Instruction Manual

P6032 PROBE

070-327

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All Tektronix instruments are warranted against defective materials and workmanship for one year. Tektronix transformers, manufactured in our own plant, are warranted for the life of the instrument.

Any questions with respect to the warranty mentioned above should be taken up with your Tektronix Field Engineer.

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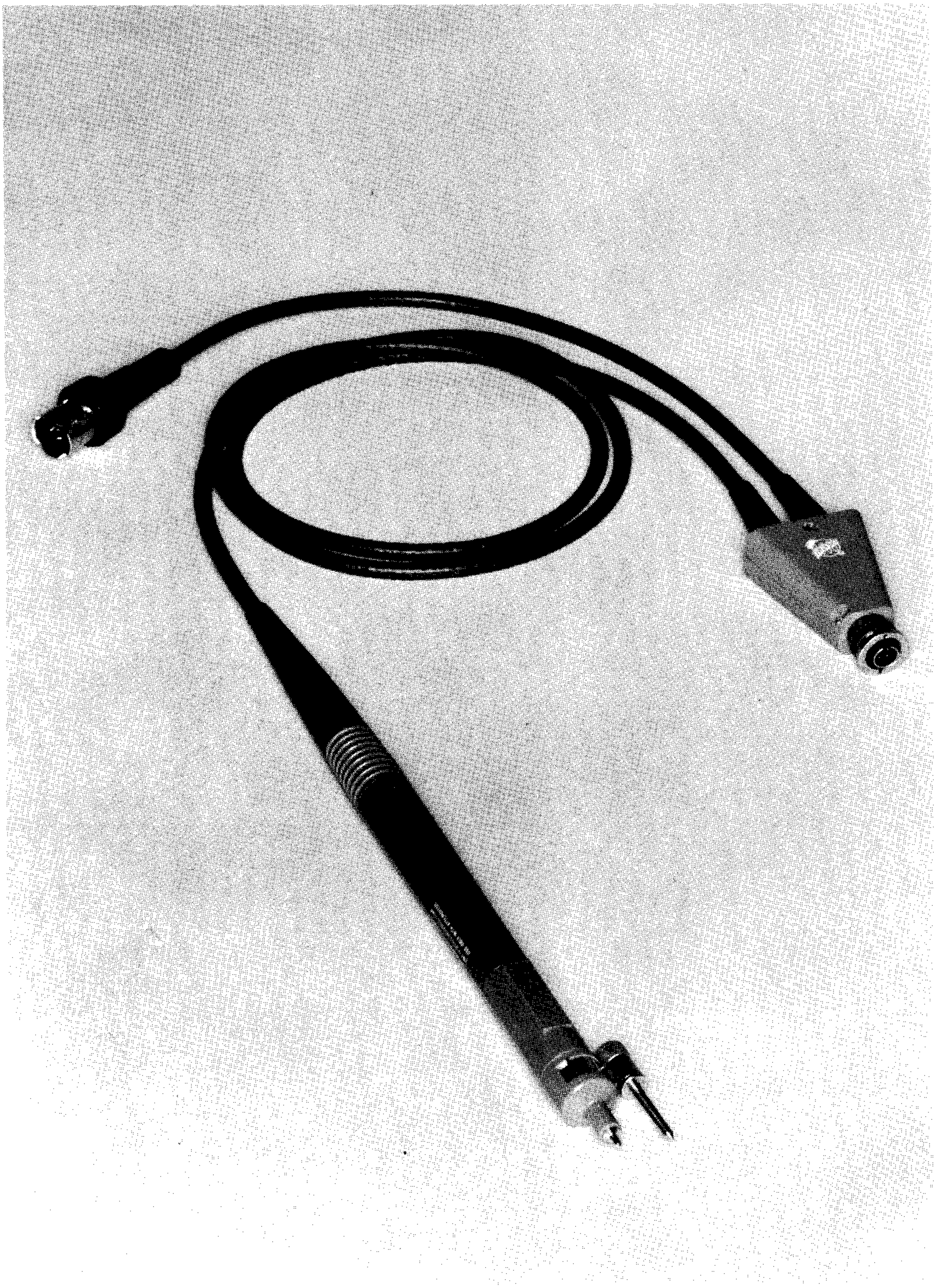
Specifications and price change privileges reserved.



SECTION 1
CHARACTERISTICS

General

The Tektronix P6032 Cathode-Follower Probe is a high-frequency probe designed for use with Tektronix vertical sampling plug-in units, such as Types 3S76 or 4S1. The Probe provides a high-impedance input for the sampling system. Seven plug-on attenuator heads provide a selection of attenuation ratio between 10 and 1000.

Probe and Attenuator Heads

Attenuation—10X, 20X, 50X, 100X, 200X, 500X, 1000X (including probe attenuation of 3X). Selected by changing attenuator heads.

Risetime—

Frequency Response—

Maximum Input Voltage— See Table 1-1.

Input Resistance—

Input Capacitance—

Dc Offset—Approximately +0.5 volt.

Maximum Output—±150 mv into 50 Ω load.

Signal Delay—Approximately 10 nsec.

Coupling Capacitor (Tektronix Part No. 010-330)

Capacitive Element—.001 μf.

Voltage Rating—600 v dc.

Low-Frequency 3-db Point—16 cps.

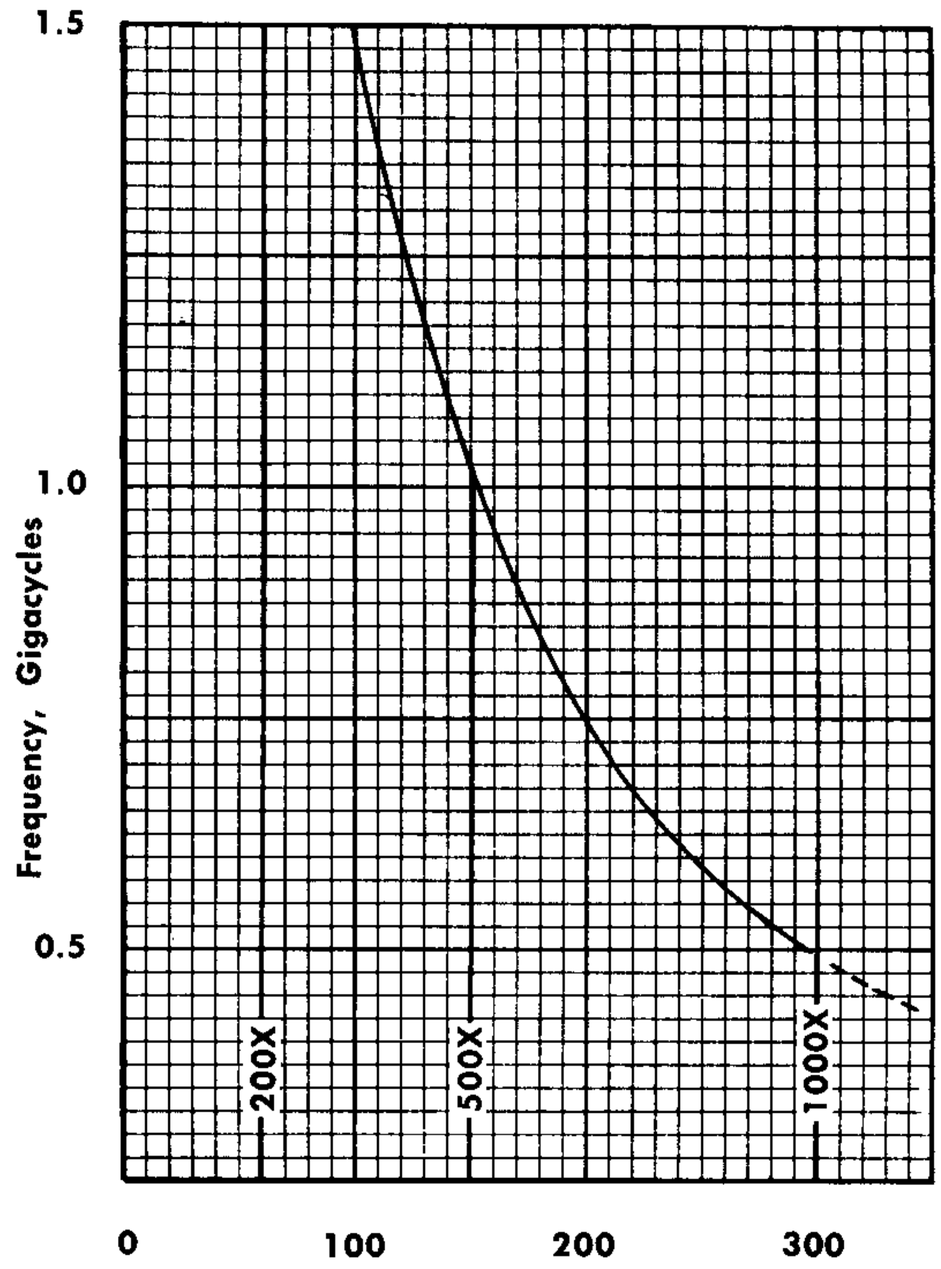


Fig. 1-1. Continuous-wave voltage derating curve for P6032 CF Probe.

