

SM-ZVM-134

Color Monitor

Service Manual



CAUTIONS . . . WARNINGS

- When you are servicing the ZVM-134 Monitor, under no circumstances should you alter or modify its design without permission from Zenith Data System.
- Replace all components with the original parts listed in Replacement Parts List in this Manual.
- The CRT uses integral implosion protection.
- The yoke is permanently bonded to the CRT. Do not attempt to separate the yoke from the neck of the CRT.
- **NOTE:** Reference to Hot Ground and Cold Ground are made throughout the text.
- Discharge the high voltage lead going to the anode of the CRT. One method of discharging it is to use a screwdriver and a 12" jumper wire with an alligator clip on each end. Clip one alligator clip to the chassis or to the DAG connector on the CRT, and place the other one on your screwdriver. Then slide the end of the screwdriver under the high voltage cap at the anode of the CRT. Refer to the illustration below.
- We recommend that you use an isolation transformer when you are working on this Monitor.

Hot Ground is an AC hot ground. It is taken from the metal plate located on the right side of the monitor that holds the sweep assembly together.

Cold Ground is a DC cold ground. It is taken from the main chassis across the top of the monitor.

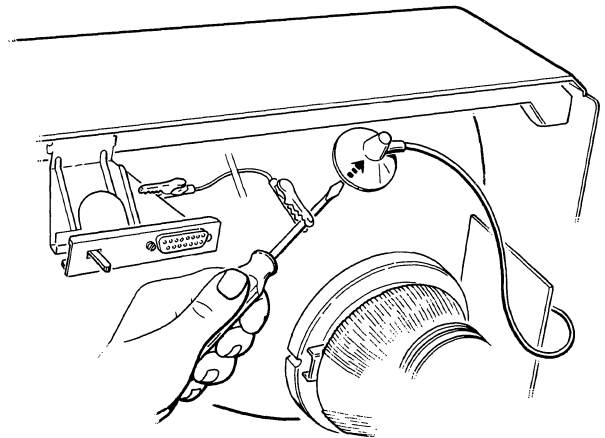


Illustration 1
High Voltage lead discharge

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Introduction

The ZVM-134 is a high resolution Color Monitor which accepts direct RGB video inputs, displays twenty-five 80-character lines, has 20 MHz bandwidth and 20 ns rise time, and uses modular chassis design for ease of service.

This Monitor is certified to comply with the limits for a class B computing device pursuant to subpart J of part 15 of the FCC rules.

Service of the ZVM-134 is to board level. When you determine that a circuit board is at fault, it must be replaced. Return the defective board to your Zenith Data Systems Distributor.

Tools and test equipment required for servicing the ZVM-134 monitor:

- 1/4" nut driver
- 1/4" long shank nut driver
- 1/4" flat screwdriver
- Needle-nose pliers
- Digital voltmeter
- Oscilloscope
- Isolation transformer
- Software — ZDOS with VMEMTEST
- ZBASIC

Specifications

Operating Voltage	120 VAC 60 Hz. "E" version: 240 VAC, 50 Hz.
Operating Current87 Amps maximum.
Normal Power	69 Watts.
Nominal High Voltage	33 kV.
Fuse Protection	4 Amp, type FX3201.
Input	DB-15 type connector. RGB signals — TTL positive (Analog, 0-5 V). Composite sync — TTL positive or negative (Analog, 1-5 V). Horiz sync — TTL positive or negative (Analog, 1-5 V). Vert sync — TTL Positive or negative (Analog, 1-5 V). Ground.
CRT	13", 90 degree, .43 mm fine pitch dot mask. 26 kV at 0 beam. 450 μ A max beam current. 100 volt cutoff. Internal magnetic shield. .7 mm max convergence error. Sealed system tube, yoke, beam-bender.
Pixel Display	640 \times 250.
Color/Monochrome Display	Green/White switch.
Size	13.5" H \times 20" W \times 15" D

Zenith Data Systems reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

Installation and Start Up

LOCATION

The ZVM-134 Monitor should be located near an AC power source, and in an area which will provide proper ventilation. There are vents on the bottom, back, and top of the cabinet which permit air to flow through the cabinet, keeping the components cool. Be sure these vents are not blocked.

CABLE DESCRIPTION

The following two RGB cables are available for the ZVM-134 Monitor.

<u>CABLE</u>	<u>COMPUTER</u>
ZVM-134-1	Z-100 family of computers
ZVM-134-2	IBM
ZVM-134-3	Apple

The connector pinout for the RGB cable is as follows. Refer to Figure 3-1.

<u>PIN</u>	<u>SIGNAL</u>
1	-H
2	+H
3	not used
4	+V
5	G
6	B
7	R
8	not used
9	-V
10	not used
11	GND
12	not used
13	not used
14	not used
15	not used



CABLE #
ZVM-134-1
9 Pin To J9 of Z100
8
4 200-Ω } * To
5 200-Ω } GND
3 200-Ω }
9
2

NOTE: Composite sync can be used. However, negative composite sync must be applied to both pins 1 and 9, or positive composite sync must be applied to both pins 2 and 4. This will require a modified cable.

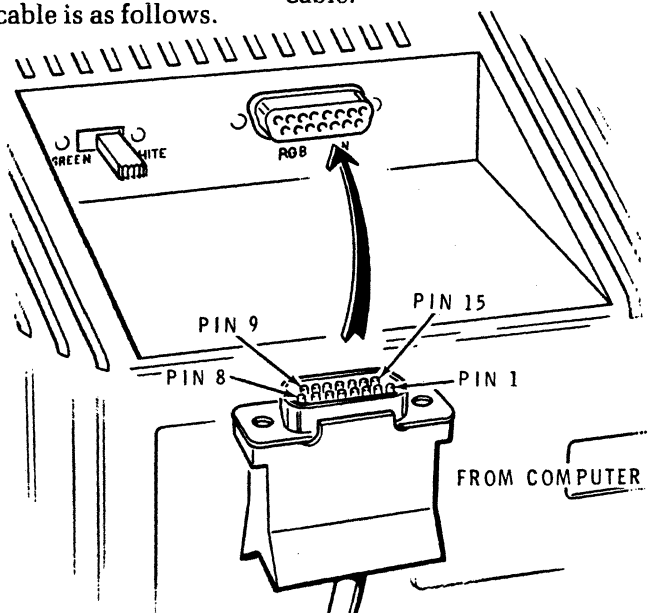


Figure 3-1
Connector pinout

Installation and Start Up

LOCATION

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ZVM-134-2	IBM
ZVM-134-3	Apple

The connector pinout for the RGB cable is as follows. Refer to Figure 3-1.

<u>PIN</u>	<u>SIGNAL</u>	
1	-H	
2	+H	8
3	not used	
4	+V	9
5	G	4
6	B	5
7	R	3
8	not used	
9	-V	
10	not used	
11	GND	2
12	not used	
13	not used	
14	not used	
15	not used	

*ZENITH CABLE #
ZVM-134-21
FOR USE ON IBM PC
9 PIN D TO IBM*

*6 (IF MOD. KIT INSTALLED)
SHELL*

SHELL (SHEILD)

NOTE: Composite sync can be used. However, negative composite sync must be applied to both pins 1 and 9, or positive composite sync must be applied to both pins 2 and 4. This will require a modified cable.

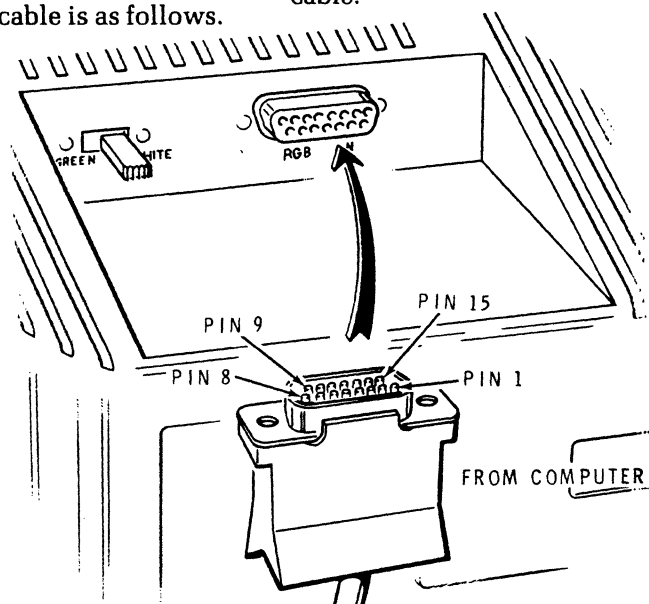


Figure 3-1
Connector pinout

CABLE CONNECTION

Refer to Figure 3-2 and connect your RGB cable to J9, located at the rear of the Z-100 Computer. Connect the other end of the RGB cable to the back of the ZVM-134 Monitor.

GREEN/WHITE SWITCH

Position the rear panel Green/White switch to White if you want a color display, or to GREEN if you want a monochrome (green) display. Refer to Figure 3-2.

ON-OFF SWITCH

With the Monitor plugged into a power source and the RGB cable properly connected, turn the On-Off switch, located on the front panel, clockwise to the On position.

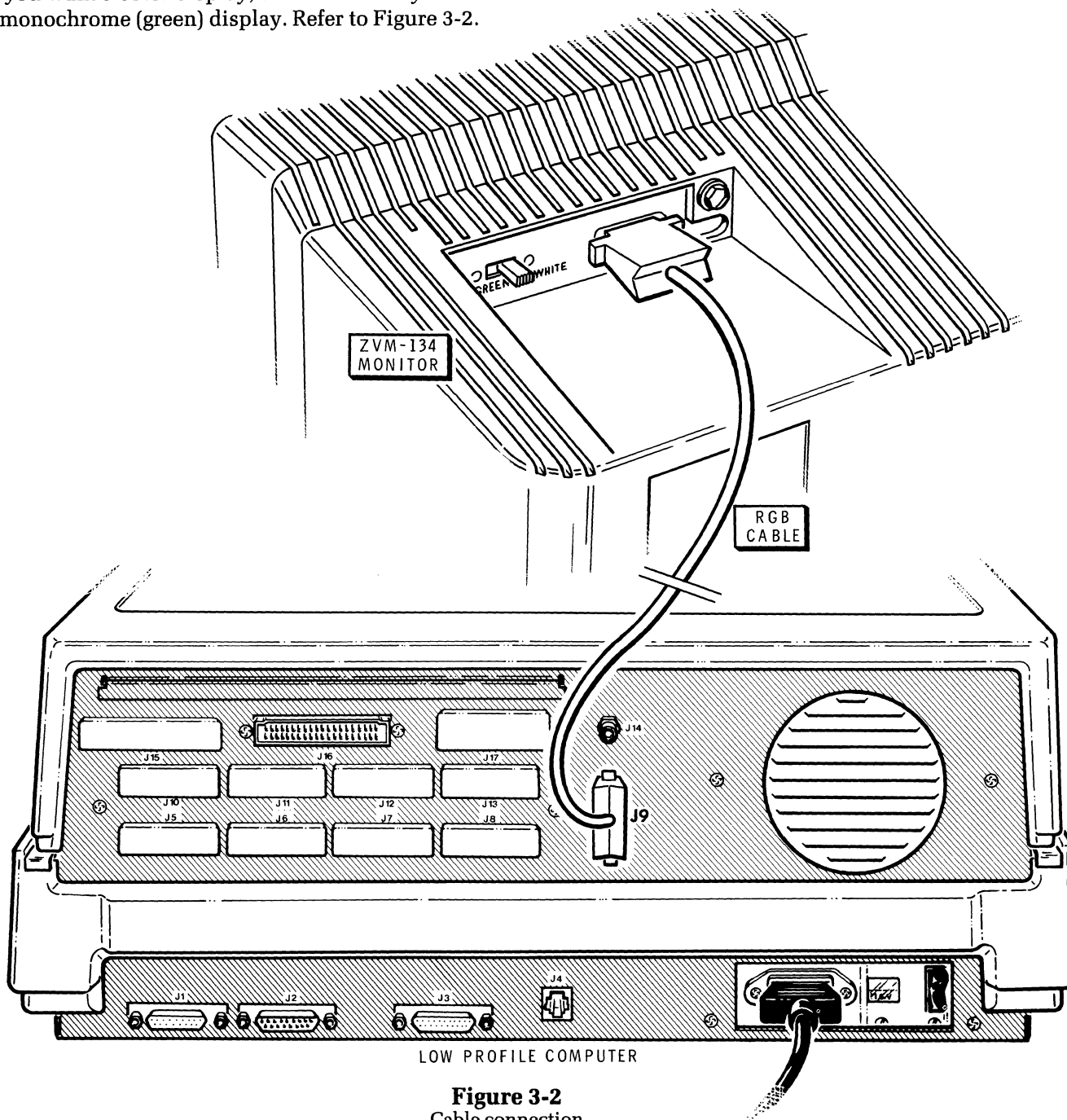


Figure 3-2
Cable connection

Theory of Operation

Refer to the fold-in schematic diagrams when reading the following section.

INPUT VOLTAGE

The input line voltage enters the main module at connector 3R8, where it goes through a line fuse and an LCI (line-conducted interference) choke. The LCI prevents monitor-generated noises from feeding back into the AC line.

Line voltage is applied across the bridge rectifier, which is referenced to hot (AC) ground. Hot ground is considered as the hot part of the chassis. (Use an isolation transformer when you are working on this Monitor.) The output of the bridge rectifier then goes through a pie-type filter, where it supplies power to various circuits.

DEGAUSSING COIL

Any external magnetic force may magnetize the mask of the CRT. Therefore, it becomes necessary to degauss the CRT every time the Monitor is turned on. The CRT is degaussed by the line voltage which is applied to a coil wrapped around the tube.

The degaussing circuit includes thermistor R3245, which is located across the AC line. Due to the positive temperature coefficient on the thermistor, its resistance is very low when the Monitor is off. When the Monitor is turned on and current begins to flow through the thermistor, the thermistor heats up, and

its resistance increases to several megohms. This increased resistance decreases the current through diodes CR3210 and CR3211, which causes the degaussing coil to become inactive.

HORIZONTAL OUTPUT TRANSISTOR

When the Monitor is turned on, the first voltage to come up in the sweep module is the 150 VDC supply. This is the B+ voltage for the H.O.T. (horizontal output transistor).

In order for the power supply system to work, the horizontal oscillator must be running so that it can drive the H.O.T. and other voltage pulses from the sweep assembly.

Transformer T3201 on the main board provides the 26 VAC SU and 12 VAC SU (SU = start up) voltages necessary to start the oscillator running. At start up, these voltages are closer to 12-15 VAC and 6-8 VAC respectively.

