

Pre-Installation/Installation Manual

**AS-80/AS-90 Scorers
w/LED Overheads**

October 2013 / 57-900714-000

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CUSTOMER SERVICE
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AS-80/90 Scorers w/LED Overheads Pre-Installation/Installation Manual

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Reorder Part No. 57-900714-000

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SAFETY!

NOTES & WARNINGS

Throughout this publication, “Warnings”, and “Cautions” (accompanied by one of the International HAZARD Symbols) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. They are defined below. OBSERVE AND READ THEM CAREFULLY!

These “Safety Alerts” alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus training and “Common Sense” operation are major accident prevention measures.

 **NOTE or IMPORTANT!** Will designate significant informational notes.

 **WARNING!** Will designate a mechanical or nonelectrical alert which could potentially cause personal injury or death.

 **WARNING!** Will designate electrical alerts which could potentially cause personal injury or death.

 **CAUTION!** Will designate an alert which could potentially cause product damage.

 Will designate grounding alerts.

SAFETY NOTICE TO USERS OF THIS MANUAL

This manual has been written and published by the Service Department of Brunswick Bowling and Billiards to aid the reader when servicing or installing the products described.

It is assumed that these personnel are familiar with, and have been trained in, the servicing or installation procedures of these products, which includes the use of common mechanic's hand tools and any special Brunswick or recommended tools from other suppliers.

We could not possibly know of and advise the reader of all conceivable procedures by which a service might be performed and of the possible hazards and/or results of each method. We have not attempted any such wide evaluation. Therefore, anyone who uses a service procedure and/or tool, which is not recommended by Brunswick, must first completely satisfy himself that neither his nor the product's safety will be endangered by the service procedure selected.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

It should be kept in mind, while working on the product, that the electrical system is capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the power to the product should be disconnected prior to servicing and remain disconnected until servicing is complete.

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Packaging

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MODEL NUMBER CONFIGURATION			
<i>BRUNSWICK BOWLING & BILLIARDS CORPORATION</i>			
Drawing Number:		E3-300439-000	Rev. No: H
DESCRIPTION: MNC - AS80/90 LCD VIDEO INTERFACE			
REV.	QTY.	PART NUMBER	DESCRIPTION OF PACKAGE
	2.00*	11-697009-000	TERMINATOR - 75 OHM, F CONNECTOR
	1.00	57-501029-000	ASS'Y. - CABLE, AS80/90 COLOR COMLINE "Y"
	1.00	57-861288-000	PKG. - LINE CORD, 7 1/2' LONG
	1.00	57-863379-403	PKG. - AS80/90 LCD VIDEO INTERFACE
	1.00	57-863536-000	PKG. - CABLE, SERIAL, F-F, 1:1, BLACK, 6'
	1.00	57-863537-000	PKG. - AS80/90 LCD INTERFACE HARDWARE
	1.00	57-863538-000	PKG. - CABLE, POWER, IEC JUMPER, 6'
	1.00	57-863539-000	PKG. - CABLE, VIDEO, RCA CONNECTOR, BLACK, 6'
	0.50	57-863540-000	PKG. - CABLE, VIDEO, COAX, F CONNECTOR, BLACK, 6'
	1.00*	57-900714-000	INSTALLATION MANUAL
			*PER CENTER

Page 1 of 1

MODEL NUMBER CONFIGURATION			
<i>BRUNSWICK BOWLING & BILLIARDS CORPORATION</i>			
Drawing Number:		E3-300440-000	Rev. No: D
DESCRIPTION: MNC - AS80/90 LCD VIDEO INTERFACE SPARE PARTS KIT			
REV.	QTY.	PART NUMBER	DESCRIPTION OF PACKAGE
	1.00	57-863049-000	PKG. - SPARE FUSE KIT, 5 AMP, 5X20 MM
	1.00	57-863265-000	PKG. - TRIPLE OUTPUT POWER SUPPLY
	1.00	57-500921-403	ASSY - PROGRAMMED AS80/90 LCD INTERFACE BOARD
	1.00	11-697009-000	TERMINATOR - 75 OHM, F CONNECTOR
	1.00	57-500880-000	ASSY. - CALIBRATION PUSHBUTTON AND LED

Pre-Installation Requirements

REMOVING AS-80/90 OVERHEAD MONITORS



CAUTION! When removing existing overhead monitors, it will be necessary to open the enclosure and carefully disconnect the existing cables. **DO NOT CUT any of the existing cables. All Cables from the ceiling will be reused.**

SITE SURVEY

1. The LED overheads require different electrical requirements than the old CRT overheads. Please review the information below with the customer to inform them of their additional electrical responsibilities.

- a. Isolated Ground (IG) outlet is required for the LED Overhead.
- b.

LED Lane Pair with Interface Electronics	Total Amperage Per Lane Pair Overhead (120/230 Volt)
32" LED	2.9/1.45
40" LED	2.9/1.45
46" LED	2.9/1.45
55" LED	4.3/2.15

2. What is the ceiling height, from the lane surface over the approach area where monitors will be located? _____
 - a. For 32" LED we recommend 10'-6" (3200 mm) ceiling heights, minimum of 9'-6" (2896 mm).
 - b. For 40" LED we recommend 10'-10" (3302 mm) ceiling heights, minimum of 9'-10" (2997 mm).
 - c. For 46" LED we recommend 11'-1" (3378 mm) ceiling heights, minimum of 10'-1" (3073 mm).
 5. For 55" LED we recommend 11'-3" (3429 mm) ceiling heights, minimum of 10'-4" (3150 mm).



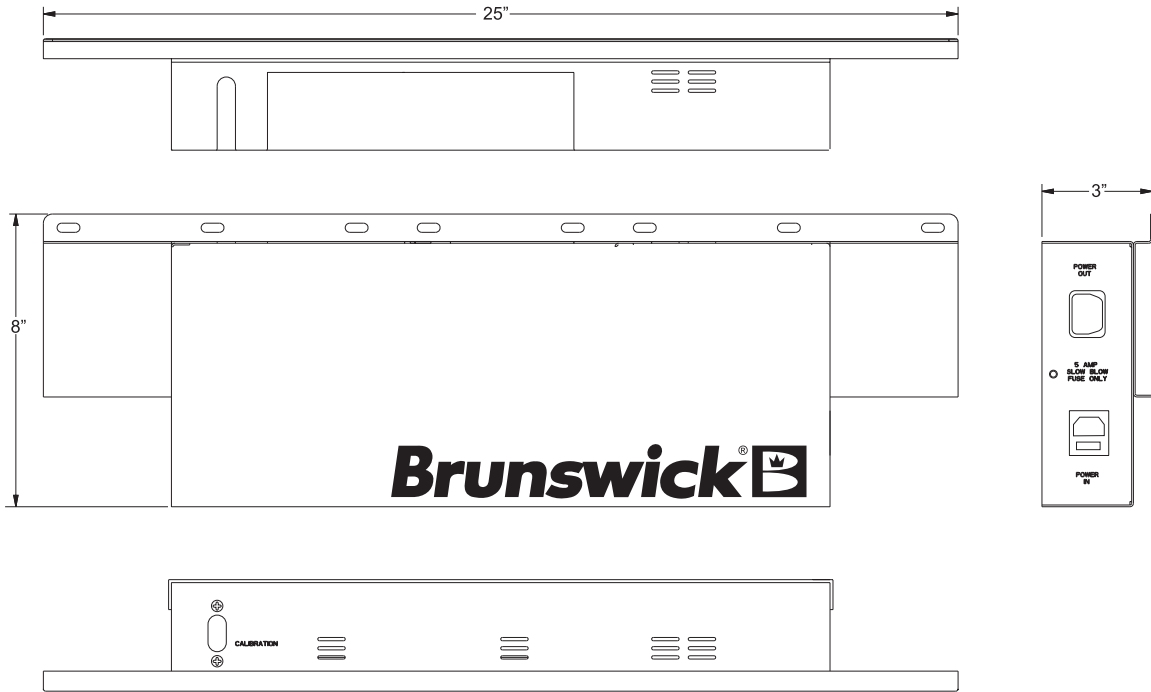
NOTE: The LED monitor may be installed with ceilings lower than the minimum ceiling height distance, but the customer should be aware the height from the lane to the bottom of the monitor would be less than 89."



IMPORTANT!: The site survey and overhead certificate must be completed and sent to Contract Management before the contract can be approved and shipped.

AS-80/90 INTERFACE

Electrical Information							
Volts	Hertz	AC/DC	Phase	AMPS Per Unit	Watts	Branch Circuit	Customer Responsibility
100-130 200-240	50/60	AC	1	0.5@120V 0.25@240V	60	2 Wires + Isolated Ground	



32" LED MONITOR LANE PAIR WITH AS-80/90 LED INTERFACE

All Scoring Systems

Electrical Information							
Volts	Hertz	AC/DC	Phase	AMPS Per Unit	Watts	Branch Circuit	Customer Responsibility
100-130	50/50	AC	1	2.9@ 120V	94	2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 Receptacle or Equivalent No more than 8 LED overheads per 20amp circuit
200-240	50/50	A/C	1	1.45 @ 240V	94	2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 Receptacle or Equivalent No more than 14 LED overheads per 16amp circuit

40" LED MONITOR LANE PAIR WITH AS-80/90 LED INTERFACE

All Scoring Systems

Electrical Information							
Volts	Hertz	AC/DC	Phase	AMPS Per Unit	Watts	Branch Circuit	Customer Responsibility
100-130	50/60	AC	1	2.9@ 120V	119	2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 Receptacle or Equivalent No more than 8 LED overheads per 20 amp circuit
200-240	50/60	A/C	1	1.45 @ 240V	119	2 Wires + Isolated Ground	Install Hubbell I.G. Receptacle or Equivalent No more than 8 LED overheads per 14 amp circuit

46" LED MONITOR LANE PAIR WITH AS-80/90 LED INTERFACE

All Scoring Systems

Electrical Information							
Volts	Hertz	AC/DC	Phase	AMPS Per Unit	Watts	Branch Circuit	Customer Responsibility
100-130	50/60	AC	1	2.9 @ 120V	136	2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 Receptacle or Equivalent No more than 8 LED overheads per 20amp circuit
200-240	50/60	A/C	1	1.45 @ 240V	136	2 Wires + Isolated Ground	Install Hubbell I.G. Receptacle or Equivalent No more than 14 LED overheads per 16amp circuit

55" LED MONITOR LANE PAIR WITH AS-80/90 LED INTERFACE

All Scoring Systems

Electrical Information							
Volts	Hertz	AC/DC	Phase	AMPS Per Unit	Watts	Branch Circuit	Customer Responsibility
100-130	50/60	AC	1	4.3 @ 120V	164	2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 Receptacle or Equivalent No more than 6 LED overheads per 20amp circuit
200-240	50/60	A/C	1	2.15 @ 240V	164	2 Wires + Isolated Ground	Install Hubbell I.G. Receptacle or Equivalent No more than 10 LED overheads per 16amp circuit