TABLE 1-1

Attenuator Head	Typical Risetime	Frequency Response (3db)	Max. Input Voltage*	Input Capacitance at DC (±10%	Input Resistance at DC (±2%)
10X (010-350)	0.4 nsec	850 mc	±1.5 v	3.6 pf	10 meg
20X (010-351)	0.4 nsec	850 mc	±3.0 v	2.6 pf	10 meg
50X (010-352)	0.4 nsec	850 mc	±7.5 v	1.8 pf	10 meg
100X (010-353)	0.4 nsec	850 mc	±15 v	1.5 pf	10 meg
200X (010-354)	0.4 nsec	850 mc	±30 v	1.4 pf	10 meg
500X (010-355)	0.4 nsec	850 mc	±75 v**	1.3 pf	10 meg
1000X (010-356)	0.4 nsec	850 mc	±150 v**	1.3 pf	10 meg

*Limited by linearity of cathode follower. This value may be exceeded by 50% for pulses without damage to probe components.

**Must be derated for continuous-wave use. (See Table 1-2).

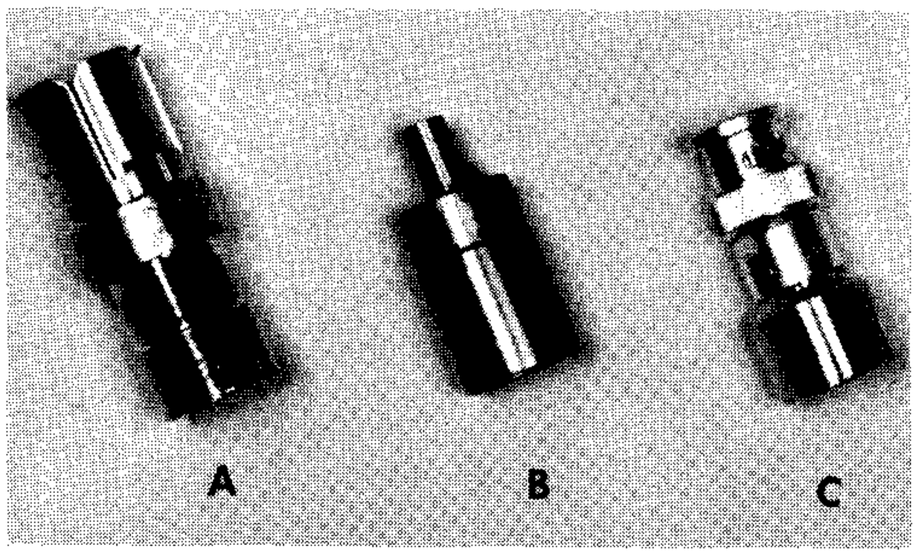


Fig. 1-2. Optional accessories for P6032 CF Probe. (a) Probe-to-GR Type 874 adapter; (b) 50 Ω termination for the adapters; and (c) Probe-to-BNC adapter.

Power Requirements

Heater—12.6 volts at 180 ma.

Plate Supply +100 volts dc at 12 ma.

Mechanical

Cable Length—54 inches.

Power Plug—4-pin miniature.

Signal Out Connector—GR Type 874 (50 Ω).

Accessories

2—Ground Clips.

1—Bayonet Ground Clip.

1—Instruction Manual.

TABLE 1-2

Attenuator Head	Max. Input Voltage (peak-to-peak)			
	500 mc	750 mc	1000 mc	1250 mc
500X	150 v	150 v	150 v	125 v
1000X	300 v	200 v	150 v	125 v

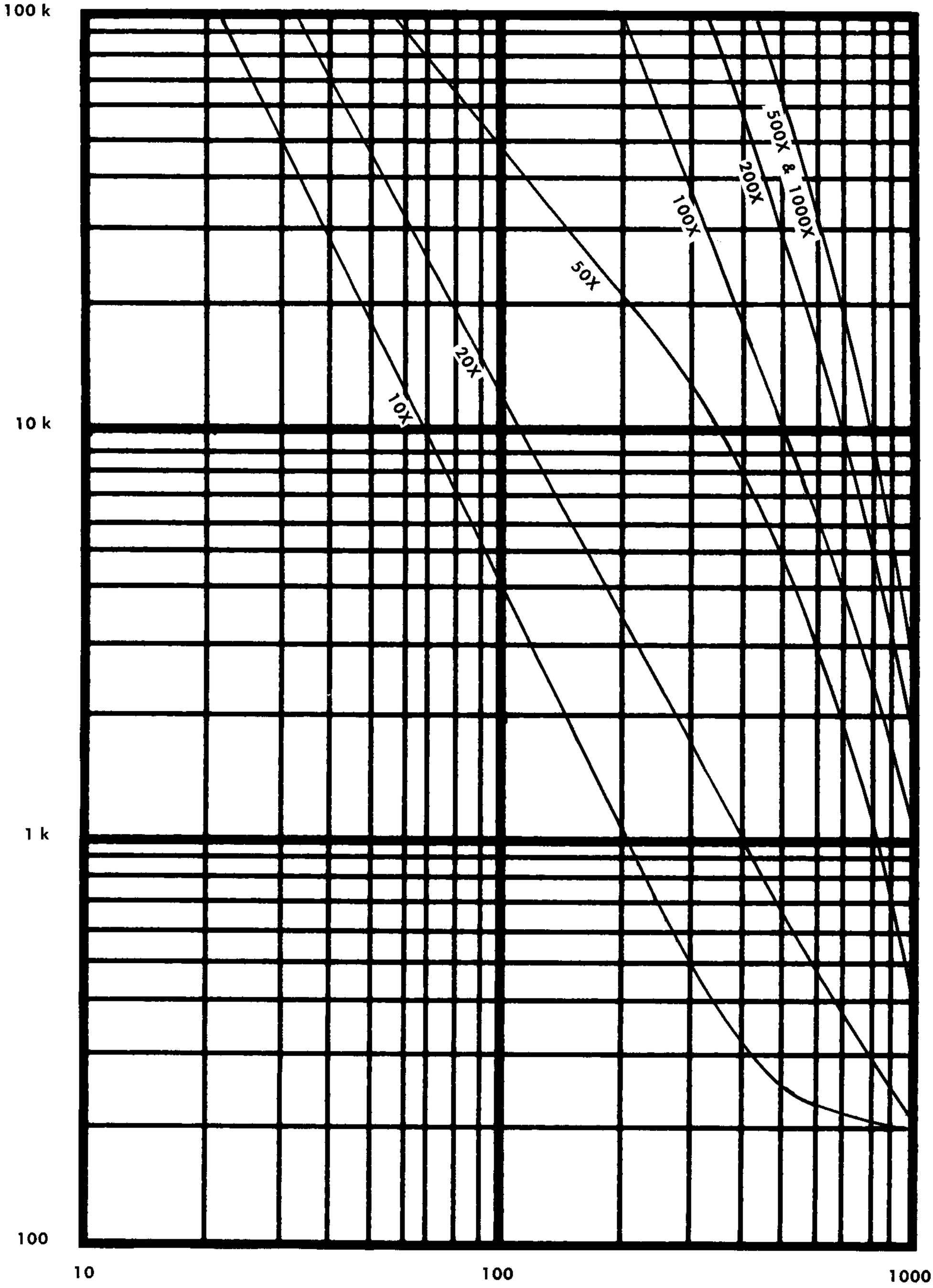


Fig. 1-3. Typical input resistance versus frequency curve of P6032 CF Probe.

