

09 JUN 1969

THIS PUBLICATION REPLACES TO 33DA21-195-2, DATED 3 JANUARY 1974.

# TEKTRONIX®

## 177 STANDARD TEST FIXTURE

SERVICE

### INSTRUCTION MANUAL

Tektronix, Inc.  
P.O. Box 500  
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Serial Number \_\_\_\_\_

1 APRIL 1976

070-1472-00

773



1-1015  
7-30-77

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

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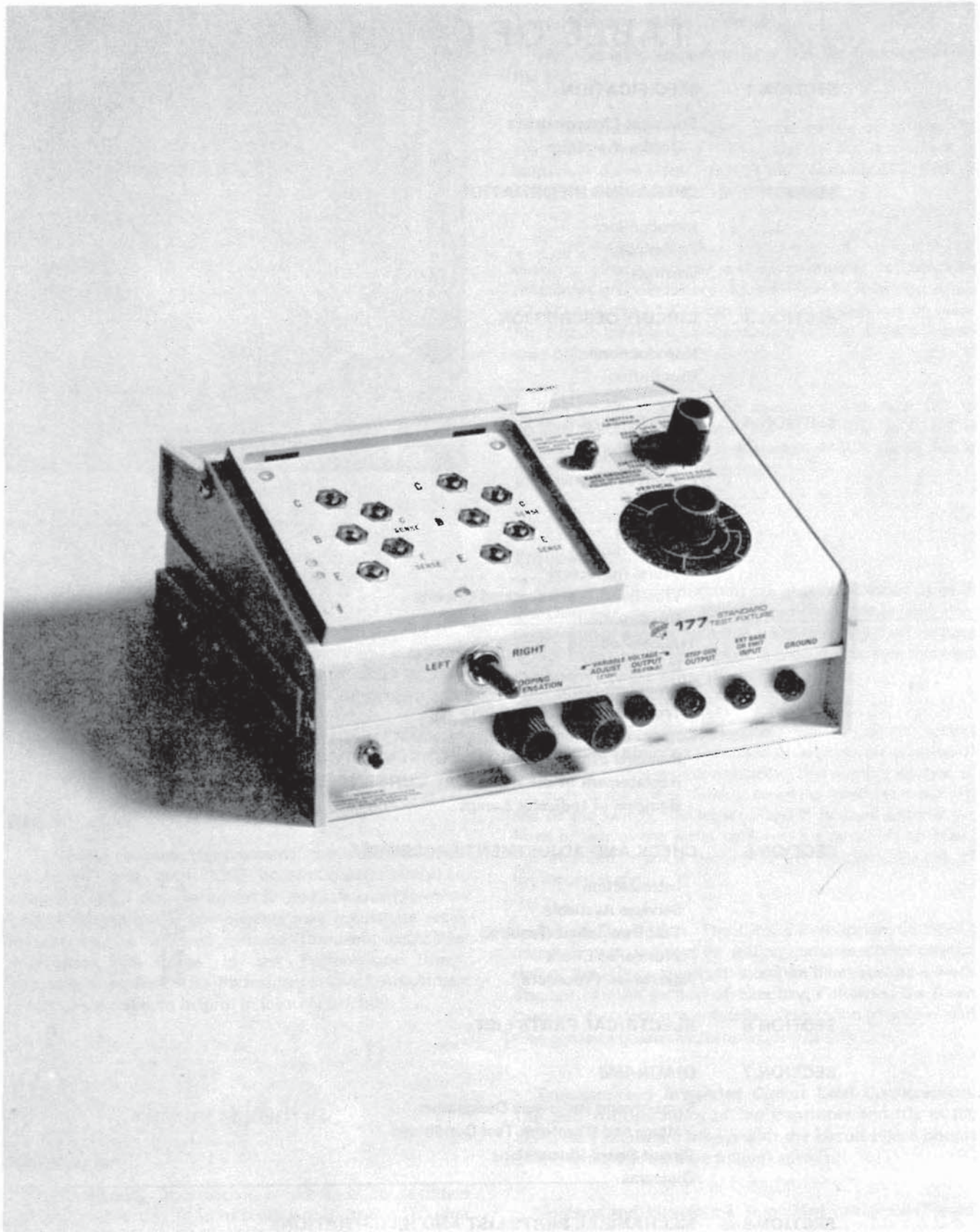
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177 Standard Test Fixture.



# SPECIFICATION

The 177 is a plug-in test fixture designed to operate with the 577-D1 or D2 Curve Tracer to form a system to measure the characteristics of a variety of two, three, and four terminal devices.

The 177 features:

Two switch-selected sets of test jacks, permitting comparison tests.

Kelvin sensing to provide accurate measurements at high current levels.

A terminal selector switch that permits easy selection of the various test configurations.

Vertical deflection factors ranging from 0.2 nA/DIV to 2 A/DIV.

External front-panel jacks permitting access to the 577 step generator output and device-under-test base (B) and emitter (E) terminals.

A variable -12, 0, +12 volt DC output and a looping compensation control.

The 100 V, 400 V, and 1600 V collector ranges are normally interlocked and are energized by closing the protective box cover or by pushing the interlock defeat button.

Only those voltages that are not interlocked are available for Emitter-Base Leakage or Breakdown tests.

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 (+68°F) to +30°C (+86°F).

## ELECTRICAL CHARACTERISTICS

### Display Amplifier

#### Accuracy (percent of highest on-screen value)

Vertical Collector Current: Total system accuracy of the 577-177-D1 or D2 is 3%, unmagnified, and 4%, magnified.

#### Deflection Factor, Vertical

Collector Current: 2 nA/DIV to 2 A/DIV in a 1-2-5 sequence, unmagnified, and 0.2 nA/DIV to 200 mA/DIV, magnified.

# OPERATING INFORMATION

## Introduction

The 177 Test Fixture operates with a Tektronix 577 Curve Tracer and the D1 or D2 Display Unit as a system.

This section of the manual gives a brief functional description of the front-panel controls of the 177. See the 577-177-D1 or D2 Operators Manual for a complete operating procedure.

## Preliminary

For initial preparation, refer to the Operating Instructions section of the 577-177-D1 or D2 Operators Manual. The Operators Manual contains operating instructions, as well as general and specific application information.

## Controls

This is a brief description of the functions of the front-panel controls. More detailed information is given in the Operators Manual.

**EMITTER GROUNDED MODE** (Emitter terminal is grounded; Base terminal is switched as follows):

### BASE TERM

#### STEP GEN

Applies step generator output to the base connections of the test fixture.

#### OPEN (OR EXT)

Disconnects the base terminal from the step generator output and connects base terminal to the front-panel EXT BASE OR EMIT INPUT Connector.

#### SHORT

Disconnects the base terminal from the step generator output and grounds the base terminal.

**BASE GROUNDED MODE** (Base terminal is grounded, step generator polarity is inverted, and the emitter terminal is switched as follows):

### EMITTER TERM

#### OPEN (OR EXT)

Disconnects the emitter terminal from the step generator output and connects the emitter terminal to the front-panel EXT BASE OR EMIT INPUT Connector.

#### STEP GEN

Applies step generator output to the emitter terminal.

### EMITTER-BASE BREAKDOWN

Grounds the base terminal and applies the collector sweep voltage to the emitter terminal. Only the collector-voltage ranges that are not interlocked are available.

### STEP GEN OUTPUT Connector

Provides external access to the step generator output.

### EXT BASE OR EMIT IN Connector

Provides external access to the base or emitter terminals, depending on the position of the Terminal Selector switch.

### GROUND

Provides for external ground connection.

### LEFT-RIGHT Switch

Three position toggle switch for applying test signals to either the left or right set of terminal connectors. The center position disconnects all terminals except the emitter terminals. The emitter terminals are always connected together and are connected to either ground, to the step generator, or to the collector sweep depending on the position of the Terminal Selector switch.

### Test Adapter Terminal Jacks

Two sets of five recessed jacks accepting various adapters for testing various semiconductor devices.

# CIRCUIT DESCRIPTION

## Introduction

This section of the manual contains a description of the circuitry in the 177 Standard Test Fixture. Complete schematic diagrams, with component numbers and parts values, are shown on the pullout pages at the rear of this manual.

## Description

The Standard Test Fixture contains the vertical preamplifier (variable gain) that measures voltage across a current-sensing resistor.

The entire vertical preamplifier, including its power supply, floats with respect to ground. See Fig. 3-1.

The vertical preamplifier consists of two FET source followers, Q604A and B; a non-inverting feedback amplifier, U616, and an inverting feedback amplifier, U624-Q626-Q628, which provides the 1-2-5 current per division switching. The inverting amplifier output connects to the 577 vertical amplifier.

Current sensing resistors, R630 through R636, are connected between the collector supply and the device under test.

Q604A and B (source followers) are connected across the current-sensing resistors, and the source-follower outputs are fed differentially to U616, the X10 amplifier.

R612 is the input resistor for U616; R616 and R615 (Gain Adj) make up the feedback resistor. The gain is set for slightly more than 10, to compensate for the FET source-follower losses.

C632, LOOPING COMPENSATION (front-panel control), compensates for stray capacitance at Q604B gate and the test adapter, as well as some of the device-under-test capacitance.

C630 and R660 through R665 (ganged with the current-sensing resistors, R630 through R636), compensate

for the stray capacitance across the current sensing resistors, keeping the time constant similar to the time constant of the stray capacitance and R630 through R636.

U616 output is connected to a 10:1 divider, R618-R619. This divider output is connected to the horizontal attenuator in the low-current ranges of the VERTICAL CURRENT/DIV switch (2 nA/DIV to 2 mA/DIV). This voltage to the horizontal attenuator is the same as the voltage on the collector of the device under test. This method permits monitoring the collector voltage without drawing current through the current-sensing resistor.

On the high-current ranges (5 mA/DIV to 2 A/DIV) the horizontal attenuator is connected directly to the collector sense terminal of the device under test to permit Kelvin sensing. If Kelvin sensing is not used, the 22  $\Omega$  resistor between C and C SENSE terminals connects the horizontal attenuator to the C terminals.

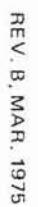
U616 output is connected to the inverting amplifier, U624-Q626-Q628. The input resistance is R621 and the feedback resistance is composed of three resistors, R627 (gain of 5), R627 and R628 in parallel (gain of 2.5), and R627 in parallel with R629 (gain of 1).

The inverting amplifier, U624-Q626-Q628, is connected to pin 21 of J110, to the vertical amplifier via pin 4 of P129. Q626-Q628 provide low-output impedance to prevent signal loading by the chopper circuit.

All power is supplied by the floating 0+15 and 0-15-volt supplies. 0 (test fixture common) is connected to the junction of the collector supply and the current sensing resistors.

When using the 177 Test Fixture in the 577, the highest ranges of the MAX PEAK VOLTS switch (100 V, 400 V, and 1600 V) are not enabled unless the protective cover is placed over the test adapter or the interlock defeat button is depressed. When the cover is closed, S626 is closed and permits these three ranges to be enabled.





**Fig. 3.3-1. Vertical Preamplifier.**

S628, the safety-interlock defeat switch (red button on the 177 front panel) may be pressed to defeat the safety interlock.

**WARNING**

The 100 V and 400 V supplies may be enabled without using the protective cover or the defeat switch by a wiring option in the 177 (see Fig. 3-2 for details).

*This modification is not recommended. The 100 V supply can be lethal and the 400 V supply is very likely lethal. If this modification is made a WARNING note should be permanently attached to the 177.*

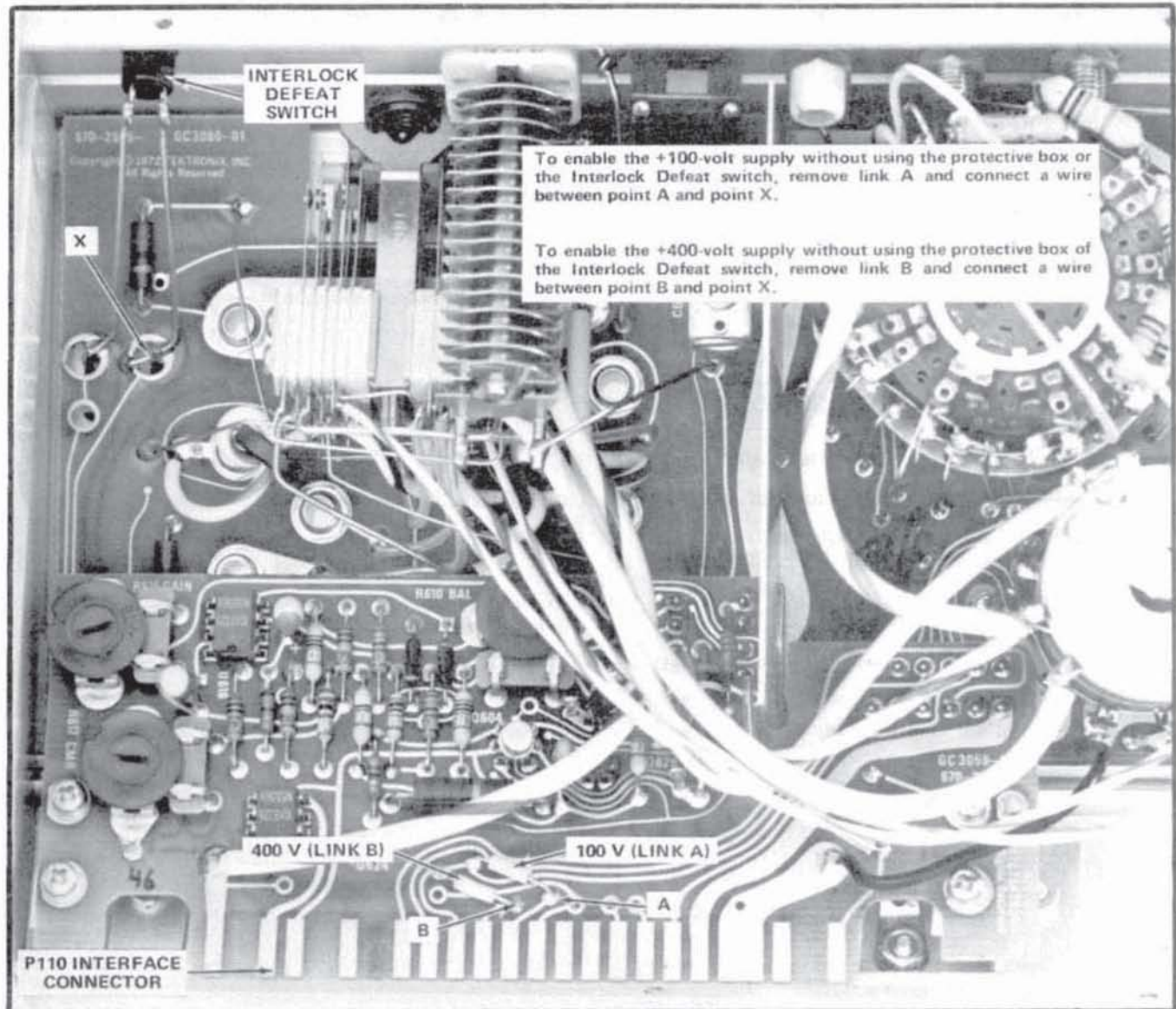


Fig. 3-2. 100 V and 400 V Interlock Defeat bypass option.