Installation Instructions

OVERVIEWS

COMMAND NETWORK

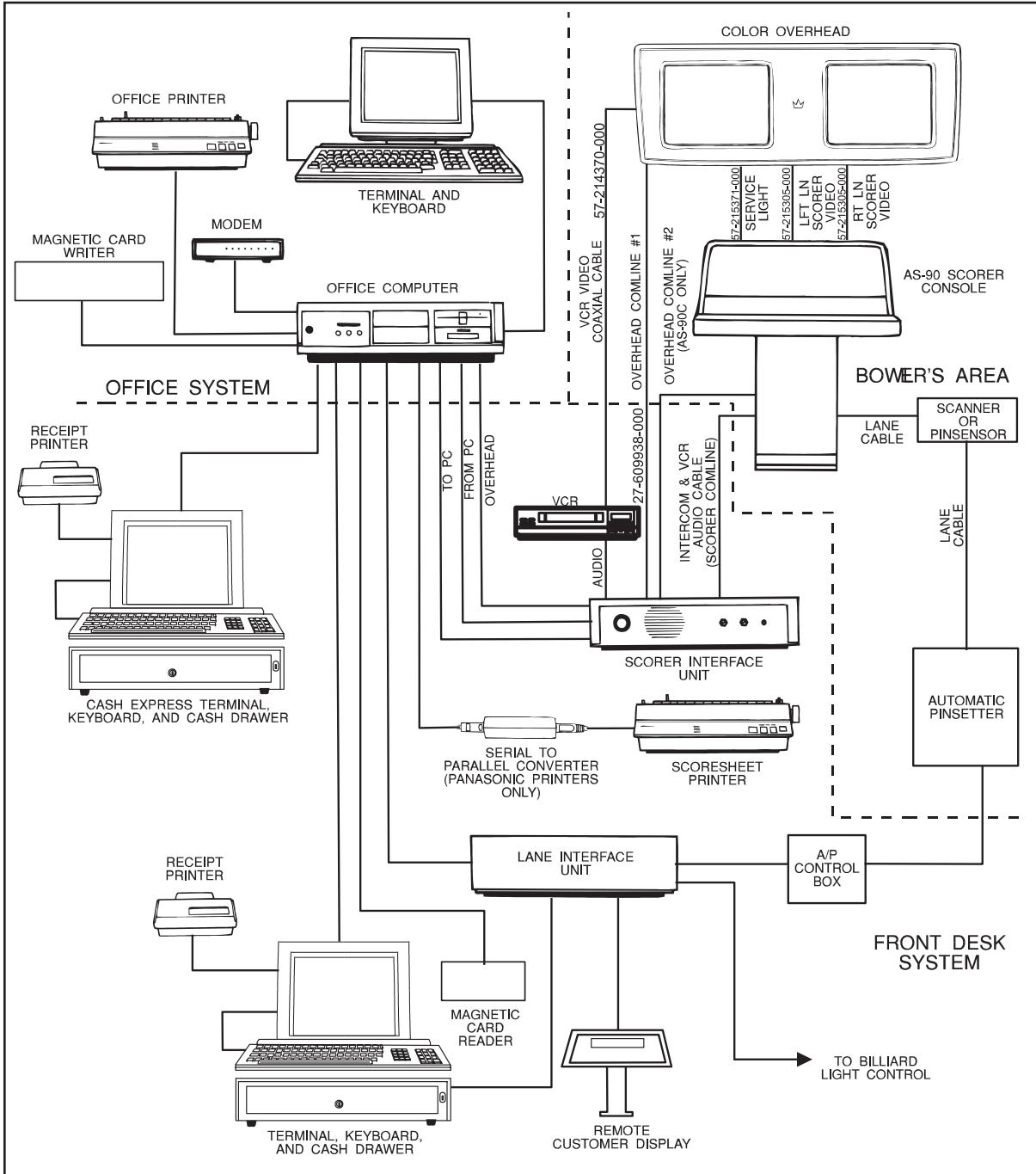


Figure 1. Command Network Overview

Color Vision w/Color Control Box

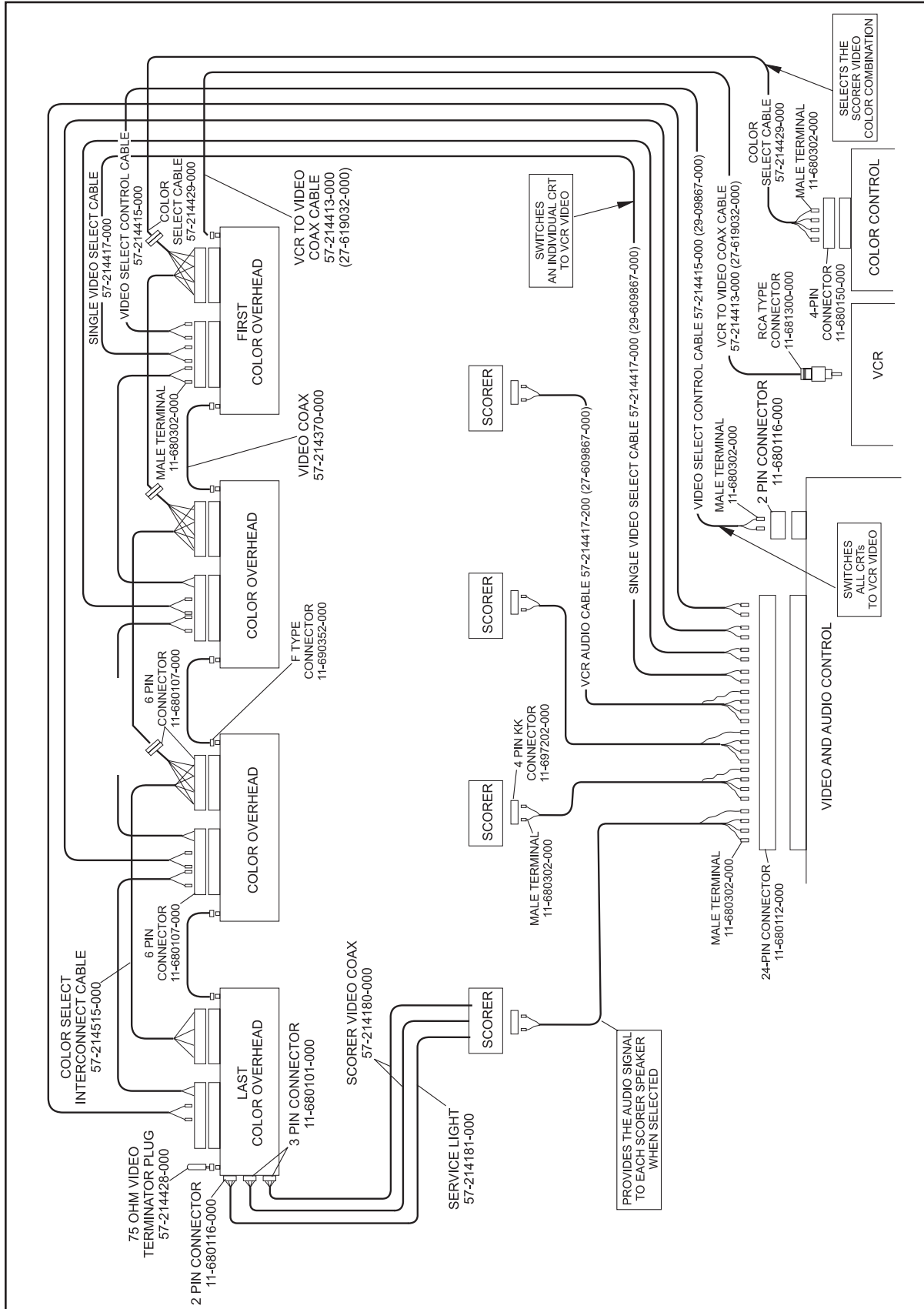


Figure 2. Color Vision Interconnection with Color Control Box

Color Vision w/Color Console

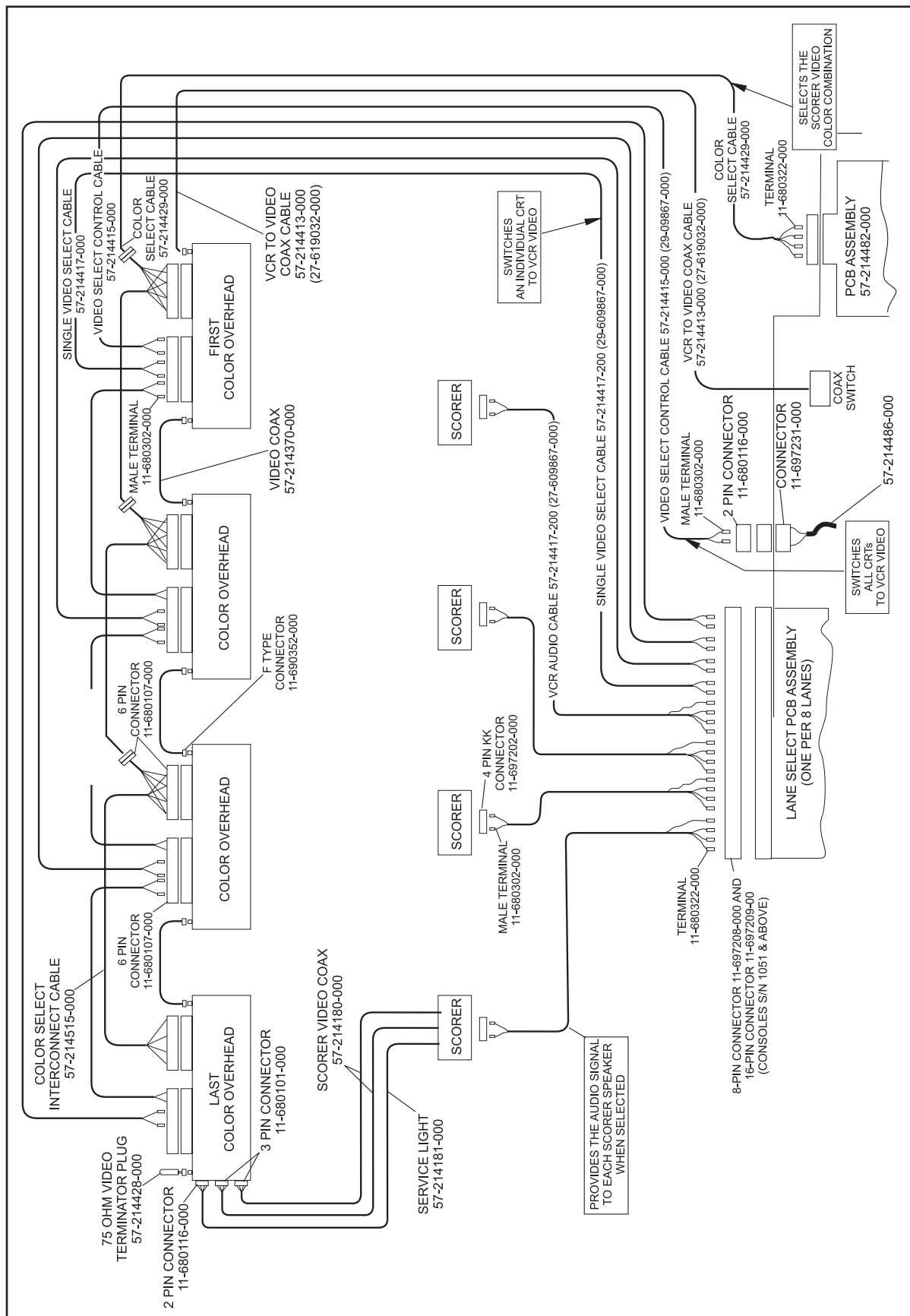


Figure 3. Color Vision w/Color Console Overview

REMOVING AS80/90 OVERHEAD MONITORS



CAUTION! When removing existing overhead monitors, it will be necessary to open the enclosure and carefully disconnect the existing cables. **DO NOT CUT** any of the existing cables. All cables which come from the ceiling will be reused in the new installation. The only exception is for the color comline cable which connects the two enclosure circuit boards to the cable which comes out of the ceiling. This cable is either daisy chained to the two boards or “Y” connected to the two boards. Disconnect this cable from the ceiling cable (below the level of the ceiling) and discard.

AS-80/90 INTERFACE

Mount the LED Interface box to the overhead LED mounting structure.

1. Slide clamp over tube of LED support weldment.

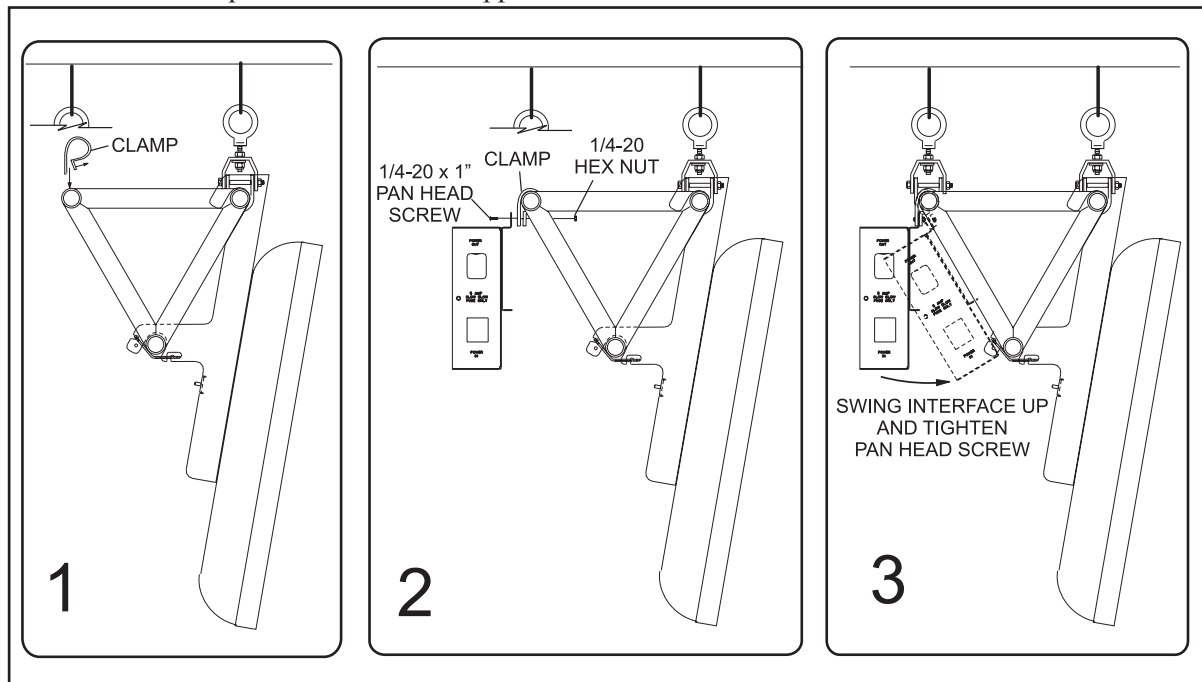


Figure 4. Mount Interface

2. Use 1/4-20 x 1” pan head screw and 1/4” hex nuts to secure the interface box and clamp to overhead weldment, ensuring there is clearance between the cables and the overhead weldment.

External Connections

MONOCHROME INSTALLATION

Install the terminator on each overhead.

1. Install a 75 ohm terminator on any one of the "global TV video IN/OUT", J1 or J2 connectors for each overhead. Refer to *Figure 5*.

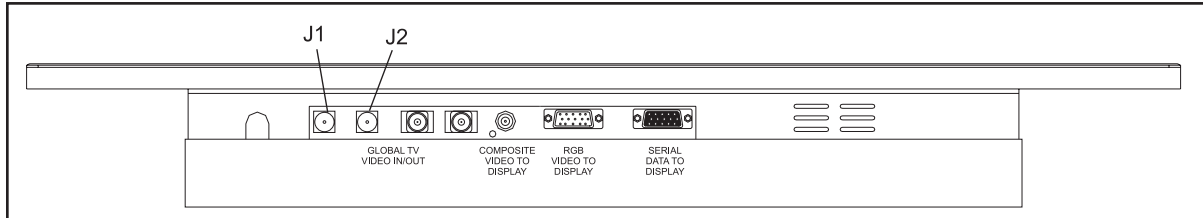


Figure 5. Install Terminator

COLOR VISION INSTALLATION

Install the global video daisy chain cables.

1. Connect the global video daisy chain cables to "global TV video IN/OUT" (J1-J2 or J3-J4)

i **NOTE:** All four connectors are parallel, so direction is not important. "BNC" and "F" connections may be mixed.

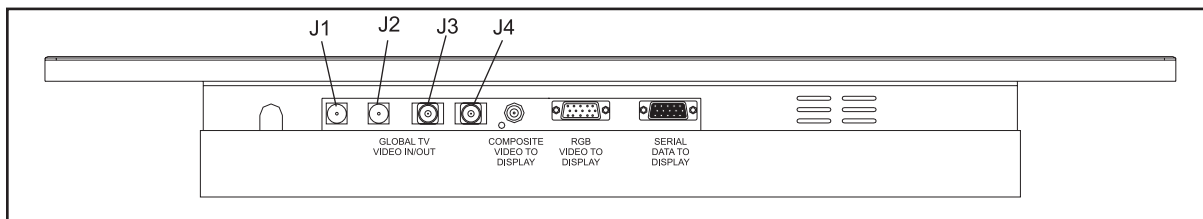


Figure 6. Connect Global Video

2. Install 75 Ohm terminator on last box in global video chassis.

SOURCE COMMAND and COMMAND NETWORK INSTALLATION

A Source Command and a Command Network installation both look the same to an AS80/90 Interface Box. Install the global video daisy chain.

1. Connect the global video daisy chain cables to "global TV video IN/OUT" (J1-J2 or J3-J4)

i **NOTE:** All four connectors are parallel, so direction is not important. "BNC" and "F" connections may be mixed.

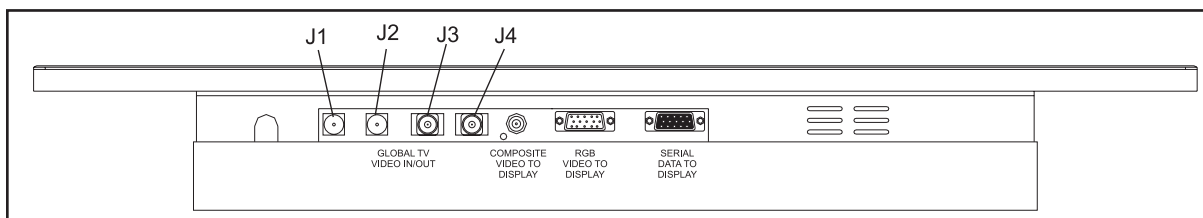


Figure 7. Connect Global Video

2. Install 75 Ohm terminator on last box in global video chassis.

LED INSTALLATION

Install the RCA video cable, VGA cable, and the serial cable to the LED overhead from the AS80/90 interface box.

1. Connect the RCA video cable, VGA cable, and Serial cable to the external connections on the top of the Interface box and LED overhead monitor.

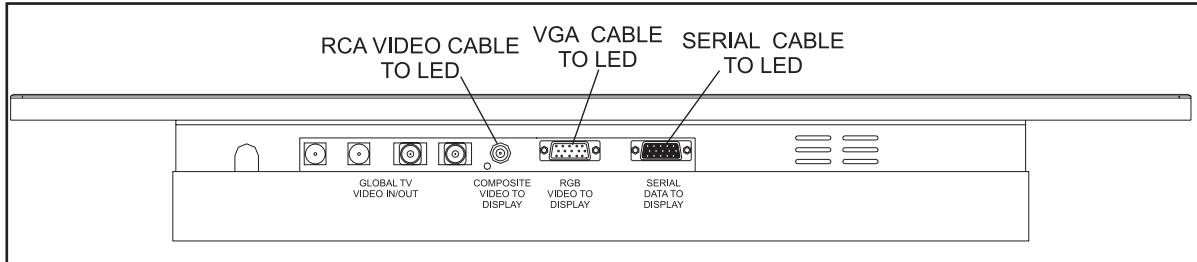


Figure 8. External Connections

Power

Use either the power cord that the LED is equipped with or the 7-1/2" power cord, to connect the interface box to the building power. Discard the unused power cord.

Internal Connections

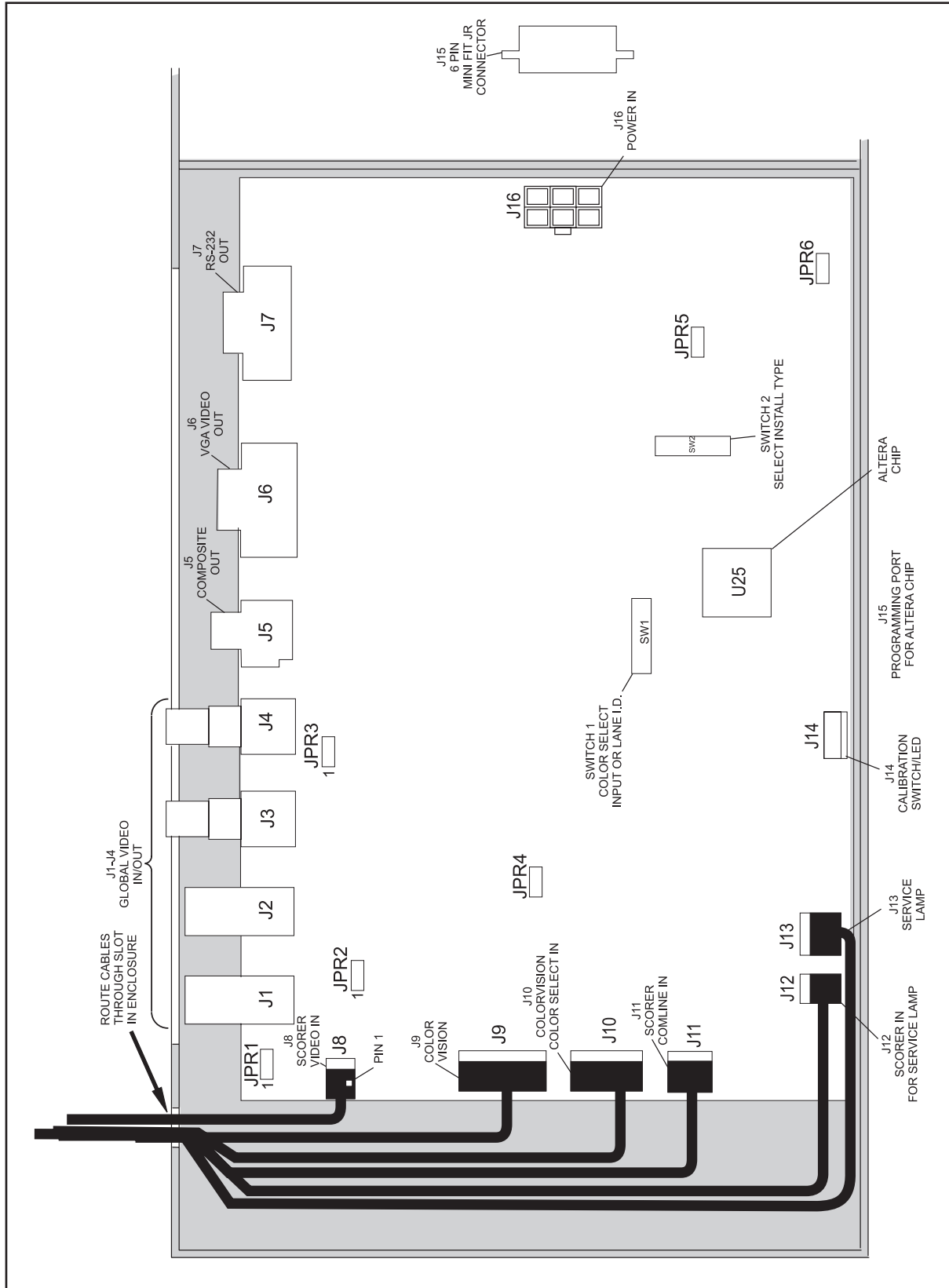


Figure 9. Internal Connections

i **NOTE:** There may or may not be a service lamp for connection to J12 & J13, if there is, connect cables to odd lane and leave even lane connectors open.

