

Service Procedures

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The *Marquee* projector is unique in that many of its service adjustments are not hardware setups but rather software setups performed using the projector's keypad. This section explains the hardware and software service setups which are available.

4.1 Hardware Setups

Hardware setups are required when the projector's installation configuration changes, the projector-to-screen distance has changed, or the projector cannot be adequately adjusted by its software controls. It is recommended that you read through this section in its entirety before you begin servicing. If hardware setups are required, carefully follow the instructions provided and make sure that you have read and understand the service guidelines in Section 3. When hardware servicing is complete, ensure the projector is fully reassembled then proceed to section 4.2 to perform the necessary software setups. In many cases, both service and user software setups will be required following hardware setup.

Reverse Scan Installation

Reverse Scan Installation is required when the projector operation configuration changes (for example, from floor mount to ceiling mount). The following reverse scan procedure allows you to change the horizontal and/or vertical scan direction to match the operating configuration of your new installation. If the scan directions are set incorrectly, the displayed image will be upside down or reversed. The projector is shipped from the factory ready for a front screen, floor mount installation. If the projector's scan settings do not match the settings you need, proceed as follows.

HIGH VOLTAGES MAY BE EXPOSED



THIS PROCEDURE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL ONLY

Step 1 - Remove Power

Unplug the projector from the wall outlet or power source.



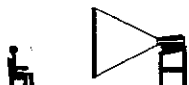


Step 2 - Remove the Top Covers and Lower the Back Panel

Remove the snap-in front top cover and a rear top cover. Also unscrew the four securing screws at the top of the back panel so that the back panel can be lowered. (See Section 5, *Parts & Disassembly*, for detailed instructions.)

Step 3 - Reverse Scan

Table 4-1 shows five common operating configurations and the scan directions for each. Determine the scan configuration required for your installation.

Table 4-1. *Operating Configurations*

OPERATING CONFIGURATION	HORIZONTAL SCAN	VERTICAL SCAN
 Front Screen, Floor Mount	NORMAL	NORMAL
 Front Screen, Ceiling Mount	REVERSED	REVERSED
 Rear Screen, Floor Mount	REVERSED	NORMAL
 Rear Screen, Ceiling Mount	NORMAL	REVERSED
 Rear Screen, Floor Mount, With Mirror	NORMAL	NORMAL

(Default configuration is front screen, floor mount.)

To reverse the direction of the horizontal scan, first locate plugs P2, P4, and P5 next to the Horizontal Deflection Module (see Figure 4-1). Disconnect P2 from its mating plug. Rotate the mating plug 180° then reconnect it. Do the same for P4 and P5.

To reverse the direction of the vertical scan, first locate plugs P5, P6 and P7 on the Vertical Deflection Module (part of Convergence/Vertical Board - see Figure 4-1). Disconnect P5, rotate it 180° then reconnect it. Do the same for P6 and P7.

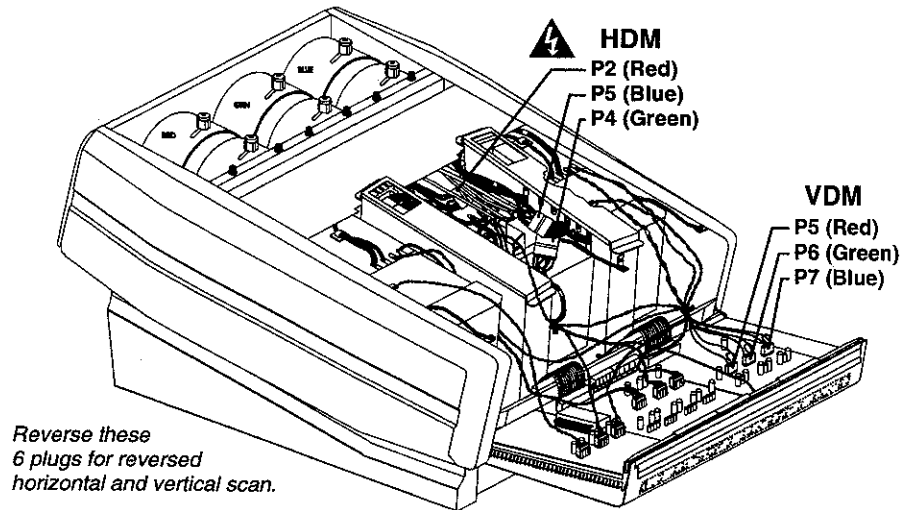


Figure 4-1. Reverse Scan Connectors

Step 4 - Verify Connector Positions

Double check to verify correct placement and orientation of all connectors.

Step 5 - Secure the Back Panel and Install Top Covers

Lift the back panel back to its original position and install the two top covers.

Step 6 - Apply Power and Verify Scan Reversal

Plug the projector line cord back into the wall outlet or power source. Press **POWER** for at least one second to turn the projector on. Display an image on the screen. Are the red, green, and blue colors orientated correctly? Press **ⓧ** to display the main status display screen. Does the status screen indicate the correct horizontal and vertical scan configuration? If an error is detected, "Error ####" is displayed. "####" contains three digits to indicate the orientation of the red, green, and blue plugs. A "0" indicates normal orientation. A "1" indicates reversed orientation.

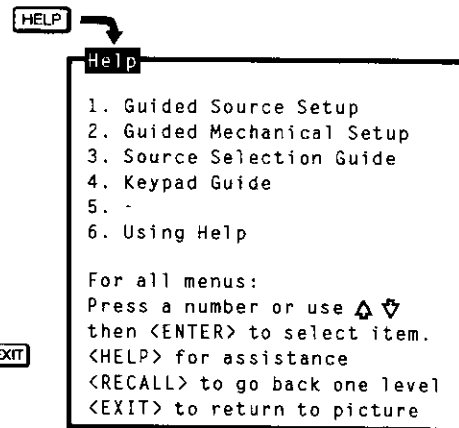
Optical Alignment ► (8110+ & 8500)

Optical alignment is required when the throw distance changes or the projector cannot be focused using the focus controls. Both the *Marquee* 8110+ and 8500 are optically aligned at the factory for use with a 6 foot diagonal screen with a throw distance of approximately 80 inches (2 metres). If the throw distance has changed since the last setup, proceed as follows:

Notes: 1) The projector must be warmed up for at least 45 minutes prior to performing optical alignment. 2) 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.

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.



Step 1 ► If you have not already done so, calculate the throw distance and set the projector position. Refer to Section 7.1, *Throw Distance*. Be sure to turn power off before moving the projector.

Step 2 ► Remove the front top cover of the projector. Also remove the black decorative foam piece at the front of the lenses (removal is optional). Remove the large allen head driver from the tool kit provided with the projector. The driver is used for lens alignment.

Examine the lenses and the lens hardware. See Figure 4-2. Each lens consists of two sections: a rear section and a front section. The rear section sets the optical focus at the center of the image. This section is secured to the lens body by a wing nut (see note below) at the top rear of the lens assembly. The front section sets the focus at the corners; it is secured to the rear section by a wing nut at the top front of the lens assembly.

Note: The projector may contain black plastic lens adjustment knobs in lieu of wing nuts. If this is the case, where "wing nut" is mentioned, please substitute this with "adjustment knob".

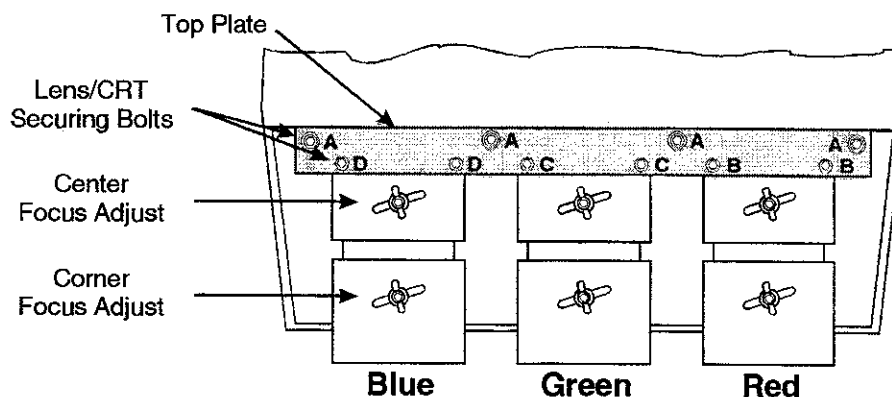


Figure 4-2. Lens Assemblies - Top View

The lenses are secured to the projector frame by a top plate as shown. During optical alignment, the securing bolts must be loosened and tightened as instructed. Each securing bolt is labelled (A-D) to assist you.

Each CRT is attached to its lens by 3 socket head allen screws located at each lens mounting plate. For each lens, 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 4-3.

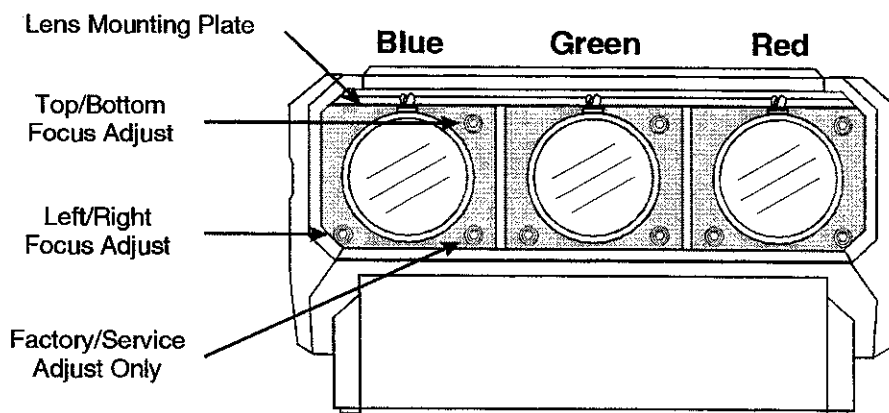
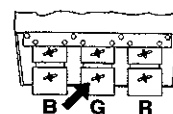
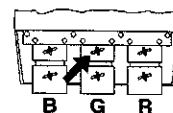
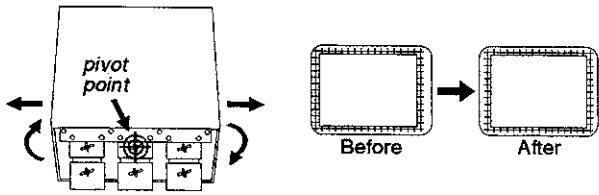
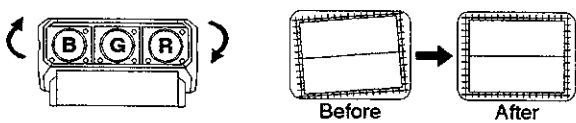
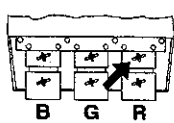
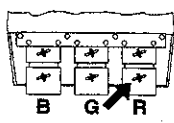
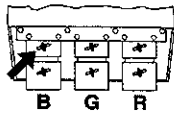
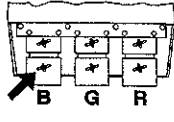


Figure 4-3. Lens Assemblies - Front View

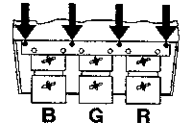
- Step 3** ➤ Loosen the rear wing nut on the green lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.
- Step 4** ➤ Loosen the front wing nut on the green lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.
- Step 5** ➤ Steps 6 to 8 require that you look directly into the lenses for adjustment. Before you continue, press contrast ☒ to reduce contrast to a low level (less than 10%).



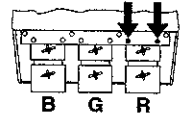
WARNING: DO NOT LOOK INTO THE LENSES IF CONTRAST IS SET TO NORMAL VIEWING LEVEL.

- Step 6** ➤ Look directly into the red lens. Press ▲, ▼, ◀ or ▶ to center the displayed crosshatch on the face of the picture tube.
- Step 7** ➤ Look directly into the green lens. Press ▲, ▼, ◀ or ▶ to center the displayed crosshatch on the face of the picture tube.
- Step 8** ➤ Look directly into the blue lens. Press ▲, ▼, ◀ or ▶ to center the displayed crosshatch on the face of the picture tube.
- Step 9** ➤ Press ▲ to increase contrast to a normal viewing level.
- Step 10** ➤ Pivot the projector and move it side to side as necessary to display a symmetrical crosshatch centered left-to-right on the screen. The pivot point should be at the rear wing nut of the green lens to avoid changing the throw distance.
- 
- Step 11** ➤ Tilt the projector until the center horizontal line is level and centered with the screen. Adjust the feet of the projector or ceiling mount as required.
- 
- Step 12** ➤ A red image is displayed. Loosen the rear wing nut on the red lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.
- 
- Step 13** ➤ Loosen the front wing nut on the red lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.
- 
- Step 14** ➤ A blue image is displayed. Loosen the rear wing nut on the blue lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.
- 
- Step 15** ➤ Loosen the front wing nut on the blue lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.
- 
- Step 16** ➤ Press ▲ or ▼ to adjust for best electrical focus at the center of the picture.

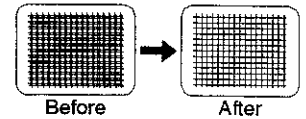
Step 17 ➤ Loosen the four bolts labelled "A"



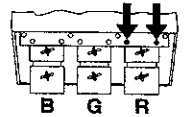
Step 18 ➤ Loosen the two bolts labelled "B".



