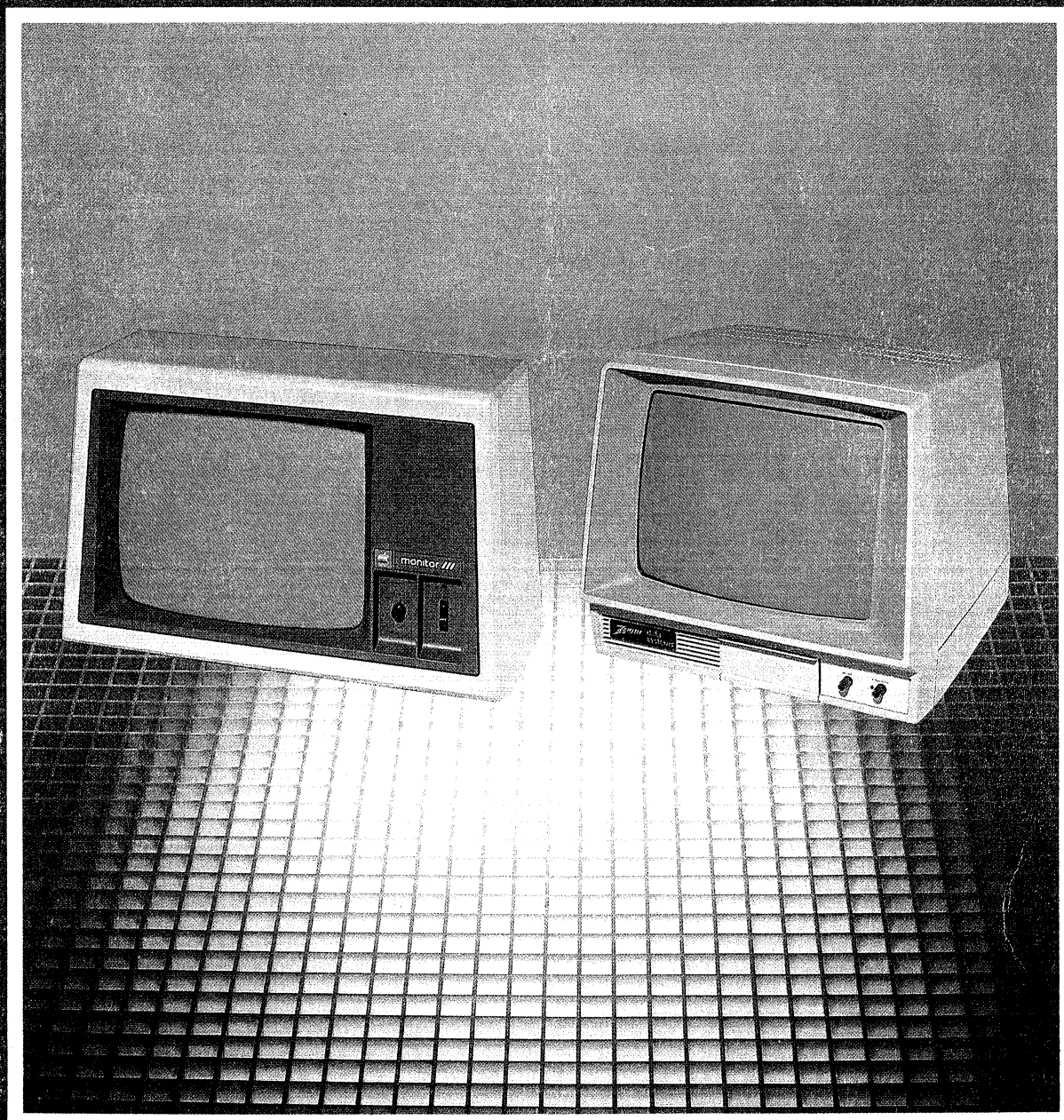


# MONITOR:

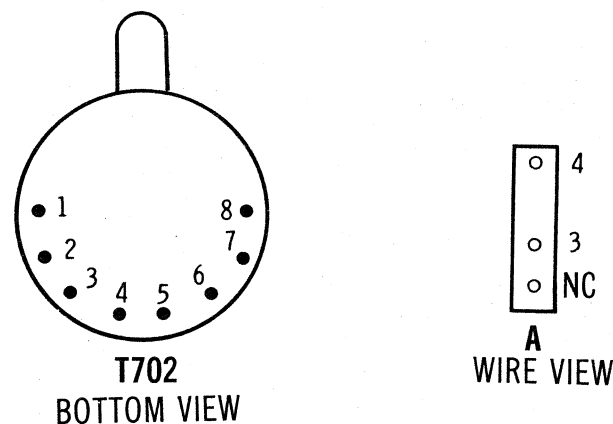
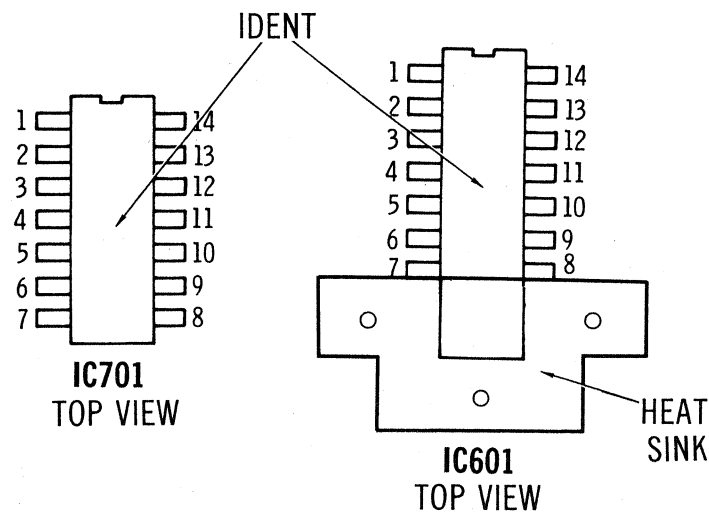
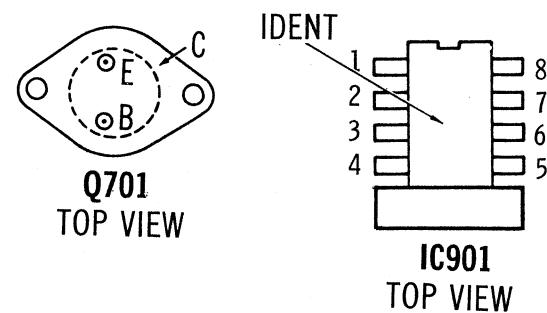
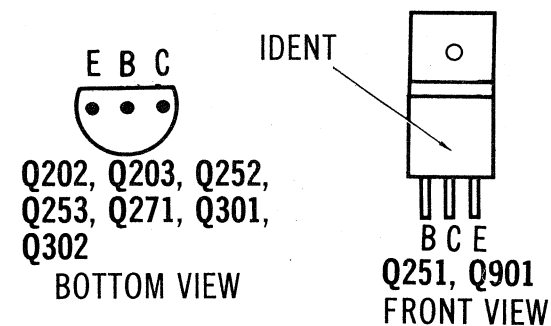
APPLE® II MODEL A3M0039

ZENITH® MODEL ZVM-131



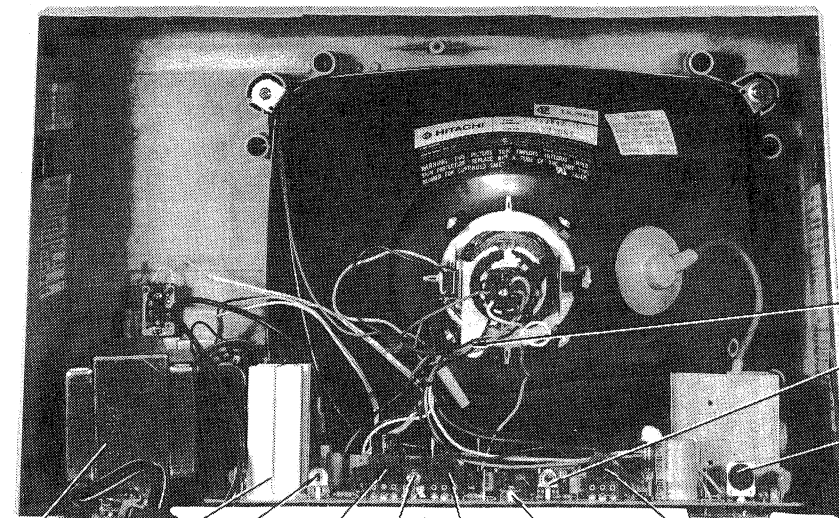
TECHNICAL SERVICE DATA FOR YOUR MONITOR

## TERMINAL GUIDES



## TERMINAL GUIDES

**CMT8-1**  
APPLE  
MODEL A3M0039



WIDTH  
HORIZ  
HOLD  
FOCUS  
BRIGHTNESS  
HORIZ  
SUB  
HOLD  
VERT  
HOLD  
VERT  
LIN  
VERT  
SIZE  
B+  
ADJ  
DC  
FUSE  
AC  
FUSE

## CABINET-REAR VIEW DISASSEMBLY INSTRUCTIONS

### CHASSIS REMOVAL

Remove four screws holding cabinet back and lift back from set. Disconnect CRT socket, HV anode lead and ground wire. Loosen and remove deflection yoke from CRT neck.

Remove one screw holding Power Indicator and one screw holding power switch bracket to cabinet front. Remove one screw holding power transformer bracket to cabinet front. The Main Board and assemblies may now be removed from cabinet.

### CRT REMOVAL

Disconnect CRT socket and HV anode lead. Loosen and remove deflection yoke from CRT neck. Lay set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. **Do not** lift CRT by the neck.

## SERVICING IN THE FIELD

### CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

### FUSE DEVICES

A 2-amp fuse is used for low-voltage power-supply protection. (See Placement Chart.)

A .75-amp fuse is used for AC line protection. (See Placement Chart.)

### HORIZONTAL OSCILLATOR

Coarse adjustment of the horizontal hold is accomplished by the proper setting of the Sub Horiz Hold Control. (See photo, Cabinet-Rear View.)

Fine adjustment of the horizontal hold is accomplished by the proper setting of the Horiz Hold Control. (See photo, Cabinet-Rear View.)

### WIDTH

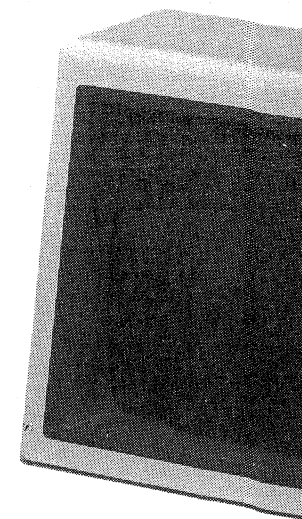
The width may be varied by adjusting the width coil located on the yoke. (See photo, Cabinet-Rear View.)

### FOCUS

The focus may be varied by a focus control. (See photo, Cabinet-Rear View.)

### CENTERING

Centering is accomplished by proper adjustment of two magnetic rings located on the yoke rear cover.



**CMT8-1**  
APPLE  
MODEL A3M0039

## SAFETY PRECAUTIONS

See page 14.

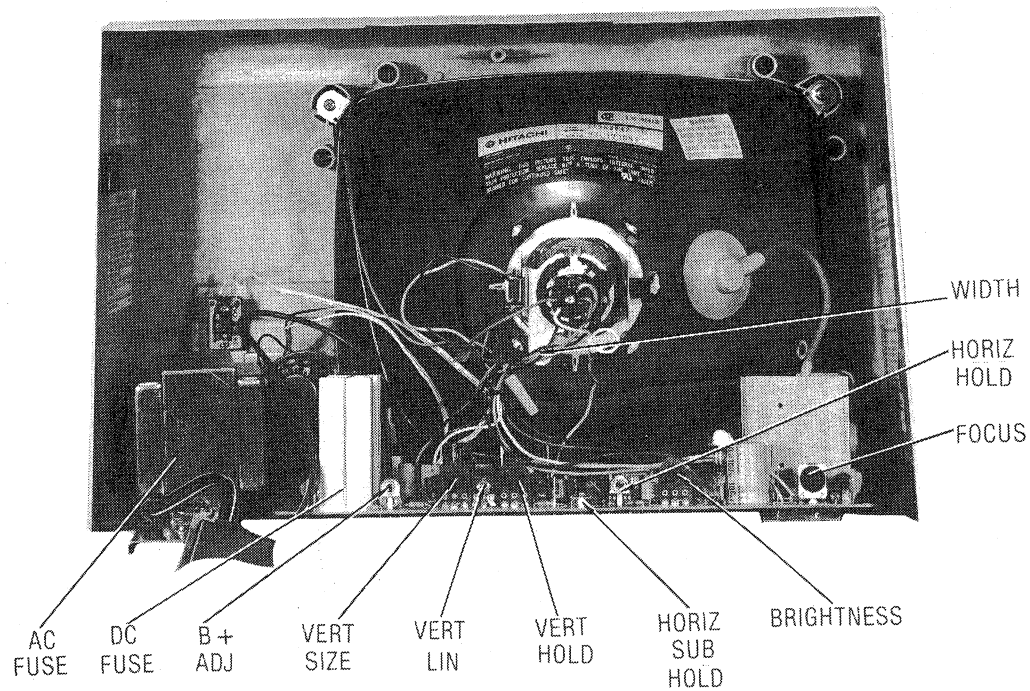
|                           |        |
|---------------------------|--------|
| Disassembly Instructions  | P      |
| GridTrace Location Guide  |        |
| Main Board                |        |
| Miscellaneous Adjustments |        |
| Parts List                |        |
| Monitor                   | 7 thru |
| Photos                    |        |
| Cabinet-Rear View         |        |
| Main Board                | 6, 11  |
| Placement Chart           |        |

**SAMS** Howard W. Sams  
4300 West 62nd St

The listing of any available replacement part herein constitute in any case a recommendation, warranty or g Howard W. Sams & Co., Inc., as to the quality and suitability replacement part. The numbers of these parts have been from information furnished to Howard W. Sams & Co., Inc. manufacturers of the particular type of replacement par







### CABINET-REAR VIEW DISASSEMBLY INSTRUCTIONS

#### CHASSIS REMOVAL

Remove four screws holding cabinet back and lift back from set. Disconnect CRT socket, HV anode lead and ground wire. Loosen and remove deflection yoke from CRT neck.

Remove one screw holding Power Indicator and one screw holding power switch bracket to cabinet front. Remove one screw holding power transformer bracket to cabinet front. The Main Board and assemblies may now be removed from cabinet.

#### CRT REMOVAL

Disconnect CRT socket and HV anode lead. Loosen and remove deflection yoke from CRT neck. Lay set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. **Do not** lift CRT by the neck.

### SERVICING IN THE FIELD

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Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

#### FUSE DEVICES

A 2-amp fuse is used for low-voltage power-supply protection. (See Placement Chart.)

A .75-amp fuse is used for AC line protection. (See Placement Chart.)

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Coarse adjustment of the horizontal hold is accomplished by the proper setting of the Sub Horiz Hold Control. (See photo, Cabinet-Rear View.)

Fine adjustment of the horizontal hold is accomplished by the proper setting of the Horiz Hold Control. (See photo, Cabinet-Rear View.)

#### WIDTH

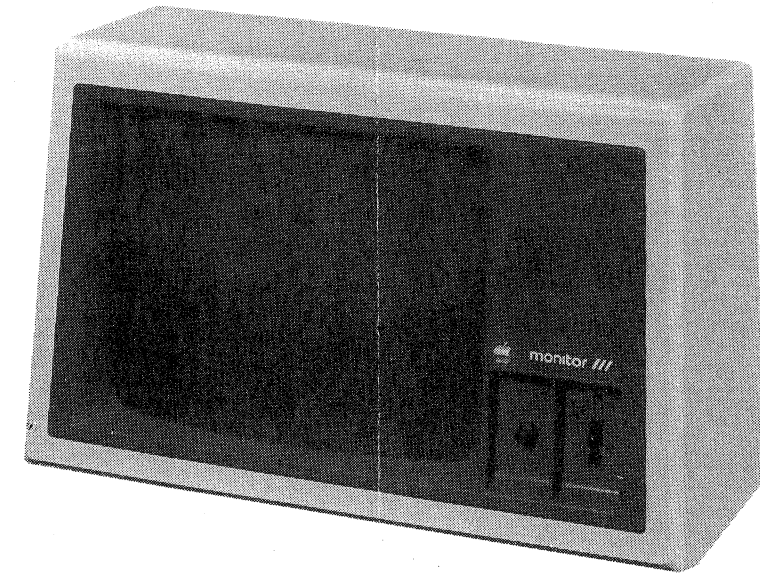
The width may be varied by adjusting the width coil located on the yoke. (See photo, Cabinet-Rear View.)

#### FOCUS

The focus may be varied by a focus control. (See photo, Cabinet-Rear View.)

#### CENTERING

Centering is accomplished by proper adjustment of two magnetic rings located on the yoke rear cover.



MODEL A3M0039

### SAFETY PRECAUTIONS

See page 14.

### PRELIMINARY SERVICE CHECKS

ENCLOSED

### INDEX

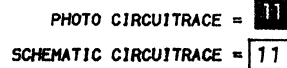
|                                 | Page      |                               | Page |
|---------------------------------|-----------|-------------------------------|------|
| Disassembly Instructions .....  | 16        | Resistance Measurements ..... | 14   |
| GridTrace Location Guide .....  |           | Safety Precautions .....      | 14   |
| Main Board .....                | 12        | Schematics .....              |      |
| Miscellaneous Adjustments ..... | 4         | Monitor .....                 | 2    |
| Parts List .....                |           | Notes .....                   | 5    |
| Monitor .....                   | 7 thru 10 | Terminal Guides .....         | 15   |
| Photos .....                    |           | Servicing in the Field .....  | 16   |
| Cabinet-Rear View .....         | 16        | Troubleshooting .....         | 5    |
| Main Board .....                | 6,11,13   | Troubleshooting Aid .....     | 4    |
| Placement Chart .....           | 3         |                               |      |

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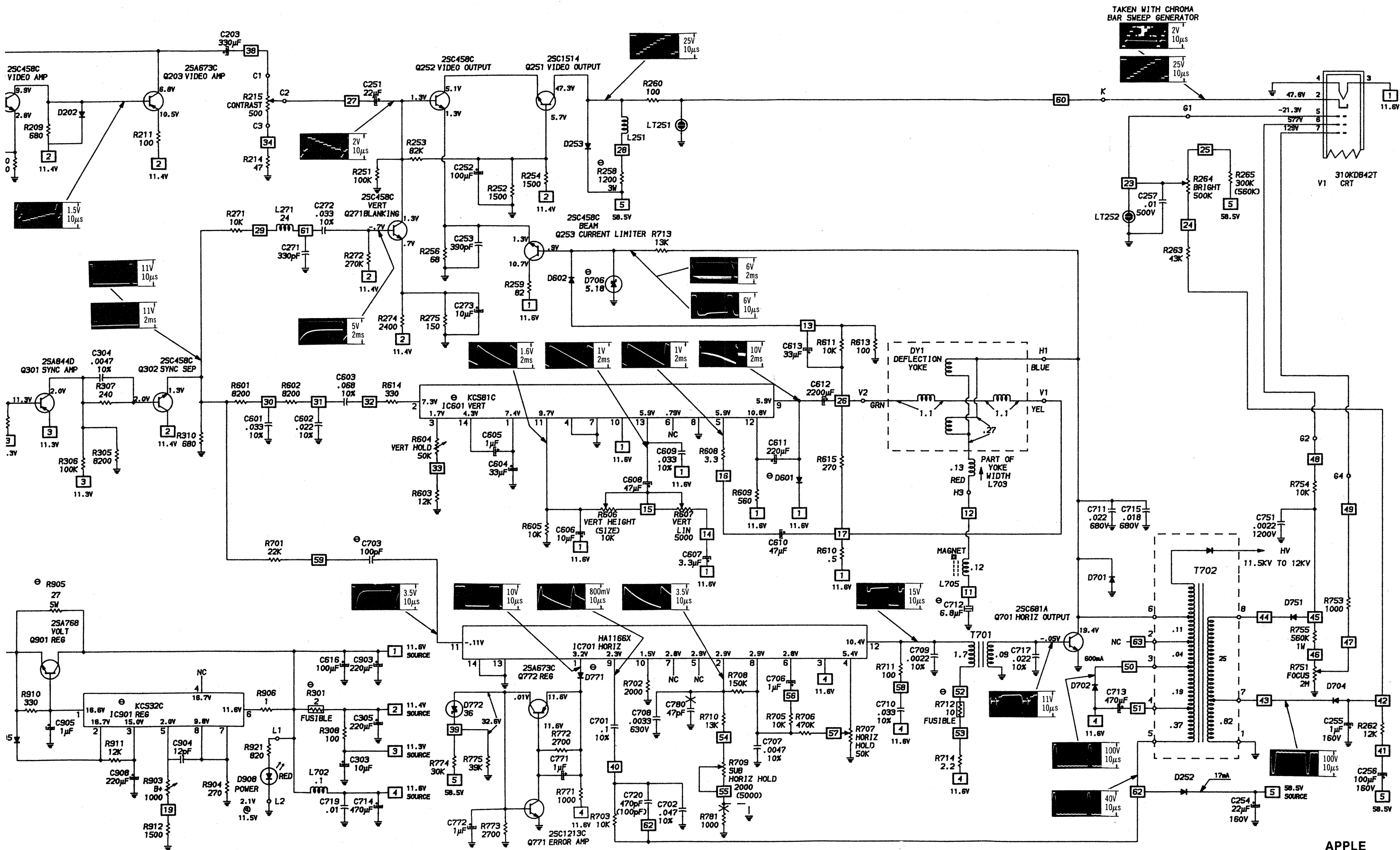
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed.

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Printed in U.S. of America. 84CA14926 DATE 3-85



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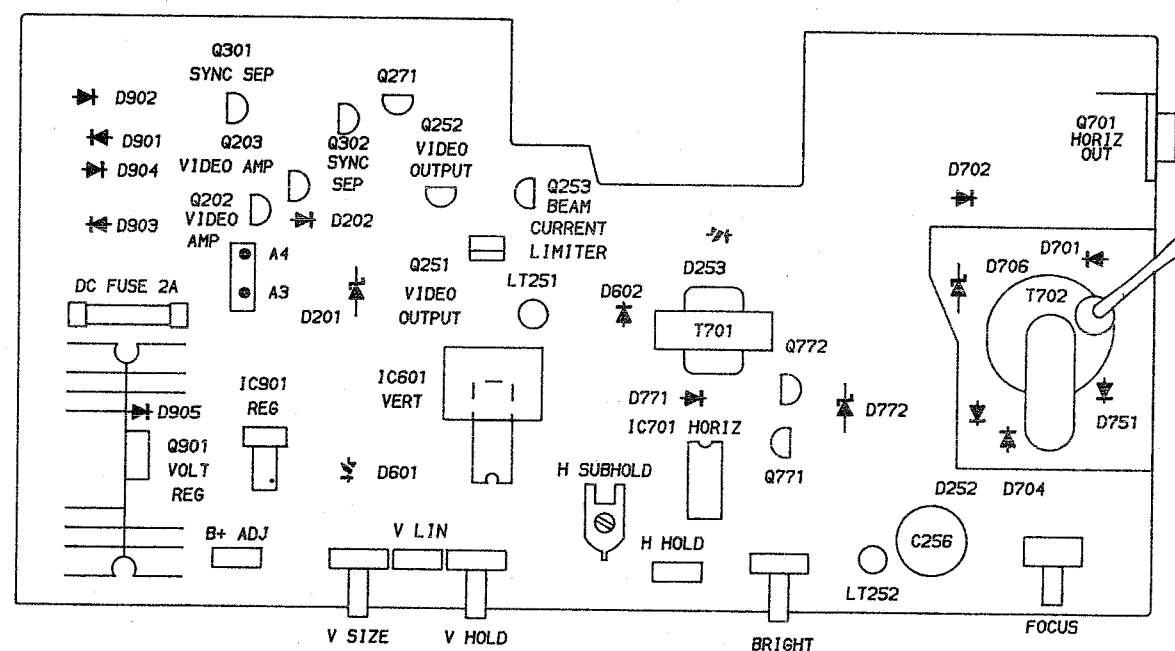
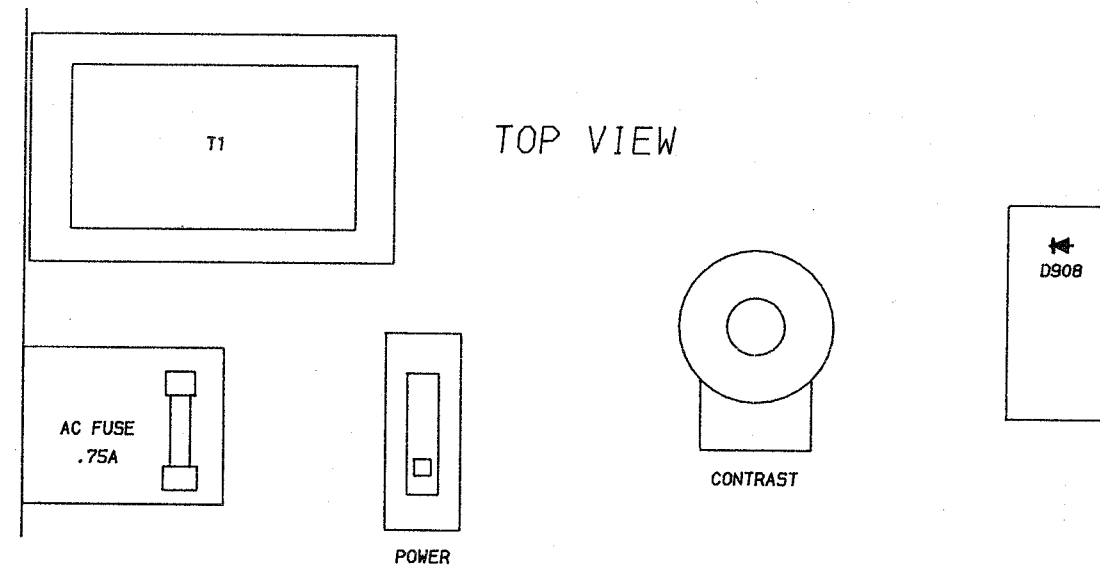
APPLE  
MODEL A3M0039

## SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the monitor before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install boards with monitor AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This monitor is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The monitor cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the monitor to water. If exposed to water turn the unit off. Do not place the monitor near possible water sources.
14. Never leave the monitor unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning monitor.
17. Never use liquids or aerosols directly on the monitor. Spray on cloth and then apply to the monitor cabinet. Make sure the monitor is disconnected from the AC power line.

## RESISTANCE MEASUREMENTS

| MEASUREMENTS TAKEN WITH LOW POWER OHMS METER |       |       |       |       |       |       |       |       |       |        |        |        |        |        |
|----------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| ITEM                                         | PIN 1 | PIN 2 | PIN 3 | PIN 4 | PIN 5 | PIN 6 | PIN 7 | PIN 8 | PIN 9 | PIN 10 | PIN 11 | PIN 12 | PIN 13 | PIN 14 |
| V1                                           | NC    | 1NF   | FIL   | FIL   | 1NF   | 1NF   | 600K  |       |       |        |        |        |        |        |
| IC601                                        | 4770  | 24K   | 29K   | .04   | 1NF   | 1NF   | .04   | 0     | 1NF   | 33     | 10K    | 586    | 13K    | 1NF    |
| IC701                                        | 1.6M  | 14K   | 33    | 10K   | 6600  | 1NF   | 11K   | 120K  | 5670  | 2000   | 13K    | 44     | .03    | .03    |
| IC901                                        | 385   | 720   | 6000  | 10K   | 1342  | 32    | 270   |       |       |        |        |        |        |        |
| ITEM                                         | E     | B     | C     |       | ITEM  | E     | B     | C     |       | ITEM   | E      | B      | C      |        |
| Q202                                         | 220   | 4800  | 720   |       | Q253  | 68    | 1NF   | 113   |       | Q701   | 0      | .09    | 1NF    |        |
| Q203                                         | 137   | 720   | 600   |       | Q271  | 140   | 270K  | 45K   |       | Q771   | 0      | 2700   | 3700   |        |
| Q251                                         | 1NF   | 750   | 1NF   |       | Q301  | 132   | 62K   | 7560  |       | Q772   | 1023   | 3700   | 2700   |        |
| Q252                                         | 68    | 1NF   | 1NF   |       | Q302  | 675   | 7800  | 33    |       | Q901   | 58     | 385    | 33     |        |



PLACEMENT CHART

APPLE  
CMT8-1  
MODEL A3M0039

TROUBLESHOOTING AID

NOTE: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE OR SOUND

NO PIC, NO RASTER: Check AC power supply, sources generated from Horizontal Output Transformer (T702) and Video circuit. Refer to "Troubleshooting" Power Supply, Video and Horizontal circuits.

NO PIC, HAS RASTER: Refer to "Troubleshooting" Video circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video circuit. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER: Check HV Rectifier, Rectifier (Part of T702) and Horizontal circuit. Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

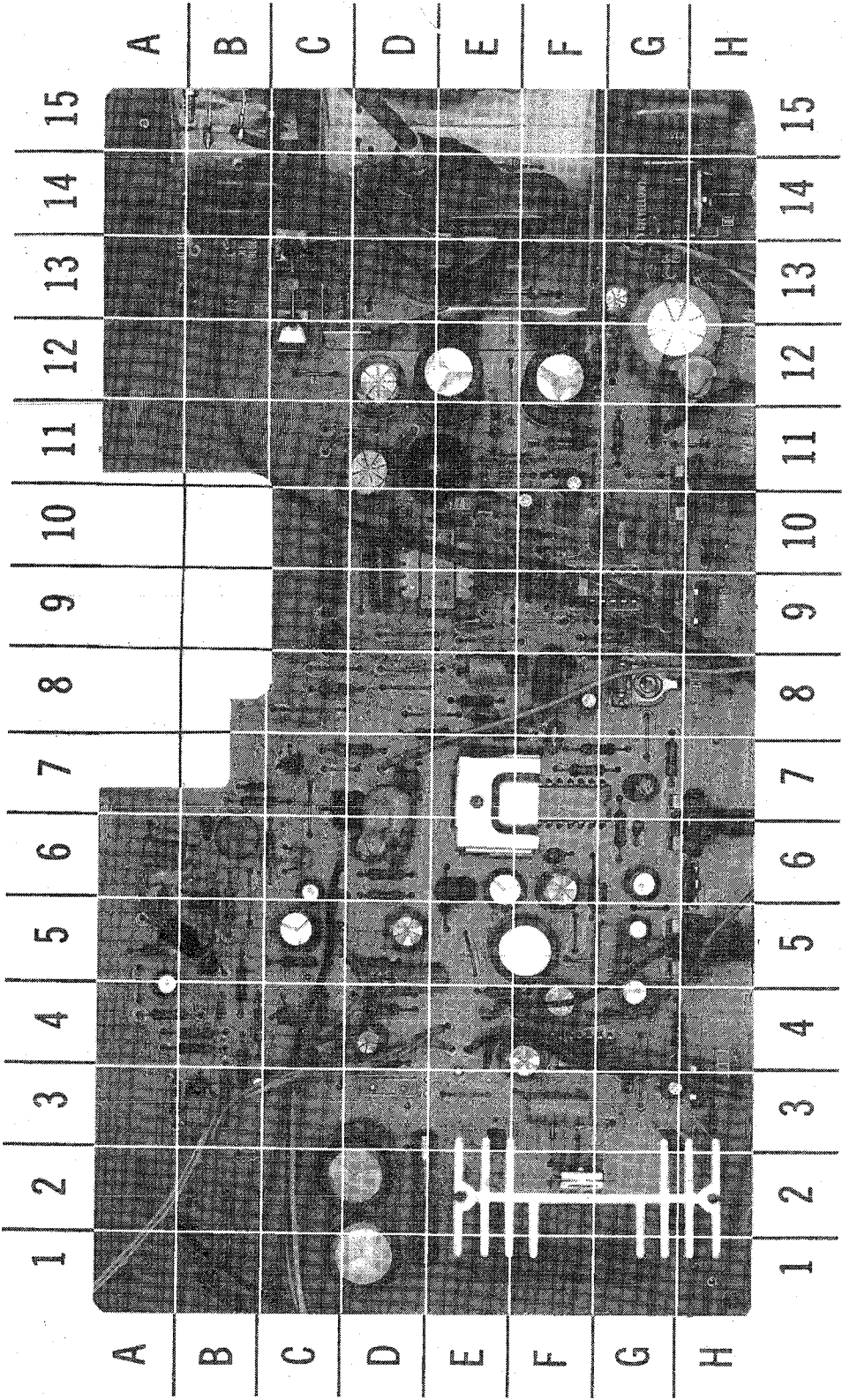
SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

MISCELLANEOUS ADJUSTMENTS

B+ ADJUSTMENT

Connect a DC volt meter to the collector of Voltage Regulator Transistor (Q901). Adjust B+ Control (R903) for 11.6V on the meter.



CMT8-1

APPLE

MODEL A3M0039



|      |      |      |       |      |      |      |      |
|------|------|------|-------|------|------|------|------|
| A3   | D-3  | C707 | D902  | R252 | D-7  | R613 | E-8  |
| A4   | D-3  | C708 | D903  | R253 | C-6  | R614 | F-7  |
| C201 | D-4  | C709 | D904  | R254 | D-6  | R615 | E-4  |
| C203 | C-5  | C710 | D905  | R256 | B-7  | R701 | F-9  |
| C251 | C-6  | C711 | F902  | R258 | C-9  | R702 | G-10 |
| C252 | D-6  | C712 | F901  | R259 | C-8  | R703 | F-11 |
| C253 | B-7  | C713 | IC601 | R260 | D-7  | R705 | G-9  |
| C254 | F-12 | C714 | IC901 | R262 | G-12 | R706 | G-10 |
| C255 | G-13 | C715 | L251  | R263 | F-12 | R707 | H-9  |
| C256 | G-12 | C717 | L271  | R264 | H-11 | R708 | G-9  |
| C257 | G-11 | C719 | L702  | R265 | C-11 | R709 | G-8  |
| C271 | B-6  | C720 | L705  | R271 | B-5  | R710 | G-8  |
| C272 | A-6  | C751 | LT251 | R272 | B-5  | R711 | E-9  |
| C273 | B-5  | C771 | LT252 | R274 | A-5  | R712 | E-8  |
| C301 | B-3  | C772 | Q202  | R275 | A-6  | R713 | C-13 |
| C303 | A-4  | C780 | Q203  | R301 | D-5  | R714 | E-8  |
| C304 | B-4  | C901 | Q251  | R302 | B-4  | R751 | H-14 |
| C305 | D-5  | C903 | Q252  | R303 | B-3  | R753 | G-13 |
| C601 | E-8  | C904 | Q253  | R304 | B-4  | R754 | G-14 |
| C602 | F-8  | C905 | Q271  | R305 | A-3  | R755 | G-14 |
| C603 | F-7  | C908 | Q301  | R306 | B-4  | R771 | E-10 |
| C604 | G-7  | C909 | Q302  | R307 | B-4  | R772 | F-10 |
| C605 | G-6  | D201 | Q302  | R308 | A-4  | R773 | F-11 |
| C606 | F-6  | D202 | Q772  | R310 | A-5  | R774 | E-11 |
| C607 | G-5  | D252 | Q901  | R601 | E-7  | R775 | E-11 |
| C608 | G-6  | D253 | R201  | R602 | E-8  | R781 | G-9  |
| C609 | G-6  | D601 | R202  | R603 | G-7  | R903 | H-3  |
| C610 | G-4  | D602 | R203  | R604 | H-6  | R904 | G-4  |
| C611 | F-6  | D701 | R204  | R605 | G-6  | R905 | F-1  |
| C612 | F-5  | D702 | R209  | R606 | H-5  | R906 | F-3  |
| C613 | E-6  | D704 | R210  | R607 | H-6  | R910 | F-2  |
| C616 | E-6  | D706 | R211  | R608 | F-7  | R911 | G-4  |
| C701 | G-10 | D751 | R212  | R609 | F-6  | R912 | H-3  |
| C702 | G-10 | D771 | R214  | R610 | G-5  | T701 | E-10 |
| C703 | F-10 | D772 | R251  | R611 | E-6  | T702 | E-14 |
| C706 | F-8  | D901 |       |      |      |      |      |

## TROUBLESHOOTING

## POWER SUPPLY

Check AC Fuse (F901). If open, check Diodes (D901 thru D904), and Electrolytics C901 and C909. Replace any defective parts and check DC Fuse (F902). If open, check Voltage Regulator Transistor (Q901). Regulator IC (IC901) and associated circuitry. Check for a short at the Horizontal Output Transistor (Q701) and Diode (D701).

