

---

# Contents

<b>Glossary of Terms .....</b>	<b>1</b>
<b>Overview .....</b>	<b>2</b>
Regular Monitor .....	4
TV Only Monitor .....	4
Cabinet Access .....	5
Overhead Replacement .....	6
Lowering the Monitor .....	6
Raising the Monitor .....	9
Overhead Electronics .....	11
Selecting the Input Voltage .....	14
Receiver PCB .....	16
TV Only PCB .....	17
Video Processor PCB .....	19
Discharge Procedure .....	20
Video Output PCB .....	21
Power Transformer .....	22
Power Relay .....	25
<b>Adjustments .....</b>	<b>26</b>
Focus .....	26
Pincushion .....	27
Screen Size Adjustments .....	27
Screen Brightness .....	28
Maintenance .....	28
Monthly .....	28
Quarterly .....	28
<b>Cable Diagrams .....</b>	<b>29</b>

**Intentionally Blank**

---

## Glossary of Terms

To better understand the information presented in this section you should better familiarize yourself with these terms.

**Deflection Coil** - An electrical coil which directs the electrons generated inside a CRT to a particular location on the screen.

**Global Video** - The VCR video from the CMS Audio Box. It is called global video because it can be displayed on any monitor.

**LGP (Lane Group Processor)** - The electronic circuit board assembly that allows operation of a lane pair. This chassis is located on the curtain wall in installations that do not include a scorer console. If the installation includes a scorer console, the LGP is located in the primary console (left lane).

**LLAN (Local Local Area Network)** - A term used to describe the communication used by an LGP to communicate to circuits boards within a lane pair. It is referred to as a local LAN because it is exclusive to a lane pair.

**Pincushion** - A distortion of the CRT screen that causes the sides or top and bottom of picture to bend toward the center of the screen.

**Receiver PCB** - A circuit board located on the lower access panel in regular monitors that adapts the incoming video so that the Video Processor PCB can use it. The PCB also determines when to turn the monitor on or off.

**RGBS (Red, Green, Blue, Sync)** - A format of video describing the way in which the video is sent over the cable.

**TV Only Monitor** - A monitor that is used to display only the VCR video. This monitor cannot display scorer console information.

**Ceronix Monitor** - A monitor that is used to display the scoresheet video. The overhead monitors can also display VCR video if needed.

**TV Only PCB** - A circuit board located on the lower access panel in the TV Only monitor that adapts the TV/VCR video so that the Video Processor can use it. This PCB also determines when to turn the monitor on or off.

**Video Processor PCB** - A circuit board located in the back of the monitor that adapts the video so it can be displayed properly on the CRT. The Video Processor controls the coils attached to the CRT and sends the video to the Video Output PCB so it can be shown on the picture tube.

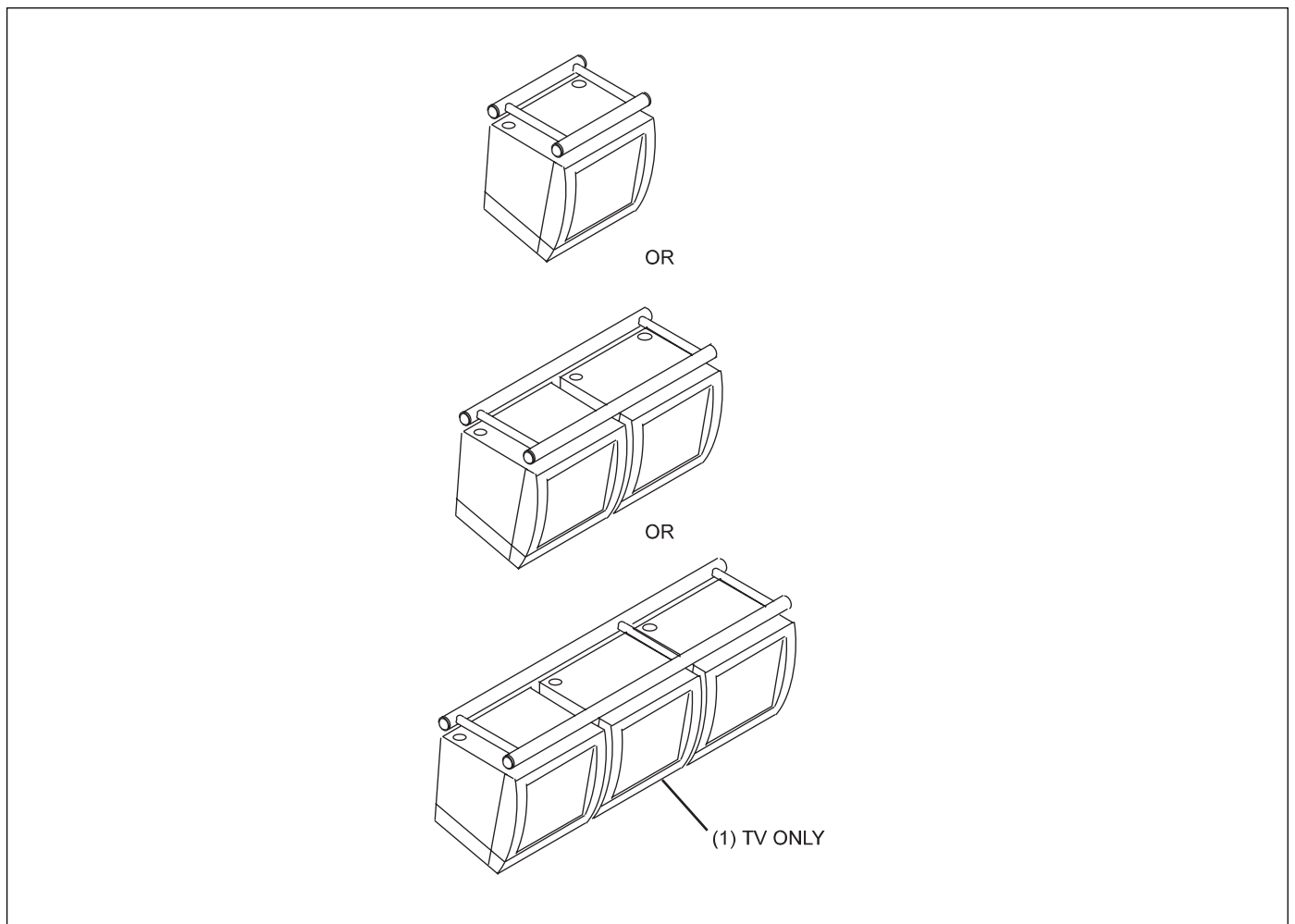
**Video Output PCB** - A circuit board located in the back of the monitor and attached to the back of the picture tube. This PCB is responsible for applying the video to the color guns located inside the picture tube.

**Watchdog Timer** - A device in a computer which monitors the operation of a circuit board and automatically resets the circuit board if activity stops.

---

## Overview

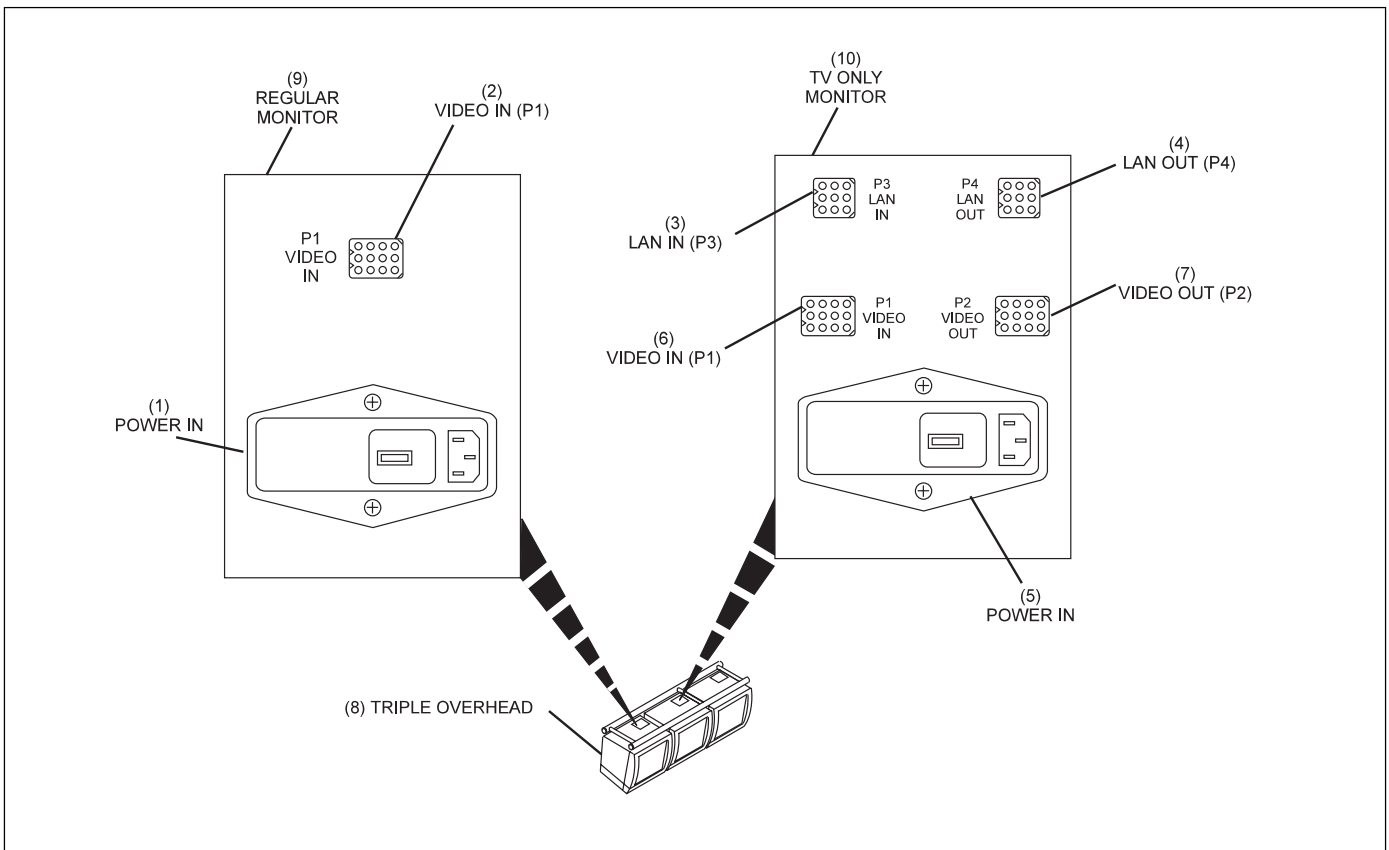
The Ceronix monitors are single lane units that can be arranged individually, in pairs, or as a triple configuration that includes a TV Only monitor. Refer to the figure titled *27" Ceronix Overhead Configurations*.



*Ceronix Overhead Configurations*

(1) TV ONLY

Two types of monitors are available: a regular monitor that is capable of showing both a scoresheet and a VCR/TV picture and a TV Only monitor that can display only the VCR/TV picture. When working on the overheads it is important to identify the type of monitor because each contains a unique circuit board and is wired differently. An easy way to determine the type of overhead is to look at the connections at the top of the unit. The regular monitor will have a single video connector while the TV Only monitor will have a total of four connectors. Refer to the figure titled *Top View Comparison of the Regular Monitor and the TV Only Monitor*.



*Top View Comparison of the Regular Monitor and the TV Only Monitor*

- |                                 |                     |                                |
|---------------------------------|---------------------|--------------------------------|
| (1) POWER IN                    | (2) VIDEO IN (P1)   | (3) LOCAL AREA NETWORK IN (P3) |
| (4) LOCAL AREA NETWORK OUT (P4) | (5) POWER IN        | (6) VIDEO IN (P1)              |
| (7) VIDEO OUT (P2)              | (8) TRIPLE OVERHEAD | (9) REGULAR MONITOR            |
| (10) TV ONLY MONITOR            |                     |                                |

The connector functions on the overhead monitor are:

---

### Regular Monitor

1. **Power In** - Receptacle for the main power to the overhead. The input here can be 120VAC or 240VAC. This is selected through a voltage selection and fuse assembly built into the receptacle. Refer to *Selecting the Input Voltage* later in this section.
2. **Video In (P1)** - Input connection for the video coming from the Remote Video PCB located in the LGP. This video, through this cable, can be either the scoresheet, a message, or the VCR video.

