TEKTRONIX®

606 MONITOR

WITH OPTIONS

INSTRUCTION MANUAL

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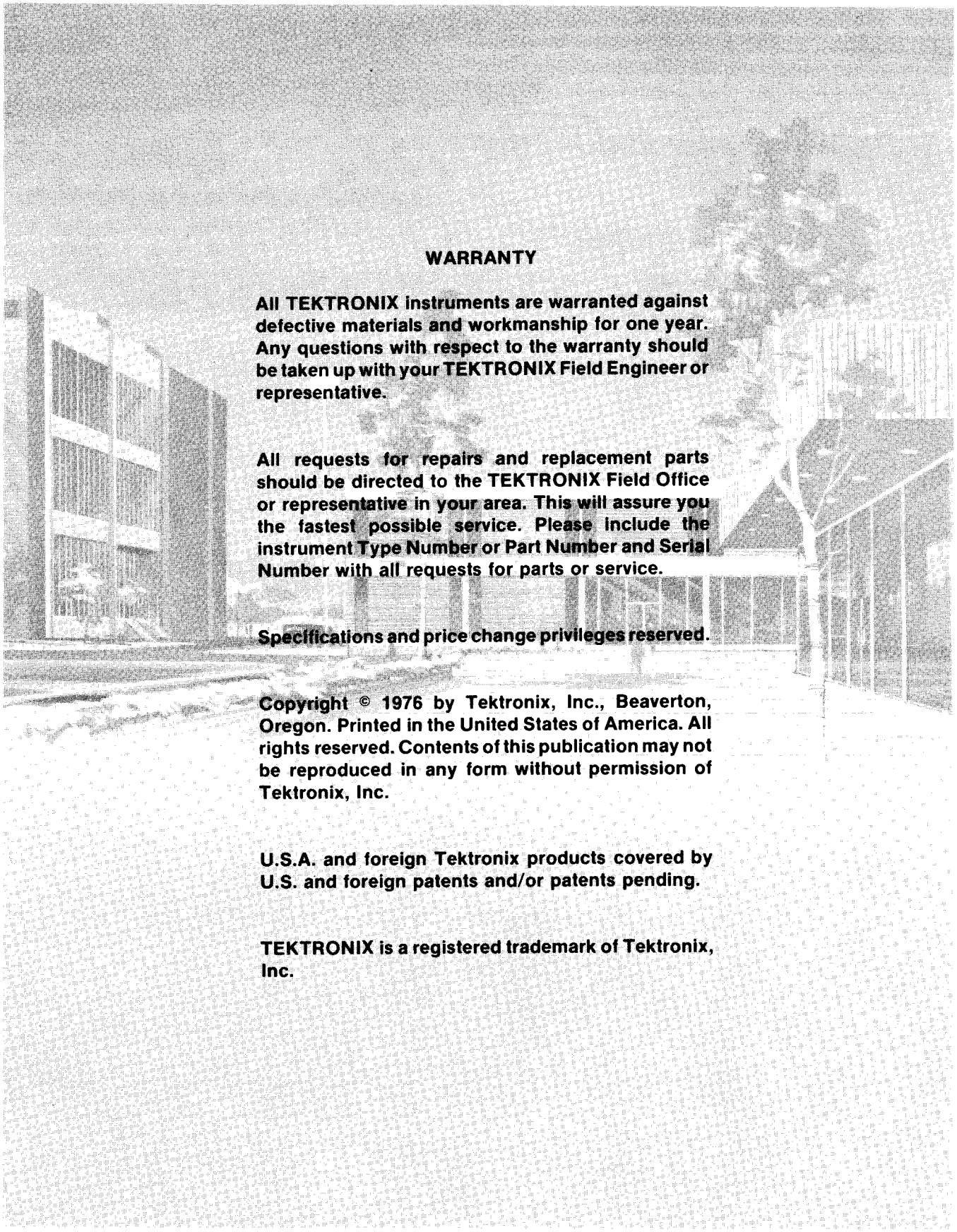

WARRANTY

All TEKTRONIX instruments are warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your TEKTRONIX Field Engineer or representative.

All requests for repairs and replacement parts should be directed to the TEKTRONIX Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument Type Number or Part Number and Serial Number with all requests for parts or service.

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WARNING

THE REMAINING PORTION OF THIS TABLE OF CONTENTS LISTS THE SERVICING INSTRUCTIONS. THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRICAL SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CALLED OUT IN THE OPERATING INSTRUCTIONS UNLESS QUALIFIED TO DO SO.

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OPERATOR SAFETY SUMMARY

This manual contains safety information which the user must follow to ensure safe operation of the Monitor. WARNING information is intended to protect the patient and the operator, and CAUTION information is intended to protect the instrument. The following are general safety precautions which do not appear in the operating sections of this manual and which must be applied during all phases of operation.

WARNING

Medical-Dental Applications

Do not use the amplifier INPUTS for direct patient connection. Signal currents at these connectors, as well as leakage currents, may exceed values considered non-hazardous for direct patient connection.

Although this Monitor is not to be used for direct patient connection, interconnection of this instrument with other equipment can result in application of excessive current to the patient. It is extremely important that the equipment be interconnected in accordance with NFPA 76B-T, Tentative Standard for the Safe Use of Electricity in Patient Care Facilities, section 3038, "Signal Transmission Between Appliances".

Do not operate this instrument in the presence of flammable gases or anesthetics. Explosion can result from operation in such an environment.

Ground the Instrument

For electric-shock protection, insert the power-cord plug only in a proper mating power outlet with a grounding (safety-earth) contact. To assure safe grounding during operation in patient-care facilities, the Hospital-Grade power-cord plug supplies with the instrument (Option 6) must be connected only to a power outlet marked "HOSPITAL-GRADE". Refer qualified service personnel to the servicing information sections of the Instrument Manual for additional information.

Before making external connections to this instrument, always ground the instrument first by connecting the power-cord plug to a proper mating power outlet.

Use Correct Fuse

For continued fire-hazard protection, replace fuse only with one of the proper type and rating. Refer fuse replacement to qualified service personnel only.

The following appear in the text of the operating sections of this manual, and are repeated here for emphasis:

WARNING

Do Not Remove Instrument Covers

High voltage is present inside the instrument. To avoid electric-shock hazard, operating personnel must not remove the protective instrument covers. Component replacement and internal adjustments must be made by qualified service personnel only.

Electric-shock hazard present; only qualified service personnel should change the input signal requirements. Refer them to the servicing information sections of the 606 Instruction Manual.

Limit Input Signals

To avoid electric-shock hazard, do not apply input signals of more than 25 volts (dc plus peak ac).

CAUTION

Exercise Care With Intensity Level

A high intensity level combined with a stationary spot will damage the crt phosphor. Therefore, set the INTENSITY control for just enough spot intensity for good visibility.

Exercise care in establishing the correct display intensity; a high-amplitude Z-Axis input signal, combined with an excessively high setting of the INTENSITY control, may damage the crt phosphor.

SERVICE SAFETY SUMMARY

The following are safety precautions which appear in the servicing information sections of this manual, and are repeated here for emphasis:

WARNING

Medical-Dental Applications

Do not use the amplifier INPUTS for direct-patient connection. Signal currents at these connectors, as well as leakage currents, may exceed values considered non-hazardous for direct-patient connection.

Although this monitor is not to be connected directly to a patient, interconnecting this monitor to other equipment can result in the application of excessive current to a patient. It is extremely important that the interconnection is made in accordance with NFPA 76B-T, Tentative Standard for the Safe Use of Electricity in Patient Care Facilities, section 3038, "Signal Transmission Between Appliances".

Ground the Instrument

The instrument is intended to be operated from a single-phase, earth-referenced power source having one current-carrying conductor (the Neutral Conductor) near earth potential. Operation from power sources where both current-carrying conductors are live with respect to earth (such as phase-to-phase on a three-wire system) is not recommended, since only the Line Conductor has over-current (fuse) protection within the instrument.

This instrument has a three-wire power cord with a polarized two-pole, three-terminal plug for connection to the power source and safety-earth. The safety-earth terminal of the plug is directly connected to the instrument frame. For electric-shock protection, insert this plug only in a mating outlet with a safety-earth contact. Do not defeat the grounding connection. Any interruption of the grounding connection can create an electric-shock hazard. Before making external connections to this instrument, always ground the instrument first by connecting the power-cord plug to a proper mating power outlet.

Disconnect Instrument Power

Disconnect the monitor from the power source, to avoid electric shock, before removing the cabinet panels, replacing components, soldering, or changing the settings of the Input Attenuation switches.

CRT Handling

Use care when handling a crt. Breakage of the crt causes a high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

CAUTION

Apply Proper Line Voltage

To prevent damage to the instrument, always check the line-voltage information recorded on the rear panel before applying power to the instrument.

Damage to the instrument may result from incorrect placement of the line-voltage selector plug.

Exercise Care With Intensity Level

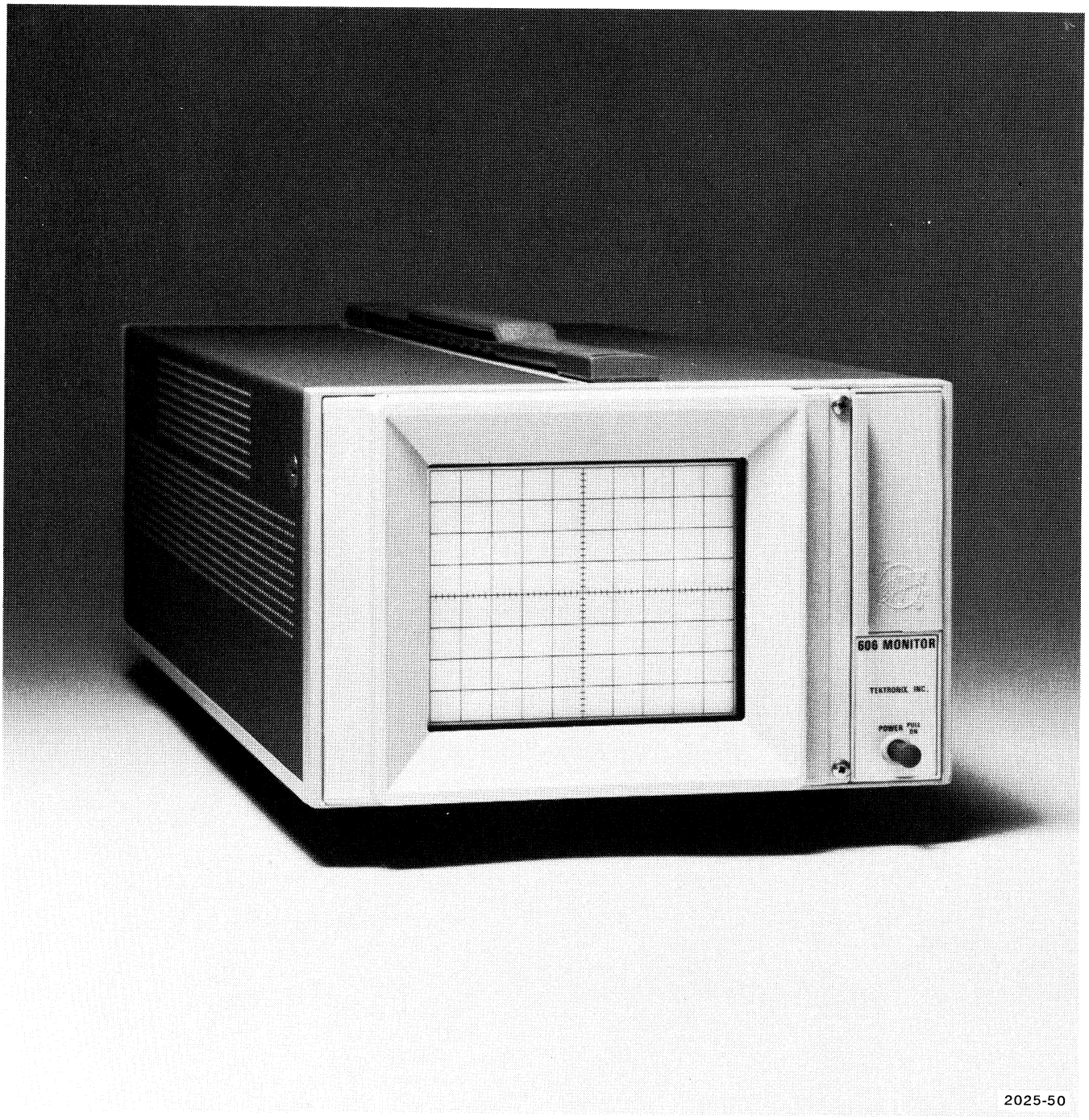
Do not allow a high-intensity spot to remain stationary on the crt. The crt phosphor could be permanently damaged.

Use Proper Cleaning Agents

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Use a non-residue type of cleaner, preferably isopropyl alcohol, total denatured ethyl alcohol, or TP35. Before using any other type of cleaner, consult your Tektronix Service Center.

Avoid Excessive Moisture

Circuit boards and components must be dry before applying power to the instrument to prevent damage from electrical arcing.



606 FEATURES

The 606 Monitor is a general purpose, high-resolution, X-Y display monitor providing a clear, bright display of analog data. This instrument is designed for display applications as in ultrasonic detection systems, electron microscope systems, radiation and thermal scanning systems, speech therapy, volume and vibration analysis, and medical and biophysical systems. The 606 Monitor may also be used to provide displays of alpha-numeric and graphic information from computers and other data transmission systems. Resolution of the crt (cathode-ray tube) in this instrument is excellent.

All display axes (vertical, horizontal, and intensity) can be operated differentially or from a single-signal source.

GENERAL INFORMATION

INTRODUCTION

The Operators Manual contains information necessary to effectively operate the 606 Monitor and is divided into three sections: Section 1 provides a basic description of the 606 with instrument specifications. Section 2 contains operating information for the instrument. Information concerning available options for the 606 Monitor is in section 3 of the manual.

The Instruction Manual provides both operating and servicing information for the 606 Monitor. The Instruction Manual is divided into ten sections. Operating information is covered in the first two sections; servicing information is contained in the remaining eight sections of the manual. Schematic diagrams are located at the rear of the manual and can be unfolded for reference while reading other parts of the manual. The reference designators and symbols used on the schematics are defined on the first page of the Diagrams and Circuit Board Illustrations section. Abbreviations used in the manuals, except for in the parts list and schematic diagrams, comply with the American National Standards Institute Y1.1-1972 publication. The parts list is a computer printout and uses computer-supplied abbreviations.

INSTRUMENT PACKAGING

If the instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing the following: owner (with address) and the name of an individual at your firm that can be contacted, complete instrument type and serial number, and a description of the service required.

Save and re-use the package in which your 606 Monitor was shipped to you. If the original packaging is unfit for use or not available, repackage the instrument as follows:

1. Obtain a carton of corrugated cardboard having inside dimensions of no less than six inches more than the instrument dimensions; this will allow for cushioning. Refer to Table 1-1 for carton test strength requirements.

2. Surround the instrument with polyethylene sheeting to protect the finish of the instrument.

3. Cushion the instrument on all sides by tightly packing dunnage or urethane foam between the carton and the instrument, allowing three inches on all sides.

4. Seal the carton with shipping tape or with an industrial stapler.

Table 1-1
Shipping Carton Test Strength

Gross Weight (lb)	Carton Test Strength (lb)
0 - 10	200
10 - 30	275
30 - 120	375
120 - 140	500
140 - 160	600

DESCRIPTION

The 606 Monitor is a compact, solid-state instrument with excellent resolution providing accurate displays of information from the X, Y, and Z signal inputs.

WARNING

High voltage is present inside the instrument. To avoid electric-shock hazard, operating personnel must not remove the protective instrument covers. Component replacement and internal adjustments must be made by qualified service personnel only.

Vertical and horizontal signals to be displayed on the crt are applied to the Vertical (Y) and Horizontal (X) Amplifiers through the appropriate + (noninverting) and – (inverting) INPUT connectors. Input signals can be either single-ended or differential. These amplifiers process the input signals and provide push-pull outputs to drive the crt deflection plates.

The Z-Axis Amplifier controls the display intensity by providing a voltage to drive the crt control grid. Input signals applied to the +Z (noninverting) and the –Z (inverting) INPUT connectors may be either single-ended or differential.

The High Voltage and Low-Voltage Power Supplies provide all the voltages necessary for operation of this instrument.

The internal Sweep circuit (Option 4) produces a positive-going sawtooth voltage, which is amplified by the Horizontal (X) Amplifier, to provide sweep deflection in the crt. The level of the vertical signal at which triggering occurs is determined by the TRIG SLOPE/LEVEL control. The Sweep circuit also produces an unblanking gate signal coincident with the sawtooth waveform. This gate signal unblanks the crt to permit display presentation.

SPECIFICATION

The electrical specifications listed in Table 1-2 apply when the following conditions are met: (1) The instrument must have been adjusted at an ambient temperature between +20° and +30° C (+68° and +86° F), (2) the instrument must be operating in an ambient temperature between 0° and +50° C (+32° and +122° F), and (3) the instrument must have been operating for at least 20 minutes.

TABLE 1-2
Electrical Characteristics

Characteristic	Performance Requirement
VERTICAL AND HORIZONTAL AMPLIFIERS	
Deflection Factor[1]	
Vertical (Y)	Internally adjustable from 0.5 V, or less, to at least 2.5 V full screen, with step attenuator in 1X position. (Internal step attenuator extends the deflection factor range to at least 12.5 V full screen.)
Horizontal (X)	Internally adjustable from 0.5 V, or less, to at least 2.5 V full screen, with step attenuator in 1X position. (Internal step attenuator extends the deflection factor range to at least 12.5 V full screen.)
Attenuators	Deflection factor reduced five times, within 3%, with 5:1 attenuator in 5X position.
Bandwidth (80% Full-Screen Reference Signal)	Dc to at least 3 MHz.
Rise Time	116 ns or less.
Settling Time	
After Deflection Between Any Two Points on Screen	Crt beam must be within 0.025 cm (0.010 inch) of final position within 500 ns.
After Deflection to Any Place On Screen From Any Position Off Screen (Within 10 cm of Screen Center)	Crt beam must be within 0.025 cm (0.010 inch) of final position within 750 ns.
Common Mode Rejection (Dc to 500 kHz)	
Attenuator at 1X	At least 100:1 cmr ratio for signals of +3 V or −3 V peak, or less.
Attenuator at 5X	At least 40:1 cmr ratio for signals of +15 V or −15 V peak, or less.
Phase Difference (Dc to 500 kHz)	1° or less between X and Y amplifiers. X and Y amplifier gain (v/div) must be set for the same deflection factor.
Input RC (All Inputs)	1 mΩ, within 1%, paralleled by 47 pF or less.

[1]**Only qualified service personnel should change the deflection sensitivity of the amplifiers. See the servicing information sections of the 606 Instruction Manual.**

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TABLE 1-2 (CONT.)
Electrical Characteristics

Characteristic	Performance Requirement
Maximum Nondestructive Input Voltage (Fault Condition Only)	+100 V or −100 V (dc plus peak ac).
Position Range (With No Input Signals Applied)	Front panel controls allow spot to be set anywhere within the viewing area.
Position Stability	0.1 cm or less per hour, after 20 minute warmup with covers installed; less than 0.2 cm in 24 hours.
Crosstalk Between X and Y Amplifiers	0.025 cm (0.01 inch), or less, of deflection on the undriven channel with full-screen amplitude of 1 MHz sine wave applied on the other channel. All other inputs grounded or terminated into 50 ohms.
Z-AXIS AMPLIFIER	
Bandwidth	Dc to 10 MHz.
Rise Time	35 ns or less.
Aberrations	5% or less.
Common Mode Rejection (Dc to 500 kHz)	Cmr ratio at least 100:1 with input signals to 5 V peak-to-peak at any setting of the Z-axis gain.
Input RC (Both Inputs)	1 MΩ, within 1%, paralleled by 47 pF or less.
Maximum Nondestructive Input Voltage (Fault Condition Only)	+100 V or −100 V (dc plus peak ac) with crt beam positioned off screen.
Useful Input Voltage[2]	
+ INPUT	Maximum intensity is produced either by an input amplitude of +1 V or less, with internal gain adjustment set at maximum; or +5 V or less with gain set at minimum.
	Crt blanking (cutoff) is produced either by an input amplitude of −1 V or more, with gain set at maximum; or by −5 V or more, with gain set at minimum.
− INPUT	Maximum intensity is produced by an input amplitude of −1 V or less, with gain set at maximum; or −5 V or less with gain set at minimum.
	Crt blanking is produced by an input amplitude of +1 V or more, with gain set at maximum; or by +5 V or more, with gain set at minimum.
Crosstalk Between Z Axis and Deflection Amplifiers.	0.025 cm (0.01 inch), or less, of deflection in X or Y axis with maximum output from Z Axis Amplifier. X and Y inputs grounded or terminated into 50 ohms.

[2] **Only qualified service personnel should change the amplifier sensitivity. See the servicing information sections of the 606 Instruction Manual.**

TABLE 1-2 (Cont.)
Electrical Characteristics

Characteristic	Performance Requirement
CATHODE-RAY TUBE DISPLAY	
Geometry	Bowing or tilt is 0.1 div, or less, full screen.
Center Screen Spot Diameter (Measured with Shrinking Raster Method)	
At 0.1 μA beam current	0.013 cm (0.005 inch), or less.
At 5 μA beam current	0.018 cm (0.007 inch), or less.
Orthogonality	90° within 0.7°.
Phosphor	P31 standard.
Option 76	P7.
Option 78	P11.
Deflection	Electrostatic.
Acceleration Potential	5.625 kV, within 2%.
Graticule	External 8 X 10 cm graticule is standard.
Option 1	Internal 8 X 10 cm unlighted orange graticule.
POWER SOURCE	
Line Voltage Ranges (ac, rms)	
120 V AC Nominal	
Low	90 to 110 V ac.
Med	99 to 121 V ac.
High	108 to 132 V ac.
220 V AC Nominal	
Low	180 to 220 V ac.
Med	198 to 242 V ac.
High	216 to 250 V ac.
Line Frequency	48 to 440 Hz.
Maximum Power Consumption	75 watts; 0.8 amperes, at 120 V ac, 60 Hz.

TABLE 1-2 (Cont.)
Electrical Characteristics

Characteristic	Performance Requirement
OPTION 4 SWEEP SYSTEM	
Sweep Range	100 ms/div to 1 μs/div, in decade steps.
Sweep Accuracy Over Center Eight Divisions	Within 3% (VARIABLE fully clockwise);
Linearity of Any Two Division Portion Within Center Eight Divisions	Within 2%, except for first 5% of total sweep length.
VARIABLE (Uncalibrated)	Provides continuously variable sweep rates between calibrated settings. Decreases each sweep rate setting by at least 10:1. Extends slowest sweep rate to at least 1 s/div.
Triggering Sensitivity (With Repetitive Signals)	At least 0.5 div vertical deflection from dc to 2 MHz.

TABLE 1-3
Environmental Characteristics

Characteristic	Performance Requirement
Temperature	
Operating	0° to +50° C (+32° to +122° F).
Nonoperating	–40° to +70° C (–40° to +158° F).
Altitude	
Operating	To 15,000 feet.
Nonoperating	To 50,000 feet.
Transportation	Qualified under National Safe Transit Committee Test Procedure 1A, Category II.

TABLE 1-4
Physical Characteristics

Characteristic	Performance Requirement
Finish	Anodized aluminum panel with gray vinyl-coated frame. Blue vinyl-coated cabinet.
Net Weight	17 lbs (7.7 kgs).
With Option 4	17 lbs 10 oz (8.0 kgs).
Overall Dimensions	See Figure 1-1.
Total Depth of Rack Required for Rackmounting	48.3 cm (19 inches).

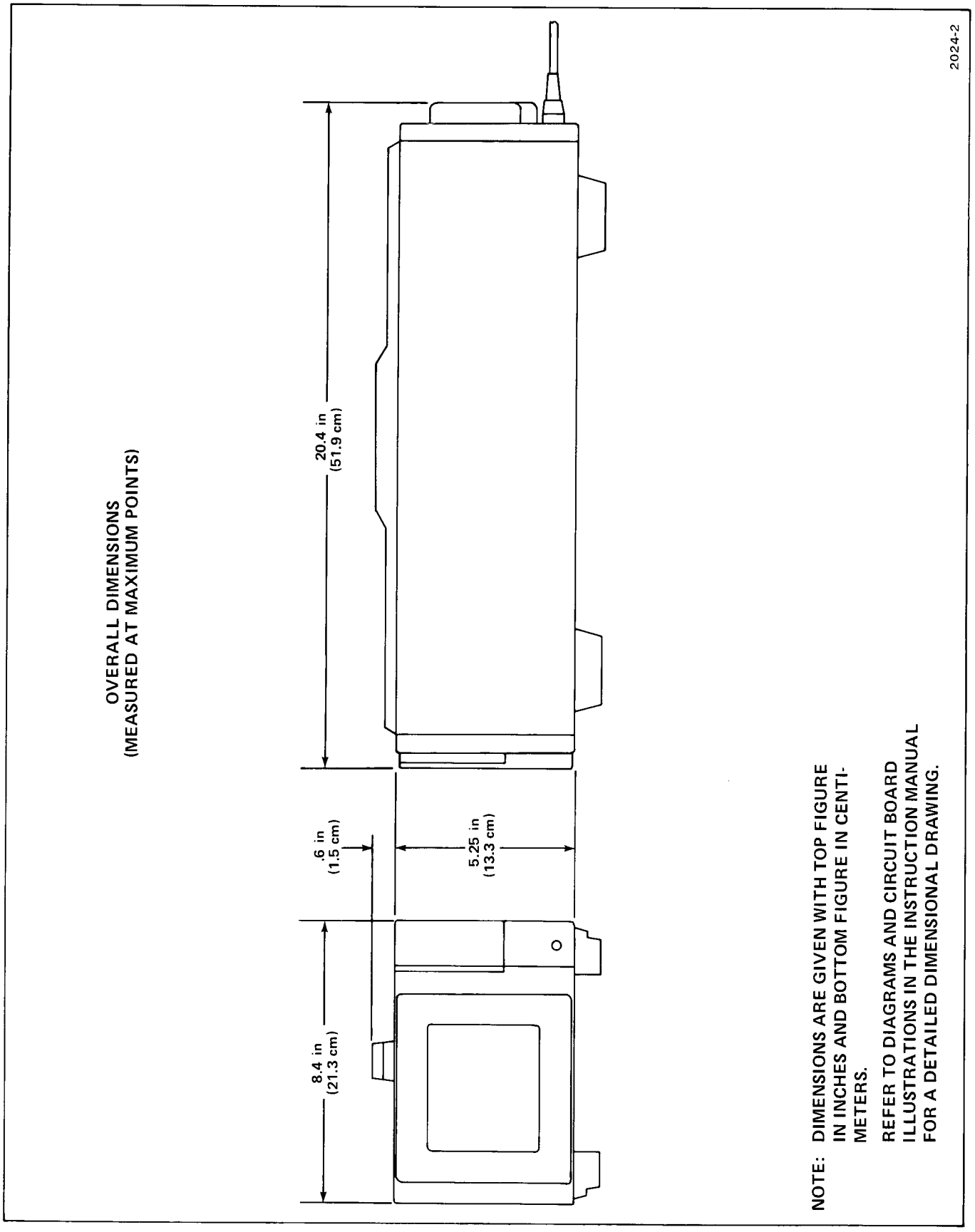

Figure 1-1. 606 Overall dimensional drawing.

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STANDARD ACCESSORIES

1 ea . . . . . .Operators Manual

1 ea . . . . . .Instruction Manual

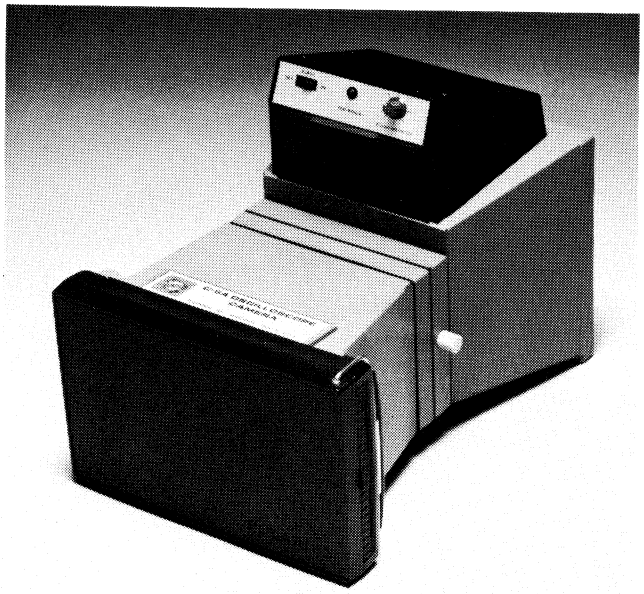
1 ea . . . . . .Marked Crt Shield (8 X 10 cm graticule)

For more detailed information, refer to the tabbed Accessories page in the 606 Instruction Manual.

RECOMMENDED ACCESSORIES

The following accessories have been selected from our catalog specifically for your instrument. They are listed as a convenience to help you meet your measurement needs. For detailed information and prices, refer to a Tektronix Products Catalog or contact your local Tektronix Field Representative.

CAMERAS

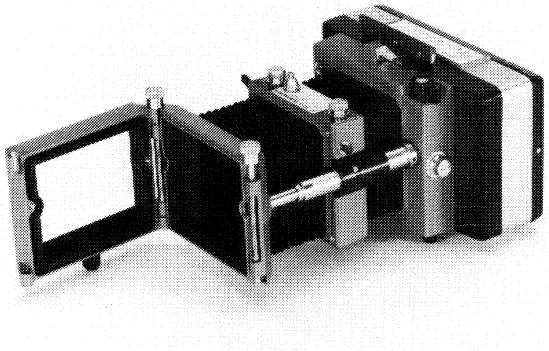


C-5A: The C-5A is a low-cost general-purpose camera with a Polaroid Pack-Film Back, pulsed graticule illumination, and a fixed f/16 lens. Magnification may be set at 0.67 or 0.85.

Order C-5A

C-5A Opt. 1: The C-5A Opt. 1 camera is the C-5A without the pulsed graticule illumination feature.

Order . . . . . C-5A Opt. 1



C-30A: The C-30A is a general purpose, variable magnification camera featuring a moderately fast f/1.9 lens and a mechanical shutter. Shutter speeds: 1 to 1/60 second, plus Bulb and Time. Camera requires adapter 016-0248-00 for use with your Monitor.

Adapter, Order 016-0248-00
Camera with Pack-Film Back, Order C-30A-P
Camera with Roll-Film Back, Order C-30A-R

Electric Shutter Option: The C-30A camera can be ordered with an integral electric shutter in place of the standard mechanical shutter.

Camera with Pack-Film Back, Order C-30A-PE
Camera with Roll-Film Back, Order C-30A-RE

CART

TEK LAB CART MODEL 3: Mobile equipment cart with 14" X 21" top tray, lockable storage drawer, and extra instrument tray.

Order . . . . . .TEK LAB CART MODEL 3

OPERATING INSTRUCTIONS

CONTROLS AND CONNECTORS

Controls and connectors necessary for operation of the 606 Monitor are located on the front and rear panels of the instrument. To make full use of the capabilities of this instrument, the operator should be familiar with the function and use of each external control and connector. The front-panel controls, including the external sweep controls for the Option 4 instrument, are shown and described in Figure 2-1. Brief descriptions of the rear-panel controls and connectors are given in Figure 2-2.

AMBIENT TEMPERATURE CONSIDERATIONS

This instrument can be operated where the ambient air temperature is between 0° and +50°C (+32° and +122°F), and can be stored in ambient temperatures between −40° and +70°C (−40° and +158°F). After being stored in temperatures beyond the operating limits, allow the chassis temperature to return to within the operating limits before applying power. Other environments and mounting configurations, such as mounting in consoles or instrument racks, may require additional cooling measures. (Refer qualified service personnel to the servicing information sections of the 606 Instruction Manual.) Allowing the Monitor to operate at an ambient temperature substantially higher than that specified may result in poor reliability as well as inaccurate performance.

FUNCTIONAL CHECK

The following procedures are provided to aid in obtaining a display on the standard 606 Monitor or the Option 4 version, and may be used as a check of basic instrument operation. The procedures may be used for incoming inspection to verify proper operation, and may also be used by the operator for instrument familiarization. Only instrument functions, and not measurement quantities or specifications, are checked in these procedures. Therefore, a minimum amount of test equipment is required. If performing the Functional Check procedure reveals improper performance or instrument malfunction, first check the operation of associated equipment; then refer to qualified service personnel for repair or adjustment of the instrument.

Test Equipment Required

The following test equipment was used as a basis to write the Functional Check procedures. Other test equipment, which meets these requirements, may be substituted. When other equipment is substituted, the control settings or set up may need to be altered.

1. Power Module

   Description: Tektronix TM 500-series power module with one or more plug-in compartments.

   Type Used: Tektronix TM 501 (used with the FG 503 Function Generator).

2. Function Generator

   Description: Frequency range, one hertz to 50 kilohertz; output amplitude, one volt peak-to-peak into 50 ohms; waveform output, sine wave.

   Type Used: Tektronix FG 503 (used with TM 501 Power Module).

3. Cables (3 Required)

   Description: Length, 42 inches (1 required), 18 inches (2 required); connectors, BNC.

   Type Used: Type RG-58/U, 50-ohm coaxial, Tektronix Part 012-0057-01 (42 inch), Tektronix Part 012-0076-00 (18 inch).

4. T Connector

   Description: Connectors, BNC to BNC.

   Type Used: BNC-to-BNC T connector, Tektronix Part 103-0030-00.

5. Adapter

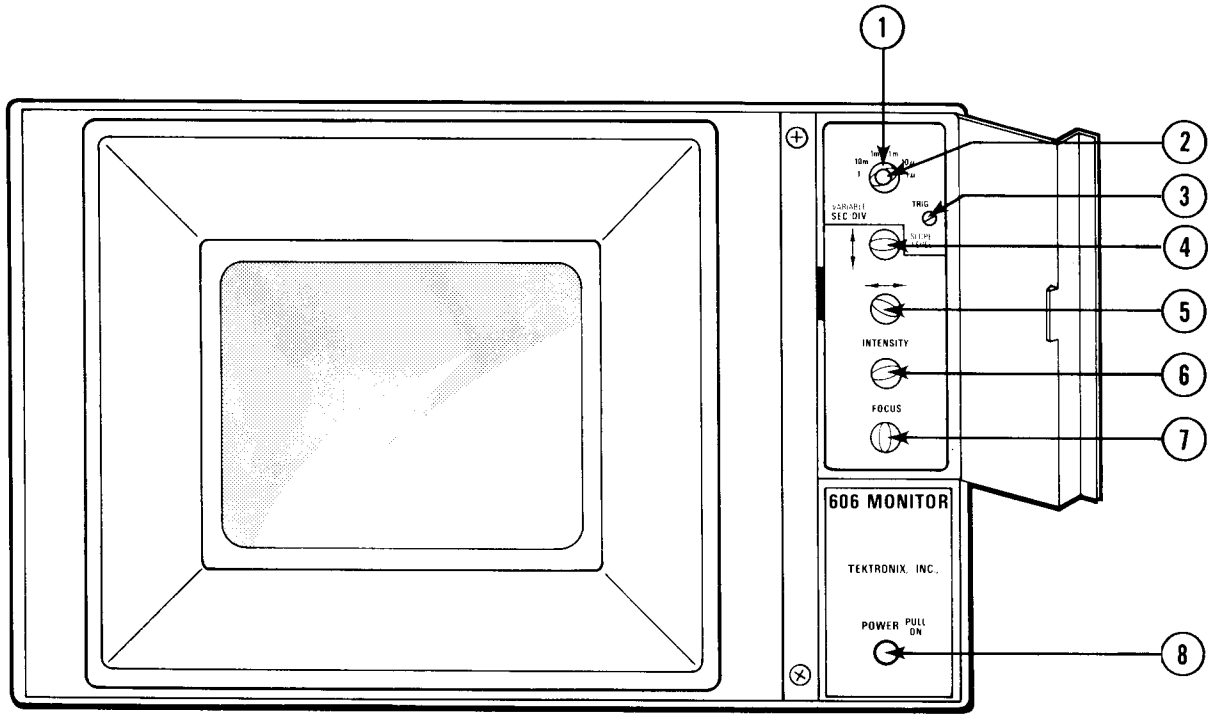
   Description: Connectors, BNC female to BNC female.

   Type Used: BNC female-to-BNC female, Tektronix Part 103-0028-00.

Preliminary Set Up

1. Install the function generator in the power module and turn on the power module.

2. Connect the 606 power cord to a suitable power source.



(1) **SEC/DIV (Option 4 only)**—Selects one of six calibrated sweep rates between 0.1 second/division and 1 microsecond/division in decade steps. (VARIABLE must be fully clockwise for the indicated sweep rate.)

(2) **VARIABLE (Option 4 only)**—Screwdriver adjustment, concentric with the SEC/DIV switch, which provides continuously variable sweep rates between the calibrated steps. Extends the sweep rate range to 1 second/division.

(3) **TRIG SLOPE/LEVEL (Option 4 only)**—Screwdriver adjustment to select the slope and level of the vertical signal from which the sweep is triggered.

(4) **Vertical (↕) Position**—Positions the crt beam in the Y Axis.

(5) **Horizontal (↔) Position**—Positions the crt beam in the X Axis.

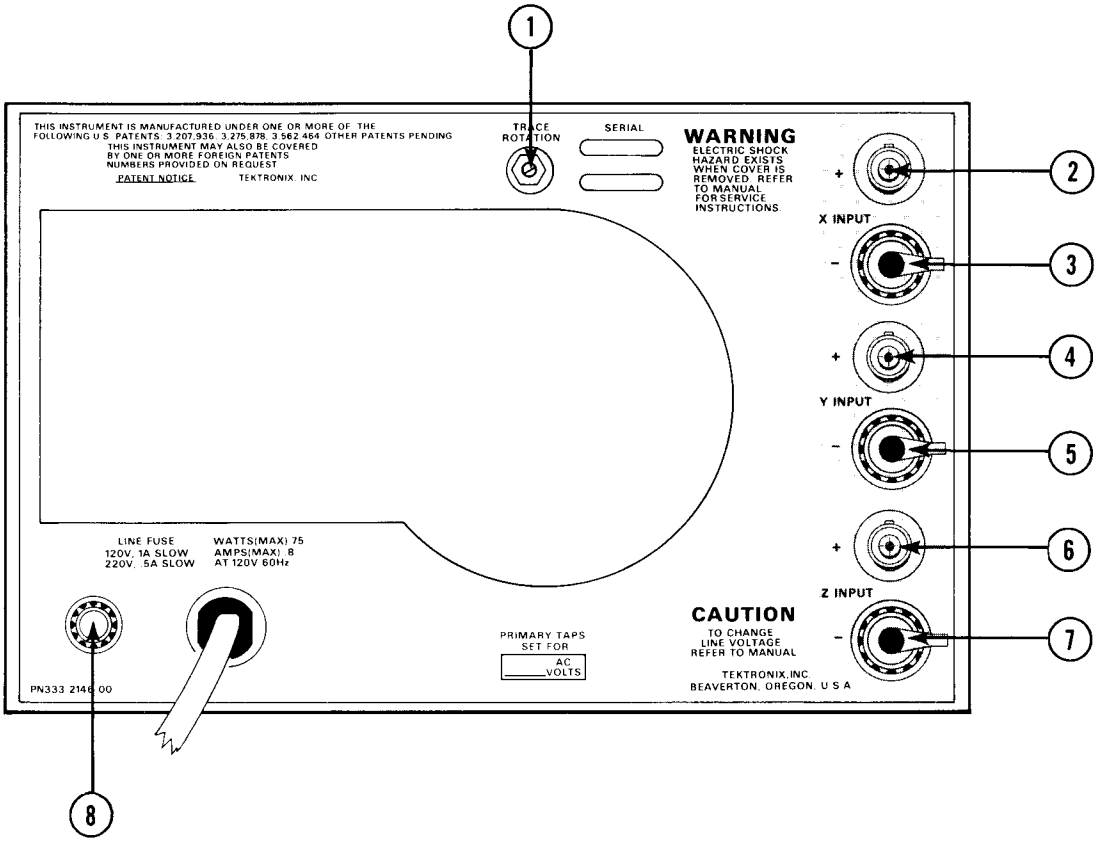
(6) **INTENSITY**—Controls brightness of the crt display and is the offset control for the Z-Axis inputs.

(7) **FOCUS**—Provides adjustment to obtain a well-defined display.

(8) **POWER (PULL ON)**—Controls power to the Monitor. Instrument is on when yellow band is visible.

2024-3

Figure 2-1. Front-panel controls.



(1) **TRACE ROTATION**—Adjustment to align the trace with the horizontal axis.

(2) **+ X INPUT**—BNC input connector to allow application of input signals. A positive signal applied deflects beam to the right; a negative signal deflects beam to the left.

(3) **– X INPUT**—BNC input connector. A positive signal applied deflects beam to the left; a negative signal deflects beam to the right.

(4) **+ Y INPUT**—BNC input connector. A positive signal applied deflects beam up; a negative signal deflects beam down.

(5) **– Y INPUT**—BNC input connector. A positive signal applied deflects beam down; a negative signal deflects beam up.

(6) **+ Z INPUT**—BNC input connector. A positive signal applied provides a linear function to increase crt brightness; a negative signal decreases crt brightness.

(7) **– Z INPUT**—BNC input connector. A positive signal applied provides a linear function to decrease crt brightness; a negative signal increases crt brightness.

(8) **LINE FUSE**—120 V: 1A SLOW; 220 V: 0.5 A SLOW. (Line fuse is internal for Option 6 instruments.*)

* **Refer qualified service personnel to the servicing information sections of the 606 Instruction Manual for further information.**

2024-4

Figure 2-2. Rear-panel controls and connectors.

NOTE

Check the line voltage information recorded on the rear panel. If the source voltage is not within this range, refer qualified service personnel to the servicing information sections of the 606 Instruction Manual.

3. Open the access door on the front panel and set the controls as follows:

SEC/DIV
(Option 4 only). . . . . .10 μ

Vertical and
Horizontal Positions. . . .Midrange

INTENSITY. . . . . .Fully counterclockwise

FOCUS . . . . . .Midrange

POWER (Pull On) . . . . .On (button out)

4. Allow at least one minute for the instrument to warm up.

5. Proceed to the appropriate Functional Check procedure for your instrument.

NOTE

Refer qualified service personnel to the servicing information sections of the 606 Instruction Manual to determine: (1) if your instrument employs an internal sweep (Option 4), and (2) if the amplifier input attenuators are set at 1X.

Instruments Without Internal Sweep

DISPLAY FUNCTIONS

1. Perform the Preliminary Set Up procedure.

2. Notice that a spot will appear on the crt, increasing in brightness as you slowly turn the INTENSITY control clockwise.

CAUTION

A high intensity level combined with a stationary spot will damage the crt phosphor. Therefore, set the INTENSITY control to the minimum necessary for good visibility.

3. Adjust the FOCUS control for a sharp, well-defined display.

4. Turn the vertical and horizontal Position controls and notice that the spot position can be controlled by both Position controls.

DEFLECTION AND Z-AXIS FUNCTIONS

1. Perform the Preliminary Set Up procedure.

2. Set the function generator for a 1-volt (peak-to-peak), 50-kilohertz sine-wave output.

3. Connect the function generator output to the rear-panel + X INPUT connector via the 42-inch cable.

4. Center the display with the horizontal Position control, and check for 8 divisions of horizontal deflection.

5. Remove the grounding cap from the – X INPUT connector.

6. Disconnect the signal from the + X INPUT connector and apply it to the – X INPUT connector.

7. Place the grounding cap on the + X INPUT connector.

8. Center the display with the horizontal Position control.

9. Check for 8 divisions of horizontal deflection.

10. Disconnect the signal from the – X INPUT connector and apply it to the + Y INPUT connector.

11. Center the display on the crt with the vertical Position control.

12. Check for 8 divisions of vertical deflection.

13. Remove the grounding cap from the – Y INPUT connector.

14. Disconnect the signal from the + Y INPUT connector and apply it to the – Y INPUT connector.

15. Place the grounding cap on the + Y INPUT connector.

16. Center the display on the crt with the vertical Position control.

17. Check for 8 divisions of vertical deflection.

18. Adjust the INTENSITY control for a barely-visible display.

19. Remove the grounding caps from the + X INPUT and the + Z INPUT connectors.

20. Disconnect the signal from the – Y INPUT connector and apply it to the + X INPUT and the + Z INPUT connectors via the 42-inch cable, BNC-to-BNC adapter, BNC T connector, and the two 18-inch cables.

21. Place the grounding caps on the – X INPUT and the – Z INPUT connectors.

22. Notice that the right end of the crt display becomes bright, and that the left end disappears.

23. Remove the grounding cap from the – Z INPUT connector.

24. Disconnect the signal from the + Z INPUT connector and apply it to the – Z INPUT connector.

25. Place the grounding cap on the + Z INPUT connector.

26. Notice that the left end of the crt display becomes bright, and that the right end disappears.

27. Disconnect the function generator.

This completes the Functional Check procedure for instruments without Option 4.

Instruments With Internal Sweep (Option 4)

NOTE

The following procedure applies to an Option 4 version of the 606 Monitor that has been properly set for internal sweep operation. Refer qualified service personnel to the servicing information sections of the 606 Instruction Manual to determine if the internal sweep of your instrument has been employed.

DISPLAY FUNCTIONS

1. Perform the Preliminary Set Up procedure.

2. Notice that a trace will appear on the crt, increasing in brightness as you slowly turn the INTENSITY control clockwise.

3. Adjust the FOCUS control for a sharp, well-defined trace.

4. Turn the vertical and horizontal Position controls and notice that the trace position can be controlled by both Position controls.

DEFLECTION AND Z-AXIS FUNCTIONS

1. Perform the Preliminary Set Up procedure.

2. Set the function generator for a 1-volt (peak-to-peak), 50-kilohertz sine-wave output.

3. Connect the function generator output to the rear-panel + Y INPUT connector via the 42-inch cable.

4. Center the display with the vertical Position control. If necessary, adjust the TRIG SLOPE/LEVEL control for a stable display.

5. Check for 8 divisions of vertical deflection.

6. Remove the grounding cap from the – Y INPUT connector.

7. Disconnect the signal from the + Y INPUT and apply it to the – Y INPUT connector.

8. Place the grounding cap on the + Y INPUT connector.

9. Center the display with the vertical Position control. If necessary, adjust the TRIG SLOPE/LEVEL control for a stable display.

10. Check for 8 divisions of vertical deflection.

11. Remove the grounding caps from the + Y INPUT and the + Z INPUT connectors.

12. Disconnect the signal from the – Y INPUT connector and apply it to the + Y INPUT and the + Z INPUT connectors via the 42-inch cable, BNC-to-BNC adapter, BNC T connector and the two 18-inch cables.

13. Place the grounding caps on the – Y INPUT and the – Z INPUT connectors.

14. Notice that only the top portion of the display is visible.

15. Remove the grounding cap from the – Z INPUT connector.

16. Disconnect the signal from the + Z INPUT connector and apply it to the – Z INPUT connector.

17. Place the grounding cap on the + Z INPUT connector.

18. Notice that only the bottom portion of the display is visible.

19. Disconnect the function generator.

This completes the Functional Check procedure for the 606 Monitor with Option 4.

DETAILED OPERATING INFORMATION

Signal Connectors

BNC connectors are provided at the rear of the instrument for application of input signals to the Horizontal (X) and Vertical (Y) Amplifiers for display on the crt, and to the Z-Axis Amplifier to control display intensity. Each amplifier is designed for either single-ended or differential operation. The 606 is shipped from the factory prepared for single-ended operation with a grounding cap connected to the – (inverting) input of each axis. For differential operation, remove the grounding cap and apply the input signals to the BNC connectors of the appropriate axis.

Input Signal Requirements

The vertical (Y) and horizontal (X) deflection factors are set at the factory to one volt for 8 divisions of deflection on each axis. Thus, as shipped, the input signal required for each division of deflection is 0.125 volt.

NOTE

The Functional Check procedure may be used to determine if the vertical and horizontal deflection factors of your particular instrument meet those set at the factory, as stated above.

WARNING

Electric-shock hazard present. Only qualified service personnel should change the input signal requirements. Refer them to the servicing information sections of the 606 Instruction Manual.

The best transient response from the 606 Monitor is achieved when the input signal amplitude to the vertical and horizontal inputs is no greater than that sufficient to provide full-screen deflection.

WARNING

To avoid electric shock, do not apply input signals of more than 25 volts (dc plus peak ac).

NOTE

Should fault conditions occur, the instrument is protected for application of input signals up to 100 volts (dc plus peak ac).

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With no signals applied to the + Z INPUT and the – Z INPUT connectors, the intensity of the display is controlled only by the front-panel INTENSITY control. To control the display intensity with an externally applied signal, set the INTENSITY control to about midrange, and apply the input signal to the proper Z INPUT connector.

CAUTION

Exercise care in establishing the correct display intensity; a high-amplitude Z-Axis input signal, combined with an excessively high setting of the INTENSITY control, may damage the crt phosphor.

The input signal required for maximum display intensity, through the + Z INPUT connector, is set at the factory for +1 volt, or less. The input signal required to visually cut off the display intensity through the + Z INPUT connector is set at the factory for –1 volt, or less. The best transient response of the Z-Axis Amplifier is achieved when the input signal is the minimum required to provide the desired intensity change.

Input Attenuation

The Horizontal (X) and Vertical (Y) Amplifier input circuits include a selectable 1X or 5X attenuator, which is set for 1X operation when shipped from the factory. The Z-Axis Amplifier input circuit can also be modified to provide a range of input impedance and attenuation. The desired input attenuation should be selected by qualified service personnel only.

Option 4 Sweep Information

The SEC/DIV switch provides six calibrated sweep rates from 0.1 second to 1 microsecond/division in decade steps (VARIABLE control in the fully clockwise position). The VARIABLE control provides uncalibrated, continuously variable sweep rates between calibrated settings of the SEC/DIV switch.

When making time measurements using the graticule, the area between the second and tenth vertical lines provides the most linear measurement. (See Figure 2-3). Therefore, the first and last divisions of the display should not be used for making accurate time measurements. Position the start of the display to be measured to the second vertical line. Then set the SEC/DIV switch so that the end of the display measurement section falls between the second and tenth vertical line.

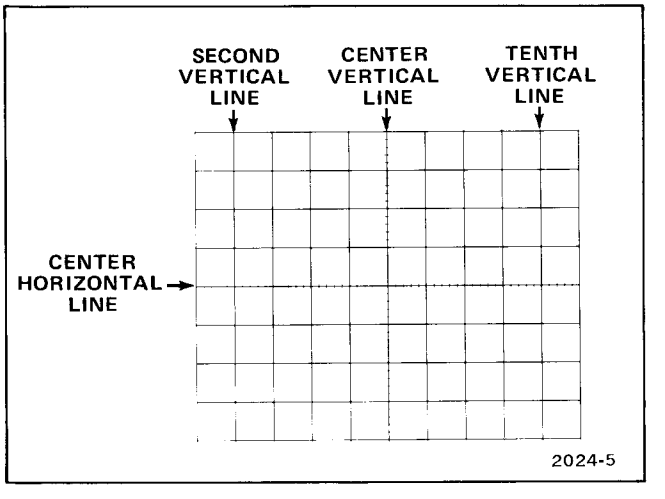


Figure 2-3. Definition of measurement lines on the 606 graticule.

INSTALLATION

OPERATING POWER INFORMATION

This instrument can be operated from either a 120-volt or 220-volt nominal line-voltage source, 48 to 440 hertz. In addition, three regulating ranges are provided for each nominal line-voltage source.

CAUTION

To prevent damage to the instrument, always check the line-voltage information recorded on the rear panel before applying power to the instrument.

Power Cord Information

WARNING

This instrument is intended to be operated from a single-phase earth-referenced power source having one current-carrying conductor (the Neutral Conductor) near earth potential. Operation from power sources where both current-carrying conductors are live with respect to earth (such as phase-to-phase on a three-wire system) is not recommended, since only the Line Conductor has over-current (fuse) protection within the instrument.

This instrument has a three-wire power cord with a polarized two-pole, three-terminal plug for connection to the power source and safety-earth. The safety-earth terminal of the plug is directly connected to the instrument frame. For electric-shock protection, insert this plug only in a mating outlet with a safety-earth contact.

Do not defeat the grounding connection. Any interruption of the grounding connection can create an electric-shock hazard. Before making external connections to this instrument, always ground the instrument first by connecting the power-cord to a proper mating power outlet.

TABLE 3-1
Power-Cord Conductor Identification

Conductor	Color	Alternate Color
Line	Brown	Black
Neutral	Light Blue*	White
Safety Earth	Green/Yellow	Green/Yellow

*** Tinned copper conductor.**

The power cord plug required depends upon the ac input voltage, and the country in which the instrument is to be used. Should you require a power cord plug other than that supplied with your instrument, refer to the standards listed in Table 3-2.

TABLE 3-2
Location of Power-Cord Plug Configurations Information

Nominal Line Voltage	Reference Standards
120 V AC	[1] ANSI C73.11 [2] NEMA 5-15-P (Hospital Grade)
220 V AC	ANSI C73.20 [3] AS C112 [4] BS 1363 [5] CEE 7, sheets IV, VI, and VII NEMA 6-15-P

[1] **ANSI—American National Standards Institute**
[2] **NEMA—National Electrical Manufacturer's Association**
[3] **AS—Standards Association of Australia**
[4] **BS—British Standards Institution**
[5] **CEE—International Commission on Rules for the Approval of Electrical Equipment**

For medical-dental applications, use NEMA 5-15-P (Hospital-Grade) plug for 120-volt operation, or NEMA 6-15-P plug for 220-volt operation.

