Tektronix®

577 D1 or D2 CURVE TRACER

SERVICE

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PLEASE CHECK FOR CHANGE INFORMATION AT THE REAR OF THIS MANUAL.

577 D1 or D2 CURVE TRACER

SERVICE

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

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Product Group 48

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INSTRUMENT SERIAL NUMBERS

Each instrument has a serial number on a panel insert, tag, or stamped on the chassis. The first number or letter designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B000000	Tektronix, Inc., Beaverton, Oregon, USA
100000	Tektronix Guernsey, Ltd., Channel Islands
200000	Tektronix United Kingdom, Ltd., London
300000	Sony/Tektronix, Japan
700000	Tektronix Holland, NV, Heerenveen, The Netherlands

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577 Curve Tracer

WARNING NOTICE

Your 576 or 577/177 is designed to be a very versatile and flexible characteristic curve tracer capable of testing both high voltage and high current devices. The 576 collector supply can generate peak voltages up to 1500 volts, the 577/177 up to 1600 volts, and both are cable of generating up to 10 amps at lower voltages. This wide range of voltage and current makes it possible for you to test a very wide range of devices. However, these supplies are potentially very dangerous.

It has come to our attention that it is becoming increasingly common for our customers to connect 576's and 577/177's to devices or fixturing external to the instrument and thus external to or outside of the safety features that are designed into the instruments.

We have provided a wide range of adapters that are designed to allow you to test your devices while inside the plastic protective cover. However, if you feel it is necessary to connect the collector supply to devices or fixturing outside of this protective cover, in effect defeating the built-in safety features of the instrument, the following simple modification will at least allow you to do so with the plastic protective cover still installed. This will reduce the chances of the operator coming into contact with the collector supply voltage.

This simple modification will prevent exposed contacts at the instrument's test fixture. This prevents operators from exposure to dangerous voltages **only at the curve tracer end of the external wires.** Exposure to dangerous voltage is still possible at the external fixture connections and the DUT. If external wires/fixturing are used by your organization, then **it is your responsibility to ensure that the necessary safeguards (additional protective cover, interlocks, etc.) to protect the operators are provided.**

Modification

Drill a hole or otherwise remove just enough material from one of the sides of the plastic protective cover as shown on the attached drawing, to allow the necessary leads to be brought out through the side of the cover.

If you have misplaced or damaged the plastic protective cover, order a replacement through your local Tektronix Field Office, for the plastic protective cover is an integral part of the safety features for these instruments.

A plastic protective cover that has been modified (notched) is available from Tektronix by ordering part number 337-1194-02.

WARNING

DANGEROUS VOLTAGE MAY STILL BE EXPOSED AT THE DEVICE OR FIXTURE END OF THE CABLES WHICH YOU BRING OUT OF THE PLASTIC PROTECTIVE COVER. IT IS YOUR RESPONSIBLITY TO PROVIDE SAFEGUARDS TO PROTECT THE OPERATOR AT THE CABLES END.

COVER MODIFICATION

Drill a hole, notch or otherwise remove just enough material, from the left side of the plastic protective cover box (as shown in Fig. A) to allow test leads to be brought out through the cover. This will allow the cover to be kept in place while using outside test fixturing.

PROTECTIVE COVER "NOTCHED" TO ALLOW TEST LEADS TO BE BROUGHT OUT THROUGH THE COVER WHILE LEAVING THE COVER IN PLACE.

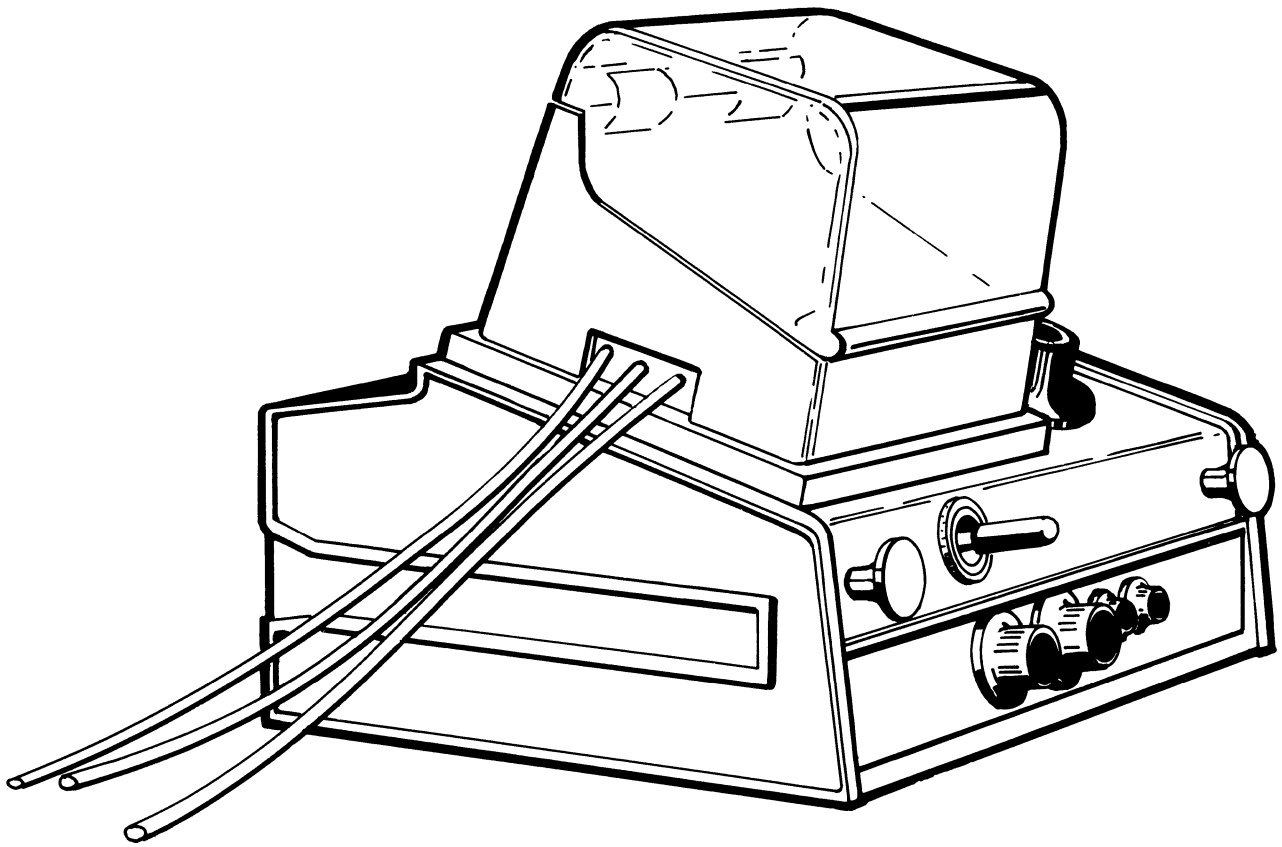


Figure A

SPECIFICATION

Introduction

The 577-D1 or D2 Curve Tracer and Display Unit is the mainframe of a curve tracer system. The plug-in test fixtures are covered in separate service manuals.

The system is a dynamic curve tracer that permits the display of characteristics of a variety of devices.

The 577 is designed to bolt to the display module that is available in either a storage (D1) or non-storage (D2) version.

3.5 kV accelerating potential ensures a bright display on the 8 x 10 division (1/2-inch or 1.27 cm/Div) internal graticule.

The 577 features include pulsed steps, calibrated step offset, step polarity tracking with collector supply polarity, independent horizontal and vertical magnifiers, and automatic display positioning when used with the 177 Test Fixture. When used with the 177 Test Fixture, the display dims automatically when the collector supply voltage is reduced to zero.

The collector supply, 0 to 1600 volts in five ranges, is continuously variable within each range.

A step generator supplies either current or voltage steps. Current steps are 5 nA/Step to 200 mA/Step and voltage steps are 5 mV/Step to 2 V/Step. Single or repetitive steps of up to 10 steps per family (approximately 1 to 95 steps per family in STEP X.1) can be applied to the device under test.

When using the 177 Standard Test Fixture, vertical current limiting protects the device under test. When the device under test current causes the display to exceed 2.5 times full-screen vertical deflection for a short time, the collector supply is disabled if the MAX PEAK POWER WATTS setting is above .6 for serial numbers B010200 and up (577-D1) and B010120 and up (577-D2), or the SERIES RESISTORS switch is below 8 k for serial numbers below B010200 (577-D1) and B010120 (577-D2).

The horizontal display amplifier measures voltage ranging from 5 mV/DIV to 200 V/DIV and base voltage from 5 mV/DIV to 2 V/DIV. The STEP GEN position of the HORIZ VOLTS/DIV switch permits the step generator output to be displayed. Illuminated knob-skirt readout is provided on the horizontal and base-step switches.

A safety interlock provides operator protection from hazardous potentials. Interlock can be defeated from the test fixture.

This instrument is intended to be operated from a single-phase earth-reference 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 three-terminal polarized 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. The color-coding of the cord conductors is in accordance with recognized standards.

The electrical and environmental characteristics shown are valid for instruments operated in an ambient temperature range from +10°C (+50°F) to +40°C (+104°F) after a five-minute warmup, if calibrated at +20°C (+58°F) to +30°C (+86°F).

CHARACTERISTICS

ELECTRICAL

Collector Supply

Voltage Ranges	6.5 V	25 V	100 V	400 V	1600 V
Max Peak Current	10 A	2.5 A	0.6 A	0.15 A	0.04 A
Peak Current, Pulsed	20 A	5 A	1.25 A	0.31 A	0.08 A
Min Series Resistance	.12 Ω	1.9 Ω	30 Ω	500 Ω	8 kΩ
Max Series Resistance	8 kΩ	120 kΩ	2 MΩ	8 MΩ	8 MΩ

Series Resistances Available: 0.12 Ω, 0.5 Ω, 1.9 Ω, 7.5 Ω, 30 Ω, 120 Ω, 500 Ω, 2 kΩ, 8 kΩ, 30 kΩ, 120 kΩ, 500 kΩ, 2 MΩ, and 8 MΩ, all within ±15%, ±0.1 Ω.

Step Generator

Accuracy (current or voltage steps, including offset)

Incremental: The amplitude of any step is within 2% of any other step.

Absolute: Within 3% of STEP/OFFSET AMPL switch setting or 3% of total output, whichever is greater. Within 4% of total output when using 10 steps, in STEP X.1

OFFSET MULT Range: Continuously variable from 0 to 10 times or from 0 to 100 times STEP/OFFSET AMPL switch setting, depending on the STEP X.1 setting, either aiding or opposing the step generator polarity.

Current Mode

STEP/OFFSET AMPL

Switch Range: 200 mA/Step to 50 nA/Step in a 1-2-5 sequence with STEP X.1 knob pushed in (X1 position). 20 mA/Step to 5 nA/Step in a 1-2-5 sequence with STEP X.1 knob in the out position (X.1 position).

Maximum Current (steps and aiding offset): 20 times STEP/OFFSET AMPL switch setting, except at least 10 times switch setting when switch is set to 200 mA/Step and 15 times switch setting when switch is set to 100 mA/Step.

Maximum Voltage: At least 7 volts, up to 1 A total output, and at least 5 volts, up to 2 A total output.

Maximum Opposing Offset Current: 10 times STEP/OFFSET AMPL switch setting up to 10 mA. Not more than 20 mA.

Maximum Opposing Voltage: Between 1 volt and 5 volts.

Voltage Mode

STEP/OFFSET AMPL

Switch Range: 50 mV/Step to 2 V/Step in a 1-2-5 sequence with STEP X.1 button pushed in (X1 position). 5 mV/Step to 200 mV/Step with STEP X.1 knob in the out position (X.1 position).

Maximum Voltage (Steps and aiding offset): 20 times STEP/OFFSET AMPL switch setting.

Maximum Current: at least 100 mA.

Short Circuit Current Limiting: Not more than 200 mA.

Maximum Opposing Offset Voltage: 10 times the STEP/OFFSET AMPL switch setting.

Maximum opposing Current: Limited between 10 mA and 20 mA at zero volts, going down to zero current at 20 V, opposing.

Pulsed Steps: Pulsed steps, approximately 300 μs, produced when the PULSED 300 μs, button is pushed to the in position.

Number of Steps: Ranges from 1 to 10 as selected by the NUMBER OF STEPS control (STEP X.1 button in). Approximately 1 to 95 steps when STEP X.1 button is released (button out).

Display Amplifiers

Display Accuracies (percent of highest on-screen value)

Vertical: See Test Fixture Service Manual for system specification.

Horizontal Collector Volts: 3%, unmagnified, and 4% magnified.

Horizontal Base Volts: 3%, unmagnified, and 4%, magnified.

Horizontal Step Generator: 4%, unmagnified, and 5%, magnified.

Deflection Factors

Vertical: See Test Fixture Service Manual

Horizontal Collector Volts: 50 mV/DIV to 200 V/DIV in a 1-2-5 sequence, unmagnified. 5 mV/DIV to 20 V/DIV in a 1-2-5 sequence, magnified.

Horizontal Base Volts: 50 mV/DIV to 2 V/DIV in a 1-2-5 sequence, unmagnified. 5 mV/DIV to .2 V/DIV in a 1-2-5 sequence, magnified.

Display Positioning Accuracy, using POLARITY switch (with 177 only):

Spot positioning with change in POLARITY switch setting (using AC position as a reference).

	Vertical	Horizontal
AC	Centered	Centered
+(NPN)	−4 div	−5 div
−(PNP)	+4 div	+5 div

Indicator and CRT (Display Module)

Cathode Ray Tube

Type: Electrostatic Deflection.

Phosphor:

D2 (non-storage): P31 (standard).

D1 (storage): Equivalent to P1.

Accelerating Voltage: 3.5 kV.

Storage Characteristics (D1)

Storage Time: 1 hour.

Power Input

Line Voltage (RMS)

Nominal: 100 V, 110 V, 120 V, or 200 V, 220 V, 240 V, within 10%.

Line Freqeuncy

Range: 50 to 60 Hz.

Maximum Power at 110 VAC, 60 Hz: 155 W (1.7 A).

Power Cord Conductor Identification

Conductor	Color	Alternate Color
Ungrounded (Line)	Brown	Black
Grounded (Neutral)	Blue	White
Grounding (Earthing)	Green-Yellow	Green-Yellow

ENVIRONMENTAL

Temperature

Specified Operating: +10°C (+50°F) to +40°C (+104°F).

Useful Operating: 0°C (+32°F) to +50°C (122°F).

Non Operating: −40°C (−40°F) to +65°C (149°F).

Altitude

Operating: to 10,000 feet.

Transportation

12-inch package drop: Qualified under the National Safe Transit Committee procedure 1A.

PHYSICAL

Net Weight

Main frame: Approximately 40 pounds (18.1 kg).

Dimensions

Length (without test fixture):	≈22 1/4 inches
Width:	≈8 1/3 inches
Height:	≈14 5/8 inches

OPERATING INFORMATION

Introduction

The D1 (storage) and D2 (non-storage) display modules operate with the Tektronix 577 Mainframe and a test fixture to form a curve tracer system.

This section of the manual gives a brief functional description of the front-panel controls and connectors and a familiarization procedure.

Preliminary

The Operating Instructions section of the appropriate Operators Manual should be referred to for initial preparation. The Operators Manual contains operating information as well as general and specific applications information.

Function of Controls

This is a brief description of the functions of the front-panel controls.

577

COLLECTOR SUPPLY POLARITY[1]

+DC	Applies positive DC to the collector terminals of the test fixture.
+	Applies positive sweeping voltage at twice line rate to the collector terminals of the test fixture. See PULSED 300 μs.
AC	Applies AC at power line frequency to the test fixture collector terminals (use slow step rate).
−	Applies negative sweeping voltage at twice line rate to the test fixture collector terminals. See PULSED 300 μs.
−DC	Applies negative DC to the test fixture collector terminals.

CAUTION

When enabling the collector supply, changing polarity, or peak voltage range, always set the Left/Right device selector to center as transients may appear which exceed the indicated maximum peak voltage.

[1]Automatic trace position, with polarity change, is maintained in all switch positions.

NOTE

The normal step generator polarity is positive-going in +DC, +, and AC, and negative-going in − and −DC. Step generator polarity can be inverted by either the STEP/OFFSET POLARITY switch or the test fixture Terminal Selector.

VARIABLE COLLECTOR %	Provides uncalibrated, continuously variable control of collector supply amplitude from 0% to 100% of the voltage selected with the MAX PEAK VOLTS switch.
MAX PEAK VOLTS	Selects one of five collector supply voltages.
SERIES RESISTORS and PEAK POWER WATTS switches	Fourteen resistor values coupled to the MAX PEAK VOLTS switch to maintain one of six labeled peak-power limits. The SERIES RESISTORS and PEAK POWER WATTS switch pulls out to unlock from the MAX PEAK VOLTS switch to change the power setting. Lower power settings are available on all except the highest voltage range.
COLLECTOR SUPPLY DISABLED (Indicator Lamp)	The yellow lamp is lighted when the test fixture protective lid is not closed over the test terminals (unless modified by a wiring option in the test fixture) whenever the MAX PEAK VOLTS switch is in the 100 V, 400 V, or 1600 V position. The yellow lamp pulses (on and off) if the vertical current limiting circuit disables the collector sweep.
COLLECTOR SUPPLY CIRCUIT BREAKER	Protects the collector supply from excessive power dissipation. Push to reset breaker after circuit interruption.
PULSED 300 μs (Pushbutton)	With the PULSED 300 μs pushbutton in the in position (Pulsed Mode), the step generator produces 300 μs wide pulses at 1 or 2 times line frequency, depending on the Step Rate selected.
STEP FAMILY REP	With this pushbutton in the in position, up to ten steps per family are generated, depending on the position of the NUMBER OF STEPS control. When the pushbutton, STEP X.1, concentric with the STEP/OFFSET AMPL switch, is in the out position, the NUMBER OF STEPS control provides from about 1 to 95 steps.

SINGLE — Each time the SINGLE button is pressed, a single family is generated. Upon release, the step generator is turned off.

SLOW (1X LINE Frequency) — When the SLOW button is in the in position, the generator stepping rate is at power-line frequency.

NORM (2X LINE Frequency) — When the NORM button is in the in position, the generator stepping rate is twice the power-line frequency.

FAST (4X LINE Frequency) — When the FAST button is in the in position, the generator stepping rate is four times the power-line frequency.

NOTE

Step transitions occur at the start of the collector supply sweep in SLOW and NORM modes. Transitions occur at both the start and the peak of the collector supply sweep in the FAST mode.

FAST and SLOW — When FAST and SLOW buttons are in the in position simultaneously, the generator stepping rate is twice the power-line frequency, but the step transitions occur at the peaks of the collector supply sweeps.

NUMBER OF STEPS — Continuously variable control selects the number of steps per display.

STEP/OFFSET AMPL — Selects from 21 current steps, from 50 nA/Step to 200 mA/Step, or six voltage steps from .05 V/Step to 2 V/Step in a 1-2-5 sequence.

STEP X.1 — Push-push knob concentric with STEP/OFFSET AMPL knob. When this knob is released (out position) the step amplitude is reduced to .1X the previous amplitude and is indicated by the illuminated area of the STEP/OFFSET AMPL knob skirt. The number of steps available changes to approximately 1 to 95 steps.

STEP/OFFSET POLARITY — When the NORM pushbutton is in the in position, the step voltage is the same polarity as the collector sweep unless inverted by the test fixture.

OFFSET MULT — Multiturn control providing DC offset from 0 to 10 times the STEP/OFFSET AMPL switch setting with the STEP X.1 button in. 0 to 100 times with the STEP X.1 button out.

OFFSET (ZERO button) — In the out position, the offset voltage is determined by the OFFSET MULT control.

OPPOSE (AID button) — In the in position, the offset voltage aids in the step generator signal. When the OPPOSE button is in the out position, the offset voltage opposes the step generator signal.

HORIZ VOLTS/DIV (knob) — Selects from 12 calibrated collector deflection factors from .05 V/DIV to 200 V/DIV or from 6 calibrated base deflection factors from 50 mV/DIV to 2 V/DIV, unmagnified. With the X10 HORIZ MAG in the out position, the deflection factors are 5 mV/DIV to 20 V/DIV or 5 mV/DIV to .2 V/DIV. All steps follow a 1-2-5 sequence.

Horizontal POSITION (knob) — Provides uncalibrated horizontal positioning over at least ±10 graticule divisions.

X10 HORIZ MAG PULL — Pulling the Horiz POSITION knob to the out position provides ten times magnification of the horizontal display.

DISPLAY INVERT — When the NORM pushbutton is in the in position, a normal display is presented. When the NORM button is out, the display is inverted, both horizontally and vertically.

DISPLAY FILTER — Full vertical bandwidth is obtained with the NORM pushbutton in the in position. When the NORM button is in the out position, vertical bandwidth is limited to reduce noise on the trace.

Vertical POSITION (knob) — Provides uncalibrated vertical positioning over at least ±8 divisions.

X10 VERT MAG PULL — Pulling the Vertical POSITION knob to the out position provides ten times magnification of the vertical display.

D1 and D2

INTENSITY	Controls display brightness
FOCUS	Provides adjustment to provide a well-defined display.
BEAM FINDER	Brings beam on screen; limits the display to the area inside the graticule.
POWER	Turns instrument power on and off.
TRACE ROTATION (rear panel)	Permits alignment of the trace with respect to the graticule lines.
UPPER and LOWER STORE	Button pushed in selects storage operation. Button out selects normal operation without storage. Each button has a push-push action and is independent of the other.
UPPER and LOWER STORE	Complementary cancelling switches select the screen to be erased. Both buttons pushed in selects both screens.
ERASE	Momentary contact pushbutton initiates erasure of the stored image selected by the Erase Selector.
BRIGHTNESS	Provides continuously variable flood-gun current duty cycle from about 10% to 100% (when the collector sweep is turned down or disabled), permitting extended retention of displayed information. Also controls the degree of spot dimming when collector sweep is turned down or disabled.

Familiarization

The following steps demonstrate the use of the controls of the D1 or D2. Follow the procedure for familiarization.

Setup Information

1. Be sure that the Curve Trace system is complete. The D1 or D2 must be properly connected to the 577 mainframe (with the test fixture in place).

2. Set the POWER switch to Off and connect the Curve Tracer system to a power source that meets the voltage and frequency requirements in the Operating Instructions of the 577 system Operators Manual.

3. Set the D1 or D2 front-panel controls as follows:

NOTE

When first receiving the instrument and when it has been turned off for two weeks or more turn the BRIGHTNESS control fully clockwise, and place the push-push STORE switches (UPPER and LOWER) in the in position. Turn the INTENSITY control fully counterclockwise. Turn the power on and note that after a short delay the screen becomes fully illuminated. Leave the instrument in this mode for five minutes before erasing or going to the non-store mode.

D1-D2

INTENSITY	counterclockwise
FOCUS	centered

D1 Only

BRIGHTNESS	counterclockwise
STORE	
UPPER and LOWER	out position
ERASE	
UPPER and LOWER	either position

4. Pull the POWER switch to the ON position.

5. Allow one minute for instrument warm-up.

6. Set the 577 Curve Tracer system controls as follows:

MAX PEAK VOLTS	25
MAX PEAK POWER WATTS	.15
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY	
POLARITY	AC
All Dark Gray Buttons	pushed in
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/DIV	1 mA
LEFT-RIGHT Switch	off (centered)
Terminal Selector	EMITTER GROUNDED BASE TERM, STEP GEN

7. Slowly turn the INTENSITY control clockwise, while pressing the BEAM FINDER button, until a spot appears in the CRT viewing area. To avoid burning the CRT phosphor, adjust the INTENSITY control until the spot is easily visible, but not exceptionally bright. Position the spot to graticule center and release the BEAM FINDER button.

8. Adjust the FOCUS control for a sharp, well-defined spot.

9. Turn the VARIABLE COLLECTOR % control to produce a ten-division horizontal trace on the CRT graticule.

10. Adjust the INTENSITY control for the desired viewing level (brightness). Adjust the FOCUS control for a sharp, well-defined display over the trace length.

11. Vertically position the trace to center horizontal graticule line. If the trace is not parallel to the center horizontal line, see Trace Alignment Adjustment in this section.

Beam Finder

1. Move the display off screen with the Vertical POSITION control.

2. Push the BEAM FINDER button and observe that the display returns to within the graticule area. Reposition the display to graticule center and release the BEAM FINDER button.

Storage Operation (D1)

Turn the INTENSITY control counterclockwise and press both UPPER and LOWER STORE buttons. A background light level will be present on the storage screens.

Simultaneously press both the UPPER and LOWER screen-selector buttons. Push the ERASE button to erase both screens; this prepares the targets for storage.

Turn the INTENSITY control slowly clockwise to produce a trace of normal viewing intensity, then turn the control (INTENSITY) fully counterclockwise. A stored display should remain on the screen.

Separate STORE switches are provided for the upper and lower storage screens, permitting independent screen use. When both screens are operated in the non-store mode (both UPPER and LOWER STORE buttons out) the instrument provides a normal display. When either or both screens are operated in the storage mode (applicable STORE button in) a display can be retained for further analysis.

A stored display is erased by first selecting the screen to be erased, then pushing the ERASE button. The erasure of one screen has no effect on the other. The UPPER and LOWER ERASE buttons are interlocked to provide cancellation of either switch when the other is pressed. However, either screen, or both, can be selected for erasure.

To demonstrate independent storage screen operation, push the ERASE, UPPER, screen selector button to release the ERASE, LOWER button. Press the ERASE button and note that only the upper screen erases. Push the ERASE, LOWER button (ERASE, UPPER button releases) and press the ERASE button. Set either screen to non-store (STORE button out) and note that the other screen is fully operable in the storage mode, permitting simultaneous store and non-store operation.

The brightness (intensity) of the CRT display is controlled from the INTENSITY control. This control is adjusted for an easily visible but not excessively bright display. Readjustment may be necessary for different displays.

Particular care should be exercised when only a spot is displayed, as a high-intensity spot can burn the CRT phosphor. Permanent damage may result if a stationary spot remains too long.

CIRCUIT DESCRIPTION

General

This circuit description is divided into two parts: a block diagram description and a circuit description.

The block diagram description describes the functions of the major circuit blocks, using the overall block diagram included in the diagrams section at the rear of the manual.

The circuit description provides a more detailed description of each of the major circuits. Some individual block diagrams are included with the text in this description. Complete schematic diagrams, including component numbers and component values, are provided on the pullouts at the rear of the manual.

BLOCK DIAGRAM DESCRIPTION (577)

The 577-D1 or D2, when used with the appropriate test fixture, is a dynamic curve tracer system that measures and displays the characteristics of a wide variety of devices. The collector supply and step generator circuits produce operating voltages that are applied to the device under test. The display amplifiers measure the results of the voltages applied to the device under test. These measurements result in the display (on the CRT) of the characteristics of the device.

The collector supply circuit produces full-wave rectified, filtered or unfiltered, sine waves (either negative going or positive going) or unrectified sine waves, depending on the positions of the COLLECTOR SUPPLY POLARITY switch or the PULSED 300 μs button. The signal amplitude can be varied from 0 to 1600 volts, determined by the settings of the MAX PEAK VOLTS switch and the VARIABLE COLLECTOR % control. The collector supply output is connected to the collector, or equivalent, terminal of the device under test.

The step generator produces ascending steps of current or voltage at a Normal rate of one step for each half-sine wave of the collector supply. The current or voltage step amplitude is controlled by the STEP/OFFSET AMPL switch. The number of steps produced is controlled by the NUMBER OF STEPS control. The step generator output is applied to either the base or emitter terminals (or equivalent) of the device under test.

The display amplifiers are connected to the device under test. These amplifier circuits sense the effects of the collector supply and step generator output on the device under test, amplify the resulting signals, and apply these signals to the CRT deflection plates. The deflection factors of these amplifiers are controlled by the VERTICAL CURRENT/DIV and HORIZ VOLTS/DIV switches.

CIRCUIT DESCRIPTION (577)

The following analysis provides a description of the major circuits in the curve tracer, with special emphasis on those areas of unique or especially complex circuitry.

Power Supply

The low-voltage power supply provides five regulated and five unregulated dc voltages and three ac voltages, derived from T701.

The regulated dc voltages are: −30 V, −12 V, +5 V, +12 V, and +30 V. The unregulated dc voltages are: −40 V, +40 V, +200 V and two voltages, +10 V and +40 V (step amplifier supplies with the step amplifier common being the reference).

The three ac voltages are used for: D1 Display Unit flood-gun heaters, 6.3-volt CRT heater (elevated to −3400 volts), + and −15 volts for the collector sweep board, and a 90-volt, ac, p-p, signal (from the same secondary as the +40 and −40-volt supplies) used as a line phase reference in the step generator.

−30-Volt Supply. The −30-volt supply consists of CR751 (a diode bridge also shared with the +30-volt supply); a filter, C771; a reference diode, VR772; an error amplifier, Q772-Q786; and a series regulator, Q788.

VR772 sets the voltage on Q772 emitter. Any variation in the −30-volt supply output level (set by R775) is compared to the reference voltage on the emitter through the divider (R777, R775, and R776). Any variation in Q772 base voltage is amplified by Q772 and Q786. This amplified error signal controls the conduction of Q788.

The −30-volt supply is short-circuit protected. If the current through series regulator Q788 causes a drop in excess of approximately 0.7 volts across R786, CR785 conducts, turning on Q786, which turns off the series regulator, limiting the current to a safe level.

+30-Volt Supply. The +30-volt supply consists of the diode bridge (shared with the −30-volt supply); a filter, C751; an error amplifier, Q754; a series regulator, Q766; and short-circuit protection, Q760.

The −30 volts at the bottom of divider R763-R765-R764 is the reference for the +30-volt supply. Any change in the +30-volt output level causes a change at the variable tap on R765 (about zero volts, DC). The voltage at R765 tap is compared to Q754 emitter voltage (approximately −0.7 volts, set by CR755). Any variation is amplified by Q754 and controls the conduction of the series regulator, Q766.

The +30-volt supply is short-circuit protected. When current through the series regulator, Q766, reaches a value that causes the drop across R766 to reach approximately 0.7 volt, Q760 turns on, limiting the base drive to Q766, limiting the current to a safe level.

−12-Volt Supply. The −12-volt supply consists of a diode bridge, CR731; filters 731 and C733; and a monolithic regulator, U732. The regulator is designed to provide short-circuit and thermal protection.

+12-Volt Supply. The +12-volt supply consists of a diode bridge, CR721 (shared with the +5-volt supply); a filter, C721 (also shared with the +5-volt supply); and a monolithic regulator, U722. U722 is identical to U732 and is designed to provide short-circuit and thermal protection.

+5-Volt Supply. The +5-volt supply consists of CR721 and C721; and a monolithic regulator, U724, which is designed to provide short-circuit and thermal protection.

Step Generator

The step generator consists of three major sections: the clock, the staircase generator, and the pulse generator. See Fig. 3-1.

The clock circuit produces a negative-going clock pulse that determines the rate and phase (with respect to the collector supply) of the step generator output.

The staircase generator produces a staircase of steps. It also determines the number of steps, and whether a single family or repetitive family of steps is produced.

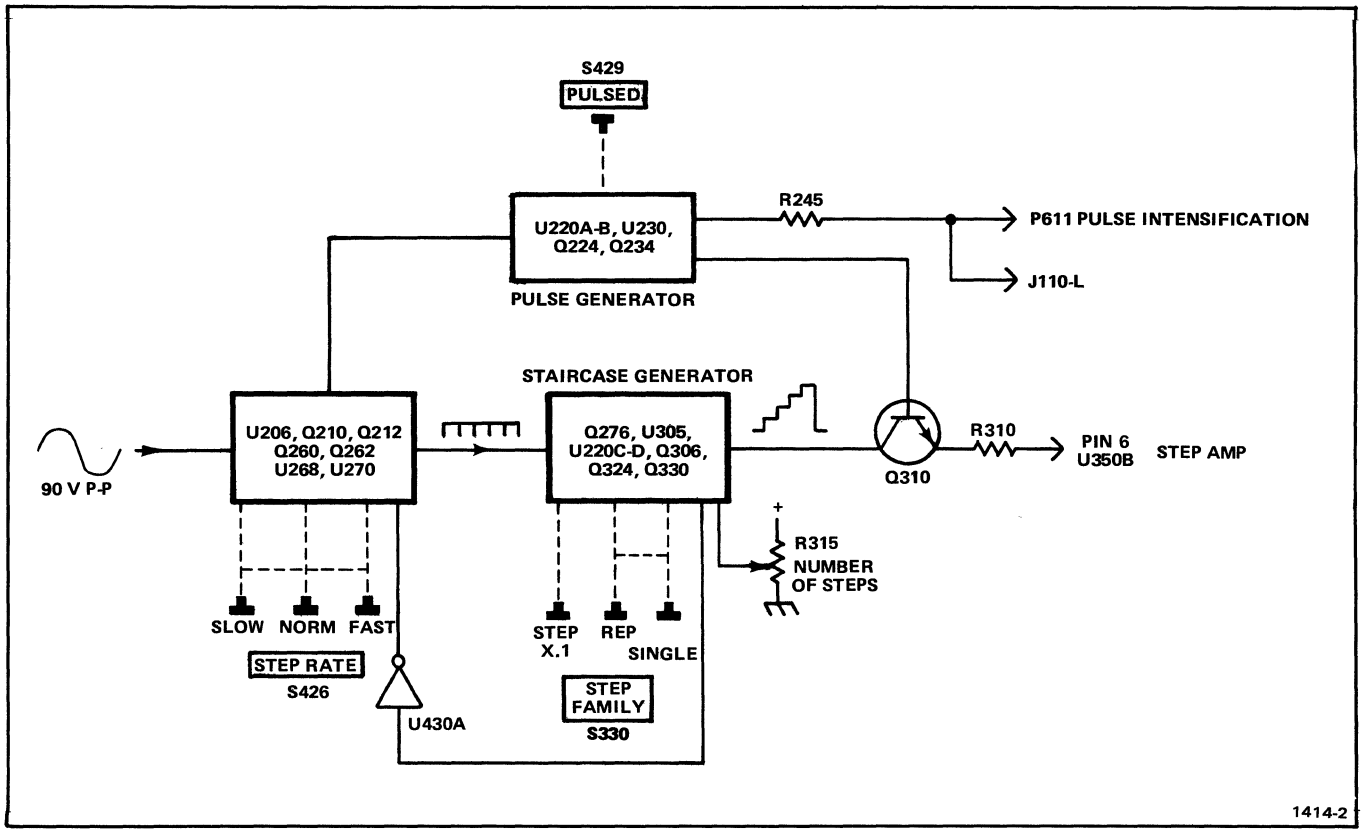


Fig. 3-1. Block diagram of the Step Generator.

The pulse generator controls the output of the step generator and may permit only 300 μs pulses instead of the staircase. The three major sections of the pulse generator are shown in Fig. 3-1, illustrating the major components.

The Clock Circuit. The clock circuit consists of phase-shift amplifier, U206; two zero-crossing comparators (Q210-Q212 and Q260-Q262); a four-wide, two-input gate, U268; and a monostable multi, U270.

The input to the clock circuit (line frequency) is from pin 8 of P392. This ac signal is fed to the base of Q260, one of the zero-crossing comparators, and also to the input of the phase-shift amplifier. The phase-shift amplifier shifts the phase of the ac signal by 90° and feeds the phase-shifted signal to the bases of the other zero-crossing comparators.

The zero-crossing comparators have four outputs, which coincide with the four zero points of the sine-wave signal and the phase-shifted signal. The phase-shifted signal is also fed to the pulse generator circuit.

The four outputs are connected to the four-wide, two-input gates of U268. The four signals at the input gates of U268 correspond in time to the two zeros and two peaks of one complete sine wave of the ac collector-supply reference signal at the input of the clock circuit. The signals at gates A and B (U268) respond to the peaks and gates C and D respond to the zeros.

The ability of U268 to pass these signals is controlled by the STEP RATE switch. If either input of any gate is connected to a low level (zero), the gate will not pass a signal.

If the SLOW button is pressed, gates A, B, and C, each has one input tied to ground. A, B and C are disabled and only gate D can pass the signal. This signal corresponds to one zero crossing of the input sine wave.

When the NORM button is pushed in, gates A and B are disabled, and gates C and D pass the signal. These signals correspond to both zeros of the input sine wave.

If the FAST button is pressed, all gates pass the signal, corresponding to both zeros and both peaks of the input sine wave.

If the FAST and SLOW buttons are pressed simultaneously, gates C and D are disabled, permitting gates A and B to pass signals corresponding to both sine-wave peaks.

The signals passed by U268 are applied to the input, pins 3 and 4 of U270.

U270 is a monostable multi having a time constant set by R273-C273. The output of U270 is a constant-width positive pulse which is applied to the staircase generator. U270 may be disabled by applying a low level to pin 5 of U270. This level is provided by U430A, which is controlled by the step family switches.

The Staircase Generator.

STEP FAMILY REPETITIVE. The staircase generator circuit consists of a common-emitter amplifier, Q276; an integrator, U305A; a level detector, U305B; U220C and U220D connected as a bistable multi; a reset transistor, Q306; and two common-emitter amplifiers, Q324 and Q330. The positive-going, constant-width input pulse from U270 is applied to the input of the staircase generator Q276. The result is a negative-going pulse (at the collector of Q276). The pulse amplitude (when STEP X.1 is pushed in) is adjusted by the Step Amplitude control, R278. When STEP X.1 is released, the pulse amplitude is adjusted by R281. This negative-going pulse is applied to either C279 or C280, depending on the setting of the STEP X.1 switch.

The negative-going step coupled by C279 or C280 causes the — input of U305A, pin 6, to try to go negative, causing the output of U305A, pin 7, to go positive to offset the negative step on pin 6. This action produces a charge on C306, causing a positive step at U305A output. The amplitude of the positive-going step depends on the ratio of C279 (or C280) to C306.

If the STEP X.1 button is pushed in, the amplitude of each step is one-half volt. Each following pulse from Q276 causes an additional step at U305A output. These steps continue until pin 2 of U305 goes more positive than pin 3 of U305B. The level at pin 3 is set by the NUMBER OF STEPS control (front panel) and is adjusted from approximately zero to approximately 5 volts.

When the — input of U305B goes more positive than the + input, the output switches to a — level. This — level is applied as a low level to U220C, pin 13, causing U220C output, pin 11, to switch to its high level, causing a high level at pin 4 of U220D. The high level on pin 4 of U220D does not cause U220D to switch, since pin 5 is still at a low level. The leading edge of the next positive pulse from U270, pin 6, is coupled through C274 to pin 5 of U220D, causing pin 6 of U220D to go low, causing a low on pin 12 of U220C, keeping the flip-flop latched in this condition.

The low level at U220D output is connected to Q324 base, turning Q324 off and causing the collector level to go

high. The high level at Q324 collector does two things: holds pin 5 of U220D at a high level and turns Q306 on. This causes Q306 to discharge C306, which in turn causes pin 7 of U305A to return to ground level.

Ground level on U305A, pin 7, causes U305B, pin 2 to go to a level lower than that on pin 3 of U305B, causing the output of U305B, pin 1, to go positive. This positive step causes a high level on U220C, pin 13, but a switch cannot occur since pin 12 of U220C is at a low level, the falling edge of the positive-going pulse from pin 6, U270, is coupled through C274 to pin 5 of U220D. U220D switches, causing pin 6 to go high, causing a high level at pin 12, U220C, causing pin 11 to go low, latching the flip-flop in this condition. At this point another staircase will be generated.

STEP FAMILY SINGLE. When the SINGLE button is pressed, the REP button is released and one family is permitted to run.

When the REP button is released, pin 2 of U430A is connected to Q324 collector. Since U430A is wired as in inverter, whenever the collector of Q324 is high, pin 3 of U430A is low, disabling U270. The base of Q330 is tied to Q324 collector, so that whenever the collector of Q324 is high, Q330 is turned on, causing Q324 base to be at ground level. Q324 is held in the off condition.

Pressing the SINGLE button causes Q330 base to be grounded momentarily by C332. This permits Q330 collector to go to a high level, since pin 6 of U220D is high. Q324 collector goes to the low level, enabling U270, causing pulses to run, and turning off Q330.

One step family runs as described previously, until pin 6 of U220D goes to the low state, and turns Q324 off, permitting Q324 collector to go high, disabling U270, turning Q330 on, latching until the single button is pressed again.

The output of the staircase generator is applied to Q310 collector.

300 μs Pulse Generator. The 300 μs pulse generator consists of gates U220A and U220B; a monostable multi, U230; common-emitter pulse-intensification amplifier, Q224; and a common-emitter amplifier, Q234.

The gates in the input of the pulse generator (U220A and U220B) operate similarly to the gates in the clock circuit in the input of U268. The inputs to U220A and U220B come from the zero-crossing comparators, Q210 and Q212. These input signals correspond in timing to the peaks of the sine-wave signal (collector supply reference) applied to the input of the step generator clock circuit. The ability of U220A and U220B to pass these signals is controlled by the PULSED 300 μs and the STEP RATE buttons.

When either the STEP RATE NORM or FAST button is pressed, while the PULSED 300 μs button is pushed in, pin 12 of U220A and pin 1 of U220B are permitted to go to high levels, and both gates (U220A and U220B) pass the signals.

When the STEP RATE SLOW button is pressed while the PULSED 300 μs button is pushed in, pin 1 of U220B is low and U220B cannot pass the signal (only U220A passes signal).

The output of U220A and U220B are coupled through C223 and C226 and applied to the input of the monostable multi, U230.

The time constant of the monostable multi is set by C231-R231. A 300 μs pulse appears at both monostable-multi outputs (Q and $\overline{Q}$) for each signal input. The Q output, pin 6, has a positive-going 300 μs pulse, and the $\overline{Q}$ output, pin 1, has a negative-going 300 μs pulse.

The $\overline{Q}$ output, pin 1, is normally about 5 volts (high state) positive unless an input signal is applied, in which case pin 1 goes to ground level for 300 μs.

When $\overline{Q}$ is at its high level, Q234 is held on, causing its collector to be at ground level, which holds Q310 off.

When $\overline{Q}$ goes to ground, Q234 turns off, causing Q310 to turn on for 300 μs, permitting a pulse step at the emitter of Q310.

When the PULSED 300 μs button is not pushed in, CR234 cathode is grounded, holding Q234 off.

The Q output of U230 is normally at ground and goes positive for 300 μs each time an input signal is applied to the input. This positive-going step at Q is delayed 100 μs by network R241-C242. After the 100 μs delay, Q224 turns off for 200 μs (300 μs minus the 100 μs delay). As Q (pin 6) returns to the low level, CR241 turns on and Q224 is immediately turned off. This process creates a negative-going signal at Q224 collector, 200 μs wide, delayed by

100 μs. The negative-going pulse on Q224 collector is used to intensify the last 200 μs of the 300 μs pulse.

The PULSED 300 μs switch has two sections. The section previously explained controls the signals through U220A and U220B. When the PULSED 300 μs button is pushed in, pins 3 and 4 of U268 are grounded, preventing U268, A and B from passing signals in the PULSED 300 μs mode. Only SLOW and NORM rates can be achieved when in pulsed mode.

The remainder of the PULSED 300 μs switch permits continuity (when pushed in) from terminal 2, P433, to the STEP RATE switch to ground. When the PULSED 300 μs button is pushed in, and either the SLOW or NORM STEP RATE button is pushed in, the collector supply goes automatically to DC mode.

When the FAST STEP RATE button is pushed in, the pulses occur at normal rate (2X line frequency) and the collector supply is not switched automatically to DC mode.

Step Amplifier

The step amplifier converts the step generator output to current or voltage steps for application to the device under test. The STEP/OFFSET AMPL switch determines the amplitude of these steps.

The step amplifier consists of an offset amplifier, U350A; a current summing amplifier, U305B; an X1 inverting or non-inverting amplifier; and an output amplifier.

For voltage steps, the output amplifier consists of U380A, and Q384 or Q386 (depending on polarity). See Fig. 3-2A.

For current steps the output amplifier consists of U380A; Q384 or Q386; Q450A and B; and U380B (an X1 feedback amplifier). See Fig. 3-2B.

The offset amplifier, U350A, produces currents ranging from 0 to 500 μA, of either polarity, depending on the setting of the OFFSET mult dial and the ZERO-AID buttons. The current is applied to the – input of U350B, pin 6. The step generator signal, consisting of steps of 50 μA each, is applied to pin 6.

Each 50 μA step to U350B input produces a negative-going step of 0.4 volts at the output of U350B, pin 7. A total of 10 steps, therefore, produces 4 volts at U350B output. If the OFFSET AID button is pressed and the OFFSET MULT dial is set to 10.00, for an additional 4.0 volts at U350B output, the result is a total of 8.0 volts at the tenth step level.

U350B output, at pin 7, is applied to U360. U360 operates as either an inverter or a follower (– or + one times amplifier), depending on the setting of relay K436. Pin 6 of U360 will be at the same voltage as U350B output, whether the same or opposite polarity.

The position of K436 is controlled by the COLLECTOR SUPPLY POLARITY switch; the STEP/OFFSET POLARITY INVERT switch; or the test fixture Terminal Selector switch, in conjunction with the step generator polarity logic, U430B, C, D, and Q326.

The step generator polarity is controlled by three inputs: pin 9, U430C; pin 12, U430D; and pin 13, U430D.

Each of these three inputs controls the step generator polarity. A change in logic level of any one of these inputs causes pin 6, U430B, level to change, resulting in Q436 turning either on or off. The condition of Q436 (on or off) controls relay K436, the step amplifier polarity relay. When pin 6, U430B, is high, Q436 is on and K436 is activated. This is the negative polarity position of the relay. When pin 6, U430B, is low, Q436 is off and K436 is not activated. This is the positive position of relay K436.

The output of U430B also controls Q440. When Q436 is on, Q440 is off, and vice versa. The collectors of Q436 and Q440 control two sets of diodes, CR441-CR438 and CR439-CR440, which are reverse-voltage limiters in the current mode.

The output step amplifier converts the output steps of U360 to current or voltage steps at amplitudes determined by the STEP/OFFSET AMPL switch. This amplifier is a differential amplifer with separate feedback to each input.

The negative amplifier input, pin 3, controls the amplitude of the output steps. The positive amplifier input, pin 2, provides either feedback from the current-setting resistors in the current mode or a constant voltage level in the voltage output mode.

Current Mode. To obtain current steps, the gain of the negative side of the differential amplifier is set to provide an output of 200 mV/Step. This output is connected to the variable series current-setting resistors (R404-R427).

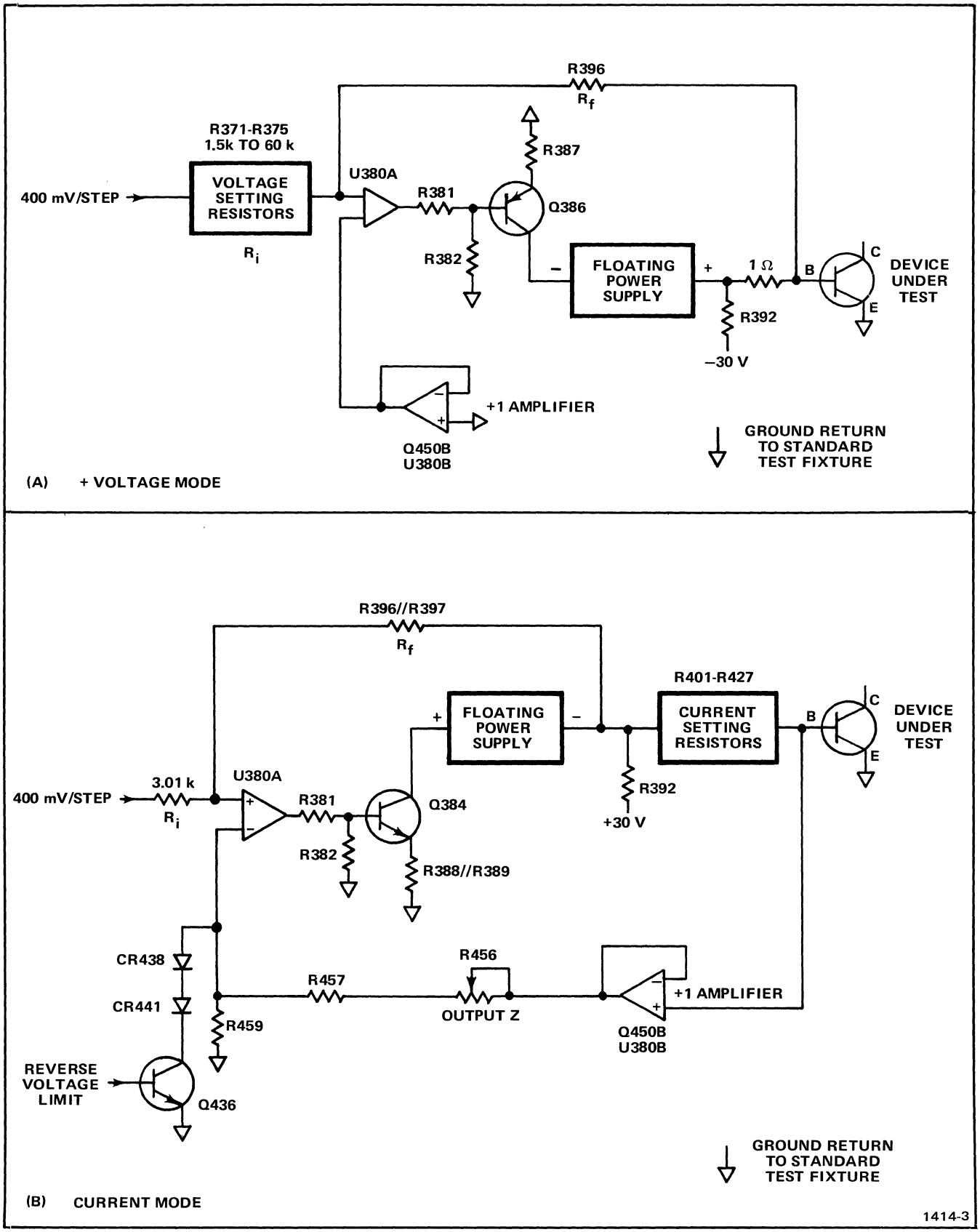


Fig. 3-2. Step Amplifier block diagram (A) Voltage mode and (B) Current mode.

With a constant-voltage per step across the current setting resistors, the current/step can be varied by changing the resistance.

To obtain voltage steps, the voltage setting resistors (which compose the input resistance of the negative input) are changed, thus varying the gain of the negative side of the feedback amplifier, U380A.

Voltage Mode. The output step amplifier in the voltage mode is an inverting feedback amplifier. The input resistance consists of R371 through R375 (the selectable voltage setting resistors); the feedback resistance is R396. With 400 mV steps in, the output steps range from 50 mV to 2 V.

The + input of the inverting feedback amplifier, U380A, is connected to the output of the +1 amplifier (voltage follower), Q450A and B, and U380B.

In the voltage mode, the input to the +1 amplifier is connected to the ground return to the standard test fixture (output voltage steps are referred to ground).

The output of U380A drives the base of either Q384 or Q386, depending on the setting of relay K436, which determines the step polarity. In the – mode, Q386 is driven by U380A output through the divider R381 and R382. Q386 collector is connected to the – side of the floating power supply.

The + side of the floating power supply is connected to the base of the device under test through a 1 Ω resistance.

The feedback path to the inverting-feedback amplifier is from the output side of the current setting resistors, through R396, the feedback resistor for the – side of the amplifier.

Voltage divider, R381-R382, in conjunction with R387 (emitter of Q386-Q384), sets the forward current limit in the voltage mode. The divider limits the voltage that may be applied to the base of Q384 or Q386.

Since the base voltage is limited, the voltage across R387 is limited, thus limiting the current through the device-under-test.

When the amplifier is in the + step polarity mode, it is possible to achieve minus voltage output by using the OFFSET MULT AID button. The power supply used for this opposite polarity output is either the + or – 30 volts to R393, via relay K436.

The current provided by the + or – 30-volt supply is limited by R393, which is the reverse current for voltage and current modes and is normally set at about 15 mA with zero volts out.

Current Mode. In current mode, the operation of the amplifier is similar to voltage mode. The output voltage is fed back to the + side of the differential amplifier (U380A), providing a reference. Input to pin 3 of U380A is always through the voltage setting resistors, R371 through R375. In the current mode, the input resistance is set at 3.01 kΩ for all positions of the STEP/OFFSET AMPL switch. When the feedback resistance is R396 and R397 in parallel, the gain of the amplifier is the feedback resistance (R396 and R397 in parallel) divided by the input resistance (3.01 kΩ) for a gain of 0.5.

400 mV steps into the input resistor produces 200 mV steps across the current setting resistors. The output of the current-setting resistors is fed back through the +1 amplifier (Q450-U380B), via divider R456-R457-R459 to the input, pin 2, of U380A. This arrangement produces a constant 200 mV across the current-setting resistors, regardless of the voltage on the terminals of the device under test, up to the voltage limit in current mode. Current out can be changed by changing the value of the current-setting resistor, R404 through R427, permitting current steps ranging from 50 nA/DIV to 200 mA/DIV with STEP X.1 pushed in.

The output impedance adjustment, R456, permits the divider ratio to be adjusted to exactly match the U380A input divider ratio. This helps to ensure a 200 mV/Step across the current-setting resistors (up to the voltage limit in current mode), regardless of the voltage on the terminals of the device under test. Since the current-setting resistors can be selected, current out can be varied by changing the value of current-setting resistor.

CR438-CR439-CR440, and CR441, reverse-voltage limiting diodes, are connected to Q436 and Q440 collectors. Either CR438 and CR441 or CR439 and CR440 determine the reverse voltage limit, depending on whether Q436 or Q440 is turned on.

If the step-amplifier polarity is +, Q436 is off and its collector high and Q440 is on (saturated), with its collector at a low level. In this condition, the junction of R457 and R459 can go no more negative than two diode junctions, plus a saturated transistor, for a voltage limit of about –1.3 volts.

In the opposite polarity, Q436 is turned on (saturated) and R457-R459 junction can go no more positive than about +1.3 volts. With the voltage at this point limited to about +1.3 volts, either polarity, the voltage at the output of the current-setting resistors is also limited. The 1.3 volts at the input to the differential comparator corresponds to about 2 volts at the output of the current-setting resistors.

The collector sweep dimming circuit is located on the main circuit board and is a part of the step amplifier schematic. Collector sweep dimming consists of Q594 and its associated components. The input to the circuit arrives via pin 1 of P596, from T102, the collector sweep transformer. When the VARIABLE COLLECTOR % control is set at 100, the signal is 200 volts, p-p. The signal is rectified by CR591 and filtered by R591-R592-C591, and applied to Q594 base.

Since Q594 is turned on by a very small signal, the VARIABLE COLLECTOR % control need be turned only a few degrees from zero to cause Q594 to saturate. When Q594 saturates, its collector approaches ground, which is applied to pin 2 of P611 to disable the collector sweep dimming. When no signal is applied to CR591 (when the VARIABLE COLLECTOR % is turned to 0) Q594 is turned off, its collector is positive, permitting the collector sweep dimming in the display module to operate, dimming the display.

Collector sweep dimming can be disabled internally by grounding pin 2 of P524 or externally by grounding pin 11 of J110 (at the test fixture interface jack).

Horizontal Amplifier

The horizontal amplifier consists of a voltage divider, R502A, B, C, and D; a FET amplifier, Q514A and B; a feedback amplifier, U520; and an adjustable gain-inverting feedback amplifier, U530. The output of this amplifier is connected to the output amplifier in the display unit.

The input to the divider, R502, comes from pin 1, P508 (pin 4-P110, 577-test fixture interface). The value of R502 is selected by S502, HORIZ VOLTS/DIV. The signal is applied to one end of the divider, R502. A selectable tap on this divider is used to select the voltage applied to the FET amplifier (Q514A and B) input. The selectable tap is moved by the HORIZ VOLTS/DIV switch and provides decade switching. In the most sensitive ranges, 50 mV, .1 and .2 volts (in both collector volts and base volts ranges), R502 is out of the circuit and the signal goes through R501, directly into the FET amplifier input.

The step-generator signal from pin 6 of U360 can bypass both R501 and R502 and be fed to the FET amplifier input. This step-generator signal arrives via the divider, R511-R512 and is applied to the FET amplifier input in the STEP GEN position of the HORIZ VOLTS/DIV switch.

Any of the signal sources must pass through the POLARITY NORM-INVERT switch, which sets the horizontal amplifier polarity.

FET amplifier, Q514A and B, is a differential-input source follower. The output of this follower is fed to the inverting-feedback amplifier, U520, having a gain of +1. U520 output is fed to another inverting-feedback amplifier, having selectable input and feedback resistors.

The input resistance consists of R526, R524, and R523, which make up the .5, 1 and 2 switching. In all the .5 positions of the HORIZ VOLTS/DIV switch, contact 24 is closed, paralleling R523 and R526. In the 1 positions of the HORIZ VOLTS/DIV switch, contact 25 is closed and R524 and R525 are in parallel. In the 2 positions of the HORIZ VOLTS/DIV switch, contacts 24 and 25 are open, leaving only R526 as the input resistance.

The feedback resistors of U530 are R536 and R537. When this amplifier is in X1 (X10 HORIZ MAG pushed in), R536 is in parallel with R537. When X10 HORIZ MAG is pulled out, R537 is the feedback resistor.

Pins 4 and 5 of P524 (pins 8-9 and J-K, P110) provide a current source for automatic display positioning with polarity change when using the 177 Standard Test Fixture.

Vertical Amplifier

The vertical amplifier is a differential-chopper amplifier. See Fig. 3-3. The amplifier is isolated and can float up to 2000 volts of common-mode voltage.

The amplifier consists of floating +15 and −15-volt power supplies and an oscillator and driver transistors to drive the chopper transformer.

The floating power supplies consist of a winding on power transformer, T701; a diode bridge, CR582; a filter, C581; and two 15-volt Zeners, VR581 and VR582.

The chopper consists of U542A, B, C, D, and E. The driver transistors Q544 and Q546 drive the primary of chopper transformer T550. T550 secondary terminals 7, 8, 9, and 10 connect to FET switches Q552, Q554, Q556, and Q558. The FET switches drive signal-isolation transformer, T560.

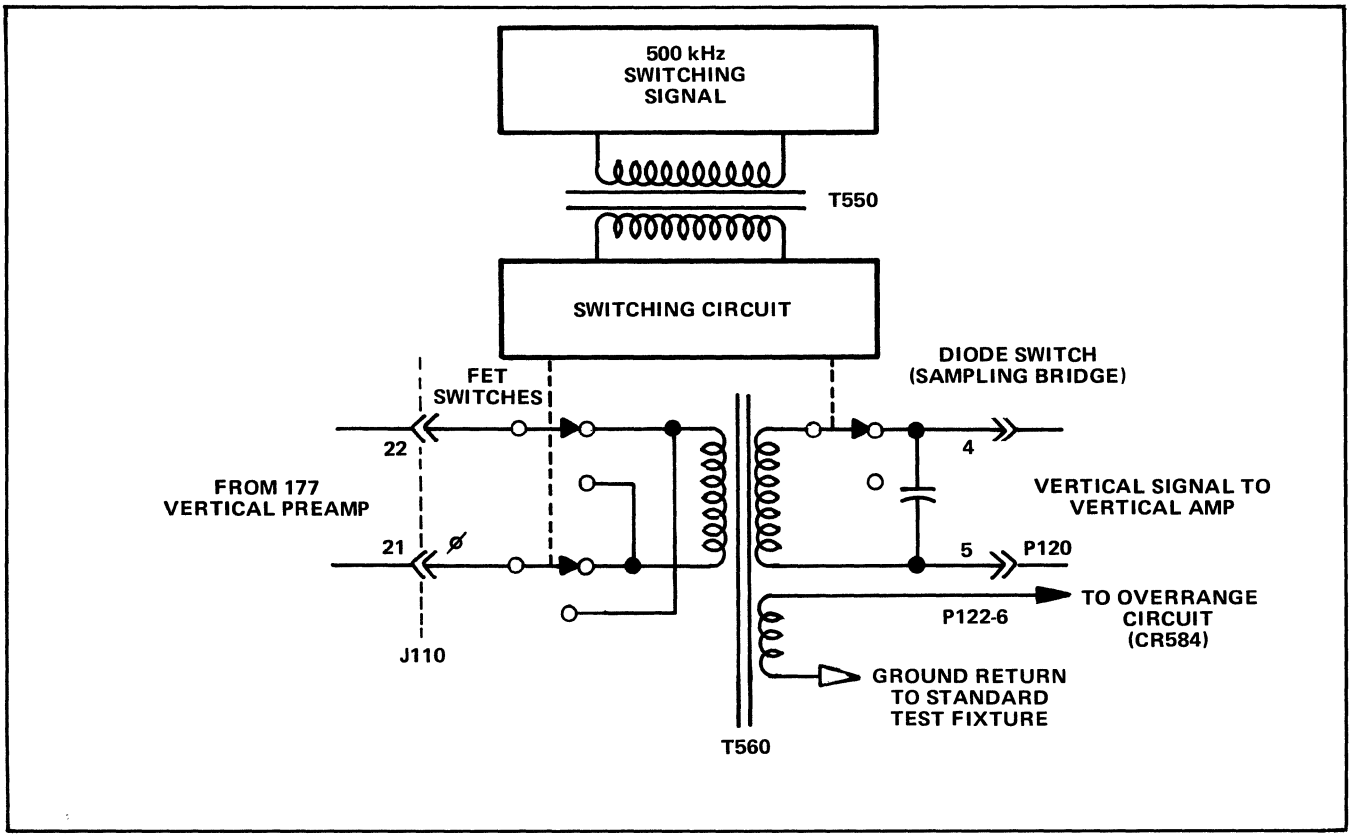


Fig. 3-3. Block diagram of the vertical amplifier.