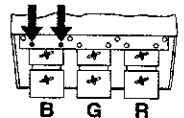
Step 19 ➤ A red and green crosshatch is displayed. Move the red lens until the left and right edges of the red crosshatch match the green.



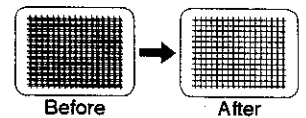
Step 20 ➤ Tighten the two bolts labelled "B".



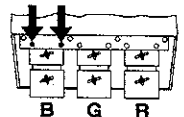
Step 21 ➤ Loosen the two bolts labelled "D".



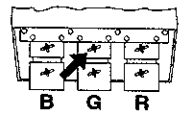
Step 22 ➤ A blue and green crosshatch is displayed. Move the blue lens until the left and right edges of the blue crosshatch match the green.



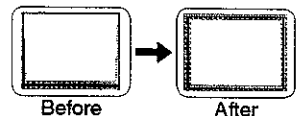
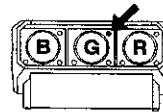
Step 23 ➤ Tighten the two bolts labelled "D".



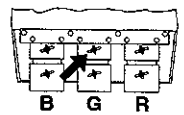
Step 24 ➤ A green image is displayed. Loosen the rear wing nut on the green lens and slightly defocus the center of the picture.



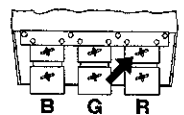
Step 25 ➤ Adjust the large allen head bolt located at the upper right corner of the green lens mounting plate. Turn the bolt head until the top and bottom areas of the picture are equally defocused. You may need to adjust the lens' rear wing nut to keep the center defocused.



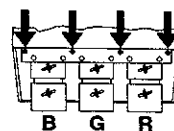
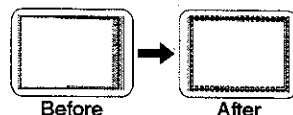
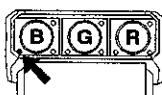
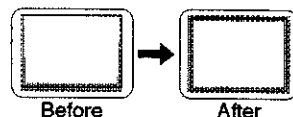
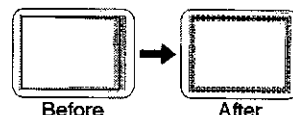
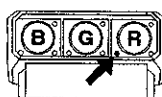
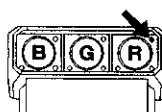
Step 26 ➤ Rotate the green lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut. If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.



Step 27 ➤ A red image is displayed. Loosen the rear wing nut on the red lens and slightly defocus the center of the picture.



- Step 28** ➤ Adjust the large allen head bolt located at the upper right corner of the red lens mounting plate. Turn the bolt head until the top and bottom areas of the picture are equally defocused. You may need to adjust the lens' rear wing nut to keep the center defocused.
- Step 29** ➤ Adjust the large allen head bolt located at the lower left corner of the red lens mounting plate. Turn the bolt head until the left and right sides of the picture are equally defocused. You may need to adjust the lens' rear wing nut to keep the center defocused.
- Step 30** ➤ Rotate the red lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut. If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.
- Step 31** ➤ A blue image is displayed. Loosen the rear wing nut on the blue lens and slightly defocus the center of the picture.
- Step 32** ➤ Adjust the large allen head bolt located at the upper right corner of the blue lens mounting plate. Turn the bolt head until the top and bottom areas of the picture are equally defocused. You may need to adjust the lens' rear wing nut to keep the center defocused.
- Step 33** ➤ Adjust the large allen head bolt located at the lower left corner of the blue lens mounting plate. Turn the bolt head until the left and right sides of the picture are equally defocused.
- Step 34** ➤ Rotate the blue lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut. Readjust corner focus if necessary (see step 15).
- If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.
- Step 35** ➤ Tighten the bolts labelled "A". Optical alignment is now complete. If you had removed the foam insert, reinstall it now. Install the front top cover. Proceed to set up each source by following the source setup procedures provided in the user's manual.



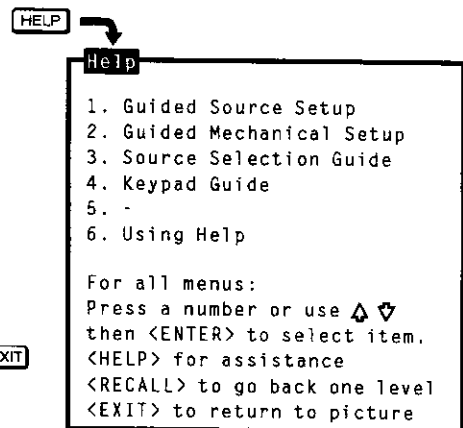
Optical Alignment ► (8500LC & 9500LC)

Optical alignment is required when the throw distance changes or the projector cannot be focused using the focus controls. The *Marquee* 8500LC is optically aligned at the factory for use with a 6 foot diagonal screen and a projector-to-screen distance of 104.5 inches (2.65 metres). The *Marquee* 9500LC is set up at the factory for use with a 8 foot diagonal screen and a projector-to-screen distance of 102 inches (2.6 metres). If the throw distance has changed since the last setup, proceed as follows:

Notes: 1) The projector must be warmed up for at least 45 minutes prior to performing optical alignment. 2) 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.

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.



Step 1 ► If you have not already done so, calculate the throw distance and set the projector position. Refer to Section 7.1, *Throw Distance*. Turn power off before moving the projector.

Step 2 ► Remove the front top cover of the projector. Also remove the black decorative foam piece at the front of the lenses (removal is optional). Remove the large allen head driver from the tool kit provided with the projector. The driver is used for lens alignment.

Examine the lenses and lens hardware (Figure 4-4). Each lens consists of a front and rear section. The rear section sets the optical focus at the center of the image. A wing nut or knob secures this section to the lens body at the top rear of the lens assembly. The front section sets the focus at the corners; a wing nut secures it to the rear section at the top front of the lens assembly.

Note: The projector may contain black plastic lens adjustment knobs in lieu of wing nuts. If this is the case, where "wing nut" is mentioned, please substitute this with "adjustment knob".

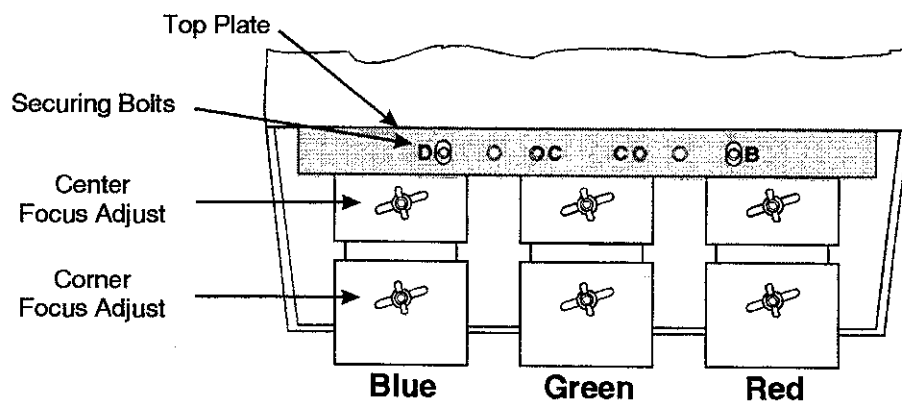

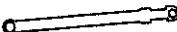


Figure 4-4. Lens Assemblies - Top View

The lenses are secured to the projector frame by a top plate and individual mounting plates as shown in Figures 4-4 and 4-5. During optical alignment, the top plate securing bolts are loosened and tightened using the ball nose screw driver () supplied with the projector. The mounting plate securing bolts are loosened and tightened using the wrench () supplied. The securing bolts are labelled (B-D) to assist you.

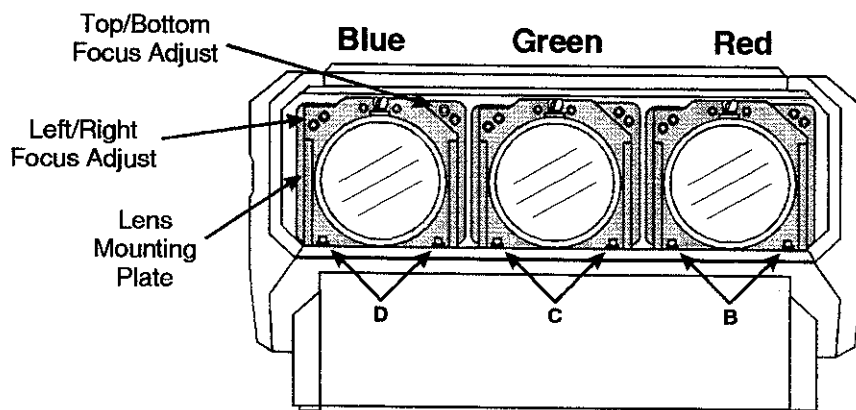
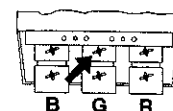


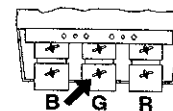
Figure 4-5. Lens Assemblies - Front View

Each CRT is attached to its lens by socket head allen screws located at each lens mounting plate. For each lens, the upper left screws (when facing the lens) adjust the focus between the left and right sides of the picture, and the upper right screws adjust the focus between the top and bottom of the picture. The supplied ball nose screw driver is used for these adjustments.

- Step 3** ➤ Loosen the rear wing nut on the green lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.



- Step 4** ➤ Loosen the front wing nut on the green lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.



- Step 5** ➤ Steps 6 to 8 require that you look directly into the lenses for adjustment. Before you continue, press to reduce contrast to a low level (less than 10%).

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

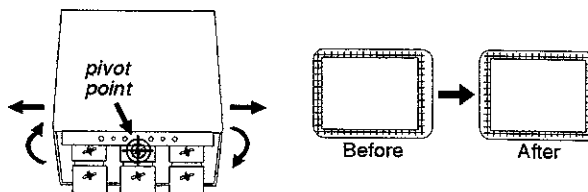
- Step 6** ➤ Look directly into the red lens. Press , , or to center the displayed crosshatch on the face of the picture tube.

- Step 7** ➤ Look directly into the green lens. Press , , or to center the displayed crosshatch on the face of the picture tube.

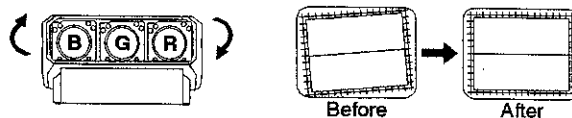
- Step 8** ➤ Look directly into the blue lens. Press , , or to center the displayed crosshatch on the face of the picture tube.

- Step 9** ➤ Press to increase contrast to a normal viewing level.

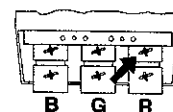
- Step 10** ➤ Pivot the projector and move it side to side as necessary to display a symmetrical crosshatch centered left-to-right on the screen. The pivot point should be at the rear wing nut of the green lens to avoid changing the throw distance.



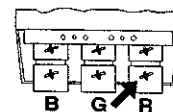
- Step 11** ➤ Tilt the projector until the center horizontal line is level and centered with the screen. Adjust the feet of the projector or ceiling mount as required.



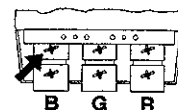
- Step 12** ➤ A red image is displayed. Loosen the rear wing nut on the red lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.



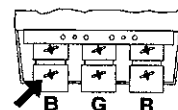
- Step 13** ➤ Loosen the front wing nut on the red lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.



- Step 14** ➤ A blue image is displayed. Loosen the rear wing nut on the blue lens. Rotate the lens using the wing nut until the picture is focused in the center. Tighten the rear wing nut.

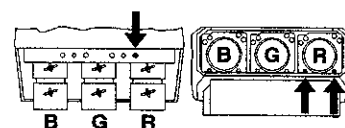


- Step 15** ➤ Loosen the front wing nut on the blue lens. Rotate the front lens barrel until the picture is focused in the corners. Tighten the front wing nut.

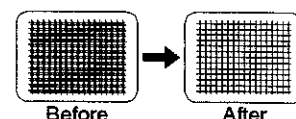


- Step 16** ➤ Press or to adjust for best electrical focus at the center of the picture.

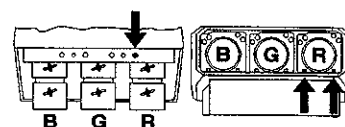
- Step 17** ➤ Loosen the three bolts labelled "B". One is located on the top plate. The other two are below the red lens.



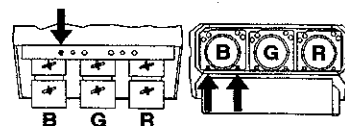
- Step 18** ➤ A red and green crosshatch is displayed. Move the red lens so that the left and right edges of the red crosshatch match the green.



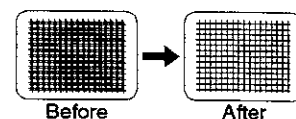
- Step 19** ➤ Tighten the three bolts labelled "B".



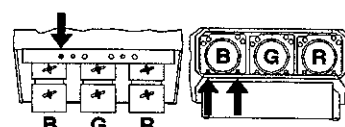
- Step 20** ➤ Loosen the three bolts labelled "D". One is located on the top plate. The other two are below the blue lens.



