

# SERVICE MANUAL

## Color Video Monitor

ZVM-130



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The purpose of this page is to make sure that all service bulletins are entered in this manual. When a service bulletin is received, mark the manual and list the information in the record below.

## Record of Field Service Bulletins

SERVICE BULLETIN NUMBER	DATE OF ISSUE	CHANGED PAGE(S)	PURPOSE OF SERVICE BULLETIN	INITIALS

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St. Joseph, Michigan 49085

# WARNINGS and CAUTIONS

**IMPORTANT SAFETY NOTICE:** Under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation. All components should be replaced only with types identical to those in the original circuit, and their physical location, wiring, and lead dress must conform to the original layout upon completion of repairs.

In some instances, redundant circuitry is used for additional circuit protection and X-radiation protection. Special circuits are also used to prevent shock and fire hazard. **These special circuit components contain an X in their reference designator (CX501 is an example). They are to be replaced with identical components only.**

**WARNING:** No work should be attempted on any part of the chassis by anyone not familiar with Zenith service procedures and precautions. Otherwise, personal injury may result.

**WARNING:** External isolation transformers should always be used when test equipment is connected to the monitor. This is to reduce a lethal shock hazard, monitor damage, and test equipment damage that could result from the monitor and/or test equipment chassis being connected to different sides of the AC line.

**WARNING:** Do not operate a monitor with excessive high voltage because the monitor will produce X-rays from the CRT when the high voltage is excessive. Always verify that the high voltage is at the normal level when servicing the unit.

**WARNING:** Discharge the high voltage at the anode lead of the CRT before attempting service on the high voltage supply or associated circuits. Refer to the servicing section of this manual for detailed instructions.

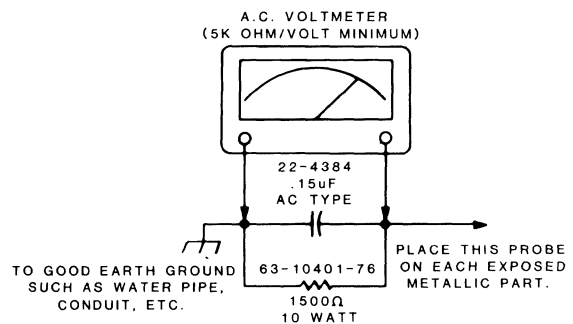
**WARNING:** The CRT and the attached CRT board loses support once the back cover is removed. Use extra care when repositioning the monitor. Turn the power off and disconnect the power cord before attempting to reposition the monitor.

**WARNING:** Handle the cathode-ray tube carefully when you hold, remove, or install it; otherwise implosion and/or personal injury may result.

**WARNING:** To prevent electrical shock after reassembly, perform an AC leakage test on all exposed metal parts of the monitor. Do not use a line isolation transformer to perform this test.

Any leakage voltage measurement that exceeds 0.75 volts rms (0.5 milliamperes AC) constitutes a potential shock hazard and must be corrected. These voltage and current values are based upon the following test meter circuit (Figure 1) and the following test instructions.

1. Connect the test circuit as shown in Figure 1.
2. With monitor power turned on, measure the leakage voltage between earth ground and an exposed monitor metal part.
3. Repeat the measurement with the meter leads reversed.
4. Repeat steps 2 and 3 until all exposed monitor metal parts are verified to have satisfactory AC leakage levels.



**Figure 1**  
**AC Leakage Voltmeter Circuit**

**WARNING:** Unplug the monitor's power cable before cleaning; otherwise, electrical shock and/or personal injury may result.

**WARNING:** Removing or lifting the ground from the AC power source may present a lethal shock hazard.

**CAUTION:** The monitor must be located in an area that will provide proper ventilation. Inform the user that the air vents at the bottom, back, and top of the monitor must not be blocked.

**CAUTION:** Be sure the signal and power cables are unplugged from the computer or other signal and power sources before disassembling the monitor.

**CAUTION:** Some of the ICs (integrated circuits) used in this unit are electrostatic-sensitive devices. These devices can be damaged by static electricity. When handling any IC, be sure to equalize the static charge before touching the IC, by using a grounding strap.

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# Characteristics

## Description

The Zenith ZVM-130 is a medium resolution color monitor with 25 lines and 40 characters per line. The ZVM-130 accepts composite video, chroma, and luma inputs. A green only switch is provided for reduced eye strain. The ZVM-130 features automatic color processing and stabilizing circuits which eliminate the need for vertical hold and horizontal hold panel controls.

## Controls, Indicators, and Connectors

Refer to Figures 1-1, 1-2, and 4-2 for locations of the following controls, indicators, and connectors.

### Front Panel

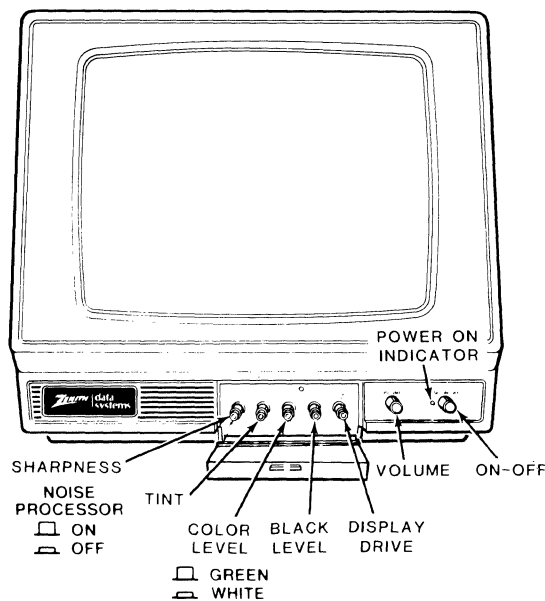
Power Switch	Color Level
Power Indicator	Green/White Switch
Volume	Tint
Display Drive	Sharpness
Black Level	Noise Processor Switch

### Rear Panel

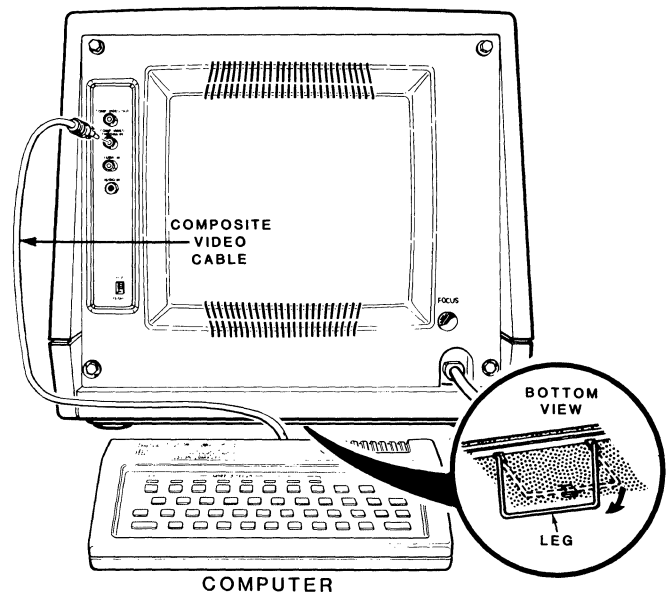
Focus Adjustment	Luma In Connector
Hi-Z/75 Ohm Switch	Audio In Connector
Comp Video Out Connector	
Comp Video Chroma In Connector	

### Internal

Interface	Width
Vertical Centering	G2
Vertical Hold	Red Background
Vertical Size	Green Background
Horizontal Centering	Blue Background
Horizontal Hold	3.58 MHz Trap
Linearity (Horizontal)	



**Figure 1-1**  
*Monitor Front View*



**Figure 1-2**  
*Monitor Rear View*

## Specifications

CRT . . . . .	13"(330 mm), 90 degree deflection, .63 mm pitch stripe mask. Negative matrix, P-22 pig- mented phosphor.
Text Capacity . . . . .	25 lines of 40 characters.
Display Resolution . . . . .	250 lines horizontal × 240 lines vertical (non-inter- laced). 480 lines (interlaced).
Inputs . . . . .	Video (COMP/CHROMA In) 1 V (P-P) NTSC standard composite video. Luma 1 Volt (P-P) NTSC standard composite. Audio — 0.3 to 1.0 Volts RMS.
Bandwidth . . . . .	2.5 MHz.
Rise Time . . . . .	100 nanoseconds.
Sync . . . . .	Plus or minus 4 volts horizontal, Plus or minus 4 volts vertical.
Scan Frequency . . . . .	15.734 kHz horizontal, 60 Hz vertical.
Timing (typical) . . . . .	Horizontal display 45 μs. Horizontal retrace 12 μs. Vertical display 15.3 ms. Vertical retrace 1 ms.
High Voltage . . . . .	20 to 23 kV (at zero beam current).
High Voltage Shutdown . . . . .	22.5 to 25.5kV, maximum 31 kV.
Speaker . . . . .	2" × 3.25".
Electrical Power . . . . .	120 VAC, 1.23 A, 60 Hz.
Dimensions . . . . .	13.75" H × 15.25" W × 15.25" D (350 × 390 × 390 mm).
Weight . . . . .	38 pounds (17.2 kg).

Zenith Data Systems reserves the right to discontinue products and to change specifications at any time.



# Installation

1. Connect the cables as shown in Figure 1-2, and supply a composite input.
2. Set the HI-Z/75  $\Omega$  switch for the input supplied.
3. Set the BLACK LEVEL control to its midrange, detent position (see Figure 1-2). This will cause the areas of the display intended to be black to become black.
4. Set the COLOR LEVEL control to its midrange, detent position.
5. Set the DISPLAY DRIVE control to its full clockwise position.
6. Select green or color:
  - If the monitor is to be used only for monochrome text display, select green by pushing in the GREEN/WHITE switch.
- If the monitor is to be used for graphics display or text and color display, select color by pulling out the GREEN/WHITE switch.
7. Turn on the computer and video monitor. The power indicator on the front of the video monitor should light.
8. After the monitor has warmed up, adjust the DISPLAY DRIVE control for the desired display brightness.
9. If the dark areas, or color areas, or both, appear faded or washed out, turn the BLACK LEVEL control counterclockwise. If the light backgrounds or colors appear too dark, turn the BLACK LEVEL control clockwise.
10. Turn the Noise Processor switch on if the display appears noisy.
11. To tilt the screen downward, extend the bail (see Figure 1-2 inset) to its down position.

# Circuit Description

Refer to the block diagram, schematics, and waveforms starting at Figure 4-3 in Chapter 4 Servicing.

## Power Supply Assembly

The power supply assembly generates the +150 VDC supply, the regulated +120 VDC supply, the start-up pulse, and the degaussing current.

### AC POWER

Line voltage is supplied to the power supply board through connector 3R8. The AC voltage is then routed through fuse FX3299 and an LCI (line conducted interference) choke. The LCI choke, in conjunction with capacitors CX3274 and CX3299 prevent noise generated within the monitor from being fed back into the AC line. The power switch is located across pins 1 and 2 of connector 3S8.

### DEGAUSSING CIRCUIT

Since externally generated magnetic forces can cause the mask inside the CRT to become magnetized, the CRT is automatically degaussed each time the monitor is switched on.

Degaussing is accomplished by passing AC current through the degaussing coil wrapped around the CRT. The average value of the AC current is zero and therefore does not allow residual magnetism to remain on the mask of the CRT.

The degaussing coil is connected to the power supply board by connector 3T8. A positive temperature coefficient thermistor (RX3296) controls AC current flow through the degaussing coil. When monitor power is

turned on, a high AC current will flow from one side of the AC line through the degaussing coil and thermistor RX3296 to the other side of the AC line. This high AC current demagnetizes the mask and then quickly drops to a value of near zero due to the heating and subsequent high resistance of RX3296.

### +150 VDC SUPPLY

When monitor power is first turned on, the first power supply to develop output voltage is the +150 VDC supply. This is a bridge rectifier comprised of diodes CRX3271 – CRX3274. The output of this bridge rectifier circuit acts as a source for the other power supplies.

**WARNING:** The bridge rectifier circuit is referenced to chassis ground and is not isolated from the AC power with a built-in isolation transformer. **Therefore, external isolation transformers should always be used when test equipment is connected to the monitor. This is to prevent injury and damage to the monitor and/or test equipment.**

This +150 VDC supply develops the start-up pulse which goes to the sweep module at pin 3 of connector 3B3. Also, the +150 VDC supplies the series regulator for the +120 VDC Horizontal Output Transistor (H.O.T.) power at connector 3U3 on the sweep module. The horizontal oscillator must be operating before additional power supplies will operate. For example, the horizontal oscillator must be operating and driving the H.O.T. before high voltage can be generated.

## Sweep Module

The sweep module develops the horizontal and vertical deflection currents, CRT anode B+, CRT filament, G2, and various power supplies for itself and other modules.

## POWER SUPPLIES

Regulated +120 VDC is received from the power supply assembly at connector 3U3 to power the H.O.T. The start-up pulse which is received from the power supply assembly allows the horizontal oscillator, located in IC3401, to generate horizontal drive to the H.O.T. The resulting H.O.T. output supplies power at the various windings of TX3204 horizontal output transformer which is the source for the following power supplies:

- +180 VDC (CR3210 half-wave rectifier)
- +26 VDC (CR3207 half-wave rectifier)
- +12 VDC (divided down from +26 VDC at Q3404 emitter)
- CRT focus
- CRT G2
- CRT filament
- CRT anode (B+) 22kV
- 60 V flyback

The +180 VDC, +26 VDC, and +12 VDC are supplied to the interface module at connector 2C5. The zener regulated ABL voltage is generated from the +180 VDC in the interface module and supplied to the sweep module at connector 5C2. Also, 60 V flyback is supplied to the interface module at pin 5 of connector 9E2.

## SWEEP CIRCUITS

Horizontal and vertical sync signals are supplied to IC3401 horizontal and vertical scan processor from connector 9E2 on the interface module.

Vertical sweep (deflection) current is supplied to the yoke from connector 2A3, and horizontal sweep (deflection) current for the yoke comes from connector 3S3.

## Interface Module

### VIDEO SIGNALS

The interface module develops Red, Green, and Blue signals for the video output module and horizontal and

vertical sync signals for the sweep module. These signals are developed from a composite video input signal.

Additionally, ABL voltage is supplied from the sweep module, and G1 and base voltages are supplied to the video output module.

Audio signals supplied at the audio input connector are processed to drive a speaker.

The composite video signal at connector 9F2 pin 1 goes to chroma/luminance IC2376 where the Red, Green, and Blue signals are processed. These signals go through background controls R2405 (Red), R2406 (Green), R2407 (Blue), and through emitter followers before reaching output connector 2A5.

### SYNC

Horizontal and vertical sync signals are processed in vertical and horizontal processor IC1301, amplified by transistors Q1217 (vertical) and Q1215 (horizontal) before reaching output connector 9E2.

### AUDIO

Audio input at connector 9E4 pin 2 is processed by audio IC1415 with capacitor C1451 coupling the signal to speaker connector 4P4 pin 1.

## Video Output Board

All outputs of this board go to the CRT socket which is on this board. The Red, Green, and Blue signals from the main board enter at connector 5A2 and go to transistors Q5102, Q5103, and Q5101 to drive the CRT. The following voltages are supplied from the sweep board:

- CRT filament voltage to connector 5H3.
- G2 voltage to connector 5X7.
- Focus voltage through a pigtail connector to the CRT.

The +180 VDC transistor supply voltage along with G1 and H.O.T. BASE DRIVE voltage are supplied by the interface module.

# Circuit Board Pinouts

Refer to Figure 4-3 Block Diagram and schematics in Chapter 4.

**Table 3-1**  
*Interface Module*

PIN NUMBER	SIGNAL NAME/DESCRIPTION
<b>8E2 (To Sweep Module)</b>	
1	Ground
2	+ 26 VDC
3	+ 12 VDC
–	(connector key)
4	ABL (Automatic Brightness Level) voltage
5	No Connection
6	+ 180 VDC
<b>9E2 (To Sweep Module)</b>	
1	Horizontal Sync
2	Vertical Sync
–	(connector key)
3	Ground
4	Horizontal Blanking
5	60 Volt Pulse
<b>2B7 (To Secondary Control Panel)</b>	
1	Color Level Control
2	Ground
–	(connector key)
3	Tint Control
4	No Connection
5	Green/White Switch
<b>2A7 (To Secondary Control Panel)</b>	
1	+ 12 VDC
2	Brightness Range Control
3	Display Drive Control
–	(connector key)
4	Sharpness Control
5	Noise Processor Switch
6	Black Level Control
<b>TP7 (To Primary Control Board)</b>	
1	Ground
2	Volume Control

**Table 3-1 (Continued)**  
*Interface Module*

PIN NUMBER	SIGNAL NAME/DESCRIPTION
<b>2A5 (To Video Output Module)</b>	
1	RED Signal
2	GREEN Signal
–	(connector key)
3	BLUE Signal
4	Ground
<b>2C5 (To Video Output Module)</b>	
1	+ 180 VDC
2	No Connection
–	(connector key)
3	Drive
4	G1 (CRT Grid 1) Voltage
5	No Connection
<b>9F2 (To Input Panel Assembly)</b>	
1	Composite Video Input
2	Ground
<b>9G3 (To Input Panel Assembly)</b>	
1	Luma Input
2	Ground
<b>9H4 (To Input Panel Assembly)</b>	
Center pin	Composite Video Loop
Shield	Ground
<b>9E4 (To Input Panel Assembly)</b>	
1	Ground
2	Audio Input
<b>4P4 (To Speaker)</b>	
1	Audio Signal
2	Ground

**Table 3-2**  
*Sweep Module*

PIN NUMBER	SIGNAL NAME/DESCRIPTION
<b>3S3 (To Yoke-Horizontal Winding)</b>	
1	Horizontal Sweep (Hi)
2	Horizontal Sweep (Lo)
<b>2A3 (To Yoke-Vertical Winding)</b>	
1	Vertical Sweep (Lo)
2	Vertical Sweep (Hi)
<b>3B3 (To Power Supply Module)</b>	
1	Frame Ground
2	Ground
3	Start-up Pulse
<b>3U3 (To Power Supply Module)</b>	
1	+ 120 VDC
<b>CRT Anode (To CRT)</b>	
High Voltage	+ 22 kV
<b>Focus (To Video Output Module)</b>	
Mid-air	Focus voltage
<b>7X5 (To Video Output Module)</b>	
1	G2 (CRT Grid 2) voltage
<b>3B9 (To Video Output Module)</b>	
1	CRT Filament (Heater) voltage
2	CRT Filament (Heater) voltage
<b>2E8 (To Interface Module)</b>	
1	+ 180 VDC
2	No Connection
3	ABL (Automatic Brightness Level) voltage (connector key)
4	+ 12 VDC
5	+ 26 VDC
6	Ground
<b>2E9 (To Interface Module)</b>	
1	60 Volt Pulse
2	Horizontal Blanking (connector key)
3	Ground
4	Vertical Sync
5	Horizontal Sync

**Table 3-3**  
*Video Output Module*

PIN NUMBER	SIGNAL NAME/DESCRIPTION
<b>5A2 (To Interface Module)</b>	
1	RED Signal
2	GREEN Signal (connector key)
3	RED Signal
4	Ground
<b>5C2 (To Interface Module)</b>	
1	+ 180 VDC
2	No Connection (connector key)
3	Drive
4	G1 (CRT Grid 1) voltage
5	No Connection
<b>DAG (To CRT Ground Contact)</b>	
1	DAG (Ground)
<b>5H3 (To Sweep Module)</b>	
1	CRT Filament (Heater) voltage
2	CRT Filament (Heater) voltage
<b>5X7 (To Sweep Module)</b>	
1	G2 (CRT Grid 2) voltage
<b>Focus (To Sweep Module)</b>	
Mid-air	Focus voltage
<b>CRT Socket (To CRT)</b>	
1, 2, and 3 are common	
4	No connection
5	G1 (CRT Grid 1) voltage
6	GREEN Cathode signal
7	G2 (CRT Grid 2) voltage
8	RED Cathode signal
9	Filament (Heater) voltage
10	Filament (Heater) voltage
11	BLUE Cathode signal
12	Ground

# Chapter 4

## Servicing

### Safety and Service Guidelines

**WARNING:** No work should be attempted on any part of the chassis by anyone not familiar with Zenith service procedures and precautions; otherwise, personal injury may result.

