Tektronix®
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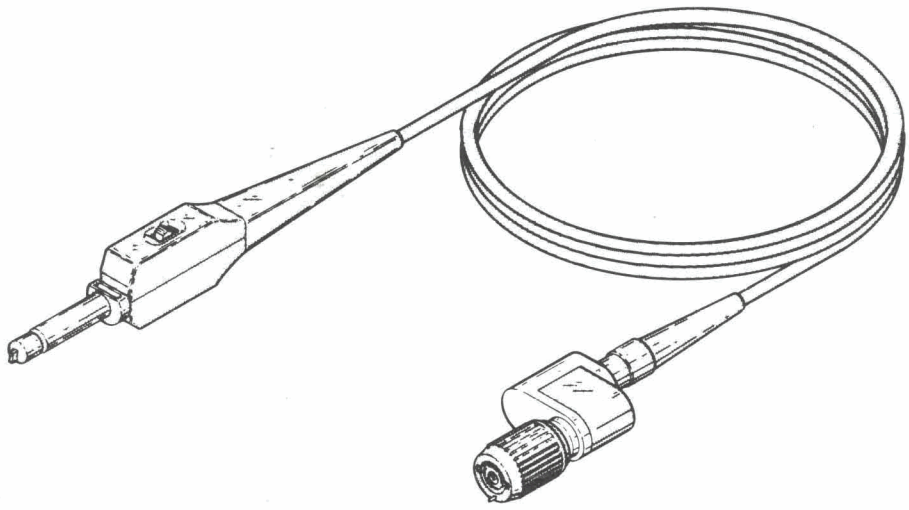
data sheet

CUSTOMER SERVICES SUPPORT

P6063B PASSIVE PROBE



The P6063B Probe is a passive probe with 1X or 10X selectable attenuation for use with dc to 225 MHz oscilloscopes having an input capacitance range of 15-24 pF and an input resistance of 1 MΩ.

The attenuation (1X or 10X) is selected by a slide switch, on the probe body, that also has the capability of changing the volts/division readout circuitry in readout oscilloscopes to include the attenuation ratio of the probe.

A ground reference push button on the body of the probe permits the user to obtain a ground reference with either 1X or 10X attenuation. This feature can also be used to identify which trace of a multitrace display reflects the signal from the probe.

Adjustable frequency compensation is provided in the compensation box to match the probe to the oscilloscope input.

The P6063B Probe is available in two lengths: 3.5-foot (1.1 meter) and 6-foot (1.8 meter). Either probe length terminates in a compensation box with a BNC connector. The BNC connector is compatible with both readout and non-readout oscilloscopes.

NO. 062-2928-01
DATE MAR 1986(R)

SPECIFICATIONS

ELECTRICAL

Attenuation: 1X position; same as oscilloscope specification.

10X position; within 3% (oscilloscope input, 1 MΩ, within 2%).

Input Resistance: 1X position; same as oscilloscope specification.

10X position; 10 MΩ, within 0.5% (oscilloscope input, 1 MΩ within 2%).

Approximate Input Capacitance (with probe connected and compensated in 10X position):

	3.5 foot (1.1 m) Probe	6 foot (1.8 m) Probe
1X	80 pF	105 pF
10X	11 pF	14 pF

Input Impedance: See Fig. 1 and 2. Typical parallels reactance (Xp) and resistance (Rp) vs. frequency.

Compensation Range: 15 pF to 24 pF.

Approximate Bandwidths (-3 dB) with probe compensated in 10X position:

	3.5 foot (1.1 m) Probe	6 foot (1.8 m) Probe
1X	12 MHz	6.7 MHz
10X	* 200 MHz	*200 MHz

*Oscilloscope bandwidth must be ⩾225 MHz.

Maximum Input Voltage (See Fig. 3):

1X position; 350 V (dc + peak ac) to 850 kHz derated to 70 V at 10 MHz, 3.5 foot probe.

1X position; 200 V (dc + peak ac) to 850 kHz derated to 70 V at 10 MHz, 6.0 foot probe.

10X position; 500 V (dc + peak ac) to 4.5 MHz derated to 30 V at 200 MHz, both 3.5 and 6.0 foot probes.

ENVIRONMENTAL

Probe operates within specifications over the following ranges:

Temperature: −15°C (5°F) to +75°C (167°F).

Altitude: To 4572 meters (15,000 feet).

PHYSICAL

Net weight (including accessories):

3.5 foot (1.1 m) Probe: 128 grams (4.5 oz.).

6 foot (1.8 m) Probe: 142 grams (5.0 oz.).