These voltages are applied to various points on the sync processor chip to start the horizontal drive oscillator running. When the oscillator is running, the horizontal drive output is generated. You can measure this output drive at pin 5 of sync processor IC3401, located on the main board.

When you are taking measurements from the various supplies, we recommend that you sync-lock the Monitor to a signal source.

MODULES

The ZVM-134 consists of three primary modules having various sub-assemblies:

- Main board
- Video output board
- Sweep assembly

Main Board

The main board's primary function is to generate horizontal and vertical drive outputs for the scan signals.

All sync processing uses the sync processor IC (#221-264). This processor contains horizontal and vertical oscillators, horizontal and vertical output drivers, horizontal APC, and accepts positive or negative horizontal and vertical sync.

The vertical output is on pin 14 and drives a stacked pair of transistors for vertical scan generation. The vertical output also goes to connector 3G3 on the main board which is fed to the sweep assembly.

The horizontal output on pin 5 drives the horizontal output transistor. The horizontal output also goes to connector 3G3 on the main board, and is then fed to the sweep assembly.

There are two grounds to be considered, hot ground (AC), and cold ground (DC). AC hot ground is referenced to the low side of the line. The potential on AC ground may be rather large relative to earth ground. DC ground is isolated through the horizontal driver transformer.

Sweep Assembly

The high voltage is generated by the sweep transformer, which is driven by the horizontal output transformer. The sweep transformer also has several pulse windings on it. These secondary windings generate different pulse amplitudes that are fed back to the main module, where they are rectified and filtered to provide supply voltages. The transformer is also tapped to provide G2 and focus voltage for the CRT.

Video Output

The video output board is located on the neck of the CRT. This board consist of the video output drivers that drive the CRT.

RGB INPUT SIGNAL

The RGB input signals enter the Monitor through a DB-15 connector located at the rear of the unit. Next to this connector is a two-position slide switch that is labeled Green/White. When the switch is in the Green position, the red and blue signals are disabled for monochrome (green) display. When the switch is in the White position, all red, green, and blue signals will be displayed.

Disassembly

BACK COVER (Refer to Figure 5-1.)

The back cover is secured to main chassis with six screws across the rear of the cabinet. To remove the back cover:

- Remove the power cord from the power source.
- Disconnect the RGB cable.
- Remove the two short hex screws near the top (A).
- Remove the three long hex screws near the bottom (B).
- Remove the one short hex screw next to the RGB IN connector (C).
- Remove the back cover.

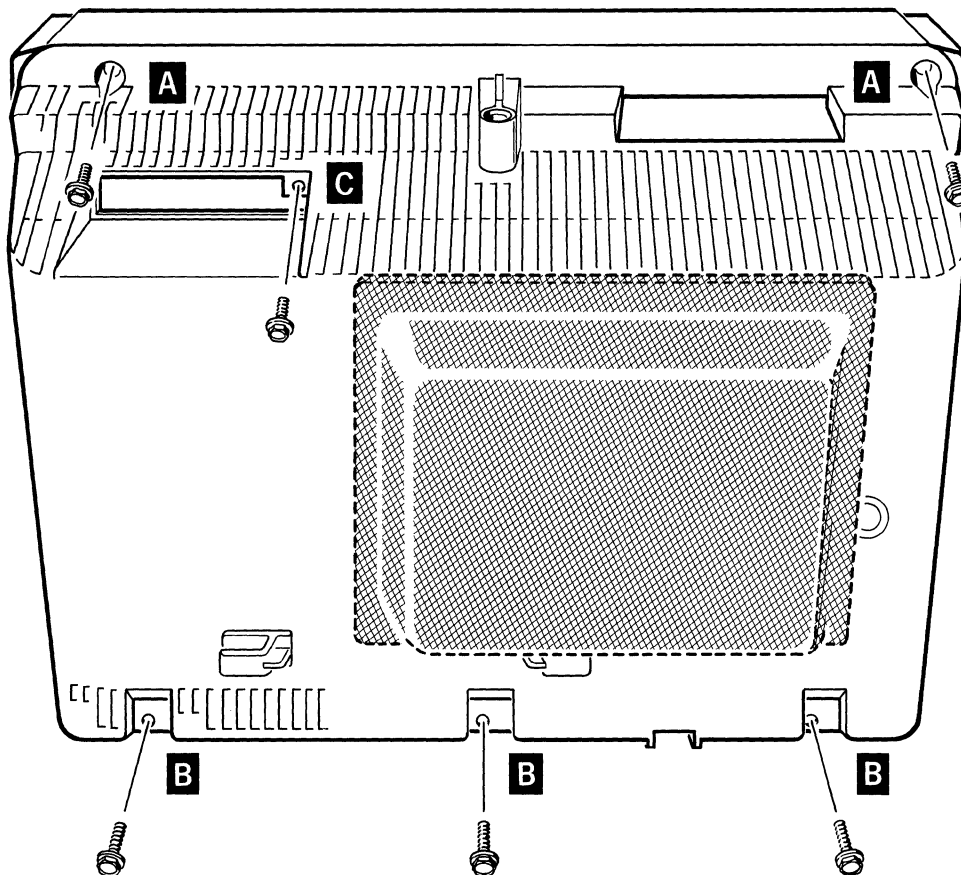


Figure 5-1
Back cover removal

VIDEO OUTPUT BOARD (Refer to Figure 5-2.)

The video output board is connected to the CRT by the socket connector.

To remove the driver board:

- Remove the back cover.
- Carefully remove the board from the CRT neck.
- Remove cable 5A2 from the video output board.
- Remove cable 5C2 from the video output board.
- Disconnect the focus voltage lead by twisting the two plastic leads about 1/8 turn, and then pulling them apart.
- Disconnect the gray grounding wire that goes to the grounding strap on the CRT.

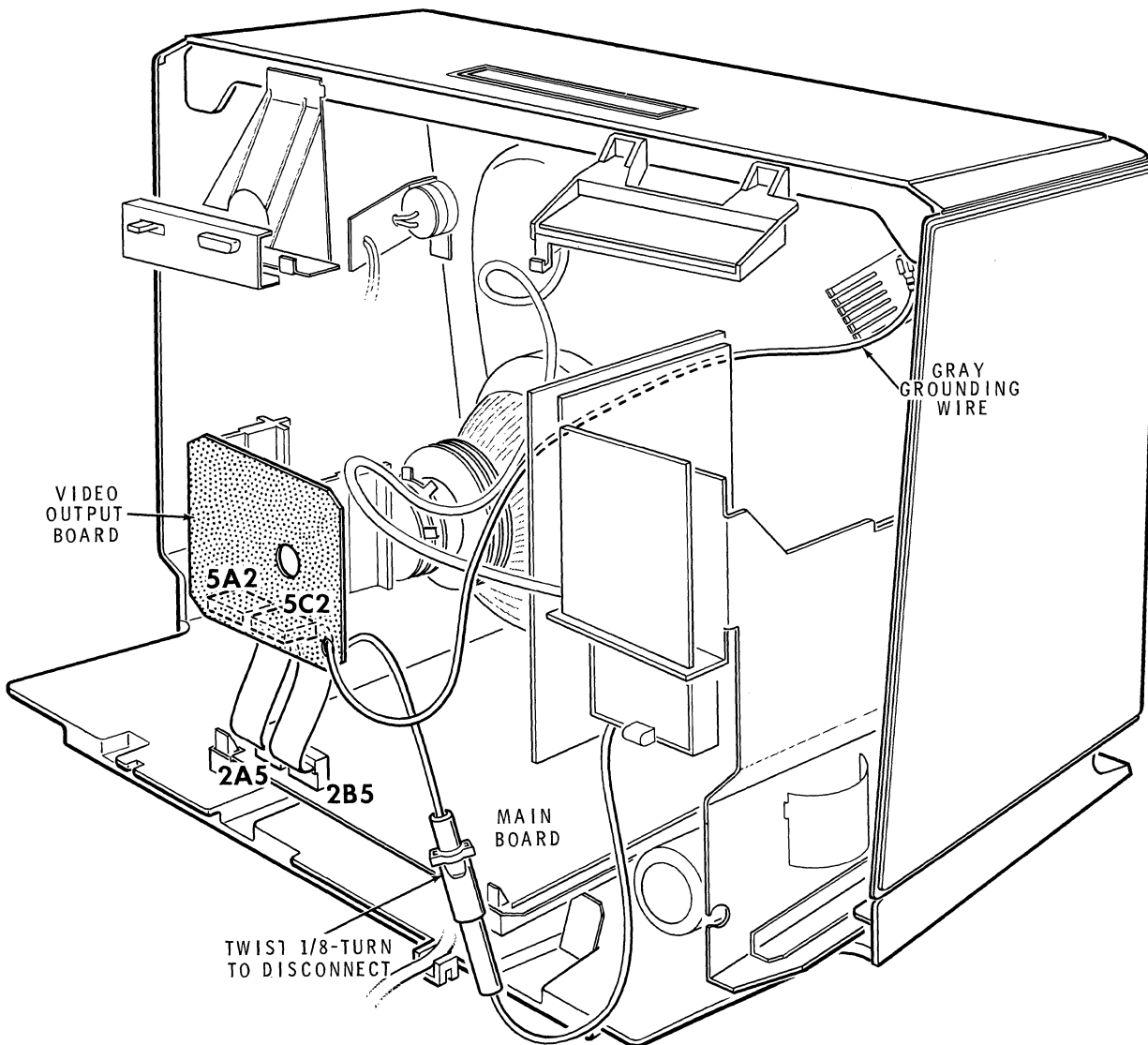


Figure 5-2
Video output board removal

MAIN BOARD (Refer to Figure 5-3.)

The main board is fastened to the chassis with two screws, four plastic tabs, and two plastic pins. To remove the main board:

- Remove the back cover.
- Remove screws A and B.
- Remove cables at 2A5, 2B5, and 3F3 on the main board.
- Remove cables at 3T8, 3S8, and 3R8.
- Remove cables at D and E.
- Remove cables at 3D3 and 3G3.
- Remove cables at 3W3 and 3V3.
- Pull out on the two tabs (X,X) in front and lift the board until it passes the notch on the tabs.

- Pull out on the two tabs on the sides and lift the board until it passes the notch on the tabs.
- Free the board from the two pins (Z), located on each side toward the rear, by pulling up on the board.
- Remove the main board.

WARNING: Due to a large power supply filter capacitor, there may be 150 VDC residual voltage present at connectors 3W3 and 3V3. Use caution in this area.

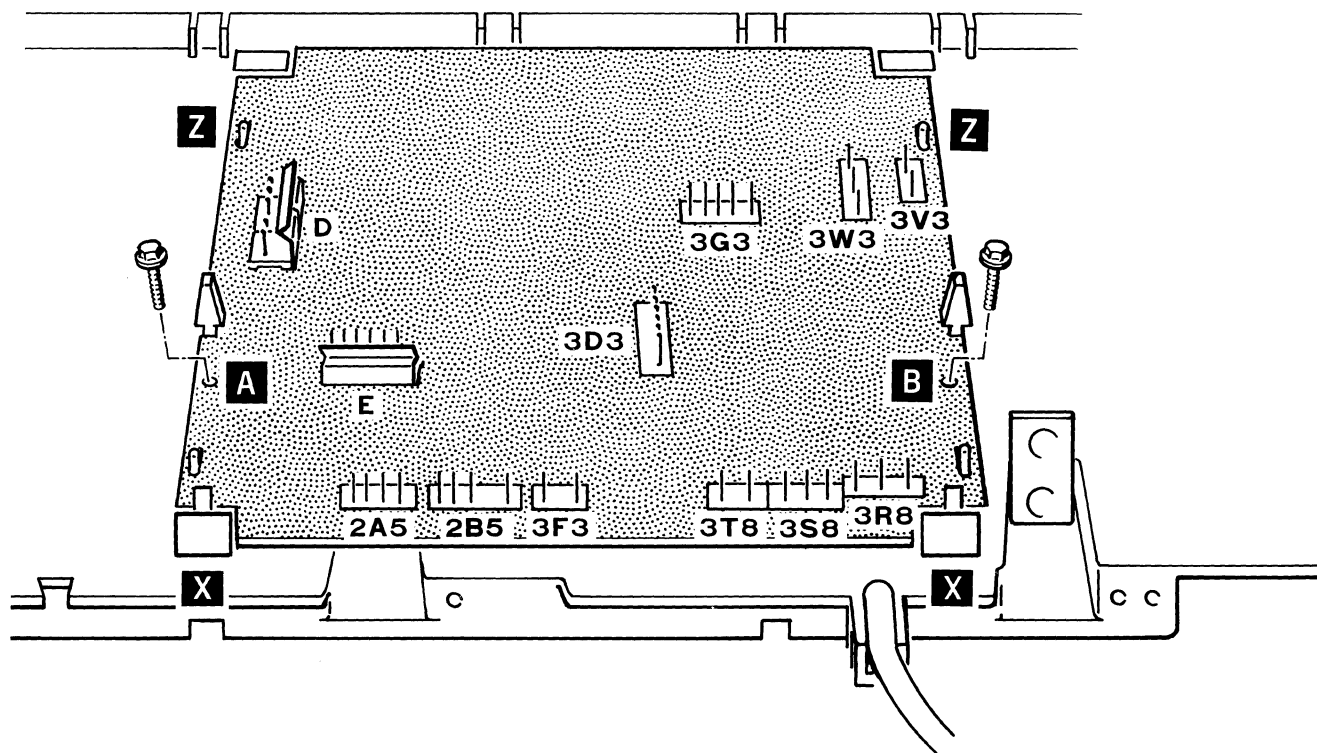


Figure 5-3
Main board removal

SWEEP MODULE and HIGH VOLTAGE SECTION (Refer to Figure 5-3 and 5-4.)

The sweep module and high voltage section are contained in one assembly. To remove this assembly:

- Remove the back cover.
- **CAUTION** — Before you go any further, discharge the high voltage lead going to the anode of the CRT. For discharge procedures, refer to the following paragraphs.

One method of discharging the high voltage lead is to use a screwdriver and a 12" jumper wire with an alligator clip on each end. Connect one alligator clip to the chassis, or to the DAG connector on the CRT, and place the other alligator clip on your screwdriver. Slide the end of the screwdriver under the rubber high voltage cap at the anode of the CRT.

You may or may not see a discharge spark depending on how much charge is built up.

- Remove the red and white focus voltage lead by twisting the two white plastic pieces 1/8 turn.