**WARNING:** External Isolation transformers should always be used when test equipment is connected to the monitor. This is to prevent injury and damage to the monitor and or test equipment.

**WARNING:** With the monitor power turned off and disconnected, discharge the high voltage anode lead at the CRT, using a jumper lead connected between the chassis and a screwdriver (see Figure 6.1). Failure to comply could result in severe shock and/or personal injury.

**WARNING:** Do not operate the monitor with excessive high voltage any longer than necessary or the monitor may produce X-rays from the CRT.

Excessive high voltage will produce X-rays from the CRT; always verify that the voltage is at normal levels when servicing the monitor.

**WARNING:** Carefully handle the cathode-ray tube when you hold, remove, or install it; otherwise, implosion and/or injury may result.

**NOTE:** Under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation.

### AC LEAKAGE TEST

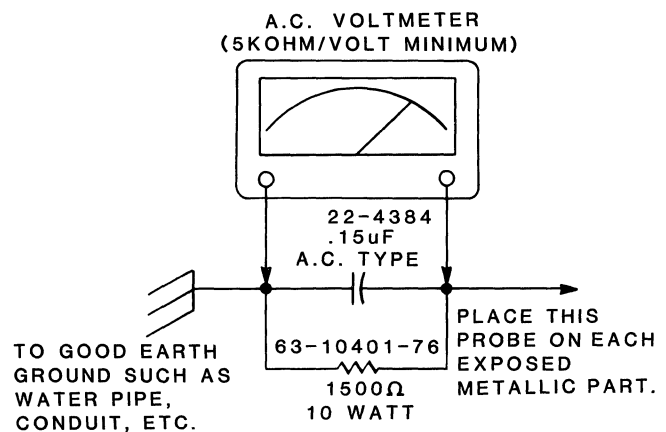
To prevent electrical shock after reassembly, perform an AC leakage test on all exposed metal parts of the monitor. **Do not use an isolation transformer to perform this test.**

1. Connect the test circuit as shown in Figure 4.1.

2. With the monitor turned on, measure the leakage voltage between earth ground and an exposed monitor metal part.
3. Repeat the measurement with the meter leads reversed.
4. Repeat steps 2 and 3 until all exposed metal parts are verified to have satisfactory AC leakage levels.

**WARNING:** Any leakage voltage measurement that exceeds 0.75 volts rms (0.5 milliamperes AC) constitutes a potential shock hazard and must be corrected.

**CAUTION:** Some of the ICs (integrated circuits) used in the monitor are electrostatic-sensitive devices. These circuits can be damaged by static electricity. When handling any IC, use a wrist grounding strap or be sure to equalize the static charge before touching the IC.



**Figure 4-1**  
AC Leakage Voltmeter Circuit

## OTHER PRECAUTIONS

- Be sure that all components are positioned in such a manner as to avoid the possibility of short circuits.
- Inspect and correct all soldered connections for cold solder joints, frayed leads, damaged insulation, splashed solder, or sharp points.
- Never release a repaired product to a customer unless all protective devices, such as insulators, barriers, cover shields, strain reliefs, etc., have been installed.
- Remove all loose material from inside the monitor after servicing.
- Follow the original lead layout, dress, lengths, and tension.
- Replace all components with exact Zenith replacement parts.

## Suggested Equipment and Supplies

### TOOLS AND SUPPLIES

- 1/4-inch nut driver
- Flat-bladed screwdriver, 1/4-inch blade
- Phillips screwdriver, No. 1 tip
- Phillips screwdriver, No. 2 tip
- Diagonal cutters
- Wire strippers
- Long-nose pliers
- Desoldering tool
- Soldering iron, 25 to 40 watts
- Solder, 60/40, HE-331-59
- Desoldering braid, HE-490-185
- Cable ties, HE-354-59
- Lint-free cloths

## TEST EQUIPMENT

- Oscilloscope — DC to 100 MHz, dual trace, triggered sweep. Tektronix Model 465, or equivalent.
- Logic probe — Capable of detecting 10 nanoseconds single pulses, and indicating logic one, logic zero, and high impedance states. Heath Model IT-7410, or equivalent.
- Digital voltmeter — High impedance input, 0 to 1000 volts, 0 to 1 M $\Omega$ . Heath Model SM-2215, or equivalent.
- Variable power supply — 0 to 120 VAC rms, 3 amps. Heath Model IM-5210, or equivalent.
- Low capacitance oscilloscope probe — Input capacitance adjustable from 15 pF to 50 pF, 4 ns rise time. Heath Model PKW-105, or equivalent.
- High voltage probe — 0 to 40 kV. Heath Model IM-5210, or equivalent.
- Isolation transformer

## Troubleshooting

Use the following inspection to determine possible causes of monitor failures.

- Verify proper computer operation.
- Check monitor controls for proper response and settings.
- Unplug the signal and power cables from the monitor and check for burnt insulation, broken wires, or loose prongs on plugs.
- Check the AC receptacle (wall outlet) for proper supply voltage.

- Check all cabling and internal circuit board plugs for proper electrical connections. Refer to the applicable block diagram and component location illustrations for cable connector assignments.
- Check monitor adjustments as explained at the end of this chapter.
- Check all circuit boards for broken or burnt components or for darkened areas or other signs of component overheating.
- Verify that the Green/White switch is in the correct position.
- When power is applied, check the CRT for a glowing filament.
- When power is applied, check for high voltage by placing the back of the hand near the face of the CRT.

**Table 4-1:**  
*General Troubleshooting*

PROBLEM	POSSIBLE CAUSE
Dead monitor	<ol style="list-style-type: none"> <li>1. No power at source.</li> <li>2. Power cord.</li> <li>3. Fuse.</li> <li>4. Connector 3R8.</li> <li>5. Connector 3S8.</li> <li>6. Power switch.</li> </ol>
No display	<ol style="list-style-type: none"> <li>1. Composite video cable.</li> <li>2. Composite video source.</li> </ol>
No color	<ol style="list-style-type: none"> <li>1. Green/White switch.</li> <li>2. Software produces monochrome display.</li> </ol>
Green color only	<ol style="list-style-type: none"> <li>1. Green/White switch.</li> <li>2. Software produces green display.</li> </ol>
Out of focus	Focus control.
Raster displayed	G2 control.
Display does not fit on CRT	<ol style="list-style-type: none"> <li>1. Vertical size (R2172).</li> <li>2. Width adjust (LX3261).</li> </ol>

## Adjustments

### INTERFACE MODULE

#### Background (Red, Green, and Blue) and G2 Adjustments

These adjustments are to be made in a darkened room.

1. Locate connector 9C1 on the interface module and move the jumper connector to the set-up position (installed in the slot away from connector 2C5, see Figure 4-4).
2. Turn each control (R2405 Red, R2406 Green, and R2407 Blue) fully counterclockwise and allow a minimum of ten minutes warm-up.
3. Adjust G2 on the sweep module until the raster just appears.
4. Adjust each control until a gray raster appears.
5. Readjust G2 until the raster just disappears.
6. Return the jumper connector to the normal position in 9C1 connector (installed in the slot near connector 2C5).

#### Interlace Adjustment

The monitor must exhibit acceptable convergence before you can check or make this adjustment.

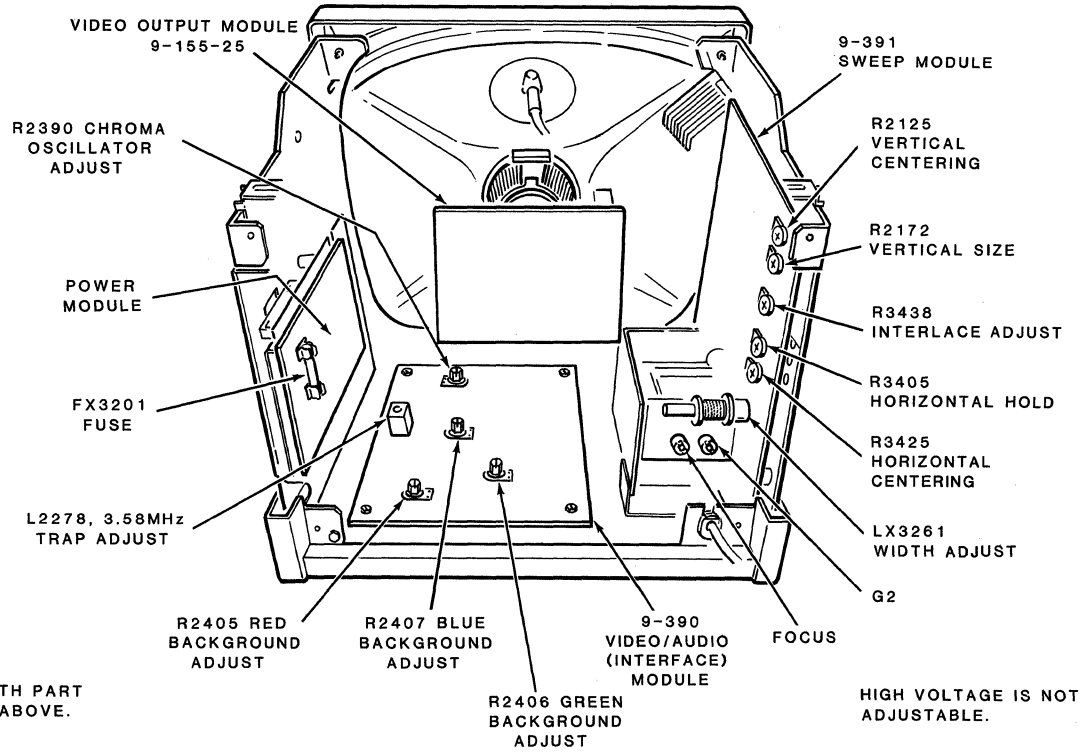
The following interlace adjustment procedure requires an interlace signal and is based on the composite interlaced video signal generated by the Z-319 video card and the CB-5063-28 Diagnostic package software.

1. Connect the monitor Composite Video Chroma input to the Composite video output of an operating Z-319 video card. Note that this will produce a **monochrome** display only.



**IMPORTANT NOTICE**

FOR X-RADIATION, FIRE OR SHOCK HAZARD PREVENTION, CERTAIN SPECIAL OR REDUNDANT PARTS ARE USED. USE ONLY EXACT REPLACEMENTS. DO NOT ALTER THE CIRCUIT OR DEFEAT THE FUSE. FAILURE TO COMPLY MAY BE UNLAWFUL.



**Figure 4-2**  
*Adjustments-Rear View*

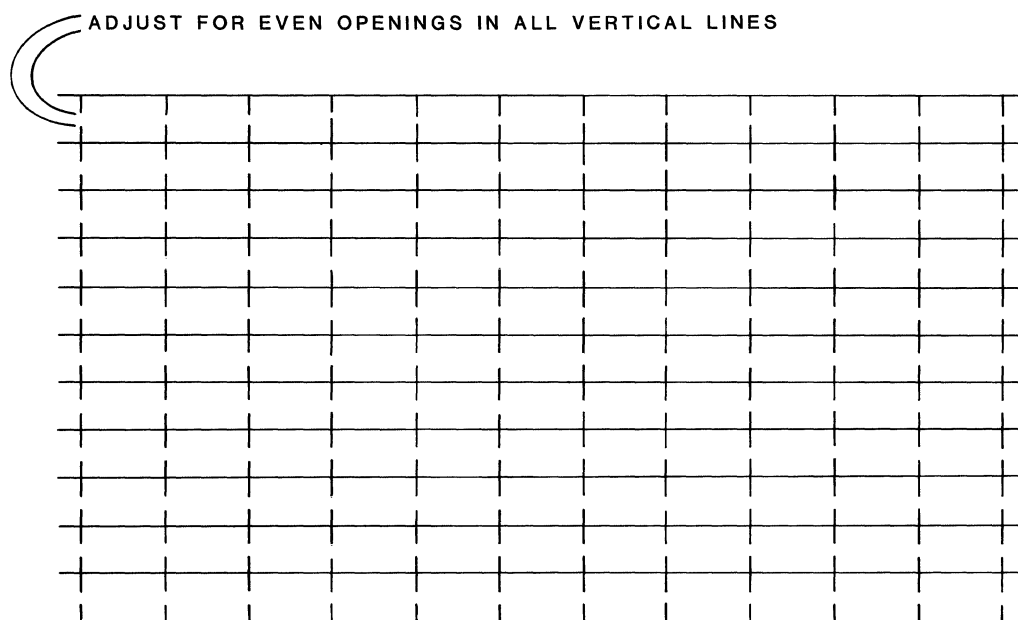
2. Use a CB-5063-28 Diagnostic package to display an interlaced pattern as shown in Figure 4-3 below. This display is the second pattern of the sixth series of displays using the Video Controller Test.
3. Adjust the Interlace control R3438 (See Figure 4-2), for the largest and most even opening in the vertical lines as indicated in Figure 4-3. This will provide stable display when the monitor is operated with an interlaced video signal.

## SWEEP MODULE

### Vertical Size and Vertical Center Adjustments

These controls (R2172 size and R2125 vertical centering) are to be adjusted under low-light conditions.

1. Turn the G2 control clockwise until a raster appears.
2. Adjust the two controls so that the top and bottom of the raster are 1/2 inch from the edge of the CRT.
3. Turn the G2 control counterclockwise until the raster just disappears.



**Figure 4-3**  
*Interlace Display*

## Width and Horizontal Center Adjustments

Horizontal centering control R3425 and width LX3261 are to be adjusted under low light conditions (see Figure 4-2).

1. Turn the G2 control clockwise until a raster appears.
2. Adjust these two controls so that the raster is 1/4 inch from the left and 3/8 inch from the right CRT edges.
3. Turn the G2 control counterclockwise until the raster just disappears.

## Focus

With a video source connected to the monitor, adjust the focus control for the clearest (sharpest) display (see Figures 1-2 and 4-2).

## Fill the Screen Test

A Z-100 Series, Z-100 PC Series, or equivalent computer is required for these tests.

The screen can be filled by using the Monitor ROM.

1. Turn on the computer.
2. Z-100: When the hand prompt appears (you may have to defeat the autoboot by pressing the ESC key during the autoboot sequence to get this), press the T key to obtain the test menu from the Monitor ROM. If the test menu does not appear and the computer beeps, then the Monitor ROM is an early version and does not contain the test routines. In this situation, use the BASIC program.  
  
Z-100 PC: Press the **CTRL**, **ALT**, and **INS** keys and then enter **TEST** and press **RETURN**.

3. Select the Keyboard Test by pressing the 2 key.
4. Choose any character to fill the screen by pressing it. The capital Z is recommended.
5. Check to see if the screen is filled with the test character and if the width and height of the display are correct.
6. Make any necessary adjustments (see Monitor Alignments and Adjustments in this chapter).
7. When you are finished using the display, press the DELETE key to return to the test menu.
8. Press the 5 key to return to the hand prompt.

## Cleaning Procedure

**WARNING:** Be sure that the monitor's power cable is unplugged before cleaning.

- Clean the cabinet with a lint-free cloth, lightly dampened and with a mild cleaning solution; do not spray liquids directly on the monitor or use a wet, saturated cloth.
- Clean the monitor's screen with a good quality glass cleaner.
- Be sure that the monitor is completely dry before applying electrical power.

## Servicing Diagrams

Use the following block diagrams to locate schematics while tracing signal and power circuits during troubleshooting.

Waveform representations are provided with adjacent schematic and component location drawings. The source location of waveforms are shown on both schematic and component location drawing.

A Z-160 PC Series computer was used to supply the composite signals for generating the waveforms.

**NOTE:** Some input and output waveforms for some boards are taken from the adjacent boards because test points having the same signal are more accessible there.

## WAVEFORM PHOTOGRAPH EXPLANATIONS

The waveforms in this manual are photographs taken on a DC-coupled Tektronix 2445, 4 channel, 150 MHz oscilloscope through a 10X probe with 10MΩ impedance. The oscilloscope automatically compensates for the 10x probe, so the display shows the probe input.

**NOTE:** The waveforms on your oscilloscope may vary slightly from those in this manual due to bandwidth, input impedance, and other oscilloscope differences, as well as the monitor being examined.

**A** — The letter (A or B) is the oscilloscope trigger that is controlling the display. The trigger source is the second character (Channel 1, 2, 3, or 4).

**B** — The voltage level at which the scan is triggered, measured in volts (V) or millivolts (mV).

**C** — One of four possible values: sweep delay time, delta voltage, delta time, or inverse delta time (1/delta time). Delta values are established between the variable reference cursor (dotted line O) and the variable data cursor (dotted line N). The symbol to the left of the value type indicates delta or delay, while the symbol to the right indicates unit of measurement, based upon either the sweep scale factor (see K and M) or the scale factor (see D, G, I, and J).

**D** — The channel 1 scale factor in volts (V) or millivolts (mV).

**E** — Indicates two signals summed together (+).

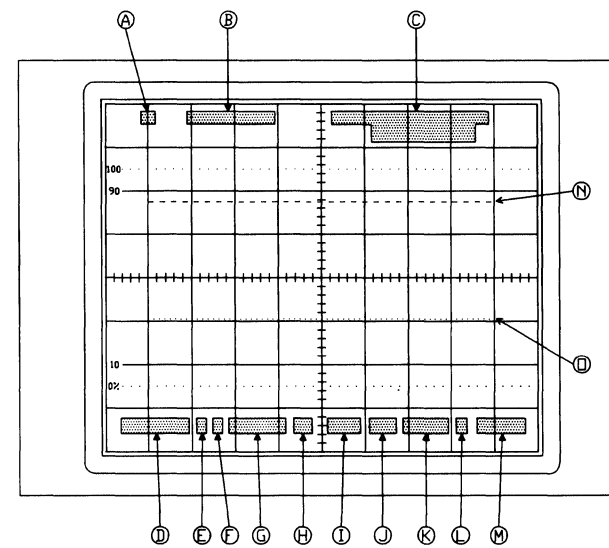
**F** — Indicates inverted display (down arrow).