OPERATING CONSIDERATIONS

CIRCUIT LOADING

1X Switch Position:

This position loads circuit more than the 10X position. The test point will see the oscilloscope input impedance (1 MΩ and 15 to 24 pF) paralleled by the capacitance of the probe cable and compensation network.

10X Switch Position:

Although the probe dc input resistance is 10 MΩ, it can load a high-impedance circuit and distort the test signal. Therefore, when possible, select low-impedance test points. Also, as signal frequency increases, probe input impedance decreases, which increases the loading effect of the probe (see Fig. 1, 2, and 3).

PROBE GROUNDING

A passive probe is a capacitive divider for high-frequency components. Inductance introduced by a long signal or ground lead will form a series resonant circuit that 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.

GROUND REFERENCE

When the Ground Reference push button switch is pressed with the slide switch in the 1X or 10X attenuation position, the test signal is grounded through the probe 9 MΩ resistor.

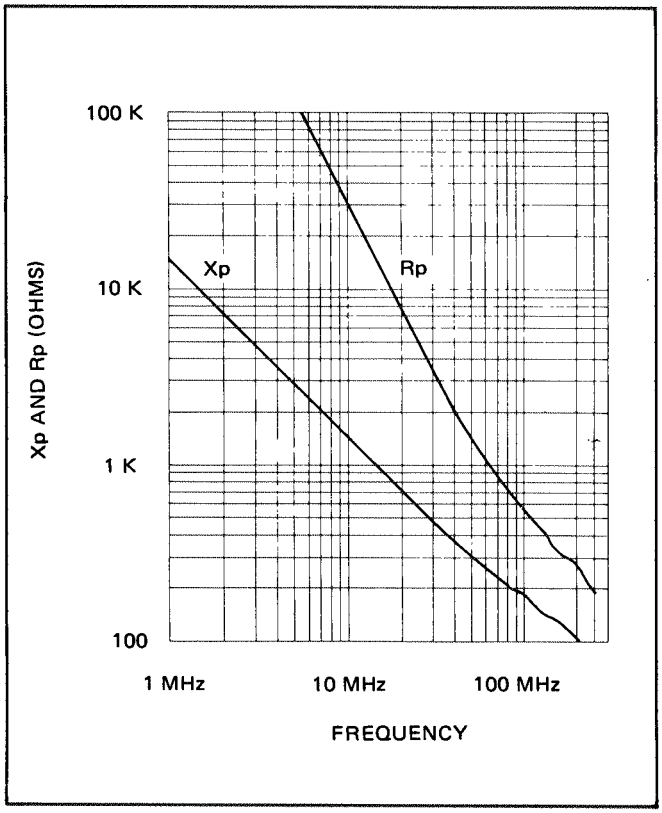


Fig. 1 Typical parallel reactance (X_p) and resistance (R_p) vs. frequency for 3.5 foot (1.1 meter) probe.

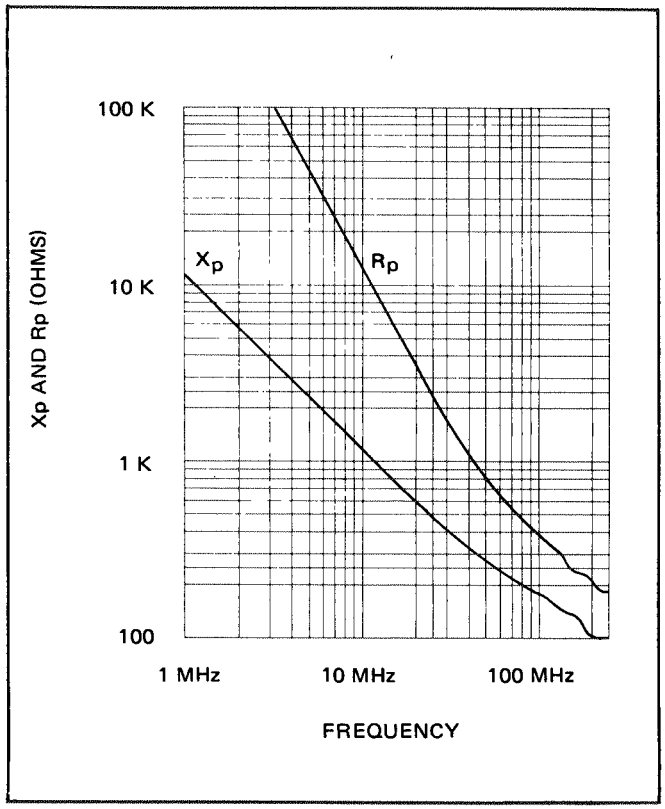


Fig 2 Typical parallel reactance (X_p) and resistance (R_p) vs. frequency for 6 foot (1.8 meter) probe.