Check for 11.6V at the collector of Q901. If the voltage is incorrect, check the adjustment of B+ Control (R903). See "B+ Adjustment" section of the Miscellaneous Adjustments. Check voltages and components associated with IC901.

Check for 58.5V at the cathode of Rectifier Diode (D252). If voltage is missing, refer to the "Horizontal" section of this Troubleshooting guide.

## HORIZONTAL

High voltage is missing. Check for 19.4V at the collector of Horizontal Output Transistor (Q701). If the voltage is missing, check for B+ at pin 3 of the Horizontal Output Transformer (T702). If the voltage is present at pin 3, check the continuity between pins 3, 4, and 6 of T702.

Check for a horizontal waveform at pin 12 of the Horizontal IC (IC701). If the waveform is missing, check the voltages, waveforms, and components associated with IC701. If the waveform is present, check Q701, Diode (D701), and Horizontal Driver Transformer (T701).

Check for 58.5V source at the cathode of Diode (D252). This voltage is developed from T702. If voltage is in error loading of the horizontal circuits may occur. The high voltage rectifier is part of T702 and it may be defective. Check the voltages, waveforms, and components associated with T702.

Poor horizontal width, linearity, or foldover problems can be caused by Deflection Yoke (DY1), the Width Coil, which is part of the yoke, Coil L705, and Electrolytic C712.

## VIDEO

Check voltages and waveforms on the CRT and check condition of the CRT. To find a defective stage, connect a video signal to the Video Input Jack (P1). Check for a video waveform at pin 2 of the CRT. If waveform is missing, check for waveform at the bases of Video Output Transistor (Q252) and Video Amp Transistors (Q202 and Q203) to isolate defective stage.

If there are retrace lines on the CRT, check the voltages, waveform and components associated with Vertical Blanking Transistor (Q271).

The Beam Current Limiter Transistor (Q253) prevents CRT screen from being burned during prolonged use and should be checked if the CRT becomes etched.

## VERTICAL

Check for a vertical waveform at pin 9 of the Vertical IC (IC601). If the waveform is present, check the voltages and components associated with the vertical section of the Deflection Yoke (DY1). If the waveform is missing, check the voltages, waveforms, and components associated with IC601.

Vertical linearity or foldover problems can be caused by the condition of Electrolytics C604 thru C608 and C610. Check adjustment of the Vertical Height (Size) Control (R606) and Linearity Control (R607).

## SYNC

No vertical or horizontal sync. Check for the proper vertical and horizontal sync waveforms at the emitter of the Sync Sep Transistor (Q302). If either of the waveforms are incorrect, check the voltages and components associated with the Sync Amp Transistor (Q301) and Q302.

## SCHEMATIC NOTES

- \*— Circuitry not used in some versions
- Circuitry used in some versions
- See parts list
- ⊥ Ground
- Chassis

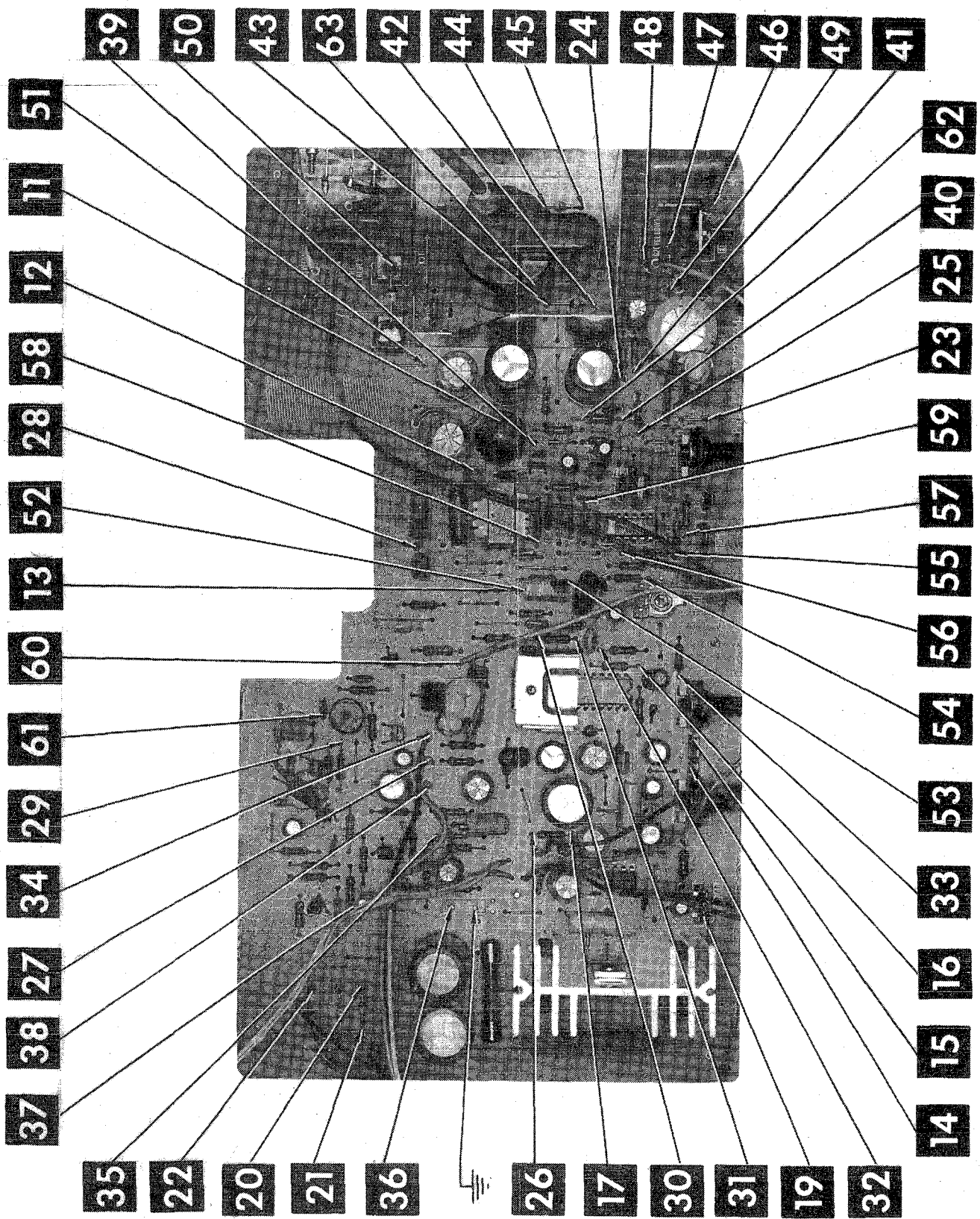
Waveforms and voltages are taken from ground, unless noted otherwise.

Waveforms: triggered scope, keyed rainbow signal applied to video input.

Item numbers in rectangles appear in the alignment/adjustment instructions.

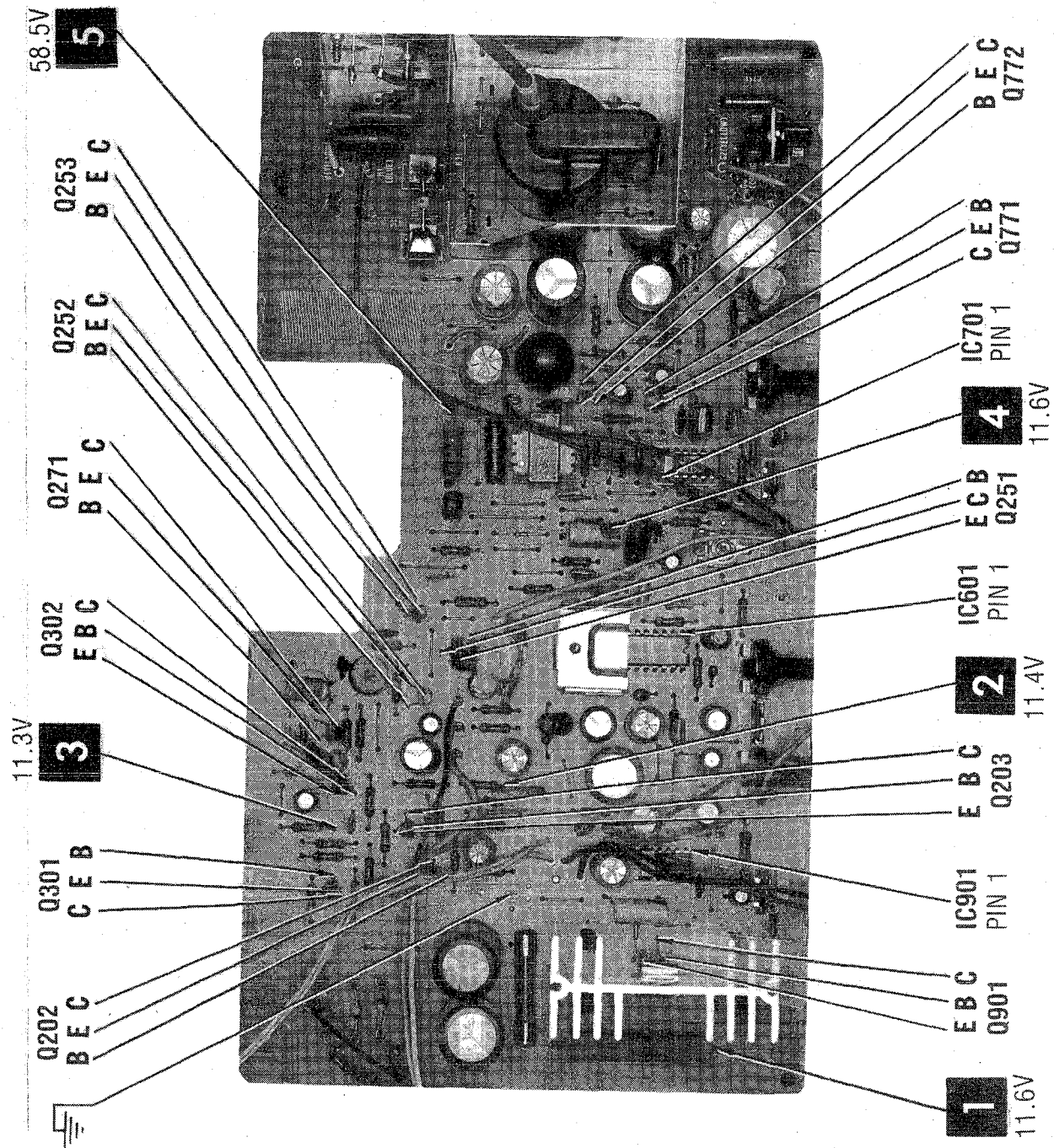
Supply voltages maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Terminal identification may not be found on unit.  
 Capacitors are 50 volts or less, 5% unless noted.  
 Electrolytic capacitors are 50 volts or less, 20% unless noted.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.  
 Measurements with switching as shown, unless noted.

APPLE  
 MODEL A3M0039  
 CMT8-1



MAIN BOARD

A Howard W. Sams CIRCUITRACE® Photo



MAIN BOARD

A Howard W. Sams CIRCUITRACE® Photo

APPLE  
MODEL A3M0039

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

FUSE DEVICES

| ITEM NO.     | DESCRIPTION                                                             | MFGR. PART NO. |        | NOTES |
|--------------|-------------------------------------------------------------------------|----------------|--------|-------|
|              |                                                                         | DEVICE         | HOLDER |       |
| F901<br>F902 | 750mA @ 250V<br>Fast Acting, Pigtail<br>2A @ 125V<br>Slow Blow, Pigtail |                |        |       |

MISCELLANEOUS

| ITEM No.                                       | PART NAME                                                          | MFGR. PART No. | NOTES                                                                                                                    |
|------------------------------------------------|--------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------|
| D908<br>LT251<br>LT252<br>P1<br>P2<br>S1<br>V1 | LED<br>Lamp<br>Lamp<br>Jack<br>Cord<br>Switch<br>CRT<br>P.C. Board | 310KDB42(T)    | Power, Red<br>Neon, used as a Spark Gap<br>Neon, Used as a Spark Gap<br>Video In<br>AC Power, Polarized<br>Power<br>Main |

CABINET & CABINET PARTS (When ordering specify model, chassis & color)

WIRING DATA

|                                           |                                                                                                                |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| High Voltage Lead .....                   | Use BELDEN No. 8869 (17 KV) or 8868 (24 KV)                                                                    |
| Shielded Hook-up Wire .....               | Use BELDEN No. 8401 or 8421 (Single-Conductor)<br>8208 (Two-Conductor)                                         |
| General-use Unshielded Hook-up Wire ..... | Use BELDEN No. 8529 (Solid) Available in 13 Colors<br>8522 (Stranded) Available in 13 Colors                   |
| 300-Ohm Tuner Input Lead .....            | Use BELDEN No. 8225                                                                                            |
| 300-Ohm Antenna Lead-in .....             | Use BELDEN No. 8230 or 8275                                                                                    |
| Antenna Rotor Cable .....                 | Use BELDEN No. 8464 (Flat) or 8484 (Round) 4-Conductor<br>8485 (Round) 5-Conductor<br>8488 (Round) 8-Conductor |

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

| ITEM No. | TYPE No.                                             | MFR. PART No. | REPLACEMENT DATA                             |                       |                      |              |                  |                    |
|----------|------------------------------------------------------|---------------|----------------------------------------------|-----------------------|----------------------|--------------|------------------|--------------------|
|          |                                                      |               | GENERAL ELECTRIC PART No.                    | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. | WORKMAN PART No. | ZENITH PART No.    |
| D201     | HZ6C1<br>1S2076<br>V09C<br>1S982<br>V06CS            |               | GEZD-6.0                                     | NTE5012A              | ECG5012A             | SK6A0/5012A  | WEP1413/5012     | 103-131<br>103-287 |
| D202     |                                                      |               | GE-514                                       | NTE519                | ECG519               | SK3100/519   | WEP925/519       |                    |
| D252     |                                                      |               | GE-511                                       | NTE552                | ECG552               | SK5002       | WEP172/506       |                    |
| D253     |                                                      |               | GE-511                                       | NTE552                | ECG552               | SK9000/552   | WEP172/506       |                    |
| D601     |                                                      |               |                                              | NTE519                | ECG519               | SK3100/519   | WEP925/519       |                    |
| D602     | 1S2076<br>V06E<br>U06C<br>U06CS<br>RD5.1E            |               | GE-531                                       | NTE125                | ECG125               | SK3017B      | WEP170/125       | 103-131<br>903-334 |
| D702     |                                                      |               | GE-533                                       | NTE525                | ECG580               | SK3925/525   | WEP177/525       | 212-29010          |
| D704     |                                                      |               | GE-533                                       | NTE525                | ECG580               | SK3925/525   | WEP177/525       | 212-29010          |
| D706     |                                                      |               | GEZD-5.1                                     | NTE5010A              | ECG5010A             | SK5A1/5010A  | WEP1411/5010     | 103-279-10         |
| D751     |                                                      |               | GE-511                                       | NTE506                | ECG506               | SK3032A      | WEP172/506       | 103-287            |
| D771     | 1S2076<br>HZ36-1                                     |               | GE-514                                       | NTE519                | ECG519               | SK3100/519   | WEP925/519       | 103-131            |
| D772     |                                                      |               | GEZD-36                                      | NTE5037A              | ECG5037A             | SK36A/5037A  | WEP1439/5037     | 103-279-37         |
| D901     |                                                      |               | 1S2076<br>KC581C<br>HA1166X                  |                       | GE-514.<br>GE-1258   | NTE519       | ECG519           | SK3100/519         |
| D902     | NTE1258                                              | ECG1258       |                                              |                       |                      | 905-166      |                  |                    |
| D903     | NTE1251<br>NTE85<br>NTE290A<br>NTE376<br>NTE85       | ECG1251       |                                              |                       |                      |              | ECG1258          |                    |
| D904     |                                                      | ECG85         |                                              |                       |                      |              | ECG290A          |                    |
| D905     |                                                      | ECG376        |                                              |                       |                      |              | ECG85            |                    |
| IC0601   |                                                      | ECG85         | ECG85                                        |                       |                      |              |                  |                    |
| IC701    | KC582C<br>2SC458C<br>2SA673C<br>2SC1514<br>2SC458C   |               | GE-210<br>GE-269<br>GE-251<br>GE-210         | NTE1251               | ECG1251              | SK3124A/289A | WEP910/289       | 121-972*           |
| IC901    |                                                      |               |                                              | NTE85                 | ECG85                | SK9132       | WEP911/290A      | 121-29003*         |
| Q202     |                                                      |               |                                              | NTE290A               | ECG290A              | SK9362/376   | WEP779/198       | 121-29028          |
| Q203     |                                                      |               |                                              | NTE376                | ECG376               | SK3124A/289A | WEP910/289       | 121-972*           |
| Q251     |                                                      |               |                                              | NTE85                 | ECG85                | SK3124A/289A | WEP910/289       | 121-972*           |
| Q252,3   | 2SC458C<br>2SA844D<br>2SC458C<br>2SC681A<br>2SC1213C |               | GE-210<br>GE-65<br>GE-210<br>GE-36<br>GE-268 | NTE85                 | ECG85                | SK3124A/289A | WEP910/289       | 121-972*           |
| Q271     |                                                      |               |                                              | NTE234                | ECG234               | SK3247/234   | WEP907/234       | 121-29005          |
| Q301     |                                                      |               |                                              | NTE85                 | ECG85                | SK3124A/289A | WEP910/289       | 121-972*           |
| Q302     |                                                      |               |                                              | NTE283                | ECG283               | SK3439A/163A | WEP707/162       | 121-29090          |
| Q701     |                                                      |               |                                              | NTE289A               | ECG289A              | SK3122       | WEP910/289       | 121-29065          |
| Q771     | 2SA673C<br>2SA768                                    |               | GE-269<br>GE-69A                             | NTE290A               | ECG290A              | SK9132       | WEP911/290A      | 121-29003*         |
| Q772     |                                                      |               |                                              | NTE153                | ECG153               | SK3274/153   | WEP746/153       | 121-988-03         |

\* Lead configuration may vary from original.

CMT8-1 APPLE MODEL A3M0039

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

| ITEM No. | RATING       | MFGR. PART No. | ITEM No. | RATING | MFGR. PART No. |
|----------|--------------|----------------|----------|--------|----------------|
| C712     | 6.8uF 25V NP |                |          |        |                |

Items not listed are normally available at local distributors.

CAPACITORS

| ITEM No. | RATING         | MFGR. PART No. | ITEM No. | RATING | MFGR. PART No. |
|----------|----------------|----------------|----------|--------|----------------|
| C703     | 100 NP0 50V 5% |                |          |        |                |

Items not listed are normally available at local distributors.

RESISTORS (Power and Special) (cont)

| ITEM No.                     | RATING                                                                           | REPLACEMENT DATA |                   |                  |
|------------------------------|----------------------------------------------------------------------------------|------------------|-------------------|------------------|
|                              |                                                                                  | MFGR. PART No.   | NEW-TONE PART No. | WORKMAN PART No. |
| R258<br>R301<br>R712<br>R905 | 1200 5% 3W Metal Oxide<br>2 5% 1/4W Fusible<br>10 5% 1/4W Fusible<br>27 5% 5W WW |                  | 5W027             |                  |

CONTROLS (All wattages 1/2 watt, or less, unless listed)

| ITEM NO.                                                             | FUNCTION                                                                                                                          | RESISTANCE                                                     | MFGR. PART NO. | NOTES |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------|-------|
| R215<br>R264<br>R604<br>R606<br>R607<br>R707<br>R709<br>R751<br>R903 | Contrast<br>Brightness<br>Vert Hold<br>Vert Height (Size)<br>Vert Linearity<br>Horiz Hold<br>Sub Horiz Hold<br>Focus<br>B+ Adjust | 500<br>500K<br>50K<br>10K<br>5000<br>50K<br>2000<br>2M<br>1000 |                |       |

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

COILS (RF-IF)

| ITEM No.             | FUNCTION                                       | MFGR. PART No. | ITEM No. | FUNCTION             | MFGR. PART No. |
|----------------------|------------------------------------------------|----------------|----------|----------------------|----------------|
| L251<br>L271<br>L702 | Peaking (15uH)<br>Peaking (15mH)<br>R.F. Choke |                | L705     | Horizontal Linearity |                |

COILS & TRANSFORMERS (Sweep Circuits)

| ITEM No.                    | FUNCTION                                                                                 | REPLACEMENT DATA                                   |                      |                     |
|-----------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------|---------------------|
|                             |                                                                                          | MFGR. PART No.                                     | OTHER IDENTIFICATION | THORDARSON PART No. |
| DY1<br>L703<br>T701<br>T702 | Yoke Horiz 138uH<br>90° Vert 2.9mH<br>Width (Horiz Size)<br>Horiz Driver<br>Horiz Output | 2441377(1)<br>(2)<br>2260016(1)<br>2431861BK16M(1) |                      |                     |

- (1) Number on unit.  
(2) Part of Deflection Yoke.

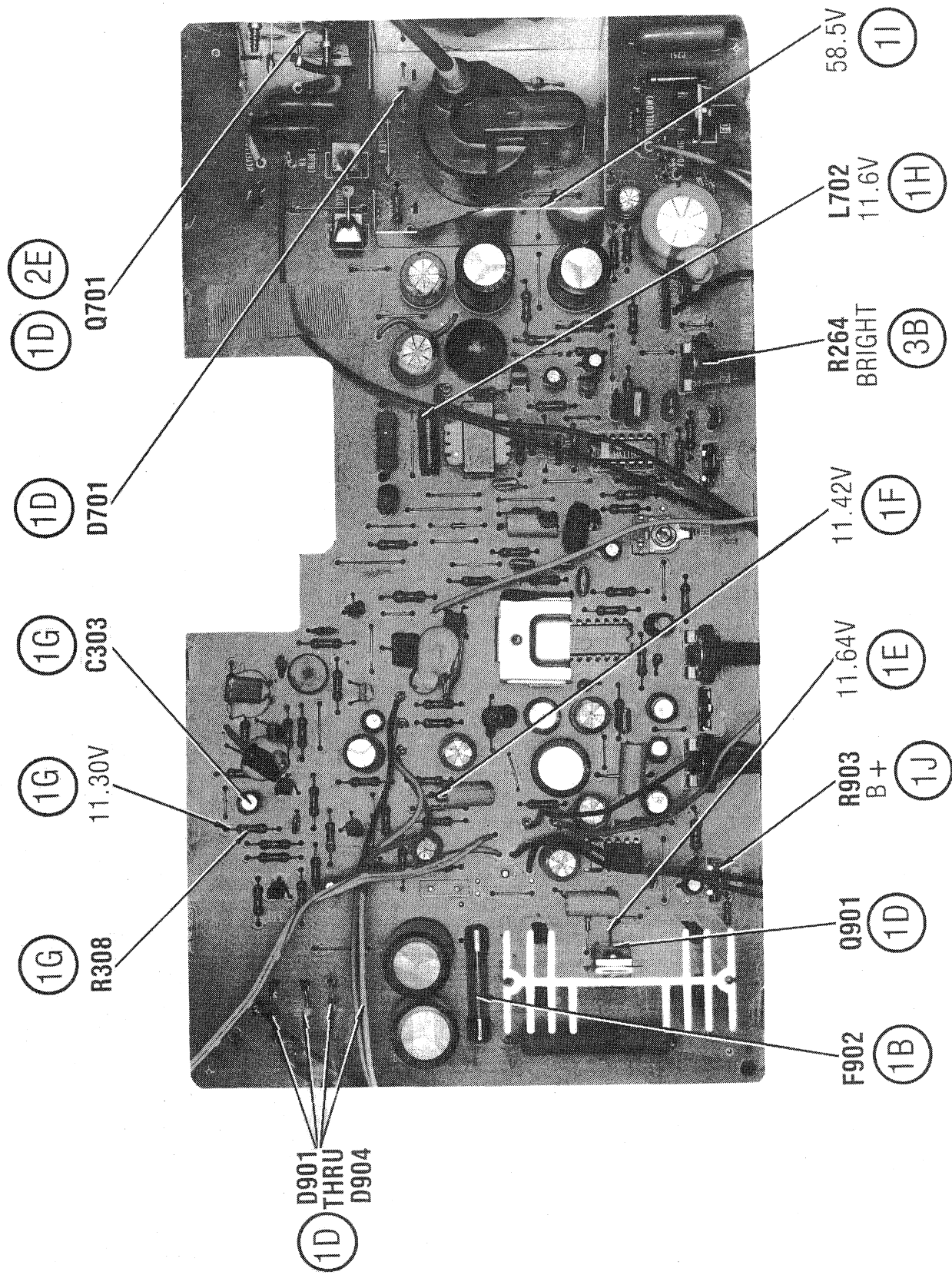
TRANSFORMER (Power)

| ITEM No. | RATING                |                           |        | REPLACEMENT DATA |                     |       |
|----------|-----------------------|---------------------------|--------|------------------|---------------------|-------|
|          | PRI.                  | SEC. 1                    | SEC. 2 | MFGR. PART No.   | THORDARSON PART No. | NOTES |
|          |                       |                           |        |                  |                     |       |
| T1       | 120V AC<br>@<br>235mA | 14.65V AC<br>@<br>1.2A DC |        | 2211687(1)       |                     |       |
|          | SEC. 3                | SEC. 4                    | SEC. 5 |                  |                     |       |
|          |                       |                           |        |                  |                     |       |

- (1) Number on unit.

CMT8-1 APPLE MODEL A3M0039





MAIN BOARD

APPLE  
MODEL A3M0039  
CMT8-1

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool designed for quick isolation and repair of monitor malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

PARTS LIST AND DESCRIPTION

| ITEM | PART NO. | DESCRIPTION                              |
|------|----------|------------------------------------------|
| C303 |          | Electrolytic, 10μF 25V                   |
| D252 |          | Diode, Rectifier                         |
| D701 |          | Diode, Damper                            |
| D901 |          | Diode, Bridge Rectifiers                 |
| Thru |          |                                          |
| D904 |          |                                          |
| F901 |          | AC Fuse, 750mA, 250V                     |
| F901 |          | DC Fuse, 2A, 125V                        |
| L702 |          | Coil RF Choke                            |
| Q701 |          | Transistor, Horizontal Output<br>2SC681A |
| Q901 |          | Transistor, Voltage Regulator<br>2SA768  |
| R215 |          | Control, Contrast 500 Ohms               |
| R264 |          | Control, Brightness 500K                 |
| R301 |          | Resistor, Fusible 2 Ohms                 |
| R308 |          | Resistor, 100 Ohms                       |
| R903 |          | Resistor, 1000 Ohms                      |
| T1   | 2211687  | Power Transformer                        |

CMT8-1  
APPLE  
MODEL A3M0039



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SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 2-amp fuse is used for low-voltage power-supply protection. (See Placement Chart.)

A .75-amp fuse is used for AC line protection. (See Placement Chart.)

HORIZONTAL OSCILLATOR

Coarse adjustment of the horizontal hold is accomplished by the proper setting of the Sub Horiz Hold Control. (See photo, Cabinet-Rear View.)

Fine adjustment of the horizontal hold is accomplished by the proper setting of the Horiz Hold Control. (See photo, Cabinet-Rear View.)

WIDTH

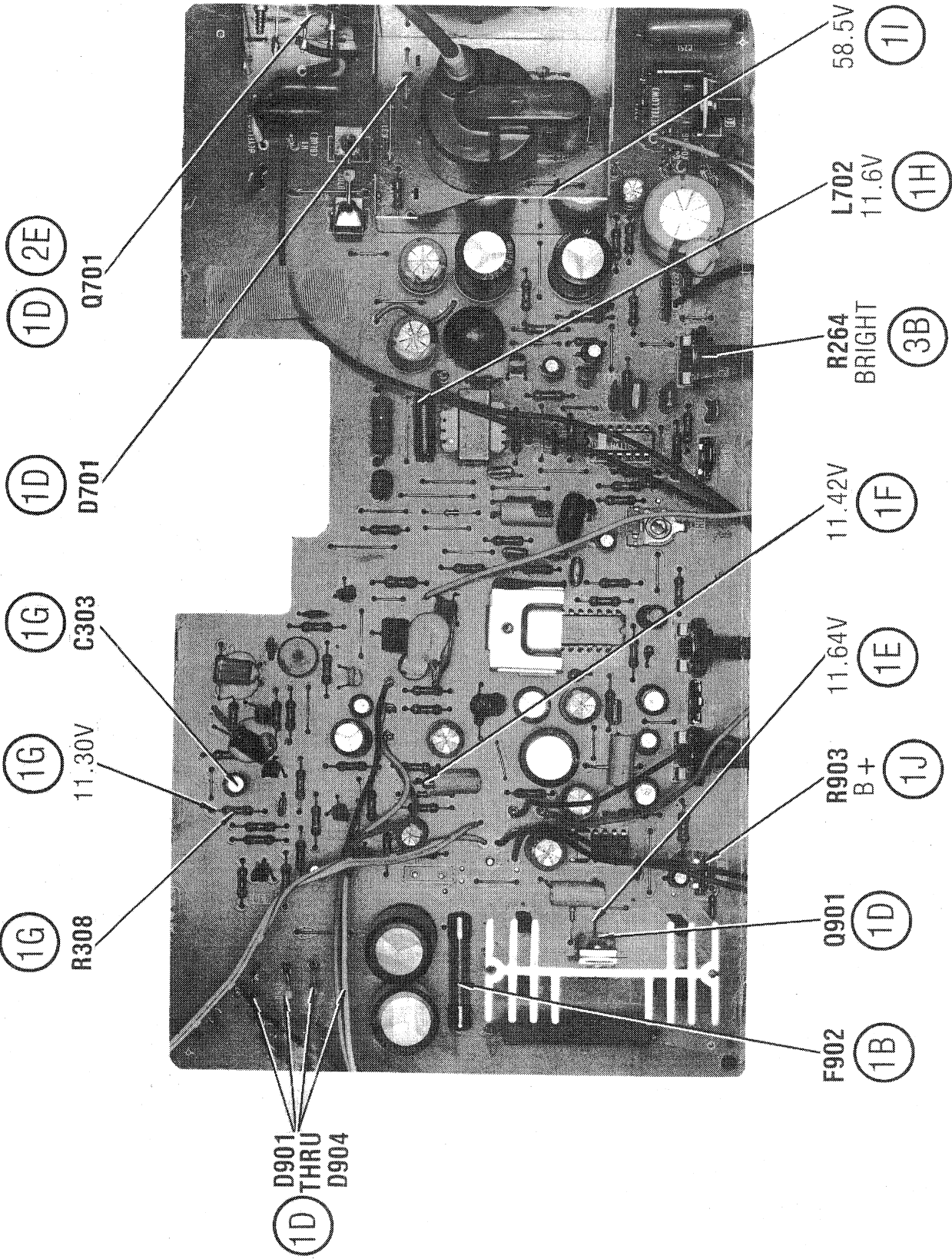
The width may be varied by adjusting the width coil located on the yoke. (See photo, Cabinet-Rear View.)

FOCUS

The focus may be varied by a focus control. (See photo, Cabinet-Rear View.)

CENTERING

Centering is accomplished by proper adjustment of two magnetic rings located on the yoke rear cover.



CMT8-1 APPLE MODEL A3M0039

MAIN BOARD



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from information furnished  
manufacturers of the parti

SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM, PLACEMENT CHART, AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

1. POWER SUPPLY

- (A) Check for open Fuse (F901).
- (B) Check for open Fuse (F902).
- (C) If Fuse F901 is open, check Power Transformer (T1) with an ohmmeter.
- (D) If Fuse F902 is open, check the Voltage Regulator Transistor (Q901), Diodes D901 thru D904, Horizontal Output Transistor (Q701), and Diode D701.
- (E) Check for 11.6V at the collector of Transistor Q901.
- (F) Check for 11.4V at the junction of R301 and R308.
- (G) Check for 11.3V at the junction of Resistor R308 and Electrolytic C303.
- (H) Check for 11.6V at Coil L702.
- (I) Check for 58.5V at the cathode of Diode D252.
- (J) Check adjustment of the B + Control (R903).

2. NO DISPLAY

- (A) Check for bad connection at the Video Input Jack (P1).
- (B) Check CRT voltages.
- (C) Check high voltage with HV probe.
- (D) Check CRT with CRT tester.
- (E) Check Horizontal Output Transistor (Q701).

3. POOR CONTRAST AND BRIGHTNESS

- (A) Clean Contrast Control (R215).
- (B) Clean Brightness Control (R264).