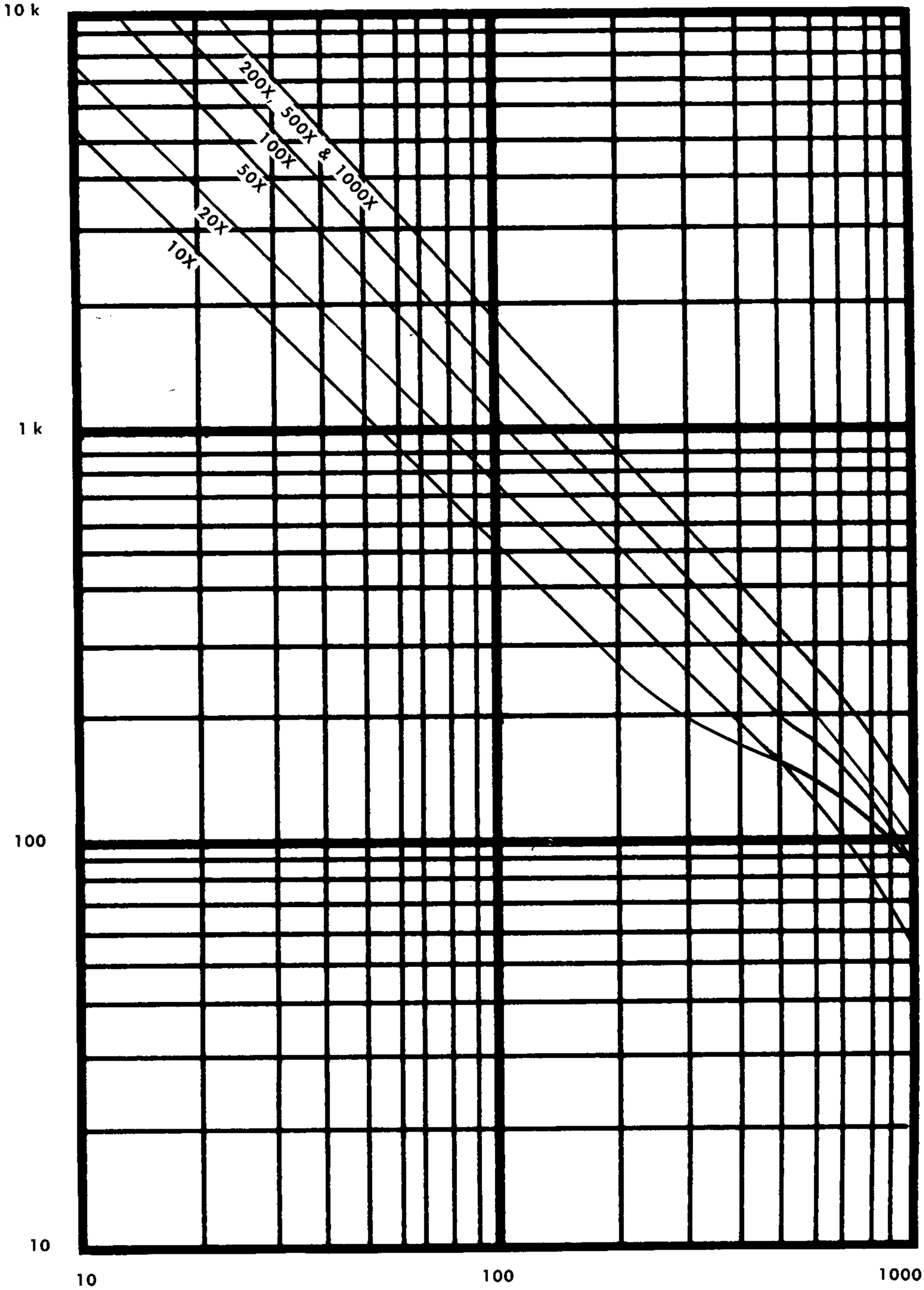


Fig. 1-4. Typical input capacitive reactance versus frequency curve of P6032 CF Probe.

SECTION 2
OPERATING INSTRUCTIONS

General

When used with Tektronix vertical sampling plug-in units, such as the Type 4S1 or 3S76, the P6032 Probe can be used to display frequencies to 850 mc. The following section will help you obtain good waveform displays using the P6032 Probe. Measurement considerations and typical test systems are included.

Handling Precautions

The P6032 Probe has been constructed as ruggedly as possible, consistent with extremely good high-frequency response. However, as with all devices handling signals in the nanosecond range, small changes in capacitance or inductance produce pronounced changes in response. For this reason, observing a few precautions in the handling of the probe and cable will insure optimum performance and reliability. Do not drop or roll equipment on the probe or cable, kink the cable, close doors or drawers on the cable, drop the probe or attenuator heads, or pull on the probe or cable.

Connecting the Probe

Fig. 2-1 shows the parts that make up the P6032 Probe. The function of each part is as follows:

Power Plug—Mates with the probe power jack on Tektronix vertical sampling plug-in units. It connects power from the oscilloscope to the probe.

Power Regulator—Connects the power from the power plug to the interconnecting cable. The circuit contains voltage-dropping components to adapt source voltages to the operating levels of the probe. Also, the signal cable passes through the regulator housing to the signal out connector.

Signal Out Connector—Connects the signal from the probe to the vertical input connector of the sampling system.

Probe Body—Contains the cathode-follower circuit and the gain adjustment.

Attenuator Heads—Provide attenuation ratios between 10 and 1000.

Coupling Capacitor—Contains a capacitor for ac coupling of signals to the probe tip.

Bayonet Ground Clip—Spring-loaded ground clip to provide convenient ground.

To set up the P6032 Probe for proper operation, connect the power plug to the probe power jack on the vertical unit. Connect the probe

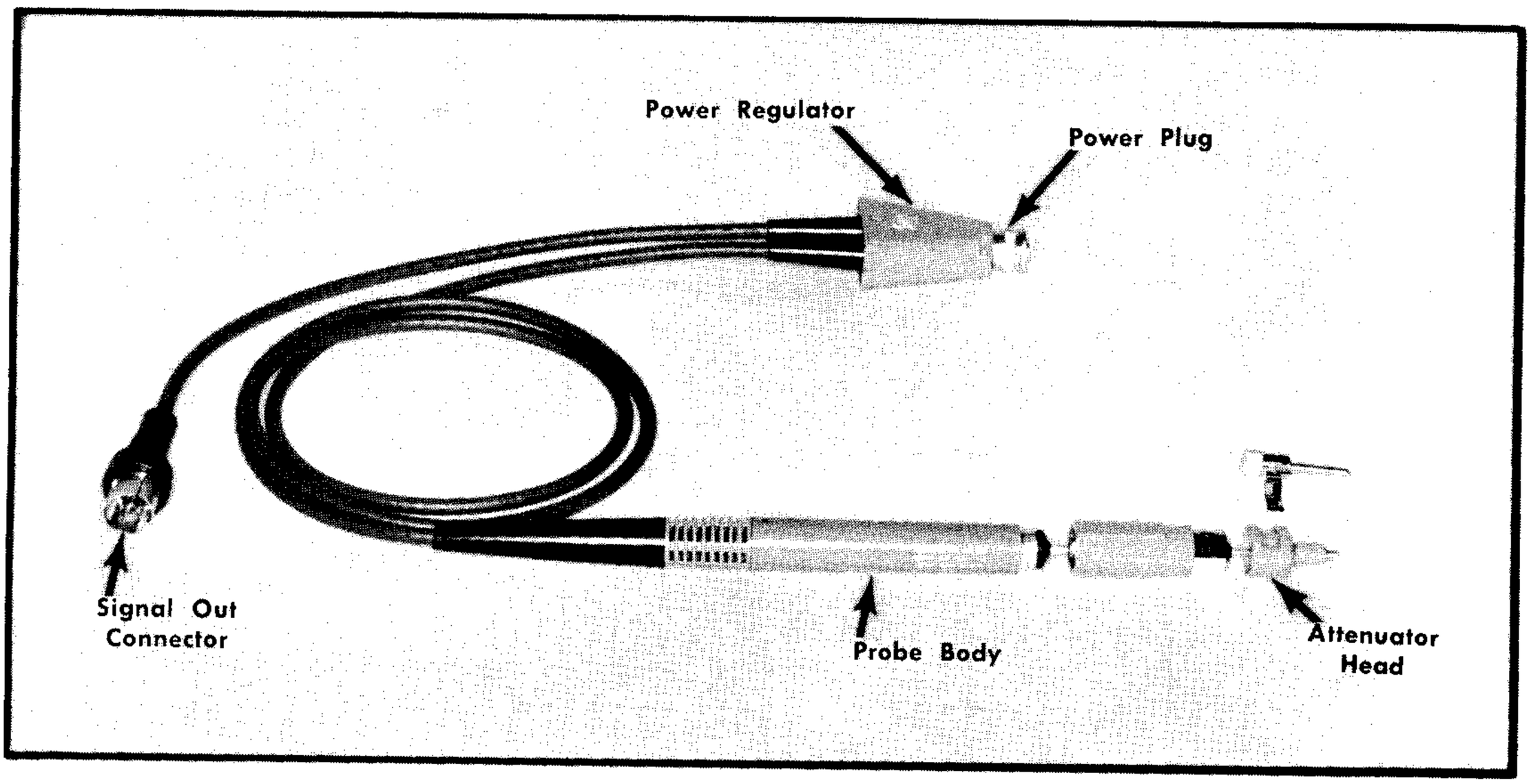


Fig. 2-1. P6032 CF Probe with parts identified.

signal out connector to the vertical unit signal-input connector. Allow the probe a short warm-up period before making any adjustments.

The P6032 Probe has a positive dc offset of about 0.5 volt at the signal out connector. Since this voltage is sufficient to shift the trace off the crt, the vertical sampling unit must be adjusted to center the trace. To make this adjustment, trigger the sampling system for a free-running sweep. Then, adjust the vertical sampling unit offset or position control to center the trace.

Select an appropriate attenuator for the probe. The attenation ratio is indicated on each head. This ratio is the total attenuation of the probe and head (the probe itself has an attenuation of 3).

CAUTION

No protection is provided for the probe input grid circuit when the probe is used without an attenuator head. Do not apply more than ±500 mv directly to the probe tip. Also, without an attenuator, the probe input impedance at dc is only 3 megohms paralleled by 7 pf.

Signal Connections

All signal connections should be made directly to the tip of the attenuator head or coupling capacitor. Establish a ground between the probe and the signal source as described in the following section. The hooked tip provided with the probe will distort signals with risetimes of 1 nanosecond or less.

If the desired signal can be obtained directly from a connector, use the adapters listed as optional accessories in the Characteristics section. A 50 Ω feed-through termination for the adapters is also available for use with connectors that must be terminated for proper operation.

Ground Connections

Use the ground clips or bayonet ground clips (see Fig. 2-2) to establish a ground between the signal source and the probe. Any type of ground connection may be soldered to the ground clip. However, a long ground lead on the probe or a common ground between instruments will introduce inductance into the source loop and produce ringing.