# MAINTENANCE

## Introduction

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

## 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 177 Test Fixture should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause leakage currents and component breakdown, especially in a humid atmosphere.

**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 remaining 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 (such as Tektronix Part No. 006-0442-00) on rotary switch contacts. Lubricate switch detents with heavier grease (such as Tektronix Part No. 006-0219-00).

### NOTE

*Shaft bushings and potentiometers that are not sealed should be lubricated with a lubricant (such as Tektronix Part No. 006-0172-00) that will not affect the electrical characteristics. Do not over-lubricate. A lubrication kit (Tektronix Part No. 003-0342-01) is available.*

## Visual Inspection

The 177 Test Fixture 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.

### NOTE

*Connecting the device under test to the test fixture in a manner that causes current flow in the Kelvin sensing resistors can burn out these resistors. See Fig. 4-1 and the Kelvin Sensing Check in the Troubleshooting section.*

*The current sensing resistors (R630 through R636) can be damaged if the vertical current over-range disabling circuit in the 577 is not functioning properly. Check the over-range circuit after replacement of a current-sense resistor.*



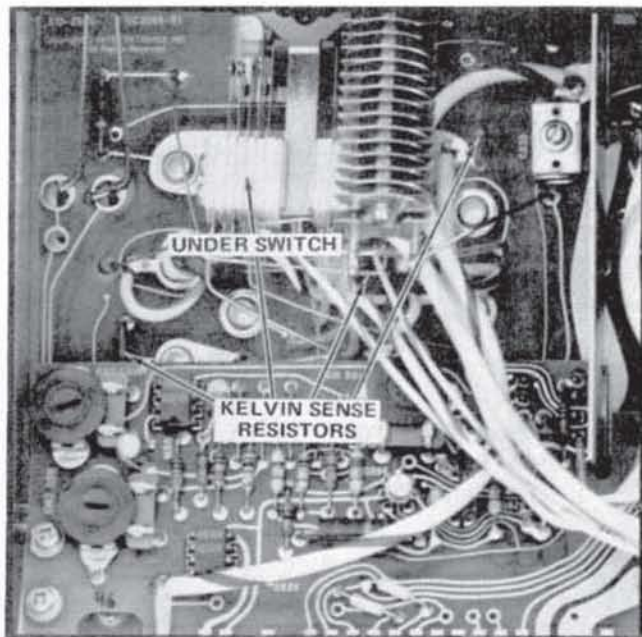


Fig. 4-1. Location of Kelvin sense resistors.

## 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. The Performance Check/Adjustment procedure can also be helpful in locating troubles.

# TROUBLESHOOTING

## Introduction

The following information is provided to facilitate troubleshooting the 177. 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 177:

1. Semiconductor Tester. 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 resistances 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. An oscilloscope with a DC to 10 MHz frequency response and 10 mV/Div to 10 V/Div vertical deflection factor is suggested. A 10X probe should be used to reduce 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.

**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 letters 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 configurations of the transistors and ICs in the 177 Test Fixture are shown with the circuit board photos on the schematic diagram foldout aprons.

**Voltages and Waveforms.** 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.

**Capacitor Identification.** Capacitor values of disc capacitors are marked on the capacitor body and electrolytic capacitor values are either marked on the capacitor body or are color coded (see Fig. 4-2).

**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

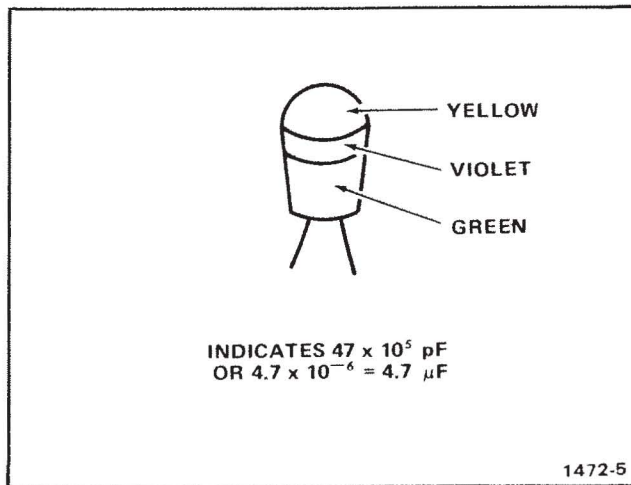


Fig. 4-2. Example of Electrolytic capacitor color code.

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-brown-gray-green indicates Tektronix Part Number 152-0185-00.

**Circuit Boards.** A photograph of each circuit board, with circuit components identified, is included on the apron of the schematic diagram relating most directly 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.

## COMPONENT REMOVAL AND REPLACEMENT

### Removal of the VERTICAL CURRENT/DIV Switch

1. Remove the right-end (viewed from the front) panel of the 177.

Remove the bottom-cover screws (including one from the left-end panel). Note the two types of screws used, to facilitate re-assembly. Machine screws hold the bottom cover and self-threading screws hold the end panels. See Fig. 4-3 for location of screws.

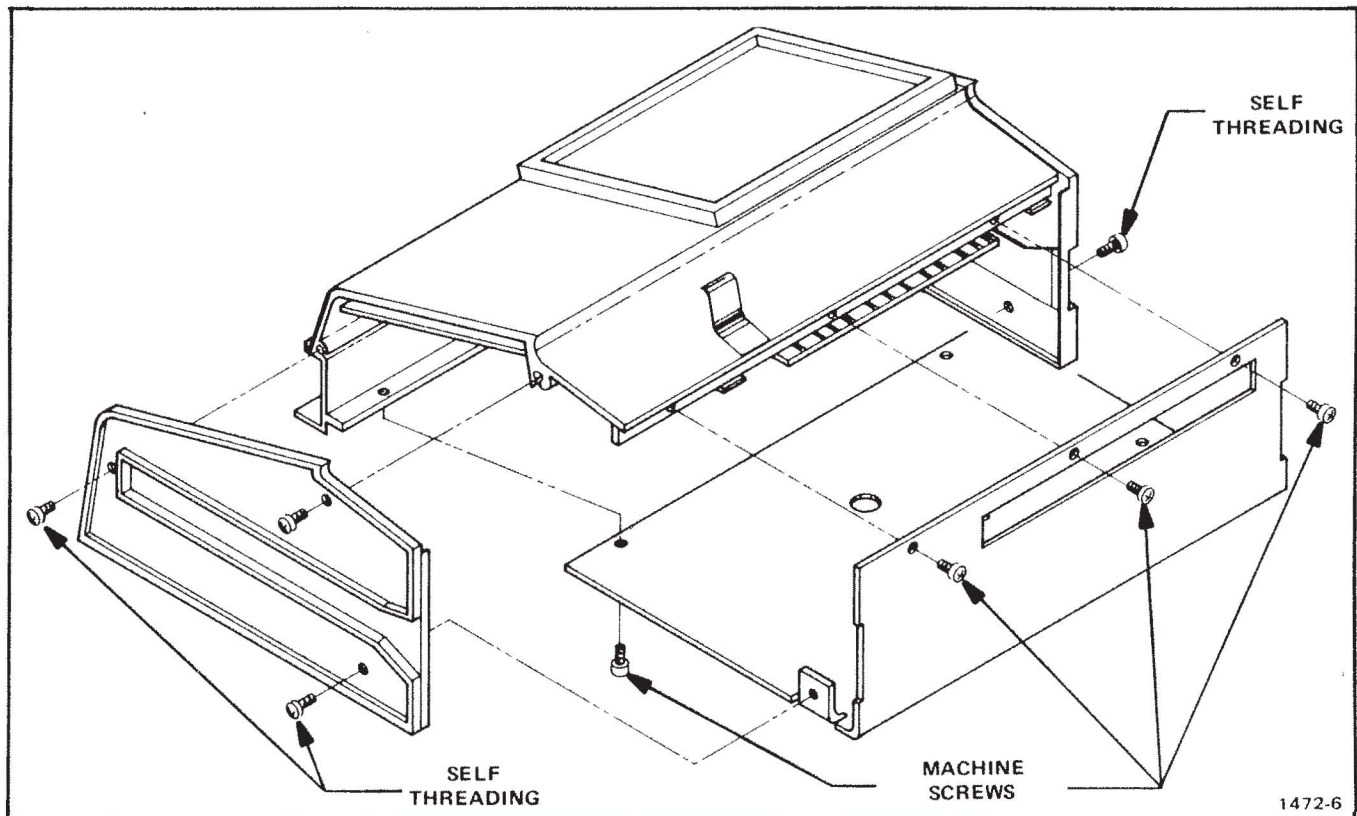


Fig. 4-3. Location of cover screws.



2. Turn the CURRENT/DIV switch to expose one of the two hex socket-head set screws (A in the diagram, Fig. 4-4). Loosen the set screw and turn the CURRENT/DIV knob to make the other set screw accessible.

Note the position of the knob skirt. Loosen the set screw and remove the knob and insulating bushing assembly through the front panel.

**WARNING**

*Do not replace the insulating bushing with an un-insulated bushing, as the switch shaft is elevated to as high as 1900 volts. Since many of the components, including entire switch assemblies, are elevated, replace components and parts with the correct parts.*

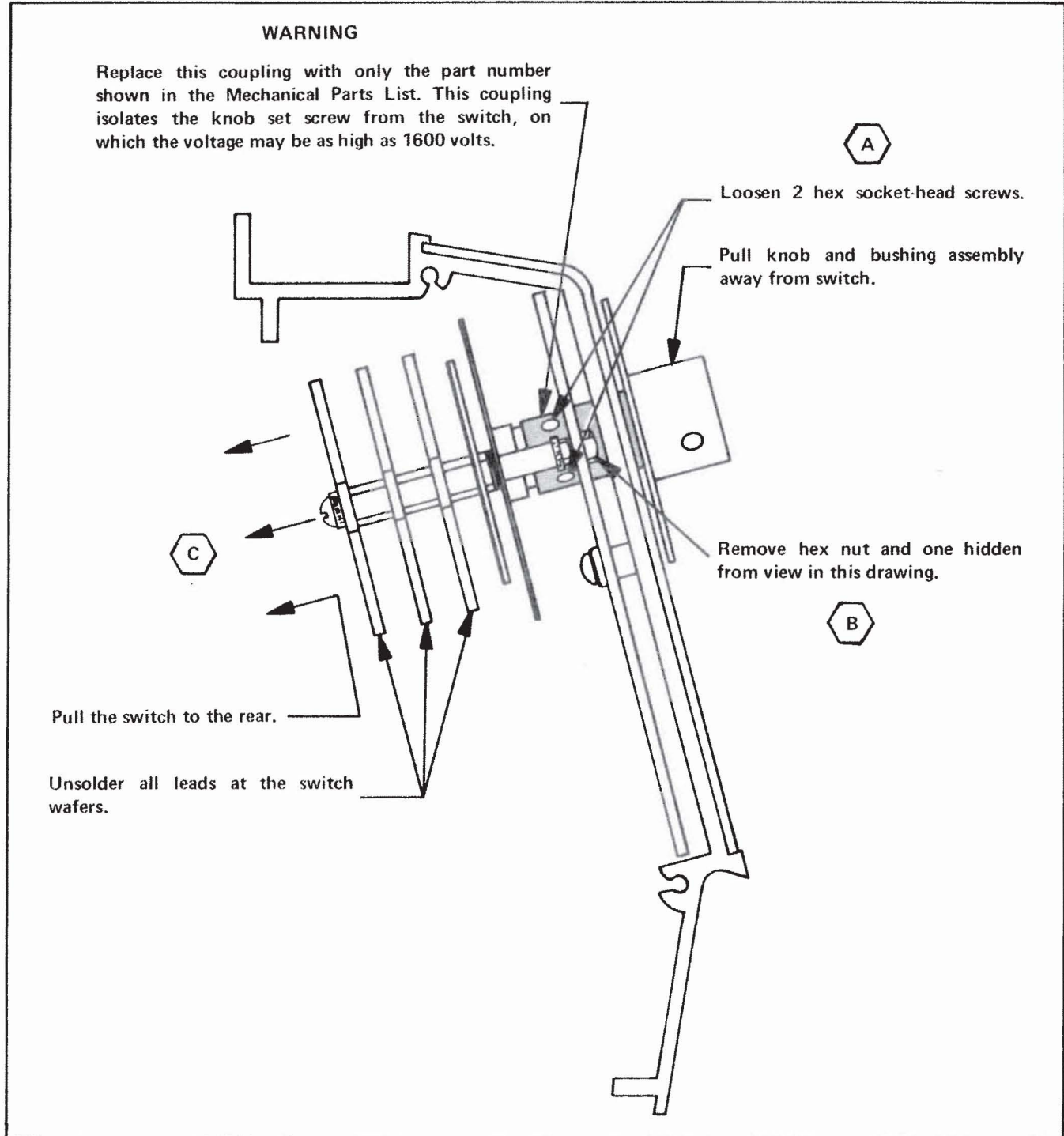


Fig. 4-4. Removal of VERTICAL CURRENT/DIV Switch.