---

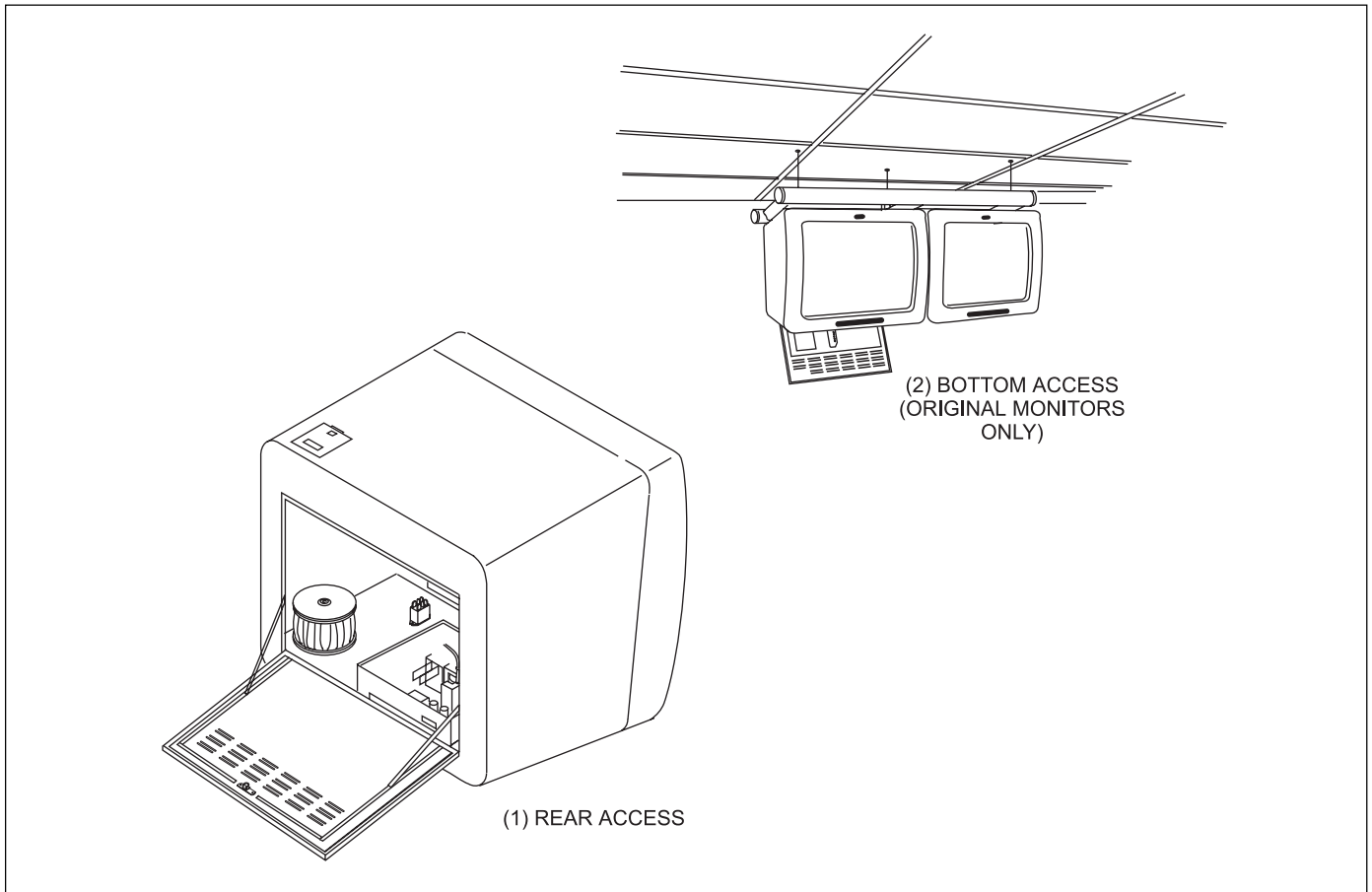
### TV Only Monitor

3. **LAN In (P3)** - Input for the LLAN originating at J2 of the LGP I/O PCB. The LLAN cable is routed through the Pinsetter Interface or GS Consolidated Electronics before it is sent to the TV Only monitors. Through this cable, the user can control the on/off operation of the monitor.
4. **LAN Out (P4)** - Output for the Local LAN. This connection connects to the BowlerTrack chassis for installations after January, 2000.
5. **Power In** - Receptacle for the main power to the overhead. The input here can be 120 VAC or 240 VAC. This is selected through a voltage selection and fuse assembly built into the receptacle. Refer to *Selecting the Input Voltage* later in this section.
6. **Video In (P1)** - Input connector for the global video cable originating at the Control Desk AV box. This cable daisy chains to all TV Only monitors. Refer to *Video Out (P2)*.
7. **Video Out (P2)** - Output for the global video continuing to the next TV Only monitor. Refer to *Video In (P1)*. If the video does not continue to another monitor, a termination plug is installed on the connector.

## Cabinet Access

Tools Required: 5/32" Allen head wrench or Phillips head screwdriver.

The circuit boards inside of the overhead can be accessed through panels located at the bottom of the cabinet. The method of opening the panel depends on the style of door. To open doors with Allen latches, turn the 5/32" Allen bolt counterclockwise until the latch unlocks and the panels swing open. To open doors equipped with screws, remove the two Phillips head screws located at the top corners of the door. Refer to the figure titled *Removal of the Circuit Board Access Panels*.



*Removal of the Circuit Board Access Panels*

(1) REAR ACCESS

(2) BOTTOM ACCESS (ORIGINAL MONITORS ONLY)

---

## Overhead Replacement

**NOTE:** Replacement of the picture tube inside the chassis may require the use of special tools and adjustment procedures. Because of this, it is suggested that tube replacement be performed by a qualified service dealer. If returning the unit for replacement, remove the monitor chassis from its cabinet. Do NOT return the cabinet or face plate.

### Lowering the Monitor

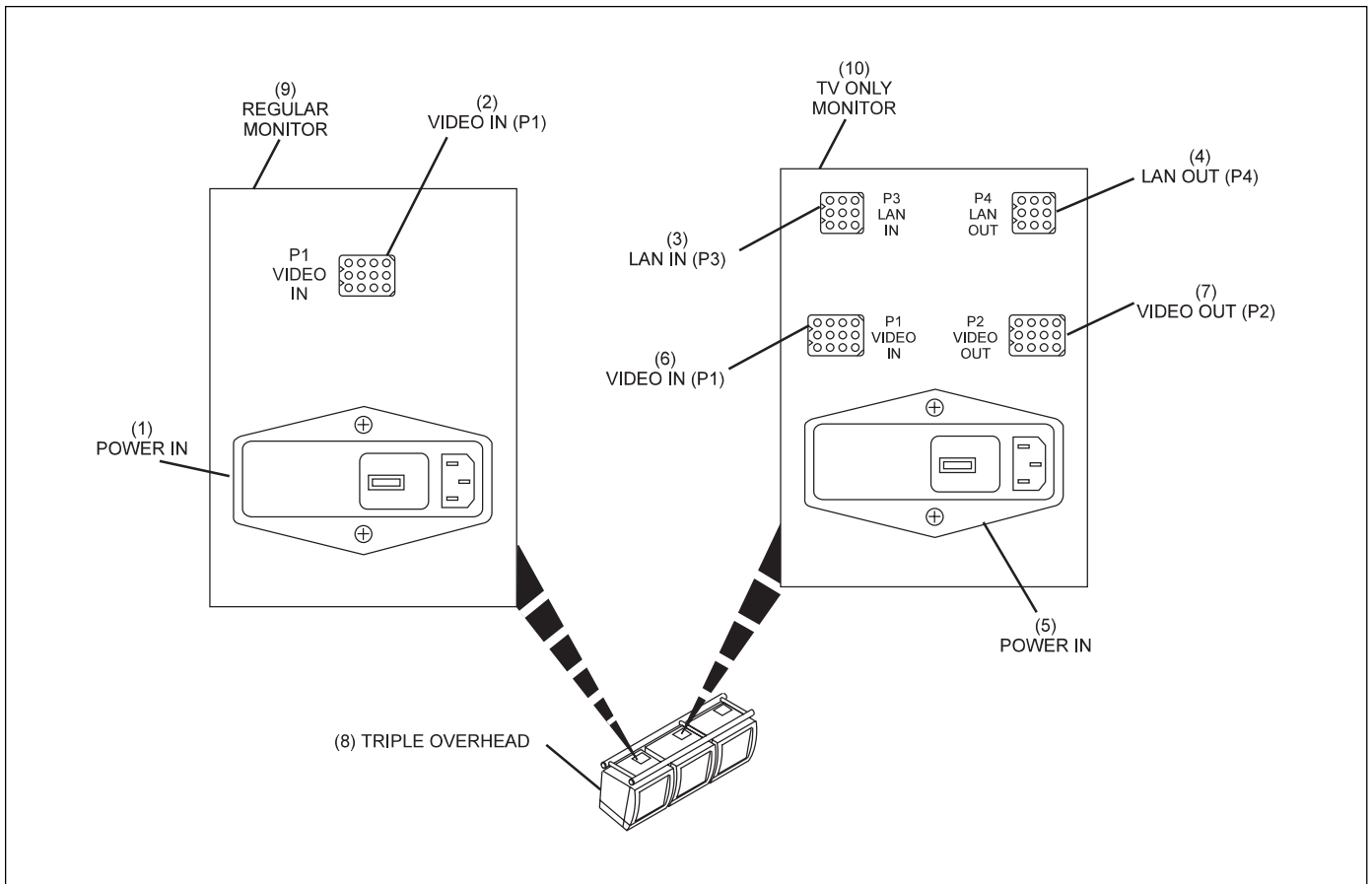
**CAUTION:** When lowering the monitor it is suggested that the monitors be lowered onto a carpeted dolly to avoid scratching the monitor cabinet and to aid in the transport of the unit.

Tools Needed: Winch with crank handle, Phillips head screwdriver

Suggested Tools: 3/8" Variable speed, heavy duty drill for use with adapter attachment and extension cord for drill

Should it become necessary to replace a complete overhead unit, or if you need to lower a monitor, perform the following steps:

1. Disconnect the following cables from the overhead:
  - a. AC power cable (All monitor types)
  - b. Video Input (P1) (All monitor types)
  - c. Video Output (P2) (TV Only monitor)
  - d. LLAN In (P3) (TV Only monitor)
  - e. LLAN Out (P4) (TV Only monitor)



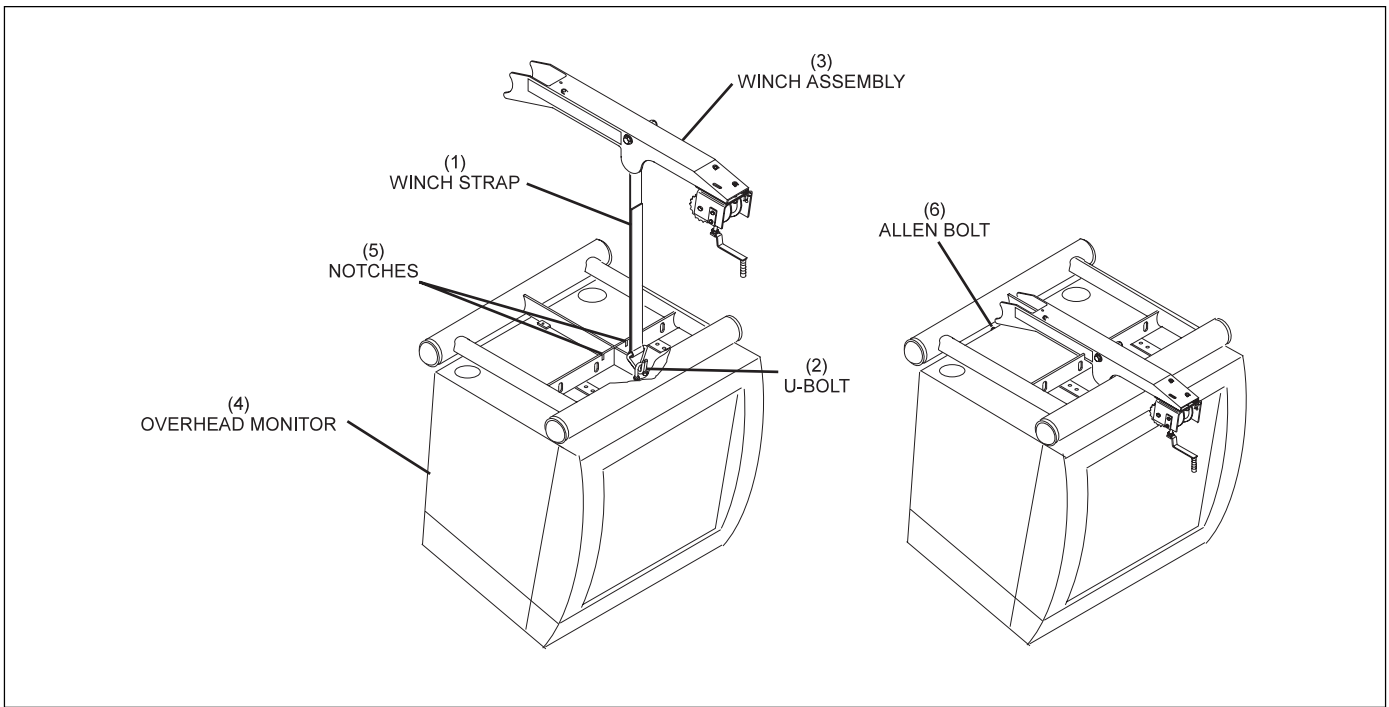
*Overheads - Top View*

- |                      |                     |                     |
|----------------------|---------------------|---------------------|
| (1) POWER IN         | (2) VIDEO IN (P1)   | (3) LAN IN (P3)     |
| (4) LAN OUT (P4)     | (5) POWER IN        | (6) VIDEO IN (P1)   |
| (7) VIDEO OUT (P2)   | (8) TRIPLE OVERHEAD | (9) REGULAR MONITOR |
| (10) TV ONLY MONITOR |                     |                     |

- Place the winch assembly on top of the overhead support weldment and center it over the monitor to be removed.

**NOTE:** Make sure that the winch is positioned so that the lowering mechanism is at the front of the overhead and it is positioned in the notches located on the flat cross brace.

- Attach the winch strap to the U-bolt located at the top of the monitor. Refer to the figure titled *Attachment of the Winch Assembly to the Weldment and Monitor*.



*Attachment of the Winch Assembly to the Weldment and Monitor*

(1) WINCH STRAP  
 (4) OVERHEAD MONITOR

(2) U-BOLT  
 (5) NOTCHES

(3) WINCH ASSEMBLY  
 (6) ALLEN BOLT

4. Remove the hardware holding the back of the monitor to the support weldment.
5. Place the crank handle or drill adapter on the winch and *raise* the overhead by turning the crank counterclockwise until the weight of the monitor is off of the support. Disconnect the J-bolts from the weldment.
6. Turn the crank clockwise to lower the monitor.