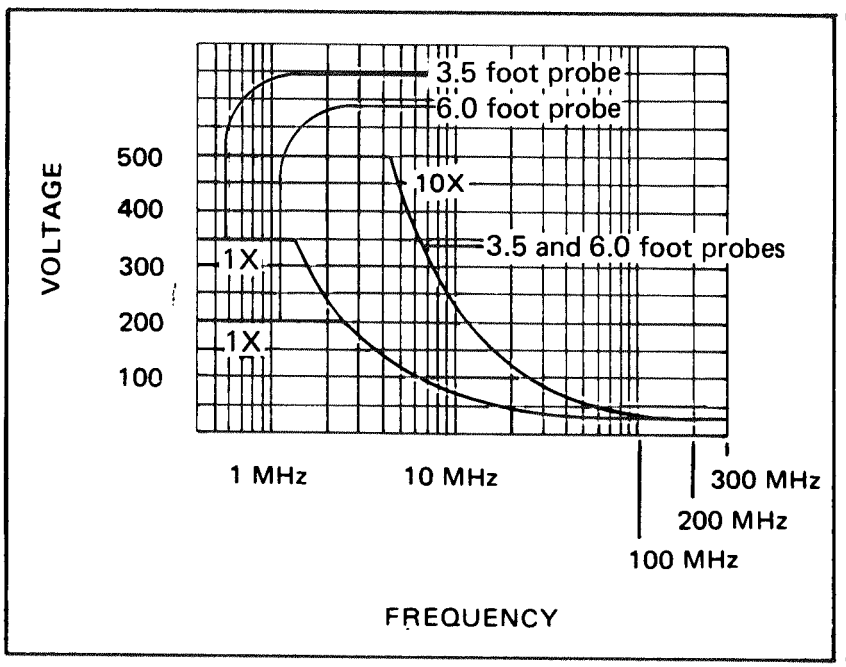


Fig. 3 Input voltage vs. frequency.

PROBE COMPENSATION

LOW-FREQUENCY COMPENSATION

If the P6063B Probe is transferred from one instrument or input channel to another, the low-frequency compensation will usually require adjustment.

Low-Frequency Compensation Procedure

1. Make sure probe attenuation switch is in 10X position.

2. Touch probe tip to oscilloscope calibrator output connector and display several cycles of calibrator square wave at approximately 4 divisions in amplitude. (Use a 1 kHz square wave from an alternate source if calibrator output is not available on oscilloscope.)

3. Adjust probe compensation for best flat top on display (see Fig. 4).

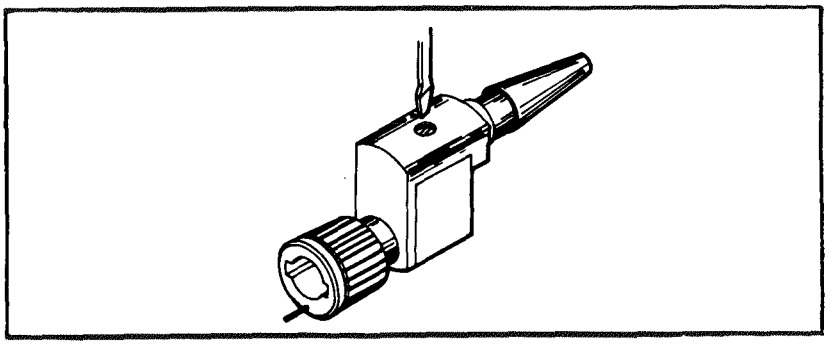


Fig. 4 Low-frequency adjustment.

HIGH-FREQUENCY COMPENSATION

If the P6063B Probe is to be used in observing or measuring sinewaves or pulses with frequency components above 3 MHz, high-frequency compensation should be checked, then adjusted if necessary.

TEST EQUIPMENT REQUIRED

DESCRIPTION	MINIMUM SPECIFICATIONS	EXAMPLES OF APPLICABLE TEST EQUIPMENT
Test oscilloscope	Bandwidth: 225 MHz	Tektronix 475A or 7904 Oscilloscope with 7A16A Amplifier and a 7B70 Time Base.
Pulse or squarewave generator	Risetime: ⩽ 1 ns Amplitude: 0.5 V into 50 Ω	Tektronix PG506[1] Calibration Generator.
Used With PG506 Only		
Coaxial cable with BNC connectors	Precision 50 Ω	Tektronix P/N 012-0482-00.
10X attenuator with BNC connectors	50 Ω	Tektronix P/N 011-0059-02.
Feedthrough termination with BNC connectors	50 Ω	Tektronix P/N 011-0049-01.
Probe-tip-to-BNC adapter		Tektronix P/N 013-0084-01.