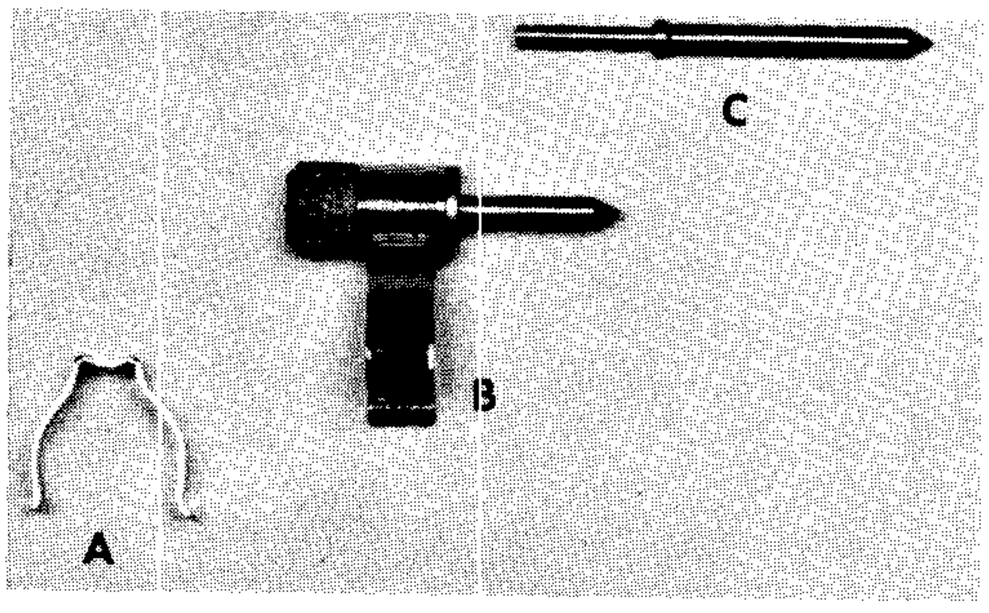


Fig. 2-2. Ground connections; (a) Ground Clip, (b) Bayonet Ground Clip, and (c) Extended Center Pin for Bayonet Ground Clip.

The extended center pin shown in Fig. 2-2 may be used when the bayonet ground clip is used with the coupling capacitor. The pin extends the probe ground connection to the same plane as the signal connection.

Test Systems

Generally, the P6032 Probe can be used in any test system where a Tektronix sampling system is used and a high-impedance input is desired. Fig. 2-3 shows a general test system. For other test systems, see the instruction manuals for Tektronix sampling-system instruments.

Precision Measurements

To make measurements with better than 5% accuracy, use the following technique:

Set the vertical sampling unit sensitivity to 50 millivolts/division. Select an attenuator head that will produce a three-or-four centimeter vertical display of the desired signal. Apply a signal to the attenuator head; the peak-to-peak voltages for each head are given in Table 2-1. For best final measurement accuracy, the peak-to-peak voltage of the applied signal should be within 1% of the values given in the table. Adjust the probe gain or the plug-in variable attenuator to obtain the proper deflection on the crt.

Check and adjust the compensation of the attenuator head as given in the Calibration section of this manual. Connect the desired signal to the attenuator head tip. Observe all signal and ground precautions outlined in this section.

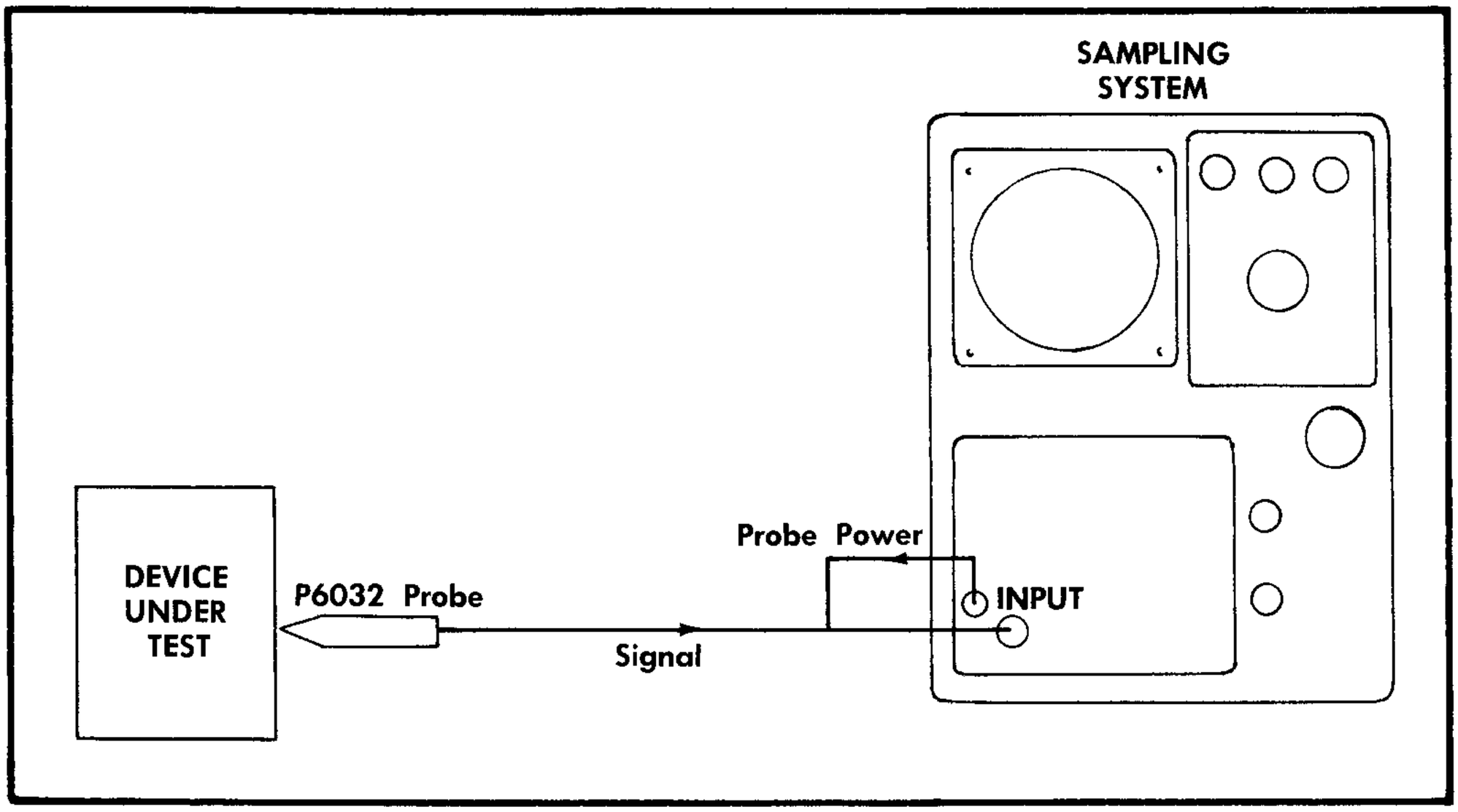


Fig. 2-3. General test setup for the P6032 CF Probe.

Accurately read the amplitude of the waveform from the crt. The voltage indicated on the crt is the voltage in the cathode circuit of the tube. From Fig. 2-4 obtain the actual voltage; the nonlinearity of the cathode-follower circuit is considered in this chart. Notice that the zero level of the chart is located at 0.5 - 0.6 volts dc, which is the dc output level of the P6032 Probe. If the observed signal is dc-coupled to the probe, the dc component must also be considered in the correction. Also, the actual voltage of ac signals at each side of the signal zero level must be found separately.

To find the actual voltage applied to the probe, multiply the value found from the chart by the attenuation of the attenuator head.