Using a 12-point box-end wrench, or open-end wrench, loosen the two hex nuts (B in the diagram) that hold the switch to the circuit board (hold the screw head, C, while removing the hex nuts).

Refer to Fig. 4-5 (drawing of the leads that must be removed) to facilitate switch replacement.

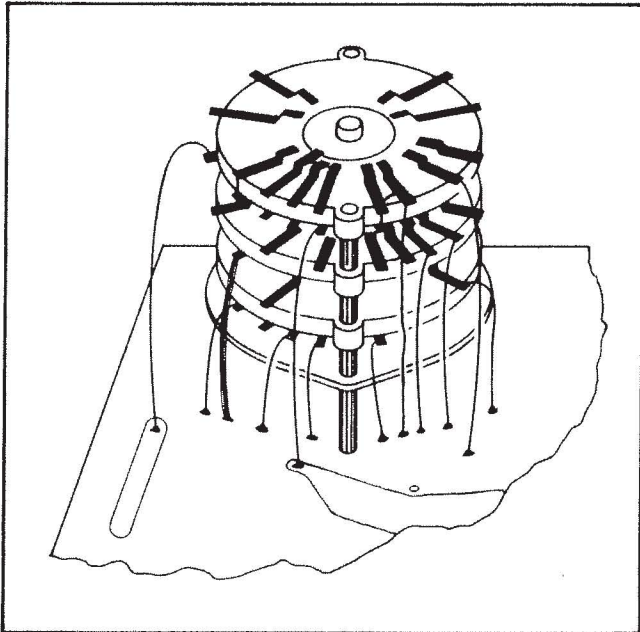


Fig. 4-5. Location of leads that must be removed to remove and replace the VERTICAL CURRENT/DIV switch.

Unsolder the leads and pull the switch away from the circuit board.

### Replacement of the VERTICAL CURRENT/DIV Switch

Place the switch mounting screws into the circuit board mounting holes and place the lock washer and hex nut on

the more accessible switch-assembly screw. Partially tighten the next nut.

Attach a piece of tape having adhesive on both sides, to a flat object (stick, screwdriver blade, etc.). Attach the nut to the tape and place the nut over the screw. With a screwdriver, turn the screw clockwise just far enough to start the nut on the screw. If the screw cannot be turned, loosen the nut on the opposite side of the board enough to allow the screw to turn.

Tighten the nut with a wrench while holding the screw-head.

Complete tightening both nuts, making sure that both nuts on the opposite side of the board are tight.

Resolder all leads into their respective switch terminals.

### Removal of Indicator Lamps

Knob Sirt Lamps. Remove the right end from the 177 as shown in Fig. 4-3.

These lamp assemblies (gray plastic) snap into the plastic sleeve. To remove the lamp assembly, grasp the assembly with needle-nose pliers and pull the assembly away from the sleeve.

Unsolder the leads and remove the lamp assembly.

Red Dangerous Voltage Lamp. This lamp assembly is mounted in a rubber grommet and may be removed by pushing the assembly out through the front panel (push from the rear while pulling from the front).

# 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 calibration of the 177 Standard Test Fixture. All test equipment is assumed to be correctly calibrated and operating within the listed specifications.

1. Digital Voltmeter (4-1/2 digits) or a DC voltage bridge. Accuracy, 0.01%; voltage range,  $\pm 5$  volts; input impedance, 500 M $\Omega$ . See footnote 1, Table 5-1.

2. Capacitor. Capacitance, 0.01  $\mu$ F; working voltage, 1000; tolerance,  $\pm 20\%$ .

3. Shunt resistors. Range 1  $\Omega$  to 10 M $\Omega$ . See the table. These resistors are available from Tektronix, Inc., as a kit (Tektronix Part Number 067-0691-00). Two 200  $\Omega$ , 1% resistors are included in this kit.

4. Extender Cable, (to permit making adjustment to the 177 without removing the 577 bottom panel) Tektronix Part Number 067-0721-00.

Resistance	Watts	Accuracy
1 $\Omega$	10	1/4%
10 $\Omega$	5	
100 $\Omega$	1/2	
1 k $\Omega$	1/4	
10 k $\Omega$	1/4	
100 k $\Omega$	1/8	
1 M $\Omega$	1/8	
10 M $\Omega$	1/8	

## PERFORMANCE CHECK

Set the controls as follows:

### 577-D1 or D2

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
COLLECTOR SUPPLY	
POLARITY	+DC
VARIABLE COL- LECTOR %	0
HORIZ VOLTS/DIV	200 V, COLLECTOR
NUMBER OF STEPS	counterclockwise

All Dark Gray Buttons and Knobs in, except:

STEP FAMILY	SINGLE
X10 VERT MAG	out
Horizontal POSITION	Centered
Vertical POSITION	Centered

### 177

VERTICAL CUR- RENT/DIV	.2 A
Terminal Selector	EMITTER GROUNDED, BASE TERM, STEP GEN
LEFT-RIGHT	Off

## 1. Check Vertical Preamplifier Balance

a. Vertically and horizontally position the spot to graticule center.

b. Switch the VERTICAL CURRENT/DIV switch throughout its range.

c. CHECK—There should be not more than 0.5 major division of vertical movement while switching the VERTICAL CURRENT/DIV through its range.

## 2. Check Vertical Preamplifier Common-Mode Rejection

a. Set the controls as follows:

VERTICAL CURRENT/DIV	10 nA
COLLECTOR SUPPLY	
POLARITY	AC
Vertical POSITION	centered
Horizontal POSITION	centered
LEFT-RIGHT	Off

b. Connect a patch cord between the 177 GROUND terminal (front panel) and TP630. To reach TP630, remove the plug in the bottom panel of the 177. TP630 is a 1/4-inch ring terminal at one end of C630. A hook tip, such as the E-Z HOOK TIP 1, provides a convenient means of connection to TP630.

c. Connect a patch cord between the 177 C and E terminals, right side.

d. Switch the LEFT-RIGHT switch to RIGHT.

e. Reset the VARIABLE COLLECTOR % to 100.

f. CHECK—Vertical deflection should be less than four major divisions.

g. Return the VARIABLE COLLECTOR % to 0. Switch the LEFT-RIGHT switch to Off.

h. Disconnect the ground lead from TP630. Leave the patch cord between C and E terminals.

### WARNING

*Replace the plug in the bottom panel of the 177 to avoid contact with potentially lethal voltage.*

## 3. Check Vertical Current Per Division

a. Reset the VERTICAL CURRENT/DIV to 2 A, switch LEFT-RIGHT to RIGHT, turn VARIABLE COLLECTOR % to 100, and wait for the COLLECTOR SUPPLY CIRCUIT BREAKER to open.

b. Remove the C to E patch cord.

c. Reset the controls as follows:

STEP/OFFSET AMPL	.1 V/Step
OFFSET MULT	0.000
STEP FAMILY	
SINGLE	press
OFFSET	
ZERO	out
AID	in
VERTICAL CURRENT/DIV	2 nA
X10 VERT MAG	pushed in
LEFT-RIGHT	Off

d. Connect the DVM between E and B on the right-side set of terminals. Connect a 10 M $\Omega$ , 1/4%, resistor (as shown in Table 5-1, second column) between the 177 B and C terminals, right side.

e. Switch the LEFT-RIGHT switch to RIGHT. Note the DVM reading.

f. Vertically position the spot to the top graticule line.

### NOTE

*The DISPLAY FILTER NORM button may have to be in the out position to reduce the display noise at high sensitivities.*

g. With the OFFSET MULT, position the spot to the bottom graticule line.

h. CHECK—The difference in DVM reading, relative to the DVM reading in step e, should be within the limits shown in Table 5-1, columns 3 and 4.

i. Switch the VERTICAL CURRENT/DIV and STEP/OFFSET AMPL to the next settings in the table.

j. Press the OFFSET ZERO button in and note the DVM reading.



k. Position the spot to the top graticule line.

l. Release the OFFSET ZERO button. With the OFFSET MUTL, position the spot to the bottom graticule line.

m. CHECK—The difference in the DVM reading should be within the limits shown in Table 5-1.

n. Repeat the above procedure for each of the VERTICAL CURRENT/DIV steps, using the value of resistance specified in the table.

TABLE 5-1

VERTICAL CURRENT/ DIV	STEP/ OFFSET AMPL	Resistor (1/4%) C-B	Difference in DVM Reading B-E	Within ±3%, ±1 nA
2 nA	.1 V	10 MΩ <sup>1</sup>	0.3200 V	0.0296 V
5 nA	.2 V	In these ranges an internal 10 MΩ resistance is in series with the external 10 MΩ	0.8000 V	0.0400 V
10 nA	.5 V		0.8800 V	0.0375 V
20 nA	1 V		1.760 V	0.0638 V
50 nA	2 V		4.400 V	0.1430 V

o. Switch the LEFT-RIGHT switch to Off.

p. Reconnect the DVM between B and C (or C SENSE).

q. Proceed as in the previous step, using Table 5-2.

r. Switch the LEFT-RIGHT switch to Off.

s. Disconnect the DVM and resistor.

<sup>1</sup>If a DVM having an input impedance of 500 MΩ or less is used, use the formula:

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

where  $V_2$  is the actual voltage,  $V_1$  is the meter reading,  $R_m$  is the meter input impedance, and  $R_s$  is the current sensing resistor in the table. Do not use a DVM having an input impedance less than 100 MΩ.

TABLE 5-2

VERTICAL CURRENT/ DIV	STEP/ OFFSET AMPL	Resistor (1/4%) C-B	Difference in DVM Reading B-E	Within ±3%, ±1 nA
.1 μA	.1 μA	1 MΩ <sup>1</sup>	0.800 V	0.024 V
.2 μA	.2 μA		1.600 V	0.048 V
.5 μA	.5 μA		4.000 V	0.120 V
1 μA	1 μA	100 kΩ <sup>1</sup>	0.800 V	0.024 V
2 μA	2 μA		1.600 V	0.048 V
5 μA	5 μA		4.000 V	0.120 V
10 μA	10 μA	10 kΩ	0.800 V	0.024 V
20 μA	20 μA		1.600 V	0.048 V
50 μA	50 μA		4.000 V	0.120 V
.1 mA	.1 mA	1 kΩ	0.800 V	0.024 V
.2 mA	.2 mA		1.600 V	0.048 V
.5 mA	.5 mA		4.000 V	0.120 V
1 mA	1 mA	100 Ω	0.800 V	0.024 V
2 mA	2 mA		1.600 V	0.048 V
5 mA	5 mA		4.000 V	0.120 V
10 mA	10 mA	10 Ω	0.800 V	0.024 V
20 mA	20 mA		1.600 V	0.048 V
50 mA	50 mA		4.000 V	0.120 V
.1 A	.1 A	1 Ω	0.800 V	0.024 V
.2 A	.2 A		1.600 V	0.048 V

Pull the X10 VERT MAG and proceed as in the previous steps.

				±4%
50 mA <sup>2</sup>	50 mA	10 Ω	4.000 V	0.160 V
.1 A	.1 A	1 Ω	0.800 V	0.032 V
.2 A	.2 A	1 Ω	1.600 V	0.064 V

t. Push to reset the COLLECTOR SUPPLY CIRCUIT BREAKER.

u. If DISPLAY FILTER was used, push NORM button in.

#### 4. Check Kelvin Sensing

a. Set the controls as follows:

MAX PEAK VOLTS	25
SERIES RESISTORS	1.9
X10 HORIZ MAG	pull
HORIZ VOLTS/DIV	5 mV, COLLECTOR
Vertical POSITION	centered
X10 VERT MAG	in
VERTICAL CUR- RENT/DIV	1 A
LEFT-RIGHT	Off

<sup>2</sup>Magnification occurs only in the 577. These measurements check the .5A, 1A, and 2A ranges in the 177.



b. Place an 013-0111-00 Diode Adapter in the 177 terminals, right side. Place a short, clean, piece of 14 gauge solid copper wire (preferably tinned) in the adapter.

c. Switch the LEFT-RIGHT switch to RIGHT.

d. Increase the VARIABLE COLLECTOR % control to display eight divisions of vertical deflection.

e. Horizontally position the bottom of the trace to graticule center line.

f. CHECK—The top of the display should be displaced horizontally, in either direction, not more than 15 mV (three major divisions) from the graticule center line. See Fig. 5-1 for an example of a typical display.

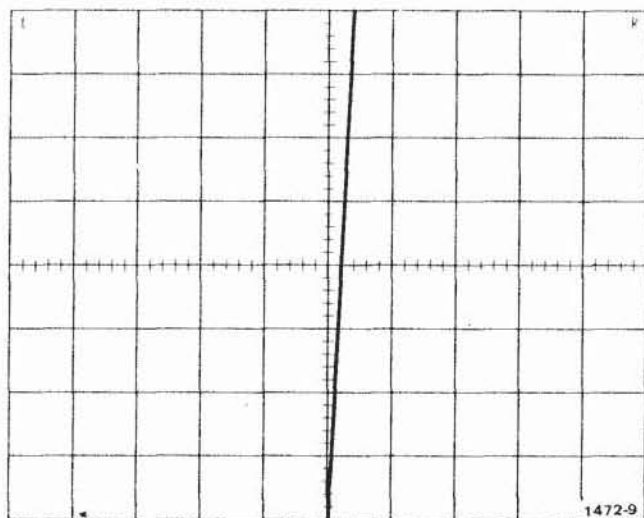


Fig. 5-1. Typical display for Kelvin sensing check.

g. If the above requirement is not met, the cause may be damaged Kelvin sensing resistors. See Maintenance section NOTE under Visual Inspection heading and Fig. 4-1.