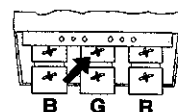
- Step 21** ➤ A blue and green crosshatch is displayed. Move the blue lens so that the left and right edges of the blue crosshatch match the green.



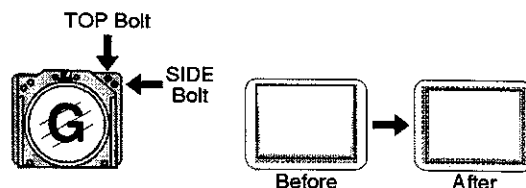
- Step 22** ➤ Tighten the three bolts labelled "D".



- Step 23** ➤ A green image is displayed. Loosen the rear wing nut on the green lens and slightly defocus the center of the picture.



- Step 24** ➤ Locate the two adjustment bolts at the upper right corner of the green lens mounting plate (viewed from the front).

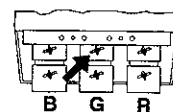


Adjust the two bolts until the top and bottom areas of the picture are equally defocused. Use the following technique for the adjustment: Turn the SIDE bolt 1/8 turn CCW. Turn the TOP bolt about 1/8 turn CW until it stops. If defocus at the top and bottom are equalizing, repeat until equal. If the top and bottom are not becoming

equally defocused, use the same technique but instead turn the TOP bolt CCW then turn the SIDE bolt CW until it stops. Repeat until defocus is equal.

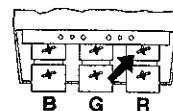
Note: It may be necessary to readjust the lens' rear wing nut to keep the center defocused.

- Step 25** ➤ Rotate the green lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut.

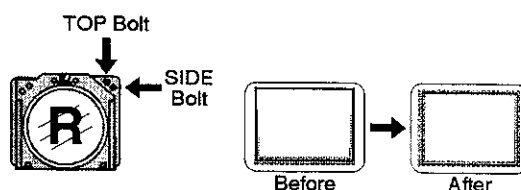


If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.

- Step 26** ➤ A red image is displayed. Loosen the rear wing nut on the red lens and slightly defocus the center of the picture.



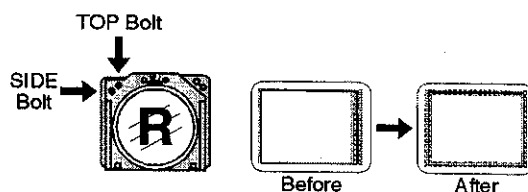
- Step 27** ➤ Locate the two adjustment bolts at the upper right corner of the red lens mounting plate (viewed from the front).



Adjust the two bolts until the top and bottom areas of the picture are equally defocused. Use the same technique as that used for the green adjustment (step 24).

Note: It may be necessary to readjust the lens' rear wing nut to keep the center defocused.

- Step 28** ➤ Locate the two adjustment bolts at the upper left corner of the red lens mounting plate (viewed from the front).



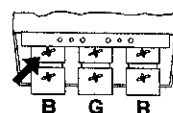
Adjust the two bolts until the left and right areas of the picture are equally defocused. Use the same technique as that used for the previous adjustment (step 27).

Note: It may be necessary to readjust the lens' rear wing nut to keep the center defocused.

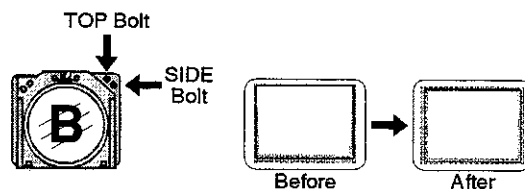
- Step 29** ➤ Rotate the red lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut.

If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.

- Step 30** ➤ A blue image is displayed. Loosen the rear wing nut on the blue lens and slightly defocus the center of the picture.



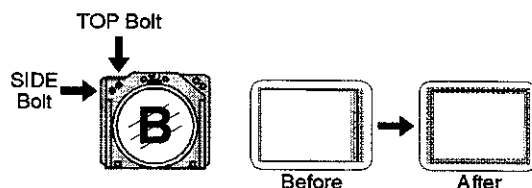
- Step 31** ➤ Locate the two adjustment bolts at the upper right corner of the blue lens mounting plate (viewed from the front).



Adjust the two bolts until the top and bottom areas of the picture are equally defocused. Use the same technique as that used for the green and red adjustments.

Note: It may be necessary to readjust the lens' rear wing nut to keep the center defocused.

- Step 32** ➤ Locate the two adjustment bolts at the upper left corner of the blue lens mounting plate (viewed from the front).



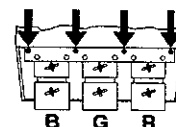
Adjust the two bolts until the left and right areas of the picture are equally defocused. Use the same technique as that used for the previous adjustment (step 31).

Note: It may be necessary to readjust the lens' rear wing nut to keep the center defocused.

- Step 33** ➤ Rotate the blue lens using the rear wing nut until the picture is focused in the center. Tighten the rear wing nut.

If necessary, loosen the front wing nut, rotate the front lens barrel to readjust the focus in the corners, then re-tighten the wing nut.

- Step 34** ➤ Optical alignment is now complete. If you had removed the foam insert, reinstall it now. Install the front top cover. Proceed to set up each source by following the source setup procedure provided in the user's manual.



Width Coil Alignment

The *Marquee* projection system uses a dual band horizontal deflection circuit. The switching point between the two bands is set at 59.5 kHz. Because of the two different bands, the following procedure must be used for width coil adjustment:

HIGH VOLTAGES MAY BE EXPOSED



**THIS PROCEDURE SHOULD BE PERFORMED
BY QUALIFIED PERSONNEL ONLY**

Tools Required:

- Phillips head screw driver
- small slot screw driver

Step 1 - Remove Power

Unplug the projector from the wall outlet or power source.

Step 2 - Remove the Front and Rear Top Covers

Remove the snap-in front top cover and a rear top cover then remove the shield cover from the Horizontal Deflection Module (HDM). (See Section 5, *Parts & Disassembly* for removal instructions.)

Step 3 - Reapply Power**Step 4 - Perform Width Coil Adjustments**

The HDM has six width coils as shown in Figure 4-6 below.

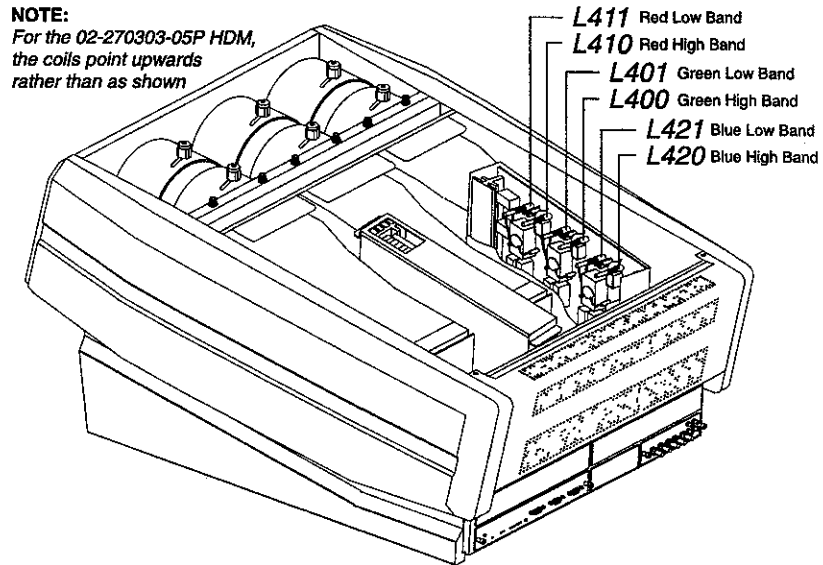


Figure 4-6. Horizontal Deflection Width Coils

- a) Set the input for a signal between 60 kHz and 65 kHz (i.e., bottom of high band).
- b) Remove all dynamic convergence by pressing **CONV** **1** **2** **EXIT** **EXIT**. Note that dynamic reset is for the current setup memory only.
- c) Preset all 6 width coils such that the ferrite cores are at the top of each.
- d) If the green width is not the smallest, adjust L400 until it matches the smallest width.
- e) Adjust L410 until the red width matches the green.
- f) Adjust L420 until the blue width matches the green.
- g) Set the input signal to approximately 31 kHz (i.e., low band).
- h) If the green width is not the smallest, adjust L401 until it matches the smallest width.
- i) Adjust L411 until the red width matches the green.
- j) Adjust L421 until the blue width matches the green.

Note: When adjusting the green width coils, L400 and L401, the green raster does not move; the red and blue rasters move instead.

Step 5 - Remove Power then Add Covers

Keypad Conversion ►

The projector's internal multi-use full-function keypad may be configured for use as a built-in, IR remote, or wired remote keypad. The keypad is configured at the factory for built-in use. Follow the steps below to convert the keypad from a factory-configured built-in keypad to a remote keypad.

- a) Unplug the projector then lift the front top cover to access the built-in keypad. To lift the cover, grasp it above the red and blue lenses then lift it until the keypad is exposed. The keypad is mounted to a securing bracket located above the lens assemblies. Loosen the two bracket wing nuts then move the keypad away from the bracket.

- b) Locate the battery compartment at the back side of the keypad. Squeeze the latch to open the door. See Figure 4-7.

If converting the keypad to an IR remote, unplug the cable connector.

Locate the jumper wires next to the cable connector location. See Figure 4-8. The jumper wires control the keypad's operating settings.

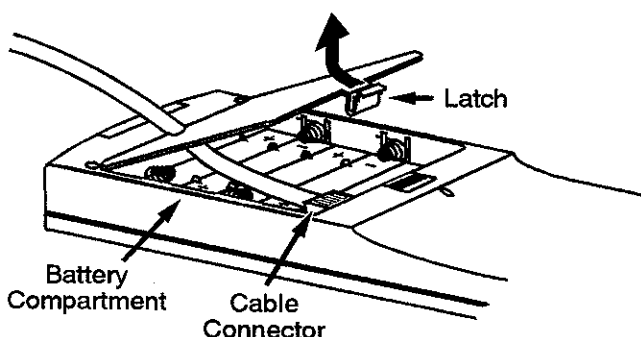


Figure 4-7. Battery Compartment

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

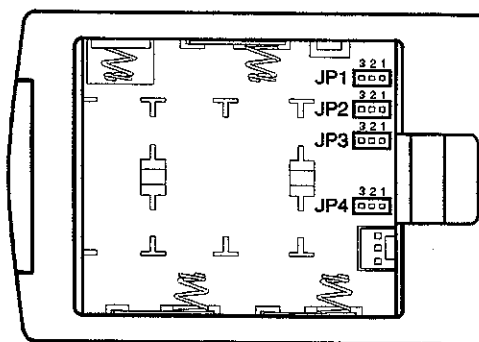


Figure 4-8. Jumper Settings

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 projector's user's manual.

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. To convert the keypad to an IR remote, move the JP4 jumper from between pins 2 and 3 to between pins 1 and 2.

- c) 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.

For a wired remote keypad, an optional accessory cable (#03-001106-02P) is required. Plug the cable into the cable connector then position the door into place. Plug the cable jack into the remote jack input on the projector.

▲ 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.

About Keypad Settings ...

With a few simple keystrokes you can over-ride the "hard wire" protocol setting 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 or built-in keypad).

If the keypad is configured for IR remote operation, make sure the batteries are installed. If it is configured for built-in or 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.*

4.2 Software Setups

To perform software service setups you must be familiar with the operation of the projector and its keypad. If your experience with the *Marquee* projector is limited, it is recommended that you read through the user's manual supplied with the projector.

The projector comes supplied to the dealer/customer with a multi-use, full function, backlit keypad which is factory configured for use as a built-in keypad. It is located below the front top cover and connected to the projector by a 3 foot extension cable. It can also be converted for use as an IR or wired remote keypad. If the keypad is still configured for built-in use, access it as follows:

Locate the front top cover of the projector. Position your hands above the red and blue lenses then grasp the cover. Lift the cover until the keypad is exposed. Slide the cover away from the projector. The keypad is mounted to a securing bracket located above the lens assemblies as shown in Figure 4-9. It can slide out of its securing bracket but it is recommended that it remain in place for use. When finished using the keypad, position the front top cover back in place.

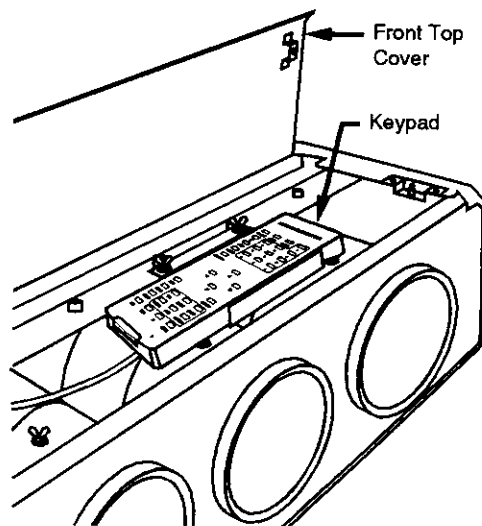


Figure 4-9. Built-in Keypad Access

Note: To re-configure the keypad, refer to the Keypad Conversion entry in section 4.1.

The keypad and its functions are shown in Figure 4-10. 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 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.

As you may notice from Figure 4-10, 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. All service related functions are accessed through on-screen menus. A complete menu tree is shown in Figure 4-11.