- Remove connector 3F3 from the main board (green,white/blue).
- Remove connector 5X3 from the video output board (white/brown).
- Remove connector 5H3 from the video output board (gray,brown).
- Remove connector 3S3 from the sweep module board (red,blue).
- Remove connector 2A3 from the high voltage board (yellow,white).
- Remove the ground wire from the CRT grounding strap.
- Remove hex nut screw B.
- Remove hex nut screw C.
- Remove hex nut screw D (a long shank or short shank 1/4" nut driver is necessary).
- Pull out the high voltage assembly.
- Remove connector 3V3 from the main board (gray,red).
- Remove connector 3W3 from the main board (white,violet,yellow).
- Remove connector 3G3 from the main board (white,violet,yellow,red,white/yellow).
- Remove connector 3D3 from the main board (white/black, violet,white/green, orange,white/violet,white,orange).
- Remove the complete high voltage assembly.

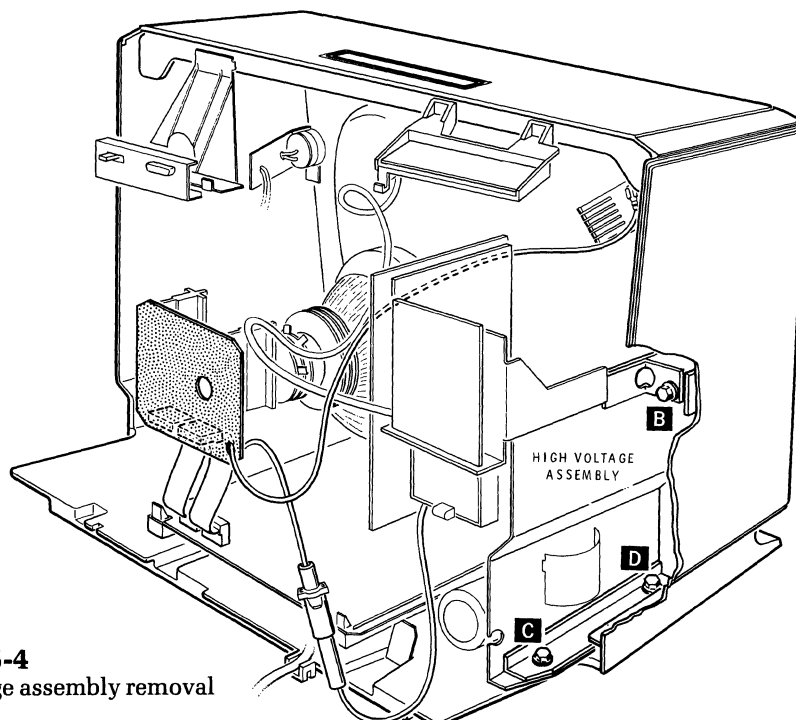


Figure 5-4
Sweep module, high voltage assembly removal

CRT (Refer to Figure 5-5.)

The CRT is fastened to the chassis with four screws located inside the cabinet. To remove the CRT:

- Remove the back cover.
- **CAUTION** — Before you go any further, discharge the High Voltage lead going to the anode of the CRT. For discharge procedures, refer to the following paragraphs.

One method of discharging the high voltage lead is to use a screwdriver and a 12" jumper wire with an alligator clip on each end. Connect one alligator clip to the chassis, or to the DAG connector on the CRT, and place the other clip on your screwdriver. Slide the end of the screwdriver under the high voltage cap at the anode of the CRT.

You may or may not see a discharge spark depending on how much charge is built up.

- Remove the driver board from the neck of the CRT.
- Remove connector 3T8 from the main board (red,red).
- Remove connector 2A3 from the high voltage board (yellow,white).
- Remove connector 3S3 from the sweep module board (red,blue).
- Place the Monitor so the front is lying face down on a padded or protected surface.
- Remove hex nut screws A,B,C.
- Remove hex nut screw D (this nut will require a long shank nut driver).
- Carefully lift out the CRT by grasping it on its sides. Do **not** lift the CRT by the neck or yoke.
- Remove the degaussing coil.

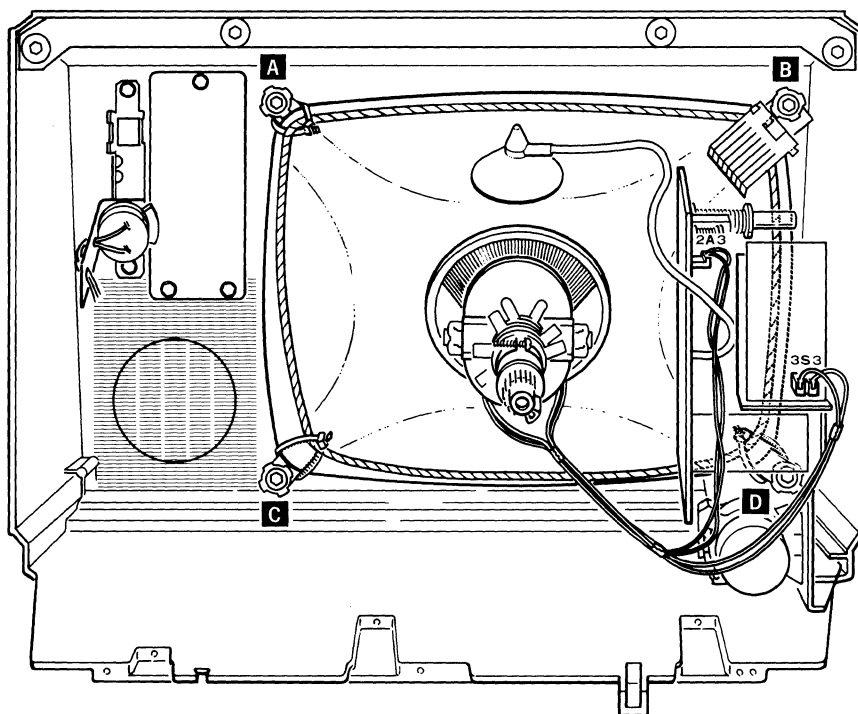


Figure 5-5
CRT removal

ON-OFF SWITCH (Refer to Figure 5-6.)

The On-Off switch is fastened to a bracket which is mounted to the inside front chassis. To remove the On-Off switch:

- Remove the back cover.
- Pull the switch knob off from the front of the cabinet.
- Remove the hex nut screws (X) from the switch mounting bracket.
- Remove the large hex nut holding the switch to the bracket.

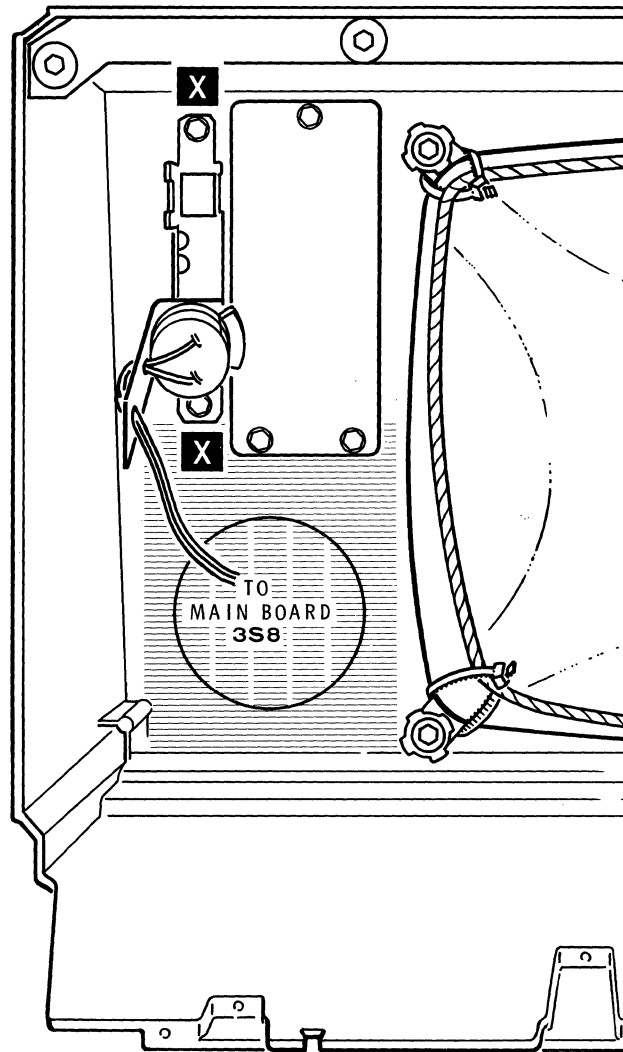


Figure 5-6
On-Off switch removal

Service Procedures

QUICK CHECKS

Make the following preliminary checks to confirm the operating condition of the Monitor.

- Check all connectors for good connections.
- Check the Green/White switch position. Refer to Page 3-2.
- Check the RGB connector for a good connection. Refer to Page 3-2.
- Check the CRT filament for filament light.
- When power is applied, check for high voltage static on the face of the CRT by rubbing your hand on the screen.

CONDITION SYMPTOMS AND CHECKS

The following list of Conditions, Symptoms, and Checks provides you with some problems you may encounter, and the most probable areas to check.

This list is not intended to be inclusive of all problems you may encounter, but rather to provide you with a systematic approach to diagnosing the problem. If you encounter a symptom not listed in this chart, analyze where the problem is located by the way the circuits relate to each other.

When you have determined the area to check, refer to the pages that follow this chart for checkout procedures, voltage measurements, and signal checks.

SYMPTOM	AREA TO CHECK
No color.	Green/White switch. Improper software.
No display.	RGB cable. 95 V test point. Refer to Page 6-4.
Out of focus.	Focus control.
Raster displayed.	Control G2.
Display will not fit properly on CRT.	P1,P2 on sweep board. Width control (LX3261). 95 V adjust (R3409).
Dead monitor.	Power cord. Fuse. Connector 3R8. Connector 3S8. On Off switch.
Green color only.	Green/White switch. Improper software.

ADJUSTMENTS

The video adjustments for the ZVM-134 are located inside the cabinet on the main board, on the high voltage board, and on the neck of the CRT. The adjustments are listed below with reference letters to help you locate them in Figures 6-1, and 6-2.

NOTE: References to Hot Ground and Cold Ground are made throughout the text.

Hot Ground is an AC hot ground. It is taken from the metal plate located on the right side of the monitor that holds the sweep assembly together.

Cold Ground is a DC cold ground. It is taken from the main chassis across the top of the monitor.

MAIN BOARD

- Horizontal Center (A)
- Horizontal Oscillator adjustment (B)
- Horizontal Oscillator test point (C)
- Red Drive (D)
- Green Drive (E)
- Blue Drive (F)
- Red Cutoff (G)
- Green Cutoff (H)
- Blue Cutoff (I)
- Vertical Height (J)
- Vertical Center (K)
- 95-volt B+ adjustment (L)

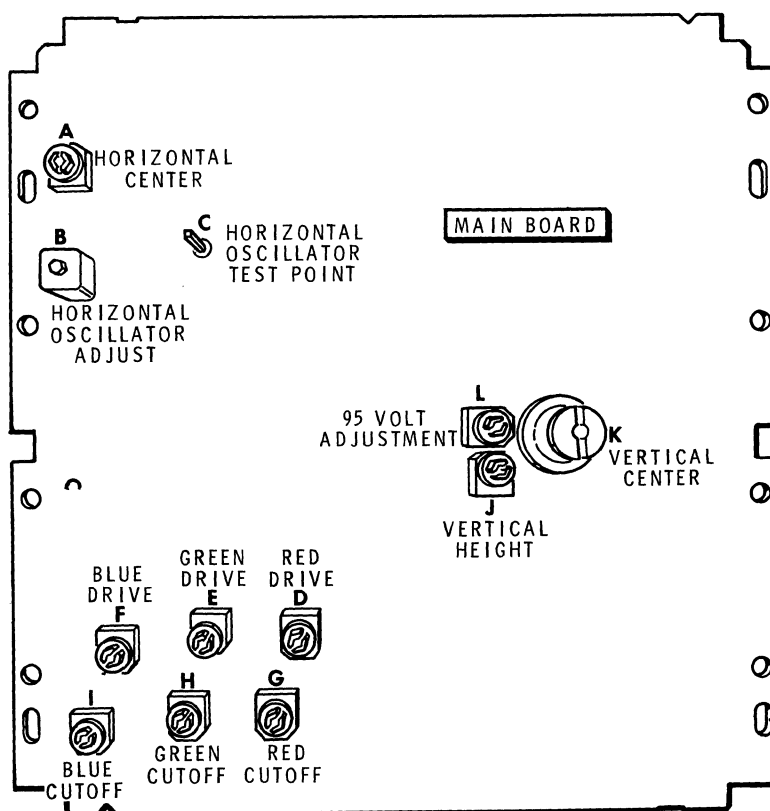


Figure 6-1
Adjustments

DISPLAY/KEYBOARD TEST

If your Z-100 Computer has the diagnostic ROM (HE 444-87-5) at location U190, you may use the Display/Keyboard Test to fill the screen.

- When the prompt appears, type "T".
- Select Keyboard Test.
- Type any character and it will fill the screen.
- Press the DELETE key to exit.

ZBASIC PROGRAM

- Boot up ZBASIC
- Enter the following program:
KEY ON
10 FOR Z = 1 TO 2000
20 PRINT "Z";
30 NEXT Z
40 GOTO 40
- The screen will be filled with Z's.

95-VOLT ADJUSTMENT — R3409 (L)

The 95-volt B+ adjustment is located on the main board. The test point for this voltage is located near the bottom of the horizontal sweep module. Refer to Figure 6-1 for the test point (P) and adjustment location (L).

This test point is on the hot side of the chassis. To measure the B+ voltage:

- Connect the monitor to the AC line through an isolation transformer.
- Connect the ground lead of your voltmeter to **Hot AC Ground**.
- Connect the hot lead of your voltmeter to test point P.

The voltage should be set at +95 volts, $\pm 5\%$.

WIDTH CONTROL — LX3261 (0)

The Width control, LX3261, is located in the horizontal sweep section. Refer to Figure 6-2. This control is the fine adjustment Width control. To adjust the Width control, use either the Display/Keyboard Test or ZBASIC Program to fill the screen.

Adjust the width control until the active video is equal on both sides.

WIDTH CONTROLS — (P1 and P2)

Width controls P1 and P2 are coarse adjustment jumpers. For Heath/Zenith computers, these jumpers should be set as shown in Figure 6-1. P1 is in the upper vertical position and P2 is in the lower vertical position.

Other computers may require these jumpers to be arranged in a different order.

With both P1 and P2 in the lower vertical position, the display width is much wider and rolls off the screen when you are using a Z-100 computer.

With P1 in the upper vertical position and P2 in the lower vertical position, the display width becomes much narrower when you are using a Z-100 computer.

