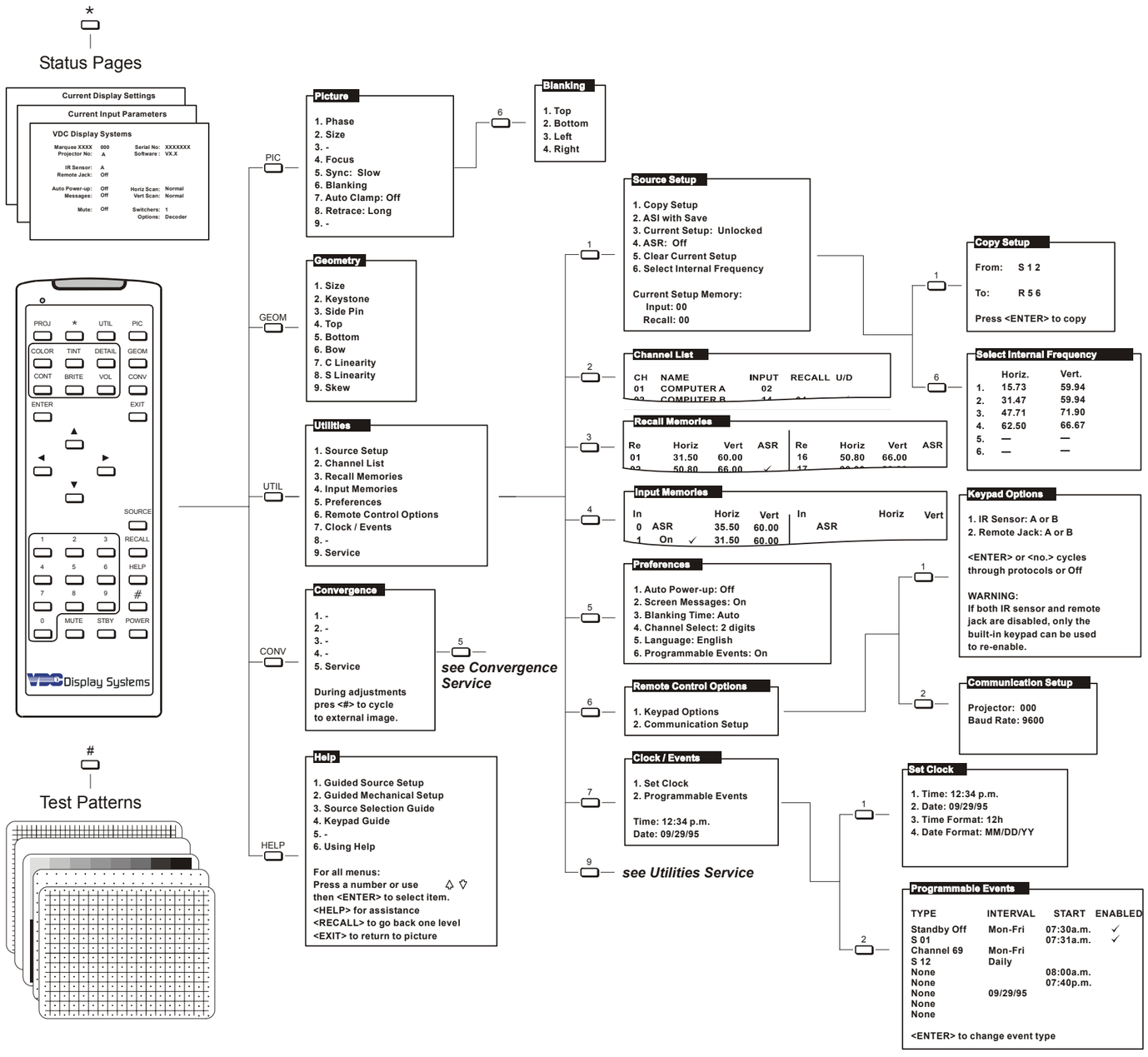
Cause/Remedy:

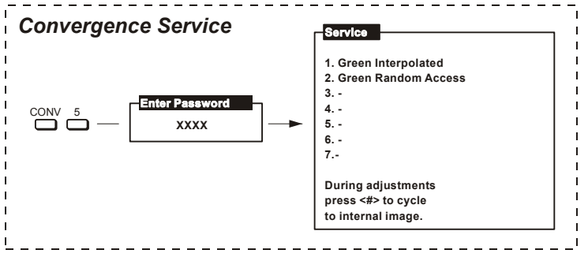
1. You may not be selecting the source correctly. Refer to Section 3.2, for source selection instructions.
2. The source may not be connected properly. Verify that the input source is active and check the cables between the source and the projector.

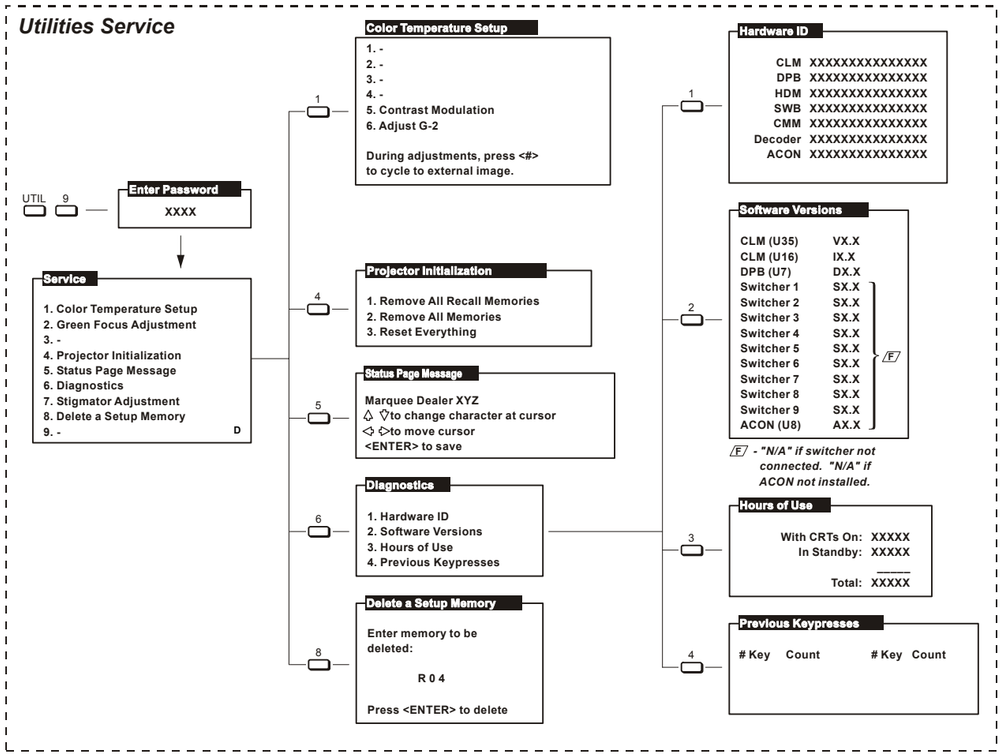
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MARQUEE 8521 Ultra Green (HUD) PROJECTOR MENU TREE
Software Version 1.0

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Appendix B Marquee Projectors RS-232 Control

B.1 Brief History of Marquee RS-232 Communications

Connecting an third party external controller to the RS-232 port on a Marquee projector enables automated control of individual or multiple projectors according to custom requirements. The original RS-232 commands enable the controller to be programmed to emulate a projector keypad. The protocol (message structure) used for issuing these commands remains valid and usable for any Marquee projector with software version 2.0 or higher. In addition, with software version 4.0 and higher, you can use a simpler RS-232 protocol to issue these original commands as well as several other new commands.