T550 secondary feeds a sampling bridge, CR561, CR562, CR563, and CR564; and an inverting-feedback amplifier, U570.

The differential vertical signal comes to the two FET pairs, Q552, Q554, Q556, and Q558, via pins 1 and 4 of P129. The common signal on pin 1 is connected to the sources of Q556 and Q558, and the vertical signal (pin 4) is connected to the sources of Q552 and Q554. The gates of these FETs are controlled by the chopper transformer, T550.

T550 is driven by a 500 kHz square wave that is generated by the astable multi, U542, which drives Q544 and Q546. T550 secondaries drive the gates of the FET pairs. Only one FET pair is turned on at one time (Q552-Q556 on or Q554-Q558 on).

In the zero-signal (on T550 secondary) condition, the four FETS are conducting. When pin 7 of T550 is negative with respect to pin 8, CR552 and CR553 are forward biased, and Q552 turns off. At the same time, pin 9 is negative with respect to pin 10, CR556 and CR557 are forward biased, and Q556 turns off. Therefore, Q554 and Q558 are conducting. The vertical signal from pins 1 and 4 of P129 are now passed through the conducting FETs, Q554 and Q558 to T560 primary. When the polarity at pins 7 and 8 and pins 9 and 10 reverse, Q554 and Q558 turn off and the vertical signal from the test fixture is connected to T560 primary in the opposite direction. This switching occurs at a 500 kHz rate, as previously described.

Thus, the vertical signal is coupled through the signal isolation transformer, T560, and appears at terminals 1 and 2. Pins 1 and 2 are connected to the diode bridge, CR561, CR562, CR563 and CR564. The bridge is driven by a winding on chopper transformer, T550. The diodes are turned on half the time, driven by the 500 kHz square wave. This action connects T560 output (terminals 1 and 2) across C565.

Filter L564-C564 helps to remove the 500 kHz component from the signal. Thus, the vertical signal is reconstructed across C565. The signal then goes through the NORM-INVERT switch, which can invert the signal applied to the inverting-feedback amplifier, U570. The input resistance of U570 is R567 and R568. The feedback resistance is the parallel total of R576 and R577 when X10 VERT MAG is pushed in. When the X10 VERT MAG is

pulled out, R577 is the feedback resistance, changing the gain by a factor of 10. A vertical filter, C568 and C569 (with protective diodes, CR568 and CR569), filters the ac signal at U570 input. When this filter (DISPLAY FILTER) is switched (S568) in, only very low frequency measurements can be made. Pin 2, U570, is the – input of the inverting amplifier and has two signal sources other than the signal through R567 and R568. These sources are: the Vertical POSITION control, R575, and the automatic positioning signal from the COLLECTOR SUPPLY POLARITY switch.

The additional winding on T560 (terminals 4 and 6) provides collector supply disable if the vertical signal is too large. The signal at terminal 4 (T560) is related to the vertical signal amplitude. This signal (terminal 4) is rectified by CR584 and connected to Q586 base via R584. Q586 is normally on (no-signal condition). If the signal amplitude is large enough, Q586 starts to turn off. As Q586 starts to turn off, the negative-going collector signal, coupled through C587 back to Q586 base, creates a negative-going ramp at Q586 collector as long as the signal amplitude is high enough to attempt to turn Q586 off (because of the Miller effect. If the ramp duration reaches approximately 150 ms (the level at R587-R588 junction reverse biases Q588), Q588 collector signal (positive-going) is coupled back to Q586-R586, and turns Q586 off.

When Q588 collector goes positive, relay K125 (collector supply schematic) deactivates and disables the collector supply. With the collector supply disabled, the signal on terminal 4 of T560 is removed and the circuit reverts to its quiescent state after C586 discharges through R586 and R585 (Q586 and Q588 on), and the collector supply, through relay K125 is enabled.

When the MAX PEAK POWER-WATTS switch is set at .6 watts or below, Q588 base is grounded through R149, disabling the collector sweep disable circuit by holding Q558 in conduction. This shut-down circuit protects the current measuring resistors in the test fixture from excessive power dissipation when the collector sweep is on the high-power ranges.

Collector Supply

The collector supply circuit produces: an unrectified sine wave; a full-wave rectified sine wave; or a capacitor-filtered full-wave rectified sine wave, with peak amplitudes that can be varied from zero to 1600 volts, peak, in five ranges.

The voltage for the collector supply is provided by a variable autotransformer, T101. T101 output is connected to sweep transformer (T102) primary and varies from zero to approximately 110 volts.

The MAX PEAK VOLTS switch permits a choice of five collector sweep voltage ranges, choosing secondary transformer (T102) taps. These secondary voltages are rectified by one of two diode bridges: CR107 for the 6.5 V, 25 V and 100 V ranges and CR103-4-5-6 for the 400 V and 1600 V ranges.

The polarity of the outputs is changed by reversing the power supply output connections. When the COLLECTOR SUPPLY POLARITY is in either the +DC or –DC modes, the MAX PEAK VOLTS switch selects one of three resistor-capacitor combinations (connected between the collector sweep output and the current-return input). The capacitance holds the collector-sweep DC voltage at a constant level, set by the VARIABLE COLLECTOR % control, to produce a spot on the CRT, rather than a sweeep. The shunt resistance discharges the capacitance when the collector voltage is turned down.

Maximum peak current is set by R131 through R147, in series with the collector sweep. These series resistors are selected by the SERIES RESISTORS control (front panel).

If excessive power is drawn from the collector sweep supply, circuit breaker S101 opens, disabling the supply.

Input power to T101 (variable auto-transformer) is also controlled by relay K125. Relay K125 is controlled by several sources, via pin 4, P122, to the COLLECTOR SUPPLY POLARITY switch (S120, which interrupts collector sweep supply between POLARITY switch positions), and to Q588 collector. Q588, as explained previously, is controlled from several points.

BLOCK DIAGRAM DESCRIPTION (D1 and D2)

The vertical and horizontal deflection amplifiers provide final amplification for the signals from the 577 unit. They produce push-pull outputs suitable to drive the CRT vertical and horizontal deflection plates. Beam-finding circuitry is incorporated to limit the display within the screen area when the front-panel BEAM FINDER button is pressed.

The CRT Circuit produces the high voltage (about –3.4 kilovolts) and contains the controls necessary for operation of the cathode-ray tube. The CRT Circuit also contains the Z-Axis amplifier, which provides the drive signal to control the intensity level of the display.

The Storage Circuit provides the voltage levels necessary to operate the storage elements associated with the CRT. The circuit includes the erase-pulse generator for erasing

stored information and a multivibrator that permits the flood-gun duty cycle to be varied.

CIRCUIT DESCRIPTION (D1 and D2)

Deflection Amplifiers

Vertical Deflection Amplifier. The Vertical Amplifier provides the final amplification of signals applied from the 577. It produces a push-pull output sufficient to drive the CRT vertical deflection plates. The amplifier consists of Q1106, Q1107, Q1116, Q1117, and associated circuitry.

The input signal arrives via P612 via the interface circuit from the 577. The output signal is developed across the collector load resistors, R1104 and R1114, and is about 50 times the magnitude of the input signal. R1116, Vert Gain, provides Q1106-Q1116 emitter degeneration to set the gain of the stage to provide a calibrated vertical display.

Horizontal Deflection Amplifier. The Horizontal Deflection Amplifier consists of Q1126, Q1127, Q1136, Q1137, and associated circuitry. It is basically the same as the Vertical Deflection Amplifier just described, and provides the amplification of signals from the 577. Signals from the 577 are applied via P611. Gain of the stage is set by R1136 (Horiz Gain) to provide a calibrated horizontal display.

Beam Finder. If a high-amplitude signal or a misadjusted control has deflected the trace or display off screen, it can be located by pressing the front-panel BEAM FINDER pushbutton. This opens S1125, permitting current to pass through R1125 into the emitter circuits of both deflection amplifiers. R1125 limits the current available to the transistors, and hence, to the collector-load resistors. Thus, the dynamic range of the deflection plates is limited to an on-screen level, and the display is compressed within the viewing area.

CRT Circuit

General. The CRT Circuit produces the high-voltage and provides the control circuits necessary for operation of the cathode-ray tube (CRT). This circuit also includes the Z-Axis Amplifier stage to set the intensity of the CRT display.

Z-Axis Amplifier. The Z-Axis Amplifier is a current-driven, shunt-feedback, operational amplifier with a voltage output, consisting of Q1222, Q1226, and Q1234. The feedback path is from the collectors of Q1226 and Q1234 through R1227-C1227 to the base of Q1222. Q1234 is a constant-current source to provide drive for the capacitance of the floating CRT grid supply without excessive power dissipation in Q1226. The output voltage provides the drive signal to control the CRT intensity level through the Control-Grid supply.

The output level of the Z-Axis Amplifier is established by the voltage drop across R1227 with reference to virtual ground at the base of Q1222 (the operational amplifier summing point). The current through R1227 is determined by the input current from any combination of several sources, such as from the front-panel INTENSITY control, test fixture interface (blanking, intensification, etc.), and from Q1214. Q1214 is a common-emitter amplifier which acts as a switch. Q1214 is normally on and is turned off whenever the Brightness multivibrator turns off the flood guns. This, in turn, blanks the CRT to prevent an incorrect deflection factor being shown.

High Voltage Regulator

High Voltage Primary. A repetitive, non-sinusoidal signal is produced by a phase- modulated switching circuit in the primary of T1240 and induced into the secondaries. Current drive for the primary winding is furnished by Q1252 in its conducting state. Q1252 is turned on by positive-going feedback applied through C1259 and L1259 from the feedback winding, then turned off by switching action from Q1262. A sample of the output DC voltage is modulated by the AC from another feedback winding at the gate of Q1278; this establishes the conduction time of Q1252 and thus maintains the proper output level. Q1252 delivers energy to T1240 only once each cycle.

Assuming Q1262 and Q1264 are initially off, R1262 provides base drive for Q1252, causing it to deliver current to T1240 primary. As Q1252 conducts, the increasing current through the primary winding induces a voltage into the secondaries. The gate of Q1278 is driven negative by the voltage from the feedback winding, switching Q1264 and Q1262 on. With conduction of Q1262, base drive for Q1252 is removed.

With Q1252 off, the transformer field collapses, reversing the polarity of the voltage induced into the secondaries. When the gate of Q1278 is driven sufficiently positive to switch Q1264 and Q1262 off, Q1252 is switched on again. Q1252 again delivers energy to the primary winding and the action is repeated.

High Voltage Regulation. Regulation is accomplished as follows: Feedback from the −3400-volt cathode supply is summed with +30 volts through the voltage divider consisting of resistors R1272B-E, R1275, and R1276 to establish the DC level at the gate of Q1278. The ac component, which is the switching signal, is derived from the trans-

former as described previously. If the output level of the cathode supply drops below the nominal −3400 volts (becomes more positive), the level at the gate of Q1278 rises. A new point is selected on the varying ac component to cause switching of Q1262-Q1264 later and hence increase conduction time of Q1252. This allows more energy to be delivered to the primary winding of T1240, resulting in an increase of voltage in the secondaries. Conversely, if the output level increases, Q1252 is allowed to conduct for a shorter length of time. The DC level at the gate of Q1278 is adjusted by R1275, H.V. Adj., to set the output at exactly −3400 volts.

High Voltage Outputs

Transformer T1240 has two high-voltage output windings which provide the potentials required for the CRT cathode and control grid supplies. The −3400-volt accelerating potential for the cathode is supplied by half-wave rectifier CR1247. The cathode heater is elevated to the cathode potential through R1273.

Half-wave rectifier CR1241 provides about −3450 volts to establish bias voltage on the CRT control grid. This voltage (and hence the CRT beam current) is dynamically controlled by the Z-Axis Amplifier, which contains the INTENSITY control, blanking inputs, and intensification inputs. R1245, Int Range, provides a fine adjustment of the quiescent grid voltage to bias the CRT just below cutoff when the Z-Axis Amplifier output is at its minimum quiescent level (INTENSITY control counterclockwise and no intensifying or blanking inputs).

Neon bulbs DS1271, DS1272, and DS1273 provide protection to the CRT if the voltage difference between the control grid and the cathode exceeds about 180 volts.

CRT Control Circuits

In addition to the INTENSITY control discussed previously, front-panel FOCUS and internal astigmatism controls have been incorporated for arriving at an optimum CRT display. FOCUS control R1295 provides the correct voltage for the second anode in the CRT. Proper voltage for the third anode is obtained by adjusting Astig control R1286. In order to obtain optimum spot size and shape, both the FOCUS and Astig controls are adjusted to provide the proper electrostatic lens configuration in the CRT.

The Geom adjustment R1285 varies the positive level on the horizontal deflection plate shields to control the overall geometry of the display. The TRACE ROTATION control, R1291 permits adjustment of the DC current through beam-rotation coil L1291 to align the display with the graticule lines.

Storage Circuit (D1 only)

General. The CRT used in the D1 is a direct-view bistable storage cathode-ray tube with a split-screen viewing area that permits each half to be operated individually for stored displays. Only those elements associated with the storage capability of the CRT are shown in the CRT enclosure on the right side of the Storage Circuit schematic diagram. The writing gun, its deflection systems and associated elements have been discussed previously under CRT circuit.

Storage Operation. Four low-energy electron guns (flood guns) provide full coverage of the large screen area. Each consists of a heated cathode and an anode. The cathode heaters, which receive an unfiltered pulsating DC from full-wave rectifier CR1329, are elevated to −30 volts (cathode potential) through R1329. Quiescently, Q1308 is saturated, providing current to the flood-gun cathodes. The anode potential is established by VR1396 and supplied via emitter follower Q1396.

The collimation electrode is a metallic band around the inner wall of the CRT envelope. It produces an electrostatic field to distribute the flood-gun electrons uniformly over the storage target. R1390, CE1, provides adjustment of the flood electron trajectories to cover the extreme rim of the targets and optimize uniformity of the target coverage. Emitter follower Q1392 maintains a stable voltage on the collimation electrode, providing a low-impedance current path to absorb current variations.

The storage screen consists of a thin tin oxide layer called the target backplate, which is coated with an insulator material containing finely-ground phosphor particles called the target. A positive voltage is applied via Q1372, S1372, and S1375 to the backplate to establish the operating level of the tube, which is the difference in potential between the backplate and the flood-gun cathodes. The CRT screen area is divided into two halves, which are electrically insulated from each other to permit independent operation.

The target operates in a bistable mode because of the secondary-emission properties of the insulator material. The first stable state is the rest potential, at which the target has gathered low-energy flood-gun electrons, causing it to charge down to the flood-gun cathode potential. The second stable state is the stored state, at which the target (or portions of it) is shifted to the backplate potential by increasing the secondary emission. Although the flood guns do not have sufficient energy to shift the target to the stored state, they do supply sufficient energy to hold the target in the stored state after it has been shifted by the high-energy writing-gun beam (CRT beam). This is because the landing energy of the flood electrons has increased with the increased potential difference between the flood-gun

cathode and the target. These higher energy electrons produce a visual display as long as the flood gun beam covers the target.

When the stored display is no longer needed, the information is erased by first shifting the entire target to the stored state, then removing the charge. A positive-going short-duration pulse is first applied to the backplate, increasing the flood-gun electron landing energy and writing the entire target area. Next, the backplate voltage is pulled well below the rest potential of the target, which follows due to its inherent capacitive coupling. Then, as the backplate is gradually returned to its quiescent potential, the target charges to the rest potential and is ready to write again.

Backplate Supply. A regulated +370 volt DC power supply is incorporated in the Storage Circuit to provide the storage level for the CRT and to ensure a potential sufficient for the erasure process. A winding of the high-voltage transformer T1240 supplies 400 volts RMS, which is rectified by CR1386. Q1386 and Q1388 are connected as a feedback pair to provide the regulated +370-volt DC output. VR1388 establishes the reference voltage, and R1387, +370 V Adj., sets the current through Q1386 to set the output level. VR1387 is a protection device for the transistors, and is normally operated in a region of its characteristic curve below its Zener knee.

Backplate Control. Separate STORE switches, S1375A and S1375B, are provided for the target backplates to permit each storage screen to be operated individually. In the store mode, the store-level potential for the backplate is supplied by either Q1372 or by the erase-generator output operational amplifier, depending upon the setting of the ERASE SELECT switches, S1372A and B.

Target backplate control is precisely maintained by a feedback amplifier system consisting of Q1356, Q1358, Q1362, and Q1364. The operational amplifier summing point is the base of Q1356 and the feedback resistor is R1355. Variable resistor R1350, Store Level, provides an adjustment of the current to the null point and hence, sets the backplate voltage through R1355 to an optimum storage level. R1370, Store Bal, permits matching the backplate voltages for uniform screen luminance, whether they are selected for erasure or not. When either or both screens are operated in the store mode, the divider network in the high-voltage regulator circuit is modified to shift the high voltage slightly, correcting for the deflection sensitivity changes that occur. The backplate voltage is applied through either R1381 or R1382 to the base of Q1384, removing the ground potential from the Q1384 collector. R1385, Sense Correct, permits an adjustable sensitivity correction voltage to be applied to the high-voltage regulator.

Erase Generator. The previously discussed operational amplifier is driven by a monostable multivibrator when it is desired to erase a stored display. The multivibrator consists of Q1334, which is normally on, and Q1336, which is normally off. When ERASE button S1330 is pressed, R1330 is grounded, producing a negative-going step through C1331 to cut Q1334 off. Q1336 turns on, and the negative-going step produced at its collector causes a corresponding positive-going step at the output of the operational amplifier. This positive-going step is applied to the target backplate, increasing the storage level and "writing" the entire target.

After an RC-controlled time of 10 milliseconds, the multivibrator reverts to its quiescent state, producing a positive-going step at the collector of Q1336 as the transistor turns off. This positive-going step is coupled through C1342, and the backplate is pulled negative through the action of the operational amplifier. The target is pulled well below its rest potential. As C1342 charges, the voltage at the cathode of CR1343 decays from about +20 volts toward the −30-volt supply at an RC-controlled rate until it is clamped at ground by conduction of CR1343. This action allows the target backplate to be raised slowly to its operating level, while the target remains at the flood-gun cathode potential. The total time from initiation of erasure to the ready-to-write condition is about 250 milliseconds.

Flood-Gun Cathode Control. As previously mentioned, Q1308 provides the current for the flood-gun cathodes, It operates at saturation, establishing a cathode potential of nearly −30 volts. Q1308 is controlled by a transistor switch activated by the sweep gate, and also by a multivibrator. While the sweep is running, Q1304 overrides the multivibrator output and holds Q1308 in its conduction state. Emitter follower Q1302 receives the sweep blanking input from R1203 in the Z-Axis Amplifier circuit; however, the level of interest is the zero volts applied to the base of Q1302 while the sweep is running. This level permits the base of Q1304 to move slightly negative, biasing the transistor into saturation and grounding the collector of Q1320. Through R1307-R1308 divider action, Q1308 is held on.

When the collector sweep is turned down, the +5 volt collector sweep dimming level is applied to Q1302, raising its emitter positive. This level switches Q1304 off, releasing its hold on Q1308. In this condition, Q1308 is controlled by collector-coupled multivibrator Q1310-Q1320. When Q1320 conducts, Q1308 conducts. Symmetry of the multivibrator is controlled by R1313 and R1325. R1325, BRIGHTNESS, is adjustable to allow Q1320 to conduct anywhere from 10% to 100% of the time. Thus the duty cycle of the flood-gun cathodes can be varied from 10% to 100%, which has the effect of varying the stored brightness.

MAINTENANCE

Introduction

This section of the manual contains information for use in preventive and corrective maintenance with some aids to troubleshooting.

WARNING

Lethal voltages are present in many areas within the instrument. Be particularly careful near the power transformer, since lethal voltages can exist on the transformer terminals even with the MAX PEAK VOLTS switch on low range, unless the VARIABLE COLLECTOR % control is set to 0. The Collector Sweep circuit board and the HORIZ VOLTS/DIV switch can also be at lethal voltage levels if the VARIABLE COLLECTOR % control is not at 0.

PREVENTIVE MAINTENANCE

General

Preventive maintenance consists of cleaning, visual inspection, lubrication, etc. Preventive maintenance performed on a regular basis improves instrument reliability. The severity of the environment in which the instrument is used determines the frequency of maintenance.

Cleaning

The 577 Curve Tracer system 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 an an insulating blanket, preventing efficient heat dissipation. Dirt, in a humid atmosphere, can also furnish a conducting path.

Exterior. Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or a small paint brush. The paint brush is particularly useful for dislodging loose dust on and around the front-panel controls. Dirt that remains can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should be avoided.

Interior. Dust in the interior of the instrument should be removed occasionally to prevent electrical conduction in high-humidity environments. Blow out accumulated dust using dry, low-velocity air. Remove any remaing dirt with a mild detergent and water solution. A cotton-tipped applicator is useful for cleaning circuit boards.

CAUTION

Avoid the use of chemical cleaning agents that might damage the plastics used in the instrument. Do not use chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Lubrication

The reliability of potentiometers, rotary switches, and other moving parts can be maintained if they are kept properly lubricated. Use a cleaning-type lubricant on rotary switch contacts. Lubricate switch detents with heavier grease (such as Tektronix Part No. 006-0219-00).

NOTE

Do not lubricate cam switch contacts. Shaft bushings and potentiometers that are not sealed should be lubricated with a lubricant (such as Tektronix Part No. 006-2574-00) that will not affect the electrical characteristics. Do not over-lubricate. A lubrication kit (Tektronix Part No. 003-0342-02) is available.

Visual Inspection

The 577 and associated modules should be inspected occasionally for such defects as broken connections, loose pin connections, improperly seated transistors, damaged circuit boards, and heat damaged parts.

The corrective procedure for most visible defects is obvious. However, particular care must be taken if heat damaged components are found. Overheating usually indicates other trouble in the instrument. It is, therefore, important that the cause of overheating be corrected to prevent recurrence of the damage.

Transistors and Integrated Circuits

Periodic checks of individual transistors and integrated circuits are not recommended. The best check is their operation in the equipment as reflected by performance. Sub-standard performance is normally detected during a performance check or calibration procedure.

Recalibration

To ensure accurate measurements, check the instrument calibration after each 1000 hours (approximately) of operation, or if the instrument is used infrequently, every year. Replacement of components may necessitate recalibration of the affected circuits. Complete calibration instructions are given in the Performance Check/Adjustment section of the appropriate test fixture manual. The Performance Check/Adjustment procedure can also be helpful in locating troubles.

TROUBLESHOOTING

Introduction

The following information is provided to facilitate troubleshooting the 577-D1 or D2 Curve Tracer system. Information contained in other sections of this manual should be used with the following information to aid in locating circuit defects (see the Operating and Circuit Description sections).

Troubleshooting Equipment

The following equipment is useful for troubleshooting the 577-D1 or D2 Curve Tracer system:

1. Semiconductor Test. Some means of testing the transistors, diodes, and FETs used in the instrument is helpful. A curve tracer such as the Tektronix 575, 576, or 577 gives the most complete information.

2. DC Voltmeter and Ohmmeter. A voltmeter for checking circuit voltages and an ohmmeter for checking resistors and diodes are required. For most applications a 20,000 ohms/volt VOM can be used if allowances are made for circuit loading when measuring voltage at high impedance points.

3. Test Oscilloscope. A test oscilloscope is necessary to view circuit waveforms. An oscilloscope with a DC to 10 MHz frequency response and 1 mV/Div to 10 V/Div vertical deflection factor is suggested. A 10X probe should be used to minimize circuit loading.

Troubleshooting Aids

Diagrams. Circuit diagrams are given on foldout pages in the Diagrams section. The component number and electrical value of each component are shown. See the first page of the Diagrams section for definition of the symbols used to identify components.

Important voltages and waveforms are shown in blue on the diagrams. Portions of the circuits mounted on circuit boards are enclosed by blue lines or boxes.

Diode Color Code. The cathode end of each glass enclosed diode is indicated by a stripe, a series of stripes, or a dot. For diodes using a series of stripes, the color code identifies either the Tektronix part number or the JEDEC number. This code follows the standard color code except that a pink first band indicates a Tektronix part number, i.e., pink—orange—red—yellow is Tektronix Part Number 152-0324-00.

The cathode and anode of metal-case diodes can be identified by the diode symbol marked on the diode body.

Circuit Boards. A photograph of each circuit board, with circuit components identified, is included on the apron of the schematic diagram most directly relating to the circuit board. Some board photos may be placed on the back of the preceding circuit diagram. Each circuit board photo is sectioned by a grid system to facilitate rapid location of components by component number.

Switch Wafer Identification. Rotary switch wafers shown on the diagrams are coded to indicate the position of each wafer in the switch assembly. The number portion of the code is the wafer number, counting from the mounting end of the switch. The F and R indicate whether the front or rear of the wafer performs the switching function. For example, a wafer designated 2R indicates the rear of the second wafer.

Circuit Description. The Circuit Description, Section 3, describes each circuit. The section contains a brief description of the theory of circuit operation illustrated by a block diagram of each section of circuitry. Following the Block Diagram description is a detailed description of each circuit that contains unique or complex circuitry.

Transistor and Integrated Circuit Lead Configuration. The lead configuration of the transistors and ICs in the 577 Curve Tracer system is shown with the circuit board photos on the schematic foldout aprons.

Power Supply Voltage and Ripple. Table 4-1 lists the voltage tolerances of the power supplies in the 577. If the supply voltage is within the listed tolerance, the supply can be assumed to be operating properly. If outside the tolerances, the supply may be misadjusted or operating incorrectly. See Fig. 4-1 for power transformer line-voltage taps.

TABLE 4-1[1]

Supply	Voltage Accuracy	Ripple
+200 V	Unregulated	4 V p-p, or less, full load
+30 V[2]	Adjust to within 0.25% or less	10 mV, p-p, or less, full load
+12 V[3]	Within 5%	10 mV
+5 V[3]	Within 5%	10 mV
−12 V	Within 5%	10 mV
−30 V[2]	Adjust to within 0.25% or less	10 mV, p-p, or less, full load

CIRCUIT BOARD REMOVAL AND REPLACEMENT

Removal of Main Circuit Board

1. Note the position of the STEP/OFFSET AMPL and HORIZ VOLTS/DIV switches. Loosen the set screws and remove the knobs.

2. Remove the hex nuts from the through-panel bushings and remove the bushings from the front panel.

3. Place all pushbuttons in the out position.

4. Referring to Fig. 4-2, remove the right-side rail as follows:

a. Remove the four machine screws from the bottom of the rail.

b. Remove the screw from the lower-left corner of the rear panel.

c. Remove the two screws on the right, inside the plug-in test fixture compartment.

d. Remove the side rail.

5. Remove the multi-pin lead connector. The plastic body is color-coded to the P number (with the exception of leads originating in the display unit). The color code follows the familiar resistor color code. The last digit of the P number indicates the connector body color.

6. Remove the machine screws securing the flat-pack transistors, Q384 and Q386, to the panel at the rear of the circuit board.

7. Note the insulating, heat-conducting washer between the transistor and the panel.

8. Remove the four machine screws securing the circuit board to the chassis.

9. Pull the rear of the circuit board out toward the side of the instrument and then slide the circuit board to the rear to remove.

Replacing the Main Circuit Board

1. Stand the instrument upright on the rear end.

2. Place the two hex panel-bushing nuts over the cam-switch shafts.

3. Slide the cam-switch shafts through the front-panel holes (pushbuttons must be aligned with the plastic guide bushings before the circuit board can be moved to its permanent position).

4. Align the pushbuttons with the front-panel holes by reaching through with a device that will not damage the plastic buttons (for example, a cotton-tipped applicator or a slender rubber-tipped rod) while carefully sliding the circuit board toward the front panel.

5. Start the rear circuit board securing screw but do not tighten.

6. Push the through-panel bushings through the front panel around the switch shafts. Place the hex nuts on the bushings and tighten.

[1] **With test fixture removed.**

[2] **Must be within 1/2% of 30 volts. +30 and −30-volt supplies must be within 1/2% of each other.**

[3] **+5 V and +12 V supplies can be loaded individually to 675 mA, but the total load on the two supplies should not exceed 800 mA.**

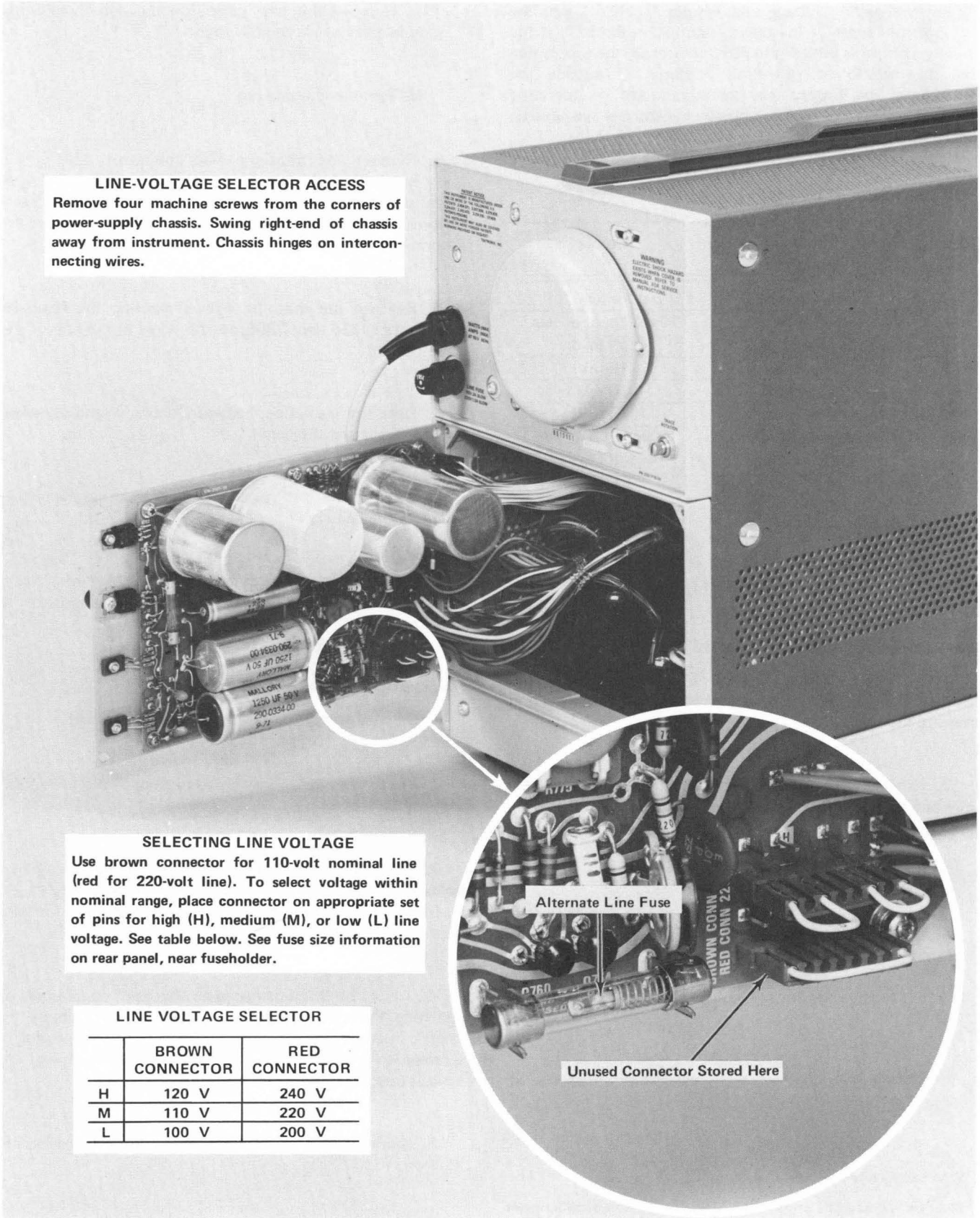


Fig. 4-1. Power transformer line-voltage taps.

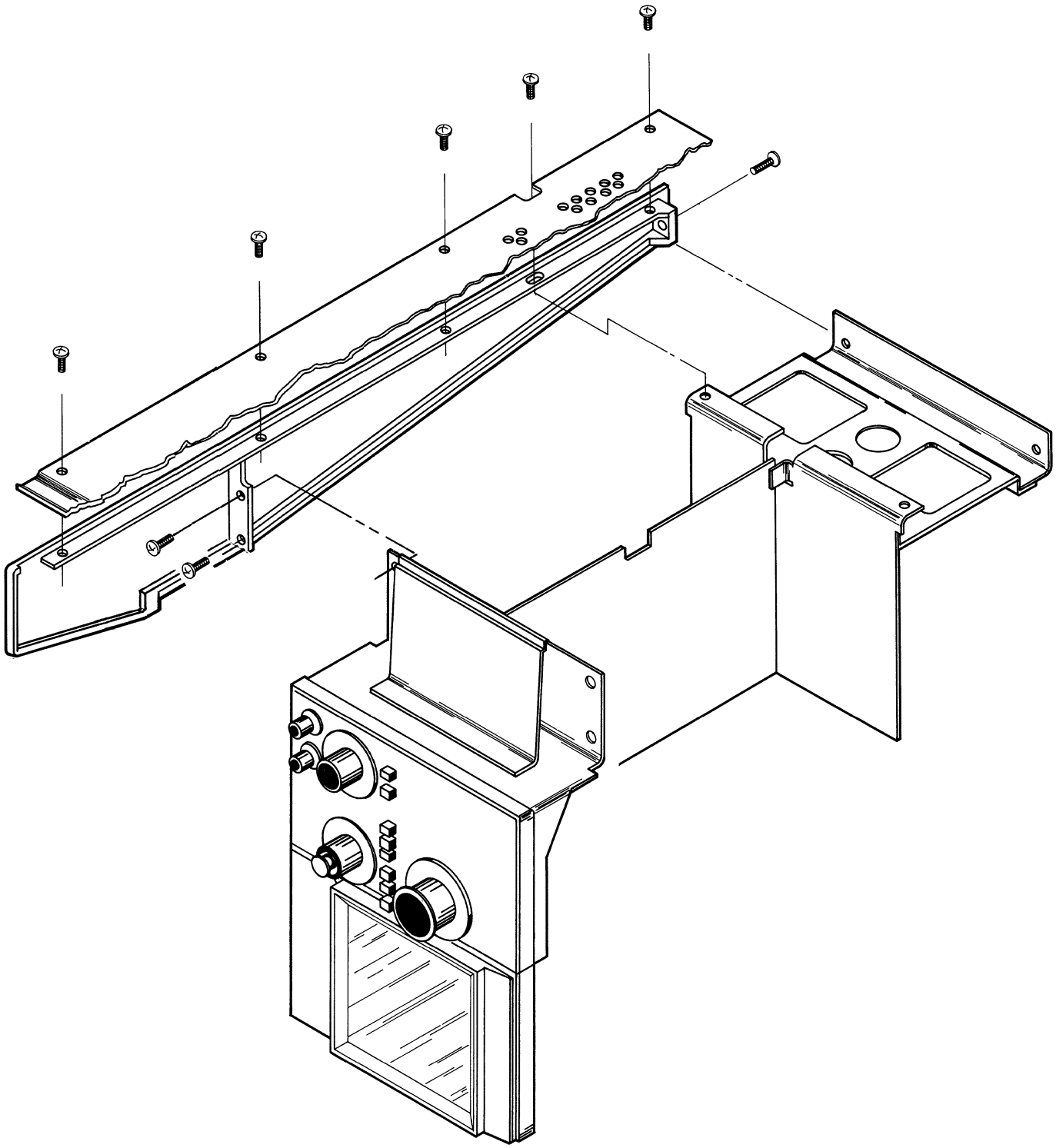


Fig. 4-2. Removal of right-side rail.

7. Coat both sides of the insulating washers with silicone grease and assemble the washers and transistors to the panel with the machine screws, but do not tighten.

8. Place the four circuit-board screws and tighten.

9. Tighten the screws securing the transistors to the panel.

10. Replace the circuit-board connectors.

11. Replace the knobs in the original positions.

Replacing the Side Rail

1. Put the rail in place and place the four screws through the bottom panel into the side rail, but do not tighten.

2. Place the screw through the rear panel into the side rail and tighten.

3. Place the two screws in the plug-in test-fixture compartment, but do not tighten.

4. Slide the test fixture into the test fixture compartment. Adjust the side rail to permit the test fixture to slide freely, without excess side clearance.

5. Tighten the four bottom-panel screws. Note that the front screw is shorter than the remaining three. If a long screw is placed in the front hole, the test fixture cannot be removed after the bottom screws are tightened.

6. Remove the test fixture and tighten the two screws in the test fixture compartment.

7. Replace the STEP/OFFSET AMPL and HORIZ VOLTS/DIV knobs in their correct positions.

8. Connect the instrument to the power line and turn the instrument power on.

9. Check the positions of the STEP/OFFSET AMPL and HORIZ VOLTS/DIV with the STEP X.1 and Horizontal POSITION controls pushed to the in position and both knobs turned to the 200 position. Check for alignment at 200 with the knob skirt lamp. If the 200 is positioned to illuminate all three digits, the alignment should be correct for all other positions.

Removal of Collector Sweep Board

WARNING

Do not attempt to remove any leads or screws with the instrument power turned on. Allow a minute after turning power off to allow capacitors to discharge.

1. Remove the left side rail from the instrument as detailed for the right-side rail removal.

2. Unsolder the five wires from the circuit board. Note the position of the two red and one yellow leads.

3. Remove the multiple-lead connectors.

4. Remove the six board screws and remove the circuit board.

Access to Power Supply Circuit Board

Remove the four corner screws (rear panel) from the power supply chassis and swing the right side of the chassis away from the instrument (the chassis will hinge on the interconnecting leads).

NOTE

The power supply should be operated in the open position only with the 177 Test Fixture. Use of a test fixture other than the 177 can possibly use more power than the power supply can dissipate with the chassis away from the mainframe.

Removal of the Power Supply Circuit Board

1. Remove the machine screws that fasten U722, U732, Q766, and Q788 to the chassis. Note the insulating, heat-conducting washers between the chassis and U732, Q788, and Q766.

2. Remove the multipin connectors and unsolder the leads that are soldered to the circuit board. Note the wire colors and positions.

3. Remove the six machine screws that secure the board to the chassis.

MISCELLANEOUS

Max Peak Volts-Series Resistors Knob Alignment

1. If removal and replacement of this switch is necessary, turn the MAX PEAK VOLTS switch to 6.5 and the SERIES RESISTORS knob to .12 and remove the knobs.

2. Set the replacement switches fully counterclockwise (both sections against the stops).

3. Mount the MAX PEAK VOLTS knob to the shaft and tighten the set screw enough to permit the shaft to turn with the knob.

4. Switch to the 100 position and align the white arrow with the second digit in the 100. Tighten the set screw.

5. Place the SERIES RESISTORS knob on the shaft and tighten the set screw enough to permit the shaft to turn with the knob.

6. Switch to the 120 position and align the black arrow with the second digit (2) in the 120 (pull knob to switch to the 120 position). Tighten the set screw.

Removal of Display Unit from Mainframe

1. Remove all multi-pin connectors (display unit to 577 mainframe leads).

2. Remove the shield from the display unit high-voltage compartment (3 screws).

3. Remove the two screws that secure the rear of the display unit to the 577 mainframe. The screws are accessible from the top of the display unit.

4. Remove the two hex-head machine screws that secure the front of the display unit to the 577 mainframe (accessible from the underside of the display unit).

5. Remove the display unit.

Removal of 577-Test Fixture Interface Connector

1. Remove the instrument bottom panel, (four machine screws on each edge). Note that the two front screws are shorter than the remaining six screws.

2. Remove the two screws (one at each end) from the ends of the connector. Note the position of the washers between the connector and the chassis.

3. Pull the connector forward far enough to gain access to the soldered terminals on the rear of the connector.

4. Note the wire colors and positions and unsolder all leads.

Replacement of 577-Test Fixture Interface Connector

1. Solder all leads to the connector and push the connector toward the opening.

2. Push the mounting screws through the panel holes and mount the washers, (a piece of masking tape over one or both of the screw heads to hold them in place may make the task a bit easier).

3. Place the connector over the mounting screws and replace the plastic guides.

4. Hold the guide blocks snugly in place while tightening the screws.

5. After assembly is completed, check to determine that the connector assembly floats on its mountings (the connector must float for proper mating with the test fixture).

Repackaging for Shipment

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

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

Surround the instrument with polyethylene sheeting to protect the finish of the instrument. Obtain a carton of corrugated cardboard of the correct carton strength and having inside dimensions of no less than six inches more than the instrument dimensions. Cushion the instrument by tightly packing three inches of dunnage or urethane foam between carton and instrument, on all sides. Seal carton with shipping tape or industrial stapler.

The carton test strength for your instrument is 375 pounds.

CHECK AND ADJUSTMENT PROCEDURE

Introduction

This section of the manual contains separate check and adjustment procedures. The Check procedure is provided to check the instrument operation against the instrument specifications. The adjustment procedure returns the circuitry to within the design capabilities. Adjustment is generally required after a repair has been made, or after a long time interval in which normal aging of components may affect instrument accuracy.

For initial inspection, using the check procedure, leave the instrument side covers in place.

Services Available

Tektronix, Inc. provides complete instrument repair and calibration service at local field service centers and field offices. Contact your local Tektronix Field Office or representative for further information.

Test Equipment Required

The following test equipment, or equivalent, is required for complete check and adjustment of the 577-D1 or 577-D2 Curve Tracer. All test equipment is assumed to be correctly calibrated and operating within the listed specifications.

1. DC Voltmeter. Accuracy, 3%, full scale; voltage range, −3400 volts to +370 volts. Example: the Simpson Model 262 VOM.

2. Digital DC Voltmeter (4-1/2 digits) or a DC voltage bridge. Input impedance, 500 MΩ (see footnote 3, Table 5-9); Accuracy, 0.01%; voltage range, −30 volts to +1000 volts.

3. Tektronix 177 Standard Test Fixture.

4. Capacitor. Capacitance, 0.01 μF; working voltage, 1000; tolerance, ±20%.

5. Capacitor. Capacitance, 0.1 μF; working voltage, 100; tolerance, ±20%.

6. Resistor. Resistance, 15 kΩ; watts, 1/4; tolerance, 10%.

7. Resistors as follows: see footnote 1.

8. Extender cable, (to permit making adjustments to the test fixture without removing the 577 bottom panel) Tektronix Part Number 067-0721-00.

Quantity	Value	Watts	Tolerance
1	1 Ω	10	1/4%
1	10 Ω	5	1/4%
1	100 Ω	1/2	1/4%
2	200 Ω	10	1%
1	1 kΩ	1/4	1/4%
1	10 kΩ	1/4	1/4%
1	100 kΩ	1/8	1/4%
1	1 MΩ	1/8	1/4%
1	10 MΩ	1/8	1/4%

SHORT-FORM PERFORMANCE CHECK PROCEDURE

Preliminary

1. Check CRT Operation Page 5-4

INTENSITY

CHECK—A spot should appear within the graticule area (with the BEAM FINDER button held in) as INTENSITY control is turned clockwise.

FOCUS

Set FOCUS control for the smallest spot while reducing the spot intensity.

CAUTION

A focused, high-intenity spot can burn the CRT phosphor.

TRACE ROTATION

CHECK—Horizontal trace must be parallel to the center horizontal graticule line (adjustment on rear panel).

GEOMETRY

CHECK—Bowing should not exceed 0.1 division over the eight vertical or ten horizontal divisions.

[1] **These resistors are available as a kit from Tektronix, Inc. Order Part Number 067-0691-00.**

2. Check Beam Finder Page 5-4

CHECK—The spot cannot be positioned out of the graticule area with the BEAM FINDER button held in.

3. Check Trace Dimming Page 5-5

CHECK—The spot should dim noticeably or disappear when the VARIABLE COLLECTOR % control is turned to 0.

4. Check Storage Operation Page 5-5

CHECK—The screen should have a uniform bright glow, with top and sides pulled in (top pulled down about 1/2 major division).

CHECK—The eleven displayed vertical traces should be uniform in appearance from top to bottom with all lines similar in appearance.

CHECK—Stored display should dim when the BRIGHTNESS control is turned counterclockwise.

5. Check Horizontal Amplifier Balance Page 5-6

CHECK—Spot movement should not exceed 0.5 major division while switching between 5 V/DIV and 2 V/DIV, COLLECTOR.

6. Check Horizontal Gain Page 5-6

CHECK—500 mV should produce 10 divisions, within 2.5% (±0.25 major division), of horizontal deflection.

7. Check Horizontal Magnifier Page 5-6

CHECK—50 mV should produce a horizontal deflection of 10 divisions, within ±3% (±0.3 major divisions).

8. Check Horizontal Display Accuracy Page 5-6

CHECK—Horizontal deflection should be 10 divisions, ±3% (±0.3 divisions) as in Tables 5-2 and 5-3.

9. Check Vertical Amplifier Gain Page 5-8

CHECK—375 mV should produce a vertical deflection of 7.5 divisions, ±0.15 division.

10. Check Collector Supply Peak Voltages Page 5-8

CHECK—The voltages should produce the deflections shown in Table 5-4.

11. Check Max Peak Current and Circuit Breaker Operation Page 5-9

CHECK—Vertical display should indicate >20 A.

CHECK—The COLLECTOR SUPPLY CIRCUIT BREAKER should open within two minutes.

CHECK—The COLLECTOR SUPPLY CIRCUIT BREAKER can be reset within one minute.

CHECK—The COLLECTOR SUPPLY CIRCUIT BREAKER should not open with 10 A of collector current.

CHECK—The peak current for each setting of the MAX PEAK VOLTS switch should be as shown in Table 5-5.

12. Check Collector Supply Interlock Page 5-9

CHECK—The yellow COLLECTOR SUPPLY DISABLED lamp lights when the protective box cover is open.

CHECK—The yellow lamp extinguishes and the red lamp on the 177 Test Fixture lights when the protective box cover is closed.

CHECK—The red lamp extinguishes, yellow lamp lights, and collector sweep is disabled when the protective box is opened.

13. Check Automatic Positioning with Collector Supply Polarity Change Page 5-10

CHECK—The spot should shift from the center reference to the lower-left corner, within ±0.1 division when COLLECTOR SUPPLY POLARITY is switched to +.

CHECK—The spot should shift to the upper-right corner of the graticule when the COLLECTOR SUPPLY POLARITY is switched to −.

STEP GENERATOR-VOLTAGE MODE

14. Check Step/Offset Amplitude Accuracy at 2 V Page 5-10

CHECK—The 11th spot should be within 3% (2.4-divisions) of the +40-volt reference.

CHECK—The 11th spot should be within 3% (2.4-divisions) of the −40-volt reference.

15. Check Linearity at Maximum Voltage and Current — Page 5-11

CHECK—Position the spots successively (11th, 10th, 9th, etc.) to the center reference. Each spot should be within 2% (±0.1 major division) of the position of the reference spot (10th).

CHECK—Each step must be within ±2% of any other step.

CHECK—Recheck as above for +DC COLLECTOR SUPPLY POLARITY.

16. Check Linearity in Oppose — Page 5-12

CHECK—The distance between any two successive spots should be within 2% of the distance between any other adjacent spots.

17. Check Maximum Current Limit — Page 5-12

CHECK—Maximum current should be less than 200 mA (4 divisions of deflection at 50 mA/DIV).

CHECK—Maximum current should be less than 200 mA with STEP/OFFSET POLARITY NORM button out.

18. Check Step/Offset Amplitude Absolute Accuracy, Step X1 — Page 5-13

CHECK—See the procedure and Table 5-6.

19. Check Step/Offset Amplitude Absolute Accuracy, X.1 — Page 5-14

CHECK—See the procedure and Table 5-7.

STEP GENERATOR-CURRENT MODE

20. Check Maximum Current and Voltage — Page 5-15

CHECK—At 5 volts, the trace should be displaced not more than 2.2 divisions downward from the vertical reference and not above the vertical reference. See Fig. 5-3A and 5-3B.

CHECK—At 5 volts, the trace should be displaced vertically not more than 2.2 divisions upward from the vertical reference. See Fig. 5-4A and 5-4B.

21. Check Current at 100 mA (Step/Offset Amplitude) and Maximum Voltage — Page 5-16

CHECK—At 7 volts, the trace should be displaced vertically not more than 1.2 divisions downward from the vertical reference. See Fig. 5-5A and 5-5B.

CHECK—At 7 volts, the trace should be displaced vertically not more than 1.2 divisions upward from the vertical reference. See Fig. 5-6A and 5-6B.

22. Check Step/Offset Amplitude Absolute Accuracy, STEP X1 — Page 5-18

CHECK—See the procedure and Tables 5-8 and 5-9.

23. Check Maximum Current and Voltage Limits with Opposing Offset — Page 5-20

CHECK—Vertical deflection from the center reference should be > 10 mA, but < 20 mA (> 2 divisions, but < 4 divisions).

CHECK—The horizontal deflection from the center reference should be > 1 volt, but < 5 volts (> 1 division, but < 5 divisions).

24. Check Pulsed 300 μs and Step Rates — Page 5-21

CHECK—See the procedure and Fig. 5-7, 5-8, 5-9, 5-10, and 5-11 A or B.

PERFORMANCE CHECK

Preliminary

Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY POLARITY	AC
VARIABLE COLLECTOR %	10
HORIZ VOLTS/DIV	200 V, COLLECTOR
NUMBER OF STEPS	10 (clockwise)
All Dark Gray Buttons and Knobs	in
STEP/OFFSET AMPL	.1 V
PULSED, 300 μs	out
VERTICAL CURRENT/DIV	2 A
Terminal Selector	EMITTER GROUNDED BASE TERM, STEP GEN
INTENSITY	ccw
FOCUS	centered
LEFT-RIGHT	Off (center)

D1 Only

STORE	
UPPER and LOWER	out
Erase Selectors	
UPPER and LOWER	in
POWER Switch (D1 or D2)	on
BRIGHTNESS	cw

1. Check CRT Operation

INTENSITY

a. While holding the BEAM FINDER button depressed, turn the INTENSITY control slowly clockwise.

b. CHECK—A spot should appear within the graticule area.

c. Release the BEAM FINDER button and turn the INTENSITY control counterclockwise.

FOCUS

a. Set the FOCUS control fully clockwise and turn the INTENSITY control fully clockwise.

b. CHECK—The spot should be round (if the spot is not round, the Astigmatism control, R1286, Astig, should be adjusted).

c. Turn the FOCUS control counterclockwise until the spot is the smallest possible while turning the INTENSITY control counterclockwise to reduce the spot intensity. A focused, high-intensity spot can burn the CRT phosphor.

d. Place a diode adapter (013-0111-00) in the right-hand set of 177 jacks and place a 1 kΩ resistor in the diode adapter.

e. Switch the VERTICAL CURRENT/DIV control to 1 mA and HORIZ VOLTS/DIV to 1 V, COLLECTOR.

f. Set the LEFT-RIGHT switch to RIGHT and turn the VARIABLE COLLECTOR % control clockwise until the diagonal line reaches to approximately the top and bottom graticule lines.

g. CHECK—The diagonal trace should be in focus throughout its length. Minor readjustment of the FOCUS control may be necessary. Switch the LEFT-RIGHT switch to Off.

TRACE ROTATION

a. Set the HORIZ VOLTS/DIV control to .5 V, COLLECTOR and adjust the VARIABLE COLLECTOR % for 10 divisions of display horizontally.

b. CHECK—If the trace is not parallel to the center graticule line, adjust the TRACE ROTATION control (rear screw-driver adjustment) to align the trace with the center graticule line.

GEOMETRY

a. Using the Vertical POSITION control, position the trace to the bottom graticule line.

b. CHECK—Bowing should not exceed 0.1 division over the ten-division trace.

c. Vertically position the trace to the top graticule line.

d. CHECK—Bowing should not exceed 0.1 division over the ten-division trace. Position the trace to the graticule center.

e. Set VARIABLE COLLECTOR % to 0. Remove the diode adapter and connect a patch cord between emitter (E) and collector (C) terminals on the right-hand set of jacks on the 177. Set the VERTICAL CURRENT/DIV to 1 mA. Switch the LEFT-RIGHT switch to RIGHT. The trace should be vertical. Set the VARIABLE COLLECTOR % for at least 8 divisions of vertical trace.

f. Horizontally position the trace to the left graticule line (zero line).

g. CHECK—Bowing should not exceed 0.1 division over the eight graticule divisions.

h. Horizontally position the trace to the right (tenth) graticule line.

i. CHECK—Bowing should not exceed 0.1 division over the eight graticule divisions. Return the trace to graticule center.

2. Check Beam Finder

a. Turn the VARIABLE COLLECTOR % to 0. Switch the LEFT-RIGHT switch to Off. Set HORIZ VOLTS/DIV to 200 V, COLLECTOR. Set INTENSITY for a visible spot.

b. While holding the BEAM FINDER button pressed in, rotate both vertical and horizontal POSITION controls throughout their range.

c. CHECK—The spot cannot be positioned out of the graticule area. Release the BEAM FINDER button and center the spot vertically and horizontally.

3. Check Trace Dimming

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
VARIABLE COLLECTOR %	20
COLLECTOR SUPPLY POLARITY	AC
HORIZ VOLTS/DIV	200 V, COLLECTOR
INTENSITY	visible trace
BRIGHTNESS	counterclockwise (D1 only)

b. Turn the VARIABLE COLLECTOR % control to 0 and watch the spot intensity.

c. CHECK—The spot should dim noticeably or disappear when the VARIABLE COLLECTOR % control is turned to 0.

d. Turn the BRIGHTNESS control fully clockwise. (D1 only)

e. CHECK—The spot should intensify.

4. Check Storage Operation (D1 only)

a. Set the controls as follows:

VARIABLE COLLECTOR %	≈80
Vertical POSITION	centered
Horizontal POSITION	centered
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/DIV	2 A
STORE UPPER and LOWER	in
Erase Selector UPPER and LOWER	in
BRIGHTNESS	clockwise

b. Set the INTENSITY control for normal viewing intensity of the display.

c. Press the ERASE button. Note a dim background glow with the horizontal line displayed.

d. Increase the INTENSITY as necessary for a bit brighter than normal display.

e. Slowly turn the Vertical POSITION control to write the entire screen. If the screen does not write uniformly, increase the INTENSITY and rewrite.

f. CHECK—The written screen should have uniform brilliance.

g. Press the ERASE button. Release the UPPER and LOWER STORE buttons.

h. Switch the HORIZ VOLTS/DIV to STEP GEN, NUMBER OF STEPS to 10, STEP FAMILY to REP, and STEP RATE to FAST. Position the first spot (furthest left) to the lower-left graticule corner.

i. Press the UPPER and LOWER STORE buttons to the in position.

j. Push the ERASE button.

k. Decrease the INTENSITY control to display the smallest spots consistent with good storage. Rotate the Vertical POSITION control very slowly clockwise to write 11 vertical traces.

l. CHECK—The display should be 11 vertical traces, approximately uniform in appearance from top to bottom and with all vertical traces similar in appearance.

m. Turn the INTENSITY control fully counterclockwise.

n. Turn the VARIABLE COLLECTOR % to 0.

o. CHECK—Slowly turn the BRIGHTNESS control counterclockwise and note that the stored display and background glow dim. Turn the BRIGHTNESS control slowly clockwise and note that the display brightens.

p. Press to release the UPPER and LOWER STORE buttons to the out position.

5. Check Horizontal Amplifier Balance

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	8 k
VARIABLE COL-LECTOR %	0
X10 HORIZ MAG	out
HORIZ VOLTS/DIV	5 V, COLLECTOR
Horizontal POSITION	centered
STEP FAMILY SINGLE	press
Vertical POSITION	centered
VERTICAL CUR-RENT/DIV	2 A
LEFT-RIGHT	RIGHT

b. Connect a patch cord from the right-side collector (C) terminal to the emitter (E) terminal.

c. Switch the HORIZ VOLTS/DIV switch from 5 V, COLLECTOR, to 2 V, COLLECTOR.

d. CHECK—Spot movement should not exceed 0.5 major division while switching between 5 V/DIV and 2 V/DIV, COLLECTOR.

e. Remove the patch cord. Push the X10 HORIZ MAG in.

6. Check Horizontal Gain

a. Set the controls as follows:

COLLECTOR SUPPLY POLARITY	AC
HORIZ VOLTS/DIV	50 mV, BASE
STEP/OFFSET AMPL	.1 V
VERTICAL CUR-RENT/DIV	2 A
LEFT-RIGHT	RIGHT

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
OFFSET ZERO	out
AID (light gray button)	in

b. Connect a DVM between the emitter sense (E SENSE) and base (B) terminals, right side.

c. Set the OFFSET MULT to 0.00.

d. Check and note the DVM reading.

e. Position the spot to the left-center graticule (centered vertically on the zero line).

f. Adjust the OFFSET MULT for a DVM reading 500 mV greater than that noted in part d.

g. CHECK—The spot should be at the right-center graticule line, within ±2.5% (0.25 major division).

7. Check Horizontal Magnifier

a. Set the controls as follows:

STEP/OFFSET AMPL	.05 V
OFFSET AID	in
X10 HORIZ MAG	out
HORIZ VOLTS/DIV	5 mV, BASE

b. Set the OFFSET MULT control to 0.00. Record the DVM reading. Position the spot to left center.

c. Adjust the OFFSET MULT for a DVM reading of 0.050 volts greater than that noted in part b.

d. CHECK—The spot should be on the right-center graticule line, ±0.3 division.

8. Check Horizontal Display Accuracy

a. Set the controls as follows:

OFFSET MULT	0.00
MAX PEAK VOLTS	6.5
SERIES RESISTORS	2 k
STEP/OFFSET AMPL	.1 V
COLLECTOR SUPPLY PLARITY	+DC
VERTICAL CUR-RENT/DIV	2 A
LEFT-RIGHT	RIGHT

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
OFFSET	
ZERO	out
AID (light gray button)	in
HORIZ VOLTS/DIV	50 mV, BASE

b. Note the DVM reading.

c. Position the spot to left-center graticule.

d. Set the OFFSET MULT to produce a DVM reading of 0.500 volt greater than that noted in part b.

e. CHECK—The spot position should be within the limits shown in columns 4 and 5 in Table 5-2.

f. For each listing in Table 5-2, proceed as follows:

Push the ZERO button to the in position and note the DVM reading; position the spot to the left-corner graticule line; release the ZERO button, readjust the OFFSET MULT, if necessary, to the voltmeter reading plus the reading previously noted, and CHECK the spot position.

TABLE 5-2

HORIZ VOLTS/DIV	STEP/ OFFSET AMPL	Voltmeter Reading	Spot Position	Limit in Div
50 mV, BASE	.1 V	0.5 V	10th div	±0.3
.1 V, BASE	.2 V	1.0 V	10th div	±0.3
.2 V, BASE	.5 V	2.0 V	10th div	±0.3
.5 V, BASE	1 V	5.0 V	10th div	±0.3
1 V, BASE	2 V	10.0 V	10th div	±0.3
2 V, BASE	2 V	18.0 V	9th div	±0.27

g. Set the LEFT-RIGHT switch to Off. Disconnect the DVM lead from B and reconnect the lead to C SENSE (DVM from C SENSE to E SENSE).

h. Connect a 0.01 μF, 1000 V capacitor between C and E.

i. Set the controls as follows:

HORIZ VOLTS/DIV	5 V, COLLECTOR
VARIABLE COL-LECTOR %	0
MAX PEAK VOLTS	100
SERIES RESISTORS	2 M
COLLECTOR SUPPLY POLARITY	+DC
VERTICAL CUR-RENT/DIV	2 A
LEFT-RIGHT	RIGHT

j. Position the spot to left-center graticule, using the vertical and horizontal POSITION controls.

WARNING

Enabling the 100, 400 or 1600 V supplies without the protective box exposes the operator to potentially lethal voltages at the 177 terminals.

k. Push the red Interlock Defeat button and set the VARIABLE COLLECTOR % control for a 50-volt DVM reading.

l. CHECK—The spot should be at the 10th graticule division, ±0.3 division.

m. Continue the test through 200 V/DIV, COL-LECTOR, as shown in Table 5-3. Readjust VARIABLE COLLECTOR % as necessary.

TABLE 5-3

HORIZ VOLTS/DIV COLLECTOR	MAX PEAK VOLTS	DC Voltmeter READING	SPOT Position	LIMIT in Div
5 V	100	50.0 V	10th div	±0.3
10 V	400	100.0 V	10th div	±0.3
20 V	400	200.0 V	10th div	±0.3
50 V	1600	500.0 V	10th div	±0.3
100 V	1600	1000.0 V	10th div	±0.3
200 V	1600	1000.0 V	5th div	±0.15

n. Turn the VARIABLE COLLECTOR % to 0, switch LEFT-RIGHT to Off.

o. Discharge the capacitor (short-circuit the leads) and remove the capacitor and the DVM.