TEST EQUIPMENT AND TOOLS

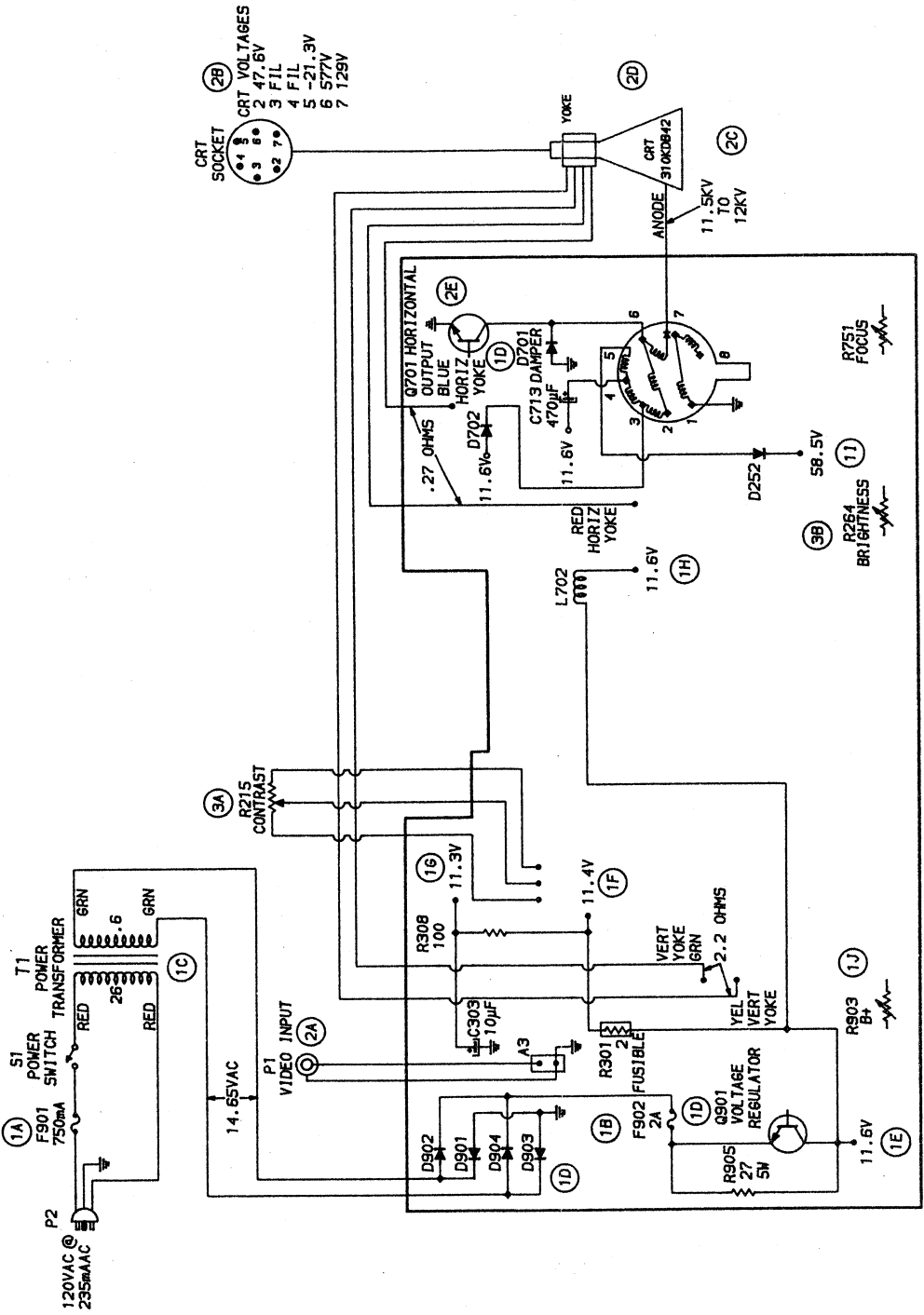
TEST EQUIPMENT

Digital Volt/Ohm Meter  
HV Test Probe

TOOLS

Phillips Screwdriver  
Low Voltage Soldering Iron  
Contact Cleaner  
Desoldering Tool

INTERCONNECTING DIAGRAM



, AND PHOTOS TO MATCH  
OWING DATA FOR SERVICE

.AY

k for bad connection at the Video Input Jack

k CRT voltages.

k high voltage with HV probe.

k CRT with CRT tester.

k Horizontal Output Transistor (Q701).

INTRAST AND BRIGHTNESS

1 Contrast Control (R215).

1 Brightness Control (R264).

TOOLS

TOOLS

- Phillips Screwdriver
- Low Voltage Soldering Iron
- Contact Cleaner
- Desoldering Tool

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

B + ADJUSTMENT

Connect a DC volt meter to the collector of Voltage Regulator Transistor (Q901). Adjust B + Control (R903) for 11.6V on the meter.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back and lift back from set. Disconnect CRT socket, HV anode lead and ground wire. Loosen and remove deflection yoke from CRT neck.

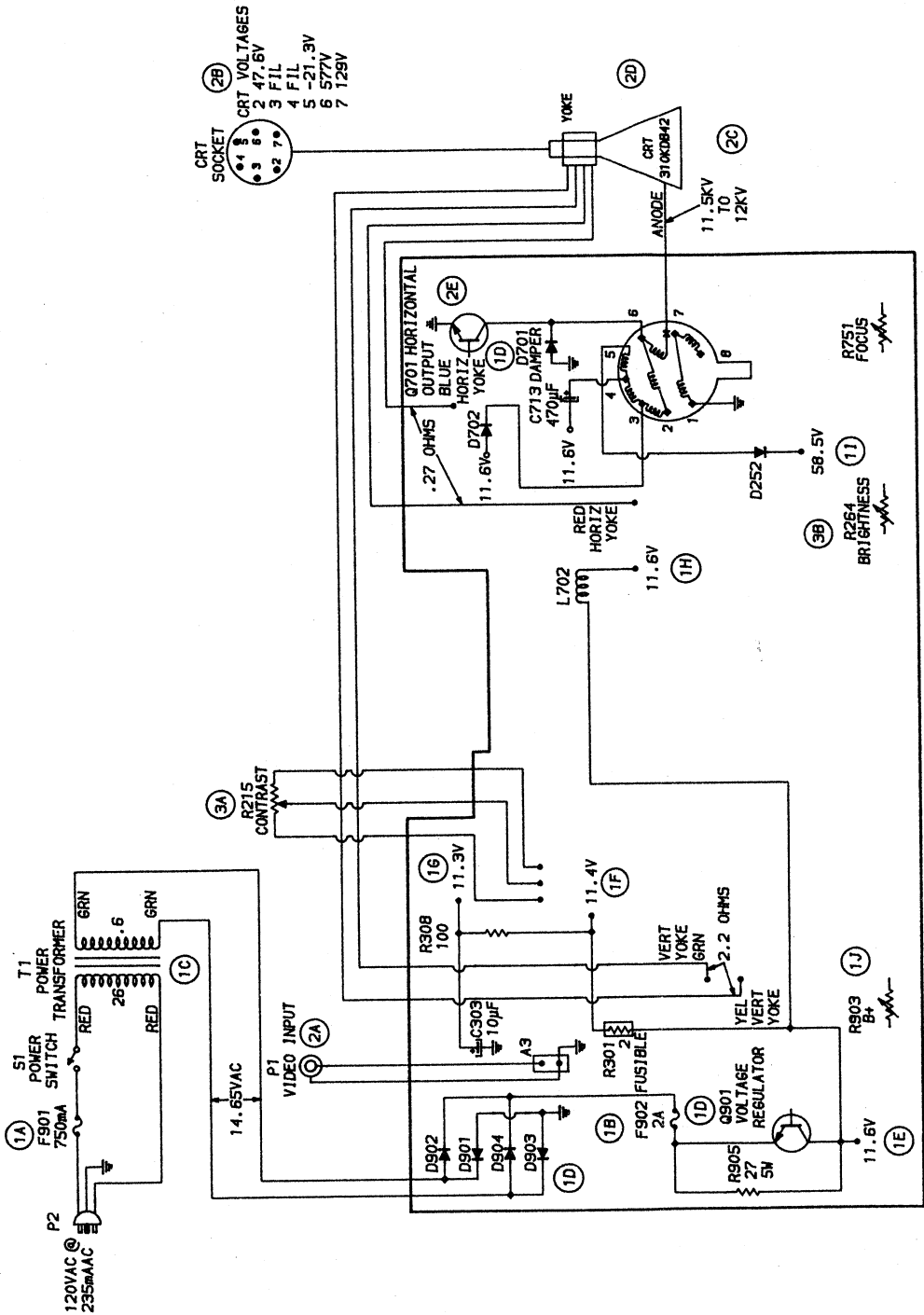
Remove one screw holding Power Indicator and one screw holding power switch bracket to cabinet front. Remove one screw holding power transformer bracket to cabinet front. The Main Board and assemblies may now be removed from cabinet.

CRT REMOVAL

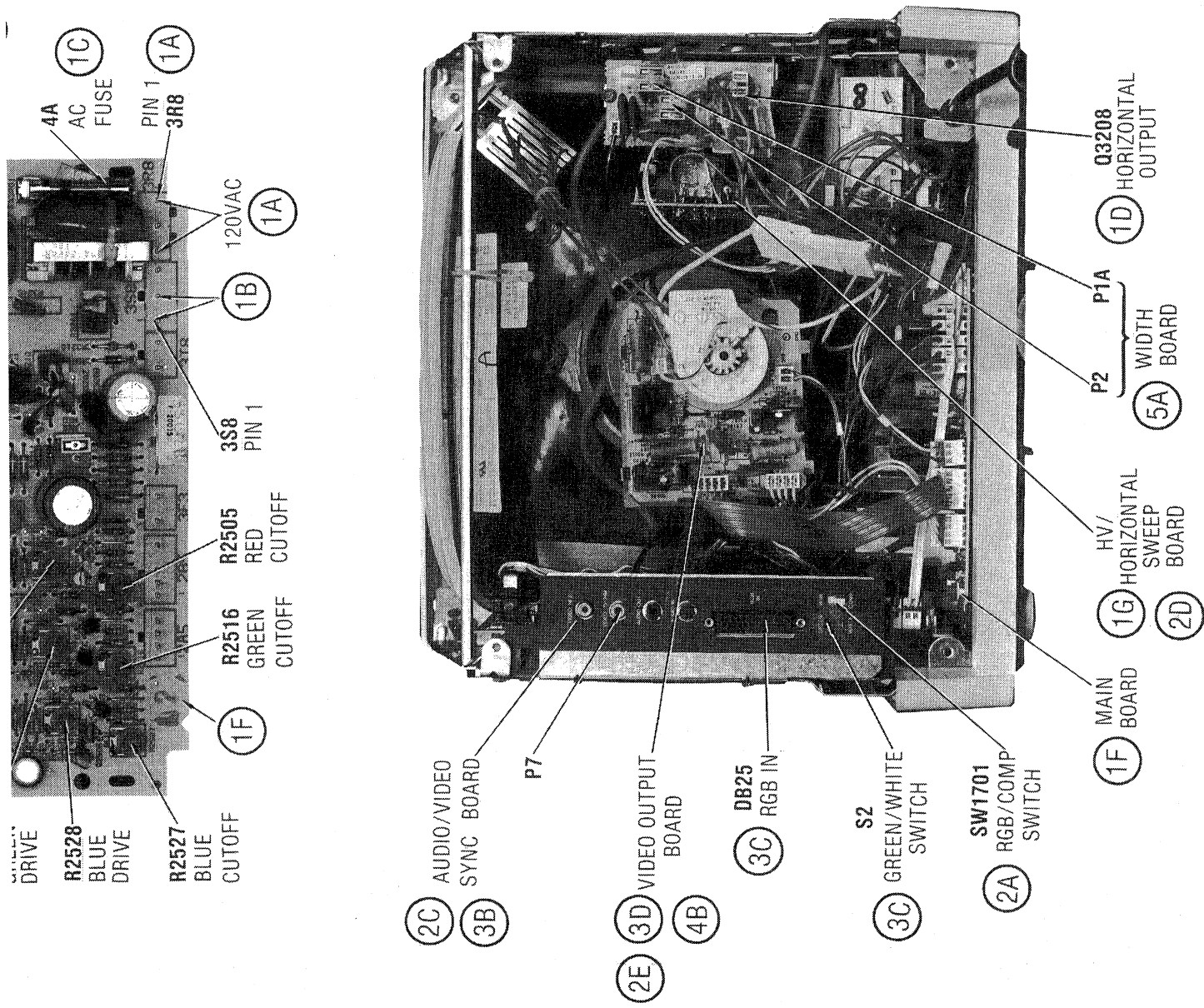
Disconnect CRT socket and HV anode lead. Loosen and remove deflection yoke from CRT neck. Lay set face down on a soft protective surface. Remove four screws holding CRT to cabinet front. Lift CRT from cabinet. **Do not** lift CRT by the neck.

CMT8-1  
MODEL A3M0039  
APPLE

INTERCONNECTING DIAGRAM







CABINET-REAR VIEW

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool designed for quick isolation and repair of Monitor malfunctions.

Check all interconnecting cables for good connection and correct hookup before making service checks.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back, lift up and remove back from set. Lay set facedown and remove two screws from cabinet bottom. Lift cabinet top from set. Remove two screws holding top brace to chassis. Remove two screws holding rear jack panel and two screws holding Audio/Video Sync Board guides. Disconnect all cables from Audio/Video Sync Board and remove board from set.

Remove four screws holding HV/Horizontal Sweep Board to bottom chassis. Disconnect all cables from HV/Horizontal Sweep Board and lift board assembly from cabinet.

Remove four screws holding Main Board to cabinet bottom.

Release two plastic retaining clips holding Main Board. Disconnect all cables from Main Board and lift board from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Disconnect HV anode lead, degaussing coil Connector (3T8), deflection yoke Connector (3S3A and 2A3), speaker Connector (4P4), front panel control Connectors (3S8, TP7, 2A7 and 2B7). Remove four screws holding cabinet front to chassis. Disconnect Power Indicator Connector (Z) and remove cabinet front from set. Remove four screws holding CRT to chassis. Disconnect ground connectors and lift CRT from set.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT

Digital Volt/Ohm Meter  
High Voltage Probe  
CRT Tester  
Crosshatch Generator  
Degaussing Coil

TOOLS

Phillips Screwdriver  
Low Voltage Soldering Iron  
Desoldering Tool

PARTS LIST AND DESCRIPTION

| Item      | Part No.    | Description                                  | Item   | Part No. | Description                              |
|-----------|-------------|----------------------------------------------|--------|----------|------------------------------------------|
| #FX3201   | 136-113-23  | AC Fuse, 4A @250V Fast Acting                | R3441  | 63-10857 | Control, Horizontal Centering (100 Ohms) |
| CR3224    | 103-330     | Diode 330GI                                  | S2     | 85-1628  | Switch, Green/White                      |
| CR3231    | 103-315-06  | Rectifier Diode 315-6C GI                    | SW1701 |          | Switch, RGB/Comp.                        |
| CR3232/33 | 103-315-06  | Rectifier Diodes H315F4                      | S3201  |          | Switch, Power                            |
| CR3234    | 103-315-06  | Rectifier Diode 315-6C GI                    |        |          | PCB, Audio/Video Sync (9-230-5)          |
| IC2376    | 221-179-01  | IC, Chroma/Luminance Processor (221-179-1)   |        |          | PCB, Main (9-227-5A)                     |
| Q3208     |             | Transistor, Horizontal Output (TZ1029-01)    |        |          | PCB, HV/Horizontal Sweep (9-247-4)       |
| R2125     | 63-09063-02 | Control, Vertical Centering (500 Ohms)       |        |          | PCB, Video Output (9-155-18)             |
| R3299A    |             | Focus, Part of Transformer (TX3204) Assembly |        |          | PCB, Start-up                            |
|           |             |                                              |        |          | PCB, Width (A-10530)                     |
|           |             |                                              |        |          | PCB, Control (A-9522-01)                 |

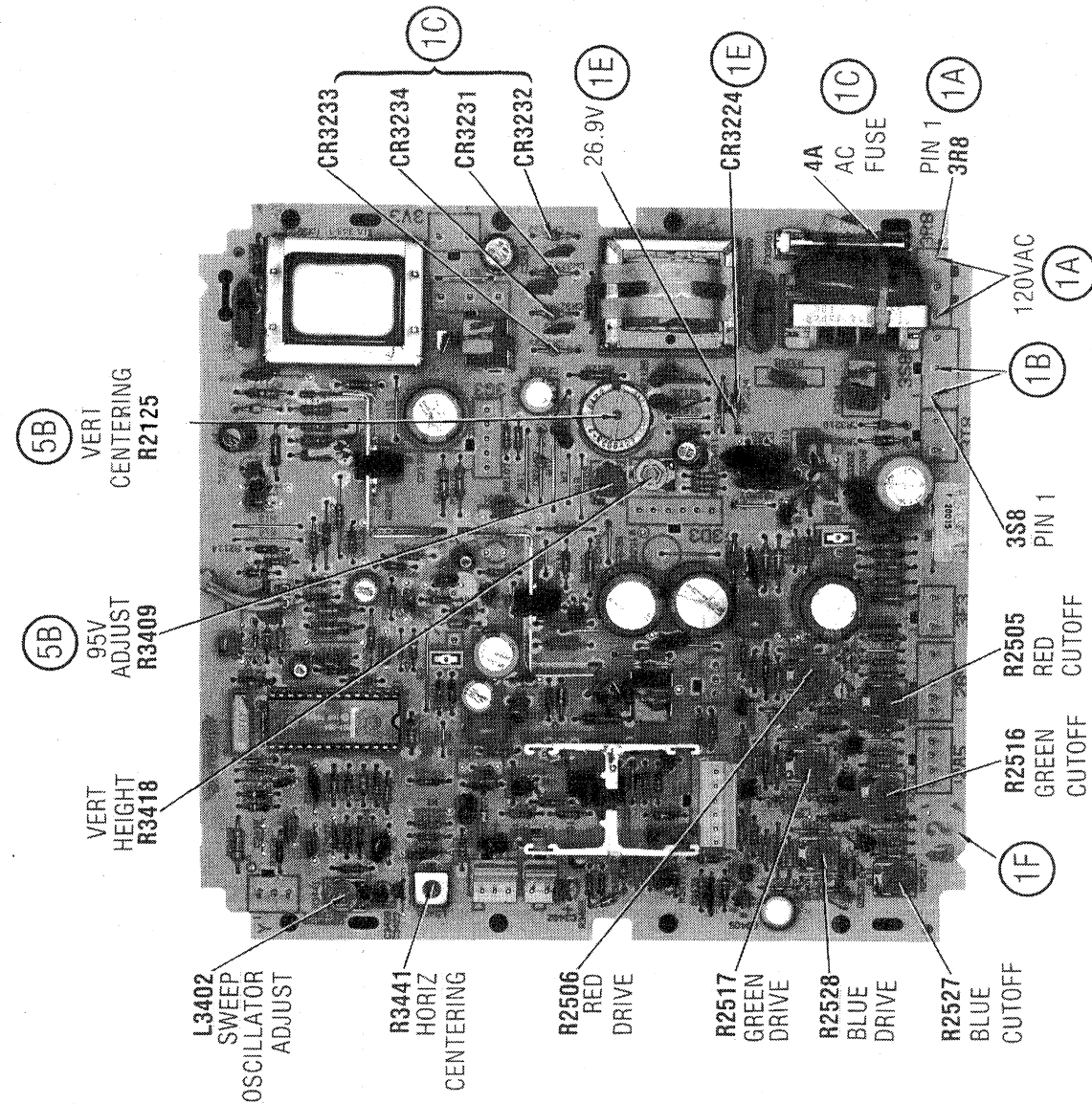
# For SAFETY use only equivalent replacement part.

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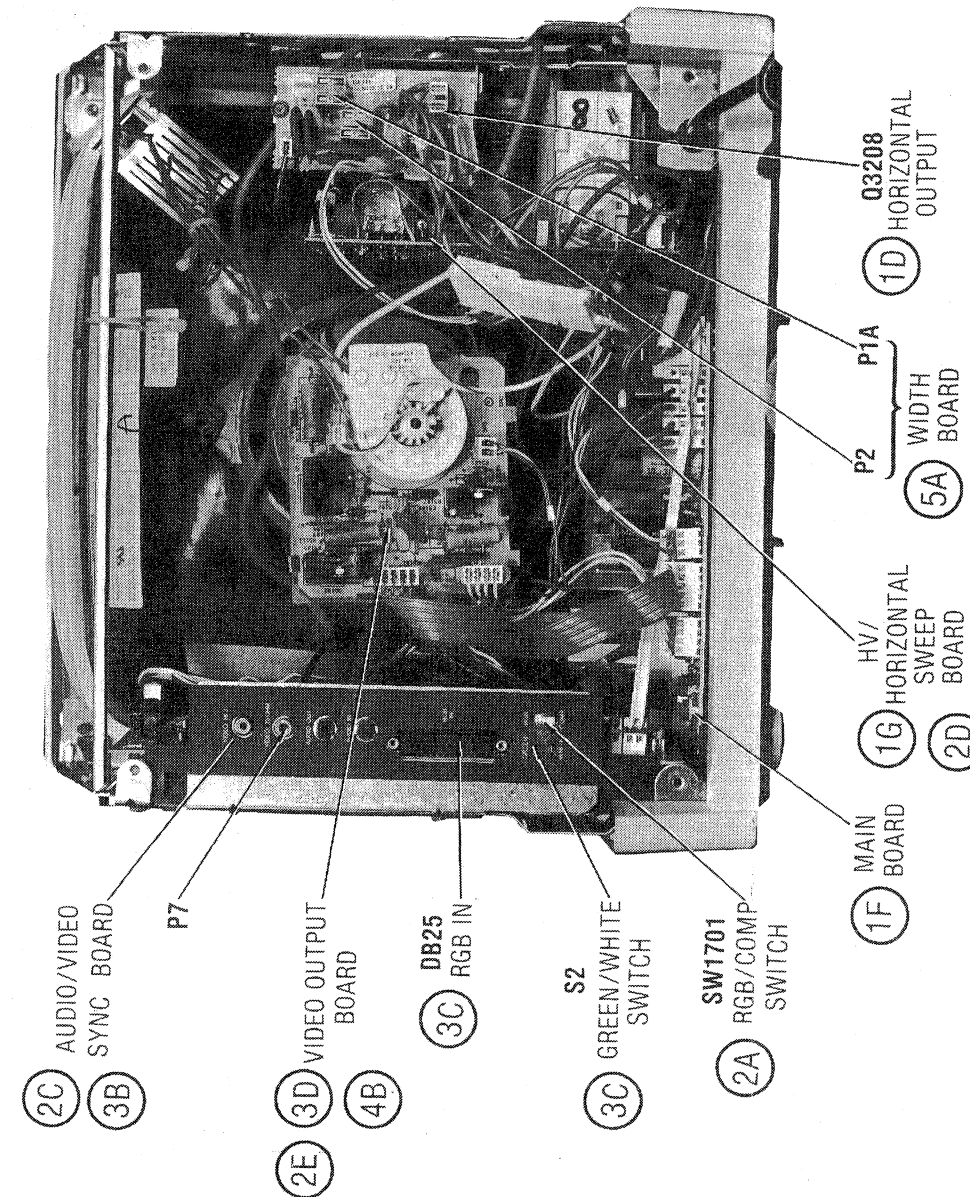
### PRELIMINARY SERVICE CHECKS (Continued)



## MAIN BOARD

## VII

### PRELIMINARY SERVICE CHECKS (Continued)



### CABINET-REAR VIEW

**CMT8-2**  
**ZENITH**  
**MODEL ZVM-131**

## CHASSIS REMOVAL

Remove four screws  
remove back from set.  
screws from cabinet b  
move two screws hol  
two screws holding re  
Audio/Video Sync Bo  
from Audio/Video Syn

Remove four screws holding bottom chassis. Disconnect Sweep Board and lift it

Remove four screws h

## TEST EQUIPMENT

Digital Volt/Ohm Meter  
High Voltage Probe  
CRT Tester  
Crosshatch Generator  
Degaussing Coil

| Item      | Part N |
|-----------|--------|
| #FX3201   | 136-11 |
| CR3224    | 103-33 |
| CR3231    | 103-31 |
| CR3232/33 | 103-31 |
| CR3234    | 103-31 |
| IC2376    | 221-17 |
| Q3208     |        |
| R2125     | 63-090 |
| R3299A    |        |

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## PRELIMINARY SERVICE CHECKS (Continued)

### SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM, PLACEMENT CHART, AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

#### 1. DEAD MONITOR

- (A) Check for 120VAC between pins 1 and 3 of Connector 3R8. If voltage is missing, check Power Cord and Connector 3R8.
- (B) If Power Cord is good, check Power Switch (S3201) and Connector 3S8.
- (C) If the 120VAC is present at Connector 3R8, check AC Fuse (FX3201). If Fuse is open, check Power Rectifiers (CR3231 thru CR3234).
- (D) If Power Rectifiers (CR3231 thru CR3234) are good, check the Horizontal Output Transistor (Q3208). If Transistor Q3208 is defective, replace it and check for 156V at the collector of Transistor Q3208.
- (E) If Transistor Q3208 is good, but the 156V at the collector of Transistor Q3208 is missing, check for 26.9V at the cathode of Diode CR3224.
- (F) If the 26.9V is missing, replace the Main Board (9-227).
- (G) If the 26.9V is present and the Monitor still does not operate, replace the HV/Horizontal Sweep Board (9-247).

#### 2. NO DISPLAY

- (A) Check the RGB/Comp Switch (SW1701), it may be defective or in wrong position.
- (B) If there is no display when using only composite video, replace the Chroma/Luminance Processor (IC2376) on the Audio/Video Sync Board.
- (C) If the video display does not return, replace the Audio/Video Sync Board (9-230).

- (D) If there is no display when using either RGB or Composite Video inputs, check for 95V at TP3 on the HV/Horizontal Sweep Board. If the voltage is missing, replace the HV/Horizontal Sweep Board (9-247).

- (E) Check CRT and CRT socket on Video Output Board.

#### 3. NO COLOR

- (A) If there is no color when using only composite video input, replace the Chroma/Luminance Processor (IC2376) on the Audio/Video Sync board.
- (B) If the color does not return, replace the Audio/Video Sync Board (9-230).
- (C) If there is no color when using RGB input, check the Green/White Switch (S2).
- (D) If only one color is missing, check the Video Output Board by substitution.

#### 4. NO FOCUS

- (A) Check the Focus Control (R3299A) by substitution.
- (B) If the characters on the display are still out of focus, check the Video Output Board by substitution.

#### 5. DISPLAY DOES NOT FIT ON CRT

- (A) Check connectors P1A and P2 on the Width Board.
- (B) Adjust Horizontal (R3441) and Vertical (R2125) Centering controls.

## PRELIMINARY SERVICE CHECKS (Continued)

### MISCELLANEOUS ADJUSTMENTS

#### VIDEO INPUT CUTOFF ADJUSTMENT

Preset the Red (R1708) and Blue (R1714) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

#### APC ADJUSTMENT

Connect a color bar signal generator to the Video Input 75 Ohm Jack (P7). Rotate Service Plug (A1) 90 degrees to Color Set-Up position. Adjust APC Control (R2390) for MINIMUM movement of color. Return Plug A1 to Normal position.

#### RGB CUTOFF ADJUSTMENT

Preset the Red (R2505), Green (R2516), and Blue (R2527) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

#### RGB DRIVE ADJUSTMENT

Connect a video generator to Video Input 75 Ohm Jack (P7). Set video generator for an all white raster signal. Adjust the Red (R2506), Green (R2517) and Blue (R2528) Drive Controls for a white raster.

#### VERTICAL CENTERING AND HEIGHT ADJUSTMENT

Adjust Screen Control (R3299B) until a raster appears. Adjust Vertical Height Control (R3418) and the Vertical Centering Control (R2125) so the top of raster is 1/2 inch from top of CRT and the bottom of raster is 1/2 inch from bottom of CRT. Readjust the Screen Control until raster just disappears.

#### SWEEP OSCILLATOR ADJUSTMENT

Adjust Sweep Oscillator Coil (L3402) for a stable picture.

#### 95V ADJUSTMENT

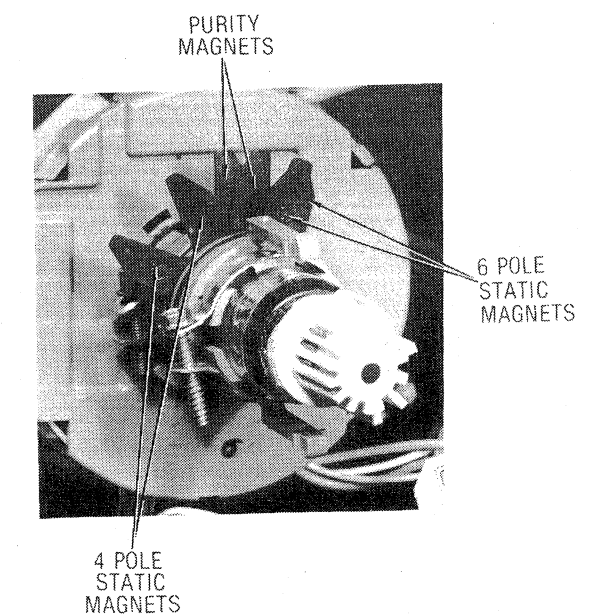
Connect a DC meter to TP3 (pin G of Horizontal Output Transformer TX3204). Adjust 95V Adjust Control (R3409) for 95V.

#### PURITY ADJUSTMENT

If the CRT appears to be magnetized use a degaussing coil to demagnetize the CRT and mounting brackets. If necessary, perform center convergence. Before proceeding with the purity adjustment, the Screen Control (R3299B) must be adjusted. Set the Color Level, Black Level and Picture Controls to MINIMUM. Set the Red (R2505), Green (R2516) and Blue (R2527) Cutoff Controls to MINIMUM. Advance Screen Control until a dim raster appears. Advance the Green Cutoff, Black Level and Picture Controls to produce a green screen. Move deflection yoke back to produce a green stripe. Adjust the Purity Tabs to center the green stripe. Turn Green Cutoff Control to MINIMUM. Advance the Red Cutoff Control to produce a red stripe. Slide the deflection yoke forward until a uniform red screen is obtained. If necessary, readjust the Purity Tabs to obtain a pure red screen. Check the purity of all three colors by advancing each Cutoff Control one at a time.

#### CONVERGENCE ADJUSTMENTS

Connect a crosshatch generator to the Video Input 75 Ohm Jack (P7) and tune in a crosshatch pattern. Rotate the Tabs of the Four Pole Static Magnet to converge the Red and Blue Horizontal Lines. Rotate the Tabs of the Four Pole Static Magnet around the neck of the CRT to converge the Red and Blue Vertical Lines. Rotate the Tabs of the Six Pole Static Magnet to converge the Red/Blue and Green Horizontal Lines. Rotate the Tabs of the Six Pole Static Magnet around the neck of the CRT to converge the Red/Blue and Green Vertical Lines.



#### CRT NECK ASSEMBLY

1G

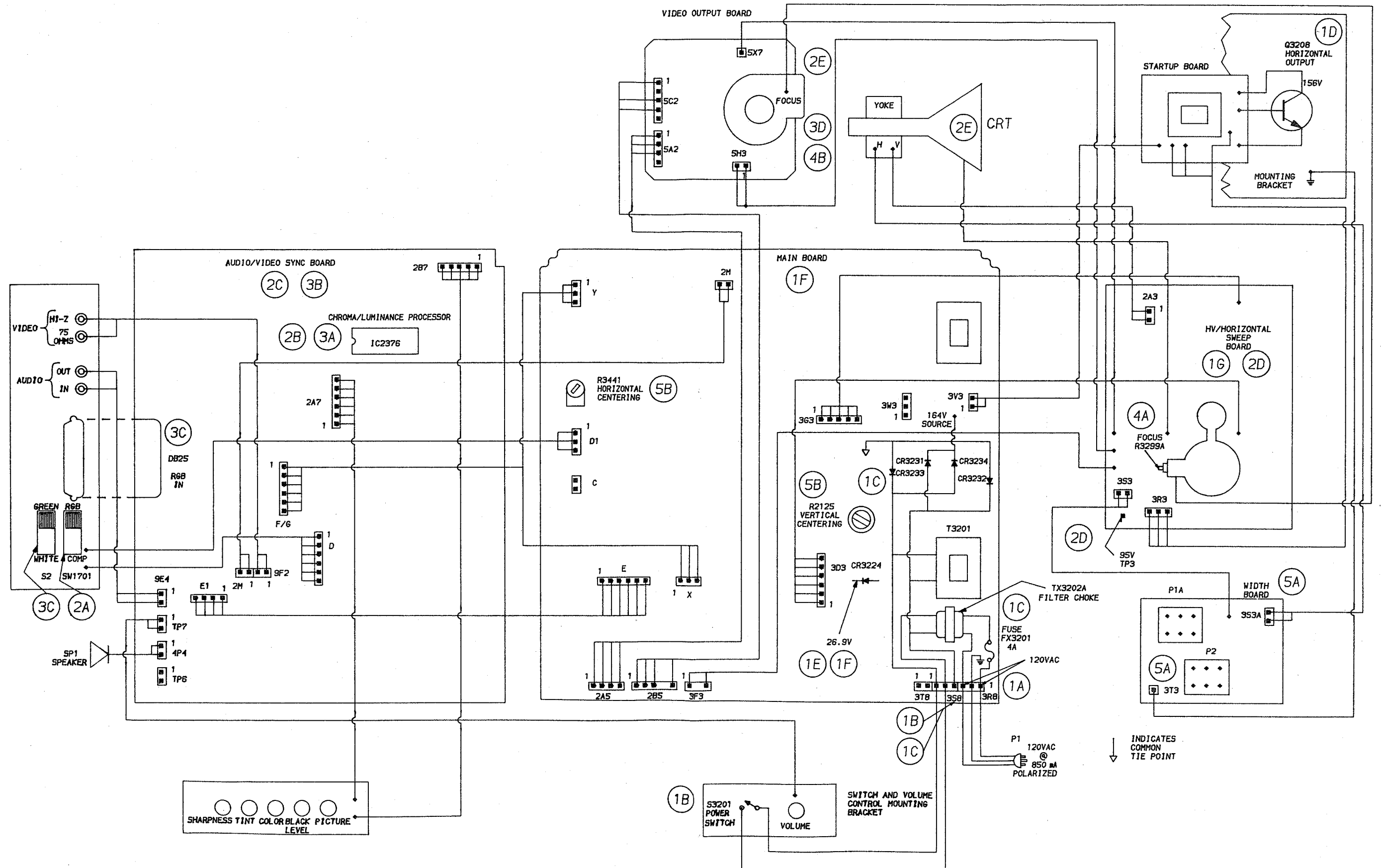
2D

R3299  
FOCUS

4A R3299  
SCREE

2D 95  
TI

### PRELIMINARY SERVICE CHECKS (Continued)



### INTERCONNECTING DIAGRAM

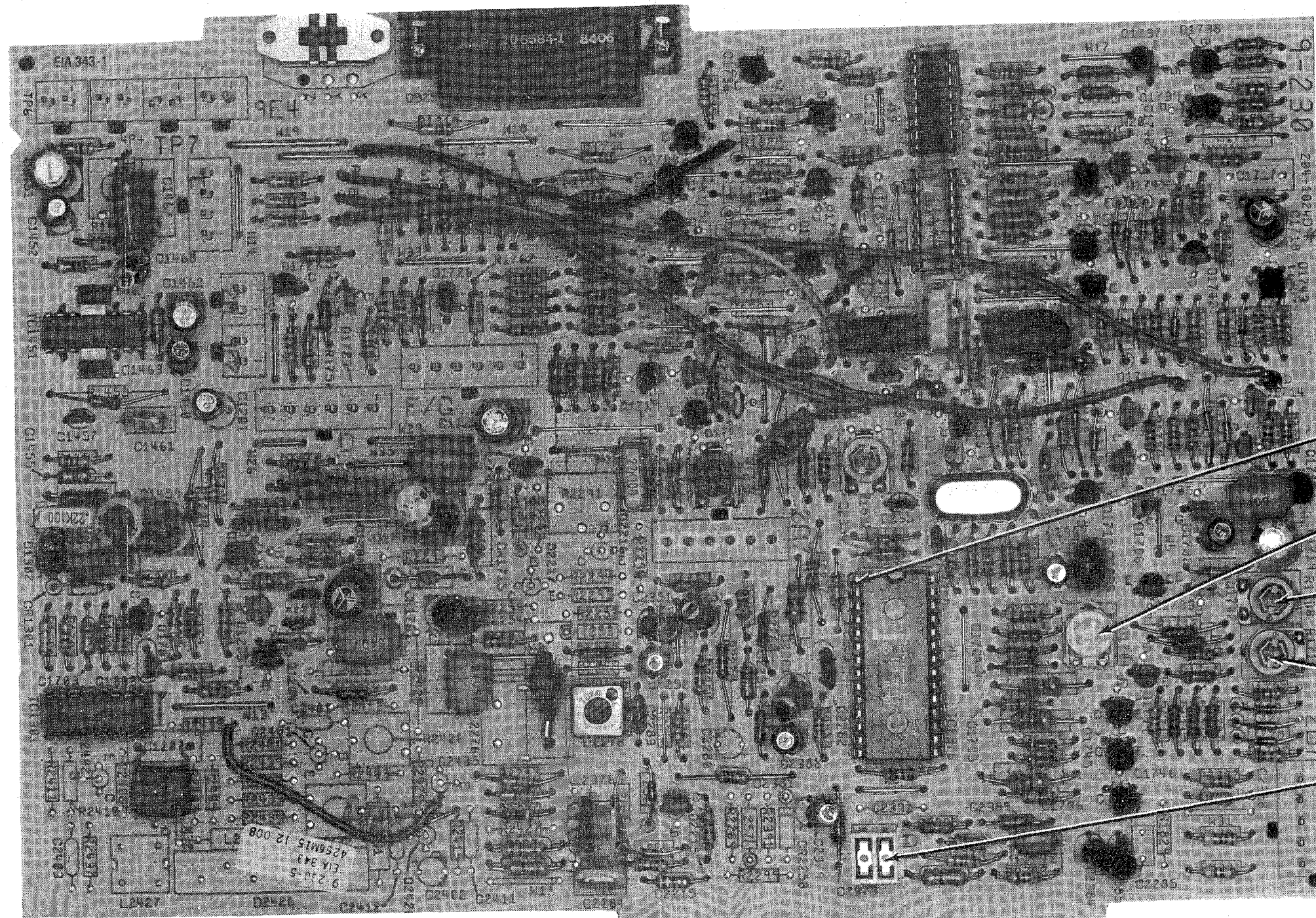
### INTERCONNECTING DIAGRAM

**CMT8-2**  
**ZENITH**  
**MODEL ZVM-131**



# PRELIMINARY SERVICE CHECKS (Continued)

# PRELIMINARY SERVICE CHECKS (Continued)



PIN 1 (2B)  
IC2376 (3A)

R2390  
APC AJUST

R1708  
RED CUTOFF

R1714  
BLUE CUTOFF

A1  
SERVICE PLUG

AUDIO/VIDEO SYNC BOARD

AUDIO/VIDEO SYNC BOARD

IV

V

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CHECKS (Continued)

CHECKS

IDENT CHART, AND PHOTOS TO MATCH  
IN THE FOLLOWING DATA FOR SERVICE

- (D) If there is no display when using either RGB or Composite Video inputs, check for 95V at TP3 on the HV/Horizontal Sweep Board. If the voltage is missing, replace the HV/Horizontal Sweep Board (9-247).
- (E) Check CRT and CRT socket on Video Output Board.
- 3. NO COLOR
  - (A) If there is no color when using only composite video input, replace the Chroma/Luminance Processor (IC2376) on the Audio/Video Sync board.
  - (B) If the color does not return, replace the Audio/Video Sync Board (9-230).
  - (C) If there is no color when using RGB input, check the Green/White Switch (S2).
  - (D) If only one color is missing, check the Video Output Board by substitution.
- 4. NO FOCUS
  - (A) Check the Focus Control (R3299A) by substitution.
  - (B) If the characters on the display are still out of focus, check the Video Output Board by substitution.
- 5. DISPLAY DOES NOT FIT ON CRT
  - (A) Check connectors P1A and P2 on the Width Board.
  - (B) Adjust Horizontal (R3441) and Vertical (R2125) Centering controls.

