

# MAINTENANCE

## GENERAL MAINTENANCE INFORMATION

### STATIC-SENSITIVE COMPONENTS

**CAUTION**

*Static discharge can damage any semiconductor component in this instrument.*

This instrument contains electrical components that are susceptible to damage from static discharge. See Table 5-1 for relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

Observe the following precautions to avoid damage:

1. Minimize handling of static sensitive components.
2. Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
3. Discharge the static voltage from your body by wearing a wrist strap while handling these components. Servicing static-sensitive assemblies or components should be performed only at a static-free work station by qualified service personnel.
4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Keep the component leads shorted together whenever possible.
6. Pick up components by the body, never by the leads.
7. Do not slide the components over any surface.
8. Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge.
9. Use a soldering iron that is connected to earth ground.
10. Use only special antistatic suction type or wick type desoldering tools.

Table 5-1

### RELATIVE SUSCEPTIBILITY TO STATIC DISCHARGE DAMAGE

Semiconductor Classes	Relative Susceptibility Levels <sup>a</sup>
MOS or CMOS microcircuits or discretes or linear microcircuits with MOS inputs. (Most Sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFETs	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (Least Sensitive)	9

<sup>a</sup> Voltage equivalent for levels:

1 = 100 to 500 V	4 = 500 V	7 = 400 to 1000 V (est)
2 = 200 to 500 V	5 = 400 to 600 V	8 = 900 V
3 = 250 V	6 = 600 to 800 V	9 = 1200 V

(Voltage discharged from a 100 pF capacitor through a resistance of 100 ohms.)

### CLEANING

This instrument should be cleaned as often as operating conditions require. Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or small brush. Remove dirt that remains with a soft cloth dampened in a mild detergent and water solution. Do not use abrasive cleaners.

**CAUTION**

*To clean the front panel use freon, isopropyl alcohol, or totally denatured ethyl alcohol. Do not use petroleum based cleansing agents. Before using any other type of cleaner, consult your Tektronix Service Center or representative.*

The best way to clean the interior is to blow off the accumulated dust with dry, low-velocity air (approximately 5 lb/in<sup>2</sup>) or use a soft brush or cloth dampened with a mild detergent and water solution.

Hold the board so the cleaning residue runs away from the connectors. Do not scrape or use an eraser to clean the edge connector contacts. Abrasive cleaning can remove the gold plating.

**CAUTION**

*Circuit boards and components must be dry before applying power.*

## OBTAINING REPLACEMENT PARTS

Electrical and mechanical parts can be obtained through your local Tektronix Field Office or representative. However, it may be possible to obtain many of the standard electronic components from a local commercial source. Before purchasing or ordering a part from a source other than Tektronix, Inc., check the Replaceable Electrical Parts list for the proper value, rating, tolerance, and description.

### NOTE

*When selecting replacement parts, remember that the physical size and shape of a component may affect its performance in the instrument.*

Some parts are manufactured or selected by Tektronix, Inc., to satisfy particular requirements or are manufactured for Tektronix, Inc., to our specifications. Most of the mechanical parts used in this instrument have been manufactured by Tektronix, Inc. To determine the manufacturer, refer to the Replaceable Parts list and the Cross Reference index, Mfr. Code Number to Manufacturer.

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

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

## SOLDERING TECHNIQUES

### WARNING

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

The reliability and accuracy of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts. General soldering techniques which apply to maintenance of any precision electronic equipment should be used when working on this instrument. Use only 60/40 rosin-core electronic grade solder. The choice of soldering iron is determined by the repair to be made.

When soldering on circuit boards or small wiring, use only a 15 watt, pencil type soldering iron. A higher wattage soldering iron can cause the etched circuit wiring to separate from the board base material and melt the insulation from small wiring. Always keep the soldering iron tip properly tinned to ensure the best heat transfer to the solder joint. Apply only enough heat to remove the component or to make a good solder joint. To protect heat sensitive components, hold the component lead with a pair of long-nose pliers between the component body and the solder joint. Use a solder removing wick to remove excess solder from connections or to clean circuit board pads.

## SEMICONDUCTORS

To remove in-line integrated circuits use an extracting tool. This tool is available from Tektronix, Inc.; order Tektronix Part Number 003-0619-00. If an extracting tool is not available, use care to avoid damaging the pins. Pull slowly and evenly on both ends of the integrated circuit. Try to avoid disengaging one end before the other end.