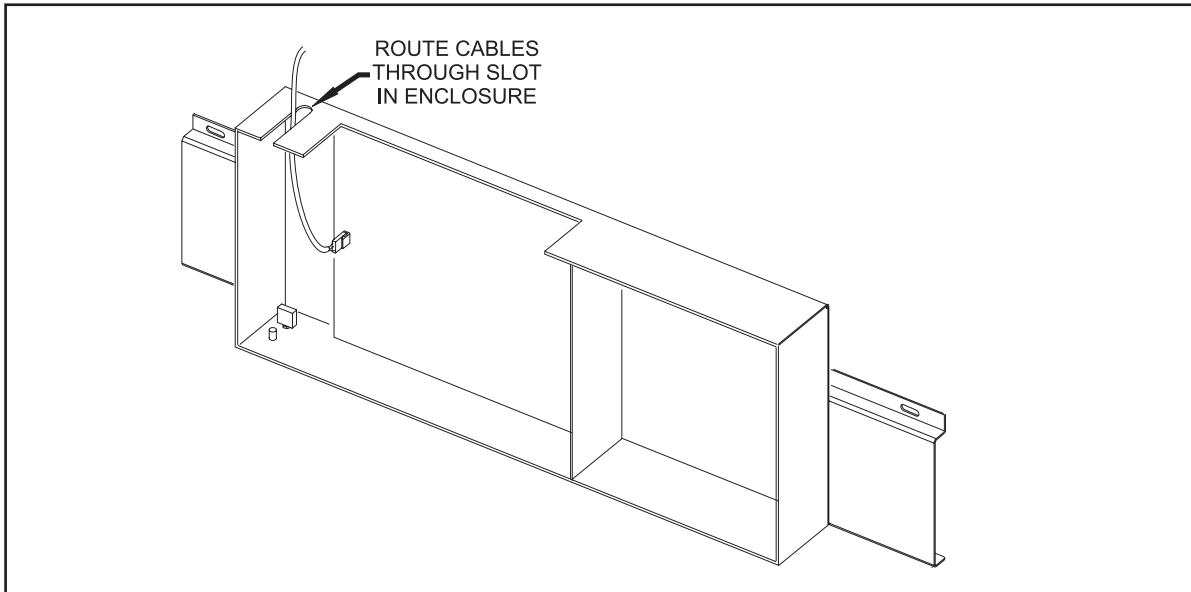


Figure 10.Route Cable to Enclosure

MONOCHROME INSTALLATION

Connect the Service Light cable and the video cable.

1. Connect the video cable to connector J8. Verify that the center conductor of the cable is on pin #1.
2. Connect the service light from AS-80/90 scorer to J12.
3. Connect the service lamp to J13
4. There are NO connections to J9, J10, and J11

COLOR VISION INSTALLATION

Connect the global video, color select input, video select input, and the Service Light.

1. Connect the video selection/video signal input cable (6-pin connector) to connector J9. Verify that the center contact of the video signal goes to pin #5 of the connector.
2. Connect the color select cable (5-pin connector) to connector J10.
3. Connect the service light cable from AS/80/90 cable scorer cable to J12.
4. Connect the service lamp to J13
5. There are NO connections to J8 and J11.

SOURCE COMMAND and COMMAND NETWORK INSTALLATION

Source Command and Command Network will have the same connection for the AS90/80 Interface Box. Connect the global video, global color comline, the video from the Scoring Console, and the Service Light.

1. Connect the scorer video cable to connector J8.
2. Connect the center connector of the Color Comline “Y” cable assembly (p/n 57-501029-000) to the Color Comline cable assembly that comes from the ceiling. Connect one of the two ends of the “Y” cable to connector J11. The other end of the “Y” cable connects to J11 in the other interface enclosure on the lane pair.
3. Connect the service lamp from AS-80/90 cable scorer cable to J12.
4. Connect the service light cable from AS-80/90 Scorer to J13
5. There are NO connections to J9 and J10.

Switch Settings

Switch SW1 Setting

(Monochrome Installation)

Bits 1, 2, and 3 of SW1 select one of eight color combinations for the screen. These are the same eight color combinations that are used in ColorVision, except that they cannot be changed from the Front Desk. The remaining bits of the switch are not used and can be set to any value.

BITS				COLOR		
1	2	3	4-8	CHARACTER	BACKGROUND	FORMS
OFF	OFF	OFF	NOT USED	YELLOW	LT BLUE	WHITE
ON	OFF	OFF	NOT USED	YELLOW	BLUE	WHITE
OFF	ON	OFF	NOT USED	YELLOW	GREEN	WHITE
ON	ON	OFF	NOT USED	WHITE	YELLOW	WHITE
OFF	OFF	ON	NOT USED	RED	LT GRAY	BLACK
ON	OFF	ON	NOT USED	YELLOW	MAGENTA	BLACK
OFF	ON	ON	NOT USED	BLUE	LT YELLOW	WHITE
ON	ON	ON	NOT USED	DO NOT USE		

(ColorVision Installation)

Switch SW1 is not used in a ColorVision installation, and may be set to any value.

(Source Command and Command Network Installation)

For either of the installation types that use a color comline, SW1 is used to set the lane number. Only bits 1-7 are used, bit #8 is unused and may be set to any value. This limits the maximum number of lanes to 127.

LANE NO.	BITS							
	1	2	3	4	5	6	7	8
-	1	2	3	4	5	6	7	8
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	NOT USED
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	NOT USED
3	ON	ON	OFF	OFF	OFF	OFF	OFF	NOT USED
-	-	-	-	-	-	-	-	-
127	ON	ON	ON	ON	ON	ON	ON	NOT USED

Switch SW2 Setting

Bits 1 & 2 = Installation Type

BIT 1	BIT 2	TYPE
OFF	OFF	0 = NOT USED
ON	OFF	1 = MONOCHROME INSTALLATION
OFF	ON	2 = COLORVISION INSTALLATION
ON	ON	3 = COLOR COMLINE INSTALLATION

Bits 3, 4, & 5 = Display Type

BIT 3	BIT 4	BIT 5	TYPE
OFF	OFF	OFF	SAMSUNG MX SERIES
ON	OFF	OFF	FOR TEST USE ONLY
OFF	ON	OFF	FOR TEST USE ONLY
ON	ON	OFF	FOR TEST USE ONLY
OFF	OFF	ON	FOR TEST USE ONLY
ON	OFF	ON	FOR TEST USE ONLY
OFF	ON	ON	FOR TEST USE ONLY
ON	ON	ON	FOR TEST USE ONLY

Bit 6 = Over-ride Normal Turn On/Off

Turn off whenever sync is lost

BIT	ON	OFF
BIT6	Sync over-rides normal on/off	Normal on/off

Bit 7 = Force Display On

BIT	ON	OFF
BIT 7	FORCE DISPLAY ON	NORMAL DISPLAY ON/OFF

Bit 8 = Set Display To Global/Scorer Video

when display is forced on (Bit 7 = On)

BIT	ON	OFF
BIT 8	Set display for global video	Set display for scorer video

For normal usage, bits 6, 7, and 8 will be in the OFF position.

JUMPER

JPR1 - commons the AS80/90 video coax shield to the Video Interface chassis ground. It will normally be set to pins 1-2, which grounds the shield to the chassis ground. This to prevent the displays from randomly blinking on and off, due to electrical noise.

JPR2 - commons the AS80/90 video coax shield to the Video Interface Board ground. It will normally be set to pins 1-2, which commons the grounds.

JPR3 - commons the global video coax shield to the Video Interface Chassis ground. It is normally set to pins 2-3, which isolates the shield from the board. If the global video is bad, or cuts in and out, change the jumper setting on the board closest to the video source.

JPR4 - Not Used - normally shorted

JPR5 - Not Used - normally open

JPR6 - Not Used - normally open

At this point all scoring console adjustments must be completed before powering up the LED display.

SCORER CONSOLE POWER SUPPLY

12VDC Power Supply (57-214156-800)

When working with AS80/90 scorers it is sometimes necessary to check and/or adjust the power supplies. Attached below are the recommended procedures for performing this check.

The +12VDC, -12VDC, and +5VDC power supply adjustments must be checked every six months and adjusted if necessary. These voltages should also be checked when an intermittent computer problem occurs and cannot be isolated. The measurements must be made with a DIGITAL voltmeter to achieve the accuracy required. Refer to *Figure 11*.

1. Turn the console power off by removing 120VAC console power.
2. Attach the black lead of the digital voltmeter to the “common” terminal of the power supply. Attach the red lead of the meter to the “+Out” terminal. The meter must be set on DC voltage.
3. Turn the console power “on” by applying 120VAC to the console.
4. Set the +12VDC adjustment to obtain a reading of +12.5VDC ±.1VDC.
5. Remove the red lead from the “+Out” terminal and attach it to the “-Out” terminal.
6. Set the -12VDC adjustment to obtain a reading of -12.2VDC ±.1VDC.

5VDC Power Supply (All Models)

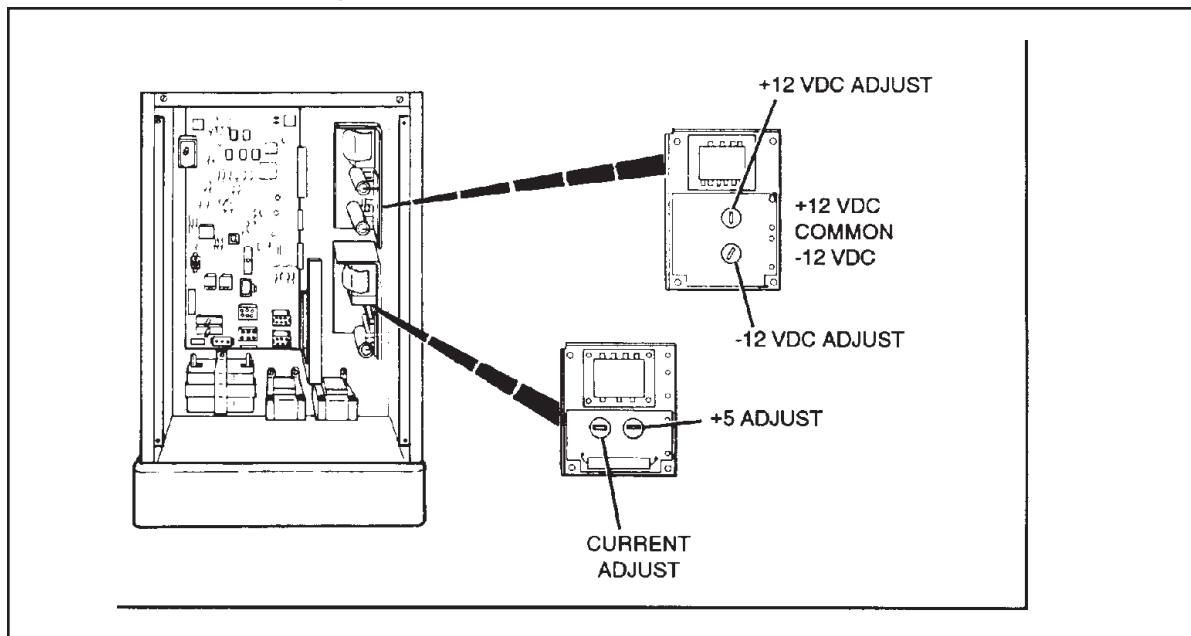


Figure 11. 5VDC Power Supply (57-214155-800)

Adjustment of the 5VDC power supply (57-214155-800) must be checked every six months and adjusted if necessary. The voltage should also be checked when an intermittent computer problem occurs and cannot be isolated. The measurement must be made with a DIGITAL voltmeter to achieve the accuracy required.

- i** Note: After adjusting the 5VDC power supply, it may be necessary to perform the Form and Character adjustments on the overheads or on consoles with color CRT's.
- i** Note: Adjustment of the voltage may cause the power supply to shut down. Powering down the console by removing 120VAC power and repowering it will reset the power supply.

Initial Set-Up

1. Disconnect 120VAC power from the console.
2. Clean the A/C to I/O edge connectors as described in the Maintenance section of this manual.
3. Attach the black lead of your digital voltmeter to the terminal labeled "-Out". Attach the red lead to the terminal labeled "+Out". (Figure 17)
4. Turn both the voltage and current adjustment potentiometers fully counterclockwise and then clockwise 1/4 turn. (Figure 17) (These adjustments are labeled V ADJ and either I LIM or O.C.P.)
5. Reconnect the 120VAC power to the console.

Current Output Adjustments

1. Slowly adjust V ADJ until a reading of 5.7VDC \pm 1V is displayed on the meter (5.6VDC to 5.8VDC). If this voltage cannot be reached, disconnect 120VAC power and turn I LIM (or O.C.P.) clockwise an additional 1/4 turn. (Figure 17.)
2. Slowly adjust I LIM (or O.C.P.) counterclockwise until the voltage reading on the meter starts to drop from 5.7VDC. Then turn it clockwise until the 5.7VDC \pm 1V returns.

Voltage Output Adjustment

1. Remove both meter leads from the power supply and attach them to the +5VDC test points on the CPU PCB.
2. Adjust V ADJ until a reading of 5VDC is displayed on the meter.