PRELIMINARY SERVICE CHECKS (Continued)  
MISCELLANEOUS ADJUSTMENTS

VIDEO INPUT CUTOFF ADJUSTMENT

Preset the Red (R1708) and Blue (R1714) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

APC ADJUSTMENT

Connect a color bar signal generator to the Video Input 75 Ohm Jack (P7). Rotate Service Plug (A1) 90 degrees to Color Set-Up position. Adjust APC Control (R2390) for MINIMUM movement of color. Return Plug A1 to Normal position.

RGB CUTOFF ADJUSTMENT

Preset the Red (R2505), Green (R2516), and Blue (R2527) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

RGB DRIVE ADJUSTMENT

Connect a video generator to Video Input 75 Ohm Jack (P7). Set video generator for an all white raster signal. Adjust the Red (R2506), Green (R2517) and Blue (R2528) Drive Controls for a white raster.

VERTICAL CENTERING AND HEIGHT ADJUSTMENT

Adjust Screen Control (R3299B) until a raster appears. Adjust Vertical Height Control (R3418) and the Vertical Centering Control (R2125) so the top of raster is 1/2 inch from top of CRT and the bottom of raster is 1/2 inch from bottom of CRT. Readjust the Screen Control until raster just disappears.

SWEEP OSCILLATOR ADJUSTMENT

Adjust Sweep Oscillator Coil (L3402) for a stable picture.

95V ADJUSTMENT

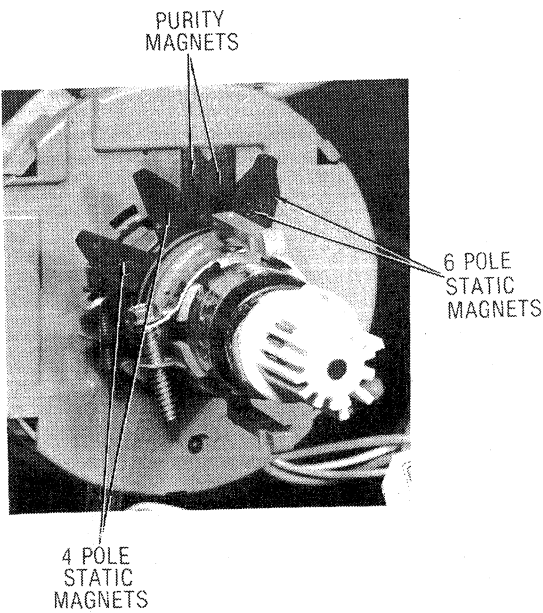
Connect a DC meter to TP3 (pin G of Horizontal Output Transformer TX3204). Adjust 95V Adjust Control (R3409) for 95V.

PURITY ADJUSTMENT

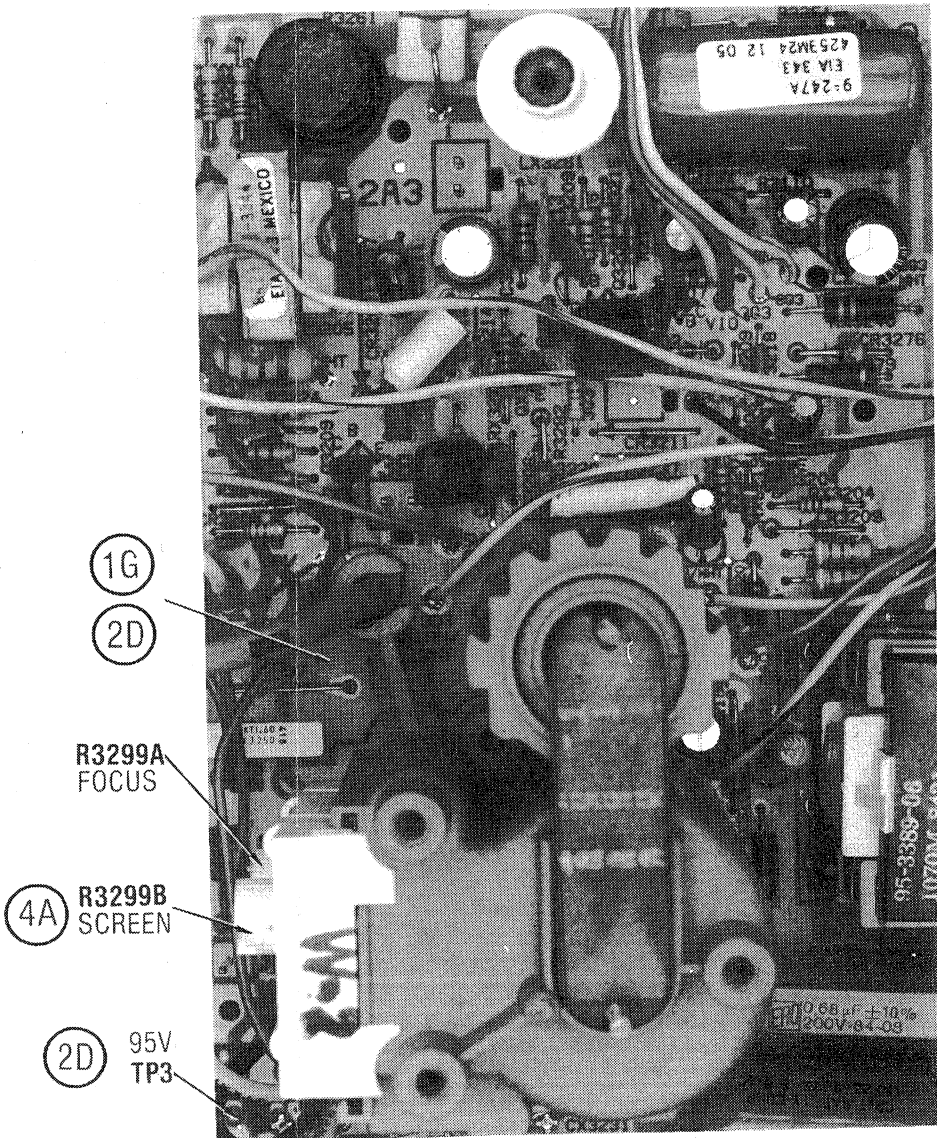
If the CRT appears to be magnetized use a degaussing coil to demagnetize the CRT and mounting brackets. If necessary, perform center convergence. Before proceeding with the purity adjustment, the Screen Control (R3299B) must be adjusted. Set the Color Level, Black Level and Picture Controls to MINIMUM. Set the Red (R2505), Green (R2516) and Blue (R2527) Cutoff Controls to MINIMUM. Advance Screen Control until a dim raster appears. Advance the Green Cutoff, Black Level and Picture Controls to produce a green screen. Move deflection yoke back to produce a green stripe. Adjust the Purity Tabs to center the green stripe. Turn Green Cutoff Control to MINIMUM. Advance the Red Cutoff Control to produce a red stripe. Slide the deflection yoke forward until a uniform red screen is obtained. If necessary, readjust the Purity Tabs to obtain a pure red screen. Check the purity of all three colors by advancing each Cutoff Control one at a time.

CONVERGENCE ADJUSTMENTS

Connect a crosshatch generator to the Video Input 75 Ohm Jack (P7) and tune in a crosshatch pattern. Rotate the Tabs of the Four Pole Static Magnet to converge the Red and Blue Horizontal Lines. Rotate the Tabs of the Four Pole Static Magnet around the neck of the CRT to converge the Red and Blue Vertical Lines. Rotate the Tabs of the Six Pole Static Magnet to converge the Red/Blue and Green Horizontal Lines. Rotate the Tabs of the Six Pole Static Magnet around the neck of the CRT to converge the Red/Blue and Green Vertical Lines.



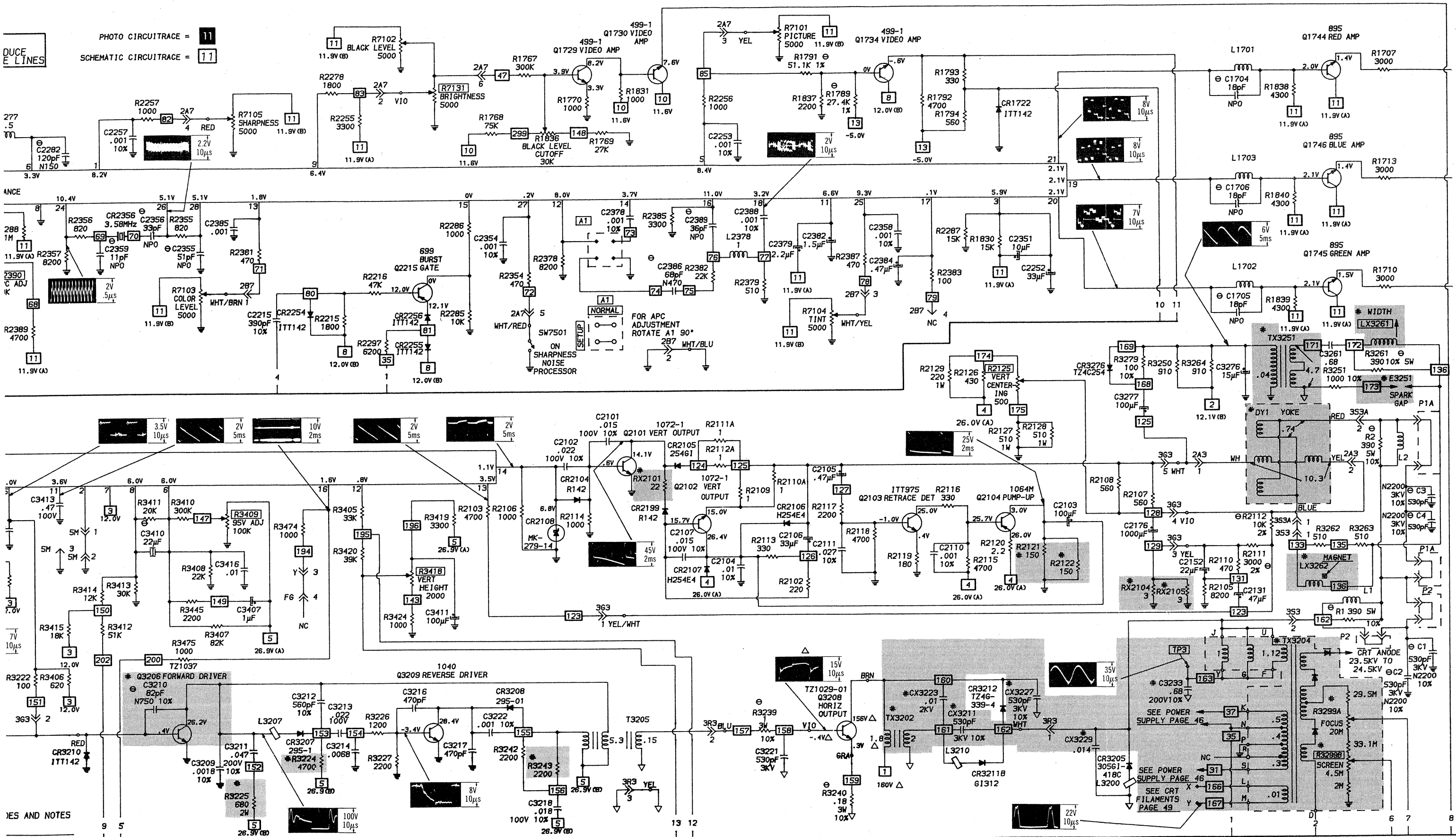
CRT NECK ASSEMBLY



HV/HORIZONTAL SWEEP BOARD



DUCE  
E LINES

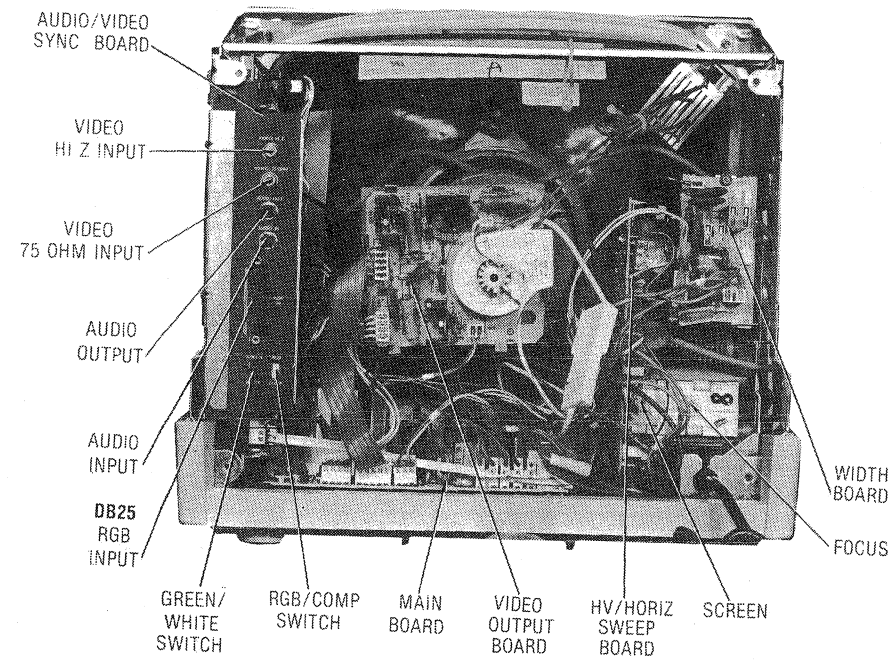
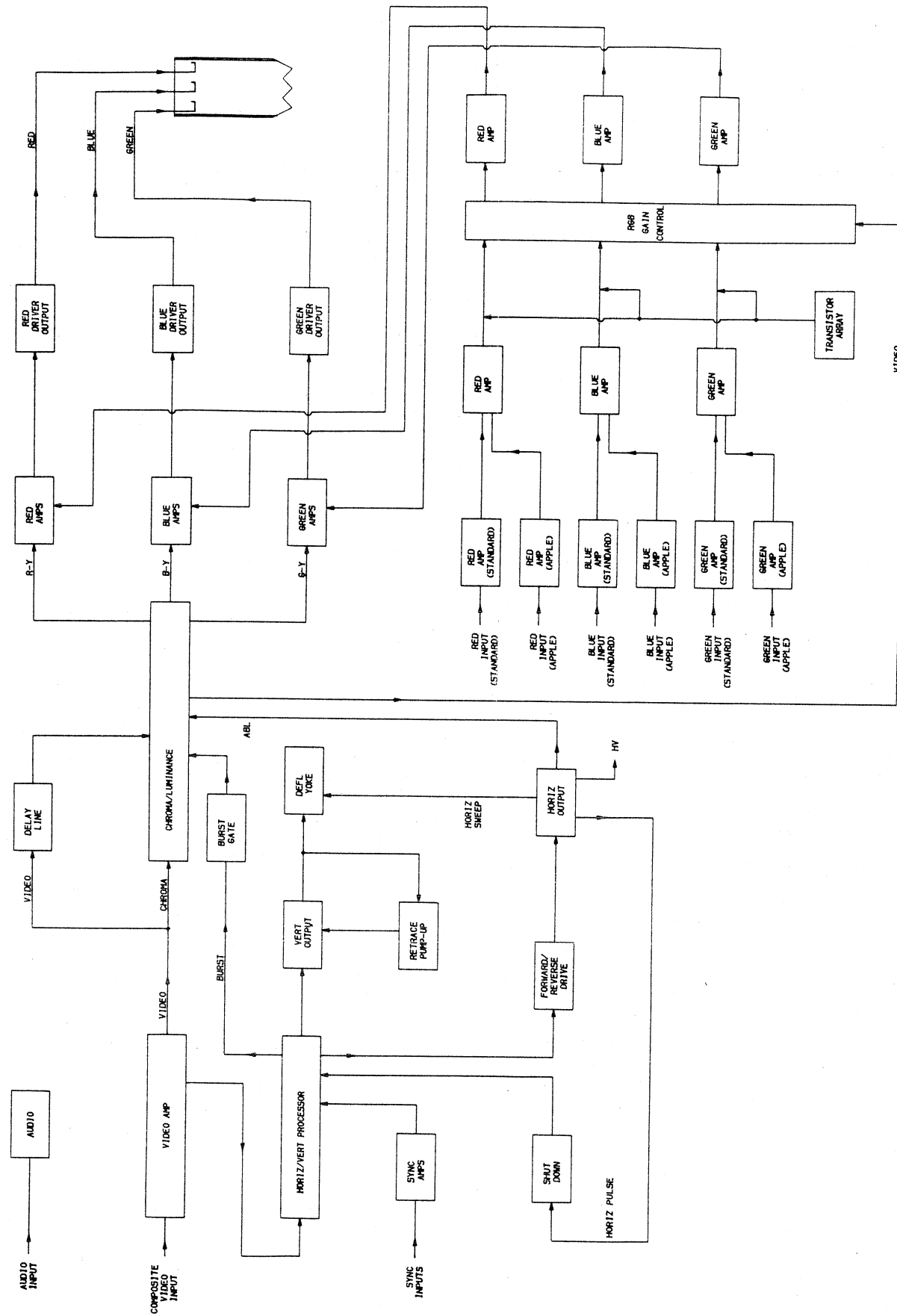


YES AND NOTES





## BLOCK DIAGRAM



## CABINET-REAR VIEW DISASSEMBLY INSTRUCTIONS

### CHASSIS REMOVAL

Remove four screws holding cabinet back, lift up and remove back from set. Lay set facedown and remove two screws from cabinet bottom. Lift cabinet top from set. Remove two screws holding top brace to chassis. Remove two screws holding rear jack panel and two screws holding Audio/Video Sync Board guides. Disconnect all cables from Audio/Video Sync Board and remove board from set.

Remove four screws holding HV/Horizontal Sweep Board to bottom chassis. Disconnect all cables from HV/Horizontal Sweep Board and lift board assembly from cabinet.

Remove four screws holding Main Board to cabinet bottom.

Release two plastic retaining clips holding Main Board. Disconnect all cables from Main Board and lift board from cabinet.

### CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Disconnect HV anode lead, degaussing coil Connector (3T8), deflection yoke Connector (3S3A and 2A3), speaker Connector (4P4), front panel control Connectors (3S8, TP7, 2A7 and 2B7). Remove four screws holding cabinet front to chassis. Disconnect Power Indicator Connector (Z) and remove cabinet front from set. Remove four screws holding CRT to chassis. Disconnect ground connectors and lift CRT from set.

## SERVICING IN THE FIELD

### CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

### FUSE DEVICES

A 4-amp fuse is used for AC line protection. (See Placement Chart.)

### WIDTH

The width may be varied by adjusting the width coil (LX3261). (See Placement Chart.)

Coarse adjustment of width may be varied by connecting the width jumper to various width points P1A and P2. (See Placement Chart.)

### FOCUS

The focus may be varied by a focus control (R3299A). (See photo, Cabinet - Rear View.)

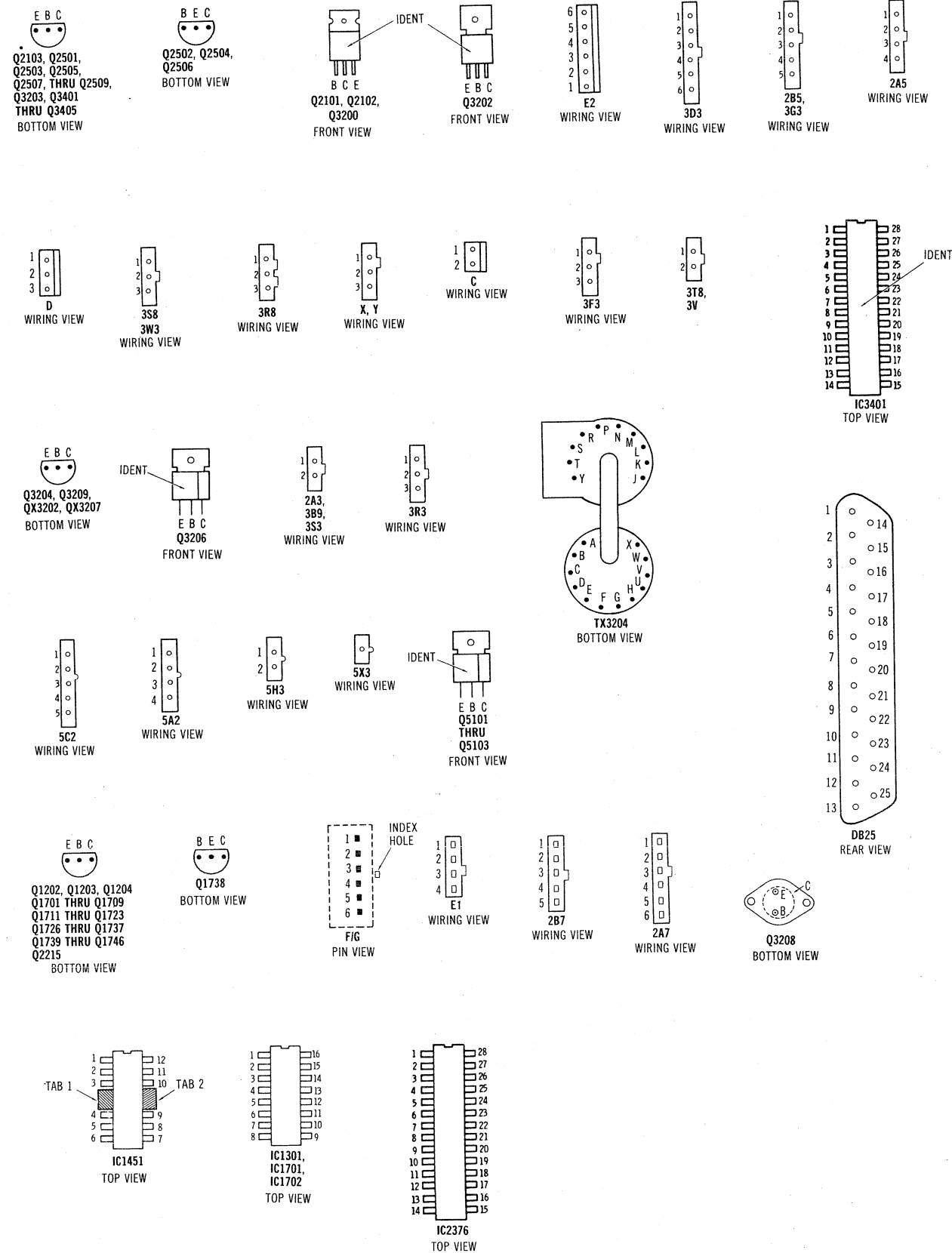
### CENTERING

Horizontal centering is accomplished by proper adjustment of the horizontal centering control (R3441). (See Placement Chart.)

Vertical centering is accomplished by proper adjustment of the vertical centering control (R2125). (See Placement Chart.)

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## TERMINAL GUIDES



## SERVICE INFORMATION

### HIGH VOLTAGE SHUTDOWN DEFEAT

**CAUTION:** Care should be taken in defeating the High Voltage Shutdown Circuit which may cause excessive high voltage and damage to the Horizontal Output Transformer (TX3204), CRT or other circuits supplied B+ from Transformer TX3204. Monitor the high voltage, if it becomes excessive, do not defeat the shutdown circuit. To troubleshoot a set with excessive high voltage, use an isolation transformer with a stepdown control as an AC power supply.

To defeat the shutdown circuit unsolder one end of Diode CX3209 and lift from the board. If this does not defeat the shutdown circuit, check for a shorted Switch Transistor (QX3202). If the shutdown circuit is not working properly, check the voltages and components associated with Shutdown Transistors (QX3202, Q3204 and Q3207). See the "Shutdown Voltage Chart" for voltages measured with the monitor in shutdown.

### SHUTDOWN VOLTAGE CHART

**NOTE:** Voltages are measured with monitor in shutdown.

| ITEM   | E    | B     | C     |
|--------|------|-------|-------|
| QX3202 | 0V   | 0.76V | 0.02V |
| Q3204  | 7.1V | 6.4V  | 7.03V |
| Q3207  | 1.5V | 2.25V | 1.51V |

### HIGH VOLTAGE SHUTDOWN CIRCUIT DESCRIPTION

The high voltage is monitored by rectifying the 60V P-P horizontal pulse, at pin N of the Horizontal Output Transformer (TX3204). The pulse, rectified by Diode CR3206, is applied to a resistor voltage divider network, Zener Diode CRX3204 then to the base of the Shutdown Transistor (Q3207). If the high voltage becomes excessive, the Diode CRX3204 will conduct, Transistor Q3207 will begin to conduct and apply enough voltage to the base of Shutdown Transistor Q3204 to cause it to conduct. When Transistor Q3204 conducts a bias voltage is applied to the base of Switch Transistor (QX3202) thru Resistor RX3204, Diodes CR3209 and CR3211, and causes Transistor QX3202 to conduct. When Transistor QX3202 conducts, it will cause the Forward Driver Transistor (Q3206) to conduct to disable the horizontal drive and shutdown the horizontal circuit. The shutdown circuit also monitors Transformer TX3204 at pin D thru Resistor RX3206. If Transformer TX3204 breaks down, the arc transient causes the emitter of Transistor Q3207 to go negative with respect to the base to start Transistor Q3207 conducting, activating the shutdown circuit.

## SCHEMATIC NOTES

# For SAFETY use only equivalent replacement part, see parts list.

- Circuitry not used in some versions
- Circuitry used in some versions
- See parts list
- ⊥ Ground
- ⏏ Chassis
- ▽ Common tie point

Waveforms and voltages taken from ground, unless noted otherwise.

Waveforms taken using a color bar signal applied at Video 75 Ohm Input Jack (P7) unless noted.

Time in  $\mu$ sec. per cm, given with p-p reading at the end of each waveform.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltages maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are  $\frac{1}{2}$ W or less, 5% unless noted.

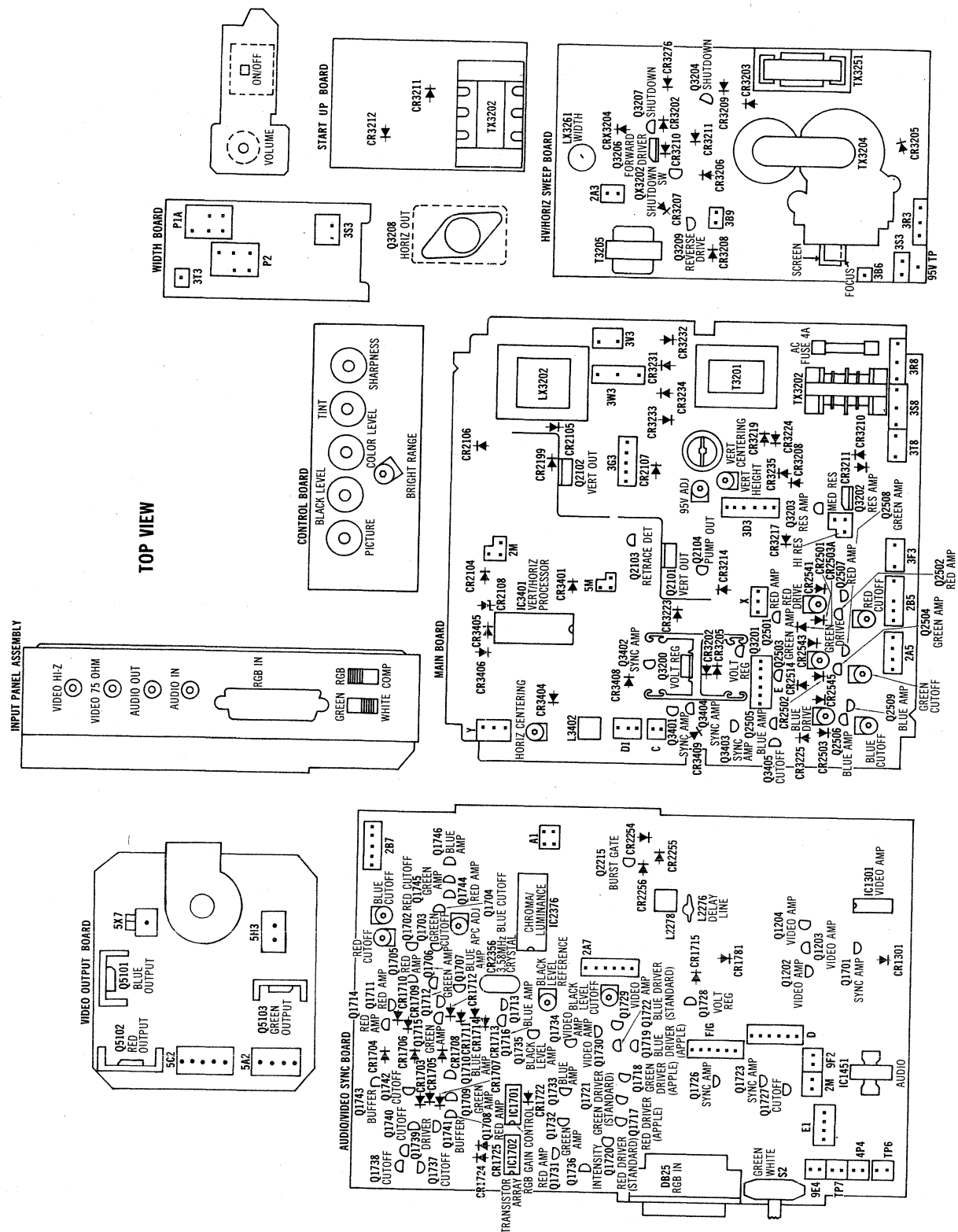
Value in ( ) used in some versions.

Measurements with switching as shown, unless noted.