## 5. Check Error Due to CMRR and Gain Misadjustment

a. Set the controls as follows:

VARIABLE COLLECTOR %	0
MAX PEAK VOLTS	6.5
SERIES RESISTORS	120
Horizontal POSITION	centered
VERTICAL CURRENT/DIV	.5 mA

b. Increase VARIABLE COLLECTOR % to produce an eight-division vertical display.

c. Horizontally position the bottom of the trace to graticule center.

d. CHECK—The top of the display should be displaced from graticule center not more than  $\pm 7$  mV (1.4 divisions). If this requirement cannot be met, the cause could be incorrect adjustment of Vertical GAIN and CMRR controls.

## ADJUSTMENT PROCEDURE

### Initial Control Settings

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COLLECTOR %	0
HORIZ VOLTS/DIV	200 V, COLLECTOR
Horizontal POSITION	centered
X10 HORIZ MAG	in
Vertical POSITION	centered
X10 VERT MAG	in
VERTICAL CURRENT/DIV	.1 A
LEFT-RIGHT	Off

### 1. ADJUST Vertical Preamplifier Balance

a. Place the curve tracer on its right side.

b. ADJUST—R610, Atten Bal, for no vertical spot movement while switching the VERTICAL CURRENT/DIV from .1 A/DIV through 50 nA/DIV (adjust R610 through the access hole in the bottom cover, shown in Fig. 5-2).

### 2. Adjust Vertical Preamplifier Gain

a. Reset the controls as follows:

MAX PEAK VOLTS	400
SERIES RESISTORS	8 M
COLLECTOR SUPPLY	
POLARITY	+
STEP/OFFSET AMPL	.05 VOLTS/Steps
STEP FAMILY	
SINGLE	press
STEP/OFFSET POLARITY	
NORM	in
OFFSET	
ZERO	out
AID	in
VERTICAL CURRENT/DIV	50 nA
LEFT-RIGHT	Off

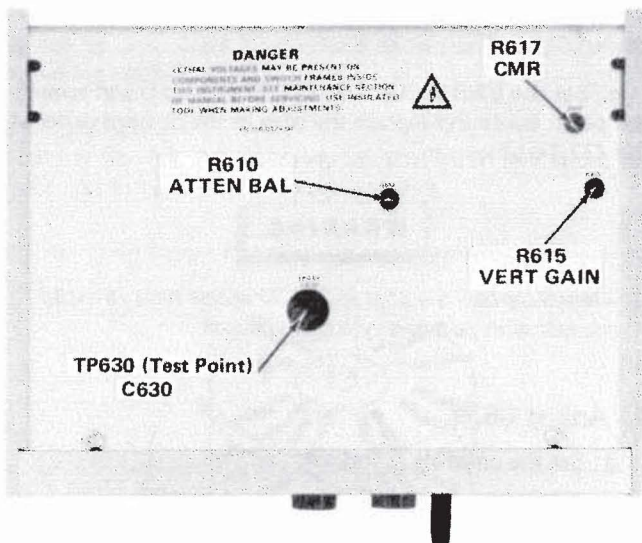


Fig. 5-2. Location of controls, 177 bottom panel.

### WARNING

*Lethal voltages may be present on the MAX PEAK VOLTS switch and Collector Sweep circuit board in the 577 any time the VARIABLE COLLECTOR % control is not at 0. Lethal voltages may be present in the 177 only when the MAX PEAK VOLTS switch is in the 100 V, 400 V, or 1600 V positions, with the Interlock Defeat button pressed in.*

b. Connect the GROUND terminal on the 177 front panel to the white-green wire on the rear wafer on the MAX PEAK VOLTS switch (See Fig. 5-3). Connect the DVM between the B terminal and the white-green wire on the MAX PEAK VOLTS switch.

c. Patch the B terminal to the C terminal, right side. Set the LEFT-RIGHT switch to RIGHT.

d. Set the OFFSET MULT to produce a DVM reading of +0.400 volt,  $\pm 0.4$  mV.

e. Move the DVM lead from B terminal to terminal 4 of connector P129 (see Fig. 5-4) on the Collector Supply board (measure the voltage between the white-green wire on the MAX PEAK VOLTS switch and P129-4).

f. ADJUST—R615, Vert gain, through the bottom cover, for a DVM reading of 4.000 volts,  $\pm 20$  mV.

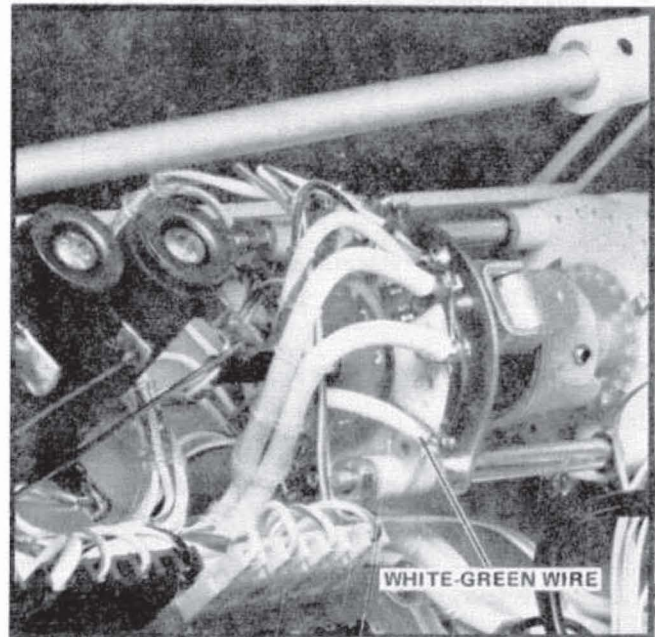


Fig. 5-3. Location of white-green wire on MAX PEAK VOLTS switch.



Fig. 5-4. Location of P129, Terminal 4.

g. Remove the DVM and the patch cord from GROUND to the white-green wire.

h. Remove the patch cord from C to B.

### 3. Adjust Common-Mode Rejection

- a. Set the controls as follows:

MAX PEAK VOLTS	6.5
SERIES RESISTORS	.12
VARIABLE COL- LECTOR %	100
COLLECTOR SUPPLY POLARITY	AC
X10 VERT MAG	pulled
VERTICAL CUR- RENT/DIV	10 nA
LEFT-RIGHT	Off

- b. Place a patch cord from the front-panel GROUND to C terminal, right side.

- c. Connect a cord from front-panel GROUND to TP630. To reach TP630, remove the plug in the bottom cover of the 177. TP630 is a 1/4-inch ring terminal at one end of C630. A hook tip, such as the E-Z HOOK TIP 1, provides a convenient means of connection to TP630.

- d. Switch LEFT-RIGHT to RIGHT.

- e. ADJUST—R617, CMR, through the 177 bottom panel for minimum vertical deflection.

- f. INTERACTION—If R617 is adjusted, repeat steps 1 and 2.

- g. Set the VARIABLE COLLECTOR % to 0 and remove the patch cords and replace the plug in the bottom panel of the 177 Test Fixture.

#### WARNING

*Always replace the plug in TP630 access hole to avoid contact with potentially lethal voltages.*

### 4. Adjust C630

- a. Set the controls as follows:

X10 HORIZ MAG	pull
HORIZ VOLTS/DIV	5 mV, COLLECTOR
VERTICAL CUR- RENT/DIV	2 nA
LEFT-RIGHT	Off

- b. ADJUST—C630 for no trace tilt with the loop closed (keep the loop closed with the LOOPING COMPENSATION control while adjusting C630). Be sure that the TRACE ROTATION control is set properly. If in doubt, switch the VERTICAL CURRENT/DIV to 2 A and determine whether the trace is parallel to the horizontal graticule lines.



# 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
01121	ALLEN-BRADLEY CO.	1201 2ND ST. SOUTH	MILWAUKEE, WI 53204
03508	GENERAL ELECTRIC CO., SEMI-CONDUCTOR PRODUCTS DEPT.	ELECTRONICS PARK	SYRACUSE, NY 13201
04713	MOTOROLA, INC., SEMICONDUCTOR PRODUCTS DIV.	5005 E. MCDOWELL RD.	PHOENIX, AZ 85036
07910	TELEDYNE SEMICONDUCTOR	12515 CHADRON AVE.	HAWTHORNE, CA 90250
08806	GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPT.	NELA PK.	CLEVELAND, OH 44112
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
18788	GENERAL ILLUMINATION INC.	2958 N. CLEVELAND ST.	ST. PAUL, MN 55113
21845	SOLITRON DEVICES, INC., TRANSISTOR DIV.	1177 BLUE HERON BLVD.	RIVIERA BEACH, FL 33404
56289	SPRAGUE ELECTRIC CO.		NORTH ADAMS, MA 01247
71450	CTS CORP.	1142 W. BEARDSLEY AVE.	ELKHART, IN 46514
72136	ELECTRO MOTIVE CORP., SUB OF INTERNATIONAL ELECTRONICS CORP.	SOUTH PARK AND JOHN STREETS	WILLIMANTIC, CT 06226
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
74970	JOHNSON, E. F., CO.	299 10TH AVE. S. W.	WASECA, MN 56093
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
76854	OAK INDUSTRIES, INC., SWITCH DIV.	S. MAIN ST.	CRYSTAL LAKE, IL 60014
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97077
80294	BOURNS, INC., INSTRUMENT DIV.	6135 MAGNOLIA AVE.	RIVERSIDE, CA 92506
81073	GRAYHILL, INC.	561 HILLGROVE AVE.	LA GRANGE, IL 60525
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NB 68601

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-2504-00	B010100 B029999	CKT BOARD ASSY:PREAMP	80009	670-2504-00
A1	670-2504-01	B030000	CKT BOARD ASSY:PREAMP	80009	670-2504-01
A2	670-2505-00		CKT BOARD ASSY:INTERFACE	80009	670-2505-00
C600	283-0128-00		CAP., FXD, CER DI:100PF, 5%, 500V	72982	871-536T2H101J
C601	290-0525-00		CAP., FXD, ELCTLT:4.7UF, 20%, 50V	56289	196D475X0050KA1
C602	290-0525-00		CAP., FXD, ELCTLT:4.7UF, 20%, 50V	56289	196D475X0050KA1
C629	283-0087-00		CAP., FXD, CER DI:300PF, 5%, 1000V	72982	838-533X5E301K
C630	281-0162-00		CAP., VAR, MICA D:8-60PF, 500V	72136	T50417-9
C632	281-0197-00	B010100 B019999	CAP., VAR, AIR DI:7.9-41PF, 10%, 1800V	74970	148-0081-012
C632	281-0197-01	B020000	CAP., VAR, AIR DI:7.9-41PF, 10%, 1800V	74970	148-0081-011
CR601	152-0324-00		SEMICONV DEVICE:SILICON, 35V, 100MA	03508	SE416
CR602	152-0324-00		SEMICONV DEVICE:SILICON, 35V, 100MA	03508	SE416
CR611	152-0324-00		SEMICONV DEVICE:SILICON, 35V, 100MA	03508	SE416
CR614	152-0324-00		SEMICONV DEVICE:SILICON, 35V, 100MA	03508	SE416
CR651	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	07910	1N4152
CR652	152-0141-02		SEMICONV DEVICE:SILICON, 30V, 150MA	07910	1N4152
DS650	150-0133-00		LAMP, CARTRIDGE:14V, 80MA, RED DOME LENS	18788	T100-7-H538
DS651	150-0048-00	B010100 B039999X	LAMP, INCAND:5V, 60MA	08806	683
DS652	150-0048-00		LAMP, INCAND:5V, 60MA	08806	683
J640	136-0140-00		JACK, TIP: BANANA STYLE, CHARCOAL GRAY CAP	80009	136-0140-00
J646	136-0140-00		JACK, TIP: BANANA STYLE, CHARCOAL GRAY CAP	80009	136-0140-00
J648	136-0140-00		JACK, TIP: BANANA STYLE, CHARCOAL GRAY CAP	80009	136-0140-00
J651	136-0140-00		JACK, TIP: BANANA STYLE, CHARCOAL GRAY CAP	80009	136-0140-00
L641	276-0525-00		CORE, FERRITE:0.196 ID X 0.437"OD	01121	T037C351A
L647	276-0525-00		CORE, FERRITE:0.196 ID X 0.437"OD	01121	T037C351A
Q604A, B	151-1049-00		TRANSISTOR:SEL FROM 2N3822	21845	FD1620
Q626	151-0190-01		TRANSISTOR:SILICON, NPN	07910	TE23652
Q628	151-0188-00		TRANSISTOR:SILICON, PNP	04713	2N3906
R601	303-0222-00		RES., FXD, COMP:2.2K OHM, 5%, 1W	01121	GB2225
R602	304-0391-00		RES., FXD, COMP:390 OHM, 10%, 1W	01121	GB3911
R604	315-0510-00		RES., FXD, COMP:51 OHM, 5%, 0.25W	01121	CB5105
R606	321-0306-00		RES., FXD, FILM:15K OHM, 1%, 0.125W	75042	CEATO-1502F
R610	311-1120-00		RES., VAR, NONWIR:TRMR, 100 OHM, 0.25W	71450	201-YA5531
R611	321-0306-00		RES., FXD, FILM:15K OHM, 1%, 0.125W	75042	CEATO-1502F
R612	321-0385-00		RES., FXD, FILM:100K OHM, 1%, 0.125W	75042	CEATO-1003F
R613	321-0385-00		RES., FXD, FILM:100K OHM, 1%, 0.125W	75042	CEATO-1003F
R614	321-0481-00		RES., FXD, FILM:1M OHM, 1%, 0.125W	75042	CEATO-1004F
R615	311-1302-00		RES., VAR, NONWIR:TRMR, 100K OHM, 0.25W	71450	201-YA5549
R616	321-0481-00		RES., FXD, FILM:1M OHM, 1%, 0.125W	75042	CEATO-1004F
R617	311-1302-00	B010100 B029999	RES., VAR, NONWIR:TRMR, 100K OHM, 0.25W	71450	U201R1048
R617	311-1235-00	B030000	RES., VAR, NONWIR:100K OHM, 20%, 0.50W	80294	3389F-P31-104
R618	321-0637-00		RES., FXD, FILM:9.9K OHM, 0.5%, 0.125W	75042	CEAT2-9901D
R619	321-0197-02		RES., FXD, FILM:1.1K OHM, 0.5%, 0.125W	75042	CEAT2-1101D
R621	321-0222-07		RES., FXD, FILM:2K OHM, 0.1%, 0.125W	75042	CEAT9-2001D
R622	315-0152-00		RES., FXD, COMP:1.5K OHM, 5%, 0.25W	01121	CB1525
R623	315-0153-00	XB030000	RES., FXD, COMP:15K OHM, 5%, 0.25W	01121	CB1535
R624	315-0361-00	XB030000	RES., FXD, COMP:360 OHM, 5%, 0.25W	01121	CB3615
R625	315-0361-00	XB030000	RES., FXD, COMP:360 OHM, 5%, 0.25W	01121	CB3615
R626	315-0153-00	XB030000	RES., FXD, COMP:15K OHM, 5%, 0.25W	01121	CB1535
R627	321-0289-01		RES., FXD, FILM:10K OHM, 0.5%, 0.125W	75042	CEATO-1002D