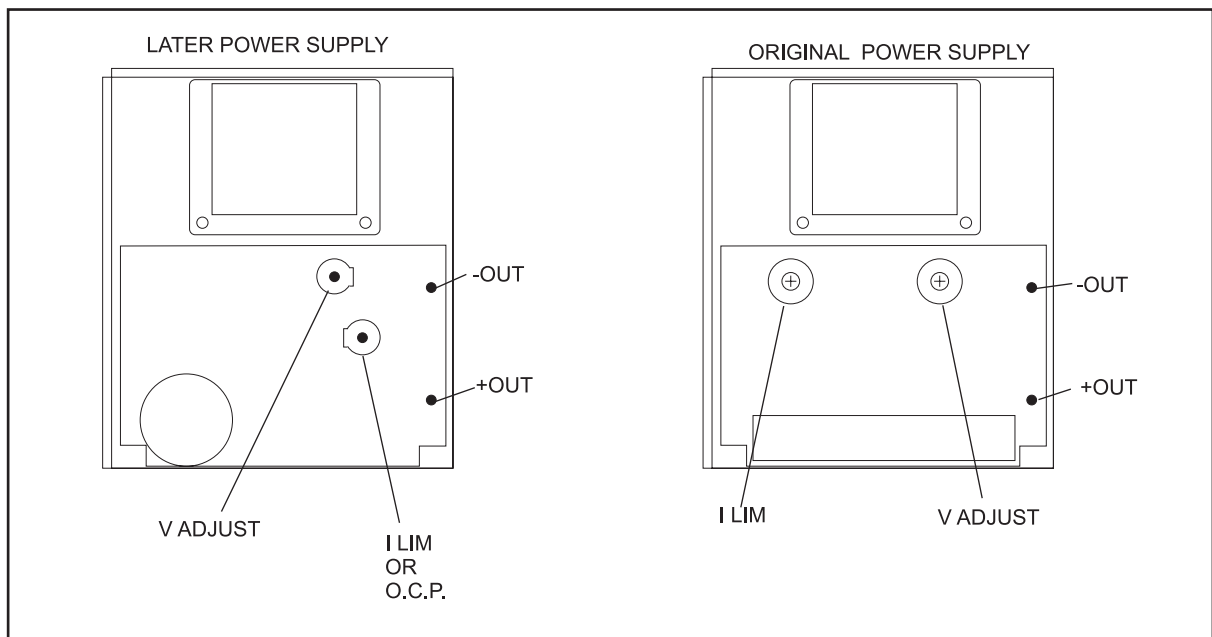


Figure 12. Voltage Adjustment

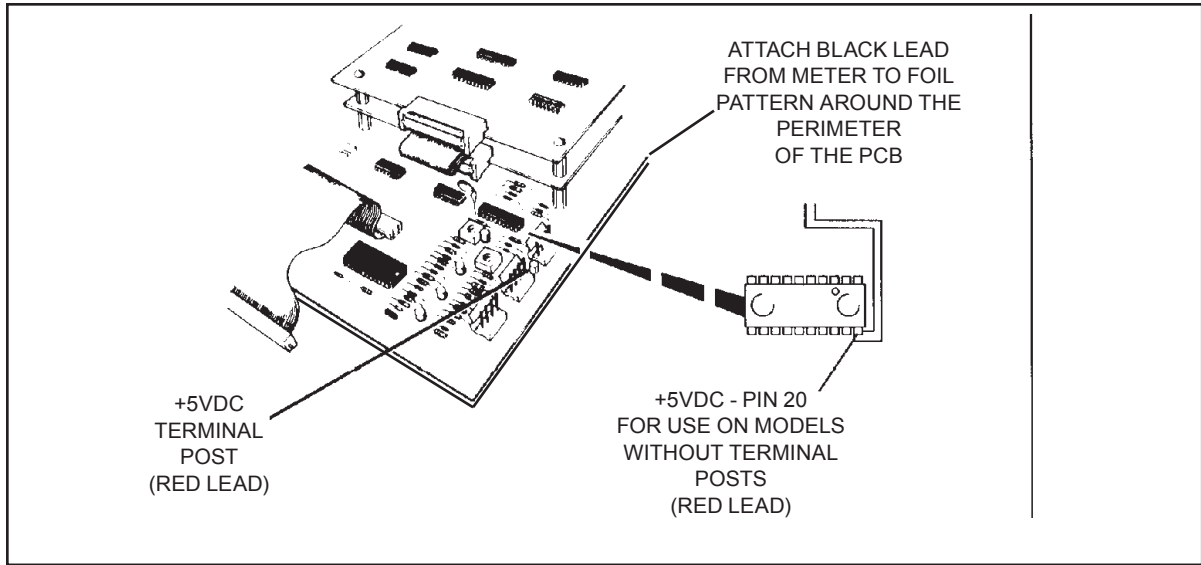


Figure 13. Voltage Adjustment

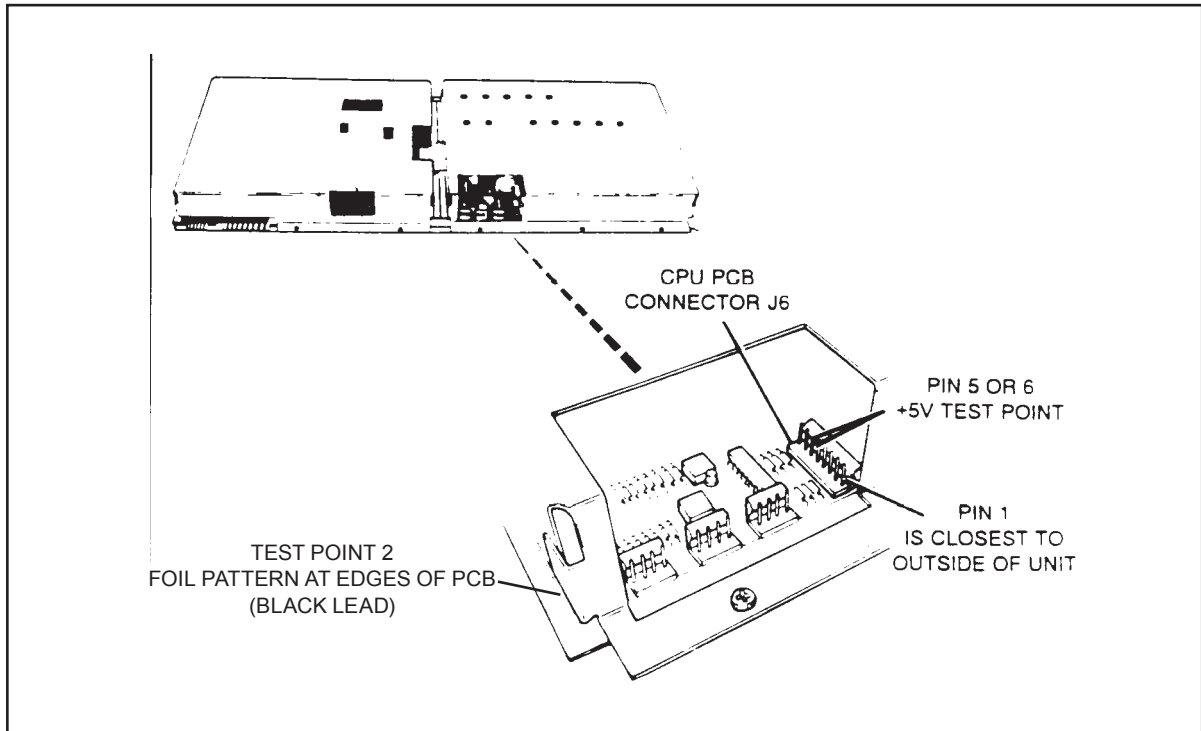


Figure 14. Voltage Adjustment

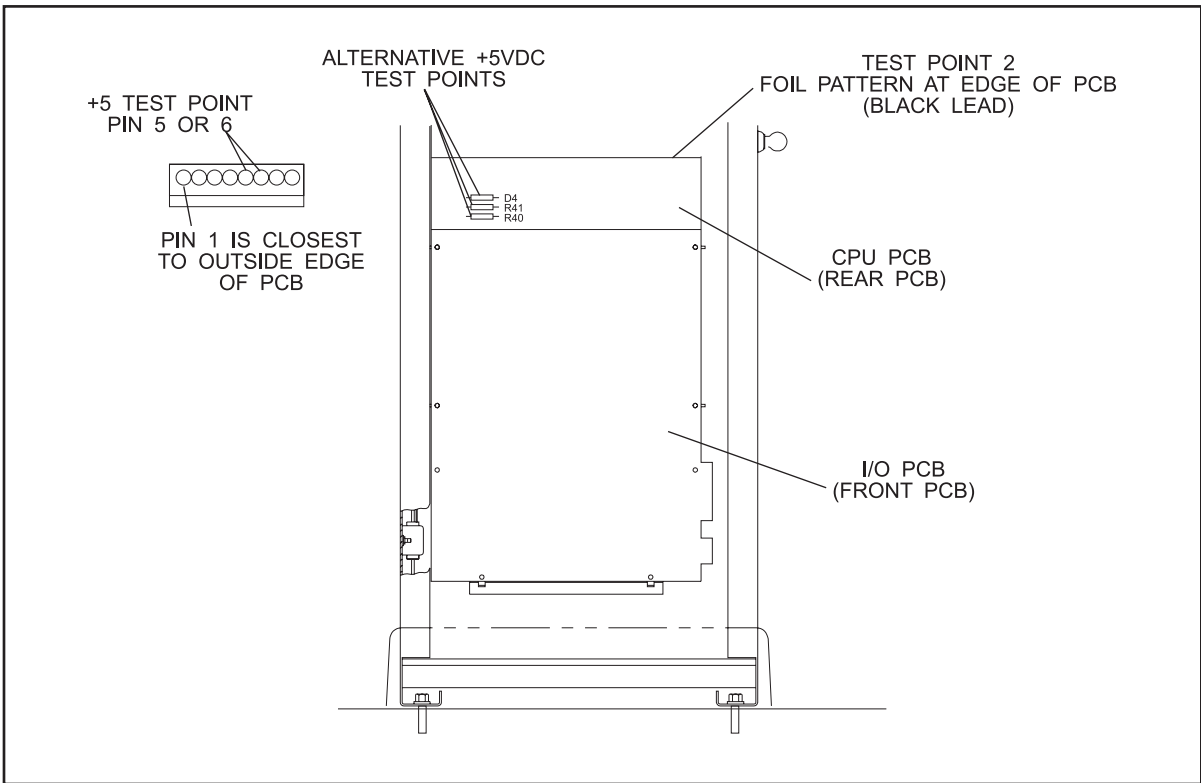


Figure 15. Voltage Adjustment

i NOTE: It may be necessary to unlock the I/O CPU tray and pull it forward to gain access to the +5VDC test point on J6. Therefore, use of the alternative test points is recommended.

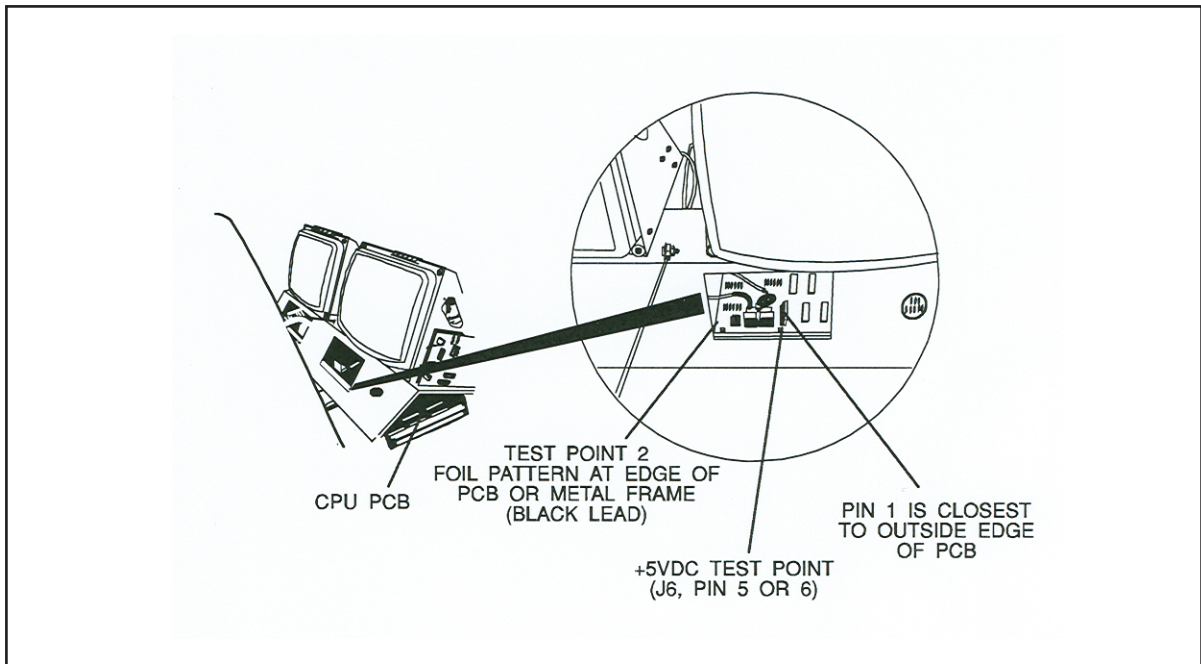


Figure 16. Voltage Adjustment

CRT DRIVER PCB

The 12" B & W CRT Driver PCB is responsible for; receiving scorer video from the CPU PCB, conditioning it, and applying it to the 12" picture tube. The Drive PCB contains all the necessary circuitry and controls to adjust the size and brightness of the video displayed on the CRT. Adjustment includes horizontal width, vertical size, brightness, and focus. Refer to *Figure 17*.

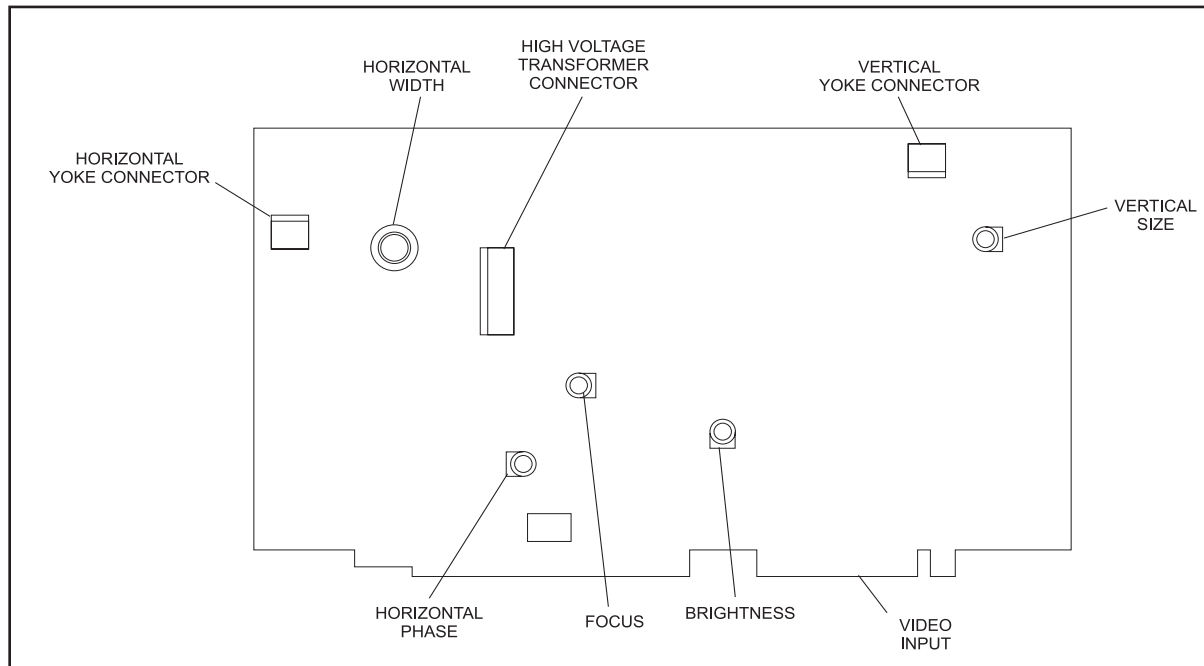


Figure 17. CRT Adjustment

The 12" B & W CRT Driver PCB component functions are:

Brightness - Turn this adjustment clockwise to increase the screen brightness. In normal operation this control should be turned down until the raster is just extinguished.

Focus - Turn this adjustment until the video has maximum clarity of detail.

Horizontal Phase - Turn this adjustment to bring the video information into the center of the raster. (This control is commonly referred to as horizontal centering.)

Horizontal Width - Turn this adjustment to increase or decrease the picture size horizontally (side to side).

Vertical Size - Turn this adjustment to increase or decrease the picture size vertically (top to bottom).

Horizontal Yoke Connector - Connector to the Horizontal deflection coil at the back of the picture tube.

Vertical Yoke Connector - Connector to the vertical deflection coil at the back of the picture tube.

High Voltage Transformer Connector - Input for the high voltage used at the horizontal and vertical deflection coils.

Video Input - Connection for input of the scorer video from the CPU PCB.

13" COLOR CRT ASSEMBLY (AS-K MODEL)

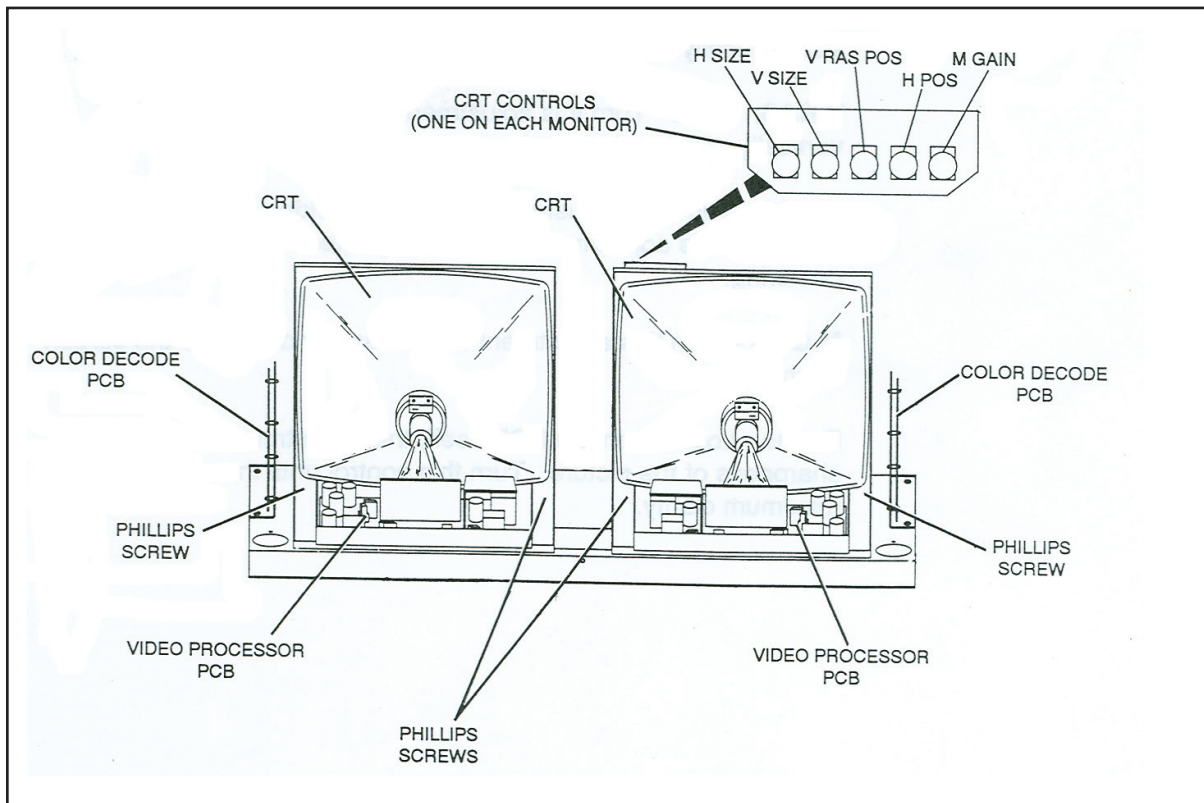


Figure 18. CRT Adjustment

VIDEO PROCESSOR PCB

The Video Processor PCB is located at the back of the CRT. It is responsible for processing the color video received from the Color Decode PCB and applying it to the picture tube. It also contains the necessary circuitry and controls to adjust the screen size, position and brightness. The screen adjustment controls are conveniently located at the top of the picture tube. Refer to *Figure 1*.

The functions of the video processor PCB controls are:

H Size - Turn this adjustment to increase or decrease the picture horizontally (side to side).

V Size - Turn this adjustment to increase or decrease the picture size vertically (top to bottom).

V RAS. POS - Turn this adjustment to center the picture vertically (top to bottom).

H POS - Turn this adjustment to enter the video horizontally (side to side).

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

Focus - Located on the PCB itself, this adjustment controls the sharpness of the picture. Turn this control until the video has maximum clarity.

COLOR DECODE PCB

The Color Decode PCB is a multifunctional board. It contains circuitry to accept scorer video from the console CPU PCB and mix it with predetermined colors programmed in EPROMS on the PCB. The colors are selectable through a selector dial plugged into “J1” of the PCB. Other adjustments on the PCB include Form and Character adjustments that determine which part of the video is forms and which is characters. This is important so the proper color is applied to each.