## INTERCONNECTING PINS

Several methods of interconnection including multipin and coaxial cable, are used to electrically connect the circuit boards with other boards and components.

## COAXIAL CABLES

Replacement of coaxial end lead connectors requires special tools. Damaged cables should be replaced as a unit. For cable part numbers see the Replaceable Mechanical Parts list. Fig. 5-1 shows a coaxial connector assembly.

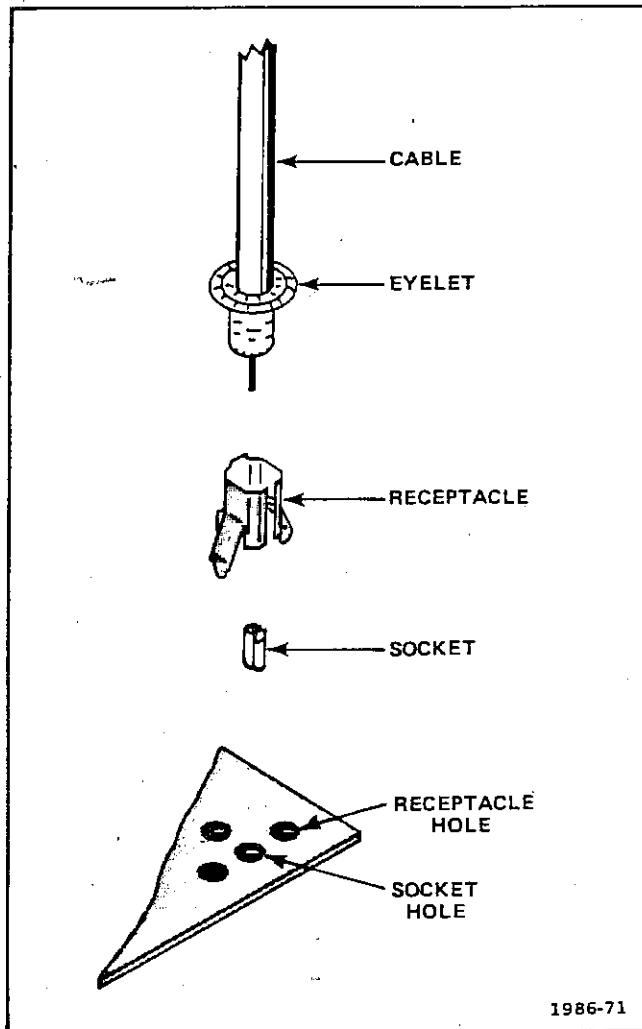


Fig. 5-1. Coaxial end lead connector assembly.

## MULTIPIN CONNECTORS

The pin connectors used to connect the wires to the interconnecting pins are clamped to the ends of the wires. To replace damaged multipin connectors, remove the old pin connector from the holder. Do this by inserting a scribe between the connector and the holder and prying the connector from the holder. Clamp the replacement connector to the wire. Reinstall the connector in the holder.

If the individual end lead pin connectors are removed from the plastic holder, note the order of the individual wires for correct replacement in the holder. For proper replacement see Fig. 5-2.

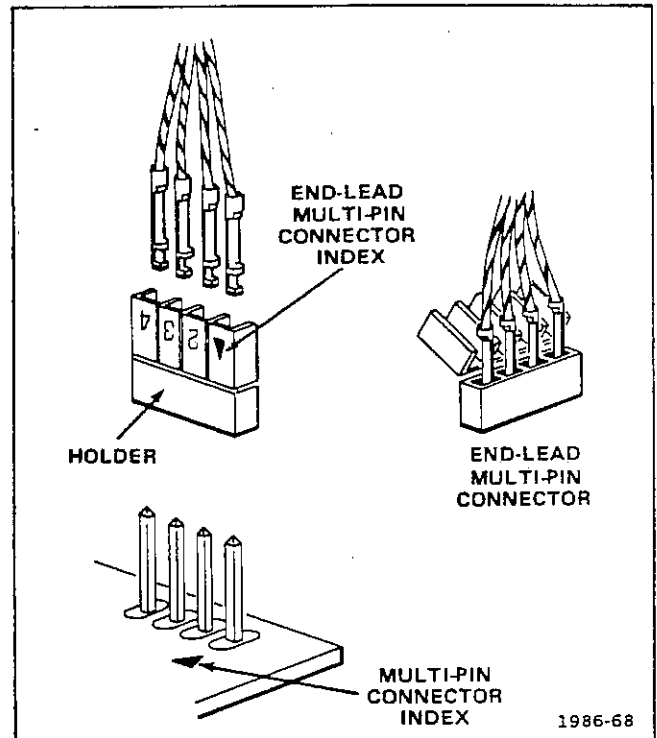


Fig. 5-2. Orientation and disassembly of multipin connectors.