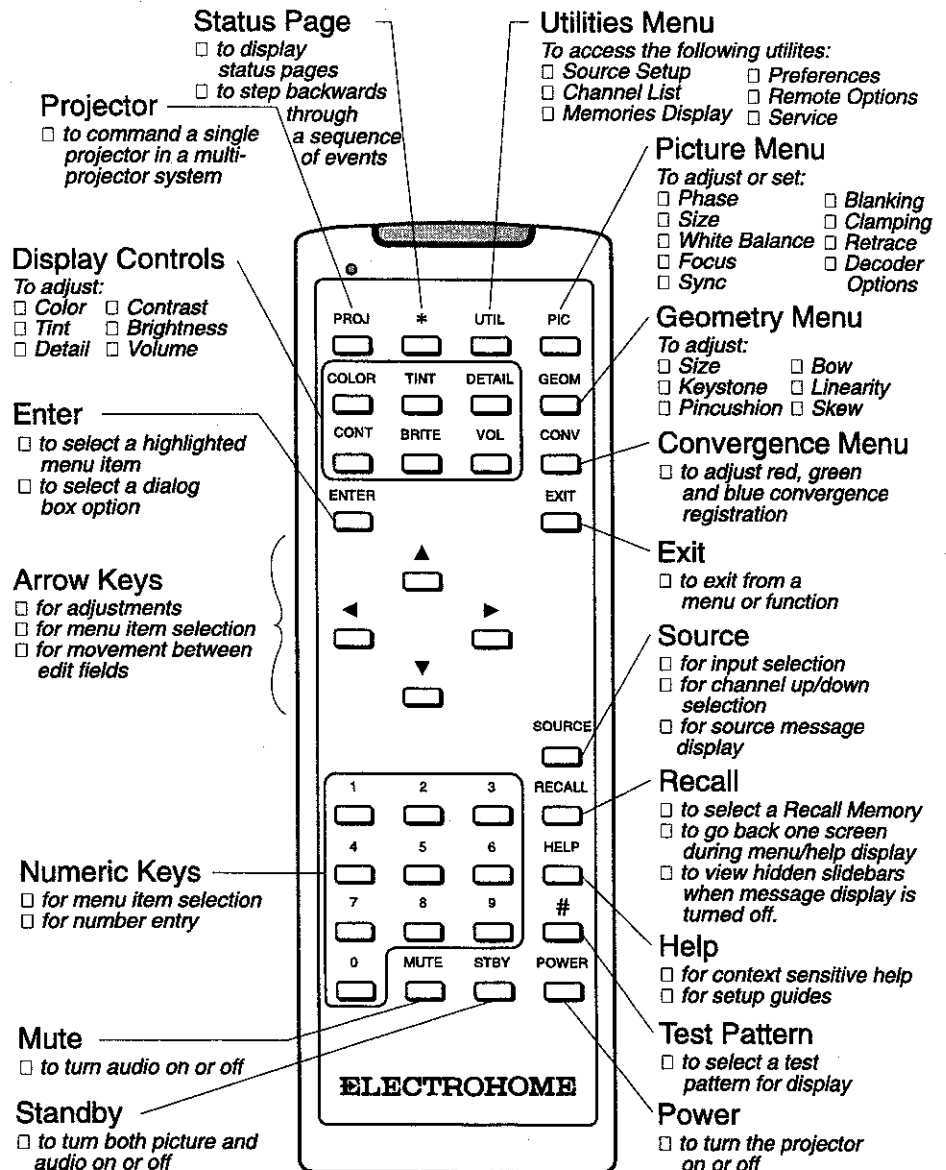


Figure 4-10. Full Function Keypad

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 perform 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.

For an explanation of each of the above, refer to the projector user's manual. While using the keypad, keep the following in mind:

In most cases ...

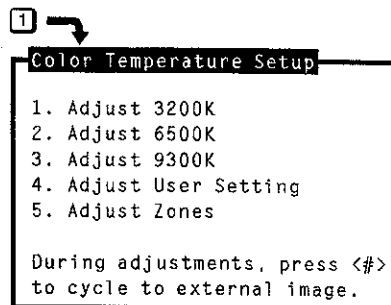
- EXIT** brings you back to presentation level,
- RECALL** brings you back to the previous page or menu,
- ENTER** is pressed to make a selection, and
- HELP** provides context-sensitive help.
- *** allows stepping backwards through a sequence

Note: Functions and items in Figures 4-10 and 4-11 may be slightly different than that shown - depending on the software version of the projector. At the time of writing this manual (first version), software version 3.4 was current.

Color Temperature Setup

The *Color Temperature Setup* service utility allows you to 1) calibrate and adjust the color temperature settings available from the White Balance menu (**PG** **3**), and 2) adjust center-to-edge contrast levels to improve color and luminance uniformity (Contrast Modulation feature).

Press **[F1]** from the Service menu to display the Color Temperature Setup menu. Items 1, 2, and 3 are for calibration of the three standard color temperatures. The three calibration settings are global and are permanently stored in the projector — they will be retained, even after a complete projector initialization has been performed. Item 4, *Adjust User Setting* allows you to customize the "user setting" for the current setup memory. Item 5, *Adjust Zones* allows you to adjust color contrast across the display for improved color uniformity. Color uniformity adjustments are global and are permanently stored in the projector. This option is available only if the projector includes the Contrast Modulation feature.

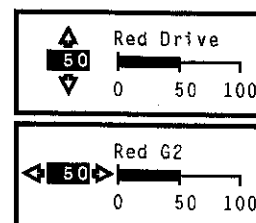


Items 1, 2, 3, and 4

Before making any color temperature adjustments, change the projector's brightness setting (**BRITE**) to 50% and set contrast (**CONT**) and focus to optimal levels. A grayscale pattern (**# # #**) is available for display during the adjustments, but if possible use a similarly appropriate test pattern from an external signal generator.

For all four menu items the setup procedure is essentially the same. When 1, 2, or 3 is selected, a warning message is first displayed to indicate that a color analyzer is required; to proceed, move the cursor bar to "Proceed" then press **[ENTER]**. A color analyzer assures an accurate (true) calibration. If a color analyzer is not available and/or you are not experienced at color temperature setup, it is recommended that settings for items 1 to 3 be left alone.

During color temperature setup, two color temperature slidebars are displayed for the red, green, or blue color. **[▲]** and **[▼]** adjust the drive (gain) level for the color. **[◀]** and **[▶]** adjust the G2 (cutoff) level for the color. To change adjustment colors, press **[COLOR]**. Every fourth press of **[COLOR]** changes the image to white (RGB). When the image is white, all three colors are displayed at the same time with one color (indicated by the slidebars) being the adjustment color. You can change the adjustment color while maintaining the white display by pressing **[TINT]**. To switch back to single color display, press **[COLOR]**. Also, if want to hide or restore the sidebar display, press **[MUTE]**.



When finished making color temperature adjustments, press **[EXIT]** to display an Exit dialog box. Within the box the cursor is positioned on "Save". Press **[ENTER]** or **[EXIT]** to save the new settings; **[ENTER]** returns to the Service menu and **[EXIT]** returns to presentation level. To continue making adjustments, 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 Color Temperature		
Save	No Save	Continue Adjust

When adjusting the "user setting" color temperature you should adjust the G2's so that the dimmest bars of the grayscale are barely visible. The drive levels should be adjusted so that the brightest bars of the grayscale are white. It is recommended that the following sequence be used:

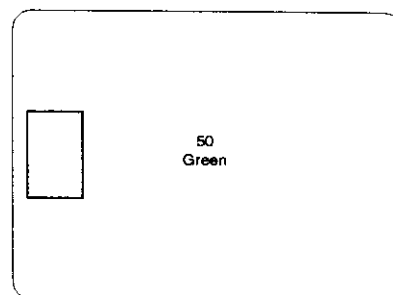
- a) Adjust Red G2 with only red displayed.
- b) Adjust Green G2 with only green displayed.
- c) Adjust Blue G2 with only blue displayed.
- d) Repeat steps a to c with white (RGB) displayed to fine tune the G2s.
- e) Adjust Red Drive with only red displayed.
- f) Adjust Green Drive with only green displayed.
- g) Adjust Blue Drive with only blue displayed.
- h) Repeat steps d) to g), if necessary, until an optimal display is reached for all three colors.

Item 5, Adjust Zones

Select item 5, *Adjust Zones* from the Color Temperature menu to perform Contrast Modulation setup. Contrast Modulation setup involves adjusting the contrast levels of the outer areas of the image to improve color and luminance uniformity across the entire image. For the adjustment the screen is divided into nine zones in a 3 x 3 matrix. The eight outer zones are adjustable. The center zone is the reference and is not adjustable. Zone adjustments are stored in global memory.

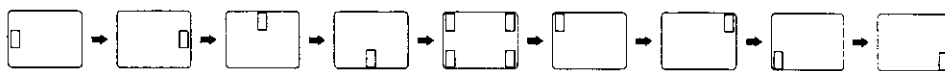
*Note: It is highly recommended that for zonal adjustment, the overall contrast setting (**[CONT]**) be set to about 20%. After zonal adjustment is complete, return the contrast setting to its normal value. If the contrast setting is too high during zonal adjustment, beam limiting may occur which can make adjustments difficult to perform (with results that may be irregular).*

At first a warning message is displayed to indicate that a light meter is required; to proceed, move the cursor bar to "Proceed" then press **[ENTER]**. The zone adjustment process begins with a completely green field displayed with a rectangular box at the center, left zone (as shown). The box indicates the active zone for adjustment. At the center of the display the current adjustment color (green, red or blue) is



shown with a number indicating the amount of adjustment. This number ranges from 0 to 100, with a default of 50. The default indicates that the contrasts of the two zones are equal and no correction is applied. A setting of 100 increases the contrast in the zone by a certain preset percentage of the center contrast, while a setting of 0 decreases the contrast of the zone by the same amount. With a light meter, measure and compare luminosity (brightness) of the center zone and each of the eight outer zones. Adjust the contrast of the outer zones to achieve uniformity across the image. The following keys are used:

- ▲ and ▼ adjust the luminosity at the active zone for the current color.
- ENTER advances the box to the next zone for adjustment.
- * moves back to the previous zone.
- MUTE hides or restores the display of the box and the text at the screen's center.
- TINT changes the adjustment color, cycling between green, red, and blue.
- COLOR changes the background color, cycling between green, red, blue, yellow, cyan and white.
- EXIT exits the process (with or without save).
- 0 resets all zones to 50 (i.e., no correction used).



Zones are adjusted in the sequence illustrated above. When adjustment for the current color is complete, the process is repeated for the next color.

Exit Zone Adjust		
Save	No	Continue
	Save	Adjust

When all zones for all colors have been adjusted (or EXIT is pressed), an Exit dialog box is displayed. The new settings are saved by pressing ENTER or EXIT with the cursor positioned on "Save". The Exit box also allows you to discard your changes or continue making adjustments.

About Making Contrast Modulation Adjustments ...

One purpose of Contrast Modulation setup is to compensate for the luminosity roll-off (decrease in brightness from the center of an image to its edges). Roll-off is expressed as a percentage of the luminosity at the center. For example, a roll-off of 25% indicates that the edges are 75% as bright as the center. The CRT, the lens, and some types of screens all contribute to this roll-off.

Increasing the contrast towards the edges and corners through Contrast Modulation corrects for the effects of roll-off. The amount of roll-off you choose to maintain in the image, if any, depends on the application. For a single projector installation, the roll-off can be as large as 25% before it becomes very noticeable. For a multi-projector installation, a smaller roll-off will ensure a smooth overall effect in which adjacent images match at their edges as well as their centers. In any case, a roll-off near 0% will usually give the most pleasing effect. However a very small roll-off with too high a contrast level may cause defocusing at the edges of the image.

Note that there is some interaction between zones when adjustments are made. You will need to fine tune your first set of adjustments to end up with

consistent luminosity levels in all eight outer zones. To reduce the amount of adjustments required, the following technique is recommended:

First determine the amount of overall luminosity roll-off that you desire. Next, measure the luminosity level at the center of the image. The desired roll-off is expressed as a percentage of this number. Adjust the zones to the left and right of center such that the luminosity is 80% of the final luminosity you wish to achieve. For example, if you desire a roll-off of 25%, adjust each zone to 60% ($80\% \times [100-25]\% = 60\%$) of the center luminosity. For the top and bottom center zones, adjust for 90% of the desired luminosity in a similar manner. For the corner zones, adjust for 100% of the desired luminosity. For the center zones, adjust for 100% of the desired luminosity. See the illustration on the right. Now recheck the zones you have just adjusted. You should find that you have closely achieved the desired roll-off. Fine adjust as necessary then proceed with adjustment of the other two colors.

Percentage of desired luminosity (first pass).

100%	90%	100%
80%		80%
100%	90%	100%

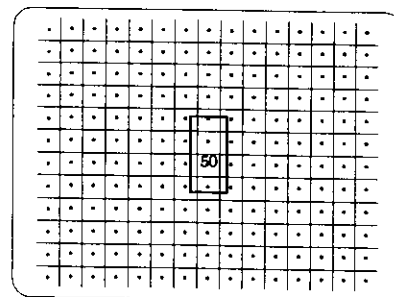
Color Uniformity Adjustment



Another purpose of Contrast Modulation Setup is to correct for color temperature differences across the image. A common cause of this is extreme toe-in of the red and blue CRTs for small screen sizes, which results in a color temperature shift from red to blue horizontally across the image. It is particularly important to correct for color shifts when edge-matching adjacent projector images. To achieve optimal color uniformity, first adjust the luminosity uniformity as described above. Without exiting Contrast Modulation setup, select a white background by pressing **[COLOR]**. Then, using a color analyzer, measure the color temperature at the center and near the edges and corners of the display. Fine tune each zone in each color (selected by pressing **[TINT]**) as required to match the color temperature to that of the center.