NOTE: If the controls are adjusted to fill the screen with active video from a Z-100 Computer, then the IBM PC display will be shifted left, and at least the first column of characters will be off the screen.

RGB CUT-OFF ADJUSTMENTS

These adjustments are easier to make in a darkened room. The RGB cut-off adjustments are located on the main board. Refer to Figure 6-1.

- Red Cutoff — R2505 (G).
- Green Cutoff — R2516 (H).
- Blue Cutoff — R2527 (I).

To adjust the RGB cut-offs:

- Turn each Cutoff fully counter-clockwise.
- Adjust G2 until a raster just appears.
- Adjust each Cutoff until a gray raster appears.
- Adjust G2 until the raster just disappears.

RGB DRIVE ADJUSTMENTS

To adjust the RGB drives, first create a white screen using the following procedure:

- Boot up ZBASIC.
- Enter this statement — `PAINT(0,0),7`

This statement will create a white screen. Observe the screen for red, green, or blue tints. If they are present, adjust out the color by using the appropriate Drive Adjust. Refer to Figure 6-1.

- Red Drive adjust — R2506 (D).
- Green Drive adjust — R2517 (E).
- Blue Drive adjust — R2528 (F).

VERTICAL CENTER ADJUSTMENT — R2125 (K)

The Vertical Center Adjustment is located on the main board. Refer to Figure 6-1. This control is used to shift the display up or down. To adjust this control, use either the Display/Keyboard Test or ZBASIC Program to fill the screen.

Adjust the Vertical Center control until the active video display is equal on the top and bottom.

VERTICAL HEIGHT ADJUSTMENT — R3418 (J)

The Vertical Height adjustment is located on the main board. Refer to Figure 6-1. This control is used to adjust the vertical size of the display. To adjust the vertical height, use either the Display/Keyboard Test or ZBASIC Program to fill the screen.

Adjust the Vertical Height control so the display is equal on the top and bottom.

HORIZONTAL CENTER ADJUSTMENT — R3441 (A)

The Horizontal Center control is located on the main board. Refer to Figure 6-1. This control is used to move the display either left or to the right. To adjust the horizontal center control, use either the Display/Keyboard Test or ZBASIC Program.

Adjust the Horizontal Center control to center the display on the screen.

HORIZONTAL OSCILLATOR ADJUSTMENT — L3402 (B)

The Horizontal Oscillator adjustment is located on the main board. Refer to Figure 6-1.

To adjust the oscillator, first defeat the APC (Automatic Phase Control) loop. You accomplish this by applying +12 VDC to pin 27 of the sync processor. This will disable the horizontal oscillator to free-run. The oscillator (L3402), should then be adjusted to 15734 ± 15 Hz. This can be accomplished by connecting a frequency counter to pin 3 or 5 of 221-264, and adjusting L3402. Another method of adjusting L3402 is to use a Z-100 and apply the RGB signals to the input of the ZVM-134. Then, adjust L3402 for zero beat of the CRT display.

HIGH VOLTAGE ASSEMBLY

- G2 (M)
- Focus (N)
- Width adjustment — fine (O)
- 95-volt test point (P)
- Width adjustment — coarse (P1, P2)

G2 ADJUSTMENT (M)

The G2 adjustment is located in the horizontal sweep section. Refer to Figure 6-2. Adjust G2 by first turning it up until a raster is shown. Then back it down until the raster just disappears. This adjustment works best in a darkened room.

FOCUS CONTROL (N)

The Focus control is located in the horizontal sweep section. Refer to Figure 6-2. This control sets the focus of the display. To adjust the focus, use either the Display/Keyboard Test or ZBASIC Programs to fill the screen.

Adjust the focus control for best focus at a point halfway between center and any corner of the active display area.

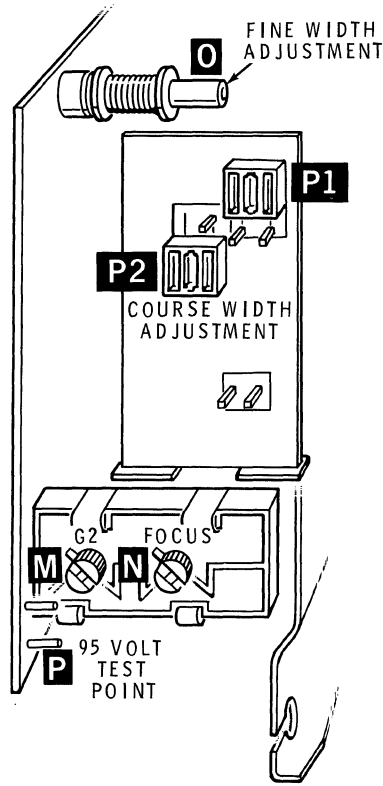


Figure 6-2
Adjustments

MEASUREMENTS

All voltage and signal measurements require the ZVM-134 to be sync-locked to a signal source.

Connect the monitor to the AC line through an isolation transformer.

NOTE: Reference to Hot Ground and Cold Ground are made throughout the text.

Hot Ground is an AC hot ground. It is taken from the metal plate located on the right side of the monitor that holds the sweep assembly together.

Cold Ground is a DC cold ground. It is taken from the main chassis across the top of the monitor.

MAIN BOARD MEASUREMENTS

The main board develops +150 VDC, B+ voltage for the horizontal output transformer; and the +12 VDC and +26 VDC start up voltages required to start the oscillator running. If the oscillators do not run, there will be no high voltage or voltage pulses generated. All RGB and sync inputs are fed into the main board, where they are sent to the video driver module.

Connector locations for the main board are shown in Figure 6-3.

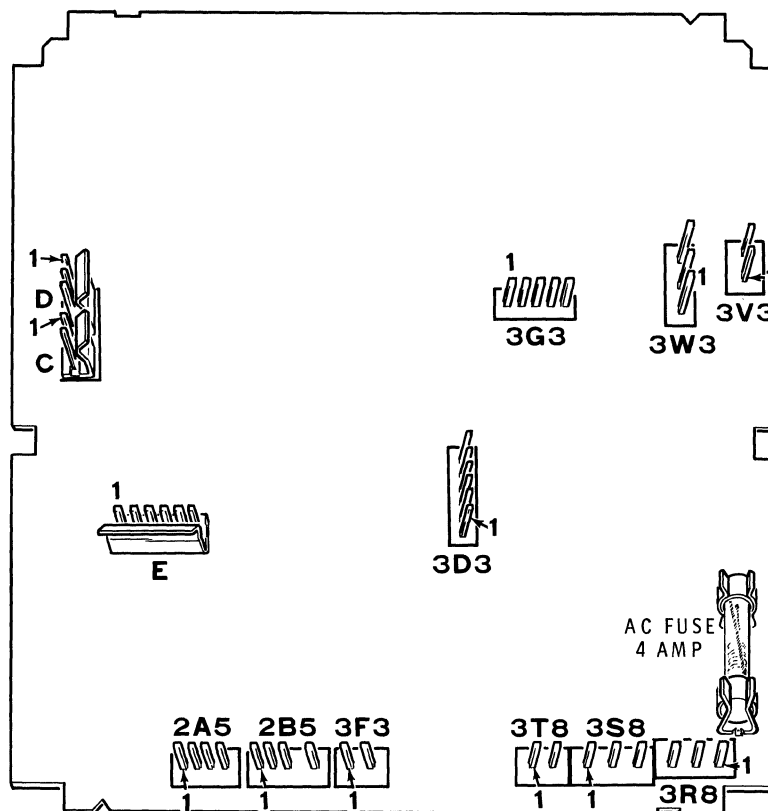
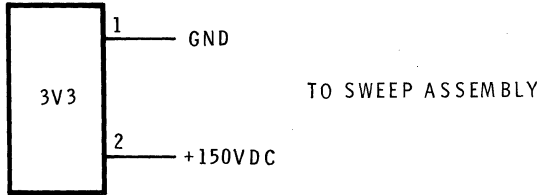


Figure 6-3
Main board connectors

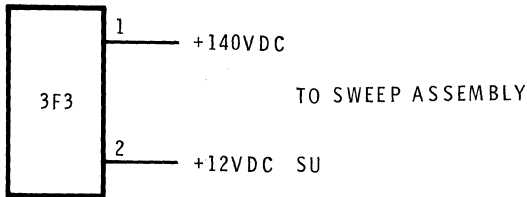
To check out the main board, perform the following steps: (Reference your scope or meter to hot ground.)

- Measure pin 2 of connector 3V3.



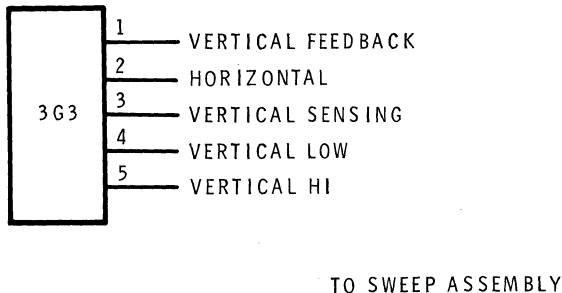
If 150 volts is not present on pin 2, replace the main board.

- Measure pin 2 of connector 3F3. Reference to DC (cold) chassis ground.



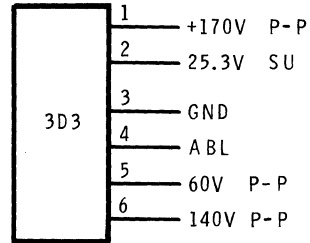
If the voltage reading on pin 2 is less than + 4.5 VDC, replace the main board.

- Measure pin 2 of connector 3G3. Reference to DC (cold) chassis ground.



If the voltage on pin 2 is less than +.3 VDC, replace the main board.

- Measure pins 1,3,5, and 6 of connector 3D3. Reference to DC (cold) chassis ground.

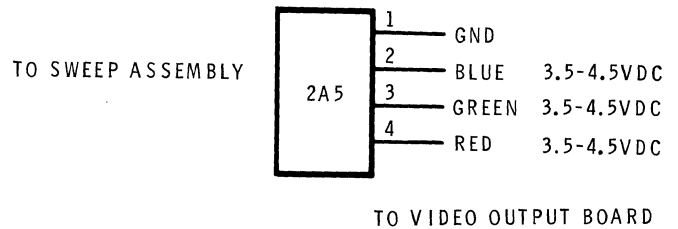


FROM SWEEP ASSEMBLY

If the voltages listed are not present, replace the sweep assembly.

- With a high voltage probe, verify the presence of 26 kV on the anode lead to the CRT. Reference to DC (cold) chassis ground.
- If the the 26 kV is not present, replace the sweep assembly.
- Boot up ZBASIC and enter PAINT (0,0), 7 to apply a white field to the CRT.

With connector 5A2 disconnected from the video driver board, measure pins 2,3, and 4. Reference to DC (cold) chassis ground.



If the voltages listed are not present, replace the main board.

If all the preceding voltages are present, make the following checks on the video output board.

VIDEO OUTPUT BOARD MEASUREMENTS

The video output board receives the RGB signal from connector 2A5 on the main board. The grid voltages for the CRT are received from the sweep assembly.

Connector locations for the video output board are shown in Figure 6-4.

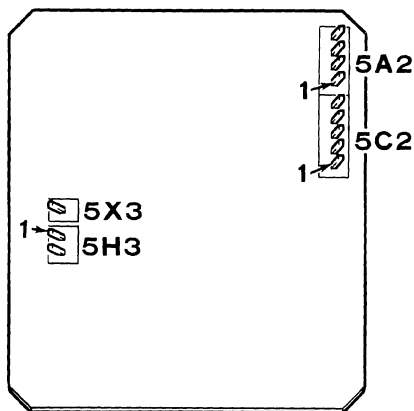
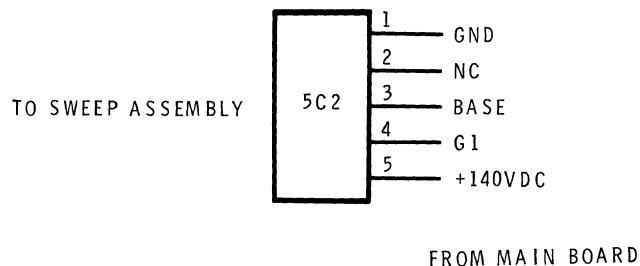


Figure 6-4
Video output board connectors

To check the video output board, perform the following steps. (Reference your scope or meter to DC (cold) chassis ground.):

- Measure pins 3,4, and 5 of connector 5C2.



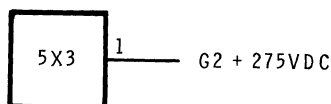
If the voltages listed are not present, replace the main board.

- With your oscilloscope, measure for RGB signals on pins 1,2, and 3 of connector 5A2.



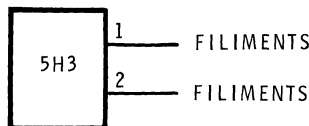
If the RGB signals are not present, check the RGB cable. If the RGB signal is being fed to the monitor and signals at pins 1,2 and 3 are not present, replace the main board.

- Measure pin 1 of connector 5X3.



If the 275 volts is not present, replace the horizontal sweep board.

- Measure pins 1 and 2 of connector 5H3.



If the 3.5 volts is not present, replace the horizontal sweep board.

SWEEP ASSEMBLY MEASUREMENTS

The sweep assembly develops high voltage and voltage pulses. It also provides G2 and focus voltage for the CRT and for the vertical and horizontal drives.

Connector locations are for the sweep assembly are shown in Figure 6-5.

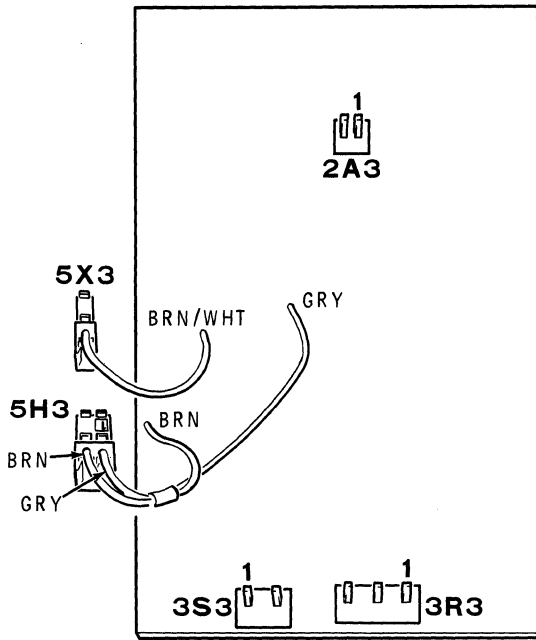
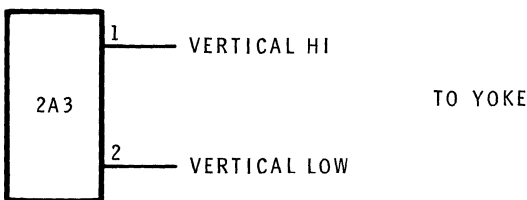


Figure 6-5
Sweep assembly connectors

To check out the sweep assembly, perform the following steps (Reference your scope or meter to DC [cold] chassis ground.):

- Measure pins 1 and 2 of connector 2A3.