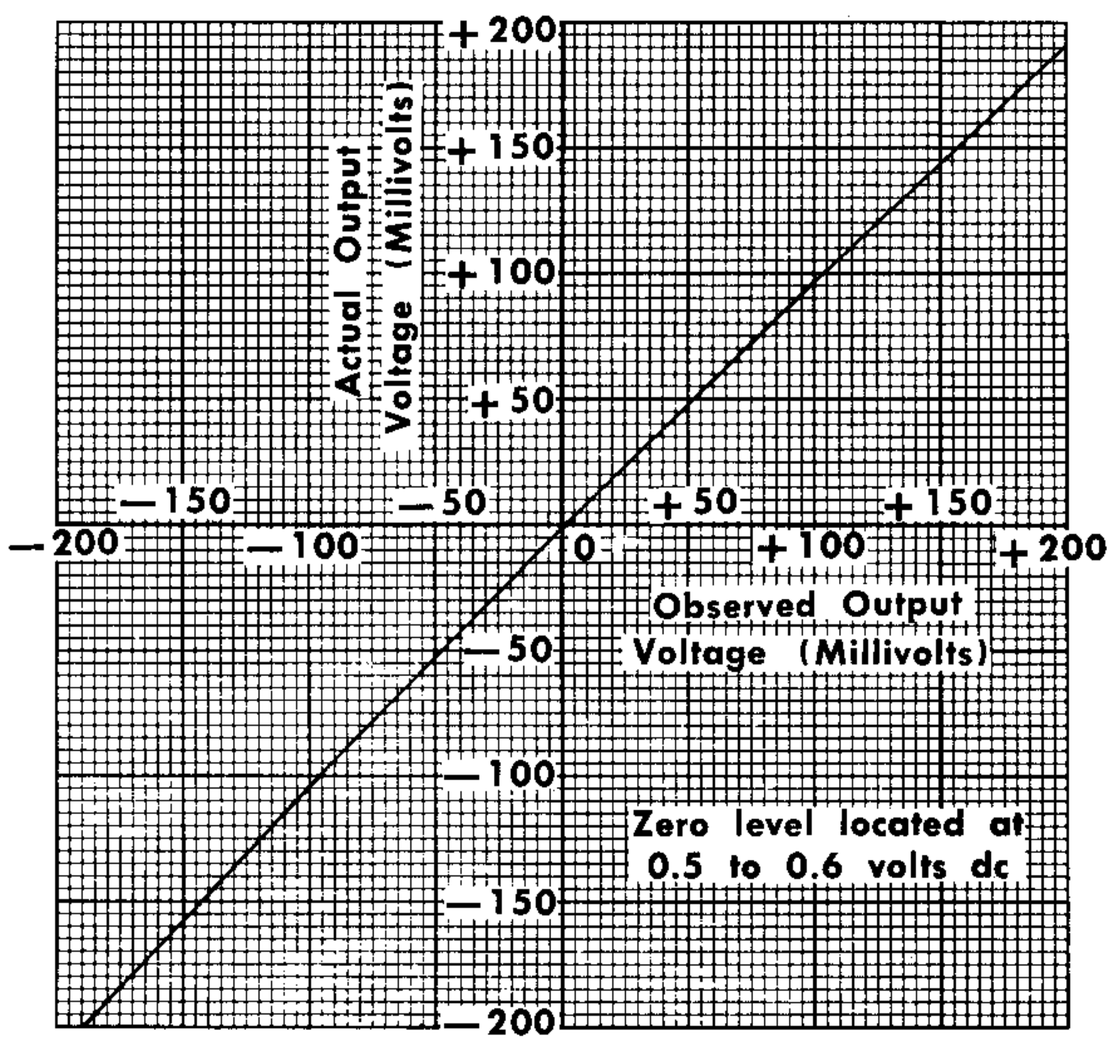


Fig. 2-4. Typical non-linearity correction curve for P6032 CF Probe.

TABLE 2-1

Attenuator Head	Peak-to-Peak Voltage for Proper Gain adjust	Centimeters of Crt Display
X10	0.5	1
X20	1	1
X50	5	2
X100	5	1
X200	10	2
X500	50	2
X1000	50	1

SECTION 3
CIRCUIT DESCRIPTION

General

The P6032 CF Probe circuitry consists of three parts; the cathode-follower input circuit, the power regulator, and the attenuator heads. A five-conductor cable connects the input circuit to the power regulator. One element of the cable is a 50 Ω coaxial line for signal transfer.

The circuit diagram at the rear of this manual may be used throughout the following discussion.

Cathode Follower Input Circuit

V103 is connected in a cathode-follower configuration to provide high-impedance input with low-impedance output. Plate and heater power for the stage is obtained from the power regulator. R106, L106, R107, and C107 in the plate circuit provide a constant damping impedance of about 82 ohms.

L108 and L109 prevent high-frequency signals at the cathode of V103 from being coupled into the vertical sampling unit through the heater-circuit power supply.

The output signal is obtained from the cathode of V103. The diode D103 is a dc-setting device that offers very little signal attenuation. The clipping line reduces signal aberration to a minimum. The gain adjustment, R103, in parallel with R104, permits a 20% change in probe gain. The signal is obtained from the R105 gain adjustment junction and applied to the signal out connector through the inter-connecting cable.

The signal path of the P6032 Probe is completely dc-coupled. Therefore, any dc voltage change at the probe tip will be displayed on the crt as a vertical shift in the trace. Since a cathode follower provides no polarity inversion, the displayed waveform will be of the same polarity as the signal waveform.

Power Regulator

The power regulator obtains power from the oscilloscope and applies it to the probe. The 50-Ω signal cable passes through the power regulator housing to the signal out connector.

The power plug is a four-pin connector that mates with the probe power jack on the sampling oscilloscope. The voltage requirements are as follows:

Pin A	Ground.
Pin B, Pin C	12.6 volts.
Pin D	+100 volts dc.

A common ground between the vertical sampling unit, power regulator and probe body is established by pin A. R129, in series with the heater of V103, drops the voltage from pins B and C to 6.3 volts for the tube.

Zener diode D127 drops the supply voltage at pin D to +70 volts at the plate of V103. C127 is a filter to keep high frequencies out of the +100-volt supply.

Attenuator Heads and Coupling Capacitor

The attenuator heads contain resistors and capacitors selected to give the desired attenuation ratio. The 10-megohm input resistance remains constant with all of the attenuator heads. The input capacitance varies between 3.6 and 1.3 pf, depending on the attenuator head used. Each head contains a variable capacitor to correctly set the ac attenuation ratio.

The coupling capacitor plugs onto the attenuator heads to provide ac coupling. The low frequency 3-db point, when the coupling capacitor is used, is 16 cps for all heads.

SECTION 4
MAINTENANCE

Cleaning

Use a soft, lint-free cloth to wipe the P6032 Probe clean of accumulated dust. Remove stubborn dirt with a cloth dampened in a mild solution of water and liquid detergent. Allow the probe to dry thoroughly before operating.

CAUTION

Do not use organic solvents to clean the plastic parts of the probe. These solvents dissolve plastics, and may damage the probe.

Removing the Probe Body Cover

To remove the probe body cover, loosen the small allen set-screw at the rear of the cover. Then, grasp the probe body cover firmly in one hand and the heat radiator in the other and pull the cover off the tip-end of the probe. The cover is tightly fitted to the probe body and may require a firm pull to remove.

When replacing the probe body cover, the allen set-screw should be aligned with the hole in the rear of the probe body and tightened to seat firmly on the metal portion of the heat radiator.

Removing the Power Regulator Cover

Remove the two screws near the power plug, and the bolt near the rear of the cover. The two halves of the cover can then be separated. When replacing the cover, it may be necessary to reposition the power plug. Loosen the set-screw near the front of the cover and move the power plug to the proper position. Then, tighten the set-screw.

Soldering

Most of the components in the P6032 Probe cannot dissipate large amounts of heat. Therefore, be careful when soldering these components. Use a low wattage soldering iron (60 watts or less.) An iron with a small chisel tip provides the best heat transfer to the junction. Apply only enough heat to make a good connection.

When soldering to the ceramic wafers in the probe body, use solder containing about 3% silver. If this type of solder is not available locally, it may be purchased directly from Tektronix in one-pound rolls; order by part number 251-514.

Ordinary 60/40 solder may be used on the etched circuit board in the power regulator. Use a low wattage iron with a small tip since excessive heat can break the bond between the etched wiring and the board.

Always use a heat sink when soldering on any part of the P6032 Probe. In most cases, a pair of long-nose pliers serves as an adequate heat sink. Hold the lead between the point where the heat is applied and the body of the component.

Parts Replacement

The high-frequency response of the P6032 Probe depends largely on the type of parts and their placement within the probe. It is important to maintain the original lead length and part position when replacing a component. Parts-ordering information is included in the Parts List in Section 6 of this manual.

Special procedures for replacing some of the critical parts and assemblies are contained in the following information. Observe normal replacement procedures for parts and assemblies not mentioned here.

Tube Replacement

To replace the tube in the P6032 Probe, remove the probe body cover and the top tube-shield. Unsolder the two resistors from the tube tip. Slide the tube forward out of its socket, and lift it out of the probe. When the new tube is placed in the socket, resolder the resistors in their original position to the tube tip.

Ceramic Wafer Replacement

Ceramic wafer replacement requires extensive dismantling of the probe; it is not a simple repair operation. Therefore, we recommend that damaged ceramic wafers be replaced only when they affect the probe operation.

Solder at the base of the ceramic wafers holds them in place. Before removing a wafer, note the exact placement of the components and unsolder them from the wafer. Then unsolder the base of the wafer from the probe body. Remove the wafer and clean the excess solder from the probe body. Position the new wafer in the body and solder it in place using 3% silver-bearing solder. Then resolder the components on the wafer.

Circuit Board Replacement

To remove the power regulator etched circuit board, unsolder all connections leading to the power plug and the interconnecting cable and note the color of the wires and their location. Remove the two screws holding the circuit board to the frame and remove the board. Solder the components in place on the new board before installing in the frame. Replace the leads.

Cable Assembly Replacement

If any part of the cable assembly (see Fig. 6-1) needs to be repaired or replaced, replace the entire assembly. To replace the P6032 Probe cable assembly, remove the probe body and power regulator covers. Note the color and location of the wires and unsolder all cable connections to the probe and regulator. Remove the small screw from the base of the probe body assembly and remove the probe body assembly from the heat radiator.

Replace the probe body assembly on the heat radiator of the new cable assembly. Be careful not to strip the threads when the screw is replaced. Solder the leads to their original connections in both the regulator and probe. Replace the probe body and power regulator covers.

Attenuator Heads and Coupling Capacitor

Repair of the attenuator heads or the coupling capacitor should not be attempted. If damaged, the entire assembly should be replaced.