Note: This Section is intended for technicians familiar with controller applications and programming. For highly specialized applications beyond simple projector control, please contact VDC Display Systems for additional technical assistance.

B.2 System Requirements and Setup

The RS-232 commands in main software V4.0 can be used with any Marquee projector that has the Control Board #02-2x0336-0xP installed. The software is backwards compatible with existing Marquee projectors. As shown below, connect the controller only to the “IN” port of the Marquee projector, never directly to a switcher. Use a quality cable of up to 100 feet in length.

In a typical application, a controller output is connected to the RS-232 “IN” port, and any additional projectors are networked by connecting the RS-232 “OUT” from one projector to the RS-232 “IN” of the next as shown below. The controller can then broadcast to all projectors or each individual projector as desired.

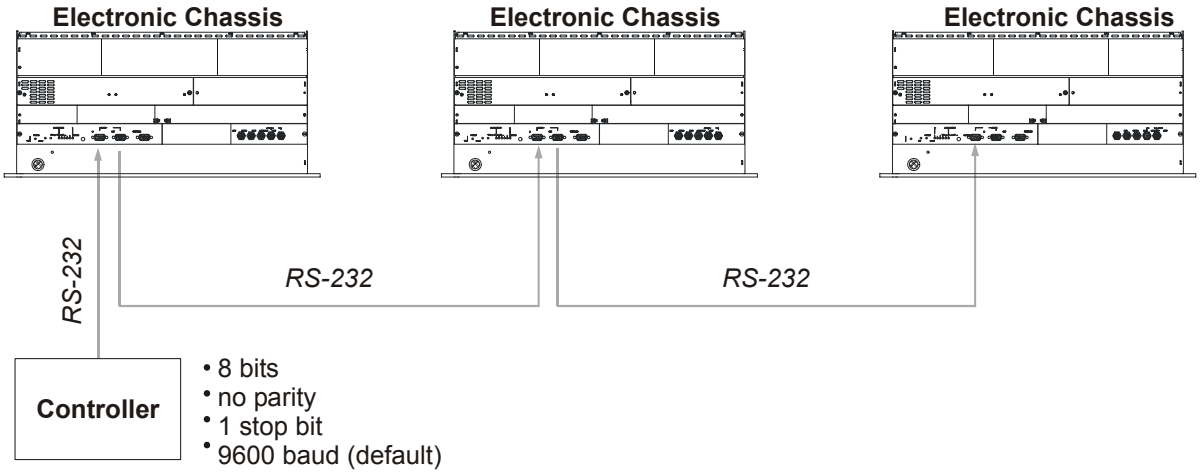


Figure B-1. Typical RS-232 Control Application

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B.3 RS-232 Communication Cables

B.3.1 RS-232, 9-Pin Male to 9-Pin Female

Step 1. For connection between the projector and a seitcher

Step 2. For connection between projectors

Step 3. For connection to a computer with a 9-pin “AT” type RS-232 port.

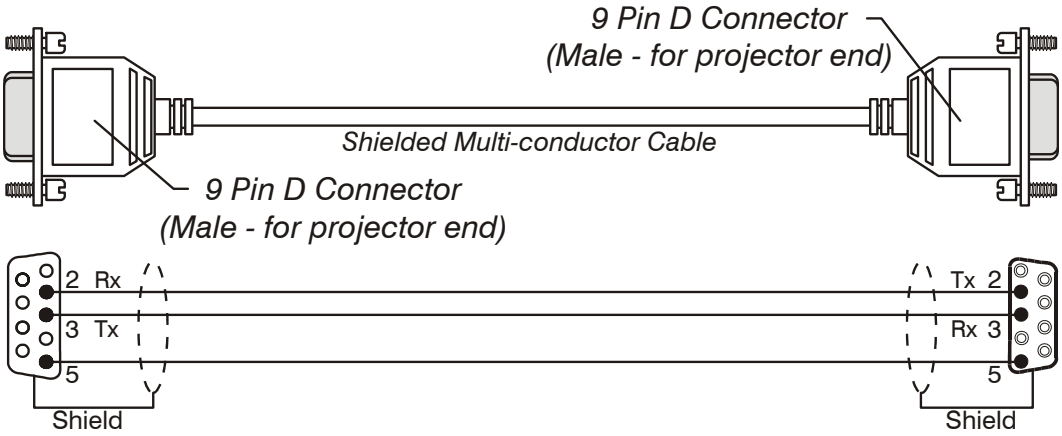


Figure B-2. Cable Wiring, RS-232, 9-Pin Male to 9-Pin Female

B.3.2 RS-232, 9-Pin Male to 25 Pin Female

Step 1. Use this cable if the computer's RS-232 serial port uses a 25 pin male D type connector.

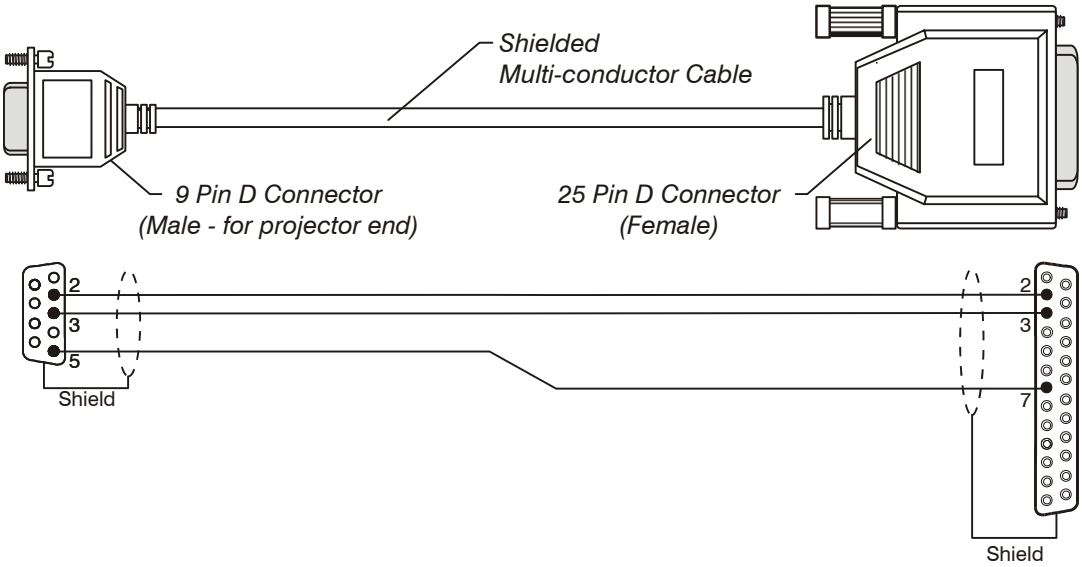


Figure B-1. Cable Wiring, RS-232, 9-Pin Male to 25-Pin Female

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B.4 Data Transmission Structure

A basic understanding of RS-232 data transmission structure enables you to begin programming automated controls for the Marquee projector. Once you have become familiar with this structure, refer to the two tables later in this document. These tables list the specific binary codes required for all available commands and provide examples of commands most commonly used in typical applications. Use these tables to quickly begin programming the controller without having to determine each complete data stream yourself.

Every Marquee serial communication consists of two parts: the transport layer and the message. In general, information in the transport layer determines how information is passed to and from the projector and the message contains the specific information being passed. Both parts are shown in Figure B-2 and are further described below.

Note: Throughout this document a number preceded by a "$" is a hexadecimal value.