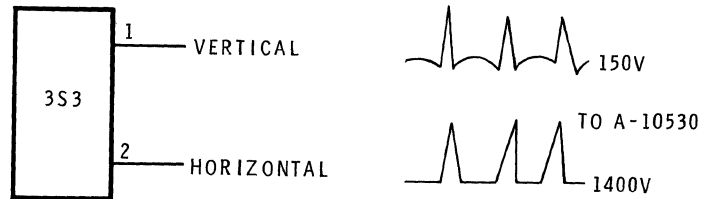
If the vertical hi and low signals are not present at pins 1 and 2, replace the main board.

- Measure pins 1,2, and 3 of connector 3R3.



If the horizontal hi signal or the horizontal drive signal are not present at pins 1 and 2, replace the main board.

- Measure pins 1 and 2 of connector 3S3.



If the vertical and horizontal signals are not present at pins 1 and 2, replace the main board.

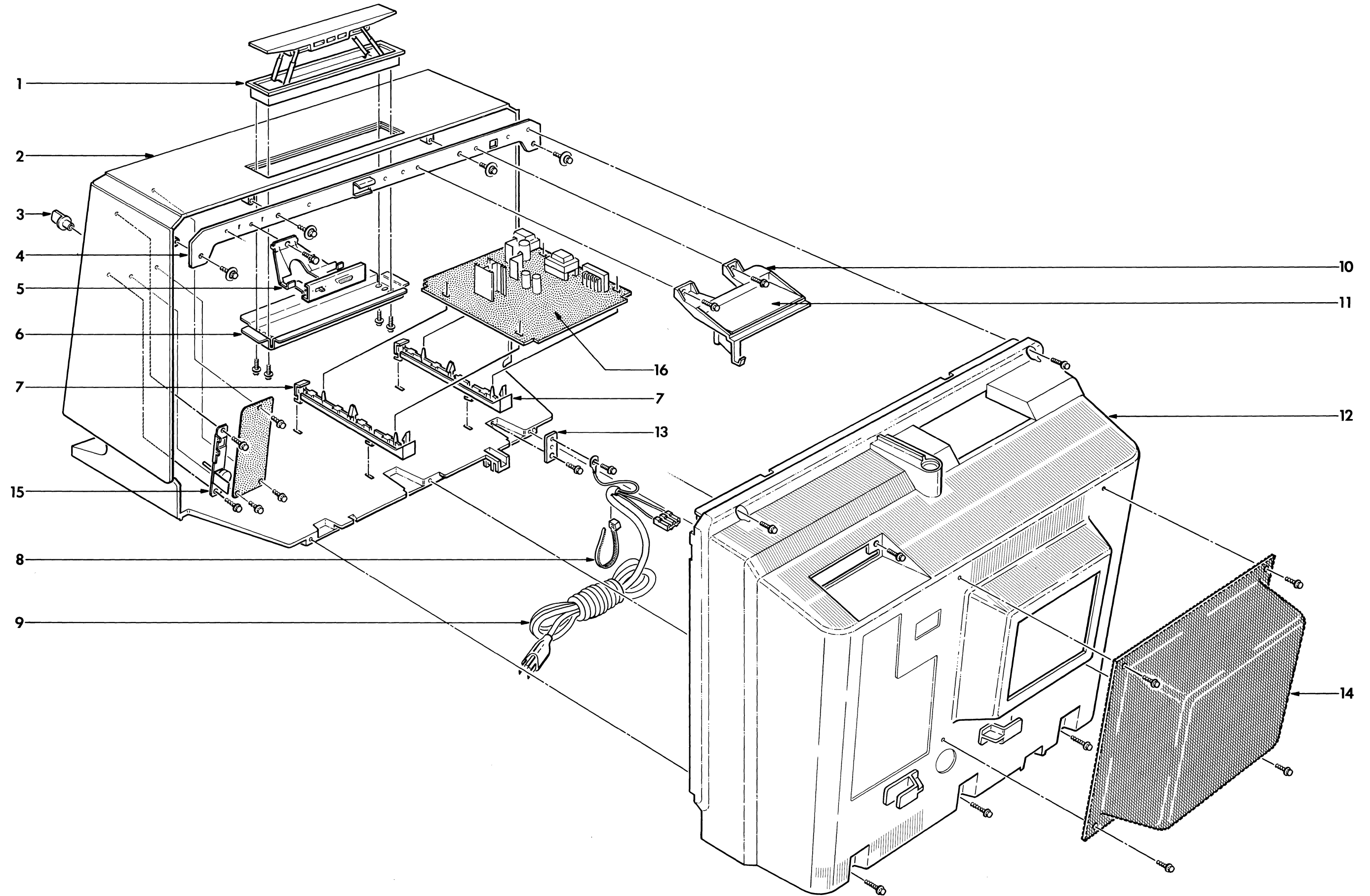
Replacement Parts List

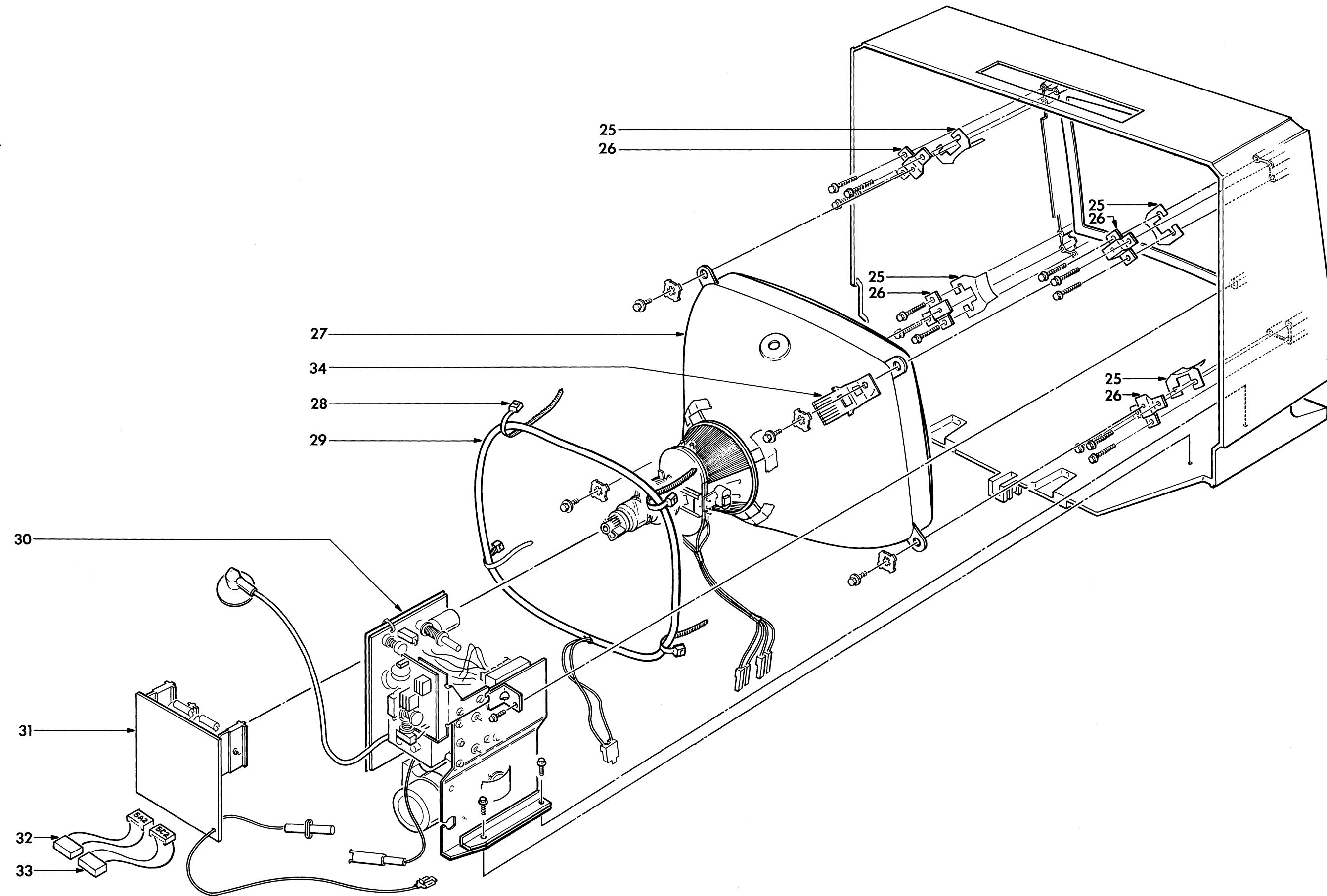
The Replacement Parts List is divided into the "Exploded View", the "Horizontal Width Sweep Assembly" parts, and the "Main Board" parts.

EXPLODED VIEW

The component numbers relate to the components in the exploded view.

COMPONENT NO.	ZDS PART NO.	DESCRIPTION
1	A-7555-21	Handle assembly
2	14-11266-36	Cabinet front
3	46-10186	Control knob
4	12-7209-03	Cross brace
5	85-01614-03	RGB connector/switch assembly
6	12-7208-01	Handle mounting bracket
7	12-7850	PC board rails
8	19-733-04	Wire tie
9	A-11397	Line cord and filter assembly
10	57-8958-07	Black cover
11	30-1047	Clear plastic
12	14-11267-26	Cabinet rear
13	125-198-07	Strain relief
14	197-143	Cup — cabinet back
NS	30-824-07	Nameplate cover
15	A-11136	ON/OFF switch assembly
16	9-227-01	Main board





COMPONENT NO.	ZDS PART NO.	DESCRIPTION	HARDWARE ZDS PART NO.	DESCRIPTION
25	12-8208	CRT positioning bracket		
26	12-8060	CRT mounting bracket		
27	A-11161	CRT, yoke, and beam bender assembly	Washer	
28	19-733-04	Wire tie	93-2106	Internal/external tooth
29	11104	Degaussing coil	Screws	
30	A-11100	HV and sweep assembly	114-804	8-18 x .500 hex washer head
31	9-155-12	Video driver board	114-805	6-2 x .375 hex washer head
32	A-9882-01	Cable 5A2	114-1274	8-18 x .625 hex washer head
33	A-9882-06	Cable 5C2	114-1393-01	8-10 x .625 hex washer head
34	127-185-02	CRT ground strap	114-1393-03	8-10 x .750 hex washer head
			114-1393-04	8-10 x 1.00 hex washer head
			114-1393-05	8-10 x .380 hex washer head
			114-1393-09	8-10 x .560 hex washer head
			114-1393-10	8-10 x .500 hex washer head
			114-1395-01	8-10 x .750 hex washer head
			114-1425	8-18 x .500 hex washer head

HORIZONTAL WIDTH SWEEP ASSEMBLY

(assembled part number A-10530)

The circuit component numbers relate to the components on the horizontal width sweep assembly.

<u>CIRCUIT COMP. NO.</u>	<u>ZDS PART NO.</u>	<u>DESCRIPTION</u>
RESISTORS		
R1-R2	63-10271	390 Ω , 10%, 5 W
CAPACITORS		
C1-C4	22-6466	530 pF, 3 kV, $\pm 10\%$, ceramic
INDUCTORS		
L1-L2	20-4031	120 Ω H

MAIN BOARD

(Assembled part number 9-227-01)

The circuit component numbers relate to the components on the main board.

<u>CIRCUIT COMP. NO.</u>	<u>ZDS PART NO.</u>	<u>DESCRIPTION</u>
RESISTORS		
NOTE: All resistors are 1/4-watt, 5% unless specified otherwise.		
R2116	63-10235-60	330 Ω
R2117	63-10235-80	2200 Ω
R2118	63-10235-88	4700 Ω
R2119	63-10235-54	180 Ω
R2128	63-10243-66	510 Ω , 1 W
R2120	63-10565-08	2.2 Ω , 1/2 W
R2121	63-10243-52	150 Ω , 1/2 W
R2129	63-10243-65	510 Ω , 1/2 W
R2122	63-10243-52	150 Ω , 1/2 W
R2125	63-9023-02	550 Ω , 20%, potentiometer
R2126	63-10243-66	560 Ω , 1/2 W
R2127	63-10243-69	750 Ω , 1/2 W
R2501	63-10236-52	2.2 M Ω
R2502	63-10235-90	5600 Ω
R2503	63-10235-58	220 Ω
R2504	63-10235-69	750 Ω
R2505	63-10857-27	800 Ω , potentiometer, red cutoff
R2506	63-10857-27	800 Ω , potentiometer, red drive
R2507	63-10235-75	1300 Ω
R2508	63-10235-82	2700 Ω
R2510	63-10235-48	100 Ω
R2511	63-10235-67	620 Ω
R2512	63-10236-52	2.2 M Ω
R2513	63-10235-90	5600 Ω
R2514	63-10235-58	270 Ω
R2515	63-10235-71	910 Ω

<u>CIRCUIT COMP. NO.</u>	<u>ZDS PART NO.</u>	<u>DESCRIPTION</u>
R2516	63-10857-25	800 Ω , potentiometer, green cutoff
R2517	63-10857-25	800 Ω , potentiometer, green drive
R2518	63-10235-73	1100 Ω
R2519	63-10235-82	2700 Ω
R2521	63-10235-48	100 Ω
R2523	63-10236-52	2.2 M Ω
R2524	63-10235-90	5600 Ω
R2525	63-10235-58	270 Ω
R2527	63-10857-26	800 Ω , potentiometer, blue cutoff
R2528	63-10857-26	800 Ω , potentiometer, blue drive
R2529	63-10235-75	1300 Ω
R2530	63-10235-82	2700 Ω
R2532	63-10235-48	100 Ω
R2534	63-10235-52	150 Ω
R2538	63-10235-48	100 Ω
R2539	63-10235-48	100 Ω
R2540	63-10235-48	100 Ω
R2541	63-10235-54	180 Ω
R2542	63-10235-53	160 Ω
R2543	63-10235-54	180 Ω
R2544	63-10235-54	180 Ω
R2545	63-10235-54	180 Ω
R2546	63-10235-53	160 Ω
R2548	63-10235-67	620 Ω
R2549	63-10235-67	620 Ω
R2550	63-10235-32	22 Ω
R2552	63-10235-32	22 Ω
R2552	63-10235-32	22 Ω
R3201	63-10235-59	300 Ω
R3202	63-10235-44	68 Ω
R3203	63-10235-52	150 Ω
R3205	63-7781	820 Ω , 1/2 W
R3206	63-10460-50	12 Ω , 10%, 10 W
R3210	63-10420-31	2 Ω , 2 W
R3212	63-10235-76	1500 Ω
R3213	63-10235-86	3900 Ω
R3214	63-10235-74	1200 Ω
R3215	63-10244-38	680 k Ω , 1/2 W
R3216	63-10244-25	160 k Ω , 1/2 W