[1] **Requires TM500-Series Power Module.**

High-Frequency Compensation Procedure

1. Make sure probe attenuation switch is in 10X position.

2. Turn test oscilloscope and signal generator on and allow enough warmup time for equipment to stabilize.

3. Connect positive going (fast rise) output of generator through a precision 50 Ω cable, a 10X attenuator, and a 50 Ω feedthrough termination to test oscilloscope input connector.

4. Set generator repetition rate switch for an output of 100 kHz.

5. Set oscilloscope Time/Div to .02 μs and Volts/Div to 10 mV.

6. Adjust the generator amplitude control for 5 division pulse amplitude.

7. Note pulse shape and aberrations.

8. Remove 50 Ω cable, 10X attenuator, and feedthrough termination from generator and test oscilloscope. Install probe on test oscilloscope input connector.

9. Connect positive going (fast rise) output of generator through a 50Ω feedthrough termination and a probe-tip to BNC adapter to the probe tip.

10. Check high-frequency response by comparing probe-oscilloscope pulse response against display noted in step 7. Aberrations from reference response should not exceed +3%, −3%, or 5% p-p of pulse amplitude.

11. If aberrations are excessive, proceed as follows:

a. Remove compensation box cover.

b. Adjust R5 and R6 (also R9 for 6-foot probe) for best overall flat response. See Fig. 5 for adjustment locations.

c. Adjust C6 for best corner response (without ringing).

d. Repeat step b. and c. as necessary for best waveform.

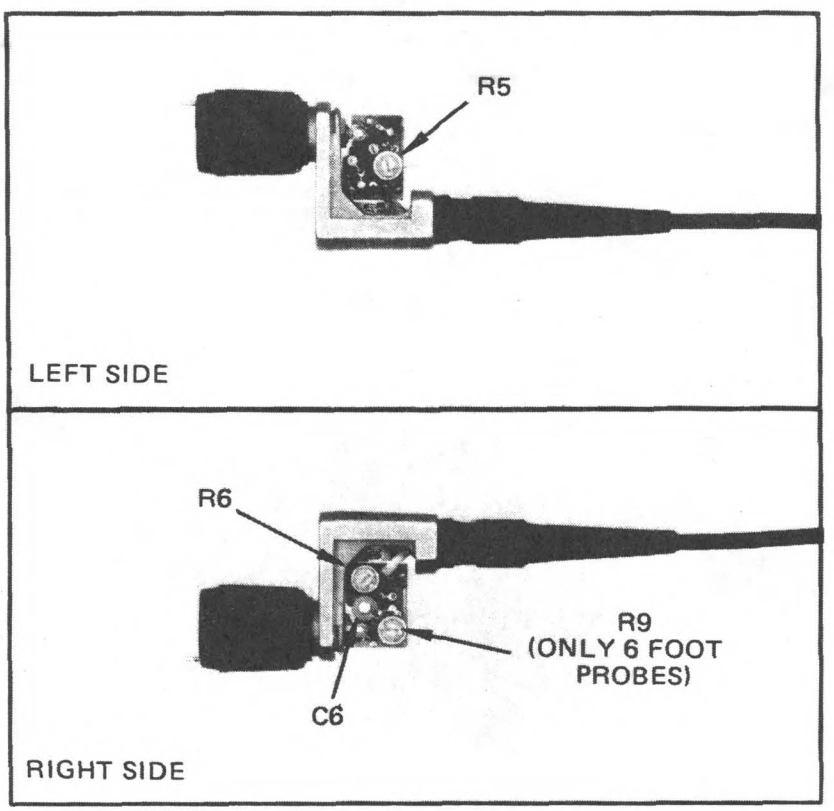


Fig. 5 High-frequency adjustments.

MAINTENANCE

WARNING

To avoid shock, do not disassemble probe when connected to voltage source. Only qualified service personnel should use the following service instructions. Unless you are qualified to do so, perform no servicing except that contained in the preceding operating instructions.

The P6063B Probe is designed to withstand normal operations and handling. However, if the probe assembly fails or breaks, replacement parts are available. See Replacement Parts List for part numbers.

Replacing Units of A Probe Assembly (See Fig. 6)

If the coaxial cable, probe head, compensation box or connector should fail, new assemblies for each may be installed. When replacing these assemblies, make sure to use the proper probe head and compensation box for cable length.