## CAM SWITCHES

Use care when cleaning or repairing cam switches. Shaft alignment and spring tension of the contacts must be carefully maintained for proper operation of the switch. For assistance, contact your local Tektronix Field Office or representative.

### NOTE

*A cam-type switch repair kit including necessary tools, instructions, and replacement contacts is available from Tektronix, Inc. Order Tektronix Part No. 040-0541-00.*

The cam switches consist of rotating cam drums which are turned by front-panel knobs, and sets of spring-leaf contacts mounted on adjacent circuit boards. The contacts are actuated by lobes on the cams. These switches can be disassembled for inspection, cleaning, repair, or replacement as follows:

1. Pull the metal cover off the switch. The switch is now open for inspection or cleaning.

2. To completely remove a switch from the circuit board, first remove any knobs or shaft extensions. Loosen the coupling at the potentiometer at the rear of the switch, and pull the long shaft out of the switch assembly.
3. Remove the screws (from the opposite side of the circuit board) that hold the cam drum to the board.
4. To remove the cam drum from the front support block, remove the retaining ring from the shaft on the front of the switch and slide the cam drum out of the support block. Be careful not to lose the small detent roller.
5. To replace defective switch contacts, follow the instructions given in the switch repair kit.
6. To reinstall the switch assembly, reverse the above procedure.

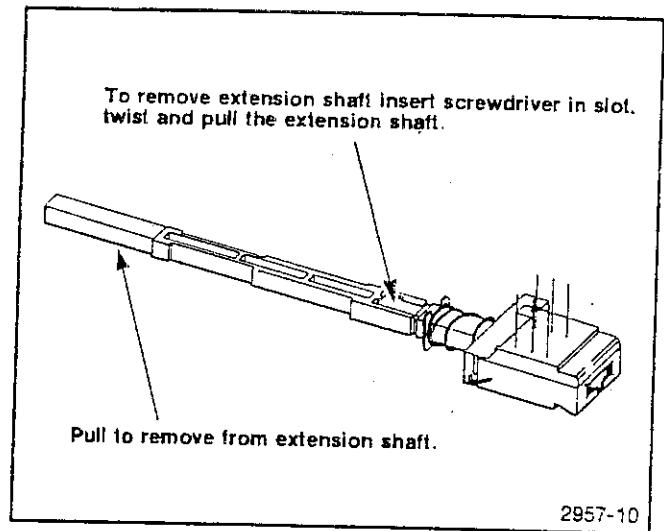


Fig. 5-3. Extension shaft and pushbutton removal.

## PUSHBUTTON SWITCHES

See Fig. 5-3 for pushbutton switch disassembly instructions.

## FRONT PANEL LATCH REMOVAL

To disassemble the latch, pry up on the pull tab bar attached to the latch assembly. The latch components can now be removed from the instrument.

# REAR INTERFACE INFORMATION

## FUNCTIONS AVAILABLE AT REAR CONNECTOR

A slot exists between pins 23 and 24 on the rear connector. Insert a barrier in the corresponding position of the power module jack to prevent noncompatible plugs from being used in that compartment. Consult the power module manual for further information. Signals for other specialized connections may be made to the rear interface connectors as shown in Fig. 5-4. A description of these connections follows.

### Output (From 600 $\Omega$ ) 28A

The output can be obtained at this terminal by connecting a coax cable from J2141 to J1204 on the A10 Main Board assembly. A 560  $\Omega$  resistor is in series with J2141.

### Output Common 27A

This is the return connection for the output.

### Trigger Output (50 $\Omega$ ) 27B

This terminal is connected via an internal jumper to the front panel trigger output connector. See the adjustment location illustration for the location of this jumper.