TROUBLESHOOTING

Inspection

If trouble develops in the P6032 Probe, a thorough visual inspection may reveal the cause. Check for foreign material, inadequate parts clearances (due to improper handling or parts replacement) loose or broken connections, cracked ceramic wafers, and scorched or burned parts. The corrective procedure for most of these conditions is apparent. However, heat-damaged parts may be the symptom of some other, less apparent defect in the circuit, such as shorted tube or transistor elements.

Tube and transistor failure is the most common cause of trouble in Tektronix instruments. Therefore, the tube and transistors should be checked next, preferably by substitution.

If the previous checks do not locate the cause of trouble, check for the following symptoms. Then, follow the procedure to locate the source of trouble.

The following procedure covers basic types of troubles that may occur in the P6032 Probe.

CAUTION

Be careful not to short wires or components when servicing the probe. An incorrect potential on the Signal Out connector could damage the input diodes of a sampling-type oscilloscope.

No Signal At Signal Out Connector

First, check for proper voltages at pin D and between pins B and C of the plug-in probe power jack. Then visually check V103 for heater glow. If there is no heater glow, check between pins 3 and 6 for 6.3 volts. If this voltage is about 12 volts, the heater of V103 is open and the tube should be changed.

If there is no voltage between these points, check L108, L109, and R129. If the components check good, check for cable continuity between pins B and C of the power plug and pin 3 or 6 of V103.

If the heater circuit is satisfactory, check for about a 0.8-volt drop across R106. If there is no drop across R106, check D127, C127, and

L106. If these components check good, check D103, R103, and R104. Then check for continuity through the signal out connector. If all components check good, replace V103.

Incorrect Gain

If the probe gain cannot be correctly set with the gain adjustment, check for the following voltages at V103:

Pin 4 or 8 to ground: About +70 volts

Pins 3 to 6: About 6.3 volts

Pin 1 or 5 to ground: About +1.5 volts

If the heater voltage is not about 6.3 volts, check R129 and the voltage between pins B and C in the plug-in Probe Power jack. If the voltage at pin 4 or 8 or pin 1 or 5 to ground is incorrect, disconnect the probe from the vertical sampling unit and connect an ohmmeter across R103 and R104. Vary R103 throughout its range; the resistance should vary from 0 to about 30 ohms maximum. Then measure R106 for correct value.

To check D103, use an ohmmeter having an internal battery of not more than 1.5 volts on the X1000 range. Connect the positive lead of the ohmmeter to pin 1 or 5 of V103, and the negative lead to the opposite side of D103. The ohmmeter should read less than 5000 ohms. An infinite reading should be obtained when the leads are reversed. If the reading is the same in both directions, replace the diode. If the readings are correct, replace V103.

Incorrect High-Frequency Attenuation

If the high-frequency attenuation of the probe and attenuator head appears different from the low-frequency attenuation, check the attenuator head compensation (described in the Calibration section of this manual). If the attenuator cannot be properly compensated, change attenuator heads. If this corrects the trouble, replace the former attenuator heads.

If the high-frequency attenuation is incorrect for all attenuator heads, the trouble is in the probe. Visually check the probe for a damaged or misplaced part. Then use an ohmmeter to check for continuity and proper component values.

SECTION 5
CALIBRATION

General

The P6032 Probe has two calibration adjustments; gain, and the high-frequency compensation of each attenuator. The probe gain is stable and should not require frequent adjustment. But always check the attenuator compensation before making a critical measurement.

Equipment

The following equipment is required for complete calibration of the P6032 Probe.

1. Sampling Oscilloscope: Tektronix Type 561 or Type 567 with Type 3S76 and Type 3T77 plug-in units, or Type 661 with Type 4S1 and Type 5T1 plug-in units, or equivalent.

   Specifications required: vertical sensitivity, 20 to 100 millivolts/division; sweep rate, 10 μseconds/division; must have probe power jack that mates with the P6032 Probe power plug.

2. Square-wave generator: Tektronix Type 105 or equivalent.
   Specifications required: output frequency, 1 kc and 10 kc; output amplitude, variable from 1 to 100 volts across 600-ohm internal load and 0.25 to 4 volts across 25-ohm external load.

3. Two 50-ohm terminations: Tektronix Part No. 011-045 (or B 52R).

4. 10 X 7 attenuator: Tektronix Part No. 011-031 (UHF) or 017-045 (GR).

5. Nominal 50-ohm UHF cable: Tektronix Part No. 013-001.

6. GR Type 874-to-UHF Jack adapter: Tektronix Part No. 017-022.

Gain Adjustment

Set the square-wave generator for a 10-kc output. Connect the generator output to the sampling system vertical input with the 50 Ω cable. Set the sensitivity of the vertical sampling unit to 50 millivolts/division and the sweep rate to 10μseconds/division. Adjust the generator output amplitude for 6 centimeters of vertical display on the crt.

Disconnect the cable from the generator output and the sampling system. Place a 50 Ω termination on the output of the generator for impedance matching. Connect the P6032 Probe power plug to the plug-in unit probe power jack, and the signal out connector to the plug-in input connector. Remove the probe body cover.

Connect the probe tip through a 0.001-μf capacitor to the square-wave generator (at the outboard end of the 50 Ω termination). Establish a ground between the probe and the generator. Adjust the probe Gain adjustment for a 2-centimeter display. As the probe gain is changed, the dc offset voltage at the signal out connector will also change. Adjust the vertical sampling unit position or offset control to keep the trace centered.

The probe gain is now 0.33 (an attenuation of 3X). To check the accuracy of an attenuator head, plug it onto the probe tip and apply a signal of known amplitude. Do not exceed the

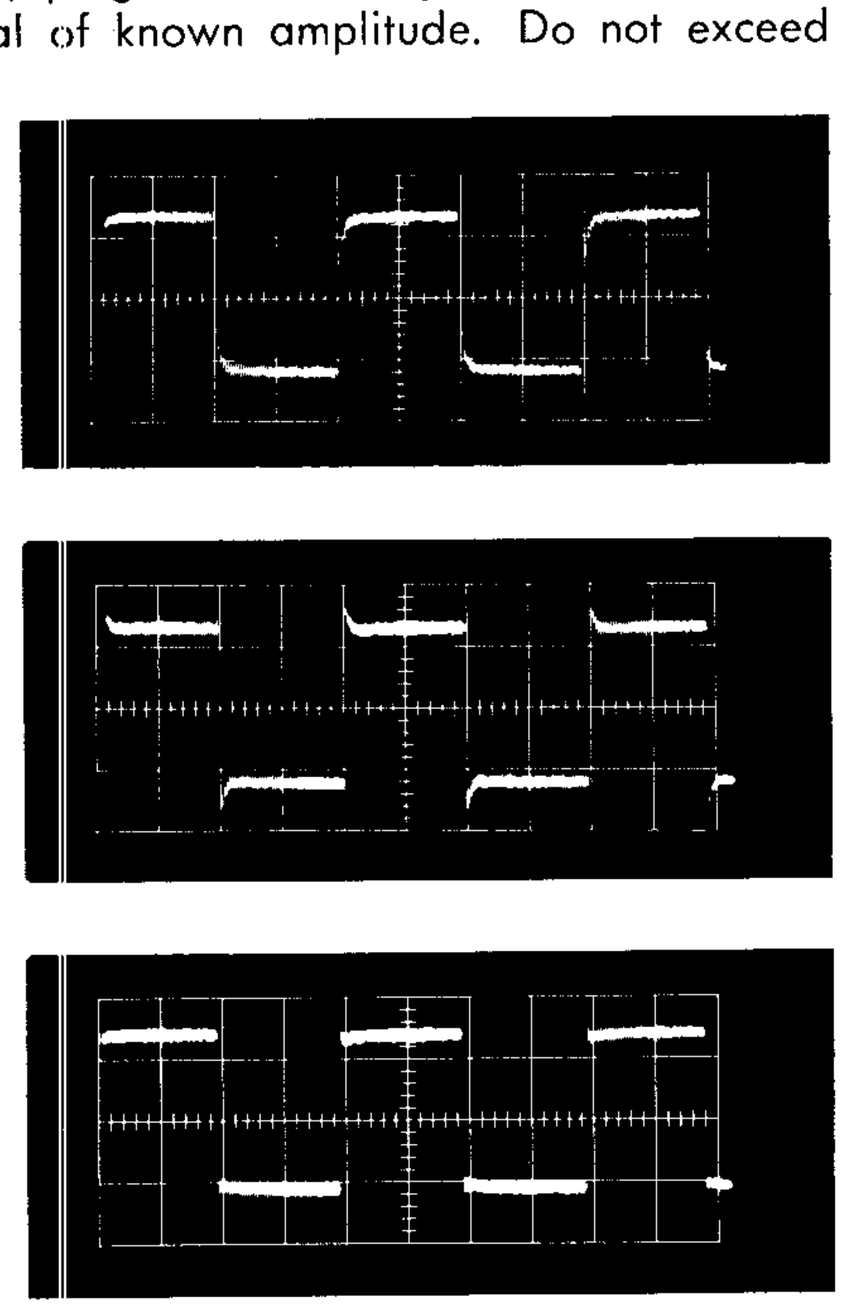


Fig. 5-1. Compensating the attenuator heads. (a) Undercompensated, (b) overcompensated, and (c) properly compensated.

voltage stamped on the attenuator head. The attenuation of the probe and the attenuator head together should be within 3% of the value stamped on the attenuator head.