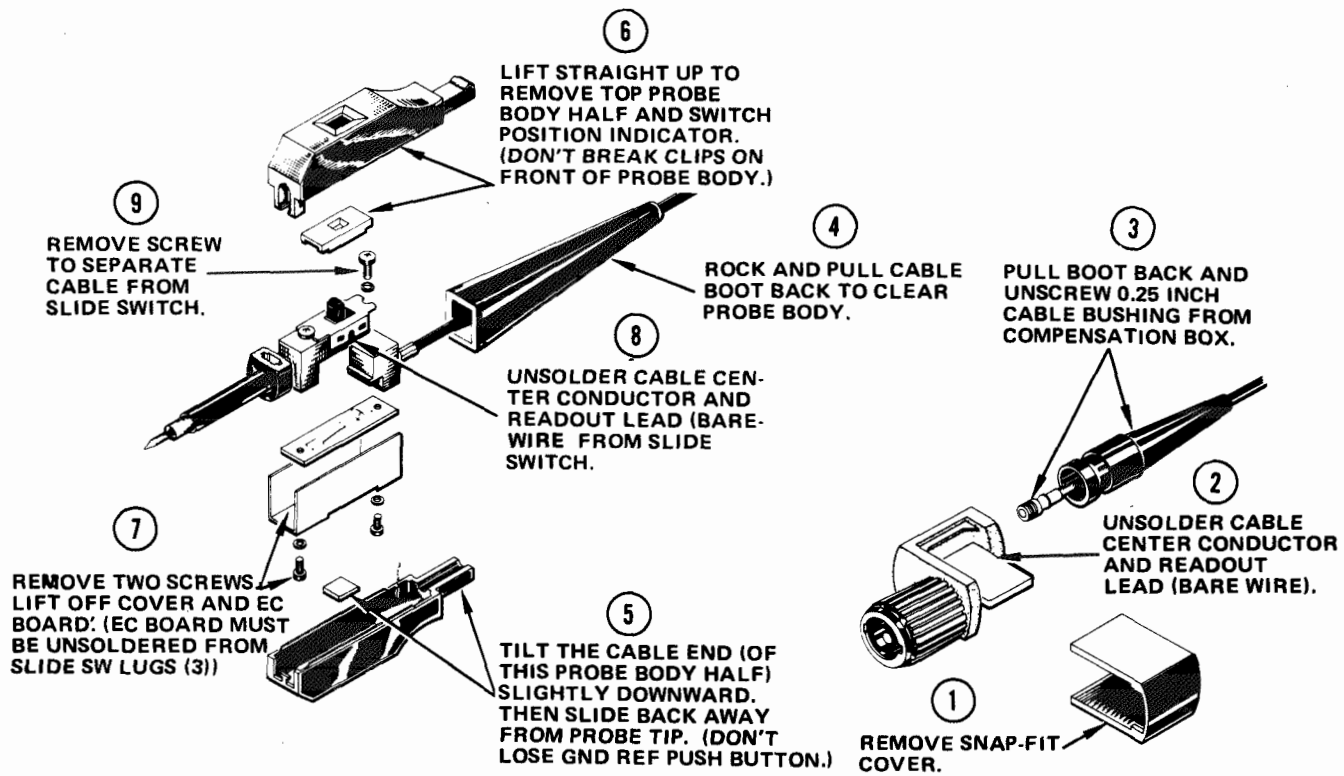
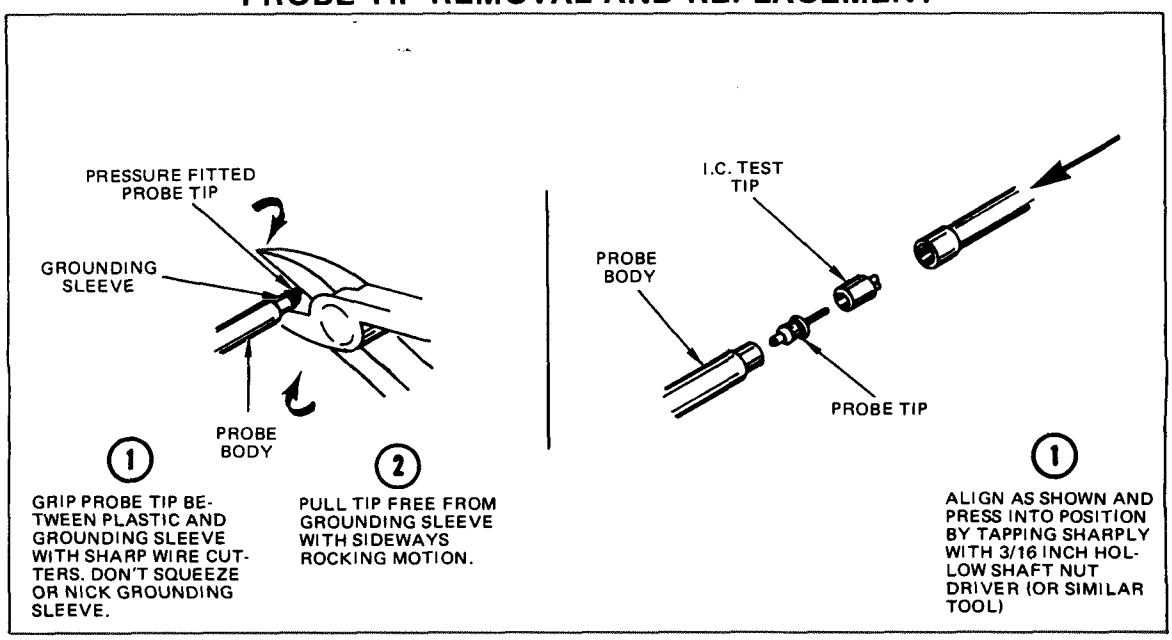