# Electrical Parts List—177 Service

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
R628	321-0289-01		RES.,FXD,FILM:10K OHM,0.5%,0.125W	75042	CEAT0-1002D
R629	321-0929-07		RES.,FXD,FILM:2.5K OHM,0.10%,0.125W	91637	MFF1816C25000B
R630A R630B R630C R630D	307-0358-00		RES.,FXD,FOIL:10 OHM,0.1W	80009	307-0358-00
R631	308-0696-00		RES.,FXD,WW:90 OHM,0.5%,3W	91637	RS2B-B90R00D
R632	323-0729-01		RES.,FXD,FILM:900 OHM,0.5%,0.50W	91637	MFF1226G900R0D
R633	323-0730-01		RES.,FXD,FILM:9K OHM,0.5%,0.5W	91637	MFF1226G90000D
R634	323-0798-01		RES.,FXD,FILM:90K OHM,0.5%,0.5W	91637	MFF1226G90001D
R635	323-0611-01		RES.,FXD,FILM:900K OHM,0.5%,0.5W	75042	CECT0-9003D
R636	323-0799-01		RES.,FXD,FILM:9M OHM,0.5%,0.5W	91637	HMF-1/2 9MEG
R640	301-0332-00		RES.,FXD,COMP:3.3K OHM,5%,0.50W	01121	EB3325
R641	301-0220-00		RES.,FXD,COMP:22 OHM,5%,0.50W	01121	EB2205
R643	301-0220-00		RES.,FXD,COMP:22 OHM,5%,0.50W	01121	EB2205
R645	301-0220-00		RES.,FXD,COMP:22 OHM,5%,0.50W	01121	EB2205
R646	315-0472-00		RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R647	301-0220-00		RES.,FXD,COMP:22 OHM,5%,0.50W	01121	EB2205
R648	301-0220-00		RES.,FXD,COMP:22 OHM,5%,0.50W	01121	EB2205
R649	315-0472-00		RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R650	311-1368-00		RES.,VAR,NONWIR:PNL,5K OHM,1W	01121	10M043
R651	315-0822-00		RES.,FXD,COMP:8.2K OHM,5%,0.25W	01121	CB8225
R659	301-0226-00		RES.,FXD,COMP:22M OHM,5%,0.50W	01121	EB2265
R660	321-0097-00		RES.,FXD,FILM:100 OHM,1%,0.125W	75042	CEAT0-1000F
R661	323-0729-01		RES.,FXD,FILM:900 OHM,0.5%,0.5W	91637	MFF1226G900R0D
R662	323-0730-01		RES.,FXD,FILM:9K OHM,0.5%,0.5W	91637	MFF1226G90000D
R663	323-0798-01		RES.,FXD,FILM:90K OHM,0.5%,0.5W	91637	MFF1226G90001D
R664	323-0611-01		RES.,FXD,FILM:900K OHM,0.5%,0.5W	75042	CECT0-9003D
R665	323-0799-01		RES.,FXD,FILM:9M OHM,0.5%,0.5W	91637	HMF-1/2 9MEG
S626 <sup>1</sup>					
S628	260-0247-00		SWITCH,PUSH:SPST	81073	30YY1009
S630	260-1459-00		SWITCH,ROTARY:VERTICAL SENSITIVITY	76854	5-33152-826
S640	260-1458-00		SWITCH,ROTARY:TERMINAL SELECTOR	76854	5-28495-211
S650	260-1491-00		SWITCH,LEVER:TRANSISTOR SELECTOR	82389	0BD
U616	156-0200-00		MICROCIRCUIT,LI:LOW INPUT/OFFSET CURRENT	18324	N5556V
U624	156-0200-00		MICROCIRCUIT,LI:LOW INPUT/OFFSET CURRENT	18324	N5556V

<sup>1</sup>See Mechanical Parts List for replacement assembly.

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols and Reference Designators

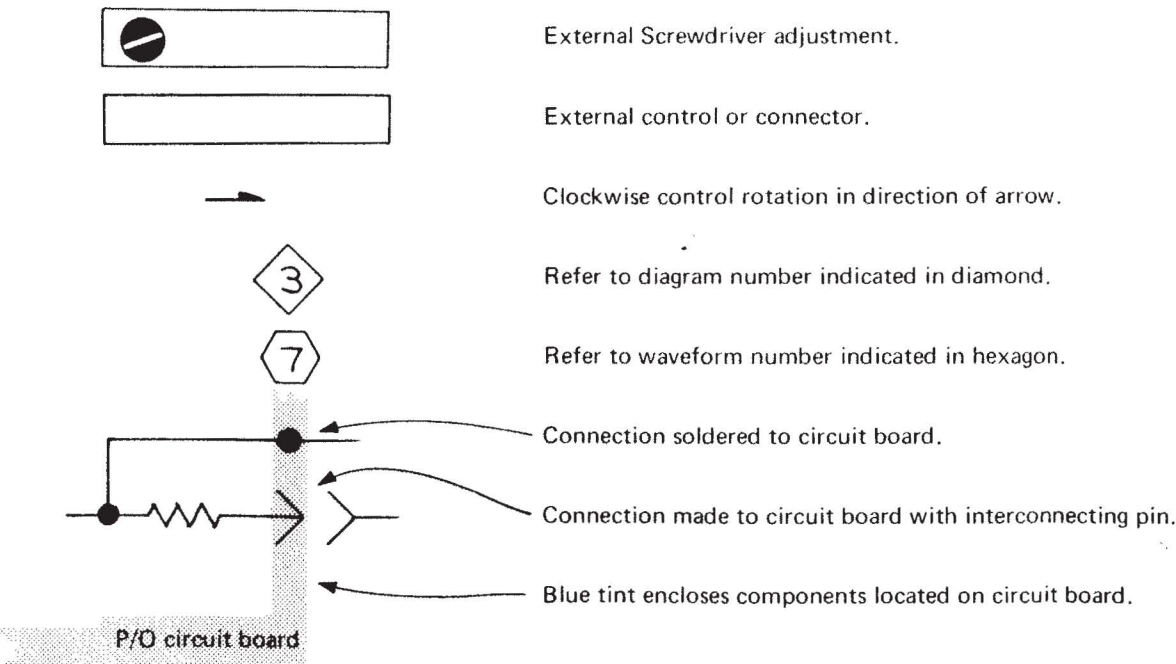
Electrical components shown on the diagrams are in the following units unless noted otherwise:

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

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/OFF AMPL 1 VOLT
- HORIZ VOLTS/DIV 100 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 button out

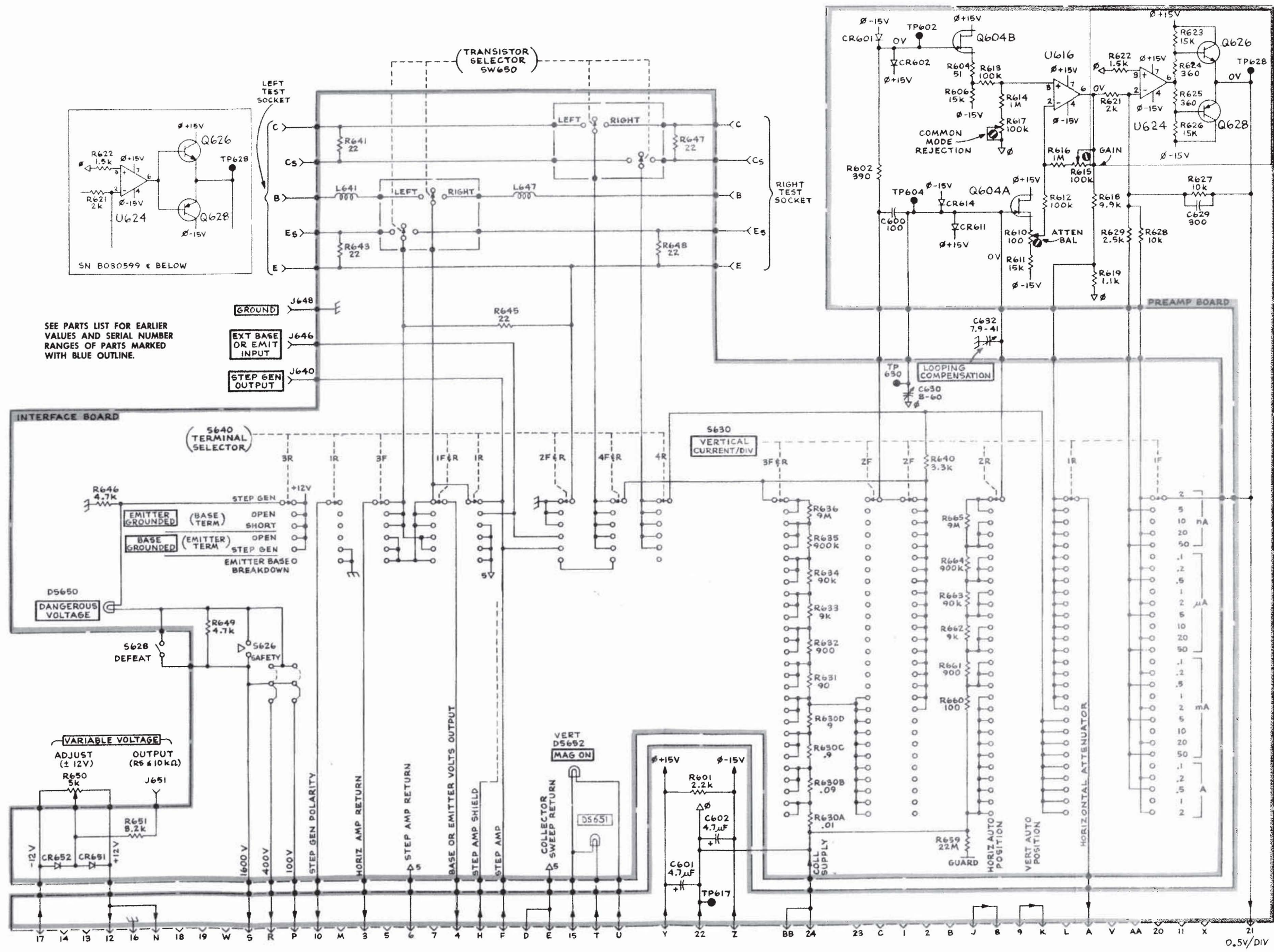
177

Terminal Selector

- EMITTER GROUNDED,
- BASE TERM, STEP GEN
- 2 A

VERTICAL CURRENT/DIV

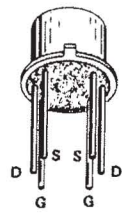




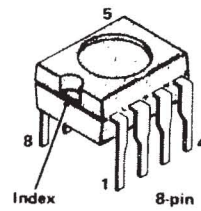
SEE PARTS LIST FOR EARLIER  
VALUES AND SERIAL NUMBER  
RANGES OF PARTS MARKED  
WITH BLUE OUTLINE.