**G** — The channel 2 scale factor in volts (V) or millivolts (mV).

**H** — Bandwidth limitation (20 MHz) indicator (BWL).

**I** — Channel 3 scale factor in volts (V) or millivolts (mV).

**J** — Channel 4 scale factor in volts (V) or millivolts (mV).



**OSCILLOSCOPE DISPLAY**

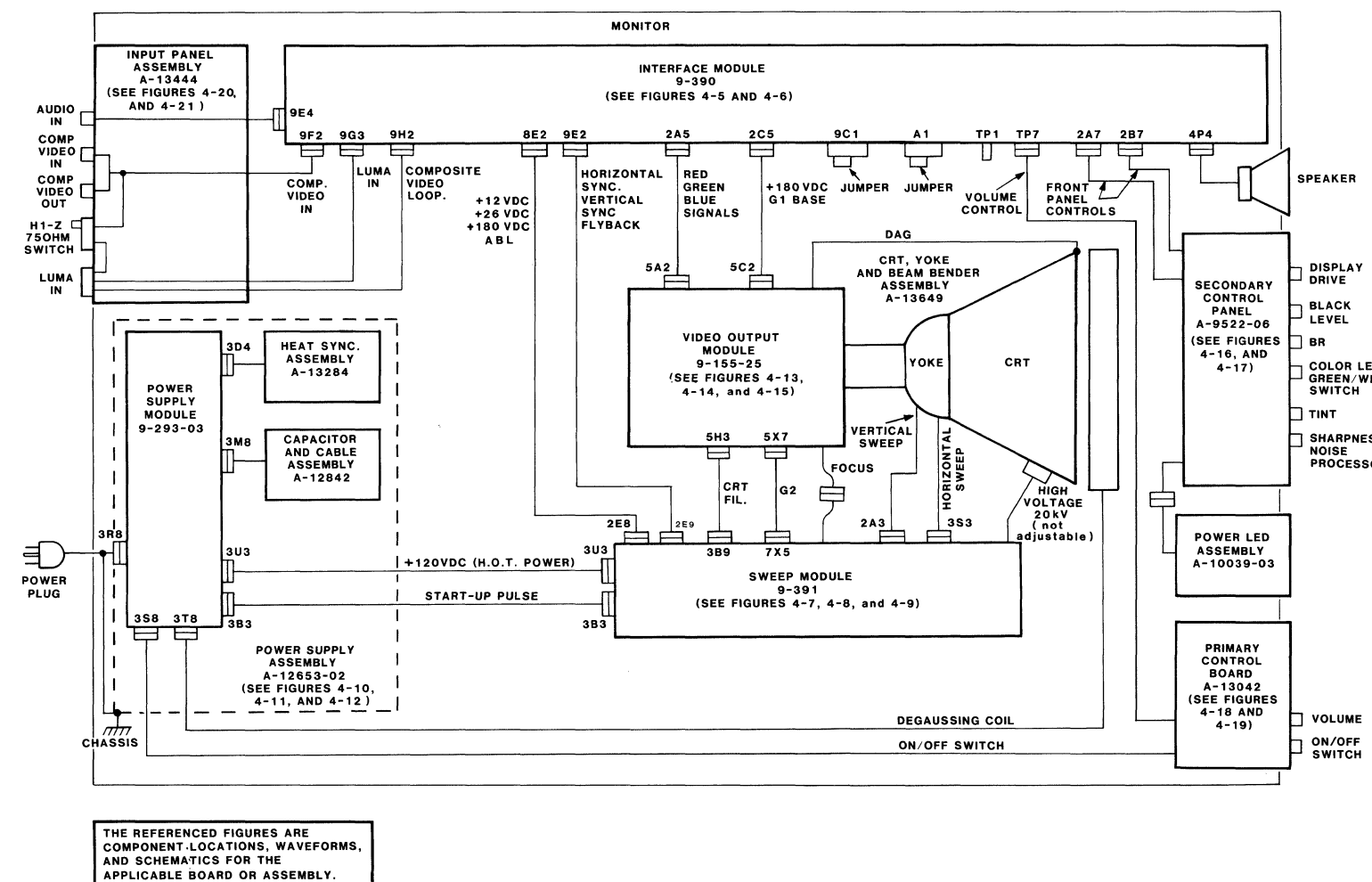
**K** — A sweep time base in seconds (s), milliseconds (ms), microseconds (us), or nanoseconds (ns).

**L** — Holdoff indicator (HO). Holdoff is the amount of time between the end of the sweep and the time that a triggering signal can initiate the next sweep.

**M** — B-sweep time base in seconds (s), milliseconds (ms), microseconds (us), or nanoseconds (ns).

**N** — Data cursor which may be varied either on the vertical axis (illustrated) to measure delta voltage or on the horizontal axis (not illustrated) to measure delta time.

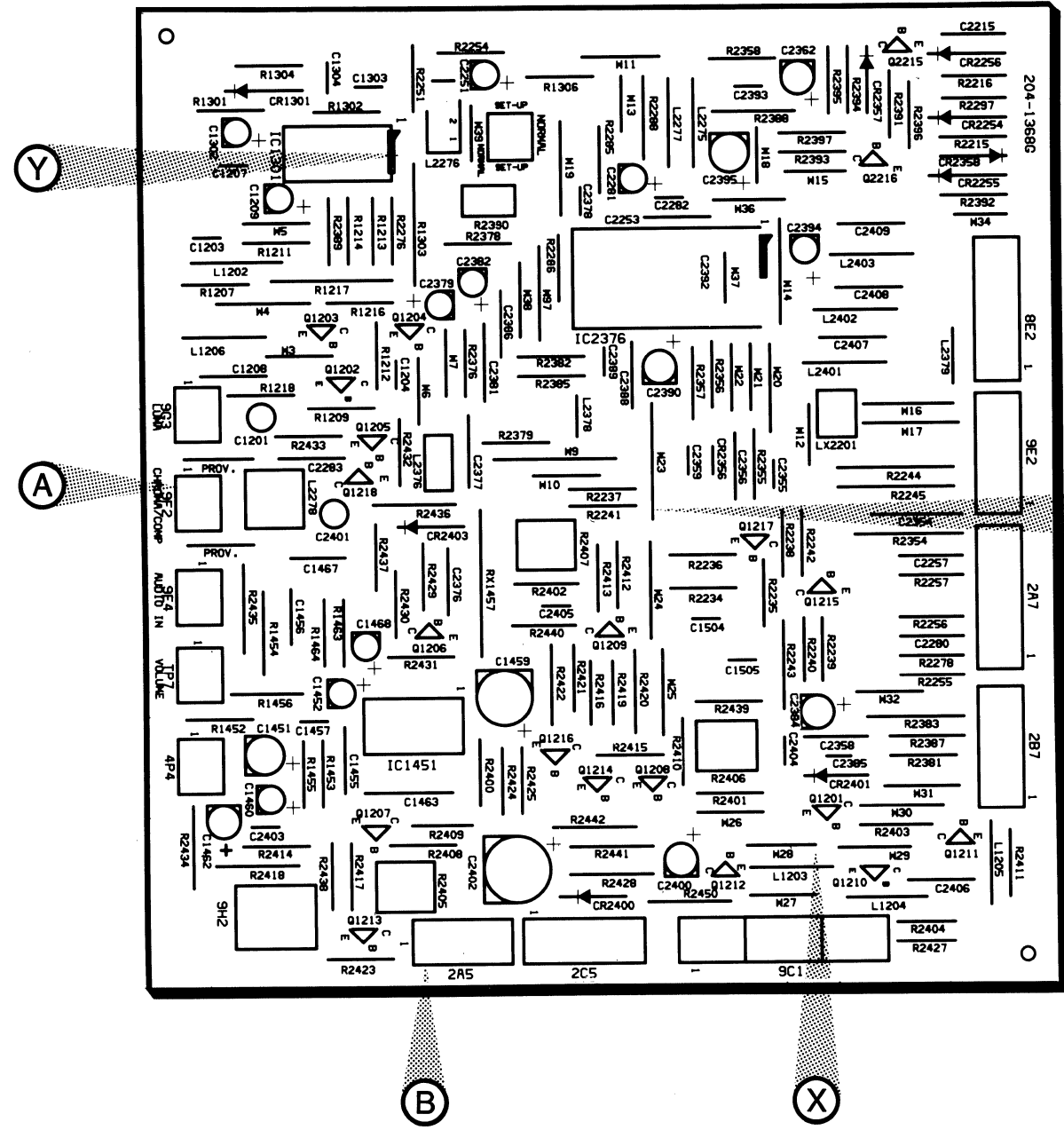
**O** — Reference cursor which may be varied either on the vertical axis (illustrated) or the horizontal axis (not illustrated). Unless otherwise indicated, this cursor is used to show ground reference when in the vertical axis.



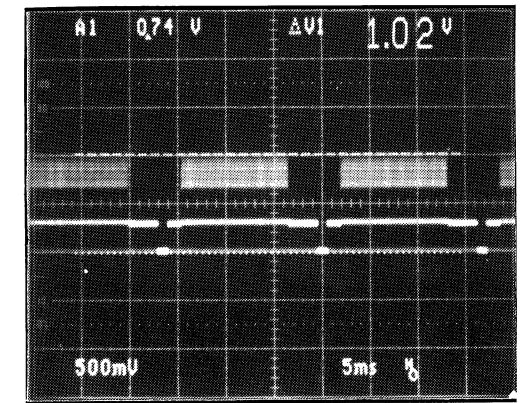
**Figure 4-4 Part 1**  
*Monitor Block Diagram*

CABLE PIN ASSIGNMENT		
<b>8E2 (INTERFACE MODULE)</b>	<b>TO</b>	<b>2E8 (SWEEP MODULE)</b>
1	_____	6
2	_____	5
3	_____	4
4	_____	3
5	_____	2
6	_____	1
<hr/>		
<b>9E2 (INTERFACE)</b>		<b>2E9 (SWEEP)</b>
1	_____	5
2	_____	4
3	_____	3
4	_____	2
5	_____	1
<hr/>		
<b>2A5 (INTERFACE MODULE)</b>		<b>5C2 (VIDEO OUTPUT)</b>
1	_____	1
2	_____	2
3	_____	3
4	_____	4
<hr/>		
<b>2C5 (INTERFACE MODULE)</b>		<b>5C2 (VIDEO OUTPUT)</b>
1	_____	1
2	_____	2
3	_____	3
4	_____	4
<hr/>		
<b>3B3 (POWER SUPPLY MODULE)</b>		<b>3B3 (SWEEP MODULE)</b>
1	_____	3
2	_____	2
3	_____	1
<hr/>		
<b>9C1 (INTERFACE MODEL) JUMPER IN NORMAL (OPERATING) POSITION</b>		
1	_____	1
2	_____	2
3	_____	3
4	_____	4
5	_____	5
6	_____	6
7	_____	
8	_____	
9	_____	
<hr/>		
<b>9C1 (INTERFACE MODULE) JUMPER IN SET-UP POSITION</b>		
1	_____	
2	_____	
3	_____	
4	_____	1
5	_____	2
6	_____	3
7	_____	4
8	_____	5
9	_____	6

**Figure 4-4 Part 2**  
*Cable Pin Assignment*

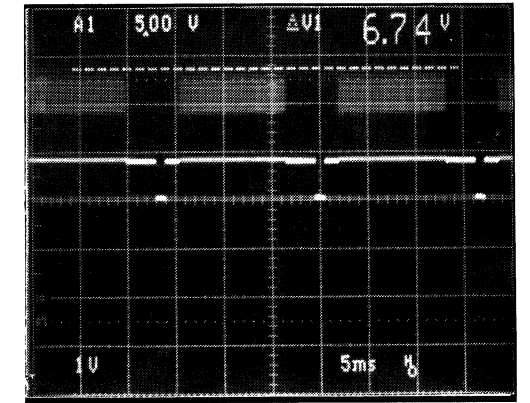


(A)



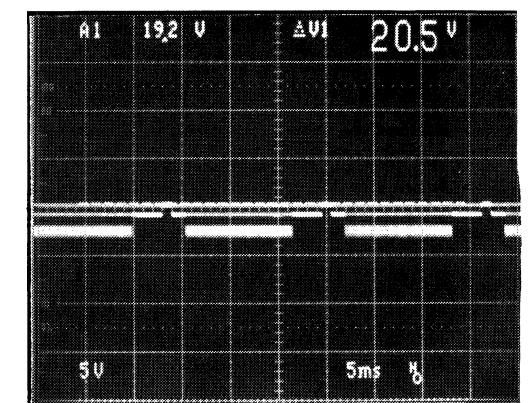
Connector 9F2 Pin 1  
(Input Connector)

(Y)



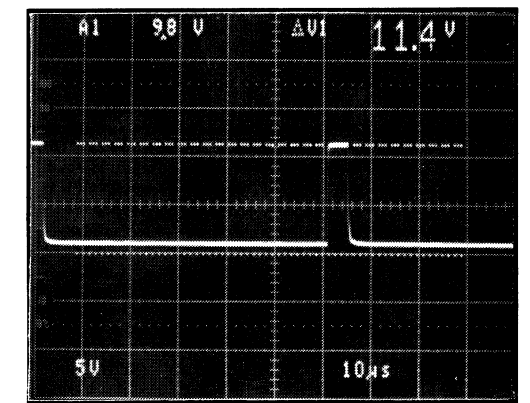
IC1301 Pin1  
(Junction C1303 and R1303 )

(B)



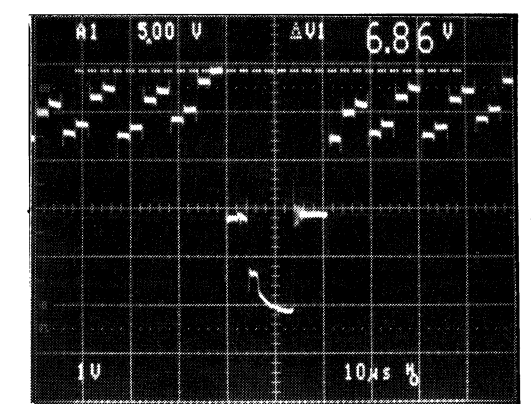
Connector 2A5 Pin 1  
RED Signal

(Z)



IC1301 Pin 3 (W23)

(X)