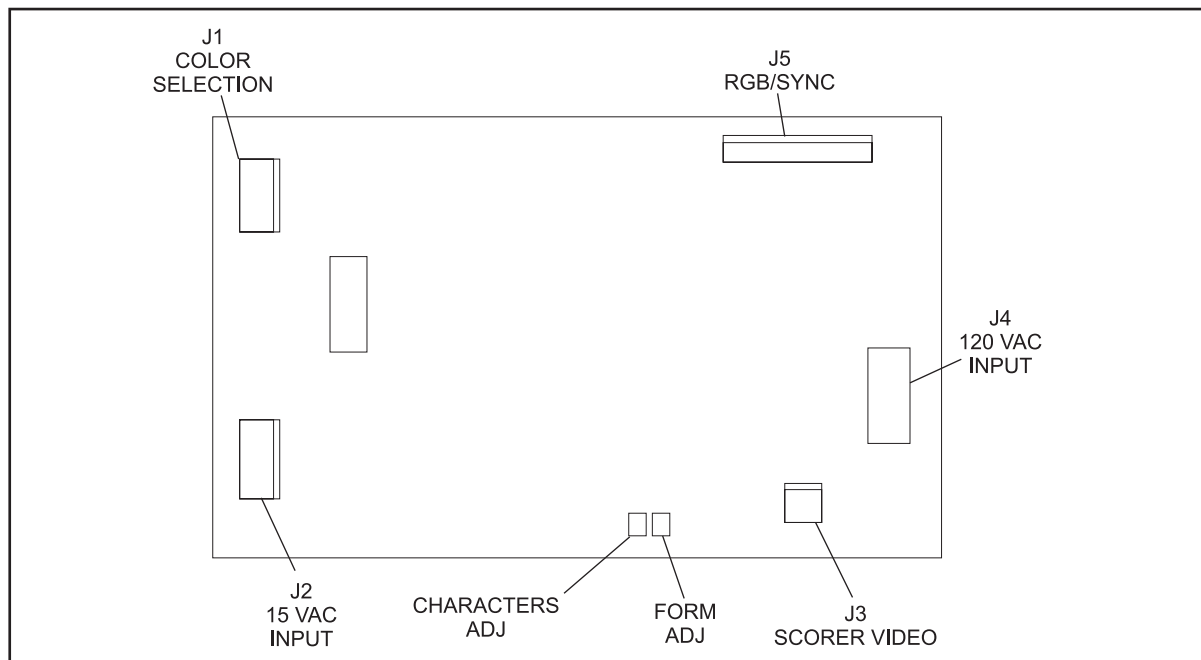


Figure 19. Color Adjustment

The functions of the Color Decoder PCB components are as follows:

J1 - Connector for the color selector. Turn the selector to display different color combinations.

J2 - 15 VAC input from transformer.

J3 - Connector for the CPU PCB. Scorer video enters the Color Decode PCB here.

J4 - Not Used

J5 - Connect to video processor PCB. Red, Green and Blue color and sync information gets transferred from this connector on individual lines.

Forms Adj - Used during the forms and characters adjustment procedure to identify the forms so they can be displayed on the CRT with the proper color.

Char Adj - Used during the forms and characters adjustment procedure to identify the characters so they can be displayed on the CRT with the proper color.

Forms and Character Adjustment

i *NOTE: Do not make the following adjustment until the +5VDC console power supply has been checked and adjusted to $+VDC \pm 0.1VDC$ using a digital V.O.M.*

1. Turn both the Forms and Character adjustment potentiometers fully clockwise. Screen will be blank with just a colored background.
2. Turn the Forms adjustment potentiometers fully counterclockwise until you just see the forms then add 1/4 turn. (Disregard the characters while adjusting the forms.)
3. Turn the Character adjustment potentiometers counterclockwise until the characters are completely colored, including the extreme left edge of each character. Note that position.
4. Continue turning the Character adjustment potentiometers counterclockwise until the forms start taking on the color of the characters. Note that position.
5. Turn the potentiometer back to the mid-point between the two noted positions.

POWER-UP

1. Connect the 6' LED display's power inlet to the AS80/90 Interface Box's power outlet, using the supplied IEC-to-IEC power cable. The power cable that came with the LED display may have been used to connect the Interface Box to the ceiling AC power outlet.
2. Using the power cord from the LED display, connect the AS90/80 Interface box AC power inlet to the ceiling AC power outlet.

i *NOTE: Make sure that the rear panel AC power switch on the LED display is turned ON.*

Verify that six power LEDs, D15-D20 of the AS90/80 Interface board light up and that the HEARTBEAT LED (D47) is blinking steadily at about a 1 Hz rate.

LED ADJUSTMENTS

Before beginning adjustments, set the scorer's overhead display to 4 frame format.

Using the remote control supplied with the Samsung monitor, perform the following adjustments:

For Image Size and Position

1. Press Menu
2. Scroll down to Picture
3. Scroll over to Image Lock
4. Press the Enter button to select it
5. Adjust the Vertical Positioning setting so that the bottom forms line is just visible.
6. Adjust the Course setting and the Horizontal Positioning setting until the image fills the screen side to side with just a little gap on each side.
7. Set the scorer to show the 4-frame display again, since this is the most common setting.
8. Adjust the Fine setting until none of the vertical lines flicker. If you cannot find an appropriate setting, decrease the Coarse setting by one and try again. If you absolutely cannot find a setting that removes all flicker, adjust it so that you have the flicker at its least and such that it is a line toward the right side of the display that is flickering. It will be normal to have some vertical lines wide and some narrow, often with small jags at the intersection of a horizontal line.

To Turn on Dynamic Contrast

1. Press Menu
2. Scroll down to Picture
3. Scroll to the right
4. Scroll down to Dynamic Contrast
5. Press Enter to select it
6. Scroll down once to turn Dynamic Contrast on

CALIBRATION

There are two types of calibration for the AS80/90 LED Interface, the Factory Restore Calibration and the standard Calibration. The standard calibration adjusts the circuitry to properly distinguish between forms and characters, allowing each to be colored correctly. To perform a standard calibration:

1. Show any style of scoresheet on the display.
2. Press the calibration pushbutton (on lower edge of the enclosure) until the Red Calibration LED lights.

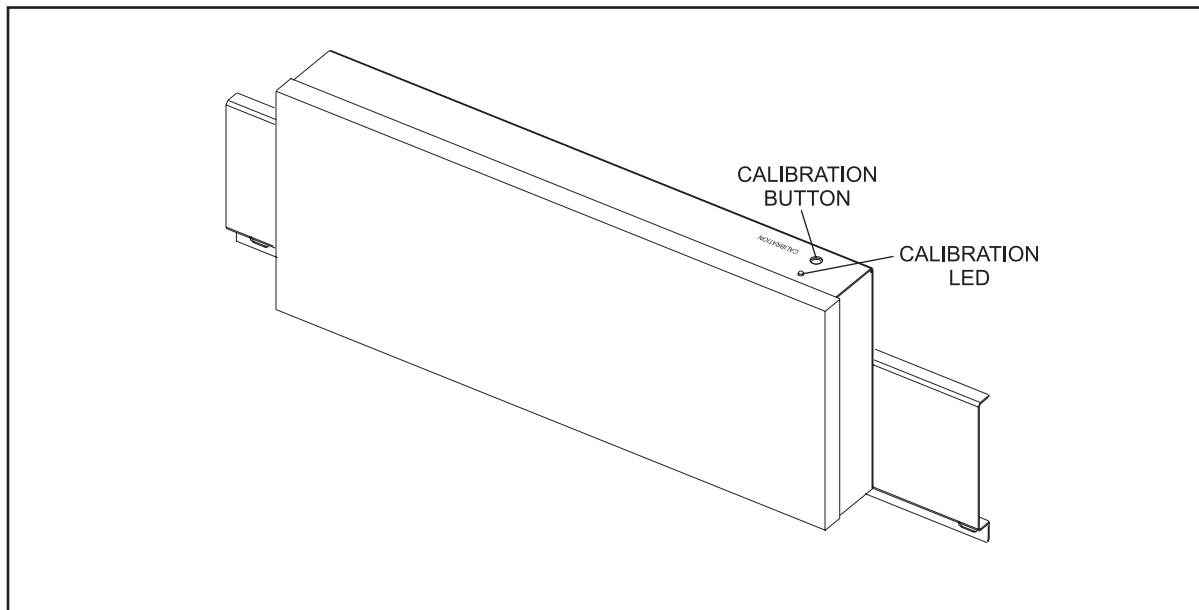


Figure 20. Recalibraqtte

3. Release the pushbutton.
4. As soon as the LED turns off, the interface has been calibrated.

The Factory Restore Calibration sets default calibration settings into the circuitry. It also sends commands to the LED to disable the menu and the front panel buttons. To do a Factory Restore Calibration:

1. Press and hold the Calibration pushbutton until the Calibration LED starts to blink (about 10 seconds).
2. Release the pushbutton.
3. Once the LED turns off, the default settings have been stored and the commands have been written to the display. If it takes more than 30 seconds for the LED to turn off, then the interface probably cannot communicate with the display.
4. Always do a standard Calibration after a Factory Restore Calibration.

Trouble Shooting

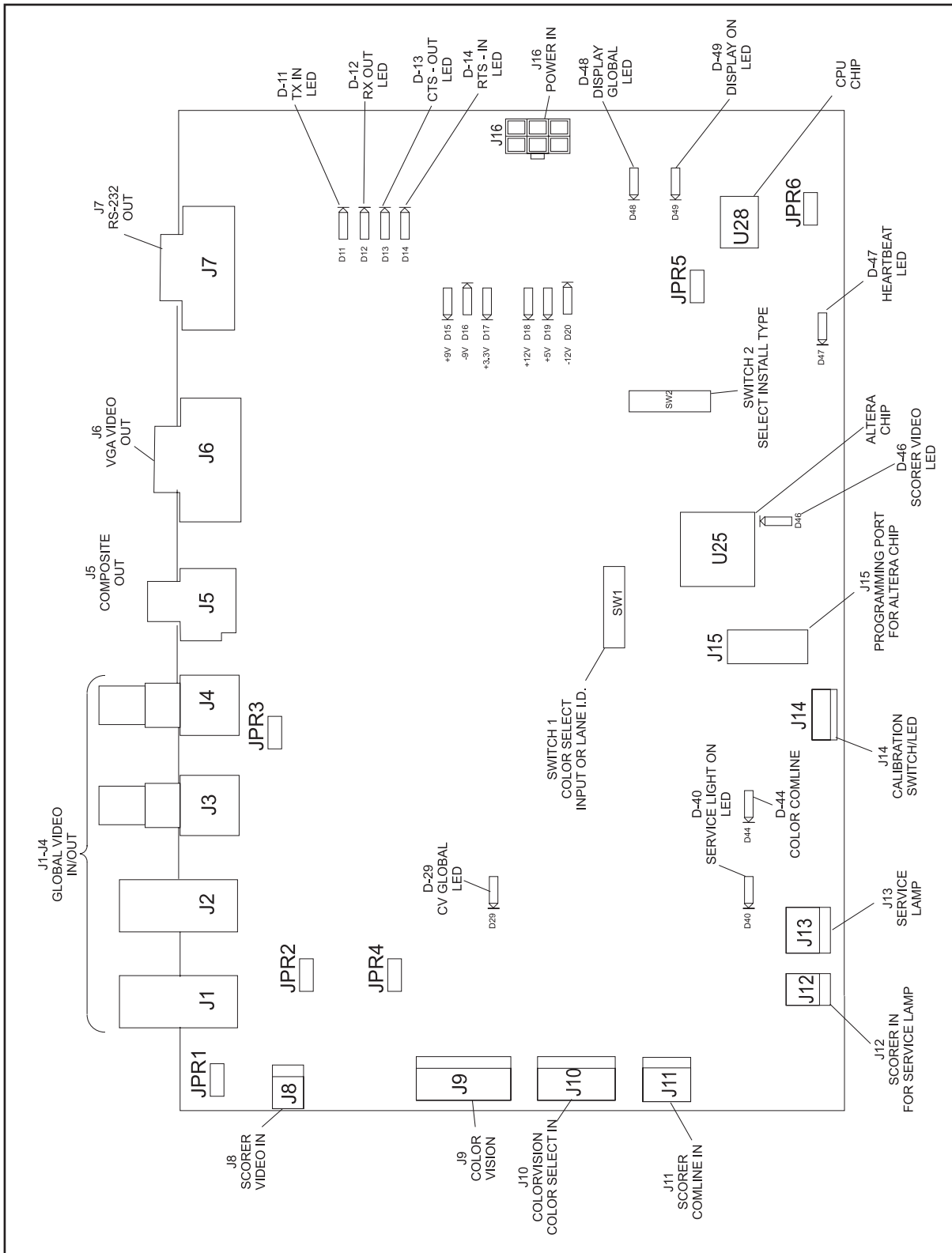


Figure 21. Trouble Shooting

1. Turn on a source of global video (if any) and turn on the Scoring Console and display a scoresheet.

2. The SCORER VIDEO LED (D46) should be lit, indicating that the scorer video is present.
3. Calibrate the video system if need.
4. Verify that all of the switch settings are correct.

Monochrome

As long as the SCORER VIDEO LED is lit and the LED display is connected to the Interface Box, then the LED display should have turned on and should be displaying a scoresheet. The DISPLAY=ON LED (D49) should be lit and the DISPLAY=GLOBAL LED (D48) should be off.

Unplug the scorer video cable from J8. Both the SCORER VIDEO and the DISPLAY=ON LEDs should turn off fairly quickly. The LED display should then turn off within 10 seconds. Plug the video cable back in. The two LEDs should turn back on and the display should turn back on, within about 20 seconds.

Use bits 1-3 of SW1 to select one of the eight available screen colors for the scoresheet. Once a color is selected, that will be the only color that they will be able to use (without having to open the Interface box again and changing the switch selection). You MAY have to cycle power to the Interface Box after selecting a new color, in order to get it recognized..

For diagnostic purposes, bit #7 of SW2 will force the LED display to turn on whenever the switch bit is set to ON, regardless of the video input. Since there is no global video, switch bit #8 of SW2 is ignored in a monochrome installation and the display will always show a scoresheet input when it is being forced on. Make sure that bit #7 is in the OFF position for normal usage.

ColorVision

The LED display is controlled by the Scorer video input signal and by the video select input. Anytime that the ColorVision Controller is commanding that the display switch to the global video input, it will short either pin 1 and/or pin 2 of J9 to ground (pin 3). This will always cause the LED display to turn on and to switch to the AV1 input (the composite video input), thereby displaying the global video. When either one or both of these inputs is grounded, the CV GLOBAL LED (D29) is lit. If neither of these two inputs are grounded, then the state of the Scorer video signal controls the LED display. If there is video present, then the SCORER VIDEO LED will be lit, causing the display to be turned on and switched to the PC input (RGB input), thereby displaying the scoresheet. If there is no Scorer video, then the LED display will be turned off.

The DISPLAY=ON LED will reflect the current state of the LED display, although it might take up to 10 seconds for the display to actually catch up to the current state. When the LED is on, the display should be on. Likewise, the DISPLAY=GLOBAL indicates which input the display is using. When the LED is on, the display is using the composite video input (AV1) to display the global video. When the LED is off, it is using the RGB input (PC input) to display scoresheet video. The DISPLAY=GLOBAL LED can be on even though the DISPLAY=ON LED is off. If there is a problem with the display, or with the RS232 communications, then these two LEDs will be displaying the expected state of the display.

Bits 7 & 8 of SW2 can be used for diagnostic purposes in the ColorVision mode. Bit #7 will force the display to turn on when the bit is switched to the ON state. When bit #7 is ON, then bit #8 is used to

select which input the display will use. Set bit #8 = ON to use the composite video input and set bit #8 = OFF to use the RGB input. Bit #8 has no effect when bit #7 is OFF. Make sure that bit #7 is OFF for normal usage.

The colors for the scoresheet will be selected remotely by the ColorVision Controller, via J10, and will select one of eight possible color sets. For diagnostic purposes, manually select different colors by shorting pins 3, 4, and 5 (the color select pins) to ground (pin 1) on J10. Different color sets will be displayed depending on which pins are grounded.

From the Front Desk:

1. With the global video selects turned off at the ColorVision Controller, turn the Scoring Console on and see the scoresheet displayed on the LED display.
2. Using the ColorVision Controller, cycle through all eight screen colors.
3. Using the ColorVision Controller, select global video for all lanes and see the global video displayed on the display.
4. Turn off the universal global video and select global video for just that lane and see the global video displayed on the lane again.
5. Turn the Scoring Console off and see that the display is still showing the global video.
6. De-select global video for the lane and see the display turn off.
7. Select global video for the lane and turn the Scoring console on and see global video on that lane.
8. De-select global video for that lane and see a scoresheet on that lane.
9. Turn the Scoring Console off and see the display turn off.

Source Command and Command Network

The LED display is controlled by the commands coming over the color comline. There are two types of commands, a Scorer and a Video command. The Video command tells the display whether it should display the global video or the scoresheet video. The Scorer command tells the display whether it should be displaying the scoresheet video or whether it should be turned off. The display will be turned on if either command is actively telling the display to display something, with the command to display global video taking precedence over a scoresheet. If global video is not to be displayed, and the scorer command says to turn the scorer off, then the display will turn off.

The DISPLAY=ON and DISPLAY=GLOBAL LEDs will indicate the current state of the display. If there is a problem with the display, or with the RS232 communications, then these two LEDs will be displaying the expected state of the display.