**NOTE:** *Using a variable speed drill with the supplied attachment to lower the monitor will speed up the process. Refer to Suggested Tools.*

7. Remove the winch strap from the monitor.

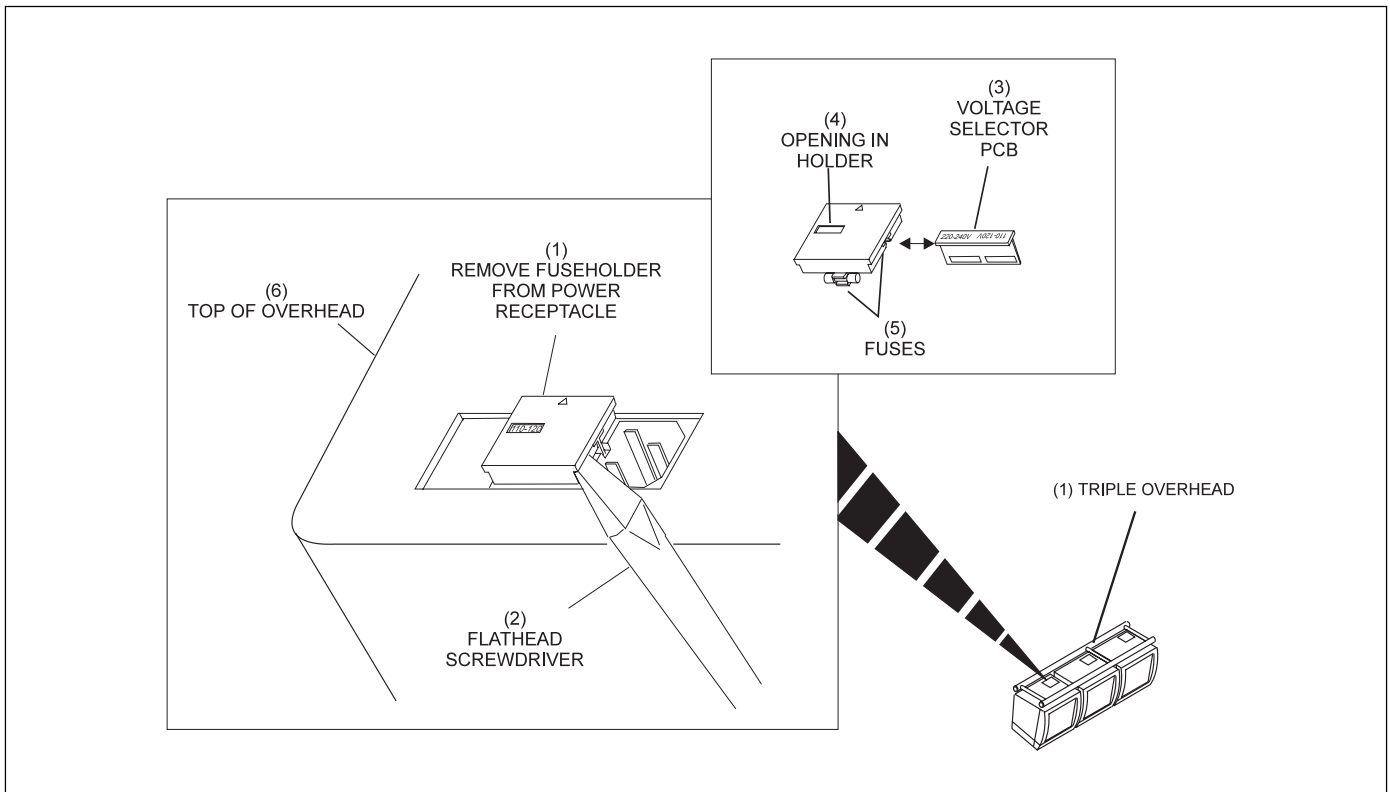
## Raising the Monitor

Tools Needed: Winch with crank handle and Phillips head screwdriver.  
 Suggested Tools: 3/8" Variable speed drill for use with adapter attachment and extension cord for drill

Should it become necessary to replace a complete overhead unit or raise a monitor, perform the following steps:

1. Check the fuse assembly located in the power receptacle to make sure that it is set to the proper voltage rating. Also check the fuses inside the assembly to make sure that they are set to the correct ratings. Refer to the figure titled *Selecting Input Voltage for Transformers*.

Input Voltage	Fuse Ratings
110-120 VAC	2 AMP
220-240 VAC	1 AMP



*Selecting Input Voltage for Transformers*

- |   |                          |  |
|---|--------------------------|--|
| (1) TRIPLE OVERHEAD                         | (2) FLATHEAD SCREWDRIVER | (3) VOLTAGE SELECTOR PRINTED CIRCUIT BOARD |
| (4) OPENING IN HOLDER                       | (5) FUSES                | (6) TOP OF OVERHEAD                        |
| (7) REMOVE FUSEHOLDER FROM POWER RECEPTACLE |                          |  |

2. Place the winch assembly on top of the overhead support weldment and position it in the notches located on the flat cross brace.

**NOTE:** *Make sure the winch is positioned so the lowering mechanism is at the front of the overhead and the lowering strap is in front of the flat cross brace.*

3. Extend the winch strap to the approach and attach the winch strap to the U-bolt located at the top of the monitor. Refer the figure titled *Attachment of the Winch Assembly to the Weldment and Monitor.*
4. Place the crank handle or drill adapter on the winch and raise the overhead by turning the crank counterclockwise until front J-bolts of the monitor can be attached to the weldment. Attach the J-bolts to the weldment.

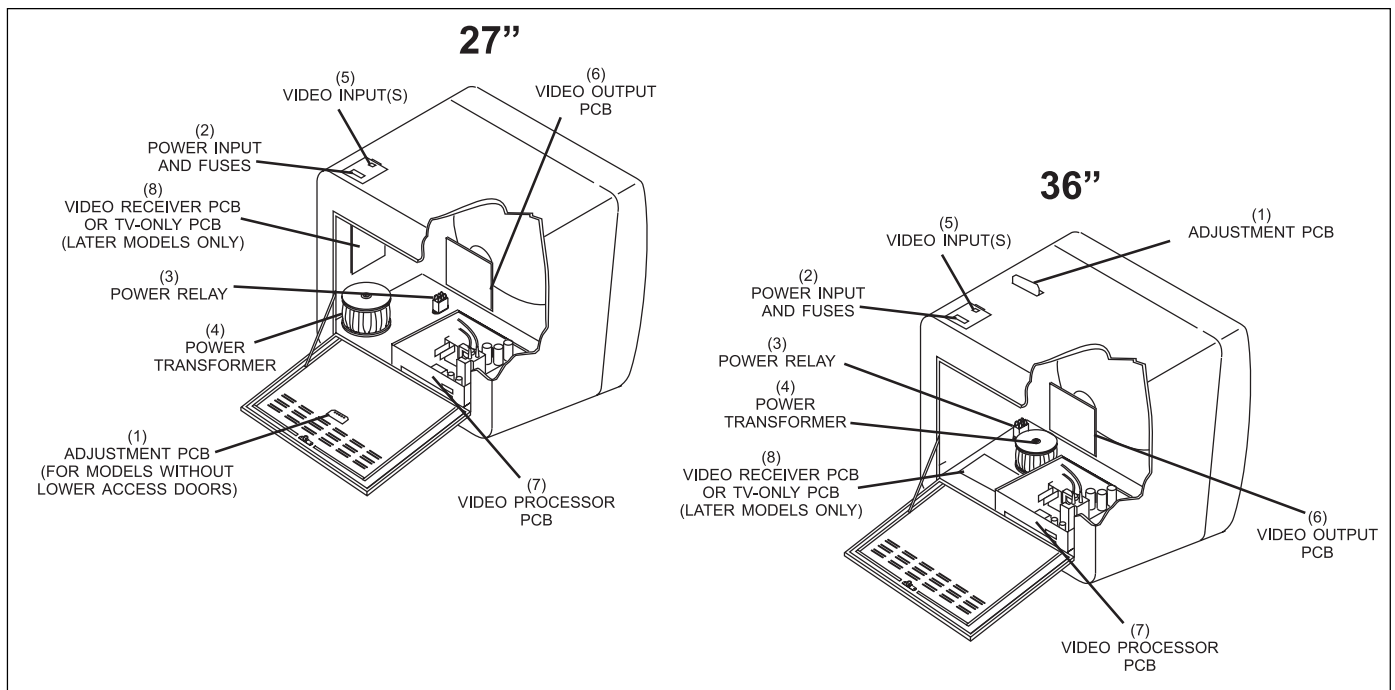
**NOTE:** *Using a variable speed drill with the supplied attachment to lower the monitor will speed up the process. Refer to Suggested Tools.*

5. Turn the crank clockwise to lower the monitor.
6. Remove the winch strap from the monitor.
7. Tilt the rear of the monitor upward and install the rear retaining hardware.
8. Connect the following cables from the overhead:
  - a. AC power cable (All monitor types)
  - b. Video Input (P1) (All monitor types)
  - c. Video Output (P2) (TV Only monitor)
  - d. LLAN In (P3) (TV Only monitor)
  - e. LLAN Out (P4) (TV Only Monitor)

## Overhead Electronics

The circuit boards for an overhead monitor are located behind the picture tube in the back of the cabinet. The boards are accessed by unlatching a rear access panel. Refer to *Cabinet Access* and the figure titled *Removal of the Circuit Board Access Panel*.

The components located behind the picture tube include a Video Processor PCB, a Video Output PCB, a Power Transformer, a Power Relay, and a Video Receiver PCB or the TV Only PCB. Mounted on the access door is a five-control Adjustment PCB. Refer to the figure titled *Circuit Boards Behind the Picture Tube*.



*Circuit Boards Behind the Picture Tube .*

The function of the components that may be located inside the back of the overhead are:

- (1) **Adjustment PCB** - A circuit board located on the lower or back access panel that allows a technician to conveniently adjust the monitor brightness, picture size and picture position.
- (2) **Power Input and Fuses** - Voltage receptacle where main power enters the overhead. The input voltage is selected using a plug-in voltage selector module. Fuses in the module protect the incoming power. Refer to *Selecting Input Voltage*.
- (3) **Power Relay** - The relay that causes the monitor to turn on or off. This relay is controlled by the Receiver PCB or the TV Only PCB.

- (4) **Power Transformer** - The device that adapts the incoming power (120 VAC or 240 VAC) for use by the circuits inside the overhead.
- (5) **Video Input(s)** - Input for the RGBS video coming from the Remote Video PCB located in the LGP.
- (6) **Video Output PCB** - A circuit board located in the back of the monitor and attached to the back of the picture tube. This PCB is responsible for applying the video to the color guns located inside the picture tube.
- (7) **Video Processor PCB** - A circuit board located in the back of the monitor that adapts the video so that it can be properly displayed on the CRT. The Video Processor PCB controls the coils attached to the CRT and sends the video to the Video Output PCB so it can be shown on the picture tube.
- (8) **Video Receiver PCB** - A circuit board located on the lower access panel in regular monitors that adapts the incoming video so that the Video Processor PCB can use it. The PCB also determines when to turn the monitor on/off by controlling the power relay. (In the TV Only monitors, this PCB is replaced with a TV Only PCB.)

**TV Only PCB** - A circuit board located on the lower access panel in the TV Only monitors to adapt the TV/VCR video so that the Video Processor PCB can use it. This PCB also determines when to turn the monitor on/off by controlling the power relay. (In the regular monitors, this PCB is replaced with a Receiver PCB.)

As stated at the beginning of this section, it is important to determine the type of overhead being serviced. The regular overhead monitor and the TV Only monitor contain many of the same circuit boards but are not exactly the same. Refer to the figure titled *Circuit Boards Behind the Picture Tube*.

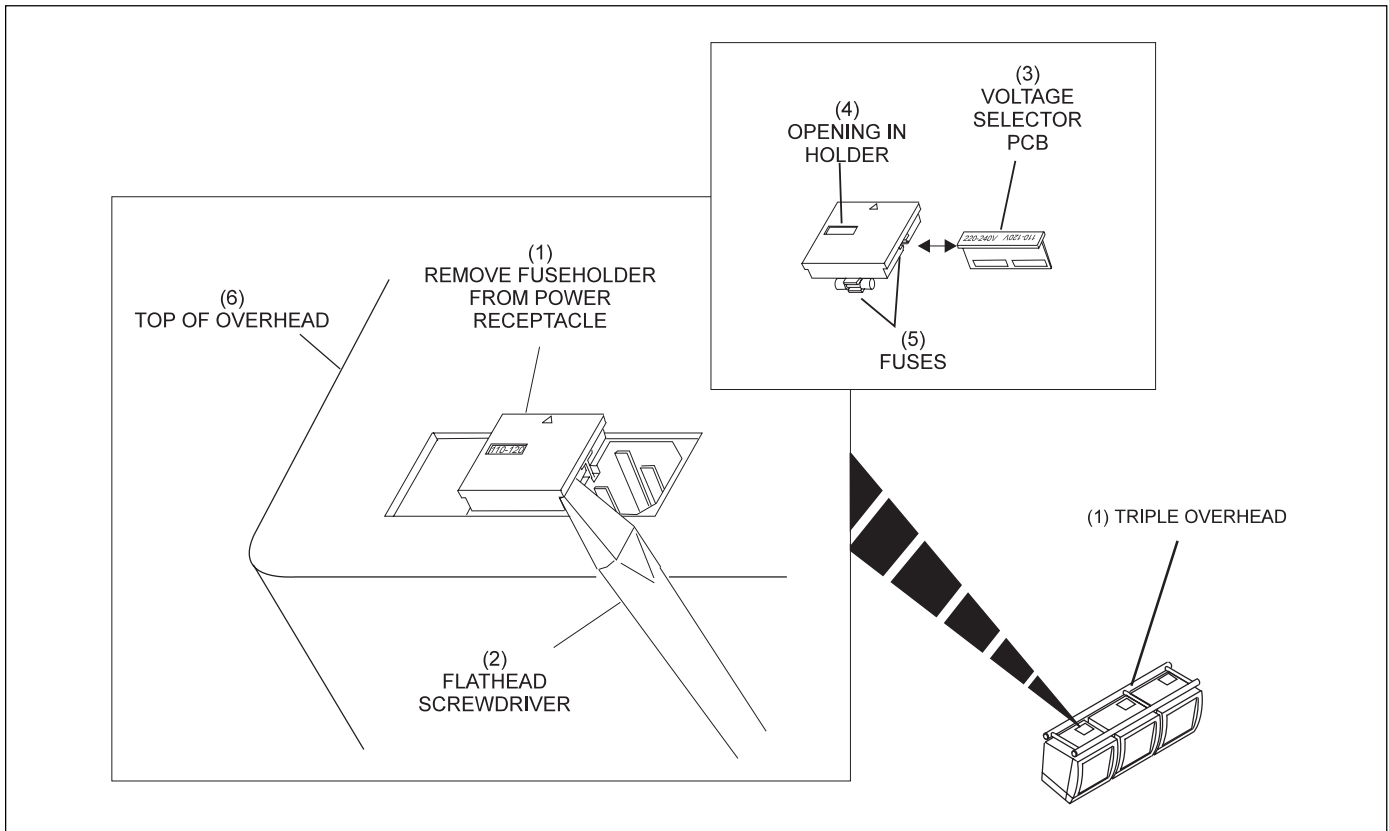
### **Selecting the Input Voltage**

To select the input voltage for the Power Transformer do the following:

1. Disconnect the power cord from the Overhead.
2. Using a flat head screwdriver, remove the fuse holder from the power receptacle.
3. Remove the Voltage Selector PCB from the holder assembly.
4. Insert the Voltage Selector PCB so the desired voltage rating can be seen through the opening in the holder. Refer to the figure titled *Selecting Input Voltage for the Transformer*.