W26 RED Signal

**Figure 4-5**  
Interface Module Component Location and Waveforms

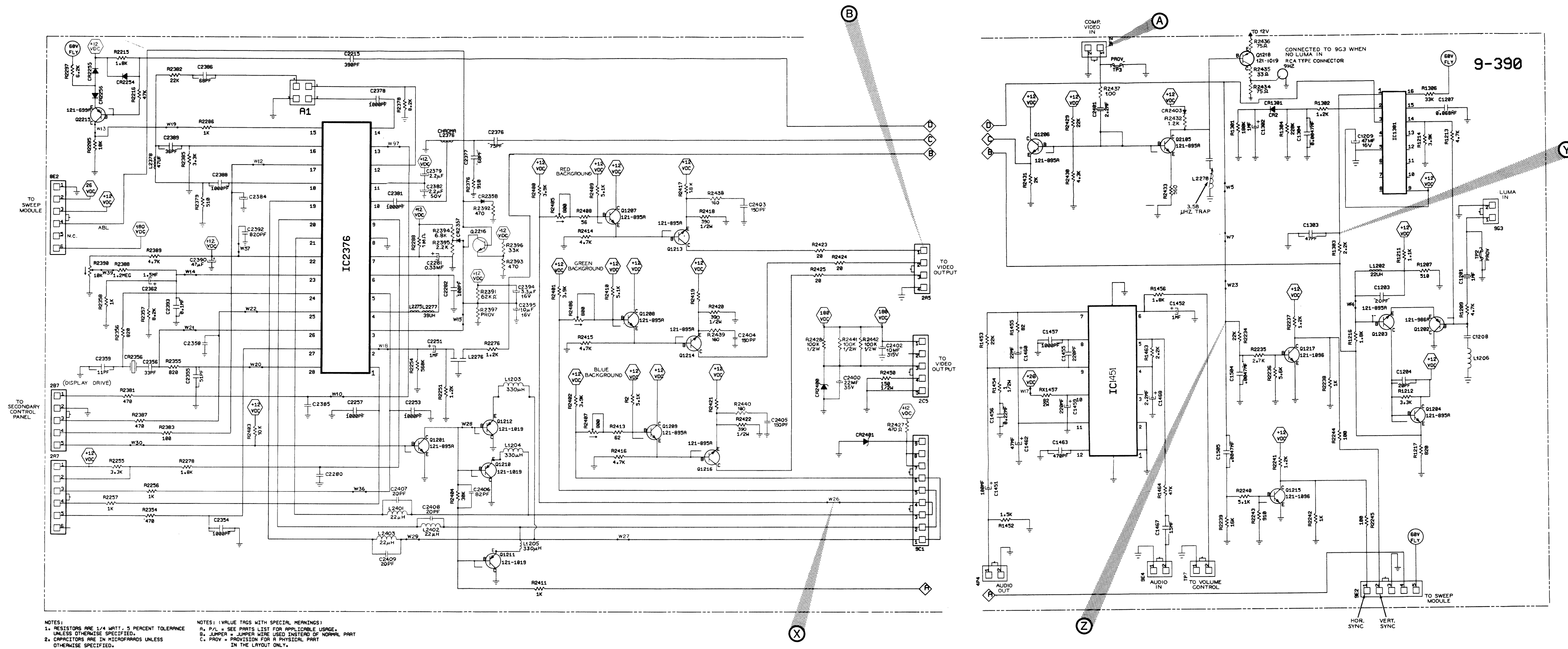


Figure 4-6  
Interface Module Schematic

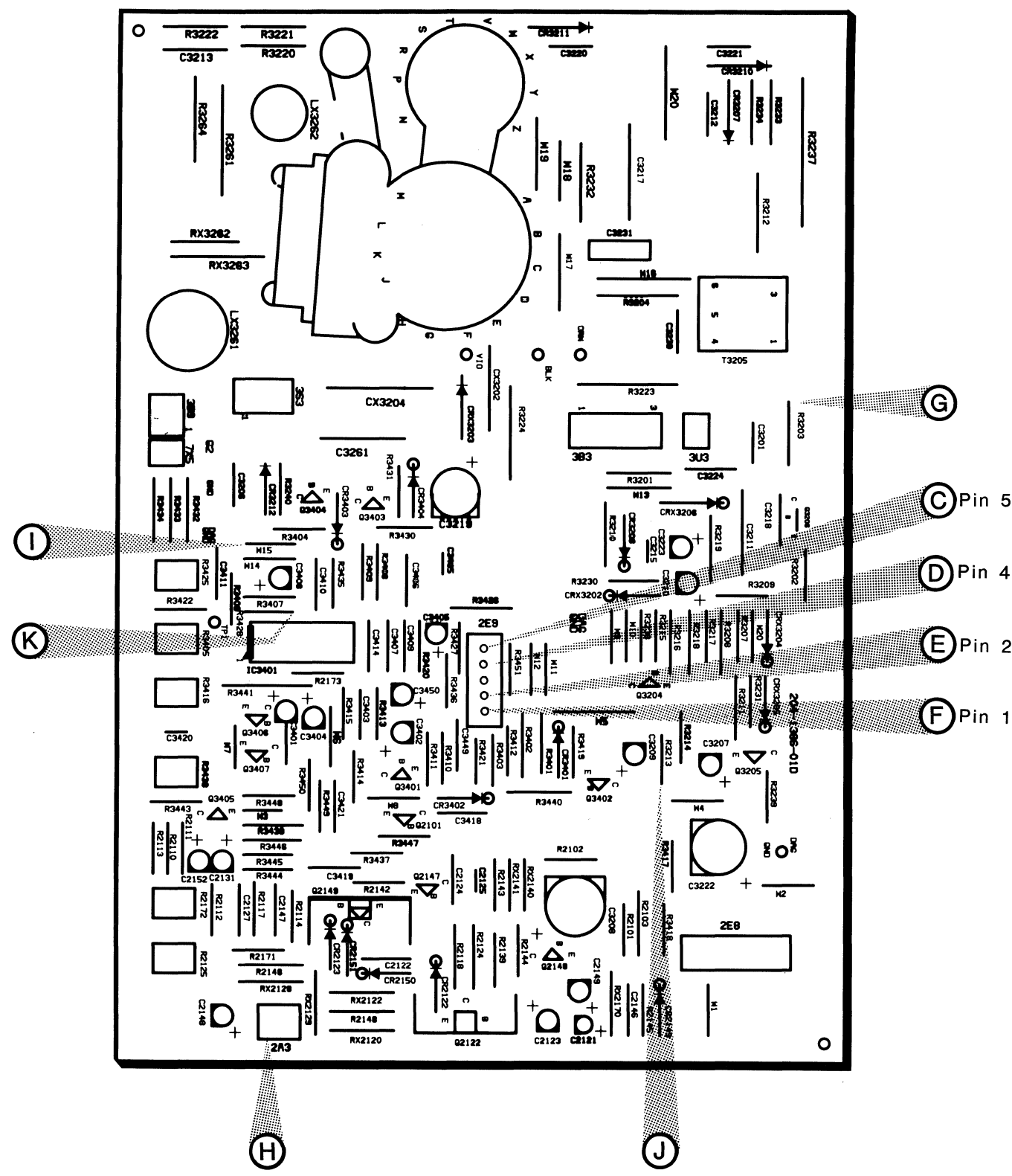
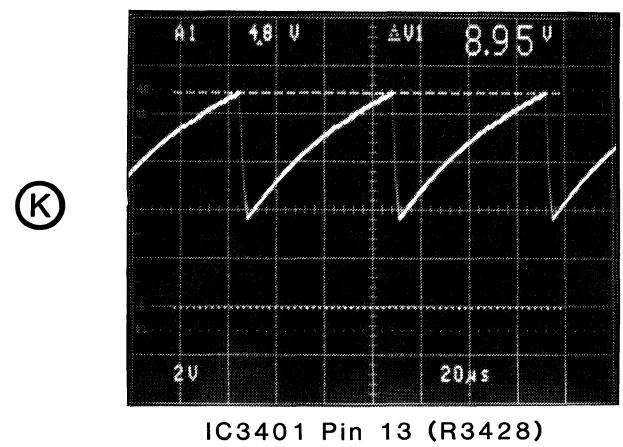
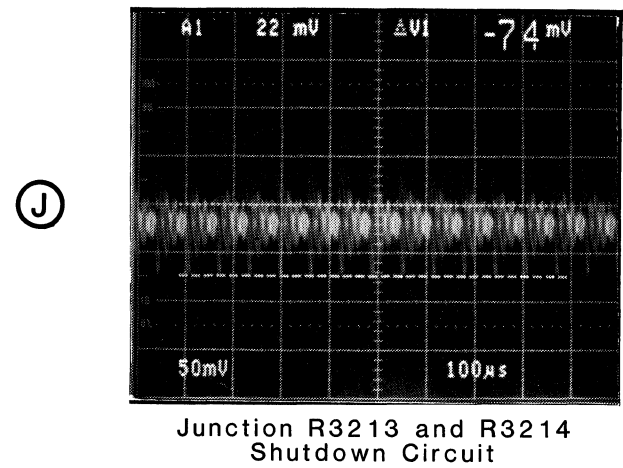
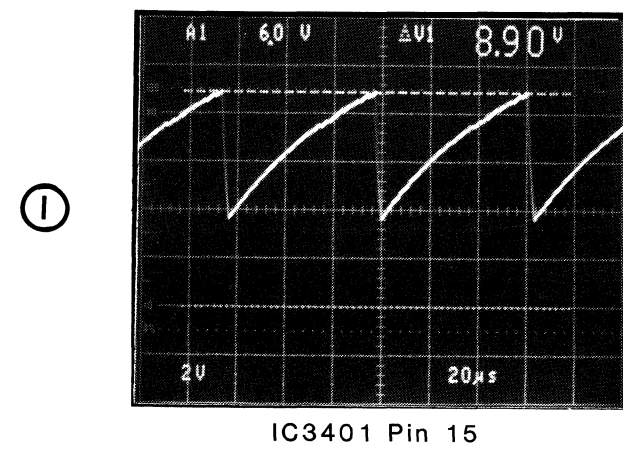


Figure 4-7  
Sweep Module Component Location

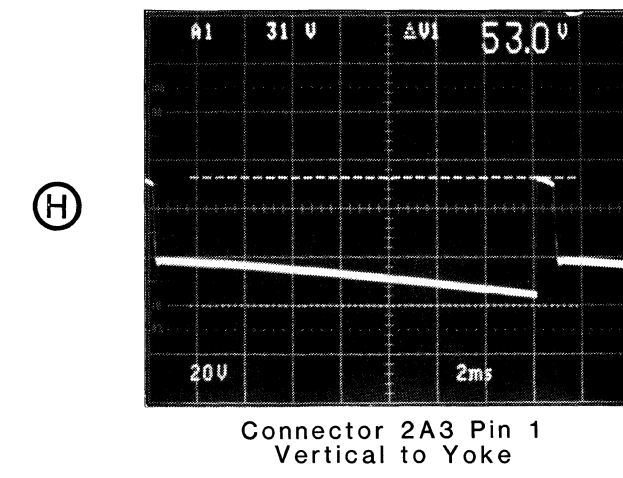
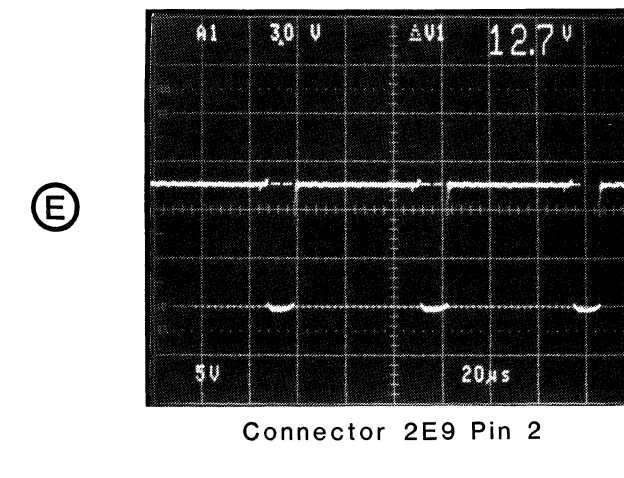
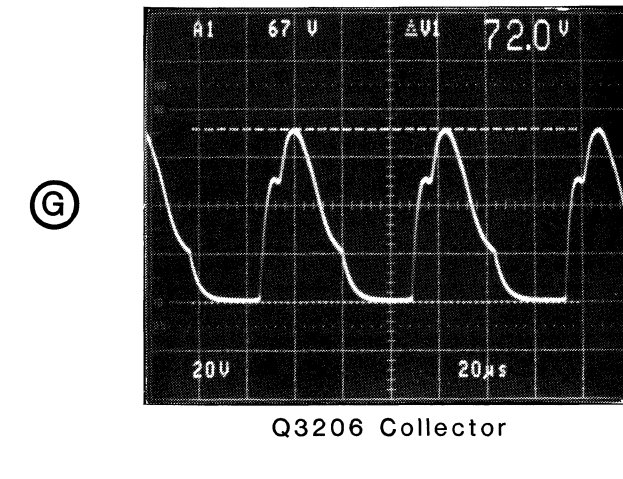
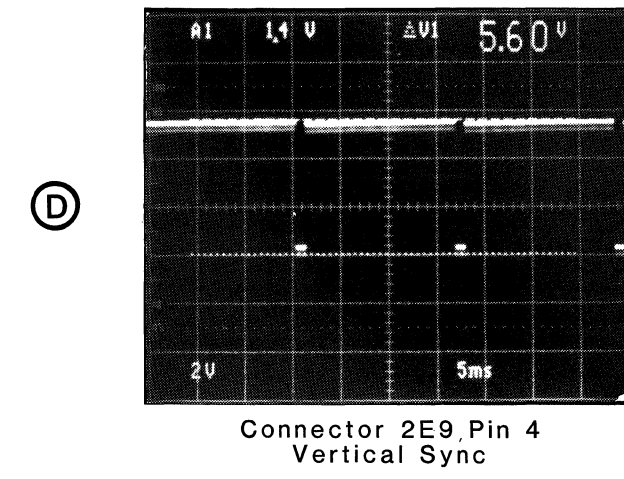
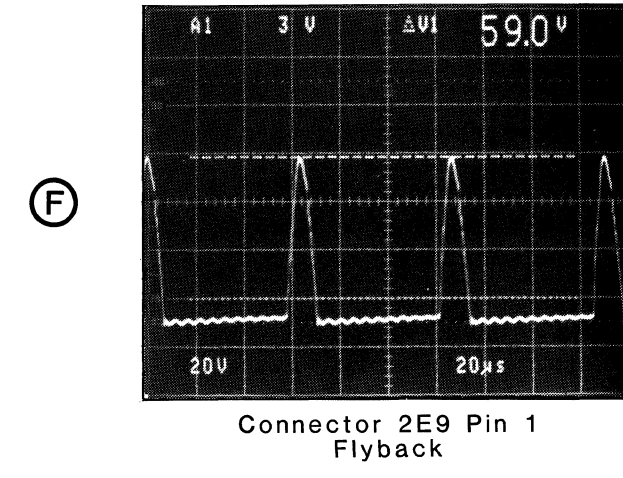
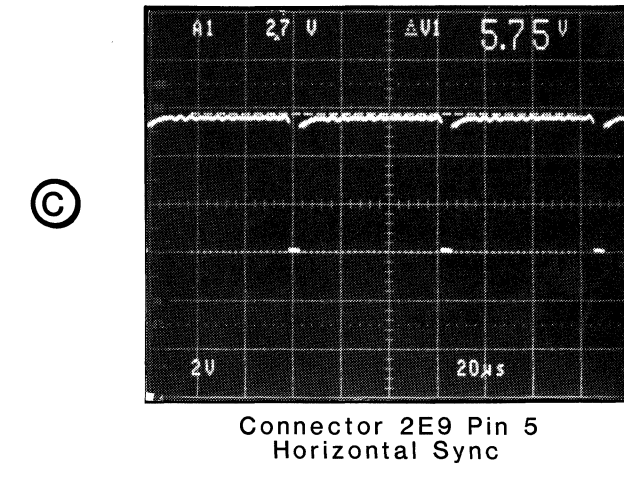
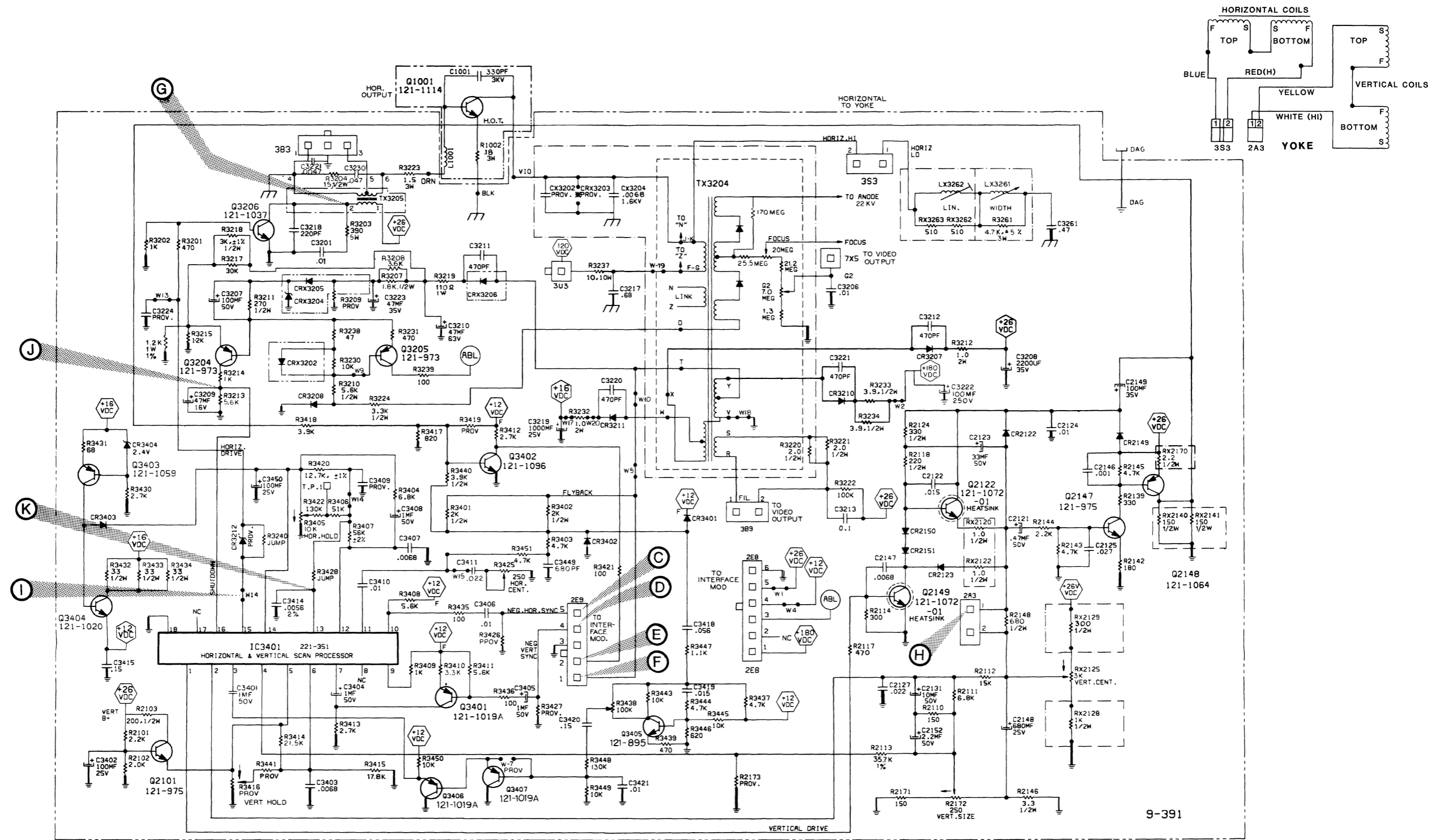
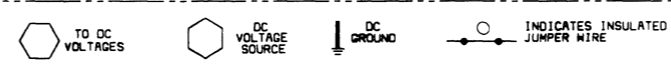


Figure 4-8  
Sweep Module Waveforms



NOTES:  
 1. RESISTORS ARE 1/4 WATT, FILM, \*5% TOLERANCE UNLESS OTHERWISE SPECIFIED.  
 2. CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

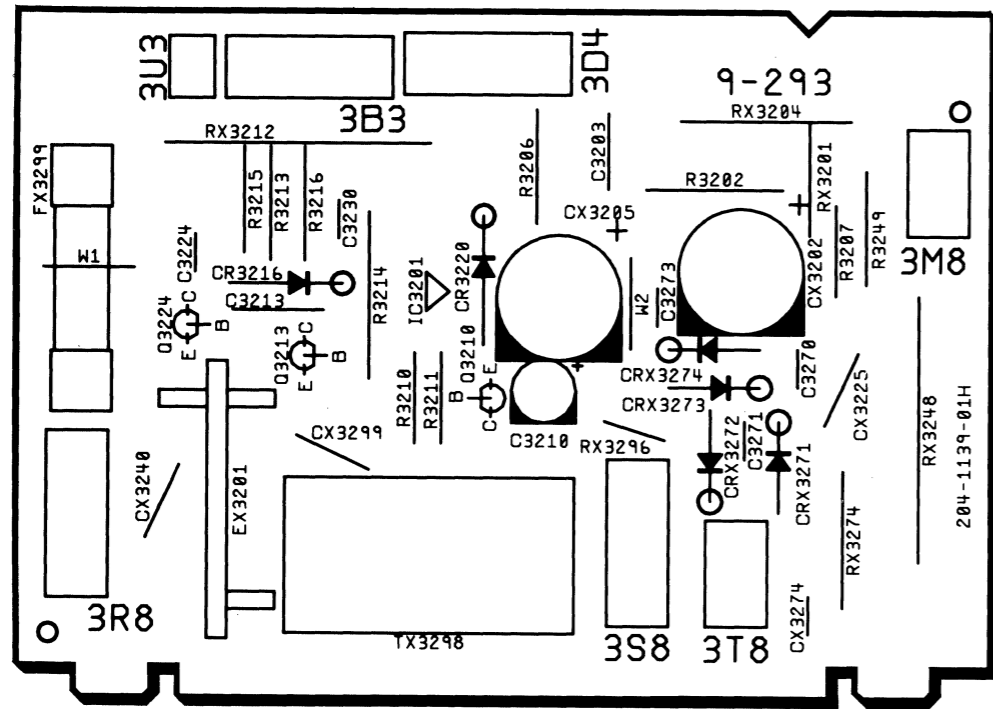
NOTES: (USED WITH CIRCUIT REFERENCE DESIGNATORS)  
 A. P/L = SEE PARTS LIST FOR APPLICABLE USAGE.  
 B. — = JUMPER WIRE USED INSTEAD.  
 C. — = PROVISION ON PRINTED CIRCUIT BOARD.