Fig. 6 Replacing units of a probe assembly.

PROBE TIP REMOVAL AND REPLACEMENT



REPLACEABLE 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.

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.

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
**** END ATTACHING PARTS ****
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
**** END ATTACHING PARTS ****
Parts of Detail Part
Attaching parts for Parts of Detail Part
**** END ATTACHING PARTS ****

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.

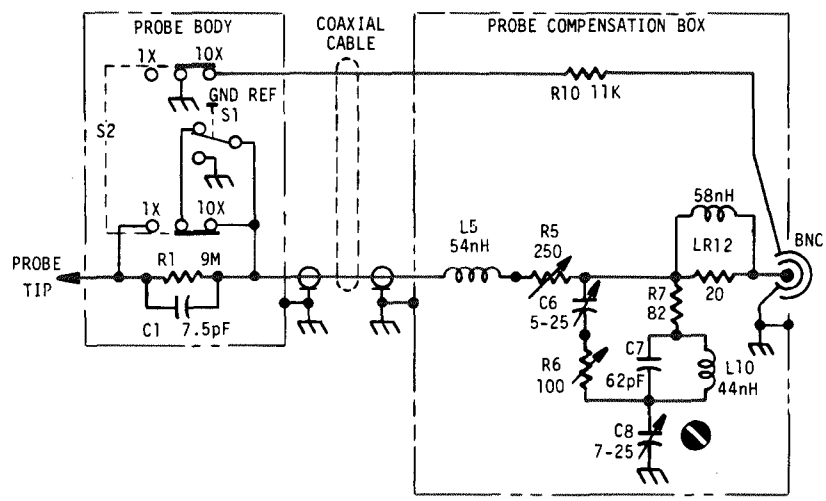
Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

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

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C1	----- -----			CAP.,FXD,CER DI:7.5PF,+/-1PF,500V (AVAILABE AS 206-0210-00 ONLY)		
C6	281-0123-00			CAP,VAR,CER DI:5-25PF,100V	59660	518-000A5-25
C7	281-0799-00			CAP,FXD,CER DI:62PF,2%,100V	04222	MA101A620GAA
C8	281-0160-00			CAP,VAR,CER DI:7-25PF,350V,MINTR CER DISC	33095	53-717-001 B7-25
L5	108-0643-00			COIL,RF:FIXED,54NH	80009	108-0643-00
L10	108-0892-00			COIL,RF:FIXED,44NH	80009	108-0892-00
LR12	108-0893-00			COIL,RF:FIXED,58NH	80009	108-0893-00
R1				RES.,FXD,FILM:9, OHM,0.1%,0.25W (AVAILABLE AS 206-0210-00 ONLY)		
R5	311-0978-01			RES,VAR,NONWW:TRMR,250 OHM,0.5W	32997	3329H-K28-251
R6	311-0622-01			RES,VAR,NONWW:TRMR,100 OHM,0.5W	32997	3329H-K28-101
R7	317-0820-00			RES,FXD,CMPSN:82 OHM,5%,0.125W	01121	BB8205
R10	317-0113-00			RES,FXD,CMPSN:11K OHM,5%,0.125W	01121	BB 1135
S2	260-1470-00			SWITCH,SLIDE:DPDT,0.5A,125VAC	10389	23-021-309