- Check the ratings of the fuses located in the fuseholder to verify that they are correct.

Input Voltage	Fuse Ratings
110-120 VAC	2 AMP (27"), 3 AMP (36")
220-240 VAC	1 AMP (27"), 1.6 AMP (36")



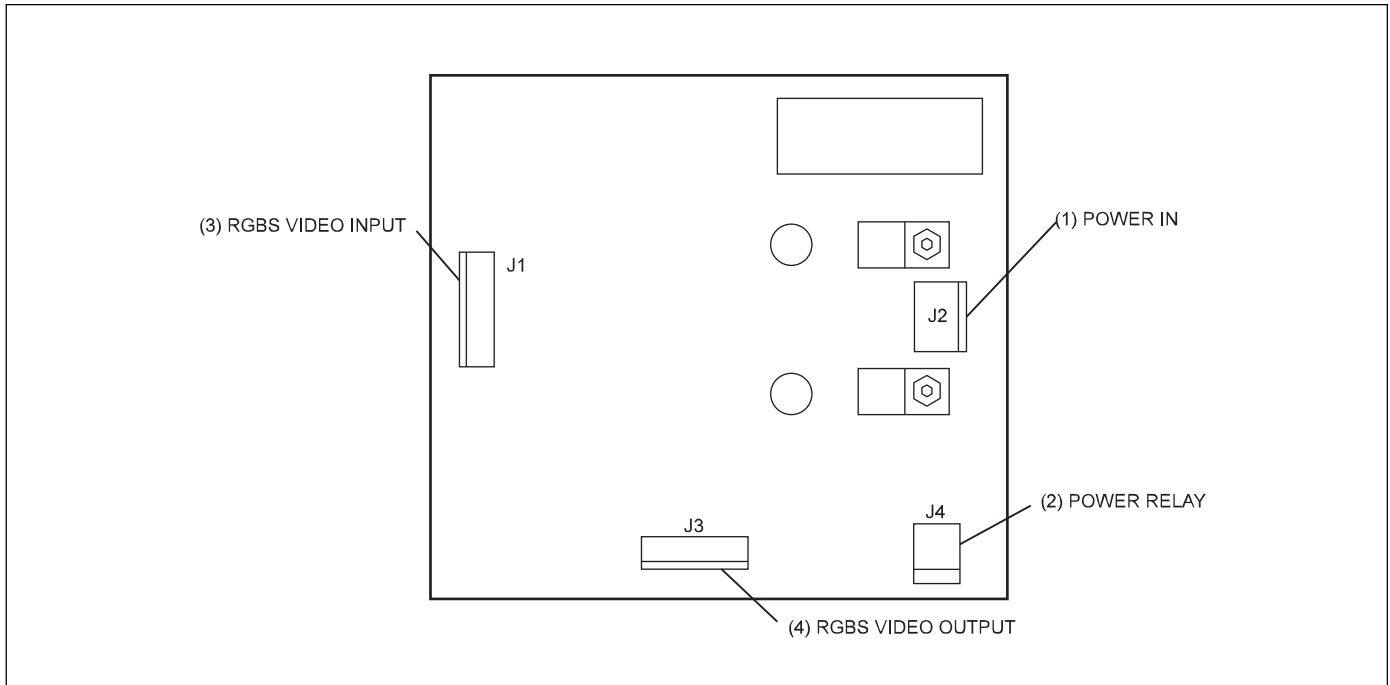
*Selecting Input Voltage for the Trnsformer*

- |   |                           |  |
|---|---------------------------|--|
| (1) REMOVE FUSEHOLDER FROM POWER RECEPTACLE | (2) FLAT HEAD SCREWDRIVER | (3) VOLTAGE SELECTOR PRINTED CIRCUIT BOARD |
| (4) OPENING IN HOLDER                       | (5) FUSES                 | (6) TOP OF OVERHEAD                        |

---

## Receiver PCB

The Receiver PCB is located on the lower access panel in earlier C5 monitors and in the back of the unit on later models. This board adapts the video sent from the Lane Group Processor's (LGP) Remote Video PCB so that it can be used by the monitor. In operation, the board changes the level of the incoming RGBS signal to a level that can be used by the monitor's Video Processor PCB. The board also turns the monitor on or off. Whenever the video signal is sensed by the PCB, it energizes the 12 VDC monitor power relay.



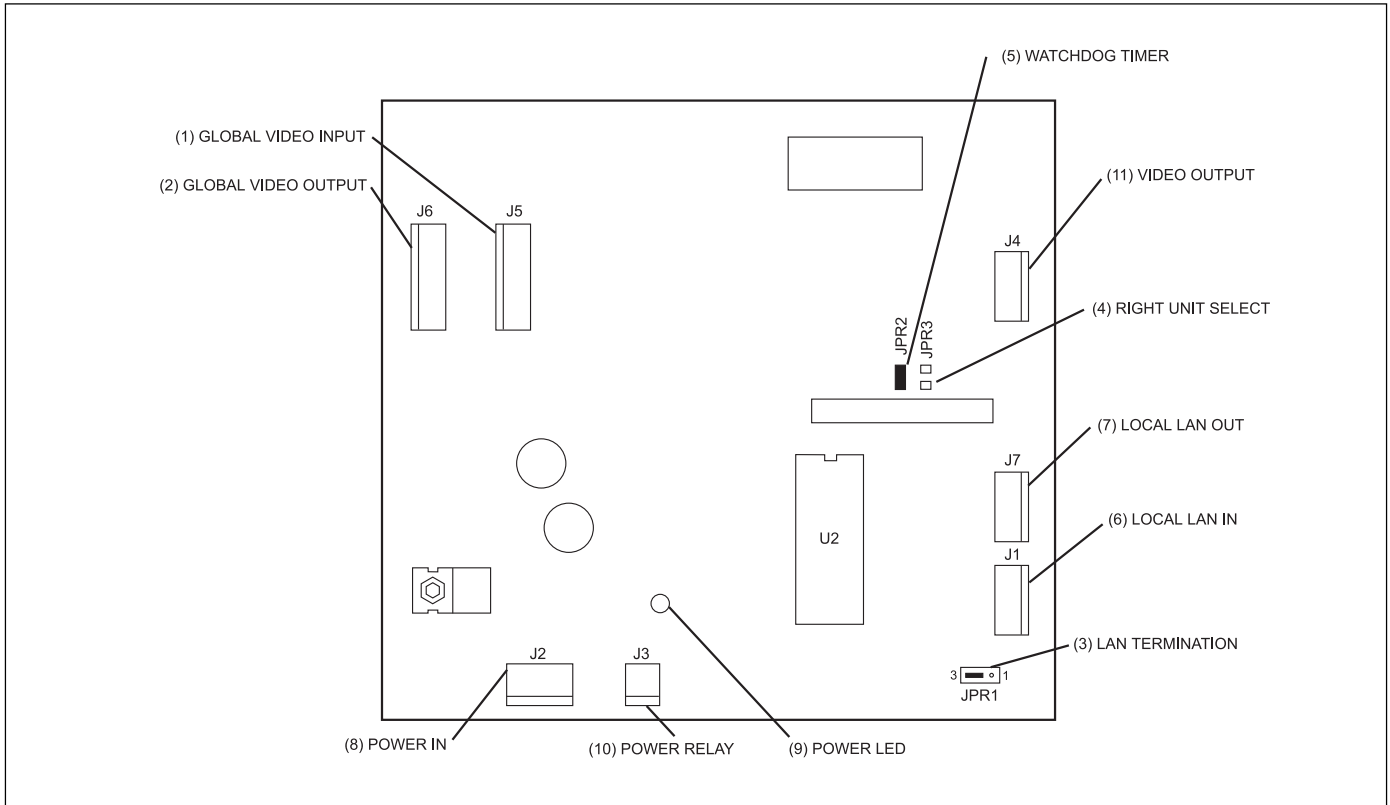
*Receiver PCB Connections*

The functions of the components on the Receiver PCB are:

- (1) **Power In (J2)** - Connection to the Power Transformer. 30 VAC enters the PCB at this connector.
- (2) **Power Relay (J4)** - Connection to the coil of the monitor power relay. 12 VDC is sent to the coil from this connector.
- (3) **RGBS Video Input (J1)** - Connection for the video coming from the LGP's Remote Video PCB. Video enters here in a RGBS format.
- (4) **RGBS Video Output (J3)** - Connection to the Video Processor PCB. Video leaves this connection in an RGBS format. The video differs from the incoming video (J1) in that the signals are now referenced to a common ground and are limited to a 1 Volt level. The Sync Signals are limited to 4 Volts.

## TV Only PCB

The TV Only PCB is similar to the Receiver PCB in design and functionality. This board replaces the Receiver PCB when a monitor is used for TV Only display. This board adapts the VCR video sent from the Audio/Video Box, located at the Control Desk, so that it can be used by the monitor. Like the Receiver PCB, the board changes the level of the incoming RGBS signal to a level that can be used by the monitor's Video Processor PCB. The board also turns the monitor on/off. Whenever an on or off instruction is sent through the lane's LLAN cable, the PCB will energize (or deenergize) the 12 VDC monitor power relay. Refer to the figure titled *TV Only PCB Connections*.





*TV Only PCB Connections*

The functions of the connector and components on the TV Only PCB are:

- (1) **Global Video Input (J5)** - Connection for the VCR video coming from the CMS audio/video box. Video enters here in a RGBS format.
- (2) **Global Video Output (J6)** - Connection to continue the VCR video to the next TV Only monitor.

- (3) **LAN Termination (JPR 1)** - Jumper used to terminate the LLAN cable if it does not continue to additional boards. Reference *Local LAN In (J7)*. To terminate the signal, install a jumper on pins 2 and 3. To continue the signal, jumper pins 1 and 2.

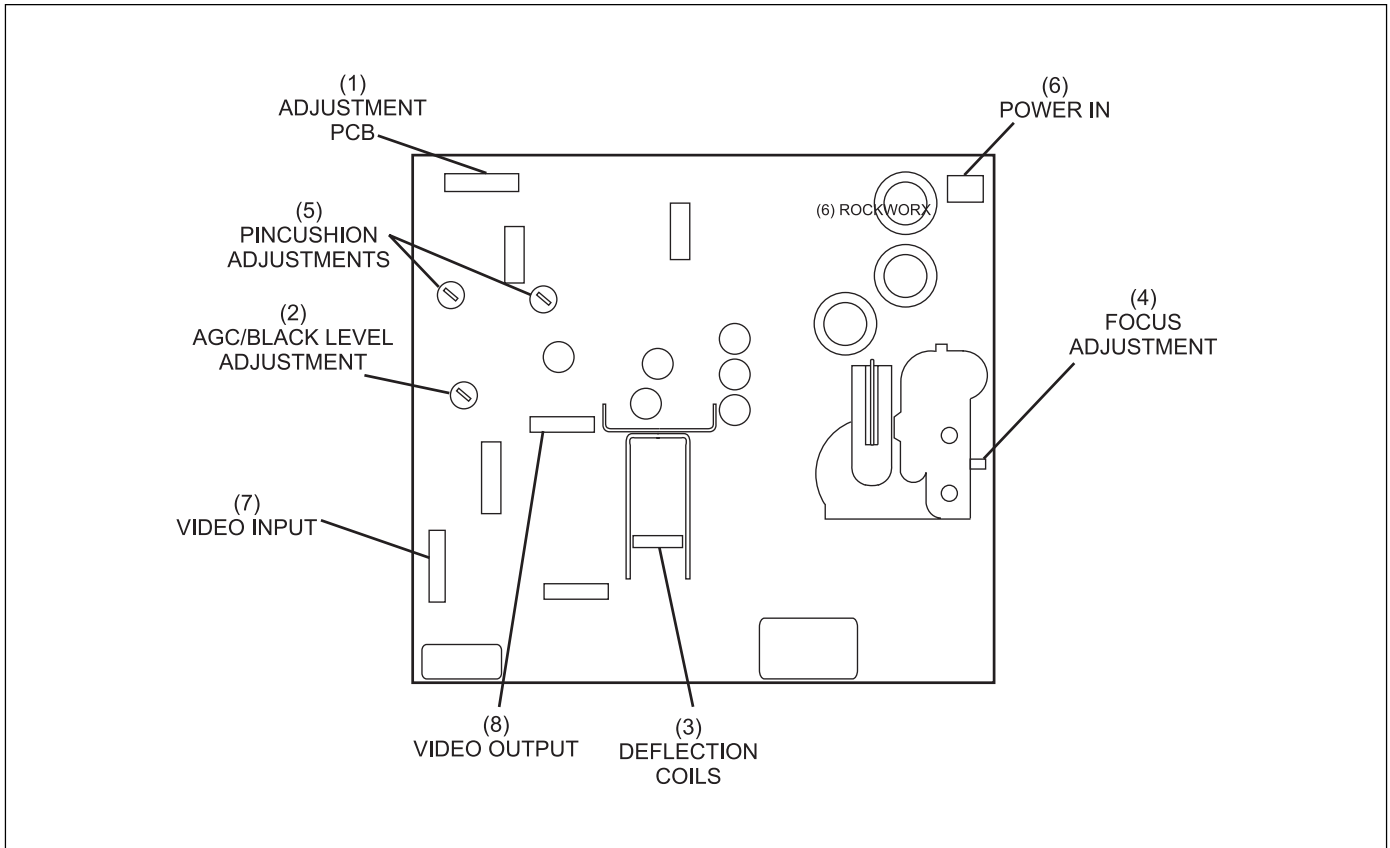
Installation Type	Jumper Position
Installations without BowlerTrack	 Pins 2 and 3