The SCORER VIDEO LED will indicate the presence or absence of video from the Scoring console. As long as there is communication being received over the color comline, unplugging the video input will not turn off the display. Setting bit #6 of SW2 to ON will set an optional mode that will cause the display to be turned off upon the loss of video when a color comline is in use. The display will be turned back on when video is re-established. This is optional, since it was not an original feature.

The D44 COLOR COMLINE LED will blink when there is data on the comline. Unplugging the color comline (J11) will cause the LED to go out, and cause the screen color to switch to the default “lost comline” color after about 10 seconds. Plugging the comline back in will cause the normal screen color to re-appear after a few seconds. LED will turn off when the cable is unplugged.

i **NOTE:** *This only works on a revision E or higher board.*

Bits #7 & #8 of SW2 work for diagnostics in this mode, just like they do in the ColorVision mode. They can be used to force the display to turn on and to switch inputs. Make sure that bit #7 is in the OFF position for normal usage.

Screen colors are selected by comline commands and can be changed remotely. For testing, you can plug and unplug the color comline and see the color change to the “lost comline” color. For more color combinations, you can reset SW2 to select the monochrome mode and use SW1 to cycle through all eight of the ColorVision colors.

From the Interface Box

1. With a scoresheet being displayed, unplug and re-plug the color comline, seeing the screen color change to and from the “lost comline” color.

From the Front Desk:

1. Send the commands over the color comline to turn the video off and scorer on. See the display turn on and show a scoresheet.
2. Send the command to show video and see the display show global video.
3. Send the command to turn the scorer off and see the display continue to show global video.
4. Send the command to turn video off and see the display turn off.
5. Send the command to display video and see the display turn on and display video.
6. Send the command to turn the scorer on and see the display continue to show global video.
7. Send the command to turn video off and see the display show a scoresheet.
8. Send the command to turn the scorer off and see the display turn off.

RS 232 Communication

Control of the LED display is via an RS232 line to the display. The commands to turn on and off and to switch inputs are all sent from the Interface Box to the display by this communication line. There are four LEDs on the board that monitor the communications. These are the TX IN, RX OUT, CTS OUT, and RTS IN, LEDs (D11-13).

Under normal circumstances, the TX and RX LEDs will be mostly off, and will only flicker briefly when the board communicates with the display. Every communication with the display (RX OUT) should have a corresponding reply (TX IN), although it will not necessarily be of the same intensity or length.

The CTS OUT LED will always be on and the RTS IN LED will always be off.

Service Light

The service light lamp will turn on anytime that the scoring console shorts pin 1 of J12 to pin 2. When this happens both the external service light lamp and the internal service light on LED will light.

To test this simply short pin 1 to pin 2 on J12 and see if the LED and the external service light lamp light. The LED should light, even if the external lamp is disconnected or open.

Heartbeat

The heartbeat LED will always be blinking at a rate of 1Hz. It can be seen through the vents in the bottom of the enclosure. This can be checked from the floor without removing the cover

Color Comline

Revision E of the 57-500921-4xx PCB, the color comline LED (D44) will blink to show comline activity, not just communication to this particular board.

LED Menu Display

Follow the instructions below to enable the reset function on the Samsung LED monitor and have the menu appear:

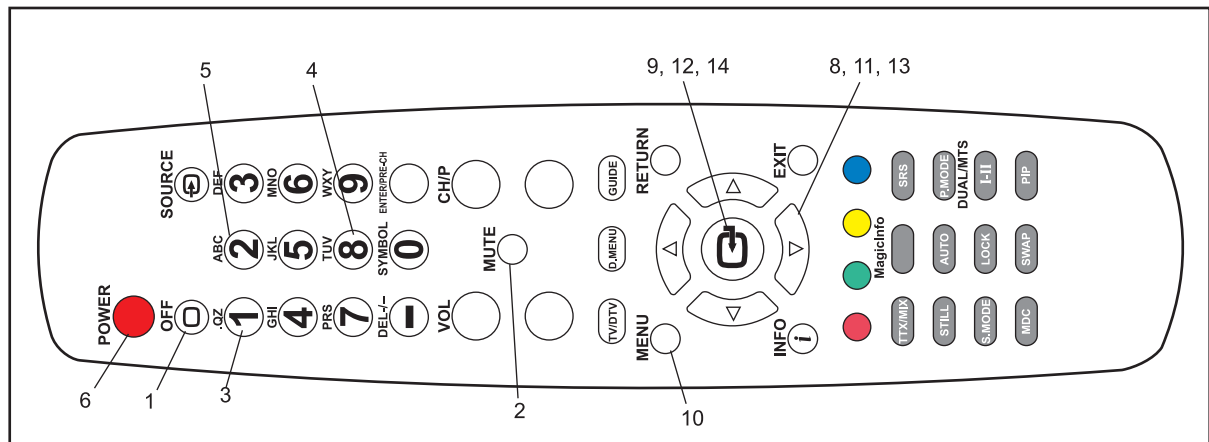


Figure 22. Remote

i NOTE: Numbers on graphics correspond to step numbers.

1. Press the “OFF” button on the remote. Refer to *Figure 22*.
2. Press the “MUTE” button on the remote. Refer to *Figure 22*.
3. Press the “1” button on the remote. Refer to *Figure 22*.
4. Press the “8” button on the remote. Refer to *Figure 22*.
5. Press the “2” button on the remote. Refer to *Figure 22*.
6. Press the “POWER” button on the remote. Refer to *Figure 22*.

7. After the LED turns on, a menu appears on the screen. Refer to *Figure 23*.
8. Scroll down to “RESET.” Refer to *Figure 22 & 23*.
9. Press the Enter button on the remote. Refer to *Figure 22*.

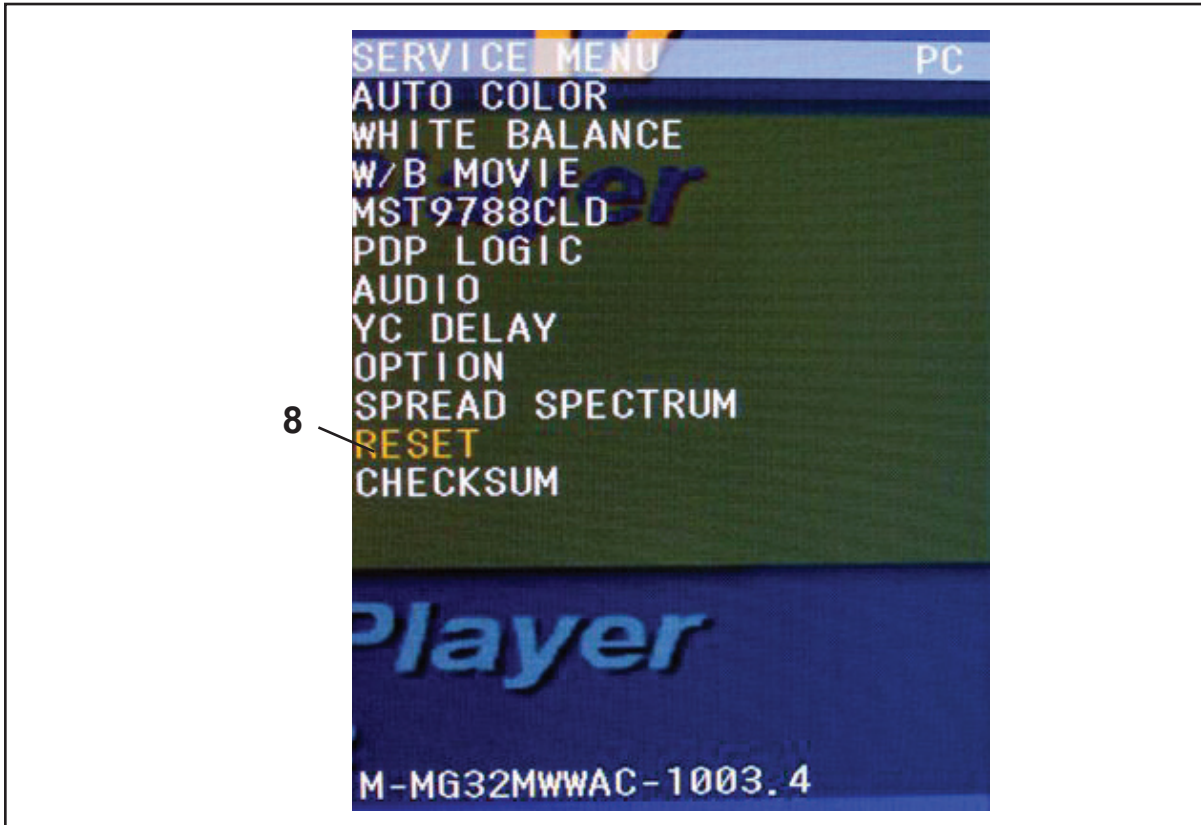


Figure 23. Reset Menu

If the image from the scoring computer does not fit the Samsung LED screen, enable the “Auto Adjustment” function.

Follow the instructions below to enable the “Auto Adjustment” function on the Samsung LED screen.

10. Press the “MENU” button on the remote. Refer to *Figure 22*. A new menu will appear. Refer to *Figure 24*.
11. Scroll down to the Screen icon. Refer to *Figures 22 & 24*.
12. Press Enter on the remote. Refer to *Figure 22*.
13. Scroll down to “Auto Adjustment.” Refer to *Figures 22 & 24*.
14. Press the Enter button on the remote. Refer to *Figure 22*.
15. The image from the scoring computer should now fit the Brunswick Samsung LED screen.

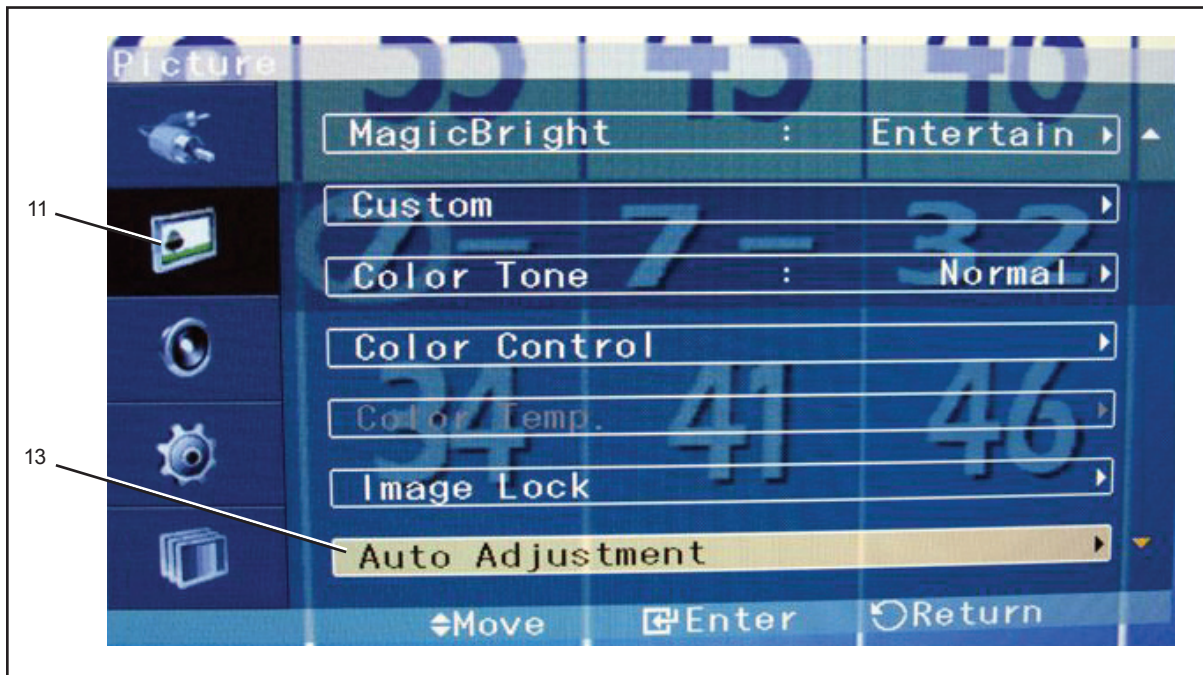
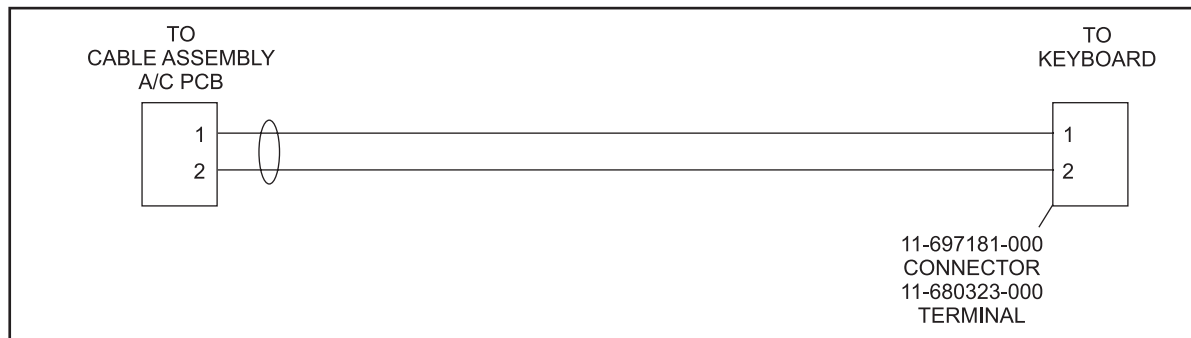
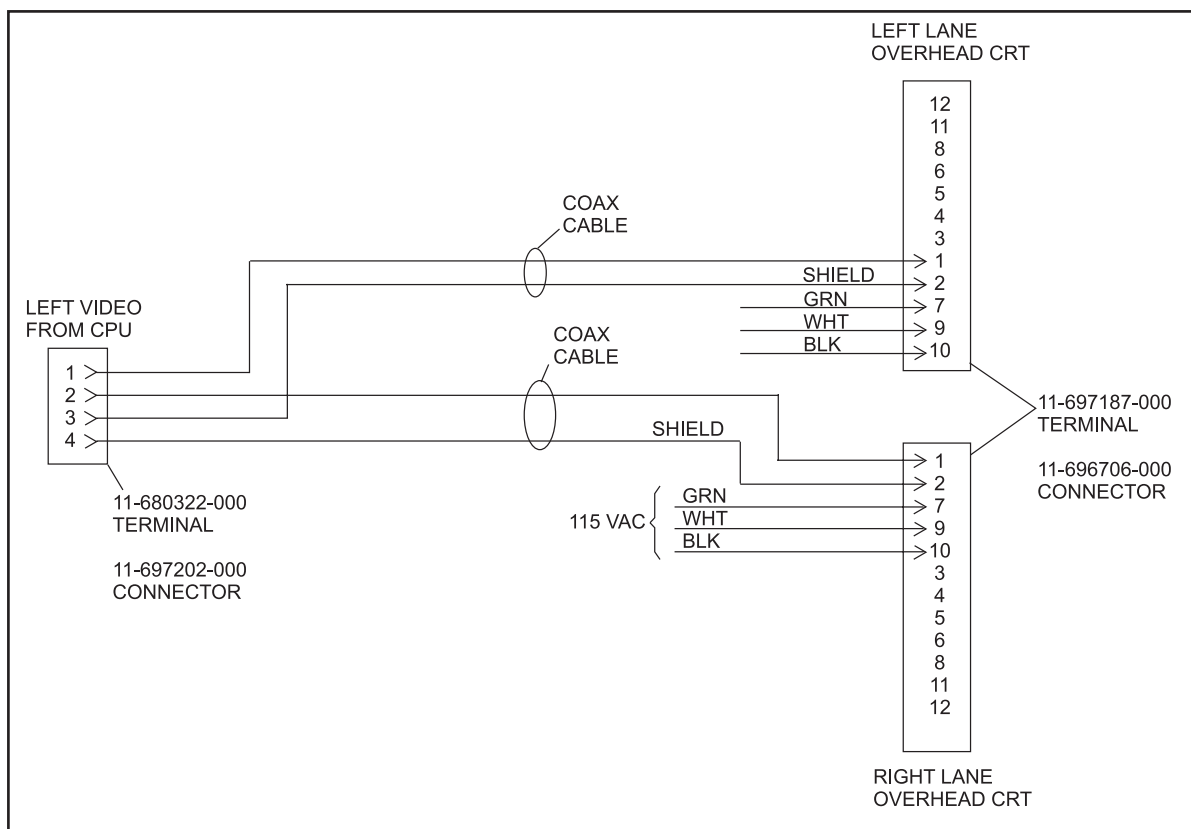