Attenuator Head High-Frequency Compensation

The high-frequency attenuation of each attenuator head must be adjusted to equal the low-frequency attenuation. This is accomplished by adjusting a variable capacitor in each head.

Connect the P6032 Probe to the vertical sampling unit and set the sensitivity for 50 millivolts/division. Set the sweep rate to 10 μseconds division. Set the square-wave generator for a symmetrical 1-kc output. (The amplitude calibrator of a Tektronix Type 530 or 540-series oscilloscope may be used for this adjustment.)

Plug the attenuator head to be compensated onto the probe tip. Attach the bayonet ground clip to the attenuator head. Touch the tip of the attenuator to the generator output, establishing a ground beween the generator and the probe with the ground clip. Free-run the sweep and adjust the generator amplitude to display a 3-cm signal. Then adjust the triggering for a stable display.

A 3-cm display of 50 millivolts/division limits the signal swing at the probe output to $\pm$150 millivolts for a linear output signal.

NOTE

Do not use a pulse repetition rate higher than 5 kc to compensate the attenuators. At repetition rates higher than 5 kc the gain appears to change as the attenuator is compensated.

Adjust the screw near the tip of the attenuator head for the best square corners on the display. Then, set the vertical sensitivity for 10 millivolts/division. Adjust the offset and position controls to center the trace. Readjust the attenuator compensation for the best square-wave display. Fig. 5-1 shows a typical display when undercompensated, overcompensated, and properly compensated.

CAUTION

Do not overtighten the nylon screw. The screw or internal components may be damaged, making further compensation impossible.

Section 6
Parts List and Schematic

HOW TO ORDER PARTS

Replacement parts are available from or through your local Tektronix Field Office.

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, for your order to contain the following information: Part number including any suffix, instrument type, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, you local Field Office will contact you concerning any change in part number.

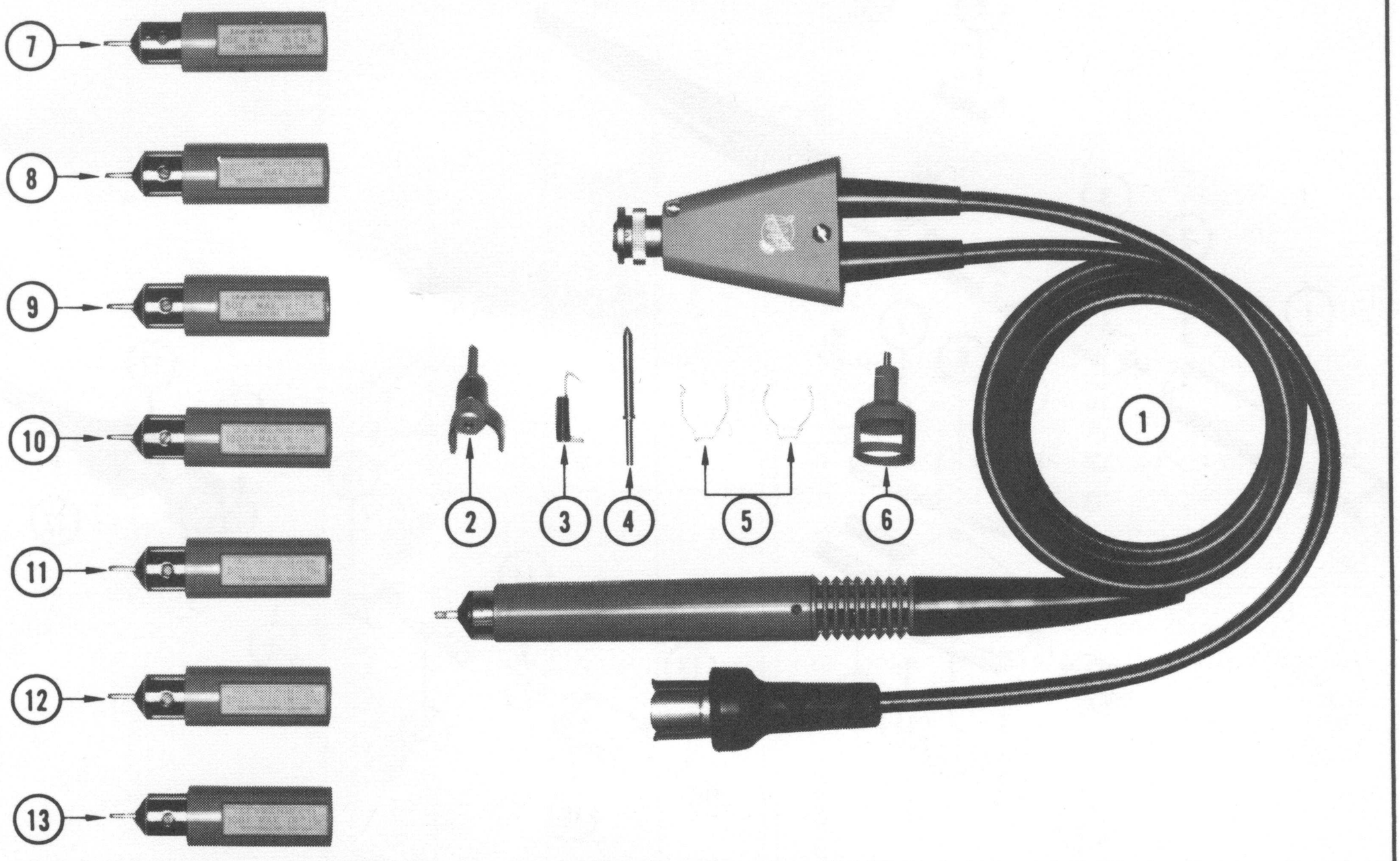
ABBREVIATIONS

BHS	Binding Head Steel	p	Pico, or 10^{-12}
f	Farad	PHS	Pan Head Steel
K or k	Kilohms, or kilo (10^3)	Var.	Variable
M or meg	Megohms, or mega (10^6)	w	Watt
Ω	Ohm	w/	With

SPECIAL NOTES AND SYMBOLS

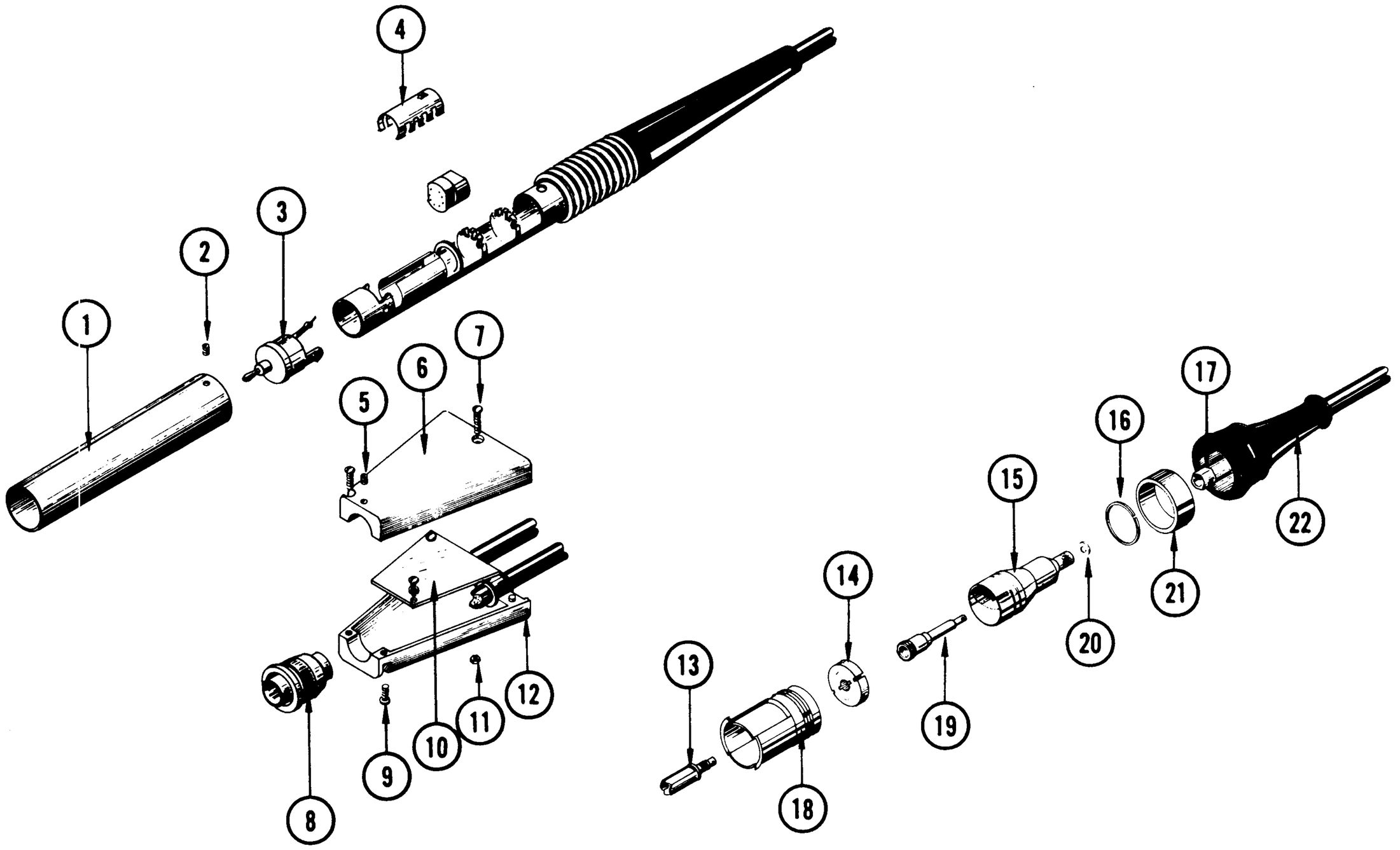
X000	Part first added at this serial number.
000X	Part removed after this serial number.
*000-000	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, also reworked or checked components.
Use 000-000	Part number indicated is direct replacement.
	Internal screwdriver adjustment.