Installation Type	Jumper Position
Installations with BowlerTrack Installed after January, 2000. Refer to (7) Local LAN Out.	 Pins 1 and 2

- (4) **Right Unit Select (JPR 3)** - Jumper used to determine if the TV Only monitor is located as a right monitor, center monitor, or left monitor. In order for the monitor to work properly, the jumper ***must*** be removed.
- (5) **Watchdog Timer (JPR 2)** - Jumper used to enable a watchdog timer that will automatically reset the PCB if it stops functioning. This jumper ***must*** be installed.
- (6) **Local LAN In (J1)** - Connection for the communication cable (LLAN) coming from the LGP via the Pinsetter Interface Box. This signal allows the overhead to turn on/off.
- (7) **Local LAN Out (J7)** - Connection to continue the communication cable (LLAN) to additional PCB if needed. Currently this connection is only used if a lane has BowlerTrack that was installed after January, 2000. Refer to *LAN Termination (JPR1)*.
- (8) **Power In (J2)** - Connection to the Power Transformer. 30VAC - 36 VAC enters the PCB at this connector.
- (9) **Power LED (LED 1)** - This light is on whenever the PCB is powered by 36 VAC. Refer to *Power In (J2)*.
- (10) **Power Relay (J3)** - Connection to the coil of the power relay in the monitor. 12 VDC is sent to the coil from this connector. The board controls monitor on/off from this connection.
- (11) **Video Output (J4)** - Connection to the Video Processor PCB. Video leaves this connection in an RGBS format. The video differs from the incoming video (J1) in that the signals are now referenced to a common ground and are limited to a 1 Volt level. The Sync signals are limited to 4 Volts.

## Video Processor PCB

The Video Processor PCB handles all sync and color signals for the CRT. It contains circuitry such as vertical and horizontal oscillators to control how the picture is written to the screen and color circuits that automatically control the red, green and blue video signal applied to the picture tube. The only adjustments necessary to the board are focus and pincushion. The remaining adjustments are located on the lower access panel. Refer to the figure titled *Video Processor PCB for Overhead Monitors*.



*Video Processor PCB for Overhead Monitors*

The functions of the connectors and controls on the Video Processor PCB are:

- (1) **Adjustment PCB** - Connector to the Adjustment Board located on the lower access panel. This allows a more convenient location to perform screen adjustments.
- (2) **AGC/Black Level Adjustment** - An optional adjustment used to increase (or decrease) the brightness of the picture.
- (3) **Deflection Coils** - Connection to the deflection coil located on the neck of the picture tube. This allows the Video Processor to control where information is put on the screen.

- (4) **Focus Adjustment** - Adjustment used to control the sharpness of the picture.
- (5) **Pincushion Adjustments** - Adjustments used to control the top and sides of the picture so that excessive rounding or bending is eliminated. Refer to the definition of *pincushion* in Glossary.
- (6) **Power In** - 120 VAC main power input to the PCB. This power is controlled by the Receiver or the TV Only PCB and is switched through the power relay.
- (7) **Video Input** - Input of the "adapted" RGBS signal coming from the Receiver or TV Only PCB.
- (8) **Video Output** - Output to the Video Output PCB.

***WARNING: Before replacing the Video Processor module, any voltage in the CRT or high voltage area of the PCB must be discharged. Refer to the discharge procedure for further information.***

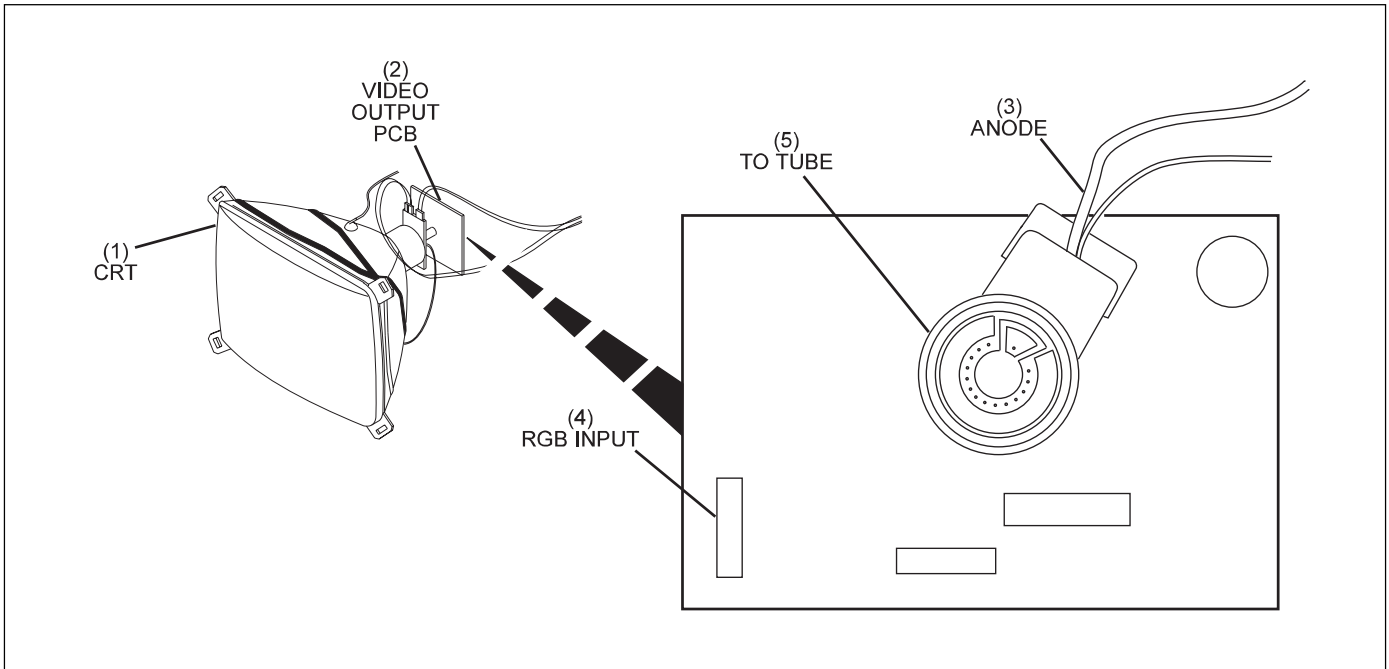
#### **Discharge Procedure**

1. Disconnect main power from the overhead unit.
2. Attach one end of a 14 gauge or larger wire to the shaft of an insulated handled screwdriver.
3. Attach the other end of the wire to the chassis ground of the overhead.
4. With the insulated handle in your hand, slide the tip of the screwdriver under the anode lead protective cup located on the top of the CRT.
5. A slight "pop" may be heard when the module discharges. Touch the metal connection under the cup until the popping quits.

***CAUTION: The voltage on the anode can exceed 26,000 volts. To ensure safety, always perform the above procedure with one hand. Place the other hand inside a pocket or behind your back. DO NOT PLACE YOUR UNUSED HAND ON ANY METAL ATTACHED TO THE OVERHEAD!***

## Video Output PCB

The Video Output PCB receives the RGB Signal and grid voltage from the Video Processor Module and applies them to the CRT. There are no adjustments on this PCB. Refer to figure titled *Video Output PCB*.



*Video Output PCB*

(1) CRT  
(4) RGB INPUT

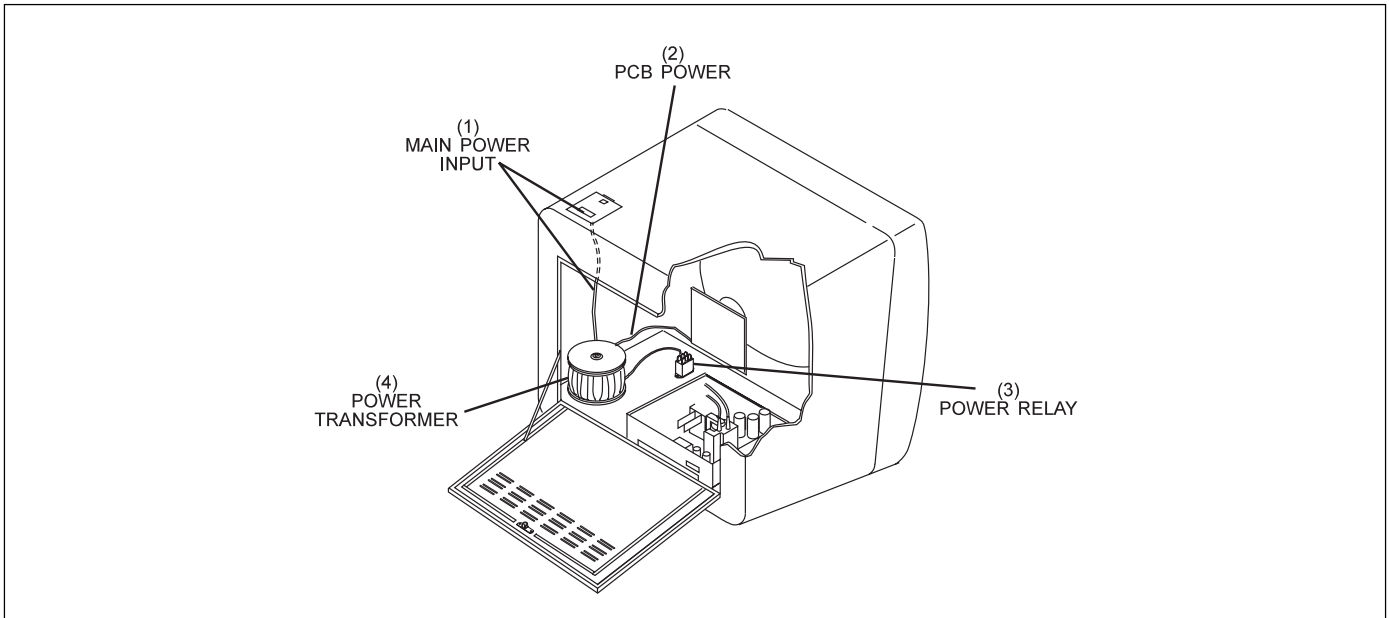
(2) VIDEO OUTPUT PCB  
(5) TO TUBE

(3) ANODE

---

## Power Transformer

The power transformer adapts the incoming voltage to the proper level needed inside the overhead. The transformer can be wired to accept 115 VAC or 230 VAC as an input. The selection of the input voltage is accomplished by a voltage selector module located next to the power input receptacle. Refer to the figure titled *Power Transformer*.



*Power Transformer*

(1) MAIN POWER INPUT  
(4) POWER TRANSFORMER

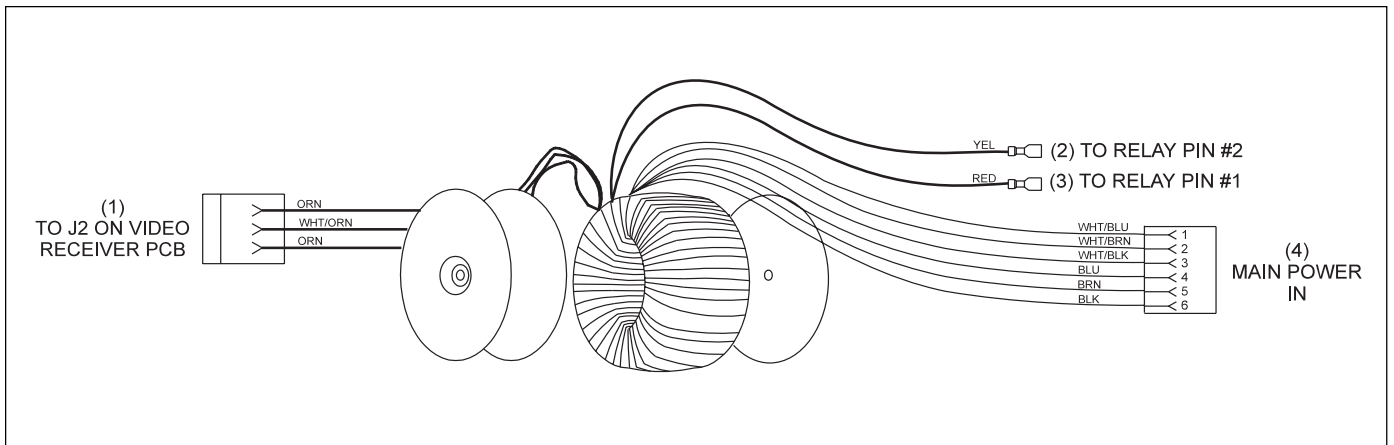
(2) PCB POWER

(3) POWER RELAY

The transformer secondary coils provide 115 VAC, 15 VAC, 30 VAC and other voltages needed by the PCBs in the overhead. Refer to the figure titled *27" Monitor Main Power Transformer*.

The connections to the power transformer are:

- (1) **Main Power Input** - Cable to the power input connection located at the top of the overhead. The power transformer can accept 115 VAC or 230 VAC.
- (2) **Power Relay** - Cable that attaches to the contacts of the monitor power relay (120 VAC).
- (3) **PCB Power** - Cable used to power either the Receiver PCB or the TV Only PCB. The power transformer supplies 30 VAC - 36 VAC to these PCBs.