CIRCUIT COMP. NO.	ZDS PART NO.	DESCRIPTION	CIRCUIT COMP. NO.	ZDS PART NO.	DESCRIPTION
R3217	63-10244-33	360 k Ω , 1/2 W	R3433	63-10236-20	100 k Ω
R3218	63-10235-80	2200 Ω	R3434	63-10236-22	120 k Ω
R3219	63-10244-38	560 k Ω , 1/2 W	R3435	63-10235-63	430 Ω
R3222	63-10235-40	47 Ω	R3436	63-10235-72	1000 Ω
R3231	63-9982	1 Ω , 2 W	R3439	63-10243-79	2000 Ω , 1/2 W
R3233	63-10565-14	3.9 Ω , 1/2 W	R3440	63-10235-86	3900 Ω
R3234	63-10565-14	3.9 Ω , 1/2 W	R3441	63-10857-02	250 Ω , potentiometer, horizontal centering
R3239	63-10244-20	100 k Ω , 1/2 W	R3442	63-10235-86	3900 Ω
R3241	63-8246	4 Ω , 10 W	R3443	63-10235-80	2200 Ω
R3244	63-10840-40	47 Ω , 3 W	R3444	63-10235-60	330 Ω
R3245	63-10710	Thermistor	R3445	63-10235-80	2200 Ω
RX3246	63-10657-03	1.2 M Ω , 1/2 W	R3446	63-10235-72	1000 Ω
R3260	63-10243-96	10 k Ω , 1/2 W	R3451	63-10235-88	4700 Ω
R3261	63-10244-24	150 k Ω , 1/2 W	R3452	63-10235-92	6800 Ω
R3262	63-10235-68	680 Ω	R3453	63-10235-75	1300 Ω
R3401	63-10236-46	1.2 M Ω	R3461	63-10236	15 k Ω
R3402	63-10236-22	120 k Ω	R3462	63-10236-13	51 k Ω
R3403	63-10235-86	3900 Ω	R3463	63-10235-72	1000 Ω
R3404	63-10235-86	3900 Ω	R3465	63-10235-72	1000 Ω
R3405	63-10236-08	33 k Ω	R3466	63-10235-86	3.9 Ω
R3406	63-10235-68	680 Ω	R3467	63-10235-94	8.2 Ω
R3407	63-10236-18	82 k Ω	R3468	63-10235-10	3900 Ω
R3408	63-10236-04	22 k Ω	R3469	63-10235-72	1000 Ω
R3409	63-10857-17	100 k Ω , potentiometer, green	R3470	63-10236-16	68 k Ω
R3410	63-10236-31	300 k Ω	R3471	63-10235-93	7500 Ω
R3411	63-10236-03	20 k Ω	R3472	63-10235-86	3900 Ω
R3412	63-10236-13	51 k Ω	R3473	63-10235-86	3900 Ω
R3413	63-10236-07	30 Ω	R3474	63-10235-72	1000 Ω
R3414	63-10235-98	12 k Ω	R3475	63-10235-72	1000 Ω
R3415	63-10236-02	18 k Ω			
R3417	63-10243-60	330 Ω , 1/2 W			
R3418	63-10857-08	2000 Ω , potentiometer, yellow			
R3419	63-10235-84	3300 Ω			
R3420	63-10236-10	39 k Ω			
R3421	63-10235-73	1100 Ω			
R3422	63-10243-60	330 Ω , 1/2 W			
R3423	63-10243-60	330 Ω , 1/2 W			
R3424	63-10235-72	1000 Ω			
R3425	63-10235-88	4700 Ω			
R3428	63-10235-82	2700 Ω			
R3429	63-10235-76	1500 Ω			
R3431	63-10235-80	2200 Ω			
R3432	63-10235-79	2000 Ω			

CIRCUIT COMP. NO.	ZDS PART NO.	DESCRIPTION
CAPACITORS		
NOTE: All capacitors are 20%, unless otherwise specified.		
C2101	22-7775-10A	.0068 μ F, 100 V
C2102	22-7775-24A	0.1 μ F, 100 V
C2103	22-7709-09C	100 μ F, + 50-10%, 35 V
C2104	22-7613-24D	.01 μ F, 10%, 50 V
C2105	22-7390-02	.47 μ F, 50 V
C2106	22-7710-07C	33 μ F, + 50-10%, 50 V
C2107	22-7615-03D	.0033 μ F, + 80-10%, 50 V
C2110	22-7742-10	.001 μ F, 10%, 50 V
C2111	22-7774-17A	.027 μ F, 10%, 100 V
C2176	22-7725	680 μ F, + 100-10%, 50 V
C2501	22-7621-42C	220 pF, 5%, 50 V
C2502	22-7621-42C	220 pF, 5%, 50 V
C2503	22-7621-42C	220 pF, 5%, 50 V
C3201	22-7775-24A	0.1 μ F, 100 V
C3204	22-7603	4.7 μ F, + 100-10%, 315 V
C3205	22-3512	.01 μ F, + 40-20%, 1 kV
3206	22-7603-01A	10 μ F, + 100-10%, 315 V
C3207	22-7742-10	.001 μ F, 10%, 50 V
C3208	22-7742-10	.001 μ F, 10%, 50 V
C3209	22-7395	470 pF, 5%, 500 V
C3234	22-7395	470 pF, 5%, 500 V
C3236	22-7861-14	2200 μ F, 35 V
C3246	22-7603-01A	10 μ F, + 100-10%, 315 V
C3247	22-7860-12	470 μ F, 25 V
C3249	22-7431-06	.0047 μ F
CX3250	22-7431-06	.0047 μ F
C3251	22-7811	.001 μ F, 10%, 1 kV
C3252	22-7811	.001 μ F, 10%, 1 kV
C3253	22-7811	.001 μ F, 10%, 1 kV
C3254	22-7404-06	22 μ F, 16 V
C3256	22-7508-05B	2200 μ F, + 50-10%, 35 V
C3257	22-7395	470 pF, 5%, 500 V
C3401	22-7613-24D	.01 μ F, 10%, 50 V
C3402	22-7406-01	1.0 μ F, 35 V
C3403	22-7773-18A	.033 μ F, 5%, 500 V
C3404	22-7773-17A	.027 μ F, 5%, 100 V
C3405	22-7775-10A	.0068 μ F, 100 V
C3407	22-7710-01A	1.0 μ F, + 50-10%, 50 V
C3409	22-7709-09C	100 μ F, + 100-10%, 35 V
C3410	22-7404-06A	22 μ F, 16 V
C3411	22-7708-09	100 μ F, + 50-10%, 25 V
C3412	22-7710-01C	1.0 μ F, + 50-10%, 50 V
C3413	22-7562-32	.47 μ F, 5%, 100 V
C3414	22-7774-16A	.022 μ F, 10%, 100 V
C3419	22-7751--39	180 pF, 5%, 50 V
C3420	22-7710-01C	1.0 μ F, + 50-10%, 50 V
C3421	22-7773-18B	.033 μ F, 5%, 100 V
C3422	22-7613-24D	.01 μ F, 10%, 50 V

CIRCUIT COMP. NO.	ZDS PART NO.	DESCRIPTION
C3423	22-7613-08D	470 pF, 10%, 50 V
C3424	22-7742-10	390 pF, 10%, 50 V
C3425	22-7742-10	.001 μ F, 10%, 50 V
C3426	22-7742-10	.001 μ F, 10%, 50 V
C3427	22-7647-35C	150 pF, 10%, 50 V
C3428	22-7774-12	.01 μ F, 10%, 50 V
C3429	22-7405-04	4.7 μ F, 25 V
C3430	22-7613-24D	.01 μ F, 10%, 50 V
C3431	22-7774-16A	.022 μ F, 10%, 100 V
C3434	22-7742-06	470 μ F, 10%, 50 V
C3436	22-7742-10	.001 μ F, 10%, 50 V
C3450	22-7739-29A	.27 μ F, 10%, 50 V
C3461	22-7710-01C	1.0 μ F, + 50-10%, 50 V
C3462	22-7739--09	.0056 μ F, 10%, 100 V
C3463	22-7508	47 μ F, 35 V

CIRCUIT COMP. NO.	ZDS PART NO.
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DIODES

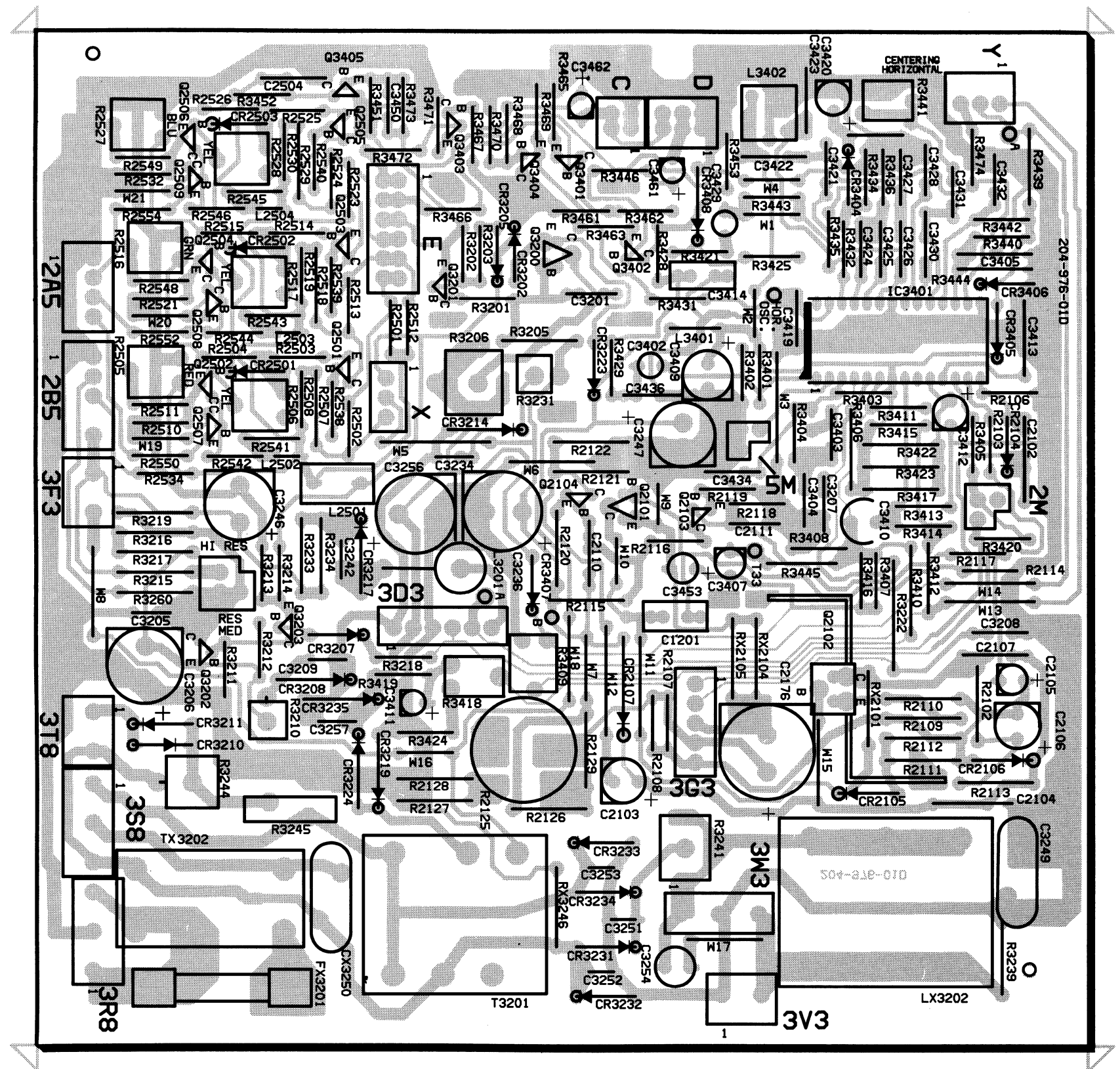
CR2104	103-142-01
CR2105	103-254-01
CR2106	103-254-01
CR2107	103-254-01
CR2501	103-142-01
CR2502	103-142-01
CR2503	103-142-01
CR3202	103-330A
CR3205	103-309-01
CR3206	103-254-01
CR3208	103-326A
CR3210	103-254-01
CR3211	103-284A
CR3214	103-284A
CR3217	103-326A
CR3219	103-330A
CR3223	103-330A
CR3224	103-330A
CR3231	103-315-06A
CR3232	103-315-06A
CR3233	103-315-06A
CR3234	103-315-06A
CR3235	103-284A
CR3401	103-142-01
CR3404	103-142-01
CR3405	103-142-01
CR3406	103-142-01
CR3408	103-279-14

<u>CIRCUIT COMP. NO.</u>	<u>ZDS PART NO.</u>	<u>DESCRIPTION</u>	<u>CIRCUIT COMP. NO.</u>	<u>ZDS PART NO.</u>
INDUCTORS			Q2501	121-1019
L2502	20-3887-01	1.2 μ H	Q2502	121-895
L2503	20-3887-01	1.2 μ H	Q2503	121-1019
L2504	20-3887-01	1.2 μ H	Q2504	121-895
L3201	20-2021	100 μ H	Q2505	121-1019
LX3202	95-3501-01	60 μ H	Q2506	121-895
L3401	20-3887-01	1.2 μ H	Q2507	121-1019
L3402	20-2998	39 μ H	Q2509	121-1019
TRANSFORMERS			Q3200	F-12737
T3201	95-3558-02	Start up (power transformer)	Q3201	121-499-01
TX3202	95-3439	LCI	Q3202	121-1034
TRANSISTORS			Q3203	121-1059
Q2101	F-10896		Q3401	121-895
Q2102	F-10896		Q3401	121-966
Q2103	121-1019		Q3402	121-966
Q2104	121-1064		Q3403	121-895
			Q3404	121-895
			Q3405	121-895
			SEMICONDUCTOR	
			IC3401	221-175