PLASTIC-CASED TRANSISTORS



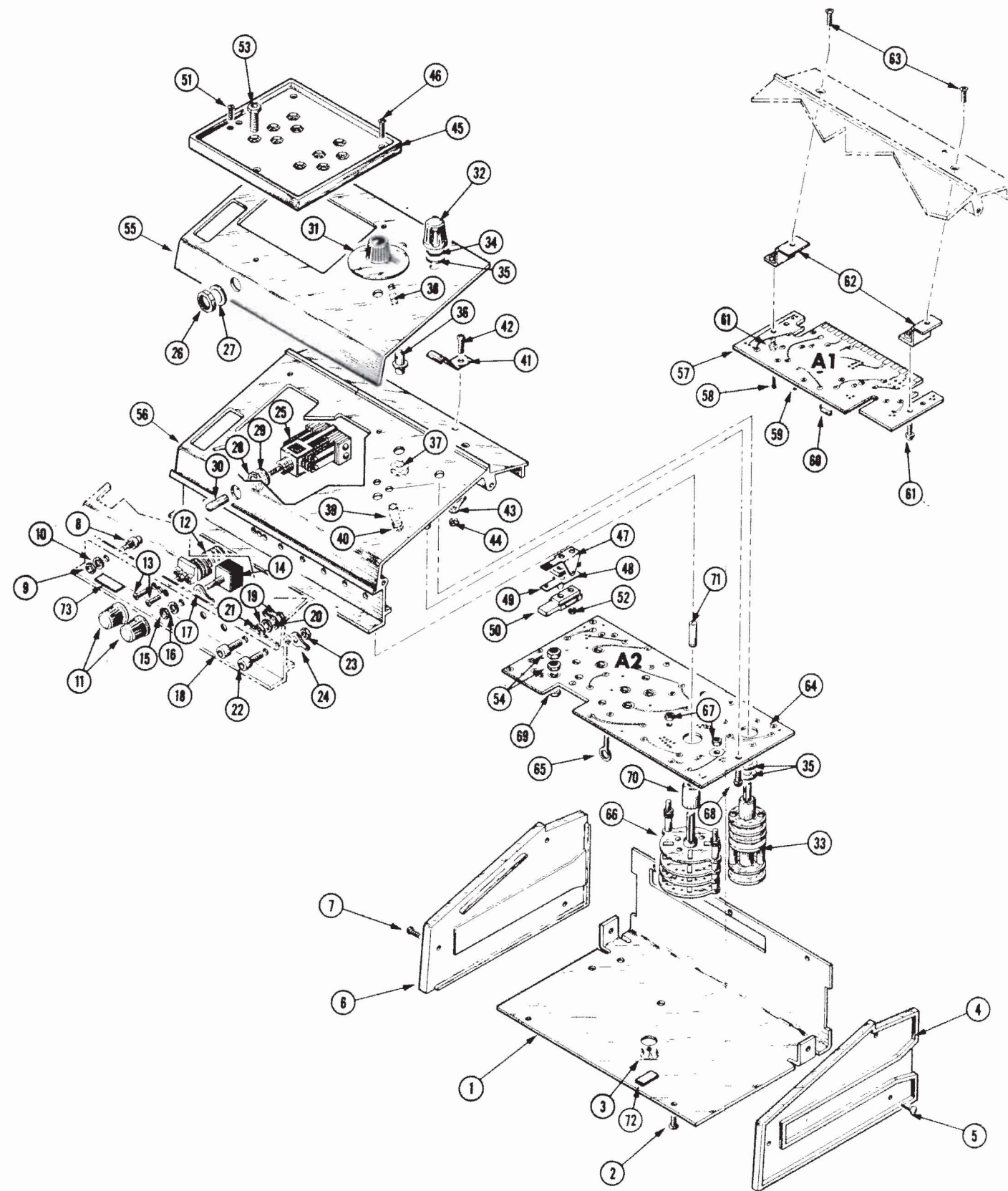
METAL-CASED TRANSISTORS



INTEGRATED CIRCUITS

Fig. 7-3. Semiconductor lead configuration for 177 circuit boards.

FIG. 1 EXPLODED



177 STANDARD TEST FIXTURE



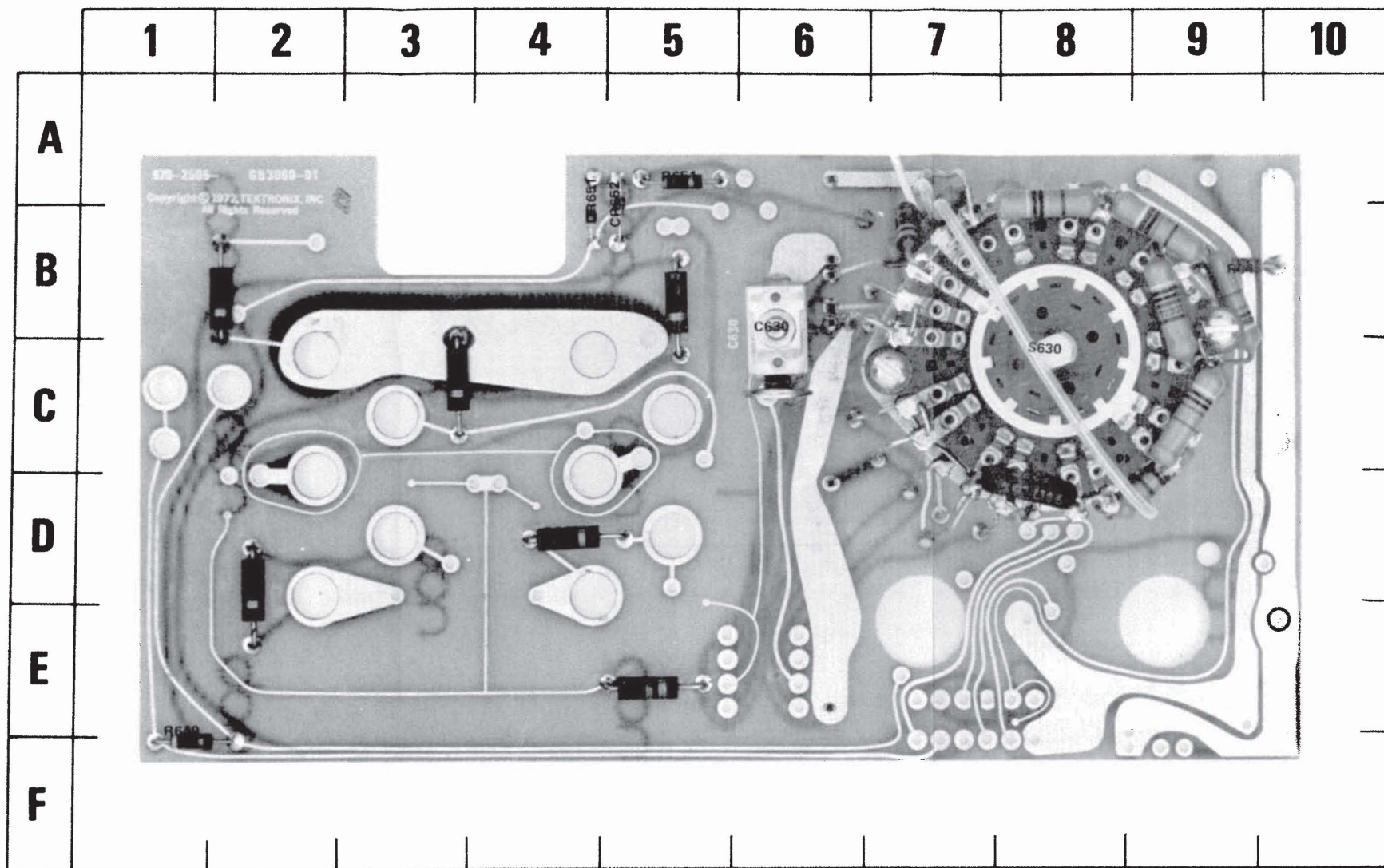
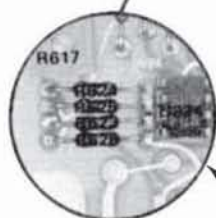


Fig. 7-2. A2 Interface circuit board.

CKT NO	GRID LOC	CKT NO	GRID LOC
C630	6B	R646	9B
		R647	4D
CR651	4B	R648	5B
CR652	5B	R649	1E
		R651	5A
R641	2D	R659	5E
R643	3C		
R645	2B	S630	8C



^ SN B030600 and up

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C601	2B	Q604	5C	R611	4B	R621	3B
C602	3A	Q626	6C	R612	3B	R622	3B
C629	6C	Q628	6B	R613	4B	R627	6C
				R614	4B	R628	5B
CR601	4B	R601	5C	R615	2B	R629	7B
CR602	5B	R602	7B	R616	3B		
CR611	6A	R604	4C	R617	2C	U616	3A
CR614	6A	R606	5B	R618	4B	U624	3C
		R610	5B	R619	4B		

FIG. 2 & 3 ACCESSORIES  
& REPACKAGING

ACCESSORIES

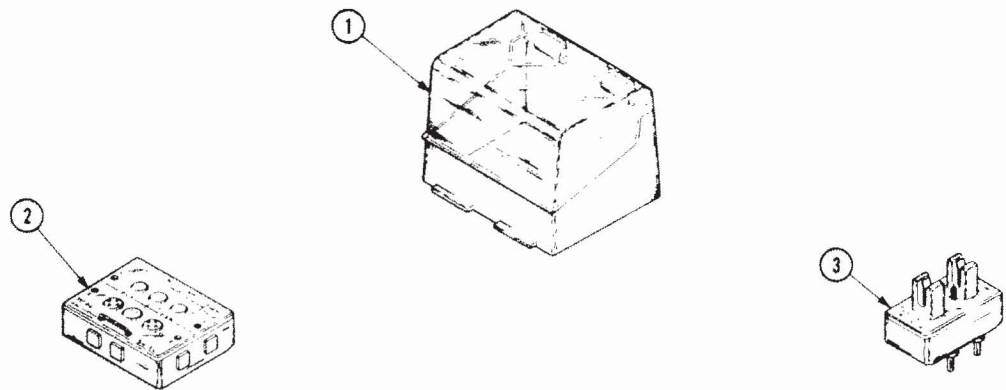


Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr	
							Code	Mfr Part Number
2-1	337-1194-00			1		SHIELD, ELEC: TRANSISTOR	80009	337-1194-00
-2	013-0098-01			1		ADAPTER, TEST: TRANSISTOR	80009	013-0098-01
-3	013-0111-00			1		ADAPTER, TEST: DIODE	80009	013-0111-00
	070-1472-00			1		MANUAL: INSTRUCTION	80009	070-1472-00

REPACKAGING

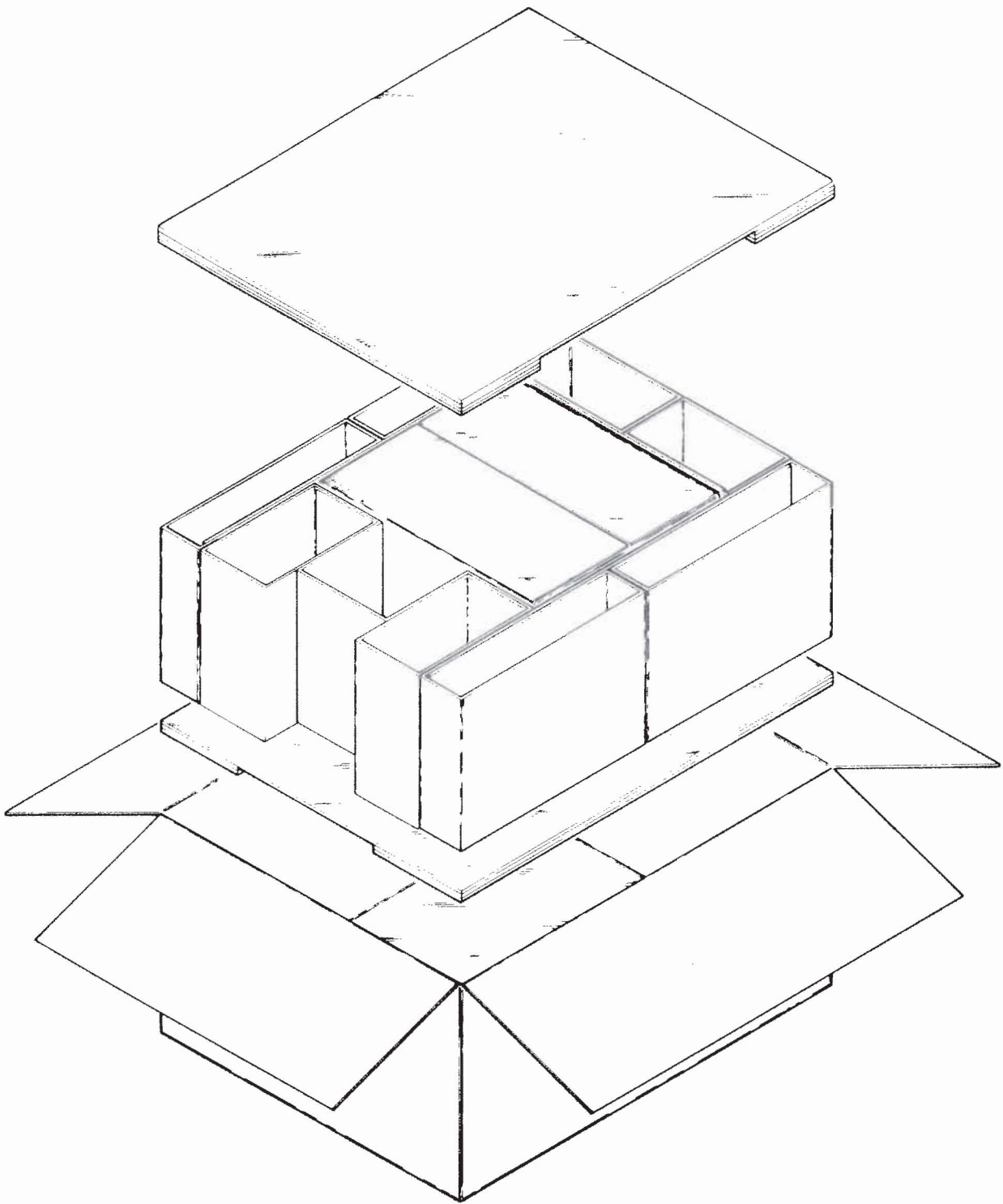
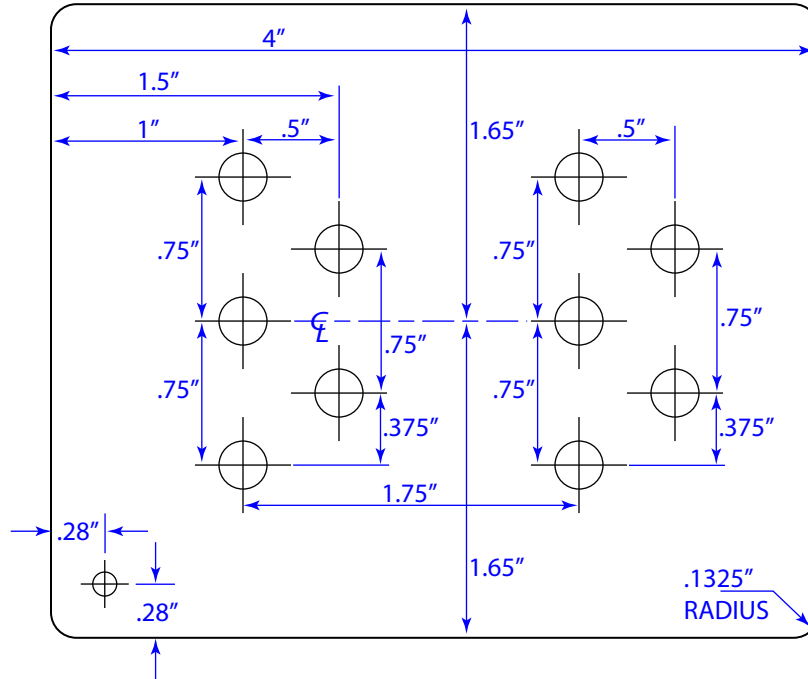