*Overhead Monitor Transformer Assembly (Part No. 57-300365-000) - B*

(1) TO J2 ON VIDEO RECEIVER  
PRINTED CIRCUIT BOARD

(2) TO RELAY PIN #2

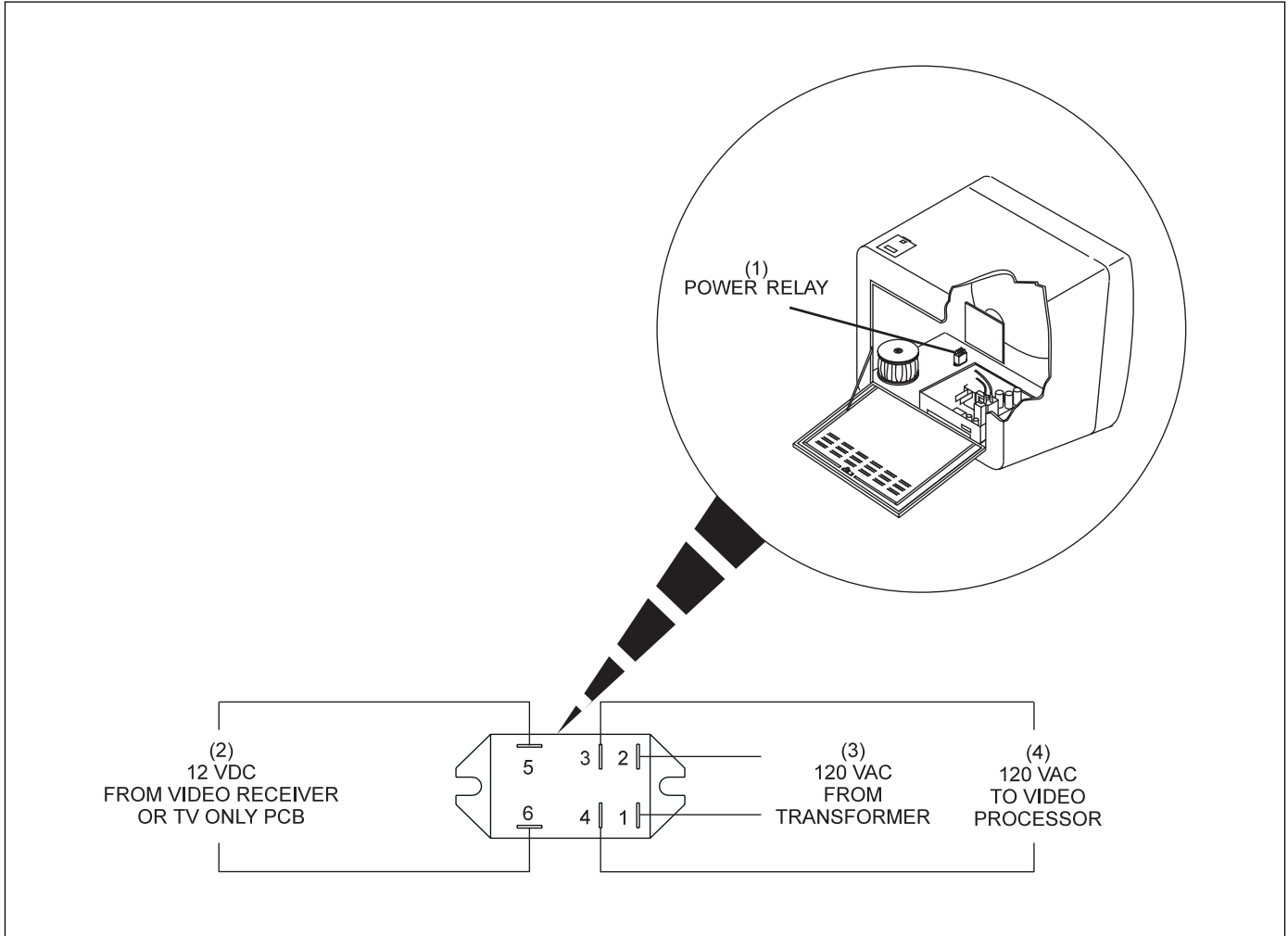
(3) TO RELAY PIN #1

(4) MAIN POWER IN

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

## Power Relay

The power relay is used to control the on or off operation of the monitor. It does this by switching 120 VAC to the Video Processor Module. (The 12 VDC coil of the relay is controlled by the Receiver PCB or the TV Only PCB.) Refer to the figure titled *Overhead Power Relay*.



*Overhead Power Relay*

- (1) POWER RELAY
- (2) 120 VOLTS ALTERNATING CURRENT FROM VIDEO RECEIVER OR TV ONLY PCB
- (3) 120 VOLTS ALTERNATING CURRENT FROM TRANSFORMER
- (4) 120 VOLTS ALTERNATING CURRENT TO VIDEO PROCESSOR

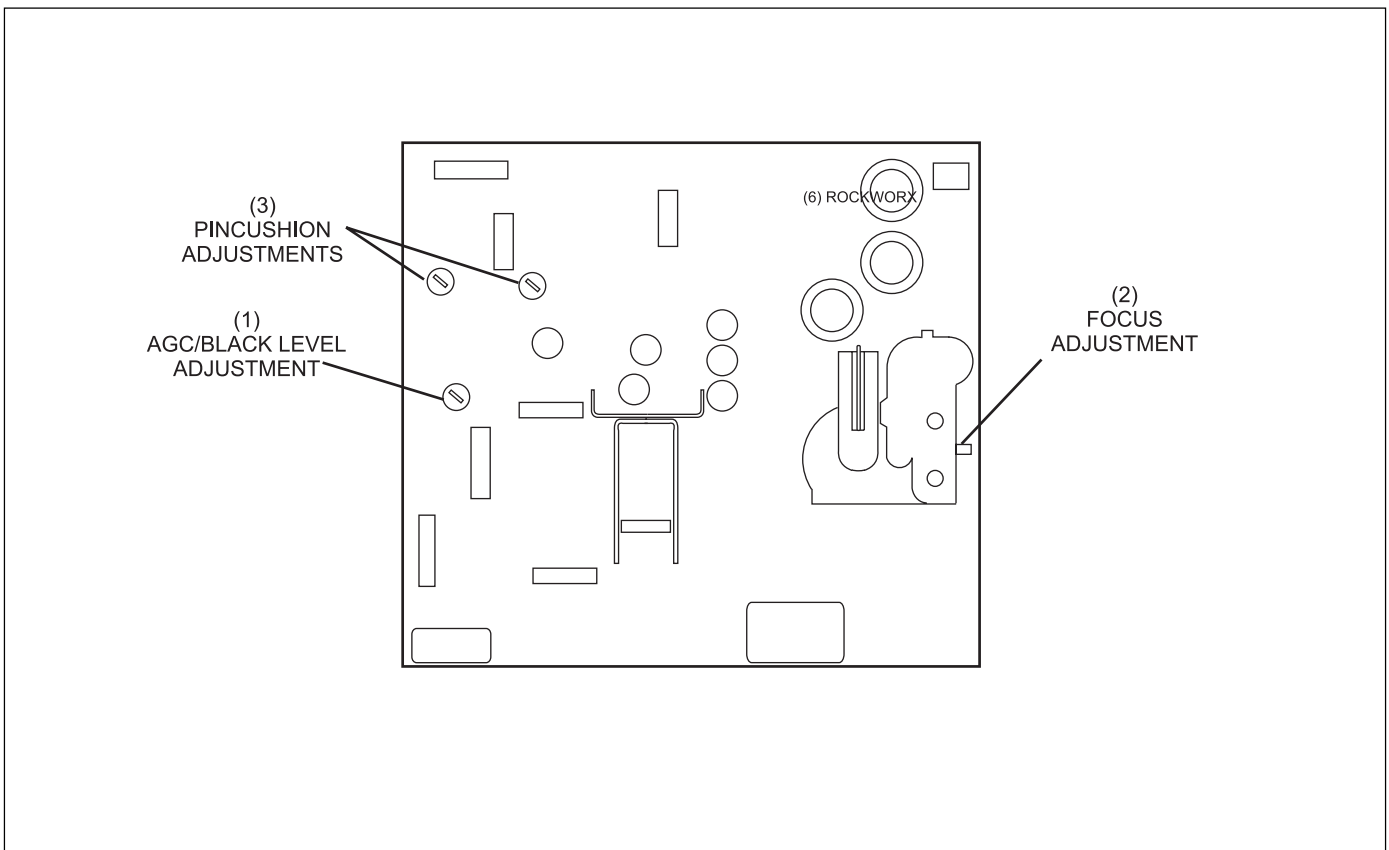
# Adjustments

The adjustments for the 27" C5 Overhead are located on the Video Processor PCB or the Adjustment PCB. These controls allow the technician to adjust pincushion, focus, brightness, and image position.

***DANGER: The voltage surrounding the controls on the Video Processor PCB can be dangerous. Always perform these adjustments using one hand. Place the other hand behind your back or in your pocket. Do not let your free hand rest on the metal chassis of scorer.***

## Focus

This control is located on the Video Processor Module at the high voltage transformer. To adjust the focus, turn the control until the desired picture sharpness is obtained. Refer to the figure titled *Video Processor Focus Control*.



*Video Processor Focus Control*

(1) AGC ADJUSTMENT

(2) FOCUS ADJUSTMENT

(3) PINCUSHION ADJUSTMENTS

---

## Pincushion

**NOTE:** The pincushion adjustment is performed at the factory and should not need readjusting. If problems occur after tube replacement or after the Video Processor Module is replaced, the screen can be adjusted in the following way.

The pincushion controls are located on the Video Processor PCB. The controls allow a technician to eliminate unwanted curvature in the perimeter of the video. To adjust, simply turn the control in the desired direction until unwanted distortion is eliminated.

---

## Screen Size Adjustments

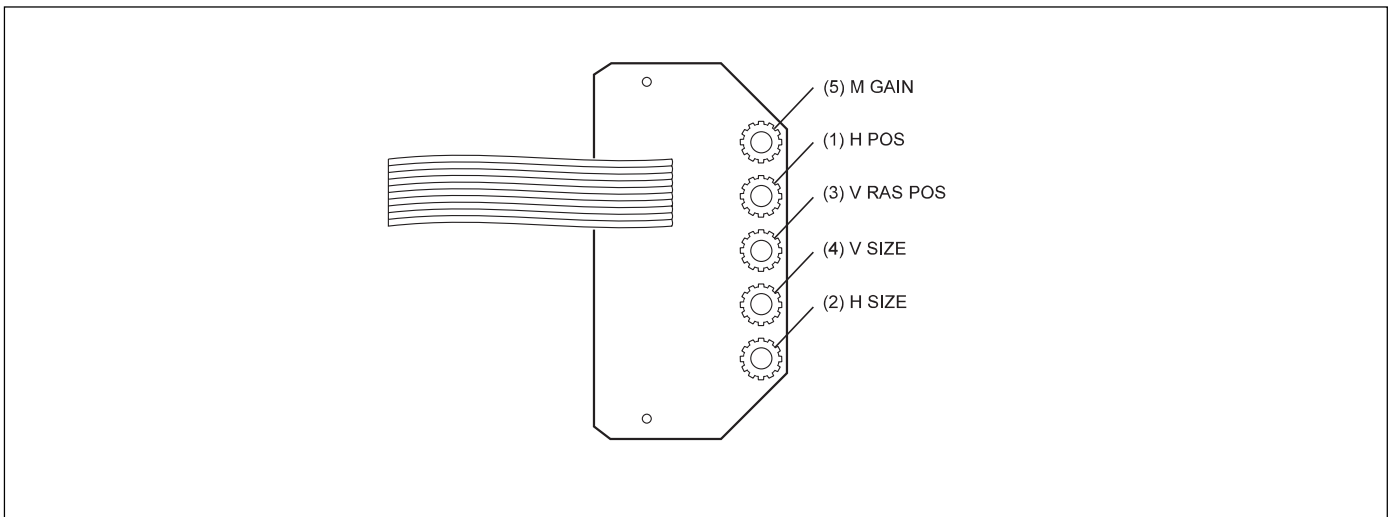
The following controls allow the technician to adjust the image position on a CRT. All controls are located on the Adjustment PCB mounted on the lower access panel.

**H Pos** - Turn this adjustment to center the video horizontally (side-to-side). This control is commonly referred to as horizontal centering.

**H Size** - Turn this adjustment to increase or decrease the picture horizontally (side-to-side). This control is commonly referred to as horizontal width.

**V Ras Pos** - Turn this adjustment to center the picture vertically (top-to-bottom). This control is commonly referred to as vertical centering.

**V Size** - Turn this control to increase or decrease the picture vertically (top-to-bottom). This control is commonly referred to as vertical width.



*Adjustment PCB Controls*

(1) H POS  
(4) V SIZE

(2) H SIZE  
(5) M GAIN

(3) V RAS POS

---

## Screen Brightness

The following adjustment allows the technician to adjust the brightness of the CRT. The control is located on the lower access panel.

**M Gain** - Turn this adjustment to increase or decrease the screen brightness.

**AGC/Black Level Adjustment** - Turn this optional adjustment to increase or decrease the screen brightness.

---

## Maintenance

The overhead is virtually maintenance free. There are, however, a few maintenance procedures that must be performed in order to keep the monitor operation at the optimal level.

***CAUTION: To avoid injury or damage to the monitor, disconnect power to the monitors before servicing them.***

### Monthly

Clean Displays

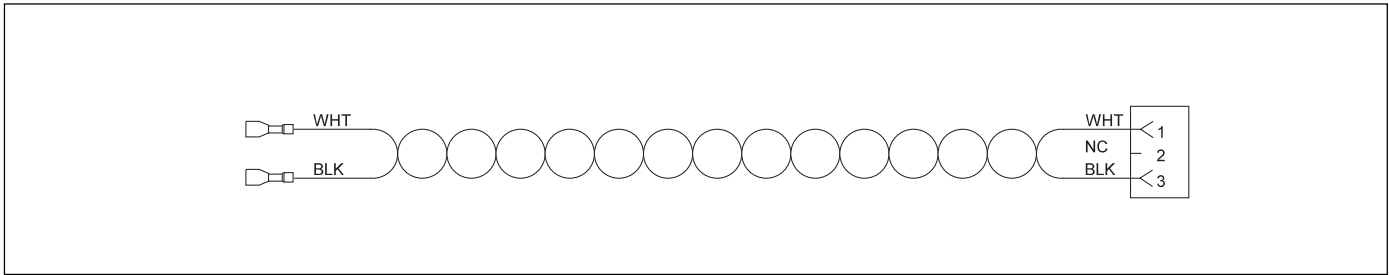
Using a glass cleaner and a soft cloth, clean the face of the picture tube. In addition, remove any excess dust on the monitor cabinet with a vacuum and/or soft cloth.