3.5 FOOT PROBE SCHEMATIC DIAGRAM

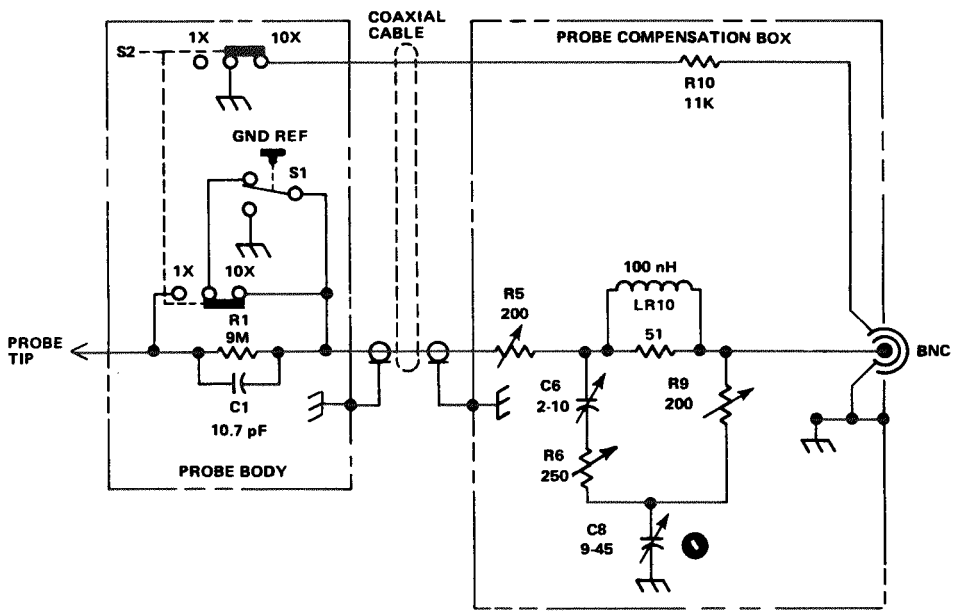


CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
10389	ILLINOIS TOOL WORKS INC	1714 N DAMEN AVE	CHICAGO IL 60647
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507
33095	SPECTRUM CONTROL INC	8061 AVONIA RD	FAIRVIEW PA 16415
59660	TUSONIX INC	2155 N FORBES BLVD	TUCSON, ARIZONA 85705
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C1	------ ------			CAP.,FXD,CER DI:10.7PF,1%,500V (AVAILABLE AS 206-0212-00 ONLY)		
C6	281-0221-00			CAP,VAR,CER DI:2-10PF,100V	72982	0513013A 2 0-10
C8	281-0167-00			CAP,VAR,CER DI:9-45PF,200V	33095	53-717-001 09-45
LR10	108-0408-00			COIL,RF:FIXED,100NH	80009	108-0408-00
R1				RES.,FXD,FILM:9, OHM,0.1%,0.25W (AVAILABLE AS 206-0212-00 ONLY)		
R5	311-0605-01			RES,VAR,NONWW:TRMR,200 OHM,0.5W	73138	82PR200-3D
R6	311-0978-01			RES,VAR,NONWW:TRMR,250 OHM,0.5W	32997	3329H-K28-251
R9	311-0605-01			RES,VAR,NONWW:TRMR,200 OHM,0.5W	73138	82PR200-3D
R10	317-0113-00			RES,FXD,CMPSN:11K OHM,5%,0.125W	01121	BB 1135
S1	260-1470-03			SWITCH,SLIDE:DPDT,0.5A,125VAC	10389	23021150H207994A

6 FOOT PROBE SCHEMATIC DIAGRAM



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32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507
33095	SPECTRUM CONTROL INC	8061 AVONIA RD	FAIRVIEW PA 16415
72982	ERIE TECHNOLOGICAL PRODUCTS INC	645 N 11TH ST	ERIE PA 16512
73138	BECKMAN INSTRUMENTS INC HELIPOT DIV	2500 HARBOR BLVD	FULLERTON CA 92634
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077

3.5 foot Probe Parts list change.
Change components no C1 and R1 to
RC1 R/C Hybrid 7.5pf

6.0 foot Probe Parts List change.
Change components no C1 and R1 to
RC1 R/C Hybrid 10.7pf.