Line-Voltage and Regulating-Range Selection

CAUTION

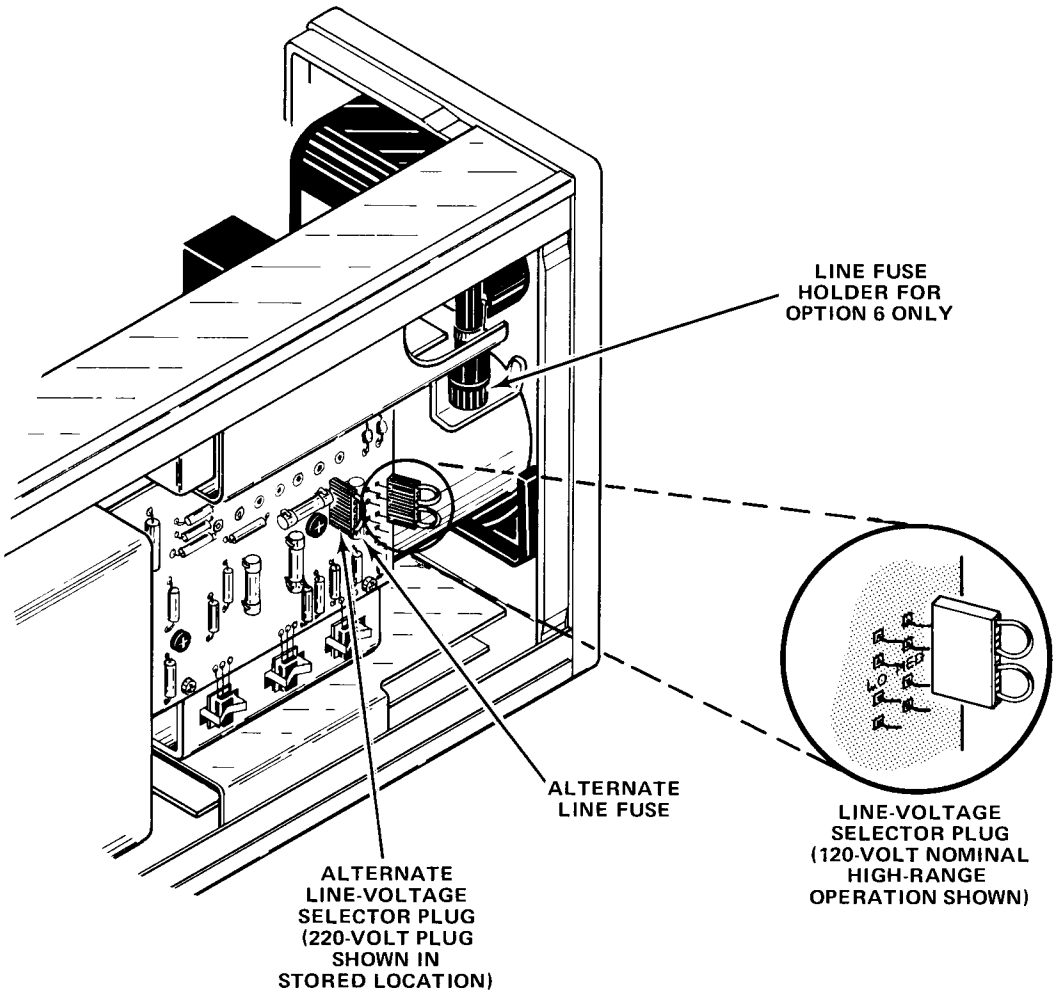
Damage to the instrument may result from incorrect placement of the line-voltage selector plug.

To select the correct nominal line voltage and regulating range, proceed as follows:

1. Disconnect the instrument from the power source.

2. Remove the bottom cabinet panel of the instrument (see section 5, Maintenance) to gain access to the Low-Voltage Power Supply and Z-Axis board.

3. Insert the proper line-voltage selector plug (the brown plug for 120-volt operation or the red plug for 220-volt operation) on the line-voltage selector pins labeled for the desired nominal line-voltage range. Refer to Figure 3-1, for location and additional information.



Regulating Ranges

Line-Voltage Selector Position	Regulating Range and Fuse Data	
	120 Volts (Nominal)	220 Volts (Nominal)
LO	90 V ac to 110 V ac	180 V ac to 220 V ac
MED	99 V ac to 121 V ac	188 V ac to 242 V ac
HI	108 V ac to 132 V ac	216 V ac to 250 V ac
Line Fuse Data	1 A slow-blowing type	0.5 A slow-blowing type

Figure 3-1. Location of line-voltage selector plugs, regulating-range pins, and line fuses.

4. Remove the line fuse from the fuse holder and check for the correct rating. Replace it with one having the correct rating, if necessary. Refer to Figure 3-1 for fuse information and location.

NOTE

An alternate line fuse, intended for the line-voltage source for which the Monitor was not set when shipped from the factory, is clipped to the Low-Voltage Power Supply and Z-Axis board (see Fig. 3-1).

5. Change the nominal line-voltage information recorded on the 606 rear panel. Use a non-abrasive eraser to remove previous data, and mark on the new data with a pencil.

6. Replace the bottom cabinet panel and apply power to the Monitor.

INSTALLATION IN PATIENT-CARE FACILITIES

WARNING

Do not use the amplifier INPUTS for direct-patient connection. Signal currents at these connectors, as well as leakage currents, may exceed values considered non-hazardous for direct-patient connection.

WARNING

Although this Monitor is not to be connected directly to a patient, interconnecting this Monitor to other equipment can result in the application of excessive current to a patient. It is extremely important that the interconnection is made in accordance with NFPA 76B-T, Tentative Standard for the Safe Use of Electricity in Patient Care Facilities, section 3038, "Signal Transmission Between Appliances".

Among the situations involving the above-mentioned patient hazard is one in which two or more pieces of interconnected equipment are grounded at locations remote from one another. The standard mentioned in the preceding warning describes both this hazard and appropriate corrective measures.

INPUT ATTENUATION SELECTION

X and Y Input Attenuation

WARNING

The heat sinks on the Deflection Amplifier board are elevated to approximately +200 volts. To avoid potential electric shock, always turn the POWER off before changing the settings of the X or Y Input Attenuators.

The Horizontal (X) and Vertical (Y) Amplifiers include a selectable 1:1 and 5:1 step attenuator in both the + (non-inverting) and the – (inverting) input circuits. These attenuators extend the deflection factor range of the appropriate amplifier to at least 12.5 volts for full-screen signal deflection. Refer to the Internal Control and Selector Locations foldout page in section 9, Diagrams and Circuit Board Illustrations, for the position settings and locations of the attenuator switches. To maintain proper differential operation of the amplifier, always change both the + and – attenuators to the same setting.

Z-Axis Input Attenuation

The Z-Axis Amplifier is shipped from the factory with 1X input attenuation and 1 megohm input impedance. However, the attenuation and input impedance can be modified to suit a specific application. Posts, on the Low-Voltage Power Supply and Z-Axis board, allow components to be changed without damage to the circuit board. Figure 3-2 illustrates the method used to modify input attenuation and input impedance of the + Z INPUT. The same method applies to both the +Z INPUT and the –Z INPUT. Refer to the Internal Control and Selector Locations foldout page in section 9, Diagrams and Circuit Board Illustrations, for location of the Z-Axis attenuation components. Refer to your Tektronix Field Office or representative for additional information.

CONNECTING THE INTERNAL SWEEP (OPTION 4)

Internal switches are provided to connect the optional sweep generator circuit. Remove the protective cabinet panels from the Monitor (see section 5, Maintenance) to gain access to these switches. Switch locations and positions are shown on the Internal Control and Selector Locations foldout page in section 9, Diagrams and Circuit Board Illustrations. To use the internal sweep, proceed as follows:

1. Set S350 (Int Swp) located on the Deflection Amplifier board to the Y-T (rear) position.

2. Set S555 (Int Blank) located on the Low-Voltage Power Supply and Z-Axis board to the Y-T (right) position.

3. Set S909 (Trig Mode) located on the Sweep board to the Auto (rear) position.

4. Replace the cabinet panels.

RACKMOUNTING INFORMATION

The 606 can be operated in a standard 19-inch instrument rack with front and rear holes that conform to universal hole spacing. Kits are available to convert the 606 from the cabinet to a rackmounted configuration, and vice versa. Complete instructions are included in the kits. A brief description of each available conversion kit is given here. Con-

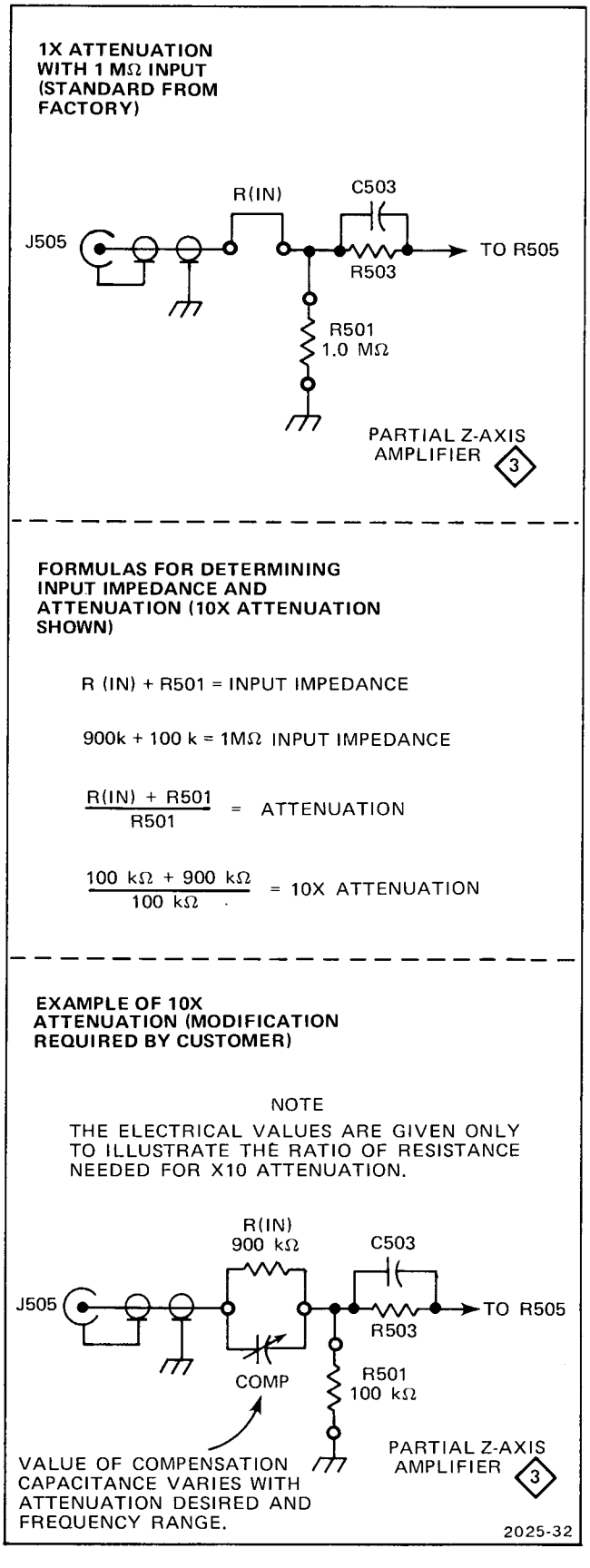


Figure 3-2. Typical method for modifying Z-Axis input impedance and attenuation.

sult your Tektronix Field Office or representative for additional information.

Cabinet-to-Rackmount Conversion

TEKTRONIX PART 040-0600-00. Mounts two 606 Monitors side-by-side in a standard 19-inch wide rack. The kit comes equipped with a slide-out assembly and includes the securing hardware. Complete rackmounting instructions are included in each kit.

TEKTRONIX PART 040-0601-00. Mounts one 606 Monitor in a standard 19-inch wide rack. The kit is equipped with a slide-out assembly, securing hardware, and a blank from panel to cover the second instrument opening in the rack. Complete rackmounting instructions are included with each kit.

TEKTRONIX PART 040-0624-00. Converts one TM 503 Power Module and one 606 Monitor to mount side-by-side in a standard 19-inch wide instrument rack. The kit includes a slide-out assembly and securing hardware. Complete rackmounting instructions are included with each kit.

TEKTRONIX PART 016-0037-00. Converts one 606 Monitor and one 602 Monitor or one 528 Waveform Monitor to rackmount side-by-side in a standard 19-inch rack. The kit includes a slide-out assembly, securing hardware, and blank panel for mounting only one instrument in the rack. Complete rackmounting instructions are included in each kit.

Rackmount-to-Cabinet Conversion

TEKTRONIX PART 040-0602-00. Converts one 606 Monitor from a rackmount configuration to a cabinet configuration. Complete instructions are included in each kit.

Instrument Dimensions

A drawing showing the major dimensions of the 606 is shown in Figure 1-1 (General Information section). Further details and tolerances are shown on the Detailed Dimensional Drawing foldout page in section 9, Diagrams and Circuit Board Illustrations.

Ventilation Requirements

When the 606 Monitor is mounted in a rack with other equipment, it is important that the ambient temperature surrounding the Monitor does not exceed +50° C (+122° F). Additional clearance or forced ventilation methods (fan) may need to be employed to maintain ambient temperatures below +50° C (+122° F). Reliability and performance of the 606 will be affected if the ventilation holes in the protective panels are obstructed, or if the 606 is operated at an ambient temperature higher than +50° C (+122° F).

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Slide-Out Tracks Information

The slide-out tracks provided in the conversion kits permit this instrument to be extended out of the rack for maintenance without removing it from the rack. Be sure the power cord and signal cables are long enough to allow operation in the extended position. Refer to the instructions in the appropriate rackmount kit for additional information.

Removing or Installing the Instrument

After initial installation and adjustment of the slide-out tracks, the instrument can be removed or installed by following the instructions given in Figure 3-3. No further adjustments are required under normal conditions.

Slide-Out Track Lubrication

The special finish on the sliding surfaces of the tracks provides permanent lubrication. However, if the tracks require additional lubrication, a thin coat of paraffin can be rubbed onto the sliding surfaces.

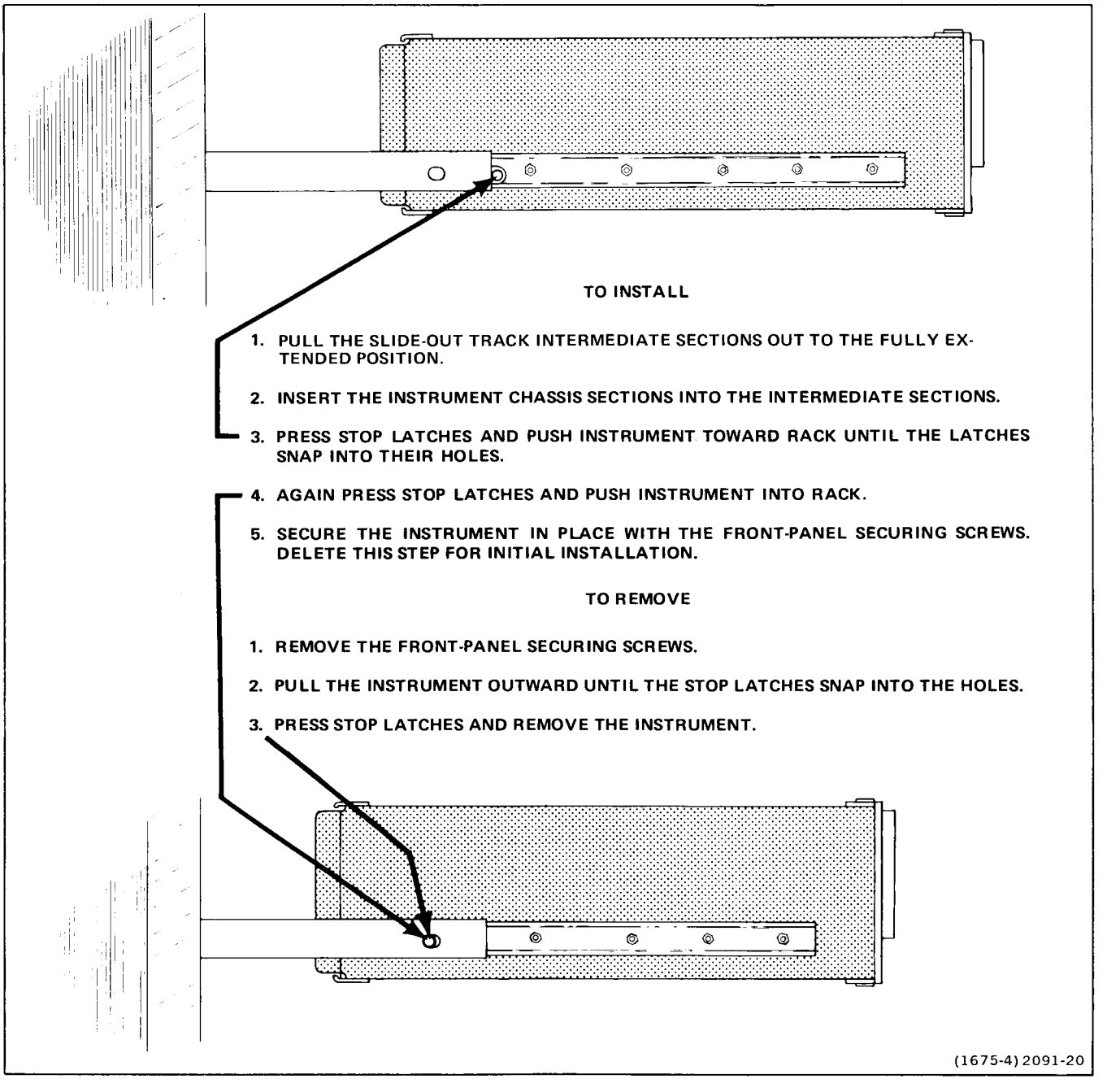


Figure 3-3. Installing and removing a rackmounted instrument.

THEORY OF OPERATION

This section of the manual describes the circuitry in the 606 Monitor. The description begins with a discussion of the instrument using the block diagram of Figure 4-1, and then continues in detail, showing the relationships between the stages in each major circuit. Schematics of all major circuits are given in section 9, Diagrams and Circuit Board Illustrations. Refer to these schematics throughout the following discussions for specific electrical values and relationships.

BLOCK DIAGRAM

The following discussion is provided to aid in understanding the overall concept of the 606 before the individual circuits are discussed in detail. A basic block diagram is shown in Figure 4-1.

Vertical and horizontal signals to be displayed on the crt are supplied to the Deflection Amplifiers through the appropriate + (noninverting) and – (inverting) INPUT connectors. Input signals can be either single-ended or differential. The Deflection Amplifiers process the input signals and provide push-pull outputs to drive the deflection plates of the crt. Both Deflection Amplifiers contain position, gain, and step attenuation controls.

The Z-Axis Amplifier controls the display intensity by providing a voltage to drive the crt control grid. Input signals applied to the + Z (noninverting) and the – Z (inverting) INPUT connectors may be either single-ended or differential.

The Dynamic Focus circuit provides focus correction for the display when it is deflected from crt center. Thus, by varying the voltage to the crt focus element, the Dynamic Focus circuit compensates for geometric defocusing.

The High-Voltage and Low-Voltage Power Supplies provide all the voltages necessary for operation of this instrument.

The optional Sweep circuit produces a positive-going sawtooth voltage, which is amplified by the Horizontal (X) Amplifier to provide sweep deflection in the crt. The level of the vertical signal from which triggering occurs is determined by the TRIG SLOPE/LEVEL control. The Sweep circuit also produces an unblanking gate signal coincident with the sawtooth waveform. This gate signal unblanks the crt to permit display presentation.

DETAILED CIRCUIT OPERATION

Complete schematic diagrams are provided in section 9, Diagrams and Circuit Board Illustrations. The numbers inside the diamond after a heading in the following discussions refer to the schematic diagram for that circuit. The schematic diagrams contain shaded borders around the major stages of the circuits to conveniently locate the components as mentioned in the following discussions. The name of each major stage is given in a shaded box on the diagram and as the sub-heading in the discussion of that schematic diagram.

VERTICAL (Y) AMPLIFIER ◇1

The Vertical (Y) Amplifier processes the Y input signals and provides final amplification to drive the vertical deflection plates of the crt. A schematic diagram of the Vertical (Y) Amplifier is shown on Diagram 1. A detailed block diagram, showing each major stage of the Vertical (Y) Amplifier, is superimposed on the schematic with shaded lines to conveniently locate the components mentioned here. The stage names (given as sub-headings in the following discussion) can be found in the shaded boxes on Diagram 1.

Y Inputs

Signals can be applied to either the + Y INPUT (noninverting) BNC connector J110, or the – Y INPUT (inverting) BNC connector J130, as single-ended inputs; or to both connectors as a differential input. An internal switch (S110, S130) for each input, allows either 1X or 5X attenuation of the input signal before it is applied to the Preamplifier. The 5X position of each attenuator is a frequency-compensated voltage divider. These step attenuators are set in the 1X position when shipped from the factory.

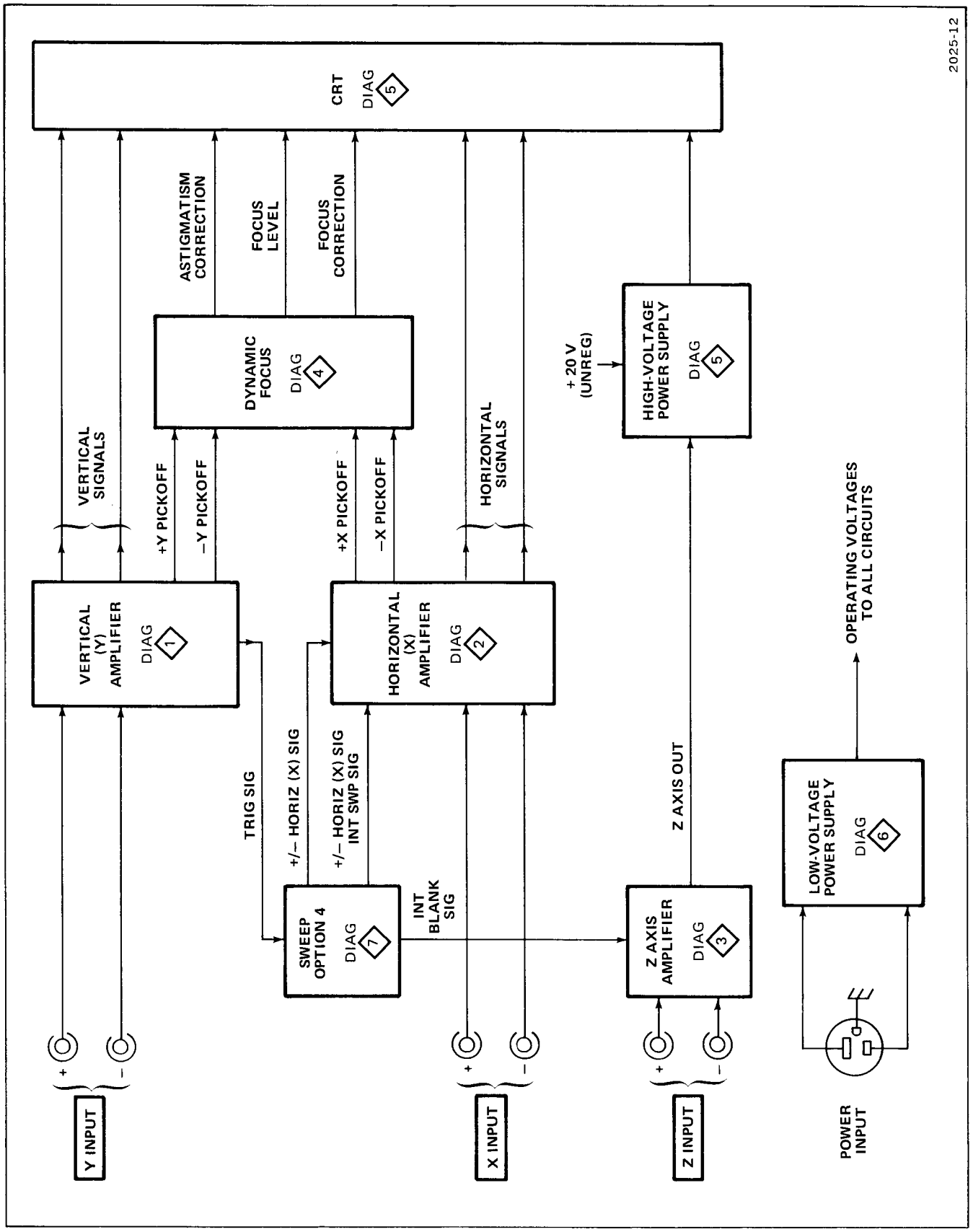


Figure 4-1. 606 Block Diagram.

Y Preamplifier

Two identical, noninverting operational amplifiers, Q120A-Q150 and Q120B-Q160, form the Y Preamplifier. The amplifier can be operated as either a paraphase amplifier (with a single-ended input) or as a differential amplifier. A push-pull signal is produced at the collectors of Q150 and Q160. The Y Preamplifier employs field-effect transistors to provide high input impedance and temperature stability. Excessively large negative-going signals are clamped by diodes CR118 and CR138 before application to transistors Q120A and Q120B. The Y Gain control R125 allows setting the crt full-screen deflection from 0.5 volt, or less, to at least 2.5 volts. This adjustment is set at the factory for 8 divisions of deflection with a 1-volt input signal applied.

Vertical Position and Limiter

Vertical positioning is provided by front-panel control R175, through the current sources of Q170-Q180, via the forward-biased zener diodes VR170-VR180. The push-pull signals from the Y Preamplifier are applied through R156 and R166 to the Y Output Amplifier after being offset by the vertical positioning stage. Diodes CR170-VR170 and CR180-VR180 prevent overdriving the Y Output Amplifier by limiting the Y Preamplifier signals to within about 5 volts of each other.

Y Output Amplifier

The Y Output Amplifier stage provides final amplification for the vertical (Y) signals before they are applied to the vertical deflection plates of the crt.

The Y Output Amplifier consists of two identical, noninverting operational amplifiers connected in a differential configuration. Frequency compensation is provided by C193-C194-R194. The Y Output Gain is set by variable resistor R192. Transistor Q280 provides source current, and Y Output Level R280 varies this source current, to determine the dc output voltage level. The + side of the Y Output Amplifier consists of active components Q190-Q210-Q230-Q235-Q250-Q255, with the feedback path provided through R198 and C198.

NOTE

Since operation of the −Y Output Amplifier is complementary to that of the + Y Output Amplifier, signal operation of only the +Y Output Amplifier will be discussed. To locate the components of the − Y Output Amplifier which correspond to those in the following discussion, add 10 to the circuit number.

LOW-FREQUENCY SIGNAL OPERATION. Low-frequency signals from the + side of the Y Preamplifier are amplified and inverted by Q190. Buffer Amplifier Q210 applies the signals through R216 to cascode amplifier Q230-Q235. The cascode amplifier again inverts the signals and provides the final amplification before the signals are applied to the crt. Transistors Q250-Q255 supply constant current to Q235.

POSITIVE-GOING HIGH-FREQUENCY SIGNAL OPERATION. Positive-going high-frequency signals applied to the + Y Output Amplifier are inverted and amplified by Q190 and buffered by Q210. The signals are then passed through C216 and C217 to the bases of Q230 and Q250. These signals turn Q230 off, and turn Q250 on. Amplifier Q250 inverts and amplifies the applied signals.

NEGATIVE-GOING HIGH-FREQUENCY SIGNAL OPERATION. Negative-going high-frequency signals applied to the + Y Output Amplifier are inverted and amplified by Q190. Buffer amplifier Q210 applies the signals through C216 and C217 to the bases of Q230 and Q250. This turns Q250 off, and turns Q230 on. Cascode amplifier Q230-Q235 inverts and provides final amplification before the signal is applied to the crt deflection plate. Transistors Q250-Q255 also supply constant current to Q235.

Y Focus Correction Pickoff

Samples of the + Y and − Y signals are coupled to the Dynamic Focus circuit (Diagram 4) for focus correction in the Y axis. The signal from the + side of the Y Preamplifier is coupled through emitter follower Q155. The signal from the − side of the Y Preamplifier is coupled to the Dynamic Focus circuit through emitter follower Q165.

HORIZONTAL (X) AMPLIFIER ◇2

The Horizontal (X) Amplifier processes the X input signals and provides final amplification to drive the horizontal deflection plates of the crt. A schematic diagram of the Horizontal (X) Amplifier is shown in Diagram 2. A detailed block diagram showing each major stage of the Horizontal (X) Amplifier is superimposed on the schematic with shaded lines.

The Horizontal (X) Amplifier is identical to the Vertical (Y) Amplifier, with the exception of the circuit numbers and the provisions made for the optional internal sweep. For the Option 4 instrument, a sample of the vertical signal is taken from the collector of Q150 in the Vertical (Y) Amplifier, and is sent to the Sweep (Option 4) circuit. The internal sweep signal is applied to the collector of Q360 on the Horizontal (X) Amplifier.

The Horizontal (X) Amplifier circuit numbers are of the 300- and 400-series, whereas the Vertical (Y) Amplifier circuit numbers are in the 100- and 200-series. For example,

Q265 on the Vertical (Y) Amplifier (Diagram 1) corresponds to Q465 on the Horizontal (X) Amplifier (Diagram 2). Therefore, the Vertical (Y) Amplifier discussion will apply to the Horizontal (X) Amplifier after converting the circuit numbers to those of the 300- and 400-series.

Z-AXIS AMPLIFIER ◈3

The Z-Axis Amplifier circuit provides the drive signal that controls the crt intensity. A schematic diagram of the Z-Axis Amplifier is shown on Diagram 3 at the rear of this manual. A detailed block diagram, showing each major stage of the Z-Axis Amplifier, is superimposed on the schematic diagram with shaded lines. The stage names (given as sub-headings in the following discussion) can be found in shaded boxes on Diagram 3.

Z Inputs

Signals can be applied to either the + Z INPUT (noninverting) BNC connector J505, or the — Z INPUT (inverting) BNC connector J515, as single-ended inputs; or to both connectors as a differential input. Provisions are made on each input line to permit installation of attenuating resistors and to change the input impedance (see Input Attenuation Selection in section 3, Installation).

Z Preamplifier

Two identical operational amplifiers, Q508A-Q520-Q525 and Q508B-Q530-Q535, which can be operated as either a paraphase amplifier (single-ended input) or as a differential amplifier, form the basic Z Preamplifier. Excessively large negative-going signals are clamped by diodes CR505 and CR515 before application to transistors Q508A and Q508B. A single-ended output is produced at the collector of Q535, and is in phase to signals applied to the + Z INPUT and opposite in phase with signals applied to the —Z INPUT. Maximum crt intensity is obtained by applying from 1 to 5 volts to the Z-axis INPUTS, as controlled by the setting of Z-Axis Gain adjustment R512.

Z Output Amplifier

The Z Output Amplifier is a noninverting operational amplifier consisting of Q550-Q560-Q585-Q570-Q580. The feedback network consists of R557-C557, with C557 also supplying high-frequency compensation. Transistors Q585 and Q570 are connected as a collector-coupled complementary amplifier to provide a fast, linear output signal to the crt control grid. Constant current for Q585 is supplied by Q570 and Q580. The quiescent output voltage level of the Z Output Amplifier is set by adjustment of the front-panel INTENSITY control, R555. The output of the amplifier is applied to the crt control grid, through the Control Grid DC Restorer network shown on Diagram 5, to control the crt beam intensity.

DYNAMIC FOCUS ◈4

The Dynamic Focus circuit provides focus correction as the crt beam is deflected to the edges of the display area in both the vertical (Y) and horizontal (X) axis. A schematic diagram of the Dynamic Focus circuit is shown on Diagram 4. A detailed block diagram, showing the major stages of this circuit, is superimposed on the schematic diagram with shaded lines. The stage names (given as sub-headings in the following discussion) can be found in shaded boxes on Diagram 4.

Geometric defocusing, a contributing factor to overall crt defocusing, occurs when the beam is deflected from crt center. The electron beam, at center screen, is focused for a particular beam length. When the beam is deflected, either vertically or horizontally, the beam length changes; the focus voltage remains the same. As a result, the display is defocused; and will appear larger at the top, bottom, and sides of the crt than it does at the crt center (see Fig. 4-2).

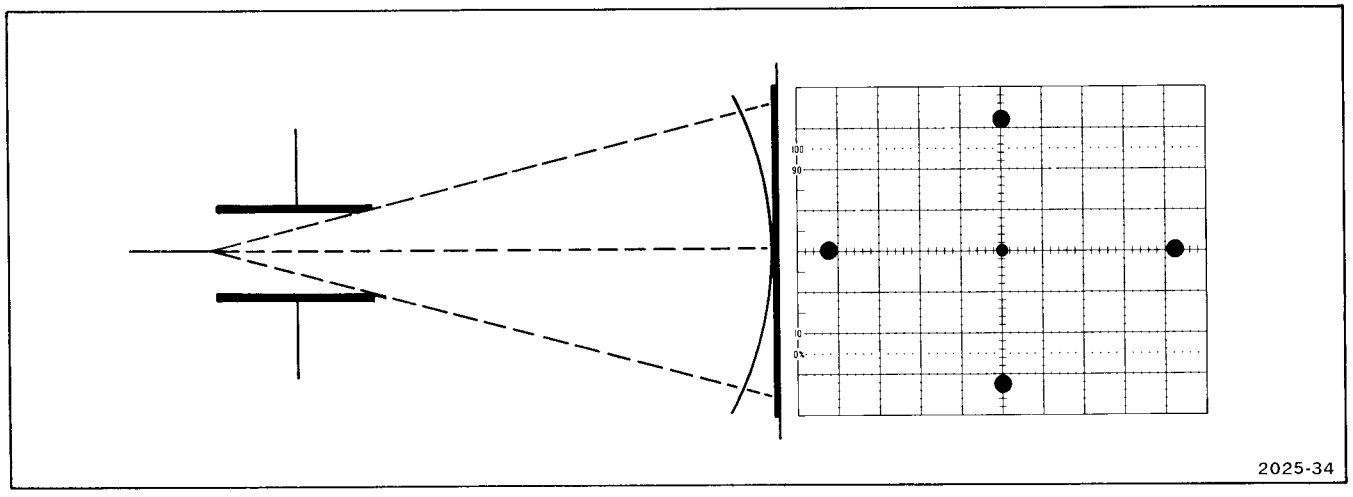


Figure 4-2. Simplified illustration of geometric defocusing.

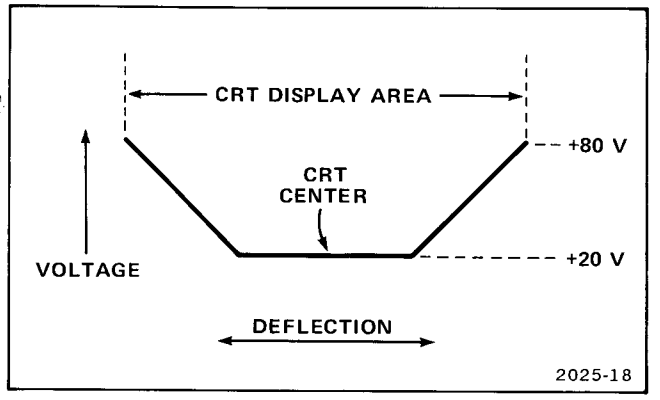


Figure 4-3. Typical correction-voltage curve applied to the crt focus element (correction voltage applied for both vertical and horizontal deflection).

The Dynamic Focus circuit varies the voltage to the focus element of the crt with respect to both the vertical and horizontal positions of the electron beam. Therefore, overall focus is improved over the crt display area. Figure 4-3 illustrates the typical correction-voltage curve as the beam is deflected over the crt display area. The correction-voltage curves for vertical and horizontal deflection are not identical; however, the theory is the same.

X Focus Correction Shaper

A sample of the horizontal signal from the X Focus Correction Pickoff Amplifiers shown on Diagram 2, is coupled differentially to the X Focus Correction Shaper stage of the Dynamic Focus circuit. Transistors Q610 and Q620 form a differential amplifier, with Q605 providing source current.

Quiescently, with the beam horizontally deflected to within about three divisions of crt center, CR613 and CR623 are reverse biased. The voltage level at the bases of Q630 and Q635 is approximately −15 volts, as determined by zener diode VR634.

As the beam is deflected to the right region of the crt display area, the output of Q610 rises above −15 volts, forward biasing CR613 (CR623 is reverse biased). The signal from CR613 is inverted and amplified by Q630.

As the beam is deflected to the left region of the crt display area, the output of Q620 rises above −15 volts, forward biasing CR623 (CR613 is reverse biased). The signal from CR623 is inverted and amplified by Q635.

The composite correction voltage for horizontal (X) deflection is coupled from Q630 and Q635 to the Summing and Output Amplifier stage at the emitter of Q678.

Y Focus Correction Shaper

A sample of the vertical signal from the Y Focus Correction Pickoff Amplifiers shown on Diagram 1, is coupled differentially to the Y Focus Correction Shaper stage of the Dynamic Focus circuit. Transistors Q650 and Q660 form a differential amplifier, with Q645 providing source current.

Quiescently, with the beam vertically deflected to within about three divisions of crt center, CR653 and CR663 are reverse biased. The voltage level at the bases of Q670 and Q675 is approximately −15 volts, as determined by zener diode VR674.

As the beam is deflected to the bottom region of the crt display area, the output of Q650 rises above −15 volts, forward biasing CR653 (CR663 remains reverse biased). The signal from CR653 is inverted and amplified by Q670.

As the beam is deflected to the top region of the crt display area, the output of Q660 rises above −15 volts, forward biasing CR663 (CR653 is reverse biased). The signal from CR663 is inverted and amplified by Q675.

The composite correction voltage for vertical (Y) deflection is coupled from Q670 and Q675 to the Summing and Output Amplifier stage at the emitter of Q678.

Summing and Output Amplifier

Outputs from both the X and Y Focus Correction Shapers are added in the Summing and Output Amplifier stage of the Dynamic Focus circuit. The focus correction signals are coupled to common-base transistor Q678. Diode CR679 limits the output of Q678 to prevent overdriving the Output Amplifier. The Output Amplifier of this stage, consisting of transistors Q680-Q685-Q690, is an inverting operational amplifier. The input signal to this amplifier is developed across R679. The feedback network for the Output Amplifier consists of C683 and R683. Emitter follower Q680 provides current amplification for Q685 and Q690, which are connected in a collector-coupled complementary amplifier configuration. Circuit protection for the complementary transistors is provided by CR685 and CR690. The composite correction signal is coupled to the Focus-Element DC Restorer stage through R692.

Focus-Element DC Restorer

The Focus-Element DC Restorer couples the dc and low-frequency components of the Dynamic Focus correction signals to the crt focus element at pin 8 of V725. This allows the X and Y Focus Correction Shaper stages to control the focus element potentials. The potential difference between the Dynamic Focus output and the focus element (approximately 3000 volts) prohibits direct coupling.

The Focus-Element DC Restorer is divided into 2 sections for ease of explanation. The first section can be considered a modulator at low-voltage potentials and the remaining section a demodulator at high-voltage potentials (see Fig. 4-4).

MODULATOR. When the secondary-winding output at T710 pin 10 (Diagram 5) swings positive, C694 charges through R673, C673, and R694 (Diagram 4) to a voltage level determined by the output level from the Summing and Output Amplifier at R692. At this voltage level (approximately 20 volts at center-screen deflection) CR692 conducts, preventing any additional increase in positive voltage across C694. When the secondary winding output swings negative, CR692 turns off. Then, CR693 conducts and clamps the negative excursion at C694 a diode drop below ground. The result is a square-wave output from the Modulator, with output amplitude determined by the difference between the Summing and Output Amplifier output level and approximately ground (see waveform 2 on Fig. 4-4). The Modulator output is coupled through C694 to the Demodulator.

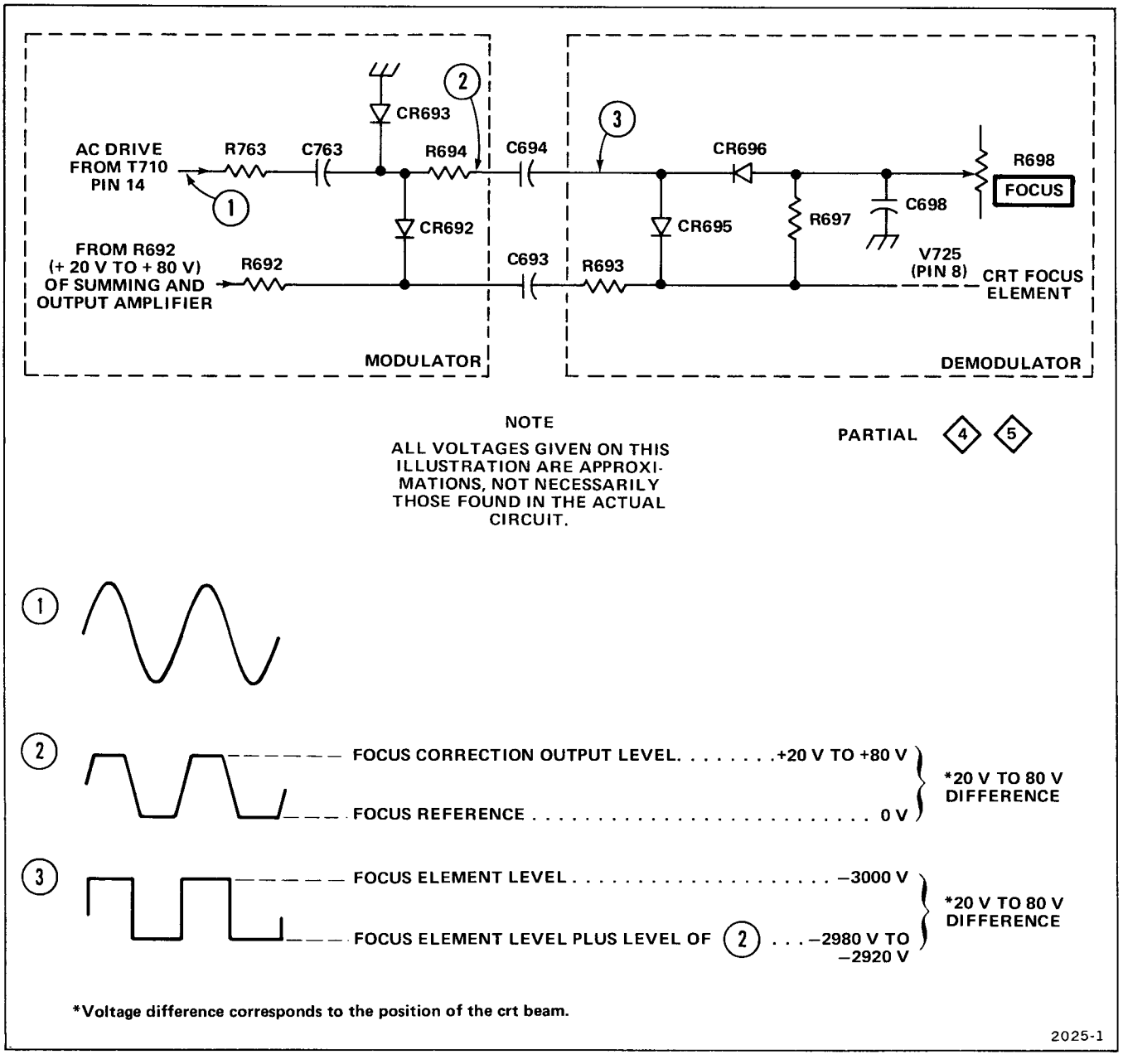


Figure 4-4. Simplified diagram of Focus-Element DC Restorer.

DEMODULATOR. The Demodulator rectifies the signal from the Modulator and references it to the crt focus-element level. The negative swing of waveform 3 in Figure 4-4 is limited by CR696 to the crt focus-element level; the positive excursion is coupled through CR695 to C693. Quiescently, C693 will charge to about −3000 volts through R693. After repetitive cycles from C694, C693 will charge to the positive level of waveform 3. Capacitor C693 holds the voltage constant at the focus element, and also provides a path for the ac portions of the X and Y focus correction signal to be coupled to the crt focus element at V725-pin 8 (Diagram 5).

The remainder of the components not shown on the simplified diagram in Figure 4-4 provides circuit protection in the event of a high-voltage arc or other malfunction.

Astigmatism Correction Shaper

The Astigmatism Correction Shaper varies the voltage to the crt astigmatism element (pin 6 of V725) corresponding to the horizontal position of the beam. Samples of current from the right and left circuits of the X Focus Correction Shaper (refer to discussion in this section) are taken at R615 and R625 respectively. Correction current, which is coupled through common-base amplifier Q625 and emitter-follower amplifier Q638, develops astigmatism correction voltage across R638. Gain for the Astigmatism Correction stage is set by R626.

The astigmatism correction voltage is amplified by common-base transistor Q702 (Diagram 5) and coupled to the astigmatism element at pin 6 of V725. Zener diode VR706 provides dc level shifting, and diode VR705 provides constant voltage across Astig adjustment R705.

HIGH-VOLTAGE POWER SUPPLY ⑤

The High-Voltage Power Supply provides the voltage levels and control circuits necessary for operation of the cathode-ray tube (crt). A schematic diagram of the High-Voltage Power Supply is shown on Diagram 5. A detailed block diagram, showing each major stage of this circuit, is superimposed on the schematic diagram with shaded lines. The stage names (given as sub-headings in the following discussion) can be found in the shaded boxes on Diagram 5.

High-Voltage Oscillator

A repetitive, sinusoidal signal is produced by a regenerative feedback oscillator in the primary of T710 and induced into the secondary. Current drive for the primary winding is furnished by Q722-Q720-Q714. The conduction of the High-Voltage Oscillator transistors is controlled by the output voltage of the Error Amplifier.

Error Amplifier

The cathode supply voltage is half-wave rectified by CR764 in the secondary of T710. Then it is filtered by C764, R765, and C766, before being applied to the crt cathode.

Regulation of the cathode supply voltage is accomplished by applying a sample of the −5500 volts, from voltage divider R734A-R734B, to the positive input (pin 3) of U740. If the output level of the cathode supply goes above the normal −5500 volts (becomes more negative), the voltage at pin 3 of U740 goes negative from its quiescent zero-volt level. This results in a reduced output voltage from U740. A lower potential from the Error Amplifier reduces the conduction of the High-Voltage Oscillator, resulting in a smaller peak-to-peak amplitude of the signal in the secondary of T710 and returning the cathode supply to −5500 volts.

Current Limiter

Transistor Q725 protects Q714 if excess current is demanded from the cathode supply, due to a short circuit or similar malfunction, by limiting the maximum current drawn by the High-Voltage Oscillator.

Control-Grid DC Restorer

The Control-Grid DC Restorer couples the dc and low-frequency components of the Z-Axis Amplifier output signal to the crt control grid. This allows the Z-Axis Amplifier to control the crt beam intensity. The potential difference between the Z-Axis Amplifier output level and the crt control grid (about −5600 volts) prohibits direct coupling.

The Control-Grid DC Restorer is actually a cathode-referenced bias supply for the crt control grid. Quiescently, its output voltage is more negative than the crt cathode by an amount determined by the Z-Axis Amplifier output level and the setting of the Grid Bias adjustment, R774. (The cutoff voltage at the crt control grid is typically about 100 volts more negative than the crt cathode level.)

NOTE

A simplified diagram of the Control-Grid DC Restorer is shown in Figure 4-5. The voltages given on this diagram are idealized levels and will not necessarily be the same as those found in the actual instrument.

The Control-Grid DC Restorer is divided into two sections for ease of explanation. The first section can be considered a modulator at low-voltage potentials, and the remaining section as a demodulator at high-voltage potentials (see Fig. 4-5).

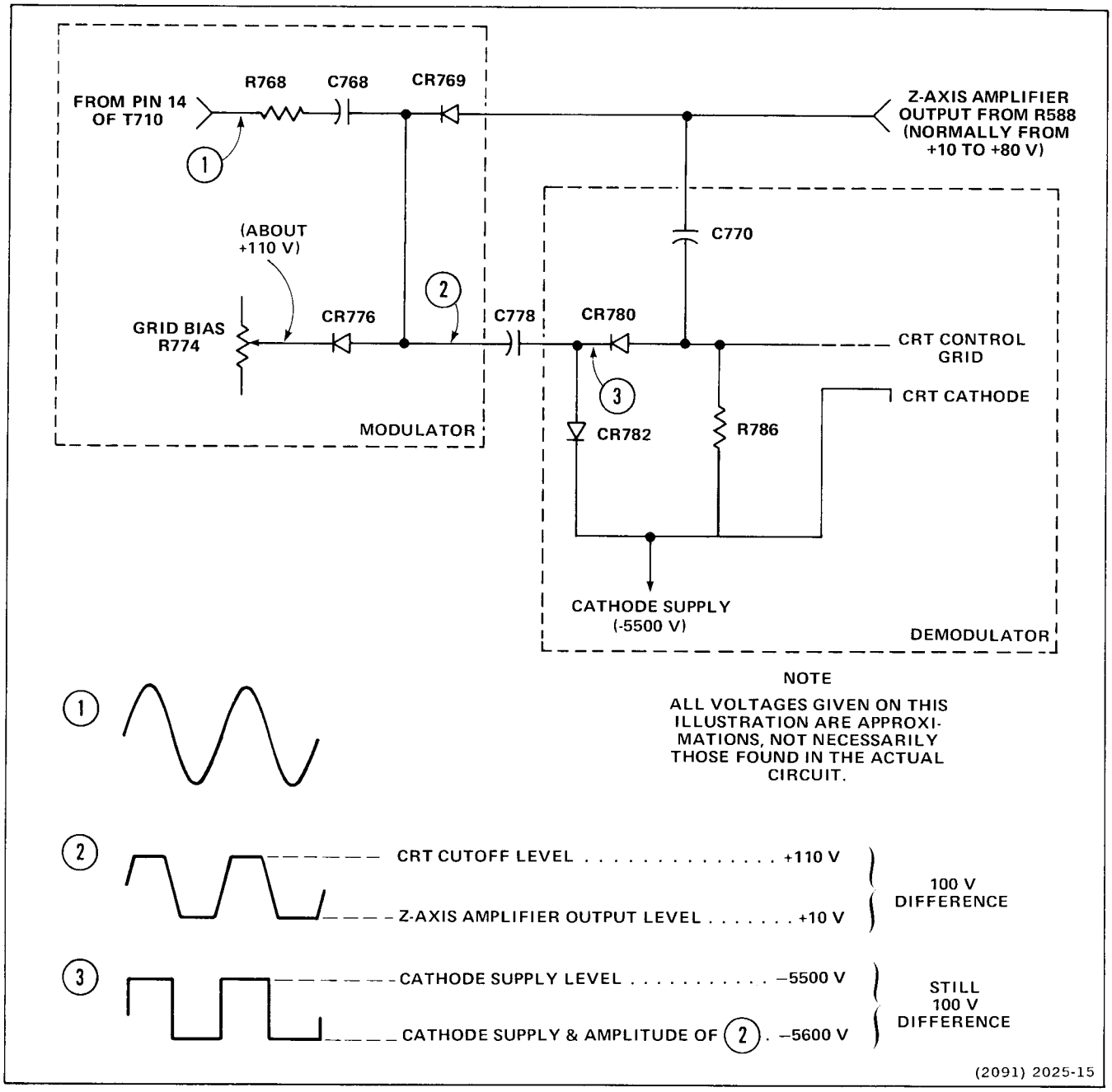


Figure 4-5. Simplified diagram of the Control-Grid DC Restorer.

MODULATOR. When the secondary-winding output of T710 (pin 14) swings positive, C778 charges through R768 and C768 to a voltage level determined by the setting of the Grid Bias adjustment, R774. At this voltage level (approximately 110 volts), CR776 conducts, preventing any additional increase in positive voltage across C778. When the secondary-winding output swings negative, CR776 turns off. Then CR769 conducts and clamps the negative excursion at C778 to the voltage level of the Z-Axis Amplifier output.

The result is a square-wave output from the Modulator; the output amplitude is determined by the difference between the Z-Axis Amplifier output level and the Grid Bias adjustment setting. (See waveform 2 on Fig. 4-5.) This square wave is coupled through C778 to the Demodulator.

DEMODULATOR. The Demodulator rectifies the signal from the Modulator and references it to the crt cathode

supply level. The positive swing of waveform 3, Figure 4-5, is limited by CR782 to the cathode supply level; the negative excursion is coupled through CR780 to C770. Quiescently, C770 will charge to about −5500 volts through R786. After repetitive cycles from C778, C770 will charge to the negative level of waveform 3. Capacitor C770 holds the voltage constant at the crt control grid, and also provides a path for the ac portions of the Z-Axis Amplifier output signal to be coupled to the crt control grid.

The remainder of the components not shown on the simplified diagram in Figure 4-5 provide circuit protection in the event of a high-voltage arc, or other malfunction.

Crt Control Circuits

The Astigmatism adjustment, R705, which is used in conjunction with the FOCUS control to provide a well-defined display, varies the positive level on the astigmatism grid of the crt. Geometry adjustment R798 varies the positive level on the geometry grid to control the over-all geometry of the display. TRACE ROTATION adjustment R750 controls the current through L725 to provide adjustment of the display alignment.

LOW-VOLTAGE POWER SUPPLY ◈6

The Low-Voltage Power Supply provides the operating power for the Monitor. Electronic regulation is used to provide stable, low-ripple output voltages. A schematic diagram of the Low-Voltage Power Supply is shown on Diagram 6 at the rear of this manual. A detailed block diagram, showing each major stage of this circuit, is superimposed on the schematic with shaded lines. The stage names (given as subheadings in the following discussion) can be found in the shaded blocks on Diagram 6.

Power Input

Power is applied to the primary of transformer T805 through fuse F800, thermal cutoff S802, POWER switch S800, and Line-Voltage Selector plug P805 or P806. The Line-Voltage Selector plugs allow changing the primary winding taps of T805 to meet different line-voltage and regulating range requirements. Line fuse F800 should be changed for each nominal line voltage (current rating of fuse for 220-volt operation must be 0.5 A slow-blowing type; for 120-volt operation the current rating of the fuse must be 1 A slow-blowing type).

Thermal cutoff S802 provides thermal protection for this instrument. If the internal temperature of the instrument exceeds a safe operating level, S802 opens to interrupt the applied power. When the temperature returns to a safe level, S802 automatically closes to re-apply the power.