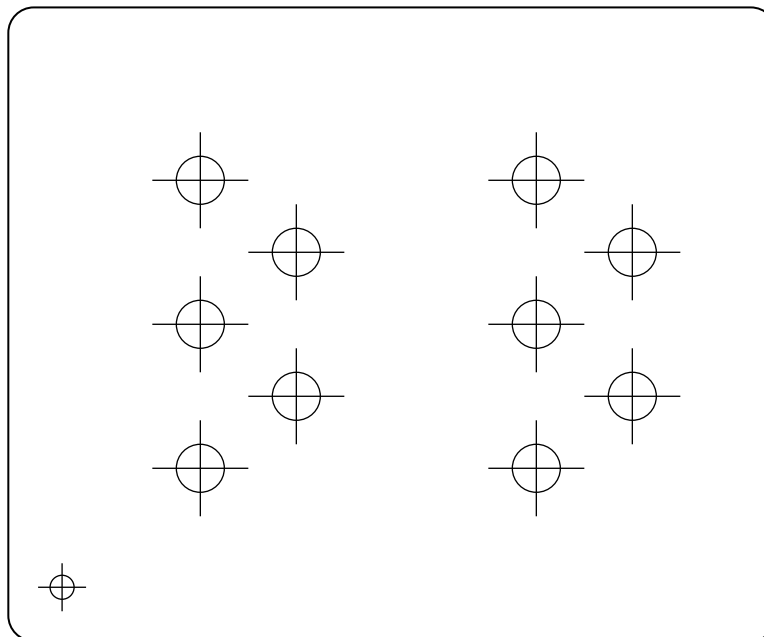
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr	
							Code	Mfr Part Number
3-	065-0198-00			1		CARTON ASSY:	80009	065-0198-00



# Tektronix 576 & 577 Test Fixture Pin Spacing



With Dimensions in Inches



Without Dimensions

# 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	ELCTRN	ELECTRON	IN	INCH	SE	SINGLE END
NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SECT	SECTION
ACTR	ELCTLT	ELECTROLYTIC	INSUL	INSULATOR	SEMICON	SEMICONDUCTOR
ADPTR	ELEM	ELEMENT	INTL	INTERNAL	SHLD	SHIELD
ALIGN	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMPHOLDER	SHLDR	SHOULDERED
AL	EQPT	EQUIPMENT	MACH	MACHINE	SKT	SOCKET
ASSEM	EXT	EXTERNAL	MECH	MECHANICAL	SL	SLIDE
ASSY	FIL	FILLISTER HEAD	MTG	MOUNTING	SLFLKG	SELF-LOCKING
ATTEN	FLEX	FLEXIBLE	NIP	NIPPLE	SLVG	SLEEVING
AWG	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING
BD	FLTR	FILTER	OBD	ORDER BY DESCRIPTION	SQ	SQUARE
BRKT	FR	FRAME or FRONT	OD	OUTSIDE DIAMETER	SST	STAINLESS STEEL
BRS	FSTNR	FASTENER	OVH	OVAL HEAD	STL	STEEL
BRZ	FT	FOOT	PH BRZ	PHOSPHOR BRONZE	SW	SWITCH
BSHG	FXD	FIXED	PL	PLAIN or PLATE	T	TUBE
CAB	GSKT	GASKET	PLSTC	PLASTIC	TERM	TERMINAL
CAP	HDL	HANDLE	PN	PART NUMBER	THD	THREAD
CER	HEX	HEXAGON	PNH	PAN HEAD	THK	THICK
CHAS	HEX HD	HEXAGONAL HEAD	PWR	POWER	TNSN	TENSION
CKT	HEX SOC	HEXAGONAL SOCKET	RCPT	RECEPTACLE	TPG	TAPPING
COMP	HLCPS	HELICAL COMPRESSION	RES	RESISTOR	TRH	TRUSS HEAD
CONN	HLEXT	HELICAL EXTENSION	RGD	RIGID	V	VOLTAGE
COV	HV	HIGH VOLTAGE	RLF	RELIEF	VAR	VARIABLE
CPLG	IC	INTEGRATED CIRCUIT	RTNR	RETAINER	W/	WITH
CRT	ID	INSIDE DIAMETER	SCH	SOCKET HEAD	WSHR	WASHER
DEG	IDENT	IDENTIFICATION	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER
DWR	IMPLR	IMPELLER	SCR	SCREW	XSTR	TRANSISTOR

## CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
0000C	GETTIG ENGINEERING AND MANUFACTURING CO.		SPRINGMILL, PA 16875
12327	FREEWAY CORP.	9301 ALLEN DR.	CLEVELAND, OH 44125
70485	ATLANTIC INDIA RUBBER WORKS, INC.	571 W. POLK ST.	CHICAGO, IL 60607
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
74445	HOLLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
74970	JOHNSON, E. F., CO.	299 10TH AVE. S. W.	WASECA, MN 56093
78189	ILLINOIS TOOL WORKS, INC.		
	SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
78471	TILLEY MFG. CO.	900 INDUSTRIAL RD.	SAN CARLOS, CA 94070
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKEE, WI 53207
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97077
81073	GRAYHILL, INC.	561 HILLGROVE AVE.	LA GRANGE, IL 60525
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153



FIGURE 1 EXPLODED

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-1	390-0323-00		1		CAB,TEST FXTR:BOTTOM (ATTACHING PARTS)	80009	390-0323-00
-2	211-0503-00		5		SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL - - - * - - -	83385	OBD
-3	134-0067-00		1		BUTTON,PLUG:GRAY PLASTIC	80009	134-0067-00
-4	390-0082-00		1		CAB,SIDE,PLUG-I:RIGHT,PLASTIC (ATTACHING PARTS)	80009	390-0082-00
-5	213-0146-00		3		SCR,TPG,THD FOR:6-20 X 0.313 INCH,PNH STL - - - * - - -	83385	OBD
-6	390-0083-00		1		CAB,SIDE,PLUG-I:LEFT,PLASTIC (ATTACHING PARTS)	80009	390-0083-00
-7	213-0146-00		3		SCR,TPG,THD FOR:6-20 X 0.313 INCH,PNH STL - - - * - - -	83385	OBD
-8	260-0247-00		1		SWITCH,PUSH:SPST,NORMALLY OPEN (ATTACHING PARTS)	81073	30YY1009
-9	210-0583-00		1		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
-10	210-0940-00		1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL - - - * - - -	79807	OBD
-11	366-0497-00		2		KNOB:GRAY	80009	366-0497-00
-12	213-0153-00		1		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-12	-----		1		CAPACITOR: (ATTACHING PARTS)		
-13	211-0038-00	B010100 B010315	2		SCREW,MACHINE:4-40 X 0.312"100 DEG,FLH STL	83385	OBD
	210-0580-00	B010316	1		NUT,PLAIN,HEX:0.312-32 X 0.474 INCH,BRS	73743	OBD
	210-1025-00	B010316	1		WASHER,FLAT:0.50 ID X 0.312 INCH OD,BRS - - - * - - -	12327	OBD
-14	-----		1		RESISTOR,VAR: (ATTACHING PARTS)		
-15	210-0583-00		1		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
-16	210-0940-00		1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-17	210-0223-00		1		TERMINAL,LUG:0.25 INCH DIA,SE - - - * - - -	78189	2101-14-03-2520N
	361-0234-00		1		RESTRAINT,SHAFT:0.24 ID X 0.32 OD,PLSTC	80009	361-0234-00
-18	136-0140-00		3		JACK,TIP:BANANA STYLE,CHARCOAL GRAY CAP (ATTACHING PARTS)	80009	136-0140-00
-19	210-0465-00		2		NUT,PLAIN,HEX.:0.25-32 X 0.375 INCH BRS	73743	3095-402
-20	210-0223-00		1		TERMINAL,LUG:0.25 INCH DIA,SE	78189	2101-14-03-2520N
-21	210-0895-00		1		WSHR,SHOULDERED:0.375ODX0.105" THK.NYLON - - - * - - -	80009	210-0895-00
-22	136-0140-00		1		JACK,TIP:BANANA STYLE,CHARCOAL GRAY CAP (ATTACHING PARTS)	80009	136-0140-00
-23	210-0465-00		1		NUT,PLAIN,HEX.:0.25-32 X 0.375 INCH BRS	73743	3095-402
-24	210-0223-00		1		TERMINAL,LUG:0.25 INCH DIA,SE - - - * - - -	78189	2101-14-03-2520N
-25	-----		1		SWITCH,LEVER:TRANSISTOR SELECTOR(SEE S650 EPL) (ATTACHING PARTS)		
-26	210-0473-00		1		NUT,PLAIN,DODEC:0.469-32 X 0.638 INCH,BRS	80009	210-0473-00
-27	210-0902-00		1		WASHER,FLAT:0.470 ID X 0.656 INCH OD,STL	12327	OBD
-28	210-0414-00		1		NUT,PLAIN,HEX.:0.468-32 X 0.562 INCH,BRS	73743	3167-402
-29	210-0021-00		1		WASHER,LOCK:INTL:0.476 ID X 0.60"OD STL - - - * - - -	78189	1222-01-00-0541C
-30	366-1126-00		1		KNOB:LEVER,GRAY PLASTIC	80009	366-1126-00
-31	366-1433-00	B010100 B039999	1		KNOB:W/SKIRT	80009	366-1433-00
	366-1433-01	B040000	1		KNOB:W/SKIRT	80009	366-1433-01
	213-0153-00		2		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-32	366-1028-00		1		KNOB:GRAY,EMITTER	80009	366-1028-00
	213-0153-00		2		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-33	-----		1		SWITCH,ROTARY:TERMINAL SELECTOR(SEE S640 EPL) (ATTACHING PARTS)		
-34	210-0590-00		1		NUT,PLAIN,HEX.:0.375 X 0.438	73743	2X28269-402
-35	210-0978-00		3		WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL - - - * - - -	78471	OBD

# Mechanical Parts List—177 Service

FIGURE 1 EXPLODED (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-36	-----	-----	1		LAMP:W/RED DOME LENS		
-37	348-0004-00		1		GROMMET,RUBBER:0.281 ID X 0.563 INCH OD	70485	763
-38	378-0635-00	B010100 B039999	2		LENS,LIGHT:WHITE	80009	378-0635-00
	378-0635-00	B040000	1		LENS,LIGHT:WHITE	80009	378-0635-00
-39	352-0157-01	B010100 B039999	2		LAMPHOLDER:BLACK PLASTIC	80009	352-0157-01
	352-0157-01	B040000	1		LAMPHOLDER:BLACK PLASTIC	80009	352-0157-01
-40	200-0935-00	B010100 B039999	2		BASE,LAMPHOLDER:0.29 OD X 0.19" L,BK PLSTC	80009	200-0935-00
	200-0935-00	B040000	1		BASE,LAMPHOLDER:0.29 OD X 0.19" L,BK PLSTC	80009	200-0935-00
-41	214-0276-02		1		CONTACT,ELEC:GROUNDING SPRING (ATTACHING PARTS)	80009	214-0276-02
-42	211-0097-00		1		SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
-43	210-0201-00		1		TERMINAL,LUG:SE #4	78189	2104-04-00-2520N
-44	210-0586-00		1		NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL - - - * - - -	78189	OBD
-45	386-1544-00		1		PL,MTG,TEST ADA: (ATTACHING PARTS)	80009	386-1544-00
-46	211-0025-00		5		SCREW,MACHINE:4-40 X 0.375 100 DEG,FLH STL - - - * - - -	83385	OBD
-47	131-0749-00		1		CONTACT,ELEC:UPPER	80009	131-0749-00
-48	131-0748-00		1		CONTACT,ELEC:LOWER	80009	131-0748-00
-49	361-0259-00		1		SPACER,CONTACT:0.320 X 0.60 INCH	80009	361-0259-00
-50	337-1152-00		1		SHIELD,ELEC:PUSH SWITCH (ATTACHING PARTS)	80009	337-1152-00
-51	211-0112-00		2		SCREW,MACHINE:2-56 X 0.375",100 DEG,FLH STL	83385	OBD
-52	210-0405-00		2		NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS - - - * - - -	73743	2X12157-402
-53	131-0031-00		10		JACK,TIP:0.635 INCH LONG,W/LUG (ATTACHING PARTS FOR EACH)	74970	161042AND13351
-54	210-0455-00		2		NUT,PLAIN,HEX.:0.25-28 X 0.375 INCH,BRASS - - - * - - -	73743	3089-402
-55	333-1658-00	B010100 B039999	1		PANEL,FRONT:	80009	333-1658-00
	333-1658-01	B040000	1		PANEL,FRONT:	80009	333-1658-01
-56	386-2406-00	B010100 B039999	1		SUBPANEL,FRONT:	80009	386-2406-00
	386-2406-01	B040000	1		SUBPANEL,FRONT:	80009	386-2406-01
-57	-----	-----	1		CKT BOARD ASSY:PREAMP(SEE A1 EPL)		
-58	214-0579-00		4		. TERM.,TEST PT:0.40 INCH LONG	80009	214-0579-00
-60	131-0566-00		2		. LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L (ATTACHING PARTS FOR CKT BD)	0000C	L-2007-1
-61	211-0116-00		4		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS - - - * - - -	83385	OBD
-62	407-1122-00		2		BRACKET,ANGLE:CIRCUIT BOARD MTG (ATTACHING PARTS FOR EACH)	80009	407-1122-00
-63	211-0101-00		1		SCREW,MACHINE:4-40 X 0.25" 100 DEG,FLH STL - - - * - - -	83385	OBD
-64	-----	-----	1		CKT BOARD ASSY:INTERFACE(SEE A2 EPL)		
-65	210-0217-00		1		. TERMINAL LUG:0.328 ID X 0.438 INCH OD,BRS	80009	210-0217-00
-66	-----	-----	1		. SWITCH,ROTARY:VERT SENS(SEE S628 EPL) (ATTACHING PARTS)		
-67	210-0449-00		2		. NUT,PLAIN,HEX.:5-40 X 0.250 INCH,BRS - - - * - - -	73743	3030-402
					(ATTACHING PARTS FOR CKT BD)		
-68	211-0116-00		1		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
-69	210-0583-00		10		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS - - - * - - -	73743	2X20319-402
-70	376-0144-00		1		CPLG,SHAFT,INSU:0.855 INCH LONG	80009	376-0144-00
-71	384-1185-00		1		EXTENSION SHAFT:0.75 LG X 0.25 INCH OD	80009	384-1185-00
-72	348-0070-01	XB031150	1		PAD,CUSHIONING:0.69 INCH,RUBBER	80009	348-0070-01
-73	334-2088-00		1		LABEL,INFORMATI:DANGER	80009	334-2088-00

INTRODUCTION:

The Cross Reference Index provides a method of identifying Tektronix, Inc. part number, circuit number and figure and index number to true manufacturer's code and manufacturer's part number.