9. Check Vertical Amplifier Gain

a. Set the controls as follows:

MAX PEAK VOLTS	100
SERIES RESISTORS	30
COLLECTOR SUPPLY POLARITY	AC
VARIABLE COLLECTOR %	0
STEP/OFFSET AMPL	.05 VOLTS
OFFSET MULT	0.00

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
OFFSET ZERO	in
AID (light gray button)	in
DISPLAY FILTER	out
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horiz POSITION	center
VERTICAL CURRENT/DIV	50 nA
LEFT-RIGHT	Off

b. Connect the DVM between E and B and a shorting patch cord between B and C, right side.

c. Switch LEFT-RIGHT to RIGHT.

d. Position the spot to the top-center graticule line, and note the DVM reading.

e. Push to release the OFFSET ZERO button.

f. Turn the OFFSET MULT to produce a DVM reading of 0.375 volt greater than the DVM reading noted in part d.

g. CHECK—The spot should deflect 7.5 divisions, ±0.15 division. This checks the 177-577 gain accuracy.

h. Switch LEFT-RIGHT to Off. Remove the DVM and patch cords.

10. Check Collector Supply Peak Voltages

a. Set the controls as follows:

VARIABLE COLLECTOR %	0
MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY POLARITY	+DC
HORIZ VOLTS/DIV (COLLECTOR VOLTS)	1 V
VERTICAL CURRENT/DIV	2 A
All Dark Gray Buttons and Knobs	in
LEFT-RIGHT	Off

b. Position the spot to the lower-left corner of the graticule.

c. Set VARIABLE COLLECTOR % to 100 and install the protective box.

d. CHECK—For the approximate deflection (voltage) listed in Table 5-4.

e. Set MAX PEAK VOLTS and HORIZ VOLTS/DIV to the next settings in Table 5-4 and repeat parts d and e.

TABLE 5-4

MAX PEAK VOLTS	HORIZ VOLTS/DIV	Approximate Deflection in Divisions
6.5	1 V	6.5
25	5 V	5
100	20 V	5
400	50 V	8
1600	200 V	8

f. Set COLLECTOR SUPPLY POLARITY to −DC, push DISPLAY INVERT, and set VARIABLE COLLECTOR % to 0.

g. Repeat parts b through e.

h. Remove the protective box.

11. Check Max Peak Current and Circuit Breaker Operation

a. Set the controls as follows:

VARIABLE COLLECTOR %	0
MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY POLARITY	+
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/DIV	2 A
All Dark Gray Buttons and Knobs	in
LEFT-RIGHT	RIGHT

b. Connect a short, heavy-gauge patch cord from C to E, right side. Position the spot to the lower-left corner of the graticule.

c. Adjust VARIABLE COLLECTOR % for 2 vertical divisions of display.

d. Position the top of the display to the bottom graticule line (most of the display is now off screen).

e. Adjust the VARIABLE COLLECTOR % fully clockwise.

f. CHECK—The top of the trace is off the top of the graticule (> 20 A).

g. CHECK—The COLLECTOR SUPPLY CIRCUIT BREAKER must open within 2 minutes.

h. Set the SERIES RESISTORS to .5.

i. CHECK—The CIRCUIT BREAKER can be reset within 1 minute after opening.

j. Adjust the VARIABLE COLLECTOR % to 0. Position the display to the lower-left corner and readjust VARIABLE COLLECTOR % to 5 vertical divisions (10 A).

k. CHECK—The CIRCUIT BREAKER should not open.

l. Set VARIABLE COLLECTOR % to 0 and install the protective box.

m. Set the VERTICAL CURRENT/DIV for the MAX PEAK VOLTS settings listed in Table 5-5, starting with 25 MAX PEAK VOLTS.

n. Set the SERIES RESISTORS knob (pull to unlock knob) for a MAX PEAK POWER-WATTS of 100.

o. Turn the VARIABLE COLLECTOR % fully clockwise, note the peak current, and turn the VARIABLE COLLECTOR % fully couterclockwise.

p. CHECK—The peak current noted in part o should be equal to or greater than the current limit shown for the MAX PEAK VOLTS setting in Table 5-5.

q. Set MAX PEAK VOLTS to the next setting in the table and repeat parts o through q.

TABLE 5-5

MAX PEAK VOLTS	VERTICAL CURRENT/DIV	Limit	
		Current	Deflection
25	2 A	≥5 A	≥2.5 div
100	.5 A	≥1.25 A	≥2.5 div
400	.1 A	≥.31 A	≥3.1 div
1600	20 mA	≥80 mA	≥4.0 div

r. Remove the protective box and patch cord.

12. Check Collector Supply Interlock

a. Set the controls as follows:

MAX PEAK VOLTS	1600
SERIES RESISTORS	8 M
VARIABLE COLLECTOR %	0
HORIZ VOLTS/DIV	10
COLLECTOR SUPPLY POLARITY	AC
LEFT-RIGHT	Off

b. Install the protective box on the 177 Test Fixture. Open the protective box lid.

c. CHECK—The yellow COLLECTOR SUPPLY DISABLED lamp is lighted.

d. Close the lid on the protective box.

e. CHECK—The yellow lamp should extinguish and the red lamp on the 177 Test Fixture should turn on.

f. Turn the VARIABLE COLLECTOR % clockwise to produce a 10-division horizontal trace.

g. Lift the protective box lid.

h. CHECK—The red lamp extinguishes, the yellow lamp lights, and the collector sweep is disabled (no trace, only a spot).

i. Close the lid on the protective box.

j. Switch the MAX PEAK VOLTS to 400 and SERIES RESISTORS to 500 k and repeat parts c through h.

k. Switch the MAX PEAK VOLTS to 100 and SERIES RESISTORS to 30 k and repeat parts d through h.

l. Remove the protective box from the 177 Test Fixture.

13. Check Automatic Positioning with Collector Polarity Change

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY POLARITY	AC
VARIABLE COLLECTOR %	0
VERTICAL CURRENT/DIV	2 A
HORIZ VOLTS/DIV	100 V, COLLECTOR

b. Position the spot vertically and horizontally to the graticule center.

c. Set the COLLECTOR SUPPLY POLARITY to +.

d. CHECK—The spot should shift to the lower-left corner of the graticule, within ±0.1 division.

e. Switch the COLLECTOR SUPPLY POLARITY to −.

f. CHECK—The spot should shift to the upper-right corner of the graticule, within ±0.1 division.

STEP GENERATOR-VOLTAGE MODE

14. Check Absolute Accuracy at 2 V/Step

a. Set the controls as follows:

MAX PEAK VOLTS	100
SERIES RESISTORS	2 M
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	+DC
STEP/OFFSET AMPL	2 V
NUMBER OF STEPS	10
OFFSET MULT	10.00

All Dark Gray Buttons and Knobs in except:

OFFSET ZERO	out
AID (light gray button)	in
X10 HORIZ MAG	out
HORIZ VOLTS/DIV (MAG On)	.5 V, COLLECTOR

b. Connect the DVM between E and C, left side, and connect a 0.1 μF, 100 V capacitor across E and C, left side.

c. Patch B to C, right side, and connect a 400 Ω, 1%, 10-watt resistor between E and B, right side. The two 200 Ω resistors supplied with the kit can be used for this test.

d. Switch LEFT-RIGHT switch to LEFT. Press the Interlock Defeat button and adjust the VARIABLE COLLECTOR % to produce a DVM reading of +40.00 volts.

e. Horizontally position the spot to graticule center or to a point near center and note the spot position. Release the Interlock Defeat button.

f. Switch LEFT-RIGHT to RIGHT.

g. CHECK—The 11th spot should be within 3% of the 40-volt reference noted in part e. 3% is 1.2 volts, or 2.4 divisions at 0.5 volts per division.

h. Switch COLLECTOR SUPPLY POLARITY to –DC.

i. Switch LEFT-RIGHT to LEFT, press BEAM FINDER, and vertically center the spot on the graticule. Push the Interlock Defeat and adjust VARIABLE COLLECTOR % for –40 volts on the DVM. Horizontally position the spot to a reference point near graticule center. Release the Interlock Defeat.

j. Switch LEFT-RIGHT to RIGHT.

k. CHECK—The 11th spot should be within 3% (±2.4 divisions) of the 40-volt reference noted in part i.

l. Remove the DVM and capacitor, 400 Ω resistor and shorting strap from B to C.

15. Check Linearity at Maximum Voltage and Current

a. Reset the controls as follows:

HORIZ VOLTS/DIV (MAG On)	.2 V, COLLECTOR
COLLECTOR SUPPLY POLARITY	+DC

b. Place a 200 Ω, 1%, 10 watt resistor between C and B, right side, and another 200 Ω, 1%, 10 watt resistor between C and E, right side.

c. Switch LEFT-RIGHT to RIGHT, press the BEAM FINDER button to locate the spot, and position the 11th spot to graticule center or a reference point near center and note the position of the 10th and 11th spots (see Fig. 5-1).

d. Position the 10th spot to the center reference and note the position of the 9th spot.

e. CHECK—With the 10th spot at the center reference, the 9th spot should be within ±2% (±0.1 major division) of the position of the 10th spot in part c.

f. CHECK—Position each spot (8th, 7th, 6th, etc.) to the center reference and note that each lower spot must be within ±2% (±0.1 major division) of the 10th spot in part c.

g. The measurement in each part must be within ±2% of the measurement in any other part.

h. Reset COLLECTOR SUPPLY POLARITY to –DC.

i. Press the BEAM FINDER and position the 11th (furthest left) spot (see Fig. 5-2) to graticule center and note the position of the 10th and 11th spots (reposition vertically as necessary).

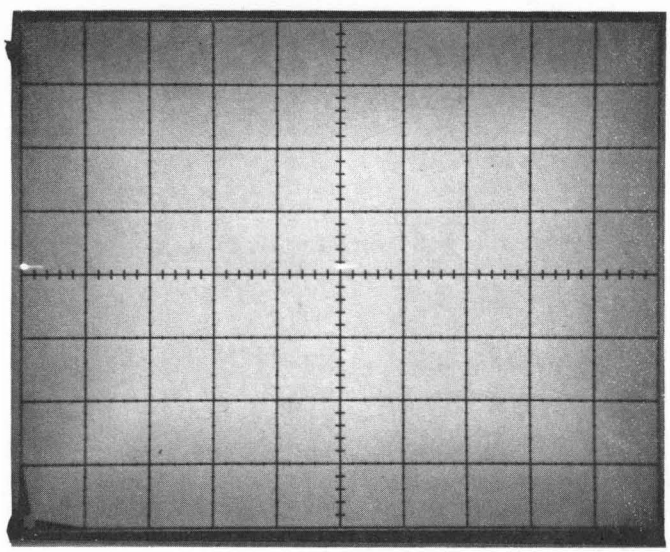


Fig. 5-1. Illustration of step 15c.

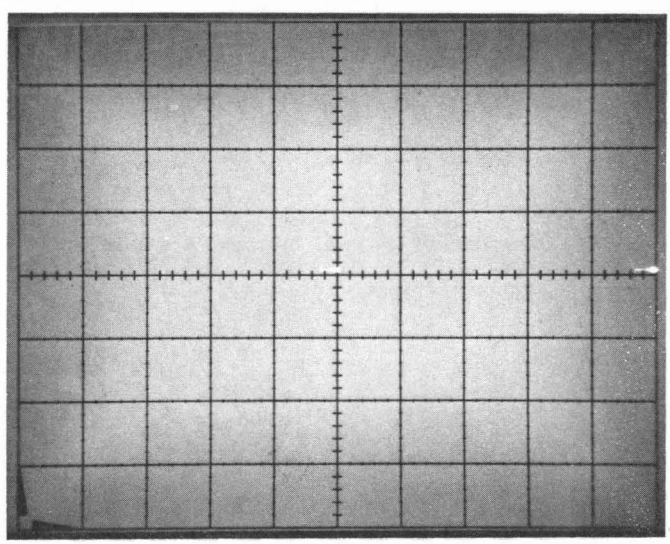


Fig. 5-2. Illustration of step 15i.

j. Position the 10th spot to graticule center and note the position of the 9th spot.

k. CHECK—With the 10th spot at the center reference, the 9th spot should be within ±2% of the position of the 10th spot in part i.

l. CHECK—Position each spot (8th, 7th, 6th, etc.) to the center reference and note that each lower spot is within ±2% of the 10th spot in part i.

m. Remove the resistors.

16. Check Linearity in Oppose

a. Reset the controls as follows:

STEP/OFFSET AMPL	1 V
HORIZ VOLTS/DIV	.2 V, BASE
OFFSET	
AID	out

b. Position the 1st spot (right end of the display) to a reference point near graticule center.

c. Note the positions of the 1st and 2nd spot (distance between spots).

d. Reposition the 2nd spot to the reference in part b.

e. CHECK—The distance between the 2nd and 3rd spots should be within ±2% (±0.1 major division) of that in part c.

f. Position each successive spot (3rd, 4th, etc.) to the reference.

g. CHECK—The distance between any two spots should be within ±2% of the distance between any other two adjacent spots.

17. Check Maximum Current Limit

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY	
POLARITY	AC
VARIABLE COL-	
LECTOR %	0
STEP/OFFSET AMPL	2 V
OFFSET MULT	10.00

All Dark Gray Buttons and Knobs in except:

OFFSET	
ZERO	out
AID (light gray button)	in
HORIZ VOLTS/DIV	200 V, COLLECTOR
VERTICAL CUR-	
RENT/DIV	50 mA
LEFT-RIGHT	Off

b. Patch C to B, right side.

c. Vertically and horizontally position the spot to graticule center. Switch LEFT-RIGHT to RIGHT.

d. CHECK—The maximum current should be less than 200 mA (4 divisions of vertical deflection at 50 mA/DIV).

e. Press to release the STEP/OFFSET POLARITY NORM button to the out position.

f. CHECK—The maximum current should be less than 200 mA (4 divisions of vertical deflection from the graticule center line).

g. Reset the controls as follows:

STEP FAMILY	
SINGLE	press
OFFSET	
AID	out
VERTICAL CUR-	
RENT/DIV	5 mA
LEFT-RIGHT	Off

h. Horizontally and vertically position the spot to graticule center.

i. Switch LEFT-RIGHT to RIGHT.

j. CHECK—Maximum current should be 10 mA (2 divisions) or greater, of vertical deflection, but less than 20 mA (4 divisions).

k. Push the STEP/OFFSET POLARITY NORM in.

l. CHECK—Maximum current should be 10 mA (2 divisions) or greater, of vertical deflection, but less than 20 mA (4 divisions).

m. Set LEFT-RIGHT switch to Off. Remove B to C patch cord.

18. Check Step/Offset Amplitude Absolute Accuracy, Step X1

a. Reset the controls as follows:

All Dark Gray Buttons and Knobs in except:

X10 HORIZ MAG	out
STEP FAMILY	SINGLE
HORIZ VOLTS/DIV (MAG On)	.2 V, BASE
STEP/OFFSET AMPL	1 V
OFFSET AID (light gray button)	in
LEFT-RIGHT	RIGHT
NUMBER OF STEPS	fully clockwise
OFFSET ZERO	out

b. Connect the DVM between B and E, right side; the (+) lead to B.

c. Set the OFFSET MULT to the DVM reading shown in Table 5-6. If this voltage cannot be set, the Step Generator is misadjusted at the low end (recalibrate the Step Generator).

d. Position the spot to approximately 0.5 of limit in divisions from Table 5-6 left of center and note the position of the spot.

e. Set the OFFSET MULT dial to 10.00.

f. CHECK—The spot should be within limit in divisions given in Table 5-6 (to the right) of the position noted in part d.

g. Push the ZERO and STEP FAMILY buttons in.

h. CHECK—The spot should be within limit in divisions given in Table 5-6 to the right of the reference position noted in part d.

i. Push to release the OFFSET POLARITY NORM button.

j. Push STEP FAMILY SINGLE button, release ZERO button to the out position, and release the AID button to the out position.

k. CHECK—The spot should be within limit in divisions given in Table 5-6 to the right of the reference in part d.

l. Push the AID button in and set the OFFSET MULT to produce the DVM reading shown in Table 5-6.

m. Position the spot to approximately 0.5 of limit in divisions from Table 5-6 to the right of center and note the position.

n. Reset the OFFSET MULT dial to 10.00.

o. CHECK—The spot should be within limit in divisions given in Table 5-6 to the left of the position noted in part m.

p. Press the STEP FAMILY REP and ZERO buttons in.

q. CHECK—The spot should be within limit in divisions given in Table 5-6 to the left of the position noted in part m.

r. Push the OFFSET POLARITY NORM button in. Push the STEP FAMILY SINGLE button, release the ZERO button to the out position and release the AID button to the out position.

s. CHECK—The spot should be within limit in divisions given in Table 5-6 to the left of the reference in part m.

t. Push the AID button in.

u. Using Table 5-6, repeat parts c through t for each of the STEP/OFFSET AMPL settings. Use the HORIZ VOLTS/DIV, OFFSET MULT, and DVM settings shown in the table and use the positions and limits shown.

TABLE 5-6

STEP/ OFFSET AMP	HORIZ VOLTS/ DIV	DVM Reading	Limit in[2] Divisions
+1 V	.2 V	+9.7 V	+3
−1 V		−9.7 V	−3
+.5 V	.1 V	+4.85 V	+3
−.5 V		−4.85 V	−3
+.2 V	50 mV	+1.94 V	+2.4
−.2 V		−1.94 V	−2.4
+.1 V	10 mV	+0.97 V	+6
−.1 V		−0.97 V	−6
+.05 V	5 mV	+0.485 V	+6
−.05 V		−0.485 V	−6

[2] + = to the right of the reference

− = to the left of the reference

19. Check Step/Offset Amplitude Absolute Accuracy, Step X.1

a. Set the controls as follows:

COLLECTOR SUPPLY POLARITY	AC
NUMBER OF STEPS	counterclockwise

All Dark Gray Buttons and Knobs in except:

STEP X.1	out
OFFSET AID (light gray button)	in
STEP/OFFSET AMPL	.2 V
HORIZ VOLTS/DIV	.2 V, BASE
VERTICAL CURRENT/DIV	2 A
LEFT-RIGHT	RIGHT

b. Connect the DVM between B and E, right side.

c. Horizontally position the first (furthest left of the two displayed spots) to the left crt edge.

d. Turn the NUMBER OF STEPS control clockwise until 10 steps (11 spots) are displayed horizontally. Horizontally position the 11th spot to graticule center. Pull the X10 HORIZ MAG knob.

e. Reset the 11th spot to graticule center.

f. Push STEP FAMILY SINGLE button and push OFFSET ZERO button to release to the out position.

g. Set the OFFSET MULT for a DVM reading of 2.000 volts, ±5 mV.

h. Reposition the spot, relative to graticule center or a reference point near graticule center by the amount of difference, if any, of the DVM reading from 2.000 volts (example: if the difference from 2.000 volts is +5 mV, then, at 20 mV/DIV, 5 mV is equal to 0.25 major divisions. Set the spot 0.25 division to the right of graticule center or a reference point near center. If in the negative direction, set the spot to the left of the reference point).

i. Press the STEP FAMILY REP button and the OFFSET ZERO buttons in.

j. CHECK—The spot should be not mroe than ±4 divisions from the reference.

k. Push the STEP/OFFSET POLARITY NORM and the DISPLAY INVERT NORM buttons to release to the out position. Note: For each succcessive step in Table 5-7 alternate the position of these buttons.

l. Press the STEP FAMILY SINGLE button and push to release the OFFSET ZERO button to the out position.

m. Readjust the OFFSET MULT for 2.000 volts, ±5 mV on the DVM.

n. Set the spot to a reference point as detailed in part h.

o. Push the STEP FAMILY REP and OFFSET ZERO buttons in.

p. CHECK—The spot should be within ±4 divisions of the reference.

q. Using Table 5-7, reset the controls to the next set of conditions.

r. Repeat parts e through p, using the control settings, DVM readings, and limits for each of the items in the table.

TABLE 5-7

STEP/ OFFSET AMPL	HORIZ VOLTS/DIV (magnified)	DVM Reading (Volts)	Max Deviation (4%) from the reference (in divisions)
.2 V	20 mV	2.000, ±5 mV	±4
.1 V	10 mV	1.000, ±2.5 mV	±4
.05 V	5 mV	0.500, ±5 mV	±4
.02 V	5 mV	0.200, ±0.5 mV	±1.6
.01 V	5 mV	0.100, ±0.25 mV	±0.8
5 mV	5 mV	0.050, ±0.13 mV	±0.4

STEP GENERATION-CURRENT MODE

20. Check Maximum Current and Voltage

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
STEP RATE	SLOW
STEP/OFFSET AMPL	200 mA
NUMBER OF STEPS	10
Horizontal POSITION	centered
Vertical POSITION	centered
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/DIV	.5 A
LEFT-RIGHT	Off

b. Connect a 1 Ω, 1/4%, 10-watt resistor between C and B terminals, left side, and connect the DVM to the same (C and B) terminals.

c. Connect a shorting patch cord between C and B terminals, right side. Horizontally position the spot to graticule center.

d. Switch LEFT-RIGHT switch to LEFT.

e. Push to release the ZERO button.

f. Set the OFFSET MULT dial to produce a DVM reading of 1.94 volts.

g. Pull the X10 VERT MAG and vertically position the trace near graticule center. Do NOT reposition horizontally. Note the position of the trace (reference).

h. Set the OFFSET MULT dial to 10.00 and LEFT-RIGHT switch to RIGHT.

i. Set MAX PEAK VOLTS to 25 and SERIES RESISTORS to 1.9.

j. Set the VARIABLE COLLECTOR % to produce a horizontal deflection that passes through 5 volts (5th division right of center). See Fig. 5-3A.

k. CHECK—At 5 volts, the trace should be displaced not more than 2.2 divisions downward from the vertical reference set in part g, and not above the vertical reference.

l. Push the ZERO and STEP FAMILY REP buttons in.

m. CHECK—At 5 volts, the trace should be displaced not more than 2.2 divisions downward from the vertical reference. Set in part g, and not above the vertical reference. See Fig. 5-3B.

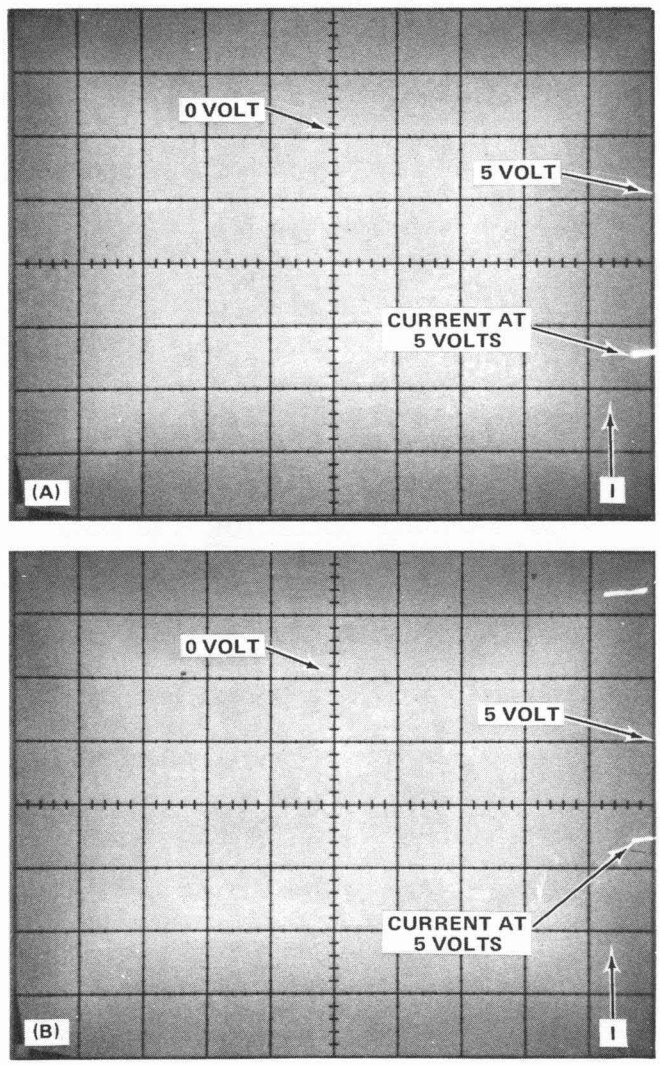


Fig. 5-3. Typical displays of Step Generator current at maximum voltage. (A) Illustrating step k and (B) illustrating step m.

n. Reset the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COL-LECTOR %	0
STEP/OFF POLARITY NORM	out
STEP FAMILY SINGLE	press
OFFSET ZERO	out
LEFT-RIGHT	LEFT

o. Adjust the OFFSET MULT for 1.94 volts on the DVM.

p. Position the spot vertically near graticule center and note the vertical position of the spot (reference). Do NOT reset horizontally.

q. Set MAX PEAK VOLTS to 25 and SERIES RESISTORS to 1.9.

r. Switch LEFT-RIGHT switch to RIGHT.

s. Reset OFFSET MULT dial to 10.00.

t. Adjust VARIABLE COLLECTOR % to produce a horizontal deflection that passes through 5 volts (5th division to the left center. See Fig. 5-4A).

u. CHECK—At 5 volts on the graticule, the trace should be displaced vertically not more than 2.2 divisions upward from the vertical reference set in part p, and not below the vertical reference.

v. Push the OFFSET ZERO and STEP FAMILY REP buttons.

w. CHECK—At the left graticule line the trace should be displaced not more than 2.2 divisions upward from the vertical reference set in part p, and not below the vertical reference. See Fig. 5-4B.

21. Check Current at 100 mA (Step/Offset Amplitude) and Maximum Voltage

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
Horizontal POSITION	centered

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
STEP RATE	SLOW
OFFSET ZERO	out
AID (light gray button)	in
HORIZ VOLTS/DIV	2 V, COLLECTOR
STEP/OFFSET AMPL	100 mA

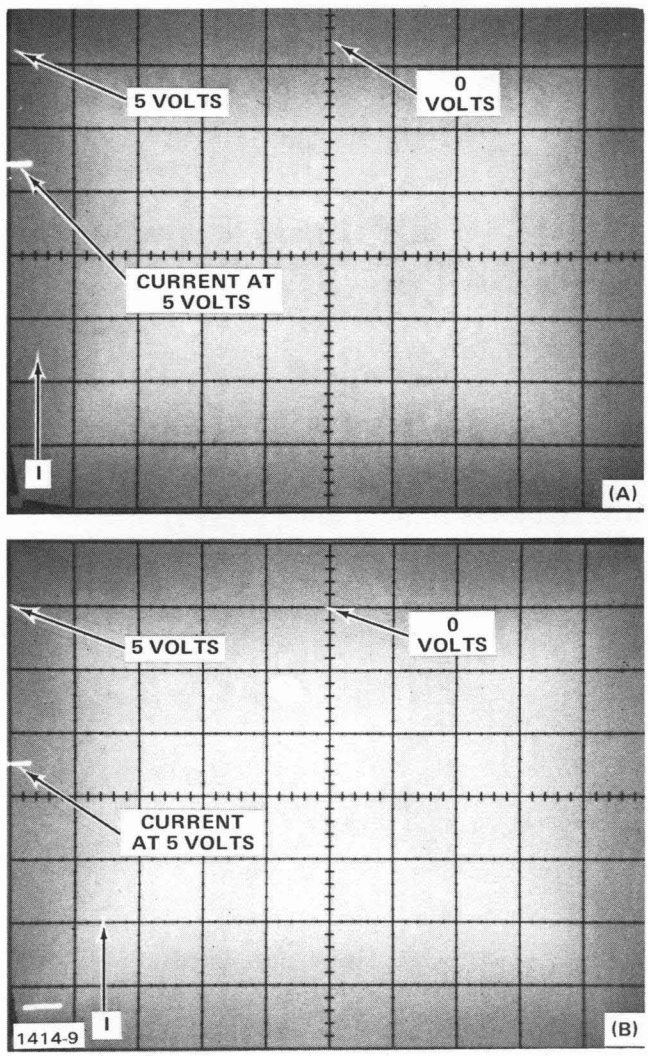


Fig. 5-4. Typical displays of Step Generator current at maximum voltage. (A) Illustrating step t and (B) illustrating step w.

b. Horizontally position the spot to graticule center. Switch LEFT-RIGHT switch to LEFT. Adjust the OFFSET MULT for a DVM reading of 0.97 volts.

c. Release X10 VERT MAG and vertically position the spot to approximately graticule center. Note the vertical spot position for reference.

d. Switch LEFT-RIGHT to RIGHT.

e. Switch SERIES RESISTORS to 7.5.

f. Reset OFFSET MULT dial to 10.00.

g. Set VARIABLE COLLECTOR % to produce a trace that passes through 7 volts (3.5 divisions to the right of graticule center. See Fig. 5-5A).

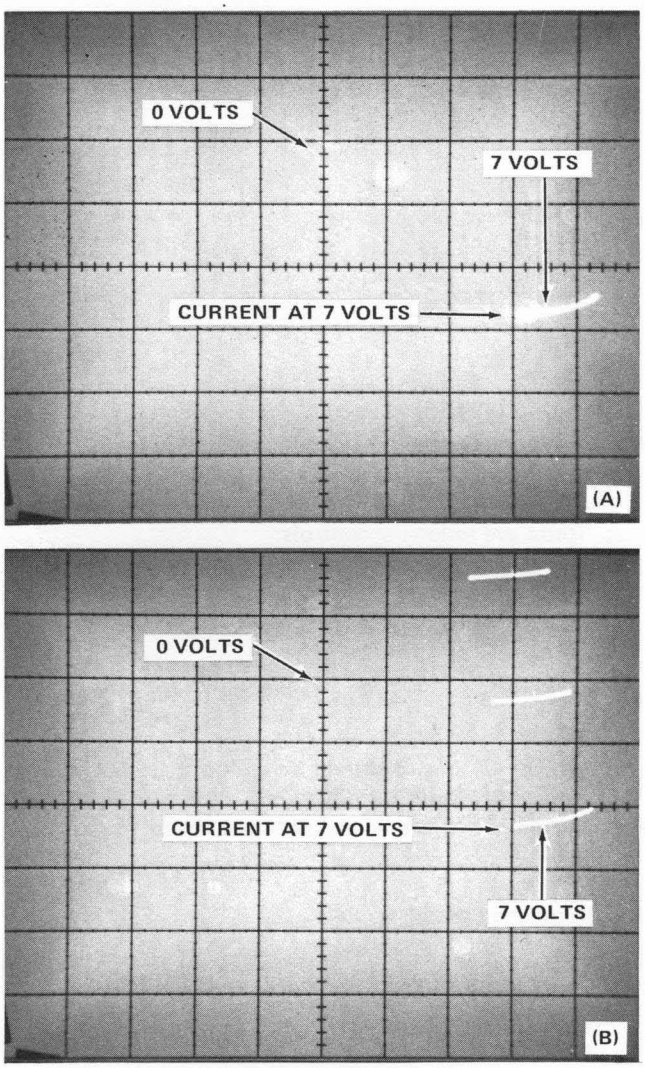


Fig. 5-5. Typical displays of Step Generator current at maximum voltage. (A) Illustrating step g and (B) illustrating step j.

h. CHECK—At 7 volts, the trace should be displaced not more than 1.2 divisions downward from the reference noted in part c, and not above the vertical reference.

i. Push OFFSET ZERO and STEP FAMILY REP buttons in.

j. CHECK—At 7 volts, the trace should not be greater than 1.2 divisions below the reference noted in part c, and should not be above the vertical reference. See Fig. 5-5B.

k. Reset the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
STEP/OFFSET	
POLARITY	
NORM	out
LEFT-RIGHT	LEFT

l. Set the OFFSET MULT for a DVM reading of 0.97 volts. Vertically position the spot to graticule center. Do NOT change horizontal position. Leave Vertical magnified.

m. Switch LEFT-RIGHT to RIGHT.

n. Reset SERIES RESISTORS to 7.5.

o. Set the OFFSET MULT dial to 10.00.

p. Set VARIABLE COLLECTOR % to produce a horizontal trace that passes through 7 volts (3.5 divisions to the left of graticule center. See Fig. 5-6A).

q. CHECK—The trace, at 7 volts, should be displaced vertically not more than 1.2 divisions above the reference set in part l, and not below the reference.

r. Push the OFFSET ZERO and STEP FAMILY REP buttons in.

s. CHECK—The trace, at 7 volts should be displaced vertically not more than 1.2 divisions above the reference set in part l, and not below the vertical reference. See Fig. 5-6B.

22. Check Step/Offset Amplitude Absolute Accuracy, Step X1

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC

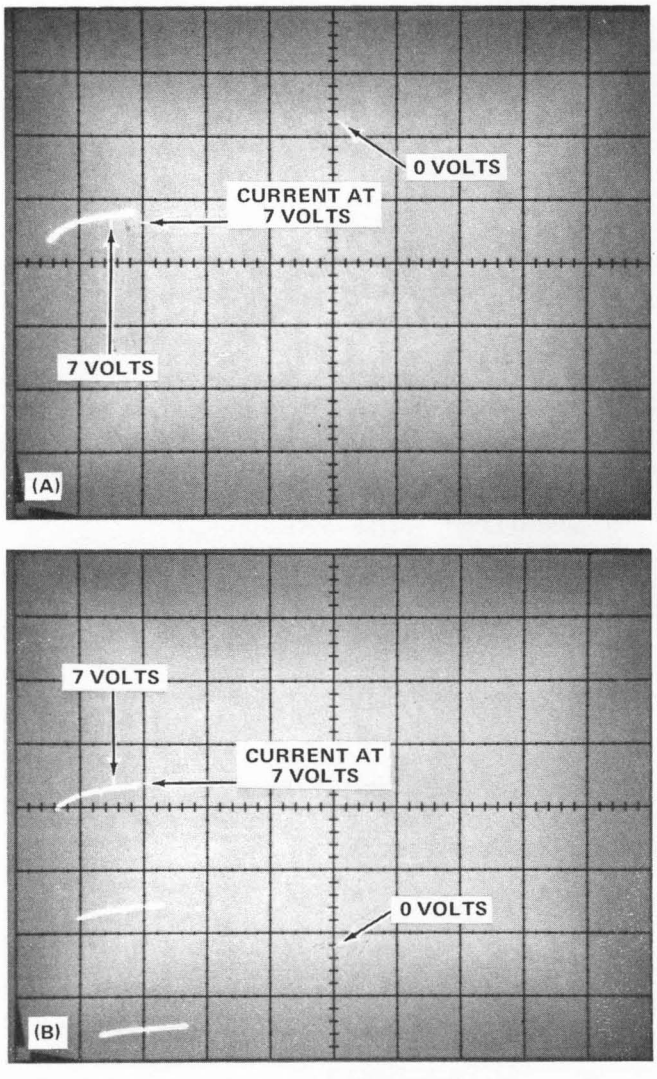


Fig. 5-6. Typical displays of Step Generator current at maximum voltage. (A) Illustrating step p and (B) illustrating step s.

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	
SINGLE	press
STEP RATE	SLOW
OFFSET	
ZERO	out
X10 VERT MAG	out
STEP/OFFSET AMPL	50 mA
HORIZ VOLTS/DIV	200 V, COLLECTOR
VERTICAL CURRENT/DIV (MAG On)	10 mA
LEFT-RIGHT	Off
NUMBER OF STEPS	fully clockwise

b. Connect a 1 Ω, 1/4%, 10-watt resistor between B and C, left side and connect the DVM across the 1 Ω resistor.

c. Set the LEFT-RIGHT switch to LEFT.

d. Adjust the OFFSET MULT for a DVM reading as shown in Table 5-8 for the appropriate STEP/OFFSET AMPL setting.

e. Position the spot vertically and horizontally approximately to graticule center. Note the spot position.

f. Set the OFFSET MULT dial to 10.00.

g. CHECK—The spot should be within the limits shown in column 5 in Table 5-8 (≤30 mA = 3 divisions, or less, vertically, from the reference point noted in part e).

h. Reset the following controls:

OFFSET	
ZERO	in
STEP FAMILY	
REP	in

i. CHECK—The spot should be within the limits shown in column 5 in Table 5-8 (≤ 30 mA = 3 divisions, or less, vertically, from the reference point noted in part e).

j. Reset the controls as follows:

STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
STEP-OFFSET POLARITY	
NORM	out

k. Set the OFFSET MULT for a DVM reading as shown in Table 5-8 for the appropriate STEP/OFFSET AMPL setting.

l. Position the spot vertically to approximately graticule center and note the spot position.

m. Set the OFFSET MULT dial to 10.00.

n. CHECK—The spot should be within the limits shown in column 5, Table 5-8.

o. Press OFFSET ZERO and STEP FAMILY REP buttons in.

p. CHECK—The top spot should be within the limits shown in column 5, Table 5-8.

q. Push the STEP FAMILY SINGLE and STEP/OFFSET POLARITY NORM buttons in and push to release OFFSET ZERO to the out position.

r. Using the next entry in Table 5-8, repeat parts d through q, using the setting, limits, and resistors shown in Table 5-8. Repeat for each entry.

TABLE 5-8

STEP OFFSET AMPL	B-C Resistor	DVM Reading	VERTICAL CURRENT/DIV (MAG On)	Limit in divisions from reference
50 mA	1 Ω	0.485 V	10 mA	3
20 mA	10 Ω	1.940 V	5 mA	2.4
10 mA	10 Ω	0.970 V	2 mA	3
5 mA	10 Ω	0.485 V	1 mA	3
2 mA	100 Ω	1.940 V	.5 mA	2.4

s. Reset the controls as follows:

MAX PEAK VOLTS	100
SERIES RESISTORS	30
STEP/OFFSET AMPL	1 mA
VERTICAL CURRENT/DIV	.2 mA

t. Connect a shorting patch cord between C and B, right side.

u. Set the OFFSET MULT for a DVM reading as shown in Table 5-9 for the appropriate STEP/OFFSET AMPL setting. Vertically position the spot to a point near graticule center and note the spot position.

v. Switch LEFT-RIGHT switch to RIGHT.

w. Set the OFFSET MULT dial to 10.00.

x. CHECK—The spot should be within the limits shown in column 5, Table 5-9.

y. Set the OFFSET ZERO and STEP FAMILY REP buttons in.

z. CHECK—The bottom spot should be within the limits shown in the table, with respect to the reference noted in part u.

aa. Push STEP FAMILY SINGLE and push to release ZERO, AID, and STEP/OFFSET POLARITY NORM buttons to the out position.

ab. CHECK—The spot should be within the limits shown in column 5, Table 5-9.

ac. Switch LEFT-RIGHT to LEFT and press AID button in.

ad. Reset OFFSET MULT for the DVM reading indicated for the STEP/OFFSET AMPL setting in Table 5-9. Vertically position the spot to near graticule center. Note the spot position.

ae. Switch LEFT-RIGHT switch to RIGHT.

af. Set OFFSET MULT dial to 10.00.

ag. CHECK—The spot should be within the limits shown in the table, with respect to the reference noted in part ad.

ah. Push STEP FAMILY REP and ZERO buttons in.

ai. CHECK—The top spot should be within the limits shown in the table, with respect to the reference noted in part ad.

aj. Press STEP FAMILY SINGLE and POLARITY NORM buttons and push to release ZERO and AID buttons to the out position.

ak. CHECK—The spot should be within the limits shown in column 5, Table 5-9.

TABLE 5-9

STEP OFFSET AMPL	C-B Resistor	DVM Reading	VERTICAL CURRENT/ DIV	Limit in divisions to reference
1 mA	100 Ω	0.970 V	.2 mA	3
.5 mA		0.485 V	.1 mA	3
.2 mA	1 kΩ	1.940 V	50 μA	2.4
.1 mA		0.970 V	20 μA	3
50 μA		0.485 V	10 μA	3
20 μA	10 kΩ[3]	1.940 V	5 μA	2.4
10 μA		0.970 V	2 μA	3
5 μA		0.485 V	1 μA	3
2 μA	100 kΩ[4]	1.940 V	.5 μA	2.4
1 μA		0.970 V	.2 μA	3
.5 μA		0.485 V	.1 μA	3
.2 μA	1 MΩ[4]	1.940 V	50 nA	2.4
.1 μA		0.970 V	20 nA	3
50 nA		0.485 V	10 nA	3

[3]When the C to B resistor is 10 kΩ and greater, the DISPLAY FILTER may have to be used to decrease the Vertical noise on DC measurements. Switch the DISPLAY FILTER out of the circuit (NORM button in) when checking STEP FAMILY (REP button in). If objectionable vertical noise is present, read the center of the display to set the reference point, then disconnect the voltmeter.

[4]If a DC voltmeter having an input impedance of 500 MΩ or less is used, calculate the correct voltage using the formula:

$$V_2 = V_1 \frac{R_m}{R_m + R_s}$$

Where:

V_2 = correct voltage,

V_1 = indicated voltage, DVM reading in the table,

R_m = meter impedance,

R_s = current sensing resistor in the table.

al. Switch LEFT-RIGHT switch to LEFT. Press AID button in.

am. Proceed to the next settings in the table and repeat parts u through am.

NOTE

Observe the footnotes to Table 5-9 when the 10 kΩ, 100 kΩ, and 1 MΩ resistors are used.

23. Check Maximum Current and Voltage Limits with Opposing Offset

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	+DC

All Dark Gray Buttons and Knobs in except:

STEP FAMILY SINGLE	press
STEP/OFFSET AMPL	10 mA
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/ DIV	5 mA

b. Vertically and horizontally position the spot to graticule center, or near center and note the spot position.

c. Switch LEFT-RIGHT to RIGHT (C to B patch).

d. Push to release ZERO and AID buttons.

e. CHECK—The vertical deflection from the center reference should be > 10 mA, but < 20 mA (> 2 divisions, but < 4 divisions).

f. Switch SERIES RESISTORS to 8 k.

g. CHECK—The horizontal deflection from the center reference should be > 1 volt, but < 5 volts (> 1 division, but > 5 divisions).

h. Switch COLLECTOR SUPPLY POLARITY to —DC and push DISPLAY INVERT NORM button to release to the out position.

i. CHECK—The horizontal deflection from the center reference should be >1 volt, but <5 volts (>1 division, but <5 divisions).

j. Switch SERIES RESISTORS to .12.

k. CHECK—The vertical deflection from the center reference should be >10 mA, but <20 mA (>2 divisions, but <4 divisions).

24. Check Pulsed 300 μs and Step Rates

a. Set the controls as follows:

COLLECTOR SUPPLY POLARITY	+
MAX PEAK VOLTS	6.5
SERIES RESISTORS	2 k
VARIABLE COLLECTOR %	0
PULSED 300 μs	out

All Dark Gray Buttons and Knobs in except:

STEP FAMILY SINGLE	press
STEP RATE	SLOW
STEP/OFFSET AMPL	.5 V
HORIZ VOLTS/DIV	.5 V, BASE
VERTICAL CURRENT/DIV	2 mA
LEFT-RIGHT	Off

b. Patch from C to B, right side.

c. Position the spot horizontally and vertically to lower-left corner of graticule.

d. Push the STEP FAMILY REP button in and adjust NUMBER OF STEPS for 3 steps (4 spots).

e. Switch LEFT-RIGHT to RIGHT.

f. Increase VARIABLE COLLECTOR % to 100.

g. CHECK—The display should resemble that of Fig. 5-7.

h. Push to release the STEP X.1 button and note the step rate.

i. Press the STEP RATE NORM button.

j. CHECK—The step rate increased.

k. Press the STEP RATE FAST button.

l. CHECK—The step rate increased.

m. Push the PULSED 300 μs button and the STEP X.1 button in.

n. CHECK—Note that the sweeps have been replaced with a short-duration pulse, except for the zero line. The pulse appears at what would have been the peaks of the sweep. See Fig. 5-8.

o. Push the STEP RATE SLOW button.

p. CHECK—That the base line is also a pulse (see Fig. 5-9).

q. See the COLLECTOR SUPPLY POLARITY to AC.

r. CHECK—The display should resemble Fig. 5-10 or inverted from top to bottom.

s. Push the STEP RATE NORM button.

t. CHECK—The display should resemble that of Fig. 5-11A or B (pulses at both the peaks and zero points).

u. Turn 577 POWER OFF.

25. Check Collector Series Resistors

a. Set controls as follows:

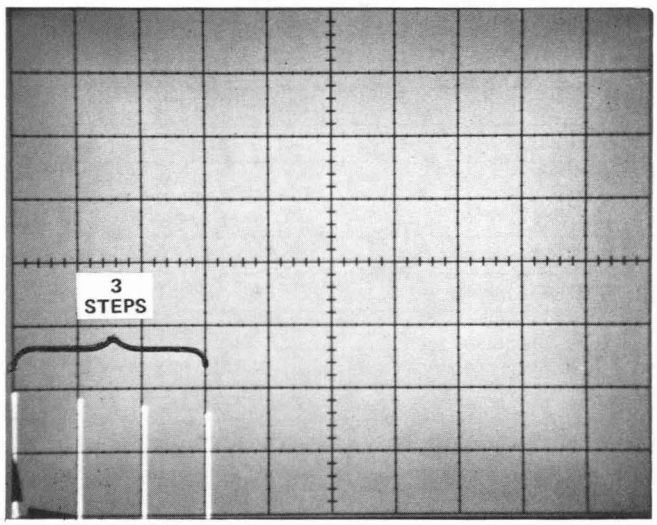


Fig. 5-7. Typical display illustrating step g.

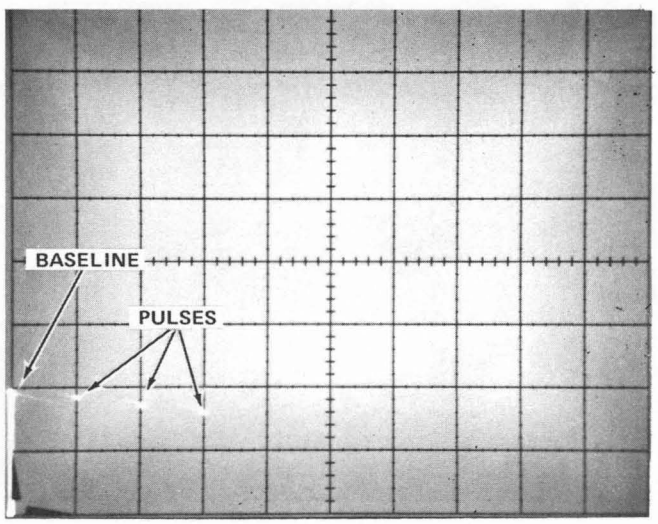


Fig. 5-8. Typical display illustrating step n.

COLLECTOR SUPPLY POLARITY	AC
SERIES RESISTORS	.12
HORIZ V/DIV	200 V COLL
VERT I/DIV	2 A
SELECTOR	RIGHT

b. Measure resistance from c to e RIGHT SIDE as in Table 5-10. For series resistance settings above 8 k, Max peak volts will need to be set to 400. (It may be necessary to use sense leads to make the lowest resistance measurements).

TABLE 5-10

SERIES RES	METER READING
.12	0 - .238 Ω
.5	.325 - .675 Ω
1.9	1.52 - 2.29 Ω
7.5	6.275 - 8.72 Ω
30	25.4 - 34.6 Ω
120	101.9 - 138.1 Ω
500	415 - 575 Ω
2 k	1.7 k - 2.3 kΩ
8 k	6.8 k - 9.2 kΩ
30 k	25.5 k - 34.5 kΩ
120 k	102 k - 138 kΩ
500 k	425 k - 575 kΩ
2 m	1.7 m - 2.3 mΩ
8 m	6.8 m - 9.2 mΩ

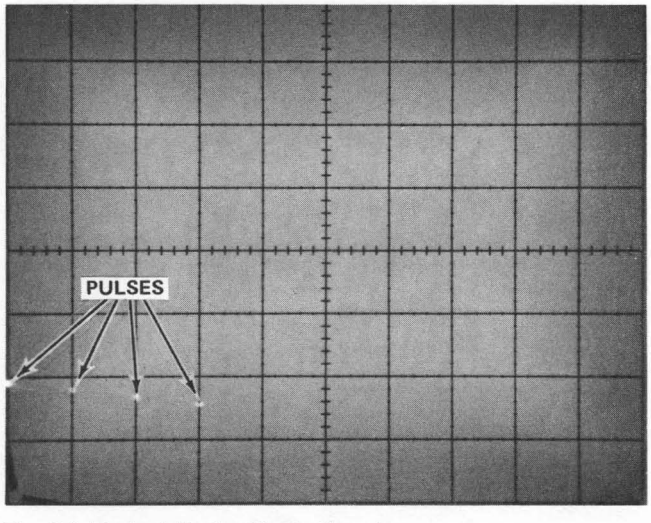


Fig. 5-9. Typical display illustrating step p.

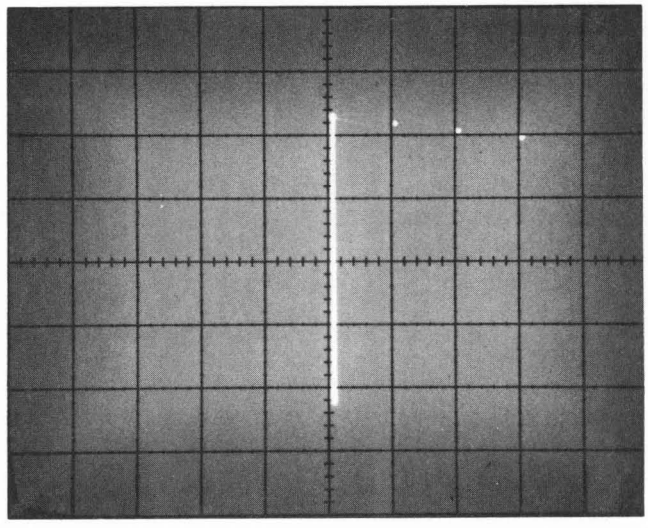
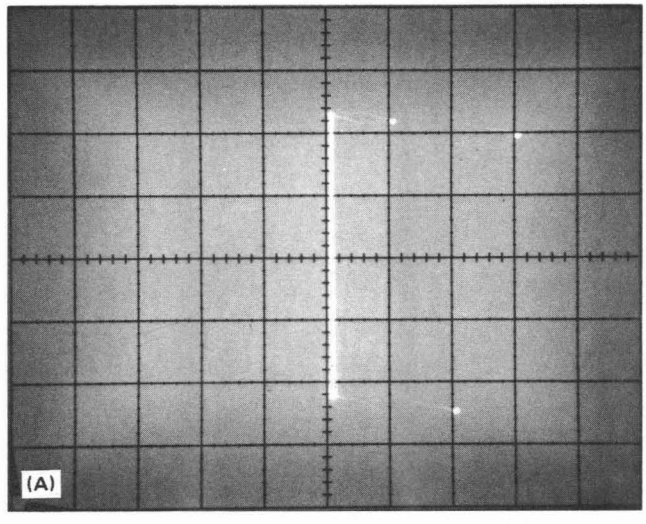


Fig. 5-10. Typical display illustrating step r.



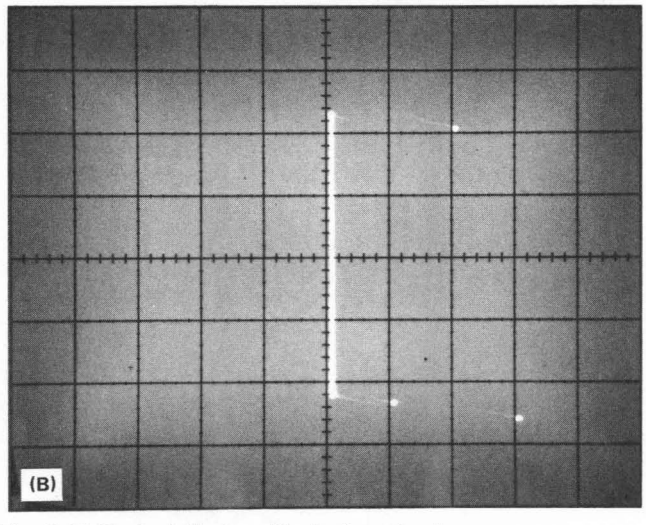


Fig. 5-11. Typical displays illustrating step t.

SHORT-FORM ADJUSTMENT PROCEDURE

1. Adjust −30-Volt Supply Page 5-24

Adjust R775, −30-V Adj, for −30 volts, ±0.075 volt.

2. Adjust +30-Volt Supply Page 5-25

Adjust R765, +30-V Adj, for +30 volts, ±0.075 volt.

3. Adjust −3400-Volt Supply Page 5-25

Adjust R1275, H V Adj, for −3400 volts, ±170 volts.

4. Adjust Intensity Range Page 5-25

Adjust R1245, Intensity Range, as detailed in step 4.

5. Adjust Astigmatism Page 5-25

Adjust R1286, Astig, for a circular spot.

6. Adjust Trace Rotation Page 5-25

Adjust R1291, TRACE ROTATION, to align the trace parallel to the center graticule line.

7. Adjust Geometry Page 5-26

Adjust R1285, Geom, for not more than 0.1 division of bowing.

8. Adjust Storage Operation (D1 only) Page 5-26

+370-VOLT SUPPLY

Adjust R1387, +370 V Adj, for +370 volts, ±7 volts.

OPERATING LEVEL

Adjust R1350, Store Level, for best stored display with Erase Selector pushed in.

STORE BALANCE

Adjust R1370, Store Bal, for best stored display with Erase Selector in the out position. Operating level and store balance level must match.

COLLIMATION

Adjust R1390, CE1, to the point at which the bright area is pulled in from the graticule line by one-half major division.

NON STORE

Adjust R1395, to erase the screen within 1 second when placed in the non-store mode.

9. Adjust Vertical Gain Page 5-28

Adjust R1116 for 8 divisions of vertical display.

10. Adjust Horizontal Amplifier Balance Page 5-28

Adjust R530, Horiz Amp Bal, for no spot movement while switching HORIZ VOLTS/DIV from 20 V/DIV, COLLECTOR to 2 V/DIV, COLLECTOR.

11. Adjust Horizontal Amplifier Gain Page 5-29

Adjust R1136, Horiz Gain Adj, for 10 divisions of horizontal deflection.

12. Adjust Sensitivity Correction Page 5-29

Adjust R1385, Sens Corr, for the same deflection sensitivity in store and nonstore.

13. Adjust Horizontal Compensation Page 5-30

Adjust C503, the yellow wire, for the smallest spot size. Adjust C511 for the least slash.

14. Adjust Step Generator Polarity Balance, Pulse Zero, and Step Zero Page 5-30

Adjust R365, Polarity Bal, for equal deflection of the brighter spot while pushing STEP/OFFSET POLARITY button in and out.

Adjust R355, Pulse Zero, to position the brighter spot to graticule center.

Adjust R300, Step Zero, to position the dim spot to graticule center.

Adjust R455, Amp Bal, to center the spot horizontally.

15. Adjust Polarity Positioning Page 5-31

Adjust R528, Horiz Pos Adj, and R570, Vert Pos Adj, to position the spot to lower-left corner of the graticule.

16. Adjust Step and Offset Amplitude Page 5-31

Adjust R278, X1 Step Amplitude, R352, Offset Ampl, and R281, X.1 Step Ampl, as detailed in the procedure.

17. Adjust Step Generator Output Impedance Page 5-32

Adjust R456, Output Z, for no spot shift as the 1 kΩ and 15 kΩ resistors are switched.

ADJUSTMENT PROCEDURE

Initial Control Settings

	D1 or D2
INTENSITY	counterclockwise
	577
MAX PEAK VOLTS	6.5
MAX PEAK POWER-WATTS	.15
VARIABLE COLLECTOR %	0

1. Adjust −30-Volt Supply

a. Connect the DVM between GND and the −30-volt test point on the Power Supply circuit board. See Fig. 7-1A for location.

NOTE

For all references to figures calling out locations of adjustments and test points, see the pullout pages preceding the Schematic Diagrams near the rear of the manual.

WARNING

Turn the instrument power off while connecting and disconnecting the DVM, since lethal voltages exist in areas adjacent to the test points. These danger areas are shown in Fig. 5-12.

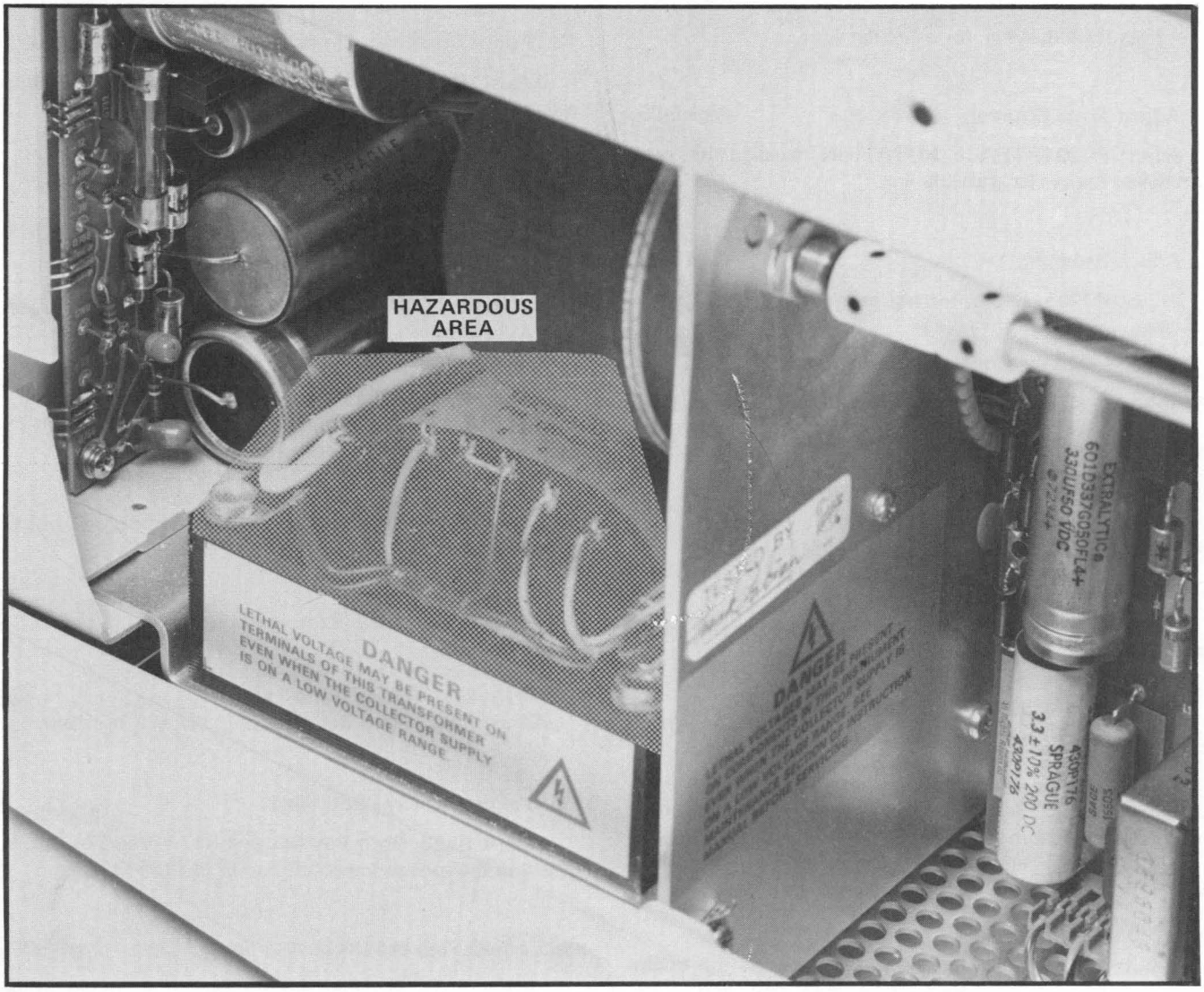


Fig. 5-12. Location of the danger areas adjacent to the Power Supply test points.

b. ADJUST—R775 (through the back panel of the 577) for −30 volts, ±0.075 volts (−29.925 V to −30.075 V).

c. INTERACTION—The −30-volt supply affects the entire instrument. Adjust this supply only if the voltage is out of tolerance or if a complete calibration is being performed. + and −30-volt supplies must be within 1/2% of 30 volts and must be within 1/2% of each other.

NOTE

Table 4-1 (Maintenance section of this manual) lists the voltage tolerance and regulation characteristics of each of the supplies in the 577.

2. Adjust +30-Volt Supply

a. Connect the DVM between GND and the +30-volt test point on the Power Supply circuit board. See Fig. 7-1A for location.

b. ADJUST—R765, +30 V Adj (see Fig. 7-1B for location) for a reading of +30 volts, ±0.075 V (+29.925 V to +30.075 V). For serial numbers B050000 and up, R765 is adjusted through the rear panel.

c. INTERACTION—The +30-volt supply affects the entire instrument. Adjust the supply only if the voltage is out of tolerance or if a complete calibration is being performed. + and −30-volt supplies must be within 1/2% of 30 volts, and within 1/2% of each other.

3. Adjust −3400-Volt Supply

a. Set the DC voltmeter to measure approximately 3400 volts.

b. Remove the CRT base cover from the display unit back panel. See Fig. 7-2A.

c. Read the voltage between pin 2 of the CRT socket (through a hole in the CRT socket) and GND on the Power Supply circuit board. See Fig. 7-2A.

d. ADJUST—R1275, H V Adj, for −3400 volts, ±170 volts (3230 volts to 3570 volts). See Fig. 7-2B.

e. INTERACTION—Adjust this voltage only if out of tolerance or if performing a complete calibration.