RGB Focus Adjustment

The *RGB Focus Adjustment* function allows you to adjust the static and dynamic focus of the red, green, and blue CRTs. Before following this procedure, an optical alignment should first be performed and the user adjustable focus control (**[PG 4]**) must be set to 50%.

Press **[2]** from the Service menu to begin the focus procedure. A red crosshatch is displayed with a rectangular box at the center zone. There are five adjustment zones in total; center, top, bottom, left, and right. At the center zone, focus adjustments affect the entire screen for the current setup memory only. At the remaining four zones, focus adjustments affect the half of the raster in which the



box is positioned, and the setup applies to all setup memories (global); global settings are stored permanently and remain even after a complete projector initialization. To make adjustments, use  or  until the crosshatch lines within the box are best focused. A number representing the amount of adjustment is displayed. Press **ENTER** to change display colors and/or move to the next zone. Continue making adjustments until all zones are completed and an Exit dialog box is displayed. (If you wish to exit prior to making all adjustments, **EXIT** will immediately display the Exit dialog box).





When the Exit dialog box is displayed, the cursor is positioned on "Save". Press **ENTER** or **EXIT** to save the new settings; **ENTER** returns to the Service menu and **EXIT** returns to presentation level. To continue making adjustments, move the cursor bar to "Continue Adjust" then press **ENTER** or **EXIT**. To discard your changes, move the cursor to "No Save" then press **ENTER** or **EXIT**.

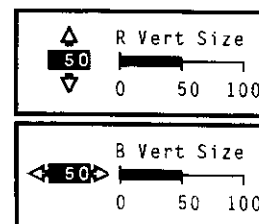
Exit Focus		
Save	No Save	Continue Adjust

Red/Blue Vertical Size ►

The *Red/Blue Vertical Size* function allows you to adjust the vertical size of the red and blue images. It is important that the vertical sizes of the rasters are properly matched to avoid potential convergence problems and reduce the need for excessive dynamic convergence adjustments. Red and blue vertical size settings are stored in global memory and apply to all setups; these settings are permanent and remain even after a complete projector initialization. Before you begin vertical size adjustments, perform a static convergence to center the red and blue to the green. Once this has been done, display a crosshatch test pattern (recommended) to use for the setup.

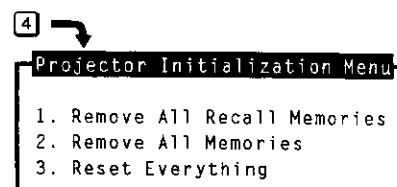
Notes: 1) Make sure the vertical sizes of the rasters are properly adjusted before making any dynamic convergence adjustments. 2) Dynamic convergence is temporarily reset for the vertical size adjustment. It is restored upon exit.

Press **3** from the Service menu to begin vertical size adjustment. Red and blue vertical size sliders are displayed. Use  or  to adjust the vertical size of the red image to match size of the green along a vertical line through the center of the raster. Use  or  to adjust the vertical size of the blue image until it best matches the green. Press **ENTER** or **EXIT** when complete; **ENTER** returns to the Service menu and **EXIT** returns to presentation level.



Projector Initialization ►

Press **4** from the Service menu to display the Projector Initialization menu. This menu allows you to delete entire groups of setup memories and clear projector operating settings.

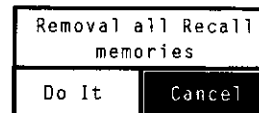


Remove All Recall Memories

Select item 1, *Remove All Recall Memories* from the Projector Initialization menu to remove all Recall memories from the projector's setup memory database. A dialog box is displayed.

Move the cursor to "Do It" then press **ENTER** or **EXIT**.

To cancel, press **ENTER** or **EXIT** when the cursor is positioned on "Cancel"; **ENTER** returns to the Service menu and **EXIT** returns to presentation level.

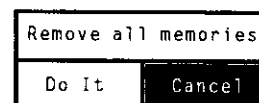


Note that this function does not simply reset the display settings of all Recall memories, but actually deletes them from the database. If the projector contains many Recall memories but none are actually used, it is a good idea to perform this function. Once performed you will notice that when the Recall memory list is selected via the Utilities menu (**UTIL** **3**), no Recall memories are displayed.

Remove All Memories

Select item 2, *Remove All Memories* from the Projector Initialization menu to remove all Input and Recall memories from the projector's setup memory database.

A dialog box is displayed. Move the cursor to "Do It" then press **ENTER** or **EXIT**. To cancel or abort, press **ENTER** or **EXIT** when the cursor is positioned on "Cancel".

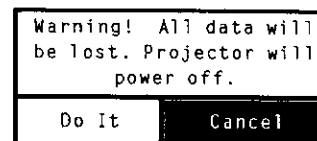


Note again that this function does not simply reset the display settings of all setup memories but actually deletes them from the database. Once performed, the Recall and Input memory listings available through the Utilities menu will show no memories except the current input memory (which is not deleted).

Reset Everything

Select item 3, *Reset Everything* from the Projector Initialization menu to delete all Input and Recall memories and set projector operating settings to default values. This operation is also called a "complete projector initialization". It should only

be selected if for some reason the stored settings in the projector have become corrupt. When selected, a dialog box is displayed as shown. Move the cursor to "Do It" then press **ENTER** or **EXIT**. The projector will prepare for reset, then power down. Press **POWER** to turn the projector back on. To cancel reset, press **ENTER** or **EXIT** with the cursor positioned on "Cancel".



Notes: 1) Date and Time functions must be set after a Reset Everything.

2) The following parameters are NOT reset by this function: Red and Blue Vertical Size; Top, Bottom, Left, and Right RGB Focus; 3200K, 6500K, and 9300K Color Temperatures; Contrast Modulation Zone adjustments; Stigmator adjustments; and hours of use.

Status Page Message ➤

Press [5] from the Service menu to edit the status page message which is displayed at the bottom line of the first status page ([*]). The message may contain up to 45 alpha and numeric characters.

.
C
B
A
space
9
8
7
.



Use the [▲] or [▼] keys to change the character at the position of the flashing cursor. [▲] changes to the next character in the alphabet. [▼] changes to the prior character. Numbers

and punctuation marks are also available. You may hold down the arrow key to quickly change the highlighted character to the one you want. To move the cursor to the previous or next character in the field, press [◀] or [▶] respectively. To erase the characters in the field which follow the highlighted character, press [X].

5

Status Page Message

Marquee Dealer XYZ

▲▼ to change character at cursor
◀▶ to move cursor
<ENTER> to save



Electrohome Projection Systems

Marquee XXXX Serial No: 123456789
Projector No: 000 Software: VX.X

IR Sensor: A
Remote Jack: A
Auto Power-up: Off Horiz Scan: Normal
Messages: On Vert Scan: Normal
Mute: Off Switchers: 1
Options: Decoder

Marquee Dealer XYZ

Programmable Message

Diagnostics ➤

Press [6] from the Service menu to display the Diagnostics menu for access to the projector's diagnostic tools.

6

Diagnostics

1. Hardware ID
2. Software Versions
3. Hours of Use
4. Previous Keypresses

Hardware ID

Select item 1, *Hardware ID* from the Diagnostics menu to display the version numbers of the primary circuit modules (or boards) and optional modules installed in the projector. At projector power-up the version number of the modules in the list is viewed and stored in the Hardware ID list. The list is primarily useful for troubleshooting and upgrading. Should there be a problem with the projector requiring a call to Electrohome, be prepared to provide the information in the list to the Electrohome technical support person. Modules included in the list are:

CLM - Control Module
DPB - Deflection Processor Board
HDM - Horizontal Deflection Module
SWB - Stigmator Waveform Board
CMM - Contrast Modulation Module
Decoder - Multi-standard Video Decoder
ACON - ACON Control Module

6 1

Hardware ID

CLM Version 1
DPB Version 2
HDM 15 kHz, Version 2
SWB Installed, Version 1
CMM Installed, Version 1
Decoder Not Installed
ACON Installed, Version 1

Software Versions

Select item 2, *Software Versions* from the Diagnostics menu to display the software version numbers of the ROMs installed in the projector and attached switchers. At projector power-up the version number of each ROM is looked at and stored in the Software Version list. For each switcher in the list, if a switcher is not detected, "N/A" is reported. This is also reported for ACON if it is not installed. Again, the list is primarily useful for troubleshooting and upgrade purposes. Should there be a problem with the projector and a call to Electrohome technical support is required, be prepared to provide the information in the list to the Electrohome technical support person.

6 2 →

Software Versions	
CLM (U35)	V3.1
CLM (U16)	12.2
DPB (U7)	D5.1
Switcher 1	N/A
Switcher 2	N/A
Switcher 3	N/A
Switcher 4	N/A
Switcher 5	N/A
Switcher 6	N/A
Switcher 7	N/A
Switcher 8	N/A
Switcher 9	N/A
ACON (U8)	A1.0

Hours of Use

Select item 3, *Hours of Use* from the Diagnostics menu to display the total number of hours in which the projector has been powered on since it was shipped from the factory. The display also shows the total number of hours the projector was powered on while in and out of standby mode.

6 3 →

Hours of Use	
With CRTs On:	653
In Standby:	231

Total:	884

Note: The Hours of Use counter is not resettable.

Previous Keypresses

Select item 4, *Previous Keypresses* from the Diagnostics menu to display a list of the most recent keypresses received by the projector. This information can be useful for troubleshooting. The displayed keypress in row #1 is the most recent keypress. The count value reflects either multiple keypresses or a "press and hold" operation. Each timeout represents a five second interval.

6 4 →

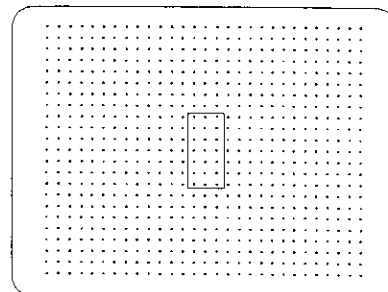
Previous Keypresses					
#	Key	Count	#	Key	Count
1	ENTER	1	11	RECALL	1
2	▽	1	12	EXIT	2
3	Timeout	1	13	Timeout	4
4	RECALL	2	14	HELP	2
5	Timeout	3	15	Timeout	4
6	ENTER	2	16	ENTER	2
7	▽	2	17	▽	1
8	Timeout	11	18	Timeout	1
9	▽	1	19	RECALL	2
10	Timeout	1	20	ENTER	2

Stigmator Adjustment

The Stigmator Adjustment function allows you to correct astigmatism of the red, green, and blue CRT beams at nine zones in the raster. Both static and dynamic adjustments are available.

Press 7 from the Service menu to begin stigmator adjustment. A red dot pattern is displayed with a rectangular box at the center zone. At this point set contrast (**CONT**) and focus (**PIG** 4) to 100% to enlarge the dots.

There are nine adjustment zones in total; center, center top, center bottom, center right, center left, top right, top left, bottom right, and bottom left. At the center zone, stigmator adjustments affect the entire screen. At the remaining eight zones, stigmator adjustments affect the area where the box is positioned. Stigmator adjustments affect all setups equally (they are global). Their settings are permanent and remain even after a complete projector initialization.



To make adjustments, use **◀**, **▶**, **▲**, and **▼** until the dots within the box are round. A number representing the amount of adjustment is displayed. Press **ENTER** to advance to the next zone. Continue making adjustments until all zones have been adjusted. To go back to a previous zone, press *****. The display automatically changes for adjustment of the green and blue colors.

Adjust all zones for each color until all dots are round.	
Use ◀ and ▶ to adjust horizontal and vertical dot size.	
Use ▲ and ▼ to adjust diagonal dot size.	
Press 0 to reset stigmator values to 0.	

Tip: For best results, position yourself a few feet from the screen so that the dots are easy to examine.

When all zones and colors have been adjusted, or **EXIT** is pressed, an Exit dialog box is displayed. Within the box the cursor is positioned on "Save". Press **ENTER** or **EXIT** to save the new settings; **ENTER** returns to the Service menu and **EXIT** returns to presentation level. To continue making adjustments, 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 Stigmators		
Save	No Save	Continue Adjust

*Note: Don't forget to set contrast (**CONT**) and focus (**PC** **4**) back to normal settings!*

Delete a Setup Memory ►

Press **8** from the Service menu to delete one of the projector's Input or Recall memories. The projector provides space for up to 80 setup memories (Input and Recall combined). In the event that memory space becomes full, memories containing setups which are currently not used may have to be deleted to make room for new sources. It may also be desirable to delete older unused memories so that the memory display lists (accessible through the Utilities menu) only show memories which are currently in use.

When the dialog box is displayed, enter the setup memory you want to delete. Input memories are entered by pressing **[SOURCE]** followed by a switcher number (0-9) and a slot number (1-9). Recall memories are entered by pressing **[RECALL]** followed by a two digit Recall memory number (01 to 99). When complete, press **[ENTER]** to proceed with the deletion. You may continue to delete other memories or press **[EXIT]** to leave the dialog box.