+20-Volt Unregulated Supply

The +20-Volt Unregulated Supply provides unregulated power for the +15-Volt Regulated Supply and the high voltage transformer (T710) on Diagram 5. A full-wave bridge circuit, composed of CR812-CR813-CR814-CR815, rectifies the ac voltage from the secondary of T805. Filtering is provided by C816 and C818. Fuse F856 provides circuit protection in the event of an overload.

+15-Volt Regulated Supply

The +15-Volt Regulated Supply, in addition to providing power to circuitry throughout the instrument, provides a reference-voltage source to establish the operating levels for the feedback regulators of the −30-Volt Regulated, the +270-Volt Regulated, and the High-Voltage Power Supplies. The regulator for the +15-Volt Regulated Supply is a feedback amplifier system that operates between ground and the +20-Volt Unregulated Supply. Current to the load is delivered by series-pass transistor Q840, which is located in the output side of the supply. The supply voltage is established by the drop across resistive divider network R852, R850, and R854. The feedback through this network is compared to the reference level established at the base of Q830 by the voltage drop across VR832 and the emitter-base junction of Q830. Any variation in output voltage of the supply (due to ripple, change of current through the load, etc.), is immediately transmitted to the base of Q840, the +15-volt series regulator, and nullified by a change in Q840 conduction, to maintain a steady output. The output of the supply is set to exactly +15 volts by adjustment of R850, the +15-V Adjust. This adjustment controls conduction of Q830 which sets the bias levels of Q840 through emitter-follower Q845.

Transistor Q845 protects the +15-volt series regulator (Q840) if excess current is demanded from this supply. Since the load is connected to this supply through R844, all current must flow through this resistor. When excess current is demanded from the +15-volt series regulator, due to a short circuit or similar malfunction at the output of this supply, the voltage drop across R844 increases enough to forward bias CR847 and CR846. The resulting current in these diodes takes control away from Q830, and will turn on Q845, turning off Q840 to limit the supply current to a safe level.

−30-Volt Regulated Supply

A full-wave bridge circuit, composed of CR862-CR863-CR864-CR865, rectifies the ac voltage from T805 to provide unregulated power for the −30-Volt Regulated Supply. Filtering is provided by C866. Fuse F868 provides circuit protection in the event of an overload.

The regulator for the —30-Volt Regulated Supply consists of series-pass transistor Q880 and error amplifier Q870. This is a feedback amplifier system similar to that just described for the +15-Volt Regulated Supply, except that the regulator is located in the return side of the supply instead of the output.

The center of resistive divider network R876-R877 is set by error amplifier Q870 to be zero volts, with respect to ground, during normal operation. Any variation in output from the —30-Volt Regulated Supply is coupled to the error amplifier, which changes the bias of the series-pass transistor. This change in bias, and resulting change in conduction of the regulator, alters the voltage at the —30-V Return, which maintains the —30-Volt Regulated Supply at the proper level.

Transistor Q885 protects the —30-volt series regulator (Q880) if excess current is demanded from this supply. All current from this supply must flow through R884. When excess current is demanded, the voltage drop across R884 increases enough to forward bias CR888. The resulting current through this diode takes control away from Q870, and will turn on Q885, turning off Q880 to limit the supply current to a safe level.

+270-Volt Regulated Supply

A full-wave bridge circuit, composed of CR802-CR803-CR804-CR805, rectifies the ac voltage from T805 to provide unregulated power for the +270-Volt Regulated Supply. Filtering is provided by C812. Fuse F814 provides circuit protection in the event of an overload.

The regulator for the +270-Volt Regulated Supply consists of series-pass transistor Q820 and error amplifier Q825. This is a feedback amplifier system similar to that described for the —30-Volt Regulated Supply, with the feedback path through R826 to the base of error amplifier Q825.

SWEEP (OPTION 4) ◇7◇

The optional Sweep circuit produces a positive-going sawtooth voltage, which is amplified by the Horizontal (X) Amplifier, to provide sweep deflection in the crt. The Sweep circuit also produces an unblanking gate signal coincident with the sawtooth waveform to unblank the crt and permit display presentation. A schematic diagram of the Sweep (Option 4) circuit is shown on Diagram 7 at the rear of this manual. A detailed block diagram, showing the major stages of this circuit, is superimposed on the schematic with thick shaded lines. The stage names (given as sub-headings in the following discussion) can be found in shaded blocks on Diagram 7.

Trigger and Sweep Generator

The Trigger and Sweep Generator stage produces a positive-going sawtooth voltage that is amplified by the Horizontal (X) Amplifier to provide sweep deflection in the crt. Six sweep rates are provided: 0.1 second through 1 microsecond, in decade steps. A negative-going gate is produced at the same time the sawtooth is produced to unblank the crt.

The Trigger and Sweep Generator is made up of Tektronix-manufactured integrated circuit U930 and the associated discrete circuit components. Integrated circuit U930 contains the trigger generator, the sweep-gating circuit, and an operational amplifier to form the basis of a Miller integrator. Power is applied to pins 7 and 12 to establish the operating levels within the device. An internal reference Zener diode provides 6.4 volts between pins 8 and 9 for operation of external controls; pin 8 provides a level of two diode junctions above the negative level at pin 12.

The timing components are selected by switch S930 (SEC/DIV), which permits one of six nominal sweep rates to be chosen. Potentiometer R945 (VARIABLE) varies the timing current for a continuously variable sweep rate.

Pins 10, 11, 13, and 14 are associated with the Trigger Generator portion of U930. The triggering signal is applied to a field-effect transistor input at pin 13. Potentiometer R918 (TRIG SLOPE/LEVEL) at pin 14 controls the internal comparators that determine the level and slope at which the internal Schmitt multivibrator switches states, initiating a sweep trigger. Differentiating capacitor C912 at pin 11 determines the trigger-pulse width.

For normal triggered operation, —8.2 volts is applied to pin 10 to hold the bright-baseline auto circuit inactive. In this mode, when the triggering signal is lost, a sweep cannot be produced. When internal switch S909 (Trig Mode) is set to Auto, the —8.2 volts is disconnected to permit a free-running sweep, or bright baseline, to be produced. Pin 10 moves positive as C910 charges, and this positive potential replaces the incoming triggering signal. A new sweep will be initiated immediately following the sweep hold-off time. However, with S909 (Trig Mode) in the Auto position, any incoming triggering signal will discharge C910. If the signal is occurring at a rate greater than about 20 hertz, C910 will be held below the auto-trigger level to permit a triggered sweep to be produced.

Pins 1 through 6, and 16, are associated with the Sweep Generator portion of U930. Upon receipt of a trigger from the Trigger Generator, the sweep gate turns on. While the gate is on, CR930 is turned off by a high logic level at pin 2, allowing the current through external R_t components R930 and R946 to be switched to timing capacitors C930 and C938. Pin 5 is the operational amplifier null point, thus the nearly constant timing current charges the capacitors linearly, producing a linear, negative-going sawtooth voltage at pin 4. When the sawtooth reaches a level determined by R915 (Swp Length), the sweep terminates. At this point, the sweep gate turns off, turning on CR930 and quickly discharging the timing capacitors. A short-duration trigger-lockout period (to allow the sweep generator to reset and stabilize), is provided by C924 and C925 at pin 3.

Sawtooth Amplifier

Operational amplifier system Q960 and Q964 provides amplification of the sweep sawtooth to an amplitude suitable to meet the sensitivity requirements of the Horizontal (X) Amplifier. Potentiometer R965 (Swp Cal) permits calibrating the sweep to the crt graticule. The base of Q960 is the null point, R950 is the R_{in} element, and R955 is the feedback element. A positive-going sawtooth is produced at the emitter of Q964.

Unblanking-Gate Output Amplifier

The negative-going gate produced at pin 16 of U930 is amplified by Q975 and Q978. The negative-going gate produced at the collector of Q978 is applied to R554 in the Z-Axis Amplifier circuit to turn on the crt during the sweep.

MAINTENANCE

This section of the manual contains information for performing preventive maintenance, troubleshooting, and corrective maintenance for the 606 Monitor.

PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the reliability of the instrument. The severity of the environment to which the instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding electrical adjustment of the instrument.

CABINET PANEL REMOVAL

WARNING

Disconnect power to the instrument before removing the cabinet panels to avoid electric-shock hazard.

The cabinet panels are held in place by slotted fasteners. To remove the panels, turn each fastener counterclockwise a quarter turn with a large screwdriver. Lift the panels away. Always operate the instrument with the panels in place to protect the interior from dust.

CLEANING

The 606 Monitor should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause overheating and component breakdown. Dirt on components acts as an insulating blanket and prevents efficient heat dissipation. It also provides an electrical conduction path which may result in instrument failure. The cabinet panels provide protection against dust in the interior of the instrument.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Use a non-residue type of cleaner, preferably isopropyl alcohol, total denatured ethyl alcohol, or TP35. Before using any other type of cleaner, consult your Tektronix Service Center.

Exterior

Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or small brush. The brush is particularly useful for dislodging dirt on and around the front-panel controls. Dirt which remains can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used.

Crt

Clean the crt faceplate with a soft, lint-free cloth dampened with denatured alcohol.

Interior

Cleaning the interior of the instrument should only be occasionally necessary. The best way to clean the interior is to blow off the accumulated dust with dry, low-velocity air (approximately 5 lb/in^2). Remove any dirt which remains with a soft brush or a cloth dampened with a mild detergent and water solution. A cotton-tipped applicator is useful for cleaning in narrow spaces, or for cleaning more delicate circuit components.

CAUTION

Circuit boards and components must be dry before applying power to the instrument to prevent damage from electrical arcing.

The high-voltage circuits should receive special attention. Excessive dirt in this area may cause high-voltage arcing and result in improper instrument operation.

VISUAL INSPECTION

The 606 Monitor should be inspected occasionally for such defects as broken connections, improperly seated semiconductors, damaged or improperly installed circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is obvious; however, particular care must be taken if heat-damaged parts are found. Overheating usually indicates other trouble in the instrument; therefore, it is important that the cause of overheating be corrected to prevent recurrence of the damage.

SEMICONDUCTOR CHECKS

Periodic checks of semiconductors are not recommended. The best check of semiconductor performance is actual operation in the instrument. More details on semiconductors are given under Troubleshooting later in this section.

PERIODIC ELECTRICAL ADJUSTMENT

To ensure accurate measurements, check the electrical adjustment of this instrument after each 1000 hours of operation, or every six months if used infrequently. In addition, replacement of components may necessitate adjustment of the affected circuits. Complete adjustment instructions are given in section 6, Performance Check and Adjustment. This procedure can be helpful in localizing certain troubles in the instrument, and in some cases, may correct them.

TROUBLESHOOTING

The following information is provided to facilitate troubleshooting of the 606 Monitor. Information contained in other sections of this manual should be used in conjunction with the following data to aid in locating a defective component. An understanding of the circuit operation is helpful in locating troubles. See section 4, Theory of Operation, for this information.

TROUBLESHOOTING AIDS

Diagrams

Complete schematic diagrams are given on the foldout pages in section 9, Diagrams and Circuit Board Illustrations. The component number and electrical value of each component in this instrument are shown on these diagrams. (See the first page of the Diagrams and Circuit Board Illustrations section for definitions of the reference designators and symbols used to identify components in this instrument.) Important voltages and numbered waveform test points are also shown on the diagrams. Important waveforms, and the numbered test points where they were obtained, are located adjacent to each diagram. The portions of circuits mounted on circuit boards are enclosed with heavy solid black lines. Each schematic diagram is divided into functional blocks, as indicated by the wide shaded lines. These functional blocks are described in detail in section 4, Theory of Operation.

Circuit Board Illustrations

To aid in locating circuit boards, a circuit board location illustration appears on the back of the foldout page facing the schematic diagram. In addition, an illustration of the circuit board is included here, with the physical location of the components and waveform test points that appear on the schematic diagram identified. Each circuit board illustration is arranged in a grid locator with an index to facilitate rapid location of components contained in the schematic diagrams.

Troubleshooting Chart

A troubleshooting chart is given in section 9, Diagrams and Circuit Board Illustrations, to aid in locating a defective circuit. The shaded blocks on the Troubleshooting Chart indicate circuit(s) that may cause the indicated malfunction. The circuits listed are discussed in detail in section 4, Theory of Operation.

Adjustment and Test Point Locations

To aid in locating test points and adjustable components called out in the Performance Check and Adjustment procedure, an Adjustment and Test Point Locations foldout page is provided in section 9, Diagrams and Circuit Board Illustrations.

Component Color Coding

The instrument contains brown composition resistors, some metal-film resistors and some wire-wound resistors. The resistance values of wire-wound resistors are usually printed on the component body. The resistance values of composition resistors and metal-film resistors are color coded on the components using the EIA color code (some metal-film resistors may have the value printed on the body). The color code is read starting with the stripe nearest the end of the resistor. Composition resistors have four stripes, which consist of two significant figures, a multiplier, and a tolerance value (see Fig. 5-1). Metal-film resistors have five stripes consisting of three significant figures, a multiplier, and a tolerance value.

The values of common disc capacitors and small electrolytics are marked on the side of the component body. The white ceramic and epoxy-coated tantalum capacitors used in the instrument are color coded using a modified EIA code (see Fig. 5-1).

The cathode end of glass-encased diodes is indicated by a stripe, a series of stripes, or a dot. The cathode and anode ends of metal-encased diodes can be identified by the diode symbol marked on the body.

Cam-Switch Contact Identification

Cam switches shown on the diagrams are coded to indicate the position of the contact in the complete switch assembly counting from the front, or knob end of the switch, toward the rear. The contact closure chart on the diagrams indicates when each contact is closed.

COLOR CODE

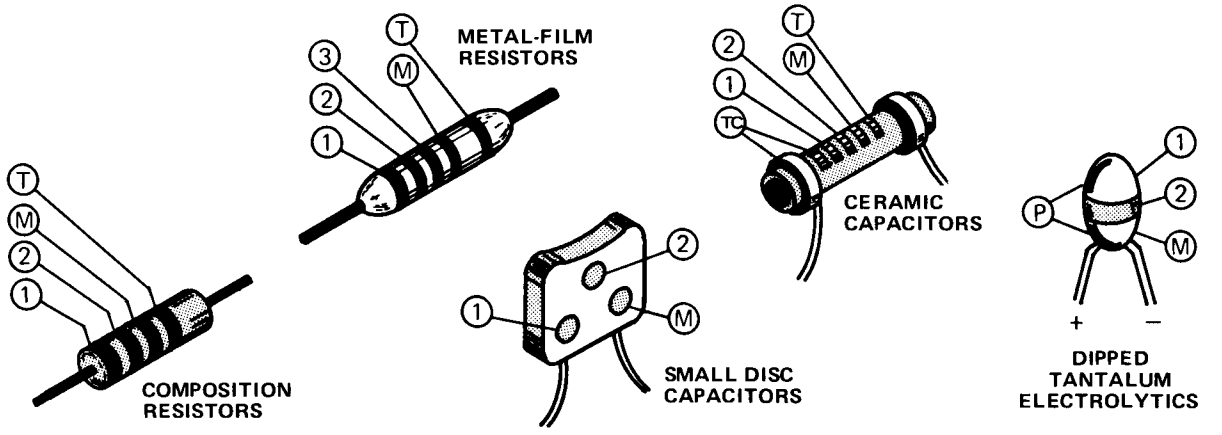
(1) (2) AND (3) - 1st, 2nd, AND 3rd SIGNIFICANT FIGS.

(M) - MULTIPLIER; (T) - TOLERANCE;

(TC) - TEMPERATURE COEFFICIENT.

(T) AND/OR (TC) COLOR CODE MAY NOT BE PRESENT ON SOME CAPACITORS;

(P) - POSITIVE (+) POLARITY AND VOLTAGE RATING.



COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER (OHMS)	TOLERANCE	MULTIPLIER (pF)	TOLERANCE		
					OVER 10pF	UNDER 10 pF	
BLACK	0	1	---	1	±20%	± 2pF	4VDC
BROWN	1	10	±1%	10	±1%	±0.1pF	6VDC
RED	2	10^2 or 100	±2%	10^2or 100	±2%	---	10VDC
ORANGE	3	10^3or 1 K	±3%	10^3 or 1000	±3%	---	15VDC
YELLOW	4	10^4 or 10K	±4%	10^4 or 10,000	+100% −0%	---	20VDC
GREEN	5	10^5 or 100 K	±1/2%	10^5or 100,000	±5%	±0.5pF	25VDC
BLUE	6	10^6 or 1 M	±1/4%	10^6 or 1,000,000	---	---	35VDC
VIOLET	7	---	±1/10%	10^7 or 10,000,000	---	---	50VDC
GRAY	8	---	---	10^{-2} or 0.01	+80% −20%	±0.25pF	---
WHITE	9	---	---	10^{-1} or 0.1	±10%	±1pF	3VDC
GOLD	---	10^{-1} or 0.1	±5%	---	---	---	---
SILVER	---	10^{-2} or 0.01	±10%	---	---	---	---
NONE	---	---	±20%	---	±10%	±1pF	---

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Figure 5-1. Color code for resistors and capacitors.

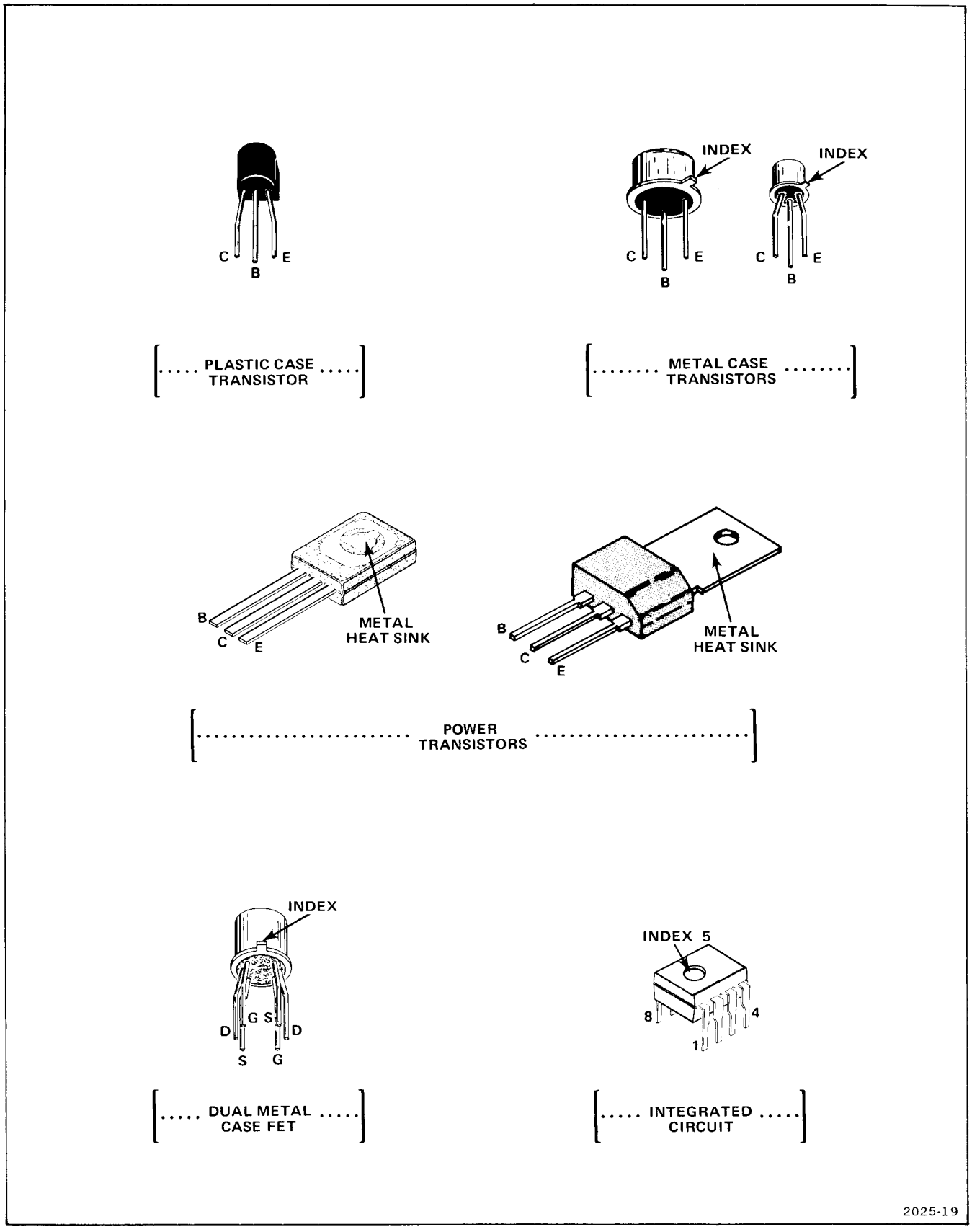

Figure 5-2. Semiconductor lead configurations.

Semiconductor Lead Configurations

Figure 5-2 shows the lead configurations of the semiconductors in the 606 Monitor.

Multi-Connector Holders

The multi-connector holders are keyed either with two triangles, one on the holder and one on the circuit board, or with one triangle on the holder and a dot on the circuit board. When a connection is made perpendicular to a circuit board surface, the orientation of the triangle on the end-lead multi-pin connector holder is determined by the placement of the multi-pin connector index (see Fig. 5-3).

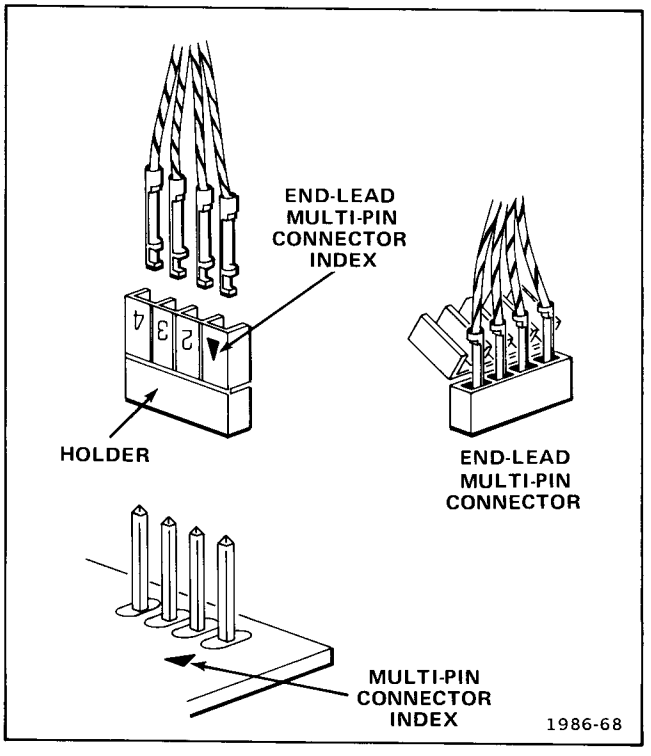

Figure 5-3. Orientation of multi-connector holders.

Troubleshooting Equipment

The following equipment, in addition to that listed in the Performance Check and Adjustment section, is useful for troubleshooting the 606 Monitor:

Semiconductor Tester

Description: Dynamic-type tester.

Purpose: To test the semiconductors used in this instrument.

Recommended type: Tektronix Type 576 or equivalent.

Multimeter

Description: Ten megohm input impedance and 0 to 300 volts range, ac and dc; ohmmeter, 0 to 50 megohms. Accuracy, within 3%. Test probes must be insulated to prevent accidental shorting.

Purpose: To check voltages and for general troubleshooting.

Test Oscilloscope

Description: Frequency response, dc to three megahertz minimum (to ten megahertz for troubleshooting the Z-Axis Amplifier); deflection factor, one millivolt/division to five volts/division. A 10X, ten megohm voltage probe should be used to reduce circuit loading for voltage measurements.

Purpose: To check operating waveforms.

TROUBLESHOOTING TECHNIQUES

This troubleshooting procedure is arranged in an order that checks the simple trouble possibilities before proceeding with extensive troubleshooting. The first few checks assure proper connection, operation, and adjustment. If the trouble is not located by these checks, the remaining steps aid in locating the defective component. When the defective component is located, replace it using the replacement procedure given under Component Replacement in this section.

1. Check Control Settings

Incorrect control settings can indicate a trouble that does not exist. If there is any question about the correct function or operation of any control on the 606, refer to section 2, Operating Instructions.

2. Check Associated Equipment

Before proceeding with troubleshooting, check that the equipment used with this instrument is operating correctly. Also, check that the input signals are properly connected and that the interconnecting cables are not defective. Check the line-voltage source.

WARNING

Although this Monitor is not to be connected directly to a patient, interconnecting this Monitor to other equipment can result in the application of excessive current to a patient. It is extremely important that the interconnection is made in accordance with NFPA 76B-T, Tentative Standard for the Safe Use of Electricity in Patient Care Facilities, section 3038, "Signal Transmission Between Appliances".

3. Visual Check

Visually check that portion of the instrument in which the trouble is located. Many troubles can be found by visible indications, such as unsoldered connections, broken wires, damaged circuit boards and damaged components.

4. Check Instrument Adjustment

Check the electrical adjustment of this instrument, or of the affected circuit if the trouble appears in one circuit. The apparent trouble may only be a result of misadjustment. Complete adjustment instructions are given in section 6, Performance Check and Adjustment.

5. Isolate Trouble to a Circuit

To isolate trouble to a particular circuit, note the trouble symptom. The symptom often identifies the circuit in which the trouble is located. When trouble symptoms appear in more than one circuit, check the affected circuits by taking voltage and waveform readings.

Incorrect operation of all circuits often indicates trouble in the power supplies. Check first for the correct output voltage of the individual supplies. A defective component elsewhere in the instrument can appear as a power supply trouble and may also affect the operation of other circuits. Table 5-1 lists the output voltage range and typical ripple of the power supplies in the instrument. These voltages are measured between the power-supply test points and ground (see the Adjustment and Test Point Locations foldout page in section 9, Diagrams and Circuit Board Illustrations, for test point locations). If the power-supply voltage and ripple is within the listed range, the supply can be assumed to be working correctly. If outside the range, the supply may be misadjusted or operating incorrectly. Use the procedure given in section 6, Performance Check and Adjustment, to adjust the power supplies.

Figure 9-10 in section 9, Diagrams and Circuit Board Illustrations, provides a guide for locating a defective circuit. Start at the top left of the Troubleshooting Chart and perform the checks given across the top of the chart until the indicated results are not found. Then proceed to further checks, or the circuit in which the trouble is suspected, as listed underneath the step. The shaded blocks on the Troubleshooting Chart indicate circuit(s) that may cause the malfunction. The circuits listed are discussed in detail in section 4, Theory of Operation. After the defective circuit has been located, proceed with steps 6 and 7 of the Troubleshooting Techniques to isolate the defective component.

6. Check Voltages and Waveforms

Often the defective component can be located by checking for the correct voltages or waveforms in the circuit. Typical voltages and waveforms are given in section 9, Diagrams and Circuit Board Illustrations.

TABLE 5-1
Power Supply Output Voltage

Power Supply	Test Point	Output Voltage Range	Typical Ripple (peak-to-peak)
−30 V	−30	−29.1 V to −30.9 V	2 mV or less
+15 V (Adjustable)	+15	+14.85 V to +15.15 V	2 mV or less
+30 V	+30	+27 V to +33 V	1 V or less
+120 V	+120	+108 V to +132 V	2 V or less
+270 V	+270	+262 V to +278 V	200 mV or less

NOTE

Voltages and waveforms given in section 9, Diagrams and Circuit Board Illustrations, are not absolute and may vary slightly between 606 Monitors. To obtain operating conditions similar to those used to take these readings, see the appropriate schematic.

7. Check Individual Components

The following procedures describe methods of checking individual components in the 606 Monitor. Components which are soldered in place are best checked by first disconnecting one end. This isolates the measurement from the effects of surrounding circuitry.

WARNING

Always disconnect the Monitor from the power source before replacing components to avoid electric-shock hazard.

FUSES. Check for open fuses by checking continuity with an ohmmeter. The location and rating of power supply fuses is shown in Figure 5-4.

TRANSISTORS. A good check of transistor operation is actual performance under operating conditions. A transistor can most effectively be checked by substituting a new component for it (or one which has been checked previously). However, be sure that circuit conditions are not such that a replacement transistor might also be damaged. If substitute transistors are not available, use a dynamic tester. Static-type testers are not recommended, since they do not check operation under simulated operating conditions.

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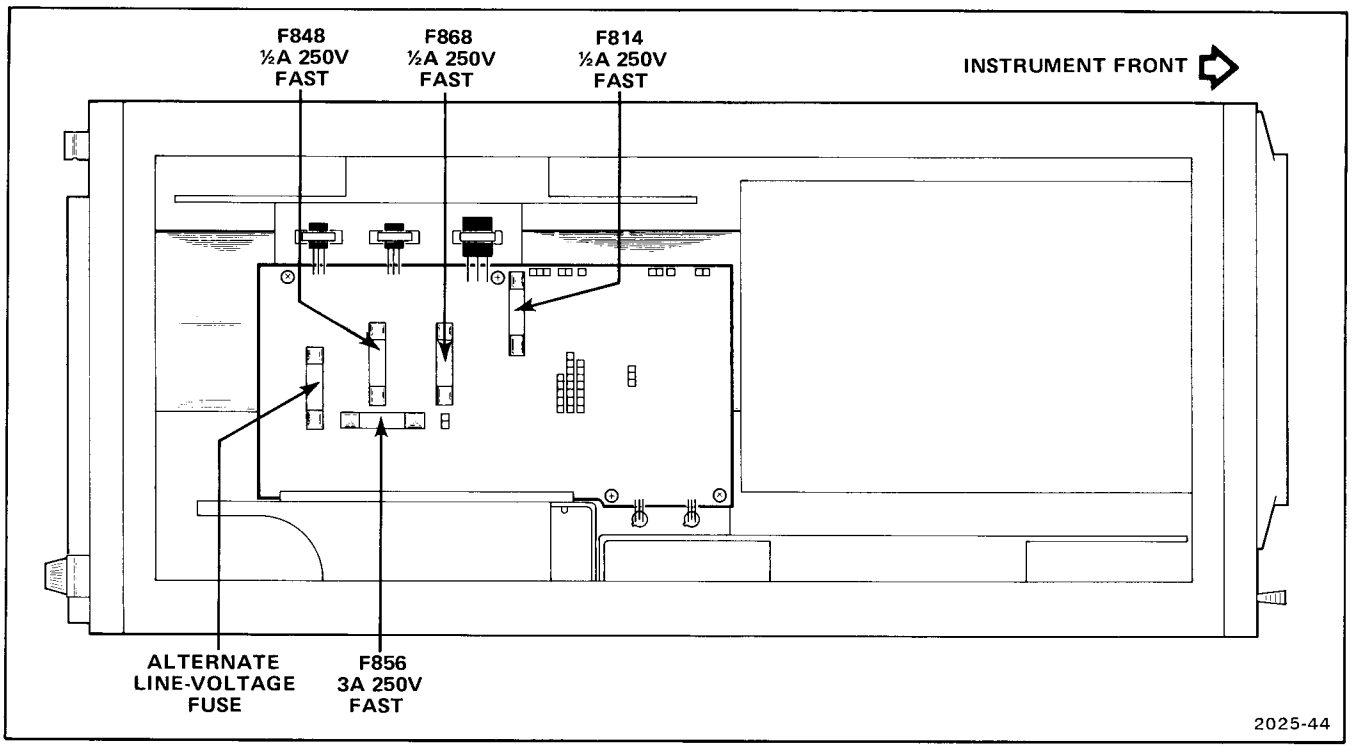

Figure 5-4. Location and rating of power-supply fuses.

INTEGRATED CIRCUITS. Integrated circuits can be checked with a voltmeter, test oscilloscope, or by direct substitution. A good understanding of the circuit operation is essential to troubleshooting circuits using integrated circuits. In addition, operating waveforms, logic levels, and other operating information for the integrated circuits are given in section 4, Theory of Operation and section 9, Diagrams and Circuit Board Illustrations. Use care when checking voltages and waveforms around the integrated circuits so that adjacent leads are not shorted together. A convenient means of clipping a test probe to the in-line multi-pin integrated circuits is with an integrated-circuit test clip. This device also doubles as an integrated-circuit extraction tool.

DIODES. A diode can be checked for an open or shorted condition by measuring the resistance between terminals with an ohmmeter scale having a low internal source current, such as the R X 1 K scale. The resistance should be very high in one direction and very low when the meter leads are reversed.

CAUTION

When checking diodes, do not use an ohmmeter scale that has a high internal current, since high currents may damage the diodes under test.

RESISTORS. Check the resistors with an ohmmeter. Resistor tolerance is given in section 7, Replaceable Electrical Parts. Normally, resistors do not need to be replaced unless the measured value varies widely from the specified value.

CAPACITORS. A leaky or shorted capacitor can best be detected by checking resistance with an ohmmeter on the highest scale. Do not exceed the voltage rating of the capacitor. The resistance reading should be high after initial charge of the capacitor. An open capacitor can best be detected with a capacitance meter or by checking if the capacitor passes ac signals.

8. Repair and Readjust the Circuit

If any defective parts are located, follow the replacement procedures given under Component Replacement in this section. Check the performance of any circuit that has been repaired or that has had any electrical components replaced. Adjustment of the circuit may be necessary.

CORRECTIVE MAINTENANCE

Corrective maintenance consists of component replacement and instrument repair. Special techniques required to replace components in the 606 Monitor are given here.

OBTAINING REPLACEMENT PARTS

Standard Parts

All electrical and mechanical part replacements can be obtained through your local Tektronix Field Office or representative. However, many of the standard electronic components can be obtained locally in less time than is required to order them from Tektronix, Inc. Before ordering or purchasing replacement parts, check the parts list for value, tolerance, rating, and description.

NOTE

When selecting replacement parts, remember that the physical size and shape of a component may affect its performance in the instrument. All replacement parts should be direct replacements unless you know that a different component will not adversly affect instrument performance.

Special Parts

Some components of the 606 are manufactured or selected by Tektronix, Inc. to meet specific performance requirements. Most of the mechanical parts used in this instrument have been manufactured by Tektronix, Inc. Order all special parts directly from your local Tektronix Field Office or representative.

Ordering Parts

When ordering replacement parts from Tektronix, Inc., include the following information:

1. Instrument type.
2. Instrument serial number.
3. A description of the part (if electrical, include the circuit number).
4. Tektronix part number.

SOLDERING TECHNIQUES

WARNING

To avoid electric-shock hazard, disconnect the Monitor from the power source before soldering.

The reliability and accuracy of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts. General soldering techniques which apply to maintenance of any precision electronic equipment should be used when working on this instrument. Use only 60/40 rosin-core, electronic-grade solder. The choice of soldering iron is determined by the repair to be made. When soldering on circuit boards or small wiring, use only a 15-watt, pencil-type soldering iron. A higher wattage soldering iron can cause the etched circuit wiring to separate from the board base material and melt the insulation from small wiring. Always keep the soldering-iron tip properly tinned to ensure the best heat transfer to the solder joint. Apply only enough heat to remove the component or to make a good solder joint. To protect heat-sensitive components, hold the component lead with a pair of long-nose pliers between the component body and the solder joint. Use a solder-removing wick to remove excess solder from connections or to clean circuit board pads.

The following technique should be used to replace a component on any of the circuit boards in this instrument. Most components can be replaced without removing the board(s) from the instrument.

1. Touch the soldering iron to the lead at the solder connection. Never place the iron directly on the board, as this may damage the board.

2. Melt a small amount of solder onto the component lead connection. This replaces the flux, which may have been removed during instrument cleaning, and facilitates removal of the component.

3. Grip the component lead with a pair of long-nose pliers. When the solder begins to flow, gently pull the component lead from the board. If unable to separate the lead from the board, try removing the other end of the component.

NOTE

Some components are difficult to remove from the circuit board due to a bend placed in each lead during machine insertion of the component. The purpose of the bent leads is to hold the component in position during a flow-solder manufacturing process which solders all components at once. To make removal of machine inserted components easier, straighten the leads of the component on the back of the circuit board using a small screwdriver or pliers while heating the soldered connection.

4. Bend the leads of the replacement component to fit the holes in the circuit board. If the component is replaced while the board is mounted in the instrument, cut the leads so they will just protrude through the board. Insert the leads into the holes in the board so that the component is firmly seated against the board, or as originally positioned.

5. Touch the iron to the connection and apply enough solder to make a firm solder joint.

6. Cut off any excess lead protruding through the board (if not clipped in step 4).

7. Clean the area around the solder connection with a flux-removing solvent. Be careful not to remove information printed on the circuit board.

COMPONENT REMOVAL AND REPLACEMENT

WARNING

Always disconnect the Monitor from the power source before replacing components to avoid potential electric-shock hazard.

The exploded-view drawings associated with the Replaceable Mechanical Parts list (located at the rear of the manual) may be helpful in the removal or disassembly of individual components or sub-assemblies.

Circuit Boards

If a circuit board is damaged beyond repair, the entire assembly, including all soldered-on components, can be replaced. Part numbers for the completely wired boards are given in section 7, Replaceable Electrical Parts.

All of the circuit boards in this instrument are mounted on the chassis. Use the following procedures to remove and replace the individual circuit boards.

DEFLECTION AMPLIFIER BOARD–A1. Remove and replace the Deflection Amplifier board as follows (see Fig. 5-5):

1. Remove the four screws securing the insulated heat-sink holding bars to the chassis.

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding connection point on the circuit board.

2. Disconnect the first row of cabling connected to the component side of the circuit board.

3. Remove the two screws holding the board to the chassis.

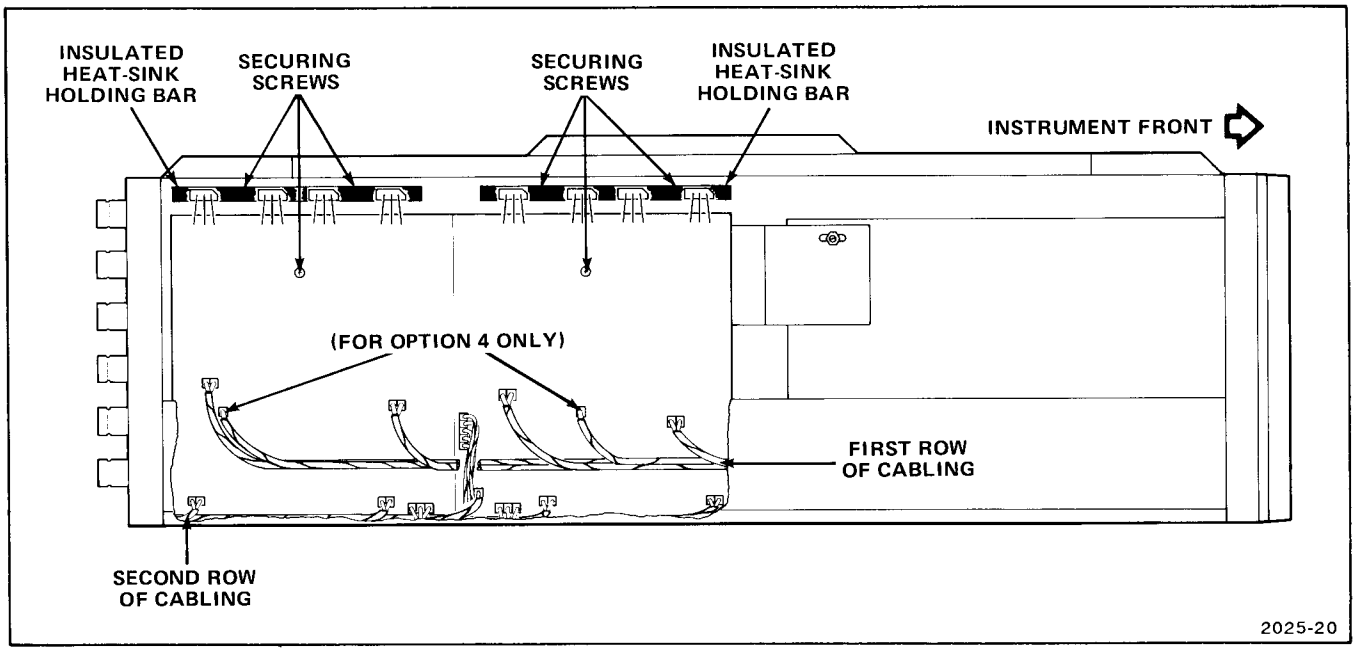

Figure 5-5. A1–Deflection Amplifier board removal and replacement.

4. Disconnect the deflection leads from the crt neck pins.

5. Lift the circuit board up from the chassis.

6. Disconnect the second row of cabling connected to the board.

7. Remove any obstructions which would prevent the board from being lifted out of the instrument.

8. Lift the circuit board up and out of the instrument. Do not force or bend the board.

9. To replace the board, reverse the order of removal.

CONTROL INTERFACE AND DYNAMIC FOCUS BOARD–A2. Remove and replace the Control Interface and Dynamic Focus board as follows:

NOTE

For Option 4 instruments, the Sweep board (A5) must be removed before removing the Control Interface and Dynamic Focus board (A2).

1. Remove the protective cover from the board.

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding connection point on the circuit board.

2. Disconnect all wires connected to the component side of the board.

3. Remove the six screws holding the board to the chassis.

4. Slide the board toward the rear of the instrument to free the front-panel controls.

5. Lift the board out of the instrument. Do not force or bend the board.

6. To replace the board, reverse the order of removal.

HIGH-VOLTAGE POWER SUPPLY BOARD–A3. Remove and replace the High-Voltage Power Supply board as follows:

1. Remove the two screws holding the protective shield to the chassis.

2. Remove the protective shield from the instrument to gain access to the circuit board.

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding connection point on the circuit board.

3. Disconnect all solderless wire holders from the circuit board.

4. Remove the three screws holding the board to the chassis.

5. Gently lift the board up to the level of the chassis rail.

6. Unsolder all attached wires to free the board. (See Soldering Techniques in this section.)

7. Remove any obstructions which would prevent the board from being lifted completely out of the instrument.

8. Lift the circuit board out of the instrument. Do not force or bend the board.

9. Disconnect the soldered wire connections from the back of the circuit board.

10. To replace the board, reverse the order of removal.

LOW-VOLTAGE POWER SUPPLY AND Z-AXIS BOARD–A4. Remove and replace the Low-Voltage Power Supply and Z-Axis board as follows (see Fig. 5-6):

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding point on the circuit board.

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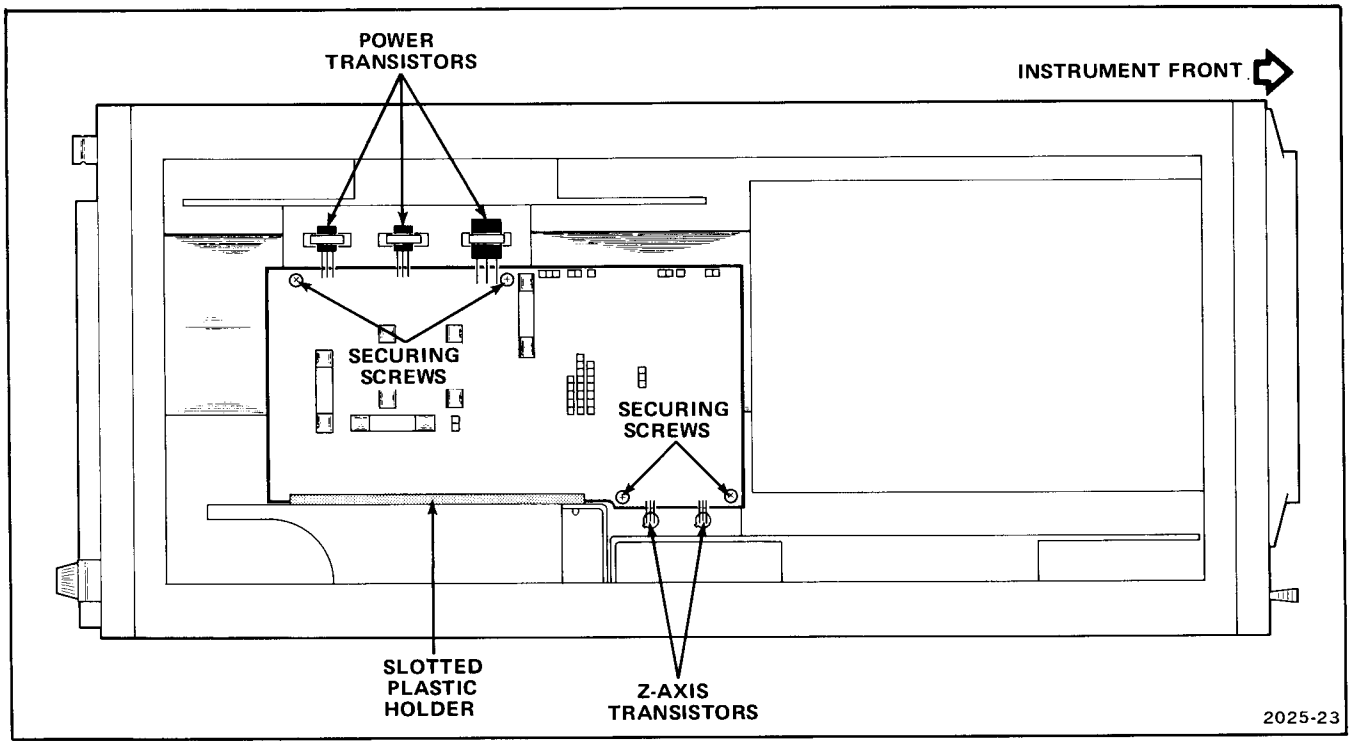

Figure 5-6. A4—Low-Voltage Power Supply and Z-Axis board removal and replacement.

1. Disconnect all wires connected to the component side of the board.

2. Using a small screwdriver, remove the spring-clips securing the power transistors to the chassis.

3. Unsolder the Z-Axis transistor leads from the circuit board.

4. Remove the four screws holding the board to the chassis.

5. Slide the board toward the power transistors to free it from the slotted plastic holder.

6. Gently pull the board from the instrument, freeing the large capacitors on the back of the board from their plastic holders. Do not force or bend the board.

7. Disconnect the soldered wire connections from the back of the circuit board.

8. To replace the board, reverse the order of removal.

SWEEP BOARD—A5. Remove and replace the optional Sweep board as follows:

NOTE

When removing wires from a circuit board, always tag the wire and the corresponding connection point on the circuit board.

1. Disconnect all wires connected to the component side of the circuit board.

2. Remove the four screws holding the board to the chassis.

3. Slide the board toward the rear of the instrument to free the front-panel sweep controls.

4. Lift the board out of the instrument. Do not force or bend the circuit board.

5. To replace the board, reverse the order of removal.

Semiconductors

Semiconductors should not be replaced unless actually defective. If removed from their sockets during routine maintenance, return them to their original sockets. Unnecessary replacement of semiconductors may affect the adjustment of the instrument. When semiconductors are replaced, check the operation of circuits which may be affected.

WARNING

Always disconnect the Monitor from the power source before replacing components to avoid electrical-shock hazard.

Replacement semiconductors should be of the original type or a direct replacement. Lead configurations of the semiconductors used in this instrument are shown in Figure 5-2. Some plastic case transistors have lead configurations which do not agree with those shown. If a replacement transistor is made by a different manufacturer than the original, check the manufacturer's basing diagram for correct basing. All transistor sockets in the 606 are wired for the standard basing as used for metal-cased transistors. When removing soldered-in transistors, use a solder-removing wick to remove the solder from the circuit board pads. Transistors which have heat radiators or are mounted on the chassis use silicone grease to increase heat transfer. Replace the silicone grease on both sides of the insulator plate and on the metal tab, if the transistor has one, when replacing these transistors.

WARNING

Handle silicone grease with care. Avoid getting silicone grease in the eyes. Wash hands thoroughly after use.

To replace one of the power transistors mounted on the chassis adjacent to the Low-Voltage Power Supply and Z-Axis board, first unsolder the leads. Then, either remove the push-on clip that clamps the transistor to the chassis, or pull the transistor from the chassis-mounted heat sink.

To replace one of the transistors mounted on the chassis adjacent to the Deflection Amplifier board, first unsolder the leads. Then remove the heat-sink holding bar to remove the defective transistor.

An extracting tool should be used to remove the 8-pin integrated circuit to prevent damage to the pins. This tool is available from Tektronix, Inc.; order Tektronix Part 003-0619-00. If an extracting tool is not available, use care to avoid damaging the pins. Pull slowly and evenly on both ends of the IC. Try to avoid having one end disengage from the socket before the other.

Cathode-Ray Tube

Remove and replace the cathode-ray tube (crt) as follows:

WARNING

Use care when handling a crt. Breakage of the crt causes a high-velocity scattering of glass fragments (implosion). Protective clothing and safety glasses should be worn. Avoid striking the crt on any object which might cause it to crack or implode. When storing a crt, place it in a protective carton or set it face down in a protected location on a smooth surface with a soft mat under the faceplate.

1. Remove the bezel assembly and snap-in implosion shield (with graticule) by removing the two screws holding them to the front panel.

2. Remove the left and bottom protective cabinet panels.

3. Disconnect the four leads from the Deflection Amplifiers at the crt neck pins. Tag each lead with the information concerning which crt neck pin it was connected to.

NOTE

The red and black wires entering the crt shield are connected to the display-rotation coil inside the shield, and will not hamper crt removal.

4. Remove the crt base cover on the rear panel of the instrument. Remove the crt base-pin socket.

5. With one hand on the crt faceplate, push on the crt base. Slide the crt forward. Pull the crt out of the instrument from the front.

To replace the crt, proceed as follows:

1. Make sure the soft plastic crt faceplate supports are in place, then insert the crt into the main shield.

2. With the crt fully inserted and loose in the shield, mount the bezel assembly with implosion shield into place and tighten the bezel screws.

3. Place the crt base socket onto the crt base pins. Replace the crt base cover.

4. Connect the leads from the Deflection Amplifiers to the proper crt neck pins.

Replacing the crt will necessitate adjustment of the Crt circuit, the Vertical (Y) and Horizontal (X) Amplifiers, and the Dynamic Focus circuit. Refer to section 6, Performance Check and Adjustment.

Power Transformer Replacement

Replace the power transformer only with a direct replacement Tektronix transformer. After the transformer has been replaced, check the power supply output voltages and the crt operation as outlined in section 6, Performance Check and Adjustment.

Interconnecting Circuit-Board Pin Replacement

A circuit-board pin replacement kit, including necessary tools, instructions, and replacement pins with attached spare ferrules, is available from Tektronix, Inc. Order Tektronix Part 040-0542-00.

To replace a damaged pin, first disconnect any pin connectors. Then unsolder (see Soldering Techniques) the damaged pin and pull it from the board with a pair of pliers, leaving the ferrule (see Fig. 5-7) in the hole if possible. If the ferrule remains in the circuit board, remove the spare ferrule from the replacement pin and press the new pin into the hole in the circuit board. If the ferrule is removed with the damaged pin, clean out the hole using a solder-removing wick and a scribe. Then press the replacement pin, with attached spare ferrule, into the hole. Position the replacement pin in the same manner as the original pin had been. Solder the pin to the circuit board on each side of the circuit board. If the original pin was bent at an angle to mate with a connector, carefully bend the new pin to the same angle. Replace the pin connector.

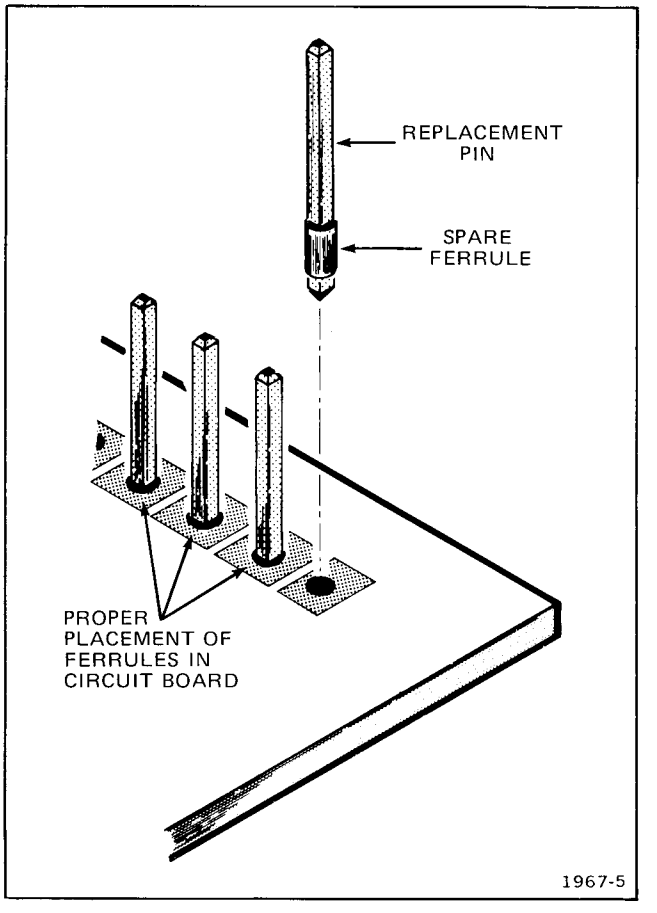

Figure 5-7. Exploded view of circuit board pin and ferrule.

PERFORMANCE CHECK AND ADJUSTMENT

This section contains information necessary to perform a complete instrument performance check and adjustment. Limits given in the procedure are adjustment guides and should not be interpreted as performance requirements unless preceded by a check mark (√). Where possible, instrument performance is checked before an adjustment is made.

PRELIMINARY INFORMATION

Adjustment Interval

To maintain instrument accuracy, check the performance of the 606 every 1000 hours of operation, or every 6 months if used infrequently. Before complete adjustment, thoroughly clean and inspect this instrument as outlined in section 5, Maintenance.

Tektronix Field Service

Tektronix Field Service Centers and the Factory Service Center provide instrument repair and adjustment services. Contact your Tektronix Field Office or representative for further information.

Using This Procedure

This Performance Check and Adjustment procedure can be used either for complete adjustment or as a check of instrument performance. Completion of each step in the procedure ensures that the instrument is correctly adjusted and operating within specified limits. Refer to the following discussion for instructions on a complete or partial check and adjustment.