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PLACEMENT CHART



RESISTANCE MEASUREMENTS

| MEASUREMENTS TAKEN WITH LOW POWER OHMS METER |        |        |        |        |        |        |        |        |        |        |        |        |         |        |
|----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|
| ITEM                                         | PIN 1  | PIN 2  | PIN 3  | PIN 4  | PIN 5  | PIN 6  | PIN 7  | PIN 8  | PIN 9  | PIN 10 | PIN 11 | PIN 12 | PIN 13  | PIN 14 |
| IC1301                                       | 2702   | INF    | 4283   | 11K    | 0      | INF    | 8702   | INF    | 94     | INF    | INF    | INF    | INF     | 3850   |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | PIN 15  | PIN 16 |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | INF     | 10K    |
| IC1451                                       | 0      | 0      | 15K    | 4790   | 7052   | 3470   | INF    | INF    | INF    | 216    | 4000   | INF    |         |        |
| IC1701                                       | INF    | 7090   | INF    | 7340   | INF    | 7340   | 1      | INF    | 10K    | 1218   | 364    | 7580   | 1219    | 449    |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | PIN 15  | PIN 16 |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | 7615    | 1220   |
| IC1702                                       | INF    | INF    | INF    | 6687   | 6590   | INF    | INF    | 6690   | INF    | INF    | 6690   | INF    | INF     | INF    |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | PIN 15  | PIN 16 |
|                                              |        |        |        |        |        |        |        |        |        |        |        |        | 6690    | INF    |
| IC2376                                       | 2000   | INF    | 7500   | INF    | 1976   | INF    | INF    | 0      | 1447   | 4340   | INF    | 8190   | 1218    | 6245   |
|                                              | PIN 15 | PIN 16 | PIN 17 | PIN 18 | PIN 19 | PIN 20 | PIN 21 | PIN 22 | PIN 23 | PIN 24 | PIN 25 | PIN 26 | PIN 27  | PIN 28 |
|                                              | 11K    | 3290   | 102    | 6976   | 4423   | 4400   | 4426   | 94     | 19K    | 8194   | 1450   | 16K    | 410     | 16K    |
| IC3401                                       | 11K    | 0      | 4366   | 24K    | 1036   | 11K    | 409    | 10K    | INF    | 643    | INF    | 60K    | 7048    | 997    |
|                                              | PIN 15 | PIN 16 | PIN 17 | PIN 18 | PIN 19 | PIN 20 | PIN 21 | PIN 22 | PIN 23 | PIN 24 | PIN 25 | PIN 26 | PIN 27  | PIN 28 |
|                                              | 0      | 3456   | 313    | 5316   | 11K    | 22K    | 33K    | 0      | 18K    | 19K    | 406    | 69K    | 3233    | INF    |
| V1                                           | INF    |        |        |        |        |        | FIL    | FIL    | INF    | INF    | INF    | INF    | INF     |        |
| ITEM                                         | E      | B      | C      |        | ITEM   | E      | B      | C      |        | ITEM   | E      | B      | C       |        |
| Q1202                                        | INF    | 8570   | 0      |        | Q1727  | 0      | 10K    | 17K    |        | Q2503  | INF    | 1320   | 0       |        |
| Q1203                                        | INF    | 315    | 3358   |        | Q1728  | 6588   | INF    | INF    |        | Q2504  | 288    | 1498   | INF     |        |
| Q1204                                        | 476    | 3358   | 101    |        | Q1729  | 1000   | 24K    | 1115   |        | Q2505  | INF    | 1321   | 0       |        |
| Q1701                                        | 0      | 1793   | 400    |        | Q1730  | 8120   | 4846   | 94     |        | Q2506  | 287    | 1369   | INF     |        |
| Q1702                                        | 9666   | 7790   | 18K    |        | Q1731  | INF    | 10K    | INF    |        | Q2507  | INF    | INF    | 0       |        |
| Q1703                                        | 9564   | 7800   | 18K    |        | Q1732  | INF    | 10K    | INF    |        | Q2508  | INF    | INF    | 0       |        |
| Q1704                                        | 9615   | 7800   | 18K    |        | Q1733  | INF    | 10K    | INF    |        | Q2509  | INF    | INF    | 0       |        |
| Q1705                                        | 8577   | 18K    | 94     |        | Q1734  | 7340   | 2029   | 94     |        | Q3200  | INF    | 970    | 3000(1) |        |
| Q1706                                        | 8607   | 18K    | 94     |        | Q1735  | INF    | 769    | INF    |        | Q3201  | 0      | 120    | 1270    |        |
| Q1707                                        | 8570   | 18K    | 94     |        | Q1736  | INF    | 6020   | 94     |        | Q3202  | INF    | 2M     | INF     |        |
| Q1708                                        | 2318   | 7612   | 6590   |        | Q1737  | 609    | 2240   | 0      |        | Q3203  | 911    | 4313   | INF     |        |
| Q1709                                        | 2325   | 7590   | 6590   |        | Q1738  | 294    | 609    | 1102   |        | Q3204  | 407    | 5170   | 3200    |        |
| Q1710                                        | 2325   | 7586   | 6590   |        | Q1739  | 7521   | 1102   | 94     |        | Q3206  | 0      | 1132   | 89K(1)  |        |
| Q1711                                        | 1699   | 8577   | 6588   |        | Q1740  | 566    | 7520   | 8130   |        | Q3207  | 468    | 2200   | 7860    |        |
| Q1712                                        | 1683   | 8607   | 6594   |        | Q1741  | 2353   | 8128   | 6590   |        | Q3208  | .1     | 1.6    | INF     |        |
| Q1713                                        | 1683   | 8560   | 6590   |        | Q1742  | 7848   | 714    | 8384   |        | Q3209  | 0      | 2224   | INF     |        |
| Q1714                                        | 1158   | 9247   | 6590   |        | Q1743  | 2360   | 8380   | 6590   |        | Q3401  | 1000   | INF    | 16K     |        |
| Q1715                                        | 1180   | 9279   | 6588   |        | Q1744  | 22K    | 4430   | 94     |        | Q3402  | 196    | 66K    | 9900    |        |
| Q1716                                        | 1177   | 9310   | 6590   |        | Q1745  | 22K    | 4404   | 94     |        | Q3403  | 3950   | INF    | 7880    |        |
| Q1717                                        | 10K    | 3064   | 94     |        | Q1746  | 22K    | 4429   | 94     |        | Q3404  | 1000   | 29K    | 91      |        |
| Q1718                                        | 10K    | 3106   | 94     |        | Q2101  | 0      | 1000   | INF    |        | Q3405  | 0      | 3630   | 6770    |        |
| Q1719                                        | 10K    | 3138   | 94     |        | Q2102  | 348    | INF    | INF    |        | Q5101  | INF    | 15K    | INF     |        |
| Q1720                                        | 10K    | 4820   | 94     |        | Q2103  | 180    | 4745   | 5226   |        | Q5102  | INF    | 12K    | INF     |        |
| Q1721                                        | 10K    | 4810   | 94     |        | Q2104  | 154    | 4892   | 76     |        | Q5103  | INF    | 10K    | INF     |        |
| Q1722                                        | 10K    | 4848   | 94     |        | Q2215  | INF    | 50K    | 10K    |        | QX3202 | 0      | 10K    | 1134    |        |
| Q1723                                        | 0      | 3864   | 4084   |        | Q2501  | INF    | 1305   | 0      |        |        |        |        |         |        |
| Q1726                                        | 0      | 3876   | 4073   |        | Q2502  | 285    | 1584   | INF    |        |        |        |        |         |        |

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(1) This reading will vary depending upon the condition of the electrolytic in the circuit.

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## TROUBLESHOOTING (Continued)

### VIDEO RGB BOARD

Connect a color bar signal from an RGB generator to the RGB Input Connector (DB25). Use a scope and check the waveform at the base of Red Amp Transistor (Q1731), waveform at the base of Green Amp Transistor (Q1732) and waveform at the base of Blue Amp Transistor (Q1733). If any or all of these waveforms are missing, check waveforms, voltages and components associated with Red, Green and Blue Driver (Standard) Transistors (Q1720, Q1721 and Q1722) or Red, Green and Blue Driver (Apple) Transistors (Q1717, Q1718 and Q1719) according to input terminals and signal path used.

If the waveforms are present at the base of Transistors Q1731, Q1732 and Q1733, check waveforms at pins 15, 12 and 9 of the RGB Gain Control IC (IC1701). If these waveforms are missing, check voltages, waveforms and components associated with IC1701, Transistor Array IC (IC1702) and Transistors Q1731, Q1732 and Q1733.

If the waveforms are present at pins 15, 16 and 17 of IC1701, check the waveforms at the emitter of Red, Green and Blue Amp Transistors (Q1714, Q1715 and Q1716). If these waveforms are missing, check voltages, waveforms and components associated with Red Amp Transistor (Q1708 and Q1714), Green Amp Transistors (Q1709 and Q1715) and Blue Amp Transistors (Q1710 and Q1716).

No red. Check for a waveform at pin 12 of the CRT socket. If the waveform is missing, check voltages, waveforms and components associated with Red Output Transistor (Q5102), Red Amp Transistors (Q2507, Q2502, Q2501 and Q1714) and White/Green Switch (S2).

No green. Check for a waveform at pin 10 of the CRT Socket. If the waveform is missing, check voltages, waveforms and components associated with Green Output Transistor (Q5103), Green Amp Transistors (Q2508, Q2504, Q2503 and Q1715).

No blue. Check for a waveform at pin 13 of the CRT Socket. If the waveform is missing, check voltages, waveforms and components associated with Blue Output Transistor (Q5101), Blue Amp Transistors (Q2509, Q2506, Q2505 and Q1716) and White/Green Switch (S2).

If the intensity of color is incorrect, check voltages, waveforms and components associated with Intensity Transistor (Q1736), IC1702 and associated circuitry.

### RASTER

Check the CRT and CRT voltages and waveforms.

If the raster is magenta, check voltages, waveforms and components associated with the Green Output Transistor (Q5103) and pin 10 of the CRT.

If the raster is yellow, check the voltages, waveforms and components associated with the Blue Output Transistor (Q5101) and pin 13 of the CRT.

If the raster is cyan, check the voltages, waveforms and components associated with the Red Output Transistor (Q5102) and pin 12 of the CRT.

If the raster has a keystone shape, check the Deflection Yoke (DY1).

If the raster has height or width problems, refer to the "Vertical", "Horizontal" or "Power Supply" sections of this Troubleshooting guide.

### AUDIO

Inject an audio signal at pin 2 of Connector 9E4 and check for sound from the speaker. No sound, from speaker, check for 23.7V at pin 10 of Audio IC (IC1451). If 23.7V is missing at pin 10 of IC1451, check Resistor RX1457 and check for shorted IC1451. Check voltages and components associated with IC1451. Also check the speaker and Volume Control (R1400).

### SYNC

No vertical or horizontal sync. Check waveforms at pins 1 and 27 of the Vertical/Horizontal Processor IC (IC3401). Check voltages and components associated with pins 1 and 25 thru 28 of IC3401.

No horizontal sync. Check voltages, waveforms and components associated with pins 25, 26 and 27 of IC3401, Sync Amp Transistors (Q3403 and Q3404).

No vertical sync. Check voltages, waveforms and components associated with pins 1 and 28 of IC3401, Sync Amp Transistors (Q3401 and Q3402).

### CHROMA

No color when a composite video signal is applied to the monitor thru the Video 75 Ohm Input Jack (P7). Check voltages, waveforms and components associated with pins 2, 4, 10, 11, 19, 20, 21, 24 and 26 of Chroma/Luminance IC (IC2376). If the waveform is incorrect at pin 2 of IC2376, check voltages, waveforms and components associated with Video Amp IC (IC1301) and Video Amp Transistors (Q1202, Q1203 and Q1204). Check the 3.58MHz Oscillator Crystal (CR2356) by checking the waveforms and components associated with pins 24, 26 and 28 of IC2376.

If there is no color when using RGB input and green is the only color present, check the White/Green Switch (S2).

## MISCELLANEOUS ADJUSTMENTS

### VIDEO INPUT CUTOFF ADJUSTMENT

Preset the Red (R1708) and Blue (R1714) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

### APC ADJUSTMENT

Connect a color bar signal generator to the Video Input 75 Ohm Jack (P7). Rotate Service Plug (A1) 90 degrees to Color Set-Up position. Adjust APC Control (R2390) for MINIMUM movement of color. Return Plug A1 to Normal position.

### RGB CUTOFF ADJUSTMENT

Preset the Red (R2505), Green (R2516), and Blue (R2527) Cutoff Controls for MINIMUM. Adjust Screen Control (R3299B) until a dim raster appears. Adjust each Cutoff Control until a gray raster is obtained. Readjust the Screen Control until raster just disappears.

### RGB DRIVE ADJUSTMENT

Connect a video generator to Video Input 75 Ohm Jack (P7). Set video generator for an all white raster signal. Adjust the Red (R2506), Green (R2517) and Blue (R2528) Drive Controls for a white raster.

### VERTICAL CENTERING AND HEIGHT ADJUSTMENT

Adjust Screen Control (R3299B) until a raster appears. Adjust Vertical Height Control (R3418) and the Vertical Centering Control (R2125) so the top of raster is 1/2 inch from top of CRT and the bottom of raster is 1/2 inch from bottom of CRT. Readjust the Screen Control until raster just disappears.

### SWEEP OSCILLATOR ADJUSTMENT

Adjust Sweep Oscillator Coil (L3402) for a stable picture.

### 95V ADJUSTMENT

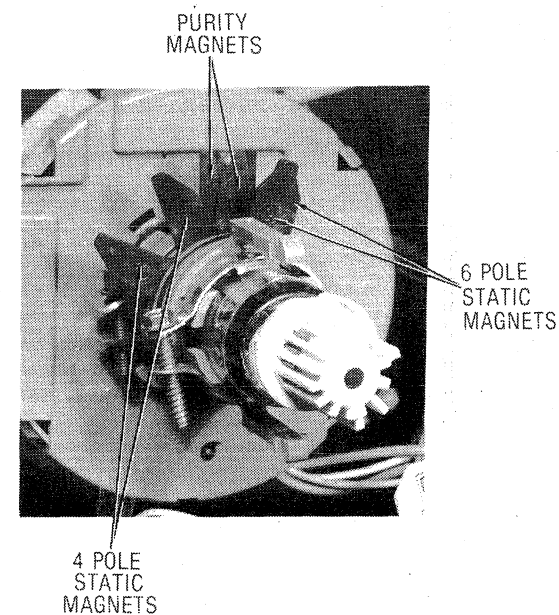
Connect a DC meter to TP3 (pin G of Horizontal Output Transformer TX3204). Adjust 95V Adjust Control (R3409) for 95V.

### PURITY ADJUSTMENT

If the CRT appears to be magnetized use a degaussing coil to demagnetize the CRT and mounting brackets. If necessary, perform center convergence. Before proceeding with the purity adjustment, the Screen Control (R3299B) must be adjusted. Set the Color Level, Black Level and Picture Controls to MINIMUM. Set the Red (R2505), Green (R2516) and Blue (R2527) Cutoff Controls to MINIMUM. Advance Screen Control until a dim raster appears. Advance the Green Cutoff, Black Level and Picture Controls to produce a green screen. Move deflection yoke back to produce a green stripe. Adjust the Purity Tabs to center the green stripe. Turn Green Cutoff Control to MINIMUM. Advance the Red Cutoff Control to produce a red stripe. Slide the deflection yoke forward until a uniform red screen is obtained. If necessary, readjust the Purity Tabs to obtain a pure red screen. Check the purity of all three colors by advancing each Cutoff Control one at a time.

### CONVERGENCE ADJUSTMENTS

Connect a crosshatch generator to the Video Input 75 Ohm Jack (P7) and tune in a crosshatch pattern. Rotate the Tabs of the Four Pole Static Magnet to converge the Red and Blue Horizontal Lines. Rotate the Tabs of the Four Pole Static Magnet around the neck of the CRT to converge the Red and Blue Vertical Lines. Rotate the Tabs of the Six Pole Static Magnet to converge the Red/Blue and Green Horizontal Lines. Rotate the Tabs of the Six Pole Static Magnet around the neck of the CRT to converge the Red/Blue and Green Vertical Lines.



CRT NECK ASSEMBLY

CMT8-2  
ZENITH  
MODEL ZVM-131

## SAFETY PRECAUTIONS

### PRODUCT SAFETY SERVICING GUIDELINES FOR COLOR TELEVISION RECEIVERS

**CAUTION:** No modification of any circuit should be attempted. Service work should be performed only after you are thoroughly familiar with all of the following safety checks and servicing guidelines. To do otherwise increases the risk of potential hazards and injury to the user.

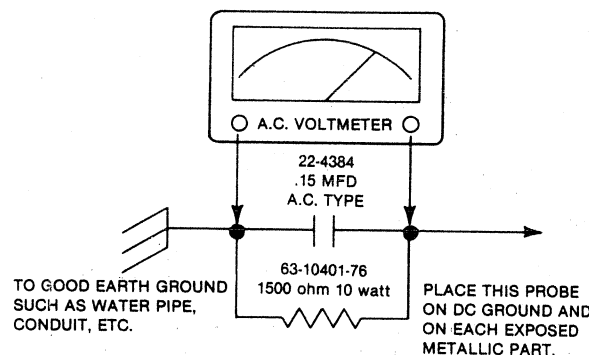
#### SAFETY CHECKS

After the original service problem has been corrected, a check should be made of the following:

#### SUBJECT: FIRE & SHOCK HAZARD

1. Be sure that all components are positioned in such a way as to avoid possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the repair shop.
2. Never release a repair unless all protective devices such as insulators, barriers, covers, shields, strain reliefs, and other hardware have been reinstalled per original design.
3. Soldering must be inspected to discover possible cold solder joints, frayed leads, damaged insulation (including AC cord), solder splashes or sharp solder points. Be certain to remove all loose foreign particles.
4. Check the "across-the-line" capacitor and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. All critical components (shaded on the schematic diagram) such as fuses, flameproof resistors, capacitors, etc. must be replaced with exact Zenith types. Do not use replacement components other than those specified or make unrecommended circuit modifications.

After re-assembly of the set always perform an AC leakage test at DC ground test point and on all exposed metallic parts of the cabinet, (the channel selector knobs, antenna terminals, handle and screws) to be sure the set is safe to operate without danger of electrical shock. **DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST.** Use an AC voltmeter, having 5000 ohms per volt or more sensitivity, in the following manner; Connect a 1500 ohm 10 watt resistor (63-10401-76), paralleled by a .15 mfd. 150V AC type capacitor (22-4384) between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd. capacitor. Reverse the AC plug and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed .75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



#### SUBJECT: IMPLOSION

1. All Zenith picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage during installation. Avoid scratching the tube.
2. Use only recommended Zenith replacement tubes.

#### SUBJECT: X-RADIATION

1. Be sure procedures and instructions to all service personnel cover the subject of X-radiation. The only potential source of X-rays in current TV receivers is the picture tube. However, this tube does not emit X-rays when the H.V. is at the factory specified level. It is only when the H.V. is excessive that X-radiation may be generated. Refer to the X-ray Precaution Label which is located inside each television receiver for the correct high voltage. The proper value is also given in the applicable service manual. Operation at higher voltages may cause a failure of the picture tube or high voltage supply and, under certain circumstances, may produce radiation in excess of desirable levels.
2. Only Zenith specified CRT anode connectors must be used. The degaussing shield also serves as an X-ray shield in color sets, do not defeat its purpose.
3. It is essential that the serviceman has available an accurate and reliable high voltage meter. The calibration of the meter should be checked periodically against a reference standard, such as the one available at your distributor.

## TROUBLESHOOTING

### POWER SUPPLY

Check the AC Fuse (FX3201). If Fuse FX3201 is open, check for possible shorts at Bridge Rectifier Diodes (CR3231 thru CR3234), Capacitors C3251 thru C3253, Degaussing Coil (L3201), Line Choke Coil (TX3202A) and Connectors 3R8 and 3S8. Use the "Resistance Measurements" chart to check for a shorted Horizontal Output Transistor (Q3208) or Vertical Output Transistors (Q2101 and Q2102).

Apply 120VAC and check for 120VAC from the cathode of Diode CR3232 to the cathode of Diode CR3233. If the 120VAC is missing, check the Power Switch (S3201), Coil TX3202A, Fuse FX3201, and Connectors 3R8 and 3S8. If the 120VAC is present, check for 160V (measured to common tie point) at pin 2 of Connector 3V3. If the 160V is missing, recheck all the parts mentioned above.

If the monitor is not operating when turned On, check for 26.9V at the cathode of Diode CR3224 and check for 12.1V at the cathode of Diode CR3223. If the voltages are missing, check Diodes CR3219, CR3224 and CR3223, Electrolytic C3247 and Start Up Transformer (T3201), check for possible shorts to ground. Check the source voltages developed from the Horizontal Output Transformer (TX3204) and rectified by Diodes CR1701, CR3235, CR3214, CR3208A and CR3217. If the source voltages are not regulated, check the voltages and components associated with pins 6 and 8 of the Vertical/Horizontal Processor IC (IC3401). If all voltages are missing, check the voltage at the base of the shutdown Switch Transistor (QX3202) to determine if the monitor is in shutdown, refer to the "High Voltage Shutdown Defeat" section of the Service Information. If the monitor is not in shutdown, refer to the "Horizontal" section of this Troubleshooting guide.

### HORIZONTAL

To determine if the monitor is in shutdown, check the voltage on the base of the shutdown Switch Transistor (QX3202). The voltage should measure about 0.78V if the monitor is in shutdown. If the monitor is in shutdown, refer to the "High Voltage Shutdown Defeat" section of the Service Information.

Check for 160V (measured to common tie point) at pin 2 of Connector 3V3. If the 160V is missing, refer to the "Power Supply" section of this Troubleshooting guide.

Inject a horizontal signal at the base of the Horizontal Output Transistor (Q3208). If the high voltage returns, check the sweep oscillator circuit at pins 23, 24 and 25 of the Vertical/Horizontal Processor IC (IC3401). Check voltages, waveforms and components associated with pins 3, 4, 5 and 16 thru 21 of IC3401 and the Reverse Driver Transistor (Q3209). If high voltage is missing, check Transistor Q3208, Diodes CR3212, CR3211B and CR3205, Deflection Yoke (DY1), Connector 3R3, Horizontal Output Transformer (TX3204) and associated components. Check for shorted sources developed from Transformer TX3204 that could load down the horizontal circuit. Check the sources rectified by Diodes CR1701, CR3235, CR3214, CR3208A and CR3217. The high voltage rectifier is part of Transformer TX3204 and may be defective.

Poor horizontal linearity or foldover may be caused by the condition of Capacitors C3221, CX3211, CX3223, CX3229 and CX3227 and Diodes CR3211B and CR3212.

If the horizontal sweep is off frequency, check the sweep oscillator circuit at pins 23, 24 and 25 of IC3401 and check the adjustment of the Sweep Oscillator Coil (L3402).

### VERTICAL

No vertical sweep. Check voltages, waveforms and components associated with the Vertical Output Transistors (Q2101 and Q2102). If the voltage is low or missing at the collector of Transistor Q2102, check Diodes CR2106 and CR2107, Pump-Up Transistor (Q2104), Electrolytic C2103 and associated circuitry. Inject a vertical signal at pin 14 of the Vertical/Horizontal Processor IC (IC3401). If the vertical deflection returns, check voltages, waveforms and components associated with pins 1, 7 and 11 thru 14 of IC3401. If the vertical deflection does not return, check voltages, waveforms and components associated with Transistors Q2101, Q2102 and Q2104 and the Retrace Detector Transistor (Q2103). Check Diodes CR2105, CR2106 and CR2107 and check the Deflection Yoke (DY1).

Vertical linearity or foldover problems can be caused by vertical feedback and bias circuits. Check Electrolytics C2103, C2105, C2106, C2131, C2152 and C3277, Pincushion Transformer (TX3251) and associated components. Use the "Resistance Measurements" chart to check for possible changes in feedback and bias circuitry resistances.

If the vertical is off frequency, check the voltages and components associated with pins 10, 12, 23, 24 and 25 of IC3401 and check the frequency of the sweep oscillator at pin 25 of IC3401.

### VIDEO INPUT JACK

Connect a video color bar signal to the Video 75 Ohm Input Jack (P7) and check for a waveform at pin 2 of Chroma/Luminance IC (IC2376). If the waveform is missing, check voltages, waveforms and components associated with Video Amp IC (IC1301), Video Amp Transistors (Q1204, Q1203 and Q1202), Delay Line (L2276) and Electrolytic C2251.

If the waveform is present at pin 2 of IC2376, check waveforms at pins 19, 20 and 21 of IC2376. If the waveforms are missing, check voltages, waveforms and components associated with pins 22 and 23 of IC2376 and check IC2376 by substitution.

If the waveforms are present at pins 19, 20 and 21 of IC2376, check for waveform at the collector of the Red, Green and Blue Cutoff Transistors (Q1702, Q1703 and Q1704). If the waveform is missing at the collector of Transistor Q1702, check voltages and components associated with Red Amp Transistor (Q1744) and Transistor Q1702. If the waveform is missing at the collector of Transistor Q1703, check voltages and components associated with Green Amp Transistor (Q1745) and Transistor Q1703. If the waveform is missing at the collector of Transistor Q1704, check voltages and components associated with Blue Amp Transistor (Q1746) and Transistor Q1704. If the waveforms are all present but video is still missing, check voltages, waveforms and components associated with Red Amp Transistors (Q1705 and Q1711), Green Amp Transistors (Q1706 and Q1712) and Blue Amp Transistors (Q1707 and Q1713).

ZENITH  
MODEL ZVM-131

Courtesy of the Manufacturer

TROUBLESHOOTING AID

NOTE: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE OR SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (TX3204). Refer to "Troubleshooting" Power Supply and Horizontal circuits.

NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (TX3204) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.

NO PIC, HAS SOUND, HAS RASTER: Refer to "Troubleshooting" Video circuit.

HAS PIC, NO SOUND: Refer to "Troubleshooting" Audio circuit.

LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER, HAS SOUND: Check HV rectifier (Part of Horizontal Output Transformer TX3204) and Horizontal circuit. Refer to "Troubleshooting" Horizontal circuit.

NO RASTER, NO SOUND: Refer to "Troubleshooting" Horizontal circuit.

NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.

POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.

POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.

NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.

VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.

HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

RASTER

YELLOW (NO BLUE): Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

CYAN (NO RED): Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

MAGENTA (NO GREEN): Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.

NO GREEN: Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.

NO RED: Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.

SAFETY PRECAUTIONS (Continued)

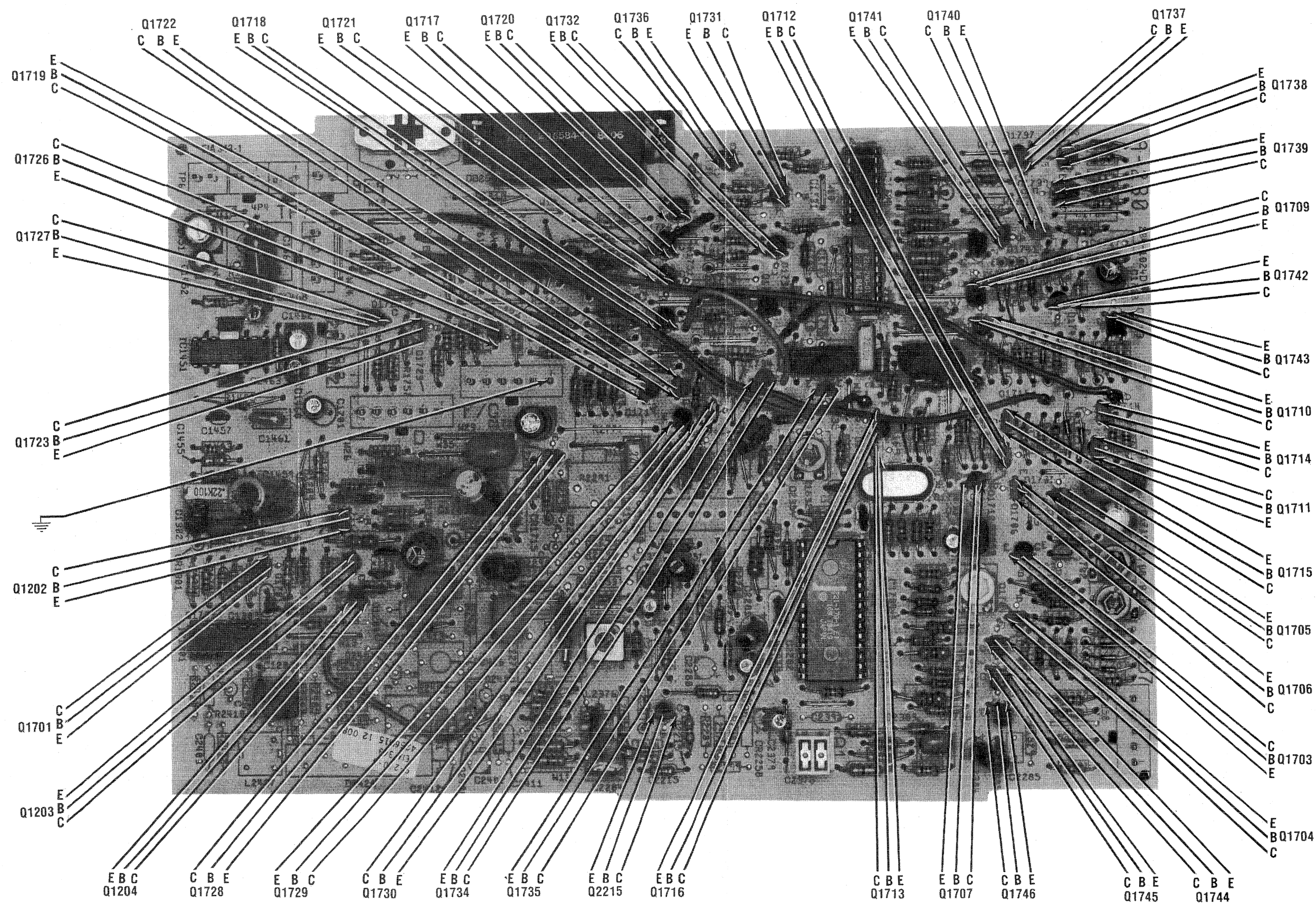
- When the high voltage circuitry is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be run up and down while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly. We suggest that you and your service organization review test procedures so that voltage regulation is always checked as a standard servicing procedure, and that the high voltage reading be recorded on each customer's invoice.
- When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, avoid being unnecessarily close to the picture tube and the high voltage compartment. Do not operate the chassis longer than is necessary to locate the cause of excessive voltage.
- Color transistor sets manufactured after June, 1973 ("E" Line and later), use new type picture tubes specifically designed to withstand higher operating voltages without causing excessive X-radiation. It is strongly recommended that the C.R.T. shop fixture be equipped with the new type tube. Addition of a permanently connected H.V. meter to the H.V. anode of the shop C.R.T. fixture is advisable. The C.R.T.'s in these sets should never be replaced with any other tube types as that may result in excessive X-radiation and possible violation of the law.
- Starting with late production "E" line color sets, a special four lead damper capacitor was used. Its feature, the interlocking four leads, should not be defeated. However, each time one of these sets is serviced, for whatever reason, the part number of the capacitor should be examined. If it is the 22-7233 type (used in "E" and "F" model lines only), that capacitor must be replaced with an improved recommended type (22-7504-01). Please refer to Zenith Tech Topics (Issue No. 87) for the details. Your distributor will answer any questions, or you may write to Zenith for further details.

SUBJECT: TIPS ON PROPER INSTALLATION

- Never install any receiver in a closed-in recess, cubby-hole or closely fitting shelf space.
- Never install a receiver over, or close to a heat duct, or in the path of heated air flow.
- Avoid conditions of high humidity such as; outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
- Avoid placement where draperies may obstruct rear venting. The customer should also avoid the use of decorative scarves or other coverings which might obstruct ventilation.
- Wall and shelf mounted installations using a commercial mounting kit, must follow the factory approved mounting instructions.
- A receiver mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
- Caution customers against the mounting of a receiver on a sloping shelf or in a tilted position, unless the receiver is properly secured.
- A receiver in a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
- Caution customers against the use of a cart or stand which has not been listed by Underwriters Laboratories, Inc. for use with their specific model of television receiver.

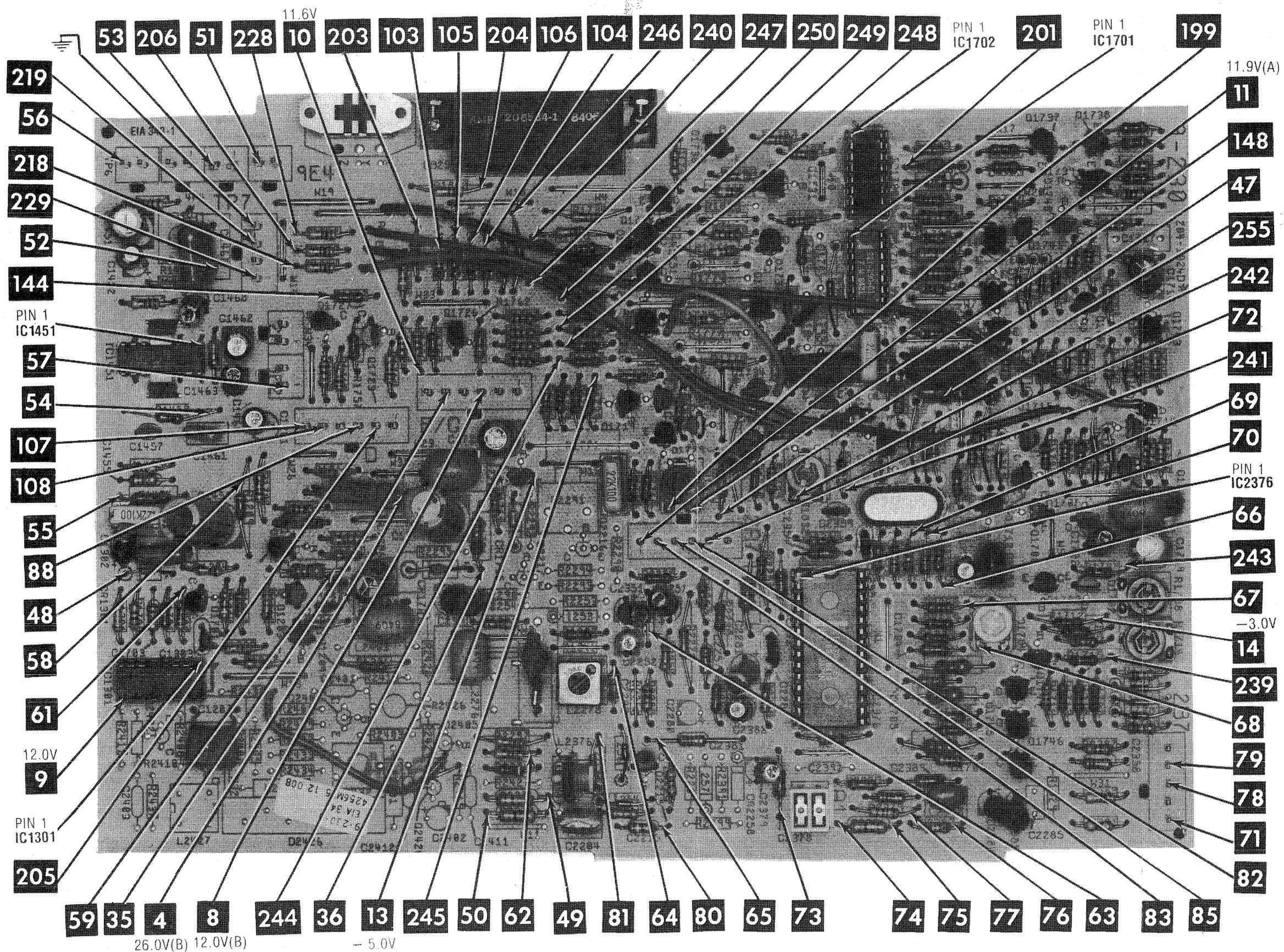
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CMT8-2