4. Adjust Intensity Range

a. Set the controls as follows:

VARIABLE COLLECTOR %	20
MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY POLARITY	AC
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horizontal POSITION	centered
VERTICAL CURRENT/DIV	2 A
Vertical POSITION	centered

All Light Gray Buttons out

All Dark Gray Buttons and Knobs in except:

STEP RATE	SLOW

b. Turn the INTENSITY control clockwise and check that a spot can be obtained. Turn the INTENSITY control fully counterclockwise.

c. ADJUST—R1245, Intensity Range, (see Fig. 7-2B) using an insulated screwdriver (hazardous voltages adjacent to R1245) until a faint spot is visible. Slowly turn the INTENSITY control clockwise 30° beyond the point at which the trace starts to brighten (30° equals 1 panel mark). To make final adjustment, turn R1245 counterclockwise until the spot just disappears.

5. Adjust Astigmatism

a. Set the FOCUS control fully counterclockwise and the INTENSITY control fully clockwise.

b. ADJUST—R1286, Astig, for a circular spot. See Fig. 7-3 for location of R1286.

6. Adjust Trace Rotation

a. Turn the INTENSITY control counterclockwise to reduce the spot intensity.

b. Adjust the FOCUS control for the smallest possible spot.

c. Set the HORIZ VOLTS/DIV switch to .5 V, COLLECTOR and adjust VARIABLE COLLECTOR % for a 10 division horizontal trace.

d. Vertically position the trace to the center graticule line.

e. ADJUST—R1291, TRACE ROTATION (on rear panel), to align the trace parallel with the center graticule line.

7. Adjust Geometry

a. Vertically position the trace to the bottom graticule line.

b. ADJUST—R1285, Geom (see Fig. 7-3 for location) for 0.1 division, or less, of bowing.

c. Vertically position the trace to the top graticule line.

d. Check for bowing of the trace, 0.1 division or less.

e. Vertically position the trace to the graticule centerline.

f. Connect a banana-banana patch cord between C and E on the right set of jacks on the 177.

g. Set the HORIZ VOLTS/DIV to STEP GEN.

h. Switch the LEFT-RIGHT switch to RIGHT.

i. Check for trace parallel with the center vertical graticule lines. See Fig. 5-13A and B for correct and incorrect adjustment of R1285.

j. READJUST—R1285, if necessary, for the best compromise between vertical and horizontal bowing.

k. If R1285, Geom, has been readjusted, recheck trace alignment by switching LEFT-RIGHT to center, remove C-E short and set HORIZ VOLTS/DIV to .1 V, COLLECTOR.

8. Adjust Storage Operation (D1 only)

Set the controls as follows:

STORE (UPPER and LOWER)	in
Erase Selector (UPPER and LOWER)	in

+370-VOLT SUPPLY

a. Connect a DC voltmeter (20 kΩ/volt or greater), set to measure at least +400 volts, between ground and the +370-volt test point (TP2 in Fig. 7-4).

b. ADJUST—R1387, +370-Volt Adj, for +370 volts, ±7 volts.

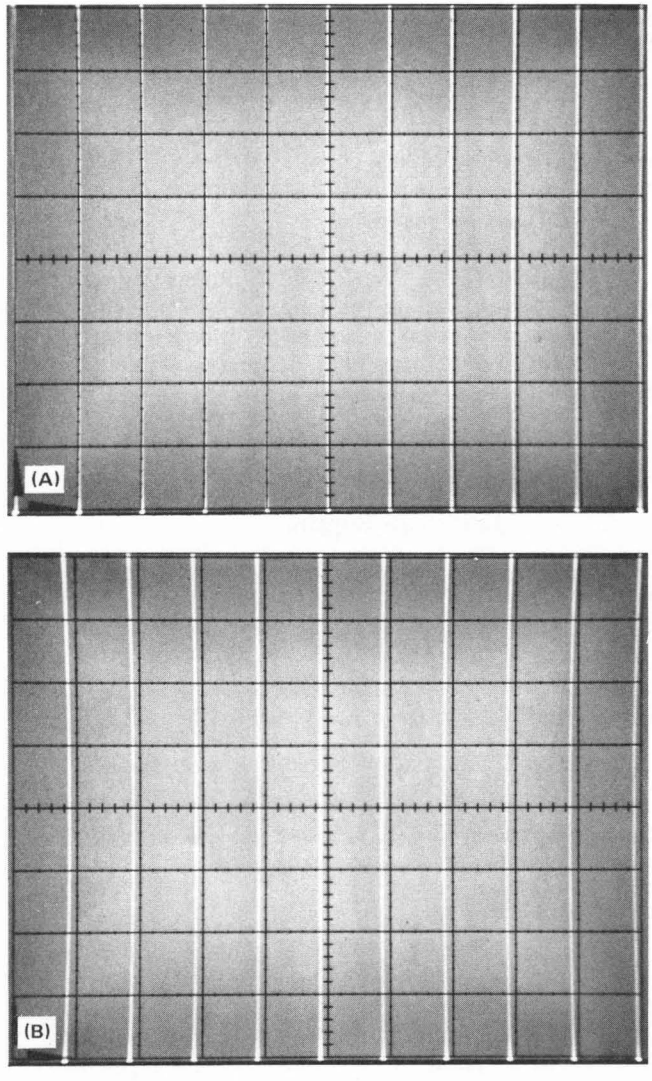


Fig. 5-13. Typical displays of (A) correct, and (B) incorrect adjustment of R1285.

OPERATING LEVEL

a. Connect the DC voltmeter (20 kΩ/volt or greater) between the flood-gun cathodes (pin 3 of P389, Fig. 7-4 and the Store Level test point, TP1. Record the voltmeter reading, so that if necessary, the operating level can be returned to the original setting.

NOTE

If CRT performance has been satisfactory, adjustment of the Store Level control is not necessary. Proceed to the Store Bal adjustment. For replacement CRTs, an information card is provided to show the optimum levels established by the factory for the individual CRT. All voltage levels associated with storage operation are made with respect to the flood-gun cathodes.

Reset the controls as follows:

HORIZ VOLTS/DIV	1 V, COLLECTOR
STEP FAMILY REP	in
VARIABLE COLLECTOR %	10 div of horiz display

b. Locate the writing threshold (minimum store level) as follows:

(1) Turn the INTENSITY control clockwise until the trace starts to defocus rapidly. Press the ERASE button to prepare the target for storage.

(2) Write about 3 lines per division across both targets by slewing the free-running trace vertically using the vertical POSITION control.

(3) Carefully check the written lines for breaks or gaps of 0.025-inch or more. If no breaks or gaps are evident after 10 seconds, adjust R1350, Store Level, to reduce the operating level by 5 volts.

(4) Erase twice, wait 10 seconds, then write again and check for breaks or gaps.

(5) Repeat this procedure, decreasing the operating voltage in 5-volt increments until breaks or gaps of about 0.025-inch occur. This is the writing threshold. Note the voltage and rotate the Store Level control clockwise until the original level, noted in part a, is reached.

NOTE

Do not change the INTENSITY or FOCUS control settings.

c. Locate the Upper Writing Limit (maximum store level) as follows:

(1) Again write about 3 lines per division. Carefully check the stored lines and background for trace spreading or background fadeup. If no trace spreading or fadeup is evident after 10 seconds, adjust R1250, Store Level, to increase the operating level by 5 volts.

(2) Erase twice, wait 10 seconds, then write again and check for spreading or fadeup.

(3) Repeat this procedure until spreading of about 0.025-inch, or background fadeup occurs. This is the Upper Writing Limit. Note the voltage.

d. ADJUST—R1350 for an operating point midway between the upper writing limit and writing threshold.

e. INTERACTION—Collimation and gain are affected if the change in operating level is significant.

STORE BALANCE

a. Move the positive DC voltmeter lead from TP1 to the Store Bal Test Point, TP4.

b. ADJUST—R1370, Store Bal, to set the store level to the same voltage level as that recorded at TP1.

COLLIMATION

a. Move the positive DC voltmeter lead from TP4 to the CE1 test point, TP3.

b. Write the entire screen by slowly positioning the trace vertically. If the screen fails to write, adjust the INTENSITY control slightly clockwise and repeat the process until the screen is fully written. Then turn the INTENSITY control fully counterclockwise.

c. Record the voltage at TP3.

d. With the screen fully written, turn R1390, CE1, fully counterclockwise, noting that the bright area is pulled in.

e. ADJUST—CE1 slowly clockwise until the bright area is pulled in from the top and bottom graticule lines by one-half major division at the top (see Fig. 5-14).

f. Erase the screen and disconnect the DC voltmeter.

g. INTERACTION—Display geometry (step 7) and storage capability (step 8) should be rechecked if a significant change was made in the collimation voltage.

NON STORE

a. Fully write the entire screen by slowly positioning the trace vertically.

b. ADJUST—R1395, Non Store, so that the screen erases in approximately 1 second when placed in the non-store mode (STORE buttons out). Repeat the step as necessary to achieve correct adjustment of R1395.

9. Adjust Vertical Gain

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	8 k
COLLECTOR SUPPLY POLARITY	+DC
VARIABLE COLLECTOR %	0
STEP/OFFSET AMPL	0.5 μA

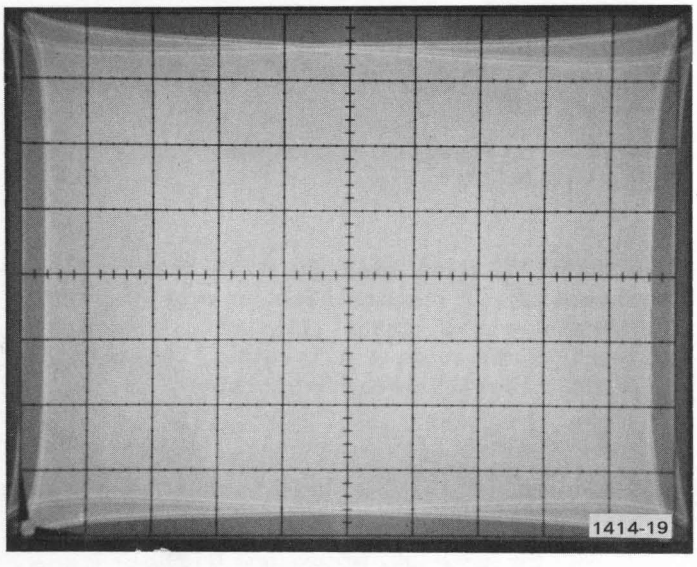


Fig. 5-14. Illustration of Collimation adjustment.

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
STEP/OFF POLARITY NORM	out
OFFSET ZERO	out
AID (light gray button)	in
DISPLAY FILTER NORM	out
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horizontal POSITION	centered
VERTICAL CURRENT/DIV	50 nA
LEFT-RIGHT	Off (center)

b. Connect a patch cord from the base (B) to the collector (C), right side jacks on the 177. Connect the DVM between pin 4 of P129 (see Fig. 7-5) and the white-green wire on the back of the MAX PEAK VOLTS switch.

CAUTION

If the VARIABLE COLLECTOR % control is not at zero, lethal voltages may be present on the MAX PEAK VOLTS switch.

c. Position the spot to the bottom-center graticule. Set the LEFT-RIGHT switch to RIGHT and adjust the OFFSET MULT control for a DVM reading of 4.00 volts.

d. ADJUST—R1116, Vertical Gain (on the display unit), to move the spot one-half the remaining distance to the top graticule line.

e. Switch the LEFT-RIGHT switch to center. Vertically reposition the spot to the bottom graticule line. Set the LEFT-RIGHT switch to RIGHT and repeat parts d and e.

10. Adjust Horizontal Amplifier Balance

a. Set the controls as follows:

MAX PEAK VOLTS	25
SERIES RESISTORS	30 k
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	
SINGLE	press
STEP RATE	SLOW
HORIZ VOLTS/DIV	200 V, COLLECTOR
VERTICAL CURRENT/DIV	2 A
Vertical POSITION	centered
Horizontal POSITION	centered
LEFT-RIGHT	RIGHT

b. Patch the base (B) and collector (C) to the emitter (E) of the right-hand set of jacks on the 177.

c. Position the spot to graticule center, using the Horizontal POSITION control.

d. Pull the Horizontal POSITION control to the out position.

e. Reposition the spot to about graticule center, using the Horizontal POSITION control.

f. Set the HORIZ VOLTS/DIV switch to 2 V, COLLECTOR.

g. If the spot shifts: ADJUST—R530, Horiz Amp Bal, to minimize spot shift while switching HORIZ VOLTS/DIV from 20 V, COLLECTOR through 2 V, COLLECTOR. See Fig. 7-6 for control location.

h. Check all other HORIZ VOLTS/DIV, COLLECTOR, positions for not more than 0.5 major division of horizontal shift from the graticule centerline.

i. Push the Horizontal POSITION control to the in position (magnifier off). Remove the patch cord to the emitter, but leave the one between base and collector.

11. Adjust Horizontal Amplifier Gain

a. Set the controls as follows:

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
AID (light gray button)	in
VERTICAL CURRENT/DIV	2 A
HORIZ VOLTS/DIV	50 mV, BASE
STEP/OFFSET AMPL	.1 VOLT
COLLECTOR SUPPY	
POLARITY	AC
LEFT-RIGHT	RIGHT

b. Connect the DVM between the emitter (E) and base (B) jacks, right side on the 177 Test Fixture.

c. Adjust the OFFSET MULT dial to 0.00. Position the spot to left-center graticule. Note the DVM reading.

d. Adjust the OFFSET MULT for 0.500 volt greater than the DVM reading in part c, and check the spot position. The spot should be within ±0.05 division of the right (10th) graticule line.

e. ADJUST—R1136, Horiz Gain Adj (see Fig. 7-15 or 7-17 for location), if the spot is not at the 10th graticule line. Adjust R1136 to bring the spot one-half the distance to the 10th graticule line and repeat parts c through e until the spot is at the 10th line at part d.

12. ADJUST Sensitivity Correction (D1 Only)

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	+

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
HORIZ VOLTS/DIV	1 V, COLLECTOR
VERTICAL CURRENT/DIV	5 mA

b. Vertically and horizontally position the spot to the lower-left corner of the graticule.

c. Push both STORE buttons and both Erase Selector buttons in.

d. Push the ERASE button to erase the screen.

e. Set INTENSITY and FOCUS controls for a small, focused spot.

f. ADJUST—R1385, Sens Corr, for minimum spot shift while switching from store to non store (press and release the UPPER and LOWER STORE buttons).

13. Adjust Horizontal Compensaton (do not adjust unless out of tolerance)

a. Connect a 1 MΩ resistor (using clip leads) between the right end of C306 and any terminal of R455, Amp Bal. See Fig. 7-6.

b. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	8 k
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC

All Dark Gray Buttons and Knobs in except:

STEP RATE	SLOW and FAST
STEP/OFFSET AMPL	2 VOLTS
NUMBER OF STEPS	10
OFFSET MULT	0.00
PULSED, 300 μs	in
Horizontal POSITION	centered
Vertical POSITION	centered
HORIZ VOLTS/DIV	50 V, COLLECTOR
VERTICAL CURRENT/DIV	2 A
LOOPING COMPENSATION	as is
Terminal Selector	EMITTER GROUNDED BASE TERM, STEP GEN
LEFT-RIGHT	Off

For D1 Only

BRIGHTNESS	ccw
VARIABLE COLLECTOR %	cw just far enough to brighten the trace. Adjust INTENSITY as required

c. Short circuit B to C, right side.

d. Switch LEFT-RIGHT to RIGHT.

e. Reset INTENSITY as necessary to obtain two spots.

f. Pull X10 HORIZ MAG.

g. Horizontally position both spots on screen.

h. Decrease INTENSITY until the left spot disappears.

i. ADJUST—Position the yellow wire, C503 (see Fig. 7-6) for the smallest spot size.

j. Reset STEP/OFFSET AMPL to .2 V and HORIZ VOLTS/DIV to 50 mV.

k. Horizontally position the spot back on screen.

l. ADJUST—C511 (see Fig. 7-6) for least slash, using an insulated adjusting tool. Turn up INTENSITY as necessary to see the slash.

m. Reset HORIZ VOLTS/DIV to .5 V, COLLECTOR, and STEP/OFFSET AMPL to 2 V.

n. CHECK—Slash should be less than 1 major division (compromise the preceding adjustment, if necessary).

o. Reset HORIZ VOLTS/DIV to 20 mV, COLLECTOR, and STEP/OFFSET AMPL to .1 V.

p. Horizontally position the spot back on screen.

q. CHECK—Slash should be less than 1 major division (compromise the preceding adjustments, if necessary).

r. Shut off the ac power and remove the 1 MΩ resistor and clip leads.

14. Adjust Step Generator Polarity Balance, Pulse Zero, and Step Zero (see Fig. 7-6 for location of controls and for remainder of tests)

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC
All Dark Gray Buttons and Knobs	in

PULSED, 300 μs	in
NUMBER OF STEPS	ccw
STEP/OFFSET AMPL	2 V
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horizontal POSITION	centered
Vertical POSITION	centered
VERTICAL CURRENT/DIV	20 mA
LEFT-RIGHT	Off
BRIGHTNESS (D1)	clockwise

b. Horizontally position the spot to graticule center.

c. Pull the X10 HORIZ MAG and horizontally and vertically reposition the spot to about graticule center.

d. Switch the HORIZ VOLTS/DIV switch to STEP GEN X10 and observe that one of the two spots displayed (two spots are displayed only if the circuit is out of calibration. One spot is much brighter than the other). If the spot is small and well-defined with normal viewing intensity, omit the Polarity Bal (R365), Pulse Zero (R355), and Step Zero (R300) adjustments and proceed to part i.

If two spots are displayed, increase the INTENSITY to determine which spot is the brighter.

e. ADJUST—R365, Polarity Bal, for equal deflection of the brighter spot from the graticule center line while pressing the STEP/OFFSET POLARITY button alternately to the in and out positions.

f. ADJUST—R355, Pulse Zero, to position the brighter spot to graticule center.

g. READJUST—R365, if necessary, and then repeat part f.

h. ADJUST—R300, Step Zero, to position the dim spot to graticule center.

i. Press STEP/OFFSET POLARITY NORM button in and set the HORIZ VOLTS/DIV to .2 V, BASE.

j. ADJUST—R455, Amp Bal, to center the spot horizontally. Set HORIZ VOLTS/DIV to 5 mV, BASE.

k. READJUST—R455 to center the spot horizontally.

15. Adjust Polarity Positioning

a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
PULSED, 300 μs	out
NUMBER OF STEPS	ccw
STEP/OFFSET AMPL	1 VOLT
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horizontal POSITION	centered
Vertical POSITION	centered
VERTICAL CURRENT/DIV	2 A

b. Horizontally and vertically position the spot to graticule center.

c. Switch the COLLECTOR SUPPLY POLARITY to +.

d. ADJUST—R528, Horiz Pos Adj, and R570, Vert Pos Adj, to position the spot to the lower-left corner of the graticule.

e. Switch the COLLECTOR SUPPLY POLARITY to —. The spot should shift to the upper-right corner of the graticule, within ±0.1 division.

f. Switch the DISPLAY INVERT NORM button to release the button to the out position. The spot should shift to the lower-left graticule corner, within ±0.1 division.

16. Adjust Step and Offset Amplitude

a. Set the controls as follows:

COLLECTOR SUPPLY POLARITY	AC
HORIZ VOLTS/DIV	1 V, BASE
Horizontal POSITION	centered
Vertical POSITION	centered

All Dark Gray Buttons and Knobs in except:

STEP RATE	FAST
STEP/OFFSET AMPL	1 V
NUMBER OF STEPS	10

b. Observe a series of spots displayed horizontally. Position the first spot to the left graticule line.

c. ADJUST—R278, X1 Step Amplitude, for approximately one spot per major division.

d. Reset the controls as follows:

STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
OFFSET MULT	10.00
COLLECTOR SUPPLY	
POLARITY	+

Remove Shorting Strap from C to B

e. Connect the DVM between B and E on the 177 Test Fixture, right side. Switch the LEFT-RIGHT switch to RIGHT.

f. ADJUST—R352, Offset Amplitude, for +10.00 volts, ±3 mV on the DVM.

g. Push the OFFSET AID button to release the button to the out position.

h. Check for −10.00 volts, ±50 mV, on the DVM. If out of specs, check that the + and − supplies are within 1/2% of each other.

i. Push the AID button to the in position.

j. Pull the X10 HORIZ MAG and position the spot to graticule center, or note the spot postion.

k. Push the OFFSET ZERO button in and the STEP FAMILY REP button in.

l. READJUST—R278 to position the spot to graticule center, or to the position noted in part j.

m. Reset the following controls:

STEP X.1	out
X10 HORIZ MAG	in
HORIZ VOLTS/DIV	.1V, BASE
COLLECTOR SUPPLY	
POLARITY	AC
OFFSET MULT	1.00
STEP FAMILY	
REP	in

n. Observe a series of spots displayed horizontally. Position the first spot to the left graticule line.

o. ADJUST—R281, X.1 Step Amplitude, for approximately one spot per graticule division.

p. Reset the controls as follows:

STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
COLLECTOR SUPPLY	
POLARITY	+

q. Adjust OFFSET MULT for a DVM reading of 1.00 volts, ±1 mV.

r. Pull the X10 HORIZ MAG and horizontally position the spot to graticule center, or note the spot position.

s. Push the OFFSET ZERO button in and the STEP FAMILY REP in.

t. READJUST—R281, to position the spot to graticule center, or to the position noted in part r.

17. Adjust Step Generator Output Z

a. Set the controls as follows:

All Dark Gray Buttons and Knobs in except:

X10 VERT MAG	out
VERTICAL CURRENT/DIV	50 μA
Vertical POSITION	centered
NUMBER OF STEPS	≈ 4
STEP/OFFSET AMPL	50 μA
VARIABLE COLLECTOR %	0
HORIZ VOLTS/DIV	200 V, COLLECTOR

b. Connect a 1 kΩ resistor between B and C terminals, left side.

c. Connect a 15 kΩ resistor between B and C terminals, right side. Switch LEFT-RIGHT to LEFT.

d. Adjust NUMBER OF STEPS for five displayed spots. Note the vertical position of the fifth spot.

e. Switch the LEFT-RIGHT switch alternately between LEFT and RIGHT.

f. ADJUST—R456, Output Z, for no spot shift (fifth spot) while switching between the 1 kΩ and 15 kΩ resistors.

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 Code
00213	NYTRONICS COMPONENTS GROUP INC SUBSIDIARY OF NYTRONICS INC	ORANGE ST	DARLINGTON SC 29532
00853	SANGAMO WESTON INC COMPONENTS DIV	SANGAMO RD PO BOX 128	PICKENS SC 29671-9716
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXP PO BOX 655012	DALLAS TX 75265
01963	CHERRY ELECTRICAL PRODUCTS CORP	3600 SUNSET AVE	WAUKEGAN IL 60087-3214
02111	HAMILTON STANDARD CONTROLS INC SPECTROL DIV	17070 E GALE AVE P O BOX 1220	CITY OF INDUSTRY CA 91749
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
04099	CAPCO INC	1328 WINTERS AVE PO BOX 1028	GRAND JUNCTION CO 81502
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
05347	ULTRONIX INC	461 N 22ND ST PO BOX 1090	GRAND JUNCTION CO 81502
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
05828	GENERAL INSTRUMENT CORP GOVERNMENT SYSTEMS DIV	600 W JOHN ST	HICKSVILLE NY 11802
06402	E-T-A CIRCUIT BREAKERS	7400 N CRONAME RD	CHICAGO IL 60648-3902
07263	FAIRCHILD SEMICONDUCTOR CORP NORTH AMERICAN SALES SUB OF SCHLUMBERGER LTD MS 118	10400 RIDGEVIEW CT	CUPERTINO CA 95014
07716	TRW INC TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08116	BOURNS INSTRUMENTS INC MAGNETICS DIV	28151 HWY 74 P O BOX 1398	ROMOLAND CA 92380
08806	GENERAL ELECTRIC CO MINIATURE LAMP PRODUCTS DEPT	NELA PK	CLEVELAND OH 44112
09353	C AND K COMPONENTS INC	15 RIVERDALE AVE	NEWTON MA 02158-1057
10582	CTS OF ASHEVILLE INC	MILLS GAP ROAD	SKYLAND NC 28776
12697	CLAROSTAT MFG CO INC	LOWER WASHINGTON ST	DOVER NH 03820
12954	MICROSEMI CORP - SCOTTSDALE	8700 E THOMAS RD P O BOX 1390	SCOTTSDALE AZ 85252
12969	UNITRODE CORP	5 FORBES RD	LEXINGTON MA 02173-7305
14099	SEMTECH CORP	652 MITCHELL ROAD	NEWBURY PARK CA 91320-2211
14193	CAL-R INC	1601 OLYMPIC BLVD PO BOX 1397	SANTA MONICA CA 90406
14552	MICROSEMI CROP	2830 S FAIRVIEW ST	SANTA ANA CA 92704-5948
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776-3825
14936	GENERAL INSTRUMENT CORP DISCRETE SEMI CONDUCTOR DIV	600 W JOHN ST	HICKSVILLE NY 11802
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
19396	ILLINOIS TOOL WORKS INC PAKTRON DIVISION	1205 MCCONVILLE RD PO BOX 4539	LYNCHBURG VA 24502-4535
19701	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067-0760
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
29604	STACKPOLE COMPONENTS CO SUB OF THE STACKPOLE CORP	PO BOX 14466	RALEIGH NC 27610
31433	UNION CARBIDE CORP ELECTRONICS DIV	HWY 276 SE PO BOX 5928	GREENVILLE SC 29606
31918	ITT SCHADOW INC	8081 WALLACE RD	EDEN PRAIRIE MN 55344-2224
32293	INTERSIL INC SUB OF GENERAL ELECTRIC CO	10600 RIDGEVIEW COURT	CUPERTINO CA 95014-0704
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
51406	MURATA ERIE NORTH AMERICA INC GEORGIA OPERATIONS	2200 LAKE PARK DRIVE	SMYRNA GA 30080
51642	CENTRE ENGINEERING INC	2820 E COLLEGE AVE	STATE COLLEGE PA 16801-7515
52763	STETTNER ELECTRONICS INC	6135 AIRWAYS BLVD PO BOX 21947	CHATTANOOGA TN 37421-2970
54583	TDK ELECTRONICS CORP	12 HARBOR PARK DR	PORT WASHINGTON NY 11550
54937	DEYOUNG MANUFACTURING INC	12920 NE 125TH WAY	KIRKLAND WA 98034-7716
55292	WILBRECHT ELECTRONICS INC LEDCO DIV	240 E PLATO BLVD	ST PAUL MN 55107-1609
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929
56699	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO	6071 ST ANDREWS RD	COLUMBIA SC 29210-3319
57668	R-OHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
58224	XENELL CORP	11 DUNBARTON RD PO BOX 4401	CHERRY HILL NJ 08003-2107
58756	CTS CORP	1142 W BEARDSLEY AVE	ELKHART IN 46514-2224
59660	TUSONIX INC	7741 N BUSINESS PARK DR PO BOX 37144	TUCSON AZ 85740-7144
59821	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO	7158 MERCHANT AVE	EL PASO TX 79915-1207
60705	CERA-MITE CORPORATION	1327 6TH AVE	GRAFTON WI 53024-1831
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
71450	CTS CORP	905 N WEST BLVD	ELKHART IN 46514-1875
71590	MEPCO/CENTRALAB INC A NORTH AMERICAN PHILIPS CO	HWY 20 W P O BOX 858	FORT DODGE IA 50501
73803	TEXAS INSTRUMENTS INC METALLURGICAL MATERIALS DIVISION	34 FOREST ST	ATTLEBORO MA 02703-2454
74970	JOHNSON E F CO	299 10TH AVE S W	WASECA MN 56093-2539
75042	TRW INC TRW ELECTRONIC COMPONENTS IRC FIXED RESISTORS PHILADELPHIA DIV	401 N BROAD ST	PHILADELPHIA PA 19108-1001
76854	OAK SWITCH SYSTEMS INC SUB OF OAK TECHNOLOGY INC	100 S MAIN ST PO BOX 517	CRYSTAL LAKE IL 60014-6201
77342	AMF INC POTTER AND BRUMFIELD DIV	200 RICHLAND CREEK DR	PRINCETON IN 47670-4771
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500 MS 53-111	BEAVERTON OR 97707-0001
81073	GRAYHILL INC	561 HILLGROVE AVE PO BOX 10373	LA GRANGE IL 60525-5914
82389	SWITCHCRAFT INC SUB OF RAYTHEON CO	5555 N ELSTRON AVE	CHICAGO IL 60630-1314
83003	VARO INC	2203 WALNUT ST PO BOX 401426	GARLAND TX 75042
83008	STACO ENERGY PRODUCTS CO	301 GADDIS BLVD	DAYTON OH 45403-1314
90484	SURPRENANT WIRE AND CABLE DIV OF FL INDUSTRIES INC	172 STERLING ST	CLINTON MA 01510
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632
95238	CONTINENTAL CONNECTOR CORP	34-63 56TH ST	WOODSIDE NY 11377-2121
TK0191	SONY TEKTRONIX	PO BOX 14 HANEDA AIRPORT	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK2038	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A1	670-2428-00	B010100	B049999	CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-00
A1	670-2428-02	B050000	B059999	CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-02
A1	670-2428-03	B060000	B082439	CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-03
A1	670-2428-04	B082440	B089999	CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-04
A1	670-2428-05	B090000	B107532	CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-05
A1	670-2428-06	B107533		CIRCUIT BD ASSY:MAIN (D1 ONLY)	80009	670-2428-06
A1	670-2428-00	B010100	B049999	CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-00
A1	670-2428-02	B050000	B059999	CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-02
A1	670-2428-03	B060000	B082449	CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-03
A1	670-2428-04	B082450	B089999	CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-04
A1	670-2428-05	B090000	B107451	CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-05
A1	670-2428-06	B107452		CIRCUIT BD ASSY:MAIN (D2 ONLY)	80009	670-2428-06
A2	670-2426-00	B010100	B059999	CIRCUIT BD ASSY:COLLECTOR SWEEP	80009	670-2426-00
A2	670-2426-01	B060000	B099999	CIRCUIT BD ASSY:COLLECTOR SWEEP	80009	670-2426-01
A2	670-2426-02	B100000		CIRCUIT BD ASSY:COLLECTOR SWEEP	80009	670-2426-02
A3	670-2427-00	B010100	B049999	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-2427-00
A3	670-2427-02	B050000	B099999	CIRCUIT BD ASSY:POWER SUPPLY	80009	670-2427-02
A3	670-2427-04	B100000		CIRCUIT BD ASSY:POWER SUPPLY	80009	670-2427-04
C101	285-0925-00			CAP,FXD,PLASTIC:3.3UF,10%,200V	14752	YK230B1C335K
C121	285-1036-00			CAP,FXD,PLASTIC:0.2UF,20%,2000V	04099	TEK-18
C124	290-0647-00			CAP,FXD,ELCTLT:10UF,+50-10%,475V	56289	43D100F475GJ4
C126	290-0334-00			CAP,FXD,ELCTLT:1250UF,+75-10%,50V	56289	53D282
C201	283-0134-00	B010100	B107004	CAP,FXD,CER DI:0.47UF,80-20%,50V (D1 ONLY)	05397	C330C474Z5U1CA
C201	283-0203-00	B107005		CAP,FXD,CER DI:0.47UF,20%,50V (D1 ONLY)	04222	SR305SC474MAA
C201	283-0134-00	B010100	B107024	CAP,FXD,CER DI:0.47UF,80-20%,50V (D2 ONLY)	05397	C330C474Z5U1CA
C201	283-0203-00	B107025		CAP,FXD,CER DI:0.47UF,20%,50V (D2 ONLY)	04222	SR305SC474MAA
C206	283-0198-00			CAP,FXD,CER DI:0.22UF,20%,50V	05397	C330C224M5U1CA
C215	290-0534-00	B010100	B082439	CAP,FXD,ELCTLT:1UF,20%,35V (D1 ONLY)	05397	T368A105M035AZ
C215	290-0283-00	B082440		CAP,FXD,ELCTLT:0.47UF,10%,35V (D1 ONLY)	05397	T320A474K035AS
C215	290-0534-00	B010100	B082449	CAP,FXD,ELCTLT:1UF,20%,35V (D2 ONLY)	05397	T368A105M035AZ
C215	290-0283-00	B082450		CAP,FXD,ELCTLT:0.47UF,10%,35V (D2 ONLY)	05397	T320A474K035AS
C218	290-0534-00	B010100	B082439	CAP,FXD,ELCTLT:1UF,20%,35V (D1 ONLY)	05397	T368A105M035AZ
C218	290-0283-00	B082440		CAP,FXD,ELCTLT:0.47UF,10%,35V (D1 ONLY)	05397	T320A474K035AS
C218	290-0534-00	B010100	B082449	CAP,FXD,ELCTLT:1UF,20%,35V (D2 ONLY)	05397	T368A105M035AZ
C218	290-0283-00	B082450		CAP,FXD,ELCTLT:0.47UF,10%,35V (D2 ONLY)	05397	T320A474K035AS
C223	283-0068-00	B010100	B010209	CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C223	283-0002-00	B010210		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C226	283-0068-00	B010100	B010209	CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C226	283-0002-00	B010210		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C231	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
C242	285-0703-00			CAP,FXD,PLASTIC:0.1UF,5%,100V	19396	104J01PT605
C264	283-0002-00	B060000		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C265	290-0534-00	B010100	B082439	CAP,FXD,ELCTLT:1UF,20%,35V (D1 ONLY)	05397	T368A105M035AZ
C265	290-0580-00	B082440		CAP,FXD,ELCTLT:0.27UF,20%,50V (D1 ONLY)	05397	T368A274M050AZ
C265	290-0534-00	B010100	B082449	CAP,FXD,ELCTLT:1UF,20%,35V (D2 ONLY)	05397	T368A105M035AZ
C265	290-0580-00	B082450		CAP,FXD,ELCTLT:0.27UF,20%,50V (D2 ONLY)	05397	T368A274M050AZ
C268	290-0534-00	B010100	B042439	CAP,FXD,ELCTLT:1UF,20%,35V (D1 ONLY)	05397	T368A105M035AZ
C268	290-0580-00	B082440		CAP,FXD,ELCTLT:0.27UF,20%,50V (D1 ONLY)	05397	T368A274M050AZ
C268	290-0534-00	B010100	B082449	CAP,FXD,ELCTLT:1UF,20%,35V (D2 ONLY)	05397	T368A105M035AZ
C268	290-0580-00	B082450		CAP,FXD,ELCTLT:0.27UF,20%,50V (D2 ONLY)	05397	T368A274M050AZ
C270	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C273	283-0023-00	B010100	B082439	CAP,FXD,CER DI:0.1UF,+80-20%,12V (D1 ONLY)	71590	2DDU66B104Z
C273	283-0111-00	B082440		CAP,FXD,CER DI:0.1UF,20%,50V (D1 ONLY)	05397	C330C104M5U1CA
C273	283-0023-00	B010100	B082449	CAP,FXD,CER DI:0.1UF,+80-20%,12V (D2 ONLY)	71590	2DDU66B104Z
C273	283-0111-00	B082450		CAP,FXD,CER DI:0.1UF,20%,50V (D2 ONLY)	05397	C330C104M5U1CA
C274	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C276	283-0041-00			CAP,FXD,CER DI:0.0033UF,5%,500V	59660	841-542B332J
C279	285-0703-00			CAP,FXD,PLASTIC:0.1UF,5%,100V	19396	104J01PT605
C280	285-0719-00			CAP,FXD,PLASTIC:0.015UF,5%,100V	19396	DU490/74-28226
C291	283-0068-00	B010100	B010209	CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C291	283-0002-00	B010210		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C293	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C295	290-0527-00			CAP,FXD,ELCTLT:15UF,20%,20V	05397	T368B156M020AS
C297	290-0527-00			CAP,FXD,ELCTLT:15UF,20%,20V	05397	T368B156M020AS
C299	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C306	285-0576-00			CAP,FXD,PLASTIC:1UF,10%,100V	56289	430P105X91
C321	283-0002-00	B060000		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C322	283-0003-00	B010100	B010209	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C322	283-0002-00	B010210		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C380	281-0543-00			CAP,FXD,CER DI:270PF,10%,500V	52763	2RDPLZ007 27POMO
C382	283-0002-00	B060000		CAP,FXD,CER DI:0.01UF,+80-20%,500V	59821	D103Z40Z5ULADEG
C383	283-0065-00	B082440		CAP,FXD,CER DI:0.001UF,5%,50V (D1 ONLY)	59660	0835-591Y5E0102J
C383	283-0065-00	B082450		CAP,FXD,CER DI:0.001UF,5%,50V (D2 ONLY)	59660	0835-591Y5E0102J
C384	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-610-Y5U0102P
C386	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-610-Y5U0102P
C391	290-0410-00			CAP,FXD,ELCTLT:15UF,+50-10%,100V	00853	556DD150T100B
C393	290-0410-00			CAP,FXD,ELCTLT:15UF,+50-10%,100V	00853	556DD150T100B
C396	283-0116-00			CAP,FXD,CER DI:820PF,5%,500V	59660	0801547Y5D0821J
C503	175-0503-00			WIRE,ELECTRICAL:SOLID,18 AWG,600V RMS,YEL, PVC	90484	ORDER BY DESCR
C505	281-0564-00			CAP,FXD,CER DI:24PF,5%,500V	52763	2RDPLZ007 24POJC
C507	281-0638-00			CAP,FXD,CER DI:240PF,5%,500V	52763	2RDPLZ007 240PMO
C509	283-0119-00			CAP,FXD,CER DI:2200PF,5%,200V	59660	855-XXXY5E0222J
C511	281-0168-00			CAP,VAR,AIR DI:1.3-5.4PF,250V	74970	187-0103-005
C513	281-0638-00	B010100	B082439	CAP,FXD,CER DI:240PF,5%,500V	52763	2RDPLZ007 240PMO

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(D1 ONLY)		
C513	281-0638-00	B082440		CAP,FXD,CER DI:240PF,5%,500V	52763	2RDPLZ007 240PMO
				(D1 ONLY. NOMINAL VALUE,SELECTED)		
C513	281-0638-00	B010100	B082449	CAP,FXD,CER DI:240PF,5%,500V	52763	2RDPLZ007 240PMO
				(D2 ONLY)		
C513	281-0638-00	B082450		CAP,FXD,CER DI:240PF,5%,500V	52763	2RDPLZ007 240PMO
				(D2 ONLY. NOMINAL VALUE,SELECTED)		
C530	281-0605-00			CAP,FXD,CER DI:200PF,10%,500V	59660	301000Y5D201K
C537	281-0576-00			CAP,FXD,CER DI:11PF,5%,500V	52763	2RDPLZ007 MPOJC
C540	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C541	283-0035-00			CAP,FXD,CER DI:1500PF,+80-20%,500V	60705	562CBA501EJ152ZA
C544	283-0103-00			CAP,FXD,CER DI:180PF,5%,500V	59821	2DDH73L181J
C545	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C546	283-0103-00			CAP,FXD,CER DI:180PF,5%,500V	59821	2DDH73L181J
C547	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C548	283-0068-00			CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C549	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C550	283-0110-00			CAP,FXD,CER DI:0.005UF,+80-20%,150V	59660	855-547-E-502Z
C551	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C558	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C562	283-0076-00			CAP,FXD,CER DI:27PF,10%,500V	59660	831-500S2L270K
C564	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-610-Y5U0102P
C565	283-0110-00			CAP,FXD,CER DI:0.005UF,+80-20%,150V	59660	855-547-E-502Z
C567	281-0509-00			CAP,FXD,CER DI:15PF,+/-1.5PF,500V	59660	301-000C0G0-150K
C568	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C569	290-0525-00			CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T368B475M050AS
C570	281-0605-00			CAP,FXD,CER DI:200PF,10%,500V	59660	301000Y5D201K
C577	281-0576-00			CAP,FXD,CER DI:11PF,5%,500V	52763	2RDPLZ007 MPOJC
C581	290-0325-00			CAP,FXD,ELCTLT:330UF,+75-10%,50V	56289	601D337G050FL4
C586	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C587	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C591	290-0517-00			CAP,FXD,ELCTLT:6.8UF,20%,35V	05397	T368B685M035AZ
C596	290-0517-00			CAP,FXD,ELCTLT:6.8UF,20%,35V	05397	T368B685M035AZ
C711	290-0325-00			CAP,FXD,ELCTLT:330UF,+75-10%,50V	56289	601D337G050FL4
C716	290-0506-00			CAP,FXD,ELCTLT:9600UF,+100-10%,30V	56289	68D10471
C721	290-0437-00			CAP,FXD,ELCTLT:3500UF,+100-10%,25V	56289	68D10468
C724	283-0068-00	B050000		CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C731	290-0437-00			CAP,FXD,ELCTLT:3500UF,+100-10%,25V	56289	68D10468
C733	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-610-Y5U0102P
C744	290-0587-00			CAP,FXD,ELCTLT:170UF,+50-10%,275V	56289	68D10496
C751	290-0334-00			CAP,FXD,ELCTLT:1250UF,+75-10%,50V	56289	53D282
C757	281-0550-00	B010100	B049999	CAP,FXD,CER DI:120PF,10%,500V	52763	2RDPLZ007 120PMO
C757	281-0543-00	B050000		CAP,FXD,CER DI:270PF,10%,500V	52763	2RDPLZ007 27POMO
C763	283-0068-00			CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C767	290-0517-00			CAP,FXD,ELCTLT:6.8UF,20%,35V	05397	T368B685M035AZ
C771	290-0334-00			CAP,FXD,ELCTLT:1250UF,+75-10%,50V	56289	53D282
C772	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
C773	281-0572-00	B010100	B049999	CAP,FXD,CER DI:6.8PF,0.5%,500V	52763	2RDPLZ007 6P80DC
C775	283-0068-00			CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C781	290-0517-00			CAP,FXD,ELCTLT:6.8UF,20%,35V	05397	T368B685M035AZ
C788	281-0543-00	B010100	B049999	CAP,FXD,CER DI:270PF,10%,500V	52763	2RDPLZ007 27POMO
C788	281-0623-00	B050000		CAP,FXD,CER DI:650PF,5%,500V	52763	2RDPLZ007 650PMO
CR103	152-0385-00			SEMICOND DVC,DI:RECT,SI,2000V,0.1A,	14099	M20
CR104	152-0385-00			SEMICOND DVC,DI:RECT,SI,2000V,0.1A,	14099	M20
CR105	152-0385-00			SEMICOND DVC,DI:RECT,SI,2000V,0.1A,	14099	M20
CR106	152-0385-00			SEMICOND DVC,DI:RECT,SI,2000V,0.1A,	14099	M20
CR107	152-0557-00			SEMICOND DVC,DI:RECT,SI,200V,12A	04713	SDA10266
CR115	152-0141-02	B060000		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
CR125	152-0141-02	B060000		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR209	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR221	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR230	152-0141-02	B050000		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR234	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR241	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR259	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR277	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR321	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR322	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR326	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR330	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR384	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
CR386	152-0198-00			SEMICOND DVC,DI:RECT,SI,200V,3A,A249	03508	1N5624
CR391	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR393	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR429	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR436	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR438	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR439	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR440	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR441	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR452	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR512	152-0324-00			SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR513	152-0324-00			SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR538	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR540	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR551	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR552	152-0141-02	B010100	B029999	SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR553	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR554	152-0141-02	B010100	B029999	SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR555	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR556	152-0141-02	B010100	B029999	SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR557	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR558	152-0141-02	B010100	B029999	SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR561	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR562	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR563	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR564	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR568	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR569	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR582	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
CR584	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR586	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR591	152-0107-00			SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR711	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
CR712	152-0423-00			SEMICOND DVC,DI:RECT,SI,400V,3A,M176A	04713	1N5000
CR716	152-0462-00			SEMICOND DVC,DI:RECT,SI,200V,2.5A	14936	KBU4D
CR721	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
CR722	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR724	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR731	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
CR732	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR741	152-0107-00			SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR742	152-0107-00			SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR743	152-0107-00			SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR744	152-0107-00			SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR751	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
CR754	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR755	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR767	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR773	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR781	152-0066-00			SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR785	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
DS125	150-0133-01			LAMP,CARTRIDGE:14V,0.08A,YELLOW LENS	55292	70106-01
DS310	150-0048-00	B010100	B069999	LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
DS311	150-0048-00			LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
DS535	150-0048-00			LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
DS536	150-0048-00	B010100	B069999	LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
F391	159-0114-00	B050000		FUSE,CARTRIDGE:1A,125A,AXIAL LEADS	71400	GFA 1
F711	159-0053-00	B050000		FUSE,CARTRIDGE:1AG,5A,32V,0.6SEC.	71400	GKN-5
F714	159-0053-00			FUSE,CARTRIDGE:1AG,5A,32V,0.6SEC.	71400	GKN-5
F721	159-0053-00			FUSE,CARTRIDGE:1AG,5A,32V,0.6SEC.	71400	GKN-5
F731	159-0053-00			FUSE,CARTRIDGE:1AG,5A,32V,0.6SEC.	71400	GKN-5
F744	159-0028-00			FUSE,CARTRIDGE:0.25A,250V,FAST BLOW	71400	AGC-1/4
J110	131-1008-00			CONN,RCPT,ELEC:EDGECARD,24/48 CONT,0.156 SP	95238	60013PC24GD30NI
K115	148-0047-00			RELAY,ARMATURE:2 FORM C,5A,28VDC,COIL 12VDC 185 OHM	77342	R10-E0697-3
K125	148-0047-00			RELAY,ARMATURE:2 FORM C,5A,28VDC,COIL 12VDC 185 OHM	77342	R10-E0697-3
K436	148-0045-00			RELAY,ARMATURE:4 FORM C,5A,28VDC,COIL 12VDC 185 OHM	80009	148-0045-00
L101	108-0725-00			CHOKE,RF:FIXED,6MH	08116	IN-0006
L540	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L545	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L547	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L550	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L551	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L552	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L553	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L564	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
L579	108-0368-00			COIL,RF:FIXED,9.7UH	TK1345	108-0368-00
Q210	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q212	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q224	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q234	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q260	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q262	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q276	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q306	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q310	151-0302-00	B010100	B106839	TRANSISTOR:NPN,SI,TO-18 (D1 ONLY)	04713	ST899
Q310	151-0192-00	B106840		TRANSISTOR:NPN,SI,TO-92 (D1 ONLY)	04713	SPS8801
Q310	151-0302-00	B010100	B106859	TRANSISTOR:NPN,SI,TO-18 (D2 ONLY)	04713	ST899
Q310	151-0192-00	B106860		TRANSISTOR:NPN,SI,TO-92 (D2 ONLY)	04713	SPS8801
Q324	151-0190-01			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-01
Q330	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q384	151-0415-00	B010100	B082439	TRANSISTOR:NPN,SI,TO-127 (D1 ONLY)	04713	SJE419
Q384	151-0606-00	B082440		TRANSISTOR:DARLINGTON,NPN,SI,TO-218 (D1 ONLY)	80009	151-0606-00
Q384	151-0415-00	B010100	B082449	TRANSISTOR:NPN,SI,TO-127 (D2 ONLY)	04713	SJE419
Q384	151-0606-00	B082450		TRANSISTOR:DARLINGTON,NPN,SI,TO-218	80009	151-0606-00

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(D2 ONLY)		
Q386	151-0414-00	B010100	B082439	TRANSISTOR:PNP,SI,TO-127	04713	SJE484
				(D1 ONLY)		
Q386	151-0607-00	B082440		TRANSISTOR:DARLINGTON,PNP,SI,TO-218	04713	SJE376
				(D1 ONLY)		
Q386	151-0414-00	B010100	B082449	TRANSISTOR:PNP,SI,TO-127	04713	SJE484
				(D2 ONLY)		
Q386	151-0607-00	B082450		TRANSISTOR:DARLINGTON,PNP,SI,TO-218	04713	SJE376
				(D2 ONLY)		
Q436	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q440	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q450	151-1011-00	B010100	B039999	TRANSISTOR:FE,N CHAN,SI,DUAL,TO-71	04713	SFD1011
Q450	151-1081-00	B040000		TRANSISTOR:FET,N-CHAN,SI,TO-71	32293	ITS3231
Q514	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-71	80009	151-1054-00
Q544	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q546	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q552	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
Q554	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
Q556	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
Q558	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
Q586	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q588	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q594	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q754	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q760	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q766	151-0405-00			TRANSISTOR:DARLINGTON,NPN,SI,TO-126	80009	151-0405-00
Q772	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q786	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q788	151-0405-00			TRANSISTOR:DARLINGTON,NPN,SI,TO-126	80009	151-0405-00
R101	308-0568-00			RES,FXD,WW:35 OHM,5%,5W	00213	1550S-35-5
R111	306-0684-00			RES,FXD,CMPSN:680K OHM,10%,2W	01121	HG6841
R112	306-0684-00			RES,FXD,CMPSN:680K OHM,10%,2W	01121	HG6841
R114	305-0473-00			RES,FXD,CMPSN:47K OHM,5%,2W	01121	HB4735
R116	306-0471-00			RES,FXD,CMPSN:470 OHM,10%,2W	01121	HB4711
R121	306-0475-00			RES,FXD,CMPSN:4.7M OHM,10%,2W	01121	HB4751
R122	306-0475-00			RES,FXD,CMPSN:4.7M OHM,10%,2W	01121	HB4751
R124	306-0154-00			RES,FXD,CMPSN:150K OHM,10%,2W	01121	HB1541
R126	304-0152-00			RES,FXD,CMPSN:1.5K OHM,10%,1W	01121	GB1521
R128	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R129	306-0121-00			RES,FXD,CMPSN:120 OHM,10%,2W	01121	HB1211
R130	306-0121-00			RES,FXD,CMPSN:120 OHM,10%,2W	01121	HB1211
R131	308-0691-00			RES,FXD,WW:0.3 OHM,5%,25W	91637	HL2502Z6R3000J
R132	308-0745-00			RES,FXD,WW:1.4 OHM,5%,25W	12697	VP25K1.4 OHM 5%
R133	308-0219-00			RES,FXD,WW:6 OHM,5%,25W	91637	HL2502Z66R000J
R134	306-0820-00			RES,FXD,CMPSN:82 OHM,10%,2W	01121	HB8201
R135	308-0233-00			RES,FXD,WW:25 OHM,5%,25W	91637	HL2506Z14625R00J
R136	308-0744-00			RES,FXD,WW:90 OHM,5%,25W	91637	HL2502Z6-90R00J
R137	308-0416-00			RES,FXD,WW:380 OHM,5%,20W	91637	HL-25-02Z-6
R138	308-0040-00			RES,FXD,WW:1.5K OHM,5%,25W	91637	HL-25-06Z-14
R139	308-0034-00			RES,FXD,WW:6K OHM,5%,20W	91637	HL-25-02Z-6
R140	308-0743-00			RES,FXD,WW:22K OHM,5%,25W	91637	HL2502Z6A22K+-5%
R141	307-0402-00			RES,FXD,FILM:90K OHM,5%,10W	24546	FP105PERCENT90K
R142	305-0204-00			RES,FXD,CMPSN:200K OHM,5%,2W	01121	HB2045
R143	305-0204-00			RES,FXD,CMPSN:200K OHM,5%,2W	01121	HB2045
R144	306-0824-00			RES,FXD,CMPSN:820K OHM,10%,2W	01121	HB8241
R145	306-0824-00			RES,FXD,CMPSN:820K OHM,10%,2W	01121	HB8241
R146	305-0475-00			RES,FXD,CMPSN:4.7M OHM,5%,2W	01121	HB4755
R147	305-0475-00			RES,FXD,CMPSN:4.7M OHM,5%,2W	01121	HB4755
R149	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R201	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R202	315-0623-00			RES,FXD,FILM:62K OHM,5%,0.25W	19701	5043CX62K00J
R203	315-0275-00			RES,FXD,FILM:2.7M OHM,5%,0.25W	01121	CB2755
R204	315-0623-00			RES,FXD,FILM:62K OHM,5%,0.25W	19701	5043CX62K00J
R206	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R208	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R209	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R211	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R212	315-0561-00	B010100	B082439	RES,FXD,FILM:560 OHM,5%,0.25W (D1 ONLY)	19701	5043CX560R0J
R212	315-0681-00	B082440		RES,FXD,FILM:680 OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E680E
R212	315-0561-00	B010100	B082449	RES,FXD,FILM:560 OHM,5%,0.25W (D2 ONLY)	19701	5043CX560R0J
R212	315-0681-00	B082450		RES,FXD,FILM:680 OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E680E
R213	315-0561-00	B010100	B082439	RES,FXD,FILM:560 OHM,5%,0.25W (D1 ONLY)	19701	5043CX560R0J
R213	315-0681-00	B082440		RES,FXD,FILM:680 OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E680E
R213	315-0561-00	B010100	B082449	RES,FXD,FILM:560 OHM,5%,0.25W (D2 ONLY)	19701	5043CX560R0J
R213	315-0681-00	B082450		RES,FXD,FILM:680 OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E680E
R214	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R215	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R216	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R218	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R221	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R222	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R224	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R225	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R227	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R228	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R230	315-0103-00	B050000		RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R231	315-0432-00	B010100	B104939	RES,FXD,FILM:4.3K OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E04K3
R231	315-0472-00	B104940		RES,FXD,FILM:4.7K OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E04K7
R231	315-0432-00	B010100	B140919	RES,FXD,FILM:4.3K OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E04K3
R231	315-0472-00	B140920		RES,FXD,FILM:4.7K OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E04K7
R232	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R234	315-0274-00			RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R235	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
R237	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R241	315-0102-00	B010100	B049999	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R241	315-0242-00	B050000		RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R242	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R243	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R244	315-0473-00			RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R245	315-0473-00			RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R258	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
R259	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R261	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R262	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
R263	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
R264	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R265	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8

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R266	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R268	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R269	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R273	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R274	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R276	321-0267-00			RES,FXD,FILM:5.90K OHM,1%,0.125_,TC=T0	19701	5033ED5K900F
R277	321-0193-00	B010100	B010199	RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
R277	321-0184-00	B010200		RES,FXD,FILM:806 OHM,1%,0.125W,TC=T0	19701	5033ED806R0F
R278	311-1362-00	B010100	B010199	RES,VAR,NONWW:TRMR,500 OHM,0.25W	71450	201-YA5554
R278	311-1123-00	B010200		RES,VAR,NONWW:TRMR,1K OHM,0.25W	71450	YA5532
R279	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
R280	321-0193-00	B010100	B010199	RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
R280	321-0184-00	B010200		RES,FXD,FILM:806 OHM,1%,0.125W,TC=T0	19701	5033ED806R0F
R281	311-1362-00	B010100	B010199	RES,VAR,NONWW:TRMR,500 OHM,0.25W	71450	201-YA5554
R281	311-1123-00	B010200		RES,VAR,NONWW:TRMR,1K OHM,0.25W	71450	YA5532
R300	311-1302-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	201-YA5549
R303	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	19701	5043CX1M500J
R304	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
R305	315-0566-00	B010100	B107533	RES,FXD,FILM:56M OHM,5%,0.25W (D1 ONLY)	01121	CB5665
R305	315-0566-00	B010100	B107452	RES,FXD,FILM:56M OHM,5%,0.25W (D2 ONLY)	01121	CB5665
R308	315-0513-00			RES,FXD,FILM:51K OHM,5%,0.25W	57668	NTR25J-E51K0
R310	321-0289-00			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T0	19701	5033ED10K0F
R312	315-0330-00			RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R0J
R313	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R315	311-1316-00			RES,VAR,NONWW:PNL,20K OHM,1W	01121	73A1N040L203M
R316	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R317	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
R318	321-0288-00			RES,FXD,FILM:9.76K OHM,1%,0.125W,TC=T0	19701	5033ED9K760F
R319	321-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.125W,TC=T0	19701	5033ED2K00F
R321	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
R322	315-0393-00	B060000		RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R323	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R324	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R326	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R327	315-0682-00	B060000		RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R328	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R329	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R331	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R332	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
R350	311-1183-00			RES,VAR,WW:PNL,2K OHM,2W	02111	534-9514
R351	321-0285-00			RES,FXD,FILM:9.09K OHM,1%,0.125W,TC=T0	07716	CEAD90900F
R352	311-1370-00			RES,VAR,NONWW:TRMR,2K OHM,0.25W	58756	U201-2RS-T
R353	315-0275-00			RES,FXD,FILM:2.7M OHM,5%,0.25W	01121	CB2755
R354	321-0289-00			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T0	19701	5033ED10K0F
R355	311-1302-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	201-YA5549
R356	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R357	321-0280-00			RES,FXD,FILM:8.06K OHM,1%,0.125W,TC=T0	19701	5033ED8K060F
R358	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R361	321-0316-03			RES,FXD,FILM:19.1K OHM,0.25%,0.125W,TC=T2	07716	CEAC19101C
R362	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R363	321-0316-03			RES,FXD,FILM:19.1K OHM,0.25%,0.125W,TC=T2	07716	CEAC19101C
R364	315-0302-00	B010100	B029999	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R364	315-0622-00	B030000		RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R365	311-1199-00			RES,VAR,NONWW:TRMR,10K OHM,0.25W	71450	YA5543
R371	322-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.25W,TC=T0	75042	CEBT0-3011F
R372	322-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.25W,TC=T0	75042	CEBT0-3011F

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R374	322-0335-00			RES,FXD,FILM:30.1K OHM,1%,0.25W,TC=T0	91637	MFF1421G30101F
R375	322-0335-00			RES,FXD,FILM:30.1K OHM,1%,0.25W,TC=T0	91637	MFF1421G30101F
R380	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R381	315-0681-00	B010100	B079999	RES,FXD,FILM:680 OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E680E
R381	321-0187-00	B080000	B082439	RES,FXD,FILM:866 OHM,1%,0.125W,TC=T0 (D1 ONLY)	07716	CEAD866R0F
R381	315-0681-00	B082440		RES,FXD,FILM:680 OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E680E
R381	315-0681-00	B010100	B079999	RES,FXD,FILM:680 OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E680E
R381	321-0187-00	B080000	B082449	RES,FXD,FILM:866 OHM,1%,0.125W,TC=T0 (D2 ONLY)	07716	CEAD866R0F
R381	315-0681-00	B082450		RES,FXD,FILM:680 OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E680E
R382	315-0511-00	B010100	B082439	RES,FXD,FILM:510 OHM,5%,0.25W (D1 ONLY)	19701	5043CX510R0J
R382	315-0511-00	B010100	B082449	RES,FXD,FILM:510 OHM,5%,0.25W (D2 ONLY)	19701	5043CX510R0J
R387	301-0130-00			RES,FXD,FILM:13 OHM,5%,0.5W	19701	5053CX13R00J
R388	308-0677-00	B010100	B082439	RES,FXD,WW:1 OHM,5%,2W (D1 ONLY)	75042	ORDER BY DESC
R388	308-0365-00	B082440		RES,FXD,WW:1.5 OHM,5%,3W (D1 ONLY)	00213	1240S-1.5-5
R388	308-0677-00	B010100	B082449	RES,FXD,WW:1 OHM,5%,2W (D2 ONLY)	75042	ORDER BY DESC
R388	308-0365-00	B082450		RES,FXD,WW:1.5 OHM,5%,3W (D2 ONLY)	00213	1240S-1.5-5
R389	308-0677-00	B010100	B082439	RES,FXD,WW:1 OHM,5%,2W (D1 ONLY)	75042	ORDER BY DESC
R389	308-0365-00	B082440		RES,FXD,WW:1.5 OHM,5%,3W (D1 ONLY)	00213	1240S-1.5-5
R389	308-0677-00	B010100	B082449	RES,FXD,WW:1 OHM,5%,2W (D2 ONLY)	75042	ORDER BY DESC
R389	308-0365-00	B082450		RES,FXD,WW:1.5 OHM,5%,3W (D2 ONLY)	00213	1240S-1.5-5
R391	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R393	308-0291-00			RES,FXD,WW:2K OHM,5%,3W	00213	1240S 2000-5
R396	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	24546	NA55D7501F
R397	321-0219-02			RES,FXD,FILM:1.87K OHM,0.5%,0.125W,TC=T2	19701	5033RC1K870D
R404	323-0510-00			RES,FXD,FILM:2.00 MEG OHM,1%,0.5W,TC=T0	75042	CECT0-2004F
R405	323-0510-00			RES,FXD,FILM:2.00 MEG OHM,1%,0.5W,TC=T0	75042	CECT0-2004F
R407	323-0414-00			RES,FXD,FILM:200K OHM,1%,0.5W,TC=T0	75042	CECT0-2003F
R408	323-0414-00			RES,FXD,FILM:200K OHM,1%,0.5W,TC=T0	75042	CECT0-2003F
R411	323-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.5W,TC=T0	91637	MFF1226D20001F
R412	323-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.5W,TC=T0	91637	MFF1226D20001F
R414	323-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.5W,TC=T0	75042	CECT0-2001F
R415	323-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.5W,TC=T0	75042	CECT0-2001F
R417	308-0736-00			RES,FXD,WW:200 OHM,1%,3W	14193	SA31 2000F
R418	308-0736-00			RES,FXD,WW:200 OHM,1%,3W	14193	SA31 2000F
R421	308-0740-00			RES,FXD,WW:20 OHM,1%,3W	00213	1200S-20-1
R422	308-0740-00			RES,FXD,WW:20 OHM,1%,3W	00213	1200S-20-1
R424	308-0739-00			RES,FXD,WW:4 OHM,1%,3W	05347	MS3-4R00F
R425	308-0739-00			RES,FXD,WW:4 OHM,1%,3W	05347	MS3-4R00F
R426	308-0739-00			RES,FXD,WW:4 OHM,1%,3W	05347	MS3-4R00F
R427	308-0739-00			RES,FXD,WW:4 OHM,1%,3W	05347	MS3-4R00F
R430	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R431	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R432	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R433	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R434	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