INDEX. An index precedes the procedure to aid in locating Performance Check and Adjustment steps.

PERFORMANCE CHECK. Instrument performance can be checked by performing the complete Performance Check and Adjustment procedure and omitting only the ADJUST parts of the steps. A check mark (√) preceding a CHECK indicates that the limit given is a performance requirement specified under specification in section 1, General Information.

ADJUSTMENT. Completion of each step in the Performance Check and Adjustment procedure ensures that the instrument is correctly adjusted and performing within specified limits. Where possible, instrument performance is checked before an adjustment is made. For best overall performance when performing the complete adjustment procedure, make each adjustment to the exact setting indicated.

PARTIAL PROCEDURES. The following procedure is written to completely check and adjust the instrument to the Specification in section 1, General Information. If the applications for which the instrument is used do not require the full available performance, the procedure and the required equipment list can be shortened accordingly.

A partial performance check and adjustment may be desireable after replacing components, or to touch up the adjustment of a portion of the instrument. To check or adjust only part of the instrument, refer to the Equipment Required list which precedes that portion of the procedure to be performed. To avoid unnecessary adjustment of other parts, adjust only if the tolerance given in each CHECK is not met.

TEST EQUIPMENT REQUIRED

The test equipment listed in Table 6-1 is required for a complete performance check and adjustment of this instrument. The specifications given in Table 6-1 for test equipment are the minimum required to meet the Specification in section 1. Detailed operating instructions for test equipment are omitted in this procedure. Refer to the test equipment instruction manual if more information is needed.

Special Fixtures

Special fixtures are used only where they facilitate instrument adjustment. These fixtures are available from Tektronix, Inc. Order by part number from Tektronix Field Offices or representatives.

Test Equipment Alternatives

The test equipment listed in the Examples of Applicable Test Equipment column, Table 6-1, is required to check and adjust this instrument. The Performance Check and Adjustment procedure is based on the first item of equipment given as an example. If other equipment is substituted, control settings or setups may need to be altered. If the exact item of equipment given as an example is not available, refer to the Minimum Specifications column to determine if other equipment may be substituted. Then check the Purpose column. If you determine that your measurement requirements will not be affected, the item and corresponding step(s) can be deleted.

TABLE 6-1
Test Equipment

Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
1. Precision dc voltmeter[1] (with test leads)	Measurement range, –30 to +270 V; measurement accuracy, within 0.1%.	Adjust +15 V supply. Check low-voltage supplies. Adjust X and Y average output level. Adjust grid bias.	a. TEKTRONIX DM 502 Digital Multi-Meter (Operates in TM 500-series power module). b. TEKTRONIX 7D12 A/D Converter with M1 Multifunction Module (operates in 7000-series mainframe). c. TEKTRONIX DM 501 Digital Multi-Meter (operates in TM 500-series power module).
2. Dc voltmeter[1]	Measurement range, –5.3 to –5.7 kV.	Adjust high-voltage supply.	a. Triplet Model 630-NA. b. Simpson Model 262.
3. Ramp generator	Ramp duration, 5 ms to 10 μs within 3%; ramp amplitude, 0.5 to 2 V into 1 MΩ; external trigger input, compatible with square-wave generator trigger output; gate output, 1 to 3 V into 1 MΩ.	Adjust gain and compensation of the vertical, horizontal and Z-Axis amplifiers. Check vertical and horizontal settling time. Check vertical and horizontal positioning. Adjust TRACE ROTATION, geometry, and astigmatism. Check and adjust sweep generator (Option 4 only).	a. TEKTRONIX RG 501 Ramp Generator (operates in TM 500-series power module).
4. Square-wave generator	Frequency, 100 kHz; rise-time, 50 ns or less; amplitude, 0.5 to 5 V into 1 MΩ; trigger output, compatible with ramp generator external trigger input.	Adjust gain and compensation of the vertical, horizontal, and Z-axis amplifiers. Check vertical and horizontal settling time. Check vertical and horizontal input attenuation. Adjust astigmatism.	a. TEKTRONIX PG 506 Calibration Generator (Operates in TM 500-series power module). b. TEKTRONIX Type 106 Square-Wave Generator.
5. Sine-wave generator[2]	Frequency, 500 kHz to at least 10 MHz, reference frequency, 50 kHz, amplitude, 0.5 to 5 V into 50 Ω; amplitude accuracy, constant within 5% of reference as output frequency changes.	Check common-mode rejection and bandwidth of the horizontal, vertical, and Z-axis amplifiers.	a. TEKTRONIX SG 503 Leveled Sine-Wave Generator (operates in TM 500-series power module). b. TEKTRONIX Type 191 Constant Amplitude Signal Generator.
6. Time-mark generator (required for Option 4 only)	Marker output, 1 μs to 0.1 s; accuracy, within 1%.	Check and adjust sweep timing (Option 4 only).	a. TEKTRONIX TG 501 Time-Mark Generator (operates in TM 500-series power module). b. TEKTRONIX 2901 Time-Mark Generator. c. TEKTRONIX Type 184 Time-Mark Generator.

[1] **Used for adjustment only; NOT used for performance check.**
[2] **Used for performance check only; NOT used for adjustment.**

@

TABLE 6-1 (CONT.)
Test Equipment

Description	Minimum Specifications	Purpose	Examples of Applicable Test Equipment
7. Dot generator[1]	Provides dot-raster display; frame rate, at least 60 hertz.	Adjust focus and astigmatism correction. (An alternative method is provided which does not require a dot generator.)	a. TEKTRONIX 067-0561-01 Test Display Generator Calibration Fixture.
8. Test oscilloscope	Bandwidth, dc to at least 50 MHz; deflection factor, 0.1 to 5 V/div within 2%; sweep rate, 1 to 10 μs/div.	Adjust horizontal, vertical, and Z-axis gain. Check horizontal and vertical input attenuation.	a. TEKTRONIX 5440 Oscilloscope with 5A45 Amplifier, 5B40 Time Base, and P6105 1-meter probe. b. TEKTRONIX 7603 Oscilloscope with 7A15A Amplifier, 7B50A Time Base and P6053B 3.5-foot probe. c. Refer to the Tektronix catalog for compatible oscilloscope system.
9. Dual input coupler[2]	BNC connectors.	Check vertical, horizontal, and Z-axis common-mode rejection. Check and adjust phasing.	a. TEKTRONIX 067-0525-00 Calibration Fixture.
10. 50-ohm termination[2]	Impedance, 50 Ω within 2%; connectors, BNC.	Check common-mode rejection and bandwidth of the horizontal, vertical, and Z-axis amplifiers. Check and adjust phasing. Check and adjust sweep timing (Option 4 only).	a. Tektronix part 011-0049-01.
11. 50-ohm cables (4 required)	Impedance, 50 Ω; length, 42 inches; connectors, BNC.	Provide signal interconnection.	a. Tektronix part 012-0057-01.
12. Screwdriver[1]	3-inch shaft, 3/32-inch bit.	Adjust variable resistors.	a. Xcelite R3323.
13. Low-capacitance screwdriver[1]	3-3/4 inch shaft.	Adjust variable capacitors.	a. Tektronix part 003-0675-00.

[1] Used for adjustment only; NOT used for performance check.
[2] Used for performance check only; NOT used for adjustment.

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PRELIMINARY PROCEDURE

NOTE

The performance of this instrument can be checked at any ambient temperature from 0° to +50° C unless otherwise stated. Adjustments must be performed at an ambient temperature from +20° to +30° C for specified accuracies.

1. Check that the internal Line Voltage Selector plug has been set for the correct input line voltage (see section 3, Installation).

2. Check that the crt has an 8 X 10 division scribed graticule over the display area.

3. Remove the cabinet panels (see section 5, Maintenance) to gain access to the internal controls and test points.

4. Connect the instrument to the line-voltage source.

NOTE

The 606 Monitor is adjusted for optimum performance at the factory. Instrument performance may exceed that required by the specifications. Therefore, it may be desirable to check instrument performance without changing the adjustments. Refer to Using This Procedure in the introductory portion of this section for Performance Check instructions.

5. Set the controls as follows:

Int Swp (Option 4 only)[1] . . . . . .X-Y (forward position)
Int Blank (Option 4 only)[1] . . . . . .X-Y (forward position)
X and Y Atten (all) . . . . . .1X (up position)
INTENSITY. . . . . .Fully counterclockwise
FOCUS . . . . . .Midrange
Vertical and Horizontal Position . . . .Midrange

6. Turn on POWER and allow at least 20 minutes warmup time.

CAUTION

Do not allow a high-intensity dot to remain stationary on the crt. The crt phosphor could be permanently damaged.

√Performance Requirement check; see introductory information.
[1] See Internal Control and Selector Locations foldout page in section 9, Diagrams and Circuit Board Illustrations, for the location of internal switches.

A. POWER SUPPLIES

Equipment Required

1. Precision dc voltmeter
2. Dc voltmeter

BEFORE YOU BEGIN, see TEST POINT AND ADJUSTMENT LOCATIONS in section 9, Diagrams and Circuit Board Illustrations.

A1. ADJUST +15 VOLT SUPPLY (R850)

a. Connect the precision dc voltmeter between the +15 V test point and ground.

b. Check for a voltmeter reading between +14.85 volts and +15.15 volts.

c. INTERACTION–Any change in adjustment of the +15-volt supply may affect operation of all circuits within this instrument.

c. ADJUST– +15 V Adj R850 for a voltmeter reading of +15.00 volts.

d. INTERACTION–Any change in adjustment of the +15-volt supply may affect operation of all circuits within this instrument.

A2. CHECK LOW-VOLTAGE SUPPLIES

a. Table 6-2 lists the low-voltage supplies in this instrument. Connect the precision dc voltmeter between the appropriate test point and ground, and check that each supply is within the voltage range given in Table 6-2.

TABLE 6-2
Low-Voltage Supply Accuracy

Supply (dc)	Voltage Range
–30 V	–29.1 V to –30.9 V
+15 V	+14.85 V to +15.15 V
+30 V	+27 V to +33 V
+120 V	+108 V to +132 V
+270 V	+262 V to +278 V

b. INTERACTION–If any of the low-voltage supplies in Table 6-2 are out of tolerance, check the adjustment of the +15 volt supply in step A1 and the high-voltage supply in step A3.

A3. ADJUST HIGH-VOLTAGE SUPPLY (R730)

WARNING

Turn off instrument POWER when connecting and disconnecting the dc voltmeter. Potentially dangerous electric-shock hazard exists at several points on the high voltage supply board and crt socket.

a. Turn off instrument POWER. Remove the rear crt cover (5 screws) from the rear panel. Then, remove the crt socket cover.

b. Connect the dc voltmeter (set for at least –6000 dc volts full scale) between pin 2 of the crt socket (second pin clockwise from socket index) and ground.

c. Turn on instrument POWER.

d. Check the voltmeter for a reading between –5.39 kilovolts and –5.61 kilovolts.

e. ADJUST–R730 (HV Adj) for exactly –5500 volts.

f. Turn off instrument POWER and disconnect the voltmeter. Replace the crt socket cover and the rear crt cover.

g. Turn on instrument POWER.

B. HORIZONTAL (X) AMPLIFIER

Equipment Required

1. Precision dc voltmeter
2. Test oscilloscope
3. Ramp generator
4. Square-wave generator
5. Sine-wave generator
6. 50-ohm cables (4 required)
7. 50-ohm termination
8. Dual-input coupler

BEFORE YOU BEGIN, see **TEST POINT AND ADJUSTMENT LOCATIONS** in section 9, Diagrams and Circuit Board Illustrations.

NOTE

Perform the Preliminary Procedure before making the following checks and adjustments.

B1. ADJUST AVERAGE X OUTPUT LEVEL (R480)

a. Set the INTENSITY control to the minimum level necessary for a crt dot display.

b. Horizontally position the displayed dot to graticule center.

c. Connect the precision dc voltmeter between TP459 and TP469.

d. Set the horizontal Position control for a voltmeter reading of zero volts (denotes horizontal electrical center). Disconnect the precision dc voltmeter.

e. Connect the precision dc voltmeter between TP459 and ground. Check for a voltmeter reading between +122 and +130 volts.

f. ADJUST–R480 (X Output Level) for a voltmeter reading of +125 volts.

g. Connect the precision dc voltmeter between TP469 and ground. Check for a voltmeter reading between +122 volts and +130 volts.

h. Disconnect the precision dc voltmeter.

B2. ADJUST HORIZONTAL (X) COMPENSATION AND OUTPUT GAIN (R392, C394, R394, C393)

WARNING

The heat sinks on the Deflection Amplifier board are elevated up to +250 volts. To avoid potential electric shock, always turn the POWER off before changing the settings of the X or Y Atten switches.

a. Apply a positive-going, 50-microsecond signal of approximately 2 volts amplitude from the ramp generator to the rear-panel + Y INPUT connector.

b. Connect the square-wave generator positive-going fast-rise output to the rear-panel + X INPUT connector.

c. Trigger the ramp generator from the square-wave generator.

NOTE

When applying a single-ended input signal to either the X, Y, or Z amplifiers, always place a grounding cap on the unused Input connector.

d. Preset R325 (X Gain) fully counterclockwise for maximum gain. Set the INTENSITY and FOCUS controls for a well-defined display.

e. Set the square-wave generator repetition rate to 100 kilohertz, and adjust the output amplitude for an 8-division display (position as necessary).

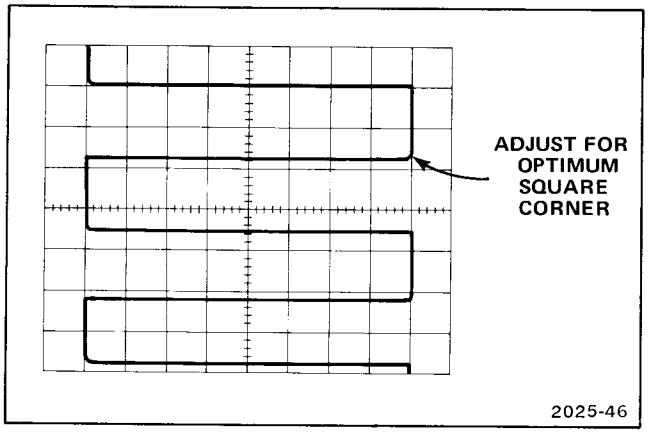

Figure 6-1. Typical crt display for adjustment of horizontal (X) compensation and gain.

f. ADJUST–C393 (X High Freq Comp) for optimum square corner (see Fig. 6-1). Use a low-capacitance screwdriver.

g. Turn the horizontal Position control counterclockwise until the right side of the square-wave display is on the second vertical graticule line.

h. ADJUST–Preset R392 (X Output Gain) fully clockwise. Adjust R392 counterclockwise for minimum distortion of the square-wave display. Then, adjust R392 approximately 30 degrees further counterclockwise.

i. Turn the horizontal Position control slowly clockwise and check that no distortion occurs as the square-wave display returns to graticule center.

j. INTERACTION–Repeat steps h and i as necessary.

k. ADJUST–C393 (X High Freq Comp) as necessary for optimum square corner. Use a low-capacitance screwdriver.

l. Preset C394 to midrange.

m. ADJUST–R394 (X Medium Freq Comp) for approximately 0.2 division overshoot. Then adjust C394 for optimum square corner.

n. ADJUST–C393 (X High Freq Comp) as necessary for optimum square corner.

B3. ADJUST HORIZONTAL (X) GAIN (R325)

NOTE

The X Gain (R325) in this procedure is set to provide 8 divisions deflection from a 1-volt input. This procedure can be repeated for any voltage, up to +2.5 volts, for the desired sensitivity. If the X Gain is changed, the + and – attenuator compensation may need readjustment for optimum square-wave response (see step B4).

a. Disconnect the square-wave generator from the + X INPUT and connect it to the test oscilloscope vertical input.

b. Set the square-wave generator amplitude for a 1-volt output, as indicated on the test oscilloscope.

c. Disconnect the square-wave generator from the test oscilloscope and connect it to the + X INPUT connector.

d. ADJUST–R325 (X Gain) for an 8-division square-wave display on the 606 Monitor.

√ B4. ADJUST HORIZONTAL (X) ATTENUATION COMPENSATION AND CHECK HORIZONTAL (X) INPUT ATTENUATION (C310, C330)

a. Turn off instrument POWER. Then, set S310 (+ X Atten switch) and S330 (– X Atten switch) to the 5X position (switches down). Turn on instrument POWER.

b. Disconnect the square-wave generator from the + X INPUT. Connect the high-amplitude square-wave output to the test oscilloscope vertical input. Set the square-wave generator repetition rate to 10 kilohertz.

c. Set the square-wave generator amplitude for a 5-volt output as indicated on the test oscilloscope.

d. Disconnect the square-wave generator from the test oscilloscope and connect it to the + X INPUT connector.

e. ADJUST–C310 (+ X Atten Comp) for optimum square corner.

√Performance Requirement check; see introductory information.

√ f. CHECK–For an 8-division (within 0.24 division) square-wave display.

g. Disconnect the square-wave generator from the + X INPUT and connect it to the – X INPUT.

h. ADJUST–C330 (– X Atten Comp) for an optimum square corner.

√ i. CHECK–606 graticule for an 8-division (within 0.24 division) square-wave display.

j. Disconnect the square-wave generator from the – X INPUT.

k. Turn off instrument POWER. Then set S310 (+ X Atten switch) and S330 (– X Atten switch) to the 1X position (switches up). Turn on instrument POWER.

√ B5. CHECK HORIZONTAL SETTLING TIME

a. Connect the ramp generator gate output to the + Z INPUT connector.

b. Set the ramp generator duration to 10 microseconds, and the amplitude for exactly 8 divisions of trace length.

c. Connect the square-wave generator fast-rise positive-going output to the + X INPUT connector. Set the amplitude for 10 divisions of horizontal display, and set the repetition rate to display approximately 1 cycle.

√ d. CHECK–That the time required for the leading edge of the square wave to travel from the zero percent level to the 100 percent level (see Fig. 6-2) is 500 nanoseconds (0.4 division) or less, within a trace width (0.025 centimeters).

e. INTERACTION–If the check requirements in part d cannot be met, repeat the adjustment of R392, C394, R394, and C393 as outlined in step B2.

f. Disconnect test equipment from the X and Z INPUT connectors.

√ B6. CHECK HORIZONTAL COMMON MODE REJECTION

a. Connect the sine-wave generator output to both the + X INPUT and the – X INPUT connectors with a 50-ohm cable, 50-ohm termination, and a dual-input coupler.

b. Set the sine-wave generator for a 0.5-megahertz, 3-volt output.

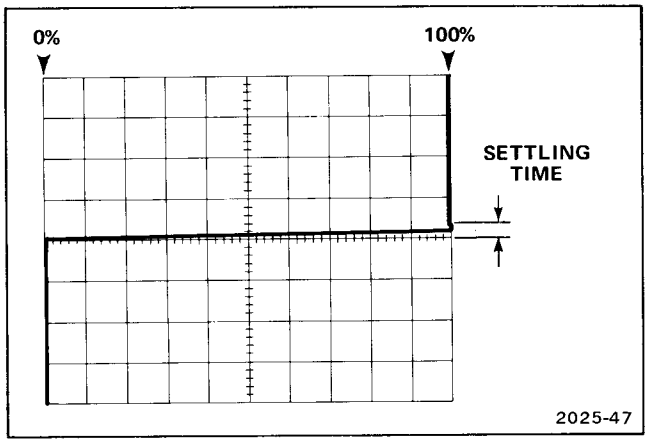

Figure 6-2. Typical crt display for horizontal settling time measurement (settling time includes corner distortion).

√ c. CHECK–Crt display for 0.24 division or less of free-running display (position as necessary).

√ B7. CHECK HORIZONTAL BANDWIDTH

a. Disconnect the dual-input coupler from the + X INPUT and the – X INPUT connectors.

b. Connect the sine-wave generator output to the + X INPUT connector (terminate into 50 ohms).

c. Set the sine-wave generator for 50-kilohertz output and set the amplitude for 8 divisions of deflection.

d. Slowly increase the sine-wave generator output frequency until the display amplitude is 5.7 divisions.

√ e. CHECK–That sine-wave generator frequency is at least 3 megahertz.

f. INTERACTION–If the check requirements in part e cannot be met, repeat the adjustment of C393 in step B2.

√ B8. CHECK HORIZONTAL POSITIONING

a. Disconnect the sine-wave generator from the + X INPUT connector.

√ b. CHECK–Rotate the horizontal Position control and check that the vertical trace can be positioned horizontally anywhere in the graticule area.

NOTE

Refer to the Vertical Amplifier portion of this procedure for phasing check.

√**Performance Requirement check; see introductory information.**

C. VERTICAL (Y) AMPLIFIER

Equipment Required

1. Precision dc voltmeter
2. Test oscilloscope
3. Ramp generator
4. Square-wave generator
5. Sine-wave generator
6. 50-ohm cables (4 required)
7. 50-ohm termination
8. Dual-input coupler

BEFORE YOU BEGIN, see TEST POINT AND ADJUSTMENT LOCATIONS in section 9, Diagrams and Circuit Board Illustrations.

NOTE

Perform the Preliminary Procedure before making the following checks and adjustments.

C1. ADJUST AVERAGE Y OUTPUT LEVEL (R280)

a. Set the INTENSITY control to the minimum level necessary for crt dot display.

b. Vertically position the displayed dot to graticule center.

c. Connect the precision dc voltmeter between TP259 and TP269.

d. Set the vertical Position control for a voltmeter reading of zero volts (denotes vertical electrical center). Disconnect the precision dc voltmeter.

e. Connect the precision dc voltmeter between TP259 and ground. Check for a voltmeter reading between +122 volts and +130 volts.

f. ADJUST–R280 (Y Output Level) for +125 volts.

g. Connect the precision dc voltmeter between TP269 and ground. Check for a voltmeter reading between +122 volts and +130 volts.

h. Disconnect the precision dc voltmeter.

C2. ADJUST VERTICAL (Y) COMPENSATION AND OUTPUT GAIN (R192, C194, R194, C193)

WARNING

The heat sinks, on the Deflection Amplifier board are elevated to as much as 250 volts. To avoid potential electric shock, always turn the POWER off before changing the settings of the X or Y Atten switches.

a. Apply a positive-going 50-microsecond signal of approximately 2 volts amplitude from the ramp generator to the rear-panel + X INPUT connector.

b. Connect the square-wave generator positive-going fast-rise output to the rear-panel + Y INPUT connector.

c. Trigger the ramp generator from the square-wave generator.

NOTE

When applying a single-ended input signal to either the X, Y, or Z amplifiers, always place a grounding cap on the unused Input connector.

d. Preset R125 (Y Gain) fully counterclockwise for maximum gain. Set the INTENSITY and FOCUS controls for a well-defined display.

e. Set the square-wave generator repetition rate to 100 kilohertz, and adjust the amplitude for a 6-division display (position as necessary).

f. ADJUST–C193 (Y High Freq Comp) for optimum square corners (see Fig. 6-3). Use a low-capacitance screwdriver.

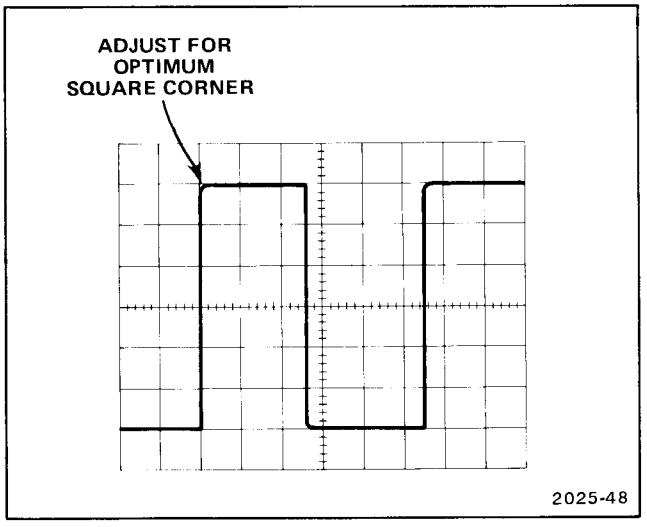

Figure 6-3. Typical crt display for adjustment of vertical (Y) compensation and output gain.

g. Turn the vertical Position control counterclockwise until the top of the square-wave display is on the second horizontal graticule line.

h. ADJUST–Preset R192 (Y Output Gain) fully clockwise. Adjust R192 for minimum distortion of the square-wave display. Then, adjust R192 approximately 30 degrees further counterclockwise.

i. Turn the vertical Position control slowly clockwise and check that no distortion occurs as the square-wave display is centered on the graticule.

j. INTERACTION -Repeat steps h and i as necessary.

k. ADJUST–C193 (Y High Freq Comp) as necessary for optimum square corner.

l. Preset C194 to midrange.

m. ADJUST–R194 (Medium Freq Comp) for approximately 0.2 division overshoot. Then adjust C194 for optimum square corner. Use a low-capacitance screwdriver.

n. ADJUST–C193 (Y High Freq Comp) as necessary for optimum square front corner.

C3. ADJUST VERTICAL (Y) GAIN (R125)

NOTE

The Y Gain (R125) in this procedure is set to provide 8 divisions of deflection from a 1-volt input. This procedure can be repeated for any voltage, up to +2.5 volts, for the desired sensitivity. If the Y Gain is changed, the + and – attenuator compensation may need readjustment for optimum square-wave response.

a. Disconnect the square-wave generator from the + Y INPUT and connect it to the test oscilloscope vertical input.

b. Set the square-wave generator amplitude for a 1-volt output as indicated on the test oscilloscope.

c. Disconnect the square-wave generator signal from the test oscilloscope and reconnect it to the + Y INPUT connector.

d. ADJUST–R125 (Y Gain) for an 8-division square-wave display on the 606 Monitor.

√ C4. ADJUST VERTICAL (Y) ATTENUATION COMPENSATION AND CHECK VERTICAL INPUT (Y) ATTENUATION (C110, C130)

a. Turn off instrument POWER. Then, set the + Y Atten switch S110, and the – Y Atten switch S130 to the 5X position (switches down). Turn on instrument POWER.

b. Disconnect the square-wave generator from the + Y INPUT. Then connect the square-wave generator high-amplitude output to the test oscilloscope vertical input. Set the square-wave generator repetition rate to 10 kilohertz.

c. Set the square-wave generator amplitude for a 5-volt output as indicated on the test oscilloscope.

d. Disconnect the square-wave generator from the test oscilloscope and connect it to the + Y INPUT connector.

e. ADJUST–C110 (+ Y Atten Comp) for an optimum square front corner.

√**Performance Requirement check; see introductory information.**

√ f. CHECK–For an 8-division (within 0.24 division) square-wave display.

g. Disconnect the square-wave generator from the + Y INPUT and connect it to the – Y INPUT.

h. ADJUST–C130 (– Y Atten Comp) for an optimum square corner.

√ i. CHECK–606 for an 8-division (within 0.24 division) square-wave display.

j. Disconnect the square-wave generator from the – Y INPUT.

k. Turn off instrument POWER. Then set S110 (+ Y Atten switch) and S130 (– Y Atten switch) to the 1X position (switches up). Turn on instrument POWER.

√ C5. CHECK VERTICAL SETTLING TIME

a. Connect the ramp generator gate output to the + Z INPUT connector.

b. Set the ramp generator duration for a 10 microsecond output and set the amplitude for exactly 10 divisions of trace length.

c. Connect the square-wave generator fast-rise positive-going output to the + Y INPUT connector. Set the amplitude for 8 divisions of vertical display and set the repetition rate to display approximately 1 cycle.

√ d. CHECK–That the time required for the leading edge of the square wave to travel from the zero percent level to the 100 percent level (see Fig. 6-4) is 500 nanoseconds (0.5 division) or less, within a trace width (0.025 centimeters).

e. INTERACTION–If the check requirements in part d cannot be met, repeat the adjustment of R192, C194, R194, and C193 as outlined in step C2.

f. Disconnect test equipment from the Y and Z INPUT connectors.

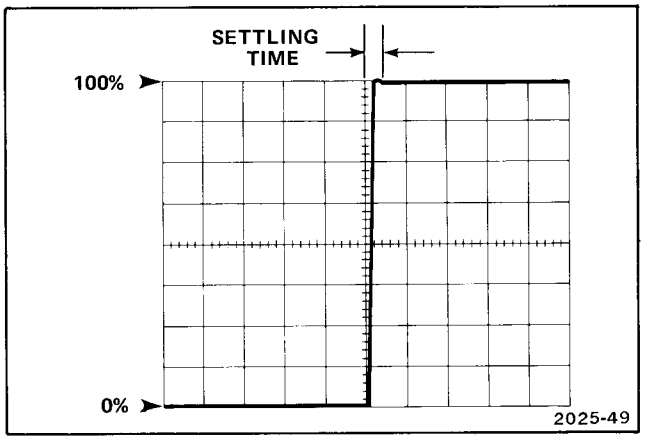

Figure 6-4. Typical crt display for vertical settling time measurement (settling time includes corner distortion).

√ C6. CHECK VERTICAL COMMON MODE REJECTION

a. Connect the sine-wave generator output to both the + Y INPUT and the – Y INPUT connectors with a 50-ohm cable, 50-ohm termination, and a dual-input coupler.

b. Set the sine-wave generator for a 0.5-megahertz, 3-volt output.

√ c. CHECK–Crt display for 0.24 division or less of free-running display (position as necessary).

√ C7. CHECK VERTICAL BANDWIDTH

a. Disconnect the dual-input coupler from the + Y INPUT and the – Y INPUT connectors.

b. Connect the sine-wave generator output to the + Y INPUT connector (terminate into 50 ohms).

c. Set the sine-wave generator for 50-kilohertz output and set the amplitude for 6 divisions of deflection.

d. Slowly increase the sine-wave generator frequency until the display amplitude is 4.2 divisions.

√ e. CHECK–That sine-wave generator frequency is at least 3 megahertz.

f. INTERACTION–If the check requirements in part e cannot be met, repeat the adjustment of C193 in step C2.

√Performance Requirement check; see introductory information.

√ C8. CHECK VERTICAL POSITIONING

a. Disconnect the sine-wave generator from the + Y INPUT connector.

√ b. CHECK–Rotate the vertical Position control and check that the horizontal trace can be positioned vertically anywhere on the graticule area.

c. Disconnect the ramp generator from the + X INPUT.

√ C9. CHECK/ADJUST PHASING (C259)

a. Connect the sine-wave generator to the + X INPUT and + Y INPUT connectors with a 50-ohm cable, 50-ohm termination, and a dual-input coupler.

b. Set the sine-wave generator for a 500-kilohertz repetition rate and a 1-volt amplitude.

c. Center the display within the graticule area.

√ d. CHECK–That the diameter of the displayed ellipse, measured vertically at the center of the graticule, is 0.1 division or less (see Fig. 6-5).

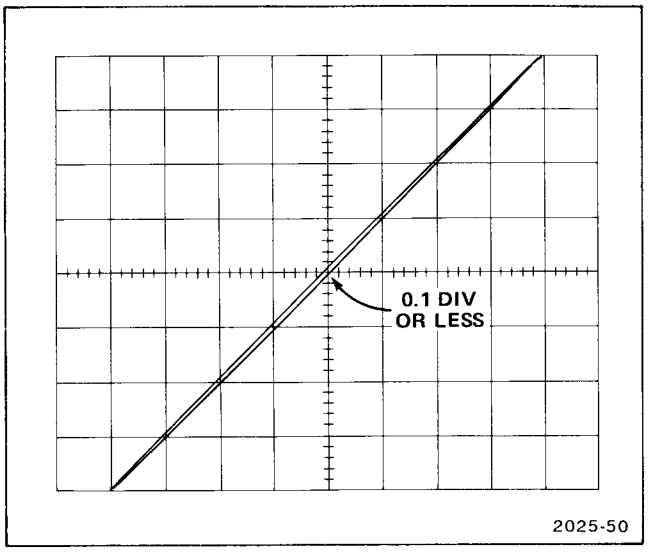

Figure 6-5. Typical horizontal and vertical phase difference display.

e. ADJUST–C259 (Phasing) for an ellipse diameter of 0.1 division or less.

f. Disconnect all test equipment.

√Performance Requirement check, see introductory information.

@

D. Z-AXIS AMPLIFIER

Equipment Required

1. Ramp generator
2. Square-wave generator
3. Sine-wave generator
4. Test oscilloscope
5. Dual-input coupler
6. 50-ohm cables (2 required)
7. 50-ohm termination

BEFORE YOU BEGIN, see TEST POINT AND ADJUSTMENT LOCATIONS in section 9, Diagrams and Circuit Board Illustrations.

NOTE

Perform the Preliminary Procedure before making the following checks and adjustments.

D1. ADJUST Z-AXIS GAIN (R512)

NOTE

The following procedure sets Z-Axis Amplifier Gain for full intensity range from +1 volt input. This procedure can be repeated for any voltage, up to +5 volts, to provide the desired intensity control range.

a. Apply a positive-going 100-microsecond signal of approximately 2 volts amplitude from the ramp generator to the + X INPUT connector.

b. Preset R512 (Z-Axis Gain) fully clockwise for maximum gain.

c. Connect the square-wave generator negative-going fast-rise output to the test oscilloscope vertical input. Set the square-wave generator output amplitude for 1 volt as indicated on the test oscilloscope and set the frequency to 100 kilohertz.

d. Disconnect the 1-volt square wave from the test oscilloscope.

e. Connect a 10X probe from the test oscilloscope vertical input to TP588. Set the test oscilloscope for dc input coupling and a deflection factor of 20 volts/division with 10X probe.

f. Set the INTENSITY control so that the trace on the 606 just disappears.

g. Note the dc level on the test oscilloscope (denotes z-axis cutoff level).

h. Connect the 1-volt square wave signal to the + Z INPUT connector.

i. ADJUST–R512 (Z-Axis Gain) so that the upper level of the square wave (displayed on test oscilloscope) is 70 volts higher than the cutoff level noted in part g.

j. Check 606 for fully brightened trace.

√ D2. ADJUST Z-AXIS COMPENSATION AND CHECK ABERRATIONS (C557)

a. Disconnect the negative-going square-wave signal from the + Z INPUT and connect the positive-going fast-rise square wave to the + Z INPUT. Set the square-wave generator for approximately 0.5-volt 100-kilohertz output.

b. Set the test oscilloscope deflection factor for 10 volts/division (with 10X probe) and for a 1 microsecond/division sweep rate.

c. Set the square-wave generator amplitude and the 606 INTENSITY control for 6 divisions amplitude (60 volts) as indicated on test oscilloscope.

d. ADJUST–C557 (Z HF Comp) for optimum square front corner on displayed pulse.

√Performance Requirement check; see introductory information.

√ e. CHECK–For 0.6 division (3 volts) or less aberrations on top front corner of displayed pulse.

f. Disconnect the square-wave generator from the + Z INPUT.

√ D3. CHECK Z-AXIS AMPLIFIER BANDWIDTH

a. Apply approximately 0.5 volt of 50 kilohertz signal from the sine-wave generator to the + Z INPUT (terminate into 50 ohms).

b. Set the sine-wave generator amplitude and the 606 INTENSITY control for a 6-division (60 volts) display on the test oscilloscope (make sure that no clipping occurs on the test oscilloscope display). Set the test oscilloscope sweep rate to 10 microseconds/division.

c. Slowly increase the sine-wave generator frequency until the display amplitude is 4.2 divisions.

√ d. CHECK–That the sine-wave generator output frequency is at least 10 megahertz.

e. INTERACTION–If the check requirements in part d cannot be met, repeat the adjustment of C557 in step D2.

√ D4. CHECK Z-AXIS COMMON MODE REJECTION

a. Connect the sine-wave generator output to the + Z INPUT and the – Z INPUT connectors with a 50-ohm cable, 50-ohm termination, and a dual input coupler.

b. Set the sine-wave generator for a 0.5-megahertz 5-volt output.

c. Set the test oscilloscope vertical for ac input coupling and the deflection factor for 1-volt/division with 10X probe.

√ d. CHECK–Test oscilloscope display for 3.5 divisions (3.5 volts) or less.

e. Disconnect all test equipment.

√Performance Requirement check; see introductory information.

E. CRT CIRCUIT AND DYNAMIC FOCUS

Equipment Required

1. Precision dc voltmeter
2. Ramp generator
3. Dot generator
4. 50-ohm cables (3 required)

BEFORE YOU BEGIN, see TEST POINT AND ADJUSTMENT LOCATIONS in section 9, Diagrams and Circuit Board Illustrations.

NOTE

Perform the Preliminary Procedure before making the following checks and adjustments.

CAUTION

Do not allow a high-intensity dot to remain stationary on the crt. The crt phosphor could be permanently damaged.

E1. ADJUST CRT GRID BIAS (R774)

a. Set the INTENSITY and FOCUS controls for a sharply focused dot display. Position dot display near graticule center.

b. Connect the precision dc voltmeter between TP588 and ground.

c. Set the INTENSITY control for a voltmeter reading of +10 volts. Disconnect the precision dc voltmeter.

d. ADJUST–R774 (Grid Bias) until the dot just disappears.

e. Set the INTENSITY control for a visible dot display.

√ E2. ADJUST TRACE ROTATION AND CHECK ORTHOGONALITY (R750)

a. Apply a positive-going, 5-millisecond signal from the ramp generator to the + X INPUT connector.

b. Set the ramp-generator amplitude for a 10-division horizontal trace on the crt.

c. Position the trace to the center horizontal graticule line.

d. ADJUST–Rear-panel TRACE ROTATION (R750) to align the trace with the center horizontal graticule line.

e. Disconnect the ramp generator from the + X INPUT and connect it to the + Y INPUT.

f. Position the trace to the center vertical graticule line.

√ g. CHECK–That vertical trace is aligned with the center vertical graticule line at the top and bottom of the graticule within 0.1 division.

√ E3. CHECK/ADJUST GEOMETRY (R798)

a. Position the vertical trace to the left edge of the graticule and then to the right edge.

√ b. CHECK–Vertical trace for 0.1 division or less of bowing at the left and right edge of the graticule.

c. ADJUST–R798 (Geom) for minimum trace bowing at the left and right edge of the graticule.

d. Disconnect the ramp generator from the + Y INPUT and connect it to the + X INPUT. Horizontally center the display on the graticule.

e. Position the horizontal trace to the top edge of the graticule and then to the bottom edge.

√ f. CHECK–Horizontal trace for 0.1 division or less of bowing at the top and bottom of the graticule.

g. INTERACTION–If necessary, readjust R798 (Geom) for minimum trace bowing at the top and bottom of the graticule. Then, reconnect the ramp generator to the + Y INPUT and repeat step E3 until optimum geometry is achieved.

√Performance Requirement check, see introductory information.

E4. ADJUST ASTIGMATISM (R705)

a. Connect the positive-going, fast-rise output from the square-wave generator to the + Y INPUT.

b. Trigger the ramp generator from the square-wave generator. Set the ramp generator for a 50-microsecond duration.

c. Set the square-wave generator repetition rate to 100 kilohertz and the amplitude for a 4-division display. Vertically position near crt center.

d. ADJUST–Front-panel FOCUS control and R705 (Astig) for best definition on front corner of square-wave display near crt center.

e. Disconnect all test equipment.

E5. ADJUST FOCUS AND ASTIGMATISM CORRECTION (R615, R625, R655, R665, AND R626)

NOTE

The recommended method for adjustment of the Dynamic Focus circuit (step E5) is based on the dot generator display. If a dot generator is not available, an alternative procedure is given in step E6.

a. Connect the dot generator X, Y, and Z outputs to the respective positive 606 Inputs.

b. Set the dot generator as follows:

Mode . . . . . .Cont Raster

Density . . . . . .X:Y
. . . . . .Horiz
. . . . . .dots
. 25

Time/Dot. . . . . .20 μs
Offset . . . . . .On (use as needed to position display)
Amplitude . . . . . .0.5 V

c. Set the 606 INTENSITY control for moderate brightness. Set the vertical and horizontal Position controls to midrange.

d. Set the FOCUS and Astig adjustment (R705) for optimum focus of dot display near graticule center.

e. ADJUST–Refer to Fig. 6-6. Adjust the focus correction adjustment, corresponding to the appropriate area of the dot display, for well-defined symmetrical dots. Use the X and Y offset controls to position the dot display to the appropriate area of the graticule.

f. ADJUST–R626 (Astig Cor) for symmetrical dots on the left and right side of the graticule (refer to Fig. 6-6).

g. INTERACTION–Compromise the adjustment of R615, R625, R655, R665 and R626 as necessary for optimum dot definition over the entire display area.

h. Disconnect all test equipment.

E6. ALTERNATIVE METHOD–ADJUST FOCUS AND ASTIGMATISM CORRECTION (R615, R625, R655, R665 AND R626)

a. Set the INTENSITY control for a moderately bright dot.

b. Position the dot to crt center. Set the FOCUS control and Astig adjustment (R705) for optimum focus of the dis displayed dot.

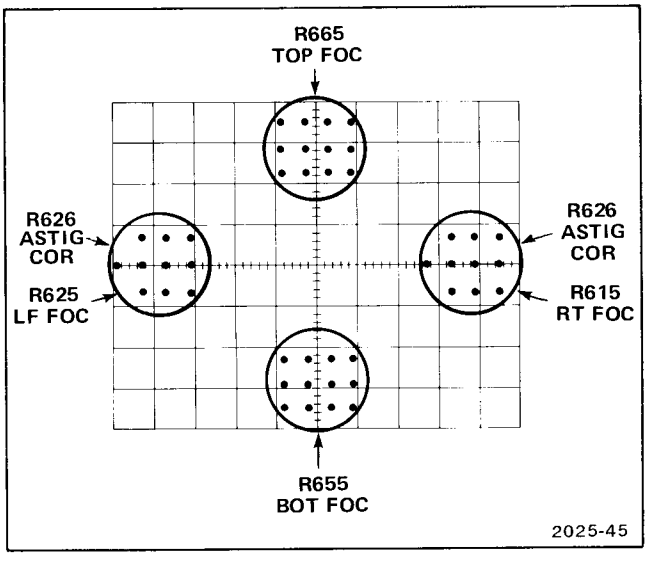

Figure 6-6. Focus and astigmatism adjustments corresponding to the appropriate area of the dot display.

c. ADJUST–Refer to Figure 6-6. Position the displayed dot to the appropriate display area and adjust the corresponding focus correction adjustment for a well-defined symmetrical dot.

d. ADJUST–Position the displayed dot to the left and right side of the graticule. Adjust R626 (Astig Cor) for a symmetrical dot (see Fig. 6-6).

e. INTERACTION–Position the displayed dot slowly over the display area. Compromise the adjustment of R615, R625, R655, R665 and R626 as necessary for optimum definition over the display area.

F. SWEEP GENERATOR (OPTION 4)

Equipment Required

1. Sine-wave generator
2. Time-mark generator
3. 50-ohm cable
4. 50-ohm termination

BEFORE YOU BEGIN, see TEST POINT AND ADJUSTMENT LOCATIONS in section 9, Diagrams and Circuit Board Illustrations.

NOTE

Perform the Preliminary Procedure before making the following checks and adjustments.

F1. ADJUST SWEEP LENGTH (R915)

a. Set the Option 4 controls as follows:

Int Swp (S350 on Deflection Amplifier board) . . . Y-T (rear position)
Int Blank (S555 on Low-Voltage Power Supply and Z-Axis board) . . . . . Y-T (rear position)
Trig Mode (S909 on Sweep board) . . . Auto (rear position)
SEC/DIV . . . . . 1 μ
VARIABLE . . . . . Fully clockwise (calibrated)

b. Set the INTENSITY control for a visible trace. Position the display as necessary.

c. ADJUST–R915 (Swp Length) for a sweep length of approximately 10.5 divisions.

√ F2. CHECK TRIGGER SLOPE/LEVEL

a. Apply a 2-megahertz sine-wave signal from the sine-wave generator to the + Y INPUT connector.

b. Set the sine-wave generator amplitude for a 0.5-division display.

√ c. CHECK–Rotate the TRIG SLOPE/LEVEL control and check for a stable display.

√ d. CHECK–For a free-running display when the TRIG SLOPE/LEVEL control is set fully clockwise and fully counterclockwise.

e. Set the Trig Mode switch, S909, to Norm.

√ f. CHECK–Rotate the TRIG SLOPE/LEVEL control and check for a stable display.

√ g. CHECK–For no display when the TRIG SLOPE/LEVEL control is set fully clockwise and fully counterclockwise.

h. Set Trig Mode switch, S909, to Auto.

i. Disconnect the sine-wave generator.

√ F3. CHECK/ADJUST SWEEP TIMING (R965)

a. Set the SEC/DIV switch to 1 m.

b. Apply 1-millisecond markers from the time-mark generator to the + Y INPUT connector (terminate into 50 ohms).

c. Set the time-mark generator amplitude for a 2- to 6-division display.

d. Position the first time marker to the left edge of the graticule and check for 1 time marker per major graticule division.

√Performance Requirement check; see introductory information.

√ e. CHECK–That the distance between the second and tenth time marker is 8 divisions within 0.24 division (3%).

f. ADJUST–R965 (Swp Cal) so that the second and tenth time markers (center 8) are exactly 8 divisions apart.

√ g. CHECK–Remaining SEC/DIV switch positions with time markers that correspond to each switch position. The distance between the second and tenth time marker at each SEC/DIV switch position should be 8 divisions within 0.24 division (3%).

√ F4. CHECK VARIABLE TIME/DIVISION

a. Set the time-mark generator for 0.1 millisecond markers.

b. Set the SEC/DIV switch to 0.1 m. Note 1 time marker per division.

c. Set the front-panel VARIABLE adjustment fully counterclockwise.

d. Set the SEC/DIV switch to 1 ms.

√ e. CHECK–For at least 1 time marker per graticule division.

f. Disconnect all test equipment.

NOTE

For X-Y operation, return the Int Swp and Int Blank switches on the Deflection boards to the X-Y position.

This completes the Performance Check and Adjustment Procedure.

√Performance Requirement check; see introductory information.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
0000W	UNITED CHEMICON INC.	731 JAMES STREET	SYRACUSE, NY 13203
01121	ALLEN-BRADLEY CO.	1201 2ND ST. SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	P. O. BOX 5012	DALLAS, TX 75222
02735	RCA CORP., SOLID STATE DIVISION	ROUTE 202	SOMERVILLE, NY 08876
03888	KDI PYROFILM CORP.	60 S. JEFFERSON RD.	WHIPPANY, NJ 07981
04222	AVX CERAMICS., DIVISION OF AVX CORP.	P.O. BOX 867, 19TH AVE. SOUTH	MURTLE BEACH, SC 29577
04713	MOTOROLA, INC., SEMICONDUCTOR PRODUCTS DIV.	5005 E. MCDOWELL RD.	PHOENIX, AZ 85036
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS ST.	MOUNTAIN VIEW, CA 94042
07910	TELEDYNE SEMICONDUCTOR	12515 CHADRON AVE.	HAWTHORNE, CA 90250
08806	GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPT.	NELA PK.	CLEVELAND, OH 44112
10389	CHICAGO SWITCH, INC.	2035 WABANSIA AVE.	CHICAGO, IL 60647
11237	CTS KEENE, INC.		PASO ROBLES, CA 93446
12969	UNITRODE CORP.	580 PLEASANT ST.	WATERTOWN, MA 02172
13715	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	4300 REDWOOD HWY.	SAN RAFAEL, CA 94903
24931	SPECIALTY CONNECTOR CO., INC.	3560 MADISON AVE.	INDIANAPOLIS, IN 46227
56289	SPRAGUE ELECTRIC CO.		NORTH ADAMS, MA 01247
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	2500 HARBOR BLVD.	FULLERTON, CA 92634
74970	JOHNSON, E. F., CO.	299 10TH AVE. S. W.	WASECA, MN 56093
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
76493	BELL INDUSTRIES, INC., MILLER, J. W., DIV.	P O BOX 5825, 19070 REYES AVE.	COMPTON, CA 90224
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97005
80031	ELECTRA-MIDLAND CORP., MEPCO DIV., A NORTH AMERICAN PHILIPS CO.	22 COLUMBIA RD.	MORRISTOWN, NJ 07960
80294	BOURNS, INC., INSTRUMENT DIV.	6135 MAGNOLIA AVE.	RIVERSIDE, CA 92506
80740	BECKMAN INSTRUMENTS, INC.	2500 HARBOR BLVD.	FULLERTON, CA 92634
81483	INTERNATIONAL RECTIFIER CORP.	9220 SUNSET BLVD.	LOS ANGELES, CA 90069
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
83003	VARO, INC.	P O BOX 411, 2203 WALNUT ST.	GARLAND, TX 75040
90201	MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY CO., INC.	3029 E. WASHINGTON ST.	INDIANAPOLIS, IN 46206
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NB 68601
91929	HONEYWELL, INC., MICRO SWITCH DIV.	CHICAGO & SPRING STS.	FREEPORT, IL 61032
93410	ESSEX INTERNATIONAL, INC., CONTROLS DIV. LEXINGTON PLANT	P. O. BOX 1007	MANSFIELD, OH 44903

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-4295-00			CKT BOARD ASSY:DEFLECTION AMPL	80009	670-4295-00
A2	670-4299-00			CKT BOARD ASSY:CNTL,INTFC/DYNAMIC	80009	670-4299-00
A3	670-4296-00			CKT BOARD ASSY:HIGH VOLTAGE	80009	670-4296-00
A4	670-4297-00			CKT BOARD ASSY:L.V. POWER AND Z AXIS AMPL	80009	670-4297-00
C110	281-0198-00			CAP.,VAR,AIR DI:1.7-11PF,250V	74970	187-0106-105
C112	281-0511-00			CAP.,FXD,CER DI:22PF,+/-2.2PF,500V	72982	301-000C0G0220K
C115	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C122	281-0512-00			CAP.,VAR,PLSTC:.1.5-5.5PF,100V	80031	C010KA/SE
C124	281-0604-00			CAP.,FXD,CER DI:2.2PF,+/-0.25PF,500V	72982	301-000C0J0229C
C130	281-0198-00			CAP.,VAR,AIR DI:1.7-11PF,250V	74970	187-0106-105
C132	281-0511-00			CAP.,FXD,CER DI:22PF,+/-2.2PF,500V	72982	301-000C0G0220K
C135	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C144	281-0604-00			CAP.,FXD,CER DI:2.2PF,+/-0.25PF,500V	72982	301-000C0J0229C
C160	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025NLF
C186	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C191	281-0512-00			CAP.,FXD,CER DI:27PF,+/-2.7PF,500V	72982	308-000C0G0270K
C193	281-0207-00			CAP.,VAR,PLSTC:2-18PF,100V	80031	HT10EA/218
C194	281-0220-00			CAP.,VAR,CER DI:1-5.5PF,400V	80031	2222-801-96139
C197	281-0593-00			CAP.,FXD,CER DI:3.9PF,10%,500V	72982	301-000C0J0399C
C198	281-0609-00			CAP.,FXD,CER DI:1PF,+/-0.1PF,500V	72982	374-005C0K0109B
C208	281-0661-00			CAP.,FXD,CER DI:0.8PF,+/-0.1PF,500V	72982	301-000C0K0808B
C210	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C216	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C217	283-0187-00			CAP.,FXD,CER DI:0.047UF,10%,400V	72982	8131N401X5R473K
C226	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C227	283-0187-00			CAP.,FXD,CER DI:0.047UF,10%,400V	72982	8131N401X5R473K
C230	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
C239	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M
C240	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
C250	283-0008-00			CAP.,FXD,CER DI:0.1UF,500V	72982	8151N501 E104M
C259	281-0220-00			CAP.,VAR,CER DI:1-5.5PF,400V	80031	2222-801-96139
C260	283-0008-00			CAP.,FXD,CER DI:0.1UF,500V	72982	8151N501 E104M
C270	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C272	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C285	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C310	281-0198-00			CAP.,VAR,AIR DI:1.7-11PF,250V	74970	187-0106-105
C312	281-0511-00			CAP.,FXD,CER DI:22PF,+/-2.2PF,500V	72982	301-000C0G0220K
C315	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C322	281-0512-00			CAP.,VAR,PLSTC:1.5-5.5PF,100V	80031	C010KA/SE
C324	281-0604-00			CAP.,FXD,CER DI:2.2PF,+/-0.25PF,500V	72982	301-000C0J0229C
C330	281-0198-00			CAP.,VAR,AIR DI:1.7-11PF,250V	74970	187-0106-105
C332	281-0511-00			CAP.,FXD,CER DI:22PF,+/-2.2PF,500V	72982	301-000C0G0220K
C335	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C344	281-0604-00			CAP.,FXD,CER DI:2.2PF,+/-0.25PF,500V	72982	301-000C0J0229C
C360	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025NLF
C386	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C391	281-0512-00			CAP.,FXD,CER DI:27PF,+/-2.7PF,500V	72982	308-000C0G0270K
C393	281-0207-00			CAP.,VAR,PLSTC:2-18PF,100V	80031	HT10EA/218
C394	281-0220-00			CAP.,VAR,CER DI:1-5.5PF,400V	80031	2222-801-96139
C397	281-0593-00			CAP.,FXD,CER DI:3.9PF,10%,500V	72982	301-000C0J0399C
C398	281-0609-00			CAP.,FXD,CER DI:1PF,+/-0.1PF,500V	72982	374-005C0K0109B
C408	281-0661-00			CAP.,FXD,CER DI:0.8PF,+/-0.1PF,500V	72982	301-000C0K0808B
C410	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z