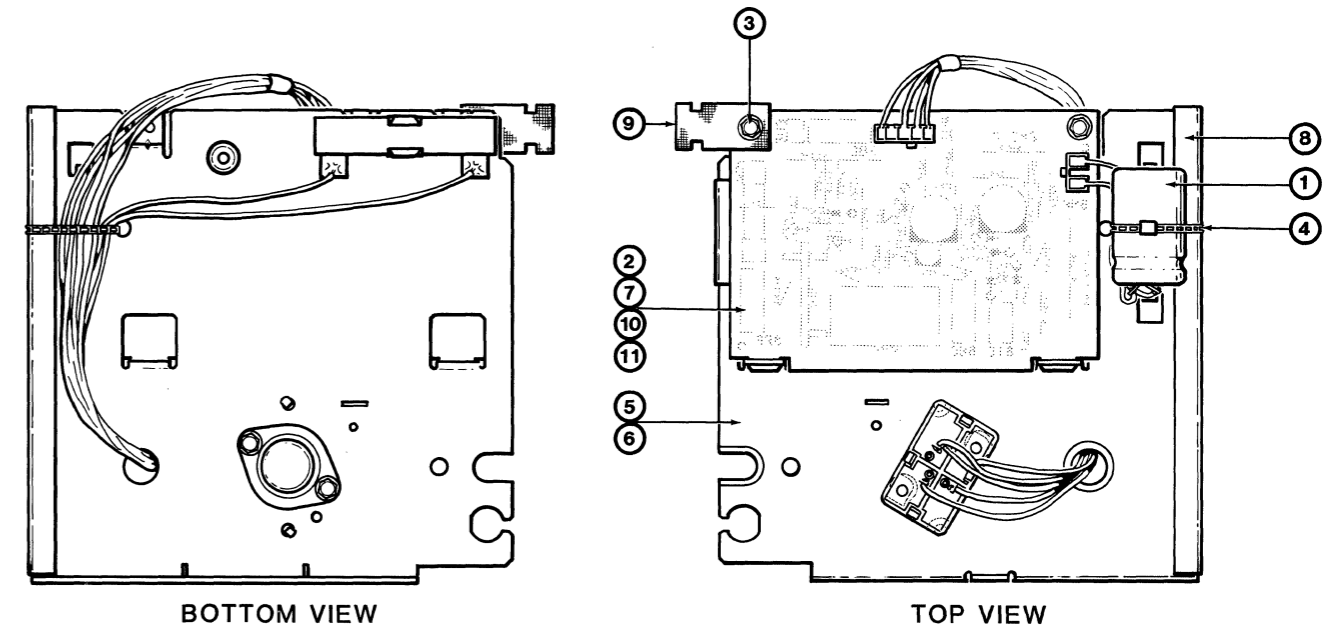
SCHEMATIC FOR  
 9-391  
 MONITOR DEFLECTION MODULE

Figure 4-9  
 Sweep Module Schematic





**Figure 4-11**  
Power Supply Module Component Locations

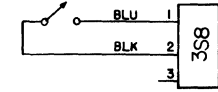


ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	A-12842	CAPACITOR AND CABLE ASSEMBLY 3M8	1 1 1 1
2	9-293	MODULE SERIES PASS POWER SUPPLY	1
3	114-802	SCREW, THD FORM 8-18x0.312 TP B STAT BRONZE	2 2 2 2
4	19-733-04	CABLE TIE	1 1 1 1
5	A-13284	HEAT SINK ASSEMBLY SERIES PASS	1 1 1 1
6	F-20120	HEAT SINK ASSEMBLY SERIES PASS	1
7	9-293-01	MODULE SERIES PASS POWER SUPPLY	1
8	83-9299	EDGE PROTECTOR, EXTRUDED PLASTIC	1 1 1 1
9	194-1395	INSULATING STRIP, FLAT STOCK	1 1 1 1
10	F-22024	MODULE SERIES PASS POWER SUPPLY	1
11	9-293-03	MODULE SERIES PASS POWER SUPPLY	1

**Figure 4-10**  
Power Supply Assembly Major Components

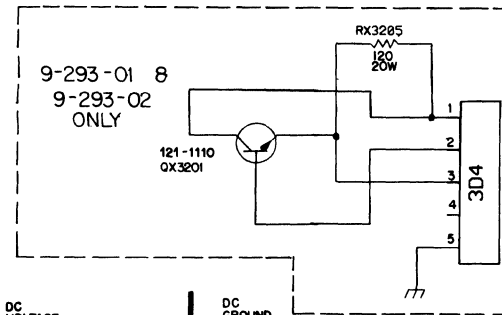
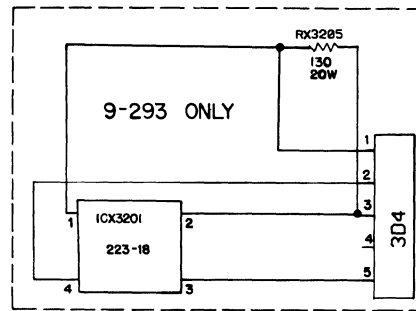
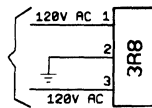
RX3205 = 63-10484-74

SW 1  
(ON/OFF SWITCH)



CIRCUIT REFERENCE DESIGNATOR	PART NUMBER	VALUE	MODULE
C3249	22-7819-10	470MF 200V	9-293 A-01
C3249	22-7819-11	680MF 200V	9-293-02

LINE CORD



DC VOLTAGE SOURCE

DC GROUND

TO DC VOLTAGES

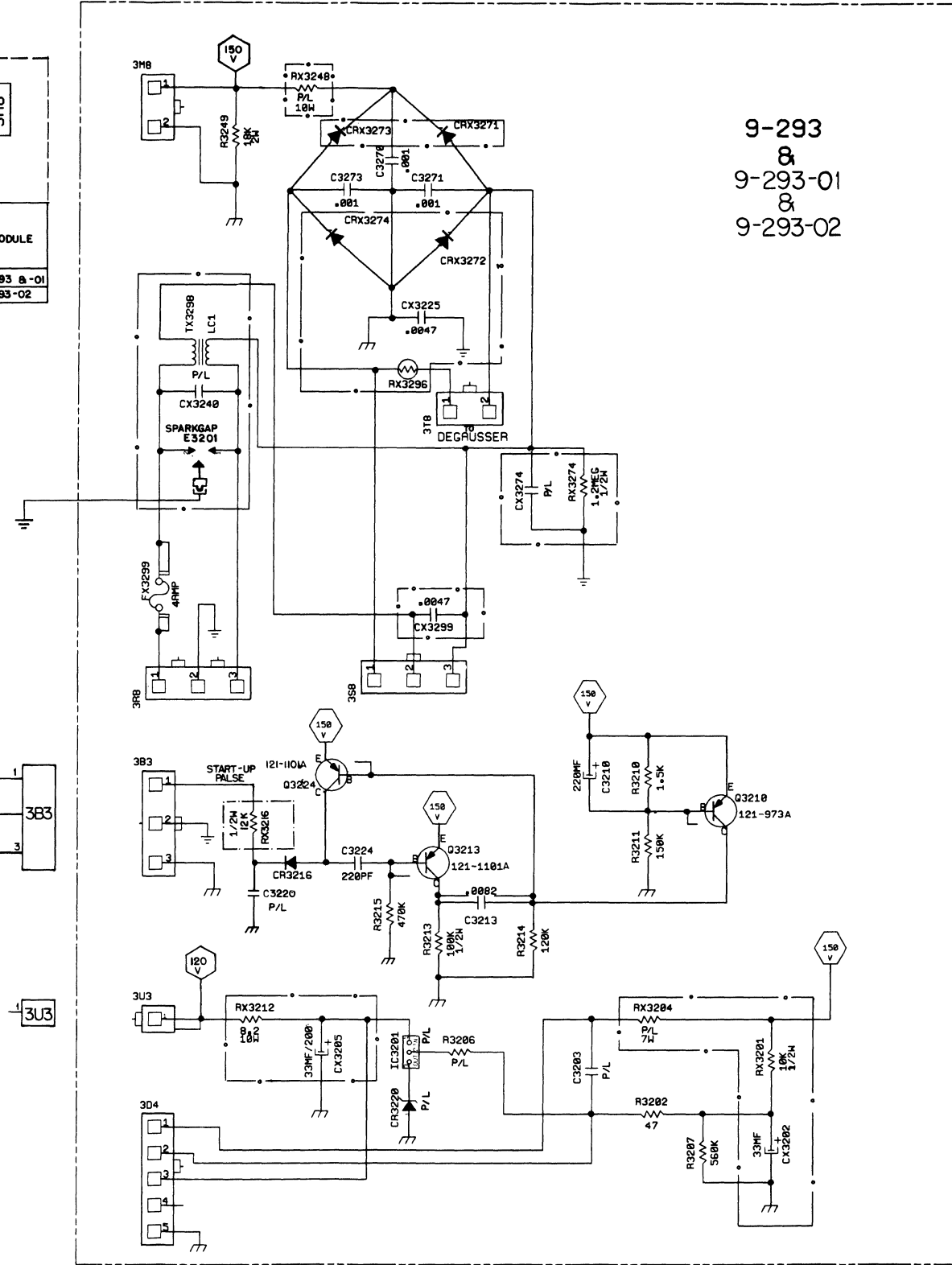
AC GROUND

NOTE: ALL PERIPHERAL INFORMATION IS FOR REFERENCE ONLY & APPLIES TO ASSEMBLIES WHERE INDICATED AS SHOWN.

NOTES:  
1. RESISTORS ARE 1/4 WATT, 5 PERCENT TOLERANCE UNLESS OTHERWISE SPECIFIED.  
2. CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

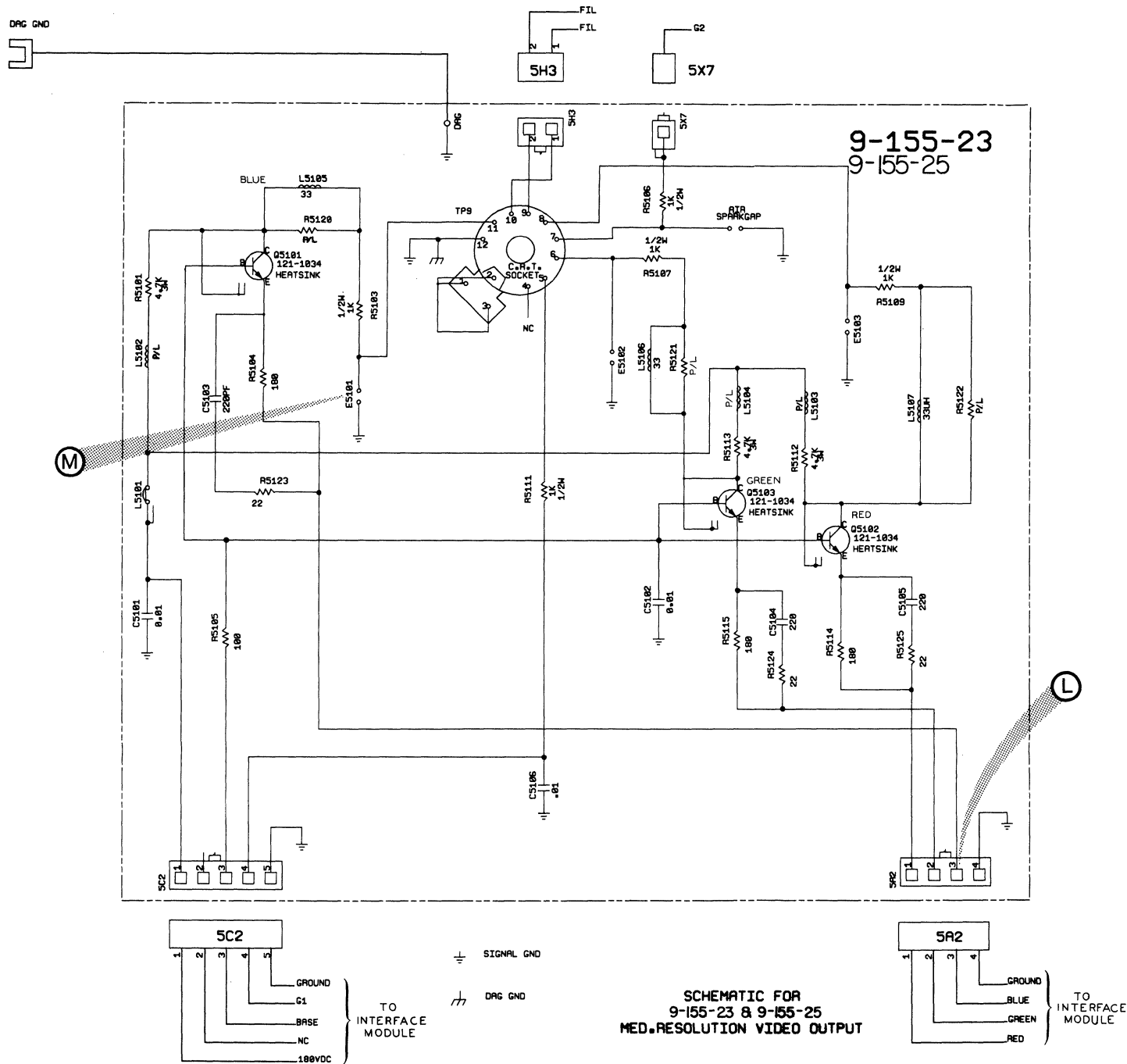
NOTES: (VALUE TAGS WITH SPECIAL MEANINGS)  
A. P/L = SEE PARTS LIST FOR APPLICABLE USAGE.  
B. JUMPER = JUMPER WIRE USED INSTEAD OF NORMAL PART  
C. PROV = PROVISION FOR A PHYSICAL PART IN THE LAYOUT ONLY.

9-293  
&  
9-293-01  
&  
9-293-02



SCHMATIC FOR  
9-293 & 9-293-01 & 9-293-02  
SERIES PASS POWER SUPPLY

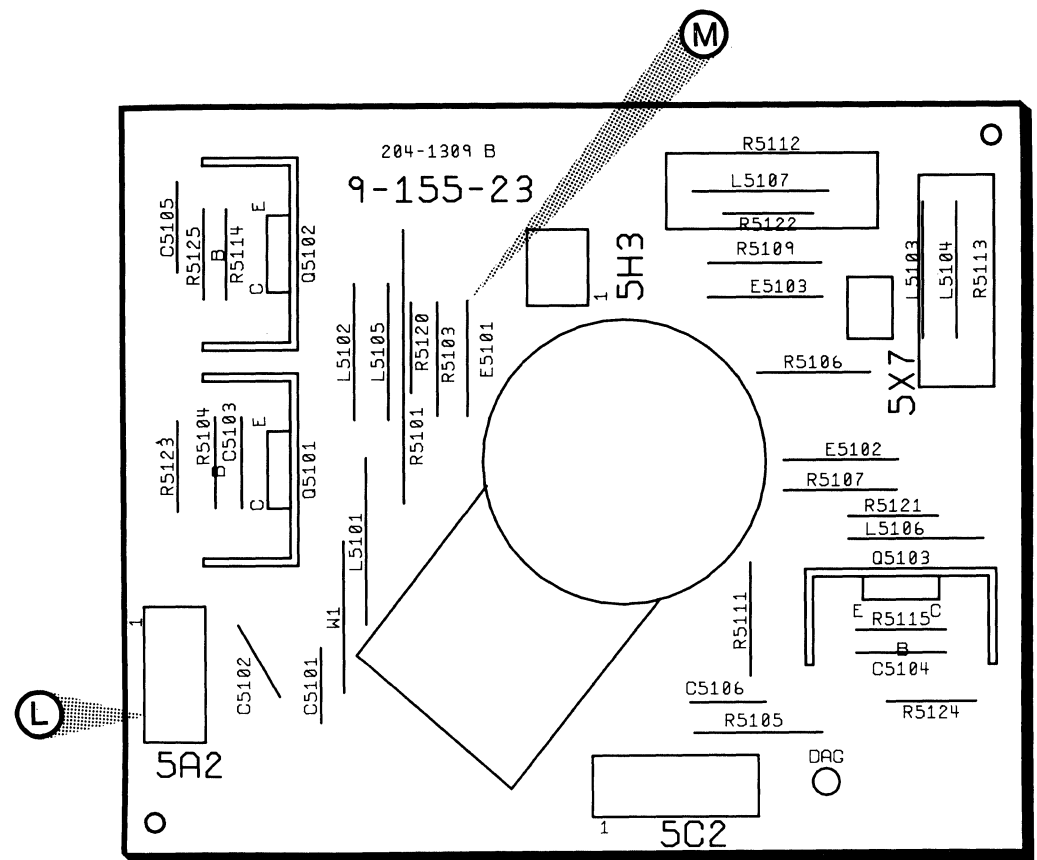
Figure 4-12  
Power Supply Assembly Schematic



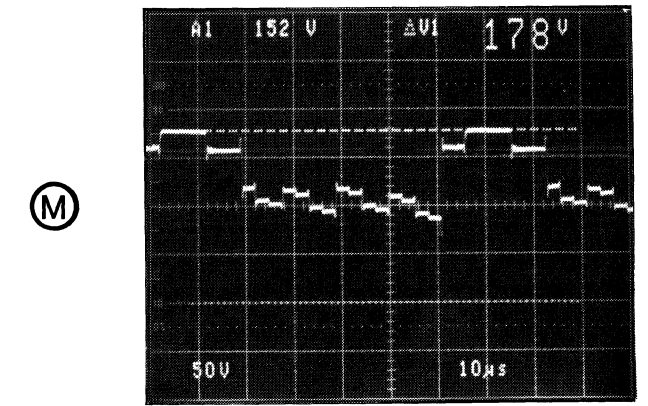
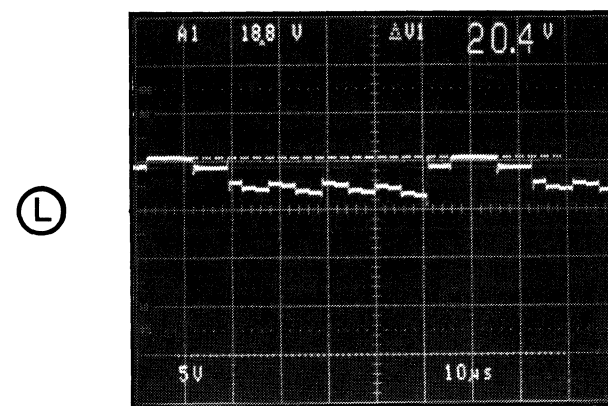
NOTES: (VALUE TAGS WITH SPECIAL MEANINGS)  
 A. P/L = SEE PARTS LIST FOR APPLICABLE USAGE.  
 B. JUMPER = JUMPER WIRE USED INSTEAD OF NORMAL PART  
 C. PROV = PROVISION FOR A PHYSICAL PART  
 IN THE LAYOUT ONLY.

NOTES:  
 1. RESISTORS ARE 1/4 WATT, 5 PERCENT TOLERANCE  
 UNLESS OTHERWISE SPECIFIED.  
 2. CAPACITORS ARE IN MICROFARADS UNLESS  
 OTHERWISE SPECIFIED.