8

Delete a Setup Memory

Enter memory to be deleted.

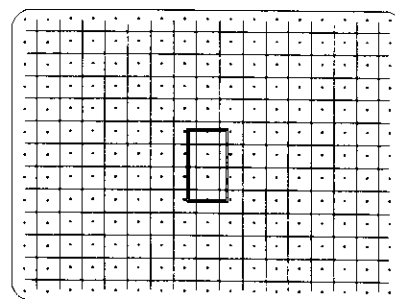
R 0 4

Press <ENTER> to delete

Note: You cannot delete the currently active memory.

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 **[I]** 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 wish to go back to a previous zone, press **[*]**. Also, the following reset functions are available:

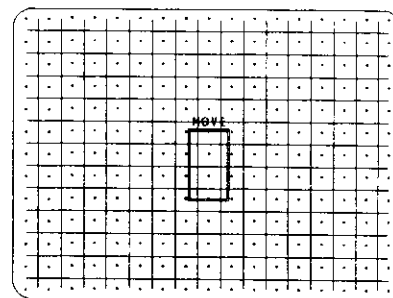
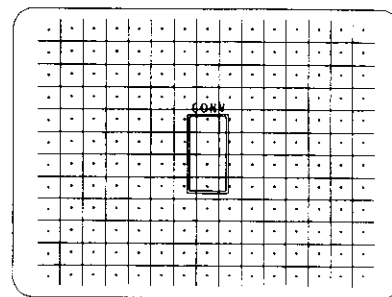
- Press **[0]** to reset static and dynamic values.
- Press **[1]** to reset static values only.
- Press **[2]** to reset dynamic values only.

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; **[ENTER]** returns to the Service menu and **[EXIT]** 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

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.

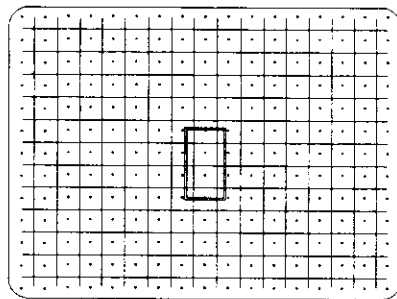
When adjustment is complete, press **[EXIT]** to display the Exit dialog box. Press **[ENTER]** or **[EXIT]** to save the new settings; **[ENTER]** returns to the Service menu and **[EXIT]** returns to presentation level. To continue adjustment from where you left off upon exit, move the cursor to "Continue 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.

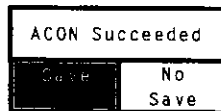
ACON Offset ►

The ACON Offset function is used to make static offset corrections of the red and blue colors to optimize the accuracy of the ACON system. Red and blue static offsets are stored in global memory. This function should be used only if the red and blue colors are consistently offset from the green after ACON convergences are performed.

To begin ACON Offset, press **[3]** from the Convergence Service menu. An ACON (Center Only) operation is then performed. When it is complete an internally generated red and green crosshatch is displayed with a rectangular box at the center. Use **[▲]**, **[▼]**, **[◀]**, or **[▶]** to adjust the position of the red onto the green within the box. Then press **[ENTER]** to change the colors to blue and green. Similarly, use **[▲]**, **[▼]**, **[◀]**, or **[▶]** to adjust the position of the blue onto the green within the box. To go back to red and green, press **[ENTER]** once more.



When adjustments are complete, press **[EXIT]** to display the Exit dialog box. Press **[ENTER]** or **[EXIT]** to save the new settings; **[ENTER]** returns to the Service menu and **[EXIT]** returns to presentation level. To continue making adjustments, move the cursor to "Continue Adjust" then press **[ENTER]** or **[EXIT]**. To discard your changes, select "No Save".



ACON Stacking ➤
Functions
 (items 4 through 7)

ACON Stacking allows you to quickly and accurately super-impose two projected images using ACON to assist you. Stacking is sometimes used in high-end video applications to produce a higher brightness image. Without ACON II and version 3.1 or higher software, projector stacking can be very difficult to set up. Using this new feature, projector stacking is greatly simplified and is much faster to perform.

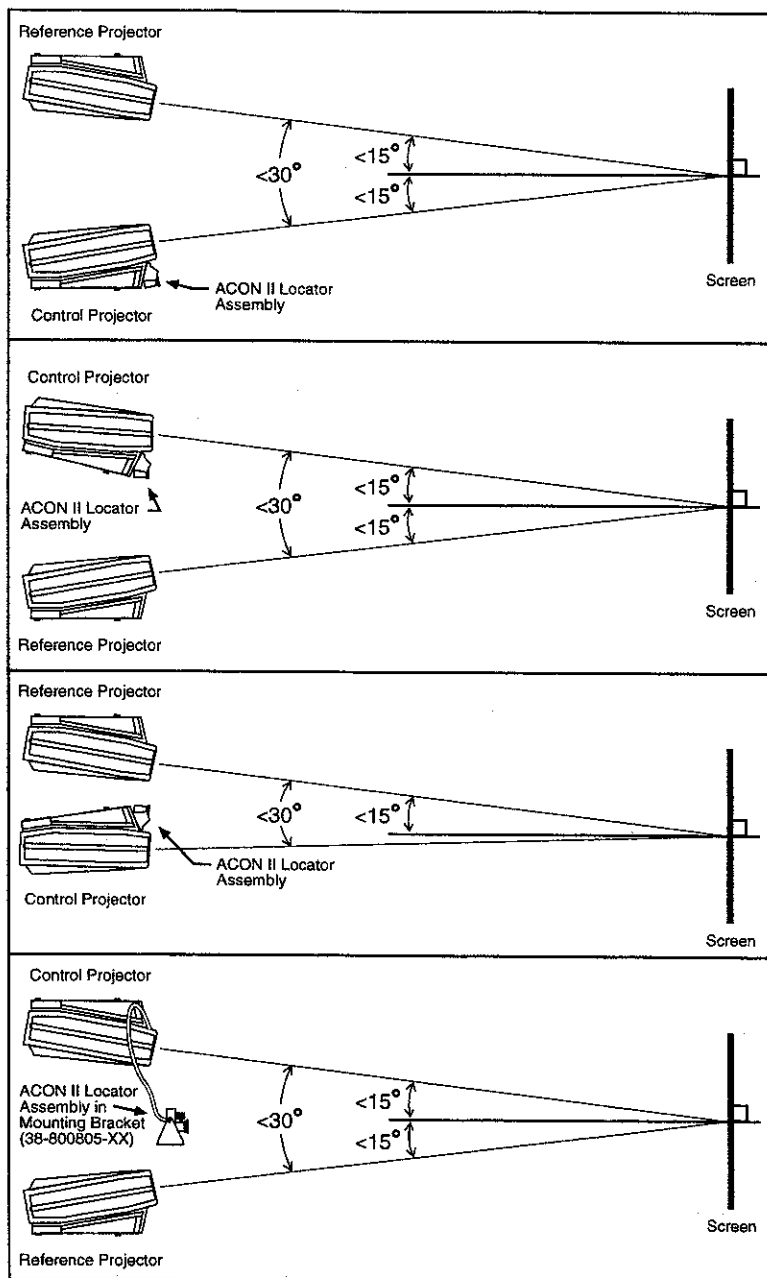


Figure 4-12. Supported Configurations

The minimum hardware involved in an ACON Stacking installation is as follows:

- 2 *Marquee* 8100+, 8500, 8500LC, or 9500LC projectors (stacked vertically)
- ACON II installed in one or both projectors
- a single video source for distribution to both projectors
- an interface installed in one of the projectors that supports loop-through of the source input signal to the other projector (e.g., RGB Loop Thru Module or Video Decoder), or an external distribution amplifier to distribute the source input signal to both projectors.
- appropriate signal cables for source connections
- an RS-232 cable to serially link the two projectors

Refer to Figure 4-12. Four supported stacking configurations are shown. The projectors are positioned in a vertical column. The usual rules for projector positioning apply.

One of the projectors is designated as the "Control" projector and the other is the "Reference" projector. Both projectors are fed the same source input signal and are linked together by an RS-232 serial cable. The Control projector includes ACON (ACM and Locator Assembly). The Locator Assembly may be mounted at the front of the projector or externally mounted using the optional mounting bracket (38-800805-XX) and extension cable (38-800903-25 or 38-800903-50).

For the installation, the Reference projector must be completely set up in a normal manner, both optically and electrically. The Control projector is similarly set up with its image roughly aligned with that of the Reference projector. However, for the Control projector (only), instead of performing a manual green convergence to overlap the green rasters then a standard convergence, an ACON Stacking operation (full or touchup) is performed. This function converges the red, green, and blue rasters of the Control projector to the green raster of the Reference projector automatically. Green convergence and standard convergence on the Control projector are adjusted with only one step.

From the Convergence Service menu the following ACON Stacking functions are available: *ACON Stacking (full)*, *ACON Stacking (touchup)*, *Stacking Setup*, and *Copy From Reference*.

Item 4, *ACON Stacking (full)*, performs a full alignment of the red, green and blue rasters of the Control projector to match the green raster of the Reference projector. This function is useful for new stacking installations.

Item 5, *ACON Stacking (touchup)* is similar to full stacking (above) except that it uses a slightly different adjustment routine which is faster yet very accurate if only minor touch-up is required. It is useful for maintaining the registration of stacked projectors.

Item 6, *Stacking Setup* is used to tell the Control projector what the projector number is of the Reference projector. The Reference projector must have its own unique projector number and the Control projector must know what it is in order for the two projectors to properly communicate with each other via the RS-232 serial link.

Item 7, *Copy From Reference* is a time saving utility which allows you to copy the geometry and retrace parameters from the Reference projector to the Control projector to provide a closer starting point for rough alignment prior to a stacking operation.

Hardware Connections for ACON Stacking Installations

Figure 4-13 shows the hardware connections for three different ACON Stacking installations.

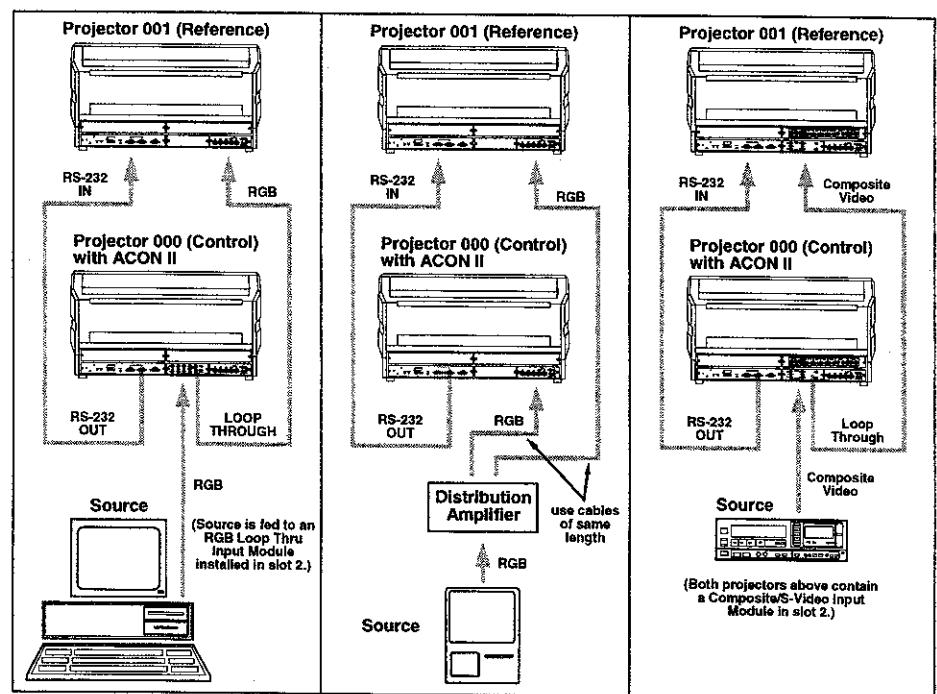


Figure 4-13. Wiring Examples

Source Connections

The source signal is fed to both projectors by one of two methods: 1) the signal is fed to a loop through module installed in slot 2 of one of the projectors then it is passed on to one of the inputs of the other projector, or 2) the signal is fed to a video distribution amplifier then is output to both projectors. There is an advantage when using a video distribution amplifier in that the signal cables feeding both projectors can be of identical length. This can prevent possible differences in picture phase. In a loop-through scenario the cabling differences between the two inputs may cause the display of the pictures to be out of phase with each other. However, this can be compensated for using projector controls (explained later in the section). In all cases it is good practice to keep cable lengths to a minimum. If using a video distribution amplifier, use cables of the same length.

RS-232 Serial Connections

Connect an RS-232 serial communications cable between the connector labelled "RS-232 OUT" on the Control projector and the connector labelled "RS-232 IN" on the Reference projector. Cable details are provided in the projector's user's manual. Make sure the cable length is appropriate for the installation. Avoid excessively long cables.