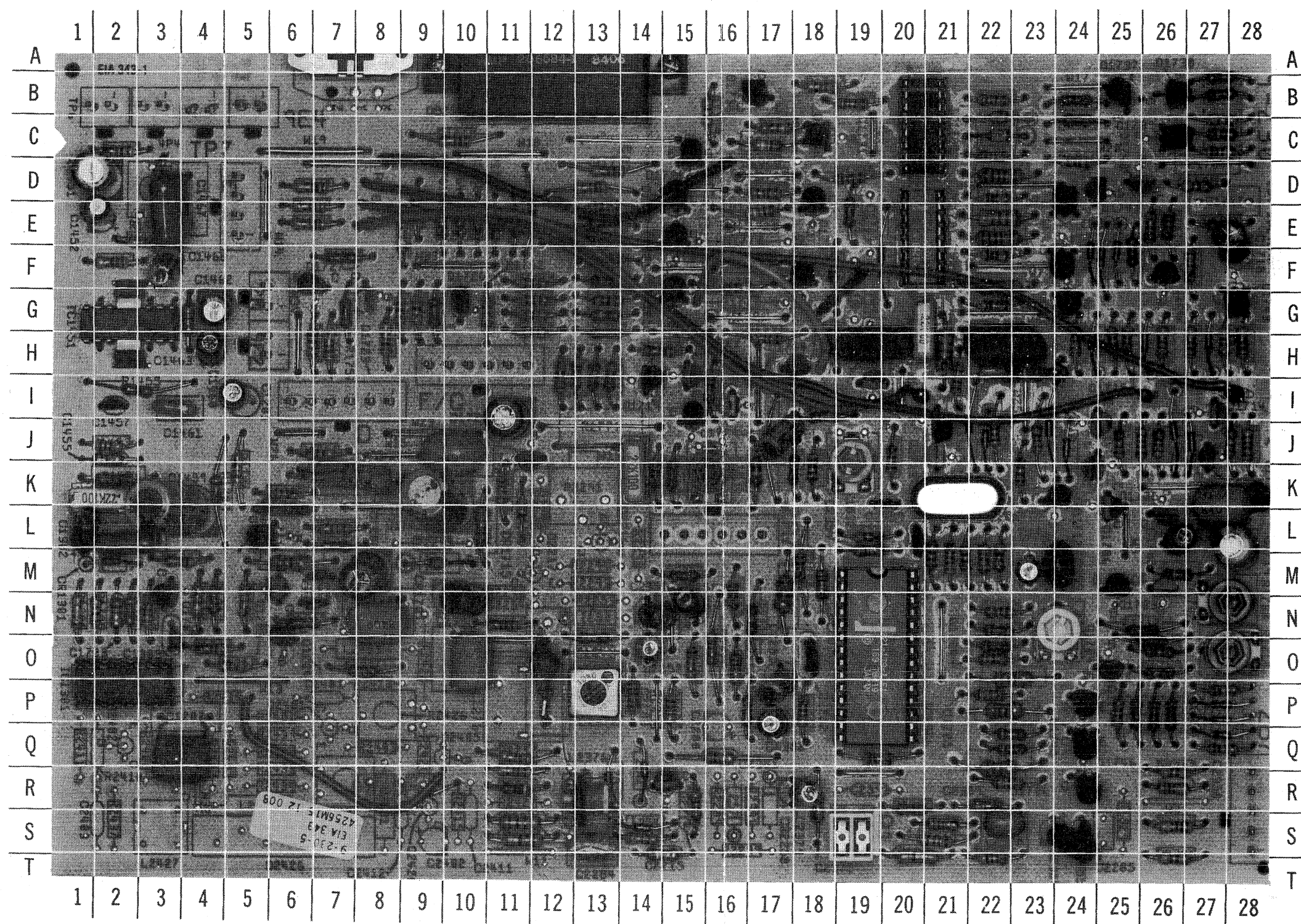
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MODEL ZVM-131



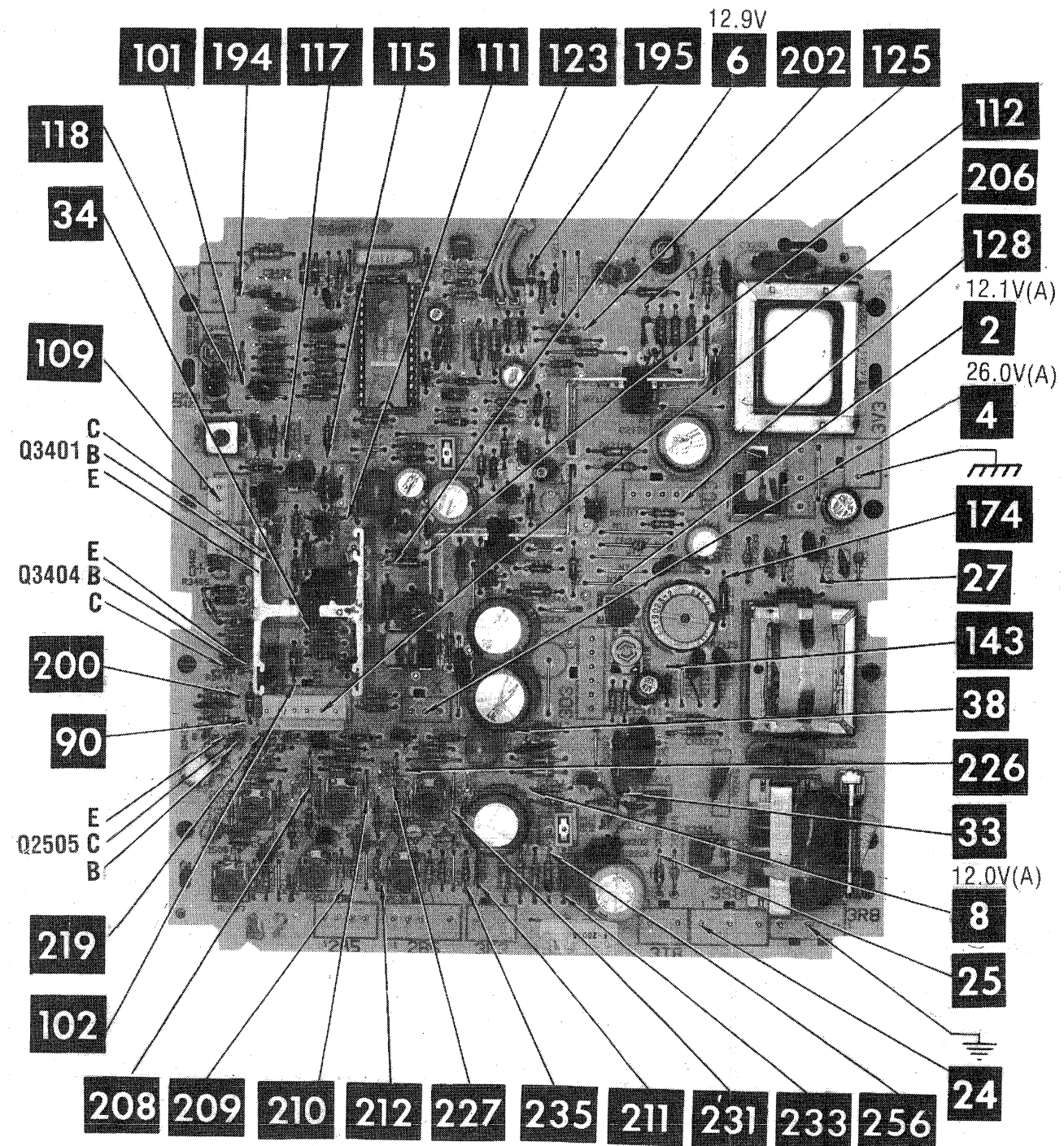


ZENITH  
MODEL ZVM-131

# AUDIO/VIDEO SYNC BOARD GridTrace LOCATION GUIDE

|        |      |        |      |       |      |       |      |        |      |
|--------|------|--------|------|-------|------|-------|------|--------|------|
| A1     | S-19 | CR1707 | F-24 | Q1733 | F-18 | R1740 | F-13 | R1826  | D-24 |
| C1201  | I-5  | CR1708 | H-24 | Q1734 | H-18 | R1741 | G-13 | R1827  | F-26 |
| C1203  | M-7  | CR1709 | J-26 | Q1735 | I-19 | R1742 | G-13 | R1830  | O-13 |
| C1204  | N-7  | CR1710 | J-27 | Q1736 | B-17 | R1743 | G-13 | R1831  | I-16 |
| C1206  | M-8  | CR1711 | J-23 | Q1737 | B-25 | R1744 | H-13 | R1832  | J-19 |
| C1207  | Q-3  | CR1712 | J-24 | Q1738 | B-26 | R1745 | H-13 | R1833  | K-18 |
| C1302  | L-1  | CR1713 | J-22 | Q1739 | C-26 | R1746 | H-12 | R1834  | H-23 |
| C1303  | O-3  | CR1714 | J-22 | Q1740 | D-26 | R1747 | F-12 | R1835  | E-22 |
| C1304  | L-2  | CR1715 | L-11 | Q1741 | D-25 | R1748 | G-12 | R1836  | K-16 |
| C1451  | D-2  | CR1722 | F-20 | Q1742 | F-26 | R1749 | G-12 | R1837  | H-19 |
| C1452  | E-2  | CR1724 | B-22 | Q1743 | G-28 | R1750 | G-12 | R1838  | O-22 |
| C1455  | J-2  | CR1725 | C-22 | Q1744 | P-24 | R1755 | E-9  | R1839  | O-23 |
| C1456  | K-2  | CR1726 | P-27 | Q1745 | Q-24 | R1756 | G-9  | R1840  | O-23 |
| C1457  | I-2  | CR1727 | P-27 | Q1746 | R-24 | R1757 | G-7  | R1841  | B-27 |
| C1459  | K-4  | CR1728 | Q-27 | Q2215 | R-15 | R1758 | E-10 | R1842  | D-6  |
| C1460  | H-4  | CR2254 | S-14 | R1207 | L-7  | R1759 | G-9  | R1843  | E-6  |
| C1461  | I-3  | CR2255 | R-13 | R1209 | K-4  | R1760 | G-9  | R1844  | E-6  |
| C1462  | G-4  | CR2256 | R-14 | R1211 | L-7  | R1761 | E-9  | R1847  | F-7  |
| C1463  | G-4  | CR2356 | K-21 | R1212 | N-6  | R1762 | G-11 | R1848  | E-9  |
| C1467  | E-3  | D      | I-7  | R1213 | N-4  | R1763 | E-11 | R1849  | H-6  |
| C1468  | F-3  | DB25   | B-2  | R1214 | N-4  | R1764 | E-10 | R2215  | S-14 |
| C1701  | K-9  | E1     | D-5  | R1216 | N-5  | R1765 | H-7  | R2216  | R-15 |
| C1702  | L-26 | F/G    | H-10 | R1217 | O-5  | R1766 | H-8  | R2251  | N-11 |
| C1703  | N-2  | IC1301 | P-2  | R1301 | N-1  | R1767 | K-17 | R2254  | O-15 |
| C1704  | O-22 | IC1451 | G-2  | R1302 | N-3  | R1768 | K-15 | R2255  | M-15 |
| C1705  | P-22 | IC1701 | E-20 | R1303 | O-4  | R1769 | K-18 | R2256  | M-18 |
| C1706  | R-22 | IC1702 | C-20 | R1304 | M-3  | R1770 | K-14 | R2257  | N-16 |
| C1707  | K-14 | IC2376 | O-19 | R1306 | O-8  | R1772 | C-17 | R2276  | R-11 |
| C1708  | G-20 | L1202  | M-6  | R1451 | D-3  | R1773 | D-17 | R2278  | O-16 |
| C1711  | H-22 | L1701  | O-23 | R1452 | C-2  | R1775 | F-17 | R2285  | P-15 |
| C1712  | H-19 | L1702  | P-22 | R1453 | J-2  | R1776 | E-17 | R2286  | Q-19 |
| C1718  | E-28 | L1703  | R-22 | R1454 | K-2  | R1778 | H-17 | R2287  | P-16 |
| C1719  | L-28 | L2276  | O-12 | R1455 | I-3  | R1779 | F-16 | R2288  | N-17 |
| C1720  | I-11 | L2277  | N-17 | R1463 | F-2  | R1780 | D-22 | R2297  | Q-11 |
| C1721  | D-12 | L2278  | P-13 | R1464 | E-3  | R1781 | D-22 | R2299* | M-9  |
| C1723  | K-28 | L2376  | R-13 | R1701 | N-2  | R1782 | E-22 | R2354  | L-19 |
| C1724  | J-17 | L2377  | O-10 | R1702 | L-6  | R1783 | H-21 | R2355  | M-21 |
| C1858  | H-22 | L2378  | S-22 | R1703 | K-6  | R1784 | F-22 | R2356  | M-21 |
| C2215  | T-15 | LX1201 | N-8  | R1704 | K-5  | R1785 | I-18 | R2357  | M-21 |
| C2251  | N-15 | LX1705 | K-27 | R1705 | N-2  | R1786 | J-20 | R2358  | M-22 |
| C2252  | O-14 | LX1706 | J-10 | R1706 | L-10 | R1787 | F-22 | R2376  | R-11 |
| C2253  | M-18 | Q1202  | L-5  | R1707 | P-26 | R1788 | G-22 | R2378  | P-18 |
| C2257  | O-16 | Q1203  | M-6  | R1708 | N-28 | R1789 | H-18 | R2379  | S-21 |
| C2281  | P-17 | Q1204  | N-6  | R1709 | M-26 | R1791 | J-17 | R2381  | T-26 |
| C2282  | O-18 | Q1701  | N-3  | R1710 | P-26 | R1792 | F-19 | R2382  | T-22 |
| C2283  | P-14 | Q1702  | M-26 | R1711 | K-11 | R1793 | E-19 | R2383  | S-26 |
| C2284  | S-13 | Q1703  | M-25 | R1712 | N-26 | R1794 | F-18 | R2385  | R-20 |
| C2351  | N-14 | Q1704  | O-25 | R1713 | P-25 | R1795 | B-16 | R2387  | R-26 |
| C2354  | M-19 | Q1705  | L-26 | R1714 | O-28 | R1796 | C-17 | R2388  | N-22 |
| C2355  | L-20 | Q1706  | L-25 | R1715 | O-26 | R1797 | B-18 | R2389  | N-22 |
| C2356  | M-22 | Q1707  | K-24 | R1716 | P-25 | R1799 | B-19 | R2390  | N-24 |
| C2358  | R-26 | Q1708  | D-24 | R1717 | O-26 | R1800 | D-19 | RX1457 | K-7  |
| C2359  | K-20 | Q1709  | F-24 | R1718 | O-13 | R1801 | C-22 | S2     | A-7  |
| C2362  | M-22 | Q1710  | G-24 | R1719 | J-26 | R1803 | B-22 | TP6    | B-2  |
| C2376  | S-11 | Q1711  | I-27 | R1720 | H-27 | R1804 | H-27 | TP7    | B-4  |
| C2377  | S-11 | Q1712  | K-24 | R1721 | P-27 | R1805 | J-28 | 2A7    | L-16 |
| C2378  | R-18 | Q1713  | J-21 | R1722 | J-28 | R1806 | H-25 | 2B7    | S-28 |
| C2379  | R-18 | Q1714  | I-27 | R1723 | J-23 | R1807 | J-26 | 2M1    | G-5  |
| C2381  | Q-16 | Q1715  | J-25 | R1724 | H-26 | R1808 | H-25 | 4P4    | B-3  |
| C2382  | Q-17 | Q1716  | J-21 | R1725 | O-26 | R1809 | I-21 | 9E4    | B-5  |
| C2384  | S-24 | Q1717  | D-15 | R1726 | J-25 | R1810 | C-10 | 9F2    | H-5  |
| C2385  | S-24 | Q1718  | F-15 | R1727 | J-22 | R1811 | J-7  |        |      |
| C2386  | T-20 | Q1719  | I-14 | R1728 | H-24 | R1812 | B-24 |        |      |
| C2388  | S-21 | Q1720  | C-15 | R1729 | Q-27 | R1815 | C-27 |        |      |
| C2389  | R-22 | Q1721  | E-15 | R1730 | K-23 | R1816 | C-27 |        |      |
| C2390  | N-10 | Q1722  | H-15 | R1731 | E-12 | R1817 | B-27 |        |      |
| C2393  | M-24 | Q1723  | G-8  | R1732 | E-11 | R1818 | C-27 |        |      |
| C2399* | N-19 | Q1726  | G-10 | R1733 | H-13 | R1819 | E-26 |        |      |
| CR1301 | M-2  | Q1727  | F-6  | R1734 | D-13 | R1820 | E-27 |        |      |
| CR1701 | M-9  | Q1728  | J-11 | R1735 | E-13 | R1821 | F-25 |        |      |
| CR1703 | F-25 | Q1729  | I-15 | R1736 | H-14 | R1822 | F-27 |        |      |
| CR1704 | H-27 | Q1730  | I-16 | R1737 | F-13 | R1823 | H-28 |        |      |
| CR1705 | F-25 | Q1731  | C-18 | R1738 | E-13 | R1824 | C-24 |        |      |
| CR1706 | H-26 | Q1732  | D-18 | R1739 | E-13 | R1825 | D-27 |        |      |

\* Located other side of board.



CMT8-2 ZENITH  
MODEL ZVM-131

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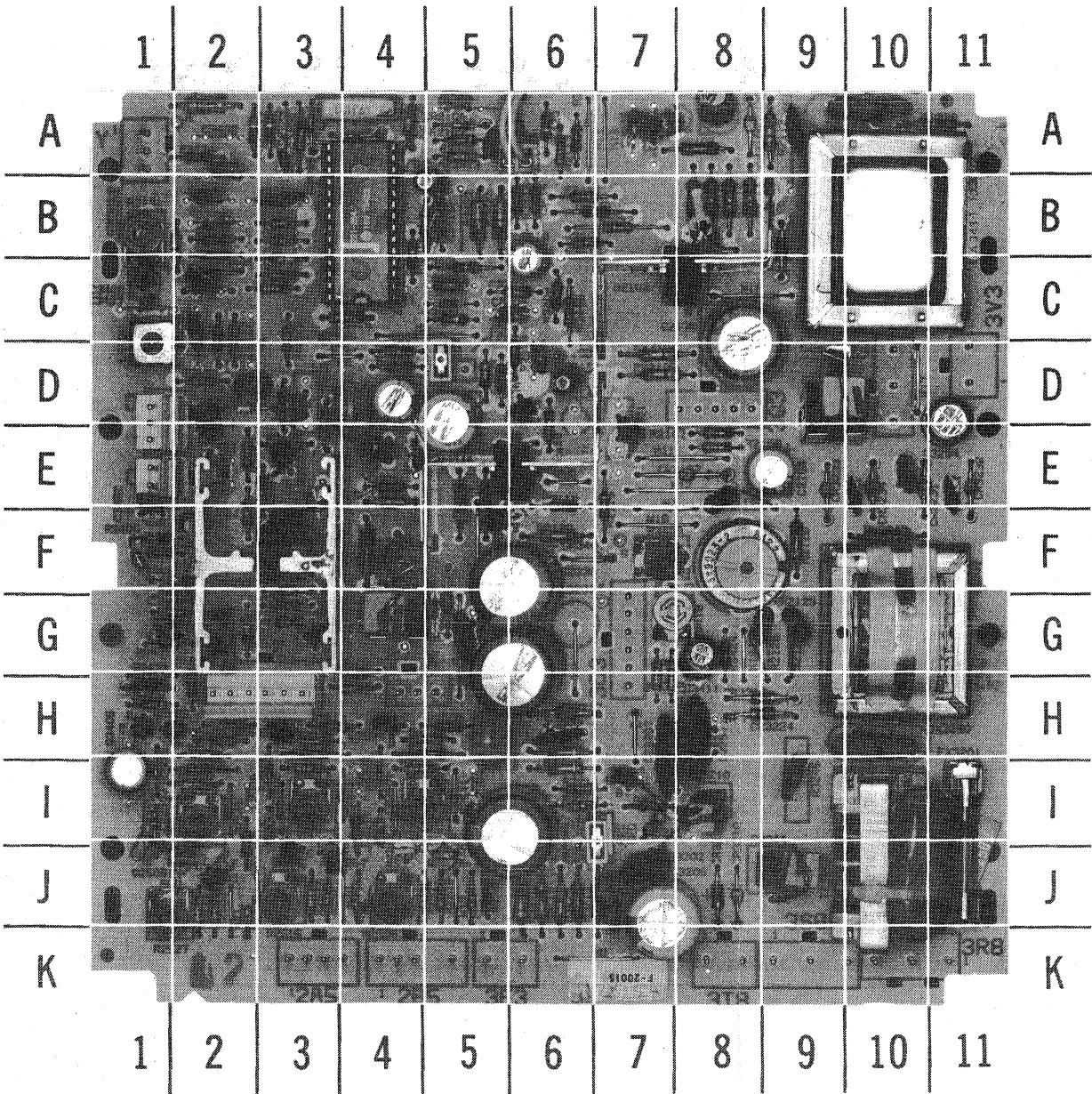
MAIN BOARD





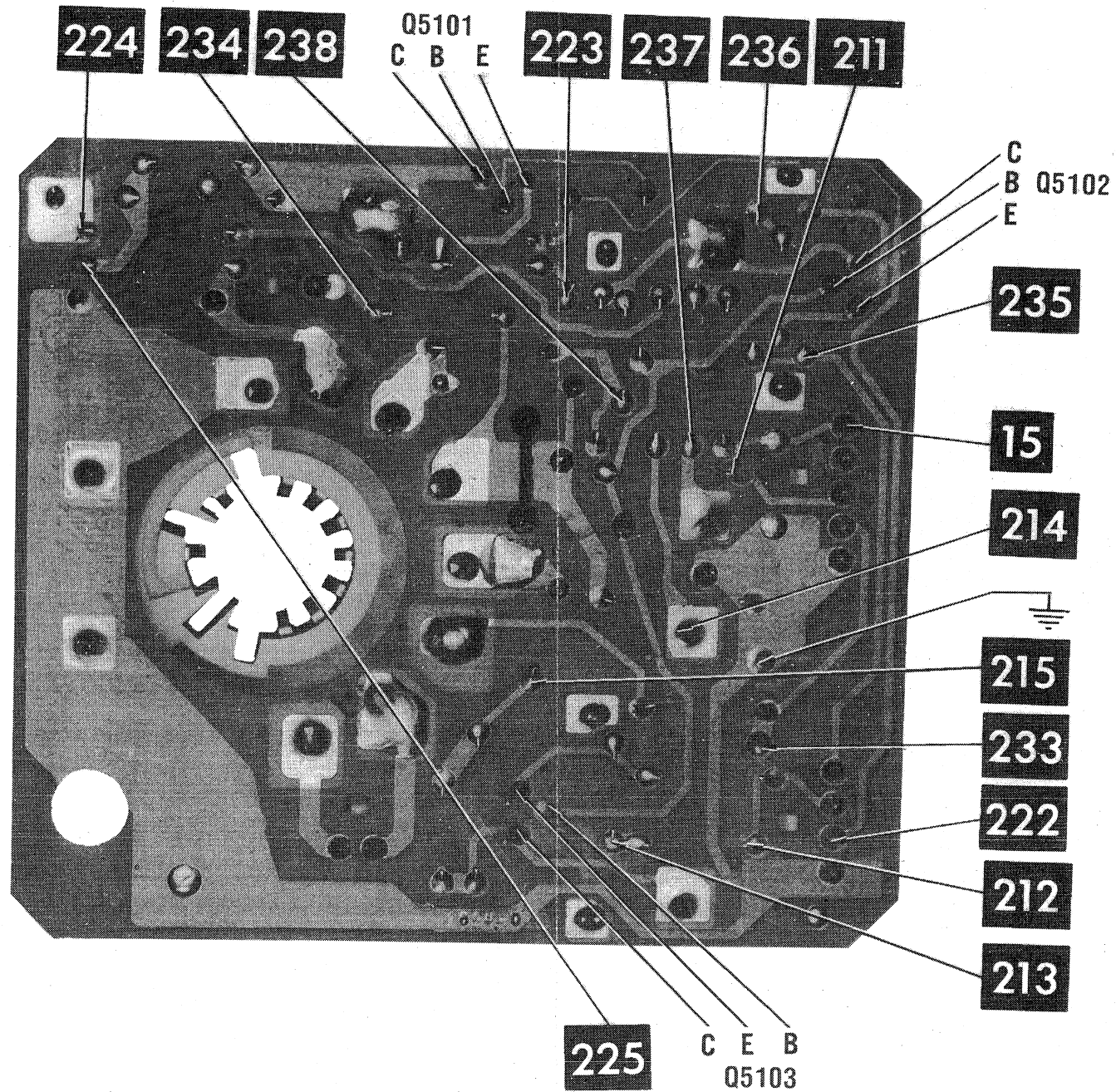
MAIN BOARD GridTrace LOCATION GUIDE

|         |      |         |      |        |      |         |      |
|---------|------|---------|------|--------|------|---------|------|
| C       | E-1  | CR3202A | F-3  | R2127  | G-9  | R3410   | B-7  |
| C2101   | E-7  | CR3205A | F-3  | R2128  | G-9  | R3411   | B-4  |
| C2102   | A-5  | CR3208A | H-8  | R2129  | E-8  | R3412   | B-6  |
| C2103   | E-9  | CR3210A | J-8  | R2501  | H-4  | R3413   | B-6  |
| C2104   | A-9  | CR3211A | J-8  | R2502  | H-5  | R3414   | B-6  |
| C2105   | A-7  | CR3214  | G-5  | R2504  | I-4  | R3415   | B-5  |
| C2106   | A-8  | CR3217  | H-6  | R2505  | J-4  | R3417   | B-5  |
| C2107   | A-7  | CR3219  | H-9  | R2506  | I-4  | R3418   | G-7  |
| C2110   | E-6  | CR3223  | E-4  | R2507  | H-5  | R3419   | H-7  |
| C2111   | D-5  | CR3224  | H-9  | R2508  | I-4  | R3420   | A-6  |
| C2176   | C-8  | CR3231  | E-10 | R2510  | J-5  | R3421   | D-3  |
| C2504   | I-1  | CR3232  | E-11 | R2511  | J-5  | R3423   | B-5  |
| C3201   | F-3  | CR3233  | E-9  | R2512  | G-4  | R3424   | G-8  |
| C3205   | J-7  | CR3234  | E-10 | R2513  | H-3  | R3425   | C-3  |
| C3206A  | J-7  | CR3235  | H-8  | R2515  | I-3  | R3428   | E-3  |
| C3207A  | C-6  | CR3401  | C-5  | R2516  | J-3  | R3429   | E-4  |
| C3209A  | H-7  | CR3404  | C-2  | R2517  | I-3  | R3431   | E-3  |
| C3234   | G-5  | CR3405  | A-4  | R2518  | H-3  | R3432   | C-3  |
| C3236   | F-6  | CR3406  | A-3  | R2519  | I-3  | R3433   | B-2  |
| C3242   | H-6  | CR3408  | D-2  | R2521  | J-3  | R3434   | B-2  |
| C3246   | I-6  | CR3409  | F-1  | R2523  | H-2  | R3435   | C-3  |
| C3247   | D-5  | CX3250  | H-10 | R2524  | H-2  | R3436   | B-2  |
| C3249   | A-10 | CX3258  | J-10 | R2526  | I-1  | R3439   | A-2  |
| C3251   | E-10 | D1      | D-1  | R2527  | J-1  | R3440   | A-3  |
| C3252   | E-11 | E       | H-3  | R2528  | I-2  | R3441   | B-1  |
| C3253   | E-10 | FX3201  | J-11 | R2529  | I-2  | R3442   | A-2  |
| C3254   | D-11 | IC3401  | B-4  | R2530  | I-2  | R3443   | C-2  |
| C3256   | G-6  | L2501   | H-5  | R2532  | J-2  | R3444   | A-3  |
| C3257   | H-8  | L3401   | D-4  | R2534  | J-5  | R3445   | C-6  |
| C3402   | E-4  | L3402   | C-1  | R2538  | H-5  | R3446   | E-2  |
| C3403   | C-5  | LX3202  | B-10 | R2539  | H-3  | R3451   | H-1  |
| C3404   | C-6  | Q2101   | E-6  | R2540  | H-2  | R3452   | J-1  |
| C3405   | A-3  | Q2102   | C-8  | R2542  | I-5  | R3453   | D-2  |
| C3407   | D-6  | Q2103   | D-6  | R2544  | I-4  | R3461   | F-2  |
| C3409   | D-4  | Q2104   | F-5  | R2546  | J-2  | R3462   | E-2  |
| C3410   | C-6  | Q2501   | H-4  | R2548  | J-3  | R3463   | E-3  |
| C3411   | G-8  | Q2502   | J-4  | R2549  | J-2  | R3465   | F-1  |
| C3412   | B-4  | Q2503   | H-3  | R2550  | J-5  | R3466   | G-2  |
| C3413   | A-4  | Q2504   | J-3  | R2552  | J-4  | R3467   | G-2  |
| C3414   | D-3  | Q2505   | H-2  | R2554  | J-2  | R3468   | F-2  |
| C3416   | B-5  | Q2506   | J-2  | R3201  | G-3  | R3469   | F-1  |
| C3419   | C-4  | Q2507   | J-5  | R3202  | G-3  | R3470   | G-2  |
| C3420   | C-1  | Q2508   | J-3  | R3203  | G-3  | R3471   | G-1  |
| C3421   | C-2  | Q2509   | J-2  | R3205  | F-4  | R3472   | H-2  |
| C3422   | C-2  | Q3200   | F-3  | R3206  | G-4  | R3473   | H-1  |
| C3423   | C-1  | Q3201   | G-3  | R3210  | I-8  | R3474   | A-2  |
| C3424   | C-3  | Q3202   | J-7  | R3212  | I-7  | R3475   | C-2  |
| C3425   | B-3  | Q3203   | I-7  | R3213  | I-6  | RX2101  | B-8  |
| C3426   | B-3  | Q3401   | F-2  | R3214  | I-6  | RX2104  | D-7  |
| C3427   | B-2  | Q3402   | E-3  | R3215  | J-6  | RX2105  | D-7  |
| C3428   | B-2  | Q3403   | G-1  | R3216  | J-6  | RX3246  | F-10 |
| C3429   | D-2  | Q3404   | F-2  | R3217  | J-6  | T3201   | G-10 |
| C3430   | B-3  | Q3405   | H-1  | R3218  | H-7  | TP9     | C-8  |
| C3431   | A-2  | R2102   | A-8  | R3219  | J-6  | TX3202A | J-10 |
| C3434   | D-5  | R2103   | A-5  | R3222  | B-7  | X       | H-4  |
| C3436   | E-4  | R2106   | A-5  | R3231  | F-4  | Y       | A-1  |
| C3450   | H-1  | R2107   | E-8  | R3233  | I-6  | 2A5     | K-3  |
| C3461   | E-2  | R2108   | E-8  | R3234  | H-6  | 2B5     | K-4  |
| C3462   | E-1  | R2109   | B-8  | R3239A | A-11 | 2M      | A-6  |
| CR2104  | A-5  | R2110A  | B-8  | R3241  | D-10 | 3D3     | G-7  |
| CR2105  | B-9  | R2111A  | B-8  | R3244A | J-9  | 3F3     | K-5  |
| CR2106  | A-8  | R2112A  | B-8  | R3245  | I-9  | 3G3     | D-8  |
| CR2107  | E-8  | R2113   | A-9  | R3260  | J-7  | 3R8     | K-10 |
| CR2108  | A-5  | R2114   | A-6  | R3261A | I-7  | 3S8     | K-9  |
| CR2199  | B-8  | R2115   | E-7  | R3262A | I-7  | 3T8     | K-8  |
| CR2501  | I-4  | R2116   | E-6  | R3401  | D-4  | 3V3     | D-11 |
| CR2502  | I-3  | R2117   | A-6  | R3402  | D-4  | 3W3     | D-10 |
| CR2503  | I-1  | R2118   | D-5  | R3403  | C-4  | 5M      | D-5  |
| CR2503A | I-4  | R2119   | D-5  | R3404  | C-5  |         |      |
| CR2514  | I-3  | R2120   | F-6  | R3405  | A-5  |         |      |
| CR2525  | I-1  | R2121   | E-5  | R3406  | C-5  |         |      |
| CR2541  | I-5  | R2122   | E-5  | R3407  | B-6  |         |      |
| CR2543  | I-4  | R2125   | F-8  | R3408  | C-6  |         |      |
| CR2545  | I-2  | R2126   | F-9  | R3409  | F-7  |         |      |