Figure 24. Auto Adjust Menu

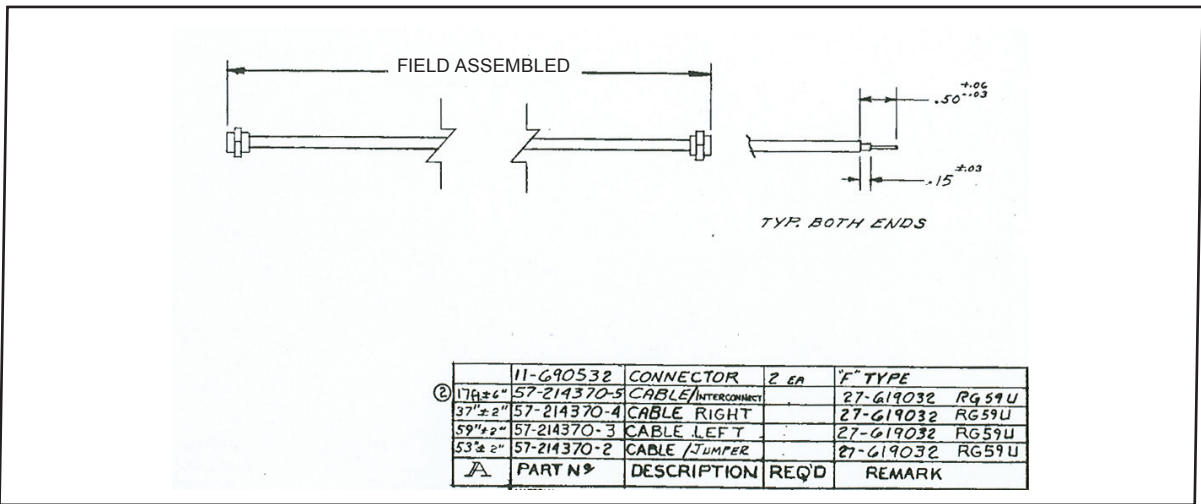
Cables



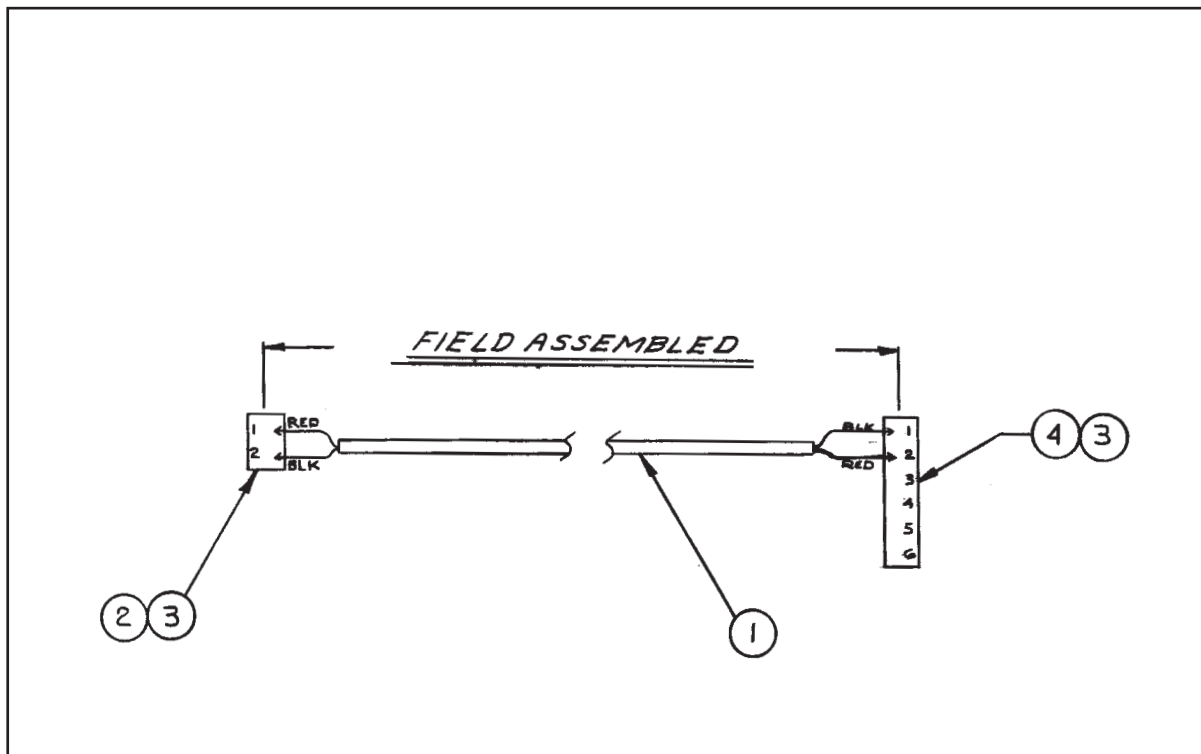
57-214175-000 - Service Light to Keyboard Cable Assembly



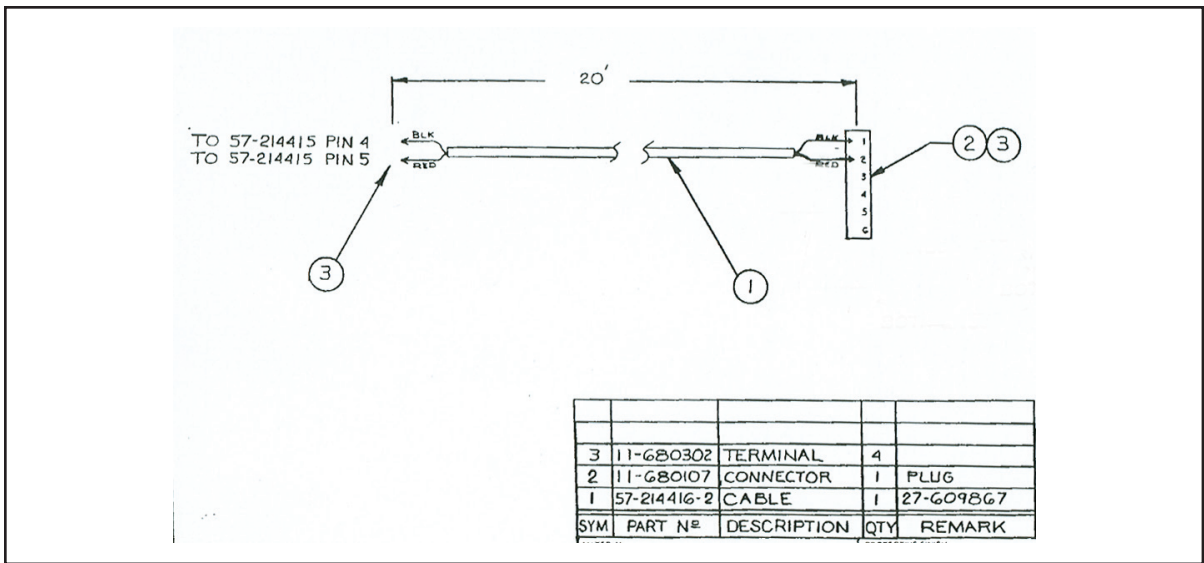
57-214180-000 - Overhead to CPU 75 Ohm Coax Cable Assembly



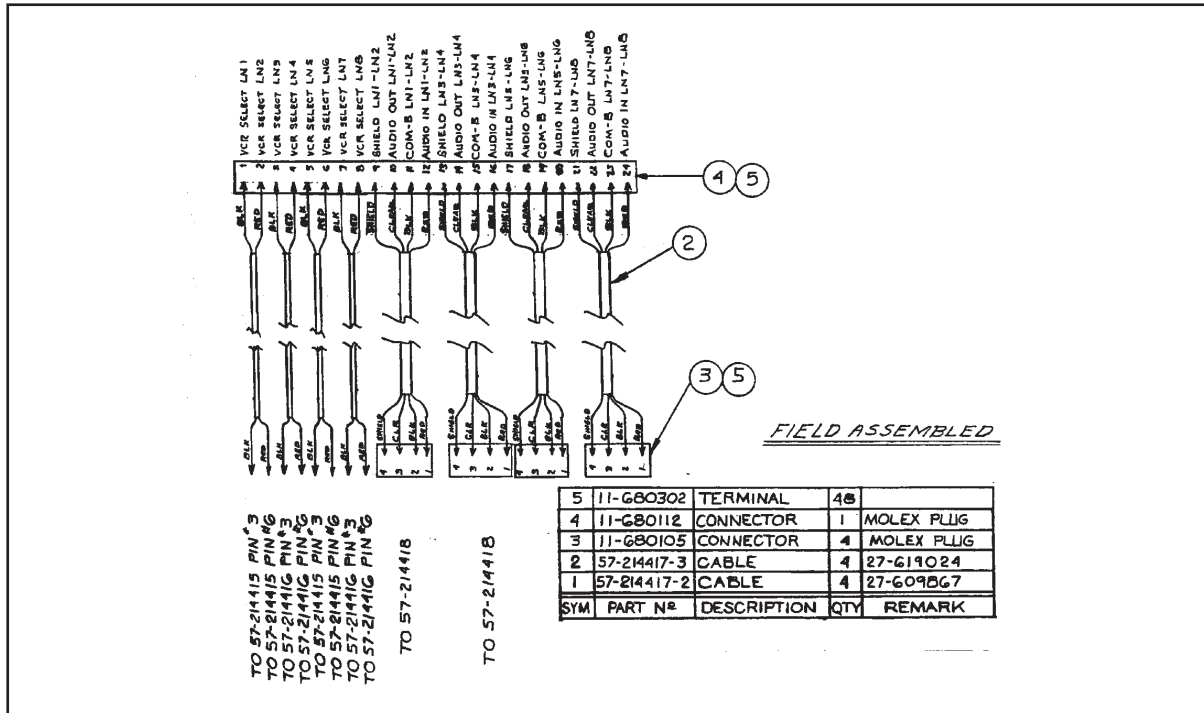
57-214370-000 - Picture Video Cable Assembly



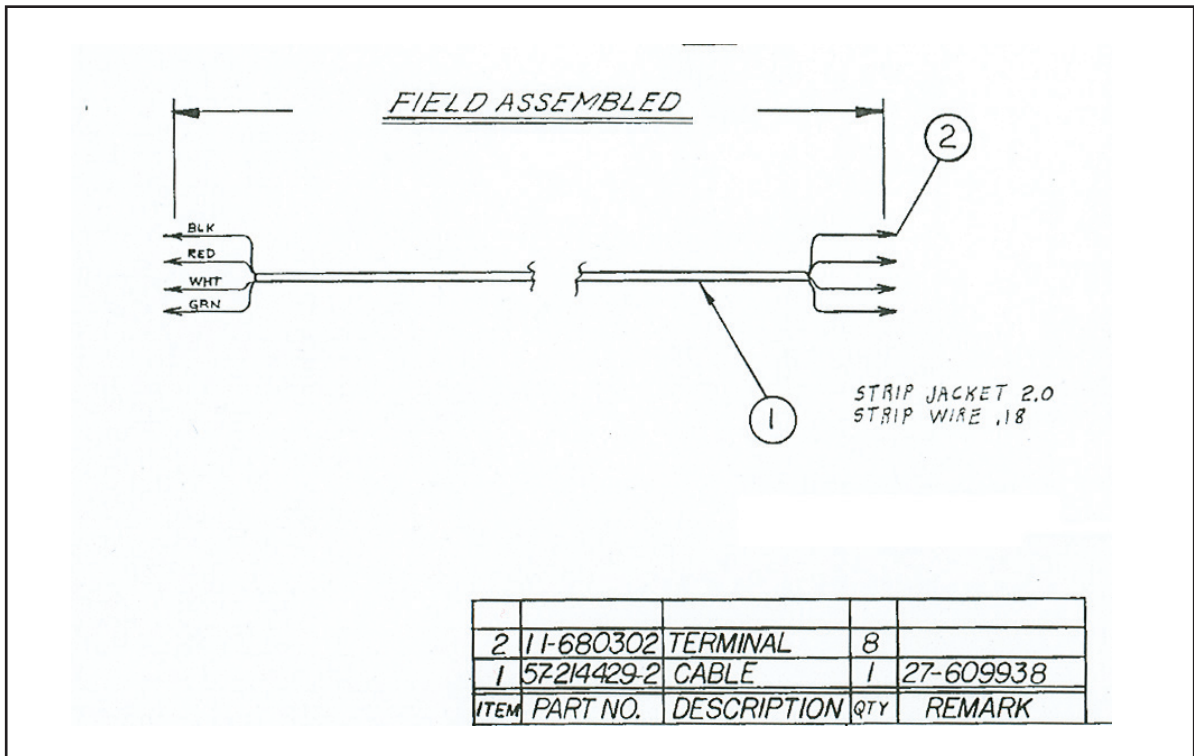
57-214415-000 Control to Overhead Select Cable Assembly



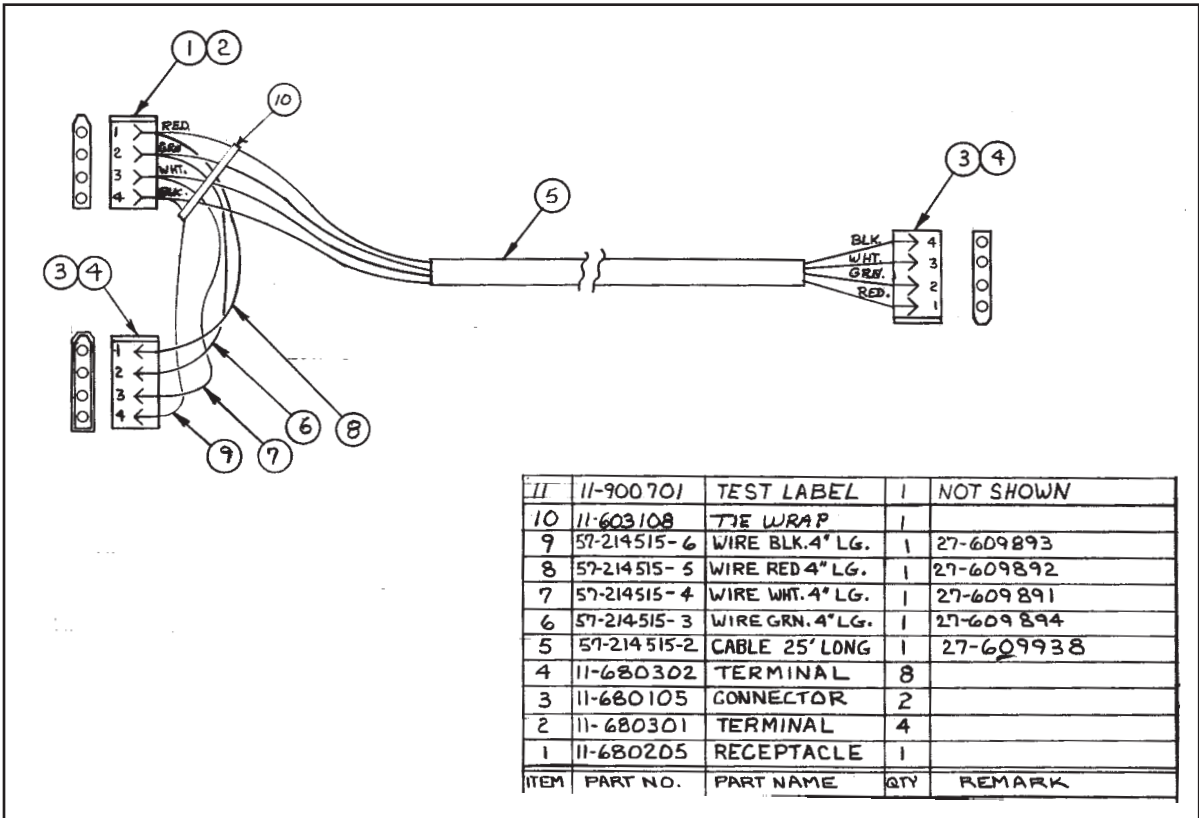
57-214416-000 - VCR Overhead Select Extension Cable Assembly



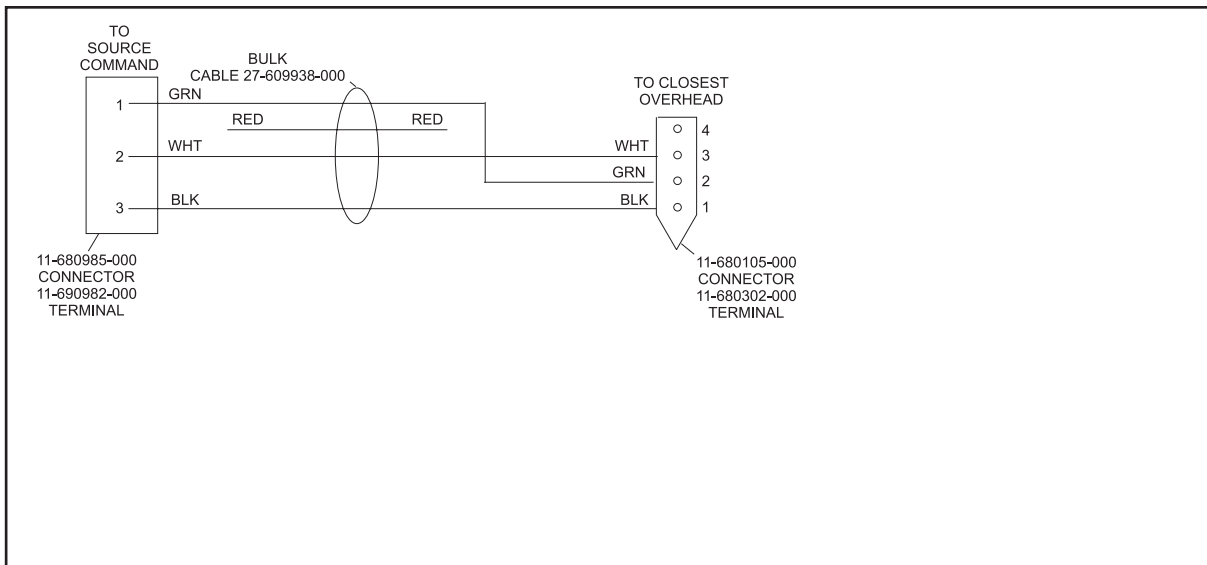
57-214417-000 - Control to Overhead Single Select & Scorer Cable Assembly