### Quarterly

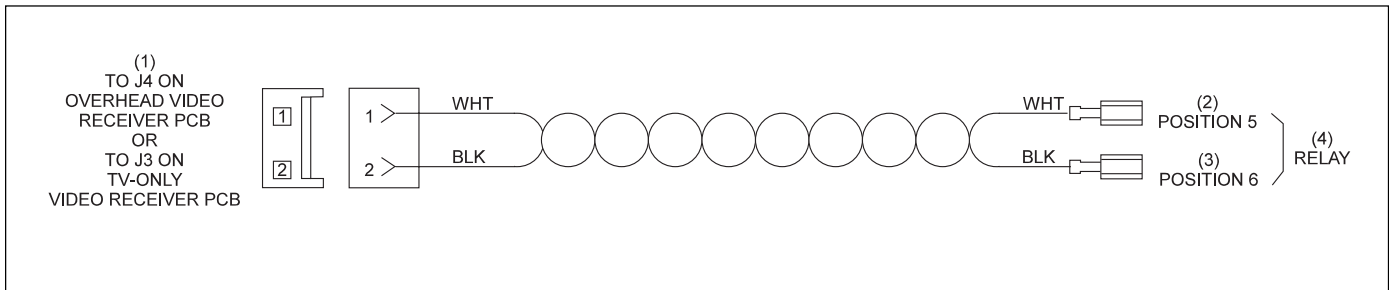
Adjust Displays

Adjust the monitors to obtain a bright, clear and centered image. Refer to *Adjustments* in this section for the adjustment procedures.

# Cable Diagrams

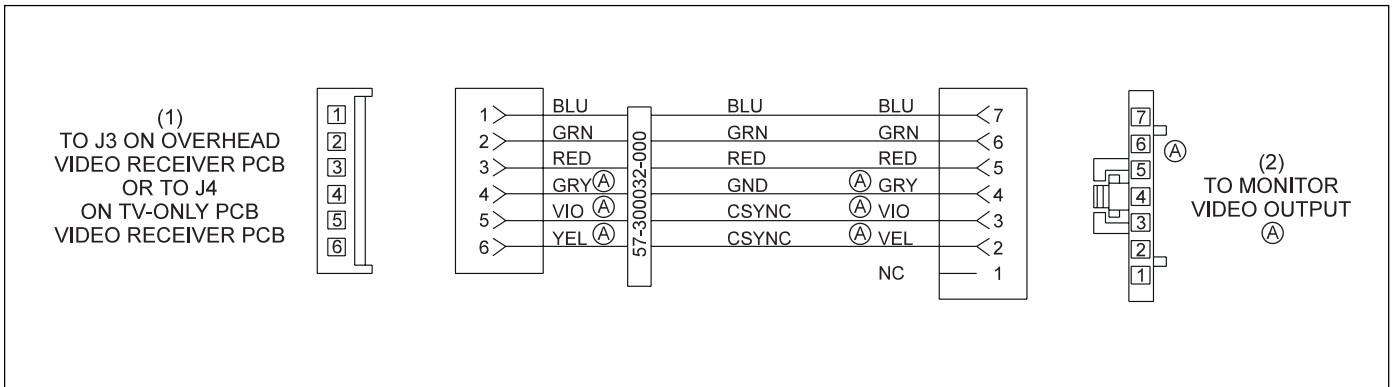


Color Overhead Monitor Power Cable (Part No. 57-215809-000)



Overhead Monitor Power Control Cable (Part No. 57-300030-000)

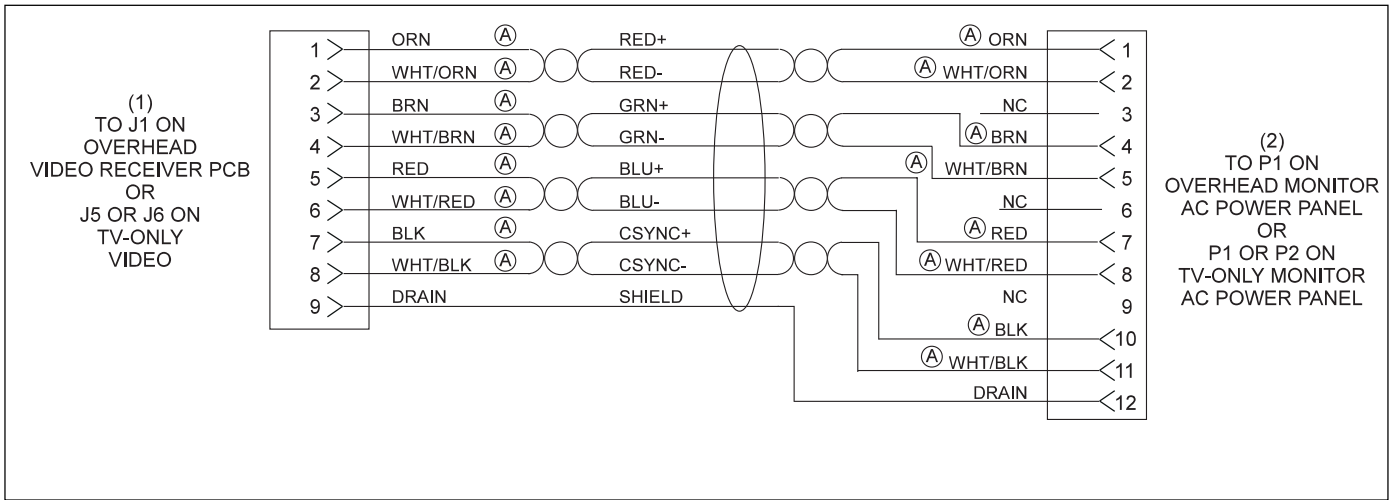
- (1) TO J4 ON OVERHEAD VIDEO RECEIVER PRINTED CIRCUIT BOARD OR TO J3 ON TV ONLY VIDEO RECEIVER PRINTED CIRCUIT BOARD  
 (2) POSITION 5  
 (3) POSITION 6  
 (4) RELAY



Overhead Receiver to Monitor Cable Assembly (Part No. 57-300032-000)

- (1) TO J3 ON OVERHEAD VIDEO RECEIVER PRINTED CIRCUIT BOARD OR TO J4 ON TV ONLY PRINTED CIRCUIT BOARD VIDEO RECIEVER PRINTED CIRCUIT BOARD  
 (2) TO MONITOR VIDEO OUTPUT

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



*D/H AC Power Panel to Video Receiver PCB Cable (Part No. 57-300138-000)*

(1) TO J1 ON OVERHEAD VIDEO RECEIVER PRINTED CIRCUIT BOARD OR J5 OR J6 ON TV ONLY VIDEO

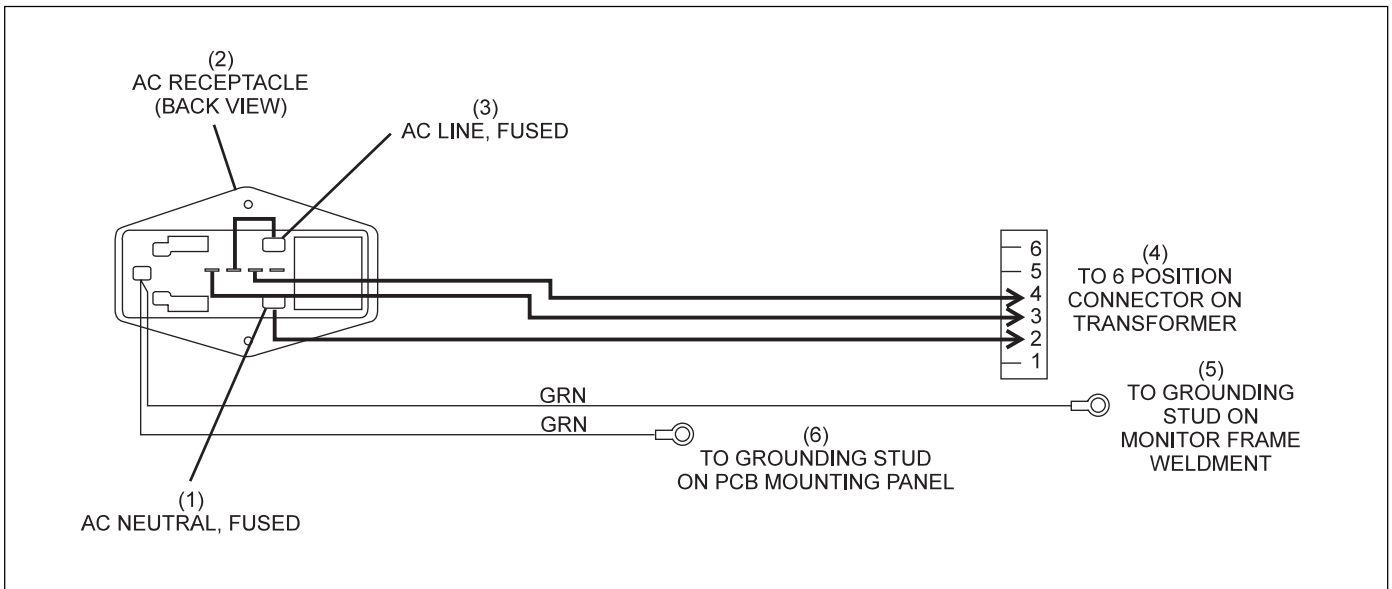
(2) TO P1 ON OVERHEAD MONITOR ALTERNATING CURRENT POWER PANEL OR P1 OR P2 ON TV ONLY MONITOR ALTERNATING CURRENT POWER PANEL

*Color Overhead Monitor Wiring Diagram (57-300094-000)*

- |  |   |  |
|--|---|--|
| (1) GROUND WIRE                                  | (2) VIDEO OUTPUT PRINTED CIRCUIT BOARD            | (3) POWER RELAY  |
| (4) ADJUSTMENT PRINTED CIRCUIT BOARD             | (5) TO GROUNDING STUD ON MONITOR FRAME WELDMENT   | (6) TO GROUNDING STUD ON ALTERNATING CURRENT POWER PANEL |
| (7) ALTERNATING CURRENT RECEPTACLE (BACK VIEW)   | (8) VIDEO RECEIVER PRINTED CIRCUIT BOARD ASSEMBLY | (9) TRANSFORMER ASSEMBLY                                 |
| (10) TO GROUNDING STUD ON MONITOR FRAME WELDMENT | (11) 0 VOLTS ALTERNATING CURRENT                  | (12) 115 VOLTS ALTERNATING CURRENT                       |
| (13) 100 VOLTS ALTERNATING CURRENT               | (14) 112 VOLTS ALTERNATING CURRENT                | (15) 15 VOLTS ALTERNATING CURRENT                        |
| (16) COMMON 30 VOLTS ALTERNATING CURRENT         | (17) VIDEO PROCESSOR PRINTED CIRCUIT BOARD        | (18) NO CONNECTION                                       |
| (19) DRAIN                                       | (20) DEFLECTION COILS CONNECTOR                   | (21) DEGAUSSING COIL                                     |
| (22) P1 VIDEO IN                                 | (23) 27" OVERHEAD                                 | (24) 36" OVERHEAD  |
| (25) DEGAUSSING SWITCH                           |   |  |

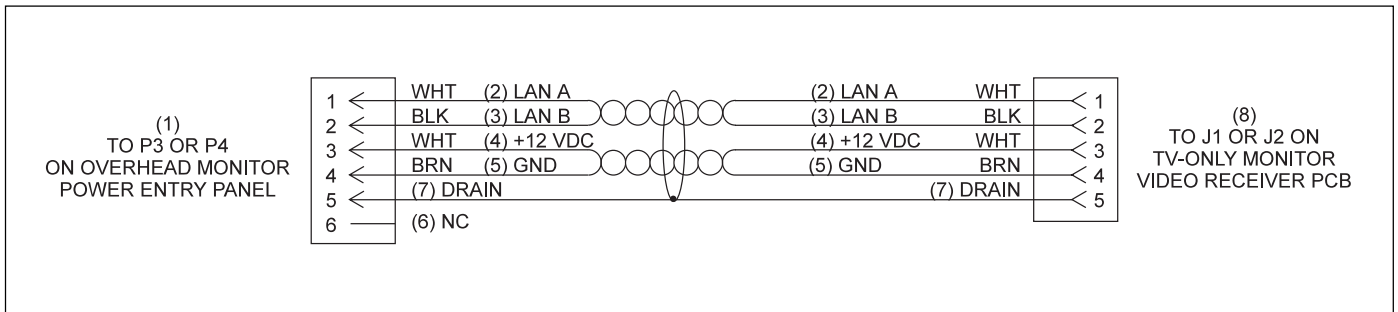
BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

**See file 57-300094.pdf for this page.**



Overhead Monitor AC Power Receptacle (Part No. 57-300175-000)