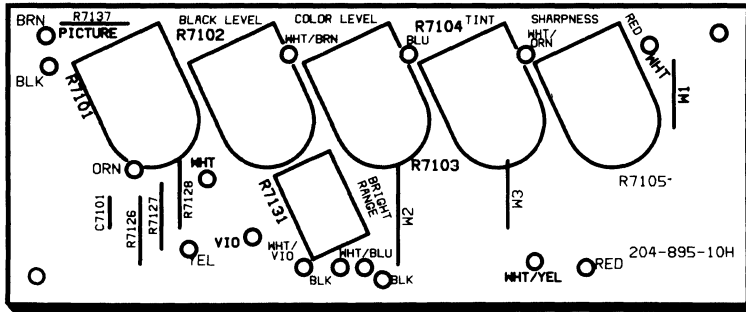
**Figure 4-15**  
Video Output Module Schematic



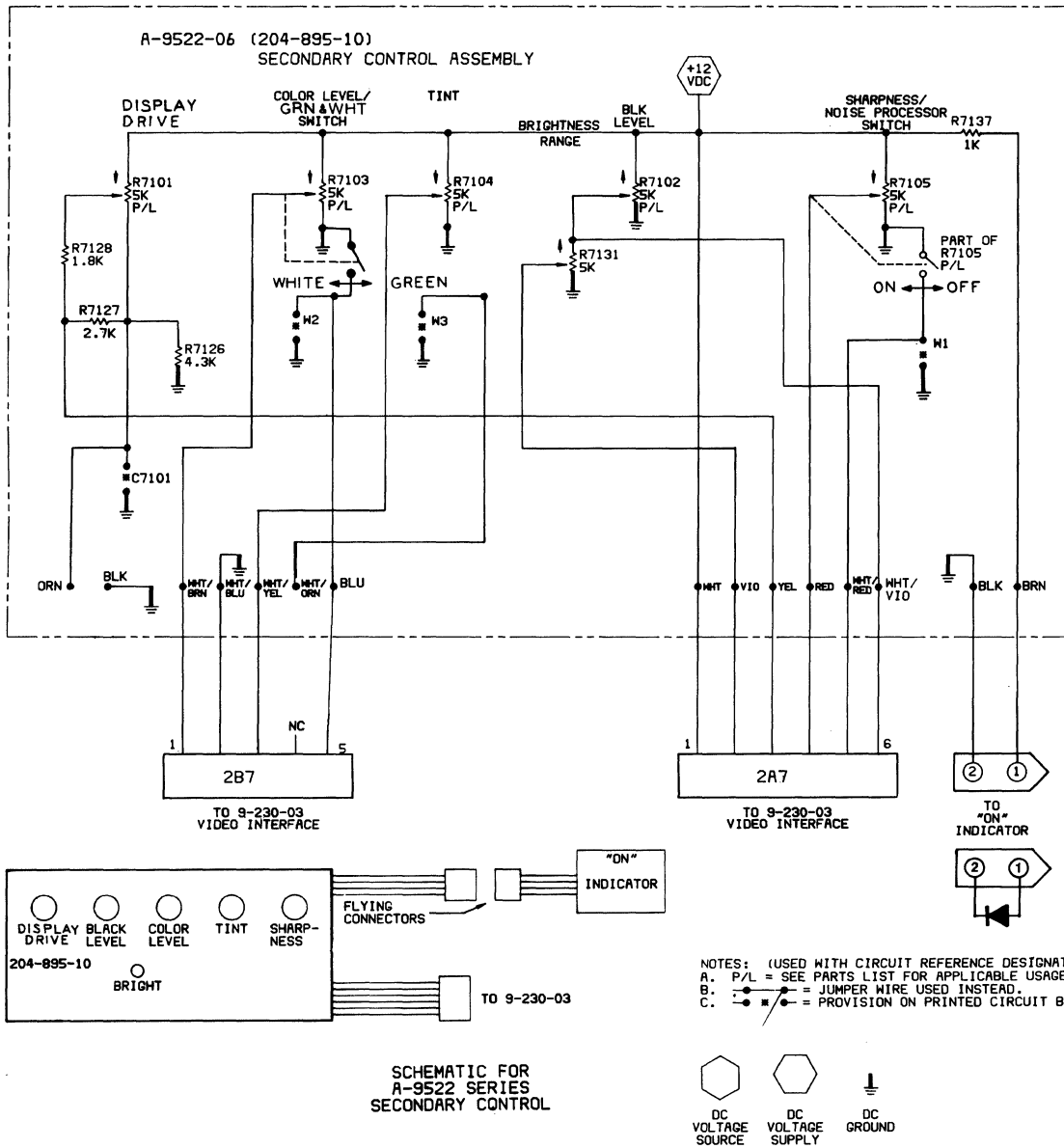
**Figure 4-13**  
Video Output Module Component Location



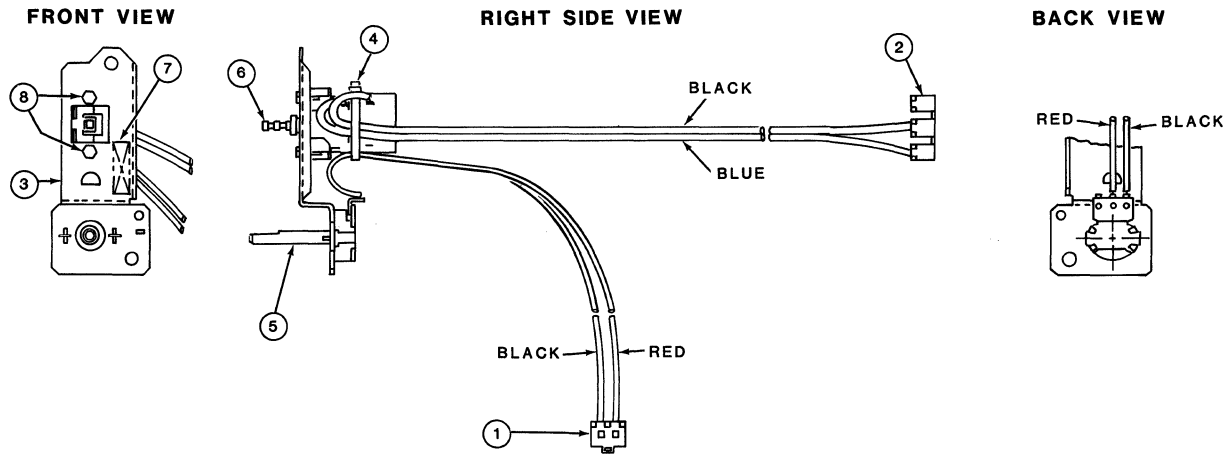
**Figure 4-14**  
Video Output Module Waveforms



**Figure 4-16**  
Secondary Control Panel Component Location

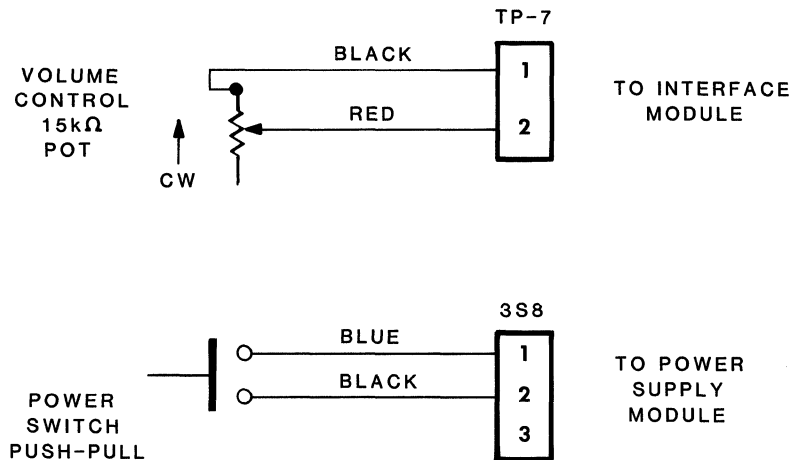


**Figure 4-17**  
Secondary Control Panel Schematic

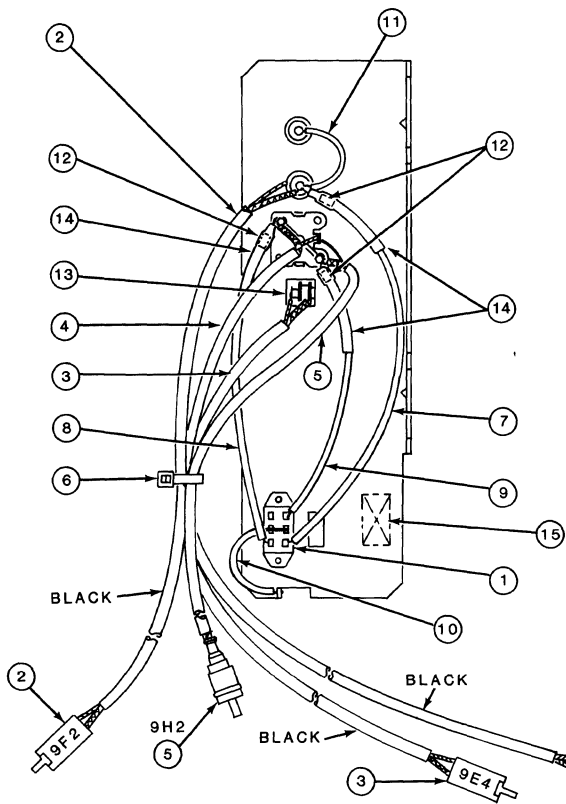


SCREW, THD FORM 4-24x0.25 TYPE B CADMIUM 0.187A HEX HD, SLOTTED	2	114-584	8
LABEL DATE CODE	1	101-6239-11	7
SWITCH PUSH BUTTON, LOCKING	1	85-1559-9-02	6
CONTROL ROTARY, SINGLE	1	63-10772-04	5
CABLE RETAINER STRAP CABLE TIE	1	19-733-06	4
METAL STAMPING BRACKET, VOLUME CONTROL MTG	1	12-7926-01	3
CABLE AND HSNQ ASSY 0.312P, 1UP, TWIN LEAD 3S8	1	A-10150-05	2
CABLE AND HSNQ ASSY 0.156P, 1P, TP7	1	A-9911-79	1
DESCRIPTION	QTY.	PART NUMBER	ITEM

**Figure 4-18**  
*Primary Control Board Component Location*

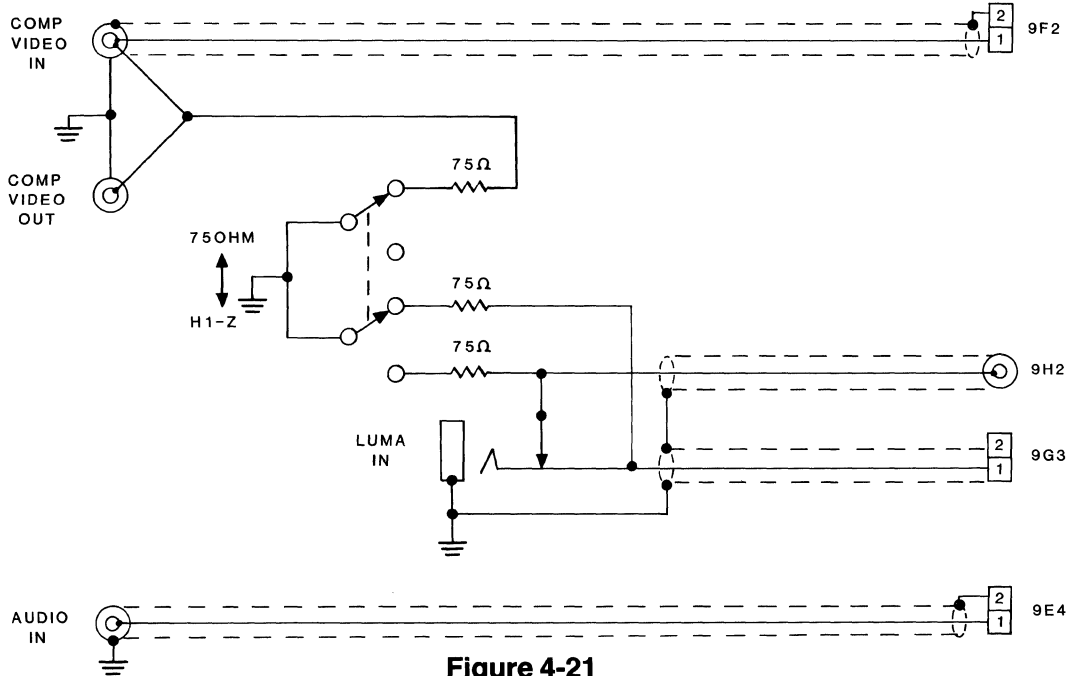


**Figure 4-19**  
*Primary Control Board Schematic*



1	LABEL, DATE CODE	101-6239-11	15
3	SLEEVING, HEAT SHRINKABLE 0.02" WALL, 0.125" DIA.	79-317-03	14
1	JACK AUDIO IN	78-2239	13
3	RESISTOR FILM 75Ω, 5%, 1/4W.	63-10235-45	12
1	WIRE STR. SINGLE COND. 22GA, BLUE	301-66282N020EE	11
1	---	301-66282N030EE	10
1	---	301-66282N035EE	9
1	---	301-66282N045EE	8
1	---	301-66282N055EE	7
1	CABLE TIE	19-733-01	6
1	CABLE SHIELDED LEAD & PLUG 9H2	52-2571-19	5
1	CONNECTOR & CABLE ASSY 0.165P 2 COND. 1 UP, SHIELDED 9G3	50-261-13	4
1	CONNECTOR & CABLE ASSY 0.165P 2 COND. 1 UP, SHIELDED 9E4	50-261-12	3
1	CONNECTOR & CABLE ASSY 0.165P 2 CONT. 1 UP, SHIELDED 9F2	50-261-11	2
1	JACK & SWITCH ASSY	A-11642-03	1
QTY	DESCRIPTION	PART NUMBER	ITEM

**Figure 4-20**  
*Input Panel Component Location*



**Figure 4-21**  
*Input Panel Schematic*

# Disassembly/ Reassembly

This section along with Figure 6-1, provides instruction for both disassembling and reassembling the monitor. The step-by-step instructions are written for disassembly. For reassembly, perform the steps in the reverse order except when instructed to do otherwise.

**WARNING:** Be sure that the monitor power and signal cables are unplugged before attempting disassembly of the monitor.

**NOTE:** Some connectors are very tight and may require careful prying with a screwdriver in order to free them.

### Back Cover (10)

1. Disconnect the power and signal cables from the rear of the monitor.
2. Remove the four screws (05) from the back cover (10) and pull the cover back and away from the monitor.

### Top Cover (20)

Remove the two screws (15) from the bottom of the cabinet and lift the top cover (20) up and toward the rear of the monitor.

### Input Panel (40)

1. Remove the back cover (10).
2. Remove the top cover (20).
3. Remove the two screws (35) that secure the input panel to the right chassis CRT mounting plate (151).

4. Disconnect the input panel cable connectors from the interface board and remove the panel from the monitor.

### Cabinet Front (150)

1. Remove the back cover (10).
2. Remove the top cover(20).
3. Disconnect the primary control cables from the power supply and interface boards.
4. Disconnect the degaussing cable connector from the power supply board.
5. Disconnect the secondary control cable connectors from the interface board.
6. Disconnect the speaker cable connector from the interface board.
7. Remove the four screws (74) that secure the cabinet front (150) and bring the cabinet front forward and away from the monitor.

### Primary Control Panel (125)

1. Remove the cabinet front (150).
2. Cut the cable tie that holds the power LED cable to the volume control cable.
3. Remove the two screws (120) that secure the primary control to the cabinet front.

### Secondary Control Panel (135)

1. Remove the cabinet front (150).
2. Disconnect the connector from the power LED cable.
3. Remove the two screws (130) that secure the secondary control to the cabinet front.

### Speaker (115)

1. Remove the cabinet front (150).
2. Remove the four screws (110) that secure the speaker to the cabinet front.

### Sweep Module (77)

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).
3. Discharge the high voltage and disconnect the high voltage lead from the CRT.

**WARNING:** Discharge the high voltage at the anode lead to the CRT using a jumper lead connected between the chassis and a screwdriver. Otherwise, shock or injury may result. Refer to the inset of Figure 6-1.

4. Remove the two screws (25) and remove the cross brace (30).
5. Disconnect the focus wire at the mid-air connector.
6. Remove the five screws (78) that secure the sweep module to the left chassis CRT mounting plate (152).
7. Disconnect interface module connectors to allow access to screw (73).
8. Loosen screw (73) and lift the sweep module up and toward the rear of the monitor.

### Video Output Module (70)

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).
3. Carefully unplug the video output module from the CRT.
4. Disconnect the focus wire at the mid-air connector.
5. Disconnect the ground connection from the CRT ground contact (100).
6. Disconnect the remaining cable connectors from the video output module.

### Interface Module (85)

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).
3. Unplug the video output module from the CRT.
4. Disconnect all cable connectors from the interface module.
5. Remove the two screws (22) that secure the rear of the interface module to the chassis.
6. Slide the interface module to the rear and out of the guides that secure the front of the interface module.

### Power Supply Board (65)

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).
3. Remove the two screws (26) that secure the top of the board to the bracket of the power supply assembly.



4. Lift the power supply board up and out of the two guides that secure the bottom of the board.
5. Disconnect all cable connectors from the power supply board.
6. Remove the power supply board from the monitor.

### **Power Supply Assembly (65)**

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).
3. Remove the screws (23) that secure the power supply assembly to the right chassis CRT mounting plate (151).
4. Remove the two screws (35) that secure the input panel (40) to the right chassis CRT mounting plate.
5. Remove the two screws (27) that secure the bottom of the power supply to the chassis and lift the assembly up and away from the monitor.

### **CRT (105)**

1. Remove the cabinet back (10).
2. Remove the cabinet top (20).

3. Discharge the high voltage and disconnect the high voltage lead from the CRT.

**WARNING:** Discharge the high voltage at the anode lead to the CRT using a jumper lead connected between the chassis and a screwdriver. Otherwise, shock or injury may result. Refer to the inset of Figure 6-1.

4. Disconnect the video output module from the CRT.
5. Disconnect the video output module ground wire from the CRT ground contact.
6. Disconnect the yoke cable connectors from the sweep module.
7. Place the monitor with its CRT face down on a soft horizontal surface, allowing access to screws (104).
8. Cut the ties that secure the degaussing coil at the four corners of the CRT.
9. Remove the four screws (104), flat washers (102), and star washers (103) that secure the CRT to the right and left chassis CRT mounting plates.
10. Lift the monitor up and away from the CRT.

# Chapter 6

## Parts List

All part numbers in this manual are identified in the following tables of parts lists Table 6-1 Monitor Major Assemblies, Table 6-2 Cable Assemblies, and Table 6-3 through Table 6-10 board and assembly components.

**CAUTION:** Some of the ICs used in this unit are electrostatic-sensitive devices. These devices can be damaged by static electricity. When handling any IC, use a wrist ground strap or be sure to equalize the static charge before touching the IC.

**IMPORTANT SAFETY NOTICE:** Under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation. All components should be replaced only with types identical to those in the original circuit, and their physical location, wiring, and lead dress must conform to the original layout upon completion of repairs.

In some instances, redundant circuits are incorporated for additional protection and X-radiation protection. Special circuits are also used to prevent shock and fire hazard. **These special circuit components, which contain X in their reference designator, are to be replaced with identical components only.**

**NOTE:** Unless otherwise specified, all resistors are 1/4-watt, 5% tolerance.

In the following parts list, N/A refers to "Not Assigned" parts for which there is no replacement part number assigned.

Assemblies identified by part numbers that start with the letter F are not available at this assembly level.