Projector Positioning and Pre-Stacking Adjustments

Before you begin to use the stacking functions, do the following:

Reference Projector

- Make sure the projector is in its final position.
- Set the projector's identification number to a number other than that which is used by the Control projector (**UTIL** **6** **2**). Typically the Reference projector is 001.
- Select the source using the Source command. For example, if the source is connected to an input module installed in slot 2 of the projector, press **SOURCE** **0** **2** to select it.
- Adjust the source image for an optimal display. This includes all geometry and convergence adjustments. If an optical alignment is necessary, do it first. If the projector includes ACON it may be used to perform an automatic convergence.

Control Projector

- Select the source using the Source command. For example, if the source is connected to an input module installed in slot 2 of the projector, press **SOURCE** **0** **2** to select it.
- Adjust the physical position of the projector as required. Its position should be such that its raster display is centered and is horizontally and vertically aligned with the raster display of the Reference projector.
- Set the projector number to a number other than that which will be used by the Reference projector. Typically the Control projector is 000 and the Reference projector is 001.

Note: Make sure that projector commands sent to the Control projector (via keypad or RS-232) are only recognized by the Control projector. If any other projector responds to the commands selected, conflicts may occur and the stacking process may fail.

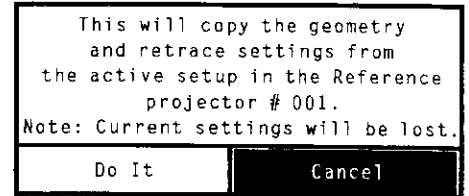
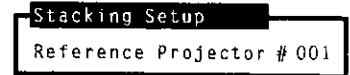
ACON Stacking Setup Procedure

Note: If performing a touch-up only, skip steps a) to d) below.

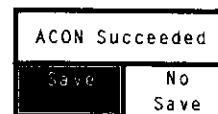
- a) Display a crosshatch on both projectors.

Note: From this point on, all commands are made to the Control projector only.

- b) From the Convergence Service menu, select item 6, *Stacking Setup*. Enter the identification number of the Reference projector then press **ENTER**. The projector checks to make sure the referenced projector is connected to the serial port. If it is not, an error message is displayed.
- c) From the Convergence Service menu, select item 7, *Copy From Reference* to automatically copy the geometry and retrace parameters from the current setup memory of the Reference projector to the current setup memory of the Control Projector. A dialog box is displayed. Select "Do It" to proceed. To abort the function, select "Cancel".
- d) Adjust the geometry on the Control projector using the functions in the Geometry menu to align the crosshatch with that of the Reference projector as closely as possible. Since the ACON Stacking operation adjusts only zonal convergence settings and not geometry settings, a minor banding effect may result if the differences between the geometry of two images are large. To minimize banding, adjust the geometry as best you can to reduce the extent of ACON adjustments required.
- e) If the difference in geometry between the two images is still larger after step d), it may be necessary to use Green Interpolated to approximately match the top and bottom edges of the crosshatch (only). This is a temporary adjustment to assist the ACON sensor.
- f) From the Convergence Service menu, select item 4, *ACON Stacking (full)* to performing a complete ACON Stacking setup. If you only want to do a touch-up of the setup, select item 5, *ACON Stacking (touchup)*. For both functions, the system begins by making sure there is proper serial communications between the two projectors. The system also checks input sync frequencies to verify that the same signal is present at both projectors. If a problem is detected, an error message is displayed, otherwise the process begins whereby ACON aligns the red, green and blue rasters of the Control projector to match the green raster of the Reference projector. Should ACON encounter a problem during the process, an error message is displayed. Refer to the troubleshooting entry for more information about error messages. If you must interrupt the process before it is complete, press **EXIT** and wait for a dialog box to appear. Select "No Save" to exit without saving the new convergence values and return convergence to its original settings. Select "Save" to save the new convergence values adjusted so far and terminate the process. Select "Continue" to continue the process from where it was interrupted.



When the ACON Stacking process is complete, a dialog box is displayed. Press **ENTER** or **EXIT** to save the new convergence settings; **ENTER** returns to the Service menu and **EXIT** returns to presentation level. To discard the new convergence settings and restore the previous settings, select "No Save".



- g) If step f) was successfully completed, display the external image on both projectors. If the Control projector's image appears out of phase with the Reference projector's image, it is most likely due to signal cabling differences. The system aligns only internal rasters and not the external picture. This problem can be easily corrected by adjusting the horizontal phase until the two external images match. If the phase adjustment resolution does not allow for an exact match, a green static convergence adjustment (item 1 or 2 in the Convergence Service menu) may be made for precise alignment of the two images.

Notes: 1) Do not use convergence alone for positioning, always adjust phase first. 2) If there are major horizontal shifts between the colors of an image, it may mean that the RGB cables are not the same length. Use a manual convergence mode to correct this type of centering error.

ACON Stacking Troubleshooting

If ACON encounters a problem during an ACON Stacking process, an error message is displayed. Some of the more common messages are listed below. In most cases the error message displayed indicates how to resolve the problem. If you cannot resolve an ACON Stacking problem, contact Electrohome technical support for assistance.

Message: Please make sure that the Reference projector number entered is different from the Control projector.

If the identification number of the Reference projector entered in the Stacking Setup dialog box is identical to the number of the Control projector, the ACON Stacking operation cannot be performed. To correct this, select item 6, *Stacking Setup* from the Convergence Service menu then modify the Reference number to match that of the Reference projector. Make sure that it is different than that of the Control projector.

Message: Reference projector not responding. Please check the RS-232 connection and Reference projector number.

If the Reference projector is not properly connected via the RS-232 link or if its number does not match the number entered in the Stacking Setup menu, the ACON Stacking operation cannot be performed. To correct this, check the RS-232 connection and verify the identification number of the Reference projector by pressing **PROJ**. Check if that number matches the number entered in the Stacking Setup menu.

Message: Control and Reference projector do not have the same external signal. Please check cables and source selected.

ACON Stacking requires that both projectors have exactly the same external signal connected to them. If the sync frequencies detected by the two projectors are different, or if a sync error is reported, then the stacking operation cannot proceed. To correct this, check the signal cables for proper routing. Verify that both projectors display the same external image.

Message: The DPB Modules appear to use different versions of hardware. You may have differences in the horizontal size of the external picture between the projectors.

There are different hardware versions of the Deflection Processor Board (DPB) which use different techniques and constants to synchronize to the external picture. If the two projectors used for stacking have different versions of DPB modules, the result may be that each external picture has a different horizontal size, even when the internal rasters are matched. To correct this, replace one of the DPBs with a compatible one so that both projectors use the same mapping of the internal picture to the external picture. You can also accept the size difference and correct it manually (by adjusting horizontal size) after the stacking operation is complete. However, this will result in a horizontal size difference of the internal raster. Menus and internal patterns will appear doubled and blurry when displayed.

Message: Reference projector cannot start stacking. Please exit the current operation on the Reference projector.

This message is displayed if the Reference projector is busy performing an operation that requires the user to exit via an Exit dialog box. For example, if the Reference projector is in the middle of a convergence while the Control projector is trying to perform a stacking operation, the above message will be displayed. Exit does not occur automatically. This message may also occur if the Reference projector is powered down.

4.3 Troubleshooting Guide

The following guide contains a number of notes to assist you during troubleshooting. Please also refer to the rear panel LEDs for initial troubleshooting (Figure 4-14). To use the guide, find the subsection for the type of problem you are observing. For example, if the problem appears to concern the horizontal deflection circuits, refer to the Horizontal Failures portion of the guide. Please note that the guide assumes that supply voltages and returns have been verified for the particular module under consideration. **In some cases, open supply resistors on that module may be the only problem.**

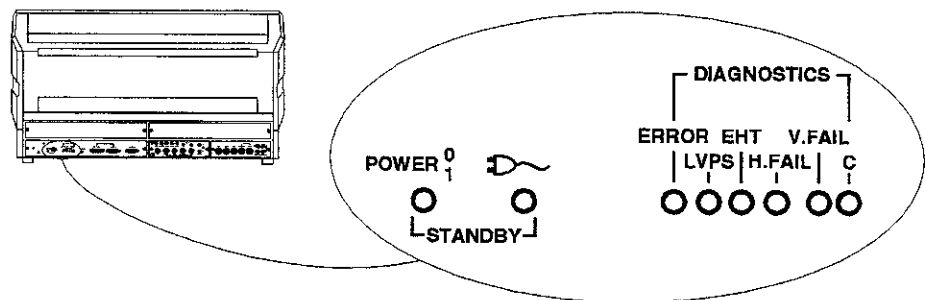



Figure 4-14. Rear Panel LEDs

Horizontal Failures ➤

(A horizontal failure has occurred when the H.FAIL LED is illuminated).

1. Check the horizontal yoke plugs on the HDM to ensure that they are seated properly and not mispinned.
2. Check that the HDM itself is seated properly in its edge connector on the Upper Mother Board.
3. Check for the horizontal drive pulse, H-DRIVE, from the DPB at PC12-8 on the HDM. If absent, a DPB failure is likely. (The DPB is mounted on the Control Board and is an integral part of the CLM; however it is available as a separate service item).
4.  If steps 1 to 3 check out, find the yoke coil drive on the HDM; P2-11 (red), P4-11 (blue), and P5-11 (green). At these points you should observe an analog waveform of approximately 1500 Vpp (depending on the width setting of projector) at the frequency of the drive source. If any are missing or distorted then the HDM itself is probably defective, but you must also check the configuration signals for the HDM from the DPB:

FREQUENCY	YOKE-SERIES	CAP-SW	SW-15
15 to 30 kHz	HIGH	HIGH	HIGH
>30 to 45 kHz	HIGH	*HIGH/LOW	LOW
>45 to 59.5 kHz	HIGH	LOW	LOW
>59.5 to 100 kHz	LOW	*HIGH/LOW	LOW
>100 to 130 kHz	LOW	LOW	LOW

Where: YOKE-SERIES is from DPB via CLM PA2-15 to HDM PC12-4.

CAP-SW is from DPB via CLM PA2-14 to HDM PC12-7.


SW-15 is from DPM via CLM PA2-10 to HDM PC12-29.

Note: * - HIGH if set to long retrace, LOW if set to short retrace.

BAND-SWITCH - An active high signal output from the DPB to the HDM.
 SCAN-FAIL - An active high signal from the HDM to the VIM and DPB.
 Both signals become active when the projector switches between input sources, or there is a change in horizontal frequency greater than 100 Hz, or a change in vertical frequency greater than 1 Hz. BAND-SWITCH keeps the high voltage power supply from shutting down during a source switch. In the case of an actual failure, SCAN-FAIL will remain high after BAND-SWITCH returns low and an H. Fail condition will result.

Vertical Failures ► (A vertical failure has occurred when the V-FAIL LED is illuminated).

1. Check the vertical yoke plugs on the VDM to ensure that they are seated properly and not mispinned.
2. Make sure that the ribbon cable and Interconnect Board at the bottom of the VDM is attached to the Upper Mother Board and that it is not pinched.
3. Check for the vertical drive pulse, V-DRIVE, from the DPB via the CLM(PC2-12) to the VDM(PC13-1). If not present at this point the DPB is the probable reason for failure.
4. If the vertical drive pulse is present, check for the vertical coil drive waveform at each one of the vertical yoke plugs. At P5-1 for red, P6-1 for green, and P7-1 for blue you should observe a 50 Vpp analog waveform at the vertical frequency of the source. If this waveform is missing, a failure of the VDM itself is probable. A defective yoke is also a possibility, but not likely.

- Focus Failures** ►
1. Make sure the Focus leads are not reversed - ie., Blue on Red, or Red on Blue.
 2. Ensure that the problem is not optical by following the Guided Mechanical Setup tutorial from the help menu. Follow the instructions on the screen for optical lens focusing.
 3. Static focus is the overall focus for each color. Check each focus coil plug; P101-3 for red, P201-3 for green, and P301-3 for blue. A +15 Vdc to -15 Vdc level should be observed at these points dependant upon the setting of the Focus parameter ( 4). Digital information driving the serial DACs on the FCM is from the CLM, therefore either the CLM or FCM could be responsible for problems in this area.
 4. Dynamic Focus - Must be separated into two categories TOP/BOTTOM and LEFT/RIGHT.

- a) T/B Evaluation - Ensure that the R, G and B vertical focus waveforms are entering the FCM from the VDM as follows:

COLOR	NAME	VDM	FCM
red	RV-FOCUS	PA13-14	PC11-15
green	GV-FOCUS	PA13-15	PC11-14
blue	BV-FOCUS	PA13-16	PC11-13

The levels of these waveforms are controlled by serial data from the CLM. If the waveforms are present at the FCM and levels are adjustable, the FCM itself is the probable cause of failure. The actual amplified waveforms driving the focus coils are available at P101-3 for red, P201-3, for green, and P301-3 for blue.

- b) L/R evaluation- Ensure that the R,G, and B horizontal focus waveforms are reaching the FCM from the CLM as follows:

COLOR	NAME	CLM	FCM
red	RH-FOCUS	PC2-9	PA11-15
green	GH-FOCUS	PC2-10	PA11-14
blue	BH-FOCUS	PC2-11	PA11-13

Level control of these waveforms is the responsibility of the CLM. If waveforms are present and adjustable at the input of the FCM, the configuration control (BAND-SW) to the FCM from the DPB must be evaluated at specific horizontal frequencies as follows:

FREQUENCY	BAND-SW0 (PA11-9)	BAND-SW2 (PA11-10)	BAND-SW4 (PA11-10)
15 to 60 kHz	HIGH	HIGH	LOW
60 to 85 kHz	HIGH	LOW	HIGH
85 to 113 kHz	LOW	HIGH	HIGH
113 to 130	HIGH	HIGH	HIGH

The actual focus coil drive waveforms are available at P101-1 red, P201-1 green, P301-1 blue on the FCM. If these waveforms are not present, clipped, or at an extremely low amplitude, the FCM is likely in failure.

