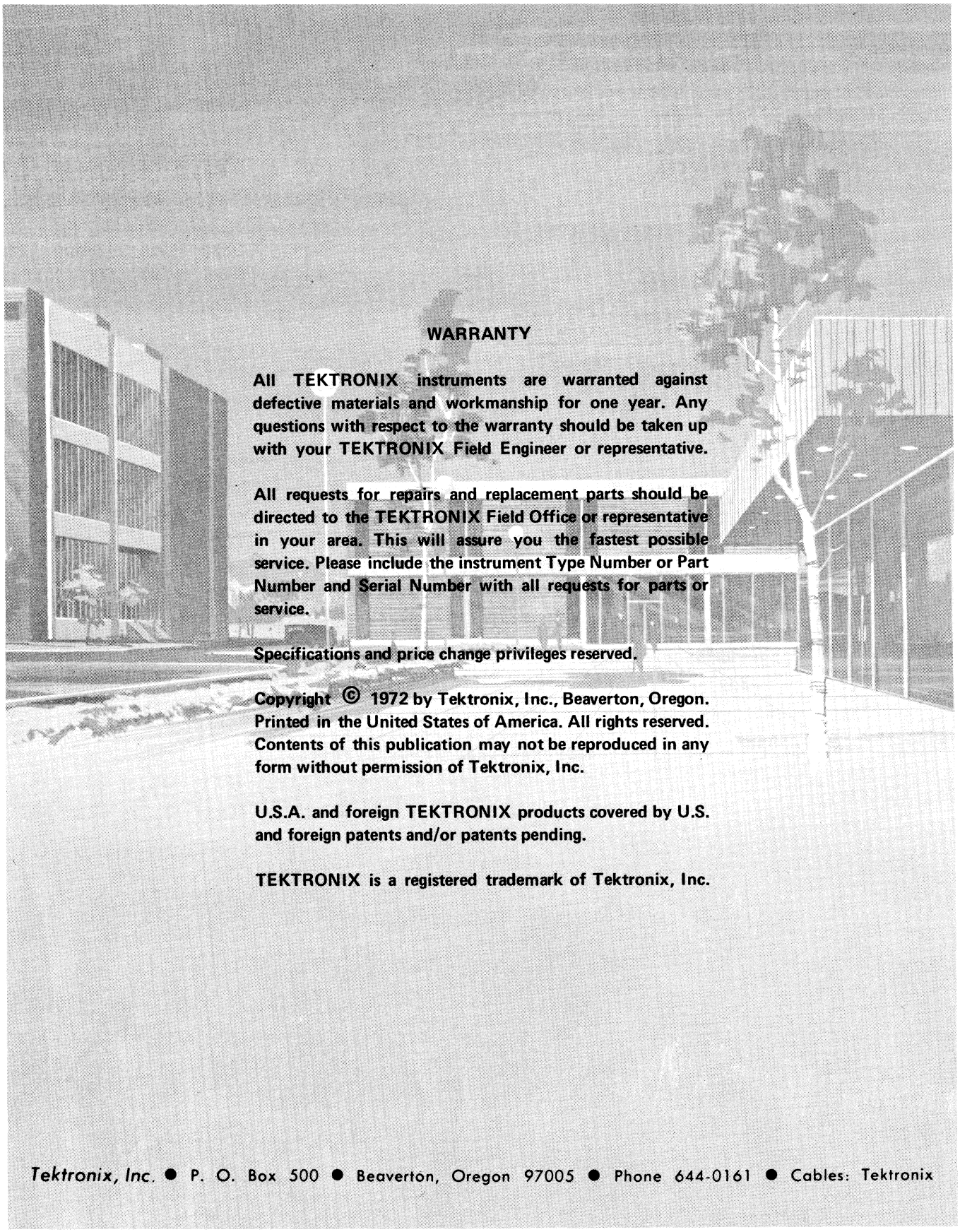
TEKTRONIX®

# P6075 PROBE

010-6075-03

INSTRUCTION MANUAL



## WARRANTY

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

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

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*Tektronix, Inc.* ● P. O. Box 500 ● Beaverton, Oregon 97005 ● Phone 644-0161 ● Cables: Tektronix

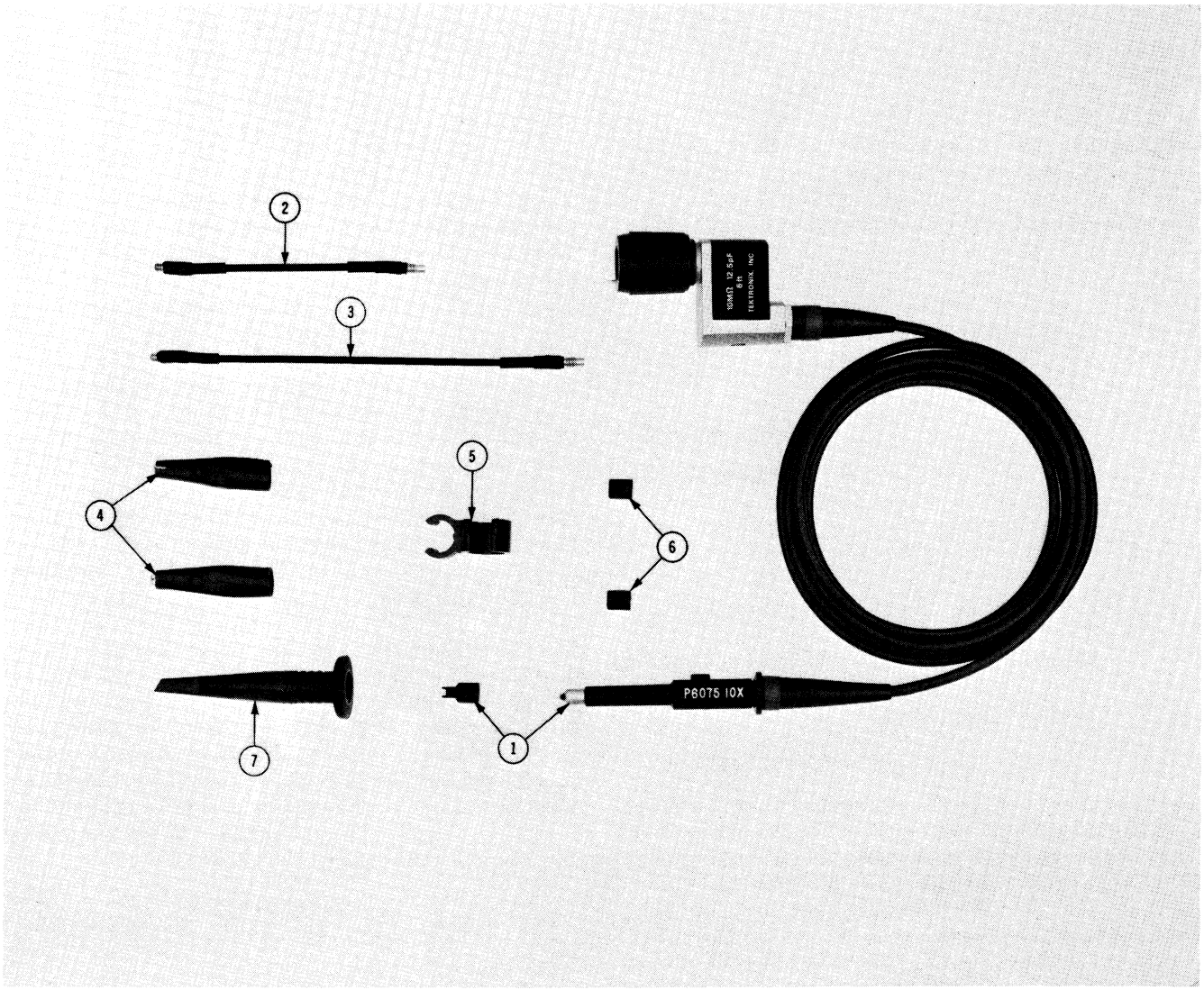



**Fig. 1 P6075 Probe and Standard Accessories.**

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Disc | Qty | 1 2 3 4 5 | Description |
|---|---|---|---|---|---|---|
| | | | | | | PROBE & STANDARD ACCESSORIES |
| | 010-6075-03 | | | 1 | | PROBE PACKAGE, P6075, 6 foot |
| | - - - - - - | | | - | | probe package includes: |
| 1 | 010-6075-02 | | | 1 | | PROBE, P6075, 6 foot |
| 2 | 175-0848-00 | | | 1 | | LEAD, electrical, 3.25 inches long |
| 3 | 175-0848-01 | | | 1 | | LEAD, electrical, 5.25 inches long |
| 4 | 344-0046-00 | | | 2 | | CLIP, probe, alligator type |
| 5 | 352-0234-00 | | | 1 | | HOLDER, probe, plastic |
| 6 | 166-0404-01 | | | 2 | | TUBE, insulating, plastic |
| 7 | 013-0107-03 | | | 1 | | TIP, probe, retractable hook |

# P6075 PROBE

## CHARACTERISTICS

### Description

The P6075 Probe is a 6 foot miniature passive, fast-rise, 10X attenuation probe, designed primarily for use with the TEKTRONIX 475 Oscilloscopes. The close tolerance probe resistor nearly eliminates the cascading of errors usually associated with attenuator probes.

A ground reference pushbutton on the body of the probe permits the user to obtain a ground reference or to determine which trace of a multitrace display includes the signal from the P6075 Probe. A coding ring on the BNC output connector actuates the Volts/Div readout of the oscilloscope mainframe to include the 10X attenuation of the probe. The connector is compatible with all BNC input connectors.

The compensating box houses a network that provides optimum transient response when the probe is used with wideband oscilloscopes. The probe can be low-frequency compensated to match the input of the associated instrument by adjusting the variable capacitor through the hole in the compensating box housing. The P6075 probe may be identified by a red colored plastic band around the cable boot at each end of the cable.

## SPECIFICATIONS[1]

### Electrical

Attenuation: 10X within 2%.

Input Resistance: 10 MΩ within 0.4%

Input Capacitance: 12.5 pF.

Compensation Range: Adjustable to match a nominal input capacitance of 20 pF.

Bandwidth (–3 dB): ≅200 MHz.

Maximum Input Voltage: 500 V (DC + Peak AC), derated with frequency. See Derating curves.

### General

Weight: With 6 foot (1.8 meters) cable; ≅5 ounces (141.7 grams) net. probe and accessories.

(141.7 grams) net probe and accessories.

[1] **Specified with Type 475.**

Dimensions:

Probe Body: ≅3.7 inches (9.4 cm), length. ≅0.45 inch (1.1 cm), maximum outside diameter.

Cable: Length; ≅6 feet (1.8 meters), between strain relief bases.

Compensation Box: Length; ≅1.7 inches (4.3 cm). Width; ≅0.6 inch (1.5 cm). Height; ≅1.2 inches (3.0 cm).

### Environmental

The probe will operate within specifications over the following ranges; Temperature, –15°C to +75°C. Altitude, to 15,000 feet.

## OPERATING INSTRUCTIONS[2]

### Probe Compensation

Due to slight variations in the input capacitance between oscilloscope input amplifiers (even on the same type), it is usually necessary to compensate the probe whenever it is transferred from one instrument to another, or from one channel to another of dual (multi-trace) units. Improper compensation will produce waveshape distortion and/or amplitude measurement error of the display. See Compensation Procedure for method of adjustment.

### Circuit Loading

Although the DC input resistance of the P6075 is 10 MΩ, it can load any high-impedance circuit it is connected into, and distort the true waveform present. To minimize this loading effect, select the lowest impedance points to check waveform. As signal frequency increases, the equivalent probe input impedance decreases because of the input capacitance of the probe. Therefore, the probe loading increases with frequency. Fig. 2 shows $R_p$ and $X_p$ as a function of frequency. These curves should be referred to when making measurements of high frequency signals, especially in high impedance circuits.

[2] **Measurement Concept Booklet; Probe Measurements, TEKTRONIX Part Number 062-1120-00 is a recommended treatise on probe use and measurement evaluation.**

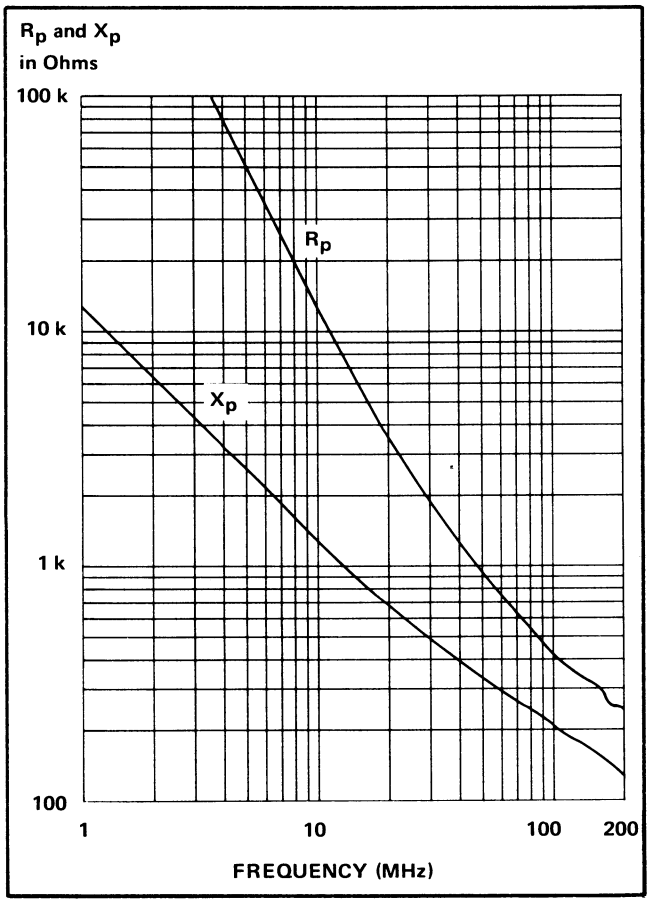



**Fig. 2. P6075 Probe typical $X_p$, $R_p$ versus frequency curves.**

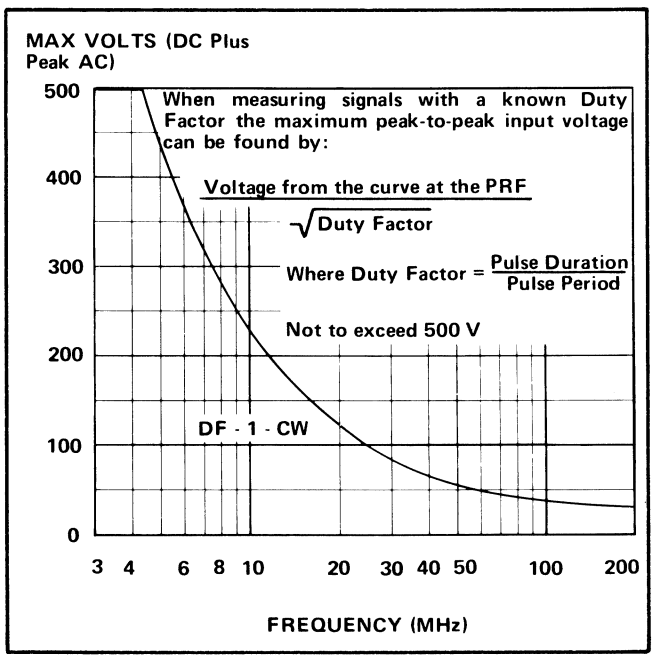



**Fig. 3. P6075 Probe, typical voltages rating with frequency curve.**

## Maximum Input Voltage

The maximum allowable input voltage of the P6075 Probe is 500 V (DC + Peak AC) at the low-frequency end of its range. As signal frequency increases, input capacitive reactance decreases and the maximum safe input voltage decreases. Fig. 3 shows the typical voltage derating vs frequency curve.

## Probe Grounding

A passive probe such as the P6075 is a capacitive divider for high-frequency components. An inductance introduced by a long signal or ground lead will form a series resonant circuit which will "ring" if driven by a signal containing significant frequency components at or above circuit resonance. These oscillations can appear on the oscilloscope display and distort the true waveform.

Ground leads and probe tip connections should be kept as short as possible to maintain the best fidelity.

# MAINTENANCE

## General

The P6075 Probe is built to withstand normal usage, but may be damaged if treated carelessly. Avoid kinking or straining the cable or subjecting the probe to extreme environmental conditions. When not in use, the probe should be stored in a drawer, or supported by the plastic holder supplied with the probe.

If the probe is damaged, replacement parts are available through your local TEKTRONIX Field Office or representative. The mechanical and electrical parts lists at the rear of this manual provide the TEKTRONIX part numbers and descriptions for the components.

Substitution of non-standard parts is not advisable if the original performance is to be restored. Even shortening the cable by more than a few percent will have a noticeable effect on the transient response of the probe. The resistive center conductor has been specifically selected for critical dampening of reflections that would otherwise exist.

## Connector Replacement

1. Remove the snap-fit cover on the compensation box.

2. Unsolder the center conductor from the connector to the circuit board. Tilt the board back away from the connector while applying heat to the conductor to achieve separation.

3. Loosen the 7/16-inch nut (part of the connector), unscrew, and remove the connector.

4. Install the new connector, performing steps 1 through 3 above in reverse order. Keep board tilted back away from the connector until the 7/16-inch nut is tightened.

## Cable Replacement

1. Remove the snap-fit cover on the compensation box.

2. Unsolder the cable center conductor from the circuit board.

3. Remove the 7/16-inch cable bushing from the compensation box.

4. Unscrew the probe body from the cable.

5. Unsolder the cable center conductor from the resistor/capacitor lead (located in the probe head).

6. Pull the resistor/capacitor assembly from the holder.

7. Insert the resistor/capacitor assembly into the holder of the new probe cable and re-assemble the probe, reversing the procedure given in steps 1 through 6.

## COMPENSATION PROCEDURE

(a) Touch the probe tip to the oscilloscope calibrator output connector and set the Volts/Div and Time/Div controls so that several cycles of the calibrator squarewave are displayed with an amplitude of approximately one-half the screen height.

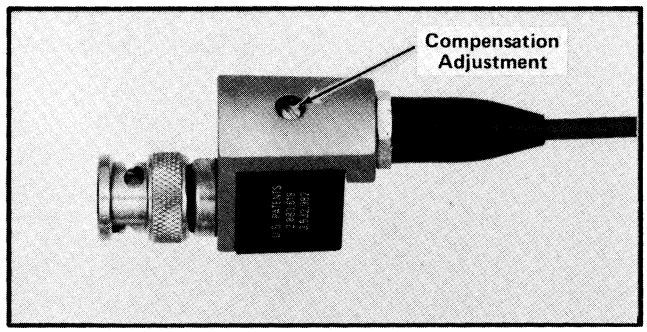



**Fig. 4. Location of probe compensation adjustment.**

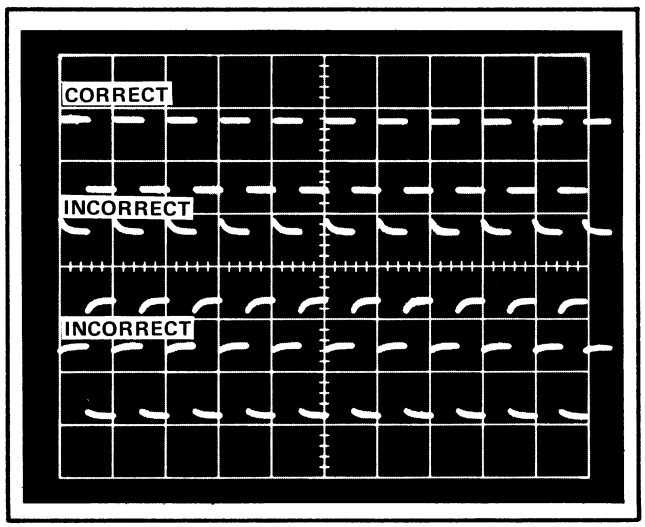
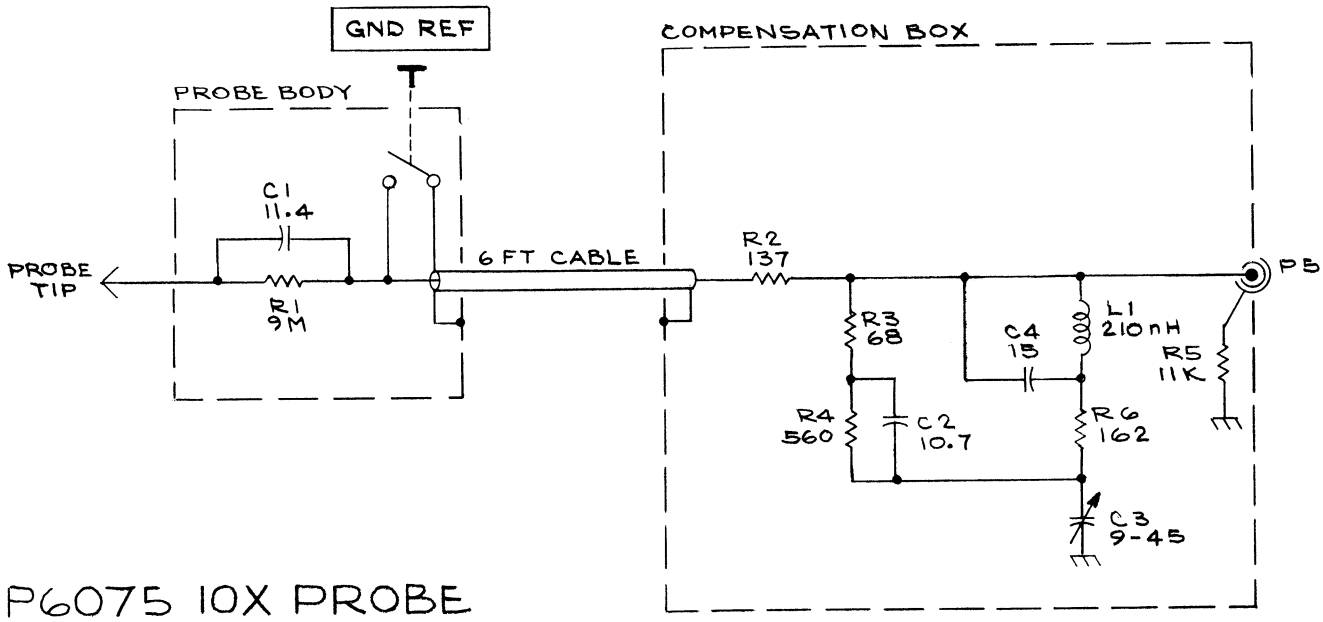



**Fig. 5. Probe compensation.**

(b) Adjust the probe compensation (Fig. 4) through the access hole in the compensation box, for optimum pulse flat top. Fig. 5 illustrates the correct and incorrect squarewave response.

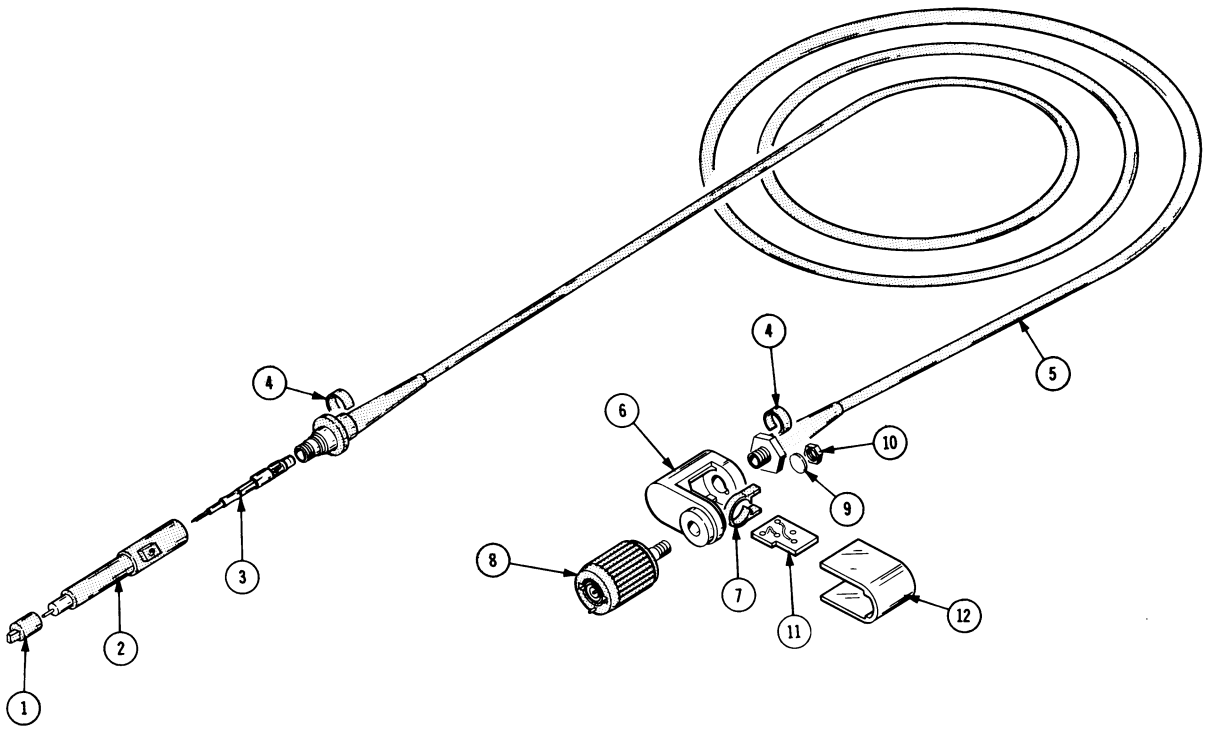
# ELECTRICAL PARTS LIST




| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Disc | Description |
|---|---|---|---|---|
| | | 6 FOOT PROBE | | |
| ASSEMBLY | | | | |
| | 670-2437-00 | | | Circuit Board Assembly |
| CAPCITORS | | | | |
| C1[1] | 281-0672-00 | | | 11.4 pF, Cer, 500 V, 1% |
| C2 | 281-0715-00 | | | 10.7 pF, Cer, 500 V, 1% |
| C3 | 281-0167-00 | | | 9-45 pF, Var, Cer |
| C4 | 281-0617-00 | | | 15 pF, Cer, 200 V, 10% |
| INDUCTORS | | | | |
| L1 | 108-0739-00 | | | 210 nH |
| RESISTORS | | | | |
| R1[1] | 325-0103-00 | | | 9 MΩ, 1/4 W, 1/10% |
| R2 | 321-0110-00 | | | 137 Ω, 1/8 W, 1% |
| R3 | 317-0680-00 | | | 68 Ω, 1/8 W, 5% |
| R4 | 315-0561-00 | | | 560 Ω, 1/4 W, 5% |
| R5 | 317-0113-00 | | | 11 kΩ, 1/8 W, 5% |
| R6 | 321-0117-00 | | | 162 Ω, 1/8 W, 1% |

[1]Furnished as a unit with 206-0204-00.

# MECHANICAL PARTS LIST




| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Serial/Model No. Disc | Qty | 1 2 3 4 5 | Description |
|---|---|---|---|---|---|---|
| | 010-6075-02 | | | 1 | | PROBE, P6075, 6 foot |
| | - - - - - - | | | - | | probe includes: |
| 1 | 015-0201-00 | | | 1 | | PROBE TIP, IC test |
| 2 | 204-0429-03 | | | 1 | | BODY ASSEMBLY, probe |
| 3 | 206-0204-00 | | | 1 | | ATTENUATOR ASSEMBLY |
| 4 | 334-1636-01 | | | 2 | | BAND, marker, red |
| 5 | 175-1383-00 | | | 1 | | CABLE ASSEMBLY, special purpose, electrical |
| 6 | 426-0690-04 | | | 1 | | FRAME, compensation box |
| 7 | 354-0396-00 | | | 1 | | RING, capacitor mounting |
| 8 | 131-1070-00 | | | 1 | | CONNECTOR, electrical, w/readout |
| | - - - - - - | | | - | | mounting hardware: (not included w/connector) |
| 9 | 210-0056-00 | | | 1 | | WASHER, lock, split,0.195 ID x 0.32 inch OD |
| 10 | 220-0572-00 | | | 1 | | NUT, hex., 10-32 x 0.25 inch |
| 11 | 670-2437-00 | | | 1 | | CIRCUIT BOARD ASSEMBLY |
| 12 | 200-1158-11 | | | 1 | | COVER, compensation box |
| | 070-1454-00 | | | 1 | | MANUAL, instruction (not shown) |