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C416	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C417	283-0187-00			CAP.,FXD,CER DI:0.047UF,10%,400V	72982	8131N401X5R473K
C426	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C427	283-0187-00			CAP.,FXD,CER DI:0.047UF,10%,400V	72982	8131N401X5R473K
C430	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
C439	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M
C440	283-0028-00			CAP.,FXD,CER DI:0.0022UF,20%,50V	56289	19C606
C450	283-0008-00			CAP.,FXD,CER DI:0.1UF,500V	72982	8151N501 E104M
C460	283-0008-00			CAP.,FXD,CER DI:0.1UF,500V	72982	8151N501 E104M
C485	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C503	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C513	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C522	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	72982	301-000C0H0569D
C532	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	72982	301-000C0H0569D
C557	281-0064-00			CAP.,VAR,PLSTC:0.25-1.5PF,600V	72982	530-002
C562	281-0584-00			CAP.,FXD,CER DI:100PF,5%,500V	72982	301-000Y5D0101J
C566	281-0584-00			CAP.,FXD,CER DI:100PF,5%,500V	72982	301-000Y5D0101J
C570	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C573	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C580	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C592	290-0572-00			CAP.,FXD,ELCTLT:0.1UF,20%,50V	56289	196D104X0050HA1
C593	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C594	290-0572-00			CAP.,FXD,ELCTLT:0.1UF,20%,50V	56289	196D104X0050HA1
C596	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C597	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C600	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C601	290-0522-00			CAP.,FXD,ELCTLT:1UF,20%,50V	56289	196D105X0050HA1
C603	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C617	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C631	281-0542-00			CAP.,FXD,CER DI:18PF,10%,500V	72982	301-002C0G0180K
C636	281-0542-00			CAP.,FXD,CER DI:18PF,10%,500V	72982	301-002C0G0180K
C638	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C643	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C657	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C671	281-0542-00			CAP.,FXD,CER DI:18PF,10%,500V	72982	301-002C0G0180K
C676	281-0542-00			CAP.,FXD,CER DI:18PF,10%,500V	72982	301-002C0G0180K
C683	281-0661-00			CAP.,FXD,CER DI:0.8PF,+/-0.1PF,500V	72982	301-000C0K0808B
C684	281-0661-00			CAP.,FXD,CER DI:0.8PF,+/-0.1%,500V	72982	301-000C0K0808B
C686	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M
C689	283-0267-00			CAP.,FXD,CER DI:0.01UF,20%,500V	72982	841-541C103M
C690	283-0008-00			CAP.,FXD,CER DI:0.1UF,500V	72982	8151N501 E104M
C693	283-0270-00			CAP.,FXD,CER DI:0.0068UF,+80-20%,4000V	56289	45C17
C694	283-0021-00			CAP.,FXD,CER DI:0.001UF,20%,5000V	72982	828-005Y5S0102M
C698	283-0270-00			CAP.,FXD,CER DI:0.0068UF,+80-20%,4000V	56289	45C17
C702	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C709	283-0328-00			CAP.,FXD,CER DI:0.03UF,+80-20%,200V	72982	8131N225651303Z
C715	290-0746-00			CAP.,FXD,ELCTLT:47UF,+50-10%,16V	0000W	16VBSL47
C716	290-0746-00			CAP.,FXD,ELCTLT:47UF,+50-10%,16V	0000W	16VBSL47
C734	283-0300-00			CAP.,FXD,CER DI:0.001UF,+80-20%,10,000V	72982	3910BW509C142K
C736	283-0203-00			CAP.,FXD,CER DI:0.47UF,20%,50V	72982	8131N075651474M
C740	290-0719-00			CAP.,FXD,ELCTLT:47UF,20%,25V	56289	196D476X0025TE3
C746	283-0142-00			CAP.,FXD,CER DI:0.0027UF,5%,200V	72982	875-551B272J
C748	283-0111-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M

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C749	283-0010-00			CAP.,FXD,CER DI:0.05UF,+100-20%,50V	56289	273C20
C756	290-0480-00			CAP.,FXD,ELCTLT:0.5UF,200V	80009	290-0480-00
C758	290-0480-00			CAP.,FXD,ELCTLT:0.5UF,200V	80009	290-0480-00
C760	290-0779-00			CAP.,FXD,ELCTLT:10UF,+50-10%,50VDC	56289	502D237
C762	283-0071-00			CAP.,FXD,CER DI:0.0068UF,+80-30%,5000V	56289	45C10A1
C763	281-0512-00			CAP.,FXD,CER DI:27PF,+/-2.7PF,500V	72982	308-000C0G0270K
C764	285-1138-00			CAP.,FXD,PLSTC:0.01UF,10%,8000V	56289	430P103980
C766	285-1138-00			CAP.,FXD,PLSTC:0.01UF,10%,8000V	56289	430P103980
C768	281-0512-00			CAP.,FXD,CER DI:27PF,+/-2.7PF,500V	72982	308-000C0G0270K
C770	285-1138-00			CAP.,FXD,PLSTC:0.01UF,10%,8000V	56289	430P103980
C776	290-0758-00			CAP.,FXD,ELCTLT:2.2UF,+50-10%,160V	0000W	200VB2.2
C778	283-0300-00			CAP.,FXD,CER DI:0.001UF,+80-20%,10,000V	72982	3910BW509C142K
C795	283-0328-00			CAP.,FXD,CER DI:0.03UF,+80-20%,200V	72982	8131N225651303Z
C799	283-0328-00			CAP.,FXD,CER DI:0.03UF,+80-20%,200V	72982	8131N225651303Z
C812	290-0781-00			CAP.,FXD,ELCTLT:150UF,+50-10%,350VDC	56289	68D10869
C814	283-0057-00			CAP.,FXD,CER DI:0.1UF,+80-20%,200V	56289	274C10
C816	290-0571-00			CAP.,FXD,ELCTLT:5000UF,+100-0%,25V	90201	20-36043
C818	290-0571-00			CAP.,FXD,ELCTLT:5000UF,+100-0%,25V	90201	20-36043
C834	281-0580-00			CAP.,FXD,CER DI:470PF,10%,500V	04222	7001-1374
C843	290-0745-00			CAP.,FXD,ELCTLT:22UF,+50-10%,25V	80009	25U22
C847	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C866	290-0702-00			CAP.,FXD,ELCTLT:2000UF,+100-0%,50V	56289	68D10715
C877	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C886	281-0524-00			CAP.,FXD,CER DI:150PF,+/-30PF,500V	04222	7001-1381
C892	290-0779-00			CAP.,FXD,ELCTLT:10UF,+50-10%,50VDC	56289	502D237
CR118	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR138	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR150	152-0242-00			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR160	152-0242-00			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR170	152-0242-00			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR180	152-0242-00			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR284	152-0242-00			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR318	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR338	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR350	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR360	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR370	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR380	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR484	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR505	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR515	152-0246-00			SEMICOND DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR520	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR530	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR566	152-0153-00			SEMICOND DEVICE:SILICON,15V,50MA	13715	FD7003
CR568	152-0233-00			SEMICOND DEVICE:SILICON,85V,100MA	07910	CD61128
CR572	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR577	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR586	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR613	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR623	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR653	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR657	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR663	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152

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CR679	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR685	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR690	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR692	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR693	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR695	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR696	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR723	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR724	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR725	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR735	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR737	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR756	152-0400-00			SEMICOND DEVICE:SILICON,400V,1A	80009	152-0400-00
CR760	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR762	152-0409-00			SEMICOND DEVICE:SILICON,12,000V,5MA	83003	VG-12X
CR764	152-0409-00			SEMICOND DEVICE:SILICON,12,000V,5MA	83003	VG-12X
CR769	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR776	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR780	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR782	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	12969	NDP341
CR802	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR803	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR804	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR805	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR812	152-0198-00			SEMICOND DEVICE:SILICON,200V,3A	04713	1N4721
CR813	152-0198-00			SEMICOND DEVICE:SILICON,200V,3A	04713	1N4721
CR814	152-0198-00			SEMICOND DEVICE:SILICON,200V,3A	04713	1N4721
CR815	152-0198-00			SEMICOND DEVICE:SILICON,200V,3A	04713	1N4721
CR825	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR828	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR834	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR842	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR843	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR846	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR847	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR858	152-0107-00			SEMICOND DEVICE:SILICON,375V,400MA	80009	152-0107-00
CR862	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR863	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR864	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR865	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
CR872	152-0333-00			SEMICOND DEVICE:SILICON,55V,200MA	80009	152-0333-00
CR874	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR888	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR892	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	02735	37304
DS777	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS778	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS783	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS784	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
E692	119-0181-00			SURGE VOLTAGE P:230VAC,+/-15%	80009	119-0181-00
E696	119-0181-00			SURGE VOLTAGE P:230VAC,+/-15%	80009	119-0181-00
E770	119-0181-00			SURGE VOLTAGE P:230VAC,+/-15%	80009	119-0181-00
F800	159-0019-00			FUSE,CARTRIDGE:3AG,1A,250V,SLOW BLOW	71400	MDL1

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F814	159-0083-00			FUSE,CARTRIDGE:3AG,0.15A,250V,FAST-BLOW	71400	AGC 15/100
F848	159-0025-00			FUSE,CARTRIDGE:0.5A,3AG,FAST-BLOW	71400	AGC 1/2
F856	159-0015-00			FUSE,CARTRIDGE:3AG,3A,250V,FAST-BLOW	71400	AGC 3
F868	159-0025-00			FUSE,CARTRIDGE:0.5A,3AG,FAST-BLOW	71400	AGC 1/2
J110	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
J130	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
J310	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
J330	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
J505	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
J515	131-0955-00			CONNECTOR,RCPT,:BNC,FEMALE	24931	28JR200-1
L725	108-0805-00			COIL,TUBE DEFLE:TRACE ROTATOR	80009	108-0805-00
L756	108-0324-00			COIL,RF:10MH	76493	70F102A1
Q120A,B	151-1054-00			TRANSISTOR:SILICON,JFE,N-CHANNEL,DUAL	80009	151-1054-00
Q150	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q155	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q160	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q165	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q170	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q180	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q190	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q200	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q210	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q220	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q230	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q235	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q240	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q245	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q250	151-0612-00			TRANSISTOR:SILICON,PNP	04713	BF464
Q255	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q260	151-0612-00			TRANSISTOR:SILICON,PNP	04713	BF464
Q265	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q280	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q320A,B	151-1054-00			TRANSISTOR:SILICON,JFE,N-CHANNEL,DUAL	80009	151-1054-00
Q350	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q355	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q360	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q365	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q370	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q380	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q390	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q400	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q410	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q420	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q430	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q435	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q440	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q445	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q450	151-0612-00			TRANSISTOR:SILICON,PNP	04713	BF464
Q455	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q460	151-0612-00			TRANSISTOR:SILICON,PNP	04713	BF464
Q465	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q480	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906

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Q508A,B	151-1042-00			SEMICOND DVC SE:MATCHED PAIR FET	80009	151-1042-00
Q520	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q525	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q530	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q535	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q550	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q560	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q570	151-0406-00			TRANSISTOR:SILICON,PNP	07263	S37880
Q580	151-0407-00			TRANSISTOR:SILICON,NPN	80009	151-0407-00
Q585	151-0124-00			TRANSISTOR:SILICON,NPN,SEL FROM 2N3501	80009	151-0124-00
Q590	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q605	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q610	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q620	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q625	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q630	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q635	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q638	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q645	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q650	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q660	151-0410-00			TRANSISTOR:SILICON,PNP	04713	SPS6765
Q670	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q675	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q678	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q680	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q685	151-0615-00			TRANSISTOR:SILICON,NPN	04713	2N6558
Q690	151-0612-00			TRANSISTOR:SILICON,PNP	04713	BF464
Q702	151-0302-00			TRANSISTOR:SILICON,NPN	04713	2N2222A
Q714	151-0349-00			TRANSISTOR:SILICON,NPN,SEL FROM MJE2801	04713	SJE924
Q720	151-0136-00			TRANSISTOR:SILICON,NPN	02735	35495
Q722	151-0134-00			TRANSISTOR:SILICON,PNP	04713	SM3195
Q725	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q820	151-0415-00			TRANSISTOR:SILICON,NPN	04713	MJE1102
Q825	151-0350-00			TRANSISTOR:SILICON,PNP	07263	2N5401
Q830	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q840	151-0405-00			TRANSISTOR:SILICON,NPN,SEL FROM MJE800	80009	151-0405-00
Q845	151-0188-00			TRANSISTOR:SILICON,PNP	01295	2N3906
Q870	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
Q880	151-0405-00			TRANSISTOR:SILICON,NPN,SEL FROM MJE800	80009	151-0405-00
Q885	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
R105	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R110	321-0891-00			RES.,FXD,FILM:800K OHM,1%,0.125W	75042	CEAT0-8003F
R112	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R114	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F
R115	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R118	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R120	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R122	321-0928-02			RES.,FXD,FILM:250 OHM,0.5%,0.125W	91637	MFF1816D250R0D
R124	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R125	311-1417-00			RES.,VAR,NONWIR:2.5K OHM,10%,0.25W	80294	3386FT06-252
R130	321-0891-00			RES.,FXD,FILM:800K OHM,1%,0.125W	75042	CEAT0-8003F
R132	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R134	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F

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R135	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R138	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R140	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R144	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R150	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R152	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
R155	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R156	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R157	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R162	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
R165	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R166	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R167	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R170	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R173	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R175	311-1311-00			RES.,VAR,NONWIR:1K OHM,20%,1W	01121	10M155A
R176	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R180	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R183	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R185	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
R186	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R190	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R192	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R193	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R194	311-1274-00			RES.,VAR,NONWIR:500K OHM,10%,0.5W	73138	62PT-357-0
R195	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R198	323-0385-00			RES.,FXD,FILM:100K OHM,1%,0.50W	75042	CECT0-1003F
R200	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R202	321-0256-00			RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEAT0-4531F
R205	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R208	323-0385-00			RES.,FXD,FILM:100K OHM,1%,0.50W	75042	CECT0-1003F
R210	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R214	301-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.50W	01121	EB6815
R216	315-0431-00			RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315
R217	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R220	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R224	301-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.50W	01121	EB6815
R226	315-0431-00			RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315
R227	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R230	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R233	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R237	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R239	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	*CB2705
R240	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R242	315-0680-00			RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
R243	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R247	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R250	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	75042	CEAT0-5230F
R252	321-0238-00			RES.,FXD,FILM:2.94K OHM,1%,0.125W	75042	CEAT0-2941F
R253	323-0403-00			RES.,FXD,FILM:154K OHM,1%,0.50W	75042	CECT0-1543F
R255	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R256	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	75042	CEAT0-1101F
R258	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F

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R259	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R260	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	75042	CEAT0-5230F
R262	321-0238-00			RES.,FXD,FILM:2.94K OHM,1%,0.125W	75042	CEAT0-2941F
R263	323-0403-00			RES.,FXD,FILM:154K OHM,1%,0.50W	75042	CECT0-1543F
R265	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R266	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	75042	CEAT0-1101F
R268	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F
R269	315-0271-00			RES.,FXD,CMPSN:270 OHM,5%,0.25W	01121	CB2715
R280	311-1261-00			RES.,VAR,NONWIR:500 OHM,10%,0.50W	80294	3329P-L58-501
R282	321-0211-00			RES.,FXD,FILM:1.54K OHM,1%,0.125W	75042	CEAT0-1541F
R284	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R286	321-0346-00			RES.,FXD,FILM:39.2K OHM,1%,0.125W	75042	CEAT0-3922F
R305	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R310	321-0891-00			RES.,FXD,FILM:800K OHM,1%,0.125W	75042	CEAT0-8003F
R312	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R314	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F
R315	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R318	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R320	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R322	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R324	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R325	311-1417-00			RES.,VAR,NONWIR:2.5K OHM,10%,0.25W	80294	3386FT06-252
R330	321-0891-00			RES.,FXD,FILM:800K OHM,1%,0.125W	75042	CEAT0-8003F
R332	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R334	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F
R335	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R338	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R340	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R344	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R350	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R352	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
R355	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R356	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R357	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R362	315-0242-00			RES.,FXD,CMPSN:2.4K OHM,5%,0.25W	01121	CB2425
R365	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R366	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
R367	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R370	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R373	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R375	311-1311-00			RES.,VAR,NONWIR:1K OHM,20%,1W	01121	10M155A
R376	315-0183-00			RES.,FXD,CMPSN:18K OHM,5%,0.25W	01121	CB1835
R380	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R383	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R385	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
R386	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R390	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R392	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R393	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R394	311-1274-00			RES.,VAR,NONWIR:500K OHM,10%,0.5W	73138	62PT-357-0
R395	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R398	323-0385-00			RES.,FXD,FILM:100K OHM,1%,0.50W	75042	CECT0-1003F
R400	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F

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R402	321-0256-00			RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEAT0-4531F
R405	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R408	323-0385-00			RES.,FXD,FILM:100K OHM,1%,0.50W	75042	CECT0-1003F
R410	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R414	301-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.50W	01121	EB6815
R416	315-0431-00			RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315
R417	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R420	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R424	301-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.50W	01121	EB6815
R426	315-0431-00			RES.,FXD,CMPSN:430 OHM,5%,0.25W	01121	CB4315
R427	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R430	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R433	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R437	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R439	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R440	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R442	315-0680-00			RES.,FXD,CMPSN:68 OHM,5%,0.25W	01121	CB6805
R443	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R447	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R450	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	75042	CEAT0-5230F
R452	321-0238-00			RES.,FXD,FILM:2.94K OHM,1%,0.125W	75042	CEAT0-2941F
R453	323-0403-00			RES.,FXD,FILM:154K OHM,1%,0.50W	75042	CECT0-1543F
R455	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R456	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	75042	CEAT0-1101F
R458	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F
R459	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R460	321-0166-00			RES.,FXD,FILM:523 OHM,1%,0.125W	75042	CEAT0-5230F
R462	321-0238-00			RES.,FXD,FILM:2.94K OHM,1%,0.125W	75042	CEAT0-2941F
R463	323-0403-00			RES.,FXD,FILM:154K OHM,1%,0.50W	75042	CECT0-1543F
R465	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R466	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	75042	CEAT0-1101F
R468	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F
R469	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
R480	311-1261-00			RES.,VAR,NONWIR:500 OHM,10%,0.50W	80294	3329P-L58-501
R482	321-0211-00			RES.,FXD,FILM:1.54K OHM,1%,0.125W	75042	CEAT0-1541F
R484	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R486	321-0346-00			RES.,FXD,FILM:39.2K OHM,1%,0.125W	75042	CEAT0-3922F
R501	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F
R503	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R505	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R508	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R510	321-0109-00			RES.,FXD,FILM:133 OHM,1%,0.125W	75042	CEAT0-1330F
R511	322-0481-00			RES.,FXD,FILM:1M OHM,1%,0.25W	75042	CEBT0-1004F
R512	311-1563-00			RES.,VAR,NONWIR:1K OHM,20%,0.50W	73138	91A-10000M
R513	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R515	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R518	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
R523	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R527	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R529	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F
R533	315-0682-00			RES.,FXD,CMPSN:6.8K OHM,5%,0.25W	01121	CB6825
R537	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	75042	CEAT0-1401F
R538	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015

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R550	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R552	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	75042	CEAT0-4751F
R554	321-0258-00			RES.,FXD,FILM:4.75K OHM,1%,0.125W	75042	CEAT0-4751F
R555	311-1313-00			RES.,VAR,NONWIR:2K OHM,20%,1W	01121	10M157A
R556	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R557	323-0331-00			RES.,FXD,FILM:27.4K OHM,1%,0.50W	75042	CECT0-2742F
R560	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R562	315-0240-00			RES.,FXD,CMPSN:24 OHM,5%,0.25W	01121	CB2405
R564	303-0202-00			RES.,FXD,CMPSN:2K OHM,5%,1W	01121	GB2025
R568	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R570	308-0498-00			RES.,FXD,WW:2.94K OHM,1%,2.5W	91637	RS2B110-29400F
R572	321-0315-00			RES.,FXD,FILM:18.7K OHM,1%,0.125W	75042	CEAT0-1872F
R574	323-0358-00			RES.,FXD,FILM:52.3K OHM,1%,0.50W	75042	CECT0-5232F
R577	321-0176-00			RES.,FXD,FILM:665 OHM,1%,0.125W	75042	CEAT0-6650F
R580	303-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,1W	01121	GB2225
R582	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R588	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R590	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R591	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R592	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R593	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R596	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
R598	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
R603	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	75042	CEAT0-7501F
R604	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	75042	CEAT0-7501F
R606	321-0178-00			RES.,FXD,FILM:698 OHM,1%,0.125W	75042	CEAT0-6980F
R611	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R612	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R614	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R615	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R617	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R618	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R621	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R622	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R624	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R625	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R626	311-1560-00			RES.,VAR,NONWIR:5K OHM,5%,0.50W	73138	91A-50000M
R631	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	75042	CEAT0-7870F
R636	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	75042	CEAT0-7870F
R638	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	75042	CEAT0-4020F
R643	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	75042	CEAT0-7501F
R644	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	75042	CEAT0-7501F
R646	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R651	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R652	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R654	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R655	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R657	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R661	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R662	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
R664	321-0175-00			RES.,FXD,FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R665	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R671	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	75042	CEAT0-7870F

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R672	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R673	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
R675	315-0124-00			RES.,FXD,CMPSN:120K OHM,5%,0.25W	01121	CB1245
R676	321-0183-00			RES.,FXD,FILM:787 OHM,1%,0.125W	75042	CEAT0-7870F
R679	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R681	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
R682	315-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.25W	01121	CB1505
R683	323-0354-00			RES.,FXD,FILM:47.5K OHM,1%,0.50W	75042	CECT0-4752F
R687	315-0433-00			RES.,FXD,CMPSN:43K OHM,5%,0.25W	01121	CB4335
R688	323-0381-00			RES.,FXD,FILM:90.9K OHM,1%,0.50W	75042	CECT0-9092F
R690	308-0391-00			RES.,FXD,WW:7.2K OHM,1%,3W	91637	RS2B-B70000H
R692	315-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
R693	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R694	301-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.50W	01121	EB2235
R695	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R696	301-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.50W	01121	EB2725
R697	301-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.50W	01121	EB1065
R698	311-1312-00			RES.,VAR,NONWIR:5M OHM,20%,1W	01121	10M156A
R702	321-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.125W	75042	CEAT0-6041F
R703	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R705	311-1555-00			RES.,VAR,NONWIR:100K OHM,20%,0.5W	73138	91A-10002M
R707	323-0354-00			RES.,FXD,FILM:47.5K OHM,1%,0.50W	75042	CECT0-4752F
R709	323-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.50W	75042	CECT0-2491F
R712	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R715	308-0499-00			RES.,FXD,WW:0.5 OHM,10%,2.5W AXIAL	91637	RS2B-ER5000K
R717	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
R718	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
R720	301-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.50W	01121	EB1005
R723	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R724	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
R726	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R728	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
R730	311-1561-00			RES.,VAR,NONWIR:2.5K OHM,20%,0.50W	73138	91A-25000M
R732	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	75042	CEAT0-6811F
R734A-D	307-0524-00			RES.,THICK FILM:	80009	307-0524-00
R735	315-0123-00			RES.,FXD,CMPSN:12K OHM,5%,0.25W	01121	CB1235
R738	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R740	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
R742	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
R744	315-0123-00			RES.,FXD,CMPSN:12K OHM,5%,0.25W	01121	CB1235
R746	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
R748	315-0181-00			RES.,FXD,CMPSN:180 OHM,5%,0.25W	01121	CB1815
R750	311-1332-00			RES.,VAR,NONWIR:5K OHM,10%,2W	80009	311-1332-00
R754	301-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.50W	01121	EB8215
R760	316-0100-00			RES.,FXD,CMPSN:10 OHM,10%,0.25W	01121	CB1001
R763	315-0564-00			RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645
R764	301-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.50W	01121	EB4705
R765	301-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.50W	01121	EB2735
R766	301-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.50W	01121	EB1015
R767	301-0200-00			RES.,FXD,CMPSN:20 OHM,5%,0.50W	01121	EB2005
R768	315-0564-00			RES.,FXD,CMPSN:560K OHM,5%,0.25W	01121	CB5645
R769	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R770	301-0181-00			RES.,FXD,CMPSN:180 OHM,5%,0.50W	01121	EB1815

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R772	323-0386-00			RES.,FXD,FILM:102K OHM,1%,0.50W	75042	CECTO-1023F
R774	311-1557-00			RES.,VAR,NONWIR:25K OHM,20%,0.50W	73138	91A-25001M
R775	321-0354-00			RES.,FXD,FILM:47.5K OHM,1%,0.125W	75042	CEATO-4752F
R776	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R777	301-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.50W	01121	EB1015
R778	301-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.50W	01121	EB4715
R782	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
R786	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
R788	301-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.50W	01121	EB1025
R794	323-0376-00			RES.,FXD,FILM:80.6K OHM,1%,0.50W	75042	CECTO-8062F
R795	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
R798	311-1556-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	73138	91A-50001M
R799	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R808	301-0150-00			RES.,FXD,CMPSN:15 OHM,5%,0.50W	01121	EB1505
R810	301-0304-00			RES.,FXD,CMPSN:300K OHM,5%,0.50W	01121	EB3045
R816	308-0460-00			RES.,FXD,WW:56 OHM,5%,3W	56289	242E5605
R818	308-0061-00			RES.,FXD,WW:1.5K OHM,5%,5W	91637	RS5-B15000J
R822	301-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.50W	01121	EB1015
R824	301-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.50W	01121	EB8225
R826	323-0726-00			RES.,FXD,FILM:306K OHM,1%,0.50W	75042	CECTO-3063F
R828	321-0359-00			RES.,FXD,FILM:53.6K OHM,1%,0.125W	75042	CEATO-5362F
R830	315-0474-00			RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
R832	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
R834	315-0561-00			RES.,FXD,CMPSN:560 OHM,5%,0.25W	01121	CB5615
R836	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R842	308-0231-00			RES.,FXD,WW:220 OHM,5%,3W	91637	RS2B-B220R0J
R844	308-0058-00			RES.,FXD,WW:1.5 OHM,10%,1W	75042	BWH-1R50K
R845	301-0224-00			RES.,FXD,CMPSN:220K OHM,5%,0.50W	01121	EB2245
R850	311-1564-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	73138	91A-500R0M
R852	321-0250-00			RES.,FXD,FILM:3.92K OHM,1%,0.125W	75042	CEATO-3921F
R854	321-0242-00			RES.,FXD,FILM:3.24K OHM,1%,0.125W	75042	CEATO-3241F
R857	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R870	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
R872	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R874	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R876	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	75042	CEATO-1502F
R877	321-0335-00			RES.,FXD,FILM:30.1K OHM,1%,0.125W	75042	CEATO-3012F
R882	308-0231-00			RES.,FXD,WW:220 OHM,5%,3W	91637	RS2B-B220R0J
R884	308-0703-00			RES.,FXD,WW:1.8 OHM,5%,2W	75042	BWH1R80J
R885	301-0224-00			RES.,FXD,CMPSN:220K OHM,5%,0.50W	01121	EB2245
R886	315-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
R888	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
S110	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC DC	82389	C56206L2
S130	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC DC	82389	C56206L2
S310	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC DC	82389	C56206L2
S330	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC DC	82389	C56206L2
S800	260-1222-00			SWITCH,PUSH-PUL:10A,250VAC	91929	2DM301
S802	260-0413-00			SW,THERMOSTATIC:10A,240V	93410	110-361
T710	120-1053-00			XFMR,POWER:H.V.	80009	120-1053-00
T805	120-1054-00			XFMR,POWER:L.V.	80009	120-1054-00
U740	156-0067-00			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	80009	156-0067-00

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
V725	154-0760-00			ELECTRON TUBE:CRT, P31	80009	154-0760-00
V725 [1]	154-0768-00			ELECTRON TUBE:CRT,P31,INTERNAL SCALE	80009	154-0768-00
V725 [2]	154-0768-03			ELECTRON TUBE:CRT,P7,INTERNAL,SCALE	80009	154-0768-03
V725 [3]	154-0760-04			ELECTRON TUBE:CRT,P11,INTERNAL SCALE	80009	154-0760-04
VR160	152-0055-00			SEMICOND DEVICE:ZENER,0.4W,11V,5%	04713	1N962B
VR170	152-0395-00			SEMICOND DEVICE:ZENER,0.4W,4.3V,5%	07910	1N749A
VR180	152-0395-00			SEMICOND DEVICE:ZENER,0.4W,4.3V,5%	07910	1N749A
VR239	152-0520-00			SEMICOND DEVICE:ZENER,1W,12V,5%	12969	UZ8712
VR258	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR268	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR360	152-0055-00			SEMICOND DEVICE:ZENER,0.4W,11V,5%	04713	1N962B
VR370	152-0395-00			SEMICOND DEVICE:ZENER,0.4W,4.3V,5%	07910	1N749A
VR380	152-0395-00			SEMICOND DEVICE:ZENER,0.4W,4.3V,5%	07910	1N749A
VR439	152-0520-00			SEMICOND DEVICE:ZENER,1W,12V,5%	12969	UZ8712
VR458	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR468	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR550	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR582	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR591	152-0055-00			SEMICOND DEVICE:ZENER,0.4W,11V,5%	04713	1N962B
VR597	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR634	152-0243-00			SEMICOND DEVICE:ZENER,0.4W,15V,5%	81483	1N965B
VR674	152-0243-00			SEMICOND DEVICE:ZENER,0.4W,15V,5%	81483	1N965B
VR686	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR704	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR705	152-0357-00			SEMICOND DEVICE:ZENER,0.4W,82V,5%	04713	1N983B
VR706	152-0357-00			SEMICOND DEVICE:ZENER,0.4W,82V,5%	04713	1N983B
VR712	152-0243-00			SEMICOND DEVICE:ZENER,0.4W,15V,5%	81483	1N965B
VR794	152-0241-00			SEMICOND DEVICE:ZENER,0.4W,33V,5%	04713	1N973B
VR795	152-0286-00			SEMICOND DEVICE:ZENER,0.4W,75V,5%	04713	1N982B
VR798	152-0428-00			SEMICOND DEVICE:ZENER,0.4W,120V,5%	04713	1N987B
VR828	152-0513-00			SEMICOND DEVICE:ZENER,1W,91V,5%	12969	UZ8791
VR832	152-0227-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585

[1]Option 1 only.
[2]Option 76 only.
[3]Option 78 only.

Option 4

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
				OPTION 4		
A5	670-2279-00			CKT BOARD ASSY:SWEEP	80009	670-2279-00
C905	281-0503-00			CAP.,FXD,CER DI:8PF,+/-0.5PF,500V	72982	301-000C0H0809D
C910	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C912	281-0629-00			CAP.,FXD,CER DI:33PF,5%,600V	72982	308-000C0G0330J
C914	283-0004-00			CAP.,FXD,CER DI:0.02UF,+80-20%,150V	72982	855-547E203Z
C924	283-0041-00			CAP.,FXD,CER DI:0.0033UF,5%,500V	72982	841-541B332J
C925	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C930[1]	285-0754-02			CAP.,FXD,PLASTIC:0.001UF,3%,400V	80009	285-0754-02
C934[1]	285-0753-01			CAP.,FXD,PLASTIC:0.01UF,3%,100V	80009	285-0753-01
C938[1]	285-0895-00			CAP.,FXD,PLASTIC:1.0UF,3%,25V	80009	285-0895-00
C960	281-0604-00			CAP.,FXD,CER DI:2.2PF,+/-0.25PF,500V	72982	301-000C0J0229C
C976	281-0549-00			CAP.,FXD,CER DI:68PF,10%,500V	72982	301-000U2J0680K
C962	290-0572-00			CAP.,FXD,ELCTLT:0.1UF,20%,50V	56289	196D104X0050HA1
C990	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C994	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C995	290-0572-00			CAP.,FXD,ELCTLT:0.1UF,20%,50V	56289	196D104X0050HA1
CR930	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR975	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
Q960	151-0342-00			TRANSISTOR:SILICON,PNP	07263	2N4249
Q964	151-0341-00			TRANSISTOR:SILICON,NPN	07263	2N3565
Q975	151-0342-00			TRANSISTOR:SILICON,PNP	07263	2N4249
Q978	151-0190-00			TRANSISTOR:SILICON,NPN	80009	151-0190-00
R364	315-0361-00			RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
R905	315-0363-00			RES.,FXD,CMPSN:36K OHM,5%,0.25W	01121	CB3635
R906	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R910	316-0332-00			RES.,FXD,CMPSN:3.3K OHM,10%,0.25W	01121	CB3321
R915	311-0607-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	80740	62-59-3
R918	311-0949-00			RES.,VAR,NONWIR:2K OHM,10%,0.50W	01121	WA1G040S202UA
R920	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R922	316-0122-00			RES.,FXD,CMPSN:1.2K OHM,10%.0.25W	01121	CB1221
R924	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
R930	321-0356-00			RES.,FXD,FILM:49.9K OHM,1%,0.125W	75042	CEAT0-4992F
R934	321-0452-00			RES.,FXD,FILM:499K OHM,1%,0.125W	75042	CEAT0-4993F
R938	307-0381-00			RES.,FXD,FILM:4.99M OHM,1%,0.50W	03888	FL12-499734
R945	311-0443-00			RES.,VAR,NONWIR:2500 OHM,20%,0.75W	11237	41330
R946	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
R950	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	75042	CEAT0-2492F
R952	321-0311-00			RES.,FXD,FILM:16.9K OHM,1%,0.125W	75042	CEAT0-1692F
R955	321-0369-00			RES.,FXD,FILM:68.1K OHM,1%,0.125W	75042	CEAT0-6812F
R956	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
R958	316-0222-00			RES.,FXD,CMPSN:2.2K OHM,10%,0.25W	01121	CB2221
R960	316-0333-00			RES.,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R962	316-0101-00			RES.,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R965	311-0635-00			RES.,VAR,NONWIR:1K OHM,10%,0.50W	80740	62-56-3
R967	321-0230-00			RES.,FXD,FILM:2.43K OHM,1%,0.125W	75042	CEAT0-2431F
R971	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
R973	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R975	316-0102-00			RES.,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R976	316-0471-00			RES.,FXD,CMPSN:470 OHM,10%,0.25W	01121	CB4711
R978	315-0133-00			RES.,FXD,CMPSN:13K OHM,5%,0.25W	01121	CB1335
R990	301-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.50W	01121	EB2415

[1]Available as a matched set, part number, 295-0159-00. The letter suffix and the tolerance should be the same for all of the assembly.

Option 4

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R994	303-0821-00			RES.,FXD,CMPSN:820 OHM,5%,1W	01121	GB8215
S350	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC-DC	82389	C5620622
S555	260-1811-00			SWITCH,SLIDE:DPDT,0.5A,125VAC-DC	82389	C5620622
S909	260-0960-01			SWITCH,SLIDE:0.5A,120VDC,CKT BD MT	10389	23-021-043
S930	105-0389-00			DRUM ASSY,CAM S:	80009	105-0389-00
U930	155-0055-00			MICROCIRCUIT,LI:MONOLITHIC,TRIG AND SWEEP	80009	155-0055-00
VR962	152-0166-00			SEMICOND DEVICE:ZENER,0.4W,6.2V,5%	81483	69-9035
VR990	152-0217-00			SEMICOND DEVICE:ZENER,0.4W,8.2V,5%	07910	1N756A
VR994	152-0217-00			SEMICOND DEVICE:ZENER,0.4W,8.2V,5%	07910	1N756A

INSTRUMENT OPTIONS

Your instrument may be equipped with one or more instrument options. A brief description of each available option is given in the following discussion. Option information is incorporated into the appropriate sections of the manual. Refer to Table 8-1 and the Table of Contents for location of option information. For further information on instrument options, see your Tektronix Catalog or contact your Tektronix Field Office.

OPTION 1

An internal, unlighted, orange graticule of 8 X 10 centimeters is included on the crt faceplate.

OPTION 3

Deletes the carrying handle and feet.

OPTION 4

Includes an internal X-axis sweep with rates from one second/division to one microsecond/division. Instrument is internally selectable for X-Y or Y-T modes of operation.

OPTION 6

The standard 606 has been modified to meet Underwriter's Laboratory 544 Medical and Dental Equipment requirements. The modifications include warnings required for medical equipment, a hospital grade cord and plug cap, and an internal line fuse.

OPTION 7

Deletes all protective cabinet panels, the feet, and the carrying handle.

OPTION 76

Utilizes P7 phosphor in the crt.

OPTION 78

Utilizes P11 phosphor in the crt.

TABLE 8-1
Option Information Locator

Instrument Option	Manual Section	Location of Information
Option 1 (Crt with internal graticule)	7 Replaceable Electrical Parts	Provides the replacement part number for the crt with an internal graticule.
	8 Instrument Options	Option 1 The introduction includes a description of the Option 1 instrument.
Option 3 (Deletes carrying handle and feet)	8 Instrument Options	Option 3 The introduction includes a description of the Option 3 instrument.
	10 Replaceable Mechanical Parts	Provides a footnote deleting the carrying handle and feet for the Option 3 instrument.
Option 4 (Provides internal horizontal sweep circuit)	1 Specification	Electrical Characteristics Table 1-2 includes electrical characteristics for the Option 4 instrument.
	2 Operating Instructions	Controls and Connectors Describes the function of the Option 4 front-panel controls.
		Functional Check Provides functional check procedure for the Option 4 instrument.
		Option 4 Sweep Information Discusses the use of the graticule, controls, and the internal sweep generator for making accurate time measurements.
	3 Installation	Connecting the Internal Sweep (Option 4) Provides a procedure for using the internal switches for connecting the internal sweep generator to the horizontal amplifier.
	4 Theory of Operation	Detailed Circuit Operation Discusses the operation of the internal sweep circuit.
	6 Performance Check and Adjustment	Sweep Generator (Option 4) Contains procedures for checking and adjustment of the Option 4 instrument.
	7 Replaceable Electrical Parts	Provides an electrical parts list for the Option 4 instrument.

TABLE 8-1 (CONT.)
Option Information Locator

Instrument Option	Manual Section	Location of Information
Option 4 (cont.)	8 Instrument Options	Option 4 The introduction includes a description of the Option 4 instrument.
	9 Diagrams and Circuit Board Illustrations	Provides block diagram; component, adjustment, test point, internal control and selector locations; a troubleshooting chart; and the schematic diagram for the Option 4 instrument.
	10 Replaceable Mechanical Parts	Provides a mechanical parts list and an exploded-view drawing for the Option 4 instrument.
Option 6 (Meets Underwriter's Laboratory 544 Medical and Dental Equipment requirements)	3 Installation	Line-Voltage and Regulating Range Selection Figure 3-1 shows the location of the line fuse for the Option 6 instrument.
	7 Replaceable Electrical Parts	Provides an electrical parts list with replacement parts footnoted for the Option 6 instrument.
	8 Instrument Options	Option 6 The introduction includes a description of the Option 6 instrument.
	10 Replaceable Mechanical Parts	Provides a mechanical parts list with replacement parts footnoted for the Option 6 instrument.
Option 7 (Deletes all protective cabinet panels, feet, and carrying handle)	8 Instrument Options	Option 7 The introduction includes a description of the Option 7 instrument.
	10 Replaceable Mechanical Parts	Provides a footnote deleting all the protective cabinet panels, feet, and carrying handle.
Option 76 (Uses crt with P7 phosphor)	7 Replaceable Electrical Parts	Provides the replacement part number for the crt with P7 phosphor.
	8 Instrument Options	Option 76 The introduction includes a description of the Option 76 instrument.
Option 78 (Uses crt with P11 phosphor)	7 Replaceable Electrical Parts	Provides the replacement part number for the crt with P11 phosphor.
	8 Instrument Options	Option 78 The introduction includes a description of the Option 78 instrument.

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols and Reference Designators

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

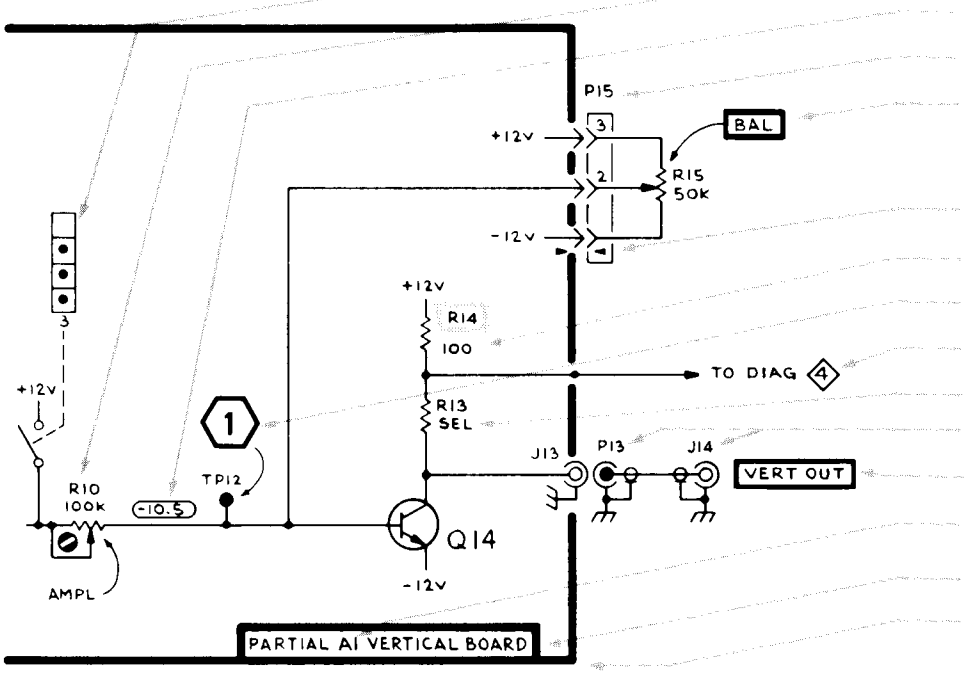
Symbols used on the diagrams are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

A	Assembly, separable or repairable (circuit board, etc.)	H	Heat dissipating device (heat sink, heat radiator, etc.)	RT	Thermistor
AT	Attenuator, fixed or variable	HR	Heater	S	Switch
B	Motor	HY	Hybrid circuit	T	Transformer
BT	Battery	J	Connector, stationary portion	TC	Thermocouple
C	Capacitor, fixed or variable	K	Relay	TP	Test point
CB	Circuit breaker	L	Inductor, fixed or variable	U	Assembly, inseparable or non-repairable (integrated circuit, etc.)
CR	Diode, signal or rectifier	LR	Inductor/resistor combination	V	Electron tube
DL	Delay line	M	Meter	VR	Voltage regulator (zener diode, etc.)
DS	Indicating device (lamp)	P	Connector, movable portion	Y	Crystal
E	Spark Gap	Q	Transistor or silicon-controlled rectifier	Z	Phase shifter
F	Fuse				
FL	Filter	R	Resistor, fixed or variable		

The following special symbols are used on the diagrams:



VERTICAL AMPLIFIER 2 CMD 1274

Cam Switch Closure Chart

Internal Screwdriver Adjustment

Test Voltage

Plug to E.C. Board

Panel Adjustment

Plug Index

Modified Component—See Parts List

Refer to Waveform

Refer to Diagram Number

SEL Value Selected at Factory

Coaxial Connector

Panel Connector

Assembly Number

Board Name

Etched Circuit Board Outlined in Black

Schematic Name and Number

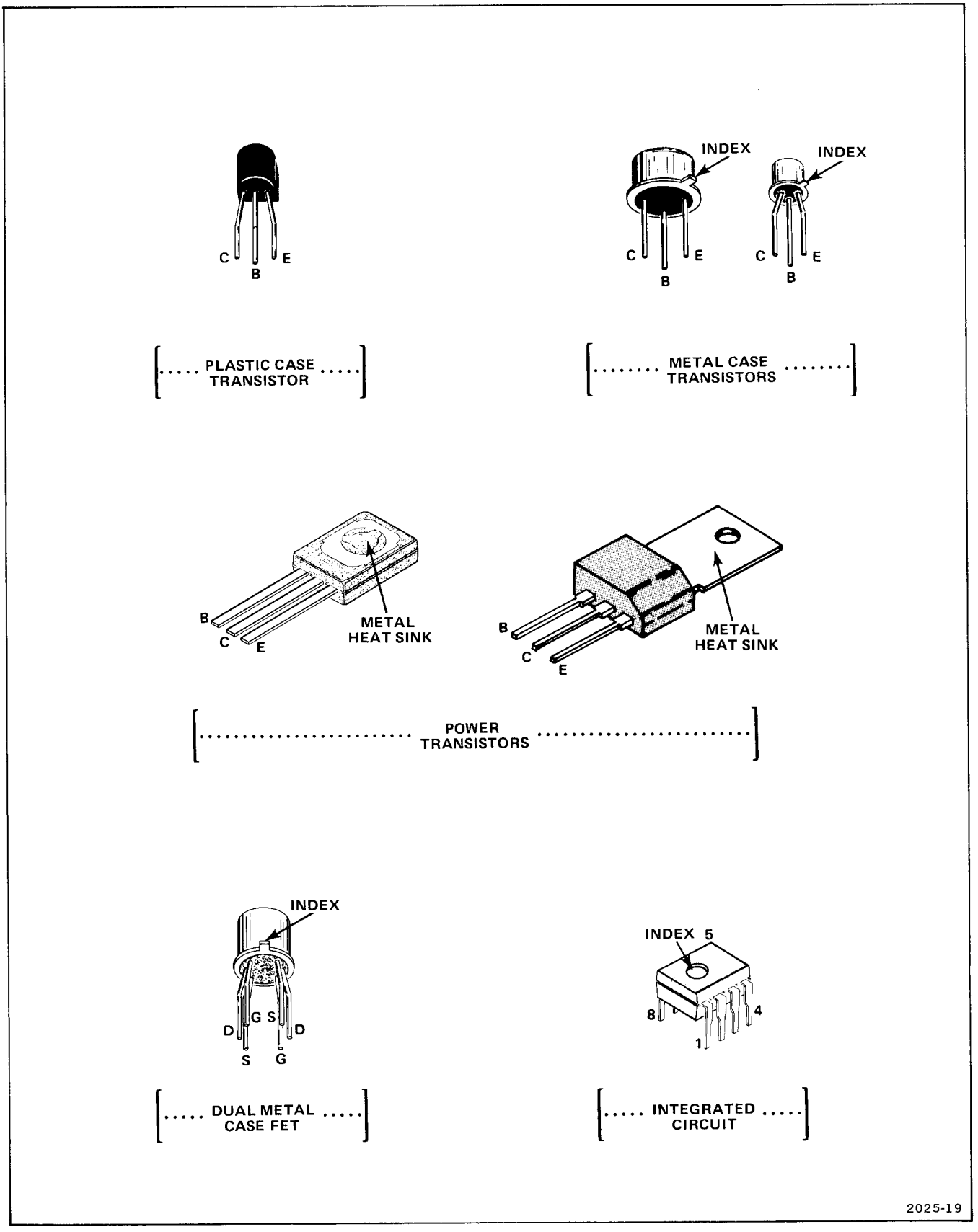


Figure 9-1. Semiconductor lead configurations.

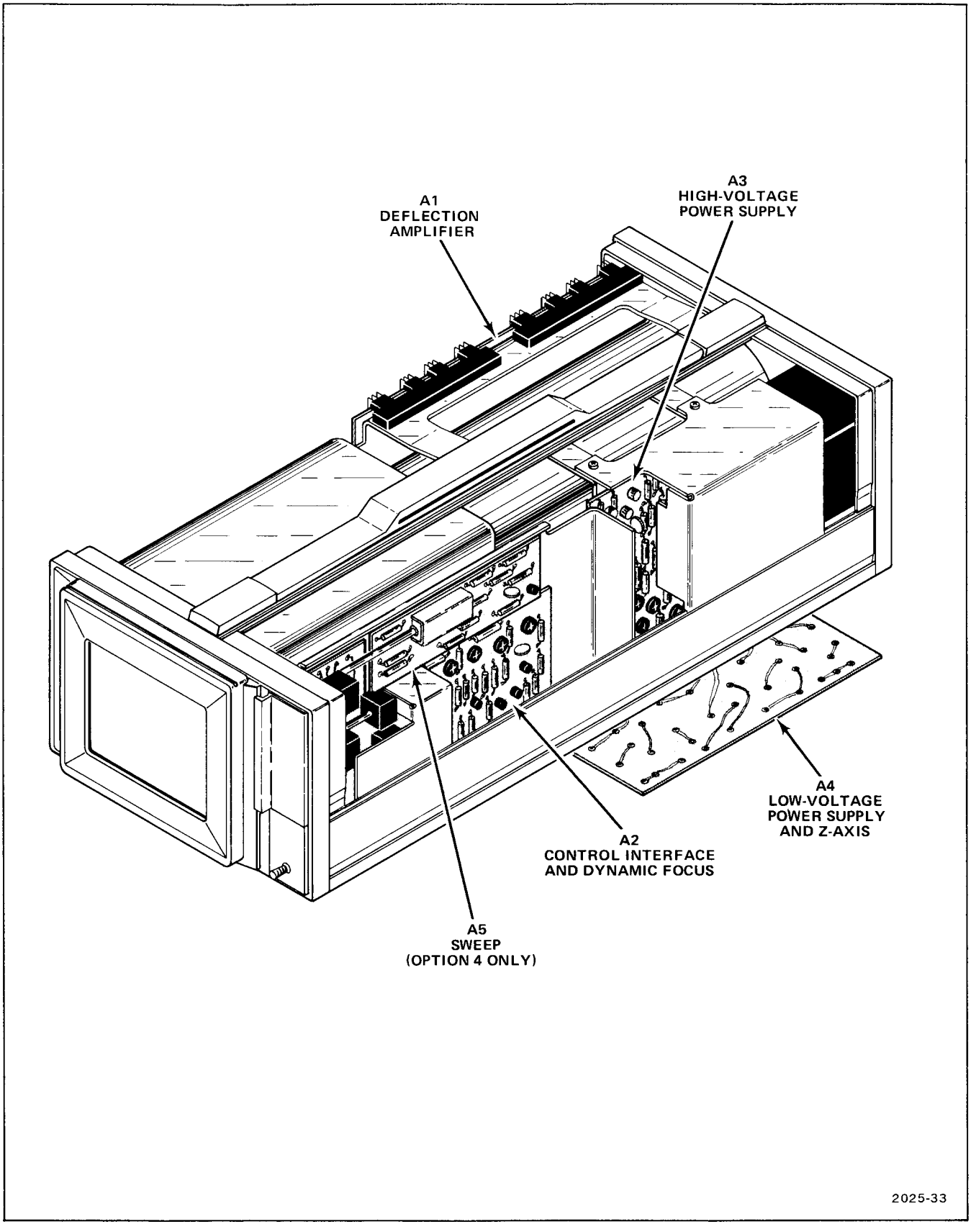
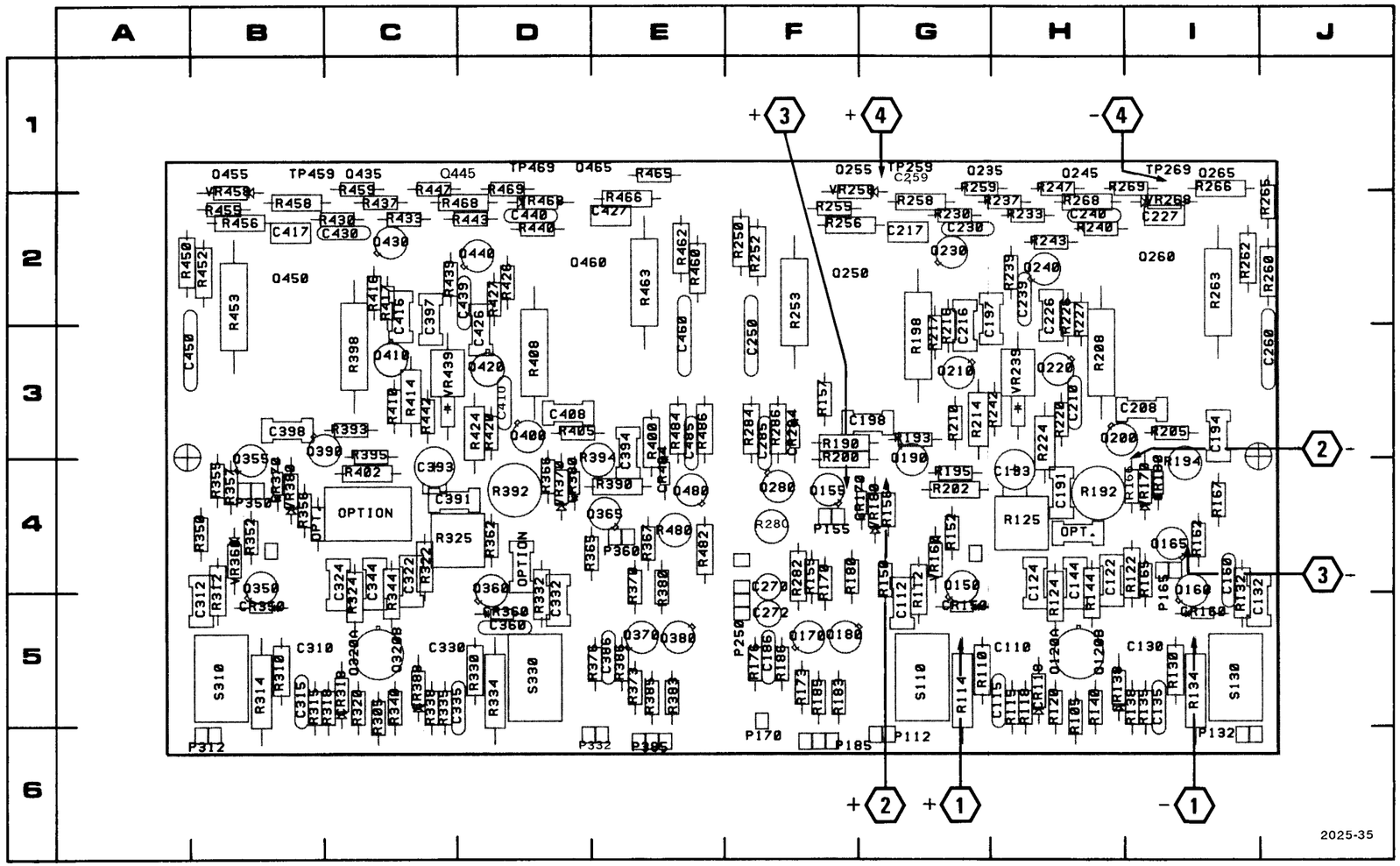


Figure 9-2. Circuit board locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C110	5H	C394	3E	Q120A	5H	R110	5G	R217	3G	R334	5D	R442	3C
C112	5G	C397	2C	Q120B	5H	R112	5G	R220	3H	R335	5C	R443	2D
C115	5H	C398	3B	Q150	4G	R114	5G	R224	3H	R338	5C	R447	1C
C122	4H	C408	3D	Q155	4F	R115	5H	R226	2H	R340	5C	R450	2A
C124	4H	C410	3D	Q160	4I	R118	5H	R227	2H	R344	4C	R452	2B
C130	5I	C416	2C	Q165	4I	R120	5H	R230	2G	R350	4B	R453	2B
C132	5I	C417	2B	Q170	5F	R122	4I	R233	2H	R352	4B	R455	2B
C135	5I	C426	3D	Q180	5F	R124	5H	R237	2H	R355	4B	R456	2B
C144	4H	C427	2E	Q190	4G	R125	4H	R239	2H	R356	4B	R458	2B
C160	4I	C430	2C	Q200	3H	R130	5I	R240	2H	R357	4B	R459	1C
C186	5F	C439	2D	Q210	3G	R132	4I	R242	3H	R362	4D	R460	2E
C191	4H	C440	2D	Q220	3H	R134	5I	R243	2H	R365	4E	R462	2E
C193	4H	C450	3A	Q230	2G	R135	5I	R247	1H	R366	4D	R463	2E
C194	3I	C460	3E	Q235	1G	R138	5I	R250	2F	R367	4E	R465	1E
C197	3G	C485	3E	Q240	2H	R140	5H	R252	2F	R370	4E	R466	2E
C198	3G			Q245	1H	R144	4H	R253	2F	R373	5E	R468	2D
C208	3I	CR118	5H	Q250	2F	R150	4G	R255	2F	R376	5E	R469	1D
C210	3H	CR138	5H	Q255	1F	R152	4G	R256	2F	R380	4E	R480	4E
C216	3G	CR150	5G	Q260	2I	R155	4F	R258	2G	R383	5E	R482	4E
C217	2G	CR160	5I	Q265	1I	R156	4G	R259	1G	R385	5E	R484	3E
C226	2H	CR170	4G	Q280	4F	R157	3F	R205	3I	R386	5E	R486	3E
C227	2I	CR180	4I	Q320A	5C	R162	4I	R260	2J	R390	4E		
C230	2G	CR284	3F	Q320B	5C	R165	4I	R262	2I	R392	4D	TP259	1G
C239	2H	CR318	5C	Q350	4B	R166	4I	R263	2I	R393	3C	TP269	1I
C240	2H	CR338	5C	Q355	3B	R167	4I	R265	2J	R394	3E	TP459	1B
C250	3F	CR350	5B	Q360	4D	R170	4F	R266	1I	R395	3C	TP469	1D
C259	1G	CR360	5D	Q365	4E	R173	5F	R268	2H	R398	3C		
C260	3J	CR370	4B	Q370	5E	R176	5F	R269	1I	R400	3E	S110	5G
C270	4F	CR380	4D	Q380	5E	R180	4F	R280	4F	R402	4C	S130	5I
C272	5F	CR484	4E	Q390	3C	R183	5F	R282	4F	R405	3D	S310	5B
C285	3F			Q400	3D	R185	5F	R284	3F	R408	3D	S330	5D
C310	5B			Q410	3C	R186	5F	R286	3F	R410	3C		
C312	5B	P112	6G	Q420	3D	R190	3F	R305	5C	R404	3C	VR160	4G
C315	5B	P132	6I	Q430	2C	R192	4H	R310	5B	R416	2C	VR170	4I
C322	4C	P155	4F	Q435	1C	R193	3G	R312	5B	R417	2C	VR180	4G
C324	4C	P165	4I	Q440	2D	R194	4I	R314	5B	R420	3D	VR239	3H
C330	5C	P170	5F	Q445	1D	R195	4G	R315	5B	R424	3D	VR258	1F
C332	5D	P185	6F	Q450	2B	R198	3G	R318	5C	R426	2D	VR268	2I
C335	5C	P250	5F	Q455	1B	R200	3F	R320	5C	R427	2D	VR360	4B
C344	4C	P312	6B	Q460	2D	R202	4G	R322	4C	R430	2C	VR370	4D
C360	5D	P332	6E	Q465	1E	R208	3H	R324	4C	R433	2C	VR380	4B
C386	5E	P350	4B	Q480	4E	R210	3G	R325	4C	R437	2C	VR439	3C
C391	4C	P360	4E			R214	3G	R330	5D	R439	2C	VR458	1B
C393	4C	P385	6E	R105	5H	R216	3G	R332	5D	R440	2D	VR468	2D



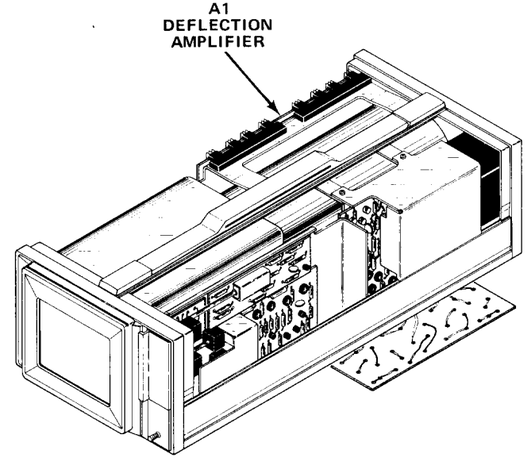


Figure 9-3. A1—Vertical (Y) Amplifier component and waveform test point locations.