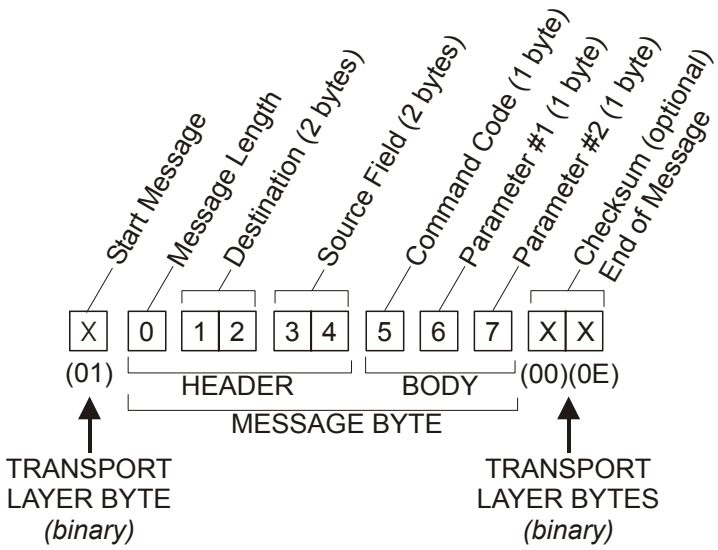


Figure B-2. A Complete RS-232 Data Transmission

B.5 Transport Layer

Every message must include a transport layer in order to be recognized as a complete RS-232 data transmission. As shown in Figure B-2, transport code appears at the beginning and end of every RS-232 communication. A transport layer has three main functions:

3. To mark the start and finish of each message.
4. To prevent data overflow.
5. To separate transport layer codes from message data.

Special control codes reserved only for the transport layer are shown in Table B-1.

Table B-1. Transport Layer Special Control Codes

Binary (Hex) Value	Mnemonic	Description	Function
$01	SOH	start of header	start of message
$0E	SO	shift out	end of message
$13	XOFF	transmit off	stop transmission
$11	XON	transmit on	resume transmission
$1B	ESC	escape	next byte has been shifted

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B.5.1 $01 AND $0E (MESSAGE START AND END)

Use the **$01** control code to preface each and every transmission. This byte indicates to a network receiver that the next byte is the first byte of a new message. Any message which (for some reason) is partially received prior to the **$01** will be discarded.

The **$0E** control code signifies the end of each and every transmitted message. It signals to the receiving network software that the message has been completely transmitted.

B.5.2 $13 AND $11 (STOP AND RESUME)

Normally messages can be sent to the projector before processing of earlier messages has been completed — the projector will just store messages in a buffer until ready to process. However, if a series of messages is sent it is possible that the projector will not be able to process them as fast as they are being transmitted and the buffer will become full. If this happens, the projector will immediately send the **$13** (XOFF) code to halt further transmission. This instructs the controller (and any devices preparing to transmit) to cease transmission within three characters transmission time. At 9600 baud (the default baud rate), this gives the controller about three milliseconds to respond. The projector is able to accommodate the receipt of at least three more bytes after it sends **$13** (XOFF) — additional bytes may be lost. When the buffer is once again available, the projector will send a **$11** (XON) command to resume transmission.

Note: XON and XOFF controls apply to both directions of communication.

B.5.3 $1B (ESCAPE)

Occasionally a byte within a message may have the same value as one of the special control codes reserved for the transport layer. If this occurs, **$1B** must be used to "escape" the byte so that it is not mistaken for a transport layer control code. “Escape” a byte by inserting an ESC character (**$1B**) into the data stream just ahead of the message byte in question and then adding 128 (**$80**) to the value of the message byte. This effectively sets the MSB (most significant bit) high, moving the value of the byte out of the range of values reserved for transport control codes.

On the receiving end, the transport layer software recognizes the escape sequence and strips the **$1B** (ESC) from the stream. The next data byte will have its MSB reset which restores it back to its original value.

B.6 Message Format

The other portion of an RS-232 communication is the message itself (see Figure B-2 again). A message portion is a sequence of up to 64 bytes — always a five-byte header followed by a variable length body. The header supplies the information needed for routing the messages within the projector network, and the body contains the specific projector control data. These two message components are further described below.

B.6.1 HEADER (NETWORK/PROJECTOR ADDRESSING)

The message header consists of three main parts:

1. **Message Length:** This byte contains a value which declares the length of the message as a specific number of bytes. Note that message length does *not* include bytes from the transport layer.
2. **Destination** and **Return Address (Source) Fields:** These fields contain two sixteen-bit addresses — one for the message destination and one for the source. A breakdown of each address field is shown in Figure B-3. Note that Near and Far Port Address bits are now ignored — while it is strongly recommended that these bits be set to “0” to ensure compatibility with future releases of software, it is not yet mandatory to do so. Bit #14, however, *must* be set to 0.

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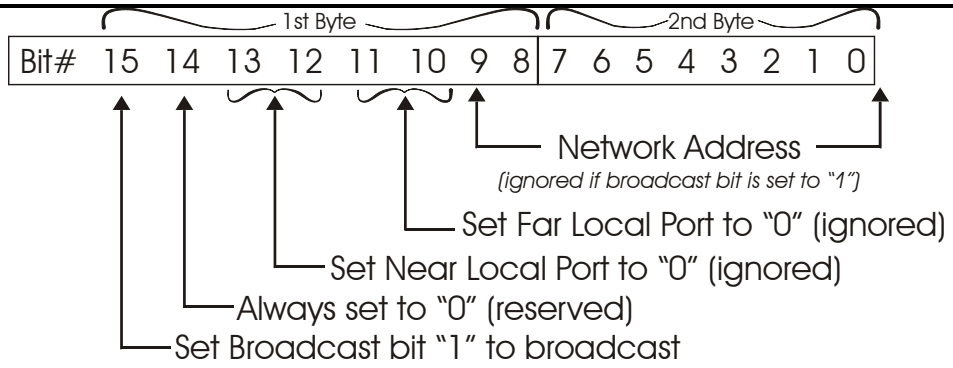


Figure B-3. Format of Address Field

Set the Broadcast flag to "0" if a specific projector is to respond, set to "1" if all projectors are to respond. Always set Bit 14 to "0" and, if at all possible, set Bits 10, 11, 12 and 13 to "0" as well. Bits 0 through 9 contain the Network Address. Possible Network Addresses are shown in Table B-2 (decimal values shown). For the Destination Address field, you should use a projector number. For the Source field, use the network controller address (note that the value for a projector number may require an ESC — see Transport Layer codes, above).

Table B-2. Network Address Assignments

Start	Finish	Device Type
0	999	projector
1000	1009	switcher
1010	1019	ACON
1020	1022	not assigned
1023	1023	network controller

B.6.2 BODY

The body of a message can consist of one or more bytes, depending on the number of details required to complete the specific command at hand.

The first byte of the message body represents the type of message being issued. There are three types of messages: a ***Set*** message, a ***Request*** message, or a ***Reply*** message. For example, the first byte may be "***Set*** Power" (turn the projector on or off) or "***Request*** Channel" (find out what the channel is) or "***Reply*** with Signal Status" (relay the current channel number). The binary message codes for each possible command are listed in Table B-3.

The next byte(s) is the actual hex value for the parameter in question. For example, to set the volume to "0" this second byte must be "00". To set it to 64, this byte must be "$40". Each parameter (there may be more than one, depending on the command) requires at least one byte in the message. Refer to Table B-3 for a list of message codes and parameter codes. Examples of entire specific commands using these codes appear in Table B-4.

Note: Most "Request" messages have no parameter data.

Note: Do not broadcast a Request to more than one projector.

Note: "Set" and "Reply" messages usually have the same data in the same format.

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B.6.3 Optional Checksum

It is no longer necessary to calculate and include an eight-bit additive sum as the next-to-last byte in every data transmission. Note that you must still include the checksum *field* in each message stream, but if the value assigned is “$00” the checksum will be ignored. If you still wish to use an accurate checksum for maximum message security, calculate the checksum value as follows:

1. Take the message before the transport layer bytes have been added.
2. Add the bytes together.
3. Divide the sum by 256 and take the remainder. The remainder value is the checksum.