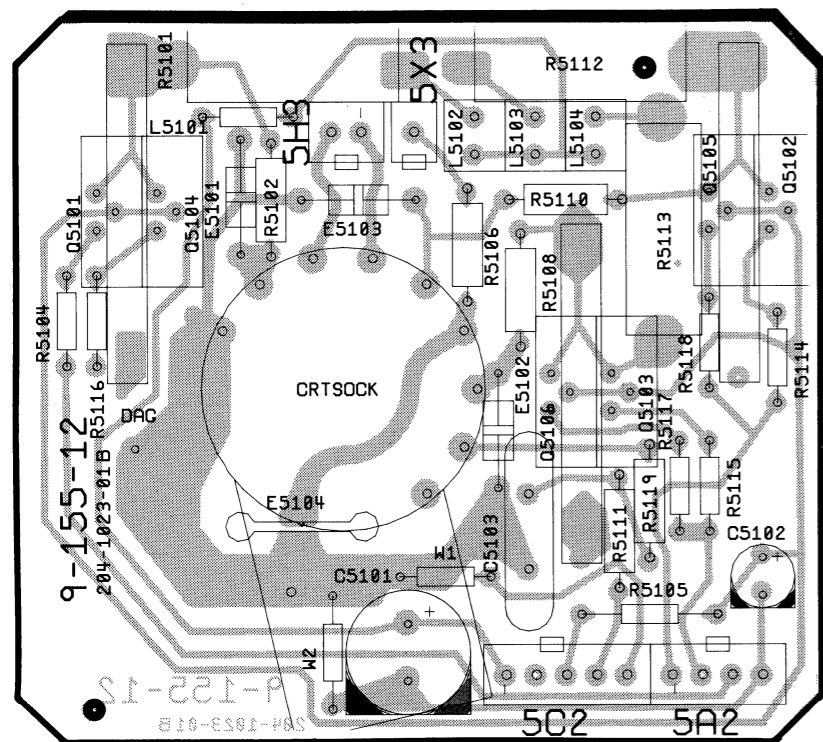
Circuit Board X-Ray Views

NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

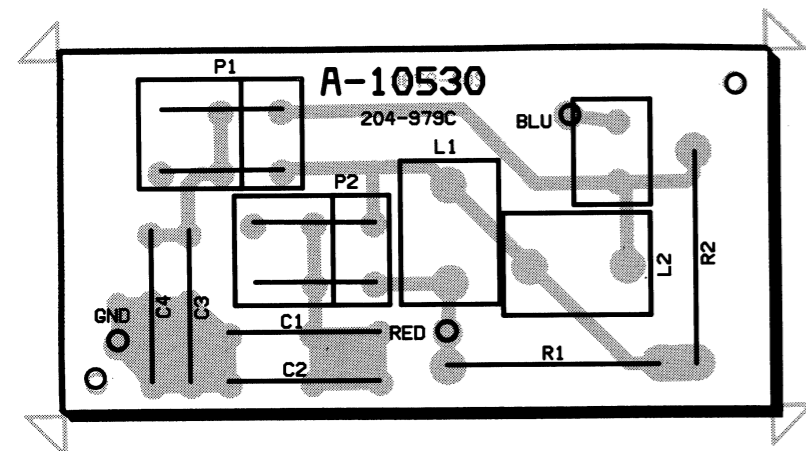
- A. Find the circuit component number (C101, R104, etc.) on the proper X-ray View.
- B. Refer to the Replacement Parts List for that circuit board. Then locate this same number in the Circuit Component Number column.
- C. Adjacent to this circuit component number, you will find the ZDS PART NUMBER.



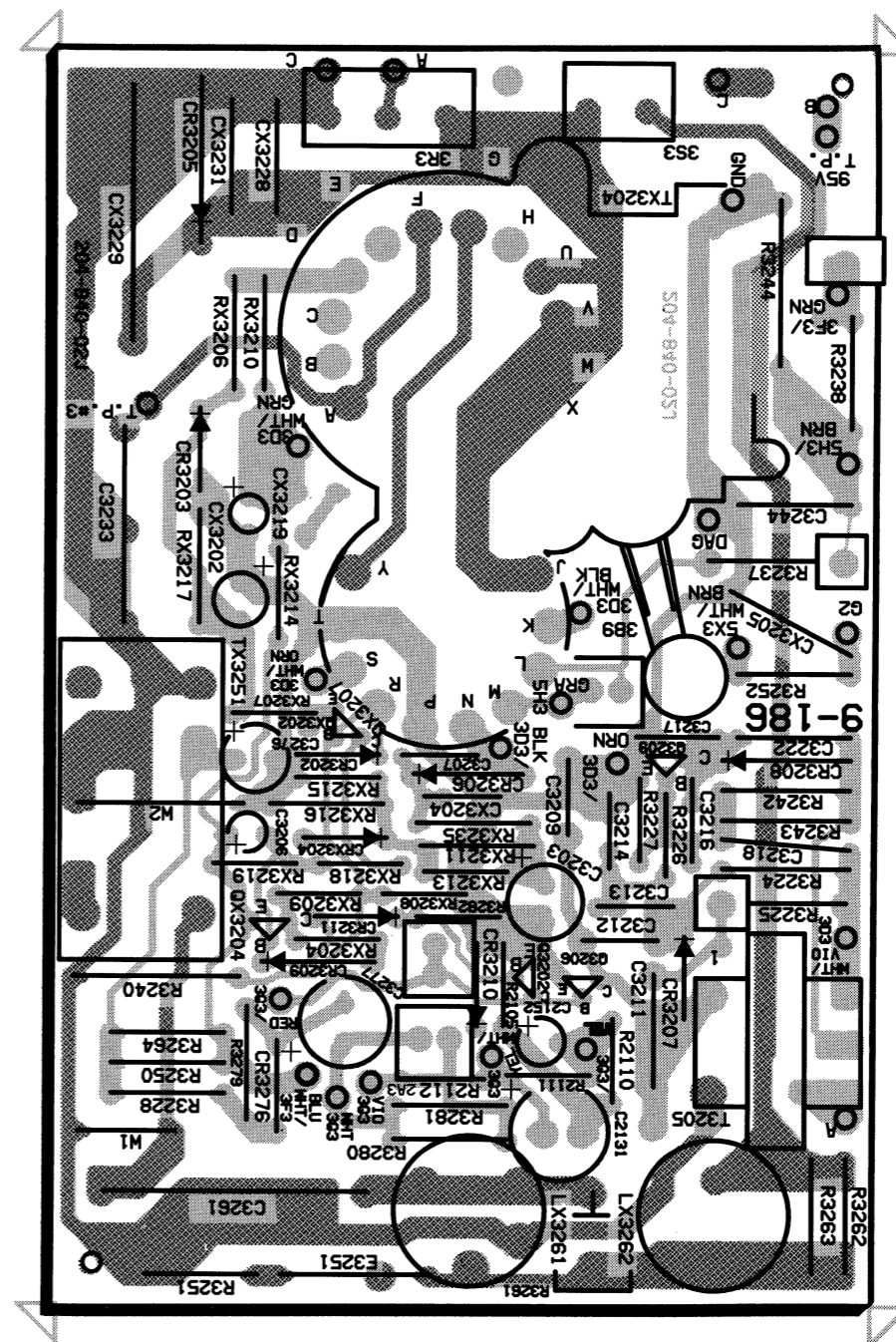
MAIN BOARD (9-227-01)
(Shown from the component side.)



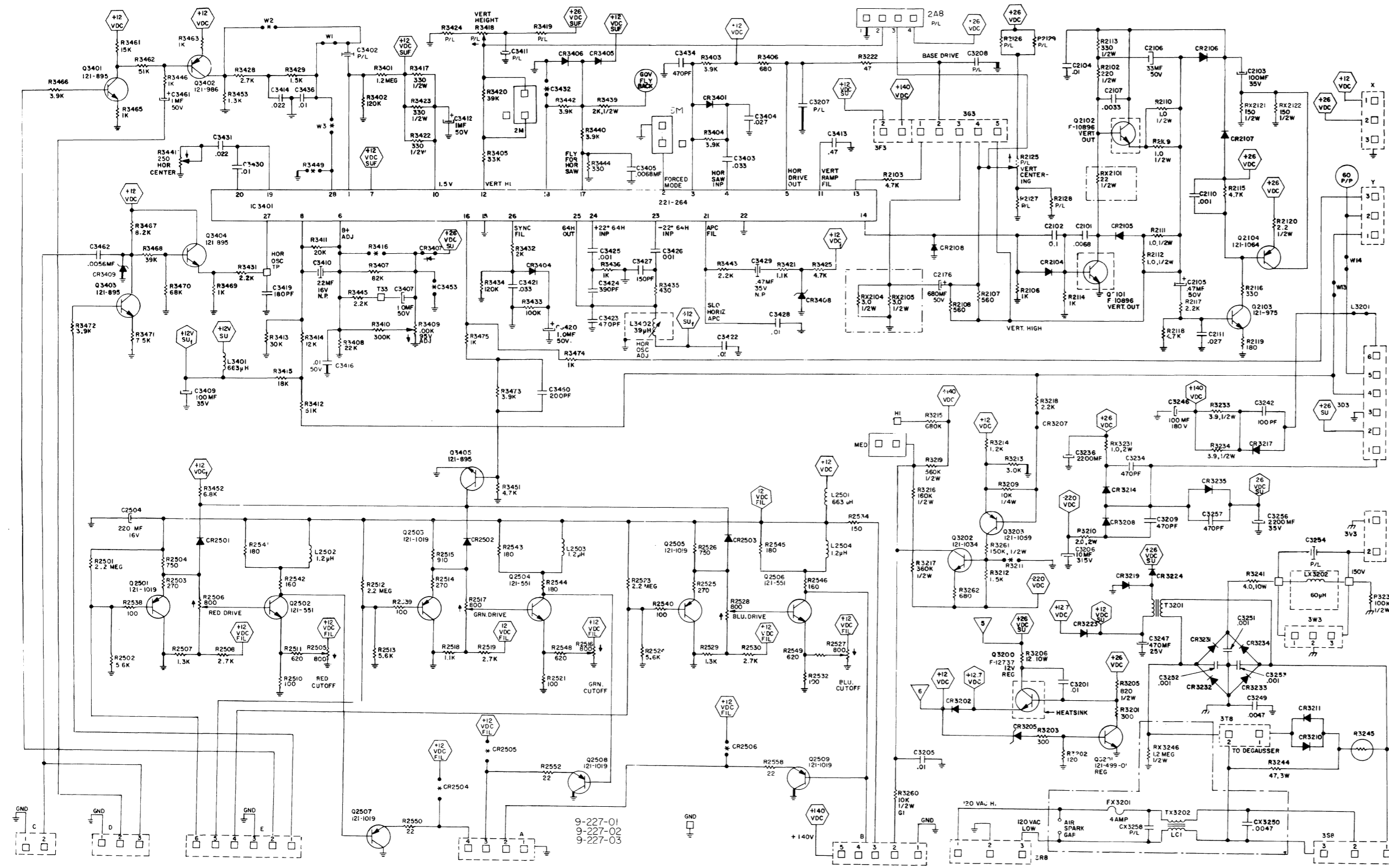
VIDEO OUTPUT BOARD (9-155-12)
(Shown from the component side.)



SWEEP BOARD (A-10530)
(Shown from the component side.)



HIGH VOLTAGE SWEEP BOARD (9-247)
(Shown from the component side.)



NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS (k = 1,000, M = 1,000,000) ALL RESISTORS ARE 1/4-WATT, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN μ F (MICROFARADS), UNLESS OTHERWISE SPECIFIED.
3. REFER TO THE CIRCUIT BOARD X-RAY VIEWS FOR THE PHYSICAL LOCATION OF PARTS.

LEGEND:

1. CHASSIS GROUND
2. CIRCUIT BOARD GROUND
3. DIRECTION
4. SIGNAL FROM S-100 BUS
5. SIGNAL TO S-100 BUS
6. MECHANICAL CONNECTION
7. MALE CONNECTION
8. FEMALE CONNECTION
9. NO CONNECTION
10. CONNECTION
11. CALIBRATION OR A TEST POINT

PARTS ORDERING INFORMATION:

If you order a part from Zenith Data Systems, use the (HE) prefix. Example:
HE 443-730