**Table 6-1**  
*Monitor Major Assembly (see Figure 6-1)*

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
05	114-1207	Screw, back cover, 8-18 × .625 hex head
10	14-11514-03	Back cover
11	14-11515-01	Cabinet bottom, rectangular
15	112-2262-05	Screw, cover glue block, 8-18 × 1.250 phillips
20	14-11649	Top cover
21	114-00802-01	Screw, CRT bracket to channel bracket
22	114-01121	Screw, Interface board to channel bracket
23	114-01353-02	Screw, Power Supply to CRT bracket
24	114-01393	Screw, channel bracket mounting
25	114-802	Screw, cross brace, 8-18 × .375 hex head
26	114-01393-01	Screw, power supply board to assembly bracket
27	N/A	Screw, power supply assembly bottom support
30	12-8298	Cross brace
35	114-00802-01	Screw to input panel
40	A-13444	Input panel assembly
64	9-293-03	Power Supply Module
65	N/A	Power Supply Assembly
70	9-155-25	Video output module
73	N/A	Screw, sweep module bracket
74	114-01402	Screw, CRT bracket to front
77	9-391	Sweep module
78	114-01121	Screw, sweep board mounting
85	9-390	Interface module
90	19-733-04	Cable tie
91	19-733-01	Cable tie
N/A	19-733-05	Cable tie
92	20-3918-09	Degaussing coil and cable assembly
100	127-226-03	Contact, CRT ground
102	N/A	Flat washer, CRT mounting
103	93-02076-01	Lock washer, see item 104
104	114-601	Screw, CRT mounting 10-16 × .500 hex w/washer

**Table 6-1 (Continued)**  
**Monitor Major Assembly (see Figure 6-1)**

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
105	A-13649	CRT, yoke, and beam bender assembly
110	114-1379	Screw speaker mounting
115	49-1332	Speaker
120	114-1402	Primary control board screws
125	A-10342	Primary control board and switch assembly
126	A-10675	LED cable and housing assembly
N/A	19-1000	Clip for A-10675
N/A	46-10335	Knob, on-off switch
N/A	A-08846	Knob assembly, volume control
130	114-1402	Secondary control board screws
135	A-9522-06	Secondary control board
140	N/A	Insulation sheet, Power Supply
141	N/A	Insulation sheet, Interface Module
145	N/A	Insulation sheet, Sweep Module
146	50-347-01	Power cable assembly
147	125-198-07	Power cable strain relief
148	114-1425-01	Screw, AC line, ground to frame
150	14-11516-08	Cabinet front
151	12-8720	Right chassis mounting plate
152	12-88720-01	Left CRT chassis mounting plate
153	12-08719	Channel support, front
154	12-08719-01	Channel support, rear

**Table 6-2**  
**Monitor Cables (see Figure 4-3)**

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
2A5/5A2	50-933	Connector and cable assembly
2A7	A-9919-43	Cable and housing assembly
2B7	A-9917-46	Cable and housing assembly
2C5/5C2	50-934	Connector and cable assembly
2E8/8E2	50-607-26	Connector and cable assembly
2E9/9E2	50-616-21	Connector and cable assembly
3B3/3B3	50-242-06	Connector and cable assembly
3S8	A-10150-05	Cable and housing assembly
3U3/3U3	50-238-28	Connector and cable assembly
4P4	A-10039-03	Speaker cable assembly
5H3/3B9	50-229-01	Connector and cable assembly
5X7/7X5	50-238-39	Connector and cable assembly

**Table 6-2 (Continued)**  
**Monitor Cables (see Figure 4-3)**

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
9E4	50-261-12	Connector and cable assembly
9F2	50-261-11	Connector and cable assembly
9G3	50-261-13	Connector and cable assembly
9H2	52-2571-19	Cable and plug
TP7	A-9911-79	Cable and housing assembly

**Table 6-3**  
**9-390 Interface Module (see Figure 4-4)**

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Capacitors</b>		
C1201	22-7407-01	1 $\mu$ F electrolytic
C1203	22-7633-29	68 pF disc
C1204	22-7648-14	20 pF disc
C1207	22-7775-22	.068 $\mu$ F polyester
C1302	22-7862-01	1 $\mu$ F electrolytic
C1303	22-7648-23	47 pF disc
C1304	22-7774-08	.0047 $\mu$ F polyester
C1451	22-7860-09	100 $\mu$ F electrolytic
C1452	22-7862-01	1 $\mu$ F electrolytic
C1455	22-7742-02	220 pF tubular
C1456	22-7774-28	.22 $\mu$ F polyester
C1457	22-7613-12	1000 pF disc
C1459	22-7861-12	470 $\mu$ F electrolytic
C1460	22-7860-06	22 $\mu$ F electrolytic
C1462	22-7860-08	47 $\mu$ F electrolytic
C1463	22-7742-06	470 pF tubular
C1467	22-7774-26	.15 $\mu$ F polyester
C1468	22-7862-02	2.2 $\mu$ F electrolytic
C1504	22-7774-08	.0047 $\mu$ F polyester
C1505	22-7774-08	.0047 $\mu$ F polyester
C2215	22-7742-05	390 pF tubular
C2251	22-7862-01	1 $\mu$ F electrolytic
C2253	22-7742-10	1000 pF tubular
C2257	22-7742-10	1000 pF tubular
C2281	22-7862-22	.33 $\mu$ F electrolytic
C2282	22-7633-35	120 pF disc
C2283	22-7743-20	22 pF tubular

**Table 6-3 (Continued)**  
9-390 Interface Module (see Figure 4-4)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
C2354	22-7742-10	1000 pF tubular
C2355	22-7621-27	51 pF disc
C2356	22-7743-24	33 pF tubular
C2358	22-7742-10	1000 pF tubular
C2359	22-7621-11	11 pF disc
C2362	22-7862-24	1.5 $\mu$ F electrolytic
C2376	22-7747-33	75 pF tubular
C2377	22-7749-32	68 pF tubular
C2378	22-7613-12	1000 pF disc
C2391	22-7742-10	1000 pF tubular
C2384	22-7862	.47 $\mu$ F electrolytic
C2385	22-7613-12	1000 pF disc
C2386	22-7749-32	68 pF tubular
C2388	22-7742-10	1000 pF tubular
C2389	22-7748-25	36 pF tubular
C2390	22-7859-08	47 $\mu$ F electrolytic
C2392	22-7503-01	820 pF trapezoidal
C2393	22-7775-24	.1 $\mu$ F polyester
C2400	22-7407-01	1 $\mu$ F electrolytic
C2401	22-7405-02	2.2 $\mu$ F electrolytic
<b>Diodes</b>		
CR1301	103-142-01	Low voltage, general
CR2254	103-142-01	Low voltage, general
CR2255	103-142-01	Low voltage, general
CR2256	103-142-01	Low voltage, general
CR2400	103-279-29	Zener diode
CR2401	103-279-09	Zener diode; 4.7V, .5 watt
<b>Integrated Circuits</b>		
IC1301	221-105	Sync scan processor
IC1451	221-98	Audio, monolithic
IC2376	221-179 78-3014-07	Chroma/luminance processor Socket for IC2376
<b>Inductors</b>		
L1202	20-3907-16	Coil
L2276	20-4136	Coil, delay line
L2277	20-3907-21	Coil
L2278	20-3919	Coil, tunable

**Table 6-3 (Continued)**  
9-390 Interface Module (see Figure 4-4)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
L2376	95-3080	Transformer
L2378	20-3887-20	Coil
<b>Transistors</b>		
Q1201	121-895	NPN
Q1202	121-986	PNP
Q1203		
through		
Q1209	121-895	NPN
Q1210	121-1019	PNP
Q1211	121-1019	PNP
Q1212	121-1019	PNP
Q1213	121-895	NPN
Q1214	121-895	NPN
Q1215	121-1096	NPN
Q1216	121-895	NPN
Q1217	121-1096	NPN
Q2215	121-699	PNP
<b>Resistors</b>		
R1207	63-10235-65	510 $\Omega$ , 1/4-watt, 5%
R1211	63-10235-73	1.1 k $\Omega$ , 1/4-watt, 5%
R1212	63-10235-84	3.3 k $\Omega$ , 1/4-watt, 5%
R1213	63-10235-88	4.7 k $\Omega$ , 1/4-watt, 5%
R1214	63-10235-86	3.9 k $\Omega$ , 1/4-watt, 5%
R1216	63-10235-78	1.8 k $\Omega$ , 1/4-watt, 5%
R1217	63-10235-70	820 $\Omega$ , 1/4-watt, 5%
R1301	63-10236-26	180 k $\Omega$ , 1/4-watt, 5%
R1302	63-10235-74	1.2 k $\Omega$ , 1/4-watt, 5%
R1303	63-10235-80	2.2 k $\Omega$ , 1/4-watt, 5%
R1304	63-10236-28	220 k $\Omega$ , 1/4-watt, 5%
R1306	63-10236-08	33 k $\Omega$ , 1/4-watt, 5%
R1452	63-10235-76	1.5 k $\Omega$ , 1/4-watt, 5%
R1453	63-10236-04	22 k $\Omega$ , 1/4-watt, 5%
R1454	63-10243	1 $\Omega$ , 1/3-watt, 5%
R1455	63-10235-46	82 $\Omega$ , 1/4-watt, 5%
R1456	63-10235-78	1.8 k $\Omega$ , 1/4-watt, 5%
RX1457	63-10236-46	82 $\Omega$ -watt, 5%
R1463	63-10235-80	2.2 k $\Omega$ , 1/4-watt, 5%
R1464	63-10236-36	470 k $\Omega$ , 1/4-watt, 5%
R1830	63-10236	15 k $\Omega$ , 1/4-watt, 5%

**Table 6-3 (Continued)**  
9-390 Interface Module (see Figure 4-4)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R2215	63-10235-78	1.8 kΩ, 1/4-watt, 5%
R2216	63-10236-12	47 kΩ, 1/4-watt, 5%
R2234	63-10236-04	22 kΩ, 1/4-watt, 5%
R2235	63-10235-95	9.1 kΩ, 1/4-watt, 5%
R2236	63-10235-90	5.6 kΩ, 1/4-watt, 5%
R2237	63-10235-74	1.2 kΩ, 1/4-watt, 5%
R2238	63-10235-72	1 kΩ, 1/4-watt, 5%
R2239	63-10236-01	16 kΩ, 1/4-watt, 5%
R2240	63-10235-89	5.1 kΩ, 1/4-watt, 5%
R2241	63-10235-74	1.2 kΩ, 1/4-watt, 5%
R2242	63-10235-72	1 kΩ, 1/4-watt, 5%
R2243	63-10235-71	910 kΩ, 1/4-watt, 5%
R2244	63-10235-48	100 Ω, 1/4-watt, 5%
R2245	63-10235-48	100Ω, 1/4-watt, 5%
R2251	63-10235-74	1.2 kΩ, 1/4-watt, 5%
R2254	63-10236-38	560 kΩ 1/4-watt, 5%
R2255	63-10235-84	3.3 kΩ, 1/4-watt, 5%
R2256	63-10235-72	1 kΩ, 1/4-watt, 5%
R2257	63-10235-72	1 kΩ, 1/4-watt, 5%
R2276	63-10235-74	1.2 kΩ, 1/4-watt, 5%
R2278	63-10235-78	1.8 kΩ, 1/4-watt, 5%
R2285	63-10235-96	10 kΩ, 1/4-watt, 5%
R2286	63-10235-72	1 kΩ, 1/4-watt, 5%
R2287	63-10236	15 kΩ, 1/4-watt, 5%
R2288	63-10236-38	560 kΩ, 1/4-watt, 5%
R2297	63-10235-91	6.2 kΩ, 1/4-watt, 5%
R2354	63-10235-64	470 Ω, 1/4-watt, 5%
R2355	63-10235-70	820 Ω, 1/4-watt, 5%
R2356	63-10235-70	820 Ω, 1/4-watt, 5%
R2357	63-10235-94	8.2 kΩ, 1/4-watt, 5%
R2358	63-10235-72	1 kΩ, 1/4-watt, 5%
R2376	63-10235-71	910 Ω, 1/4-watt, 5%
R2378	63-10235-94	8.2 kΩ, 1/4-watt, 5%
R2379	63-10235-65	510 Ω, 1/4-watt, 5%
R2381	63-10235-64	470 Ω, 1/4-watt, 5%
R2382	63-10236-04	22 kΩ, 1/4-watt, 5%
R2383	63-10235-48	100 Ω, 1/4-watt, 5%
R2385	63-10235-04	3.3 kΩ, 1/4-watt, 5%
R2387	63-10235-64	470 Ω, 1/4-watt, 5%
R2388	63-10236-46	1.2 mΩ, 1/4-watt, 5%
R2389	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2390	63-10857-12	Control

**Table 6-3 (Continued)**  
9-390 Interface Module (see Figure 4-4)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R2400	63-10235-86	3.9 kΩ, 1/4-watt, 5%
R2401	63-10235-86	3.9 kΩ, 1/4-watt, 5%
R2402	63-10235-86	3.9 kΩ, 1/4-watt, 5%
R2403	63-10235-72	1 kΩ, 1/4-watt, 5%
R2404	63-10236-07	30 kΩ, 1/4-watt, 5%
R2405	63-10857-33	Control
R2406	63-10857-32	Control
R2407	63-10857-31	Control
R2408	63-10235-42	56 Ω, 1/4-watt, 5%
R2409	63-10235-89	5.1 kΩ, 1/4-watt, 5%
R2410	63-10235-89	5.1 kΩ, 1/4-watt, 5%
R2411	63-10235-72	1 kΩ, 1/4-watt, 5%
R2412	63-10235-89	5.1 kΩ, 1/4-watt, 5%
R2413	63-10235-43	62 Ω, 1/4-watt, 5%
R2414	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2415	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2416	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2417	63-10235-72	1 kΩ, 1/4-watt, 5%
R2418	63-10243-56	220 Ω, 1/2-watt, 5%
R2419	63-10235-72	1 kΩ, 1/4-watt, 5%
R2420	63-10243-56	220 Ω, 1/2-watt, 5%
R2421	63-10235-72	1 kΩ, 1/4-watt, 5%
R2422	63-10243-56	220 Ω, 1/2-watt, 5%
R2423	63-10235-31	20 Ω, 1/4-watt, 5%
R2424	63-10235-31	20 Ω, 1/4-watt, 5%
R2425	63-10235-31	20 Ω, 1/4-watt, 5%
R2427	63-10235-64	470 Ω, 1/4-watt, 5%
R2428	63-10833-07	30 kΩ, 1-watt, 5%
R2429	63-10236-04	22 kΩ, 1/4-watt, 5%
R2430	63-10235-87	4.3 kΩ, 1/4-watt, 5%
R2431	63-10235-79	2 kΩ, 1/4-watt, 5%
R2432	63-10235-80	2.2 kΩ, 1/4-watt, 5%
R2433	63-10235-79	2 kΩ, 1/4-watt, 5%
R2434	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2450	63-10243-52	150 Ω, 1/4-watt, 5%
N/A	78-3039-06	Connector, 6 circuit
N/A	78-3042-06	Connector, multi 6 circuit chain
N/A	86-799	Terminal, pin 0.045 inch square

**Table 6-4**  
9-155-25 Video Output Module (see Figure 4-13)

REFERENCE DESIGNATION	ZDS PART NUMBER	DESCRIPTION
<b>Capacitors</b>		
C5101	22-4671	.01 $\mu$ F disc
C5102	22-4671	.01 $\mu$ F, disc
C5103	22-7742-02	220 pF, tubular
C5104	22-7742-02	220 pF, tubular
C5105	22-7742-02	220 pF, tubular
C5106	22-4671	.01 $\mu$ F, disc
<b>Spark Gap</b>		
E5101 through E5103	52-2240-06	Spark gap
<b>Inductors</b>		
L5101 through L5104	20-3907-25	Wire Coil
L5105 through L5107	20-3907-18	Coil
<b>Transistors</b>		
Q5101	121-01034	NPN
N/A	126-02169	Heat sink for Q5101
N/A	114-01403	Screw for Q5101
N/A	93-02110	Washer for Q5101
N/A	54-00952	Nut for Q5101
Q5102	121-01034	NPN
N/A	126-02169	Heat sink for Q5102
N/A	114-01403	Screw for Q5102
N/A	93-02110	Washer for Q5102
N/A	54-00952	Nut for Q5102
Q5103	121-01034	NPN
N/A	126-02169	Heat sink for Q5103
N/A	114-01403	Screw for Q5103
N/A	93-02110	Washer for Q5103
N/A	54-00952	Nut for Q5103
<b>Resistors</b>		
R5101	63-10840-88	4.7 k $\Omega$ , 3-watt, 5%
R5103	63-7785	1 k $\Omega$ , 1/2-watt, 10%
R5104	63-10235-54	180 $\Omega$ , 1/4-watt, 5%
R5105	63-10235-48	100 $\Omega$ , 1/4-watt, 5%

**Table 6-4 (Continued)**  
9-155-25 Video Output Module (see Figure 4-13)

REFERENCE DESIGNATION	ZDS PART NUMBER	DESCRIPTION
R5106	63-7785	1 k $\Omega$ , 1/2-watt, 10%
R5107	63-7785	1 k $\Omega$ , 1/2-watt, 10%
R5109	63-7785	1 k $\Omega$ , 1/2-watt, 10%
R5111	63-7785	1 k $\Omega$ , 1/2-watt, 10%
R5112		
R5113	63-10840-88	4.7 k $\Omega$ , 3-watt, 5%
R5114	63-10235-54	180 $\Omega$ , 1/4-watt, 5%
R5115	63-10235-54	180 $\Omega$ , 1/4-watt, 5%
R5120 through R5122	63-10235-97	11 k $\Omega$ , 1/4-watt, 5%
R5124	63-10235-32	22 $\Omega$ , 1/4-watt, 5%
R5125	63-10235-32	22 $\Omega$ , 1/4-watt, 5%
<b>Miscellaneous</b>		
N/A	A-11056-02	CRT socket and connector assembly
N/A	43-1821-02	Housing connector, focus
N/A	54-952	Nut 4-40 $\times$ .25
N/A	78-2993-04	CRT socket

**Table 6-5**  
9-391 Sweep Module (see Figure 4-7)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Capacitors</b>		
C2121	22-7862	.47 $\mu$ F electrolytic
C2122	22-7774-14	.015 $\mu$ F polyester
C2123	22-7862-07	33 $\mu$ F electrolytic
C2124	22-7802-07	.01 $\mu$ F tubular
C2125	22-7774-17	.027 $\mu$ F polyester
C2127	22-7774-16	.022 $\mu$ F polyester
C2131	22-7862-05	10 $\mu$ F electrolytic
C2146	22-7742-10	1000 Pf tubular
C2147	22-7773-10	.0086 $\mu$ F polyester
C2148	22-7860-29	680 $\mu$ F electrolytic
C2149	22-7861-09	100 $\mu$ F electrolytic
C2152	22-7862-02	2.2 $\mu$ F electrolytic
CX3204	22-7672-18	.0068 $\mu$ F polypropylene
C3206	22-7523-01	.01 $\mu$ F disc
C3207	22-7862-09	100 $\mu$ F electrolytic
C3208	22-7861-14	2200 $\mu$ F electrolytic

**Table 6-5 (Continued)**  
9-391 Sweep Module (see Figure 4-7)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
C3209	22-7680	47 $\mu$ F electrolytic
C3210	22-7863-08	47 $\mu$ F electrolytic
C3211	22-7395	470 pF disc
C3212	22-7395	470 pF disc
C3213	22-7566-24	.1 $\mu$ F polyester
C3215	22-7773-24	.1 $\mu$ F polyester
C3217	22-7128	.68 $\mu$ F polyester
C3218	22-2703	220 pF disc
C3219	22-7860-13	1000 $\mu$ F electrolytic
C3220	22-7395	470 pF disc
C3221	22-7395	470 pF disc
C3222	22-7832-10	100 $\mu$ F electrolytic
C3401	22-7562-36	1 $\mu$ F polyester
C3402	22-7860-09	100 $\mu$ F electrolytic
C3403	22-7773-10	.0068 $\mu$ F polyester
C3404	22-7862-01	1 $\mu$ F electrolytic
C3405	22-7862-01	1 $\mu$ F polyester
C3406	22-7774-12	.01 $\mu$ F polyester
C3407	22-7773-10	.0068 $\mu$ F polyester
C3408	22-7862-01	1 $\mu$ F electrolytic
C3410	22-7774-12	.01 $\mu$ F polyester
C3411	22-7773-16	.022 $\mu$ F polyester
C3414	22-7702-09	.0056 $\mu$ F polypropylene
C3415	22-7775-26	.015 $\mu$ F polyester
C3418	22-7774-21	.056 $\mu$ F polyester
C3419	22-7774-14	.015 $\mu$ F polyester
C3420	22-7773026	.15 $\mu$ F polyester
C3421	22-7773-12	.01 $\mu$ F polyester
C3449	22-7613-10	680 pF disc
C3450	22-7860-09	100 $\mu$ F electrolytic
<b>Diodes</b>		
CR2122	103-254-01	Low voltage, general
CR2123	103-254-01	Low voltage, general
CR2149	103-254-01	Low voltage, general
CR2150	103-142-01	Low voltage, general
CR2151	103-142-01	Low voltage, general
CRX3202	103-142-01	Low voltage, general
CRX3204	103-336-19	Zener, 10.0 V, 1/2-watt
CRX3205	103-254-01	Low voltage, general
CRX3206	103-344-02	Low voltage, general
CR3207	103-284	Low voltage, general
CR3208	103-254-01	Low voltage, general
CR3210	103-326	Low voltage, general
CR3211	103-284	Low voltage, general