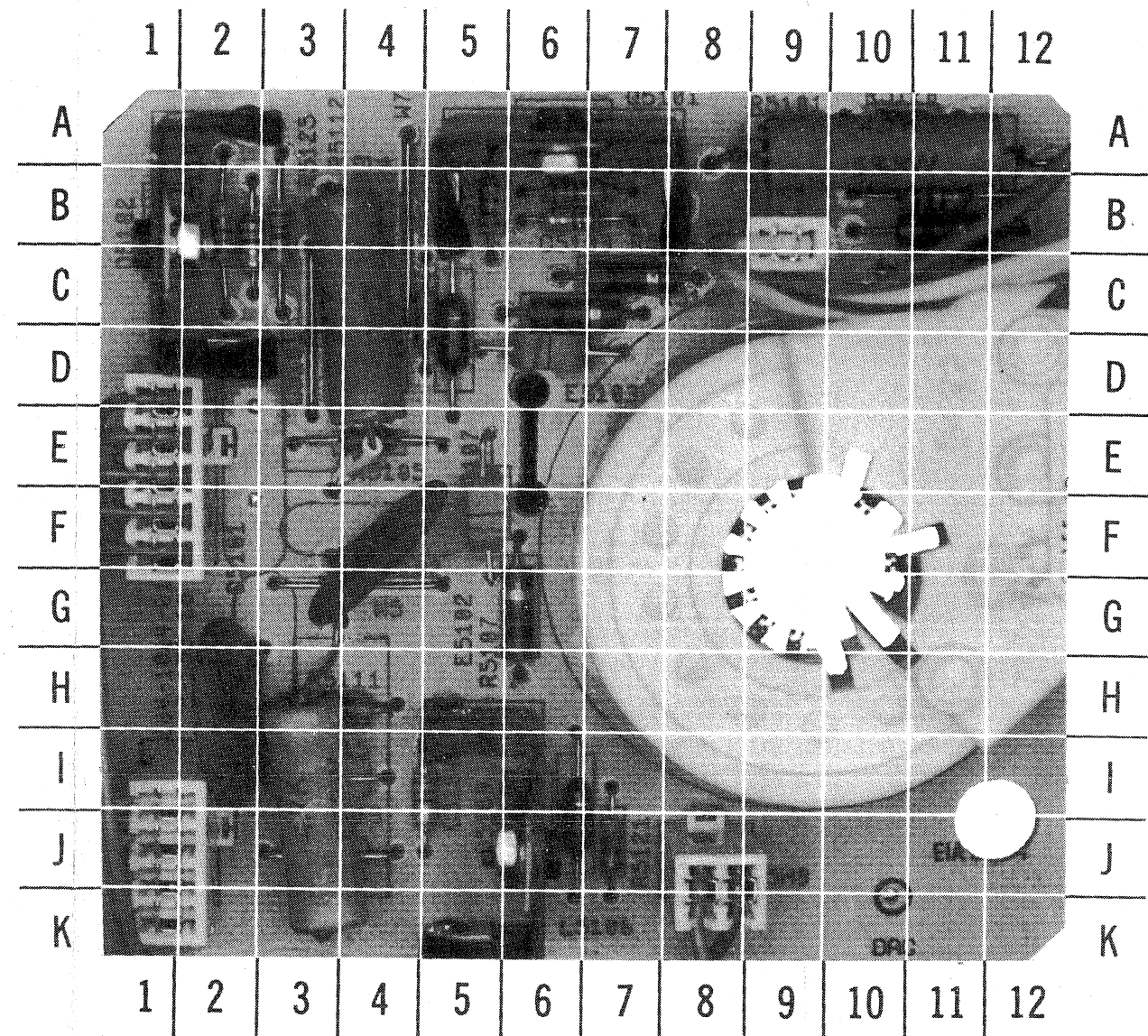
CMT8-2  
ZENITH  
MODEL ZVM-131



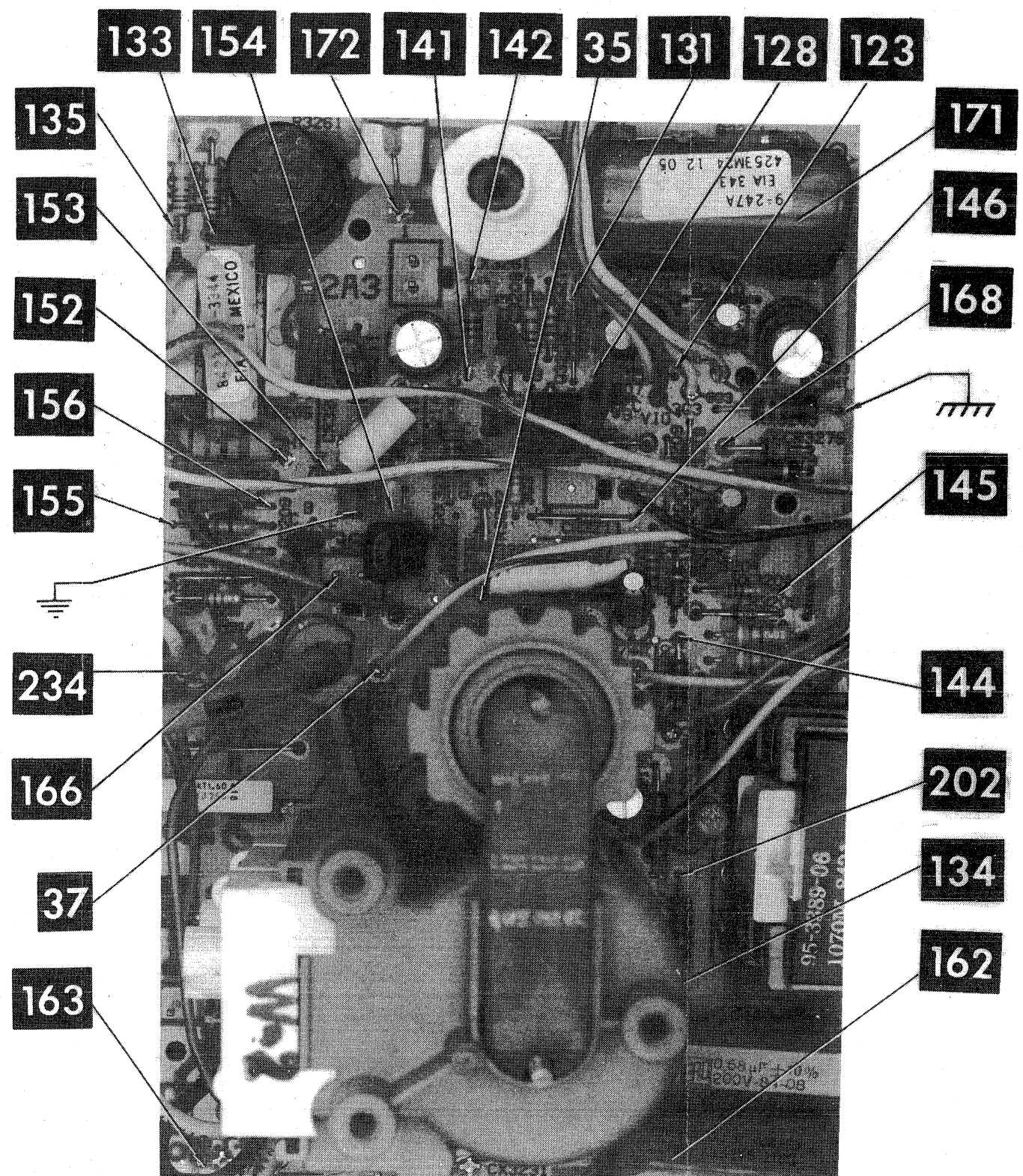
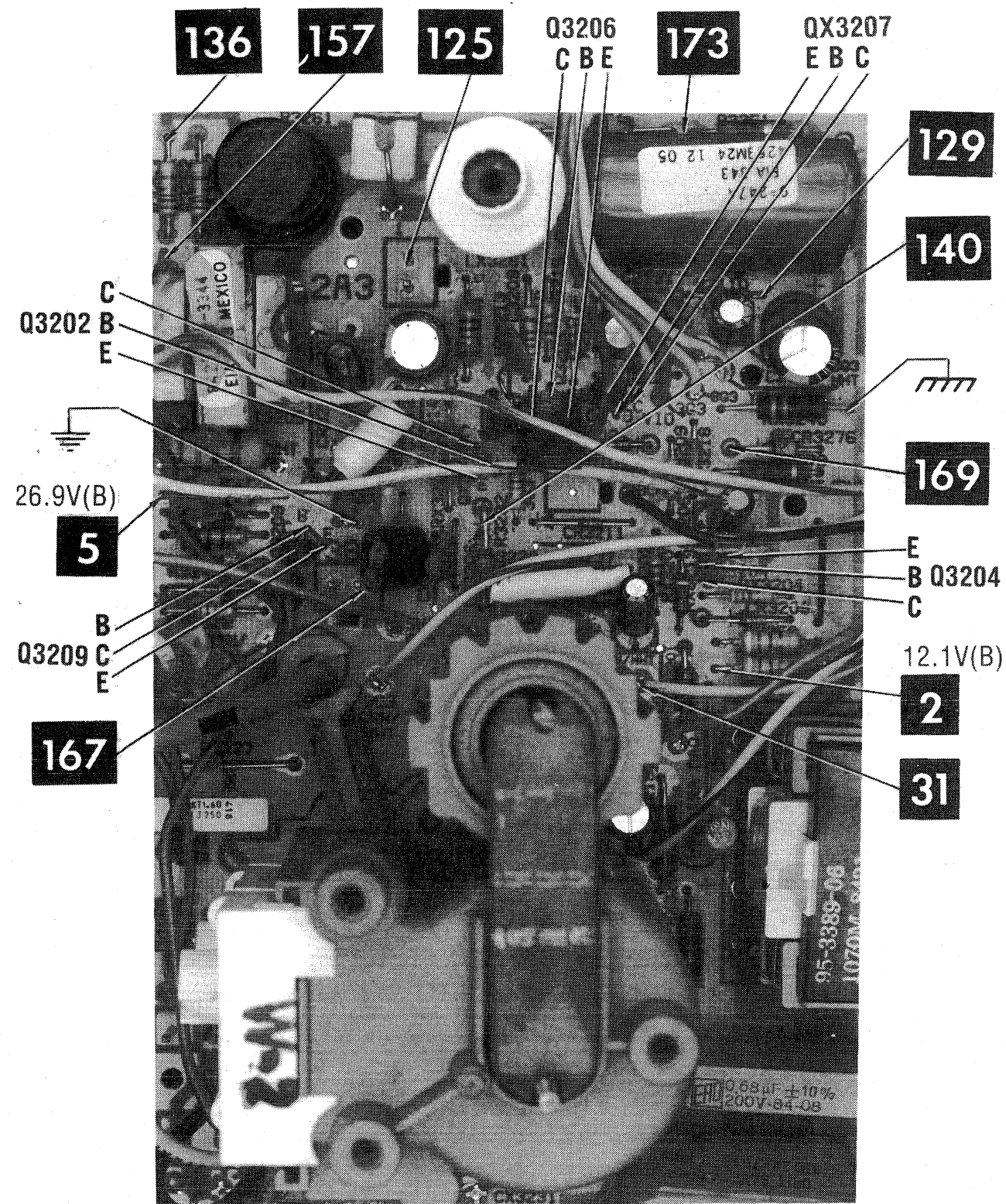


# VIDEO OUTPUT BOARD GridTrace LOCATION GUIDE

|       |      |       |      |       |      |       |      |       |     |
|-------|------|-------|------|-------|------|-------|------|-------|-----|
| C5102 | F-4  | L5102 | B-11 | Q5103 | J-6  | R5111 | H-4  | R5123 | B-5 |
| C5103 | B-6  | L5103 | C-4  | R5101 | A-10 | R5112 | C-4  | R5125 | B-3 |
| C5104 | I-5  | L5104 | D-4  | R5103 | B-11 | R5113 | J-3  | R5154 | J-3 |
| C5105 | B-2  | L5105 | A-11 | R5104 | B-6  | R5114 | B-2  | 5A2   | J-1 |
| C5106 | H-2  | L5106 | J-6  | R5105 | E-4  | R5115 | I-3  | 5C2   | E-1 |
| E5101 | C-11 | L5107 | D-5  | R5106 | C-7  | R5120 | A-10 | 5H3   | J-8 |
| E5102 | F-5  | Q5101 | A-6  | R5107 | G-6  | R5121 | J-7  | 5X7   | B-9 |
| E5103 | D-6  | Q5102 | B-1  | R5109 | C-6  | R5122 | C-5  |       |     |





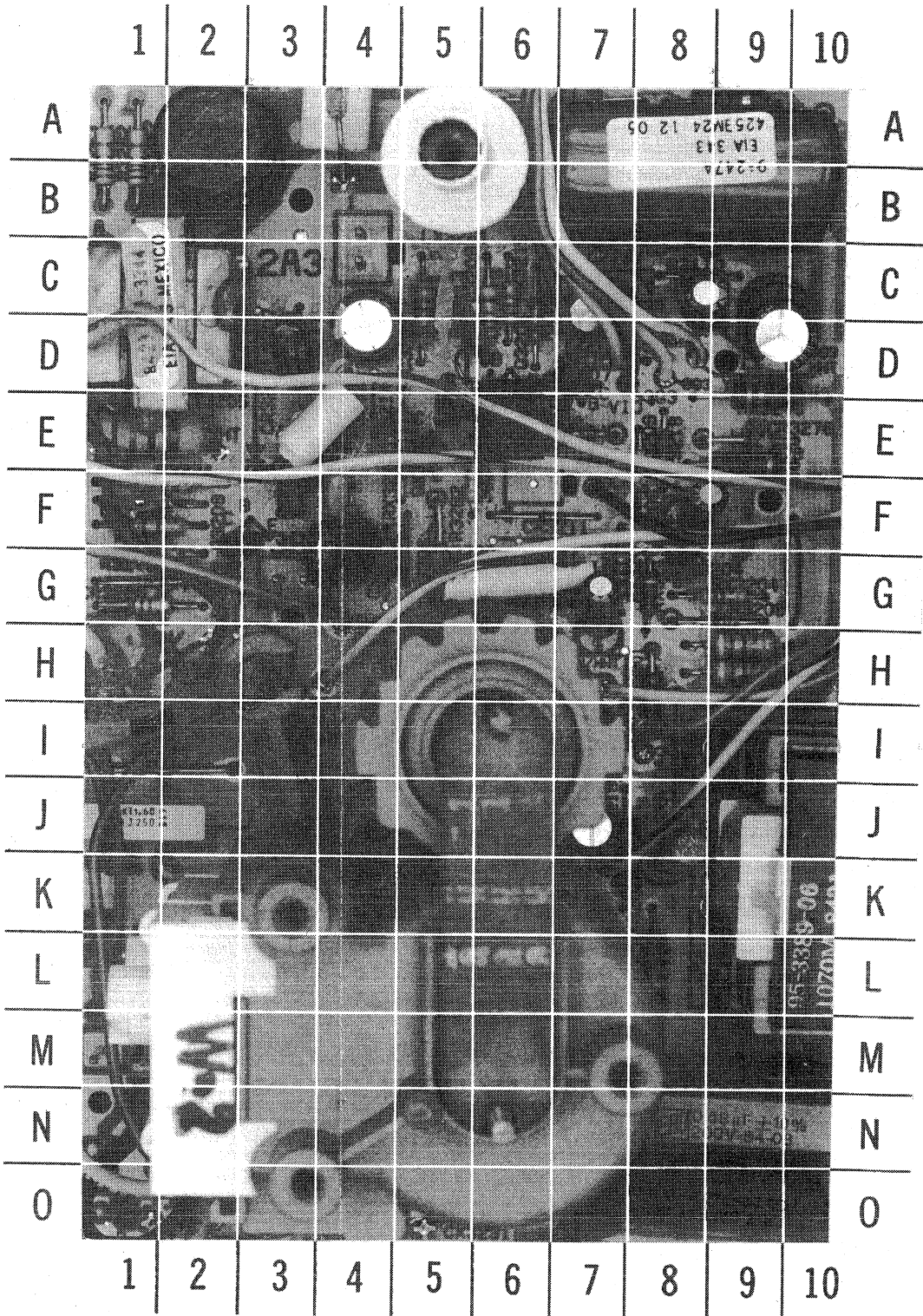


CMT8-2 ZENITH  
 MODEL ZVM-131



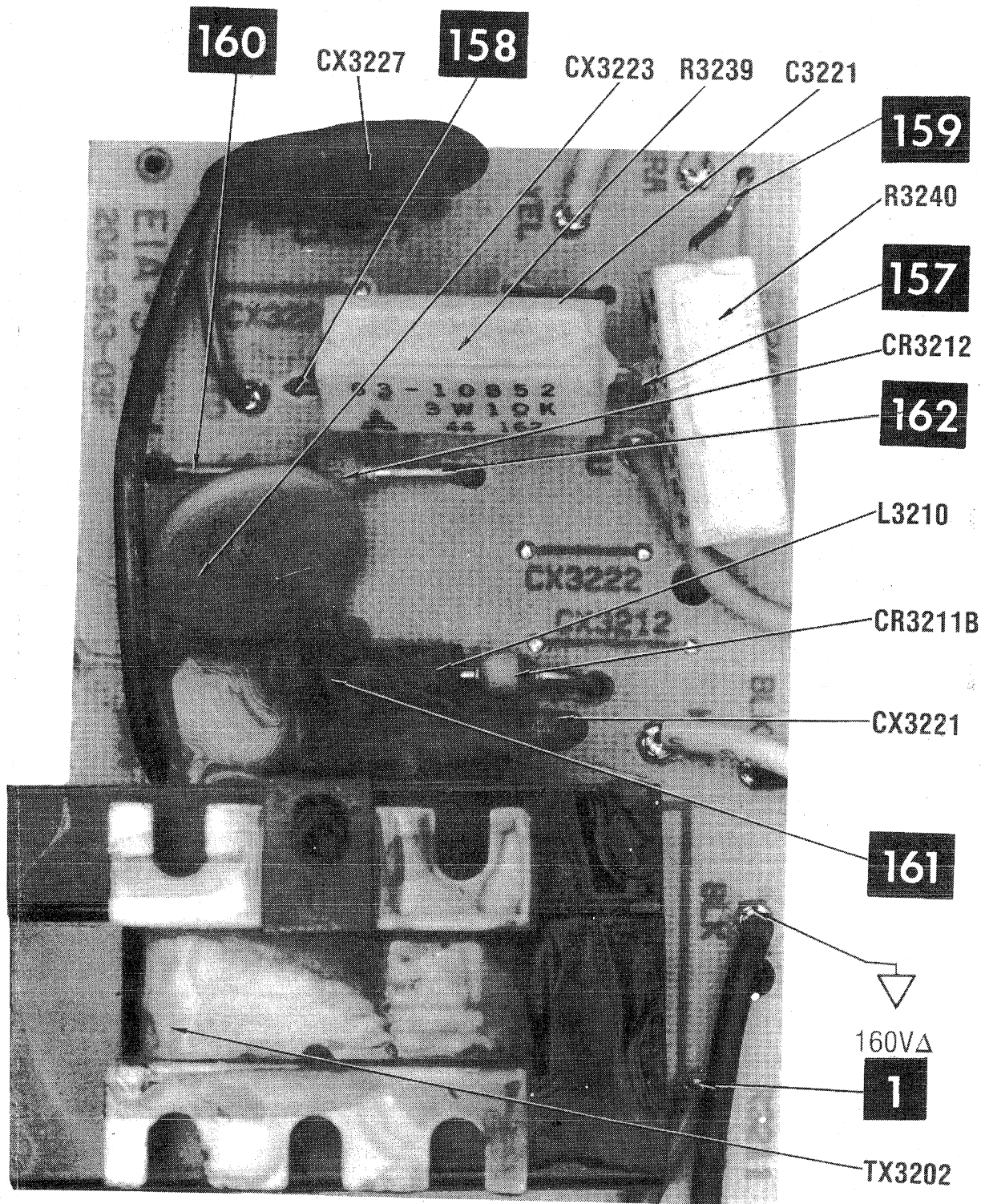
HV/HORIZONTAL SWEEP BOARD GridTrace LOCATION GUIDE

|         |     |        |     |        |     |        |      |     |     |
|---------|-----|--------|-----|--------|-----|--------|------|-----|-----|
| C2131   | C-7 | RX3214 | I-8 | RX3218 | E-8 | T3205  | C-1  | 2A3 | C-4 |
| C2152   | C-8 | RX3215 | C-6 | RX3219 | G-8 | TP3    | O-1  | 3B9 | G-3 |
| C3203   | D-4 | RX3216 | C-6 | RX3235 | E-5 | TX3204 | K-6  | 3R3 | O-3 |
| C3206   | F-8 | RX3217 | G-6 | RX3240 | E-9 | TX3251 | K-10 | 3S3 | O-1 |
| C3207   | G-4 |        |     |        |     |        |      |     |     |
| C3209   | D-5 |        |     |        |     |        |      |     |     |
| C3210   | E-5 |        |     |        |     |        |      |     |     |
| C3211   | D-3 |        |     |        |     |        |      |     |     |
| C3212   | E-4 |        |     |        |     |        |      |     |     |
| C3213   | E-4 |        |     |        |     |        |      |     |     |
| C3214   | E-4 |        |     |        |     |        |      |     |     |
| C3216   | F-3 |        |     |        |     |        |      |     |     |
| C3217   | G-2 |        |     |        |     |        |      |     |     |
| C3218   | F-1 |        |     |        |     |        |      |     |     |
| C3222   | G-1 |        |     |        |     |        |      |     |     |
| C3233   | N-9 |        |     |        |     |        |      |     |     |
| C3244   | J-1 |        |     |        |     |        |      |     |     |
| C3261   | B-8 |        |     |        |     |        |      |     |     |
| C3276   | J-9 |        |     |        |     |        |      |     |     |
| C3277   | D-7 |        |     |        |     |        |      |     |     |
| CR3202  | E-7 |        |     |        |     |        |      |     |     |
| CR3203  | H-8 |        |     |        |     |        |      |     |     |
| CR3205  | O-6 |        |     |        |     |        |      |     |     |
| CR3206  | G-5 |        |     |        |     |        |      |     |     |
| CR3207  | E-3 |        |     |        |     |        |      |     |     |
| CR3208  | G-1 |        |     |        |     |        |      |     |     |
| CR3209  | G-9 |        |     |        |     |        |      |     |     |
| CR3210  | E-6 |        |     |        |     |        |      |     |     |
| CR3211  | F-6 |        |     |        |     |        |      |     |     |
| CR3276  | E-9 |        |     |        |     |        |      |     |     |
| CRX3204 | C-6 |        |     |        |     |        |      |     |     |
| CX3202  | G-7 |        |     |        |     |        |      |     |     |
| CX3204  | G-4 |        |     |        |     |        |      |     |     |
| CX3205  | H-2 |        |     |        |     |        |      |     |     |
| CX3219  | J-7 |        |     |        |     |        |      |     |     |
| CX3229  | O-9 |        |     |        |     |        |      |     |     |
| E3251   | A-7 |        |     |        |     |        |      |     |     |
| L3207   | E-4 |        |     |        |     |        |      |     |     |
| L3220   | G-6 |        |     |        |     |        |      |     |     |
| LX3261  | A-5 |        |     |        |     |        |      |     |     |
| LX3262  | A-2 |        |     |        |     |        |      |     |     |
| Q3204   | G-8 |        |     |        |     |        |      |     |     |
| Q3206   | E-6 |        |     |        |     |        |      |     |     |
| Q3207   | D-7 |        |     |        |     |        |      |     |     |
| Q3209   | F-2 |        |     |        |     |        |      |     |     |
| QX3202  | E-5 |        |     |        |     |        |      |     |     |
| R2105   | C-6 |        |     |        |     |        |      |     |     |
| R2110   | C-8 |        |     |        |     |        |      |     |     |
| R2111   | C-8 |        |     |        |     |        |      |     |     |
| R2112   | D-7 |        |     |        |     |        |      |     |     |
| R3224   | F-2 |        |     |        |     |        |      |     |     |
| R3225   | E-1 |        |     |        |     |        |      |     |     |
| R3226   | E-3 |        |     |        |     |        |      |     |     |
| R3227   | F-4 |        |     |        |     |        |      |     |     |
| R3242   | F-1 |        |     |        |     |        |      |     |     |
| R3243   | G-1 |        |     |        |     |        |      |     |     |
| R3244   | M-1 |        |     |        |     |        |      |     |     |
| R3250   | H-9 |        |     |        |     |        |      |     |     |
| R3251   | A-9 |        |     |        |     |        |      |     |     |
| R3261   | A-4 |        |     |        |     |        |      |     |     |
| R3262   | A-1 |        |     |        |     |        |      |     |     |
| R3263   | A-1 |        |     |        |     |        |      |     |     |
| R3264   | H-9 |        |     |        |     |        |      |     |     |
| R3279   | E-9 |        |     |        |     |        |      |     |     |
| R3282   | F-5 |        |     |        |     |        |      |     |     |
| R3299A  | L-1 |        |     |        |     |        |      |     |     |
| R3299B  | M-1 |        |     |        |     |        |      |     |     |
| RX3204  | G-9 |        |     |        |     |        |      |     |     |
| RX3206  | J-8 |        |     |        |     |        |      |     |     |
| RX3207  | G-7 |        |     |        |     |        |      |     |     |
| RX3208  | E-7 |        |     |        |     |        |      |     |     |
| RX3209  | E-8 |        |     |        |     |        |      |     |     |
| RX3210  | L-8 |        |     |        |     |        |      |     |     |
| RX3211  | C-5 |        |     |        |     |        |      |     |     |



HV/HORIZONTAL SWEEP BOARD

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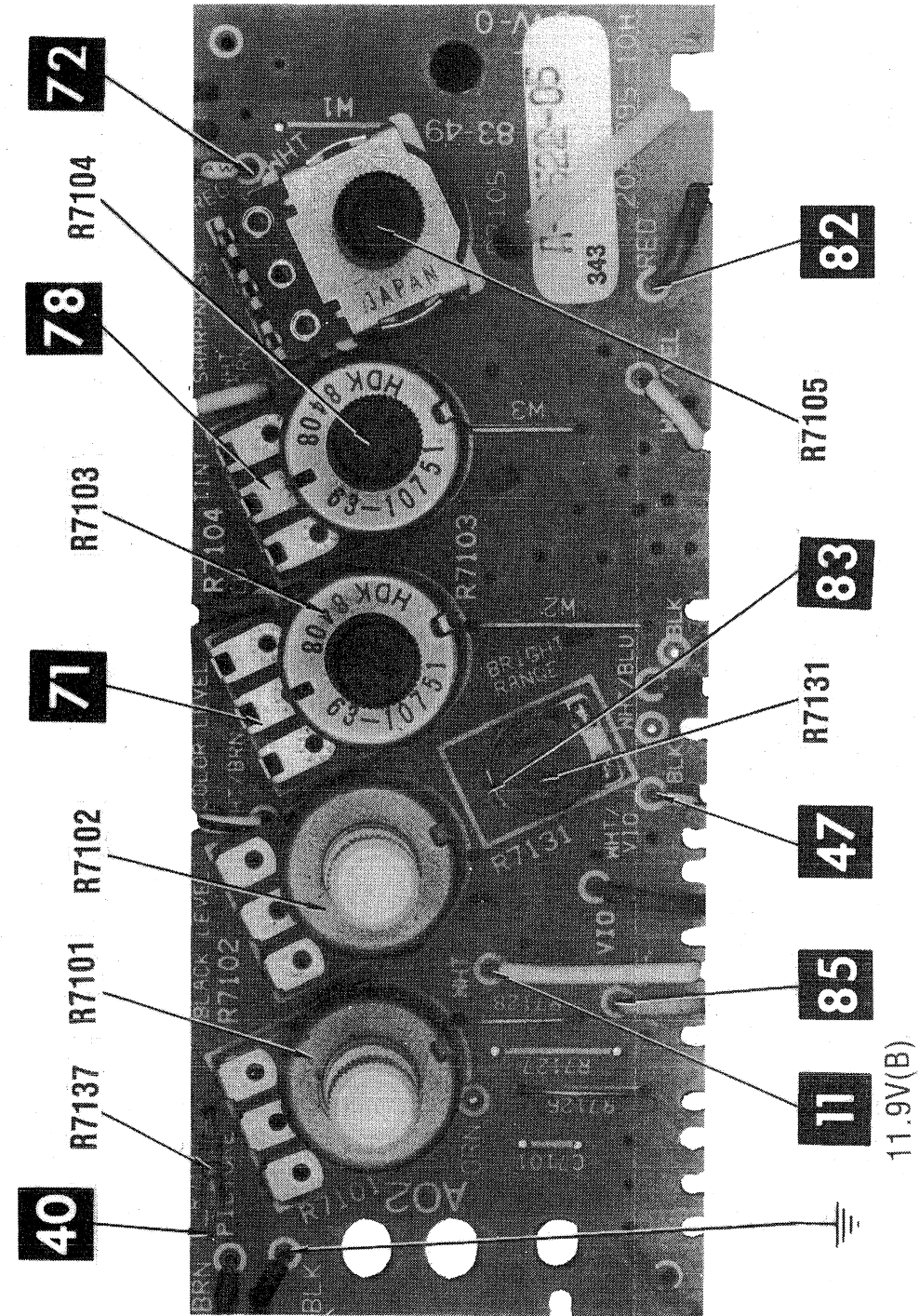
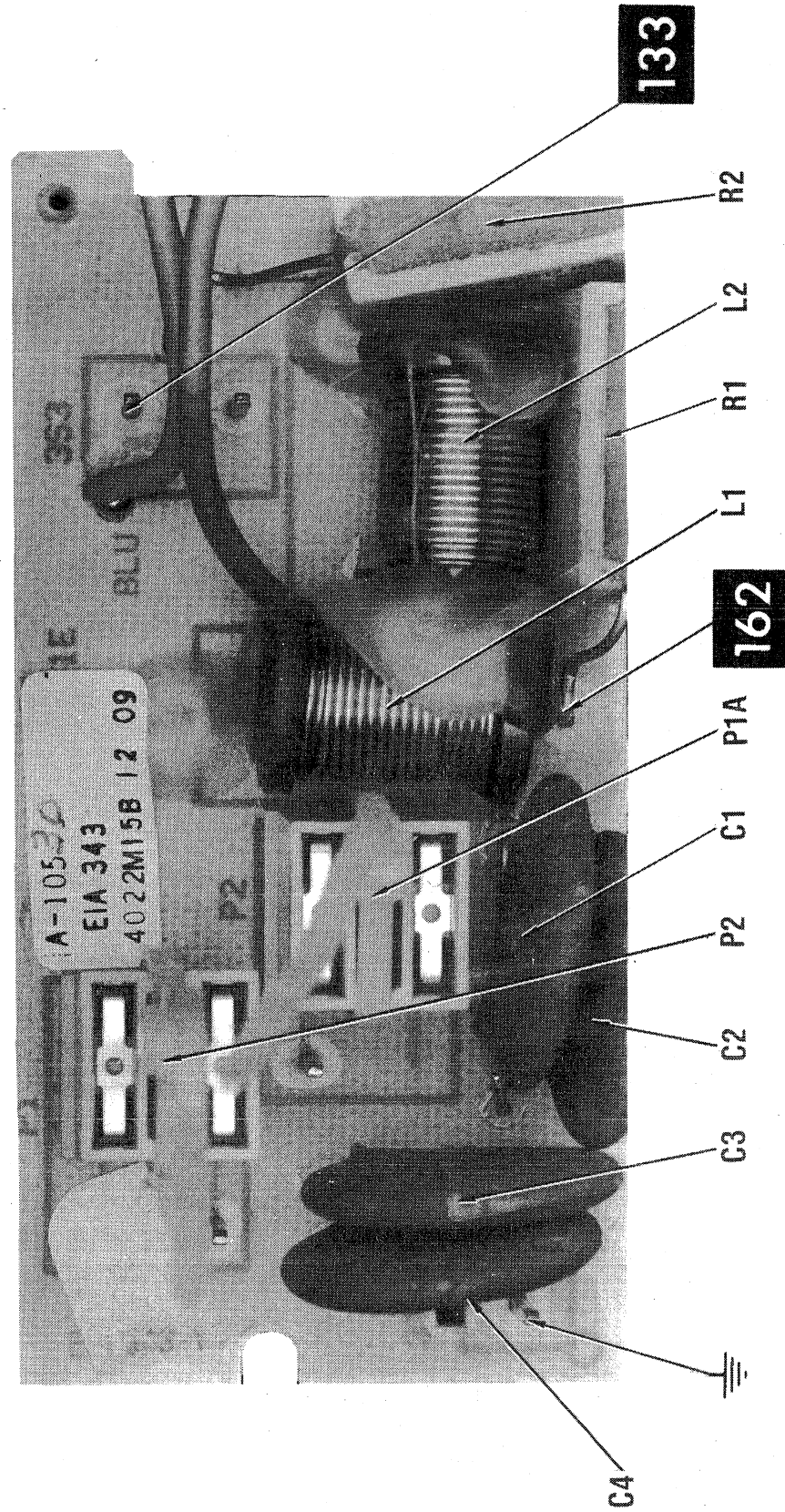


ZENITH  
MODEL ZVM-131

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STARTUP BOARD







When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

| ITEM No.           | TYPE No. | MFG. PART No.                          | REPLACEMENT DATA          |                       |                      |              |                  | ZENITH PART No. |
|--------------------|----------|----------------------------------------|---------------------------|-----------------------|----------------------|--------------|------------------|-----------------|
|                    |          |                                        | GENERAL ELECTRIC PART No. | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. | WORKMAN PART No. |                 |
| CR1301             | ITT142   | 103-142-01<br>103-254-01<br>103-142-01 | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR1701             | H284D4   |                                        | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR1703 thru CR1714 | ITT142   |                                        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR1715             | M33611   | 103-336-11                             | GEZD-5.6                  | NTE5011A              | ECG5011A             | SK5A6/5011A  | WEP1412/5011     | 103-336-11      |
| CR1722             | ITT142   | 103-142-01<br>103-254-01<br>103-142-01 | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR1724             | TZ4E254  |                                        | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR1725             | 1N4739A  |                                        | GEZD-9.1                  | NTE139A               | ECG139A              | SK9V11/39A   | WEP1109/139      | 103-301-13      |
| CR1726 thru CR1728 | ITT142   | 103-142-01                             | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2104             | R142     | 103-142-01<br>103-254-01<br>103-254-01 | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2105             | 254G1    |                                        | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR2106, 7          | H254E4   |                                        | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR2108             | MK279-14 | 103-279-14                             | GEZD-6.8                  | NTE5014A              | ECG5014A             | SK6A8/5014A  | WEP1415/5014     | 103-279-14      |
| CR2199             | R142     | 103-142-01                             | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2254 thru CR2256 | ITT142   | 103-142-01                             | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2501 thru CR2503 | ITT142   | 103-142-011                            | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2503A            | R142     | 103-142-01<br>103-254-01               | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2504 thru CR2506 | 254G1    |                                        | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR2514             | R142     |                                        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CABINET & CABINET PARTS (When ordering specify model, chassis & color)

| ITEM           | PART No.    | ITEM                         | PART No. |
|----------------|-------------|------------------------------|----------|
| Cabinet Bottom | 14-11515-01 | Perforated Bottom Plate      | 12-8416  |
| Cabinet Front  | 14-11516-05 | Knob-On/Off                  | 49-1332  |
| Back Cover     | 14-11514-01 | Knob-Volume                  | 46-10333 |
| Top Cover      | 14-11529-01 | Knob Assembly-Volume         | A-08846  |
| Bottom Plate   | 12-8215     | Knob Retaining Spring-Volume | 80-02166 |

WIRING DATA

|                                           |                                                    |
|-------------------------------------------|----------------------------------------------------|
| High Voltage Lead .....                   | Use BELDEN No. 9867 (30 KV)                        |
| Shielded Hook-up Wire .....               | Use BELDEN No. 8401 or 8421 (Single-Conductor)     |
|                                           | 8208 (Two-Conductor)                               |
| General-use Unshielded Hook-up Wire ..... | Use BELDEN No. 8529 (Solid) Available in 13 Colors |
|                                           | 8522 (Stranded) Available in 13 Colors             |

ZENITH  
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**PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**SPEAKER**

| ITEM No. | TYPE                       | REPLACEMENT DATA |               | NOTES |
|----------|----------------------------|------------------|---------------|-------|
|          |                            | MFGR. PART No.   | QUAM PART No. |       |
| SP1      | 2 1/4" X 3 1/2" PM 32 Ohms | 49-1332          |               |       |

**FUSE DEVICES**

| ITEM NO. | DESCRIPTION           | MFGR. PART NO. |        | NOTES |
|----------|-----------------------|----------------|--------|-------|
|          |                       | DEVICE         | HOLDER |       |
| # FX3201 | 4A @ 250V Fast-Acting | 136-113-23     |        |       |

# For SAFETY use only equivalent replacement part.

**MISCELLANEOUS**

| ITEM No. | PART NAME       | MFGR. PART No.                   | NOTES                                                                                                                                                                                                                                                    |
|----------|-----------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CR7100   | LED             | A-10675                          | Power Indicator, Red (1.63V @ 10.5mA) 3.58MHz                                                                                                                                                                                                            |
| CR2356   | Crystal         | 103-15201                        |                                                                                                                                                                                                                                                          |
| E3251    | Spark Gap       | 52-2240-08                       |                                                                                                                                                                                                                                                          |
| E5101    | Spark Gap       | 52-2240-06                       |                                                                                                                                                                                                                                                          |
| E5102    | Spark Gap       | 52-2240-06                       |                                                                                                                                                                                                                                                          |
| E5103    | Spark Gap       | 52-2240-06                       | AC, Polarized Power White/Green Composite/RGB Noise Processor (Part of Sharpness Control R7105)                                                                                                                                                          |
| L3201    | Degaussing Coil | 20-3918-09 or 20-3918-20 149-454 |                                                                                                                                                                                                                                                          |
| L3207    | Ferrite Bead    | A-11847                          |                                                                                                                                                                                                                                                          |
| L3210    | Ferrite Bead    | 85-1628                          |                                                                                                                                                                                                                                                          |
| L3220    | Ferrite Bead    | 63-10766-01                      |                                                                                                                                                                                                                                                          |
| P1       | Power Cord      | 13VBWP22                         | Convergence/Purity, Assembly Audio/Video Sync Audio/Video Sync Control HV/Horiz Sweep HV/Horiz Sweep, Assembly Main Main, Assembly Start Up Video Output Video Output, Assembly Width Width, Assembly Input, Assembly AC, Assembly AC, Strain Relief CRT |
| S3201    | Switch          | HE-234-545                       |                                                                                                                                                                                                                                                          |
| S2       | Switch          | A-7690-03                        |                                                                                                                                                                                                                                                          |
| SW1701   | Switch          | 9-230-5 (1)                      |                                                                                                                                                                                                                                                          |
| SW7501   | Switch          | 9-230-02                         |                                                                                                                                                                                                                                                          |
| V1       | CRT             | A-9522-05 (1)                    |                                                                                                                                                                                                                                                          |
|          | CRT             | A-9522-01                        |                                                                                                                                                                                                                                                          |
|          | Magnet          | 204-840-03                       |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 9-247-4                          |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 204-976-02                       |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 9-227-5A (1)                     |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | A-10632-3 (1)                    |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 204-1064-02                      |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 9-155-18                         |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | 204-979-01                       |                                                                                                                                                                                                                                                          |
|          | P.C. Board      | A-10530                          |                                                                                                                                                                                                                                                          |
|          | Panel           | A-12155                          |                                                                                                                                                                                                                                                          |
|          | Power Cord      | 50-347                           |                                                                                                                                                                                                                                                          |
|          | Power Cord      | 125-198-07                       |                                                                                                                                                                                                                                                          |
|          | Socket          | A-11056                          |                                                                                                                                                                                                                                                          |

(1) Number on unit.