Convergence ► Failures

1. There are two convergence signal types to look at: Dynamic and Static.
 - a) Dynamic Convergence - The dynamic convergence waveforms are produced and level adjusted on the CLM and then sent to the CVA module. The connections are as follows:

WAVEFORM	CLM	CVA
RH-CONV	PA2-5	PC14-1
RV-CONV	PC2-5	PC14-2
GH-CONV	PA2-6	PC14-5
GV-CONV	PC2-6	PC14-6
BH-CONV	PA2-7	PC14-9
BV-CONV	PC2-7	PC14-10

The final coil drive waveforms can be observed at the yoke plugs on the CVA as follows:

WAVEFORM	PIN
RH-CON-H	P1-3
RV-CON-H	P1-2
GH-CON-H	P3-3
GV-CON-H	P3-2
BH-CON-H	P5-3
BV-CON-H	P5-2

If the input waveforms are present and adjustable, the CVA module is most likely at fault. Coil failure is a possibility but unlikely. To check for this you can swap yoke plugs on the CVA to see if the problem follows. Remember that if you swap red with green, for example, and are adjusting the red convergence, the result will be seen on the green CRT.

- b) Static Convergence - This is movement of the complete raster in either a N/S or E/W direction. The control for this is serial data from the CLM driving DACs on the HDM and VDM for E/W and N/S static convergence respectively.
- 2. If the problem is with one color only, check for open (burned out) resistors on the CVA. Specifically, check the low value resistors identified on the schematic as safety components.

Geometry ►

- 1. Typically most failures involving geometry are associated with the VDM or CLM. Most geometry waveforms are produced on the VDM and selected and controlled by the CLM. The fundamental waveforms produced within the VDM to create the geometry waveforms are RAMP, CLPARA, and PARA. The other geometry waveforms are either scaled versions or scaled combinations of these. Two of these waveforms, KEY-PIN and SKEW, are used by other modules. KEY-PIN goes to the HDM, while SKEW goes to the CVA. These modules must therefore be evaluated when dealing with keystone, side pincushion and skew problems.

Sync Failures ►

- 1. The VIM is the primary module that processes sync. Within the VIM, relays pass the sync through to the processing circuitry. When more than

one type of sync is available from a particular source, the processing circuit chooses the sync type with the highest priority. Separate H and V sync has the highest priority, followed by composite sync, followed by sync-on-green. The processing circuitry also inverts the sync if necessary to ensure that the module's sync outputs to the DPB, H-SYNC and V-SYNC are always positive going. H-SYNC is output at PA3-10 and input to the DPB via the CLM at PC2-20. V-SYNC is output at PC3-23 and input to the DPB via the CLM at PA2-20.

- 2. Sync problems are most likely the fault of the VIM, but may also be caused by the DPB. Horizontal jitter problems are most likely the fault of the DPB but may be due to the HDM. The frequencies of the H-DRIVE and V-DRIVE pulses output from the DPB must match those of the H-SYNC and V-SYNC inputs (unless using internally generated frequencies), otherwise a DPB problem exists.

Video Failures ►

- 1. The primary modules involved with the video signal (internal and external) are the VIM, VNBs (x3), CLM and DPB.
 - a) Internal Video - The test patterns and menus are examples of internally generated video. The text and test pattern generator is located on the CLM and its signals are sent to the VIM as follows:

SIGNAL	CLM	VIM
R-INT-VID	PC2-25	PC3-20
G-INT-VID	PC3-22	PC3-22
B-INT-VID	PC2-23	PC3-24

Switching between internal and external video is done on the VIM, but the signal that is responsible for this (INT/EXT) is generated by the CLM. INT/EXT exits the CLM at PC2-22 and enters the VIM at PA3-32. The signal goes high for internal video. The CLAMP pulse is also generated by the CLM and input to the VIM for dc restoration of the video signal. The CLM uses a clock signal, PIXCLK, from the DPB to generate the text and test patterns. PIXCLK problems are evidenced by locked but unstable internal video patterns.

- b) External Video - Enters the VIM and is sent up to each VNB as follows:

SIGNAL	VIM	VNB
R-VIDEO	J6	Red VNB - J1
G-VIDEO	J7	Green VNB - J1
B-VIDEO	J8	Blue VNB - J1

The level of the video signal at the point of entry on the VNB depends on the contrast setting. The video signal is amplified and then applied to G1 and K of each CRT. Typical amplitudes at these points will be around 80 Vpp at a contrast setting of approximately 60%.

- c) G2 - The G2 control voltages are developed on the CLM and output to the HVPS via the Backplane Mother Board (BMB). The control voltage ranges from 0-10 Vdc.

SIGNAL	CLM	BMB
R-G2-CONT	PC1-27	P5-9
G-G2-CONT	PC1-28	P5-8
B-G2-CONT	PC1-29	P5-7

The G2 supply voltages from the HVPS are applied individually to each VNB at the G2 lug (P4). This voltage is typically between 400 to 800 Vdc and is dependant upon control voltage input from the CLM. An active high G2-INHIBIT signal is output from the VIM to the HVPS in response to a scan failure, video over-current condition, or an active high BAND-SWITCH signal. When G2-INHIBIT is high, it will turn the G2 supply voltages off.

- d) OVER-I - An over-current signal is generated by each of the VNBs and sent to the VIM via the Upper Mother Board (UMB) as follows:

SIGNAL	UMB	VIM
R-OVER-I	P11-11	PC3-15
G-OVER-I	P12-11	PC3-17
B-OVER-I	P13-11	PC3-19

OVER-I is an output from opto-coupler U3 on each VNB that represents the beam current being drawn by the CRT. If the dc level from this opto-coupler exceeds 2.5 Vdc, the HVPS will shut down. OVER-I should go high in cases of CRTs drawing an excessive amount of beam current. To troubleshoot problems of this type, disconnect the red anode lead from each CRT to the HV Splitter. Disconnect one, then power up the projector. If the HVPS doesn't come up, turn the projector off, connect the lead back on to the CRT just checked and disconnect the next CRT. Repeat this procedure until all three CRTs are checked. If the high voltage doesn't come up at any point then there is a good possibility that the HVPS itself is defective.

Note: Another way to determine VNB or VIM failures is the swap the RCA cables on the VIM to switch color paths.

At times, faulty opto-couplers will cause HVPS shutdown. Symptoms of this are: as you increase contrast the HVPS shuts down and within a few seconds the image reappears out of focus and expanded then slowly comes into regulation. To check for this, press **COLOR** then **1** for red, **2** for green and **3** for blue. With one color on, drive the contrast level up and see if the image blanks out for that particular color. If it does, that VNB should be replaced. If replacing the particular VNB does not help, then replace the VIM.

WARNING: THE HVPS IS NOT SERVICEABLE; IF FAULTY, IT MUST BE REPLACED.

Low Voltage Power Supply ►

- 1) Low Voltage Power Supply (LVPS) failures will cause the red LVPS LED on the rear of the CLM to illuminate. There are instances when failures on other modules that short LVPS rails to ground will cause this LED to illuminate or pulse on and off (as the module "crowbars"). The modules that most often cause such false indications of LVPS failure are the HDM, FCM, CVA, VDM, SAB, and VNBs. When the LVPS light is on you should unload each one of these modules individually and see if it goes off. If it does not, there is a good possibility that the LVPS is defective.

WARNING: THE LVPS IS NOT SERVICEABLE; IF FAULTY, IT MUST BE REPLACED.

4.4 Software Upgrade Procedure

This subsection provides instructions for upgrading the projector to include later version software and language updates. Upgrade kits are available from Electrohome, and in most cases, the upgrade kit includes instructions for installation. The following instructions may be used if upgrade instructions are not provided with the replacement IC components.

A typical software version upgrade requires that ICs U35 and U16 on the Control Board (the main board of the Control Module) be replaced. For language update, *Marquee Librarian* software and a *Marquee Languages* software disk is required.

Tools & Equipment Required:

- Phillips screwdriver
- slot screwdriver
- PLCC extraction tool
- IBM PC or compatible computer with 3.5", 1.44 Mb floppy drive

Step 1 - Save Existing Settings using Marquee Librarian (optional)

Replacement of the software ICs will cause a Complete Projector Initialization to occur. This erases all stored setups and display settings. Using *Marquee Librarian* software (available from Electrohome) with a computer and serial cable, you can easily copy the projector's settings to the computer before you change the software ICs, then restore the settings once software installation is complete. To do this, refer to the *Marquee Librarian* user's manual (provided with *Marquee Librarian* software) for details.

Step 2 - Turn Power Off and Unplug the Projector

Step 3 - Remove Control Module

Loosen the two retaining-type screws securing the Control Module to the projector.

Step 4 - Remove Stigmator Waveform Board

Note: Skip this step if the projector is an 8110+. The 8110+ does not have a Stigmator Waveform Board.

Locate the Stigmator Waveform PCB mounted to the Control PCB. See Figure 4-15. Remove the three securing screws as shown. A header at the rear bottom face of the Stigmator Waveform PCB connects to a mating connector on the Control PCB.

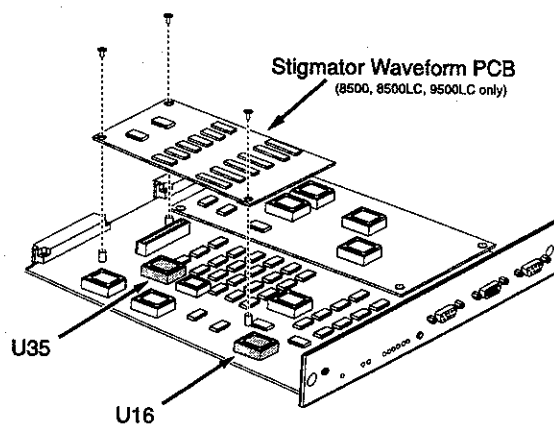


Figure 4-15. Software ICs

The Stigmator Waveform PCB is firmly secured to the Control PCB by three screws. After removing the three screws, carefully and slowly lift the Stigmator Waveform PCB off the Control PCB. When lifting the board, hold it at the front and back ends, making sure that it remains parallel to the Control PCB until it is free.

Step 5 - Replace Software ICs

Locate U16 on the Control PCB. Using a PLCC extraction tool, remove the IC then replace with the new one. Make sure you are inserting U16 (not U35) into the socket. For insertion, align pin 1 of the IC with the pin 1 indicator in the socket. Be careful not to damage the pins of the socket or the PROM.

Now locate U35 and replace per instructions above.

Notes: 1) There are many ICs on the Control PCB which appear similar. Make sure you properly identify the IC before replacing it. 2) Do not use a screw driver to remove ICs.

Step 6 - Install the Stigmator Waveform Board

Carefully place the Stigmator Waveform PCB back into its original position then secure it with the three screws.

Step 7 - Install the Control Module and Power-up the Projector

Slide the Control Module back into the projector, ensuring that the card edge connectors insert fully into the sockets on the projector's backplane motherboard. Tighten the securing screws to secure the module.

Plug in the projector. The amber LED on the back panel should be illuminated. If it is not, unplug the projector then check the installation of U16 and U35. Make sure they are fully inserted and in the correct sockets. Also check for bent socket pins. Make sure that no pins are shorted and that all pins make proper contact.

If the amber LED illuminates after the projector is plugged in, press **POWER** to turn the projector on. The green LED labeled POWER should be on and the projector should automatically begin a Complete Projector Initialization. If the projector does not initialize, force an initialization by selecting "Reset Everything" from the projector's Projector Initialization service menu - from presentation level, press **UTIL** **9** < Service Password > **4** **3** **ENTER**.

Note: If after power-up the display appears too dark, the contrast level may be set too low for the current room lighting; increase the contrast level.

Step 8 - Use Marquee Librarian to Clear Flash ROM and Download Languages

IMPORTANT: DO NOT OMIT THIS STEP! If this step is not performed, odd projector behavior such as an unexpected Complete Projector Initialization may occur.

Refer to the "Getting Started" section of the *Marquee Librarian* user's manual. Install the *Marquee Librarian* software and make a serial connection between the projector and the computer as explained in the manual. Once the software is installed and running, and the projector and computer is connected, select function F6, *Alternate Language* to perform a language download. Use the *Marquee Languages* disk. Four languages are provided on the disk: French, German, Spanish, and Italian. Refer to the *Marquee Librarian* user's manual for download instructions.

Step 9 - Use Marquee Librarian to Restore Previously Saved Projector Settings

If you saved the previous projector settings using *Marquee Librarian*, proceed to restore the settings per instructions in the *Marquee Librarian* user's manual.

Note: The following steps must be performed immediately after the restore:

- a) Exit from *Marquee Librarian*.
- b) Set the keypad protocols to the appropriate values (via **UTIL** **6** **1**). Note that this step applies only to upgrades from V3.1 to V3.3. or higher.
- c) Power down then power up.

Failure to perform step b) before step c) may result in the projector being unresponsive to both the IR keypad and the wired remote keypad. In this case, an internal keypad must be used to reset the protocol.