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R435	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
R438	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R439	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R440	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R450	321-0164-00	B010100	B082439	RES,FXD,FILM:499 OHM,1%,0.125W,TC=T0 (D1 ONLY)	19701	5033ED499R0F
R450	321-0280-00	B082440		RES,FXD,FILM:8.06K OHM,1%,0.125W,TC=T0 (D1 ONLY)	19701	5033ED8K060F
R450	321-0164-00	B010100	B082449	RES,FXD,FILM:499 OHM,1%,0.125W,TC=T0 (D2 ONLY)	19701	5033ED499R0F
R450	321-0280-00	B082450		RES,FXD,FILM:8.06K OHM,1%,0.125W,TC=T0 (D2 ONLY)	19701	5033ED8K060F
R451	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R452	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R453	321-0160-00	B010100	B082439	RES,FXD,FILM:453 OHM,1%,0.125W,MI (D1 ONLY)	19701	5033ED453R0F
R453	321-0278-00	B082440		RES,FXD,FILM:7.68K OHM,1%,0.125W,TC=T0 (D1 ONLY)	07716	CEAD76800F
R453	321-0160-00	B010100	B082449	RES,FXD,FILM:453 OHM,1%,0.125W,MI (D2 ONLY)	19701	5033ED453R0F
R453	321-0278-00	B082450		RES,FXD,FILM:7.68K OHM,1%,0.125W,TC=T0 (D2 ONLY)	07716	CEAD76800F
R455	311-1120-00	B010100	B082439	RES,VAR,NONWW:TRMR,100 OHM,0.25W (D1 ONLY)	71450	YA5531
R455	311-1123-00	B082440		RES,VAR,NONWW:TRMR,1K OHM,0.25W (D1 ONLY)	71450	YA5532
R455	311-1120-00	B010100	B082449	RES,VAR,NONWW:TRMR,100 OHM,0.25W (D2 ONLY)	71450	YA5531
R455	311-1123-00	B082450		RES,VAR,NONWW:TRMR,1K OHM,0.25W (D2 ONLY)	71450	YA5532
R456	311-1124-00			RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	YA5533
R457	321-0234-00	B010100	B104939	RES,FXD,FILM:2.67K OHM,1%,0.125W,TC=T0 (D1 ONLY)	19701	5033ED2K67F
R457	321-0235-00	B104940		RES,FXD,FILM:2.74K OHM,1%,0.125W,TC=T0 (D1 ONLY)	07716	CEAD27400F
R457	321-0234-00	B010100	B140919	RES,FXD,FILM:2.67K OHM,1%,0.125W,TC=T0 (D2 ONLY)	19701	5033ED2K67F
R457	321-0235-00	B140920		RES,FXD,FILM:2.74K OHM,1%,0.125W,TC=T0 (D2 ONLY)	07716	CEAD27400F
R459	321-0266-00			RES,FXD,FILM:5.76K OHM,1%,0.125W,TC=T0	19701	5033ED5K760F
R501	306-0224-00			RES,FXD,CMPSN:220K OHM,10%,2W	01121	HB2241
R502	307-0363-00			RES,FXD,FILM:22.0029 MEG OHM 10%	80009	307-0363-00
R511	321-0385-00			RES,FXD,FILM:100K OHM,1%,0.125W,TC=T0	19701	5033ED100K0F
R512	321-0385-00			RES,FXD,FILM:100K OHM,1%,0.125W,TC=T0	19701	5033ED100K0F
R513	315-0224-00	B010100	B029999	RES,FXD,FILM:220K OHM,5%,0.25W	57668	NTR25J-E220K
R513	316-0103-00	B030000		RES,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R514	321-0344-00			RES,FXD,FILM:37.4K OHM,1%,0.125W,TC=T0	19701	5033ED 37K40F
R515	321-0344-00			RES,FXD,FILM:37.4K OHM,1%,0.125W,TC=T0	19701	5033ED 37K40F
R517	321-0979-01			RES,FXD,FILM:125K OHM,0.1%,0.125W,TC=T2	19701	5033RD125K0D
R518	321-0979-01			RES,FXD,FILM:125K OHM,0.1%,0.125W,TC=T2	19701	5033RD125K0D
R519	321-0979-01			RES,FXD,FILM:125K OHM,0.1%,0.125W,TC=T2	19701	5033RD125K0D
R521	321-0979-01			RES,FXD,FILM:125K OHM,0.1%,0.125W,TC=T2	19701	5033RD125K0D
R523	321-0980-01			RES,FXD,FILM:667K OHM,0.5%,0.125W,TC=T2	07716	CEAD667R0D
R524	323-0222-01			RES,FXD,FILM:2.0K OHM,0.5%,0.5W,TC=T0	19701	5053RD2K000D
R526	323-0222-01			RES,FXD,FILM:2.0K OHM,0.5%,0.5W,TC=T0	19701	5053RD2K000D
R527	321-0362-00			RES,FXD,FILM:57.6K OHM,1%,0.125W,TC=T0	19701	5043ED57K60F
R528	311-1133-00			RES,VAR,NONWW:TRMR,10K OHM,0.25W	29604	VT20 R 103B
R529	315-0274-00	B090000		RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R530	311-1206-00			RES,VAR,NONWW:TRMR,250K OHM,0.25W	58756	YA5546
R531	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
R532	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

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R533	311-1805-00	B090000		RES,VAR,NONWW:PNL,2 X 20K,20%,0.5W,DPDT	59821	BA0289-0001
R534	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
R535	311-1310-00	B010100	B089999	RES,VAR,NONWW:PNL,20K OHM,1W,4PST SWITCH (PART OF S535)	01121	10M654
R535	311-1805-00	B090000		RES,VAR,NONWW:PNL,2 X 20K,20%,0.5W,DPDT (PART OF S535)	59821	BA0289-0001
R536	323-0720-01			RES,FXD,FILM:5.556K OHM,1%,0.5W,TC=T0	91637	MFF1226G55560D
R537	323-0636-01			RES,FXD,FILM:50K OHM,0.5%,0.5W,TC=T0	56699	5053RD50K00D
R538	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R539	315-0330-00			RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
R540	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R541	315-0561-00			RES,FXD,FILM:560 OHM,5%,0.25W	19701	5043CX560R0J
R542	315-0361-00			RES,FXD,FILM:360 OHM,5%,0.25W	19701	5043CX360R0J
R544	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R545	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R546	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R547	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R548	301-0330-00			RES,FXD,FILM:33 OHM,5%,0.5W	19701	5053CX33R00J
R549	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R552	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R554	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R556	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R558	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R560	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R561	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
R562	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R563	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
R564	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R567	321-0353-01	B010100	B029999	RES,FXD,FILM:46.4K OHM,0.5%,0.125W,TC=T0	07716	CEA 46.4KOHM 0.5
R567	321-0692-00	B030000		RES,FXD,FILM:49.9K OHM,0.5%,0.125W,TC=T0	91637	MFF1816G49901D
R568	321-0353-01	B010100	B029999	RES,FXD,FILM:46.4K OHM,0.5%,0.125W,TC=T0	07716	CEA 46.4KOHM 0.5
R568	321-0692-00	B030000		RES,FXD,FILM:49.9K OHM,0.5%,0.125W,TC=T0	91637	MFF1816G49901D
R569	323-0496-00			RES,FXD,FILM:1.43M OHM,1%,0.5W,TC=T0	19701	5053RD1M430F
R570	311-1302-00	B010100	B082439	RES,VAR,NONWW:TRMR,100K OHM,0.25W (D1 ONLY)	71450	201-YA5549
R570	311-1813-00	B082440		RES,VAR,NONWW:TRMR,200K OHM,30%,0.25W (D1 ONLY)	58756	AB7931
R570	311-1302-00	B010100	B082449	RES,VAR,NONWW:TRMR,100K OHM,0.25W (D2 ONLY)	71450	201-YA5549
R570	311-1813-00	B082450		RES,VAR,NONWW:TRMR,200K OHM,30%,0.25W (D2 ONLY)	58756	AB7931
R572	315-0625-00	B090000		RES,FXD,FILM:6.2M OHM,5%,0.25W	01121	CB6255
R573	311-1805-00	B090000		RES,VAR,NONWW:PNL,2 X 20K,20%,0.5W,DPDT	59821	BA0289-0001
R574	315-0624-00			RES,FXD,FILM:620K OHM,5%,0.25W	19701	5043CX620K0J
R575	311-1310-00	B010100	B089999	RES,VAR,NONWW:PNL,20K OHM,1W,4PST SWITCH (PART OF S575)	01121	10M654
R575	311-1805-00	B090000		RES,VAR,NONWW:PNL,2 X 20K,20%,0.5W,DPDT (PART OF S575)	59821	BA0289-0001
R576	321-1389-01			RES,FXD,FILM:111K OHM,0.5%,0.125W,TC=T0	19701	5033RD111K0D
R577	321-0481-01			RES,FXD,FILM:1M OHM,0.5%,0.125W	07716	CEAD10003D
R581	308-0075-00	B010100	B039999	RES,FXD,WW:100 OHM,5%,3W	00213	1240S-100-5
R581	308-0431-00	B040000		RES,FXD,WW:120 OHM,5%,3W	14193	SA31-1200J
R583	308-0075-00	B010100	B039999	RES,FXD,WW:100 OHM,5%,3W	00213	1240S-100-5
R583	308-0431-00	B040000		RES,FXD,WW:120 OHM,5%,3W	14193	SA31-1200J
R584	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R585	315-0274-00			RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R586	315-0274-00			RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R587	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R588	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

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R591	315-0473-00			RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R592	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R594	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R596	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R597	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R711	307-0023-00	B030000	B049999	RES,FXD,CMPSN:4.7 OHM,10%,0.5W	01121	EB47G1
R744	315-0683-00	B010100	B082439	RES,FXD,FILM:68K OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E68K0
R744	301-0104-00			RES,FXD,FILM:100K OHM,5%,0.5W (D1 ONLY)	19701	5053CX100K0J
R744	315-0683-00	B010100	B082449	RES,FXD,FILM:68K OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E68K0
R744	301-0104-00	B082450		RES,FXD,FILM:100K OHM,5%,0.5W (D2 ONLY)	19701	5053CX100K0J
R754	315-0684-00	B010100	B082439	RES,FXD,FILM:680K OHM,5%,0.25W (D1 ONLY)	01121	CB6845
R754	315-0304-00	B082440		RES,FXD,FILM:300K OHM,5%,0.25W (D1 ONLY)	57668	NTR25J-E300K
R754	315-0684-00	B010100	B082449	RES,FXD,FILM:680K OHM,5%,0.25W (D2 ONLY)	01121	CB6845
R754	315-0304-00	B082450		RES,FXD,FILM:300K OHM,5%,0.25W (D2 ONLY)	57668	NTR25J-E300K
R755	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R757	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
R761	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
R762	315-0183-00			RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R763	321-0268-08			RES,FXD,FILM:6.04K OHM,1%,0.125W,TC=T2	07716	CEAC60400F
R764	321-0268-08			RES,FXD,FILM:6.04K OHM,1%,0.125W,TC=T2	07716	CEAC60400F
R765	311-1308-00	B010100	B049999	RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	201-YA5550
R765	311-1124-00	B050000		RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	YA5533
R766	307-0105-00			RES,FXD,CMPSN:3.9 OHM,5%,0.25W	01121	CB 39G5
R772	315-0562-00			RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R773	315-0221-00	B010100	B049999	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
R774	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R775	311-1124-00			RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	YA5533
R776	321-0202-00	B010100	B039999	RES,FXD,FILM:1.24K OHM,1%,0.125W,TC=T0	24546	NA55D1241F
R776	321-0206-02	B040000		RES,FXD,FILM:1.37K OHM,0.5%,0.125W,TC=T2	19701	5033RC1K370D
R777	321-0256-00	B010100	B039999	RES,FXD,FILM:4.53K OHM,1%,0.125W,TC=T9	19701	5033ED4K530F
R777	321-0259-09	B040000		RES,FXD,FILM:4.87K OHM,1%,0.125W,TC=T9	19701	5033RE4K870F
R781	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R784	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
R785	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R786	307-0105-00			RES,FXD,CMPSN:3.9 OHM,5%,0.25W	01121	CB 39G5
R787	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
R788	315-0301-00	B010100	B049999	RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
R788	315-0201-00	B050000		RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
S101	260-1478-00			CIRCUIT BREAKER:0.4A,250VAC,PB RESET	06402	ORDER BY DESCR
S120	260-1457-00	B010100	B010199	SWITCH,ROTARY:COLLECTOR SWEEP (D1 ONLY)	80009	260-1457-00
S120	260-1457-01	B010200		SWITCH,ROTARY:COLLECTOR SWEEP (D1 ONLY)	76854	5-36844-810
S120	260-0735-00	B010200		SWITCH,PUSH:T,NO CONTACT,RED BUTTON (D1 ONLY)	81073	39-1
S120	260-1457-00	B010100	B010119	SWITCH,ROTARY:COLLECTOR SWEEP (D2 ONLY)	80009	260-1457-00
S120	260-1457-01	B010120		SWITCH,ROTARY:COLLECTOR SWEEP (D2 ONLY)	76854	5-36844-810
S120	260-0735-00	B010120		SWITCH,PUSH:T,NO CONTACT,RED BUTTON (D2 ONLY)	81073	39-1
S130	260-1456-00			SWITCH,ROTARY:SWEEP POLARITY	76854	5-36132-861

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
S310	260-1453-00			SWITCH,PUSH:1 BUTTON,2 POLE,POWER	59821	2KAB010000554
S330	260-1455-00			SWITCH,PUSH:2 BUTTON,2 POLE,STEP FAMILY	31918	ORDER BY DESCR
S350	260-1452-00			SWITCH,PUSH:2 BUTTON,2 POLE,OFFSET	59821	2KBB020000657
S404	105-0359-00			ACTR ASSY,CAM S:BASE STOP AMPLITUDE	80009	105-0359-00
S426	260-1454-00			SWITCH,PUSH:3 BUTTON,2 POLE,STEP RATE	31918	ORDER BY DESCR
S429	260-1211-00			SWITCH,PUSH:1A,28VDC	31918	601348
S430	260-1211-00			SWITCH,PUSH:1A,28VDC	31918	601348
S502	105-0360-00			ACTR ASSY,CAM S:HORIZ ATTEN	80009	105-0360-00
S512	260-1363-00			SWITCH,PUSH:1 BUTTON,6 POLE,DISPLAY	31918	ORDER BY DESCR
S535	----- -----			(PART OF R535)		
S568	260-1211-00			SWITCH,PUSH:1A,28VDC	31918	601348
S575	----- -----			(PART OF R575)		
T101	120-0808-00			XFMR,VAR,POWER:0-132V,1.75A	83008	033-0152
T102	120-0831-00			XFMR,PWR,SDN&SU:COLLECTOR SWEEP	TK2038	120-0831-00
T550	120-0832-00			XFMR,PWR,STU:BASE DRIVE	54937	120-0832-00
T560	120-0833-00			XFMR,ISOLATION:	54937	120-0833-00
T701	120-0830-00	B010100	B039999	XFMR,PWR,SDN&SU:	80009	120-0830-00
T701	120-0830-01	B040000		XFMR,PWR,SDN&SU:	TK2038	120-0830-01
U206	156-0067-00			MICROCKT,LINEAR:OPNL AMPL,SEL	04713	MC1741CP1
U220	156-0030-03			MICROCKT,DGTL:QUAD 2 INPUT NAND GATE,SCRN	18324	N7400(NB OR FB)
U230	156-0072-02			MICROCKT,DGTL:MONOSTABLE MV,SCRN	18324	N74121(NB OR FB)
U268	156-0031-00			MICROCKT,DGTL:4-W 2-INP AND-OR-INVT GATES	01295	SN7454N
U270	156-0072-02			MICROCKT,DGTL:MONOSTABLE MV,SCRN	18324	N74121(NB OR FB)
U305	156-0158-00	B010100	B107532	MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U305	156-1191-01	B107533		MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP (D1 ONLY)	80009	156-1191-01
U305	156-0158-00	B010100	B107451	MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U305	156-1191-01	B107452		MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP (D2 ONLY)	80009	156-1191-01
U350	156-0158-00			MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U360	156-0067-00			MICROCKT,LINEAR:OPNL AMPL,SEL	04713	MC1741CP1
U380	156-0158-00			MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U430	156-0062-02			MICROCKT,DGTL:QUAD 2-INP EXCL-OR GATE,SCRN	18324	N7486(NB OR FB)
U520	156-0200-00			MICROCKT,LINEAR:OPNL AMPL	04713	MC1456P1
U530	156-0200-00			MICROCKT,LINEAR:OPNL AMPL	04713	MC1456P1
U542	156-0058-02			MICROCKT,DGTL:HEX INV,SCRN	18324	N7404(NB OR FB)
U570	156-0200-00			MICROCKT,LINEAR:OPNL AMPL	04713	MC1456P1
U722	156-0285-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC7812CT
U724	156-0277-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	LM340T-5.0
U732	156-0285-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC7812CT
VR380	152-0278-00	B082440		SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7 (D1 ONLY)	80009	152-0278-00
VR380	152-0278-00	B082450		SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7 (D2 ONLY)	80009	152-0278-00
VR382	152-0278-00	B082440		SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7 (D1 ONLY)	80009	152-0278-00
VR382	152-0278-00	B082450		SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7 (D2 ONLY)	80009	152-0278-00
VR581	152-0024-00			SEMICOND DVC,DI:ZEN,SI,15V,5%,1W,A31A	04713	1N3024B
VR582	152-0024-00			SEMICOND DVC,DI:ZEN,SI,15V,5%,1W,A31A	04713	1N3024B
VR772	152-0280-00			SEMICOND DVC,DI:ZEN,S1,6.2V,5%,0.4W,DO-7	04713	1N753A

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A4	670-2560-00			CIRCUIT BD ASSY:STORAGE (D1 ONLY)	80009	670-2560-00
A5	670-2559-00	B010100	B082439	CIRCUIT BD ASSY:HIGH VOLTAGE-DEFLECTION (D1 ONLY)	80009	670-2559-00
A5	670-4126-00	B082440		CIRCUIT BD ASSY:HIGH VOLTAGE (D1 ONLY)	80009	670-4126-00
C1212	283-0119-00	B040000		CAP,FXD,CER DI:2200PF,5%,200V	59660	855-XXXY5E0222J
C1224	283-0065-00			CAP,FXD,CER DI:0.001UF,5%,50V	59660	0835-591Y5E0102J
C1227	281-0537-00			CAP,FXD,CER DI:0.68PF,20%,600V	54583	MA12C0G2HR68M
C1236	285-0526-00			CAP,FXD,PLASTIC:0.1UF,20%,400V	56289	430P104X04M28
C1241	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1242	283-0261-00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
C1248	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1249	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1251	290-0194-00			CAP,FXD,ELCTLT:10UF,+50-10%,100V	00853	556DC100T100B
C1252	283-0617-00			CAP,FXD,MICA DI:4700PF,10%,300V	00853	D195F472K0
C1253	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1254	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,25V	31433	C330C105M5R5CA
C1258	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,25V	31433	C330C105M5R5CA
C1259	283-0164-00			CAP,FXD,CER DI:2.2UF,20%,25V	04222	SR402E225MAA
C1272	283-0021-00			CAP,FXD,CER DI:0.001UF,20%,5000V	51406	DHR17Y55102M5KV
C1273	283-0208-00			CAP,FXD,CER DI:0.22UF,10%,200V	04222	SR502C224KAA
C1274	283-0142-00			CAP,FXD,CER DI:0.0027UF,5%,200V	54583	CK45YE2D272J-A
C1279	283-0065-00			CAP,FXD,CER DI:0.001UF,5%,50V	59660	0835-591Y5E0102J
C1281	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1303	283-0067-00			CAP,FXD,CER DI:0.001UF,10%,200V	59660	835-515-YSE0102K
C1307	283-0067-00	B010100	B039999	CAP,FXD,CER DI:0.001UF,10%,200V	59660	835-515-YSE0102K
C1311	281-0500-00			CAP,FXD,CER DI:2.2PF,+/-0.5PF,500V	52763	2RDPLZ007 2P20DC
C1321	281-0500-00			CAP,FXD,CER DI:2.2PF,+/-0.5PF,500V	52763	2RDPLZ007 2P20DC
C1325	283-0026-00			CAP,FXD,CER DI:0.2UF,+80-20%,25V	31433	C330C332JIG5CA
C1330	290-0267-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T320A105M035AS
C1331	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1337	290-0188-00			CAP,FXD,ELCTLT:0.1UF,10%,35V	05397	T322A104K035AS
C1342	290-0135-00			CAP,FXD,ELCTLT:15UF,20%,20V	05397	T110B156M020AS
C1385	290-0134-00			CAP,FXD,ELCTLT:22UF,20%,15V	05397	T110B226M015AS
C1386	285-0562-00			CAP,FXD,PLASTIC:0.47UF,20%,400V	14752	230B1E474
C1387	283-0067-00			CAP,FXD,CER DI:0.001UF,10%,200V	59660	835-515-YSE0102K
C1389	283-0013-00			CAP,FXD,CER DI:0.01UF,-0+100%,1000V	59660	818-602ZSU0103P
C1391	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	51642	500-500-X7R-104M
C1394	283-0057-00			CAP,FXD,CER DI:0.1UF,+80-20%,200V	04222	SR306E104ZAA
C1398	290-0267-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T320A105M035AS
C1399	290-0247-00			CAP,FXD,ELCTLT:5.6UF,10%,6V	05397	T322B565K006AS
CR1209	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1224	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1241	152-0409-00			SEMICOND DVC,DI:RECT,SI,12KV,35MA,2NS	83003	VG12X-1
CR1247	152-0409-00			SEMICOND DVC,DI:RECT,SI,12KV,35MA,2NS	83003	VG12X-1
CR1253	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1255	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1256	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1259	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1262	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1264	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1269	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1329	152-0488-00			SEMICOND DVC,DI:BRIDGE,SI,200V,1.5A	80009	152-0488-00
CR1332	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1343	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1351	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)

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CR1358	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1386	152-0331-00			SEMICOND DVC,DI:RECT,SI,1,500 25MA	TK0191	152-0331-00
CR1392	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
DS1271	150-0030-00			LAMP,GLOW:60-90V MAX,0.7MA,A28-T,WIRE LEADS	58224	A2B-T
DS1272	150-0030-00			LAMP,GLOW:60-90V MAX,0.7MA,A28-T,WIRE LEADS	58224	A2B-T
DS1273	150-0030-00			LAMP,GLOW:60-90V MAX,0.7MA,A28-T,WIRE LEADS	58224	A2B-T
DS1390	150-0048-00	B070000		LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
F1201	159-0023-00			FUSE,CARTRIDGE:3AG,2A,250V,SLOW BLOW	71400	MDX2
F1201	159-0041-00			FUSE,CARTRIDGE:3AG,1.25A,250V,20SEC (220 VOLTAGE)	71400	MSL 1 1/4
L1259	108-0564-00			COIL,RF:FIXED,74UH	TK1345	108-0564-00
L1291	108-0644-00			COIL,TUBE DEFL:TRACE ROTATION	80009	108-0644-00
Q1104	151-0279-00	B010100	B082439	TRANSISTOR:SELECTED	04713	SS2821
Q1106	151-0190-00	B010100	B082439	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1106	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1107	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1114	151-0279-00	B010100	B082439	TRANSISTOR:SELECTED	04713	SS2821
Q1116	151-0190-00	B010100	B082439	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1116	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1117	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1124	151-0279-00	B010100	B082439	TRANSISTOR:SELECTED	04713	SS2821
Q1126	151-0347-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS7951
Q1126	151-0190-00	B010100	B082439	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1126	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1127	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1134	151-0279-00	B010100	B082439	TRANSISTOR:SELECTED	04713	SS2821
Q1136	151-0190-00	B010100	B082439	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1136	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1137	151-0444-02	B082440		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1214	151-0141-00			TRANSISTOR:NPN,SI,TO-3	02735	60580
Q1222	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1234	151-0406-00			TRANSISTOR:PNP,SI,TO-39	04713	ST1264
Q1252	151-0256-00			TRANSISTOR:NPN,SI,TO-3	80009	151-0256-00
Q1262	151-0207-00			TRANSISTOR:NPN,SI,X-55,SEL	57668	XD11BCP0207
Q1264	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q1278	151-1005-00			TRANSISTOR:FET,N-CHAN,SI,TO-106	04713	SPF685
Q1302	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q1304	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
Q1308	151-0279-00			TRANSISTOR:SELECTED	04713	SS2821
Q1310	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
Q1320	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
Q1334	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q1336	151-0207-00			TRANSISTOR:NPN,SI,X-55,SEL	57668	XD11BCP0207
Q1356	151-0341-00			TRANSISTOR:NPN,SI,TO-106	04713	SPS6919
Q1358	151-0169-00			TRANSISTOR:NPN,SI,TO-5	04713	ST830
Q1362	151-0279-00			TRANSISTOR:SELECTED	04713	SS2821
Q1364	151-0279-00			TRANSISTOR:SELECTED	04713	SS2821
Q1372	151-0279-00			TRANSISTOR:SELECTED	04713	SS2821
Q1384	151-0216-00			TRANSISTOR:PNP,SI,TO-92	04713	SPS8803
Q1386	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q1388	151-0331-00			TRANSISTOR:NPN,SI	03508	X40CR115
Q1392	151-0169-00			TRANSISTOR:NPN,SI,TO-5	04713	ST830
Q1396	151-0279-00			TRANSISTOR:SELECTED	04713	SS2821
R1101	315-0101-00	B010100	B082439	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1102	315-0221-00	B010100	B082439	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
R1103	316-0390-00	B010100	B049999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1103	315-0111-00	B050000	B082439	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1103	315-0390-00	B082440		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0

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R1104	308-0564-00	B010100	B082439	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1104	323-0395-00	B082440		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1106	321-0179-00	B010100	B082439	RES,FXD,FILM:715 OHM,1%,0.125W,TC=T0	07716	CEAD715R0F
R1106	321-0253-00	B082440		RES,FXD,FILM:4.22K OHM,1%,0.125W,TC=T0	19701	5033ED 4K 220F
R1107	301-0154-00	B082440		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1108	301-0752-00	B010100	B082439	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1108	315-0473-00	B082440		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1112	315-0221-00	B010100	B082439	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
R1113	316-0390-00	B010100	B049999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1113	315-0111-00	B050000	B082439	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1113	315-0390-00	B082440		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1114	308-0564-00	B010100	B082439	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1114	323-0395-00	B082440		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1116	311-1308-00	B010100	B082439	RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	201-YA5550
R1116	311-1560-00	B082440		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-1-502
R1117	301-0154-00	B082440		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1118	301-0752-00	B010100	B082439	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1118	315-0473-00	B082440		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1122	315-0221-00	B010100	B082439	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
R1123	316-0390-00	B010100	B049999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1123	315-0511-00	B050000	B082439	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
R1123	315-0390-00	B082440		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1124	308-0564-00	B010100	B019999	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1124	308-0053-00	B020000	B082439	RES,FXD,WW:8K OHM,5%,5W	91637	RS5-B80000J
R1124	323-0395-00	B082440		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1125	301-0272-00	B010100	B082439	RES,FXD,FILM:2.7K OHM,5%,0.5W	80009	301-0272-00
R1125	301-0152-00	B020000	B082439	RES,FXD,FILM:1.5K OHM,5%,0.5W	19701	5053CX1K500J
R1125	315-0163-00	B082440		RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
R1126	321-0179-00	B010100	B019999	RES,FXD,FILM:715 OHM,1%,0.125W,TC=T0	07716	CEAD715R0F
R1126	321-0139-00	B020000	B082439	RES,FXD,FILM:274 OHM,1%,0.125W,TC=T0	07716	CEAD274R0F
R1126	321-0253-00	B082440		RES,FXD,FILM:4.22K OHM,1%,0.125W,TC=T0	19701	5033ED 4K 220F
R1127	301-0154-00	B082440		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1128	301-0752-00	B010100	B019999	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1128	303-0302-00	B020000	B082439	RES,FXD,CMPSN:3K OHM,5%,1W	01121	GB3025
R1128	315-0473-00	B082440		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1132	315-0221-00	B010100	B082439	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
R1133	316-0390-00	B010100	B049999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1133	315-0111-00	B050000	B082439	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1133	315-0390-00	B082440		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1134	308-0564-00	B010100	B019999	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1134	308-0053-00	B020000	B082439	RES,FXD,WW:8K OHM,5%,5W	91637	RS5-B80000J
R1134	323-0395-00	B082440		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1136	311-1308-00	B010100	B019999	RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	201-YA5550
R1136	311-1328-00	B020000	B082439	RES,VAR,NONWW:TRMR,100 OHM,0.25W	71450	201-YA5553
R1136	311-1560-00	B082440		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-1-502
R1137	301-0154-00	B082440		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1138	301-0752-00	B010100	B019999	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1138	303-0302-00	B020000	B082439	RES,FXD,CMPSN:3K OHM,5%,1W	01121	GB3025
R1138	315-0473-00	B082440		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1200	311-1160-00			RES,VAR,NONWW:PNL,100K OHM,1W	12697	381-CM 39689
R1202	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
R1203	316-0103-00	B010100	B104749	RES,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1203	315-0103-00	B104750		RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1207	316-0822-00	B010100	B194749	RES,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R1207	315-0822-00	B104750		RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1208	316-0473-00	B010100	B104749	RES,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R1208	315-0473-00	B104750		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1211	315-0564-00			RES,FXD,FILM:560K OHM,5%,0.25W	19701	5043CX560K0J

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R1213	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1217	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
R1218	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R1222	316-0102-00	B010100	B104749	RES,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1222	315-0102-00	B104750		RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1223	316-0472-00	B010100	B104749	RES,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1223	315-0472-00	B104750		RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R1226	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1227	321-0399-00			RES,FXD,FILM:140K OHM,1%,0.125W,TC=T0	07716	CEAD14002F
R1231	316-0472-00	B010100	B104749	RES,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1231	315-0472-00	B104750		RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R1232	316-0274-00	B010100	B104749	RES,FXD,CMPSN:270K OHM,10%,0.25W	01121	CB2741
R1232	315-0274-00	B104750		RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R1234	304-0223-00			RES,FXD,CMPSN:22K OHM,10%,1W	01121	GB2231
R1236	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1239	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1242	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1242	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1243	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1243	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1245	311-1205-00			RES,VAR,NONWW:TRMR,2M OHM,30%,0.25W	58756	201-YA5545
R1248	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1248	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1251	307-0058-00			RES,FXD,CMPSN:5.6 OHM,5%,0.5W	01121	EB56G5
R1252	308-0075-00			RES,FXD,WW:100 OHM,5%,3W	00213	1240S-100-5
R1254	308-0690-00			RES,FXD,WW:3 OHM,10%,3W	00213	1240S 3-10
R1262	302-0472-00			RES,FXD,CMPSN:4.7K OHM,10%,0.5W	01121	EB 4721
R1263	316-0183-00	B010100	B104749	RES,FXD,CMPSN:18K OHM,10%,0.25W	01121	CB1831
R1263	315-0183-00	B104750		RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R1266	316-0334-00	B010100	B104749	RES,FXD,CMPSN:330K OHM,10%,0.25W	01121	CB3341
R1266	315-0334-00	B104750		RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
R1267	316-0333-00	B010100	B104749	RES,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R1267	315-0333-00	B104750		RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R1268	316-0103-00	B010100	B104749	RES,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1268	315-0103-00	B104750		RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1269	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1270	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1270	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1271	316-0395-00	B010100	B104749	RES,FXD,CMPSN:3.9M OHM,10%,0.25W	01121	CB3951
R1271	315-0395-00	B104750		RES,FXD,FILM:3.9M OHM,5%,0.25W	01121	CB3955
R1272	307-0296-00			RES,FXD,FILM:151K,13 MEG,4 MEG,2.2 MEG,40 MEG OHM,20%	80009	307-0296-00
R1273	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1274	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1274	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1275	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536
R1276	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1276	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1278	316-0562-00	B010100	B104749	RES,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1278	315-0562-00	B104750		RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R1279	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1282	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
R1285	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536
R1286	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536
R1287	301-0183-00			RES,FXD,FILM:18K OHM,5%,0.5W	19701	5053CX18K00J
R1291	311-1189-00			RES,VAR,WW:PNL,5K OHM,2W	10582	AW-3349
R1295	311-0254-00			RES,VAR,NONWW:PNL,5MEG OHM,20%,0.5W	12697	CM29709
R1302	316-0102-00			RES,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R1303	315-0513-00			RES,FXD,FILM:51K OHM,5%,0.25W	57668	NTR25J-E51K0
R1304	316-0474-00			RES,FXD,CMPSN:470K OHM,10%,0.25W	01121	CB4741
R1307	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1308	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R1310	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1311	315-0125-00			RES,FXD,FILM:1.2M OHM,5%,0.25W	19701	5043CX1M200J
R1312	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1313	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1321	315-0125-00			RES,FXD,FILM:1.2M OHM,5%,0.25W	19701	5043CX1M200J
R1322	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1324	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
R1325	311-1155-00			RES,VAR,NONWW:PNL,20K OHM,0.5W	01121	W-7796
R1329	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1330	316-0105-00			RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1331	315-0202-00	B030000		RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1332	315-0201-00	B010100	B029999	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
R1332	315-0202-00	B030000		RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1334	316-0472-00	B010100	B029999	RES,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1334	315-0622-00	B030000		RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R1336	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R1337	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1339	315-0623-00			RES,FXD,FILM:62K OHM,5%,0.25W	19701	5043CX62K00J
R1341	315-0753-00			RES,FXD,FILM:75K OHM,5%,0.25W	57668	NTR25J-E75K0
R1342	316-0101-00			RES,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
R1343	316-0473-00			RES,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R1346	315-0183-00			RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R1347	321-0359-00			RES,FXD,FILM:53.6K OHM,1%,0.125W,TC=T0	07716	CEAD53601F
R1350	311-1153-00			RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-CK7-502
R1351	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R1352	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1354	315-0154-00			RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
R1355	323-0452-00			RES,FXD,FILM:499K OHM,1%,0.5W,TC=T0	75042	CECT0-4993F
R1364	303-0473-00			RES,FXD,CMPSN:47K OHM,5%,1W	01121	GB4735
R1365	303-0473-00			RES,FXD,CMPSN:47K OHM,5%,1W	01121	GB4735
R1370	311-1166-00			RES,VAR,NONWW:TRMR,250K OHM,0.5W	32997	3352T-CK7-254
R1371	316-0393-00			RES,FXD,CMPSN:39K OHM,10%,0.25W	01121	CB3931
R1381	316-0334-00			RES,FXD,CMPSN:330K OHM,10%,0.25W	01121	CB3341
R1382	316-0334-00			RES,FXD,CMPSN:330K OHM,10%,0.25W	01121	CB3341
R1384	316-0123-00			RES,FXD,CMPSN:12K OHM,10%,0.25W	01121	CB1231
R1385	311-1153-00			RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-CK7-502
R1386	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1387	311-1154-00			RES,VAR,NONWW:TRMR,1K OHM,0.5W	32997	3352T-CK7-102
R1388	321-0261-00			RES,FXD,FILM:5.11K OHM,1%,0.125W,TC=T0	19701	5033ED5K110F
R1389	323-0436-00			RES,FXD,FILM:340K OHM,1%,0.5W,TC=T0	91637	MFF1226G34002F
R1390	311-1166-00			RES,VAR,NONWW:TRMR,250K OHM,0.5W	32997	3352T-CK7-254
R1392	301-0753-00			RES,FXD,FILM:75K OHM,5%,0.5W	01121	EB7535
R1395	311-1152-00			RES,VAR,NONWW:TRMR,100K OHM,0.5W	32997	3352T-CK7-104
R1396	315-0623-00			RES,FXD,FILM:62K OHM,5%,0.25W	19701	5043CX62K00J
R1397	316-0101-00			RES,FXD,CMPSN:100 OHM,10%,0.25W	01121	CB1011
S1125	260-1238-00			SWITCH,PUSH:SPST,0.5A,115VAC,MOMENTARY	09353	8633ZG7E
S1200	260-0227-00			SW,THRMSTC:NC,OPEN 73.9,CL 51.7,10A,240V	73803	20700L63-330
S1201	260-1222-00			SWITCH,PP:DPDT,40A,250AC,PUSH-PULL	01963	E79-96A
S1330	260-1223-00			SWITCH,PUSH:1 BUTTON,4 POLE,ERASE	31918	ORDER BY DESCR
S1372	260-1232-00	B010100	B019999	SWITCH,PUSH:2 BUTTON,4 POLE,ERASE SEL	31918	ORDER BY DESCR
S1372	260-1232-01	B020000	B103989	SWITCH,PUSH:4PDT,2 BTN,GRIGSBY ONLY	80009	260-1232-01
S1372	260-1232-00	B103990		SWITCH,PUSH:2 BUTTON,4 POLE,ERASE SEL	31918	ORDER BY DESCR
S1375	260-1207-00			SWITCH,PUSH:DPDT,28VDC,PUSH-PUSH	59821	ORDER BY DESCR
T1240	120-0761-00			XFMR,PWR,STU:HV	80009	120-0761-00

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V1291	154-0634-00	B010100	B019999	ELECTRON TUBE:CRT,P400,INT SCALE	80009	154-0634-00
V1291	154-0634-10	B020000		ELECTRON TUBE:CRT,P400,INT SCALE	80009	154-0634-10
V1291	154-0752-00			ELECTRON TUBE:CRT,P400,INT SCALE (D1 OPTION 10 ONLY)	80009	154-0752-00
VR1237	152-0283-00			SEMICOND DVC,DI:ZEN,SI,43V,5%,0.4W,D-07	04713	SZ14257KRL
VR1258	152-0438-00			SEMICOND DVC,DI:ZEN,SI,9.1V,5%,3W,A60	12954	3EZ 9.1 D5
VR1281	152-0357-00			SEMICOND DVC,DI:ZEN,SI,82V,5%,0.4W,DO-7	04713	SZ12461KRL
VR1282	152-0255-00			SEMICOND DVC,DI:ZEN,SI,51V,5%,0.4W,DO-7	04713	SZG35009K7
VR1370	152-0287-00			SEMICOND DVC,DI:ZEN,SI,110V,5%,0.4W,DO-7	12954	1N986B
VR1387	152-0283-00			SEMICOND DVC,DI:ZEN,SI,43V,5%,0.4W,D-07	04713	SZ14257KRL
VR1388	152-0166-00			SEMICOND DVC,DI:ZEN,SI,6.2V,5%,400MW,DO-7	04713	SZ11738RL
VR1396	152-0288-00			SEMICOND DVC,DI:ZEN,SI,140V,5%,400MW	04713	SZ11824RL

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A6	670-2561-00	B010100	B082449	CIRCUIT BD ASSY:HIGH VOLTAGE-DEFLECTION (D2 ONLY)	80009	670-2561-00
A6	670-4126-01	B082450		CIRCUIT BD ASSY:HIGH VOLTAGE (D2 ONLY)	80009	670-4126-01
C1224	283-0065-00			CAP,FXD,CER DI:0.001UF,5%,50V	59660	0835-591Y5E0102J
C1227	281-0537-00			CAP,FXD,CER DI:0.68PF,20%,600V	54583	MA12C0G2HR68M
C1236	285-0526-00			CAP,FXD,PLASTIC:0.1UF,20%,400V	56289	430P104X04M28
C1241	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1242	283-0261-00			CAP,FXD,CER DI:0.01UF,20%,4000V	51406	DHR28Z5U103M4KV
C1248	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1249	283-0270-00			CAP,FXD,CER DI:6800PF,+80-20%,4000V	51406	DHR34Y55682Z4KV
C1251	290-0194-00			CAP,FXD,ELCTLT:10UF,+50-10%,100V	00853	556DC100T100B
C1252	283-0617-00			CAP,FXD,MICA DI:4700PF,10%,300V	00853	D195F472K0
C1253	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1254	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,25V	31433	C330C105M5R5CA
C1258	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,25V	31433	C330C105M5R5CA
C1259	283-0198-00			CAP,FXD,CER DI:0.22UF,20%,50V	05397	C330C224M5U1CA
C1272	283-0021-00			CAP,FXD,CER DI:0.001UF,20%,5000V	51406	DHR17Y55102M5KV
C1273	283-0208-00			CAP,FXD,CER DI:0.22UF,10%,200V	04222	SR502C224KAA
C1274	283-0142-00			CAP,FXD,CER DI:0.0027UF,5%,200V	54583	CK45YE2D272J-A
C1279	283-0065-00			CAP,FXD,CER DI:0.001UF,5%,50V	59660	0835-591Y5E0102J
C1281	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
CR1209	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1224	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1239	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1241	152-0409-00			SEMICOND DVC,DI:RECT,SI,12KV,35MA,2NS	83003	VG12X-1
CR1247	152-0409-00			SEMICOND DVC,DI:RECT,SI,12KV,35MA,2NS	83003	VG12X-1
CR1253	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1255	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1256	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1262	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1264	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
CR1269	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
DS1255	150-0048-00	B070000		LAMP,INCAND:5V,0.06A,#683,WIRE LEAD	08806	683
DS1271	150-0030-00			LAMP,GLOW:60-90V MAX,0.7MA,A28-T,WIRE LEADS	58224	A2B-T
DS1272	150-0030-00			LAMP,GLOW:60-90V MAX,0.7MA,A28-T,WIRE LEADS	58224	A2B-T
F1201	159-0023-00			FUSE,CARTRIDGE:3AG,2A,250V,SLOW BLOW	71400	MDX2
F1201	159-0041-00			FUSE,CARTRIDGE:3AG,1.25A,250V,20SEC (220 VOLTAGE)	71400	MSL 1 1/4
L1259	108-0564-00			COIL,RF:FIXED,74UH	TK1345	108-0564-00
L1291	108-0644-00			COIL,TUBE DEFL:TRACE ROTATION	80009	108-0644-00
Q1104	151-0279-00	B010100	B082449	TRANSISTOR:SELECTED	04713	SS2821
Q1106	151-0190-00	B010100	B082449	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1106	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1107	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1114	151-0279-00	B010100	B082449	TRANSISTOR:SELECTED	04713	SS2821
Q1116	151-0190-00	B010100	B082449	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1116	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1117	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1124	151-0279-00	B010100	B082449	TRANSISTOR:SELECTED	04713	SS2821
Q1126	151-0190-00	B010100	B082449	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1126	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1127	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1134	151-0279-00	B010100	B082449	TRANSISTOR:SELECTED	04713	SS2821
Q1136	151-0190-00	B010100	B082449	TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1136	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2
Q1137	151-0444-02	B082450		TRANSISTOR:NPN,SI,TO-92	04713	SPS797-2

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Q1222	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q1226	151-0347-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS7951
Q1237	151-0406-00			TRANSISTOR:PNP,SI,TO-39	04713	ST1264
Q1252	151-0256-00			TRANSISTOR:NPN,SI,TO-3	80009	151-0256-00
Q1262	151-0207-00			TRANSISTOR:NPN,SI,X-55,SEL	57668	XD11BCP0207
Q1264	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
Q1278	151-1005-00			TRANSISTOR:FET,N-CHAN,SI,TO-106	04713	SPF685
R1101	315-0101-00	B010100	B082449	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1102	316-0221-00	B010100	B082449	RES,FXD,CMPSN:220 OHM,10%,0.25W	01121	CB2211
R1103	316-0390-00	B010100	B019999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1103	315-0111-00	B020000	B082449	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1103	315-0390-00	B082450		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1104	308-0564-00	B010100	B082449	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1104	323-0395-00	B082450		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1106	321-0179-00	B010100	B082449	RES,FXD,FILM:715 OHM,1%,0.125W,TC=T0	07716	CEAD715R0F
R1106	321-0253-00	B082450		RES,FXD,FILM:4.22K OHM,1%,0.125W,TC=T0	19701	5033ED 4K 220F
R1107	301-0154-00	B082450		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1108	301-0752-00	B010100	B082449	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1108	315-0473-00	B082450		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1112	316-0221-00	B010100	B082449	RES,FXD,CMPSN:220 OHM,10%,0.25W	01121	CB2211
R1113	316-0390-00	B010100	B019999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1113	315-0111-00	B020000	B082449	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1113	315-0390-00	B082450		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1114	308-0564-00	B010100	B082449	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1114	323-0395-00	B082450		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1116	311-1308-00	B010100	B082449	RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	201-YA5550
R1116	311-1560-00	B082450		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-1-502
R1117	301-0154-00	B082450		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1118	301-0752-00	B010100	B082449	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1118	315-0473-00	B082450		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1122	316-0221-00	B010100	B082449	RES,FXD,CMPSN:220 OHM,10%,0.25W	01121	CB2211
R1123	316-0390-00	B010100	B019999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1123	315-0511-00	B020000	B082449	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
R1123	315-0390-00	B082450		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1124	308-0564-00	B010100	B082449	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1124	323-0395-00	B082450		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1125	301-0272-00	B010100	B082449	RES,FXD,FILM:2.7K OHM,5%,0.5W	80009	301-0272-00
R1125	315-0163-00	B082450		RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
R1126	321-0179-00	B010100	B082449	RES,FXD,FILM:715 OHM,1%,0.125W,TC=T0	07716	CEAD715R0F
R1126	321-0253-00	B082450		RES,FXD,FILM:4.22K OHM,1%,0.125W,TC=T0	19701	5033ED 4K 220F
R1127	301-0154-00	B082450		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1128	301-0752-00	B010100	B082449	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1128	315-0473-00	B082450		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1132	316-0221-00	B010100	B082449	RES,FXD,CMPSN:220 OHM,10%,0.25W	01121	CB2211
R1133	316-0390-00	B010100	B019999	RES,FXD,CMPSN:39 OHM,10%,0.25W	01121	CB3901
R1133	315-0111-00	B020000	B082449	RES,FXD,FILM:110 OHM,5%,0.25W	57668	NTR25J-E110E
R1133	315-0390-00	B082450		RES,FXD,FILM:39 OHM,5%,0.25W	57668	NTR25J-E39E0
R1134	308-0564-00	B010100	B082449	RES,FXD,WW:20K OHM,1%,4W	00213	1300S-20000-1
R1134	323-0395-00	B082450		RES,FXD,FILM:127K OHM,1%,0.5W,TC=T0	19701	5053RD127K0F
R1136	311-1308-00	B010100	B082449	RES,VAR,NONWW:TRMR,250 OHM,0.25W	71450	201-YA5550
R1136	311-1560-00	B082450		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3352T-1-502
R1137	301-0154-00	B082450		RES,FXD,FILM:150K OHM,5%,0.5W	19701	5053CX150K0J
R1138	301-0752-00	B010100	B082449	RES,FXD,FILM:7.5K OHM,5%,0.5W	19701	5053CX7K500J
R1138	315-0473-00	B082450		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1200	311-1160-00			RES,VAR,NONWW:PNL,100K OHM,1W	12697	381-CM 39689
R1202	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
R1203	316-0103-00	B010100	B104749	RES,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1203	315-0103-00	B104750		RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

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R1206	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
R1207	316-0822-00	B010100	B104749	RES,FXD,CMPSN:8.2K OHM,10%,0.25W	01121	CB8221
R1207	315-0822-00	B104750		RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1208	316-0473-00	B010100	B104749	RES,FXD,CMPSN:47K OHM,10%,0.25W	01121	CB4731
R1208	315-0473-00	B104750		RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1209	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R1222	316-0102-00	B010100	B104749	RES,FXD,CMPSN:1K OHM,10%,0.25W	01121	CB1021
R1222	315-0102-00	B104750		RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1223	316-0472-00	B010100	B104749	RES,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1223	315-0472-00	B104750		RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R1226	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1227	321-0399-00			RES,FXD,FILM:140K OHM,1%,0.125W,TC=T0	07716	CEAD14002F
R1231	316-0472-00	B010100	B104749	RES,FXD,CMPSN:4.7K OHM,10%,0.25W	01121	CB4721
R1231	315-0472-00	B104750		RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R1232	316-0274-00	B010100	B104749	RES,FXD,CMPSN:270K OHM,10%,0.25W	01121	CB2741
R1232	315-0274-00	B104750		RES,FXD,FILM:270K OHM,5%,0.25W	57668	NTR25J-E270K
R1234	304-0223-00			RES,FXD,CMPSN:22K OHM,10%,1W	01121	GB2231
R1236	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1239	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1242	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1242	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1243	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1243	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1245	311-1205-00			RES,VAR,NONWW:TRMR,2M OHM,30%,0.25W	58756	201-YA5545
R1248	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1248	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1251	307-0058-00			RES,FXD,CMPSN:5.6 OHM,5%,0.5W	01121	EB56G5
R1252	308-0075-00			RES,FXD,WW:100 OHM,5%,3W	00213	1240S-100-5
R1254	308-0690-00			RES,FXD,WW:3 OHM,10%,3W	00213	1240S 3-10
R1257	306-0104-00			RES,FXD,CMPSN:100K OHM,10%,2W	01121	HB1041
R1262	302-0472-00			RES,FXD,CMPSN:4.7K OHM,10%,0.5W	01121	EB 4721
R1263	316-0183-00	B010100	B104749	RES,FXD,CMPSN:18K OHM,10%,0.25W	01121	CB1831
R1263	315-0183-00	B104750		RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R1266	316-0334-00	B010100	B104749	RES,FXD,CMPSN:330K OHM,10%,0.25W	01121	CB3341
R1266	315-0334-00	B104750		RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
R1267	316-0333-00	B010100	B104749	RES,FXD,CMPSN:33K OHM,10%,0.25W	01121	CB3331
R1267	315-0333-00	B104750		RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R1268	316-0103-00	B010100	B104749	RES,FXD,CMPSN:10K OHM,10%,0.25W	01121	CB1031
R1268	315-0103-00	B104750		RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1269	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1270	316-0223-00	B010100	B104749	RES,FXD,CMPSN:22K OHM,10%,0.25W	01121	CB2231
R1270	315-0223-00	B104750		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R1271	316-0395-00	B010100	B014749	RES,FXD,CMPSN:3.9M OHM,10%,0.25W	01121	CB3951
R1271	315-0395-00	B104750		RES,FXD,FILM:3.9M OHM,5%,0.25W	01121	CB3955
R1272	307-0296-00			RES,FXD,FILM:151K,13 MEG,4 MEG,2.2 MEG,40 MEG OHM,20%	80009	307-0296-00
R1273	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1274	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1274	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1275	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536
R1276	316-0105-00	B010100	B104749	RES,FXD,CMPSN:1M OHM,10%,0.25W	01121	CB1051
R1276	315-0105-00	B104750		RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1278	316-0562-00	B010100	B104749	RES,FXD,CMPSN:5.6K OHM,10%,0.25W	01121	CB5621
R1278	315-0562-00	B104750		RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R1279	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R1282	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
R1285	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536
R1286	311-1136-00			RES,VAR,NONWW:TRMR,100K OHM,0.25W	71450	YA5536

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R1287	301-0183-00			RES,FXD,FILM:18K OHM,5%,0.5W	19701	5053CX18K00J
R1291	311-1189-00			RES,VAR,WW:PNL,5K OHM,2W	10582	AW-3349
R1295	311-0254-00			RES,VAR,NONWW:PNL,5MEG OHM,20%,0.5W	12697	CM29709
S1125	260-0688-00			SWITCH,PUSH:DPDT,1A,120VAC	82389	12S-1025D
S1200	260-0227-00			SW,THRMSTC:NC,OPEN 73.9,CL 51.7,10A,240V	73803	20700L63-330
S1201	260-1222-00			SWITCH,PP:DPDT,40A,250AC,PUSH-PULL	01963	E79-96A
S1330	260-1223-00			SWITCH,PUSH:1 BUTTON,4 POLE,ERASE	31918	ORDER BY DESCR
S1372	260-1232-00	B010100	B019999	SWITCH,PUSH:2 BUTTON,4 POLE,ERASE SEL	31918	ORDER BY DESCR
S1372	260-1232-01	B020000	B103989	SWITCH,PUSH:4PDT,2 BTN,GRIGSBY ONLY	80009	260-1232-01
S1372	260-1232-00	B103990		SWITCH,PUSH:2 BUTTON,4 POLE,ERASE SEL	31918	ORDER BY DESCR
S1375	260-1207-00			SWITCH,PUSH:DPDT,28VDC,PUSH-PUSH	59821	ORDER BY DESCR
T1240	120-0761-00			XFMR,PWR,STU:HV	80009	120-0761-00
V1291	154-0633-00	B010100	B010149	ELECTRON TUBE:CRT,P31,INT SCALE	80009	154-0633-00
V1291	154-0633-05	B010150	B092809	ELECTRON TUBE:CRT,P31,INT SCALE	80009	154-0633-05
V1291	154-0633-10	B092810		ELECTRON TUBE:CRT,P31,INT SC	80009	154-0633-10
V1291	154-0751-05			ELECTRON TUBE:CRT,P31 (D2 OPTION 10 ONLY)	80009	154-0751-05
VR1237	152-0283-00			SEMICOND DVC,DI:ZEN,SI,43V,5%,0.4W,D-07	04713	SZ14257KRL
VR1258	152-0438-00			SEMICOND DVC,DI:ZEN,SI,9.1V,5%,3W,A60	12954	3EZ 9.1 D5
VR1281	152-0357-00			SEMICOND DVC,DI:ZEN,SI,82V,5%,0.4W,DO-7	04713	SZ12461KRL
VR1282	152-0255-00			SEMICOND DVC,DI:ZEN,SI,51V,5%,0.4W,DO-7	04713	SZG35009K7

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols and Reference Designators

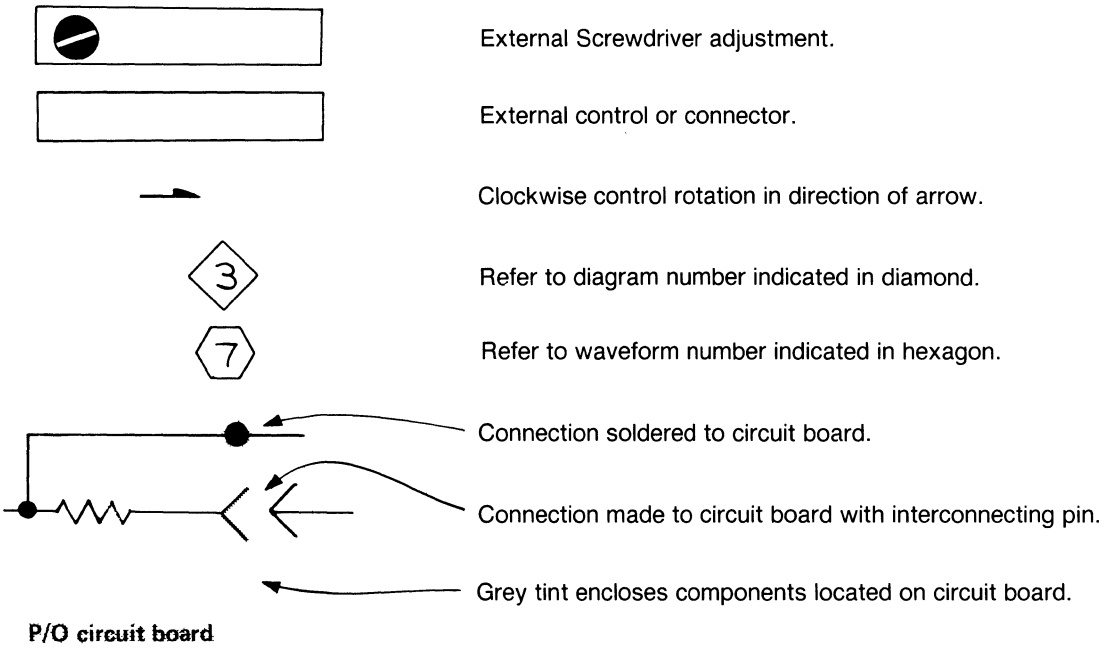
Electrical components shown on the diagrams are in the following units unless noted otherwise:

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 USA Standard Y32.2-1967.

Logic symbology is based on MIL-STD-806B in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The following special symbols are used on the diagrams:



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

Voltage and Waveform Test Conditions

577-177-D1 or D2

Voltages and waveforms (shown in blue) in the diagrams are not absolute and may vary from instrument to instrument because of differing component tolerances or internal calibration.

Typical DC voltage measurements were obtained using the following settings:

577-D1 or D2

VARIABLE COLLECTOR %	0
COLLECTOR SUPPLY POLARITY	AC
SERIES RESISTORS	.12
MAX PEAK VOLTS	6.5
STEP/OFFSET AMPL	1 VOLT
HORIZ VOLTS/DIV	200 V, COLLECTOR

All Dark Gray Buttons and Knobs in except:

STEP FAMILY	SINGLE
All Light Gray Buttons	out
INTENSITY	midrange
FOCUS	clockwise
BRIGHTNESS	clockwise
STORE buttons	out

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Terminal Selector	EMITTER GROUNDED, BASE TERM, STEP GEN
VERTICAL CURRENT/DIV	2 A

The waveforms shown are idealized. The waveforms actually observed may vary somewhat from these idealized waveforms.

The waveforms shown were obtained using the same settings as for voltage measurements, with the following exceptions:

STEP FAMILY	REP
BRIGHTNESS	centered

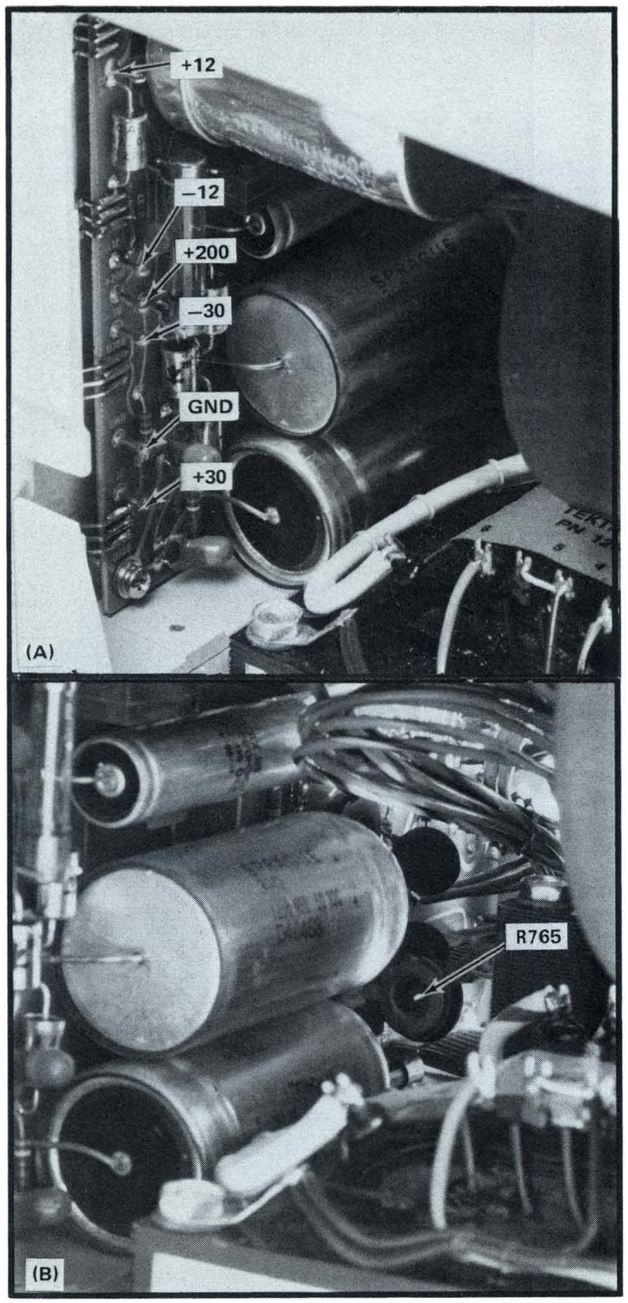


Fig. 7-1. (A) Location of test points on the Power Supply circuit board. (B) Location of R765.



Fig. 7-2. Location of (A) CRT socket access and (B) R1275, H V Adj R1245, Intensity Range.