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

Note: NOTE: Transport layer bytes including ESC (and the resultant top bit set) are NOT included in the checksum. See Transport Layer.

B.6.4 Command Codes

Table B-3 4 lists all 1-byte hex command codes now available on the Marquee. The first column identifies each projector control, with the applicable set/request/reply command codes listed in the next two columns — one of these codes appears as the first byte after the header in any message. The fourth column lists any parameters that may apply to the function at hand, with P1 representing the first parameter of the data sent (such as switcher number), P2 representing the second parameter of the data sent (such as slot number) and P3 representing the third parameter (such as vertical frequency). These bytes follow the command code byte. The last column briefly describes what each “set” command does.

Note: Each parameter allows a limited range of values — these values are shown in Table B-3 in **decimal format**.

Note: The projector will convert any out-of-range value to the nearest maximum value allowed. For example, “set color to 100” will set the color to its maximum value of 63.

Note: Values are treated as unsigned. So -1 in a byte is treated as 255.

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Table B-3. Command Codes and Descriptions

Note: Parameter values are shown in decimal format

Function	Command Code		Parameter(s) "Set" and "Reply" msg.	Description ("set" function)
	Set	Request or Reply		
Power ON/OFF	$08	$88	P1: 0 = Off 1 = On 2 = Between	Turn projector off or on. NOTE: If "2", the projector is currently in the process of powering up. In this state, any RS-232 commands (other than "Power Off") will be ignored and discarded.
Standby ON/OFF	$3D	$BD	P1: 0 = Off 1 = On	"On" blanks the picture and mutes the audio (and is same as sending separate commands to blank picture and mute audio). The projector remains operational while in standby. "Off" turns picture and audio back on. See page 15.
Picture Mute ON/OFF	$0E	$8E	P1: 0 = Off 1 = On	"On" blanks the picture only — the rest of the projector remains operational. You can go into this mode, then switch sources or change a setting, and then leave ("Off) to regain the picture. See page 15.
Audio Mute ON/OFF	$0D	$8D	P1: 0 = Off 1 = On	Turn the audio off or on. The rest of the projector remains operational.
Volume Level	$34	$B4	P1: 0-127	Set the volume level of the current slot.
Contrast Level	$56	$D6	P1: 0-127	Set the contrast level of the current slot.
Brightness Level	$55	$D5	P1: 0-255	Set the brightness level of the current slot.
Color Level	$57	$D7	P1: 0-63	Set the color level of the current slot.
Tint Level	$58	$D8	P1: 0-63	Set the tint level of the current slot.
Detail Level	$59	$D9	P1: 0-63	Set the detail level of the current slot.
Channel ##	$0B	$8B	P1: 1-99	Select channel ##. 0 = no channel
Input (Switcher, Slot)	$09	$89	P1 (switcher#): 0-9 P2 (slot#): 1-9	Select input. If P1 = 0 (projector) then: Slot 1 = standard RGB, VIM Slot 2 = optional interface card, into VIM Slot 3 = Composite (on decoder) Slot 4 = Composite (on decoder) Slot 5 = S-Video (on decoder) Slot 6 = S-Video (on decoder)
Recall Memory	$0C	$8C	P1: 0-99	Select recall memory. 0 = none
Internal Frequency	$35	$B5	P1: 0-6	Select internal frequency. 0 = current external signal. 1-6 = one of the internal frequencies from the Marquee "Select Internal Frequency" menu.
Key Code	$63	n/a	P1 = Code	Emulate the function of a key on the keypad. Any additional parameters sent are ignored. See Technical Bulletin TB96-05 (June 1996).

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Function	Command Code		Parameter(s) "Set" and "Reply" msg.	Description ("set" function)
	Set	Request or Reply		
Projector Address	$02	$82	P1: 0-999	Set projector to a new address. NOTE: The next message sent must either contain the new address or it must be a broadcast message.
Signal Status	n/a	$91	P1: 3 options: 0 = frequency P2: Horizontal P3: Vertical 1 = state P2 = 0: Good P2 = 1: Changing P2 = 2: Error 2 = sync P2 = see right ➡	Request frequency, state, or sync of current input signal. Reply with frequency of current input signal. Reply with state of current input signal. Good = locked signal Changing = signal is currently changing, as in a source switch Error = signal is unstable or missing **NOTE:** sync errors cannot be detected if a signal has one of the following **vertical** frequencies (all ± 2.00 Hz) as well as one of the following **horizontal** frequencies (± .120 kHz): **vertical:** **horizontal:** 50.0 Hz 15.62*2 kHz 59.95 Hz 15.73*2 kHz 100 Hz 119.9 Hz Reply with sync type of current input signal. P2: 0 = no sync 1 = sync-on-green 2 = composite sync 3 = separate H sync 6 = sync from decoder 7 = sync on internal
Ping	n/a	$81	P1 = 2 (Marquee 68k) P2 = 0-99 P3 = 0-99 P4 = a-z P5 = 0-999 P6 = 0	Request/read general projector information (type and software version) Software version, major Software version, minor Software version, maintenance Software version, beta number Software version, type (always 0 for now). See page 18 for additional information.

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Function	Command Code		Parameter(s) "Set" and "Reply" msg."	Description ("set" function)
	Set	Request or Reply		
Diagnostic: Internal Test Pattern	$7F	$FF	P1: 7 (test ptn.) P2: Various: 0 = external video 7 = black 19 = dots in xhatch 20 = dots only 21 = gray scale 17 = white field 22 = dbl. xhatch 23 = xhatch	Run a diagnostic, such as "Test Pattern". P1 = $07 (runs the "Test Pattern" diagnostic). In Replies to "set" command: 7 0 = OK 7 1 = pattern not available

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B.7 Creating Simple Messages

Figure B-4 below illustrates a complete RS-232 data transmission using the hex command codes from Table B-4. In this example, the projector is “0” and the message is coming from the controller (always 1023). Note that in this example contrast ***level*** is the only parameter involved.