HOW TO USE THE CROSS REFERENCE INDEX:

- (1) When the Tektronix, Inc. part number is known, go directly to the Cross Reference Index and look up the part number. Read the manufacturer's code and manufacturer's part number from the appropriate column.  
  
NOTE: The Cross Reference index is arranged in numerical order by Tektronix, Inc. part number.
- (2) When the Tektronix, Inc. part number is not known, go to the parts list section of this instruction manual to locate needed part number. Then go to the Cross Reference Index as described in paragraph one (1).
- (3) If the circuit number or figure and index number is known, go to the parts list section of this instruction manual to locate the Tektronix, Inc. part number. Then go to the Cross Reference Index as described in paragraph one (1).
- (4) A listing of manufacturer's name and manufacturer's address is provided at the end of your Cross Reference Index.

NOTE: This listing is in numerical order by manufacturer's code number.



TEKTRONIX PART NUMBER	CKT. / FIG. & INDEX NO.	MFR. CODE	MFR. PART NUMBER	SOURCE CODE	REPAIR CODE
004-0496-00	1-2	80009	004-0496-00		
004-1168-00	1-1	80009	004-1168-00		
013-0098-01	2-2	80009	013-0098-01		
013-0111-00	2-3	80009	013-0111-00		
065-0198-00	2-	80009	065-0198-00		
070-1472-00	2-3	80009	070-1472-00		
131-0031-00	1-53	74970	161042AND13351		
131-0566-00	1-60	0000C	L-2007-1		
131-0748-00	1-48	80009	131-0748-00		
131-0749-00	1-47	80009	131-0749-00		
134-0067-00	1-3	80009	134-0067-00		
136-0140-00	J640	80009	136-0140-00		
	J646				
	J648				
	J651				
	1-18				
	1-22				
150-0048-00	DS651	08806	683		
	DS652				
150-0133-00	DS650	18788	T100-7-H538		
151-0188-00	Q628	04713	2N3906		
151-0190-01	Q626	07910	TE23652		
151-1049-00	Q604A,B	21845	FD1620		
152-0141-02	CR651	07910	1N4152		
	CR652				
152-0324-00	CR601	03508	SE416		
	CR602				
	CR611				
	CR614				
156-0200-00	U616	18324	N5556V		
	U624				
200-0935-00	1-40	80009	200-0935-00		
	1-40				
210-0021-00	1-29	78189	1222-01-00-0541C		
210-0201-00	1-43	78189	2104-04-00-2520N		
210-0217-00	1-65	80009	210-0217-00		
210-0223-00	1-17	78189	2101-14-03-2520N		
	1-20				
	1-24				
210-0405-00	1-52	73743	2X12157-402		
210-0414-00	1-28	73743	3167-402		
210-0449-00	1-67	73743	3030-402		
210-0455-00	1-54	73743	3089-402		
210-0465-00	1-19	73743	3095-402		
	1-23				
210-0473-00	1-26	80009	210-0473-00		
210-0580-00	1-13	73743	OBD		
210-0583-00	1-9	73743	2X20319-402		
	1-15				

TEKTRONIX PART NUMBER	CKT./ FIG. & INDEX NO.	MFR. CODE	MFR. PART NUMBER	SOURCE CODE	REPAIR CODE
210-0583-00	1-69	73743	2X20319-402		
210-0586-00	1-44	78189	OBD		
210-0590-00	1-34	73743	2X28269-402		
210-0895-00	1-21	80009	210-0895-00		
210-0902-00	1-27	12327	OBD		
210-0940-00	1-10	79807	OBD		
	1-16				
210-0978-00	1-35	78471	OBD		
210-1025-00	1-13	12327	OBD		
211-0025-00	1-46	83385	OBD		
211-0038-00	1-13	83385	OBD		
211-0097-00	1-42	83385	OBD		
211-0101-00	1-63	83385	OBD		
211-0112-00	1-51	83385	OBD		
211-0116-00	1-61	83385	OBD		
	1-68				
211-0503-00	1-2	83385	OBD		
213-0146-00	1-5	83385	OBD		
	1-7				
213-0153-00	1-11	74445	OBD		
	1-31				
	1-32				
214-0276-02	1-41	80009	214-0276-02		
214-0579-00	1-58	80009	214-0579-00		
260-0247-00	S628	81073	30YY1009		
	1-8				
260-1458-00	S640	76854	5-28495-211		
260-1459-00	S630	76854	5-33152-826		
260-1491-00	S650	82389	OBD		
276-0525-00	L641	01121	T037C351A		
	L647				
281-0162-00	C630	72136	T50417-9		
281-0197-00	C632	74970	148-0081-012		
281-0197-01	C632	74970	148-0081-011		
283-0087-00	C629	72982	838-533X5E301K		
283-0128-00	C600	72982	871-536T2H101J		
290-0525-00	C601	56289	196D475X0050KA1		
	C602				
301-0220-00	R641	01121	EB2205		
	R643				
	R645				
	R647				
	R648				
301-0226-00	R659	01121	EB2265		
301-0332-00	R640	01121	EB3325		
303-0222-00	R601	01121	GB2225		
304-0391-00	R602	01121	GB3911		
307-0358-00	R630C	80009	307-0358-00		
308-0696-00	R631	91637	RS2B-B90R00D		

TEKTRONIX PART NUMBER	CKT./ FIG. & INDEX NO.	MFR. CODE	MFR. PART NUMBER	SOURCE CODE	REPAIR CODE
311-1120-00	R610	71450	201-YA5531		
311-1235-00	R617	80294	3389F-P31-104		
311-1302-00	R615	71450	201-YA5549		
	R617				
311-1368-00	R650	01121	10M043		
315-0152-00	R622	01121	CB1525		
315-0153-00	R623	01121	CB1535		
	R626				
315-0361-00	R624	01121	CB3615		
	R625				
315-0472-00	R646	01121	CB4725		
	R649				
315-0510-00	R604	01121	CB5105		
315-0822-00	R651	01121	CB8225		
321-0097-00	R660	75042	CEAT0-1000F		
321-0197-02	R619	75042	CEAT2-1101D		
321-0222-07	R621	75042	CEAT9-2001D		
321-0289-01	R627	75042	CEAT0-1002D		
	R628				
321-0306-00	R606	75042	CEAT0-1502F		
	R611				
321-0385-00	R612	75042	CEAT0-1003F		
	R613				
321-0481-00	R614	75042	CEAT0-1004F		
	R616				
321-0637-00	R618	75042	CEAT2-9901D		
321-0929-07	R629	91637	MFF1816C25000B		
323-0611-01	R635	75042	CECT0-9003D		
	R664				
323-0729-01	R632	91637	MFF1226G900R0D		
	R661				
323-0730-01	R633	91637	MFF1226G90000D		
	R662				
323-0798-01	R634	91637	MFF1226G90001D		
	R663				
323-0799-01	R636	91637	HMF-1/2 9MEG		
	R665				
333-1658-00	1-55	80009	333-1658-00		
333-1658-01	1-55	80009	333-1658-01		
334-2088-00	1-73	80009	334-2088-00		
337-1152-00	1-50	80009	337-1152-00		
337-1194-00	2-1	80009	337-1194-00		
348-0004-00	1-37	70485	763		
348-0070-01	1-72	80009	348-0070-01		
352-0157-01	1-39	80009	352-0157-01		
	1-39				
361-0234-00	1-17	80009	361-0234-00		
361-0259-00	1-49	80009	361-0259-00		
366-0497-00	1-11	80009	366-0497-00		



TEKTRONIX PART NUMBER	CKT. / FIG. & INDEX NO.	MFR. CODE	MFR. PART NUMBER	SOURCE CODE	REPAIR CODE
366-1028-00	1-32	80009	366-1028-00		
366-1126-00	1-30	80009	366-1126-00		
366-1433-00	1-31	80009	366-1433-00		
366-1433-01	1-31	80009	366-1433-01		
376-0144-00	1-70	80009	376-0144-00		
378-0635-00	1-38	80009	378-0635-00		
	1-38				
384-1185-00	1-71	80009	384-1185-00		
386-1544-00	1-45	80009	386-1544-00		
386-2406-00	1-56	80009	386-2406-00		
386-2406-01	1-56	80009	386-2406-01		
390-0082-00	1-4	80009	390-0082-00		
390-0083-00	1-6	80009	390-0083-00		
390-0323-00	1-1	80009	390-0323-00		
407-1122-00	1-62	80009	407-1122-00		
670-2504-00	A1	80009	670-2504-00		
670-2504-01	A1	80009	670-2504-01		
670-2505-00	A2	80009	670-2505-00		

## CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
0000C	GETTIG ENGINEERING AND MANUFACTURING CO.		SPRINGMILL, PA 16875
01121	ALLEN-BRADLEY CO.	1201 2ND ST. SOUTH	MILWAUKEE, WI 53204
03508	GENERAL ELECTRIC CO., SEMI-CONDUCTOR PRODUCTS DEPT.	ELECTRONICS PARK	SYRACUSE, NY 13201
04713	MOTOROLA, INC., SEMICONDUCTOR PRODUCTS DIV.	5005 E. MCDOWELL RD.	PHOENIX, AZ 85036
07910	TELEDYNE SEMICONDUCTOR	12515 CHADRON AVE.	HAWTHORNE, CA 90250
08806	GENERAL ELECTRIC CO., MINIATURE LAMP PRODUCTS DEPT.	NELA PK.	CLEVELAND, OH 44112
12327	FREEWAY CORP.	9301 ALLEN DR.	CLEVELAND, OH 44125
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
18788	GENERAL ILLUMINATION INC.	2958 N. CLEVELAND ST.	ST. PAUL, MN 55113
21845	SOLITRON DEVICES, INC., TRANSISTOR DIV.	1177 BLUE HERON BLVD.	RIVIERA BEACH, FL 33404
56289	SPRAGUE ELECTRIC CO.		NORTH ADAMS, MA 01247
70485	ATLANTIC INDIA RUBBER WORKS, INC.	571 W. POLK ST.	CHICAGO, IL 60607
71450	CTS CORP.	1142 W. BEARDSLEY AVE.	ELKHART, IN 46514
72136	ELECTRO MOTIVE CORP., SUB OF INTERNATIONAL ELECTRONICS CORP.	SOUTH PARK AND JOHN STREETS	WILLIMANTIC, CT 06226
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
74445	HOLLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
74970	JOHNSON, E. F., CO.	299 10TH AVE. S. W.	WASECA, MN 56093
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
76854	OAK INDUSTRIES, INC., SWITCH DIV.	S. MAIN ST.	CRYSTAL LAKE, IL 60014
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
78471	TILLEY MFG. CO.	900 INDUSTRIAL RD.	SAN CARLOS, CA 94070
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKEE, WI 53207
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97077
80294	BOURNS, INC., INSTRUMENT DIV.	6135 MAGNOLIA AVE.	RIVERSIDE, CA 92506
81073	GRAYHILL, INC.	561 HILLGROVE AVE.	LA GRANGE, IL 60525
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NB 68601

☆U.S. GOVERNMENT PRINTING OFFICE: 1976-665-684/SA 2847

14 MAR 1980  
P-802

IDENTIFYING TECHNICAL PUBLICATION SHEET

T.O. 33D7-38-55-2  
4 January 1974

**I. IDENTIFICATION DATA**

1. PURPOSE: This technical publication is issued for the purpose of identifying and authorizing the following commercial manual for Air Force use.

MANUFACTURER: TEKTRONIX

PURCHASE ORDER OR CONTRACT NO.:

EQUIPMENT: 577-177-D1 (Storage) or D2 (Non-Storage) Curve Tracer System

REQUISITION NO.:

FEDERAL STOCK NUMBER: 6625

TITLE: Service Manual with Parts List

ADDITIONAL IDENTIFICATION:

DATE: Undated

2. FILE LOCATION: The above described commercial manual is filed in

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(Each library will fill this in if this identifying technical publication sheet is filed separately from the commercial manual.)

**II. SUPPLEMENTAL DATA**

1. LIST OF AFFECTED PAGES IN BASIC MANUAL.

2. SUPPLEMENTAL INFORMATION. The information contained in the above identified commercial manual is supplemented as follows: