Instruction Sheet
No. 070-7432-00
Product Group 63

TEK PROBE AND ACCESSORIES

# P6119

## 1X/10X PASSIVE PROBE

Tektronix®
COMMITTED TO EXCELLENCE

# SPECIFICATIONS

## Description

The P6119 is a miniature, passive probe with a 1X or 10X selectable attenuation for use with DC to 100 MHz oscilloscopes. It is fully compatible with the Tektronix family of miniature probe accessories. The P6119 is available with a 2 or 3 Meter cable.

## Electrical Characteristics

**Attenuation (System)**

1X Position: same as oscilloscope system

10X Position: ±1.5% at DC (probe installed on Tektronix 2200 Series oscilloscope)

**Input Resistance (System)**

1X Position: same as oscilloscope system

10X Position: 10 MΩ ±1.5% (see Figure 1)

| **Input Capacitance:** | **2 M probe** | **3 M probe** |
|---|---|---|
| 1X Position: | 120 pF | 145 pF |
| 10X Position: | 15.3 pF | 17.5 pF |

**Compensation Range:** 18 pF to 22 pF

| **System Bandwidth (-3 dB):** | **2 M probe** | **3 M probe** |
|---|---|---|
| 1X Position: | >8.0 MHz | >6.7 MHz |
| 10X Position: | >100 MHz | >100 MHz |

The preceding specifications are achieved using an oscilloscope with an input capacitance of 20 pF (±2 pF) and an input bandwidth of >100 MHz with a properly terminated 50-Ω source. A similar correspondence is achieved for oscilloscopes of lower bandwidth and identical capacitance range.

**Maximum Nondestructive Input Voltage (See Figure 2 for voltage derating curve)**

1X Position: 350 V (DC + peak AC) to 190 kHz

10X Position: 500 V (DC + peak AC) to 1.3 MHz

## Environmental Characteristics

**Temperature Range (Operating):** -15°C to +75°C (+5°F to +167°F)

**Temperature Range (Non-operating):** -62°C to +85°C (-80°F to +185°F)

**Humidity:** Five cycles (120 hours total) at 95% to 97% relative humidity (Tek Standard 062-2847-00, Class 3. Refer to MIL-E-16400F, paragraph 4.5.9 through 4.5.9.5.1, class 4.)

## Physical Characteristics

| **Net Weight (Including Accessories):** | **2 M probe** | **3 M probe** |
|---|---|---|
| | <154 g (5.5 oz) | <182 g (6.0 oz) |

## Safety

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

This product meets the requirements of UL 1244.


Revised DEC 1991

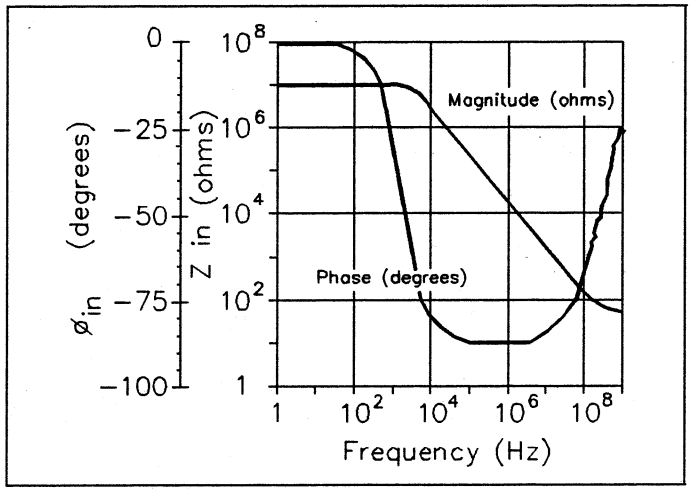



**Figure 1. Typical Input Impedance, 10X Position**

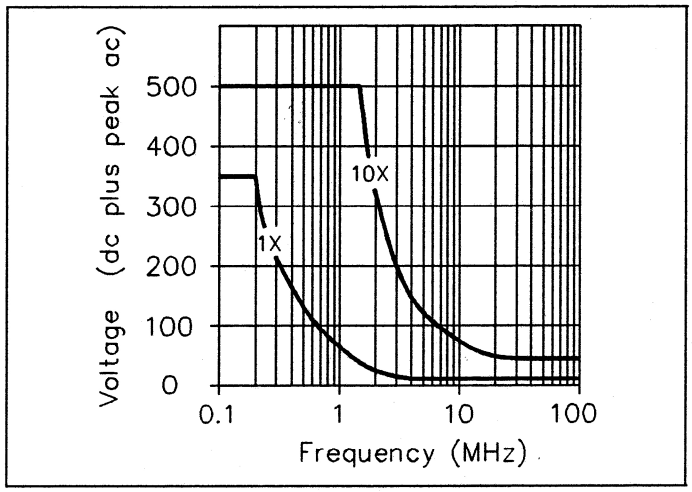



**Figure 2. Typical Voltage Derating versus Frequency.**

## OPERATING CONSIDERATIONS

**Probe Grounding.** Inductance introduced by a long signal lead or ground lead will form a resonant circuit that will ring and distort the true waveform if driven by a signal containing significant frequency components at or above resonance. The ground lead and signal input connections should be as short as possible to maintain the best waveform fidelity.