**PARTS LIST AND DESCRIPTION (Continued)**

When ordering parts, state Model, Part Number, and Description

**SEMICONDUCTORS (Select replacement for best results)**

| ITEM No.   | TYPE No.  | MFGR. PART No. | REPLACEMENT DATA          |                       |                      |              |                  |                 |
|------------|-----------|----------------|---------------------------|-----------------------|----------------------|--------------|------------------|-----------------|
|            |           |                | GENERAL ELECTRIC PART No. | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. | WORKMAN PART No. | ZENITH PART No. |
| CR2525     | R142      | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2541     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2543     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR2545     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3202     | ITT412142 | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3202A    | 330G1     | 103-330        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-330         |
| CR3203     | ITT330419 | 103-330        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-330         |
| CR3205     | 305G1418C | 103-305        | GE-533                    | NTE525                | ECG525               | SK3925/525   | WEP177/525       | 103-305         |
| CR3205A    | 309-011TT | 103-309-01     | GEZD-10                   | NTE5019A              | ECG5019A             | SK10A/5019A  | WEP1420/5019     | 103-309-01      |
| CR3206     | TZ4C284   | 103-284        | GE-511                    | NTE552                | ECG552               | SK9000/552   | WEP172/506       | 103-284         |
| CR3207     | 295-1     | 103-295-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-295-01      |
| CR3208     | 295-01    | F-16147 (1)    | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | F-16147         |
| CR3208A    | TZ4A326   | 103-295-01     | GE-511                    | NTE552                | ECG552               | SK9000/552   | WEP172/506       | 103-295-01      |
| CR3209     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3210     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3210A    | H254E4    | 103-254-01     | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR3211     | ITT142    | 103-142-01     | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3211A    | 254G1     | 103-254-01     | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |
| CR3211B    | GI312     |                |                           |                       |                      |              |                  |                 |
| CR3212     | TZ4G339-4 | 103-326        | GE-511                    | NTE552                | ECG552               | SK9000/552   | WEP172/506       | 103-326         |
| CR3214     | TZ4A326   |                |                           |                       |                      |              |                  |                 |
| CR3217     | TZ4F339-4 | 103-330        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-330         |
| CR3219     | 330G1     | 103-330        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-330         |
| CR3223, 24 | 330G1     | 103-330        | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-330         |
| CR3231     | 315-6CGI  | 103-315-06     |                           |                       |                      |              |                  | 103-315-06      |
| CR3232, 33 | H315F4    | 103-315-06     |                           |                       |                      |              |                  | 103-315-06      |
| CR3234     | 315-6CGI  | 103-315-06     |                           |                       |                      |              |                  | 103-315-06      |
| CR3235     | H284D4    | 103-284        | GE-511                    | NTE552                | ECG552               | SK9000/552   | WEP172/506       | 103-284         |
| CR3276     | TZ4C254   | 103-254-01     | GE-504A                   | NTE116                | ECG116               | SK3313/116   | WEP158/116       | 103-254-01      |

CMT8-2 ZENITH MODEL ZVM-131

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

| ITEM No.         | TYPE No.   | MFG. PART No. | REPLACEMENT DATA          |                       |                      |              |                  |                 |
|------------------|------------|---------------|---------------------------|-----------------------|----------------------|--------------|------------------|-----------------|
|                  |            |               | GENERAL ELECTRIC PART No. | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. | WORKMAN PART No. | ZENITH PART No. |
| CR3401           | ITT142     | 103-142-01    | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3404           | ITT142     | 103-142-01    | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3405           | R142       | 103-142-01    | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3406           | ITT142     | 103-142-01    | GE-300                    | NTE177                | ECG177               | SK9091/177   | WEP1062/177      | 103-142-01      |
| CR3408           | MK279-14   | 103-279-14    | GEZD-6.8                  | NTE5014A              | ECG5014A             | SK6A8/5014A  | WEP1415/5014     | 103-279-14      |
| CR3409           | 279-14ITT  | 103-279-19    | GEZD-10                   | NTE5019A              | ECG5019A             | SK10A/5019A  | WEP1420/5019     | 103-279-19      |
| CRX3204          | MK30884    | 103-308       |                           |                       |                      |              |                  | 103-308         |
| IC1301           | 221-105    | 221-105       |                           | NTE701                | ECG701               | SK9026/701   |                  | 221-105         |
| IC1451           | 221-98A05  | 221-98        |                           | NTE1231               | ECG1231              | SK3832/1231  | WEP1231/1231     | 221-98          |
| IC1701           | 221-290-01 | 221-290       |                           |                       |                      |              |                  | 221-290         |
| IC1702           | 221-130    | 221-130       |                           |                       |                      |              |                  | 221-130         |
| IC2376           | 221-179-1  | 221-179-01    |                           |                       |                      |              |                  | 221-179-01      |
| IC3401           | 221-264    | 221-264       |                           |                       |                      |              |                  | 221-264         |
| Q1203, 4         | 986        | 121-986       |                           |                       |                      |              |                  | 121-986         |
| Q1701 thru Q1707 | 895        | 121-895       | GE-82                     | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      | 121-895         |
|                  | 895        | 121-895       | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      | 121-895         |
| Q1708 thru Q1716 | 1019       | 121-1019      | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        | 121-1019        |
| Q1717 thru Q1722 | 1084       | 121-1084      |                           |                       |                      |              |                  | 121-1084        |
| Q1723            | 1096       | 121-1096      |                           |                       |                      |              |                  | 121-1096        |
| Q1726            | 1096       | 121-1096      |                           |                       |                      |              |                  | 121-1096        |
| Q1727            | 895        | 121-895       |                           |                       |                      |              |                  | 121-1096        |
| Q1728            | 1064       | 121-895       | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      | 121-895         |
|                  | 1096       | 121-1096      |                           |                       |                      |              |                  | 121-1096        |
| Q1729, 30        | 499-1      | 121-499-01    |                           |                       |                      |              |                  | 121-1096        |
| Q1731 thru Q1733 | 1019       | 121-1019      | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      | 121-499-01      |
| Q1733            |            |               | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        | 121-1019        |
| Q1734            | 499-1      | 121-499-01    | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      | 121-499-01      |
| Q1735            | 1019       | 121-1019      | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        | 121-1019        |

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

COILS (RF-IF)

| ITEM No. | FUNCTION         | MFGR. PART No. |
|----------|------------------|----------------|
| L1       | Width (120uH)    | 20-4031        |
| L2       | Width (120uH)    | 20-4031        |
| L1202    | RF Choke         | 28-3907-16     |
| L1701    | Peaking          | 20-3887-16     |
| L1702    | Peaking          | 20-3887-16     |
| L1703    | Peaking          | 20-3887-16     |
| L2276    | Delay Line       | 20-4136        |
| L2277    | Peaking          | 20-3907-21     |
| L2278    | RF Choke         | 20-3919        |
| L2376    | Chroma Takeoff   | 45-3080        |
| L2377    | RF Choke         |                |
| L2378    | Peaking          | 20-3887-20     |
| L2501    | RF Choke (663uH) | 20-3831        |

# For SAFETY use only equivalent replacement part.

| ITEM No.  | FUNCTION         | MFGR. PART No. |
|-----------|------------------|----------------|
| L3401     | RF Choke (663uH) | 20-3831        |
| L5102     | RF Choke         | 20-3907-25     |
| L5103     | RF Choke         | 20-3907-25     |
| L5104     | RF Choke         | 20-3907-25     |
| L5105     | Peaking          | 20-3907-18     |
| L5106     | Peaking          | 20-3907-18     |
| L5107     | Peaking          | 20-3907-18     |
| # LX1201  | RF Choke         | 20-3831-01     |
| # LX1705  | RF Choke         | 20-3801-01     |
| # LX1706  | RF Choke         | 20-3801-01     |
| # LX3262  | Horiz Linearity  | 20-3975        |
| # TX3202A | Line Choke       | 95-3439        |

COILS & TRANSFORMERS (Sweep Circuits)

| ITEM No. | FUNCTION         | REPLACEMENT DATA |                      |                     |
|----------|------------------|------------------|----------------------|---------------------|
|          |                  | MFGR. PART No.   | OTHER IDENTIFICATION | THORDARSON PART No. |
| # DY1    | Yoke Horiz .85mH | 95-3387-05       |                      |                     |
| # L3402  | 100° Vert 21mH   |                  |                      |                     |
| # LX3261 | Sweep Oscillator | 20-4026          |                      |                     |
| # T3201  | Width            | 20-3976          |                      |                     |
| # T3205  | Start Up         | 95-3558-03       |                      |                     |
| # TX3202 | Horiz Driver     | 95-3344          |                      |                     |
| # TX3204 | Regulator        | 95-3439A         |                      |                     |
| # TX3251 | Horiz Output     | 95-3667          |                      |                     |
|          | Pincushion       | 95-3389-04       |                      |                     |

# For SAFETY use only equivalent replacement part.

FILTER CHOKE

| ITEM No. | RATINGS            |         |                              | REPLACEMENT DATA |                     | NOTES |
|----------|--------------------|---------|------------------------------|------------------|---------------------|-------|
|          | CURRENT (Measured) | DC RES. | INDUCTANCE (0 CURRENT 1000~) | MFGR. PART No.   | THORDARSON PART No. |       |
| # LX3202 | 600mA              | 2.5     | 60mH                         | 95-3501-02       |                     |       |

# For SAFETY use only equivalent replacement part.

ZENITH  
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PARTS LIST AND DESCRIPTION (Continued)  
When ordering parts, state Model, Part Number, and Description

RESISTORS (Power and Special)

| ITEM No. | RATING                    | REPLACEMENT DATA               |                   |                  |
|----------|---------------------------|--------------------------------|-------------------|------------------|
|          |                           | MFGR. PART No.                 | NEW-TONE PART No. | WORKMAN PART No. |
| R1       | 390 10% 5W WW             | 63-10271                       | 5W139             |                  |
| R2       | 390 10% 5W WW             | 63-10444-86 (1)<br>63-10271    | 5W139             |                  |
| # R1706  | 2 5% 1/2W Metal Oxide     | 63-10444-86 (1)<br>63-10565-07 | HW2D0             |                  |
| R1772    | 681 1% 1/4W Carbon Film   | 63-10934-96                    |                   |                  |
| R1776    | 681 1% 1/4W Carbon Film   | 63-10934-96                    |                   |                  |
| R1779    | 681 1% 1/4W Carbon Film   | 63-10934-96                    |                   |                  |
| R1781    | 1100 1% 1W Carbon Film    | 63-10936-84                    |                   |                  |
| R1782    | 1100 1% 1W Carbon Film    | 63-10936-84                    |                   |                  |
| R1784    | 1100 1% 1W Carbon Film    | 63-10936-84                    |                   |                  |
| R1785    | 681 1% 1/4W Carbon Film   | 63-10934-96                    |                   |                  |
| R1789    | 27.4K 1% 1/4W Carbon Film | 63-10935-48                    |                   |                  |
| R1791    | 51.1K 1% 1/4W Carbon Film |                                |                   |                  |
| R1799    | 100 1% 1/4W Carbon Film   | 63-10235-48                    |                   |                  |
| R1800    | 100 1% 1/4W Carbon Film   | 63-10235-48                    |                   |                  |
| R1801    | 100 1% 1/4W Carbon Film   | 63-10235-48                    |                   |                  |
| R1803    | 100 1% 1/4W Carbon Film   | 63-10235-48                    |                   |                  |
| # R1834  | 51 5% 1/2W Carbon Film    |                                | HW051             |                  |
| # R1834A | 39 5% 1/2W Carbon Film    |                                | HW039             | 22-2062          |
| R2111    | 3000 2% 1/4W Carbon Film  | 63-10233-83                    | QW230             |                  |
| R2112    | 10K 2% 1/4W Carbon Film   | 63-10233-96                    | QW310             | 22-2253          |
| # R2121  | 150 5% 1/2W Carbon Film   | 63-10565-52                    | HW115             | 22-2076          |
| # R2122  | 150 5% 1/2W Carbon Film   | 63-10565-52                    | HW115             | 22-2076          |
| R2299    | 47 5% 7W WW               | 63-10918-02 (1)                |                   |                  |
| R2507    | 1500 2% 1/4W Carbon Film  | 63-10235-76                    | QW215             | 22-2243          |
| R2518    | 1500 2% 1/4W Carbon Film  | 63-10235-76                    | QW215             | 22-2243          |
| R2529    | 1500 2% 1/4W Carbon Film  | 63-10235-76                    | QW215             | 22-2243          |
| R3206    | 12 10% 10W WW             | 63-10460-50                    | 10W012            |                  |
| # R3224  | 4700 5% 1/2W Carbon Film  | 63-10243-88                    | HW247             | 22-2112          |
| # R3225  | 680 5% 2W Metal Oxide     |                                | 2W168             | 22-4092          |
|          | 680 5% 2W WW              | 63-10836-68                    | 2W168             |                  |
| # R3231  | 1 10% 2W WW               | 63-10422-24                    | 2W1D0             | WS1.0            |
| R3239    | 1 10% 3W WW               | 63-10852 (1)                   |                   |                  |
| R3240    | .18 10% 3W WW             | 63-10852-01 (1)                |                   |                  |
| R3241    | 4 10% 10W WW              | 63-08246                       | 10W3D9            | 24-4021          |
| # R3243  | 2200 5% 1/2W Carbon Film  | 63-10243-80                    | HW222             | 22-2104          |
| R3244A   | 47 10% 3W WW              | 63-10430-64 (1)                |                   |                  |
|          | 47 5% 3W Carbon Film      | 63-10840-40                    |                   |                  |
| R3245    | PTC 11 Cold               | 63-10710                       |                   | FR605            |
|          |                           | 778413 (1)                     |                   |                  |
| R3261    | 390 10% 5W WW             | 63-10444-86                    | 5W139             |                  |
| R5101    | 4700 5% 3W Carbon Film    | 63-10840-88                    |                   | 20-027           |
| R5112    | 4700 5% 3W Carbon Film    | 63-10840-88                    |                   | 20-027           |
| R5113    | 4700 5% 3W Carbon Film    | 63-10840-88                    |                   | 20-027           |
| # RX1457 | 82 5% 2W Metal Oxide      | 63-10235-46                    | 2W082             | 22-4070          |
| # RX2101 | 22 5% 1/2W Carbon Film    | 63-10565-32                    | HW022             | 22-2056          |
| # RX2104 | 3 5% 1/2W Carbon Film     | 63-10243-11                    | HW3D0             |                  |
| # RX2105 | 3 5% 1/2W Carbon Film     | 63-10243-11                    | HW3D0             |                  |
| # RX3204 | 2200 5% 1/4W Carbon Film  | 63-10235-80                    | QW222             | 22-1104          |
| # RX3206 | 3300 5% 1/2W Carbon       | 63-7805                        | HW233             | 22-2108          |
| # RX3207 | 22 5% 1/2W Carbon Film    | 63-10235-32                    | HW022             | 22-2056          |
| # RX3208 | 2200 5% 1/4W Carbon Film  | 63-10235-80                    | QW222             | 22-1104          |
| # RX3209 | 1000 5% 1/4W Carbon Film  | 63-10235-72                    | QW210             | 22-1096          |
| # RX3210 | 3300 5% 1/2W Carbon       | 63-7805                        | HW233             | 22-2108          |
| # RX3211 | 3000 1% 1W Carbon Film    | 63-10818                       |                   |                  |
| # RX3214 | 2400 2% 1/4W Carbon Film  | 63-10233-81                    | QW224             |                  |
| # RX3215 | 12K 5% 1/4W Carbon Film   | 63-10235-98                    | QW312             | 22-1122          |
| # RX3216 | 1200 1% 1/2W Carbon Film  | 63-10810-06                    |                   |                  |
| # RX3217 | 270 5% 1/2W Carbon        | 63-7760                        | HW127             | 22-2082          |
| # RX3218 | 2700 5% 1/4W Carbon Film  | 63-10235-82                    | QW227             | 22-1106          |
| # RX3219 | 4700 5% 1/4W Carbon Film  | 63-10235-88                    | QW247             | 22-1112          |
| # RX3235 | 1100 1% 1W Carbon Film    | 63-10810                       |                   |                  |
| # RX3240 | 10M 10% 1/2W Carbon       | 63-10657-04                    |                   |                  |
| # RX3246 | 1.2M 10% 1/2W Carbon      | 63-10657-03                    |                   | 22-2170          |

# For SAFETY use only equivalent replacement part.  
(1) Number on unit.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

| ITEM No.         | TYPE No.  | MFGR. PART No.            | REPLACEMENT DATA          |                       |                      |              |                  |
|------------------|-----------|---------------------------|---------------------------|-----------------------|----------------------|--------------|------------------|
|                  |           |                           | GENERAL ELECTRIC PART No. | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. | WORKMAN PART No. |
| Q1736            | 1084      | 121-1084                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q1737            | 1019      | 121-1019                  | GE-61                     | NTE229                | ECG229               | SK3246A/229  | WEP956/229       |
| Q1738            | 551       | 121-551                   | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      |
| Q1739            | 895       | 121-895                   | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q1740 thru Q1743 | 1019      | 121-1019                  |                           |                       |                      |              |                  |
| Q1744 thru Q1746 | 895       | 121-895                   | GE-123AP                  | NTE123AP              | ECG123AP             | SK3954/123AP | WEP736/123A      |
| Q2101, 2         | 1072-1    | 121-1072-01<br>F-10896(2) | GE-302                    | NTE291                | ECG291               | SK3440/291   | WEP780/291       |
| Q2103            | 1TT975    | 121-975                   | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      |
| Q2104            | 1064M     | 121-1064                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2215            | 699       | 121-699                   | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2501            | 1019M     | 121-1019                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2502            | 551M      | 121-551                   | GE-61                     | NTE229                | ECG229               | SK3246A/229  | WEP956/229       |
| Q2503            | R1019     | 121-1019                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2504            | 551M      | 121-551                   | GE-61                     | NTE229                | ECG229               | SK3246A/229  | WEP956/229       |
| Q2505            | 1019M     | 121-1019                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2506            | 551M      | 121-551                   | GE-61                     | NTE229                | ECG229               | SK3246A/229  | WEP956/229       |
| Q2507            | R1019     | 121-1019                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q2508, 9         | 1019M     | 121-1019                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q3200            | TZ966-03  | 121-966-02<br>F12737(2)   | GE-66A                    | NTE152                | ECG152               | SK3893/152   | WEP745/152       |
| Q3201            | R499-01-C | 121-499-01                | GE-123AP                  | NTE123AP              | ECG123AP             | SK3854/123AP | WEP736/123A      |
| Q3202            | TZ1034    | 121-1034                  | GE-27                     | NTE171                | ECG171               | SK3201/171   | WEP702/171       |
| Q3203            | 1059M     | 121-1059                  | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |
| Q3204            | 1TT975    | 121-975                   | GE-82                     | NTE159                | ECG159               | SK3466/159   | WEP62/159        |

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MODEL ZVM-131  
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When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

| REPLACEMENT DATA |           |                |                           |                       |                      |              |
|------------------|-----------|----------------|---------------------------|-----------------------|----------------------|--------------|
| ITEM No.         | TYPE No.  | MFGR. PART No. | GENERAL ELECTRIC PART No. | NEW-TONE NTE PART No. | PHILIPS ECG PART No. | RCA PART No. |
| Q3206            | TZ1037    | 121-1037       | GE-27                     | NTE171                | EGG171               | SK3201/171   |
| Q3207            | ITT975    | 121-975        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q3208            | TZ1029-01 | 121-1029       | GE-38                     | NTE165                | EGG165               | SK3115/165   |
| Q3209            | 1040      | 121-1040       | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q3401            | R895      | 121-895        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q3402            | 986M      | 121-895        | GE-82                     | NTE159                | EGG159               | SK3466/159   |
| Q3403            | R895      | 121-895        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q3404            | ITT895    | 121-895        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q3405            | R895      | 121-895        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |
| Q5101 thru Q5103 | 1034      | 121-01034      | GE-27                     | NTE171                | EGG171               | SK3201/171   |
| QX3202           | ITT975    | 121-975        | GE-123AP                  | NTE123AP              | EGG123AP             | SK3854/123AP |

# For SAFETY use only equivalent replacement part.  
(1) Assembly, includes diode, ferrite bead & sleeve.  
(2) Assembly, includes heat sink.

ELECTROLYTIC CAPACITORS

Item numbers not listed are normally available at local distributors.

| ITEM No. | RATING     | MFGR. PART No. | ITEM No. | RATING     | MFGR. PART No.  |
|----------|------------|----------------|----------|------------|-----------------|
| C1201    | 1 50V NP   | 22-7487-01     | C3429    | .47 35V NP | 22-7406         |
| C1702    | 2.2 25V NP | 22-7405-02     | CX3202   | 1 50V      | 22-7862-01      |
| C3254    | 22 100V NP | 22-7900        | CX3219   | 10 25V     | 22-7708-05      |
| C3402    | 1 35V NP   | 22-7406-01     | CX3240   | 1700 180V  | 22-7735-01 (1)  |
| C3410    | 22 16V NP  | 22-7404-06     | CX3240A  | 300 180V   | F-13479 (1) (2) |

# For SAFETY use only equivalent replacement part.  
(1) Includes CX3240 and CX3240A.  
(2) Includes Lead Assembly.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CAPACITORS

Item numbers not listed are normally available at local distributors.

| ITEM No. | RATING            | MFGR. PART No. | ITEM No. | RATING          | MFGR. PART No. |
|----------|-------------------|----------------|----------|-----------------|----------------|
| C1       | 530 N2200 3KV 10% | 22-6466        | C2386    | 68 N470 50V 5%  | 22-7749-32     |
| C2       | 530 N2200 3KV 10% | 22-6466        | C2389    | 36 NPO 50V 5%   | 22-7743-25     |
| C3       | 530 N2200 3KV 10% | 22-6466        | C3209A   | 470 N1500 5%    | 22-7395        |
| C4       | 530 N2200 3KV 10% | 22-6466        | C3210    | 82 N750 10%     | 22-5995        |
| C1203    | 68 N150 50V 5%    | 22-7633-29     | C3233    | .68 200V 10%    | 22-7128        |
| C1204    | 20 N470 50V       |                | C3234    | 470 N1500 5%    | 22-7395        |
| C1303    | 47 N750 50V       | 22-7648-23     | C3242    | 470 N1500 5%    | 22-7395        |
| C1704    | 18 NPO 50V 5%     | 22-7743-18     | C3257    | 470 N1500 5%    | 22-7395        |
| C1705    | 18 NPO 50V 5%     | 22-7743-18     | C3427    | 150 N750 50V 5% | 22-7647-35     |
| C1706    | 18 NPO 50V 5%     | 22-7743-18     | C3450    | 200 NPO 50V 5%  | 22-7619-41     |
| C1723    | 68 NPO 50V 5%     | 22-76121-30    | CX3204   | .1 100V 5%      | 22-7773-24     |
| C2282    | 120 N150 50V 5%   | 22-7633-35     | CX3205   | .01 2KV         | 22-7523-01     |
| C2283    | 22 NPO 50V 5%     | 22-7743-20     | CX3211   | 530 3KV 10%     |                |
| C2355    | 51 NPO 50V 5%     | 22-7621-27     | CX3223   | .01 2KV         |                |
| C2356    | 33 NPO 50V 5%     | 22-7743-24     | CX3227   | 530 3KV 10%     |                |
| C2359    | 11 NPO 50V        | 22-7621-11     | CX3229   | .014            | 22-7672-12     |
| C2376    | 75 N470 50V 5%    | 22-7747-33     | CX3250   | .0047 500V      | 22-7431-06     |
| C2377    | 68 N470 50V 5%    | 22-7749-32     | CX3258   | .1 125VAC       | 22-5854        |

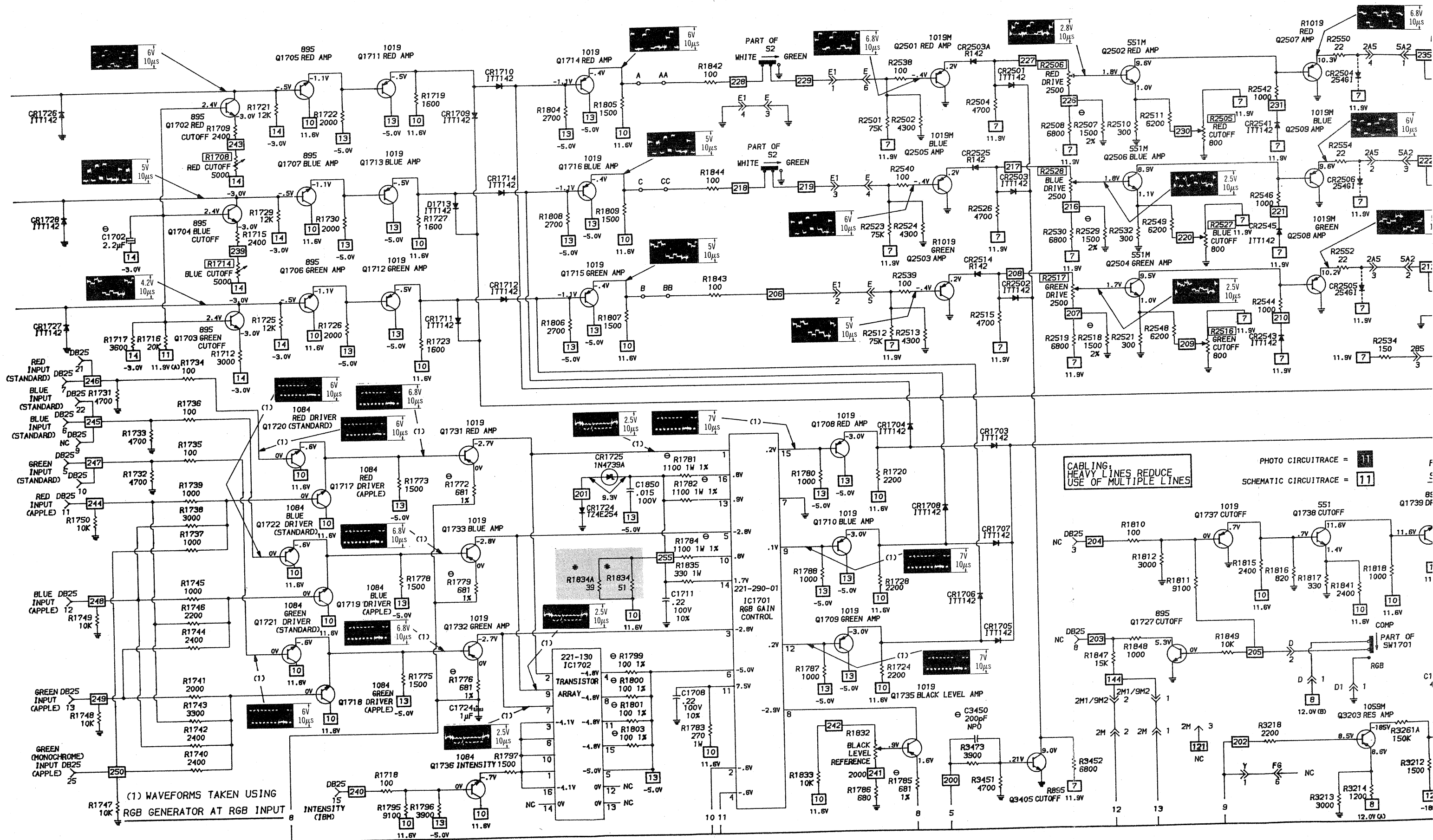
# For SAFETY use only equivalent replacement part.

CONTROLS (All wattages 1/2 watt, or less, unless listed)

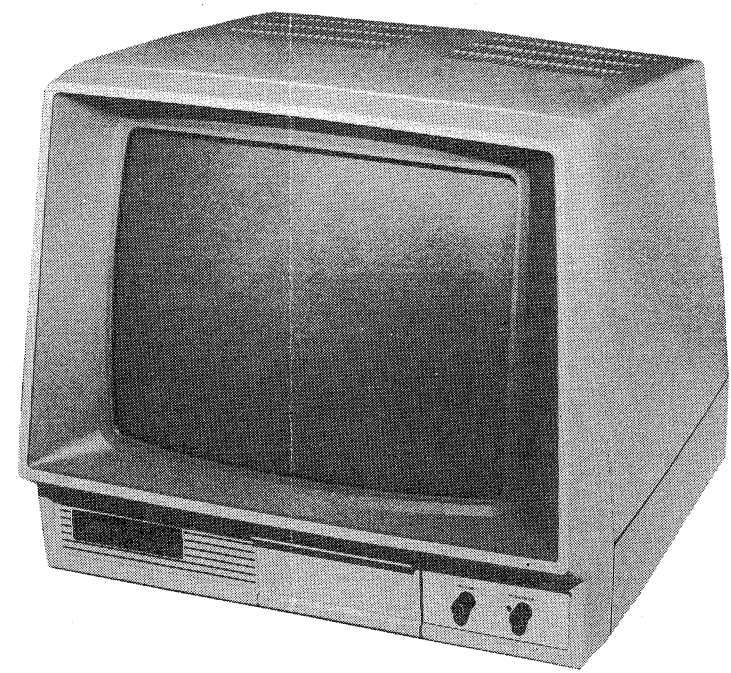
| ITEM NO. | FUNCTION              | RESISTANCE        | MFGR. PART NO.             | NOTES |
|----------|-----------------------|-------------------|----------------------------|-------|
| R1400    | Volume                | 15K               | 63-10772-04 (1)            |       |
| R1708    | Red Cutoff            | 5000              | 63-10857-11                |       |
| R1714    | Blue Cutoff           | 5000              | 63-10857-31                |       |
| R1832    | Black Level Reference | 2000              | 63-10857-86 or 63-10857-88 |       |
| R1836    | Black Level Cutoff    | 30K               | 63-10857-15                |       |
| R2125    | Vert Centering        | 500               | 63-09063-02                |       |
| R2390    | APC Adjust            | 10K               | 63-9023-2 (1)              |       |
| R2505    | Red Cutoff            | 800               | 63-10857-12                |       |
| R2506    | Red Drive             | 2500              | 63-10857-27                |       |
| R2516    | Green Cutoff          | 800               | 63-10857-25                |       |
| R2517    | Green Drive           | 2500              |                            |       |
| R2527    | Blue Cutoff           | 800               | 63-10857-26                |       |
| R2528    | Blue Drive            | 2500              |                            |       |
| R3299A   | Focus                 | 20M               | (2)                        |       |
| R3299B   | Screen                | 4.5M              | (2)                        |       |
| R3409    | 95V Adjust            | 100K              | 63-10857-17                |       |
| R3418    | Vert Height           | 2000              | 63-10857-08                |       |
| R3441    | Horiz Centering       | 100               | 63-10857                   |       |
| R7101    | Picture               | 5000              | 63-10750                   |       |
| R7102    | Black Level           | 5000              | 63-10754                   |       |
| R7103    | Color Level           | Detent @ 50%      |                            |       |
| R7104    | Tint                  | 5000              | 63-10751                   |       |
| R7105    | Sharpness/Switch      | 5000              | 63-10766-01                |       |
| R7131    | Brightness            | Detent @ 50% 5000 | 63-10857-87                |       |

# For SAFETY use only equivalent replacement part.  
(1) Number on unit.  
(2) Part of Horizontal Output Transformer TX304.

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Model ZVM-131

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### PRELIMINARY SERVICE CHECKS

ENCLOSED

### SAFETY PRECAUTIONS

See pages 8, 9.

### SERVICE INFORMATION

See page 5.

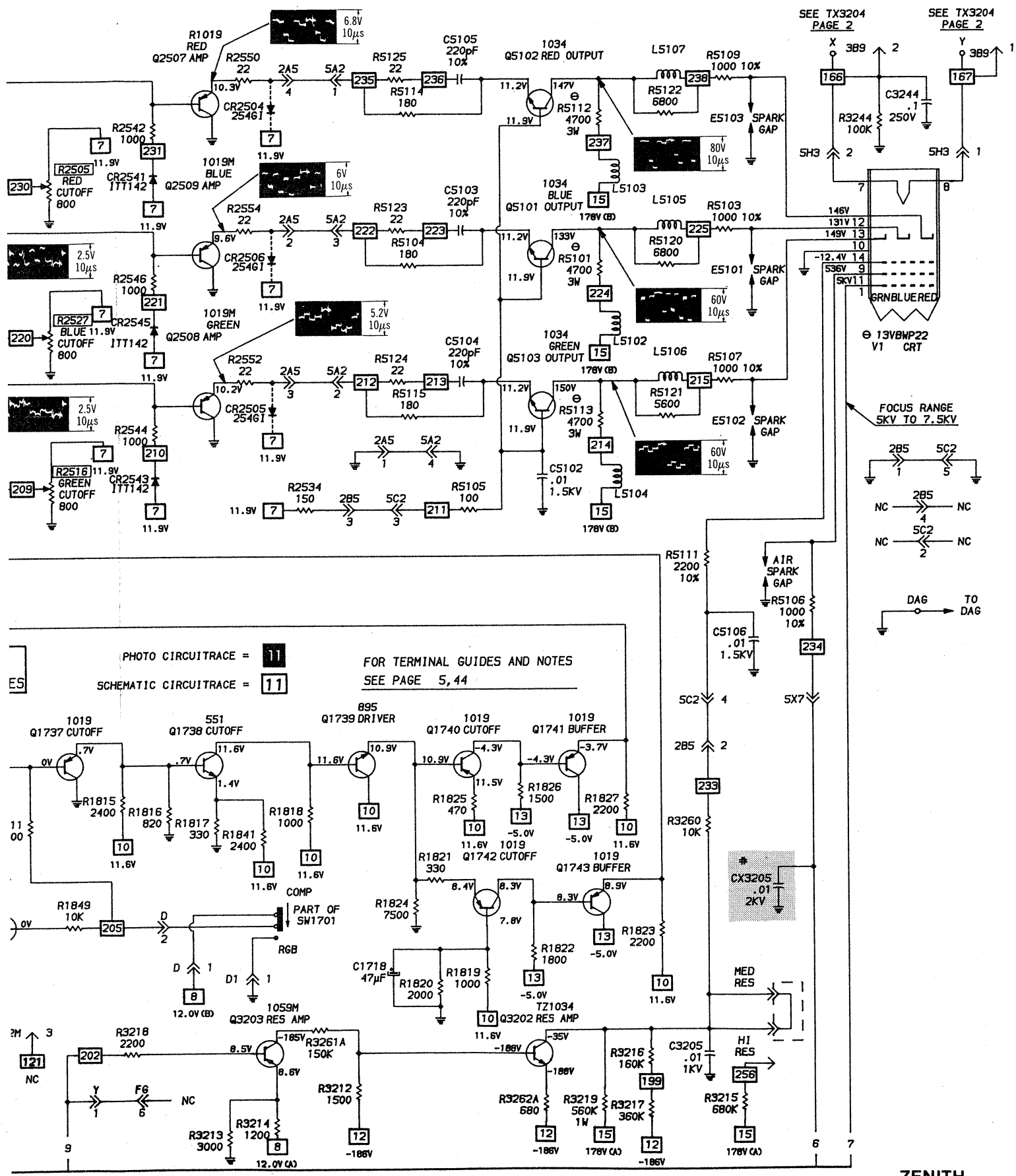
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**SAMS** Howard W. Sams & Co., Inc.  
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