### Trigger Out Common 28B

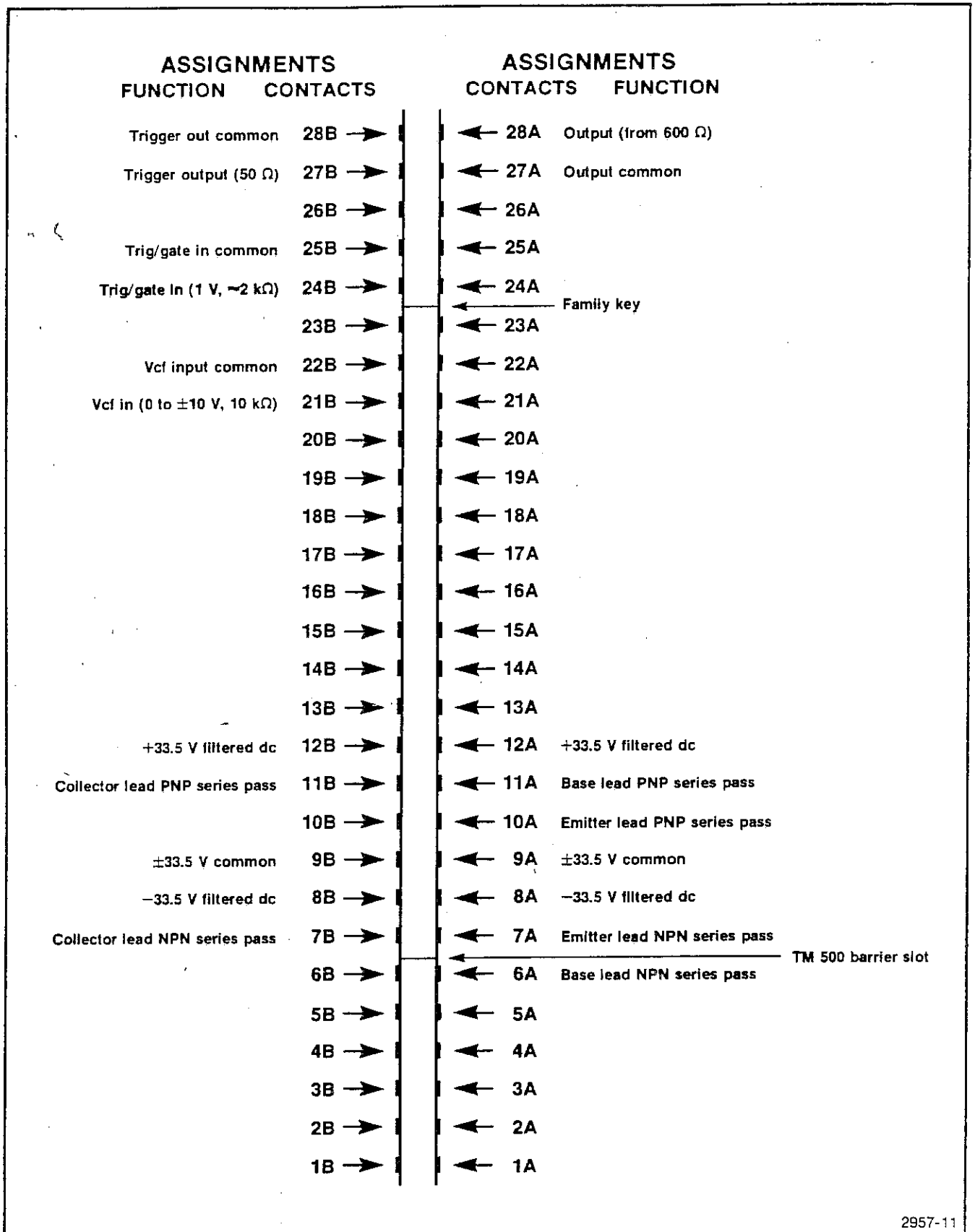
This is the return connection for the trigger output.

### Trig/Gate In 24B

This terminal is connected to the trigger amplifier through a 1 K $\Omega$  resistor. The output signal is 1 V with an impedance of  $\leq 10$  K $\Omega$ .

### Trig/Gate In Common 25B

This is the return connection for the trig/gate in.



2957-11

Fig. 5-4. Rear interface connector assignments.

**VCF In 21B**

This terminal is connected through a 10 K $\Omega$  resistor via an internal jumper to the virtual ground summing node of operational amplifier U1540A (pin 2). See the Adjustment Location illustration for the location of this jumper.

**VCF In Common 22B**

This connection is the ground return for the VCF In.