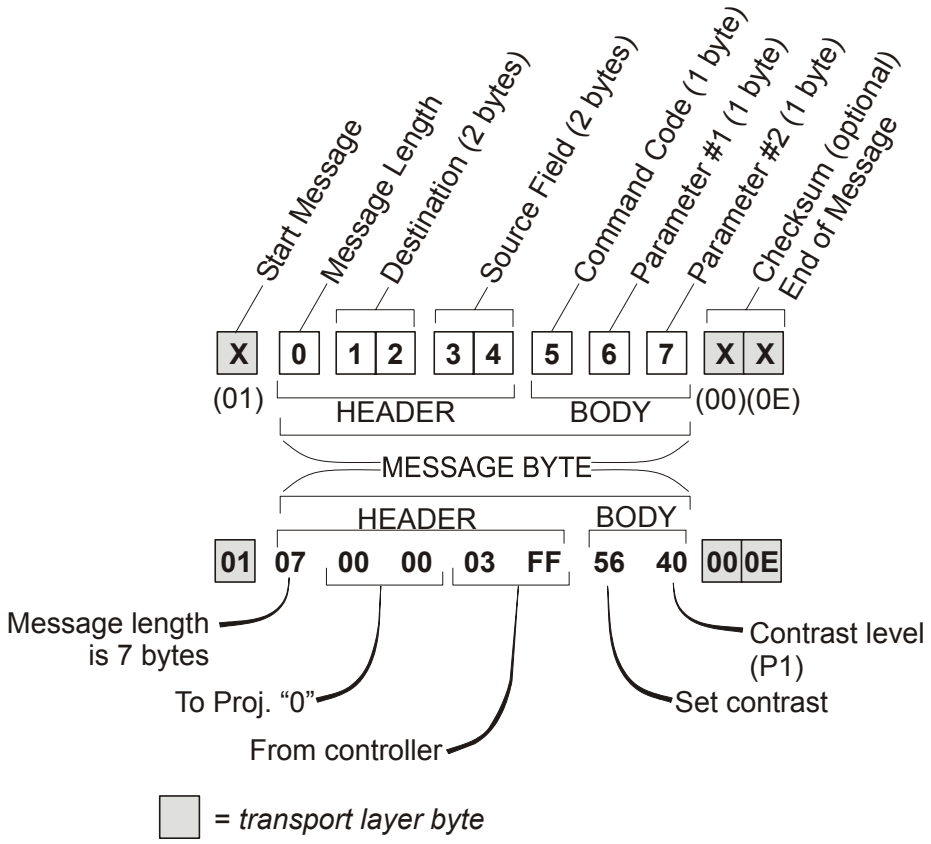


Figure B-4. The “set contrast to 64” command

The above data transmission is one of the sample messages in Table B-4. A comparison with code in the other three “contrast” commands reveals how identically structured transmissions differ in content and function. For example, note that the request message has no data (P1), thus it is only 6 bytes in length. In the resulting reply message from the projector, the controller (03 FF) is now the destination and the projector (00 00) is the source, thus the codes for these two fields are likewise reversed. The “D6” byte signifying request or reply is drawn from the list of codes in Table B-3.

Note that several of the sample messages in Table 5 include escape ($1B) codes to prevent message bytes from being interpreted as transport layer bytes. For example, in the first four controls shown (power, standby, picture mute and audio mute), the normal “on” code of $01 must be escaped with the insertion of $1B and the addition of $80 to $01. Thus “$01” is replaced with “$1B $81”.

Commands that are more complex (standby, picture mute, projector address, signal status, ping, and the test pattern diagnostic) are described in detail on the pages following Table 5.

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B.7.1 Sample Data Transmissions

Table B-4 shows complete examples of common binary commands for projector control. All are for projector “0”.

Table B-4. RS-232 Commands in v.4.0

Set Power Off	01 07 00 00 03 FF 08 00 00 0E	
Set Power On	01 07 00 00 03 FF 08 1B 81 00 0E	
Request Power Status	01 06 00 00 03 FF 88 00 0E	
Reply with Power Status	01 07 03 FF 00 00 88 1B 81 00 0E	(On)
Set Standby Off	01 07 00 00 03 FF 3D 00 00 0E	
Set Standby On	01 07 00 00 03 FF 3D 1B 81 00 0E	
Request Standby Status	01 06 00 00 03 FF BD 00 0E	
Reply with Standby Status	01 07 03 FF 00 00 BD 1B 81 00 0E	(On)
Set Pic Mute Off	01 07 00 00 03 FF 1B 8E 00 00 0E	
Set Pic Mute On	01 07 00 00 03 FF 1B 8E 1B 81 00 0E	
Request Pic Mute Status	01 06 00 00 03 FF 8E 00 0E	
Reply with Pic Mute Status	01 07 03 FF 00 00 8E 1B 81 00 0E	(On)
Set Audio Mute Off	01 07 00 00 03 FF 0D 00 00 0E	
Set Audio Mute On	01 07 00 00 03 FF 0D 1B 81 00 0E	
Request Audio Mute Status	01 06 00 00 03 FF 8D 00 0E	
Reply with Audio Mute Status	01 07 03 FF 00 00 8D 1B 81 00 0E	(On)
Set Contrast to 0	01 07 00 00 03 FF 56 00 00 0E	
Set Contrast to 64	01 07 00 00 03 FF 56 40 00 0E	
Request Contrast Value	01 06 00 00 03 FF D6 00 0E	
Reply with Contrast Value	01 07 03 FF 00 00 D6 40 00 0E	(64, 50%)
Set Volume to 0	01 07 00 00 03 FF 34 00 00 0E	
Set Volume to 64	01 07 00 00 03 FF 34 40 00 0E	
Request Volume Value	01 06 00 00 03 FF B4 00 0E	
Reply Volume Value	01 07 03 FF 00 00 B4 40 00 0E	

Set Brightness to 0	01 07 00 00 03 FF 55 00 00 0E	
Set Brightness to 128	01 07 00 00 03 FF 55 80 00 0E	
Request Brightness Value	01 06 00 00 03 FF D5 00 0E	
Reply with Brightness Value	01 07 03 FF 00 00 D5 80 00 0E	(128, 50%)
Set Color to 0	01 07 00 00 03 FF 57 00 00 0E	
Set Color to 32	01 07 00 00 03 FF 57 20 00 0E	
Request Color Value	01 06 00 00 03 FF D7 00 0E	
Reply with Color Value	01 07 03 FF 00 00 D7 20 00 0E	(32, 50%)
Set Tint to 0	01 07 00 00 03 FF 58 00 00 0E	
Set Tint to 32	01 07 00 00 03 FF 58 20 00 0E	
Request Tint Value	01 06 00 00 03 FF D8 00 0E	
Reply with Tint Value	01 07 03 FF 00 00 D8 20 00 0E	(32, 50%)
Set Detail to 0	01 07 00 00 03 FF 59 00 00 0E	
Set Detail to 32	01 07 00 00 03 FF 59 20 00 0E	
Request Detail Value	01 06 00 00 03 FF D9 00 0E	
Reply with Detail Value	01 07 03 FF 00 00 D9 20 00 0E	(32, 50%)
Select Channel 1	01 07 00 00 03 FF 0B 1B 81 00 0E	
Select Channel 3	01 07 00 00 03 FF 0B 03 00 0E	
Request Current Channel	01 06 00 00 03 FF 8B 00 0E	
Reply with Channel	01 07 03 FF 00 00 8B 03 00 0E	(channel 3)
Select Input (0,1)	01 08 00 00 03 FF 09 00 1B 81 00 0E	
Select Input (1,5)	01 08 00 00 03 FF 09 1B 81 05 00 0E	
Request Current Input	01 06 00 00 03 FF 89 00 0E	
Reply with Input	01 08 03 FF 00 00 89 1B 81 05 00 0E (switcher 1, slot 5)	

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Select Recall (00)	01 07 00 00 03 FF 0C 00 00 0E
Select Recall (15)	01 07 00 00 03 FF 0C 0F 00 0E
Request Current Recall	01 06 00 00 03 FF 8C 00 0E
Reply with Recall	01 07 03 FF 00 00 8C 0F 00 0E (recall 15)
Reply with Recall	01 07 03 FF 00 00 8C 00 00 0E (recall 0, i.e. using input memory)
Request Signal Status, Freq	01 07 00 00 03 FF 91 00 00 0E
Reply w/ Sig.Status,Freq	01 0B 03 FF 00 00 91 00 0C 4E 17 70 00 0E (31.5Khz,60.0Hz)
Request Sig. Status, State	01 07 00 00 03 FF 91 1B 81 00 0E
Reply w/ Sig. Status, State	01 08 03 FF 00 00 91 1B 81 00 00 0E (Good,SignalLocked)
Reply with Signal Status, State	01 08 03 FF 00 00 91 1B 81 1B 81 00 0E (Changing src)
Reply with Signal Status, State	01 08 03 FF 00 00 91 1B 81 02 00 0E (Error,sync err)
Request Signal Status, Sync On?	01 07 00 00 03 FF 91 02 00 0E
Reply with Signal Status, Sync	01 08 03 FF 00 00 91 02 00 00 0E (No sync)
Reply with Signal Status, Sync	01 08 03 FF 00 00 91 02 1B 81 00 0E (Sync On Green)
Reply with Signal Status, Sync	01 08 03 FF 00 00 91 02 02 00 0E (Composite Sync)
Reply with Signal Status, Sync	01 08 03 FF 00 00 91 02 03 00 0E (Sep.HSync on H.)
Reply with Signal Status, Sync	01 08 03 FF 00 00 91 02 06 00 0E (SyncfromDecoder)
Request Ping	01 06 00 00 03 FF 81 00 0E
Reply w/ Data	01 0D 03 FF 00 00 81 02 03 04 61 00 48 00 00 0E See page 18 for additional information
Select Internal Test Pattern	01 08 00 00 03 FF 7F 07 17 00 0E (crosshatch)
Select Internal Test Pattern (ext.)	01 08 00 00 03 FF 7F 07 00 00 0E
Request Current Test Pattern	01 07 00 00 03 FF FF 07 00 0E
Reply with Current Test Pattern	01 08 03 FF 00 00 FF 07 1B 93 00 0E (dots in crosshatch)
Reply with Current Test Pattern	01 08 03 FF 00 00 FF 07 00 00 0E (ext.)
Select Internal Frequency (1)	01 07 00 00 03 FF 35 1B 81 00 0E
Select External Freq (signal)	01 07 00 00 03 FF 35 00 00 0E
Request Current Internal Freq	01 06 00 00 03 FF B5 00 0E
Reply with Internal Freq	01 07 03 FF 00 00 B5 1B 81 00 0E (Int Freq 1, menu)
Set Proj Address to 0	01 08 00 00 03 FF 02 00 00 00 0E
Set Proj Address to 14	01 08 00 00 03 FF 02 00 1B 8E 00 0E
Request Proj Address (broadcast)	01 06 80 00 03 FF 82 00 0E
Reply with Proj Address	01 08 03 FF 80 00 82 00 1B 8E 00 0E (proj address 14)
If broadcasting: Same as above examples, except use “80 00” for destination	
Example:	
Set Tint to 0	01 07 80 00 03 FF 58 00 00 0E
Set Tint to 32	01 07 80 00 03 FF 58 20 00 0E
Request Tint Value (max. 1 proj.)*	01 06 80 00 03 FF D8 00 0E
Reply w/ Tint Value (max. 1 proj.)*	01 07 03 FF 80 00 D8 20 00 0E (32, 50%)

* Do not broadcast a request to more than one projector, as it may generate multiple attempts at replies that could collide on the network.

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This section includes additional notes about some of the more complex RS-232 messages.

B.7.2 "Standby" Command

During standby entered via normal keypad-projector operation, the picture is blanked, the audio is muted and you can perform no operation from the keypad except to "get out of standby". This type of standby occurs when you use the Standby key on either the keypad or Marquee switcher (available only from Presentation level), when you use the Picture Mute key on the Extron switcher, or when you send RS-232 standby keycodes from a controller.

The RS-232 "set standby" command triggers a significantly different type of standby. This standby command blanks the picture and mutes the audio as usual, but you can still execute most other projector commands as well — you are not locked out. In addition, note that it is not necessary to be in presentation mode in order to enter standby via the RS-232 command.

WHILE IN STANDBY…

- the picture and audio are both off.
- you can issue other projector commands as desired.
- a request of Contrast, Brightness or Audio Mute reports the value that will be
- restored after coming out of standby.
- any Picture Mute command is ignored.
- switcher slot buttons do not function.
- commands causing an unblanked picture take effect only after leaving standby
- mode (exit via a keypress or RS-232 methods).
- the amber LED status light is lit on the projector and connected switcher.

LEAVING STANDBY…

Exit standby via a keypress or RS-232 method. The amber LED status light will go out.

B.7.3 "Picture Mute" Command

The RS-232 "set pic mute" command blanks only the picture — the audio is not affected. Otherwise, this command is similar to the RS-232 "set standby" command. You can use most other projector commands while in "pic mute" mode. Note that it is not necessary to be in presentation mode in order to enter Picture Mute via the RS-232 command. Note also that a Picture Mute command is ignored if you are already in any form of standby.

WHILE IN PICTURE MUTE…

- the picture is off but the audio is on
- you can issue other projector commands as desired.
- commands causing an unblanked picture take effect only after leaving picture
- mute mode (exit via a keypress or RS-232 methods).
- a request of Contrast or Brightness reports the value that will be restored after
- coming out of Picture Mute.
- the amber LED status light is lit on the projector and connected switcher.

LEAVING PICTURE MUTE …

Exit Picture Mute via a keypress or RS-232 method.

Note: You have no way of knowing that a projector has only the picture muted rather than being in standby except if you hear audio from the current source. If you mistake Picture Mute for Standby and try to leave by pressing the standby key, you will enter standby rather than leave it. Press the standby key once again to leave standby and restore the picture.

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B.7.4 "Projector Address" Command

Make sure that if you change a projector's address, either change the address in all future messages as well or issue a command that is broadcast (set broadcast bit to "1").

B.7.5 "Signal Status" Command

The signal status command enables you to request and obtain specific information about the current signal, namely its ***frequency***, ***state*** or type of ***sync***. Note that one (only) of these descriptors must be included as P1 in every signal status request message. Resulting signal status replies will then include one or two additional parameters as necessary to fully describe the status of P1. Frequency, state and sync signal status messages are further described below.

Note: There is no "set" command for signal status information — you can issue requests and receive replies only.

P1 = FREQUENCY ($00)

If you want to determine the horizontal and vertical frequencies of the current signal, you can send a "request signal status/**frequency**" to the projector. Note that this message must include both the signal status code ($91) as well as the P1 frequency code ($00) as shown in the example from Table B-4.

01 07 00 00 03 FF **91 00** 00 0E

FREQUENCY REPLIES:

A reply to the "request signal status/**frequency**" message supplies the horizontal and vertical frequencies of the current signal. In the example from Table B-4, P2 is the horizontal frequency and P3 is the vertical frequency as shown in the following illustration. Convert to decimal format and assume two decimal places.

P1 = STATE ($01)

If you want to determine the state of the current signal, you can send a "request signal status/**state**" to the projector. Note that this message must include both the signal status code ($91) as well as the P1 state code ($01) as shown in the example from Table B-4. Note also the "escaped" $01 byte.

01 07 00 00 03 FF **91 00 81** 00 0E

STATE REPLIES:

A reply to the "request signal status/**state**" message includes another parameter (P2) whose value describes the state of the current signal as a good locked signal ($00), a changing signal ($01), or an error characterized by an unstable or missing signal ($02). See Table B-4 for an example of each.

Note: Errors are not detected or reported for NTSC and PAL frequencies or certain computer-generated sources having these frequencies. See Table B-4.

P1 = SYNC ON? ($02)

If you want to determine the sync of the current signal, you can send a "request signal status/**sync**" to the projector. Note that this message must include both the signal status code ($91) as well as the P1 sync code ($02) as shown in the example from Table B-4.

01 07 00 00 03 FF **91 02** 00 0E

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SYNC REPLIES:

A reply to the “request signal status/sync” message includes a second parameter (P2) to describe the sync. Possible values are defined in Table B-5.

Table B-5. Sync Replies

0	None, no sync present
1	Sync-on-green
2	Composite sync
3	Separate H sync on H
6	Sync from decoder
7	Sync on internal

B.7.6 “Ping” Command

Use ping to request and obtain basic projector information, such as projector type and current software version. Like most RS-232 requests, a ping request contains no data (parameters):

01 06 00 00 03 FF **81** 00 0E

Note: There is no “set” command for ping — you can issue requests and receive replies only.