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-					PERTAINS TO BOTH 3.5 AND 6 FOOT PROBES EXCEPT WHERE FOOTNOTED.		
-1	——— ———			1	TIP,TEST PROD:IC TEST (AVAILABALE IN PACKS OF 10,015-0201-04) (AVAILABLE IN PACKS OF 100,015-0201-05)		
-2	206-0210-00			1	ATTEN SUBASSY:1X-10X	80009	206-0210-00
-3	——— ———			1	.TIP,TEST PROD:M/BODY .(AVAILABLE IN PACKS OF 10,206-0191-03) .CAP.,FXD,CER DI:(C1 REPL) .RES.,FXD,FILM:(R1 REPL)		
-4	204-0596-03			1	BODY HALF,PROBE:BOTTOM	80009	204-0596-03
-5	366-1529-01			1	PUSH BUTTON:BLACK,0.22 SQ X 0.135	80009	366-1529-01
-6	204-0595-00			1	BODY HALF,PROBE:TOP	80009	204-0595-00
-7	214-2041-00			1	IND,SWITCH POSN:	80009	214-2041-00
-8	337-2380-00			1	SHIELD,ELEC:PROBE ATTACHING PARTS	80009	337-2380-00
-9	211-0264-00			2	SCREW,MACHINE:2-56 X 0.156 L,PNH,SST	83385	ORDER BY DESCR
-10	210-0080-00			2	WASHER,LOCK:#2 SPLIT,0.015 THK,SST END ATTACHING PARTS	86928	ORDER BY DESCR
-11	670-4797-00			1	CIRCUIT BD ASSY:GROUND REFERENCE SWITCH	80009	670-4797-00
-12	——— ———			1	SWITCH,SLIDE:(S2 REPL) ATTACHING PARTS		
-13	211-0264-00			2	SCREW,MACHINE:2-56 X 0.156 L,PNH,SST	83385	ORDER BY DESCR
-14	210-0080-00			2	WASHER,LOCK:#2 SPLIT,0.015 THK,SST END ATTACHING PARTS	86928	ORDER BY DESCR
-15	204-0598-00			1	BODY,PROBE:INNER REAR	80009	204-0598-00
-16	343-0447-00			1	COLLAR,GND CLIP:0.24 ID X 0.175,ACETAL GY	80009	343-0447-00
-17	200-1158-17			1	COVER,COMP BOX:	80009	200-1158-17
-18	670-3259-01			1	CIRCUIT BD ASSY:PROBE (3.5 FOOT PROBE ONLY)	80009	670-3259-01
	670-3260-01			1	CIRCUIT BD ASSY:PROBE (6 FOOT PROBE ONLY)	80009	670-3260-01
-19	131-1070-00			1	CONN,RCPT,ELEC:BNC,MALE,3 CONTACT ATTACHING PARTS	80009	131-1070-00
-20	220-0572-00			1	NUT,PLAIN,HEX:10-32 X 0.25 HEX,BRS NP	80009	220-0572-00
-21	210-0056-00			1	WASHER,LOCK:#10 SPLIT,0.047 THK,SI BRZ END ATTACHING PARTS	86928	ORDER BY DESCR
-22	——— ———			1	CAP.,VAR,CER DI:(C8 REPL)		
-23	354-0396-00			1	RING,CAP.MTG:PROBE,POLYCARBONATE	80009	354-0396-00
-24	426-0690-04			1	FRAME,CMPNT BOX:	80009	426-0690-04
-25	175-1499-00			1	CA ASSY,RF:50 OHM COAX W/MESS WIRE,42.0 L	80009	175-1499-00
					STANDARD ACCESSORIES		
-26	016-0521-00			1	POUCH,ACCESSORY:PROBE ACCESSORIES	TK1556	ORDER BY DESCR
-27	013-0107-03			1	TIP,PROBE:RETR HOOK ASSY,W/FLANGE	80009	013-0107-03
-28	166-0404-01			1	COVER,GROUND:	80009	166-0404-01
-29	175-0124-01			1	LEAD,ELEC:STRD,23 AWG,BLK VINYL,5.0 L	80009	175-0124-01
-30	175-0263-01			1	LEAD,ELECTRICAL:STRD,18 AWG,3.0 L	80009	175-0263-01
-31	206-0114-00			1	TIP,PROBE:HOOK	80009	206-0114-00
-32	344-0046-00			1	CLIP,ELEC:ALLIGATOR,1.56 L,STL BRT DIPPED	80009	344-0046-00
-33	352-0351-00			1	HOLDER,PROBE:BLACK ABS	80009	352-0351-00
-34	——— ———			2	TIP,TEST PROD:M/BODY (AVAILABLE IN PACS OF 10,206-0191-03)		
	062-1675-00			1	PROBE CARD:	80009	062-1675-00
	062-2928-01			1	DATA SHEET:	80009	062-2928-01

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Mfr. Code	Manufacturer	Address	City, State, Zip Code
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
TK1556	CONSOLIDATED VINYL SALES	1237 S SAN GABRIEL BLVD.	SAN GABRIEL CA 91776