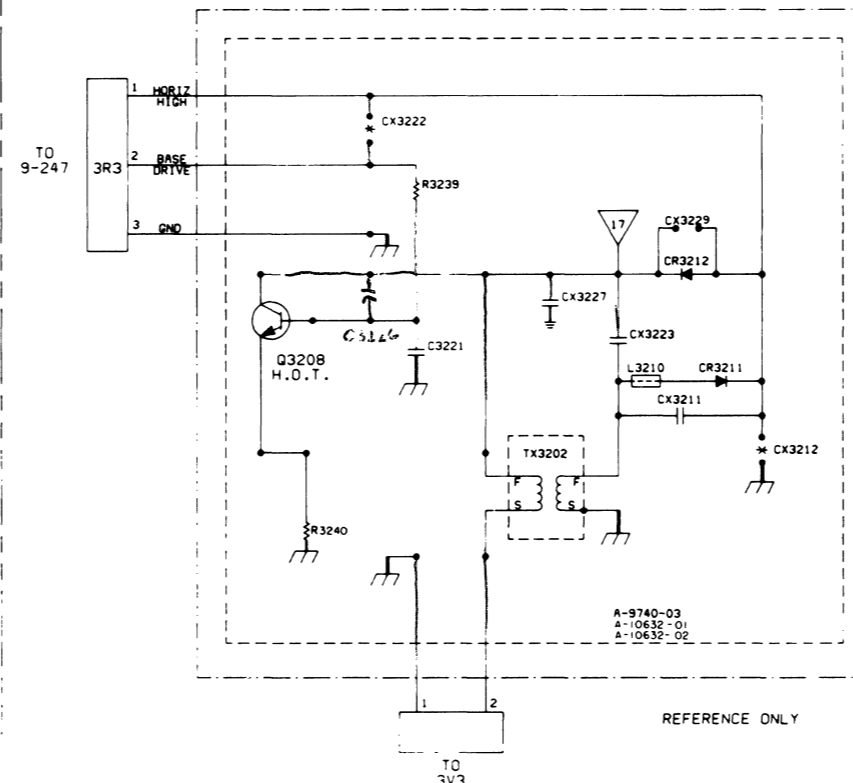
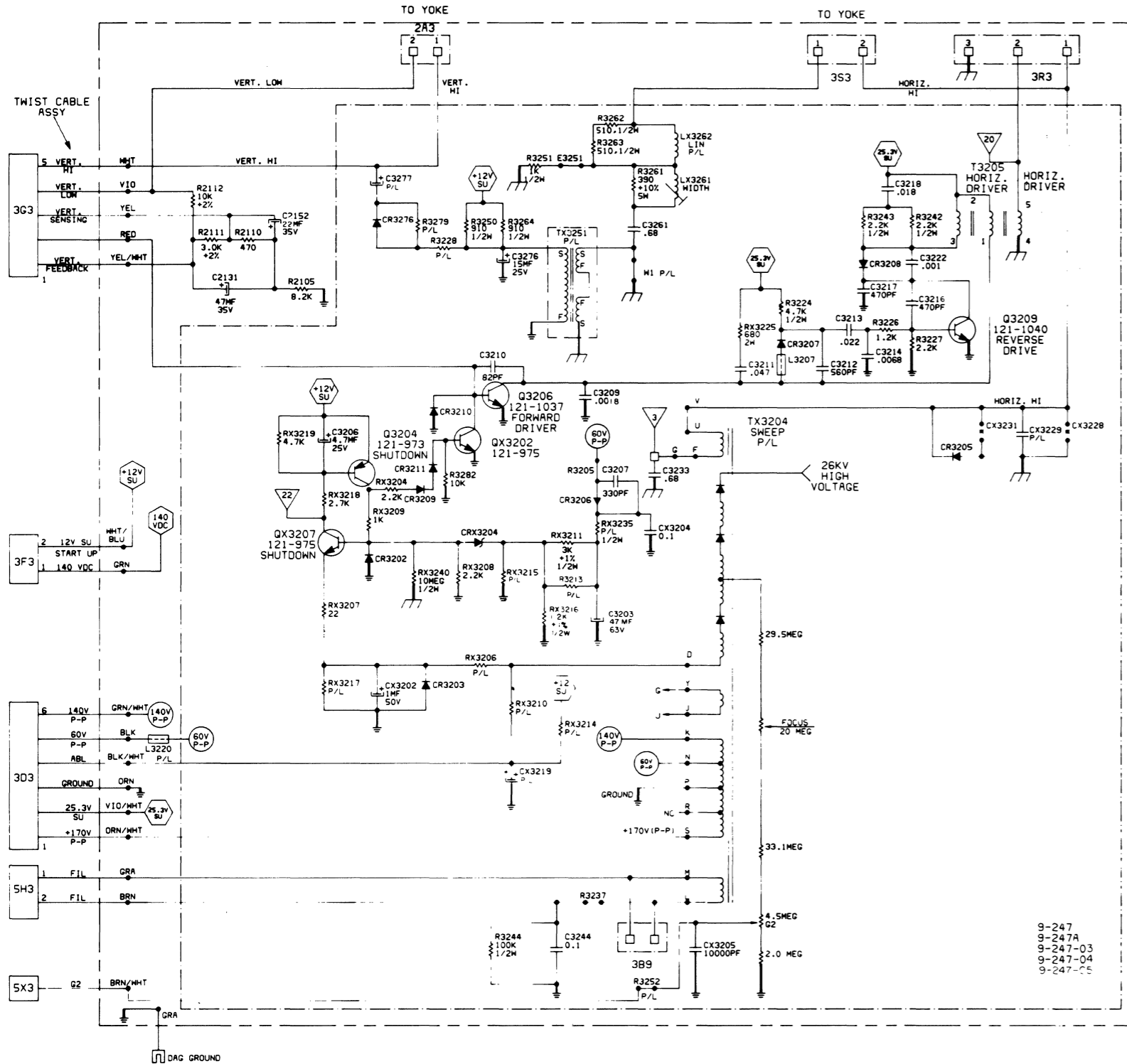
If you order a part from Heath Company, DO NOT use the (HE) prefix. Example:
443-730

For semiconductor type numbers (Example: 74LS153), refer to the "Semiconductor Identification Chart."

**ZVM-134
MAIN BOARD SCHEMATIC
SHEET 1 of 1**

Part Number 585-23

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NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS (k= 1,000, M= 1,000,000) ALL RESISTORS ARE 1/4-WATT, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN μ F (MICROFARADS), UNLESS OTHERWISE SPECIFIED.
3. REFER TO THE CIRCUIT BOARD X-RAY VIEWS FOR THE PHYSICAL LOCATION OF PARTS.

LEGEND:

1. CHASSIS GROUND
2. CIRCUIT BOARD GROUND
3. DIRECTION
4. SIGNAL FROM S-100 BUS
5. SIGNAL TO S-100 BUS
6. MECHANICAL CONNECTION
7. MALE CONNECTION
8. FEMALE CONNECTION
9. NO CONNECTION
10. CONNECTION
11. CALIBRATION OR A TEST POINT

PARTS ORDERING INFORMATION:

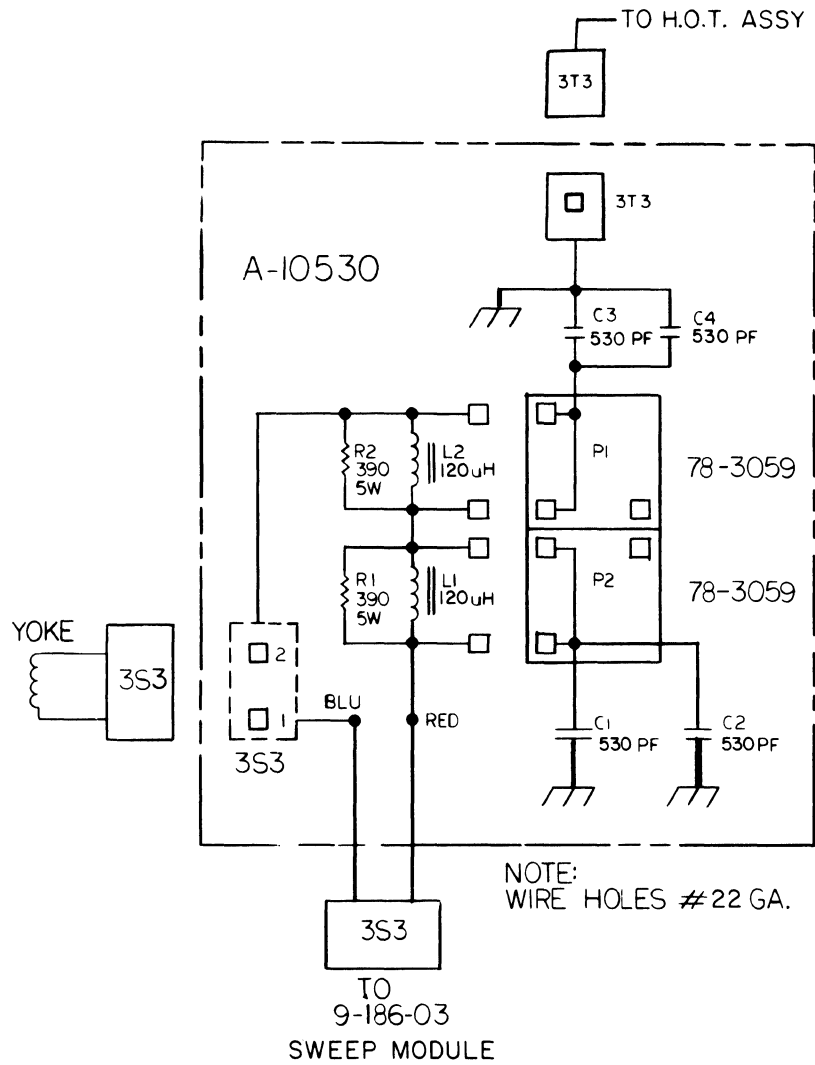
If you order a part from Zenith Data Systems, use the (HE) prefix. Example:
HE 443-730

If you order a part from Heath Company, DO NOT use the (HE) prefix. Example:
443-730

For semiconductor type numbers (Example: 74LS153), refer to the "Semiconductor Identification Chart."

**ZVM-134
SWEEP BOARD SCHEMATIC
SHEET 1 of 1**

Part Number 585-23



NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS (K=1,000, M=1,000,000) ALL RESISTORS ARE 1/4-WATT, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN μ F (MICROFARADS), UNLESS OTHERWISE SPECIFIED.
3. REFER TO THE CIRCUIT BOARD X-RAY VIEWS FOR THE PHYSICAL LOCATION OF PARTS.

LEGEND:

1. CHASSIS GROUND
2. CIRCUIT BOARD GROUND
3. DIRECTION
4. SIGNAL FROM S-100 BUS
5. SIGNAL TO S-100 BUS
6. MECHANICAL CONNECTION
7. MALE CONNECTION
8. FEMALE CONNECTION
9. NO CONNECTION
10. CONNECTION
11. CALIBRATION OR A TEST POINT

PARTS ORDERING INFORMATION:

If you order a part from Zenith Data Systems, use the (HE) prefix. Example:

HE 443-730

If you order a part from Heath Company, DO NOT use the (HE) prefix. Example:

443-730

For semiconductor type numbers (Example: 74LS153), refer to the "Semiconductor Identification Chart."

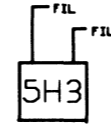
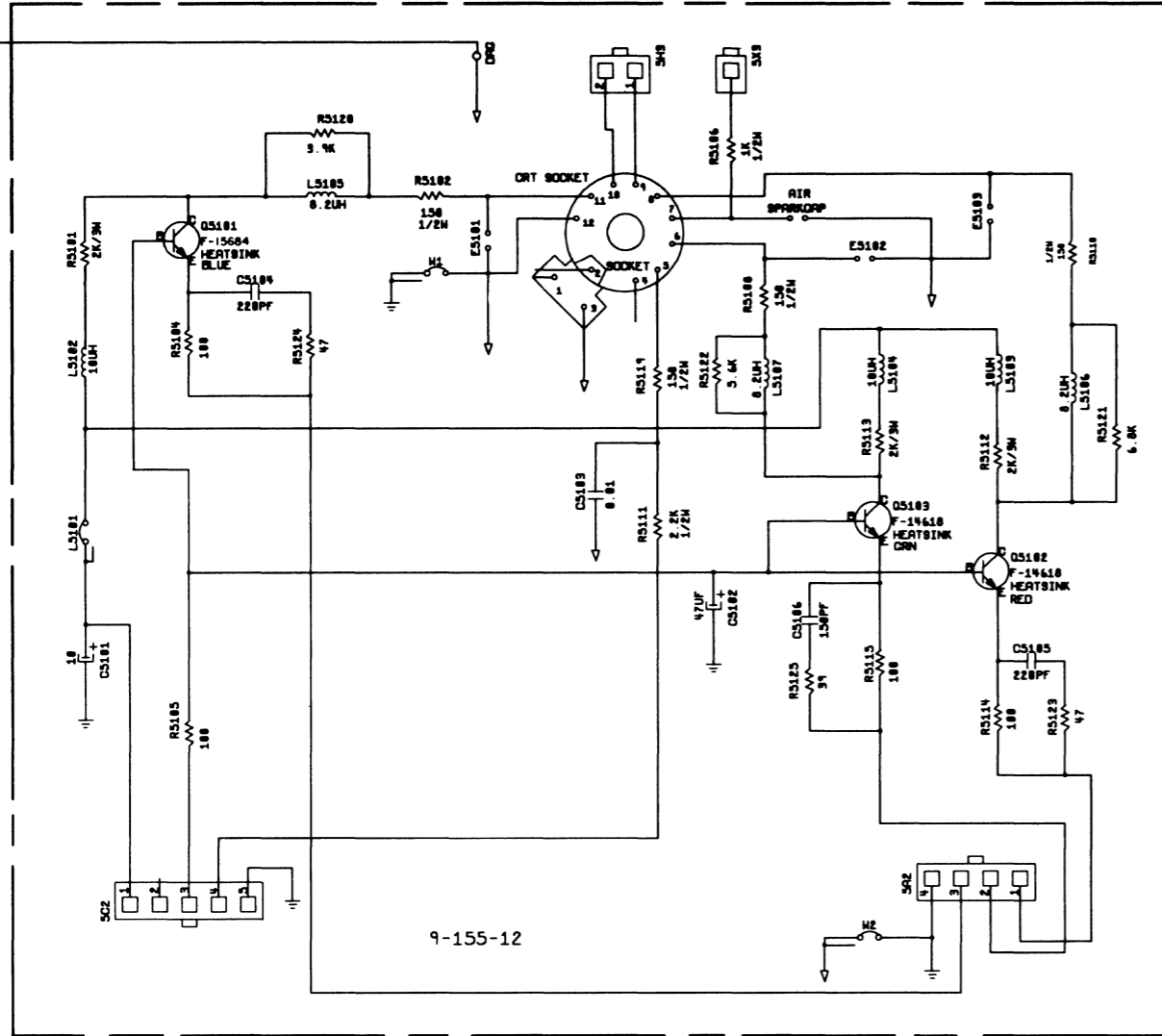
**ZVM-134
WIDTH STEP BOARD SCHEMATIC**

SHEET 1 OF 1

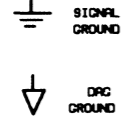
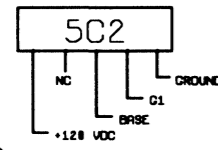
Part Number 585-23

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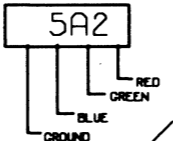
U
DAG
GND



9-155-12



NOTES:
 1. ALL RESISTORS ARE 1/2WATT 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.



TO 9-227 SERIES
 VIDEO MONITOR
 MAIN BOARD



NOTES:

1. ALL RESISTOR VALUES ARE IN OHMS (k=1,000, M=1,000,000) ALL RESISTORS ARE 1/4-WATT, 5% UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITOR VALUES ARE IN μF (MICROFARADS), UNLESS OTHERWISE SPECIFIED.
3. REFER TO THE CIRCUIT BOARD X-RAY VIEWS FOR THE PHYSICAL LOCATION OF PARTS.

LEGEND:

1. CHASSIS GROUND
2. CIRCUIT BOARD GROUND
3. DIRECTION
4. SIGNAL FROM S-100 BUS
5. SIGNAL TO S-100 BUS
6. MECHANICAL CONNECTION
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8. FEMALE CONNECTION
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If you order a part from Zenith Data Systems, use the (HE) prefix. Example:
 HE 443-730

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 443-730

For semiconductor type numbers (Example: 74LS153), refer to the "Semiconductor Identification Chart."

**ZVM-134
 VIDEO OUTPUT BOARD SCHEMATIC
 SHEET 1 OF 1**

Part Number 585-23

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