PING REPLIES

The Ping reply contains data for the six parameters necessary to fully answer the ping request, as shown in the example from Table B-4:

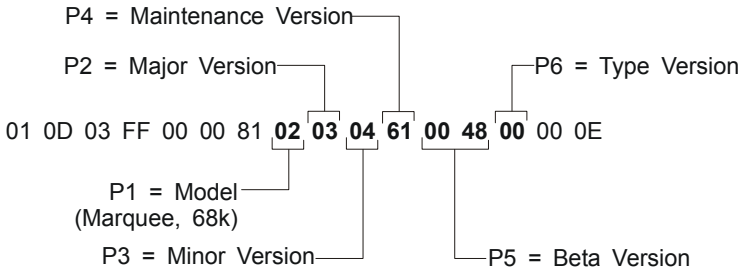


Figure B-5. Ping Reply Contents

This reply represents V3.4.a.072 Beta of the main (68K) software.

B.7.7 “Test Pattern” Diagnostic Command

The “Diagnostic:Test Pattern” command enables you to select, request or obtain the number of a specific test pattern. Note that such commands must include both the “diagnostic” command code as well as the “test pattern” parameter (P1). This parameter represents the diagnostic to be run and ensures that the proper diagnostic is run (in this case “test pattern”). Shown below is the “request” example from Table B-4.

01 07 00 00 03 FF **FF 07** 00 0E

DIAGNOSTIC/TEST PATTERN REPLIES

Resulting replies will then include an additional parameter (P2) representing the number (name) of the test pattern. The example below shows that a “dots in crosshatch” pattern is present.

01 08 03 FF 00 00 **FF 07 1B 93** 00 0E

EXITING FROM A TEST PATTERN

Exit a test pattern by pressing the Exit key or by selecting test pattern “0”.

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B.7.8 Color Modulation (CNM) Command

Use this message to set or get the current contrast modulation values. There are 3 colors in each of 8 on-screen zones.

Table B-6. Color Modulation (CNM) Command

Message = Adjust Zonal Contrast			
Parameter	**Name**	**Description**	
P1	Which adjustment	P1 is made of three characters. The first specifies zone or command, and the second red, green or blue.	
(2 bytes)	byte 1: 0 = Left, 1 = Right, 2 = Top, 3 = Bottom, 4 = Top Left, 5 = Top Right, 6 = Bottom Left, 7 = Bottom Right, 8 = Save to Eeprom 9 = Restore from EEprom byte 2: 0 = red, 1 = green, 2 = blue	Example: 0,2 specifies an adjustment of blue left zone.	
P2 (1 byte)	value	0 - 255	(8 bits)
Message = Read Zonal Contrast			
P1	Which adjustment	Specifies which color and zone of zonal contrast adjustment to return.	
Reply to Read Zonal Contrast Message			
P1 (2 bytes)	Which adjustment	Specifies which color and zone of zonal contrast adjustment to return.	
P2 (1 byte)	value	The value of the specified adjustment	

Example – Contrast modulation message

01 09 00 00 03 ff 2e 1b 81 00 41 00 0e = set right red zone to 65.

Saving and Discarding Contrast Modulation Values

Writing to hardware will change values & save values in shadow EEPROM memory structure but will not save permanently to EEPROM for next power up. You must use the ***Save*** command to do this. When you use byte 1 of P1 for the save or restore operation, the rest of the message is unused.

Color Temperature (SCT) Command

Use this message to set or get the current color temperature, selecting from a list of color temperatures. Note that white balance must be selected in order to provide a color temperature between 3200°K and 9300°K.

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B.7.9 Color Temperature Modify Command (CTM)

Use this message to set (alter) or get the red, green and blue levels present for a defined color temperature. This command does ***not*** select a color temperature.

Table B-7. Color Temperature Command (CTM)

- Value Range: 0 = 3200K, 2 = 6500K, 3 = 9300K, 5 = source custom, 6 = white balance

Message = Adjust Color Temperature		
Parameter	**Name**	**Description**
P1 (3 bytes)	Which adjustment byte 1: 0 = G2, 1 = drive, 2 = white balance 8 = Save to Eeprom 9 = Restore from EEprom byte 2: 0 = red, 1 = green, 2 = blue byte 3: 0 = 3200K, 1 = 5400K(Future), 2 = 6500K, 3 = 9300K, 5 = source custom	P1 is made of three characters. The first specifies G2, drive or white balance, the second red, green or blue, and the third what to set. Example: 0,2,3 specifies an adjustment of blue G2 for the 9300K temperature setting. 2 specifies an adjustment to the white balance setting Bytes 2 & 3 are not relevant (but must be used anyway) when adjusting white balance
P2 (2 bytes)	value	0-4095, G2 (12 bits) (MSB,LSB) (most significant digit, least significant digit) 0 - 255, drive (8 bits) (0,LSB) 0 - 255, white balance (8 bits) (0,LSB)
Message = Read Color Temperature		
P1	Which adjustment	Specifies which color temperature adjustment to return.
Reply to Read Color Temperature Message		
P1	Which adjustment	Specifies which color temperature adjustment to return.
P2	value	The value of the specified adjustment

Example - Color Temperature Modify:

010b 00 00 03 ff 52 00 00 02 08 00 00 0e = set 6500K red G2 to 2048.

Saving and Discarding Modified Color Temperature Values

Writing to hardware will change values & save values in shadow EEPROM memory structure but will not save permanently to EEPROM for next power up. You must use the ***Save*** command to do this — this save applies only to the currently selected temperature, ***not*** all temperatures When byte 1 of P1 is used for the save or restore operation, the rest of the message is unused.

If the requested data is unrecognized, no message is returned. If the requested adjustment is invalid (out of range), no adjustment is made.

If you query a parameter for a color temperature other than what is currently selected, a switch to the queried temperature ***may*** occur.

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Appendix C Glossary

This appendix defines many of the terms used in this manual as they apply to the Marquee projection system.

ACON (Automatic Convergence)

ACON is an optional automatic convergence feature available for Marquee series projectors. With ACON installed, convergence of the red, green and blue images is performed accurately and automatically with minimal user intervention.

ASI (Automatic Source Interpolation)

A process whereby a display setup for a given source is approximated from other setups already in memory. For more information about ASI, refer to the ASR entry in section 3.7, Utility Features.

ASR (Automatic Source Recall)

A process whereby a display setup for a given source is chosen from memory according to its signal parameters (horizontal and vertical frequencies). For more information about ASR, refer to the ASR entry in section 3.7, Utility Features.

Active Line Time

The time, inside one horizontal scan line, during which video is generated.

Ambient Light Rejection

The ability of a screen to reflect ambient light in a direction away from the "line of best viewing". Curved screens usually have good ambient light rejection. Flat screens usually have less ambient light rejection.

Analog Video

The video output of most computers and video tape machines. Analog video can generate a large number of colors.

Aspect Ratio

The ratio of the width of an image to its height.

Automatic Convergence

The automatic alignment of the projected red, green and blue images on the projection screen.

Autolock

The ability of the projector to automatically synchronize to the horizontal and vertical scan frequencies of an input signal.

Bandwidth

The frequency range of the projector's video amplifier.

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.

Bow

A horizontal curve in the center of the image, and/or a vertical curve across an image.

Brightness

Brightness in projection usually describes the amount of light emitted from a surface such as a screen. Brightness is measured in lumens, foot-lamberts, foot-candles, or lux.

Candela or Candle

The intensity of light is measured in candelas.

Channel

A 2-digit number with user-assigned source input information. This information includes a physical input (switcher, slot), a setup memory (input or recall), and a name or description. Assignments are made through the Channel List.

Channel List

A list of up to 99 channels (explained above) which may be created, edited, or deleted by the user. The Channel List feature provides an alternative, and sometimes easier, way to select sources and their setups.

Color Shift

The change in the tint of a white field across an image.