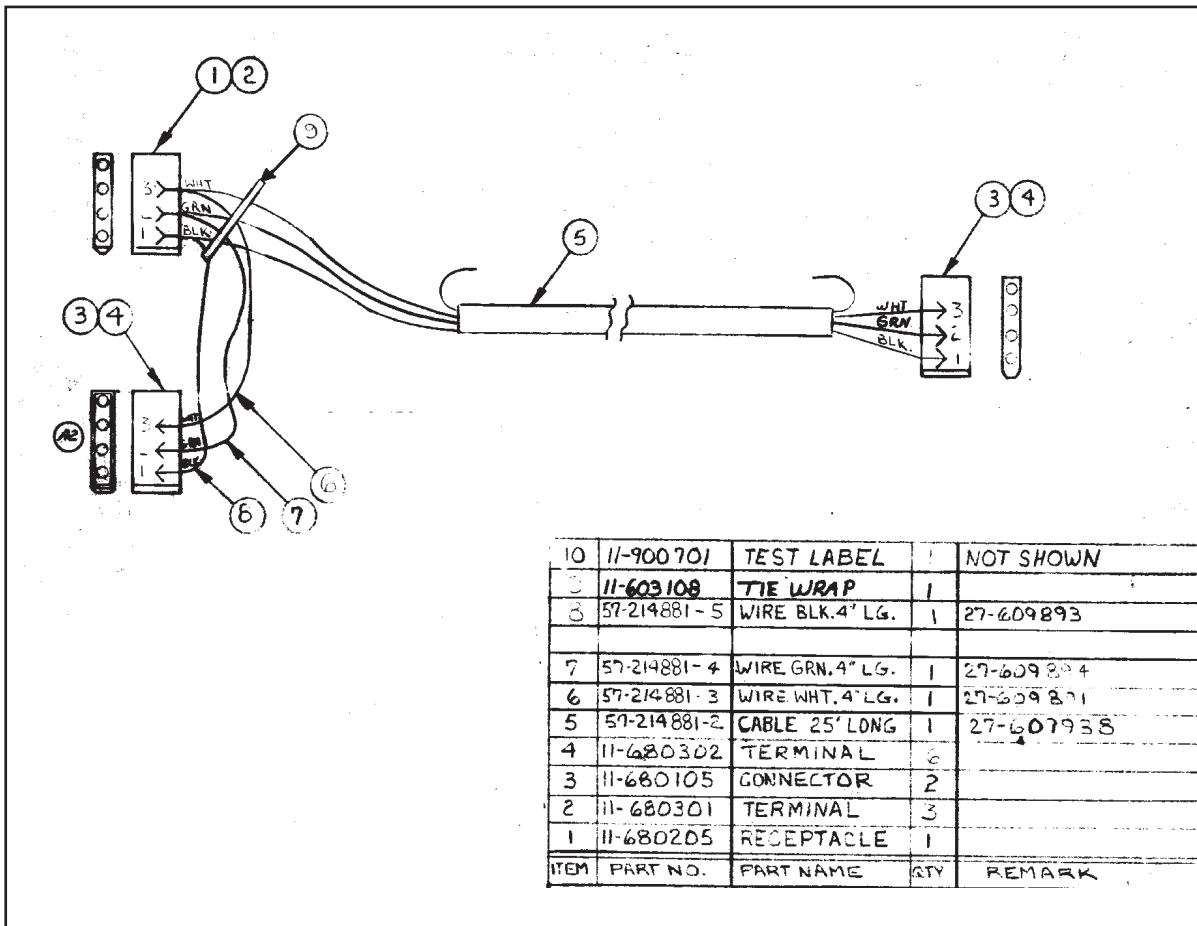
57-214429-000 - Color Select Cable Assembly



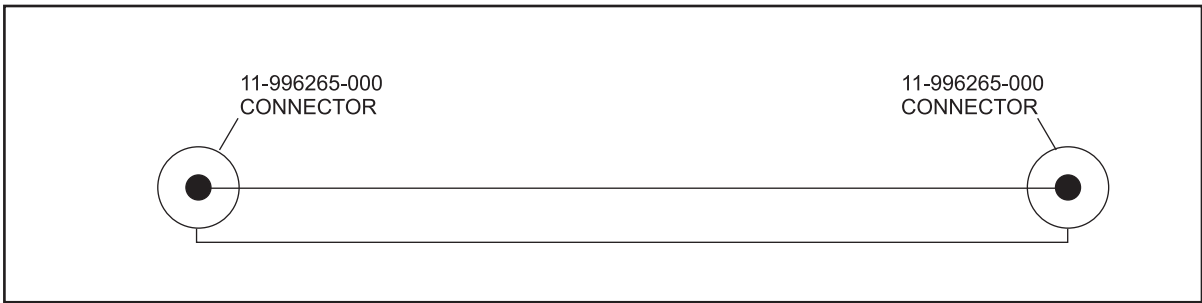
57-214515-000 - Color Control Interconnect Cable Assembly



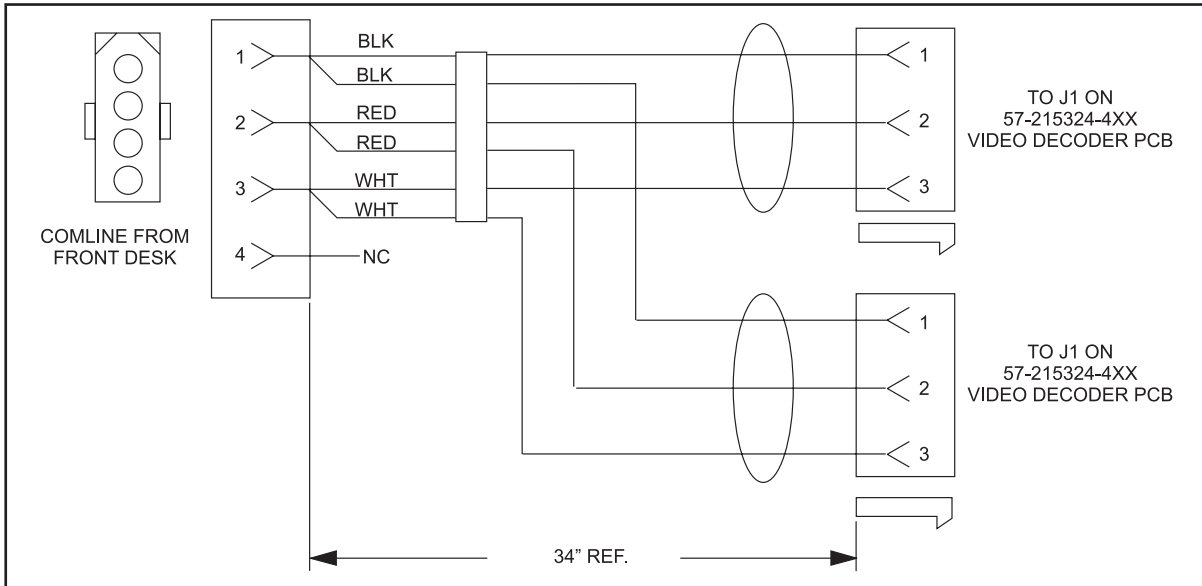
57-214583-000 - VCR Overhead Com Line Source Command Cable Assembly



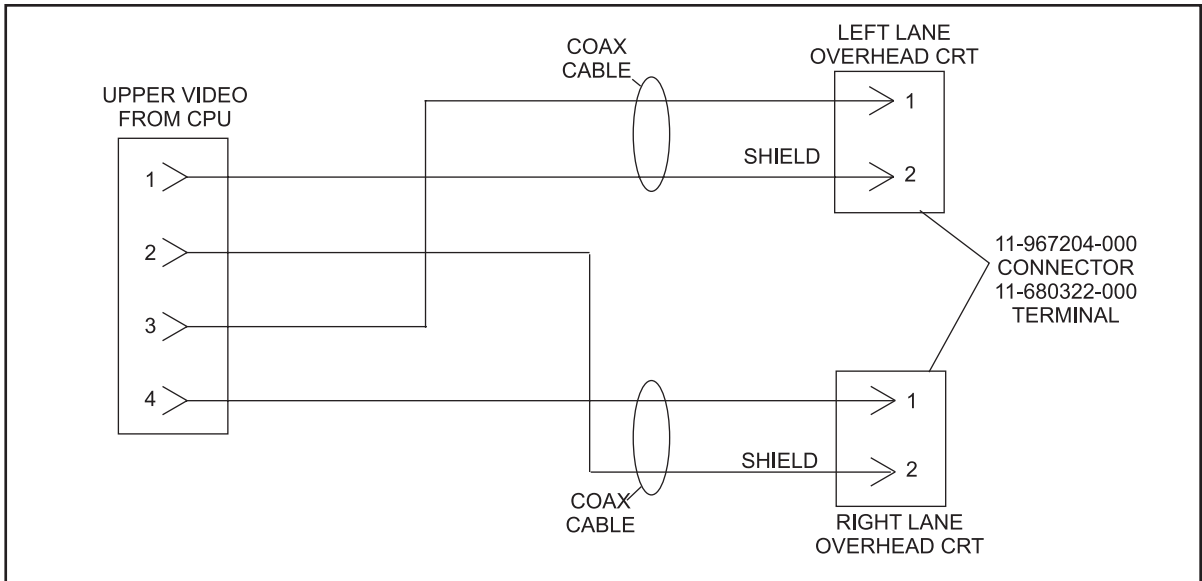
57-214881-000 - VCR Overhead Communication Cable Assembly



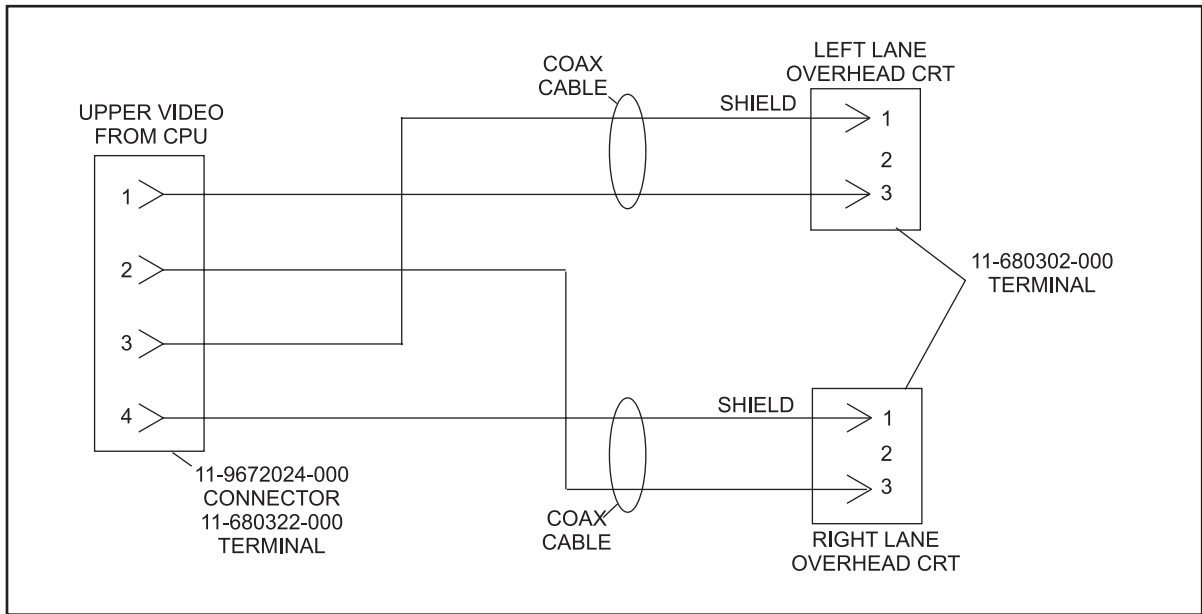
57-215224-000 - Video Coaxial Jumper Cable



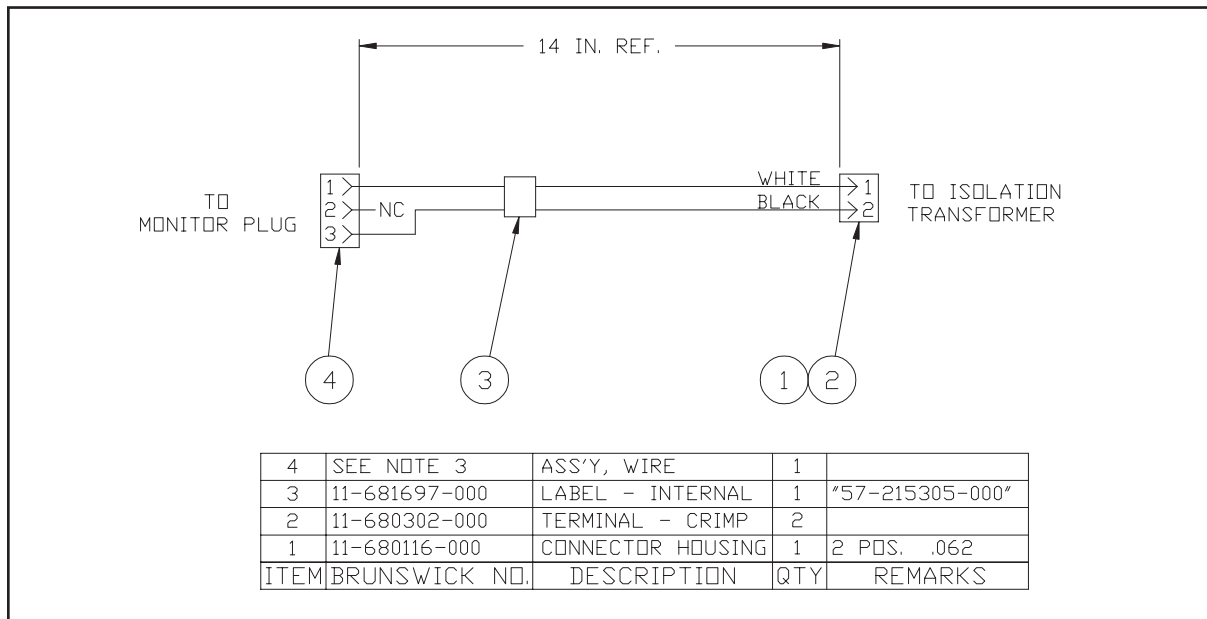
57-215365-000 - Comline Video Decoder Cable Assembly



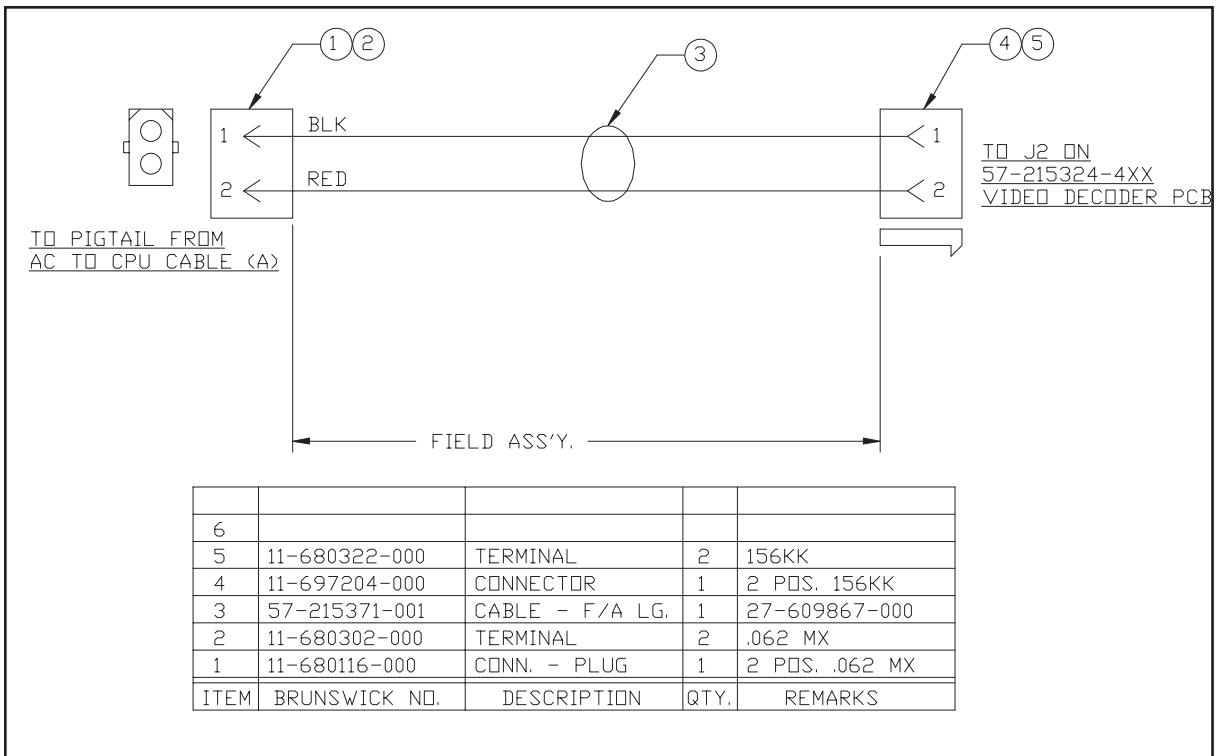
Overhead (27") to CPU 75 Ohm Coax Cable Assembly



Overhead (2'') to CPU 75 Ohm Coax Cable Assembly



57-215305-000 - CRT Interface Cable Assembly



57-215371-000 - Service Light Video Decoder Cable Assembly