Ⓐ

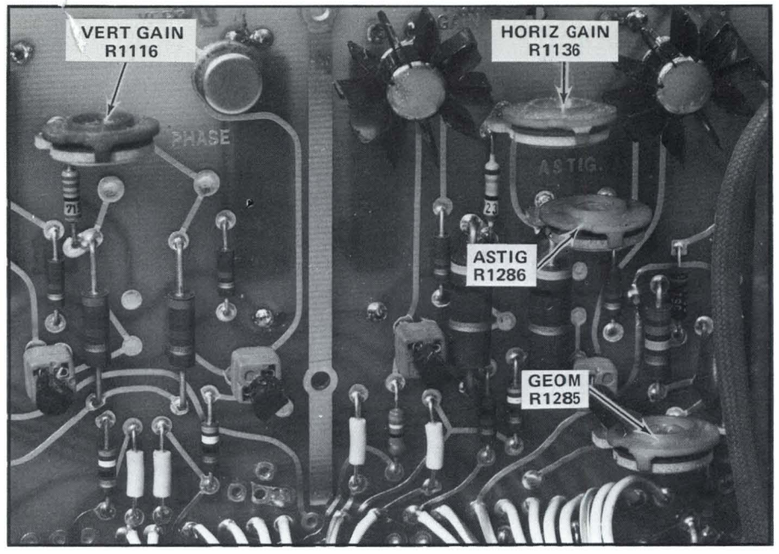


Fig. 7-3. Location of VERT GAIN, HORIZ GAIN, ASTIG, and GEOM controls.

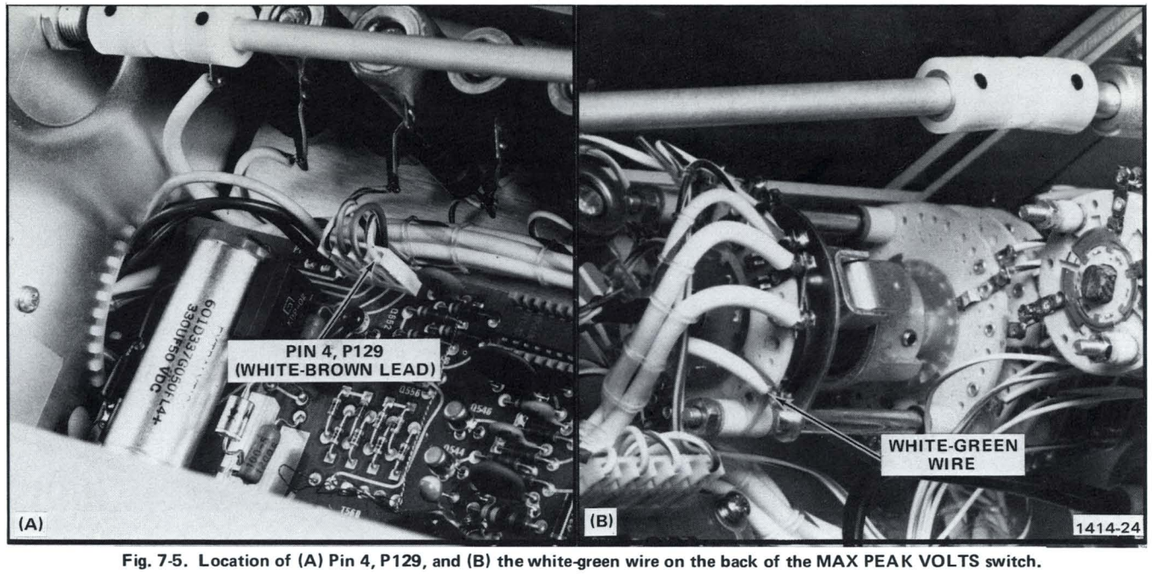


Fig. 7-5. Location of (A) Pin 4, P129, and (B) the white-green wire on the back of the MAX PEAK VOLTS switch.

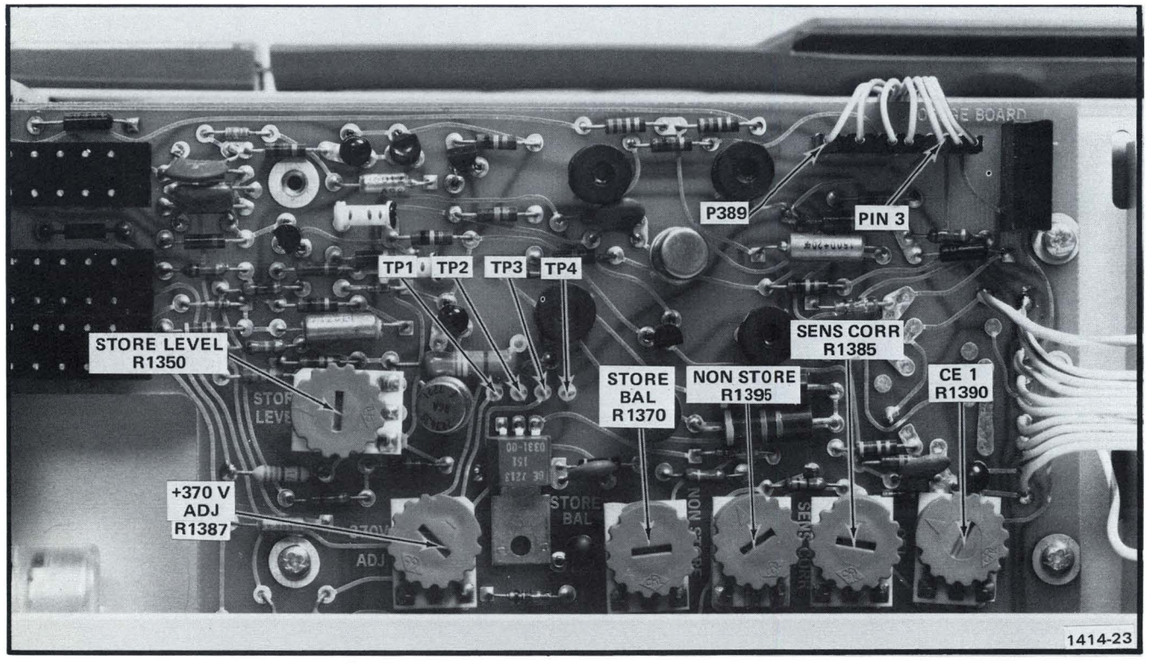


Fig. 7-4. Location of controls on the Storage board.

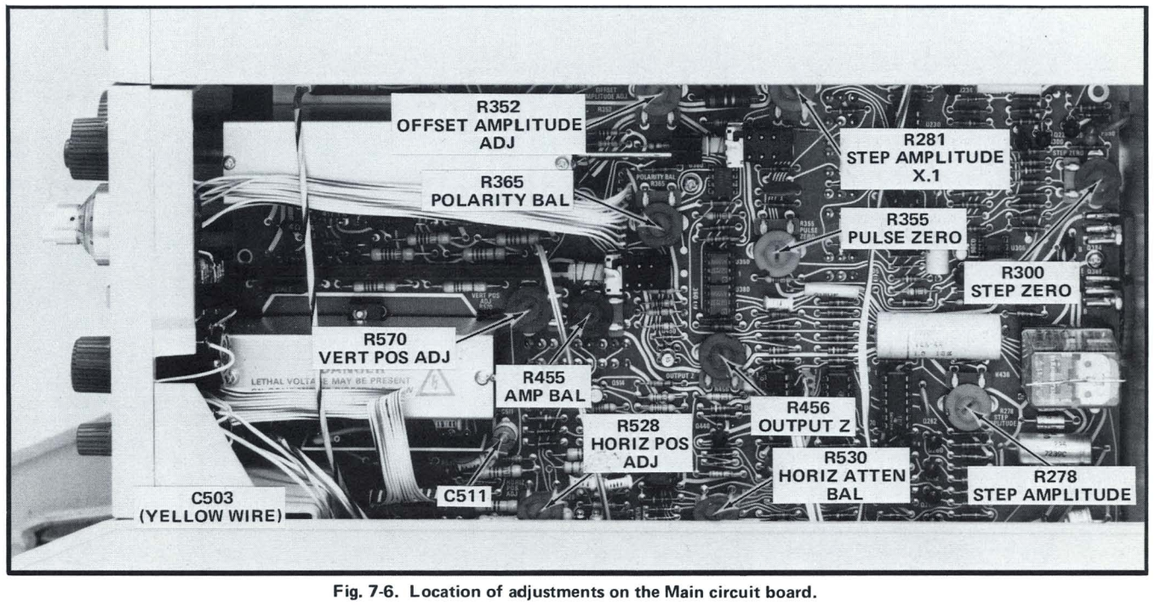


Fig. 7-6. Location of adjustments on the Main circuit board.

400V RMS

370V SUPPLY Q1386 Q1388

+370V

BACKPLATE SUPPLY Q1372 Q1384

R1370 STORE BAL

ERASE S1330

ERASE GENERATOR Q1334 Q1336

BACKPLATE CONTROL OP AMP Q1356 Q1362 Q1358 Q1364

R1350 STORE

STORE/NON-STORE & ERASE SELECTOR SWITCHING

R1390 CE1

V1291

COLLIMATION SUPPLY Q1392

R1325 BRIGHTNESS

DUTY-CYCLE MULTIVIBRATOR Q1310 Q1320

FLOOD-GUN ANODE SUPPLY Q1396

R1395 NON STORE

COLLECTOR SWEEP DIMMING

R1203

OVERRIDE SWITCH Q1302 Q1304

CATHODE CONTROL

FLOOD-GUN CATHODE SUPPLY Q1308

D1 STORAGE

COLLECTOR SUPPLY

SERIES RESISTORS

CURRENT SENSING RESISTORS

VERTICAL PREAMPLIFIER

BRIGHTNESS BLANKING

VERTICAL AMPLIFIER U542 U570 Q544 Q546 Q552 Q554 Q556 Q558 Q586 Q588

VERTICAL OUTPUT AMPLIFIER Q1104 Q1106 Q1114 Q1116

R1211

AUTO POSITION

Q1214

BEAM FINDER S1125

S640

HORIZONTAL AMPLIFIER U520 U530 Q514

HORIZONTAL OUTPUT AMPLIFIER Q1124 Q1126 Q1134 Q1136

STEP GENERATOR U206 U220 U230 U268 U270 U305 U430A Q210 Q212 Q224 Q234 Q260 Q262 Q276 Q306 Q310 Q324 Q330

STEP AMPLIFIER U350 U360 U430B,C,D U380 Q384 Q386 Q436 Q440 Q450 Q594

DEVICE UNDER TEST

HORIZONTAL ATTENUATOR

R1200 INTENSITY

PULSE INTENSIFICATION

TRACE INTENSIFICATION

Z AXIS AMPLIFIERS Q1222 Q1226 Q1236

GRID SUPPLY CR1241

-3450V

-3400V

R1273

177 TEST FIXTURES

POWER SUPPLY U722 U724 U732 Q754 Q760 Q766 Q772 Q786 Q788

TO ALL CIRCUITS

+40V UNREG

H.V. PRIMARY Q1252

R1275 HV ADJ

FEEDBACK CIRCUIT Q1262 Q1264 Q1278

CATHODE SUPPLY CR1247

6.3VAC

577-D1 OR D2

Ⓐ

BLOCK DIAGRAM

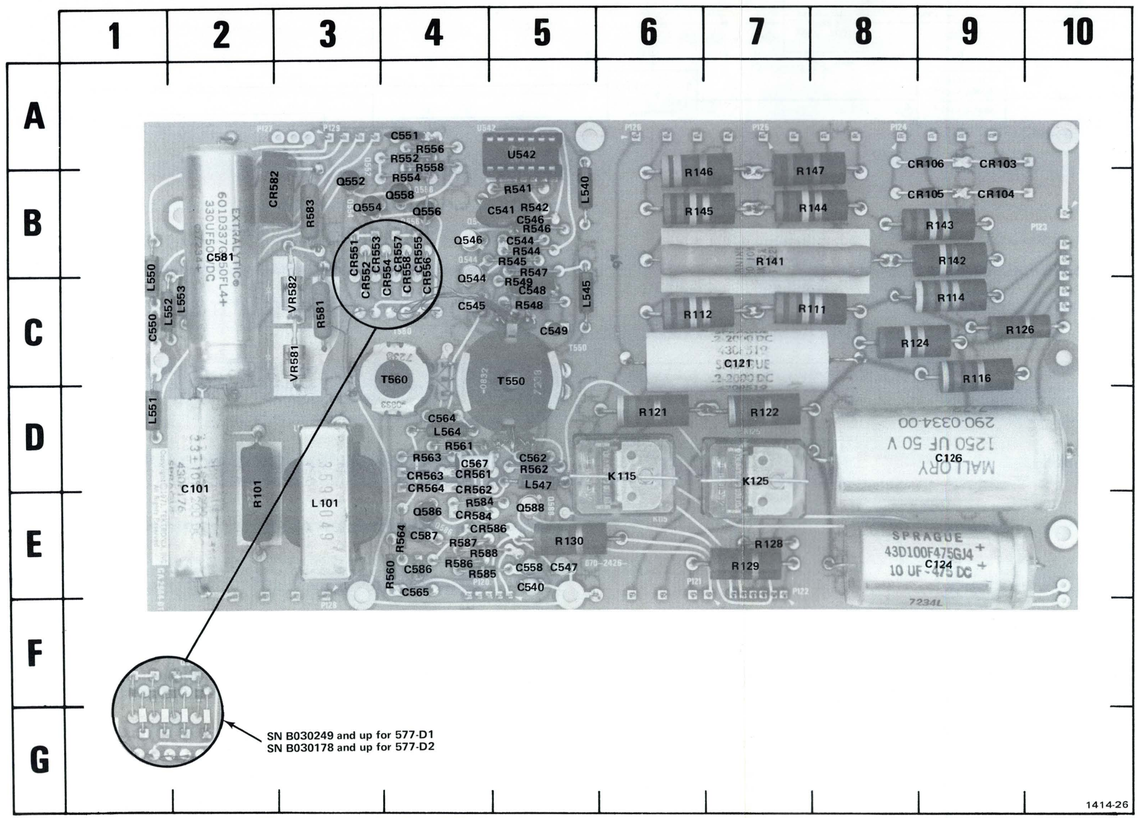


Fig. 7-7. A2 Collector Supply circuit board.

GRID LOCATOR

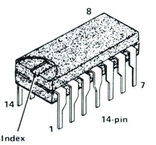
CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C101	2D	K115	6D	R147	7B
C121	7C	K125	7D	R541	5B
C124	9E			R542	5B
C126	9D	L101	3E	R544	5B
C540	5E	L540	5B	R545	5B
C541	5B	L545	5C	R546	5B
C544	5B	L547	5D	R547	5B
C545	4C	L550	1B	R548	5C
C546	5B	L551	1D	R549	5C
C547	5E	L552	1C	R552	4A
C548	5C	L553	2C	R554	4B
C549	5C	L564	4D	R556	4A
C550	1C			R558	4A
C551	4A	Q544	4B	R560	4E
C558	5E	Q546	4B	R561	4D
C562	5D	Q552	3B	R562	5D
C564	4D	Q554	3B	R563	4D
C565	4E	Q556	4B	R564	4E
C567	4D	Q558	4B	R581	3C
C581	2B	Q586	4E	R583	3B
C587	4E	Q588	5E	R584	4E
C586	4E			R585	4E
		R101	2E	R586	4E
CR103	9A	R111	8C	R587	4E
CR104	9B	R112	6C	R588	4E
CR105	9B	R114	9C		
CR106	9A	R116	9C	T550	5C
CR551	3B	R121	6D	T560	4C
CR552	3C	R122	7D		
CR553	3B	R124	8C	U542	5A
CR554	4C	R126	9C		
CR555	4B	R128	7E	VR581	3C
CR556	4C	R129	7E	VR582	3C
CR557	4C	R130	5E		
CR558	4C	R141	7B		
CR561	4D	R142	9B		
CR562	4D	R143	9B		
CR563	4D	R144	7B		
CR564	4D	R145	6B		
CR577	4B	R146	6B		
CR582	2B				
CR584	4E				
CR586	4E				

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.



PLASTIC-CASED TRANSISTORS

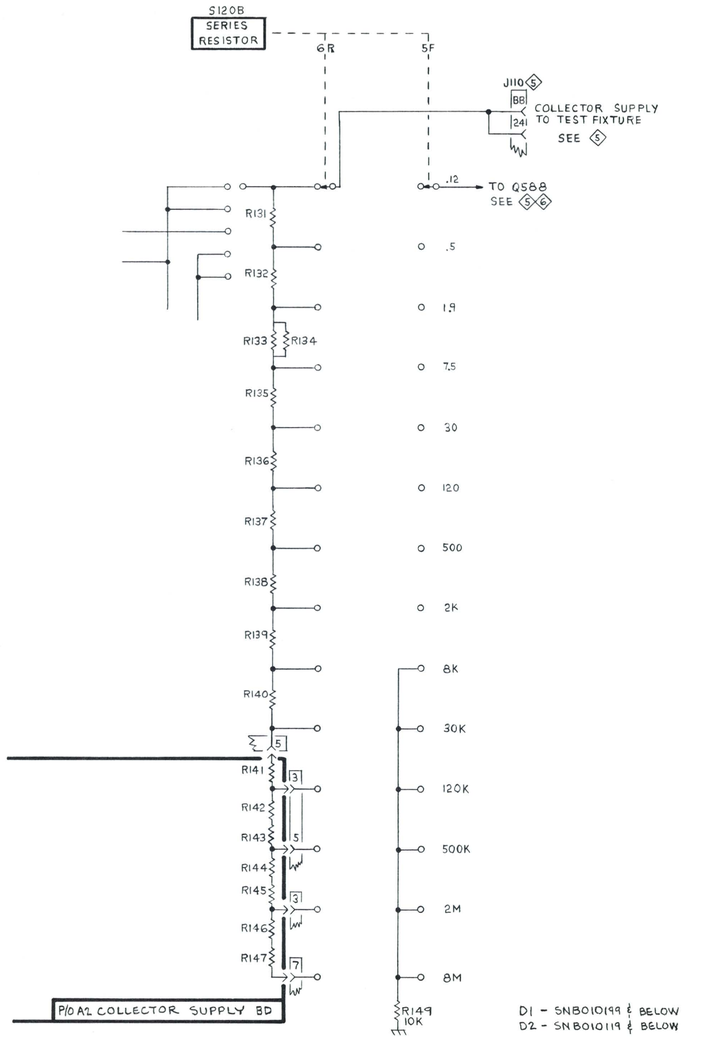
METAL-CASED TRANSISTORS



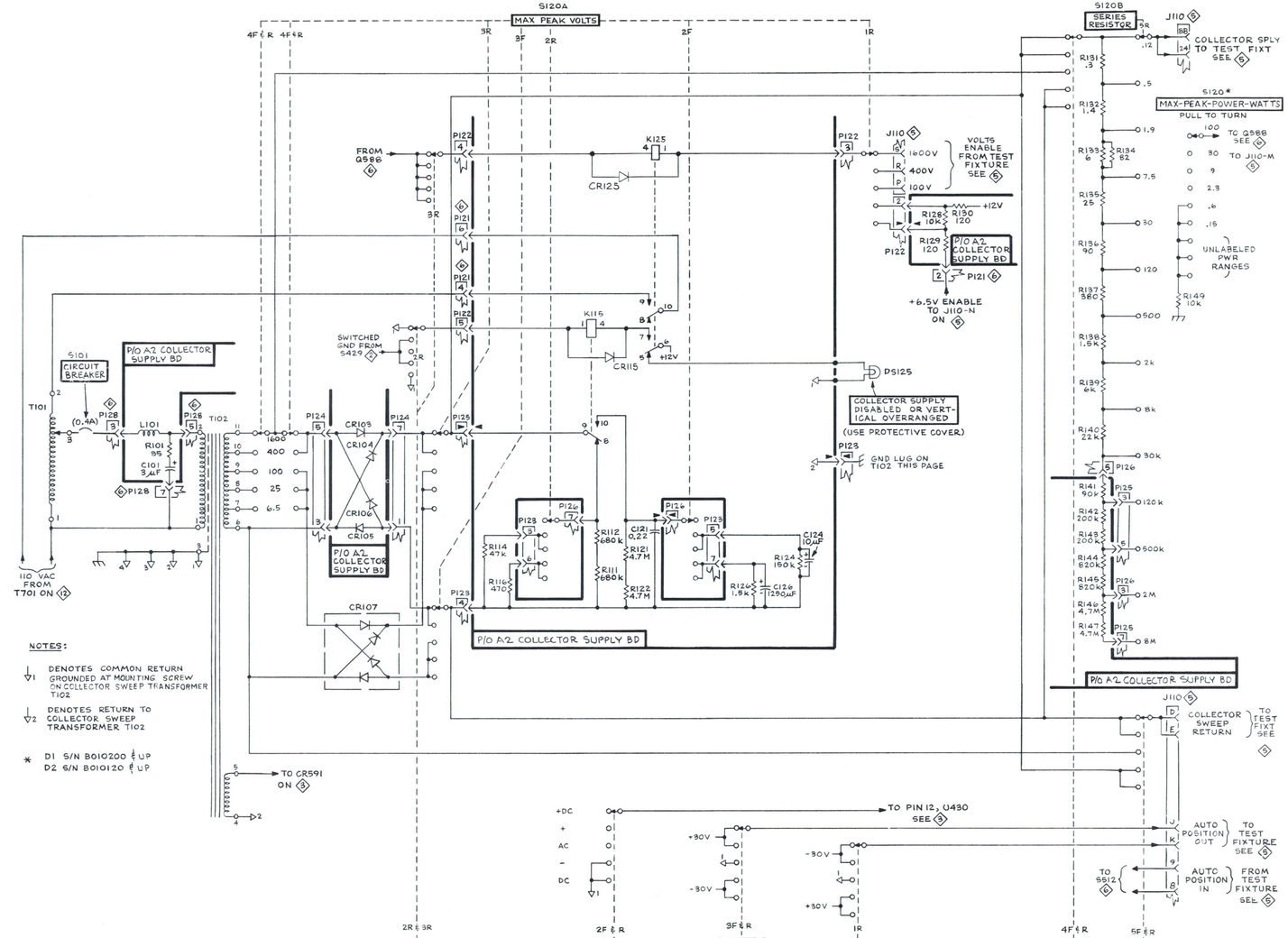
1414-27

INTEGRATED CIRCUITS

Fig. 7-8. Semiconductor lead configuration for Collector Supply circuit board.



COLLECTOR SUPPLY ADDENDUM TO ◇1



REV JAN 1965

COLLECTOR SUPPLY ◇1

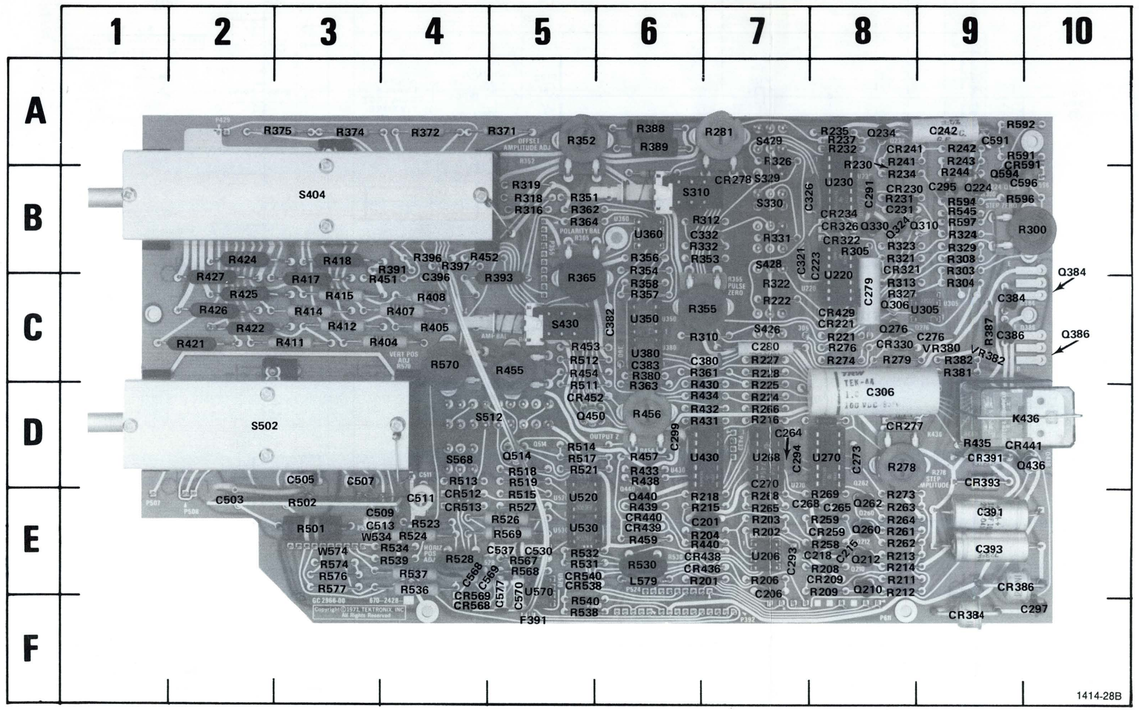


Fig. 7-9. A1 Main circuit board.

GRID LOCATOR

*See Parts List for serial number ranges.

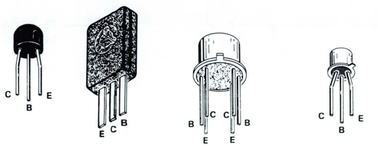
[1]Relocated to horizontal position switch.

[2]Relocated to vertical position switch.

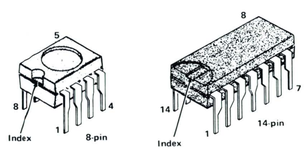
†Located on back of board.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C201	7E	CR259	8E	R201	7E	R310	7C	R418	3B	R567	5E
C206	7E	CR277	8D	R202	7E	R312	7B	R421	2C	R568	5E
C215	8E	CR278	7B	R203	7E	R313	8C	R422	2C	R569	5E
C218	8E	CR322	8B	R204	7E	R318	5B	R424	2B	R570	4C
C231	8B	CR326	8B	R206	7E	R319	5B	R425	2C	R574[2]	3E
C242	9A	CR330	8C	R208	8E	R321	8B	R426	2C	R576	3E
C264*	7D	CR384	9F	R209	8E	R322†	7C	R427	2C	R577	3E
C265	8E	CR386	9E	R211	8E	R323	8B	R430	7D	R591	9A
C268	7E	CR391	9D	R212	8E	R324	9B	R431	7D	R592	9A
C270*	7D	CR393	9D	R213	8E	R326	7A	R432	7D	R596	9B
C273	8D	CR429	8C	R214	8E	R327*	8C	R433	6D	R597	9B
C276	9C	CR436	7E	R215	7E	R329	9B	R434	7D		
C279	8C	CR438	7E	R216	7D	R331	7B	R435	9D	S310	6B
C291	8B	CR439	6E	R218	7E	R332	7B	R438	6D	S329†	7B
C293	7E	CR440	6E	R221	8E	R351	5A	R439	6E	S330†	7B
C294	7D	CR441	9D	R222	7C	R352	5A	R440	7E	S404	3B
C295	9B	CR441	9D	R224	7D	R353	7B	R450	5C	S426†	7C
C297	10F	CR452	5D	R225	7D	R354	6B	R451	4C	S428†	7C
C299	8D	CR512	4E	R227	7C	R355	6C	R452	4C	S429†	7A
C306	8B	CR513	4E	R228	7C	R356	6B	R453	5C	S430	5C
C321*	7B	CR538	5E	R230*	8B	R357	6C	R455	5C	S502	2D
C332	7B	CR540	5E	R231	8B	R358	6C	R456	6D	S512†	5D
C380	7C	CR568	4F	R232	8A	R361	7C	R457	6D	S568†	4D
C382*	5C	CR569	4E	R234	8B	R362	5B	R459	6E		
C383*	6D	CR591	10B	R235	8A	R363	6D	R501	3E	U206	7E
C384	9C			R237	8A	R364	5B	R502	3E	U220	8B
C386	9C	F391*	F5	R241	8A	R365	5C	R511	5D	U230	8B
C391	9E			R242	9A	R371	5A	R512	5C	U268	7D
C393	9E	K436	10D	R244	9B	R372	4A	R513	4D	U270	8D
C396	4C			R258	8E	R374	3A	R514	5D	U305	9C
C503	2E	L579	6E	R259	8E	R375	3A	R515	5E	U350	9C
C505	3D			R261	8E	R380	6C	R517	5D	U360	6B
C507	3D	Q210	8E	R262	8E	R381	9C	R518	5D	U380	6C
C509	4E	Q212	8E	R263	8E	R382*	9C	R519	5D	U430	7D
C511	4E	Q224	9B	R264	8E	R387	9C	R521	5D	U520	5E
C513	3E	Q234	8A	R265	7E	R388	6A	R523	4E	U530	5E
C530	5E	Q260	8E	R266	7D	R389	6A	R524	4E	U570	5E
C537	5E	Q262	8E	R268	7E	R391	4B	R526	5E		
C568	4E	Q276	8C	R269	8E	R393	5C	R527	5E	VR380*	9C
C569	4E	Q276	8C	R273	8E	R396	4B	R528	4E	VR383*	9C
C570	5F	Q306	8C	R274	8C	R397	4B	R530	6E		
C577	5F	Q310	9B	R276	8C	R404	4C	R531	5E	W534*	4E
C591	9A	Q324	8B	R278	8D	R405	4C	R532	5E	W574*	3E
C596	10B	Q330	8B	R279	8C	R407	4C	R534	4E		
		Q384	10C	R281	7A	R408	4C	R536	4E		
CR209	8E	Q436	10D	R300	10B	R411	3C	R537	4E		
CR221	8C	Q440	6D	R303	9B	R412	3C	R538	5F		
CR230*	8B	Q450	5D	R304	9C	R414	3C	R539	4E		
CR234	8B	Q514	5D	R305† *	8B	R415	3C	R540	5F		
CR241	8A	Q594	9B	R308	9B	R417	3C	R545	9B		

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

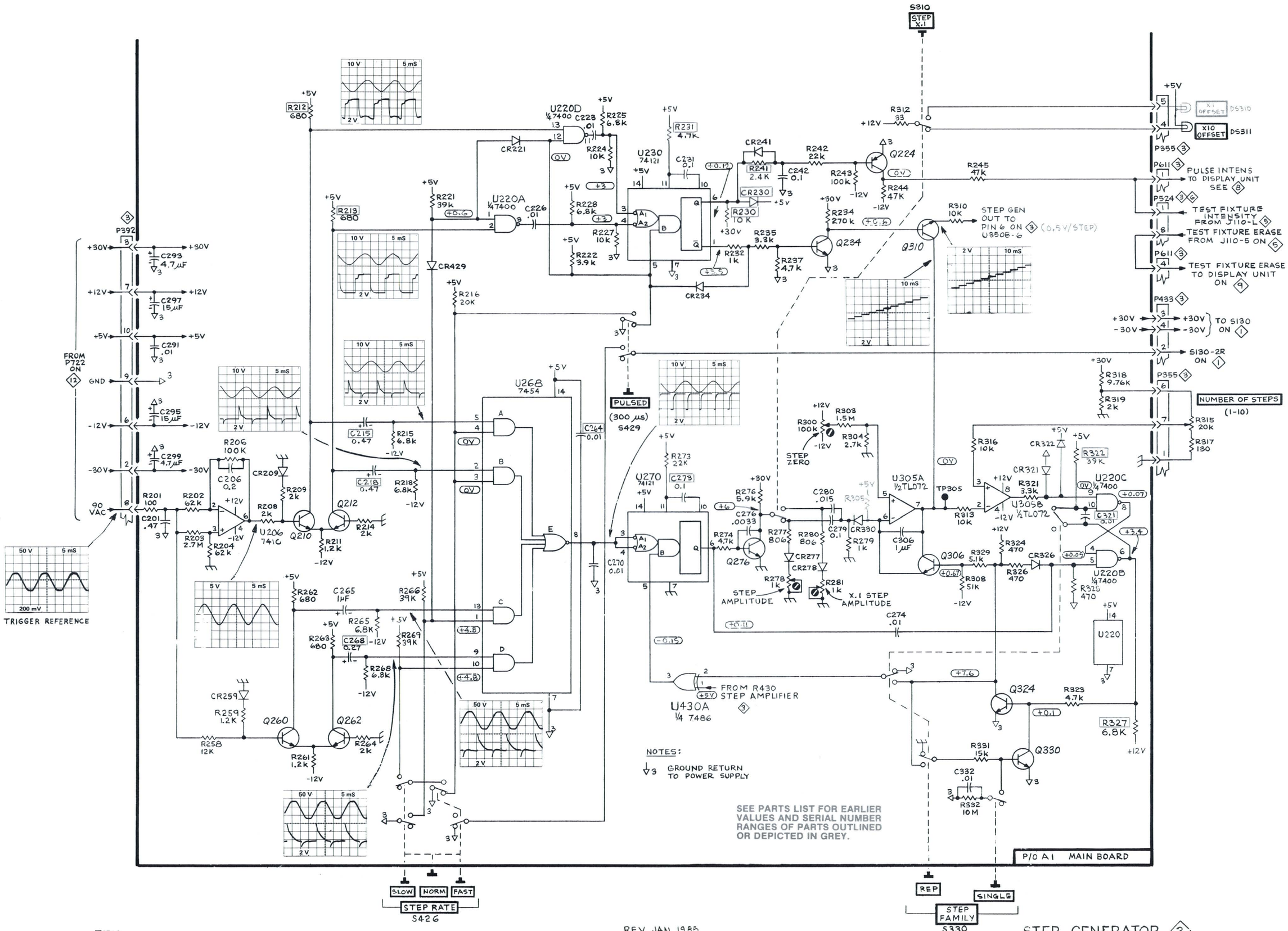


PLASTIC-CASED TRANSISTORS METAL-CASED TRANSISTORS



INTEGRATED CIRCUITS

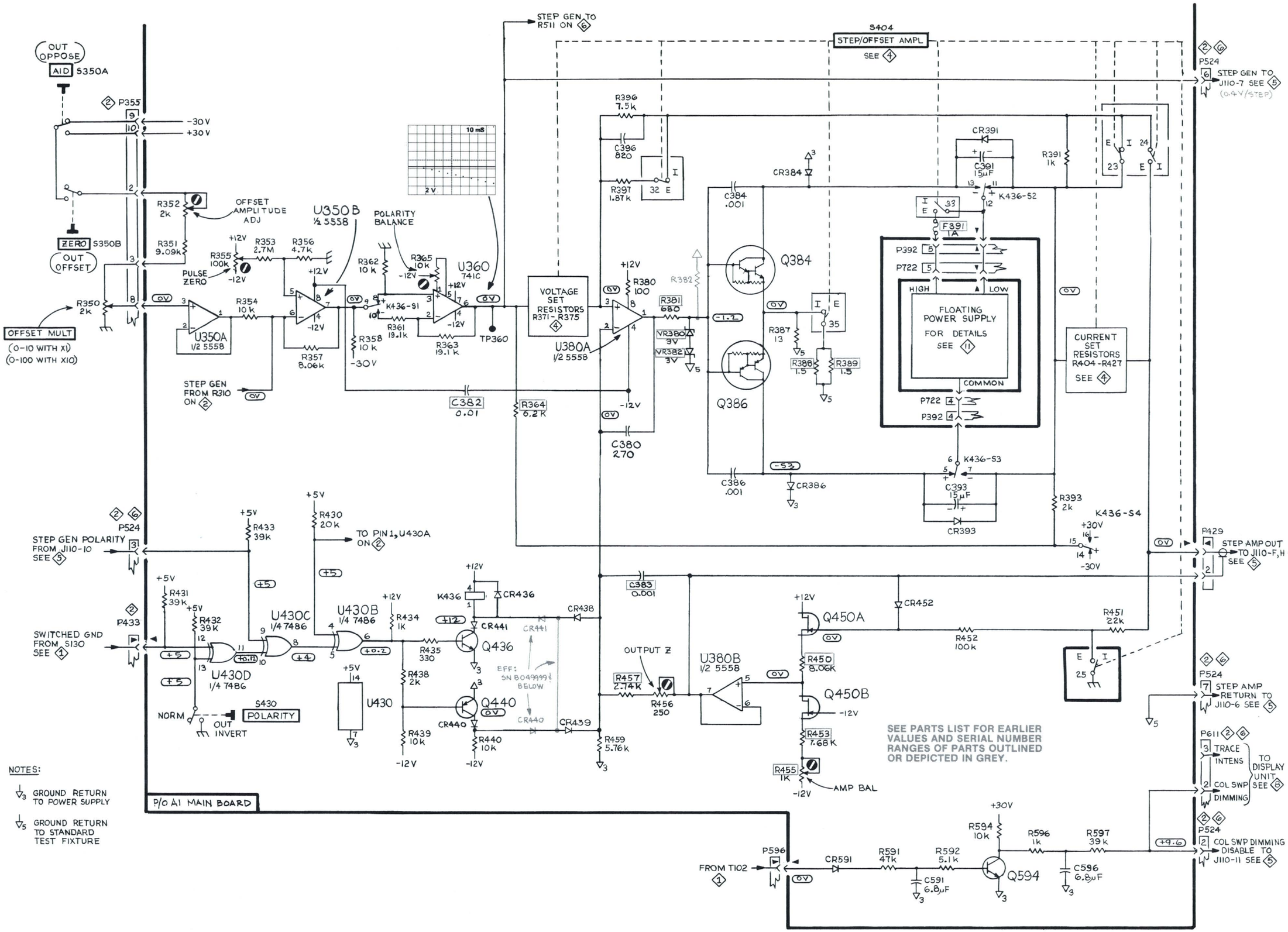
Fig. 7-10. Semiconductor lead configuration for Main circuit board.

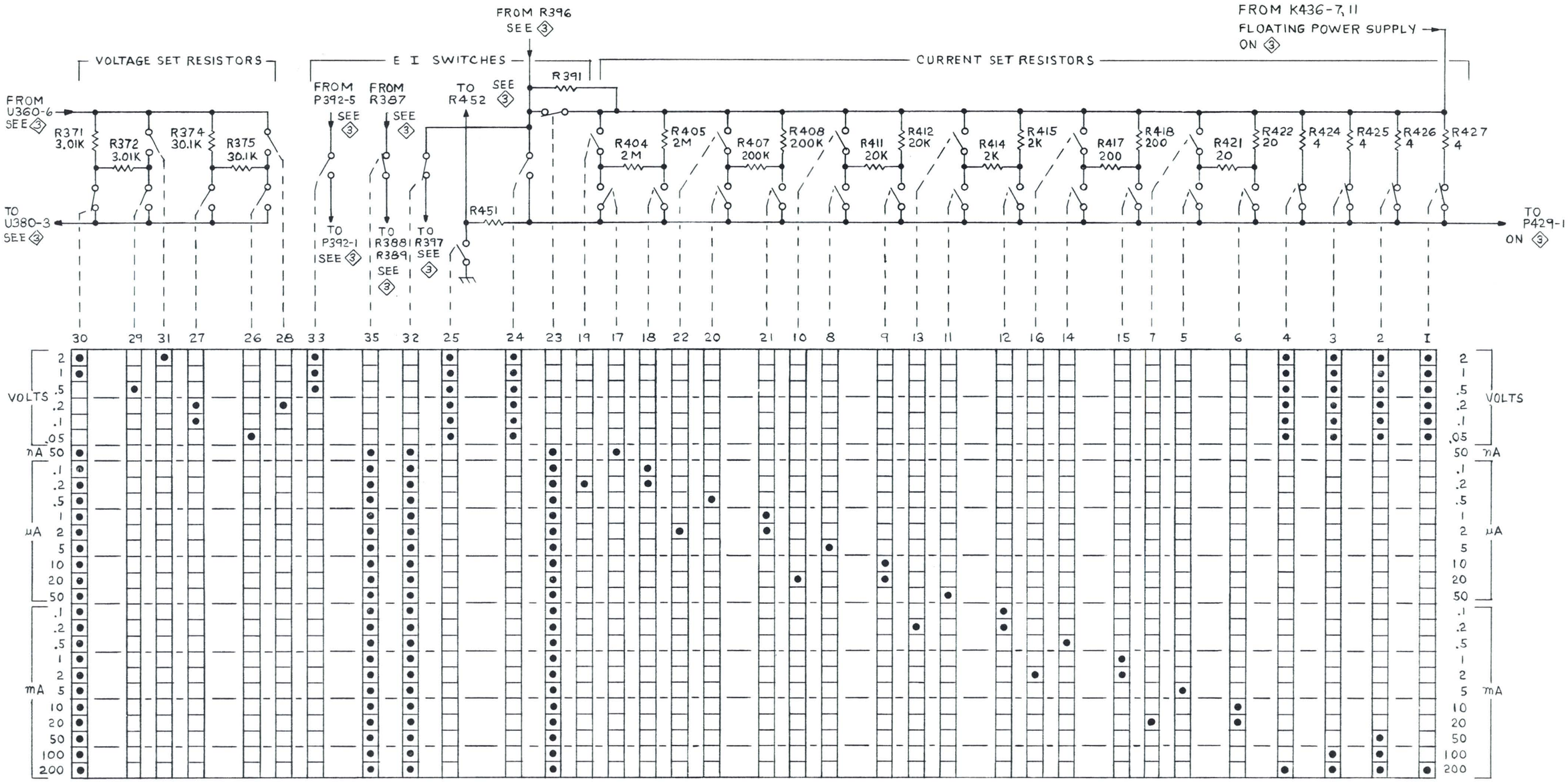


NOTES:

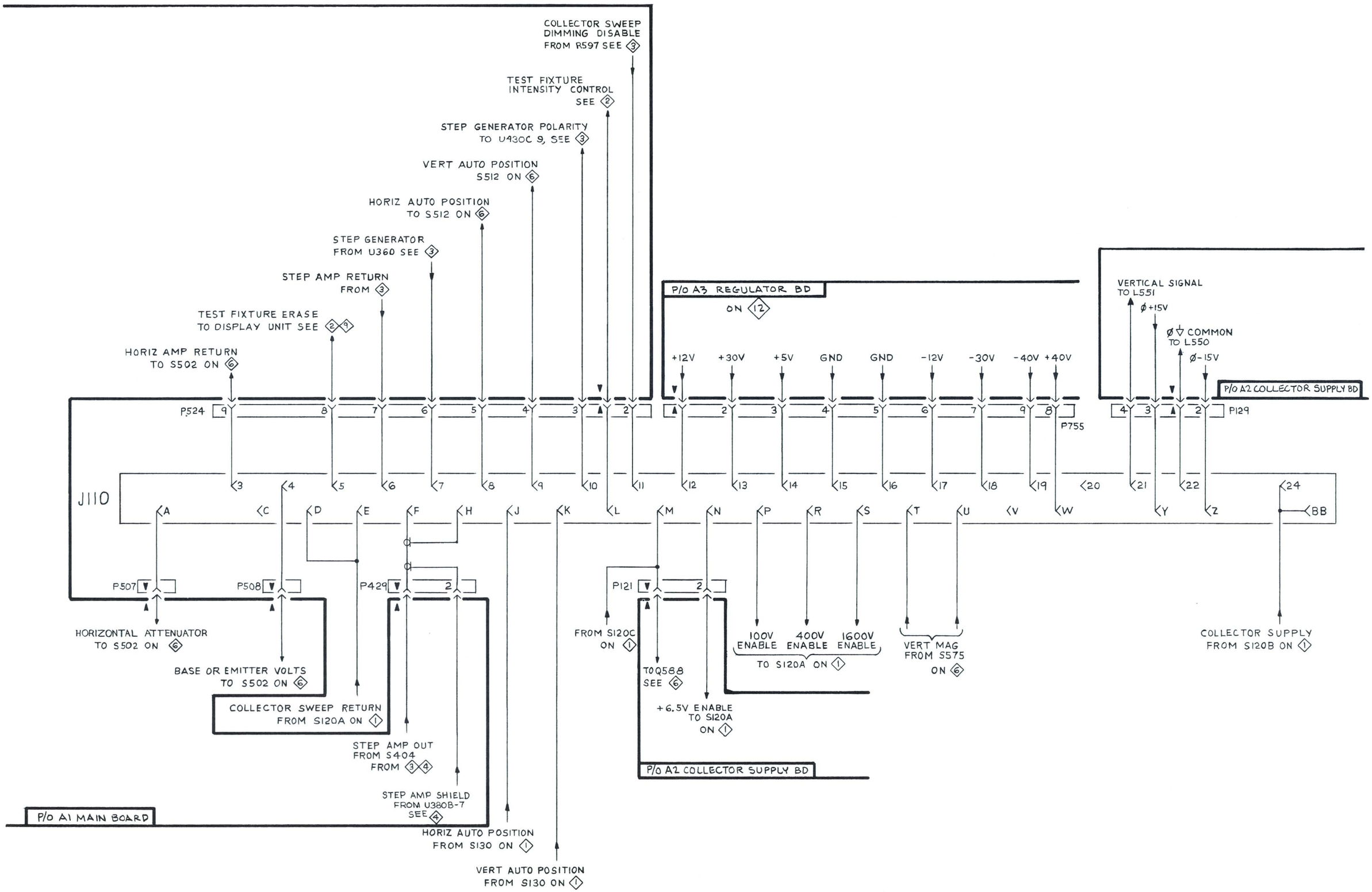
3 GROUND RETURN TO POWER SUPPLY

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.


OUT OPPOSE AID S350A
ZERO S350B
OUT OFFSET
OFFSET MULT
(0-10 WITH X1)
(0-100 WITH X10)
P355
-30V
+30V
R352 2k
OFFSET AMPLITUDE ADJ
R351 9.09k
R350 2k
PULSE ZERO
R355 100k
R353 2.7M
R356 4.7k
U350A 1/2 5558
R354 10k
R357 8.06k
U350B 1/2 5558
R362 10k
R365 10k
POLARITY BALANCE
U360 741C
K436-S1
R361 19.1k
R358 10k
R363 19.1k
TP360
STEP GEN FROM R310 ON 2
C382 0.01
R364 6.2K
STEP GEN TO R511 ON 6
VOLTAGE SET RESISTORS R371 - R375 4
U380A 1/2 5558
R380 100
R381 680
VR380 3V
VR382 3V
R382
Q384
Q386
R387 13
R386 1.5
R389 1.5
C380 270
C384 .001
C386 .001
CR384
CR386
R396 7.5k
C396 820
R397 1.87k
S404 STEP/OFFSET AMPL SEE 4
CR391
C391 15µF
R391 1k
K436-S2
F391 1A
P392
P722
HIGH
LOW
FLOATING POWER SUPPLY FOR DETAILS SEE 11
COMMON
CURRENT SET RESISTORS R404 - R427 SEE 4
P524 STEP GEN TO J110-7 SEE 5 (0.4V/STEP)
K436-S3
C393 15µF
CR393
R393 2k
K436-S4
+30V
-30V
P429 STEP AMP OUT TO J110-F,H SEE 5
C383 0.001
CR452
R451 22k
R452 100k
Q450A
Q450B
R450 8.06K
R453 7.68K
R455 1K
AMP BAL
OUTPUT Z
R457 2.74K
R456 250
U380B 1/2 5558
P524 STEP AMP RETURN TO J110-6 SEE 5
P611 TRACE INTENS
COL SWP DIMMING
TO DISPLAY UNIT SEE 8
P524 COL SWP DIMMING DISABLE TO J110-11 SEE 5
P596
FROM T102 1
CR591
R591 47k
C591 6.8µF
R592 5.1k
Q594
R594 10k
R596 1k
R597 39k
C596 6.8µF
STEP GEN POLARITY FROM J110-10 SEE 5
P524
P433
SWITCHED GND FROM S130 SEE 1
R430 20k
TO PIN 1, U430A ON 2
R431 39k
R432 39k
R433 39k
U430C 1/4 7486
U430B 1/4 7486
U430D 1/4 7486
U430
R434 1K
R435 330
R438 2k
R439 10k
R440 10k
K436
CR436
CR438
CR439
CR440
CR441
Q436
Q440
EFF: SN B049999 & BELOW
S430 POLARITY
NORM
OUT INVERT
NOTES:
GROUND RETURN TO POWER SUPPLY
GROUND RETURN TO STANDARD TEST FIXTURE
P/O A1 MAIN BOARD
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.



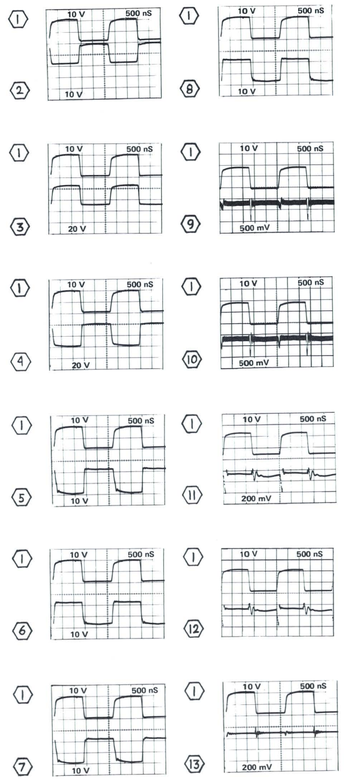
STEP/OFFSET AMPL S404 SHOWN IN 200mA POSITION

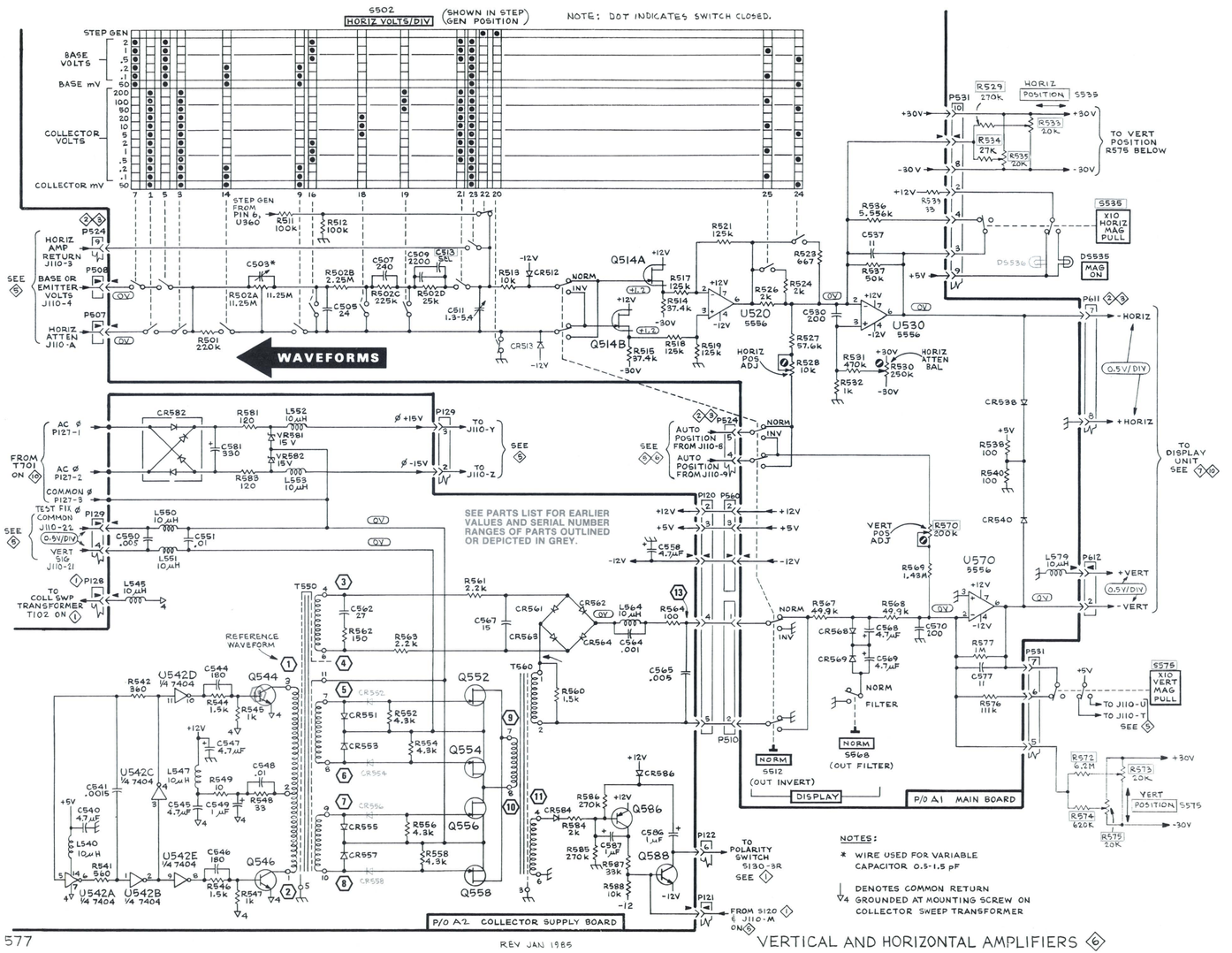


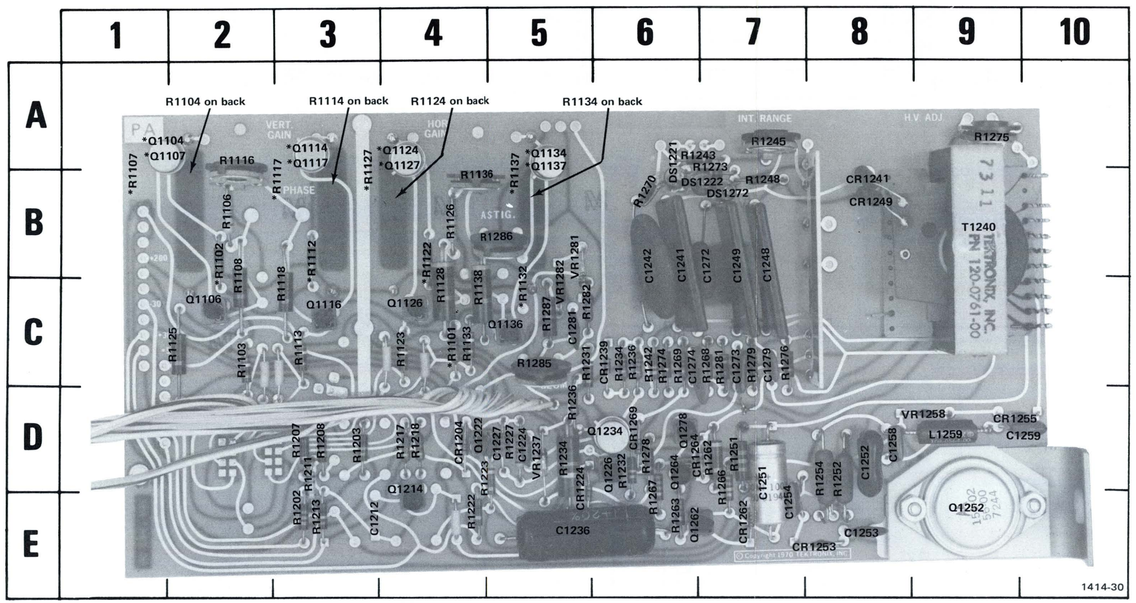
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TEST FIXTURE INTERFACE 5

THE TOP WAVEFORM IN EACH OF THE ILLUSTRATIONS IS THE REFERENCE WAVEFORM, AND IS INCLUDED TO SHOW THE AMPLITUDE AND PHASE RELATIONSHIP OF THE REFERENCE POINT TO EACH OF THE OTHER POINTS MEASURED.







*See Parts List for serial number ranges.

Fig. 7-11. A5 Deflection Amplifier/High Voltage circuit board.

GRID LOCATOR

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1212	3E			T1240	9B
C1224	5D	R1108	2B		
C1227	5D	R1112	3B	VR1237	5D
C1236	5E	R1113	3C	VR1258	9D
C1241	6B	R1114	3B	VR1281	5B
C1242	6B	R1116	2A	VR1282	5C
C1248	7B	R1117	2A		
C1249	7B	R1118	3C		
C1251	7D	R1122	4B		
C1252	8D	R1123	4C		
C1253	8E	R1124	3B		
C1254	7E	R1125	1C		
C1258	8D	R1126	4B		
C1259	9D	R1127	3A		
C1272	7B	R1128	4C		
C1273	7C	R1132	5C		
C1274	6C	R1133	4C		
C1279	7C	R1134	4A		
C1281	5C	R1136	4A		
		R1137	4C		
CR1204	4D	R1138	4C		
CR1224	5D	R1202	3E		
CR1239	6C	R1203	3D		
CR1241	8B	R1207	3D		
CR1249	8B	R1208	3D		
CR1253	8E	R1211	3D		
CR1255	9D	R1213	3E		
CR1262	7E	R1217	4D		
CR1264	6D	R1218	4D		
CR1269	6D	R1222	4E		
		R1223	4D		
DS1221	6B	R1227	5D		
DS1222	7B	R1231	5C		
DS1272	7B	R1232	6D		
		R1234	6C		
		R1236	5D		
L1259	9D	R1239	6C		
		R1242	6C		
Q1104	1A	R1243	6A		
Q1107	1A	R1245	7A		
Q1106	2C	R1248	7B		
Q1116	3C	R1251	7D		
Q1117	3B	R1252	8D		
Q1124	4A	R1254	8D		
Q1126	4C	R1262	7D		
Q1127	3B	R1263	6E		
Q1134	5A	R1266	7D		
Q1136	5C	R1267	6E		
Q1137	5B	R1268	7C		
Q1214	4D	R1269	6C		
Q1222	4D	R1270	6B		
Q1226	6D	R1273	7B		
Q1234	6D	R1274	6C		
Q1252	9E	R1275	9A		
Q1262	6E	R1276	7C		
Q1264	6E	R1278	6D		
Q1278	6D	R1279	7C		
		R1281	7C		
R1101	4C	R1282	5C		
R1102	2B	R1285	5C		
R1103	2C	R1286	5B		
R1104	2B	R1287	5C		
R1106	2B				

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

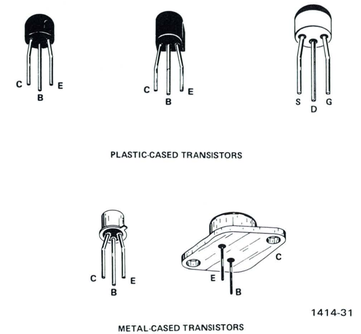
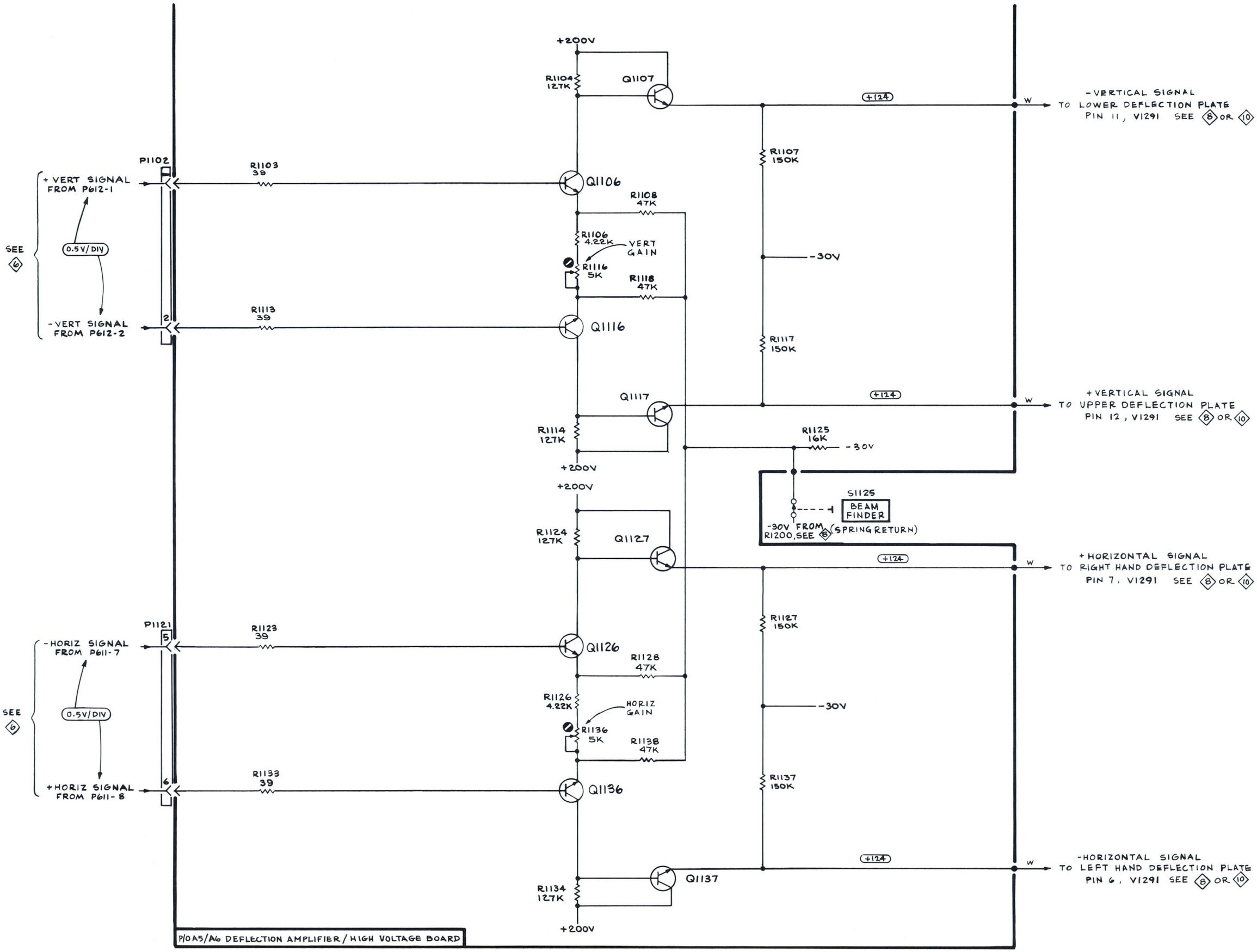


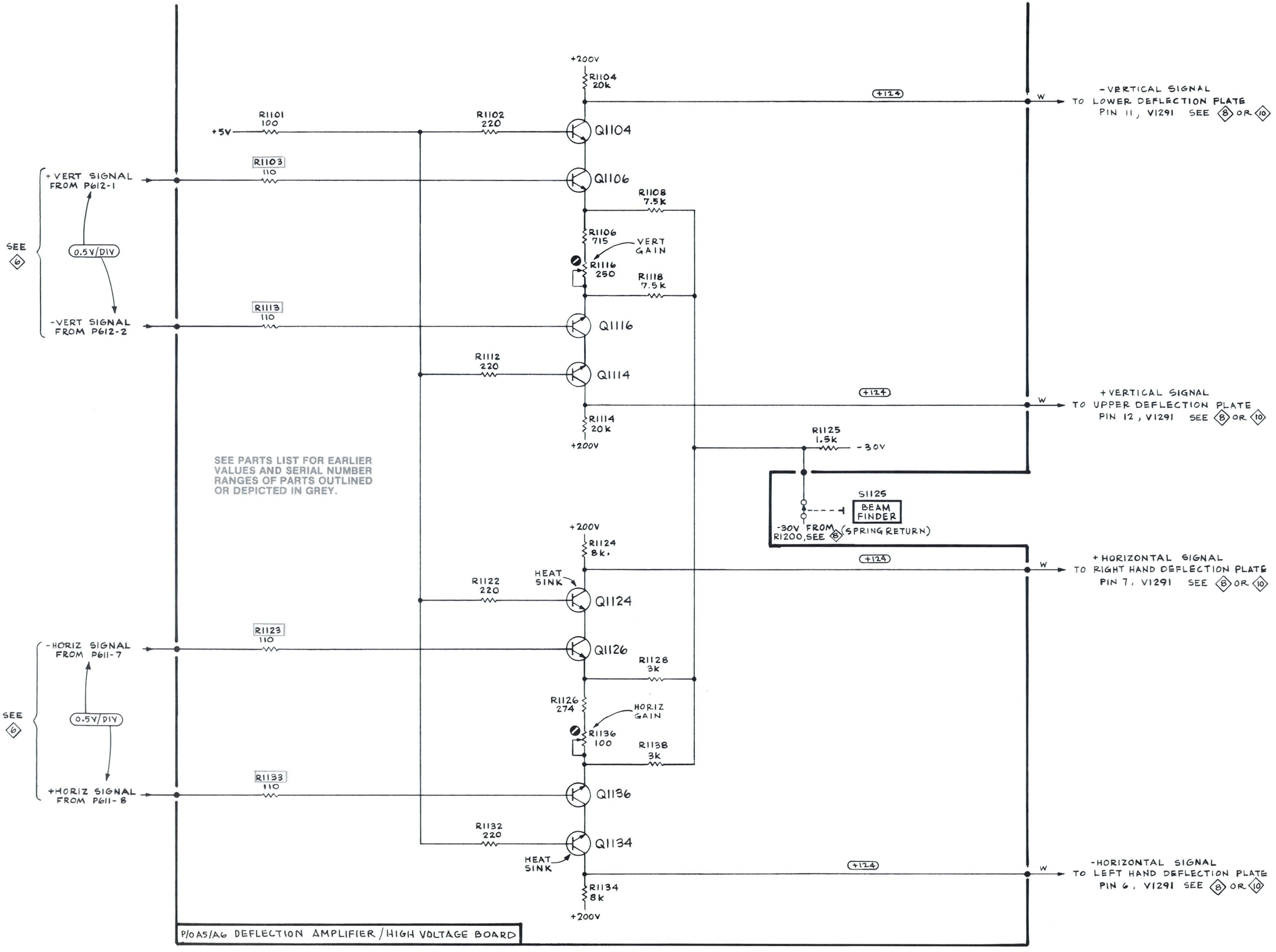
Fig. 7-12. Semiconductor lead configuration for Deflection Amplifier/High Voltage circuit board.