**Table 6-5 (Continued)**  
9-391 Sweep Module (see Figure 4-7)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
CR3401	103-142-01	Low voltage, general
CR3402	103-142-01	Low voltage, general
CR3403	103-142-01	Low voltage, general
CR3404	103-279	Zener, 2.4 V, 1/2-watt
<b>Integrated Circuits</b>		
IC3401	221-351	Vertical/horizontal processor
<b>Inductors</b>		
L1001	149-454	Core, ferrite bead
LX3261	20-3968	Coil, width control
LX3262	20-4142-01	Coil, linearity
<b>Transistors</b>		
Q1001	121-1114	Horizontal output transistor
N/A	126-2284	Heat sink for Q1001
N/A	78-3080-01	Socket for Q1001
N/A	86-775	Terminal (female) for Q1001
N/A	112-2367	Screw for Q1001
N/A	114-802	Screw (bronze) for Q1001
Q2147	121-975	NPN
Q2148	121-1064	PNP
Q2149	121-1072-01	NPN transistor
N/A	126-2131-01	Heat sink
N/A	54-952	Nut for Q2149
N/A	114-1403	Screw for Q2149
Q3204	121-973	PNP
Q3205	121-973	PNP
Q3206	121-1037	NPN
Q3401	121-1019	PNP
Q3402	121-1096	NPN
Q3403	121-1059	PNP
Q3404	121-1020	NPN
Q3405	121-895	NPN
Q3406	121-1019	PNP
Q3407	121-1019	PNP
<b>Resistors</b>		
R1002	63-10852-01	.18 $\Omega$ , 3-watt, 10%
R2101	63-10235-80	2.2 k $\Omega$ , 1/4-watt, 5%
R2102	63-10235-79	2 k $\Omega$ , 1/4-watt, 5%
R2103	63-10243-55	200 $\Omega$ , 1/2-watt, 5%
R2110	63-10235-52	150 $\Omega$ , 1/4-watt, 5%

**Table 6-5 (Continued)**  
9-391 Sweep Module (see Figure 4-7)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R2111	63-10235-92	6.8 kΩ, 1/4-watt, 5%
R2112	63-10236	15 kΩ, 1/4-watt, 5%
R2113	63-10938-61	35.7 kΩ, 1/4-watt, 5%
R2114	63-10235-59	300 Ω, 1/4-watt, 5%
R2117	63-10235-64	470 Ω, 1/4-watt, 5%
R2118	63-10243-56	220 Ω, 1/2-watt, 5%
RX2120	63-10565	1 Ω, 1/2-watt, 5%
RX2122	63-10565	1 Ω, 1/2-watt, 5%
R2124	63-10243-60	330 Ω, 1/2-watt, 5%
R2125	63-10651-09	Control
RX2126	63-10565-59	300 Ω, 1/2-watt, 5%
RX2128	63-10565-72	1 kΩ, 1/2-watt, 5%
RX2129	63-10565-59	300 Ω, 1/2-watt, 5%
R2139	63-10235-60	330 Ω, 1/4-watt, 5%
RX2140	63-10565-52	150 Ω, 1/2-watt, 5%
RX2141	63-10565-52	150 Ω, 1/2-watt, 5%
R2142	63-10235-54	180 Ω, 1/4-watt, 5%
R2143	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2144	63-10235-80	2.2 kΩ, 1/4-watt, 5%
R2145	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R2146	63-10243-12	3.3 Ω, 1/2-watt, 5%
R2148	63-10243-68	600 Ω, 1/2-watt, 5%
RX2170	63-10565-08	2.2 Ω, 1/2-watt, 5%
R2171	63-10235-52	150 Ω, 1/4-watt, 5%
R2172	63-10651-24	Control
R3201	63-10235-64	470 Ω, 1/4-watt, 5%
R3202	63-10235-72	1 kΩ, 1/4-watt, 5%
R3203	63-10442-86	390 Ω, 5-watt, 5%
R3204	63-10243-28	15 Ω, 1/2-watt, 5%
R3207	63-10235-85	3.6 kΩ, 1/4-watt, 5%
R3208	63-10243-78	1.8 kΩ, 1/2-watt, 5%
R3210	63-10235-90	5.6 kΩ, 1/4-watt, 5%
R3211	63-10243-58	270 Ω 1/2-watt, 5%
R3212	63-10422-24	1 Ω, 2-watt, 5%
R3213	63-10235-90	5.6 kΩ, 1/4-watt, 5%
R3214	63-10235-72	1 kΩ, 1/4-watt, 5%
R3215	63-10235-98	12 kΩ, 1/4-watt, 5%
R3216	63-10810-06	1.2kΩ, 1/2-watt, 5%
R3217	63-10236-07	30 kΩ, 1/4-watt, 5%
R3218	63-10810-07	3 kΩ, 1/2-watt, 5%
R3219	63-10832-49	110 Ω, 1-watt, 5%
R3220	63-10565-07	2 Ω, 1/2-watt, 5%
R3221	63-10565-07	2 Ω, 1/2-watt, 5%
R3222	63-10244-20	100 kΩ, 1/2-watt, 5%
R3223	63-10430-28	1.5 Ω, 3-watt, 10%
R3224	63-7805	3,3 kΩ, 1/2-watt, 5%
R3230	63-10235-82	2.7 kΩ, 1/4-watt, 5%
R3231	63-10235-64	470 Ω, 1/4-watt, 5%
R3232	63-10422-24	1 Ω, 2-watt, 10%

**Table 6-5 (Continued)**  
9-391 Sweep Module (see Figure 4-7)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R3233	63-10565-14	3.9 Ω, 1/2-watt, 5%
R3234	63-10565-14	3.9 Ω, 1/2-watt, 5%
R3237	63-10460-48	10 Ω, 10-watt, 10%
R3238	63-10235-40	47 Ω, 1/4-watt, 5%
R3239	63-10235-48	100 Ω, 1/4-watt, 5%
R3261	63-10840-88	4.7 kΩ, 3-watt, 5%
	93-2104	Washer for R3261
RX3262	63-10565-65	510 Ω, 1/2-watt, 5%
RX3263	63-10565-65	510 Ω, 1/2-watt, 5%
R3401	63-10243-79	2 kΩ, 1/2-watt, 5%
R3402	63-10243-79	2 kΩ, 1/2-watt, 5%
R3403	63-10235-88	4.7 kΩ, 1/4-watt, 5%
R3404	61-10235-92	6.8 kΩ, 1/4-watt, 5%
R3405	63-10651-18	Control
R3406	63-10236-13	51 kΩ, 1/4-watt, 5%
R3407	63-10234-14	56 kΩ, 1/4-watt, 2%
R3408	63-10235-90	5.6 kΩ, 1/4-watt, 5%
R3409	63-10235-72	1 kΩ, 1/4-watt, 5%
R3410	63-10235-84	3.3 kΩ, 1/4-watt, 5%
R3411	63-10235-90	5,6 kΩ, 1/4-watt, 5%
R3412	63-10235-82	2.7 kΩ, 1/4-watt, 5%
R3413	63-10235-82	2.7 kΩ, 1/4-watt, 5%
R3414	63-10938-35	21.5 kΩ, 1/4-watt, 1%
R3415	63-10938-26	17.8 kΩ, 1/4-watt, 1%
R3417	63-10235-70	820 Ω, 1/4-watt, 5%
R3418	63-10235-86	3.9 kΩ, 1/4-watt, 5%
R3420	63-10938-11	12.7 kΩ, 1/4-watt, 1%
R3421	63-10235-48	100 Ω, 1/4-watt, 5%
R3422	63-10236-23	130 kΩ, 1/4-watt, 5%
R3425	63-10651-24	Control
R3430	63-10235-82	2.7 kΩ, 1/4-watt, 5%
R3431	63-10235-44	68Ω, 1/4-watt, 5%
R3432	63-10828-36	33 Ω, 1/2-watt, 5%
R3433	63-10828-36	33 Ω 1/2-watt, 5%
R3434	63-10828-36	33 Ω 1/2-watt, 5%
R3435	63-10235-48	100Ω, 1/4-watt, 5%
R3436	63-10235-48	100 Ω, 14-watt, 5%
R3437	63-10235-88	4.7 kΩ 1/4-watt, 5%
R3438	63-10651-12	Control
R3439	63-10235-64	470 Ω, 1/4-watt, 5%
R3440	63-10243-86	1.9 kΩ, 1/2-watt, 5%
R3442	63-10235-96	10 kΩ, 1/4-watt, 5%
R3443	63-10235-96	10 kΩ, 1/4-watt, 5%
R3444	63-10235-88	4.7 kΩ, 1/4-watt, 5%



**Table 6-5 (Continued)**  
*9-391 Sweep Module (see Figure 4-7)*

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R3445	63-10235-96	10 k $\Omega$ , 1/4-watt, 5%
R3446	63-10235-67	620 $\Omega$ , 1/4-watt, 5%
R3447	63-10235-73	1.1 k $\Omega$ , 1/4-watt, 5%
R3448	63-10236-23	130 k $\Omega$ , 1/4-watt, 5%
R3449	63-10235-96	10 k $\Omega$ , 1/4-watt, 5%
R3450	63-10235-96	10 k $\Omega$ , 1/4-watt, 5%
R3451	63-10235-88	4.7 k $\Omega$ , 1/4-watt, 5%
<b>Transformers</b>		
TX3204	95-3786	Sweep, final display
TX3205	95-3670-03	Horizontal driver
N/A	64-519-01	Eyelet for TX3205

**Table 6-6**  
*A-13284 Heat Sync Assembly (see Figure 4-10)*

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Integrated Circuit Parts</b>		
ICX3201	223-18	Voltage regulator
N/A	78-03169	Socket for ICX3201
N/A	194-678-02	Insulating strip for ICX3201
N/A	93-2113	Lock washer for ICX3201
N/A	112-2367-02	Screw for ICX3201
<b>Miscellaneous</b>		
RX3205	63-10482-75	130 $\Omega$ , 20-watt, 5% resistor
N/A	19-1085	Clip for resistor
3D3	50-216-65	Connector and cable assembly
N/A	12-8562	Metal bracket for heat sync

**Table 6-7**  
*A-12842 Capacitor and Cable Assembly (see Figure 4-10)*

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Capacitors</b>		
C3249	22-7819-10	470 $\mu$ F, electrolytic
<b>Cable</b>		
3M8	50-222-03	Connector and cable assembly

**Table 6-8**  
*9-293-03 Power Supply Module (see Figure 4-11)*

REFERENCE DESIGNATOR	ZDS PART NUMBERS	DESCRIPTION
<b>Capacitors</b>		
C3202	22-7962-14	33 $\mu$ F electrolytic
C3205	22-7962-14	33 $\mu$ F electrolytic
C3210	22-7857-10	220 $\mu$ F electrolytic
C3213	22-7777-11	.0082 $\mu$ F polyester
C3220	22-7786-01	220 pF disc
C3224	22-7786-01	220 pF disc
C3225	22-7431-06	.0047 $\mu$ F disc
CX3240	22-7431-06	.0047 $\mu$ F disc
C3270	22-7811	1000 pF disc
C3271	22-7811	1000 pF disc
C3273	22-7811	1000 pF disc
CX3299	22-7431-06	.0047 $\mu$ F disc
<b>Diodes</b>		
CR3216	103-295-02	Low voltage, general
CR3220	103-275-16	Zener 8.2 V, 1/2-watt
CRX3271		through
CRX3274	103-345-06	Low voltage, general
<b>Integrated Circuits</b>		
IC3201	221-297	Regulator driver, 150 V
N/A	126-2131-01	Heat sink for IC3201
<b>Transistors</b>		
Q3210	126-978-01	PNP
Q3213	121-1101	PNP
Q3224	121-1101	PNP
<b>Resistors</b>		
RX3201	63-10828-96	10 k $\Omega$ , 1/2-watt, 5%
R3202	63-10559-40	47 $\Omega$ , 1/4-watt, 5%
R3204	63-10449-31	2 $\Omega$ , 7-watt, 5%
R3206	63-10244-02	18 k $\Omega$ , 1/2-watt, 5%
R3210	63-10533-16	1 k $\Omega$ , 1/4-watt, 1%
R3211	63-10533-33	150 k $\Omega$ , 1/4-watt, 1%
R3212	63-10460-46	8.2 $\Omega$ , 10-watt, 10%
R3213	63-10244-20	100 k $\Omega$ , 1/2-watt, 5%
R3214	63-10236-22	120 k $\Omega$ , 1/4-watt, 5%
R3215	63-10236-36	470 k $\Omega$ , 1/4-watt, 5%
RX3216	63-10828-72	1 k $\Omega$ , 1/2-watt, 5%
R3248	63-10458-31	2 $\Omega$ , 10-watt, 5%

**Table 6-8 (Continued)**  
9-293-03 Power Supply Module (see Figure 4-11)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
R3249	63-10837-02	18 k $\Omega$ , 2-watt, 5%
RX3274	63-10657-03	1.2 M $\Omega$ , 1/2-watt, 20%
R3296	63-10710	Thermistor
<b>Inductor</b>		
TX3298	95-3439	Coil, line filter

**Table 6-9**  
A-9522-06 Secondary Control Panel (see Figure 4-16)

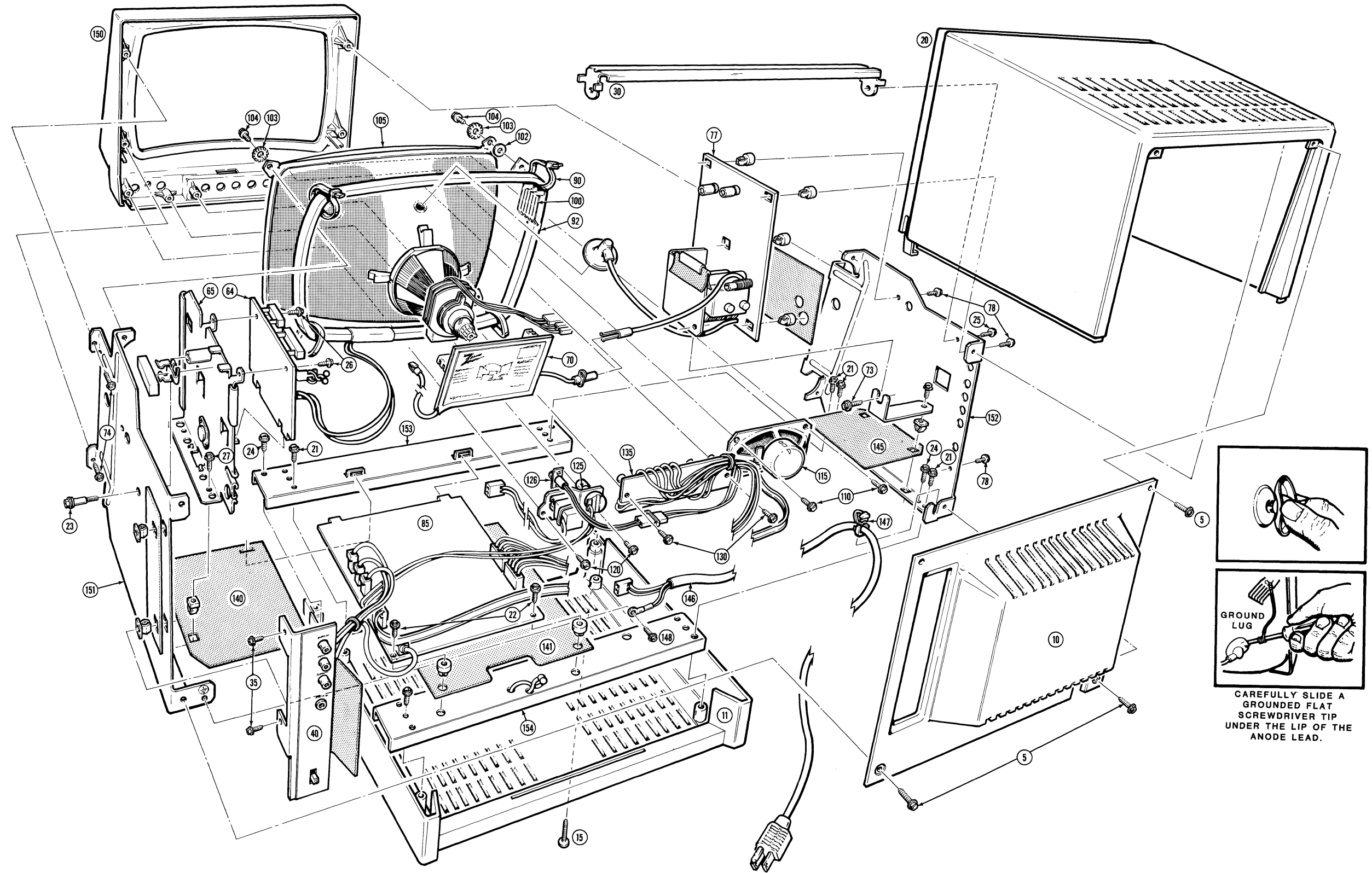
REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Resistors</b>		
R7101	63-10750	Control
R7102	63-10754	Control
R7103	63-10766-01	Control
R7104	63-10751	Control
R7105	63-10766-01	Control
R7131	63-10857-11	Control
R7137	63-10235-72	1 k $\Omega$ , 1/4-watt, 5%
<b>Cables</b>		
2B7	A-9917-46	Cable and housing assembly
2A7	A-9919-43	Cable and housing assembly
N/A	A-10322	Cable assembly with housing
N/A	19-733-01	Cable tie
N/A	43-1203	Housing; connector, female
2B7	50-216-43	Connector and cable assembly
2A7	50-218-51	Connector and cable assembly
N/A	50-738	Connector and cable assembly
N/A	78-3039-05	Connector, 5 circuit
N/A	78-3039-06	Connector, 6 circuit
N/A	78-3042-05	Connector, 5 circuit chain
N/A	78-3042-06	Connector, 6 circuit chain
N/A	86-389	Female terminal
N/A	157-44	Fastener, push-in

**Table 6-10**  
A-13042 Primary Control Board (see Figure 4-18)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
SW 1	85-1559-02	Switch, power on/off
N/A	63-10772-04	Control, volume
N/A	19-733-06	Cable tie
N/A	12-7926-01	Metal bracket
3S8	A-10150-05	Cable and housing assembly
TP7	A-9911-79	Cable and housing assembly

**Table 6-11**  
A-13444 Input Panel (see Figure 4-20)

REFERENCE DESIGNATOR	ZDS PART NUMBER	DESCRIPTION
<b>Resistors</b>		
N/A	63-10235-45	75 $\Omega$ , 1/4-watt, 5%
N/A	63-10235-45	75 $\Omega$ , 1/4-watt, 5%
N/A	63-10235-45	75 $\Omega$ , 1/4-watt, 5%
<b>Cables, Connectors, and Jacks</b>		
9H2	52-2571-19	Cable and plug
9G3	50-261-13	Connector and cable assembly
9E4	50-261-12	Connector and cable assembly
9F2	50-261-11	Connector and cable assembly
N/A	A-11642-03	Jack and switch assembly (Luma In jack and Hi Z-75 $\Omega$ Switch)
N/A	78-2399	Jack, audio in
N/A	19-733-01	Cable tie



**Figure 6-1**  
Exploded View