PROBE WITH ACCESSORIES

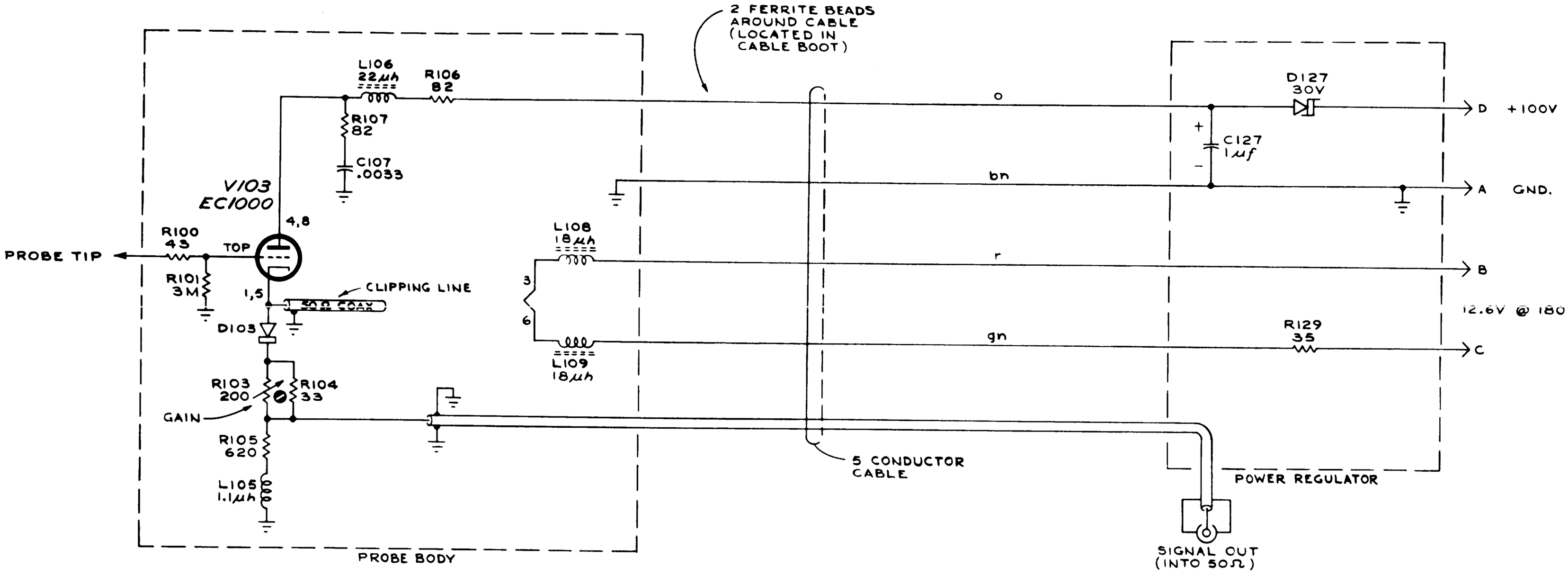


REF. NO.	PART NO.	SERIAL NO. EFF.	SERIAL NO. DISC.	QTY.	DESCRIPTION
PROBE ONLY					
1-13	010-108				PROBE WITH STANDARD ACCESSORIES
PROBE PACKAGE					
1.	010-098				(SEE PAGE 6-3 FOR REPLACEABLE PARTS)
STANDARD ACCESSORIES					
2.	013-037			1	GROUND CLIP ASSEMBLY
3.	214-278			1	SPRING, coil, probe, with insulating cover and hook
4.	214-302			1	PIN, center
5.	344-080			2	CLIP, ground
6.	010-330			1	CAPACITOR, COUPLER HEAD
7.	010-350			1	ATTENUATOR HEAD, 10X
8.	010-351			1	ATTENUATOR HEAD, 20X
9.	010-352			1	ATTENUATOR, HEAD, 50X
10.	010-356			1	ATTENUATOR HEAD, 1000X
11.	010-355			1	ATTENUATOR HEAD, 500X
12.	010-354			1	ATTENUATOR HEAD, 200X
13.	010-353			1	ATTENUATOR HEAD, 100X
	200-411			1	COVER, probe tray (not shown)
	436-032			1	TRAY, accessory (not shown)
	436-034			1	TRAY, probe (not shown)

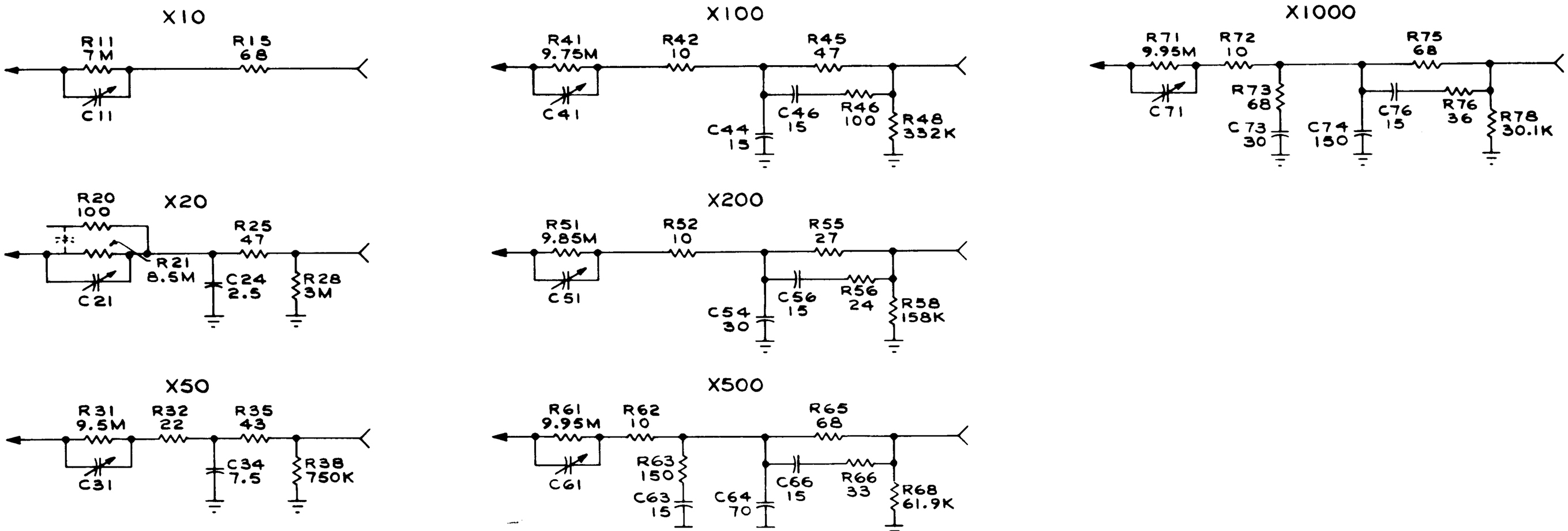
REPLACEABLE PARTS



REF. NO.	PART NO.	SERIAL NO. EFF.	SERIAL NO. DISC.	QTY.	DESCRIPTION
	010-098				PROBE, P6032
					Includes:
1.	204-117			1	BODY, probe
2.	213-075			1	SCREW, set, 4-40 x 3/32 in. allen hex socket
3.	206-118			1	NOSE ASSEMBLY, P6032
4.	337-458			1	SHIELD, tube miniature
5.	213-048			1	SCREW, set, 4-40 x 1/8 in. HSS, allen head
6.	202-090			1	BOX, voltage circuit, with set screw hole
7.	211-017			1	SCREW, 4-40 x 5/8 in. RHS
8.	131-203			1	CONNECTOR, cable socket, 4 contact, male
9.	211-001			2	SCREW, 2-56 x 1/4 in. RHS
10.	288-521			1	BOARD, etched circuit
	211-022			2	SCREW, 2-56 x 3/16 in. RHS
	210-001			2	LOCKWASHER, steel, internal #2
11.	210-406			1	NUT, hex, brass, 4-40 x 3/16 in.
12.	202-089			1	BOX, voltage circuit
13.	132-029			1	INNER CONDUCTOR
14.	132-028			1	INSULATOR
15.	132-115			1	OUTER TRANSITION
16.	132-007			1	SNAP RING
17.	358-183			1	BUSHING, outer sleeve
18.	132-002			1	SLEEVE, conductor, outer
19.	132-116			1	INNER TRANSITION
20.	132-119			1	DISC
21.	132-001			1	NUT, coupling
22.	132-043			1	GUARD, cord, rubber



P 6032 CF PROBE



ATTENUATOR HEADS

P 6032 CF PROBE