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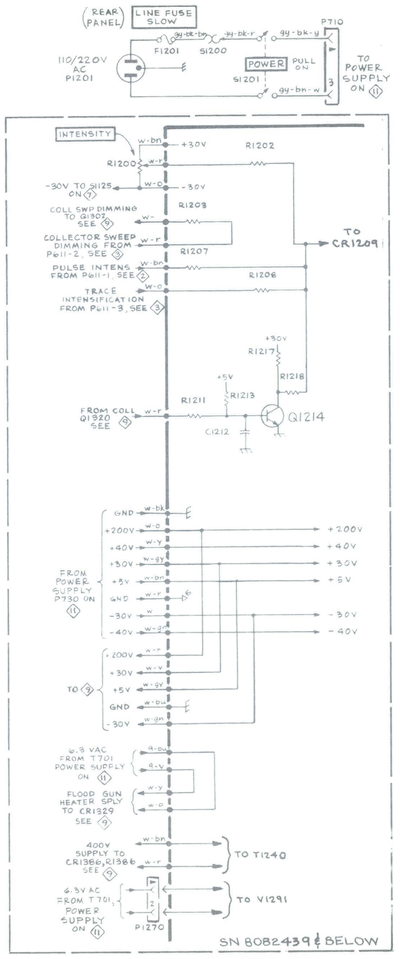
(SN B082440 & UP)

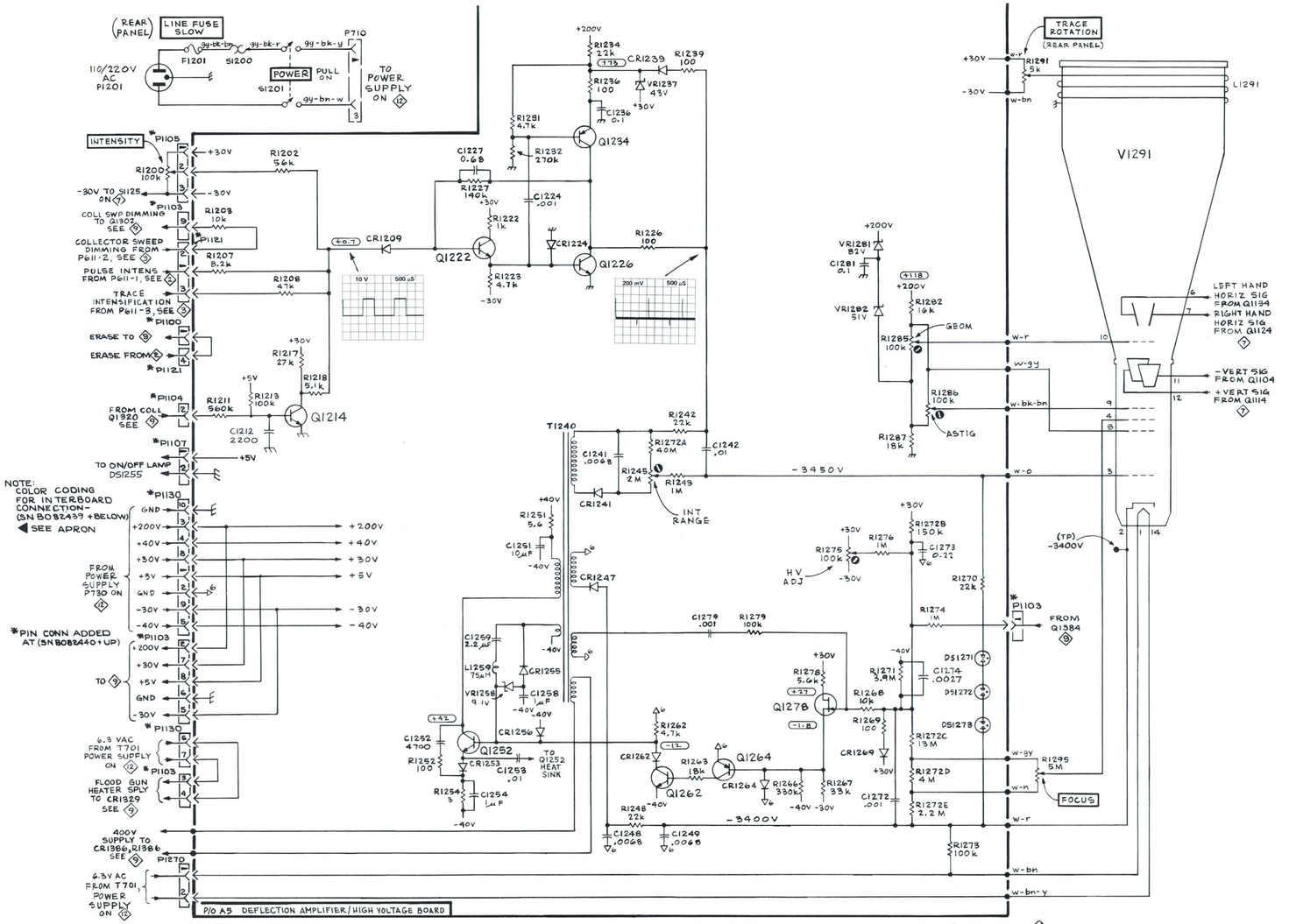
VERTICAL AND HORIZONTAL OUTPUT AMPLIFIER 7



(SN B082439 & BELOW)

VERTICAL AND HORIZONTAL OUTPUT AMPLIFIER 7


(REAR PANEL)
LINE FUSE SLOW
F1201
S1200
POWER PULL ON
S1201
P710
TO POWER SUPPLY ON
110/220V AC P1201
INTENSITY
R1200
R1202
R1203
R1207
R1208
R1217
R1218
R1211
R1213
Q1214
C1212
TO CR1209
FROM POWER SUPPLY P730 ON
TO
6.3 VAC FROM T701 POWER SUPPLY ON
FLOOD GUN HEATER SPLY TO CR1329 SEE
400V SUPPLY TO CR1386,R1386 SEE
TO T1240
6.3V AC FROM T701 POWER SUPPLY ON
TO V1291
P1270
SN B082439 & BELOW


(REAR PANEL)
LINE FUSE SLOW
F1201
S1200
POWER PULL ON
S1201
P710
TO POWER SUPPLY ON
110/220V AC P1201
INTENSITY
P1105
R1200 100k
R1202 56k
R1203 10k
R1207 8.2k
R1208 4.7k
P1103
P1121
P1100
P1107
P1104
P1130
R1211 560k
R1213 100k
R1217 27k
R1218 5.1k
Q1214
C1212 2200
TO ON/OFF LAMP DS1255
NOTE: COLOR CODING FOR INTERBOARD CONNECTION- (SN B082439 +BELOW) SEE APRON
FROM POWER SUPPLY P730 ON
*PIN CONN ADDED AT (SN B082440 + UP)
6.3 VAC FROM T701 POWER SUPPLY ON
FLOOD GUN HEATER SPLY TO CR1329 SEE
400V SUPPLY TO CR1386,R1386 SEE
6.3V AC FROM T701 POWER SUPPLY ON
P1270
CR1209
Q1222
Q1226
Q1234
R1222 1k
R1223 4.7k
R1224
R1226 100
R1227 140k
R1231 4.7k
R1232 270k
C1224 .001
C1227 0.68
R1234 22k
R1236 100
C1236 0.1
CR1239
R1239 100
VR1237 43V
T1240
R1242 22k
C1242 .01
R1272A 40M
R1245 2M
R1249 1M
INT RANGE
C1241 .0068
CR1241
R1251 5.6
C1251 10μF
CR1247
C1259 2.2μF
L1259 75μH
VR1258 9.1V
C1258 1μF
CR1255
C1252 4700
R1252 100
CR1253
C1253 .01
R1254 3
C1254 1μF
CR1256
Q1252
TO Q1252 HEAT SINK
R1262 4.7k
CR1262
R1263 18k
Q1262
Q1264
CR1264
R1266 330k
R1267 33k
R1248 22k
C1248 .0068
C1249 .0068
-3400V
C1279 .001
R1279 100k
R1278 5.6k
Q1278
R1268 10k
R1269 100
CR1269
C1272 .001
R1272C 15M
R1272D 4M
R1272E 2.2M
R1273 100k
R1295 5M
FOCUS
R1270 22k
R1274 1M
P1103
FROM Q1384
DS1271
DS1272
DS1273
C1274 .0027
R1275 100k
R1276 1M
C1273 0.22
HV ADJ
R1272B 150k
(TP) -3400V
TRACE ROTATION (REAR PANEL)
R1291 5k
L1291
V1291
VR1281 82V
C1281 0.1
VR1282 51V
R1282 16k
GEOM
R1285 100k
R1286 100k
ASTIG
R1287 18k
LEFT HAND HORIZ SIG FROM Q1134
RIGHT HAND HORIZ SIG FROM Q1124
-VERT SIG FROM Q1104
+VERT SIG FROM Q1114
P/O A5 DEFLECTION AMPLIFIER/HIGH VOLTAGE BOARD
577/D1
REV JAN 1985
CRT CIRCUIT

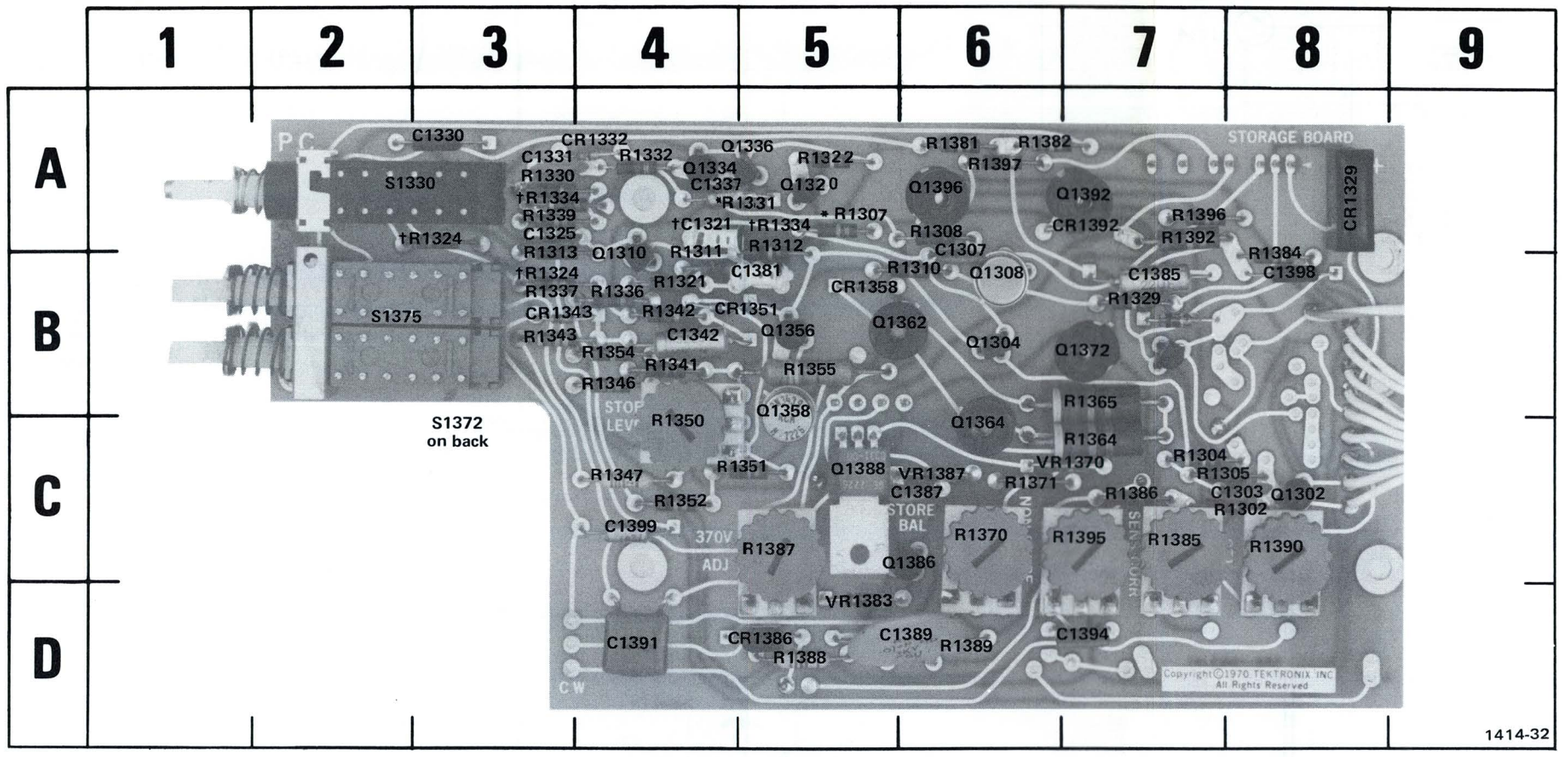


Fig. 7-13. A4 Storage circuit board.

*See Parts List for serial number ranges.

*See Parts List for serial number ranges.

†Relocated at SN B050000

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

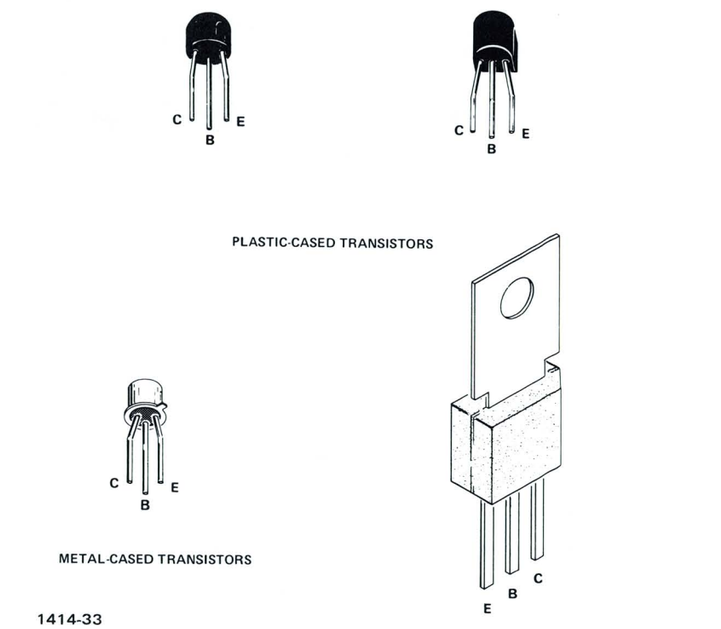


Fig. 7-14. Semiconductor lead configuration for Storage circuit board.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1303	8C	CR1329	8A	Q1362	6B	R1312	5A	R1351	5C	R1390	8C
C1307	6B	CR1332	4A	Q1364	6C	R1313	3B	R1354	4B	R1392	7A
C1321	4A	CR1343	3B	Q1372	7B	R1321	4B	R1355	5B	R1395	7C
C1325	3A	CR1351	4B	Q1384	7B	R1322	5A	R1359	4C	R1396	7A
C1330	3A	CR1358	5B	Q1386	6C	R1324	3A	R1364	7C	R1397	6A
C1331	3A	CR1386	5D	Q1388	5C	R1329	7B	R1365	7B		
C1337	4A	CR1392	7A	Q1392	7A	R1330	3A	R1370	6C	S1330	3A
C1342	4B			Q1396	6A	R1332	5A	R1371	6C	S1372	3C
C1381	5B	Q1302	8C			R1334	3A	R1381	6A	S1375	2B
C1385	7B	Q1304	6B	R1302	8C	R1336	4B	R1382	6A		
C1387	6C	Q1308	6B	R1304	7C	R1337	3B	R1384	8B	VR1370	7C
C1389	6D	Q1310	4A	R1305	8C	R1339	3A	R1385	7C	VR1387	6C
C1391	4D	Q1320	5A	R1307	5A	R1341	4B	R1386	7C	VR1388	5D
C1394	7D	Q1334	4A	R1308	6B	R1342	3B	R1387	5C	VR1396	7B
C1398	8B	Q1336	4A	R1310	6B	R1343	3B	R1388	5D		
C1399	4C	Q1356	5B	R1311	4B	R1346	4B	R1389	6D		
		Q1358	5B			R1347	4C				
						R1350	4C				

MORE

400V FROM T1240 (8)
w-bn
w-r
CR1386
C1386 0.47
R1386 10
R1387 1k
+370V ADJ
(+40)
R1388 5.11k
Q1386
VR1387 43V
C1387 .001
R1389 340k
C1389 .01
+30V
VR1388 6.2V
TP 2 +370V
Q1388
+370V
VR1370 110V
R1370 250k
+30V
STORE BAL
R1371 39k
Q1372
HEAT SINK
TP4 STORE BAL
Q1384
SENS CORRECT
R1385 5k
C1385 22µF
R1384 12k -30V
w-bn
SENSITIVITY CORRECTION TO R1274 ON (8)
P1389
(ERASE SELECT) UP
(STORE) UP
R1364 47k
R1365 47k
Q1364
HEAT SINK
Q1362
(ERASE SELECT) LWR
(STORE) LWR
R1381 330k
R1382 330k
CR1358
TP1 STORE LEVEL
Q1358
Q1356
R1351 20k
R1352 10k
CR1351
R1355 499k
R1354 150k -30V
C1391 0.1
+30V
R1336 5.1k
R1342 100
C1342 15µF
CR1343
R1346 18k
STORE LEVEL (+0.6)
R1350 5k
R1343 47k
R1347 53.6k
-30V
-30V
+5V
R1339 62k
C1337 0.1
CR1332
R1337 10k
R1341 7.5k
(+19)
+5V
R1334 6.2K
Q1336
R1330 1M
C1331 .01
R1332 2K
R1331 2K
Q1334
TEST FIXTURE ERASE FROM J110-5, SEE (2) (5)
w-y
S1330 ERASE
C1330 1µF
+30V
R1324 24k
BRIGHTNESS
CW
R1325 20k
R1313 2k
C1325 0.2
R1312 100k
R1322 100k
Q1310
(-30)
Q1320
(-1.3)
R1311 1.2M
R1321 1.2M
R1310 22k
C1311 2.2
C1321 2.2
-30V
10 V 500 µS
+200V
CW
R1390 250k
CE1
+200V
HEAT SINK
Q1392
CR1392
TP3 CE1
R1392 75k
-30V
+200V
R1396 62k
+200V
HEAT SINK
R1397 100
VR1396 140V
Q1396
(+140)
CW
R1395 100k
C1394 0.1
NON STORE
50 V 500 µS
ANODE
FLOOD GUNS
LOWER SCREEN
UPPER SCREEN
V1291
CE 1
+200V w-r
+30V w-v
+5V w-gy
GND w-bu
-30V w-gn
FROM (8)
C1399 5.6µF
C1398 1 µF
+200V
+30V
+5V
-30V
COLLECTOR SWEEP DIMMING FROM R1203 SEE (8)
w-
(+5.7)
Q1302
+5V
C1303 .001
(+1.4)
Q1304
R1302 1k
R1308 51k
R1304 470k
-30V
C1307
R1307 22k
R1308 1.5k
-30V
Q1308
(-30)
-30V
DS1390
+5V
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
CR1329
6.3 VAC FROM T701, POWER SUPPLY ON (12)
R1329 100k
-30V
A4 STORAGE BOARD
TO R1211 ON (8)
577/D1
REV JAN 1985
STORAGE CIRCUIT (9)

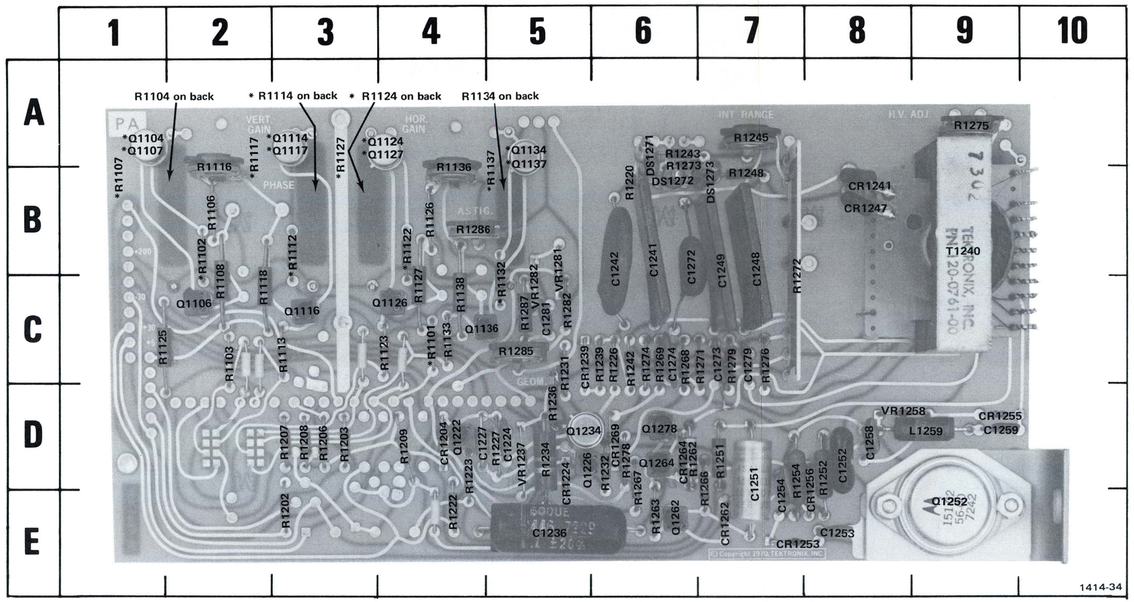


Fig. 7-15. A6 Deflection Amplifier/High Voltage circuit board.

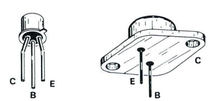
*See Parts List for serial number ranges.

CKT NO	GRID LOC
C1224	5D
C1227	4D
C1236	5E
C1241	6B
C1242	6B
C1248	7B
C1249	7B
C1251	7D
C1252	8D
C1253	8E
C1254	7E
C1258	8D
C1259	9D
C1272	6B
C1273	7C
C1274	6C
C1279	7C
C1281	5C
CR1204	4D
CR1224	5D
CR1239	5C
CR1241	8B
CR1247	8B
CR1255	9D
CR1256	8E
CR1262	7E
CR1264	6D
CR1269	6D
DS1271	6A
DS1272	6B
DS1273	7B
L1259	9D
Q1104	1A
Q1106	2C
Q1107	1A
Q1114	3A
Q1116	3C
Q1117	3B
Q1124	3A
Q1126	4C
Q1127	3B
Q1134	5A
Q1136	4C
Q1137	5B
Q1222	4D
Q1226	5D
Q1234	5D
Q1252	9E
Q1262	6E
Q1264	6D
Q1278	6D
R1101	4C
R1102	2B
R1103	2C
R1104	1A
R1106	2B
R1108	2C
R1112	3B
R1113	3C
R1114	3A
R1116	2A
R1117	2A
R1118	2C
R1122	4B
R1123	4B
R1124	3B
R1125	1C
R1126	4B
R1127	3A
R1128	4C
R1132	5C
R1133	4A
R1134	4A
R1136	4A
R1137	4C
R1138	4C
R1202	3E
R1203	3D
R1206	3D
R1207	3D
R1220	6B
R1222	4E
R1223	4D
R1226	6C
R1227	5D
R1231	5C
R1232	6D
R1234	5D
R1236	6C
R1239	6C
R1242	6A
R1243	7A
R1245	7D
R1252	7D
R1254	7D
R1262	6D
R1263	6E
R1266	7D
R1267	6D
R1268	6C
R1269	6C
R1271	7C
R1272	7C
R1273	6A
R1274	6C
R1275	9A
R1276	7C
R1278	6D
R1279	7C
R1282	5C
R1285	5C
R1286	4B
R1287	5C
T1240	9B
VR1237	5D
VR1258	9D
VR1281	5B
VR1282	5C

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

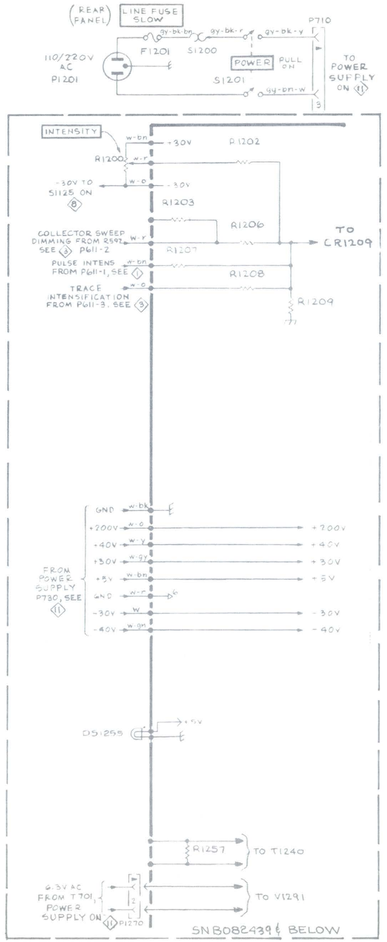


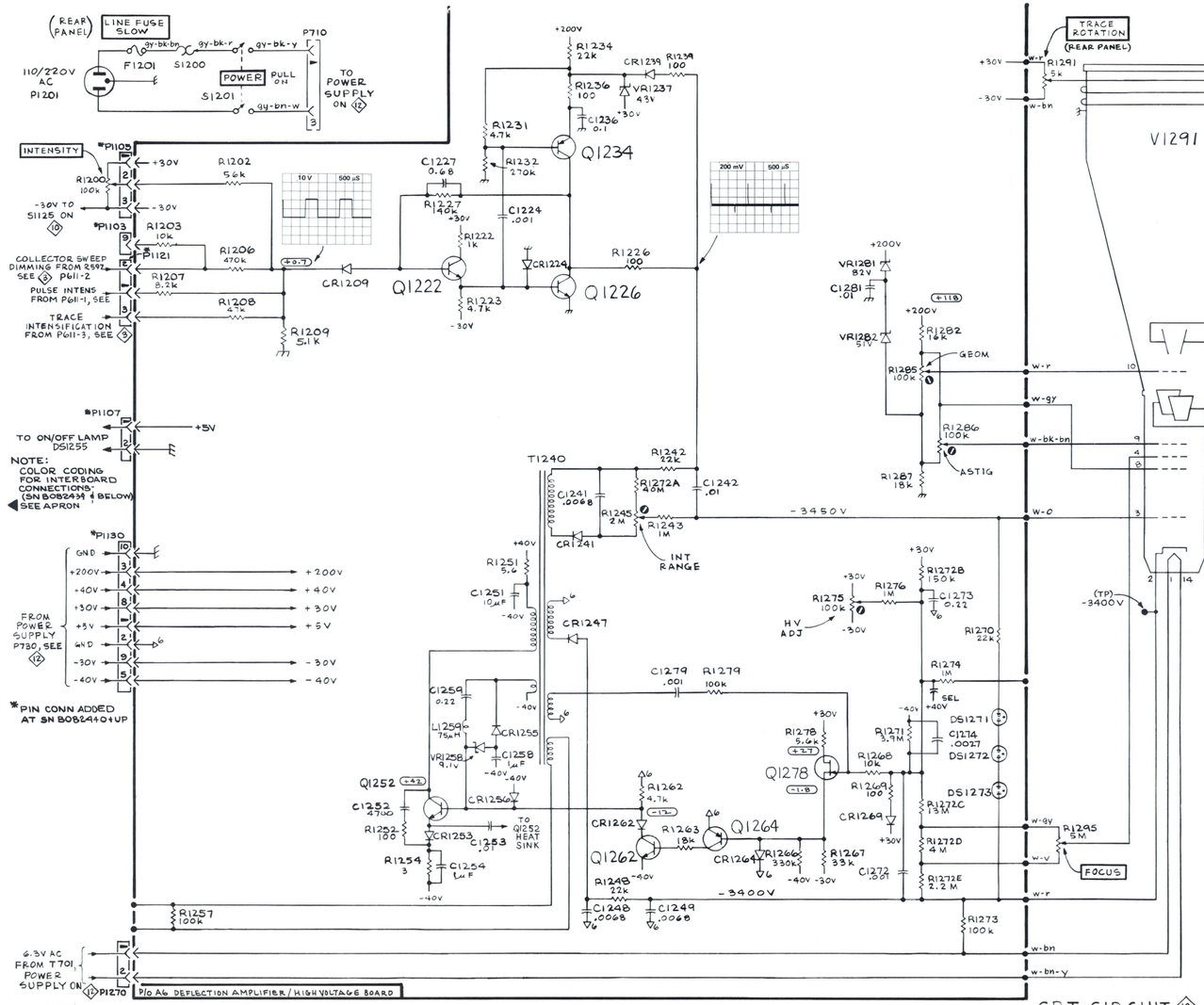
PLASTIC-CASED TRANSISTORS



METAL-CASED TRANSISTORS

Fig. 7-16. Semiconductor lead configuration for Deflection Amplifier/High Voltage circuit board.


(REAR PANEL)
LINE FUSE SLOW
F1201
S1200
S1201
POWER
PULL ON
P710
TO POWER SUPPLY ON 11
110/220V AC P1201
INTENSITY
R1200
R1202
R1203
R1206
R1207
R1208
R1209
TO CR1209
-30V TO S1125 ON 8
COLLECTOR SWEEP DIMMING FROM 2592 SEE 2 P611-2
PULSE INTENS FROM P611-1, SEE 2
TRACE INTENSIFICATION FROM P611-3, SEE 2
FROM POWER SUPPLY P730, SEE 11
GND
+200V
+40V
+30V
+5V
-30V
-40V
DS1255
R1257
TO T1240
TO V1291
6.3V AC FROM T701 POWER SUPPLY ON 11
P1270
SN B082439 & BELOW


(REAR PANEL)
LINE FUSE SLOW
F1201
S1200
S1201
POWER
PULL ON
P710
TO POWER SUPPLY ON 12
110/220V AC P1201
INTENSITY
*P1105
R1200
R1202
R1203
*P1103
*P1121
R1206
R1207
R1208
R1209
-30V TO S1125 ON 10
COLLECTOR SWEEP DIMMING FROM 2592 SEE 2 P611-2
PULSE INTENS FROM P611-1, SEE 2
TRACE INTENSIFICATION FROM P611-3, SEE 2
CR1209
Q1222
Q1223
Q1224
Q1226
Q1227
Q1234
R1222
R1223
R1224
R1226
R1227
R1231
R1232
R1234
R1236
R1239
CR1239
VR1237
CR1224
*P1107
TO ON/OFF LAMP DS1255
+5V
NOTE: COLOR CODING FOR INTERBOARD CONNECTIONS (SN B082431 & BELOW) SEE APRON
*P1130
FROM POWER SUPPLY P730, SEE 12
GND
+200V
+40V
+30V
+5V
-30V
-40V
*PIN CONN ADDED AT SN B082404 UP
T1240
R1242
R1272A
C1242
C1241
R1245
R1243
CR1241
INT RANGE
-3450V
R1251
C1251
CR1247
C1259
L1259
CR1255
VR1258
C1258
CR1256
Q1252
C1252
R1252
CR1253
C1253
R1254
C1254
TO Q1252 HEAT SINK
C1279
R1279
R1262
CR1262
Q1262
R1263
Q1264
CR1264
R1266
R1267
R1248
C1248
C1249
-3400V
R1257
R1273
6.3V AC FROM T701 POWER SUPPLY ON 12
P1270
P/O A6 DEFLECTION AMPLIFIER/HIGH VOLTAGE BOARD
TRACE ROTATION (REAR PANEL)
R1291
L1291
V1291
VR1281
C1281
VR1282
R1282
R1285
GEOM
R1286
ASTIG
R1287
LEFT HAND HORIZ SIG FROM Q1134 10
RIGHT HAND HORIZ SIG FROM Q1124
-VERT SIG FROM Q1104 10
+VERT SIG FROM Q1114 10
(TP) -3400V
R1275
HV ADJ
R1276
R1272B
C1273
R1270
R1278
Q1278
R1268
R1269
R1271
C1274
DS1271
DS1272
DS1273
R1272C
R1272D
R1272E
R1279
SEL
R1295
FOCUS
577/D2
REV JAN 1985
CRT CIRCUIT 10

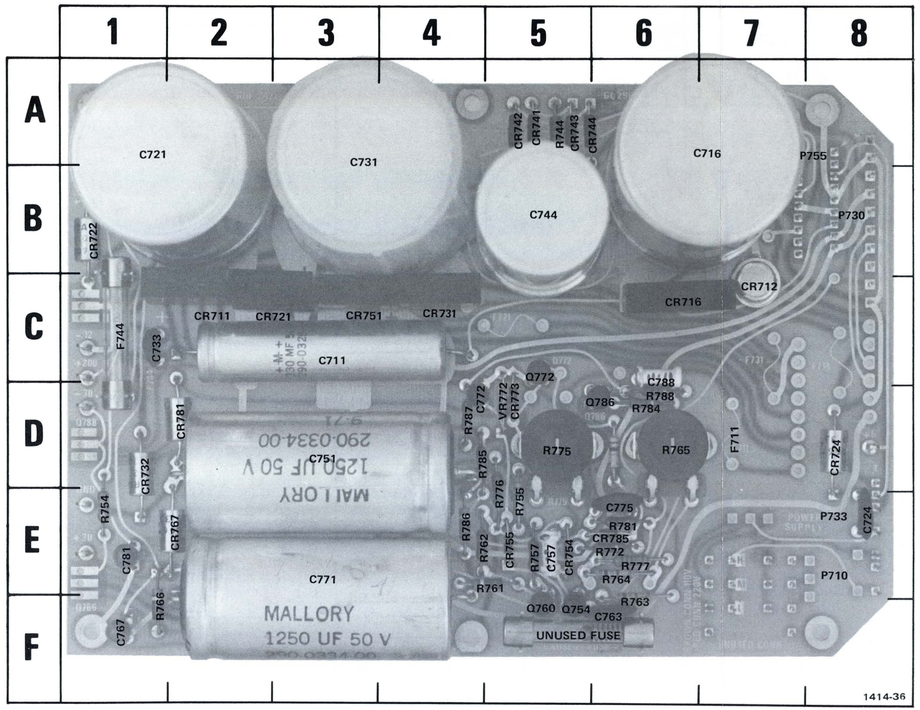


Fig. 7-17A. A3 Regulator circuit board SN B050000-up.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C711	3C	C771	3E	CR722	1B	CR755	5E	R754	1E	R775	5D	Q754	5F
C716	7A	C772	4D	CR724	8D	CR767	2E	R755	5E	R776	5E	Q760	5F
C721	1A	C775	6E	CR731	4C	CR773	5D	R757	5E	R777	6E	Q772	5C
C724	8E	C781	1E	CR732	1D	CR781	2D	R761	5E	R781	6E	Q786	6D
C731	3A	C788	6C	CR741	5A	CR785	6E	R762	5E	R784	6D		
C733	1C			CR742	5A			R763	6F	R785	4D	VR772	5D
C744	5B	CR711	2C	CR743	5A	F711	7D	R764	6E	R786	4E		
C757	5E	CR712	7C	CR744	6A	F744	1C	R765	6D	R787	4D		
C763	6F	CR716	6C	CR751	3C			R766	1F	R788	6C		
C767	1F	CR721	3C	CR754	5E	R744	5A	R772	6E				

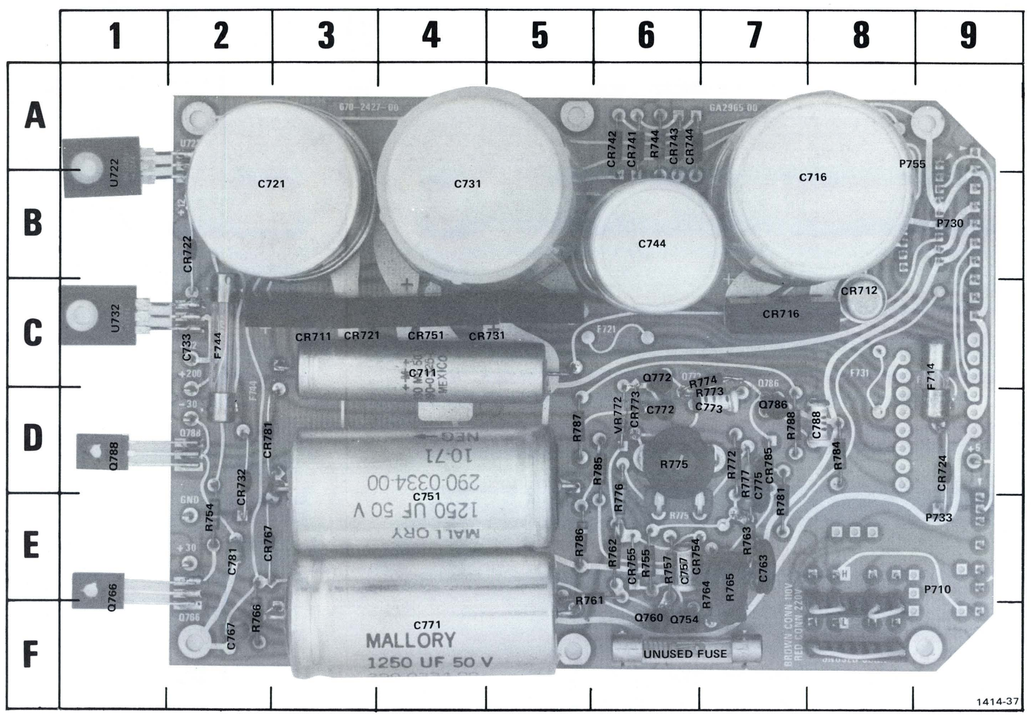


Fig. 7-17B. A3 Regulator circuit board below SN B050000.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C711	4C	C772	6D	CR724	9D	CR773	6D	Q786	7D	R765	7E	R786	5E
C716	8B	C773	6D	CR731	5C	CR781	2D	Q788	1D	R766	2F	R787	5D
C721	2B	C775	7D	CR732	2D	CR785	7D			R772	7D	R788	7D
C731	4B	C781	2E	CR741	6A			R744	6A	R773	7D		
C733	2C	C788	8D	CR742	6A	F714	9C	R754	2E	R774	7C	U722	1A
C744	6B			CR743	6A	F744	2C	R755	6E	R775	6D	U732	1C
C751	4E	CR711	3C	CR744	6A			R757	6E	R776	6E		
C757	6E	CR712	8C	CR751	4C	Q754	6F	R761	5E	R777	7D	VR772	6D
C763	7E	CR716	7C	CR754	6E	Q760	6F	R762	6E	R781	7E		
C767	2F	CR721	3C	CR755	6E	Q766	1E	R763	7E	R784	8D		
C771	4F	CR722	2B	CR767	2E	Q772	6C	R764	7E	R785	8D		

NOTE
LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

Fig. 7-18. Semiconductor lead configuration for Regulator circuit board.

NOTE:

*DENOTES FUSIBLE RUN

T701 W W gn gn bu bu y y r r o o v v w

*F711 5A R711 CR711 C711 330µF CR712

F714 * CR716 C716 9600µF

C724 .01

F721 CR721 +21.5 C721 3500µF

F731 CR731 +9.5 U732 µA7812 INPUT OUTPUT COMMON C733 .001 C731 3500µF

F744 CR741 CR742 CR743 CR744 R744 100K C744 170µF +30V

CR751 C751 1250µF C771 1250µF

U724 µA7805 P733 3 2 P733 P733

U722 µA7812 INPUT OUTPUT COMMON

CR724 CR722 CR732

+52

P722 5 STEP AMP HIGH VOLT ③
1 + STEP AMP LOW VOLT ③
4 STEP AMP COMMON ③

P755-3 +5V
P730-1 +5V
P722-10 +5V
P755-1 +12V
P722-7 +12V
P755-6 -12V
P722-6 -12V
P730-3 +200V

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

P722-8 90 VAC P-P
P755-8 +40V
P730-4 +40V

R754 300K Q766 INTERNAL RESISTORS
R757 680 Q760 +30V R761 390 R766 3.9 CR767
C757 270 R762 18K C763 .01 C767 6.8µF
CR754 CR755 Q754 R755 10k -30V
R763 6.04k R765 250 +30V ADJ R764 6.04k -30V

P755-2 +30V
P730-8 +30V
P722-3 +30V

P755-4 GND
P755-5 GND
P730-2 GND
P730-10 GND
P722-9 GND

C772 10µF VR772 CR773 R772 5.6k -30V Q772 C773 R773
-30V ADJ R776 1.37K R775 250 C775 .01 R777 4.87k R781 100
R774 10k R785 100 CR785
C781 6.8µF CR781
C788 650 R788 200 R787 27K Q788 INTERNAL RESISTORS Q786
R784 620 R786 3.9

P755-7 -30V
P730-9 -30V
P722-2 -30V
P755-9 -40V
P730-5 -40V

6 7 P730 TO FLOOD GUN HEATERS ⑨

P/O A3 REGULATOR BOARD

P733 7 110 VAC TO P121-6 SEE ①
5 TO T101-1 ON ①

gy-bk-y gy gy-r gy-v gy-bu gy-o gy-gn gy-bn-w

P702 P701 P701

VOLTAGE SELECTOR JUMPER FOR 220V OPERATION
LO MED HI
VOLTAGE SELECTOR JUMPER FOR 110V OPERATION

3 P710

S1201 POWER
S1200
F1201 2A
1.25A FOR 234V OPERATION
110 - 220 VAC
IN DISPLAY UNIT

bn bn 6.3VAC TO CRT HEATER ELEVATED TO 3400V SEE ⑧⑩
y r y TO COLLECTOR SWEEP BOARD SEE ⑥

P722
1	BASE LV
2	-30V
3	+30V
4	BASE COM
5	BASE HV
6	-12V
7	+12V
8	AC
9	GND
10	+5V

TO MAIN BOARD SEE ②③

P730
1	+5V
2	GND
3	+200V
4	+40V
5	-40V
6	FLOODGUN
7	FLOODGUN
8	+30V
9	-30V
10	GND

TO DISPLAY UNIT SEE ⑧⑨⑩

P755
1	+12V
2	+30V
3	+5V
4	GND
5	GND
6	-12V
7	-30V
8	+40V
9	-40V

TO STANDARD TEST FIXTURE SEE ⑤

POWER SUPPLY ⑪

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

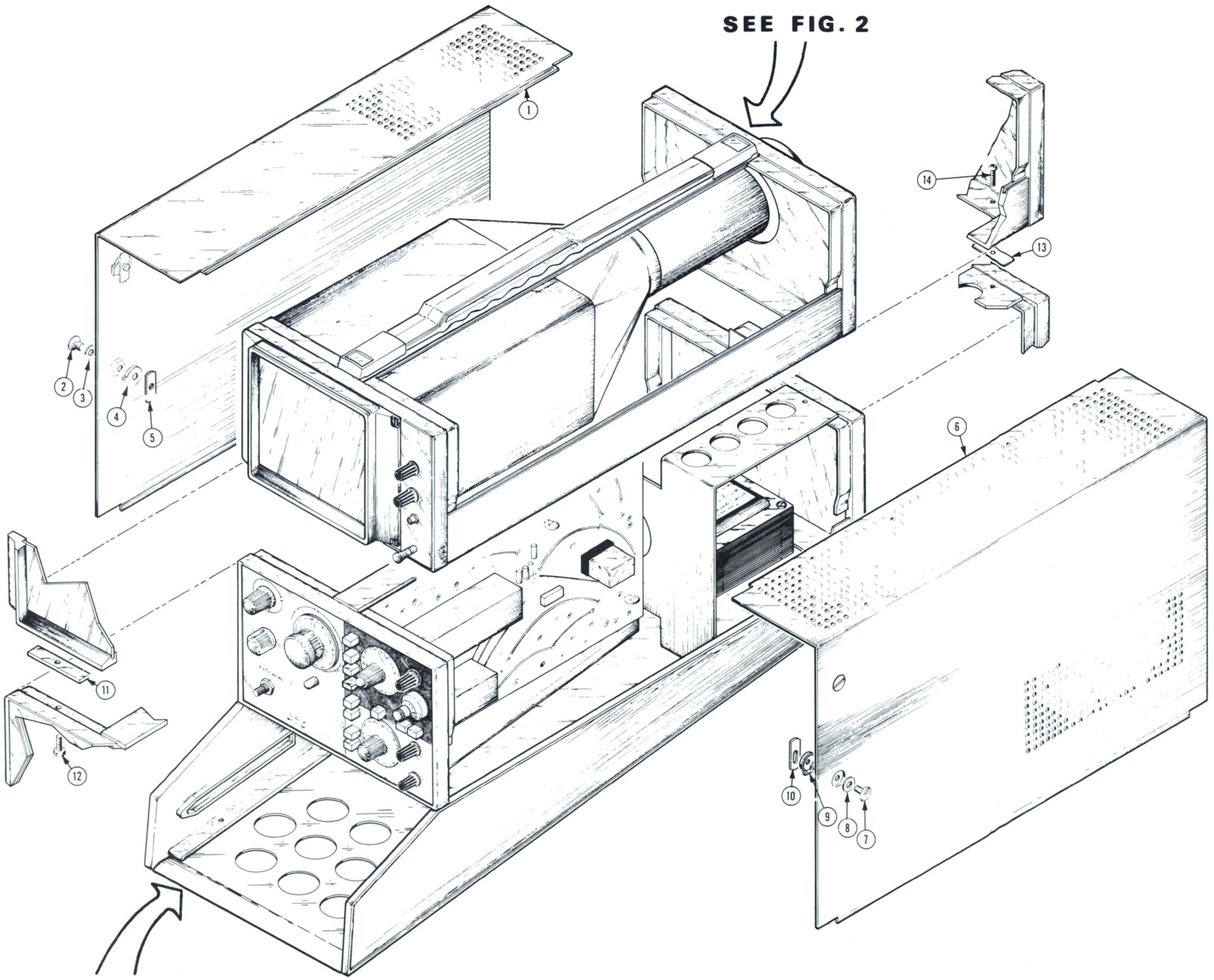
CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
05129	KILO ENGINEERING CO	2118 D ST	LA VERNE CA 91750-5422
05469	BEARINGS INC	3634 EUCLID P O BOX 6925	CLEVELAND OH 44101
05820	EG AND G WAKEFIELD ENGINEERING	60 AUDUBON RD	WAKEFIELD MA 01880-1203
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 07094-2917
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
09772	WEST COAST LOCKWASHER CO INC	16730 E JOHNSON DRIVE P O BOX 3588	CITY OF INDUSTRY CA 91744
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
11897	PLASTIGLIDE MFG CORP	2701 W EL SEGUNDO BLVD	HAWTHORNE CA 90250-3318
12136	P H C INDUSTRIES INC	1643 HADDON AVE	CAMDEN NJ 08103-3109
12300	POTTER AND BRUMFIELD DIV AMF CANADA LTD	52 ROYAL RD P O BOX 698	GUELPH ONT CAN
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
12697	CLAROSTAT MFG CO INC	LOWER WASHINGTON ST	DOVER NH 03820
16428	COOPER BELDEN ELECTRONIC WIRE AND CA SUB OF COOPER INDUSTRIES INC	NW N ST	RICHMOND IN 47374
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS DIV MILITARY PRODUCTS GROUP	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119-2728
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
63743	WARD LEONARD ELECTRIC CO INC	31 SOUTH ST	MOUNT VERNON NY 10550-1714
70318	ALLMETAL SCREW PRODUCTS CO INC	821 STEWART AVE	GARDEN CITY NY 11530-4810
70485	ATLANTIC INDIA RUBBER WORKS INC	571 W POLK ST	CHICAGO IL 60607
71590	MEPCO/CENTRALAB INC A NORTH AMERICAN PHILIPS CO	HWY 20 W P O BOX 858	FORT DODGE IA 50501
71785	TRW INC TRW CINCH CONNECTORS DIV	1501 MORSE AVE	ELK GROVE VILLAGE IL 60007-5723
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
75915	LITTELFUSE TRACTOR INC SUB TRACTOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
76854	OAK SWITCH SYSTEMS INC SUB OF OAK TECHNOLOGY INC	100 S MAIN ST PO BOX 517	CRYSTAL LAKE IL 60014-6201
77342	AMF INC POTTER AND BRUMFIELD DIV	200 RICHLAND CREEK DR	PRINCETON IN 47670-4771
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
79136	WALDES KOHINOR IN	47-16 AUSTEL PLACE	LONG ISLAND CITY NY 11101-4402
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500 MS 53-111	BEAVERTON OR 97707-0001
81350	JOINT ARMY-NAVY SPECIFICATIONS, PROMULGATED BY MILITARY DEPARTMENTS UNDER AUTHORITY OF DEFENSE STANDARD- IZATION MANUAL 4120 3-M		
83309	ELECTRICAL SPECIALITY CO SUBSIDIARY OF BELDEN CORP	345 SWIFT AVE	SOUTH SAN FRANCISCO CA 94080-6206
83385	MICRODOT MFG INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
85471	BOYD CORP	13885 RAMONA AVE	CHINO CA 91710
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201-2431
88797	ROBINTECH, INC., ELECTRO MECHANICAL DIV.	3421 VESTAL RD.	VESTAL, NY 13850
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61101
95238	CONTINENTAL CONNECTOR CORP	34-63 56TH ST	WOODSIDE NY 11377-2121

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
95987	WECKESSER CO INC	4444 WEST IRVING PARK RD	CHICAGO IL 60641
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0392	NORTHWEST FASTENER SALES INC	7923 SW CIRRUS DRIVE	BEAVERTON OR 97005-6448
TK0433	PORTLAND SCREW CO	6520 N BASIN	PORTLAND OR 97217-3920
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK0588	UNIVERSAL PRECISION PRODUCTS	1775 NW 216TH	HILLSBORO OR 97123
TK0858	STAUFFER SUPPLY CO	105 SE TAYLOR	PORTLAND OR 97214
TK0861	H SCHURTER AG DIST PANEL COMPONENTS	2015 SECOND STREET	BERKELEY CA 94170
TK1582	DELTA WEST CO	7185 SW SANDBURG ST SUITE C	TIGARD OR 97223

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	390-0322-00			1	COVER,SCOPE:LEFT SIDE	80009	390-0322-00
	214-0812-00			3	.FASTENER,PAWL:	80009	214-0812-00
-2	214-0603-01			3	..PIN,SECURING:0.45 DIA X 0.27,ZAMAK CD PL	80009	214-0603-01
-3	214-0604-00			3	..WASHER,SPR TNSN:0.26 ID X 0.47 OD,SST	80009	214-0604-00
-4	386-0227-00			3	..STOP,CLP,RIM CL:	80009	386-0227-00
-5	386-0226-00			3	..CLAMP,RIM CLENC:	80009	386-0226-00
-6	390-0321-00			1	COVER,SCOPE:RIGHT SIDE	80009	390-0321-00
	214-0812-00			2	.FASTENER,PAWL:	80009	214-0812-00
-7	214-0603-01			2	..PIN,SECURING:0.45 DIA X 0.27,ZAMAK CD PL	80009	214-0603-01
-8	214-0604-00			2	..WASHER,SPR TNSN:0.26 ID X 0.47 OD,SST	80009	214-0604-00
-9	386-0227-00			2	..STOP,CLP,RIM CL:	80009	386-0227-00
-10	386-0226-00			2	..CLAMP,RIM CLENC:	80009	386-0226-00
-11	361-0507-00			2	SPACER,CHASSIS:0.125 X 2.0 X 0.5,AL (ATTACHING PARTS)	80009	361-0507-00
-12	212-0084-00	B010100	B107089	2	SCREW,MACHINE:8-32 X 0.312,LGE HEX HD,STL (D1 ONLY)	83385	ORDER BY DESCR
	212-0103-00	B107090		2	SCREW,MACHINE:8-32 X 0.375,HEX HD,STL (D1 ONLY)	TK0858	ORDER BY DESCR
	210-0804-00	B107090		2	WASHER,FLAT:0.17 ID X 0.375 OD X 0.032 (D1 ONLY)	86928	76430-000
	212-0084-00	B010100	B107189	2	SCREW,MACHINE:8-32 X 0.312,LGE HEX HD,STL (D2 ONLY)	83385	ORDER BY DESCR
	212-0103-00	B107190		2	SCREW,MACHINE:8-32 X 0.375,HEX HD,STL (D2 ONLY)	TK0858	ORDER BY DESCR
	210-0804-00	B107190		2	WASHER,FLAT:0.17 ID X 0.375 OD X 0.032 (D2 ONLY) (END ATTACHING PARTS)	86928	76430-000
-13	361-0508-00			2	SPACER,CHASSIS:0.25 X 1.5 X 0.5,AL (ATTACHING PARTS)	80009	361-0508-00
-14	212-0008-00			2	SCREW,MACHINE:8-32 X 0.5,PNH,STL (END ATTACHING PARTS)	83385	ORDER BY DESCR


SEE FIG. 2
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SEE FIG. 3 & FIG.4