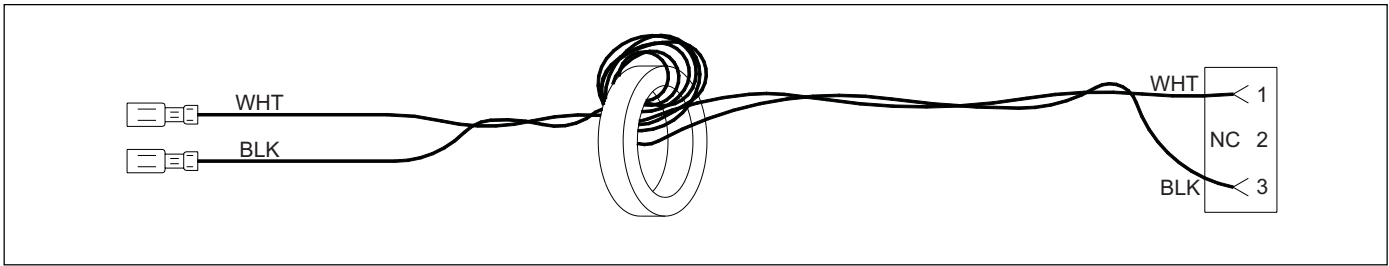
- |  |   |   |
|--|---|---|
| (1) ALTERNATING CURRENT NEUTRAL, FUSED     | (2) ALTERNATING CURRENT RECEPTACLE (BACK VIEW)  | (3) ALTERNATING CURRENT LINE, FUSED                           |
| (4) TO 6 POSITION CONNECTOR ON TRANSFORMER | (5) TO GROUNDING STUD ON MONITOR FRAME WELDMENT | (6) TO GROUNDING STUD ON PRINTED CIRCUIT BOARD MOUNTING PANEL |



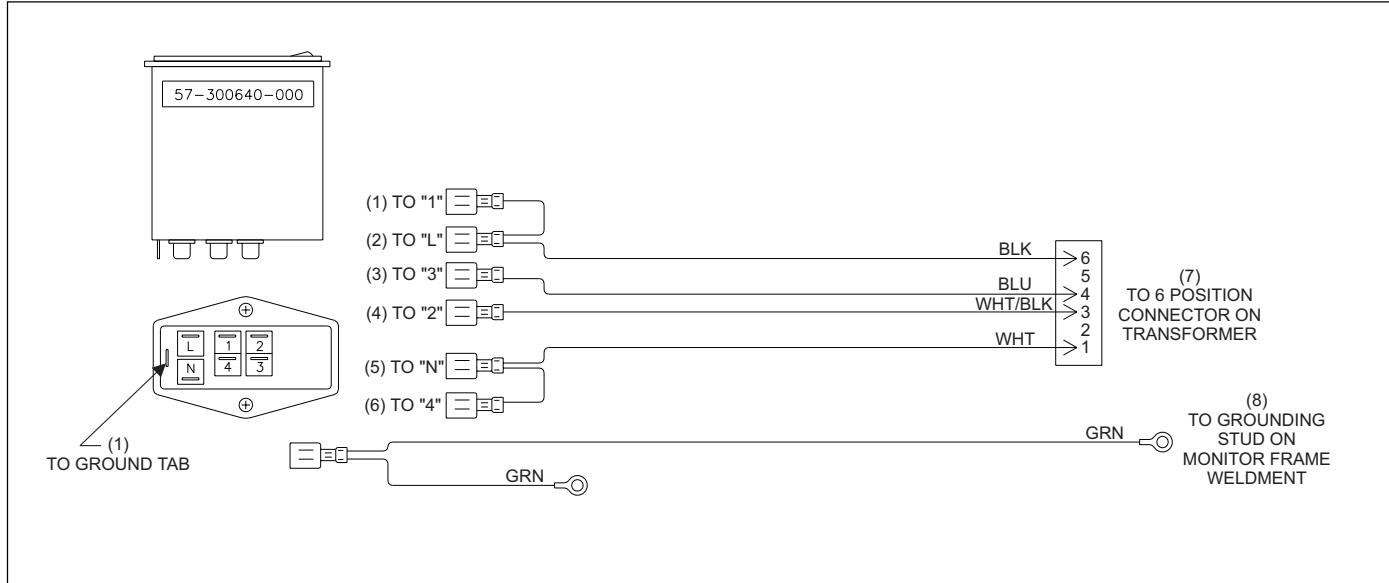
Power Entry Panel to TV Only Video Receiver (Part No. 57-300216-000)

- |   |   |                          |
|---|---|--------------------------|
| (1) TO P3 OR P4 ON OVERHEAD MONITOR POWER ENTRY PANEL | (2) LOCAL AREA NETWORK A  | (3) LOCAL AREA NETWORK B |
| (4) +12 VOLTS DIRECT CURRENT                          | (5) GROUND  | (6) NO CONNECTION        |
| (7) DRAIN   | (8) TO J1 OR J2 ON TV ONLY MONITOR VIDEO RECEIVER PRINTED CIRCUIT BOARD |                          |

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



CE Overhead Monitor (Part No. 57-300614-000)



AC Power Receptacle, CE Overhead Monitor (Part No. 57-300640-000)

- |                   |  |   |
|-------------------|--|---|
| (1) TO GROUND TAB | (2) TO "L"                                 | (3) TO "L"                                      |
| (4) TO "3"        | (5) TO "2"                                 | (6) TO "N"                                      |
| (7) TO "4"        | (8) TO 6 POSITION CONNECTOR ON TRANSFORMER | (9) TO GROUNDING STUD ON MONITOR FRAME WELDMENT |

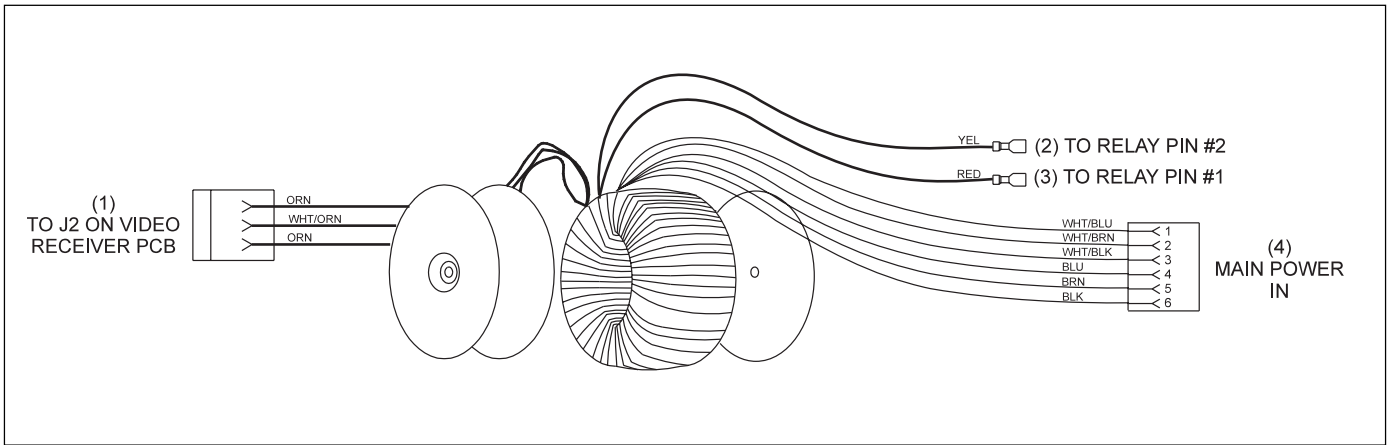
BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

*Color TV Only Overhead (Part No. 57-300241-000)*

- |  |  |   |
|--|--|---|
| (1) P2 VIDEO OUT                         | (2) P4 LOCAL LAN AREA NETWORK OUT                          | (3) P1 VIDEO IN   |
| (4) P3 LOCAL LAN AREA NETWORK IN         | (5) GROUND   | (6) CSYNC   |
| (7) DEFLECTION COILS CONNECTOR           | (8) VIDEO PROCESSOR MODULE                                 | (9) VIDEO OUTPUT PRINTED CIRCUIT BOARD                    |
| (10) POWER RELAY                         | (11) ALTERNATING CURRENT POWER PANEL GROUNDING STUD        | (12) ALTERNATING CURRENT RECEPTACLE (BACK VIEW)           |
| (13) ADJUSTMENT PRINTED CIRCUIT BOARD    | (14) TO GROUNDING STUD ON MONITOR FRAME WELDMENT           | (15) TO GROUNDING STUD ON ALTERNATING CURRENT POWER PANEL |
| (16) TRANSFORMER ASSEMBLY                | (17) 0 VOLTS ALTERNATING CURRENT                           | (18) 115 VOLTS ALTERNATING CURRENT                        |
| (19) 112 VOLTS ALTERNATING CURRENT       | (20) 15 VOLTS ALTERNATING CURRENT                          | (21) TO GROUNDING STUD ON MONITOR FRAME WELDMENT          |
| (22) COMMON 30 VOLTS ALTERNATING CURRENT | (23) TV ONLY VIDEO RECEIVER PRINTED CIRCUIT BOARD ASSEMBLY | (24) DRAIN  |
| (25) DEGAUSSING COIL                     | (26) DEGAUSSING SWITCH                                     | (27) 36" OVERHEAD   |
| (28) 36" OVERHEAD                        |  |   |

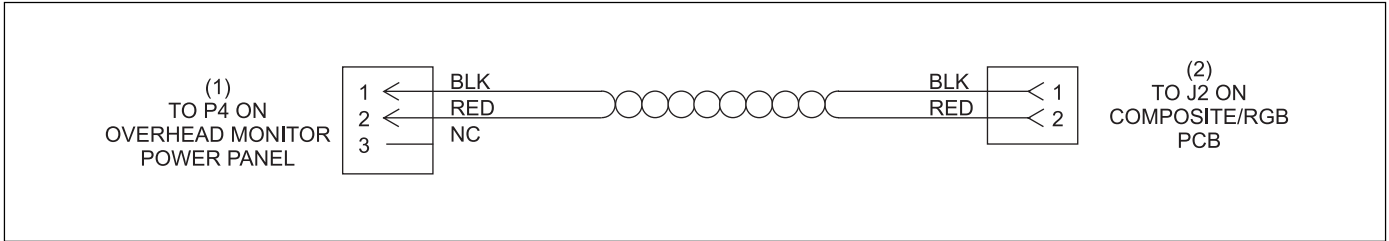
BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

See file 57-300241.pdf for this page



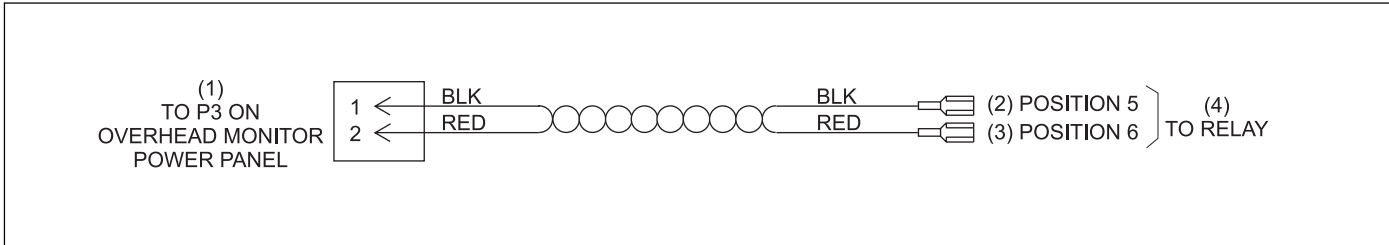
Overhead Monitor Transformer Assembly (Part No. 57-300365-000)

- (1) TO J2 ON VIDEO RECEIVER PRINTED CIRCUIT BOARD
- (2) TO RELAY PIN #2
- (3) TO RELAY PIN #1
- (4) MAIN POWER IN



Composite/RGB PCB to Scorer Video (Part No. 68-100990-000)

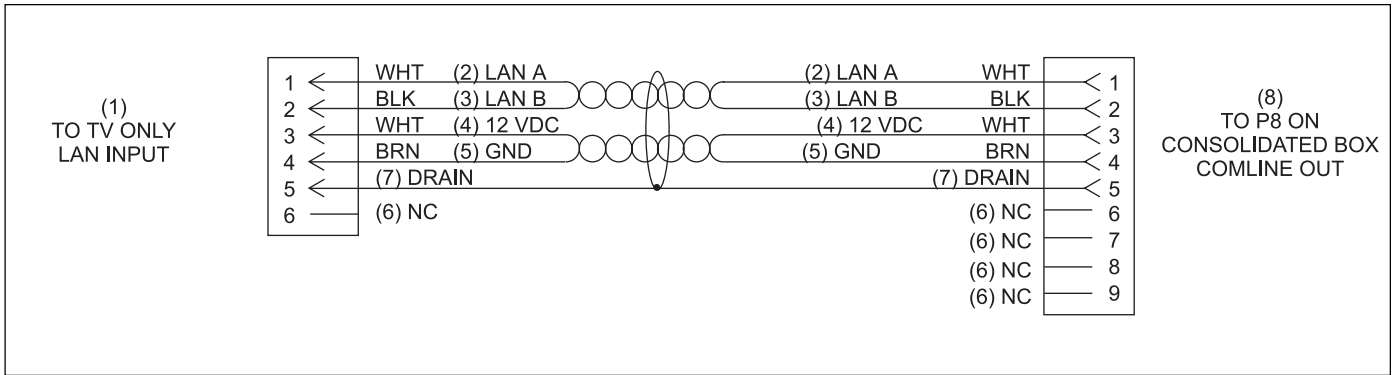
- (1) TO P4 ON OVERHEAD MONITOR POWER PANEL
- (2) TO J2 ON COMPOSITE/RGB PRINTED CIRCUIT BOARD



Overhead Monitor Power Control Assembly (Part No. 68-100991-000)

- (1) TO P3 ON OVERHEAD MONITOR POWER PANEL
- (2) POSITION 5
- (3) POSITION 6
- (4) TO RELAY

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



*TV Only LLAN In to Consolidated Box Comline Out (Part No. 57-300642-000)*

- |   |   |                          |
|---|---|--------------------------|
| (1) TO TV ONLY LOCAL AREA NETWORK INPUT | (2) LOCAL AREA NETWORK A                  | (3) LOCAL AREA NETWORK B |
| (4) 12 VOLTS ALTERNATING CURRENT        | (5) GROUND                                | (6) NO CONNECTION        |
| (7) DRAIN                               | (8) TO P8 ON CONSOLIDATED BOX COMLINE OUT |                          |