Color Temperature

This term refers to the coloration (reddish, white, bluish, etc.) of a white image. (It does not refer to the brightness of a white image.) The Kelvin (K) temperature scale is used to measure color temperature.

Color Temperature Uniformity

The accuracy of color temperature at any location.

Composite Video

This term refers to the output of video tape players and some computers. Synchronization, luminance, and color signals are combined on one output cable.

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Contrast (ratio)

The ratio of brightness of the brightest possible area to the darkest possible area of an image.

Convergence

The alignment of the projected red, green and blue images on the projection screen.

Current Setup Memory

The setup memory which is currently being used to display a given source's image.

Curved Screen

A projection screen which is curved to improve screen gain. Curved screens usually have screen gains which are greater than 1 but viewing angles much less than 180°.

Decoder

A device that converts NTSC, PAL, PAL M, PAL N, PAL 60, SECAM or NTSC 4.43 video to RGB video (Marquee Multi-standard Decoder).

Diffused Screen

A type of rear-projection screen which spreads the light striking it. Screen gain is less than 1 but audience viewing angles are increased.

Display Setting

The level of a display adjustment. Some display adjustments are: Contrast, Brightness, Blanking, Bow, Size, Keystone, Pincushion, Focus and Convergence.

Flicker

A rapid variation in brightness created when the frame rate is too slow. (See also 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 is one half of vertical frequency.

Foot-candle

The intensity of visible light per square foot.

1 foot-candle = 1 lumen/square foot = 10.76 lux

Foot-lambert

The luminance (brightness) which results from one foot-candle of illumination falling on a perfectly diffuse surface.

Gain or Screen Gain

The ability of a screen to direct incident light to an audience. A flat matte white wall has a gain of approximately 1. Screens with gain less than 1 attenuate incident light; screens with gain more than 1 direct more incident light to the audience but have a narrow viewing angle. For example: An image reflecting off a 10 gain screen appears 10 times brighter than it would if reflected off a matte white wall. Curved screens usually have larger gain than flat screens.

Gamma Correction

A feature provided on Marquee Ultra Series, 9500DM and 8500SM models which boosts the blue color output when required to provide improved picture intensity and color uniformity.

Geometry

The reproduction of a straight and rectangular image.

Help Page

A display of help information on the projection screen.

Horizontal Frequency

Also called horizontal scan rate or line rate, this is the frequency at which scan lines are generated. Horizontal frequencies vary amongst sources.

Hot Spot

A circular area of a screen where the image appears brighter than elsewhere on the screen. The hot spot always appears located along the line of sight and "moves" with the line of sight. High gain screens and rear screens designed for slide or movie projection usually have a hot spot.

Input

A physical connection route for a source signal defined by two numbers; a switcher number and a slot number. If the switcher number is 0, the input is a projector input.

Image Shifter Module

An optional interface module which can lengthen CRT life while maintaining a bright picture by slowly shifting the image about the CRT faceplate. Image shifting occurs both horizontally and vertically. Shift range is totally controllable by the user. NOTE: Standard on the 9500LC.

Input Memory

A setup memory which is associated with a particular projector or switcher input.

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Interface

A device that accepts an input signal for display by the projector.

Interlace

A method used by video tape players and some computers to double the vertical resolution without increasing the horizontal line rate. If the resulting frame rate is too low, the image may flicker depending on the image content.

Keypad

A device which allows the user to control projector settings and operation. There are four different keypad types which may be used with the projector: built-in, IR remote, wired remote, and presenter's. For more information about these keypads, refer to the keypads entry in section 3.2, Projector Basics.

Keystone

A distortion of the image which occurs when the top and bottom borders of the image are not equal in length. Side borders slant in or out, producing a keystone shaped image.

Learn Screen

An ACON function which stores screen position data in memory for future reference. Learn Screen is usually performed only once per projector installation. If the ACON Locator Assembly or screen is moved (i.e., the projector installation changes to ceiling mount), the Learn Screen function must be repeated.

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.

Locator Assembly

The Locator Assembly, situated on the front of projectors which include the ACON automatic convergence feature, is the "eye" of the ACON system. It includes a photosensor/lens component which mechanically scans the projected display at each convergence point while sensing relative positions of each projected color.

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 amount of visible light emitted by a light source is measured in lumens.

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 options which are displayed on the screen for selection by the user.

NTSC Video

A video output format of some video tape and disk players. There are two types of NTSC (National Television Standards Committee) video: NTSC 3.58 and NTSC 4.43. NTSC 3.58 is used primarily in North America and Japan. NTSC 4.43 is less commonly used.

Optical Screen

A type of rear-projection screen which re-directs light through the screen to increase image brightness in front of the screen. Screen gain is usually greater than 1 but audience viewing angles are reduced.

PAL Video

A video output format of some video tape and disk players (used primarily in Europe, China and some South American and African countries). All PAL (Phase Alternating Line) video is a 50 Hz standard with 768 x 576 resolutions.

Pincushion

A distortion of the image which occurs when the borders are concave or convex.

Pixel (Picture Element)

The smallest discernable element of a computer generated image.

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Presentation Level

The projector is at presentation level when an image is (or may be) displayed and no control, dialog, error, or help messages are displayed. For example, if a help page is displayed, the projector is not at presentation level.

Projector-to-Screen Distance

Also called "Throw Distance", the distance between the front of the projector's green lens and the screen.

Protocol

The type of code format utilized by IR keypad(s). The standard code is Protocol A. By using two different protocols, two projectors may be used side by side while being controlled independently by their remote IR keypads.

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.

Recall Memory

A setup memory which is not associated with any particular input.

Resolution - CRT

The maximum number of lines that can be distinguished on the face of a CRT.

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 light source.

Resolution - Projector

The smaller of CRT and Lens resolutions.

Retrace Time (Horizontal)

The minimum time required for the projector to move the position of the scanning spot from the right edge to the left edge of a CRT.

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 of most computers. It can be analog or digital. Analog RGB video has 3, 4, or 5 wires; one for red, one for green, one for blue, and none, one or two for sync. For three wire RGB, the green wire usually provides sync. (See also TTL Video).

Scan Frequency

The horizontal or vertical frequency at which images are generated.

Scan Line

One scan line is 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.

Setup Memory

A projector memory which stores user-adjustable display settings. There are two types of setup memories: Input and Recall. Both memory types store the same parameters. The only difference is that Input memories store display settings for a particular physical input (i.e., switcher 0, slot 1) and Recall memories can be used with any input.

Slidebar

A slidebar is a graphical display of an adjustment setting. The setting is displayed on a percentage scale.

Source

A device, such as a computer or VCR, which may be connected to the projector for display.

Spot Size

The diameter of the smallest dot that can be generated on the face of a CRT.

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Sync

This term refers to the part of the video signal that is used to stabilize the picture. Sync can take three forms:

1)"Composite sync" when the horizontal and vertical components are together on one cable.

2)"Sync on green" when the sync is part of the green video.

3)"Separate sync" or "H.SYNC and V.SYNC" when 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 75Ω for video).

Throw Distance

Also called "Projector-to-Screen Distance", the distance between the front of the projector's green lens and the screen.

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. This term is also called vertical scan rate.

Video

The signal that is used by display devices (such as projectors) to generate a picture. This term also refers to the output of video tape/disk players and computers.

Video Decoder

A device that converts NTSC, PAL, SECAM or NTSC 4.43 video to RGB video (Marquee Multi-standard Decoder).

Viewing Angle

Screens do not reflect equally in all directions. Most light is reflected in a conical volume which is centered around the "line of best viewing". Maximum brightness is seen when you are positioned within the viewing cone. The horizontal and vertical viewing angles are the horizontal and vertical angles of the cone.

White Balance

White Balance refers to the color temperature of white used by the projector.

White Field

A white field is 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.

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