VOLTAGE AND WAVEFORM CONDITIONS

NOTE

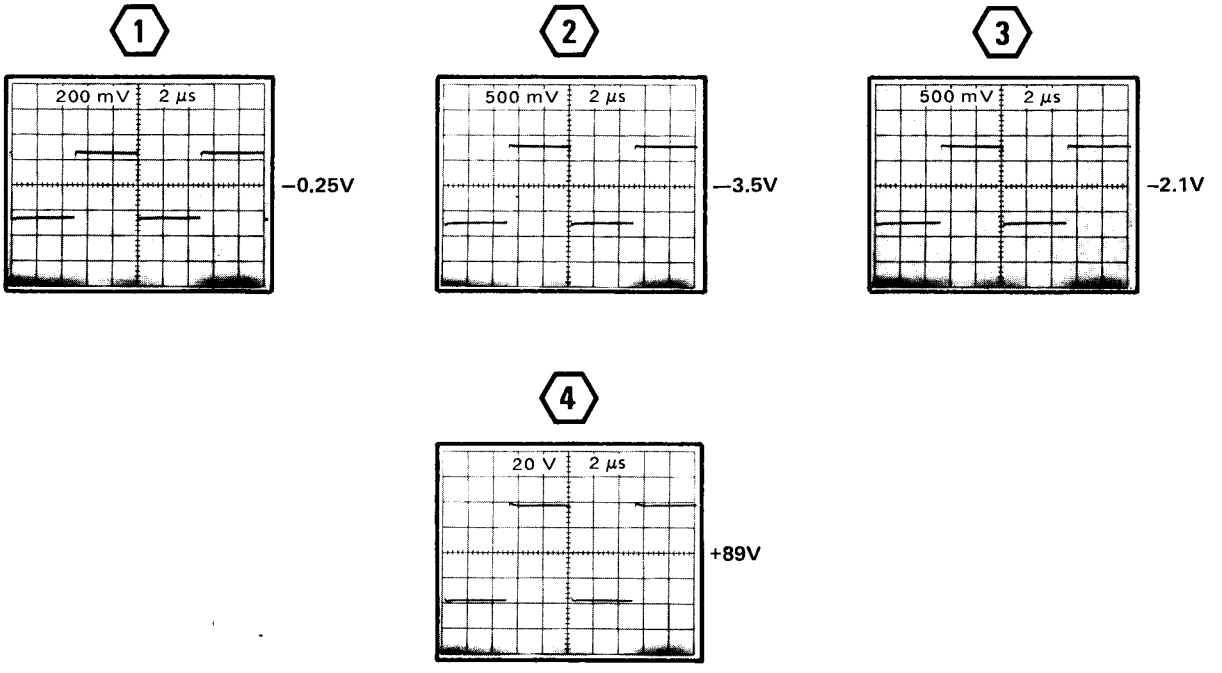
The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

VOLTAGE CONDITIONS

The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

WAVEFORM CONDITIONS

The following waveforms were monitored with a test oscilloscope and a 10X probe. A negative-going 100 kHz, 0.5 V, square wave was applied to the appropriate input connector with the vertical position control centered, Y Atten switches at 1X, internal sweep generator disconnected (Option 4 version only), and the unused input connector grounded (grounding cap installed). The Y Gain was adjusted to 1 V for 8 divisions of deflection. The test points shown on the component and waveform test point location illustration with a + or − sign opposite the test point number indicates the input connector to which the test signal was applied.



VOLTAGE & WAVEFORM CONDITIONS

+Y FOCUS CORRECTION PICKOFF AMPLIFIER

+Y INPUT

Y INPUT

-Y INPUT

-Y FOCUS CORRECTION PICKOFF AMPLIFIER

Y PREAMPLIFIER

VERTICAL POSITION & LIMITER

Y OUTPUT AMPLIFIER

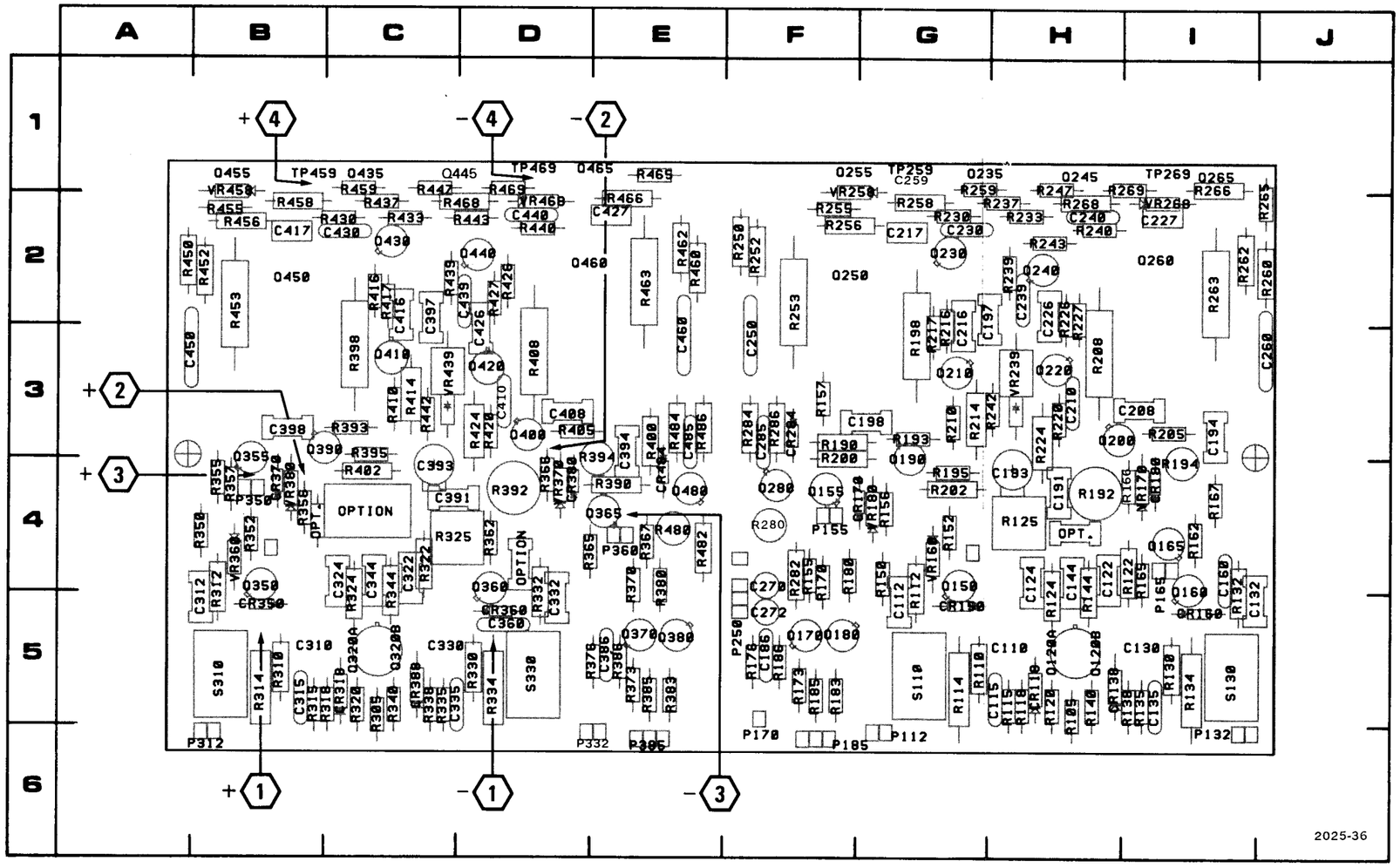
NOTES:

* HEAT SINK.
** PARTIAL A2 CONTROL INTERFACE & DYNAMIC FOCUS BOARD.
† OPTIONAL BANDWIDTH LIMIT CAPACITOR.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

PARTIAL A1 DEFLECTION AMPLIFIER BOARD

606 MONITOR @ VERTICAL (Y) AMPLIFIER ◇1



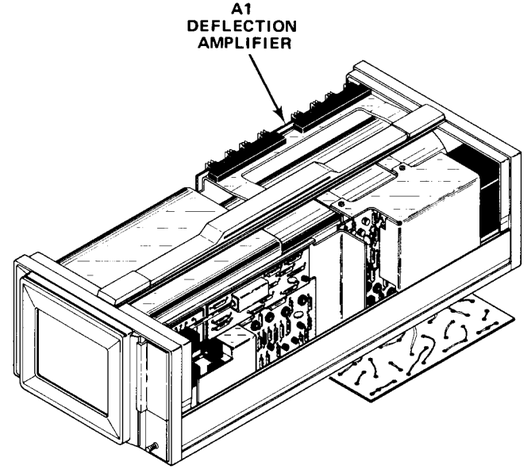


Figure 9-4. A1—Horizontal (X) Amplifier component and waveform test point locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C110	5H	C394	3E	Q120A	5H	R110	5G	R217	3G	R334	5D	R442	3C
C112	5G	C397	2C	Q120B	5H	R112	5G	R220	3H	R335	5C	R443	2D
C115	5H	C398	3B	Q150	4G	R114	5G	R224	3H	R338	5C	R447	1C
C122	4H	C408	3D	Q155	4F	R115	5H	R226	2H	R340	5C	R450	2A
C124	4H	C410	3D	Q160	4I	R118	5H	R227	2H	R344	4C	R452	2B
C130	5I	C416	2C	Q165	4I	R120	5H	R230	2G	R350	4B	R453	2B
C132	5I	C417	2B	Q170	5F	R122	4I	R233	2H	R352	4B	R455	2B
C135	5I	C426	3D	Q180	5F	R124	5H	R237	2H	R355	4B	R456	2B
C144	4H	C427	2E	Q190	4G	R125	4H	R239	2H	R356	4B	R458	2B
C160	4I	C430	2C	Q200	3H	R130	5I	R240	2H	R357	4B	R459	1C
C186	5F	C439	2D	Q210	3G	R132	4I	R242	3H	R362	4D	R460	2E
C191	4H	C440	2D	Q220	3H	R134	5I	R243	2H	R365	4E	R462	2E
C193	4H	C450	3A	Q230	2G	R135	5I	R247	1H	R366	4D	R463	2E
C194	3I	C460	3E	Q235	1G	R138	5I	R250	2F	R367	4E	R465	1E
C197	3G	C485	3E	Q240	2H	R140	5H	R252	2F	R370	4E	R466	2E
C198	3G			Q245	1H	R144	4H	R253	2F	R373	5E	R468	2D
C208	3I	CR118	5H	Q250	2F	R150	4G	R255	2F	R376	5E	R469	1D
C210	3H	CR138	5H	Q255	1F	R152	4G	R256	2F	R380	4E	R480	4E
C216	3G	CR150	5G	Q260	2I	R155	4F	R258	2G	R383	5E	R482	4E
C217	2G	CR160	5I	Q265	1I	R156	4G	R259	1G	R385	5E	R484	3E
C226	2H	CR170	4G	Q280	4F	R157	3F	R205	3I	R386	5E	R486	3E
C227	2I	CR180	4I	Q320A	5C	R162	4I	R260	2J	R390	4E		
C230	2G	CR284	3F	Q320B	5C	R165	4I	R262	2I	R392	4D	TP259	1G
C239	2H	CR318	5C	Q350	4B	R166	4I	R263	2I	R393	3C	TP269	1I
C240	2H	CR338	5C	Q355	3B	R167	4I	R265	2J	R394	3E	TP459	1B
C250	3F	CR350	5B	Q360	4D	R170	4F	R266	1I	R395	3C	TP469	1D
C259	1G	CR360	5D	Q365	4E	R173	5F	R268	2H	R398	3C		
C260	3J	CR370	4B	Q370	5E	R176	5F	R269	1I	R400	3E	S110	5G
C270	4F	CR380	4D	Q380	5E	R180	4F	R280	4F	R402	4C	S130	5I
C272	5F	CR484	4E	Q390	3C	R183	5F	R282	4F	R405	3D	S310	5B
C285	3F			Q400	3D	R185	5F	R284	3F	R408	3D	S330	5D
C310	5B			Q410	3C	R186	5F	R286	3F	R410	3C		
C312	5B	P112	6G	Q420	3D	R190	3F	R305	5C	R404	3C	VR160	4G
C315	5B	P132	6I	Q430	2C	R192	4H	R310	5B	R416	2C	VR170	4I
C322	4C	P155	4F	Q435	1C	R193	3G	R312	5B	R417	2C	VR180	4G
C324	4C	P165	4I	Q440	2D	R194	4I	R314	5B	R420	3D	VR239	3H
C330	5C	P170	5F	Q445	1D	R195	4G	R315	5B	R424	3D	VR258	1F
C332	5D	P185	6F	Q450	2B	R198	3G	R318	5C	R426	2D	VR268	2I
C335	5C	P250	5F	Q455	1B	R200	3F	R320	5C	R427	2D	VR360	4B
C344	4C	P312	6B	Q460	2D	R202	4G	R322	4C	R430	2C	VR370	4D
C360	5D	P332	6E	Q465	1E	R208	3H	R324	4C	R433	2C	VR380	4B
C386	5E	P350	4B	Q480	4E	R210	3G	R325	4C	R437	2C	VR439	3C
C391	4C	P360	4E			R214	3G	R330	5D	R439	2C	VR458	1B
C393	4C	P385	6E	R105	5H	R216	3G	R332	5D	R440	2D	VR468	2D

VOLTAGE AND WAVEFORM CONDITIONS

NOTE

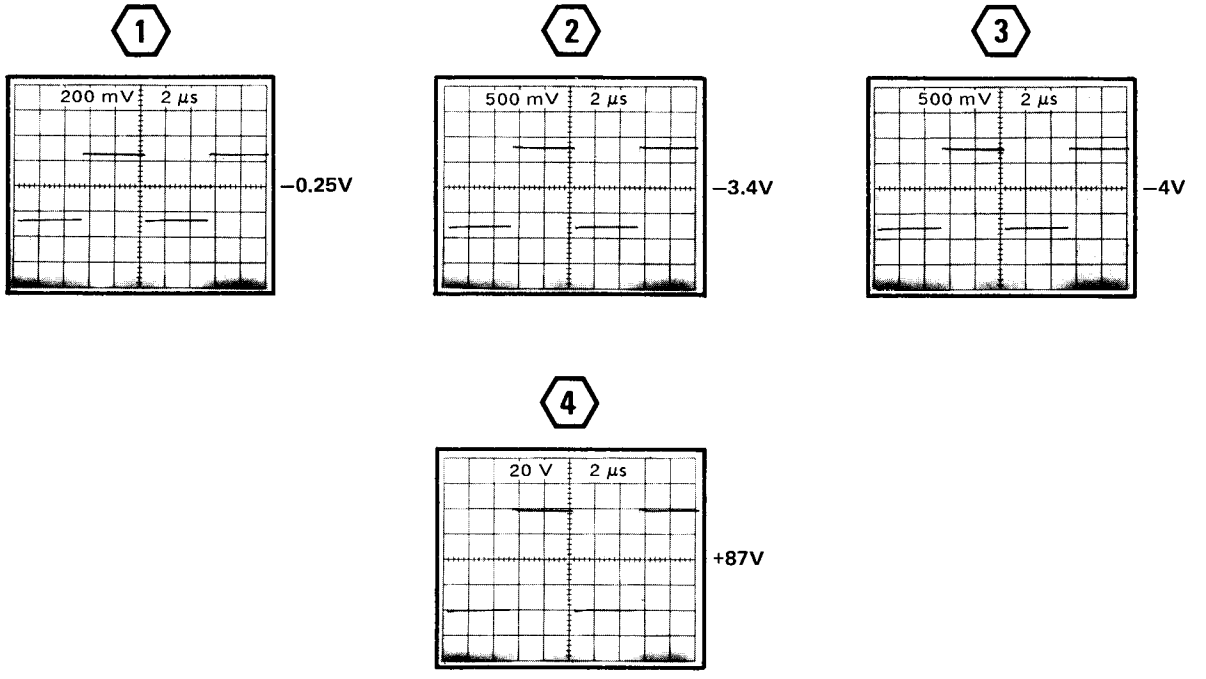
The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

VOLTAGE CONDITIONS

The dc voltages on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

WAVEFORM CONDITIONS

The following waveforms were monitored with a test oscilloscope and a 10X probe. A negative-going 100 kHz, 0.5 V square wave was applied to the appropriate input connector with the vertical Position control centered, X Atten switches at 1X, internal sweep generator disconnected (Option 4 version only), and the unused input connector grounded (grounding cap installed). The X Gain was adjusted to 1 V for 8 divisions of deflection. The test points shown on the component and waveform test point location illustration with a + or – sign opposite the test point number indicates the input connector to which the test signal was applied.



VOLTAGE & WAVEFORM CONDITIONS

+X FOCUS CORRECTION PICKOFF AMPLIFIER

+X INPUT

+X ATTEN S310

HORIZONTAL POSITION & LIMITER

X OUTPUT AMPLIFIER

X INPUT

X PREAMPLIFIER

-X ATTEN S330

-X INPUT

-X FOCUS CORRECTION PICKOFF AMPLIFIER

PARTIAL A1 DEFLECTION AMPLIFIER BOARD

NOTES:

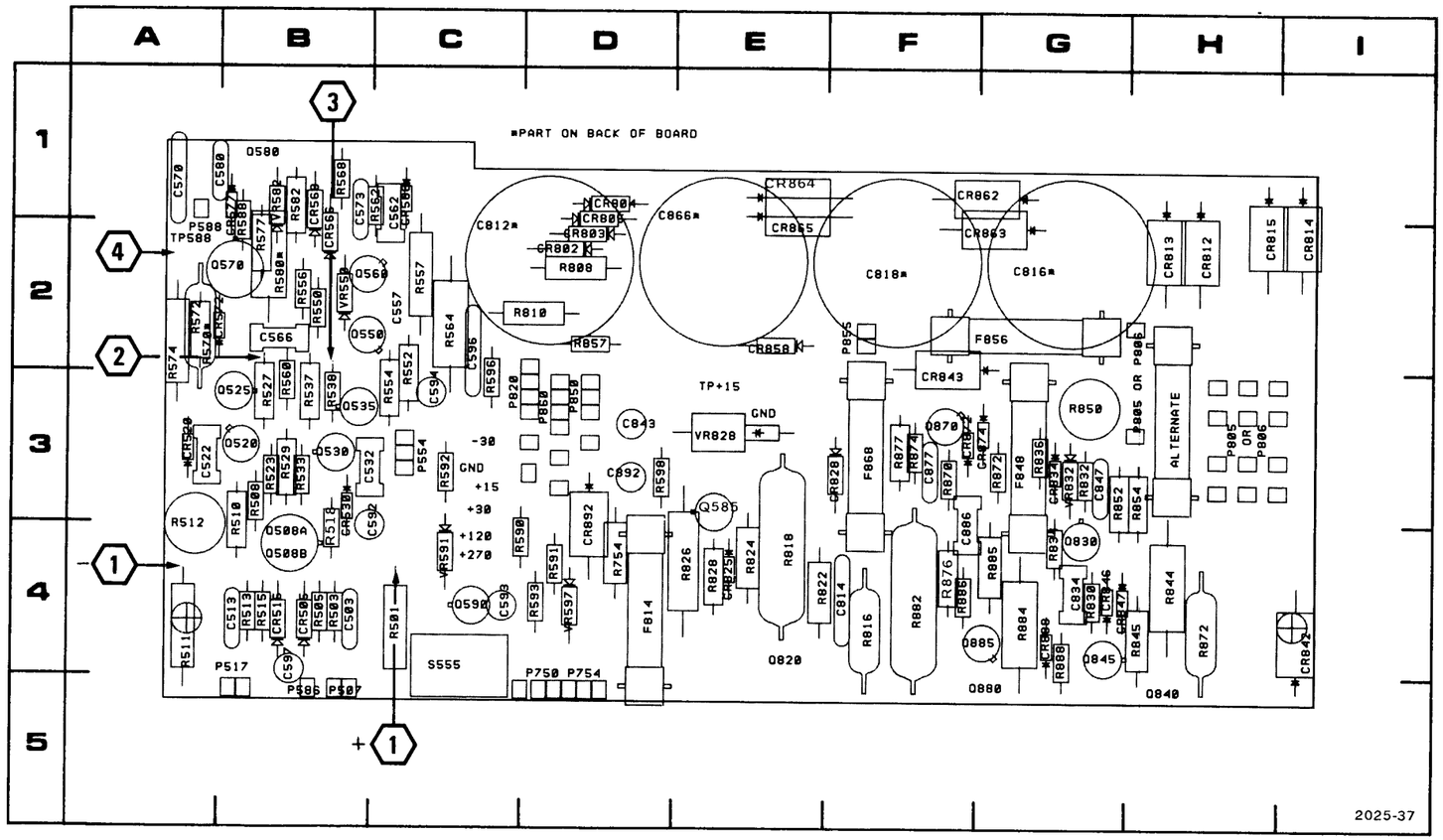
* HEAT SINK.
** PARTIAL A2 CONTROL INTERFACE & DYNAMIC FOCUS BOARD.
† OPTIONAL BANDWIDTH LIMIT CAPACITOR.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

LIC P1 P2

606 MONITOR @ HORIZONTAL (X) AMPLIFIER ◇2

HORIZONTAL (X) AMPLIFIER ◇2



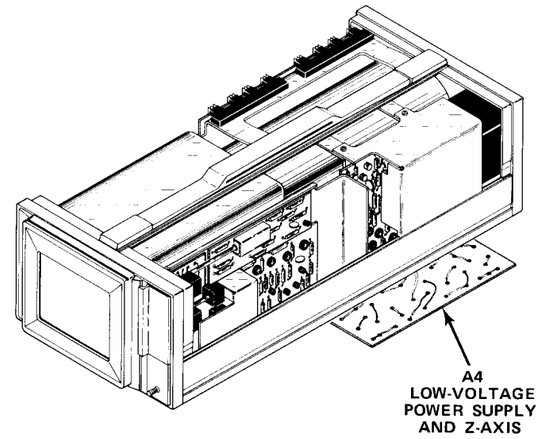


Figure 9-5. A4—Z-Axis Amplifier component and waveform test point locations.

ASSEMBLY A4

@

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C503	4B	CR515	4B	CR872	3F	Q530	3B	R527	3B	R808	2D	S555	4C
C513	4B	CR520	3A	CR874	3G	Q535	3B	R529	3B	R810	2D		
C522	3A	CR530	3B	CR888	4G	Q550	2B	R533	3B	R816	4F	TPGND	3C
C532	3B	CR566	2B	CR892	3D	Q560	2B	R537	3B	R818	4E	TPGND	3E
C557	2C	CR568	1B			Q570	2B	R538	3B	R822	4E	TP+15	3E
C562	1C	CR572	2A	F814	4D	Q580	1B	R550	2B	R824	4E	TP+15	3C
C566	2B	CR577	1B	F848	3G	Q585	3E	R552	2C	R826	4E	TP−30	3C
C570	1A	CR586	1C	F856	2G	Q590	4C	R554	3C	R828	4E	TP+30	3C
C573	1B	CR802	2D	F868	3F	Q820	4E	R556	2B	R830	4G	TP+120	4C
C580	1A	CR803	2D			Q825	3E	R557	2C	R832	3G	TP+270	4C
C592	4C	CR804	1D	P507	5B	Q830	4G	R560	3B	R834	4G	TP588	2A
C593	4C	CR805	1D	P517	4B	Q840	5H	R562	1C	R836	3G		
C594	3C	CR812	2H	P554	3C	Q845	4G	R564	2C	R842	4H	VR550	2B
C596	2C	CR813	2H	P586	5B	Q870	3F	R568	1B	R844	4H	VR582	1B
C597	4B	CR814	2I	P588	1A	Q880	5G	R570	2A	R845	4H	VR591	4C
C812	2D	CR815	2H	P750	5D	Q885	4G	R572	2A	R850	3G	VR597	4D
C814	4F	CR825	4E	P754	5D			R574	2A	R852	3G	VR828	3E
C816	2G	CR828	3E	P805	3H	R501	4C	R577	2B	R854	3H	VR832	3G
C818	2F	CR834	3G	P806	2H	R503	4B	R580	2B	R857	2D		
C834	4G	CR842	4I	P820	3D	R505	4B	R582	1B	R870	3F		
C843	3D	CR843	3F	P850	3D	R508	3B	R588	1B	R874	3F		
C847	3G	CR846	4G	P855	2F	R510	4B	R590	4D	R876	4F		
C866	2E	CR847	4G	P860	3D	R511	4A	R591	4D	R877	3F		
C877	3F	CR858	2E			R512	4A	R592	3C	R882	4F		
C886	4F	CR862	1F	Q508A	4B	R513	4B	R593	4D	R884	4G		
C892	3D	CR863	2G	Q508B	4B	R515	4B	R596	3C	R885	4G		
		CR864	1E	Q520	3B	R518	4B	R598	3D	R886	4F		
CR505	4B	CR865	2E	Q525	3B	R523	3B	R754	4D	R888	4G		

VOLTAGE AND WAVEFORM CONDITIONS

NOTE

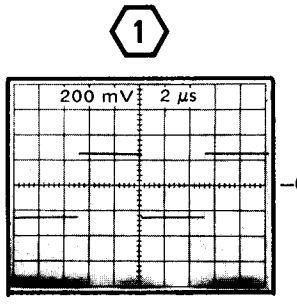
The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

VOLTAGE CONDITIONS

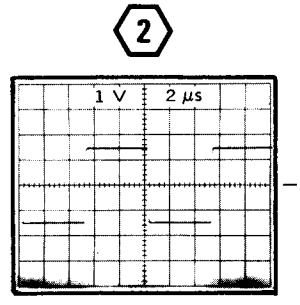
The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

WAVEFORM CONDITIONS

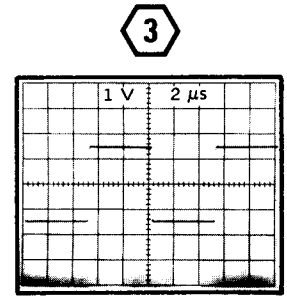
The following waveforms were monitored with a test oscilloscope and a 10X probe. A negative-going 100 kHz, 0.5 V, square wave was applied to the appropriate input connector with the vertical and horizontal Position controls fully clockwise, internal sweep generator disconnected (Option 4 version only), and the unused input connector grounded (grounding cap installed). The INTENSITY control was set for +40 V dc at test point 4 with the test signal applied to the +Z INPUT and +10 V dc at test point 4 with the test signal applied to the −X INPUT.



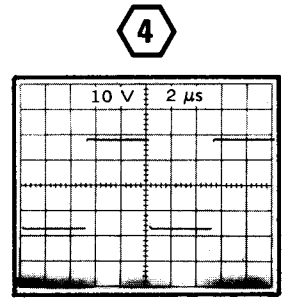
−0.25V



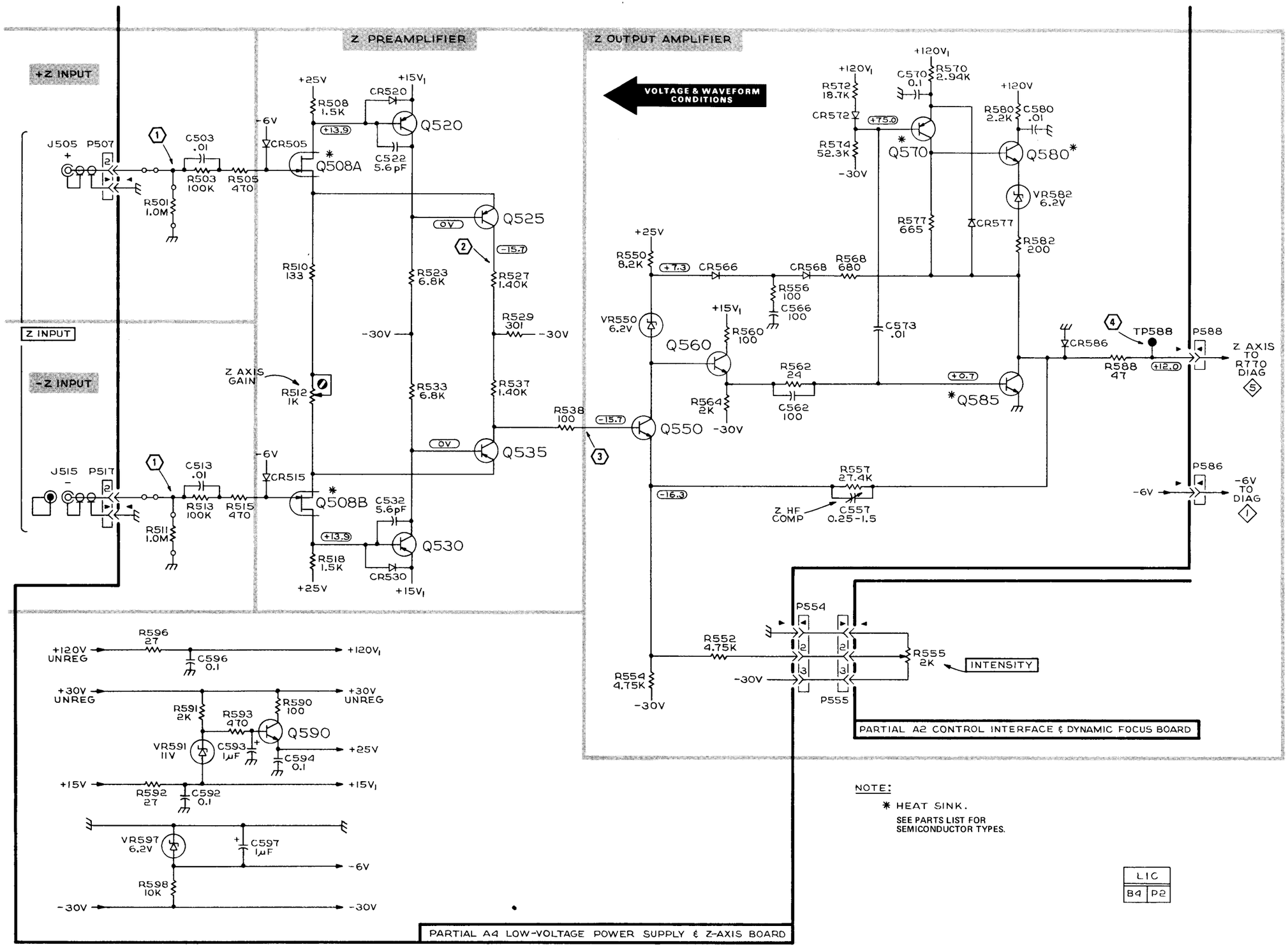
−14V



−17V



+23V



NOTE:

* HEAT SINK.
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

LIC
B4 P2

606 MONITOR @ Z-AXIS AMPLIFIER ③

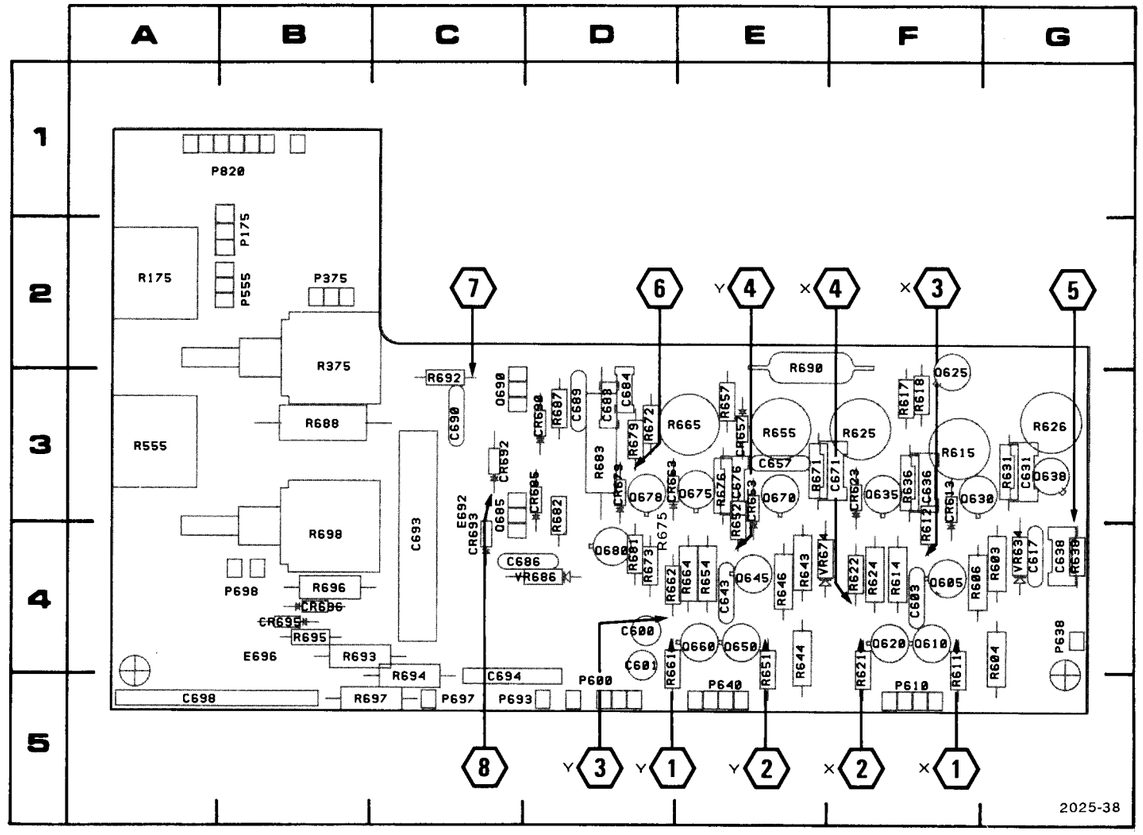
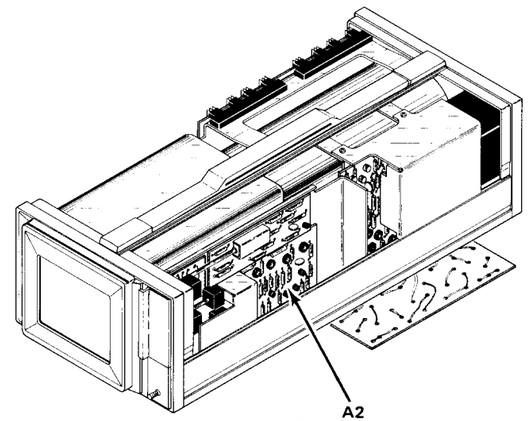


Figure 9-6. A2—Dynamic Focus component and waveform test point locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C600	4D	CR613	3F	P610	5F	R622	4F	R672	3D	Q610	4F
C601	4D	CR623	3F	P638	4G	R624	4F	R673	4D	Q620	4F
C603	4F	CR653	3E	P640	5E	R625	3F	R675	4D	Q625	3F
C617	4G	CR657	3E	P693	5D	R626	3G	R676	3E	Q630	3F
C631	3G	CR663	3D	P697	5C	R631	3G	R679	3D	Q635	3F
C636	3F	CR679	3D	P698	4B	R636	3F	R681	4D	Q638	3G
C638	4G	CR685	3D			R638	4G	R682	3D	Q645	4E
C643	4E	CR690	3D	R175	2A	R643	4E	R683	3D	Q650	4E
C657	3E	CR692	3C	R375	2B	R644	4E	R687	3D	Q660	4E
C671	3F	CR693	4C	R555	3A	R646	4E	R688	3B	Q670	3E
C676	3E	CR695	4B	R603	4G	R651	5E	R690	2E	Q675	3E
C680	3D	CR696	4B	R604	4G	R652	3E	R692	3C	Q678	3D
C683	3D			R606	4F	R654	4E	R693	4B	Q680	4D
C684	3D	E692	3C	R611	4F	R655	3E	R694	5C	Q685	3C
C686	4D	E696	4B	R612	4F	R657	3E	R695	4B	Q690	3C
C689	3D			R614	4F	R661	4D	R696	4B		
C690	3C	P175	1A	R615	3F	R662	4D	R697	5C	VR634	4G
C693	4C	P375	2B	R617	3F	R664	4E	R698	4B	VR674	4E
C694	5C	P555	2B	R618	3F	R665	3E			VR686	4D
C698	5A	P600	5D	R621	4F	R671	3E	Q605	4F		



VOLTAGE AND WAVEFORM CONDITIONS

NOTE

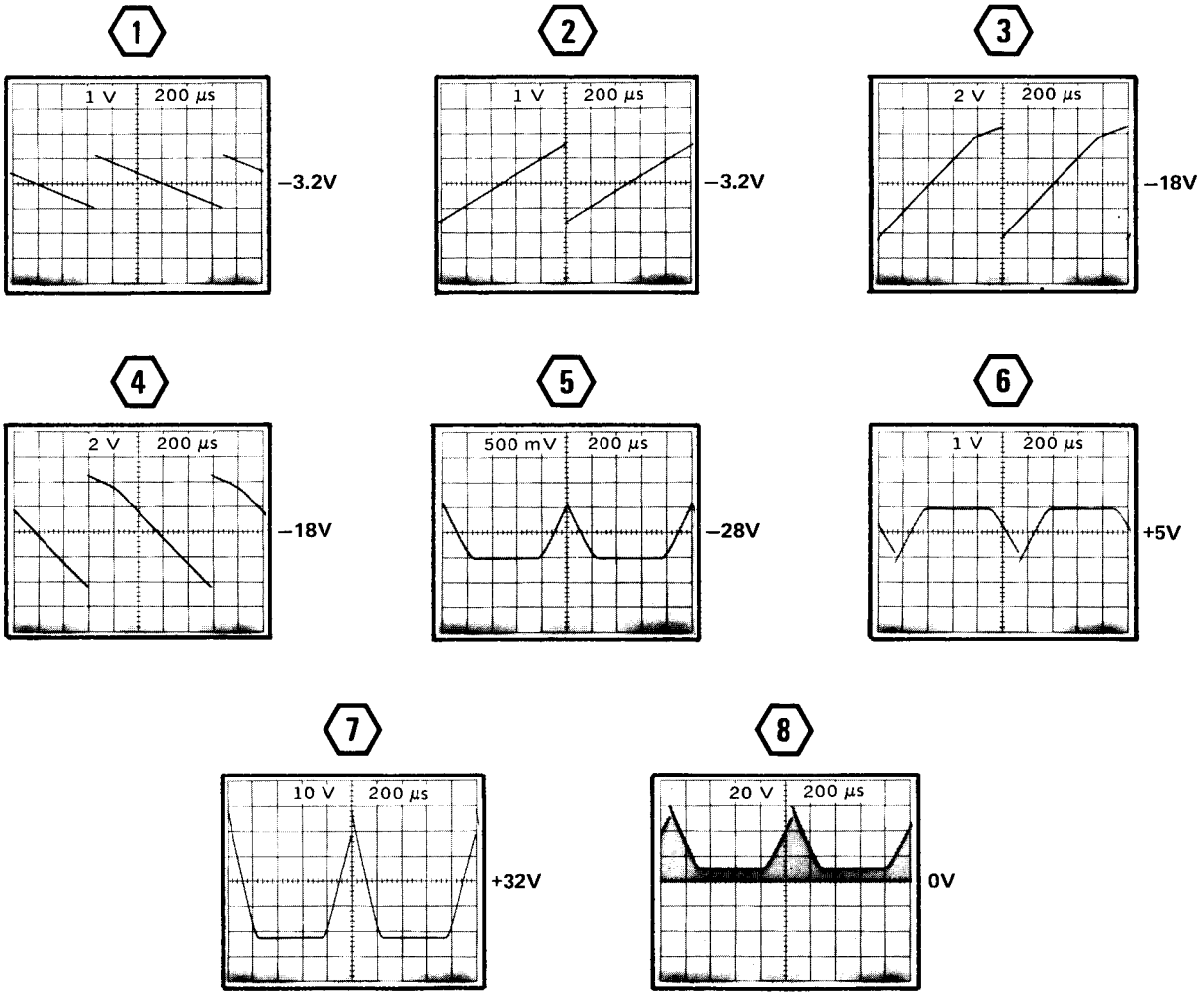
The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

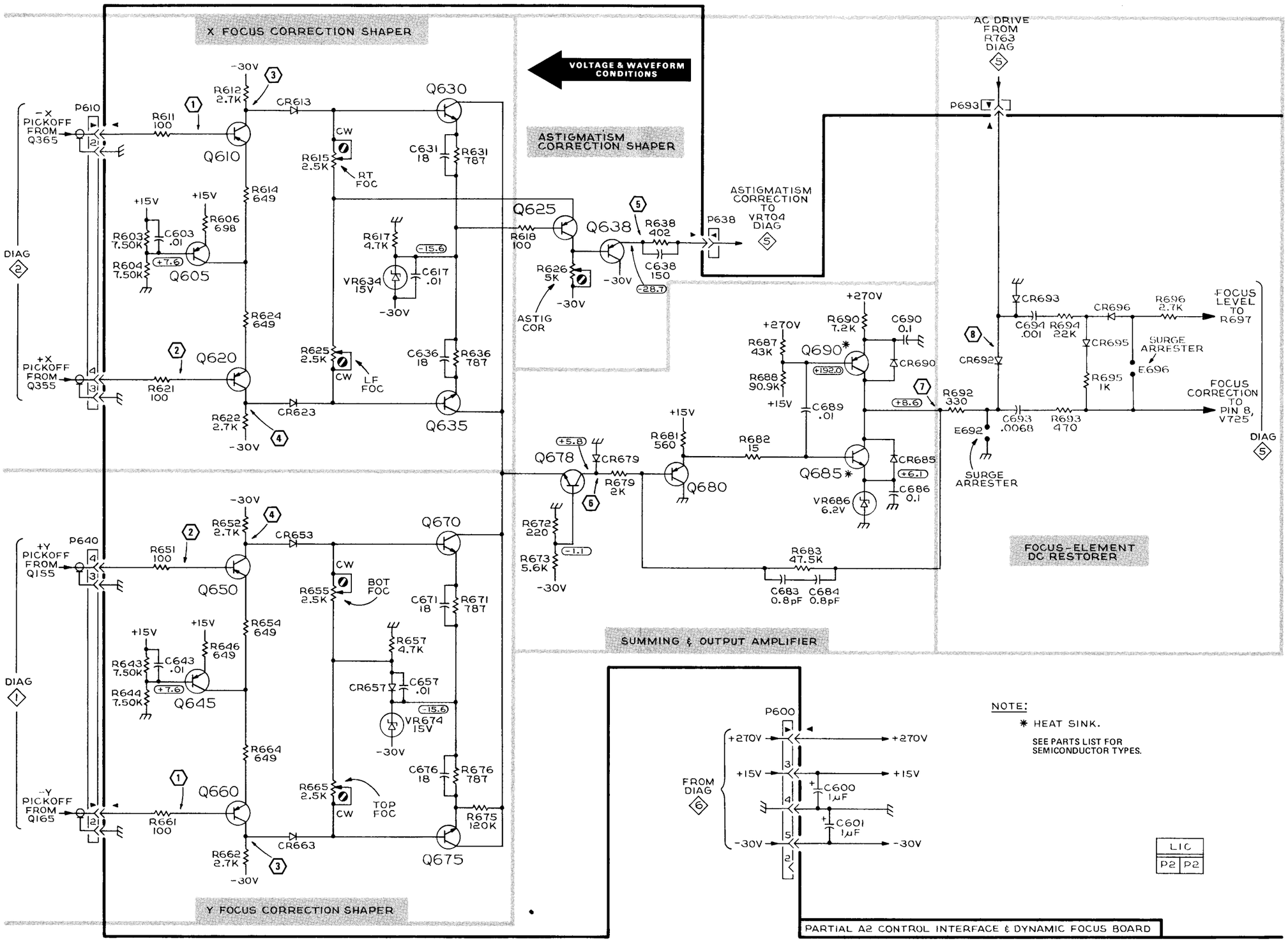
VOLTAGE CONDITIONS

The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

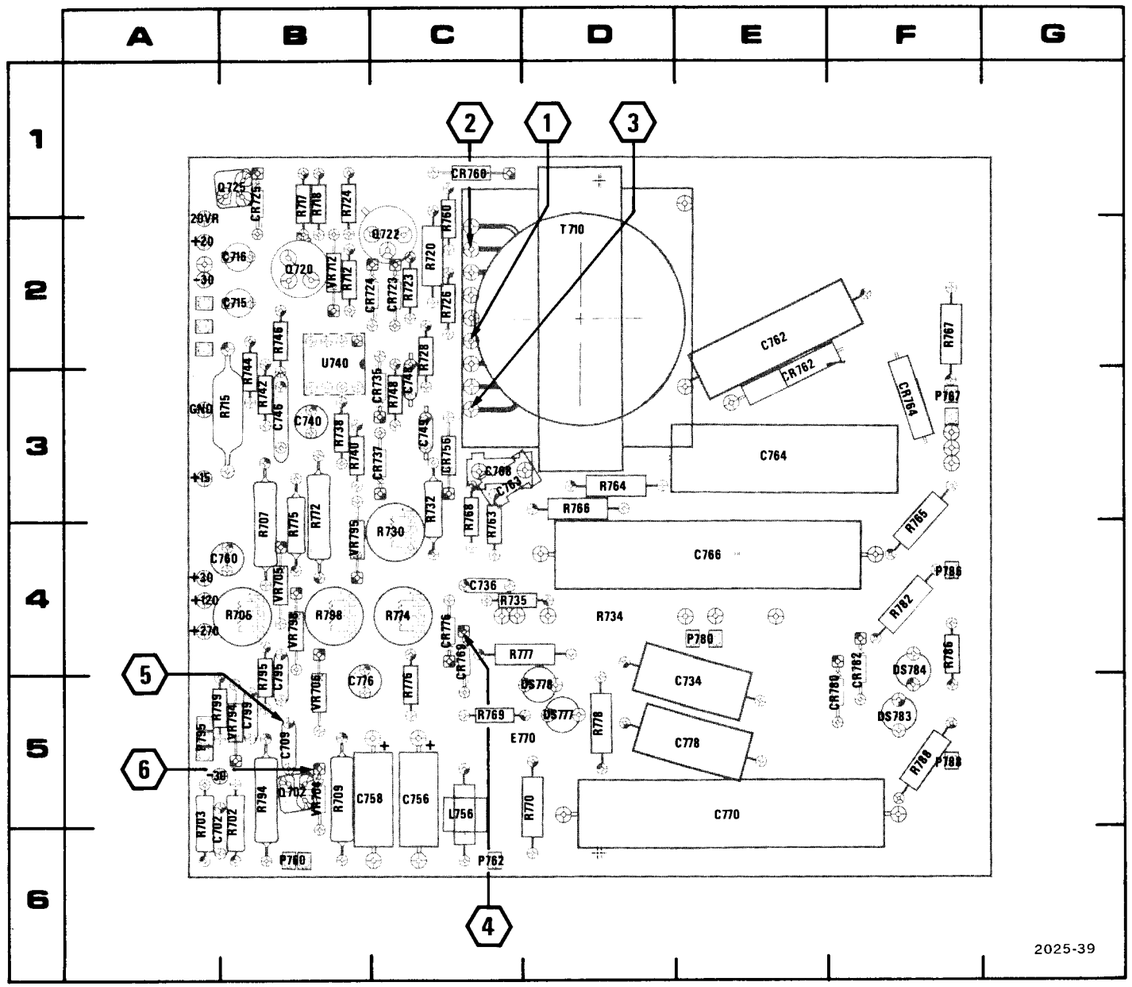
WAVEFORM CONDITIONS

The following waveforms were monitored with a test oscilloscope and a 10X probe. A positive-going 1 V, 1 ms, ramp test signal was applied from a ramp generator to the appropriate input connector. The internal sweep generator was disconnected (Option 4 version only), the unused input connector grounded (grounding cap installed) and the trace was centered. The test points shown on the component and waveform test point location illustration with an X or Y opposite the test point number indicates the input connector to which the test signal was applied.