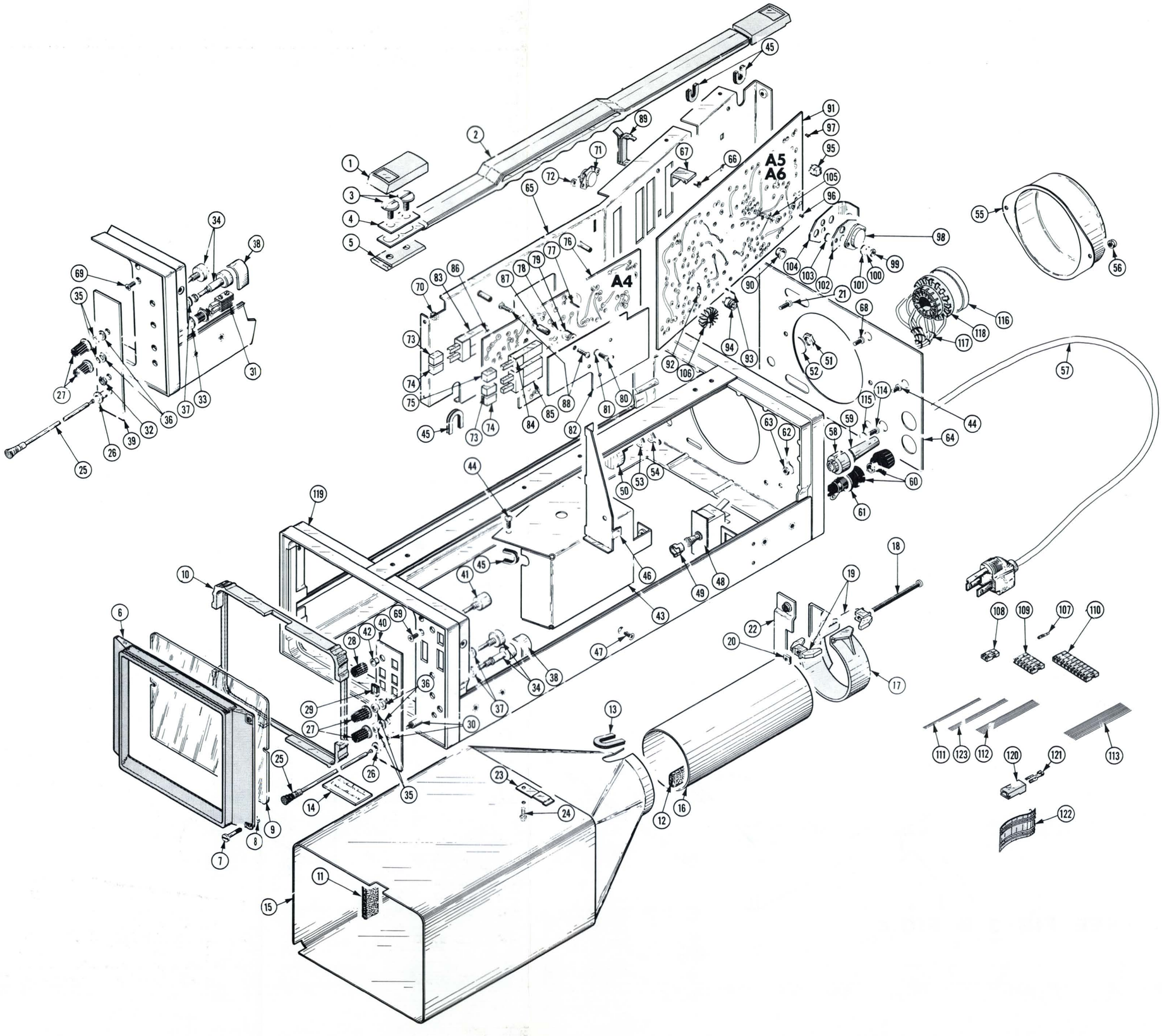

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-1	200-0728-00			2	COVER,HDL END:1.91 X 0.91 X 0.36 BLUE	80009	200-0728-00
-2	367-0116-00			1	HANDLE,CARRYING:16.54 L,BLUE VINYL	12136	ORDER BY DESCR
					(ATTACHING PARTS)		
-3	212-0597-00			4	SCREW,SHOULDER:10-32 X 0.55,0.5 RDH,STL	83486	ORDER BY DESCR
-4	386-1283-00			2	PLATE,HDL MTG:FRONT	80009	386-1283-00
-5	386-1624-00			2	PLATE,HDL RTNG:STAINLESS STEEL	80009	386-1624-00
					(END ATTACHING PARTS)		
-6	200-1218-00			1	RTNR,CRT SCALE:6.814 X 5.125,NYLON	80009	200-1218-00
-7	211-0188-00			2	.SCREW,MACHINE:4-40 X 0.6,PNH,SST	80009	211-0188-00
-8	354-0233-00			2	.RING,RETAINING:TYPE E,EXT,U/O 0.14 DIA SFT	05469	X-5133-14
-9	337-1440-00			1	SHLD,IMPLOSION:	80009	337-1440-00
	337-1440-01			1	SHLD,IMPLOSION:GREEN	80009	337-1440-01
-10	386-1946-00			1	SUPPORT,CRT:FRONT	80009	386-1946-00
-11	348-0279-00			2	PAD,CUSHIONING:3.5 X 0.67 X 0.188,RUBBER	80009	348-0279-00
-12	348-0070-01			4	PAD,CUSHIONING:2.03 X 0.69 X 0.18 SI RBR	85471	ORDER BY DESCR
-13	348-0145-00			2	GROMMET,PLASTIC:GRAY,U SHAPE,0.48 ID	80009	348-0145-00
-14	334-1379-00			1	MARKER,IDENT:MKD HI VACUUM	07416	ORDER BY DESCR
-15	337-1419-05			1	SHIELD SECT,CRT:	80009	337-1419-05
-16	337-1420-00			1	SHIELD SECT,CRT:	80009	337-1420-00
-17	354-0409-00			1	R,CLP,CRT SHLD:U/O 2.375 OD SHIELD	80009	354-0409-00
					(ATTACHING PARTS)		
-18	211-0632-00			1	SCREW,MACHINE:6-32 X 2.25,FILH,STL	TK0433	ORDER BY DESCR
-19	343-0123-01			2	CLP,ELCTRN TUBE:AL,CD PL	80009	343-0123-01
-20	220-0444-00			1	NUT,PLAIN,SQ:6-32 X 0.25 SQ,SST	70318	ORDER BY DESCR
-21	211-0507-00			2	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
-22	407-0922-00			1	BRACKET,CRT CLP:ALUMINUM	80009	407-0922-00
					(END ATTACHING PARTS)		
-23	344-0226-00			1	CLIP,CABLE:8 CONDUCTOR RIBBON,PH BRZ	80009	344-0226-00
					(ATTACHING PARTS)		
-24	211-0587-00			1	SCREW,MACHINE:6-32 X 0.188,HEX HD,BRS	80009	211-0587-00
					(END ATTACHING PARTS)		
-25	384-1064-00			1	KNOB:14.42 L X 0.125 OD,5-40 ONE END	80009	384-1064-00
-26	358-0216-00			1	GROMMET,PLASTIC:GRAY,ROUND,0.257 ID	80009	358-0216-00
-27	366-0494-00			2	KNOB:GRAY WITH SETSCREW	80009	366-0494-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-28	366-1023-01			1	KNOB:GY,0.127 ID X 0.392 OD X 0.531 H	80009	366-1023-01
	213-0153-00			1	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-29	426-0681-00			5	FRAME,PUSH BTN:	80009	426-0681-00
-30	----- -----			1	SWITCH,PUSH:(SEE D1 S1125 REPL)		
-31	----- -----			1	SWITCH,PUSH:(SEE D2 S1125 REPL)		
					(ATTACHING PARTS)		
-32	210-0583-00			2	NUT,PLAIN,HEX:0.25-32 X 0.312,BRS CD PL	73743	2X-20319-402
-33	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					(END ATTACHING PARTS)		
	200-0935-00	B070000		1	BASE,LAMPHOLDER:0.29 OD X 0.19 L,BK PLSTC	80009	200-0935-00
	352-0157-00	B070000		1	LAMPHOLDER:(1)T-2 UNBASED,WHITE	80009	352-0157-00
	378-0602-00	B070000		1	LENS,LIGHT:GREEN	80009	378-0602-00
-34	----- -----			2	RES.,VAR,NONWIR:(SEE R1200,R1295 REPL)		
					(ATTACHING PARTS)		
-35	210-0583-00			2	NUT,PLAIN,HEX:0.25-32 X 0.312,BRS CD PL	73743	2X-20319-402
-36	210-0940-00			2	WASHER,FLAT:0.25 ID X 0.375 OD X 0.02,STL	12327	ORDER BY DESCR
-37	210-0046-00			2	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					(END ATTACHING PARTS)		
-38	200-0608-00			1	SHIELD,RESISTOR:0.7 X 1.0 X 0.75,VAR	80009	200-0608-00
-39	333-1707-00	B010100	B069999	1	PANEL,FRONT:	80009	333-1707-00
	333-1707-01	B070000		1	PANEL,FRONT:	80009	333-1707-01
					(D2 ONLY)		
-40	333-1706-00	B010100	B069999	1	PANEL,FRONT:	80009	333-1706-00
	333-1706-01	B070000		1	PANEL,FRONT:	80009	333-1706-01
					(D1 ONLY)		
-41	----- -----			1	RES.,VAR,NONWIR:(SEE R1325 REPL)		
-42	358-0378-00			1	BUSHING,SLEEVE:0.131 ID X 0.18 OD X 0.125 L	80009	358-0378-00
-43	337-1421-00			1	SHIELD,ELEC:HIGH VOLTAGE	80009	337-1421-00
					(ATTACHING PARTS)		
-44	211-0504-00			3	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
					(END ATTACHING PARTS)		
-45	348-0115-00			4	GROMMET,PLASTIC:BLACK,U-SHAPE,0.368 ID	80009	348-0115-00
	348-0115-00			3	GROMMET,PLASTIC:BLACK,U-SHAPE,0.368 ID	80009	348-0115-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-46	407-0896-00			1	BRACKET,CHASSIS:ALUMINUM (ATTACHING PARTS)	80009	407-0896-00
-47	211-0541-00			1	SCREW,MACHINE:6-32 X 0.25,FLH,100 DEG,STL (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-48	----- -----			1	SWITCH,PUSH-PUL:(SEE S1201 REPL)		
	407-0895-00	B010100	B092739	1	BRACKET,ELEC SW:ALUMINUM	80009	407-0895-00
	407-0895-01	B092740		1	BRACKET,ELEC SW:ALUMINUM (D1 ONLY)	80009	407-0895-01
	407-0895-00	B010100	B092729	1	BRACKET,ELEC SW:ALUMINUM	80009	407-0895-00
	407-0895-01	B092730		1	BRACKET,ELEC SW:ALUMINUM (D2 ONLY)	80009	407-0895-01
-49	376-0127-00			1	CPLG,SHAFT,FLEX:0.055 & 0.326 ID,DELRIN	80009	376-0127-00
-50	----- -----			1	RES,VARIABLE:(SEE R1291 REPL) (ATTACHING PARTS)		
-51	210-0590-00			1	NUT,PLAIN,HEX:0.375-32 X 0.438 BRS CD PL	73743	28269-402
-52	210-0978-00			1	WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL	12327	ORDER BY DESCR
-53	210-0012-00			1	WASHER,LOCK:0.384 ID,INTL,0.022 THK,STL	09772	ORDER BY DESCR
-54	210-0207-00			1	TERMINAL,LUG:0.385 OD,PLAIN,BRS CD PL (END ATTACHING PARTS)	12697	01136902
-55	200-1204-01			1	COVER,CRT:REAR ALUMINUM,PTD BLUE (ATTACHING PARTS)	80009	200-1204-01
-56	210-0401-00			2	NUT,PLAIN,CAP:6-32 X 0.312 HEX,BRS CD PL (END ATTACHING PARTS)	73743	93262-02
-57	161-0033-08			1	CABLE ASSY,PWR,:3,18 AWG,125V,98.0 L	16428	ORDER BY DESCR
-58	358-0366-00			1	BSHG,STRAIN RLF:U/W 0.29 DIA CABLE,STRAIGHT	80009	358-0366-00
	358-0365-00			1	BSHG,STRAIN RLF:U/W 0.29 DIA CABLE,STRAIGHT	80009	358-0365-00
-59	200-1004-00			1	CABLE NIP,ELEC:0.253 ID X 1.5 L,BLACK	80009	200-1004-00
-60	352-0076-00	B010100	B106654	1	FUHLR,EXTR POST:3AG,20A,250V,PNL MT	75915	3420212-L
	204-0833-00	B106655		1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	TK0861	031 1653 (FEU)
	200-2264-00	B106655		1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
	210-1039-00	B106655		1	WASHER,LOCK:0.521 ID,INT,0.025 THK,SST	24931	ORDER BY DESCR
-61	210-0873-00			1	WASHER,FLAT:0.5 ID X 0.688 OD X 0.047,RBR	70485	ORDER BY DESCR
-62	210-0201-00	B010100	B093339	1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
	210-0202-00	B093340		1	TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL (D1 ONLY)	86928	A-373-158-2
	210-0201-00	B010100	B093349	1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
	210-0202-00	B093350		1	TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL (D2 ONLY) (ATTACHING PARTS)	86928	A-373-158-2
	210-0586-00	B010100	B093339	1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
	210-0457-00	B093340		1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL (D1 ONLY)	78189	511-061800-00
-63	210-0586-00	B010100	B093349	1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
	210-0457-00	B093350		1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL (D2 ONLY) (END ATTACHING PARTS)	78189	511-061800-00
	334-3379-02	B103850		1	MARKER,IDENT:MARKED GROUND SYMBOL (D1 ONLY)	22670	ORDER BY DESCR
	334-3379-02	B103840		1	MARKER,IDENT:MARKED GROUND SYMBOL (D2 ONLY)	22670	ORDER BY DESCR
-64	333-1715-00			1	PANEL,REAR:	80009	333-1715-00
-65	441-0991-00	B010100	B103549	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-00
	441-0991-02	B103550	B104439	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-02
	441-0991-03	B104440	B107480	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-03
	441-0991-06	B107481		1	CHAS,DSPL UNIT:MAIN (D1 ONLY)	80009	441-0991-06
	441-0991-00	B010100	B103569	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-00
	441-0991-02	B103570	B104429	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-02
	441-0991-03	B104430	B107420	1	CHAS,DSPL UNIT:MAIN	80009	441-0991-03
	441-0991-06	B107421		1	CHAS,DSPL UNIT:MAIN (D2 ONLY)	80009	441-0991-06
	129-0628-00	B10748		4	SPACER,POST:0.563 L,4-40 EXT/INT,BRS,0.188 HEX (D1 ONLY)	80009	129-0628-00
-66	210-0659-01			4	.EYELET,MTLC:0.121 OD X 0.156 L,BRS CD PL	80009	210-0659-01
-67	344-0131-00			4	.CLIP,SPR TNSN:CKT BOARD MT,ACETAL BLACK (ATTACHING PARTS FOR CHASSIS)	80009	344-0131-00
-68	211-0504-00			2	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-69	211-0538-00			2	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	93907	ORDER BY DESCR
-70	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL (END ATTACHING PARTS)	78189	511-061800-00
-71	----- -----			1	SWITCH,THRMSTC:(SEE S1200 REPL) (ATTACHING PARTS)		
-72	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL (END ATTACHING PARTS)	78189	211-041800-00
	343-0042-00	B100000	B106959	1	CLAMP,LOOP:0.297 ID,PLASTIC	95987	5-16-6BH
	343-0042-01	B106960		1	CLAMP,HALF LOOP:WHITE,NYLON (D1 ONLY)	80009	343-0042-01
	343-0042-00	B100000	B107029	1	CLAMP,LOOP:0.297 ID,PLASTIC	95987	5-16-6BH
	343-0042-01	B107030		1	CLAMP,HALF LOOP:WHITE,NYLON (D2 ONLY)	80009	343-0042-01
	210-0851-00	B100000		1	WASHER,FLAT:0.119 ID X 0.375 OD X 0.025,STL	12327	ORDER BY DESCR
-73	366-1257-44			2	PUSH BUTTON:SIL GY,UPPER	80009	366-1257-44
-74	366-1257-45			2	PUSH BUTTON:SIL GY,LOWER	80009	366-1257-45
-75	366-1257-46			1	PUSH BUTTON:SIL GY,ERASE	80009	366-1257-46
-76	----- -----			1	CKT BOARD ASSY:STORAGE(SEE A4 (D1) REPL)		
-77	131-0608-00			7	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0589-00			4	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-78	136-0252-04			45	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
-79	214-1611-00	B010100	B107669	5	.HEAT SINK,XSTR:TO-5,CU BE BLK ENAMEL .(577 ONLY)	05820	260-4T5E
	214-2569-00	B107670		5	.HEAT SINK,XSTR:TO-5,CU BE .(577 ONLY)	05820	260-4 TH5B
	214-2569-00			5	.HEAT SINK,XSTR:TO-5,CU BE .(D1 AND D2 ONLY) .(ATTACHING PARTS)	05820	260-4 TH5B
-80	211-0007-00			5	.SCREW,MACHINE:4-40 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-81	210-0003-00			5	.WASHER,LOCK:#4 EXT,0.015 THK,STL .(END ATTACHING PARTS)	78189	1104-00-00-0541C
-82	214-1612-01	B010100	B082439	1	.HEAT SINK,XSTR:TO-5,AL	80009	214-1612-01
	214-1612-02	B082440		1	.HEAT SINK,XSTR:TO-5,AL	80009	214-1612-02
-83	----- -----			1	.SWITCH,PUSH:(SEE A4R1375 REPL)		
-84	----- -----			1	.SWITCH,PUSH:(SEE A4S1330 REPL)		
-85	----- -----			1	.SWITCH,PUSH:(SEE A4S1372 REPL)		
-86	361-0411-00			10	.SPACER,PUSH SW:0.109 L,BLUE POLYCARBONATE	80009	361-0411-00
	361-0542-00			4	.SPACER,PUSH SW:0.078 L,POLYPROPYLENE	71590	PCS-078
-87	166-0169-00			1	.SPACER,SLEEVE:0.562 L X 0.562 ID,STL .(ATTACHING PARTS)	76854	3-5162-263
-88	211-0118-00			2	.SCREW,MACHINE:2-56 X 0.25,PNH,STL .(END ATTACHING PARTS) (ATTACHING PARTS FOR CKT BD ASSY)	TK1582	1152-406
	211-0008-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,STL (END ATTACHING PARTS)	93907	ORDER BY DESCR
-89	344-0225-00			2	CLIP,CABLE:4 CONDUCTOR RIBBON,DELRIN	80009	344-0225-00
-90	348-0067-00			1	GROMMET,PLASTIC:GRAY,ROUND,0.252 ID	80009	348-0067-00
-91	----- -----			1	CKT BOARD ASSY:HIGH V(SEE A5-D1,A6-D2 REPL)		
-92	131-0566-00	B010100	B082439	5	.BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L .(D1 ONLY)	24546	OMA 07
	131-0566-00	B010100	B082449	5	.BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L .(D2 ONLY)	24546	OMA 07
-93	131-0589-00	B010100	B093059	2	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	B093060		37	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ .(D1 ONLY)	22526	48283-029
	131-0589-00	B010100	B093069	2	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	B093070		37	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ .(D2 ONLY)	22526	48283-029
-94	136-0183-00	B010100	B093059	5	.SKT,PL-IN ELEK:TRANSISTOR,3 CONTACT .(D1 ONLY)	80009	136-0183-00
	136-0183-00	B010100	B093069	5	.SKT,PL-IN ELEK:TRANSISTOR,3 CONTACT .(D2 ONLY)	80009	136-0183-00
-95	136-0220-00			13	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT .(D1 ONLY)	71785	133-23-11-034
-96	136-0254-00	B010100	B107174	2	.SOCKET,PIN TERM:U/W 0.031 TO 0.04 DIA PINS	00779	1-331892-5
	136-0254-01	B107175		2	.SOCKET,PIN TERM:U/W 0.031 TO 0.04 DIA PIN .(D1 ONLY)	00779	1-331892-8
	136-0254-00	B010100	B107260	2	.SOCKET,PIN TERM:U/W 0.031 TO 0.04 DIA PINS	00779	1-331892-5

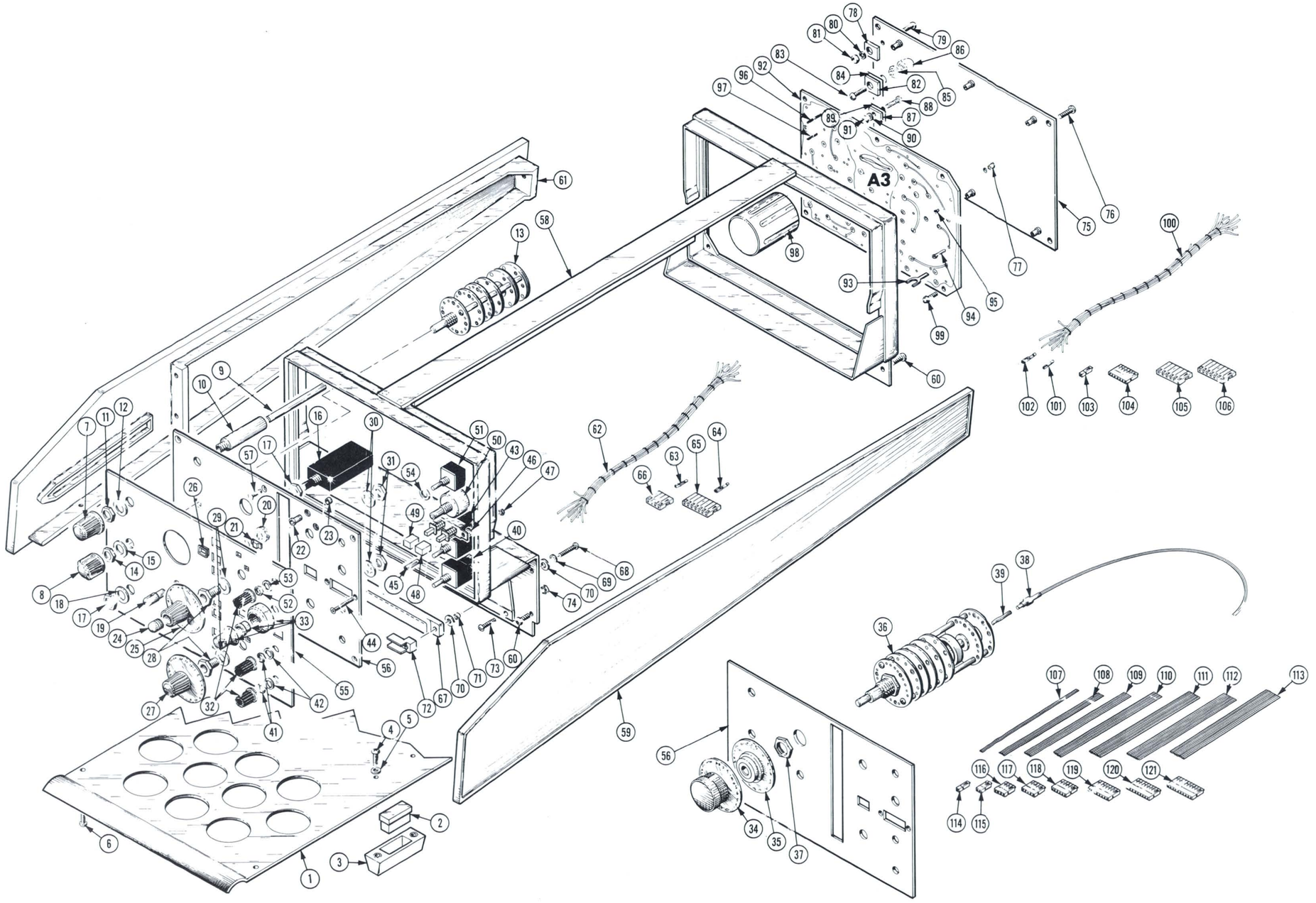
Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-	136-0254-01	B107261		2	.SOCKET,PIN TERM:U/W 0.031 TO 0.04 DIA PIN .(D2 ONLY)	00779	1-331892-8
-97	136-0252-07	B010100	B093059	12	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	B093060		45	.SOCKET,PIN CONN:W/O DIMPLE .(D1 ONLY)	22526	75060-012
	136-0252-07	B010100	B093069	12	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	B093070		42	.SOCKET,PIN CONN:W/O DIMPLE .(D2 ONLY)	22526	75060-012
-98	----- -----			1	.TRANSISTOR:(SEE A4Q1252 REPL) .(ATTACHING PARTS)		
-99	210-0407-00			2	.NUT,PLAIN,HEX:6-32 X 0.25,BRS CD PL	73743	3038-402
-100	210-0055-00			2	.WASHER,LOCK:#6 SPLIT,0.031 THK,STL	81350	ORDER BY DESCR
-101	210-0801-00			2	.WASHER,FLAT:0.14 ID X 0.281 OD X 0.25,BRS	12327	31724-000
-102	214-1610-00			1	.HEAT SINK,XSTR:TO-3,ALUMINA	80009	214-1610-00
-103	210-1133-00			2	.WASHER,FLAT:0.142 ID X 0.25 OD X0.058,FBR	86928	ORDER BY DESCR
-104	214-1536-00			1	.HEAT SINK,DIODE:TO-3,AL	80009	214-1536-00
-105	211-0511-00			2	.SCREW,MACHINE:6-32 X 0.5,PNH,STL .(END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-106	214-1291-00	B020000		4	.HEAT SINK,XSTR:TO-5,SIL BRZ PTD BLACK .(D1 ONLY)	05820	207SB
-107	131-0621-00			18	.CONN,TERM:22-26 AWG,BRS,CU BE GLD PL	22526	46231-000
-108	352-0198-00			1	.HLDR,TERM CONN:2 WIRE,BLACK	80009	352-0198-00
-109	352-0204-00			1	.HLDR,TERM CONN:8 WIRE,BLACK	80009	352-0204-00
-110	352-0206-00			1	.HLDR,TERM CONN:10 WIRE,BLACK	80009	352-0206-00
-111	175-0863-00			AR	.CABLE,SP,ELEC:2,22 AWG,STRD,PVC JKT,RBN	TK0846	02CF2M7-BBT
-112	175-0859-00			AR	.CABLE,SP,ELEC:6,22 AWG,STRD,PVC JKT,RBN	TK0846	06CF22M7-BBT
-113	175-0855-00			AR	.CABLE,SP,ELEC:10,22 AWG,STRD,PVC,RBN (ATTACHING PARTS FOR CKT BD ASSY)	08261	SS-1022(1061)0C
-114	211-0510-00			1	SCREW,MACHINE:6-32 X 0.375,PNH,STL	83385	ORDER BY DESCR
-115	210-0975-00			1	WASHER,SHLDR:0.14 ID X 0.375 OD X 0.1 THK (END ATTACHING PARTS)	80009	210-0975-00
-116	200-0616-01			1	COVER,CRT SKT:1.78 DIA X 0.2 D,WHITE	80009	200-0616-01
-117	136-0492-01			1	SKT,PL-IN ELEK:ELCTRN TUBE,14 CONT W/LEADS	80009	136-0492-01
	343-0549-00			14	.STRAP,TIEDOWN,E:0.091 W X 4.0 L,ZYTEL	06383	PLT1M
-118	136-0301-01	B010100	B104719	1	.SKT,PL-IN ELEK:ELECTRON TUBE,14 CONTACT	80009	136-0301-01
	136-0202-04	B104720		1	.SKT,PL-IN ELEK:ELECTRON TUBE,14 CONTACT .(D1 ONLY)	80009	136-0202-04
	136-0301-01	B010100	B104749	1	.SKT,PL-IN ELEK:ELECTRON TUBE,14 CONTACT	80009	136-0301-01
	136-0202-04	B104750		1	.SKT,PL-IN ELEK:ELECTRON TUBE,14 CONTACT .(D2 ONLY)	80009	136-0202-04
-119	426-0739-00	B010100	B069999	1	FR ASSY,DSPL UN:	80009	426-0739-00
	426-0739-01	B070000		1	FR ASSY,DSPL UN:	80009	426-0739-01
	426-0740-00	B010100	B069999	1	FR ASSY,DSPL UN:	80009	426-0740-00
	426-0740-01	B070000		1	FR ASSY,DSPL UN: D2	80009	426-0740-01
-120	200-1075-00			4	COVER,TERMINAL:QUICK DISCONNECT	00779	1-480435-0
-121	131-0861-00			4	TERM,QIK DISC.:16-20 AWG,0.22 W X 0.02 THK	00779	61387-1
-122	195-0086-00			1	LEAD SET,ELEC:CRT DEFLECTION	80009	195-0086-00
	131-0621-00			2	CONN,TERM:22-26 AWG,BRS,CU BE GLD PL	22526	46231-000
	352-0198-00			1	HLDR,TERM CONN:2 WIRE,BLACK	80009	352-0198-00
-123	175-0862-00			AR	CABLE,SP,ELEC:3,22 AWG,STRD,PVC JKT,RBN	TK0846	03CF22M19-BBT

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-1	390-0320-00	B010100	B099999	1	COVER,SCOPE:BOTTOM	80009	390-0320-00
	390-0320-01	B100000		1	COVER,SCOPE:BOTTOM	80009	390-0320-01
-2	348-0177-00			4	.PAD,CAB.FOOT:BLACK,POLYURETHANE	80009	348-0177-00
-3	348-0178-00			4	.FOOT,CABINET:BLACK DELRIN	80009	348-0178-00
					.(ATTACHING PARTS)		
-4	213-0054-00			4	.SCREW,TPG,TF:6-32 X 0.312,TYPE T,PNH,STL	93907	ORDER BY DESCR
-5	210-0803-00			4	.WASHER,FLAT:0.15 ID X 0.375 OD X 0.032,STL	12327	ORDER BY DESCR
					.(END ATTACHING PARTS)		
					(ATTACHING PARTS FOR CAB BOTTOM)		
-6	211-0503-00			2	SCREW,MACHINE:6-32 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
	211-0504-00			6	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
					(END ATTACHING PARTS)		
-7	366-1026-00			1	KNOB:GY,0.084 ID X 0.825 OD X 0.67 H	80009	366-1026-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-8	366-1028-00			1	KNOB:GY,0.252 ID X 0.796 OD X 0.65 H	80009	366-1028-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-9	384-1184-00			1	EXTENSION SHAFT:2.875 L X 0.25 OD,STL CD PL	80009	384-1184-00
-10	358-0480-00			1	BUSHING,SLEEVE:0.253 ID X 0.5 OD X 1.5 L,AL	80009	358-0480-00
					(ATTACHING PARTS)		
-11	210-0590-00			1	NUT,PLAIN,HEX:0.375-32 X 0.438 BRS CD PL	73743	28269-402
-12	210-0978-00			1	WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL	12327	ORDER BY DESCR
					(END ATTACHING PARTS)		
-13	----- -----			1	SWITCH,ROTARY:SWEEP POLARITY(SEE S130 REPL)		
					(ATTACHING PARTS)		
-14	210-0590-00			1	NUT,PLAIN,HEX:0.375-32 X 0.438 BRS CD PL	73743	28269-402
-15	210-0978-00			1	WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL	12327	ORDER BY DESCR
					(END ATTACHING PARTS)		
-16	----- -----			1	CIRCUIT BREAKER:(SEE S101 REPL)		
					(ATTACHING PARTS)		
-17	210-0505-00			2	NUT,PLAIN,HEX:0.375-27 X 0.5 HEX,BRS CD PL	73743	2X32032-402
-18	210-0840-00			1	WASHER,FLAT:0.39 ID X 0.562 OD X 0.02,STL	86928	ORDER BY DESCR
					(END ATTACHING PARTS)		
-19	----- -----			1	LAMP,CARTRIDGE:(SEE DS125 REPL)		
-20	348-0004-00			1	GROMMET,RUBBER:BLACK,ROUND,0.281 ID	70485	763
-21	378-0635-00	B010100	B069999	4	LENS,LIGHT:WHITE	80009	378-0635-00
	378-0635-00	B070000		2	LENS,LIGHT:WHITE	80009	378-0635-00
-22	352-0157-01	B010100	B069999	4	LAMPHOLDER:(1)T-2 UNBASED,BLACK	80009	352-0157-01
	352-0157-01	B070000		2	LAMPHOLDER:(1)T-2 UNBASED,BLACK	80009	352-0157-01
-23	200-0935-00	B010100	B069999	4	BASE,LAMPHOLDER:0.29 OD X 0.19 L,BK PLSTC	80009	200-0935-00
	200-0935-00	B070000		2	BASE,LAMPHOLDER:0.29 OD X 0.19 L,BK PLSTC	80009	200-0935-00
-24	366-1431-01			1	KNOB:GY,STEP X.1	80009	366-1431-01
-25	366-1417-00	B010100	B069999	1	KNOB:GY,STEP GEN,0.252 ID X 1.75 OD X 0.79	80009	366-1417-00
	366-1417-01	B070000	B089999	1	KNOB:GY,STEP GEN,0.252 ID X 1.75 OD X 0.79	80009	366-1417-01
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-26	426-0681-00			11	FRAME,PUSH BTN:	80009	426-0681-00
-27	366-1418-00	B010100	B069999	1	KNOB:GY,HORIZ V/DIV,0.252 ID X 1.75 OD	80009	366-1418-00
	366-1418-01	B070000		1	KNOB:GY,HORIZ V/DIV,0.252 ID X 1.75 OD	80009	366-1418-01
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-28	358-0029-00			2	BSHG,MACH THD:0.375-32 X 0.5 HEX,BRS NP	80009	358-0029-00
					(ATTACHING PARTS)		
-29	210-0978-00			2	WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL	12327	ORDER BY DESCR
-30	210-0012-00			2	WASHER,LOCK:0.384 ID,INTL,0.022 THK,STL	09772	ORDER BY DESCR
-31	210-0590-00			2	NUT,PLAIN,HEX:0.375-32 X 0.438 BRS CD PL	73743	28269-402
					(END ATTACHING PARTS)		
-32	366-0494-00	B010100	B089999	3	KNOB:GRAY WITH SETSCREW	80009	366-0494-00
	366-0494-00	B090000		1	KNOB:GRAY WITH SETSCREW	80009	366-0494-00
	366-1619-01	B090000		2	KNOB:GY,0.081 ID X 0.3 OD X 0.43 H	80009	366-1619-01
	366-1215-00	B090000		2	KNOB:GY,0.127 ID X 0.5 OD 0.531 H	80009	366-1215-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-33	331-0139-00			1	DIAL,CONTROL:10 TURNS W/O BRAKE	05129	461-S 41
-34	366-1462-00			1	KNOB:GY,.15-100,0.252 ID X 1.85 OD X 0.85	80009	366-1462-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-35	354-0337-00			1	RING,KNOB SKIRT:NEW GEN GRAY,1.85 OD	80009	354-0337-00
-36	----- -----			1	SW,ROTARY:COLLECTOR SWEEP(SEE S120 REPL)		
					(ATTACHING PARTS)		
-37	210-0579-00			1	NUT,PLAIN,HEX:0.625-24 X 0.75,BRS CD PL	73743	48046-402
					(END ATTACHING PARTS)		
-38	----- -----			1	SWITCH,PUSH:(SEE S120 REPL)		

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-39	214-1749-00	B010200		1	PIN,HINGE:0.125 OD X 0.75 L,SST	80009	214-1749-00
-40	----- -----			2	RES.,VAR,NONWIR:W/SW(SEE R535,R575 REPL)		
					(ATTACHING PARTS)		
-41	210-0583-00			2	NUT,PLAIN,HEX:0.25-32 X 0.312,BRS CD PL	73743	2X-20319-402
-42	210-0940-00			2	WASHER,FLAT:0.25 ID X 0.375 OD X 0.02,STL	12327	ORDER BY DESCR
					(END ATTACHING PARTS)		
-43	----- -----			1	SWITCH,PUSH:(SEE S350 REPL)		
					(ATTACHING PARTS)		
-44	213-0202-00			2	SCREW,MACHINE:2-56 X 0.625,FLH 100 DEG	83385	ORDER BY DESCR
-45	166-0418-00			2	SHIELD,ELEC:	76854	3-5152-320
-46	210-0001-00			2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
-47	210-0405-00			2	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
					(END ATTACHING PARTS)		
-48	366-1402-51			1	PUSH BUTTON:SIL GY,AID	80009	366-1402-51
-49	366-1328-24			1	PUSH BUTTON:CHARCOAL,ZERO	80009	366-1328-24
-50	----- -----			1	RES.,VAR,WW:(SEE R350 REPL)		
-51	----- -----			1	RES.,VAR,NONWIR:(SEE R315 REPL)		
					(ATTACHING PARTS)		
-52	210-0583-00			1	NUT,PLAIN,HEX:0.25-32 X 0.312,BRS CD PL	73743	2X-20319-402
-53	210-0940-00			1	WASHER,FLAT:0.25 ID X 0.375 OD X 0.02,STL	12327	ORDER BY DESCR
-54	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					(END ATTACHING PARTS)		
-55	333-1652-00	B010100	B069999	1	PANEL,FRONT:	80009	333-1652-00
	333-1652-01	B070000	B089999	1	PANEL,FRONT:	80009	333-1652-01
	333-1652-02	B090000		1	PANEL,FRONT:	80009	333-1652-02
-56	386-2392-00	B010100	B069999	1	SUBPANEL,FRONT:	80009	386-2392-00
	386-2392-01	B070000	B089999	1	SUBPANEL,FRONT:	80009	386-2392-01
	386-2392-02	B090000		1	SUBPANEL,FRONT:	80009	386-2392-02
					(ATTACHING PARTS)		
-57	211-0541-00			6	SCREW,MACHINE:6-32 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					(END ATTACHING PARTS)		
-58	426-0936-00			1	FR ASSY,CRV TRA:	80009	426-0936-00
-59	426-0473-04			1	FRAME SECT,CAB.:RIGHT BOTTOM	80009	426-0473-04
					(ATTACHING PARTS)		
-60	212-0023-00			3	SCREW,MACHINE:8-32 X 0.375,PNH,STL	TK0435	ORDER BY DESCR
	211-0507-00			1	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
					(END ATTACHING PARTS)		
-61	426-0472-05			1	FRAME SECT,CAB.:BOTTOM LEFT	80009	426-0472-05
					(ATTACHING PARTS)		
	212-0023-00			3	SCREW,MACHINE:8-32 X 0.375,PNH,STL	TK0435	ORDER BY DESCR
	211-0507-00			1	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
					(END ATTACHING PARTS)		
-62	179-1856-00			1	WIRING HARNESS:MAIN	80009	179-1856-00
-63	131-0621-00			18	.CONN,TERM:22-26 AWG,BRS,CU BE GLD PL	22526	46231-000
-64	131-0792-00			4	.CONNECTOR,TERM:18-20 AWG,CU BE GOLD PL	22526	46221
-65	352-0203-03			1	.HLDR,TERM CONN:7 WIRE,ORANGE	80009	352-0203-03
	352-0203-04			1	.HLDR,TERM CONN:7 WIRE,YELLOW	80009	352-0203-04
	352-0203-05			1	.HLDR,TERM CONN:7 WIRE,GREEN	80009	352-0203-05
	352-0203-06			1	.HLDR,TERM CONN:7 WIRE,BLUE	80009	352-0203-06
-66	352-0200-09			1	.HLDR,TERM CONN:4 WIRE,WHITE	80009	352-0200-09
-67	131-1008-00			1	.CONN,RCPT,ELEC:EDGECARD,24/48 CONT,0.156 SP	95238	60013PC24GD30NI
					(ATTACHING PARTS FOR WIRING HARN)		
-68	211-0016-00			2	SCREW,MACHINE:4-40 X 0.625,PNH,STL	TK0435	ORDER BY DESCR
-69	210-0004-00			2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-70	210-0851-00			4	WASHER,FLAT:0.119 ID X 0.375 OD X 0.025,STL	12327	ORDER BY DESCR
-71	361-0552-00			2	SPACER,SLEEVE:0.093 L X 0.126 ID,BRS	76854	3-5116-312
-72	351-0352-00			2	GUIDE,CKT BOARD:BLACK NYLON,0.7 L	80009	351-0352-00
					(END ATTACHING PARTS)		
-73	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-74	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-75	200-1433-00	B010100	B049999	1	COVER,REAR:	80009	200-1433-00
	200-1433-01	B050000		1	COVER,REAR:	80009	200-1433-01
					(ATTACHING PARTS)		
-76	211-0504-00			4	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
					(END ATTACHING PARTS)		
	129-0320-00	B010100	B099999	6	SPACER,POST:0.15 L,4-40,BRS,CU SN ZN PL	80009	129-0320-00
	129-0160-00	B100000		6	SPACER,POST:0.25 L,4-40 THRU,BRS	80009	129-0160-00
-77	348-0031-00			2	GROMMET,PLASTIC:0.127 ID,GRAY ACETAL	80009	348-0031-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-78	----- -----			1	MICROCIRCUIT,LI:(SEE U722 REPL) (ATTACHING PARTS)		
-79	211-0097-00			1	SCREW,MACHINE:4-40 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-80	210-1122-00			1	WASHER,LOCK:0.12 ID,DISHED,0.025 THK,STL	86928	ORDER BY DESCR
-81	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-82	----- -----			1	MICROCIRCUIT,LI:(SEE U732 REPL) (ATTACHING PARTS)		
-83	211-0507-00	B010100	B107939	1	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
	211-0510-00	B107940		1	SCREW,MACHINE:6-32 X 0.375,PNH,STL (577D1 ONLY)	83385	ORDER BY DESCR
	211-0507-00	B010100	B107701	1	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
	211-0510-00	B107702		1	SCREW,MACHINE:6-32 X 0.375,PNH,STL (577D2 ONLY)	83385	ORDER BY DESCR
-84	342-0163-00			1	INSULATOR,PLATE:TRANSISTOR,MICA	80009	342-0163-00
-85	210-0967-00			1	WSHR,SHLDR:0.156 ID X 0.375 OD X 0.094 THK, NYL	02735	495334-7
-86	348-0187-00			1	FOOT,CABINET:BLACK POLYURETHANE (END ATTACHING PARTS)	80009	348-0187-00
-87	----- -----			2	TRANSISTOR:(SEE Q766,Q788 REPL) (ATTACHING PARTS)		
-88	211-0012-00			2	SCREW,MACHINE:4-40 X 0.375,PNH,STL	TK0435	ORDER BY DESCR
-89	342-0163-00			2	INSULATOR,PLATE:TRANSISTOR,MICA	80009	342-0163-00
-90	210-1122-00			2	WASHER,LOCK:0.12 ID,DISHED,0.025 THK,STL	86928	ORDER BY DESCR
-91	210-0551-00			2	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-92	----- -----			1	CKT BOARD ASSY:POWER SUPPLY(SEE A3 REPL)		
-93	344-0154-00			4	.CLIP,ELECTRICAL:FUSE,CKT BD MT	80009	344-0154-00
-94	214-0579-00			7	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-95	136-0252-04	B010100	B051109	12	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0220-00	B051110	B072249	4	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072250		12	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D1 ONLY)	22526	75060-007
	136-0220-00	B051110	B072269	4	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072270		12	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D2 ONLY)	22526	75060-007
-96	131-0589-00			10	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-97	131-0608-00			40	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
-98	200-0260-00			1	.SHIELD,CAP.:1.365 DIA X 2.144 L,PLASTIC (ATTACHING PARTS FOR CKT BD ASSY)	80009	200-0260-00
-99	211-0116-00			6	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ (END ATTACHING PARTS)	77900	ORDER BY DESCR
-100	179-1855-00			1	WIRING HARNESS:AC	80009	179-1855-00
-101	131-0707-00			6	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-102	131-0621-00			10	.CONN,TERM:22-26 AWG,BRS,CU BE GLD PL	22526	46231-000
-103	352-0171-06			1	.HLDR,TERM CONN:1 WIRE,BLUE	80009	352-0171-06
-104	352-0165-03			1	.HLDR,TERM CONN:7 WIRE,ORANGE	80009	352-0165-03
-105	352-0202-01			1	.HLDR,TERM CONN:6 WIRE,BROWN	80009	352-0202-01
-106	352-0203-08			1	.HLDR,TERM CONN:7 WIRE,GRAY	80009	352-0203-08
	131-0707-00			90	CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-107	175-0825-00	B010200		AR	CABLE,SP,ELEC:2,26 AWG,STRD,PVC JKT,RBN	80009	175-0825-00
-108	175-0827-00			AR	CABLE,SP,ELEC:4,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-954
-109	175-0828-00			AR	CABLE,SP,ELEC:5,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-955
-110	175-0829-00			AR	CABLE,SP,ELEC:6,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-973
-111	175-0831-00	B010100	B010199	AR	CABLE,SP,ELEC:8,26 AWG,STRD,PVC INSUL,RBN	08261	111-2699-971
-112	175-0832-00	B010200		AR	CABLE,SP,ELEC:9,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-956
-113	175-0833-00			AR	CABLE,SP,ELEC:10,26 AWG STRD,PVC JKT,RBN	08261	111-2699-970
-114	352-0171-07			1	HLDR,TERM CONN:1 WIRE,VIOLET	80009	352-0171-07
-115	352-0169-08			1	HLDR,TERM CONN:2 WIRE,GRAY	80009	352-0169-08
	352-0169-09			1	HLDR,TERM CONN:2 WIRE,WHITE	80009	352-0169-09
-116	352-0162-03			1	HLDR,TERM CONN:4 WIRE,ORANGE	80009	352-0162-03
-117	352-0163-00			2	HLDR,TERM CONN:5 WIRE,BLACK	80009	352-0163-00
-118	352-0164-02			2	HLDR,TERM CONN:6 WIRE,RED	80009	352-0164-02
-119	352-0166-01			1	HLDR,TERM CONN:8 WIRE,BROWN	80009	352-0166-01
	352-0166-04	B010100	B010199	1	HLDR,TERM CONN:8 WIRE,YELLOW	80009	352-0166-04
-120	352-0167-04	B010200		1	HLDR,TERM CONN:9 WIRE,YELLOW	80009	352-0167-04
	352-0167-05			1	HLDR,TERM CONN:9 WIRE,GREEN	80009	352-0167-05
-121	352-0168-01			1	HLDR,TERM CONN:10 WIRE,BROWN	80009	352-0168-01

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-	352-0168-02			2	HLDR,TERM CONN:10 WIRE,RED	80009	352-0168-02
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05
	352-0168-05			1	HLDR,TERM CONN:10 WIRE,GREEN	80009	352-0168-05


A3

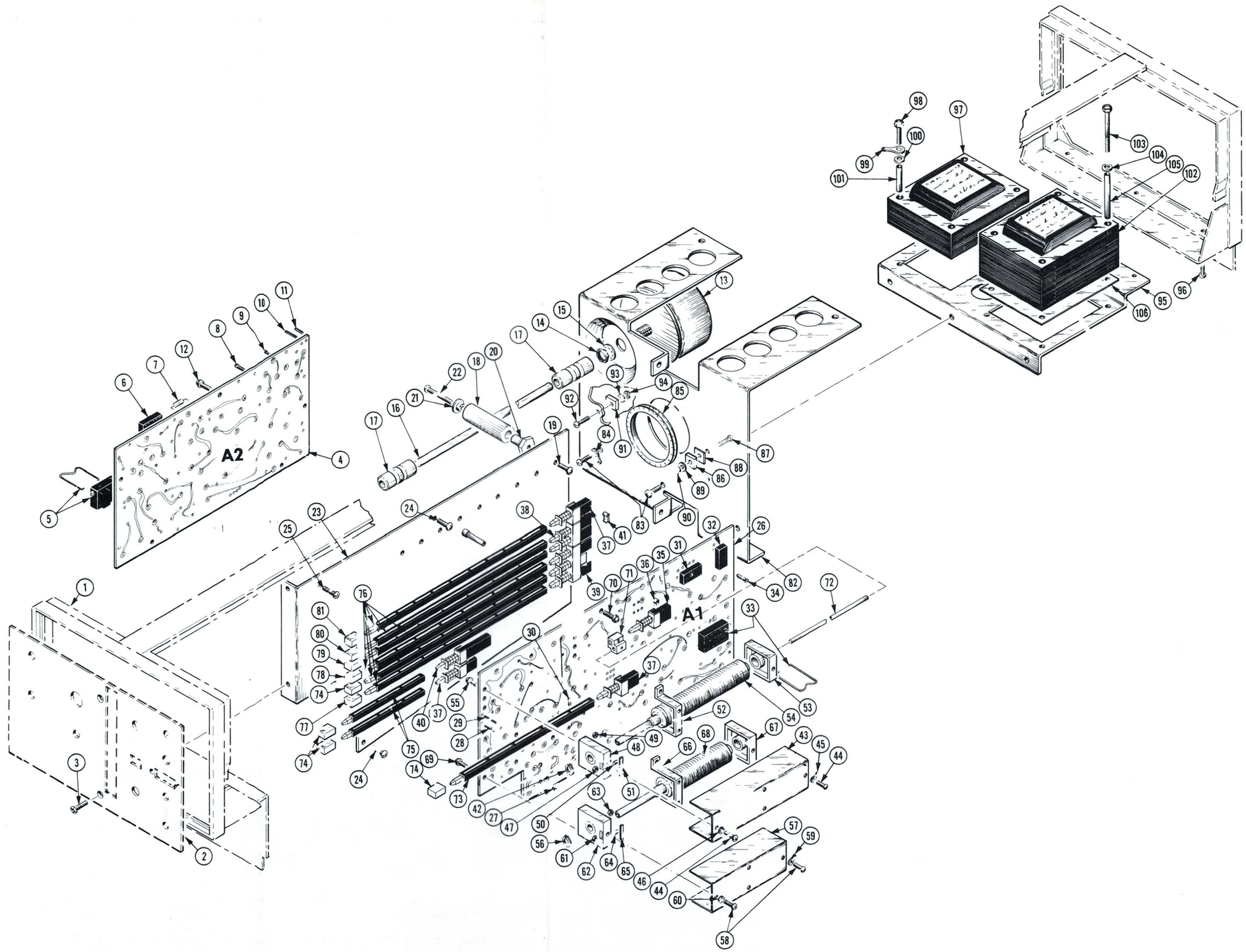

A2
A1

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
4-1	426-0936-00			1	FR ASSY,CRV TRA:	80009	426-0936-00
-2	386-2392-00			1	SUBPANEL,FRONT: (ATTACHING PARTS)	80009	386-2392-00
-3	211-0541-00			6	SCREW,MACHINE:6-32 X 0.25,FLH,100 DEG,STL (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-4	----- -----			1	CKT BOARD ASSY:COLLECTOR SWEEP(SEE A2 REPL)		
-5	136-0394-00			2	.SKT,PL-IN ELEK:RELAY,10 CONTACT	12300	27E709 W/20C249
-6	136-0269-00	B010100	B051109	1	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP,PCB MT	71785	133-51-02-073
	136-0269-02	B051110		1	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
-7	131-0566-00	B030000		4	.BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
-8	214-0479-00			1	.SPRING,HLCPS:0.19 OD X 1.5 L,CLE,SST	80009	214-0479-00
-9	136-0252-04	B010100	B051109	24	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0220-00	B051110	B072249	8	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072250		24	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D1 ONLY)	22526	75060-007
	136-0220-00	B051110	B072269	8	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072270		24	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D2 ONLY)	22526	75060-007
-10	131-0589-00			30	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-11	131-0608-00			11	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (ATTACHING PARTS FOR CKT BD ASSY)	22526	48283-036
-12	211-0116-00			6	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ (END ATTACHING PARTS)	77900	ORDER BY DESCR
-13	----- -----			1	TRANSFORMER:VARIAC(SEE T101 REPL) (ATTACHING PARTS)		
-14	210-0590-00			1	NUT,PLAIN,HEX:0.375-32 X 0.438 BRS CD PL	73743	28269-402
-15	210-0978-00			1	WASHER,FLAT:0.375 ID X 0.5 OD X 0.024,STL (END ATTACHING PARTS)	12327	ORDER BY DESCR
-16	384-1182-00			1	EXTENSION SHAFT:8.5 L X 0.25 OD,AL	80009	384-1182-00
-17	376-0005-00	B010100	B082449	2	CPLG,SHAFT,FLEX:0.252 ID X 0.5 OD,AL	88797	MB360
	376-0084-01	B082450	B104299	2	CPLG,SHAFT,FLEX:0.251 ID X 0.5 OD,PC	80009	376-0084-01
	376-0084-02	B104300		2	CPLG,SHAFT,FLEX:0.251 ID X 0.5 OD,PP (D1 ONLY)	80009	376-0084-02
	376-0005-00	B010100	B082439	2	CPLG,SHAFT,FLEX:0.252 ID X 0.5 OD,AL	88797	MB360
	376-0084-01	B082440	B104289	2	CPLG,SHAFT,FLEX:0.251 ID X 0.5 OD,PC	80009	376-0084-01
	376-0084-02	B104290		2	CPLG,SHAFT,FLEX:0.251 ID X 0.5 OD,PP (D2 ONLY) (ATTACHING PARTS)	80009	376-0084-02
	213-0153-00			4	SETSCREW:5-40 X 0.125,STL (END ATTACHING PARTS)	TK0392	ORDER BY DESCR
-18	----- -----			9	RES,VARIABLE:(SEE R131,R132,R133,R134,R135, R137,R138,R139,R140 REPL) (ATTACHING PARTS)		
-19	212-0004-00			9	SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-20	210-0462-00			9	NUT,SLV:0.719 L W/8-32 THD THRU,AL,HEX ONE END,ROUND OTHER	80009	210-0462-00
-21	210-0808-00			9	WASHER,RECESSED:0.173 ID X 0.156 THK,BRS ZN PL,0.562 OD	63743	25151.13-3
-22	212-0037-00			9	SCREW,MACHINE:8-32 X 1.75,FILH,STL (END ATTACHING PARTS)	83385	ORDER BY DESCR
-23	441-1063-00			1	CHASSIS,SCOPE:MAIN (ATTACHING PARTS)	80009	441-1063-00
-24	211-0504-00			4	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
-25	211-0501-00			1	SCREW,MACHINE:6-32 X 0.125,PNH,STL (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-26	----- -----			1	CKT BOARD ASSY:MAIN(SEE A1 REPL)		
-27	136-0252-04	B010100	B051109	86	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-04	B051110		12	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0220-00	B051110	B072249	14	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072250		42	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D1 ONLY)	22526	75060-007
	136-0220-00	B051110	B072269	14	.SKT,PL-IN ELEK:TRANSISTOR 3 CONTACT	71785	133-23-11-034
	136-0252-04	B072270		42	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS .(D2 ONLY)	22526	75060-007
	136-0514-00	B051110	B106654	4	.SKT,PL-IN ELEK:MICROCIRCUIT,8 DIP	09922	DILB8P-108
	136-0727-00	B106655		4	.SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P-108
-28	131-0608-00			54	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
-29	131-0589-00			7	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
4-30	131-0604-00			49	.CONTACT,ELEC:CKT BD SW,SPR,CU BE	80009	131-0604-00
-31	136-0260-01	B010100	B051109	2	.SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP,PCB MT	71785	133-51-02-075
	136-0260-02	B051110	B106654	2	.SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP	09922	DILB16P-108T
	136-0729-00	B106655		2	.SKT,PL-IN ELEK:MICROCKT,16 CONTACT	09922	DILB16P-108T
-32	136-0269-00	B010100	B051109	5	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP,PCB MT	71785	133-51-02-073
	136-0269-02	B051110	B106654	5	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
	136-0728-00	B106655		5	.SKT,PL-IN ELEK:MICROCKT,14 CONTACT	09922	DILB14P-108
-33	136-0393-00			1	.SKT,PL-IN ELEK:RELAY,16 CONTACT	77342	27E710 /20C250
	214-3047-00			1	.RTNR,ELEC RELAY:STAINLESS STEEL	77342	20C250
-34	214-0579-00			2	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	175-0825-00			AR	.CABLE,SP,ELEC:2,26 AWG,STRD,PVC JKT,RBN	80009	175-0825-00
-35	----- -----			1	.SWITCH,PUSH:1 BUTTON(SEE A1S310 REPL)		
-36	361-0385-00			4	.SPACER,PB SW:0.164 L,GREEN POLYCARBONATE	80009	361-0385-00
-37	----- -----			3	.SWITCH,PUSH:(SEE A1S429,S430,S568 REPL)		
-38	----- -----			1	.SWITCH,PUSH:(SEE A1S330 REPL)		
-39	----- -----			1	.SWITCH,PUSH:(SEE A1S426 REPL)		
-40	----- -----			1	.SWITCH,PUSH:(SEE A1S512 REPL)		
-41	361-0383-00			14	.SPACER,PB SW:0.33 L,CHARCOAL,POLYCARBONATE	80009	361-0383-00
	131-0566-00	B090000		2	.BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
	105-0359-00			1	.ACTR ASSY,CAM S:BASE STOP AMPLITUDE	80009	105-0359-00
-43	200-1484-00			1	..COVER,CAM SW:35 ELEMENTS ..(ATTACHING PARTS)	80009	200-1484-00
-44	211-0022-00			4	..SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-45	210-0259-00			1	..TERMINAL,LUG:0.099 ID,LOCKING,BRS CD PL	80009	210-0259-00
-46	210-0001-00			3	..WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
-47	210-0405-00			4	..NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL ..(END ATTACHING PARTS)	73743	12157-50
-48	401-0057-00			1	..BEARING,CAM SW:FRONT W/0.83 DIA BSHG	80009	401-0057-00
-49	210-0406-00			6	..NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-50	214-1127-00			1	..ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-51	214-1139-02			1	..SPRING,FLAT:0.885 X 0.156 CU BE GRN CLR	80009	214-1139-02
	214-1139-03			1	..SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-52	407-0653-00			1	..BRACKET,COVER:CAM SWITCH,DELRIN	80009	407-0653-00
-53	401-0056-00			1	..BEARING,CAM SW:REAR,0.83 DIA CAM	80009	401-0056-00
-54	105-0358-00			1	..ACTUATOR,CAM SW:BASE STOP AMPLITUDE .(ATTACHING PARTS FOR ACTR ASSY)	80009	105-0358-00
-55	211-0116-00			6	.SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ .(END ATTACHING PARTS)	77900	ORDER BY DESCR
	105-0360-00			1	.ACTR ASSY,CAM S:HORIZ ATTEN	80009	105-0360-00
-56	354-0219-00			1	..RING,RETAINING:EXT,CRESCENT,U/O 0.25 DIA	79136	5103-25-S-ZD-R
-57	200-1417-00			1	..COVER,CAM SW:25 ELEMENTS ..(ATTACHING PARTS)	80009	200-1417-00
-58	211-0022-00			4	..SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-59	210-0259-00			1	..TERMINAL,LUG:0.099 ID,LOCKING,BRS CD PL	80009	210-0259-00
-60	210-0001-00			3	..WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
-61	210-0405-00			4	..NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL ..(END ATTACHING PARTS)	73743	12157-50
-62	401-0057-00			1	..BEARING,CAM SW:FRONT W/0.83 DIA BSHG	80009	401-0057-00
-63	210-0406-00			6	..NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-64	214-1127-00			1	..ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-65	214-1139-02			1	..SPRING,FLAT:0.885 X 0.156 CU BE GRN CLR	80009	214-1139-02
	214-1139-03			1	..SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-66	407-0653-00			1	..BRACKET,COVER:CAM SWITCH,DELRIN	80009	407-0653-00
-67	401-0056-00			1	..BEARING,CAM SW:REAR,0.83 DIA CAM	80009	401-0056-00
-68	105-0357-00			1	..ACTUATOR,CAM SW:HORIZ ATTEN .(ATTACHING PARTS FOR ACTR ASSY)	80009	105-0357-00
-69	211-0116-00			6	.SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ .(END ATTACHING PARTS) (ATTACHING PARTS FOR CKT BD ASSY)	77900	ORDER BY DESCR
-70	211-0116-00			4	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ (END ATTACHING PARTS)	77900	ORDER BY DESCR
-71	376-0114-00	B010100	B107269	1	COUPLING,SWITCH:PUSH BUTTON,BLACK DELRIN	80009	376-0114-00
	376-0114-01	B107270		1	COUPLING,SWITCH:PUSH BUTTON,BLACK DELRIN (D1 ONLY)	80009	376-0114-01
	376-0114-00	B010100	B107309	1	COUPLING,SWITCH:PUSH BUTTON,BLACK DELRIN	80009	376-0114-00
	376-0114-01	B107310		1	COUPLING,SWITCH:PUSH BUTTON,BLACK DELRIN (D2 ONLY)	80009	376-0114-01
-72	384-0656-00			1	EXTENSION SHAFT:8.026 L X 0.125 OD,STL	TK0588	ORDER BY DESCR

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
4-73	384-1129-00			1	EXTENSION SHAFT:5.607 INCH LONG	80009	384-1129-00
-74	366-1328-25			4	PUSH BUTTON:CHARCOAL,NORM	80009	366-1328-25
-75	384-1061-00			2	EXTENSION SHAFT:4.357 L	80009	384-1061-00
-76	384-1058-00			6	EXTENSION SHAFT:8.157 L	80009	384-1058-00
-77	366-1402-12			1	PUSH BUTTON:SIL GY,FAST	80009	366-1402-12
-78	366-1402-62			1	PUSH BUTTON:SIL GY,SLOW	80009	366-1402-62
-79	366-1402-54			1	PUSH BUTTON:SIL GY,SINGLE	80009	366-1402-54
-80	366-1328-23			1	PUSH BUTTON:CHARCOAL,REP	80009	366-1328-23
-81	366-1402-52			1	PUSH BUTTON:SIL GY,300US	80009	366-1402-52
-82	407-1139-00			1	BRACKET,XFMR:ALUMINUM	80009	407-1139-00
					(ATTACHING PARTS)		
-83	210-0504-00			3	NUT,PLAIN,HEX:0-80 X 0.156 HEX,BRS CD PL	73743	ORDER BY DESCR
-84	210-0202-00			2	TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL	86928	A-373-158-2
					(END ATTACHING PARTS)		
-85	255-0334-00			AR	PLASTIC CHANNEL:12.75 X 0.175 X 0.155,NYLON	11897	122-37-2500
	334-1379-00			1	MARKER,IDENT:MKD HI VACUUM	07416	ORDER BY DESCR
	334-1418-00			2	PLATE,IDENT:BLANK	80009	334-1418-00
	334-2065-00			1	MARKER,IDENT:MKD DANGER	80009	334-2065-00
	334-2066-00			2	MARKER,IDENT:MKD DANGER	80009	334-2066-00
	334-2067-00			2	MARKER,IDENT:MKD DANGER	80009	334-2067-00
	334-2068-00			1	MARKER,IDENT:MKD DANGER	80009	334-2068-00
	334-2154-00			1	MARKER,IDENT:MKD CAUTION	80009	334-2154-00
-86	----- -----			2	TRANSISTOR:(SEE Q384,Q386 REPL)		
					(ATTACHING PARTS)		
-87	211-0578-00			1	SCREW,MACHINE:6-32 X 0.438,PNH,STL	TK0435	ORDER BY DESCR
-88	342-0163-00			1	INSULATOR,PLATE:TRANSISTOR,MICA	80009	342-0163-00
-89	210-0803-00			1	WASHER,FLAT:0.15 ID X 0.375 OD X 0.032,STL	12327	ORDER BY DESCR
	210-0811-00			1	WSHR,SHLDR:0.14 ID X 0.313 OD X 0.062,FBR	86928	5604-47
-90	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					(END ATTACHING PARTS)		
-91	----- -----			1	MICROCIRCUIT,LI:(SEE U724 REPL)		
					(ATTACHING PARTS)		
-92	211-0097-00			1	SCREW,MACHINE:4-40 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-93	210-1122-00			1	WASHER,LOCK:0.12 ID,DISHED,0.025 THK,STL	86928	ORDER BY DESCR
-94	210-0406-00			1	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					(END ATTACHING PARTS)		
-95	407-1143-00			1	BRACKET,XFMR:ALUMINUM	80009	407-1143-00
					(ATTACHING PARTS)		
-96	211-0504-00			3	SCREW,MACHINE:6-32 X 0.250,PNH,STL	TK0435	ORDER BY DESCR
					(END ATTACHING PARTS)		
-97	----- -----			1	TRANSFORMER:COLLECTOR SWEEP(SEE T102 REPL)		
					(ATTACHING PARTS)		
-98	212-0517-00			4	SCREW,MACHINE:10-32 X 1.75,HEX HD,STL	TK0433	ORDER BY DESCR
-99	210-0206-00			1	TERMINAL,LUG:0.2 ID,LOCKING,BRZ TINNED	86928	A373-147-1
-100	210-0812-00			4	WASHER,FLAT:0.188 ID X 0.375 OD X 0.31	83309	ORDER BY DESCR
-101	166-0226-00			4	INSUL SLVG,ELEC:0.187 ID X 1.125 L,MYLAR	80009	166-0226-00
					(END ATTACHING PARTS)		
-102	----- -----			1	TRANSFORMER:POWER(SEE T701 REPL)		
-103	212-0523-00			4	.SCREW,MACHINE:10-32 X 2.75,HEX HD,STL	TK0435	ORDER BY DESCR
-104	210-0812-00			4	.WASHER,FLAT:0.188 ID X 0.375 OD X 0.31	83309	ORDER BY DESCR
-105	166-0434-00			4	.INSUL SLVG,ELEC:0.19 ID X 2.25 L,MYLAR	80009	166-0434-00
-106	200-0772-02			1	.COVER,ELEC XFMR:3.125 X 3.75 X 0.875	80009	200-0772-02
					ACCESSORIES		
	070-1414-00			1	MANUAL,TECH:SERVICE	80009	070-1414-00

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.