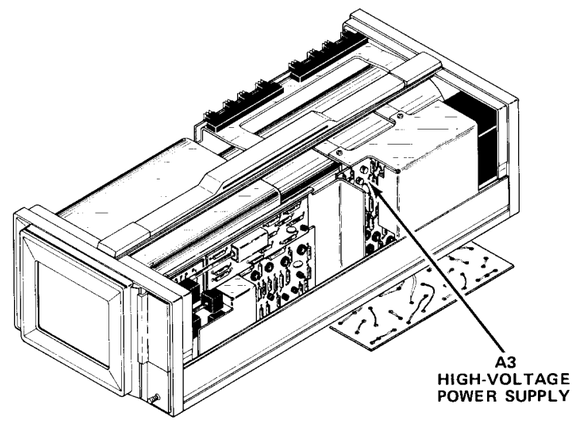
606 MONITOR @ DYNAMIC FOCUS 4



2025-39

Figure 9-7. A3—High-Voltage Power Supply component and waveform test point locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C702	5A	C778	5E	DS783	5F	R702	5B	R740	3B	R782	4F
C709	5B	C795	5B	DS784	4F	R703	5A	R742	3B	R786	4F
C715	2B	C799	5B			R705	4B	R744	3B	R788	5F
C716	2B			E770	5D	R706	4B	R746	2B	R794	5B
C734	5E	CR723	2C			R707	4B	R748	3C	R795	5B
C736	4C	CR724	2B	L756	5C	R709	5B	R760	2C	R798	4B
C740	3B	CR725	1B			R712	2B	R763	4C	R799	5A
C746	3B	CR735	3C	P760	6B	R715	3B	R764	3D		
C748	3C	CR737	3C	P762	6C	R717	1B	R765	4F	T710	2D
C749	3C	CR756	3C	P767	3F	R718	1B	R766	3D		
C756	5C	CR760	1C	P780	4E	R720	2C	R767	2F	U740	2B
C758	5B	CR762	3E	P786	4F	R723	2C	R768	4C		
C760	4B	CR764	3F	P788	5F	R724	1B	R769	5C	VR704	5B
C762	2E	CR769	4C	P795	5A	R726	2C	R770	5D	VR705	4B
C763	3C	CR776	4C			R728	2C	R772	4B	VR706	5B
C764	3E	CR780	5F			R730	4C	R774	4C	VR712	2B
C766	4E	CR782	4F	Q702	5B	R732	3C	R775	4B	VR794	5B
C768	3C			Q720	2B	R734	4D	R776	5C	VR795	4B
C770	5E	DS777	5D	Q722	2C	R735	4C	R777	4D	VR798	4B
C776	5B	DS778	5D	Q725	1B	R738	3B	R778	5D		



VOLTAGE AND WAVEFORM CONDITIONS

NOTE

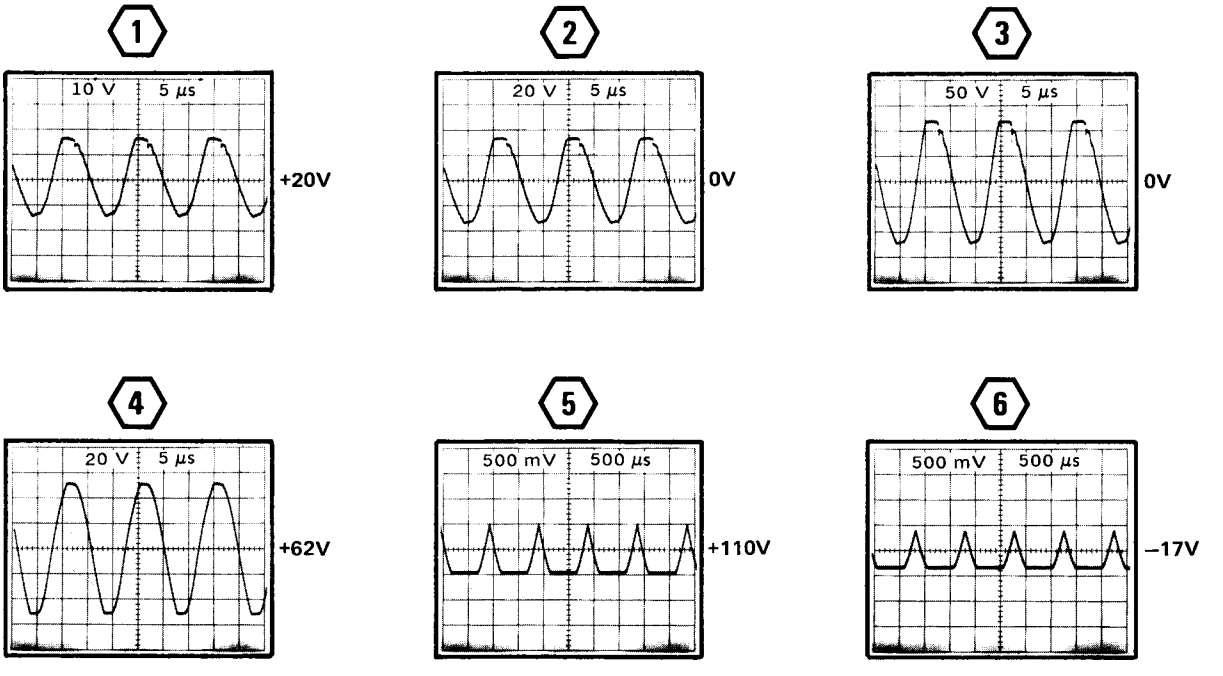
The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

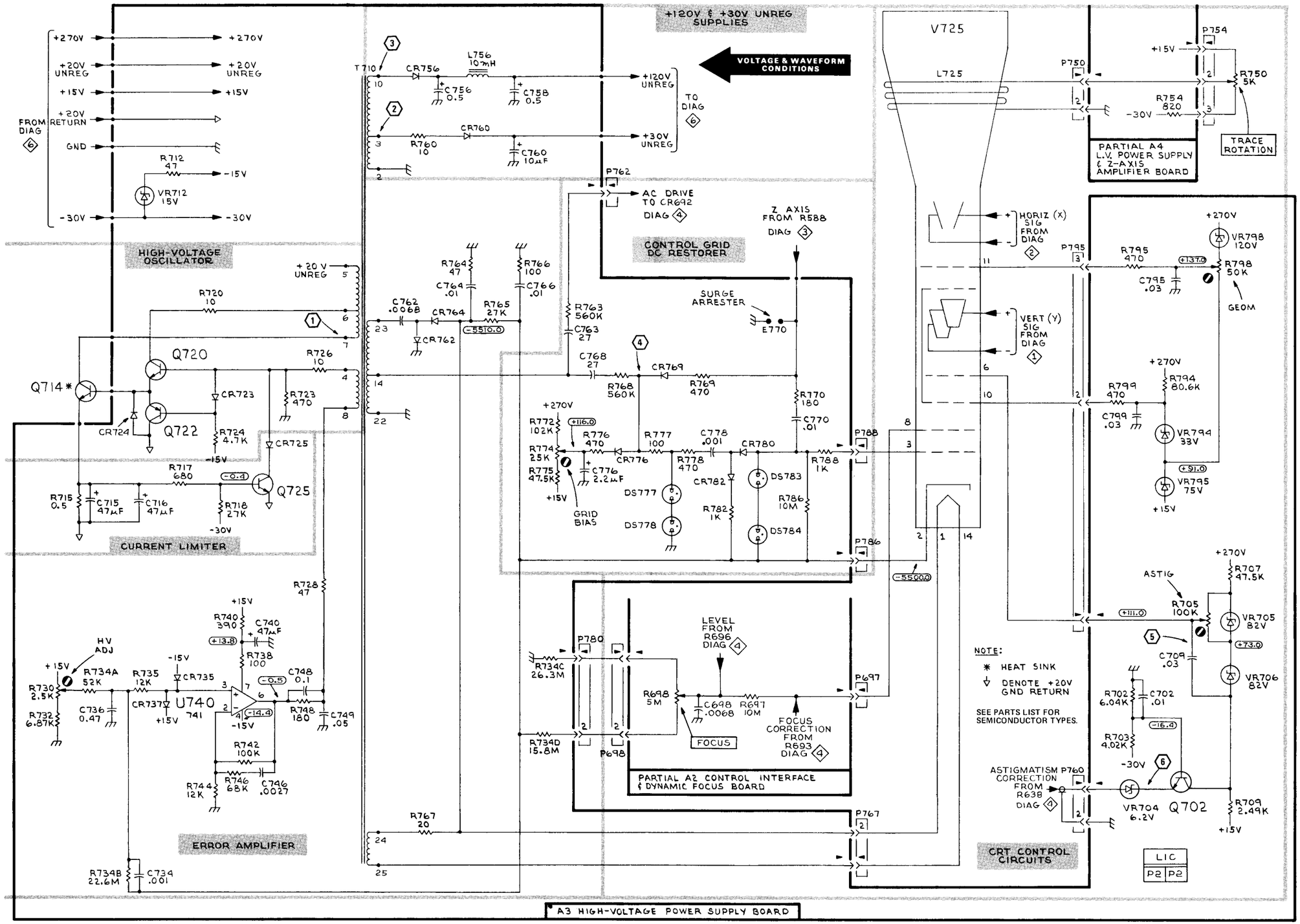
VOLTAGE CONDITIONS

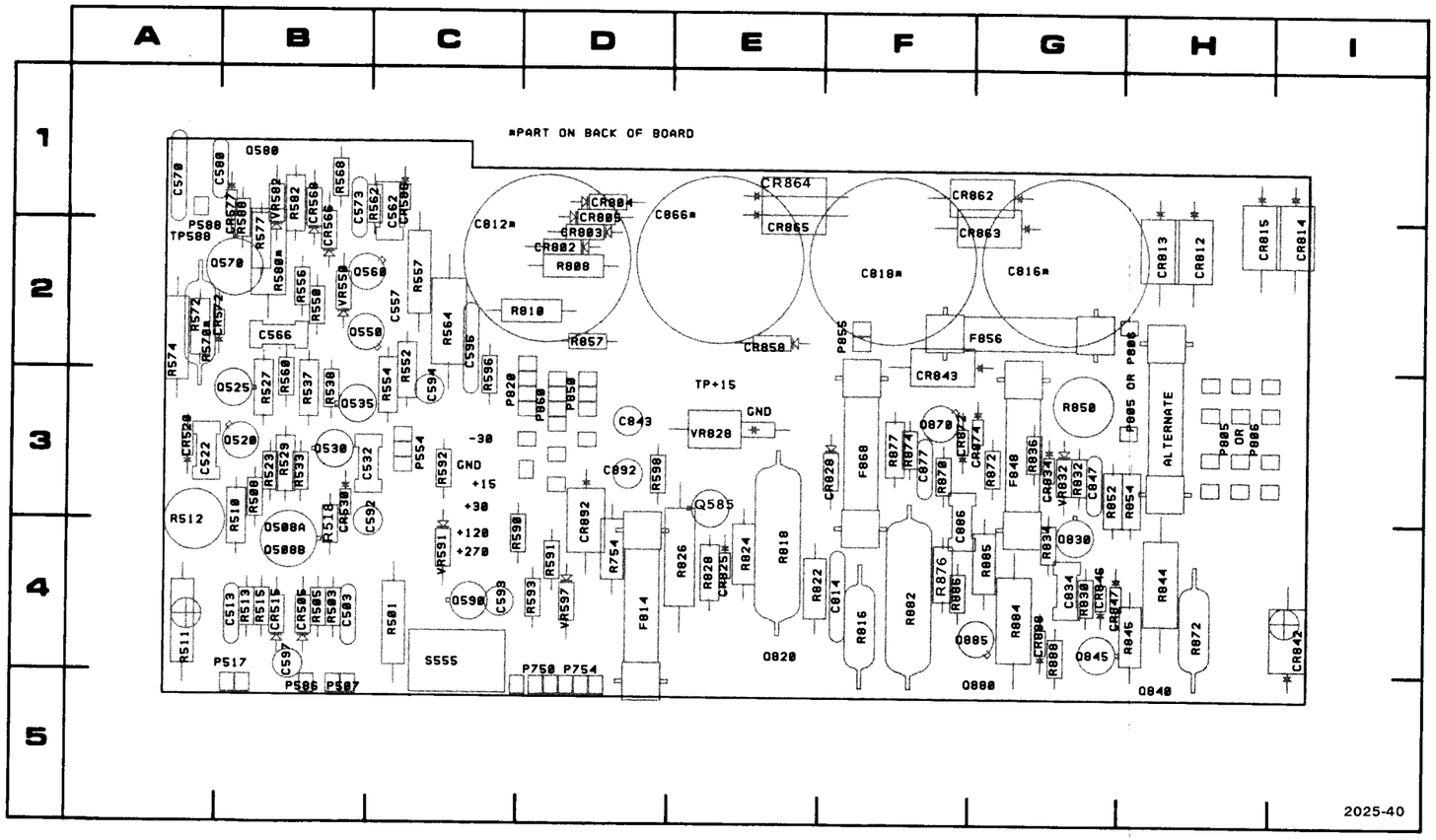
The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

WAVEFORM CONDITIONS

The following waveforms were monitored with a test oscilloscope and a 10X probe. The internal sweep generator was disconnected (Option 4 version only). Waveforms at test points 1 through 4 were obtained with no test signal applied and the INTENSITY control set for a barely visible dot. Waveforms at test points 5 and 6 were obtained with a positive-going 1 V, 1 ms, ramp test signal applied from a ramp generator to the +X INPUT connector.




+270V
+20V UNREG
+15V
+20V RETURN
GND
-30V
FROM DIAG 6
R712 47
VR712 15V
-15V
HIGH-VOLTAGE OSCILLATOR
+20V UNREG
R720 10
Q720
Q714*
Q722
CR724
CR723
R723 470
R724 4.7K
R726 10
CR725
-15V
R717 680
-0.4
Q725
R715 0.5
C715 47μF
C716 47μF
R718 27K
-30V
CURRENT LIMITER
+120V & +30V UNREG SUPPLIES
VOLTAGE & WAVEFORM CONDITIONS
T710
CR756
L756 10mH
C756 0.5
C758 0.5
+120V UNREG
TO DIAG 6
CR760
R760 10
C760 10μF
+30V UNREG
P762
AC DRIVE TO CR692 DIAG 4
Z AXIS FROM R588 DIAG 3
CONTROL GRID DC RESTORER
R764 47
C764 .01
R766 100
C766 .01
C762 .0068
CR764
R765 27K
-5510.0
CR762
R763 560K
C763 27
SURGE ARRESTER
E770
C768 27
CR769
R768 560K
R769 470
R770 180
C770 .01
+270V
R772 102K
+116.0
R776 470
R774 25K
R775 47.5K
+15V
GRID BIAS
C776 2.2μF
CR776
R777 100
C778 .001
CR780
R778 470
R788 1K
P788
DS777
DS778
CR782
DS783
DS784
R782 1K
R786 10M
P786
-5500.0
R728 47
+15V
R740 390
C740 47μF
+13.8
R738 100
HV ADJ
+15V
R734A 52K
R735 12K
-15V
CR735
CR737
U740 741
+15V
-15V
-0.5
C748 0.1
-14.4
R748 180
C749 .05
R730 2.5K
R732 6.87K
C736 0.47
R742 100K
R744 12K
R746 68K
C746 .0027
ERROR AMPLIFIER
R734B 22.6M
C734 .001
P780
R734C 26.3M
R734D 15.8M
LEVEL FROM R696 DIAG 4
R698 5M
C698 .0068
R697 10M
FOCUS
FOCUS CORRECTION FROM R693 DIAG 4
P698
P697
PARTIAL A2 CONTROL INTERFACE & DYNAMIC FOCUS BOARD
R767 20
P767
V725
L725
HORIZ (X) SIG FROM DIAG 2
VERT (Y) SIG FROM DIAG 1
P795
+270V
VR798 120V
R795 470
+137.0
R798 50K
C795 .03
GEOM
+270V
R799 470
R794 80.6K
C799 .03
VR794 33V
+91.0
VR795 75V
+15V
P754
+15V
P750
R750 5K
R754 820
-30V
TRACE ROTATION
PARTIAL A4 L.V. POWER SUPPLY & Z-AXIS AMPLIFIER BOARD
NOTE:
HEAT SINK
DENOTE +20V GND RETURN
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.
+270V
ASTIG
R707 47.5K
R705 100K
+111.0
VR705 82V
+73.0
VR706 82V
C709 .03
R702 6.04K
C702 .01
-16.4
R703 4.02K
-30V
ASTIGMATISM CORRECTION FROM R638 DIAG 4
P760
VR704 6.2V
Q702
R709 2.49K
+15V
CRT CONTROL CIRCUITS
LIC
P2 P2
A3 HIGH-VOLTAGE POWER SUPPLY BOARD



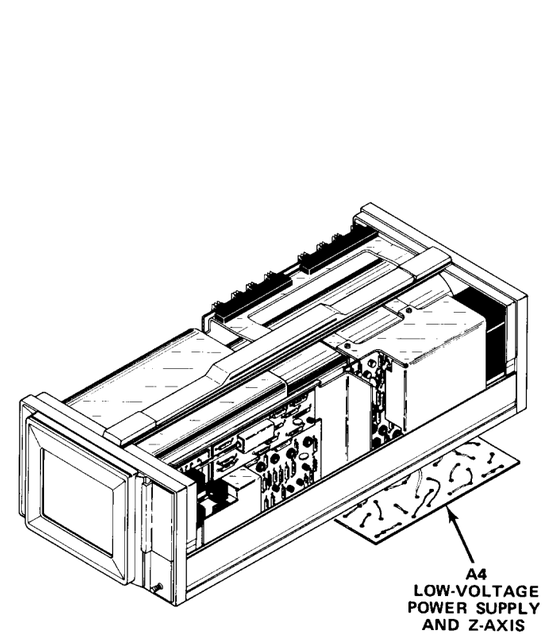


Figure 9-8. A4—Low-Voltage Power Supply Component locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C503	4B	CR515	4B	CR872	3F	Q530	3B	R527	3B	R808	2D	S555	4C
C513	4B	CR520	3A	CR874	3G	Q535	3B	R529	3B	R810	2D		
C522	3A	CR530	3B	CR888	4G	Q550	2B	R533	3B	R816	4F	TPGND	3C
C532	3B	CR566	2B	CR892	3D	Q560	2B	R537	3B	R818	4E	TPGND	3E
C557	2C	CR568	1B			Q570	2B	R538	3B	R822	4E	TP+15	3E
C562	1C	CR572	2A	F814	4D	Q580	1B	R550	2B	R824	4E	TP+15	3C
C566	2B	CR577	1B	F848	3G	Q585	3E	R552	2C	R826	4E	TP−30	3C
C570	1A	CR586	1C	F856	2G	Q590	4C	R554	3C	R828	4E	TP+30	3C
C573	1B	CR802	2D	F868	3F	Q820	4E	R556	2B	R830	4G	TP+120	4C
C580	1A	CR803	2D			Q825	3E	R557	2C	R832	3G	TP+270	4C
C592	4C	CR804	1D	P507	5B	Q830	4G	R560	3B	R834	4G	TP588	2A
C593	4C	CR805	1D	P517	4B	Q840	5H	R562	1C	R836	3G		
C594	3C	CR812	2H	P554	3C	Q845	4G	R564	2C	R842	4H	VR550	2B
C596	2C	CR813	2H	P586	5B	Q870	3F	R568	1B	R844	4H	VR582	1B
C597	4B	CR814	2I	P588	1A	Q880	5G	R570	2A	R845	4H	VR591	4C
C812	2D	CR815	2H	P750	5D	Q885	4G	R572	2A	R850	3G	VR597	4D
C814	4F	CR825	4E	P754	5D			R574	2A	R852	3G	VR828	3E
C816	2G	CR828	3E	P805	3H	R501	4C	R577	2B	R854	3H	VR832	3G
C818	2F	CR834	3G	P806	2H	R503	4B	R580	2B	R857	2D		
C834	4G	CR842	4I	P820	3D	R505	4B	R582	1B	R870	3F		
C843	3D	CR843	3F	P850	3D	R508	3B	R588	1B	R874	3F		
C847	3G	CR846	4G	P855	2F	R510	4B	R590	4D	R876	4F		
C866	2E	CR847	4G	P860	3D	R511	4A	R591	4D	R877	3F		
C877	3F	CR858	2E			R512	4A	R592	3C	R882	4F		
C886	4F	CR862	1F	Q508A	4B	R513	4B	R593	4D	R884	4G		
C892	3D	CR863	2G	Q508B	4B	R515	4B	R596	3C	R885	4G		
		CR864	1E	Q520	3B	R518	4B	R598	3D	R886	4F		
CR505	4B	CR865	2E	Q525	3B	R523	3B	R754	4D	R888	4G		

VOLTAGE CONDITIONS

NOTE

The test equipment used to obtain the voltages is listed in Table 6-1, Test Equipment.

The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible dot at near center screen with the internal sweep generator disconnected (Option 4 version only).

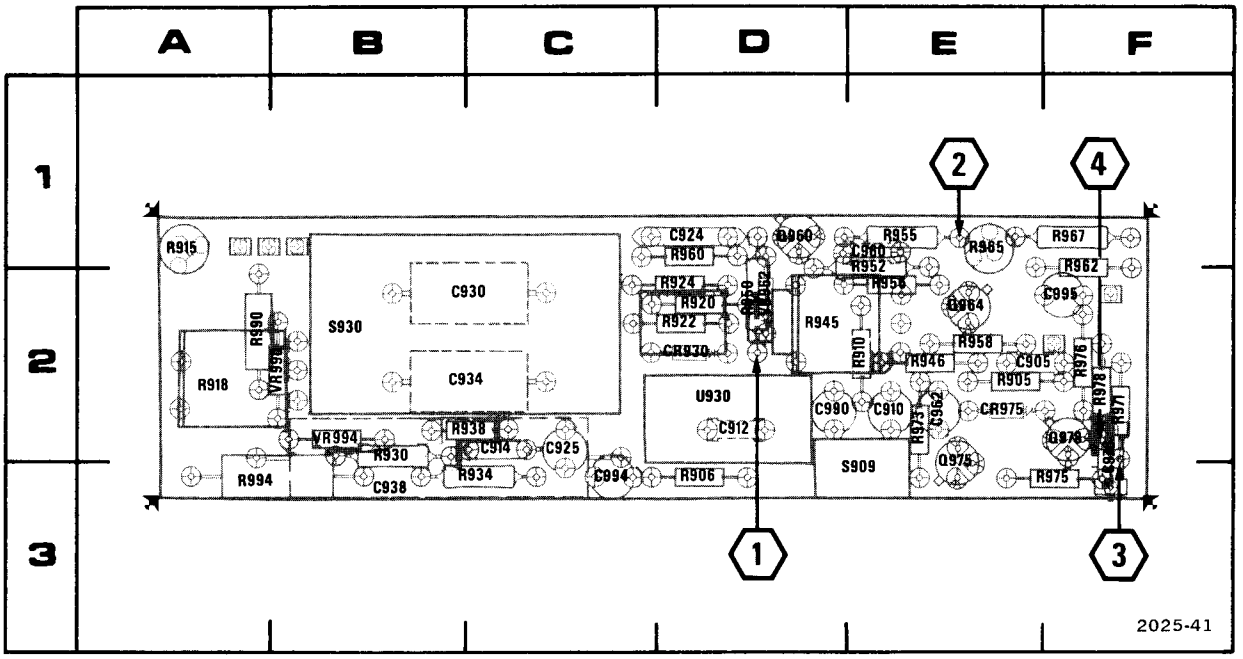
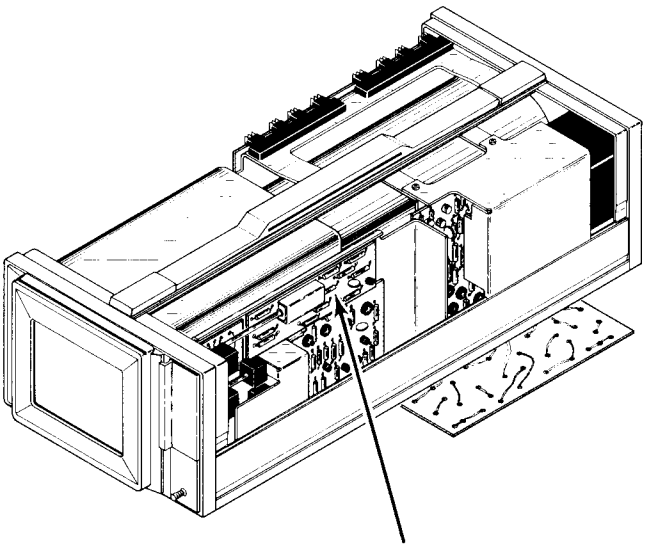
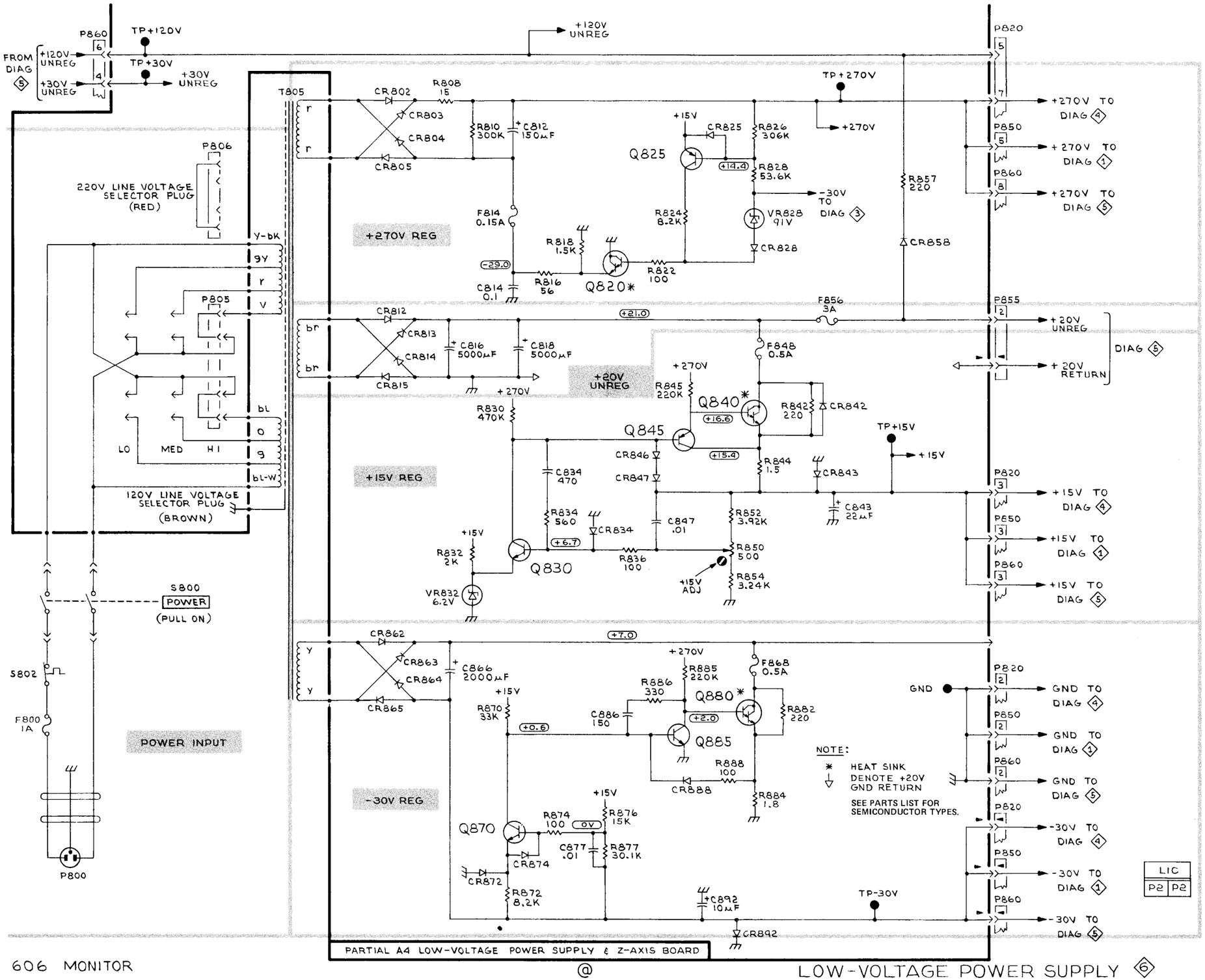


Figure 9-9. A5—Sweep (Option 4) component and waveform test point locations.

CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD	CKT NO	GRID COORD
C905	2E	C994	3C	R910	2E	R955	1E	R994	3A
C910	2E	C995	2F	R915	1A	R956	2E		
C912	2D			R918	2A	R958	2E	S909	3E
C914	2C	CR930	2D	R920	2D	R960	1D	S930	2B
C924	1D	CR975	2E	R922	2D	R962	2F		
C925	2C			R924	2D	R965	1E	U930	2D
C930	2C	Q960	1D	R930	2B	R967	1F		
C934	2C	Q964	2E	R934	3C	R971	2F	VR962	2D
C938	3B	Q975	2E	R938	2C	R973	2E	VR990	2B
C960	1E	Q978	2F	R945	2D	R975	3F	VR994	2B
C962	2E			R946	2E	R976	2F		
C976	2F	R905	2E	R950	2D	R978	2F		
C990	2D	R906	3D	R952	1E	R990	2A		



A5
SWEEP
(OPTION 4 ONLY)



606 MONITOR

@ LOW-VOLTAGE POWER SUPPLY 6

VOLTAGE AND WAVEFORM CONDITIONS

NOTE

The test equipment used to obtain the voltages and waveforms is listed in Table 6-1, Test Equipment.

VOLTAGE CONDITIONS

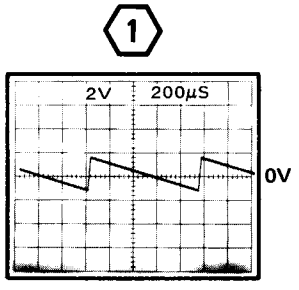
The dc voltages indicated on the schematic diagram were obtained with no test signal input using a digital multimeter. The INTENSITY and Position controls were set for a barely visible trace at near center screen with the internal sweep generator connected. The internal Trig Mode switch (S909) was set to the Normal position.

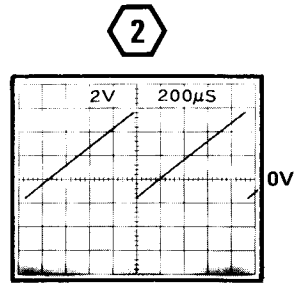
WAVEFORM CONDITIONS

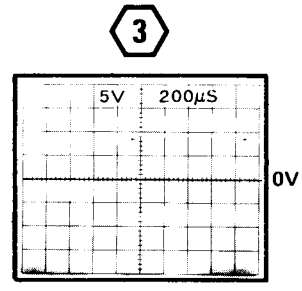
The following waveforms were monitored by a test oscilloscope and a 10X probe with no test signal applied and the internal sweep generator connected. The internal Trig Mode switch (S909) was set to the Auto position, SEC/DIV switch to .1 m, and VARIABLE control fully clockwise (calibrated).

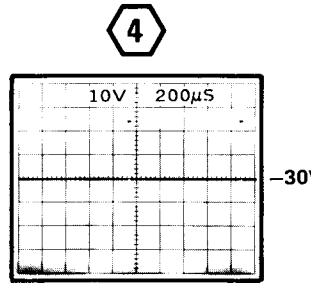
NOTE

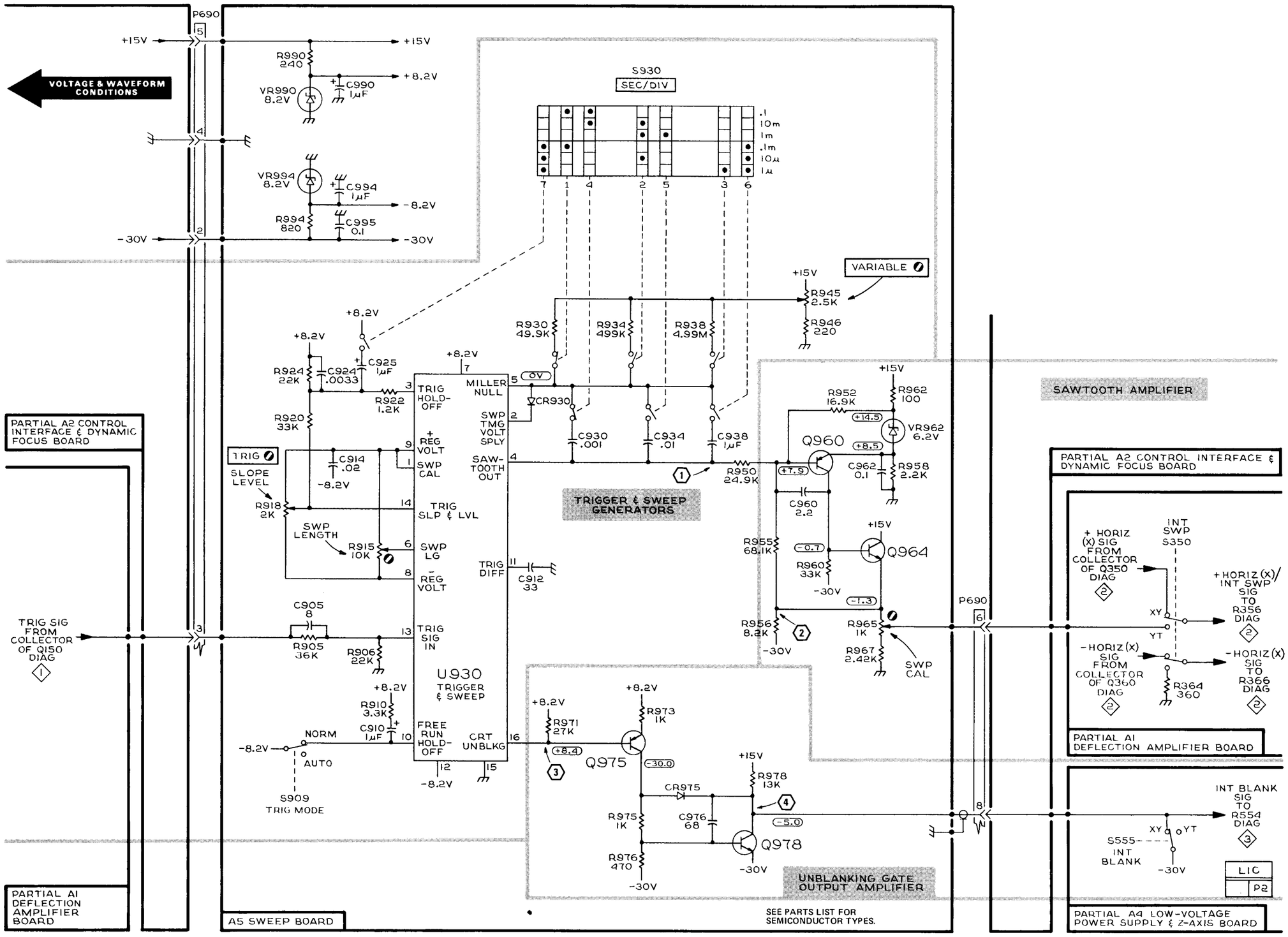
If no waveform is obtained at the test points, adjust the SLOPE/LEVEL control.











606 MONITOR @ SWEEP (OPTION 4) 7

SWEEP (OPTION 4)

7

TROUBLESHOOTING CHART INSTRUCTIONS:

1. Beginning at the top left block of the chart proceed to the right until the Monitor does not perform as indicated.

2. Then follow the dashed line as the symptom indicates. Each shaded block indicates a circuit or a stage which may be the cause of the malfunction. Refer to section 4, Theory of Operation, for a detailed discussion.

NOTE

For instruments equipped with the Option 4 Sweep circuit, disconnect the sweep (by reversing the procedure given in section 3, Installation) before beginning this procedure.

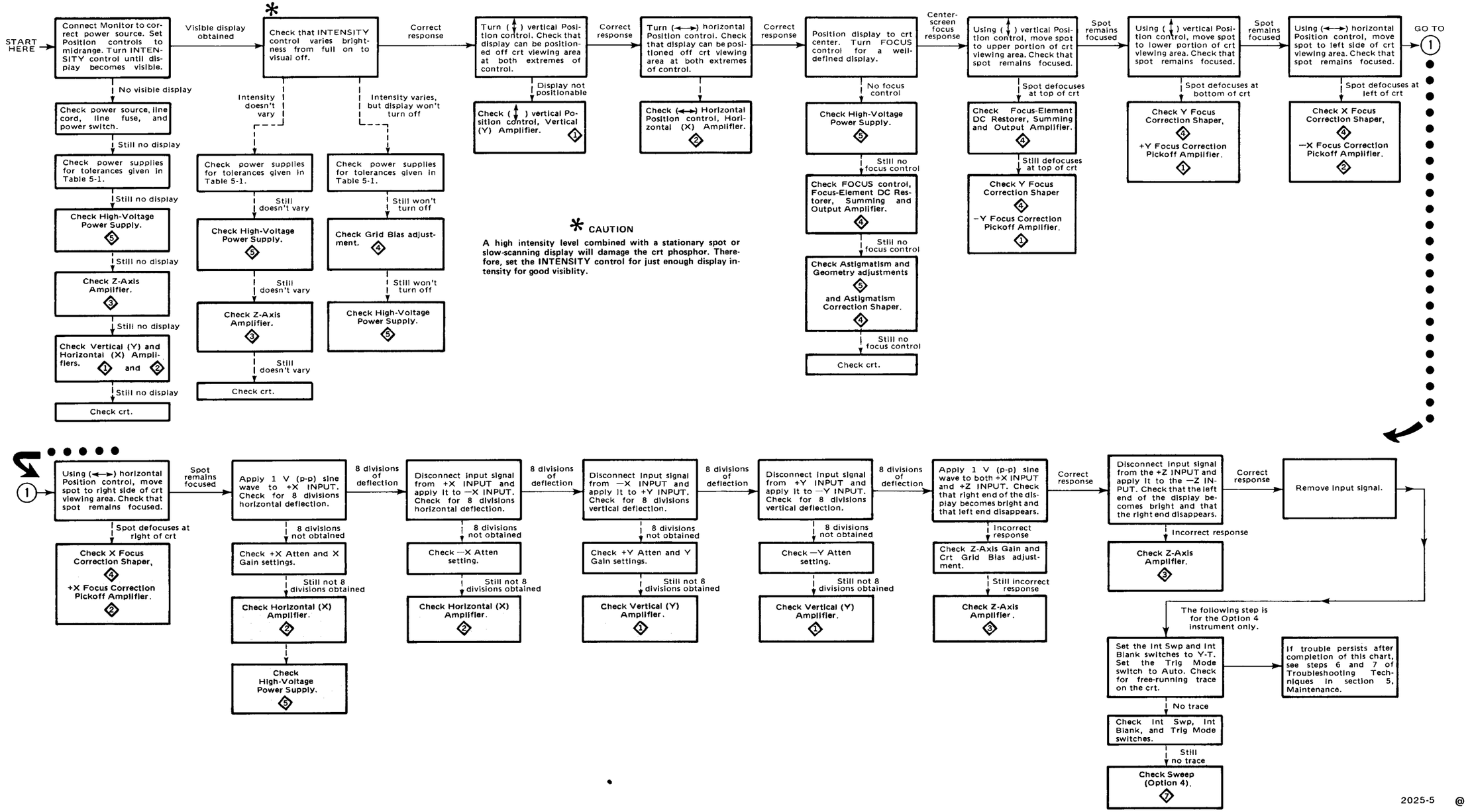


Figure 9-10. Troubleshooting Chart.

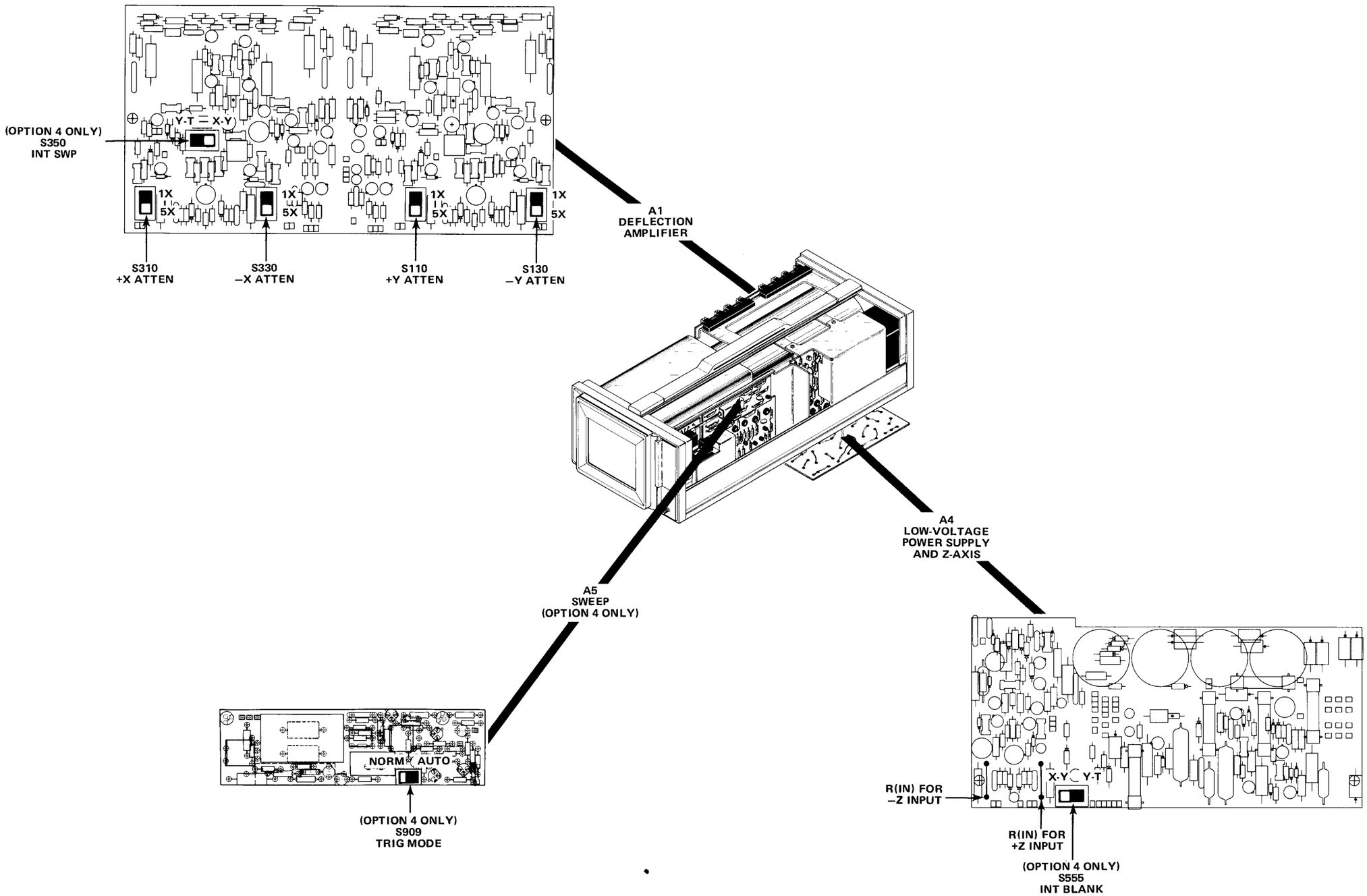


Figure 9-11. Internal control and selector locations.

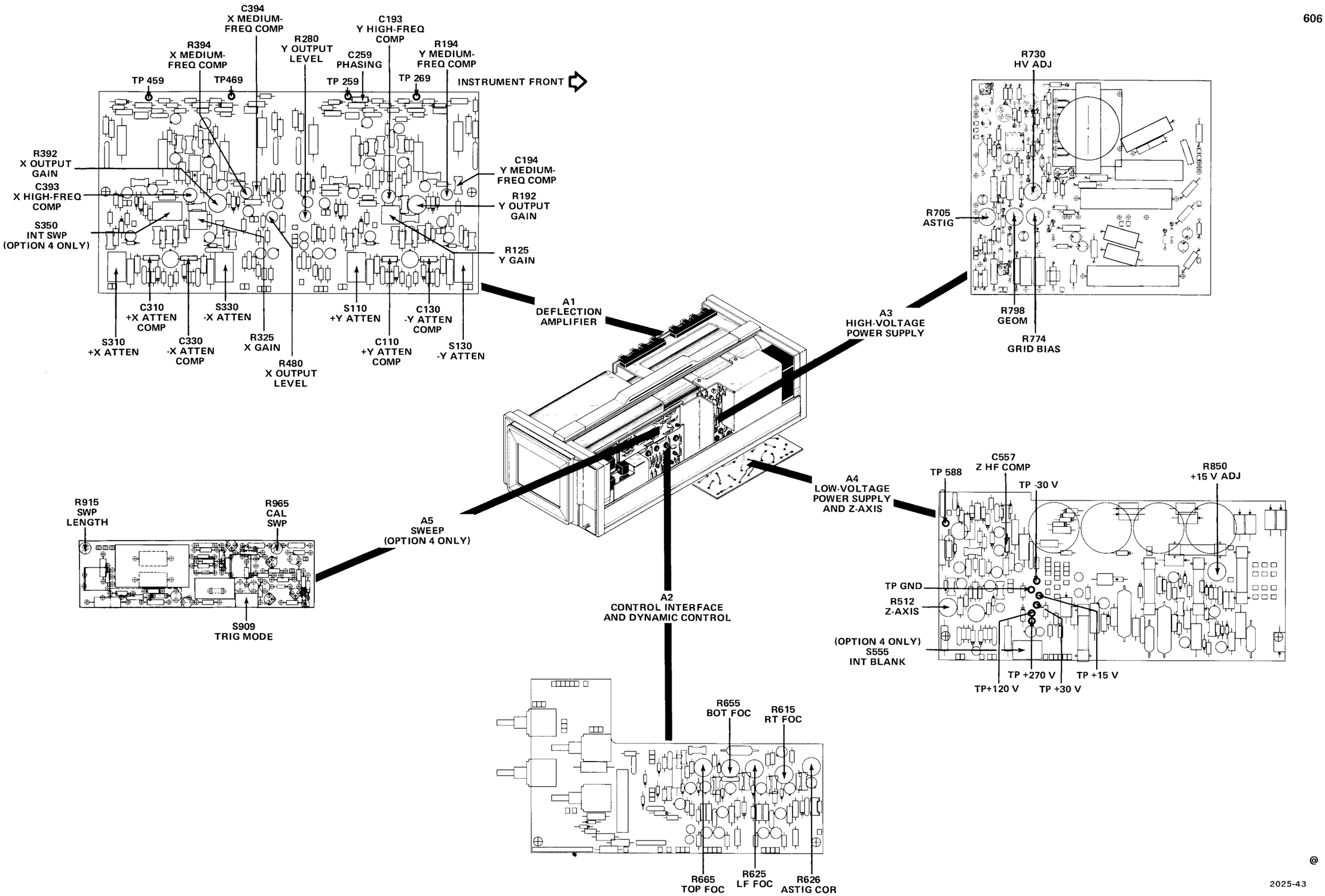
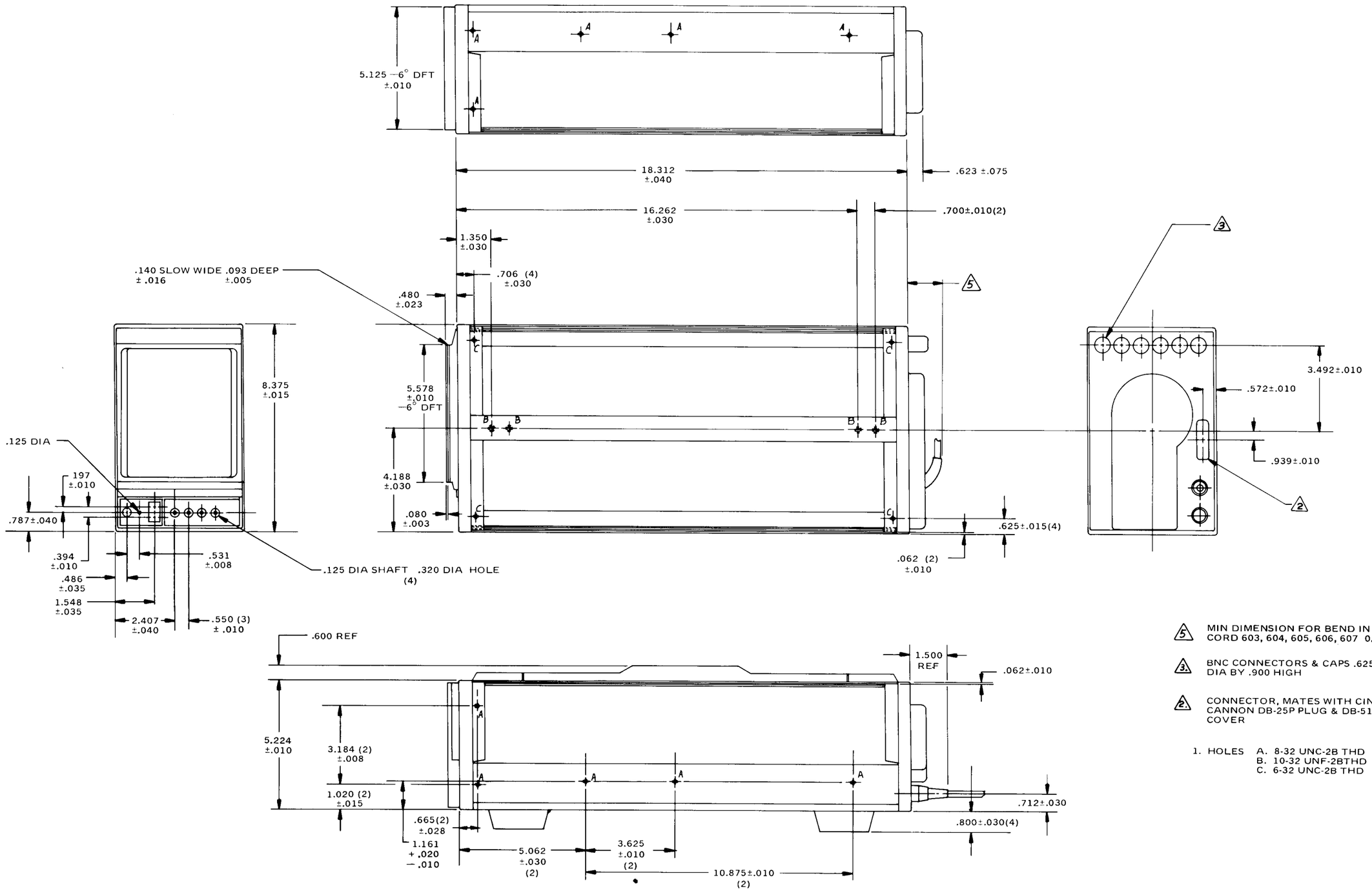


Figure 9-12. Test point and adjustment locations.

English To Metric Conversion

Inches	Centimeters	Inches	Centimeters
0.003	0.008	0.600	1.524
0.005	0.013	0.623	1.582
0.008	0.020	0.625	1.588
0.010	0.025		
0.015	0.038	0.665	1.689
		0.700	1.778
0.016	0.041	0.706	1.793
0.020	0.051	0.712	1.809
0.023	0.058	0.787	1.999
0.028	0.071	0.800	2.032
0.030	0.076	.900	2.286
		1.020	2.591
0.035	0.089	1.161	2.949
0.040	0.102	1.350	3.429
0.062	0.158	1.500	3.810
0.075	0.191		
0.080	0.203	1.548	3.932
		2.407	6.116
0.093	0.236	3.187	8.087
0.125	0.318	3.492	8.870
0.140	0.356	3.625	9.208
0.197	0.500		
0.320	0.813	4.188	10.638
		5.062	12.858
0.339	0.861	5.125	13.018
0.394	1.001	5.224	13.269
0.480	1.219	5.578	14.168
0.486	1.234		
0.531	1.349	8.325	21.273
		10.875	27.623
0.550	1.397	16.262	41.306
0.572	1.453	18.312	46.513



5 MIN DIMENSION FOR BEND IN POWER CORD 603, 604, 605, 606, 607 0.900 1.250

3 BNC CONNECTORS & CAPS .625 MAX DIA BY .900 HIGH

2 CONNECTOR, MATES WITH CINCH OR CANNON DB-25P PLUG & DB-51226-1A COVER

1. HOLES A. 8-32 UNC-2B THD
   B. 10-32 UNF-2BTHD
   C. 6-32 UNC-2B THD

(2091-38) 2025-52

Figure 9-13. Detailed dimensional drawing.

REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 *Name & Description*

Assembly and/or Component
Attaching parts for Assembly and/or Component
- - - * - - -
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
- - - * - - -
Parts of Detail Part
Attaching parts for Parts of Detail Part
- - - * - - -

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
0000C	GETTIG ENGINEERING AND MANUFACTURING CO.		SPRINGMILL, PA 16875
00779	AMP, INC.	P. O. BOX 3608	HARRISBURG, PA 17105
05820	WAKEFIELD ENGINEERING, INC.	AUDUBON ROAD	WAKEFIELD, MA 01880
08261	SPECTRA-STRIP CORP.	7100 LAMPSON AVE.	GARDEN GROVE, CA 92642
12327	FREEWAY CORP.	9301 ALLEN DR.	CLEVELAND, OH 44125
12360	ALBANY PRODUCTS CO., DIV. OF PNEUMO DYNAMICS CORP.	351 CONNECTICUT AVE.	SOUTH NORWALK, CT 06856
18722	RCA CORP., SOLID STATE DIVISION	CRESTWOOD RD.	MOUNTAINTOP, PA 18707
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
23499	GAVITT WIRE AND CABLE, DIVISION OF RSC INDUSTRIES, INC.	455 N. QUINCE ST.	ESCONDIDO, CA 92025
28520	HEYMAN MFG. CO.	147 N. MICHIGAN AVE.	KENILWORTH, NJ 07033
59730	THOMAS AND BETTS CO., THE	36 BUTLER ST.	ELIZABETH, NJ 07207
70485	ATLANTIC INDIA RUBBER WORKS, INC.	571 W. POLK ST.	CHICAGO, IL 60607
71785	TRW ELECTRONIC COMPONENTS, CINCH CONNECTOR OPERATIONS	1501 MORSE AVE.	ELK GROVE VILLAGE, IL 60007
72653	G. C. ELECTRONICS CO., A DIVISION OF HYDROMETALS, INC.	400 S. WYMAN ST.	ROCKFORD, IL 61101
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
74445	HOLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
75915	LITTELFUSE, INC.	800 E. NORTHWEST HWY	DES PLAINES, IL 60016
NO ENTRY	FOR 76850		
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
78471	TILLEY MFG. CO.	900 INDUSTRIAL RD.	SAN CARLOS, CA 94070
79136	WALDES, KOHINOOR, INC.	47-16 AUSTEL PLACE	LONG ISLAND CITY, NY 11101
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKEE, WI 53207
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97005
82647	TEXAS INSTRUMENTS, INC., CONTROL PRODUCTS DIV.	34 FOREST ST.	ATTLEBORO, MA 02703
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
83907	ACCURATE RUBBER PRODUCTS CO.	123 N. RACINE	CHICAGO, IL 60607
95937	FEDERAL TELEVISION DIV., CARDWELL CONDENSER CORP.	80 E. MONTAUK HWY.	LINDENHURST, NY 11757
95987	WECKESSER CO., INC.	4444 WEST IRVING PARK RD.	CHICAGO, IL 60641
98978	INTERNATIONAL ELECTRONIC RESEARCH CORP.	135 W. MAGNOLIA BLVD.	BURBANK, CA 91502

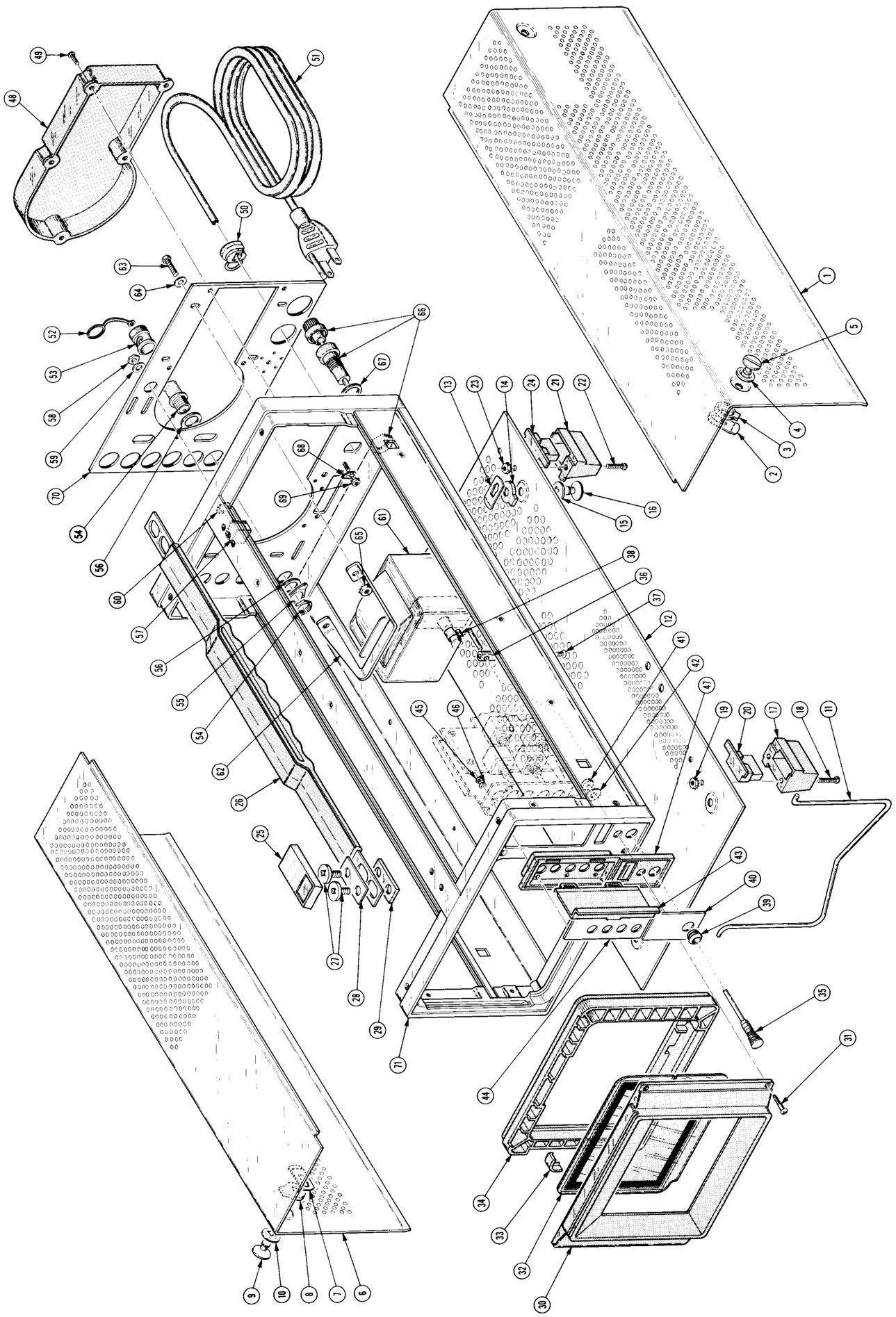
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
1-1	390-0244-00[1,2]			1	COVER,MONITOR:RIGHT	80009	390-0244-00
	390-0543-00[3]			1	COVER,SCOPE:SIDE	80009	390-0543-00
	214-0812-00			2	. FASTENER,PAWL:	80009	214-0812-00
-2	386-0226-00			2	. . PL,LATCH LKG:FOR 0.080 INCH THICKNESS	80009	386-0226-00
-3	386-0227-00			2	. . PL,LATCH INDEX:	80009	386-0227-00
-4	214-0604-00			2	. . WASH.,SPG TNSN:0.26 ID X 0.47 INCH OD	80009	214-0604-00
-5	214-0603-01			2	. . PIN,SECURING:0.27 INCH LONG	80009	214-0603-01
-6	390-0270-00[1,2]			1	COVER,MONITOR:LEFT	80009	390-0270-00
	390-0543-00[3]			1	COVER,SCOPE:SIDE	80009	390-0543-00
	214-0812-00			2	. FASTENER,PAWL:	80009	214-0812-00
-7	386-0226-00			2	. . PL,LATCH LKG:FOR 0.080 INCH THICKNESS	80009	386-0226-00
-8	386-0227-00			2	. . PL,LATCH INDEX:	80009	386-0227-00
-9	214-0603-01			2	. . PIN,SECURING:0.27 INCH LONG	80009	214-0603-01
-10	214-0604-00			2	. . WASH.,SPG TNSN:0.26 ID X 0.47 INCH OD	80009	214-0604-00
-11	348-0275-00[4]			1	FLIPSTAND,CAB.:	80009	348-0275-00
-12	390-0280-00[1,4]			1	COVER,SCOPE:BOTTOM	80009	390-0280-00
	390-0523-00[3]			1	COVER,SCOPE:BOTTOM	80009	390-0523-00
	214-0812-00			4	. FASTENER,PAWL:	80009	214-0812-00
-13	386-0226-00			4	. . PL,LATCH LKG:FOR 0.080 INCH THICKNESS	80009	386-0226-00
-14	386-0227-00			4	. . PL,LATCH INDEX:	80009	386-0227-00
-15	214-0604-00			4	. . WASH.,SPG TNSN:0.26 ID X 0.47 INCH OD	80009	214-0604-00
-16	214-0603-01			4	. . PIN,SECURING:0.27 INCH LONG	80009	214-0603-01
-17	348-0074-00			2	. SPT PIVOT,FLIP:RIGHT FRONT AND LEFT REAR	80009	348-0074-00
					(ATTACHING PARTS FOR EACH)		
-18	211-0532-00			2	. SCREW,MACHINE:6-32 X 0.75 INCH,FILH STL	83385	OBD
-19	210-0457-00			2	. NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
					- - - * - - -		
-20	348-0207-00			2	. FOOT,CABINET:RIGHT FRONT AND LEFT REAR	80009	348-0207-00
-21	348-0073-00			2	. SPT PIVOT,FLIP:LEFT FRONT AND RIGHT REAR	80009	348-0073-00
					(ATTACHING PARTS FOR EACH)		
-22	211-0532-00			2	. SCREW,MACHINE:6-32 X 0.75 INCH,FILH STL	83385	OBD
-23	210-0457-00			2	. NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
					- - - * - - -		
-24	348-0208-00			2	. FOOT,CABINET:LEFT FRONT AND RIGHT REAR	80009	348-0208-00
	390-0281-00[5]			1	COVER,SCOPE:BOTTOM	80009	390-0281-00
	214-0812-00			4	. FASTENER,PAWL:	80009	214-0812-00
	386-0226-00			4	. . PL,LATCH LKG:FOR 0.080 INCH THICKNESS	80009	386-0126-00
	386-0227-00			4	. . PL,LATCH INDEX:	80009	386-0227-00
	214-0603-01			4	. . PIN SECURING:0.27 INCH LONG	80009	214-0603-01
	214-0604-00			4	. . WASH.,SPG TNSN:0.26 ID X 0.47 INCH OD	80009	214-0604-00
-25	200-0728-00[4]			2	COV,HANDLE END:	80009	200-0728-00
-26	367-0116-00[4]			1	HANDLE,CARRYING:	80009	367-0116-00
					(ATTACHING PARTS)		
-27	212-0597-00[4]			4	SCREW,MACHINE:10-32 X 0.50 INCH,STL	80009	212-0597-00
-28	386-1624-00[4]			2	PL,RET.,HANDLE:	80009	386-1624-00
-29	386-1283-00[4]			2	PLATE,HDL MTG:PLASTIC	80009	386-1283-00
					- - - * - - -		
-30	200-1661-01[1]			1	RTNR,CRT SCALE:	80009	200-1661-01
	200-1661-03[3]			1	RTNR,CRT SCALE:	80009	200-1661-03
					(ATTACHING PARTS)		
-31	211-0188-00			2	SCREW,MACHINE:4-40 X 0.30"INCH,SST	80009	211-0188-00
					- - - * - - -		
-32	337-1674-13			1	SHLD,IMPLOSION:CLEAR	80009	337-1674-13
	337-1674-12[6]			1	SHLD,IMPLOSION:AMBER	80009	337-1674-12
	337-1674-11[7]			1	SHLD,IMPLOSION:BLUE	80009	337-1674-11
-33	386-2544-00			4	SUPPORT,CRT:	80009	386-2544-00
-34	386-3530-00			1	SUPPORT,CRT:FRONT	80009	386-3530-00
-35	384-1270-00			1	EXTENSION SHAFT:	80009	384-1270-00
-36	385-0033-00			1	INS,STANDOFF:0.625 INCH LONG,NYLON	80009	385-0033-00
					(ATTACHING PARTS)		
-37	211-0538-00			1	SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
					- - - * - - -		
-38	376-0127-00			1	COUPLER,SHAFT:PLASTIC	80009	376-0127-00
-39	358-0216-00			1	BUSHING,PLASTIC:0.257 ID X 0.412 INCH OD	80009	358-0216-00

[1]Remove for Option 6.
[2]Remove for OPtion 7.
[3]Option 6 only.
[4]Remove for Option 3 and 7.
[5]Option 3 only.
[6]Option 76 only.
[7]Option 78 only.

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
1-40	333-2145-00			1	PANEL,FRONT:	80009	333-2145-00
					(ATTACHING PARTS)		
-41	210-0586-00			1	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
-42	210-0958-00			1	WASHER,FLAT:0.115 ID X 0.469 INCH OD,STL	78471	OBD
					- - - * - - -		
-43	200-1282-00			1	DOOR ACCESS:	80009	200-1282-00
-44	333-1514-00[1]			1	PANEL,FRONT:NON-SWEEP	80009	333-1514-00
					(ATTACHING PARTS)		
-45	210-0406-00			3	NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
-46	210-0054-00			3	WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL	83385	OBD
					- - - * - - -		
-47	386-2067-00			1	SUBPANEL,FRONT:	80009	386-2067-00
-48	200-1308-00[2]			1	COVER,CRT,REAR:	80009	200-1308-00
	200-1308-01[3]			1	COVER,CRT,REAR:	80009	200-1308-01
					(ATTACHING PARTS)		
-49	211-0097-00			5	SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
					- - - * - - -		
-50	358-0529-00[2]			1	BSHG,STRAIN RLF:FOR 0.3-0.36 OD CABLE,STR	28520	SR-6P3-4
	334-2551-00[3]			1	MARKER,IDENT:MKD WARNING POWER PLUG	80009	334-2551-00
-51	161-0017-02[2]			1	CABLE ASSY,PWR:3.18 AWG,96.0 LONG	80009	161-0017-02
	161-0106-00[3]			1	CABLE ASSY,PWR:3,18 AWG,115V,70.0 L	80009	161-0106-00
-52	346-0045-00			3	STRAP,CONN COV:	80009	346-0045-00
-53	200-0991-00			3	COVER,ELEC CONN:	80009	200-0991-00
-54	----- -----			6	CONN,RCPT,:(SEE J110,130,310,330,505,515 EPL)		
-55	210-0255-00			6	TERMINAL,LUG:0.391" ID INT TOOTH	80009	210-0255-00
-56	342-0117-00			12	INSULATOR,BSHG:	80009	342-0117-00
-57	----- -----			1	RESISTOR,VAR:(SEE R750 EPL)		
					(ATTACHING PARTS)		
-58	210-0583-00			1	NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20224-402
-59	210-0940-00			1	WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-60	210-0046-00			1	WASHER,LOCK:INTL,0.26 ID X 0.40" OD,STL	78189	1214-05-00-0541C
					- - - * - - -		
-61	----- -----			1	TRANSFORMER:(SEE T805 EPL)		
-62	343-0267-00			2	BRACKET,XFMR:	80009	343-0267-00
					(ATTACHING PARTS FOR EACH)		
-63	212-0100-00			2	SCREW,MACHINE:8-32 X 0.625 INCH,HEX.HD,STL	83385	OBD
-64	210-0804-00			2	WASHER,FLAT:0.17 ID X 0.375 INCH OD,STL	12327	OBD
-65	210-0458-00			2	NUT,PLAIN,EXT W:8-32 X 0.344 INCH,STL	83385	OBD
					- - - * - - -		
-66	352-0076-00			1	FUSEHOLDER:W/HARDWARE	75915	342012
-67	210-0873-00			1	WASHER,NONMETAL:0.5 ID X 0.688 INCH OD,NPRN	70485	OBD
-68	210-0201-00			1	TERMINAL,LUG:SE #4	78189	2104-04-00-2520N
					(ATTACHING PARTS)		
-69	210-0586-00			1	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-70	333-2146-00[2]			1	PANEL,REAR:	80009	333-2146-00
	333-2146-01[3]			1	PANEL,FRONT:OPTION 6	80009	333-2146-01
-71	426-1301-00			1	FRAME,MONITOR:	80009	426-1301-00

[1]Remove for Option 4.
[2]Remove for Option 6.
[3]Option 6 only.

FIG. 1 CABINET
& CHASSIS



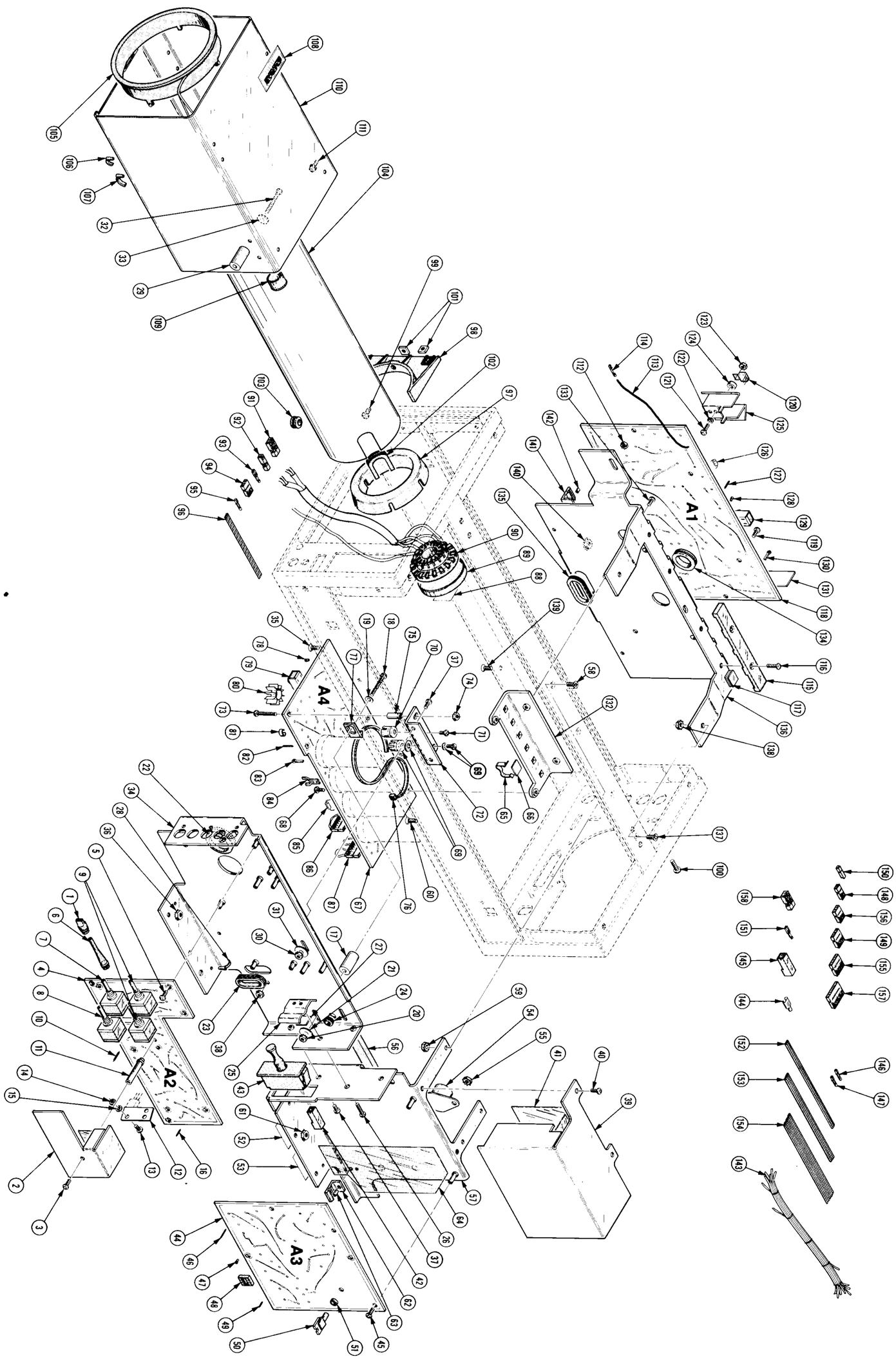

A1
A2
A3
A4

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
2-1	366-1432-00			4	KNOB:GRAY,W/SPRING	80009	366-1432-00
-2	200-1987-00			1	COVER,CKT BD:	80009	200-1987-00
					(ATTACHING PARTS)		
-3	211-0101-00			1	SCREW,MACHINE:4-40 X 0.25",100 DEG,FLH STL	83385	OBD
					- - - * - - -		
-4	----- -----			1	CKT BOARD ASSY:DYNAMIC FOCUS(SEE A2 EPL)		
					(ATTACHING PARTS)		
-5	211-0008-00			6	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. CIRCUIT BOARD ASSY INCLUDES:		
-6	384-1121-00			2	. EXTENSION SHAFT:1.41 INCH LONG	80009	384-1121-00
-7	----- -----			1	. RESISTOR,VAR:(SEE R555 EPL)		
-8	----- -----			1	. RESISTOR,VAR;(SEE R698 EPL)		
-9	----- -----			2	. RESISTOR,VAR:(SEE R175 AND R375 EPL)		
-10	131-0589-00			3	. CONTACT,ELEC:0.46 INCH LONG	22526	47350
-11	129-0427-00			1	. POST,ELEC-MECH:4-40 X 0.188 X 1.056 L,HEX	80009	129-0427-00
					(ATTACHING PARTS)		
	210-0004-00			1	. WASHER,LOCK:INTL,0.12 ID X 0.26" OD,STL	78189	OBD
	211-0008-00			1	. SCREW,MACHINE:4-40 X 0.250 INCH,PNH STL	83385	OBD
					- - - * - - -		
-12	214-2454-00			1	. HEATSINK:	80009	214-2454-00
					(ATTACHING PARTS)		
-13	211-0007-00			2	. SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	83385	OBD
-14	210-0406-00			2	. NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
-15	210-0004-00			2	. WASHER,LOCK:INTL,0.12 ID X 0.26"OD,STL	78189	1204-00-00-0541C
					- - - * - - -		
-16	131-0608-00			23	. CONTACT,ELEC:0.365 INCH LONG	22526	47357
	131-0566-00[1]			1	. LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L	0000C	L-2007-1
-17	384-0539-00			1	ROD,SPACER:0.375 X 0.750 INCH	80009	384-0539-00
					(ATTACHING PARTS)		
-18	211-0231-00			1	SCREW,MACHINE:4-40 X 1.0,PNH,SST PSVT,P02	83385	OBD
-19	210-1001-00			1	WASHER,FLAT:0.119 ID X 0.375" OD,BRS	12360	OBD
-20	210-0586-00			1	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
-21	210-0958-00			1	WASHER,FLAT:0.115 ID X 0.469 INCH OD,STL	78471	OBD
					- - - * - - -		
-22	348-0051-00			1	GROMMET,RUBBER:0.938 INCH DIA	83907	1107
-23	348-0253-00			1	GROMMET,PLASTIC:1.24 X 0.739 X 0.108" OA	80009	348-0253-00
-24	348-0004-00			1	GROMMET,RUBBER:0.281 ID X 0.563 INCH OD	70485	763
-25	343-0521-00			1	CLAMP,XSTR:750 WIDE W(2)4-40 THD HOLE	80009	343-0521-00
					(ATTACHING PARTS)		
-26	211-0014-00			1	SCREW,MACHINE:4-40 X 0.50 INCH,PNH STL	83385	OBD
					- - - * - - -		
-27	342-0082-00			1	INSULATOR,PLATE:0.52 SQ X 0.015 INCH THK,AL	80009	342-0082-00
-28	343-0213-00			2	CLAMP,LOOP:PRESS MT,PLASTIC	80009	343-0213-00
-29	384-0539-00			1	ROD,SPACER:0.375 X 0.750 INCH	80009	384-0539-00
					(ATTACHING PARTS)		
-30	210-0586-00			1	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
-31	210-0958-00			1	WASHER,FLAT:0.115 ID X 0.469 INCH OD,STL	78471	OBD
-32	211-0231-00			1	SCREW,MACHINE:4-40 X 1.0,PNH,SST PSVT,P02	83385	OBD
-33	210-1001-00			1	WASHER,FLAT:0.119 ID X 0.375" OD,BRS	12360	OBD
					- - - * - - -		
	334-2360-00			1	MARKER,IDENT:WARNING	80009	334-2360-00
-34	441-1224-01			1	CHASSIS,MONITOR:CONTROL	80009	441-1224-01
					(ATTACHING PARTS)		
-35	211-0538-00			2	SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-36	210-0457-00			2	NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	78189	OBD
-37	211-0008-00			4	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
-38	210-0586-00			2	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-39	337-2307-00			1	SHIELD,ELEC:HIGH VOLTAGE	80009	337-2307-00
					(ATTACHING PARTS)		
-40	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		

[1]Remove for Option 4 only.

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
2-	----- -----			-	. HV SHIELD INCLUDES:		
-41	342-0329-00			1	. INSULATION,FILM:HV SHIELD,3.15 W X 4.15 L	80009	342-0329-00
-42	200-1075-00			1	COVER,ELEC CONN:PLASTIC	00779	1-480435-0
-43	----- -----			1	SWITCH,PUSH-PUL:(SEE S800 EPL)		
-44	----- -----			1	CKT BOARD ASSY:HIGH VOLTAGE(SEE A3 EPL)		
					(ATTACHING PARTS)		
-45	211-0008-00			3	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. CKT BOARD ASSY INCLUDES:		
-46	131-0589-00			6	. CONTACT,ELEC:0.46 INCH LONG	22526	47350
-47	136-0252-04			3	. CONTACT,ELEC:0.188 INCH LONG	22526	75060
-48	136-0514-00			1	. SOCKET,PLUG-IN:MICROCIRCUIT,8 CONTACT	82647	C930802
-49	131-0608-00			6	. SOCKET,PLUG-IN:	80009	131-0608-00
-50	124-0118-00			1	. TERMINAL BOARD:1 NOTCH	80009	124-0118-00
-51	361-0008-00			1	. SPACER,SLEEVE:0.11 ID X 0.25 OD X 0.28"H	80009	361-0008-00
-52	334-2360-00			1	MARKER,IDENT:WARNING	80009	334-2360-00
-53	334-2359-00			1	MARKER,IDENT:WARNING	80009	334-2359-00
	334-2363-00			1	MARKER,IDENT:WARNING,DANGER,HV	80009	334-2363-00
-54	----- -----			1	SW,THERMOSTATIC:(SEE S802 EPL)		
					(ATTACHING PARTS)		
-55	210-0586-00			2	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-56	351-0087-00			1	GUIDE,CKT CARD:4.75 INCH LONG,PLASTIC	80009	351-0087-00
-57	441-1327-01			1	CHASIS,MONITOR:HIGH VOLTAGE	80009	441-1327-01
					(ATTACHING PARTS)		
-58	211-0025-00			2	SCREW,MACHINE:4-40 X 0.375 100 DEG,FLH STL	83385	OBD
-59	210-0586-00			2	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
-60	211-0538-00			3	SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-61	210-0457-00			3	NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
					- - - * - - -		
	----- -----			-	. HV CHASSIS INCLUDES:		
-62	344-0131-00			2	. . CLIP,SPG TENS:CIRCUIT BOARD MOUNTING	80009	344-0131-00
					(ATTACHING PARTS FOR EACH)		
-63	210-0659-01			1	. . EYELET,METALLIC:0.121 OD X 0.156 INCH LONG	80009	210-0659-01
					- - - * - - -		
-64	342-0330-00			1	. . INSULATOR,FILM:1.87 W X 4.75 L POLYESTER	80009	342-0330-00
-65	344-0236-00			3	CLIP,SPG TNSN:	80009	344-0236-00
-66	342-0082-00			3	INSULATOR,PLATE:0.52 SQ X 0.015 INCH THK,AL	80009	342-0082-00
-67	----- -----			-	CKT BOARD ASSY:LV POWER(SEE A4 EPL)		
					(ATTACHING PARTS)		
-68	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. CKT BOARD ASSY INCLUDES:		
-69	214-0757-00			1	. HEAT SINK,ELEC:	98978	TXP0503B
-70	214-1611-00			1	. HEAT SINK,ELEC:0.280 ID,W/ 4-40 THREADS	05820	OBD
					(ATTACHING PARTS)		
-71	211-0007-00			1	. SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	83385	OBD
					- - - * - - -		
-72	200-1949-00			1	. HEAT SK,CKT BD:Z AXIS	80009	200-1949-00
					(ATTACHING PARTS)		
-73	211-0017-00			2	. SCREW,MACHINE:4-40 X 0.375 INCH,PNH STL	83385	OBD
-74	210-0586-00			2	. NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-75	361-0564-00			2	. SPACER,SLEEVE:0.50 L X 0.133 ID BRS CD	76850	3-5165-275
-76	346-0128-00			1	. STRAP,TIE DOWN:0.1W X 8.0" LONG,NYLON	59730	TY-232M
-77	343-0150-00			1	. CLAMP,TIE DOWN:	95987	OBD
-78	136-0252-04			6	. CONTACT,ELEC:0.188 INCH LONG	22526	75060
-79	----- -----[1]			-	. SWITCH,SLIDE:(SEE S555 EPL)		
-80	214-1291-00			1	. HEAT SINK,ELEC:XSTR,0.72 OD X 0.375"H	05820	207-AB
-81	214-1916-00			1	. HEAT SINK,ELEC:TEMPERATURE STABILIZING	05820	256-D
-82	131-0608-00			47	. CONTACT,ELEC:0.365 INCH LONG	22526	47357
-83	214-0579-00			15	. TERM.,TEST PT:0.40 INCH LONG	80009	214-0579-00
-84	344-0154-00			10	. CLIP,ELECTRICAL:FOR 0.25 INCH DIA FUSE	80009	344-0154-00
-85	131-0566-00			1	. LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L	0000C	L-2007-1

[1]Option 4 only.

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
2-86	131-1895-00			1	. LINK,TERM CONN:8,22 AWG,1.5 L	80009	131-1895-00
	352-0166-02			1	. . CONN BODY,PL,EL:8 WIRE RED	80009	352-0166-02
	131-0707-00			2	. . CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-87	131-1896-00			1	. LINK,TERM CONN:8,22 AWG,1.5L	80009	131-1896-00
	352-0166-01			1	. . CONN BODY,PL,EL:8 WIRE BROWN	80009	352-0166-01
	131-0707-00			4	. . CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-88	334-2363-00			1	MARKER INDENT:WARNING,DANGER,HV	80009	334-2363-00
-89	200-0616-01			1	COV,ELECTRON TU:	80009	200-0616-01
-90	136-0663-00			1	SOCKET,ASSY,CRT:	80009	136-0663-00
	----- -----			-	. SOCKET ASSY INCLUDES:		
-91	352-0198-00			1	. CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0198-00
-92	352-0197-00			2	. CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0197-00
-93	131-0792-00			4	. CONTACT,ELEC:0.577"L,18-20 AWG WIRE	22526	46221
-94	352-0161-00			1	. CONN BODY,PL,EL:3 WIRE BLACK	80009	352-0161-00
-95	131-0707-00			3	. CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-96	175-0826-00			FT	. WIRE,ELECTRICAL:3 WIRE RIBBON	08261	TEK-175-0826-00
-97	386-2246-00			1	SUPPORT,CRT:REAR	80009	386-2246-00
-98	407-1128-00			1	BRKT,CRT SHIELD:REAR	80009	407-1128-00
					(ATTACHING PARTS)		
-99	211-0507-00			2	SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL	83385	OBD
-100	211-0589-00			1	SCREW,MACHINE:6-32 X 0.312 INCH,PNH BRS	83385	OBD
-101	220-0419-00			3	NUT,PLAIN,SQ:6-32 X 0.312 INCH,STL	83385	OBD
					- - - * - - -		
-102	348-0145-00			1	GROMMET,PLASTIC:U-SHP,1.0 X 0.42 INCH	80009	348-0145-00
-103	348-0004-00			1	GROMMET,RUBBER:0.281 ID X 0.563 INCH OD	70485	763
-104	337-2309-00			1	SHIELD,ELEC:CRT REAR	80009	337-2309-00
-105	----- -----			1	COIL,TUBE DEFF:(SEE L725 EPL)		
-106	343-0088-00			7	CLAMP,LOOP:0.062 INCH DIA	80009	343-0088-00
-107	343-0089-00			2	CLAMP,LOOP:LARGE	80009	343-0089-00
-108	334-1379-00			1	LABEL:CRT,ADHESIVE BACK	80009	334-1379-00
	334-2551-00[1]			1	MARKER,IDENT:MKD WARNING POWER PLUG	80009	334-2551-00
-109	348-0064-00			1	GROMMET,PLASTIC:0.625 INCH DIA	80009	348-0064-00
-110	337-2306-00			1	SHIELD,CRT:FRONT	80009	337-2306-00
					(ATTACHING PARTS)		
-111	211-0116-00			1	SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
-112	210-0586-00			1	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-113	195-0164-00			1	LEAD SET,ELEC:CRT DEFL	80009	195-0164-00
-114	131-1538-00			4	. CONTACT,ELEC:CRIMP-ON,22-26 AWG WIRE	22526	75369-002
-115	343-0618-00			2	RETAINER,XSTR:	80009	343-0618-00
					(ATTACHING PARTS FOR EACH)		
-116	211-0025-00			2	SCREW,MACHINE:4-40 X 0.375 100 DEG,FLH STL	83385	OBD
					- - - * - - -		
-117	342-0082-00			16	INSULATOR,PLATE:0.52 SQ X 0.015 INCH THK,AL	80009	342-0082-00
-118	----- -----			1	CKT BOARD ASSY:DEFLECTION(SEE A1 EPL)		
					(ATTACHING PARTS)		
-119	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. CKT BOARD ASSY INCLUDES:		
-120	----- -----			4	. TRANSISTOR:(SEE Q250,Q260,Q450 AND Q460 EPL)		
					(ATTACHING PARTS FOR EACH)		
-121	211-0008-00			1	. SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
-122	210-1178-00			1	. WSHR,SHOULDERED:FOR MTG TO-220 TRANSISTOR	18722	DF137A
-123	210-0586-00			1	. NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
					- - - * - - -		
-124	361-0555-00			4	. SPACER,RING:0.30 OD X 0.134 ID THK CERAMIC	80009	361-0555-00
-125	214-2418-00			4	. HEAT SINK,ELEC:TRANSISTOR	80009	214-2418-00
-126	131-0566-00[2]			2	. LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L	0000C	L-2007-1
-127	131-0608-00			27	. CONTACT,ELEC:0.365 INCH LONG	22526	47357
-128	136-0252-04			12	. CONTACT,ELEC:0.188 INCH LONG	22526	75060
-129	----- -----			4	. SWITCH,SLIDE:(SEE S110,S130,S310 AND S330)		
-130	214-0579-00			4	. TERM.,TEST PT:0.40 INCH LONG	80009	214-0579-00

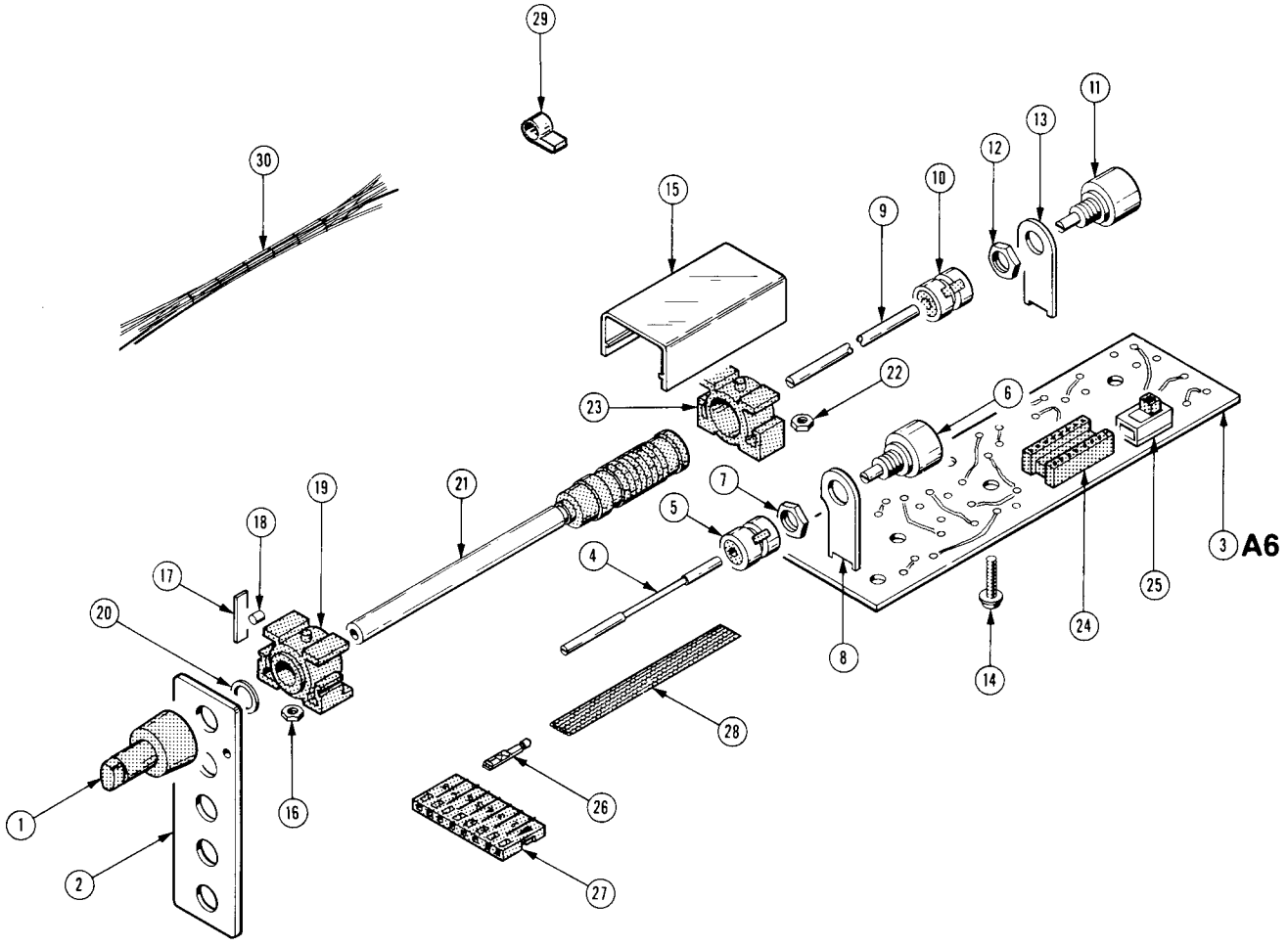
[1]Option 6 only.
[2]Remove for Option 4.

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
2-131	337-2305-00			2	. SHIELD,ELEC:CIRCUIT BOARD	80009	337-2305-00
-132	407-1498-00			1	BRACKET,ANGLE:	80009	407-1498-00
					(ATTACHING PARTS)		
-133	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
-134	348-0012-00			2	GROMMET,RUBBER:	72653	1043-1M
-135	348-0233-00			1	GROMMET,PLASTIC:GRAY,OVAL SHAPE,0.927 ID	80009	348-0233-00
	334-2360-00			1	MARKER,IDENT:WARNING	80009	334-2360-00
	343-0213-00[1]			1	CLAMP,LOOP:PRESS MT,PLASTIC	80009	343-0213-00
-136	441-1324-00			1	CHASSIS,MONITOR:DEFLECTION	80009	441-1324-00
					(ATTACHING PARTS)		
-137	211-0025-00			2	SCREW,MACHINE:4-40 X 0.375 100 DEG,FLH STL	83385	OBD
-138	210-0586-00			2	NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL	78189	OBD
-139	211-0538-00			2	SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-140	210-0457-00			2	NUT,PLAIN,EXT W:6-32 X 0.312 INCH,STL	83385	OBD
					- - - * - - -		
	----- -----			-	. DEFLECTION CHASSIS INCLUDES:		
-141	344-0131-00			2	. CLIP,SPG TENS:CIRCUIT BOARD MOUNTING	80009	344-0131-00
					(ATTACHING PARTS FOR EACH)		
-142	210-0659-00			1	. EYELET,METALLIC:0.121 OD X 0.156 INCH LONG	80009	210-0659-00
					- - - * - - -		
-143	179-2163-00			1	WIRING HARNESS:POWER	80009	179-2163-00
-144	131-0861-00			4	. CONTACT,ELEC:QUICK DISCONNECT	00779	42617-2
-145	200-1075-00			3	. COVER,ELEC CONN:PLASTIC	00779	1-480435-0
	179-2464-00			1	WIRING HARNESS:POWER	80009	179-2464-00
-146	131-0707-00			8	. CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-147	131-0708-00			8	. CONTACT,ELEC:0.48"L,28-32 AWG WIRE	22526	47437
-148	352-0169-01			4	. CONN BODY,PL,EL:2 WIRE BROWN	80009	352-0169-01
-149	352-0162-03			2	. CONN BODY,PL,EL:4 WIRE ORANGE	80009	352-0162-03
	179-2465-00			1	WIRING HARNESS:Z AXIS INPUT	80009	179-2465-00
	131-0707-00			4	. CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
	131-0708-00			2	. CONTACT,ELEC:0.48"L,28-32 AWG WIRE	22526	47437
-150	352-0171-01			1	. CONN BODY,PL,EL:1 WIRE BROWN	80009	352-0171-01
	352-0171-02			1	. CONN BODY,PL,EL:1 WIRE RED	80009	352-0171-02
	352-0169-02			2	. CONN BODY,PL,EL:2 WIRE RED	80009	352-0169-00
-151	131-0792-00			4	CONTACT,ELEC:0.577"L,18-20 AWG WIRE	22526	46221
	131-0708-00			8	CONTACT,ELEC:0.48"L,28-32 AWG WIRE	22526	47437
	131-0707-00			48	CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-152	175-0826-00			FT	WIRE,ELECTRICAL:3 WIRE RIBBON	08261	TEK-175-0826-00
-153	175-0827-00			FT	WIRE,ELECTRICAL:4 WIRE RIBBON	08261	TEK-175-0827-00
-154	175-0831-00			FT	WIRE,ELECTRICAL:8 WIRE RIBBON	08261	TEK-175-0831-00
-155	352-0163-00			1	CONN BODY,PL,EL:5 WIRE BLACK	80009	352-0163-00
	352-0163-03			1	CONN BODY,PL,EL:5 WIRE ORANGE	80009	352-0163-03
	352-0169-00			2	CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0169-00
	352-0169-01			2	CONN BODY,PL,EL:2 WIRE BROWN	80009	352-0169-01
	352-0169-02			1	CONN BODY,PL,EL:2 WIRE RED	80009	352-0169-00
	352-0169-03			1	CONN BODY,PL,EL:2 WIRE ORANGE	80009	352-0169-03
-156	352-0161-01			1	CONN BODY,PL,EL:3 WIRE BROWN	80009	352-0161-01
	352-0161-04			1	CONN BODY,PL,EL:3 WIRE YELLOW	80009	352-0161-04
	352-0161-05			1	CONN BODY,PL,EL:3 WIRE GREEN	80009	352-0161-05
	352-0161-06			1	CONN BODY,PL,EL:3 WIRE BLUE	80009	352-0161-06
	352-0161-07			1	CONN BODY,PL,EL:3 WIRE VIOLET	80009	352-0161-07
-157	352-0165-00			1	CONN BODY,PL,EL:7 WIRE BLACK	80009	352-0165-00
-158	352-0198-00			1	CONN BODY,PL,EL:2 WIRE BLACK	80009	352-0198-00
	352-0198-03			1	CONN BODY,PL,EL:2 WIRE ORANGE	80009	352-0198-03
	352-0171-00			1	CONN BODY,PL,EL:1 WIRE BLACK	80009	352-0171-00
	352-0171-02			1	CONN BODY,PL,EL:1 WIRE RED	80009	352-0171-02
	352-0171-03			1	CONN BODY,PL,EL:1 WIRE ORANGE	80009	352-0171-03

[1]Option 6 only.

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
	337-1674-10			1		SHLD,IMPLOSION:CLEAR,MARKED FOR SCALE	80009	337-1674-10
	070-2024-00			1		MANUAL,TECH:OPERATORS,606 MONITOR	80009	070-2024-00
	070-2025-00			1		MANUAL,TECH:INSTR,606 MONITOR	80009	070-2025-00

Option 4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Option 4

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5 Name & Description	Mfr Code	Mfr Part Number
-1	366-1369-00			1	KNOB:GRAY	80009	366-1369-00
	213-0153-00			2	. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-2	333-1513-00			1	PANEL,FRONT:SWP OPTION 4	80009	333-1513-00
-3	----- -----			1	CKT BOARD ASSY:SWEEP(SEE A6 EPL)		
					(ATTACHING PARTS)		
	211-0008-00			4	SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL	83385	OBD
					- - - * - - -		
	----- -----			-	. CKT BOARD ASSY:INCLUDES:		
-4	384-1156-00			1	. EXTENSION SHAFT:2.20 INCH LONG	80009	384-1156-00
-5	376-0051-01			1	. CPLG,SHAFT,FLEX:FOR 0.125 INCH DIA SHAFTS	80009	376-0051-01
	213-0048-00			1	. . SETSCREW:4-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-6	----- -----			1	. RESISTOR,VAR:(SEE R918 EPL)		
					(ATTACHING PARTS)		
-7	210-0583-00			1	. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20224-402
	210-0590-00			1	. NUT,PLAIN,HEX.:0.375 X 0.438 INCH,STL	73743	2X28269-402
					- - - * - - -		
-8	386-2351-00			1	. PLATE,RES MTG:	80009	386-2351-00
-9	384-0284-00			1	. EXTENSION SHAFT:5.688 INCH LONG	80009	384-0284-00
-10	376-0051-01			1	. CPLG,SHAFT,FLEX:FOR 0.125 INCH DIA SHAFTS	80009	376-0051-01
	213-0048-00			4	. . SETSCREW:4-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-11	----- -----			1	. RESISTOR,VAR:(SEE R945 EPL)		
					(ATTACHING PARTS)		
-12	210-0583-00			1	. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20224-402
	210-0590-00			1	. NUT,PLAIN,HEX.:0.375 X 0.438 INCH,STL	73743	2X28269-402
					- - - * - - -		
-13	387-0794-00			1	. BRKT,VAR RES:	80009	387-0794-00
	----- -----			1	. DRUM ASSY,CAM SW:(SEE S1130 EPL)		
					(ATTACHING PARTS)		
-14	211-0116-00			4	. SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
					- - - * - - -		
	----- -----			-	. . DRUM ASSEMBLY INCLUDES:		
-15	200-1441-00			1	. . COVER,CAM SW.:7 ELEMENTS	80009	200-1441-00
-16	210-0406-00			2	. . NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
-17	214-1704-01			2	. . SPRING,FLAT:CAM SW DETENT,0.008 INCH THK	80009	214-1704-01
-18	214-1127-00			2	. . ROLLER,DETENT:0.125 DIA X 0.125 INCH L	80009	214-1127-00
-19	401-0155-00			1	. . BEARING,CAM SW:FRONT	80009	401-0155-00
					(ATTACHING PARTS)		
-20	354-0219-00			1	. . RING,RETAINING:FOR 0.25 INCH SHAFT	79136	5103-25-MD-R
					- - - * - - -		
-21	105-0388-00			1	. . DRUM CAM SWITCH:TIMING	80009	105-0388-00
-22	210-0406-00			2	. . NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	2X12161-402
-23	401-0156-00			1	. . BEARING,CAM SW:REAR	80009	401-0156-00
-24	136-0260-02			1	. SOCKET,PLUG-IN:16 CONTACT,RECT SHAPE	71785	133-51-02-075
-25	----- -----			1	. SWITCH,SLIDE:(SEE S1109 EPL)		
-26	131-0707-00			6	. CONTACT,ELEC:0.48"L,22-26 AWG WIRE	22526	47439
-27	352-0166-05			1	. CONN BODY,PL,EL:8 WIRE GREEN	80009	352-0166-05
-28	175-0828-00			FT	. WIRE,ELECTRICAL:5 WIRE RIBBON	23499	TEK-175-0828-00
-29	343-0298-00			1	CLAMP,LOOP:PLASTIC,W/ADHESIVE BACK	95937	HPC25
-30	179-2478-00			1	WIRING HARNESS:SWEEP	80009	179-2478-00

MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.

SERVICE NOTE

Because of the universal parts procurement problem, some electrical parts in your instrument may be different from those described in the Replaceable Electrical Parts List. The parts used will in no way alter or compromise the performance or reliability of this instrument. They are installed when necessary to ensure prompt delivery to the customer. Order replacement parts from the Replaceable Electrical Parts List.

CALIBRATION TEST EQUIPMENT REPLACEMENT

Calibration Test Equipment Chart

This chart compares TM 500 product performance to that of older Tektronix equipment. Only those characteristics where significant specification differences occur, are listed. In some cases the new instrument may not be a total functional replacement. Additional support instrumentation may be needed or a change in calibration procedure may be necessary.

Comparison of Main Characteristics

DM 501 replaces 7D13		
PG 501 replaces 107	PG 501 - Risetime less than 3.5 ns into 50 Ω.	107 - Risetime less than 3.0 ns into 50 Ω.
108	PG 501 - 5 V output pulse; 3.5 ns Risetime.	108 - 10 V output pulse; 1 ns Risetime.
111	PG 501 - Risetime less than 3.5 ns; 8 ns Pretrigger pulse delay.	111 - Risetime 0.5 ns; 30 to 250 ns Pretrigger Pulse delay.
114	PG 501 - ±5 V output.	114 - ±10 V output. Short proof output.
115	PG 501 - Does not have Paired, Burst, Gated, or Delayed pulse mode; ±5 V dc Offset. Has ±5 V output.	115 - Paired, Burst, Gated, and Delayed pulse mode; ±10 V output. Short-proof output.
PG 502 replaces 107		
108	PG 502 - 5 V output	108 - 10 V output.
111	PG 502 - Risetime less than 1 ns; 10 ns Pretrigger pulse delay.	111 - Risetime 0.5 ns; 30 to 250 ns Pretrigger pulse delay.
114	PG 502 - ±5 V output	114 - ±10 V output. Short proof output.
115	PG 502 - Does not have Paired, Burst, Gated, Delayed & Undelayed pulse mode; Has ±5 V output.	115 - Paired, Burst, Gated, Delayed & Undelayed pulse mode; ±10 V output. Short-proof output.
2101	PG 502 - Does not have Paired or Delayed pulse. Has ±5 V output.	2101 - Paired and Delayed pulse; 10 V output.
PG 506 replaces 106	PG 506 - Positive-going trigger output signal at least 1 V; High Amplitude output, 60 V.	106 - Positive and Negative-going trigger output signal, 50 ns and 1 V; High Amplitude output, 100 V.
067-0502-01	PG 506 - Does not have chopped feature.	0502-01 - Comparator output can be alternately chopped to a reference voltage.
SG 503 replaces 190, 190A, 190B	SG 503 - Amplitude range 5 mV to 5.5 V p-p.	190B - Amplitude range 40 mV to 10 V p-p.
191	SG 503 - Frequency range 250 kHz to 250 MHz.	191 - Frequency range 350 kHz to 100 MHz.
067-0532-01	SG 503 - Frequency range 250 kHz to 250 MHz.	0532-01 - Frequency range 65 MHz to 500 MHz.
TG 501 replaces 180, 180A	TG 501 - Marker outputs, 5 sec to 1 ns. Sinewave available at 5, 2, and 1 ns. Trigger output - slaved to marker output from 5 sec through 100 ns. One time-mark can be generated at a time.	180A - Marker outputs, 5 sec to 1 μs. Sinewave available at 20, 10, and 2 ns. Trigger pulses 1, 10, 100 Hz; 1, 10, and 100 kHz. Multiple time-marks can be generated simultaneously.
181	TG 501 - Marker outputs, 5 sec to 1 ns. Sinewave available at 5, 2, and 1 ns.	181 - Marker outputs, 1, 10, 100, 1000, and 10,000 μs, plus 10 ns sinewave.
184	TG 501 - Marker outputs, 5 sec to 1 ns. Sinewave available at 5, 2, and 1 ns. Trigger output - slaved to marker output from 5 sec through 100 ns. One time-mark can be generated at a time.	184 - Marker outputs, 5 sec to 2 ns. Sinewave available at 50, 20, 10, 5, and 2 ns. Separate trigger pulses of 1 and .1 sec; 10, 1, and .1 ms; 10 and 1 μs. Marker amplifier provides positive or negative time marks of 25 V min. Marker intervals of 1 and .1 sec; 10, 1, and .1 ms; 10 and 1 μs.
2901	TG 501 - Marker outputs, 5 sec to 1 ns. Sinewave available at 5, 2, and 1 ns. Trigger output - slaved to marker output from 5 sec through 100 ns. One time-mark can be generated at a time.	2901 - Marker outputs, 5 sec to 0.1 μs. Sinewave available to 50, 10, and 5 ns. Separate trigger pulses, from 5 sec to 0.1 μs. Multiple time-marks can be generated simultaneously.

NOTE: All TM 500 generator outputs are short-proof. All TM 500 plug-in instruments require TM 500-Series Power Module.

TEKTRONIX®
committed to technical excellence

MANUAL CHANGE INFORMATION

PRODUCT 606 MONITOR
EFF SN B010100-up

CHANGE REFERENCE C1/676
DATE 6-8-76

CHANGE:	DESCRIPTION

070-2025-00

TEXT CORRECTIONS

Page 6-7 Step B4, part a.

ADD the following at the end of the paragraph:

Set Ramp generator duration to 500 µs.

Page 6-10 Step C4, part a.

ADD the following at the end of the paragraph:

Set Ramp generator duration to 500 µs.

Page 6-18 Step F3, part c.

CHANGE TO READ:

c. Use attenuators as necessary for a 2- to 6- division display.

Page 6-19 Step F4, part d.

CHANGE TO READ:

d. Set the SEC/DIV switch to 10 µs.

Pilot Change #3 ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

CHANGE TO:

R777	301-0471-00	RES.,FXD,CMPSN:470 OHM,5%,0.50W
R788	301-0101-00	RES.,FXD,CMPSN:100 OHM,5%,0.50W
VR591	152-0212-00	SEMICOND DEVICE:ZENER,0.5W,9V,5%

REMOVE:

DS783	150-0111-00	LAMP,GLOW,NEON,1.2MA
DS784	150-0111-00	LAMP,GLOW,NEON,1.2MA

ADD:

CR591	152-0141-02	SEMICOND DEVICE:SILICON,30V,150MA,1N4152
E783	119-0181-00	SURGE VOLTAGE P:230VAC,+/-15%

CHANGE:	DESCRIPTION

SCHEMATIC CHANGES

DIAGRAM ◇3◇ Z-AXIS AMPLIFIER - Partial

CR591 is added as shown below.

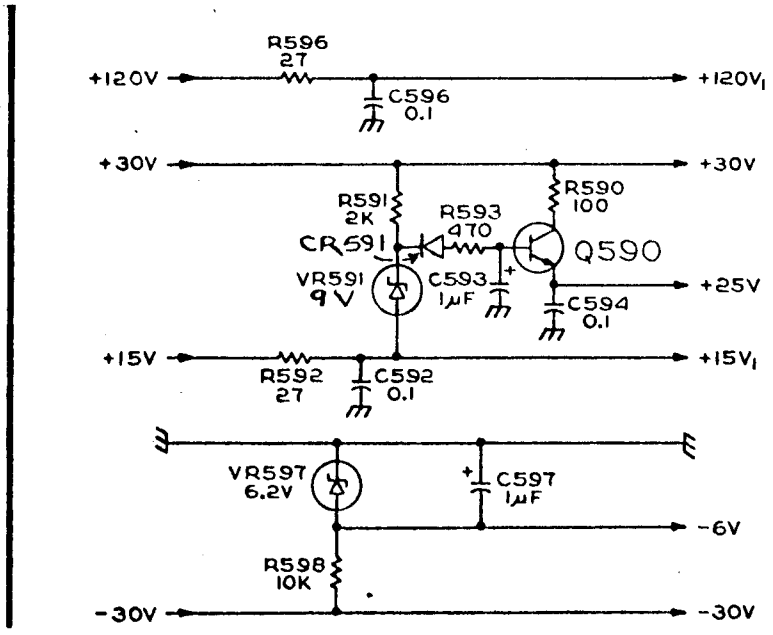

DIAGRAM ◇5◇ HIGH VOLTAGE SUPPLY

DS 783 and DS 784 are replaced by E783.

MECHANICAL PARTS LIST CHANGES

ADD:

214-2454-00	1	HEAT SINK (CNTL,INTFC/DYNAMIC CKT BOARD ASSY)