**Low-Frequency Compensation.** Due to variations in oscilloscope input characteristics, probe low-frequency (l-f) compensation may need adjustment after moving the probe from one input to another. Perform the following steps to adjust the low-frequency compensation:

1. Apply the probe tip to a 1 kHz square-wave signal (such as an oscilloscope calibrator output)
2. Using a low-reactance alignment tool, adjust the i-f compensation capacitor (shown in Figure 3) to obtain the squarest waveform corner.

**High-Frequency Compensation.** High-frequency (h-f) compensation seldom requires adjustment; however, if the probe has excessive h-f aberrations or insufficient bandwidth, perform the following steps to minimize these problems:

1. Obtain a pulse generator (such as the Tektronix PG 506A) with a fast-rise pulse of 1 ns or less. Select a repetition rate of 1 MHz.
2. Terminate the pulse generator output with a 50-Ω feed-through termination.
3. Using a BNC-to-miniature probe tip adapter (Tektronix part number 013-0084-01), connect the P6119 probe to the 50-Ω termination.
4. Adjust R1 so that the oscilloscope displays the best rise time with the flattest response in the first 30 ns of the pulse (see Figures 3 and 4).

***WARNING***

*The following maintenance instructions are for qualified personnel only. To avoid electrical shock, do not perform any probe maintenance while the probe is connected to a signal source.*

## MAINTENANCE

**Cleaning.** To remove accumulated dirt from the probe, use a soft cloth dampened with a non-residue cleaner, preferably isopropyl alcohol. Before using any other cleaner, consult your Tektronix Service Center or representative. Avoid using benzene, toluene, xylene, acetone, MEK, or similar solvents.

**Replacing Parts.** The probe tip, probe head, and cable assembly are available as separate units through your Tektronix Field Office or representative.

To replace the probe tip, unscrew the old tip from the probe head and replace it with a new one.

To replace either the probe head or cable assembly, pull the head from the cable assembly. Replace the head or cable assembly with a new one and re-connect the parts by pushing them together again.

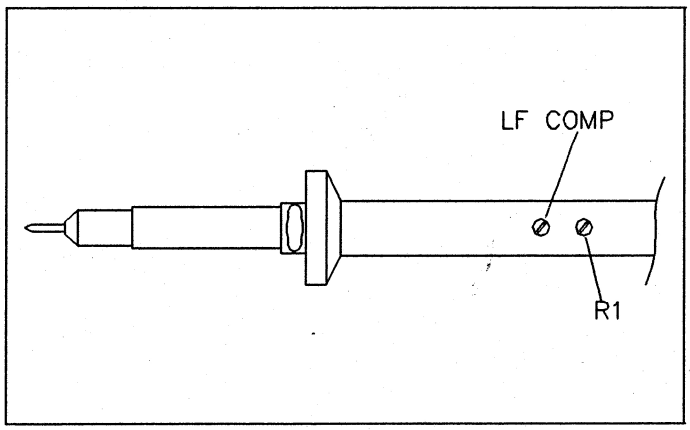



**Figure 3. Location of Adjustments.**

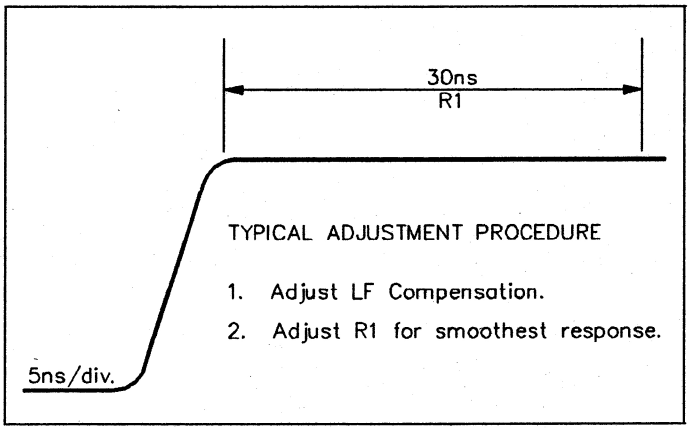
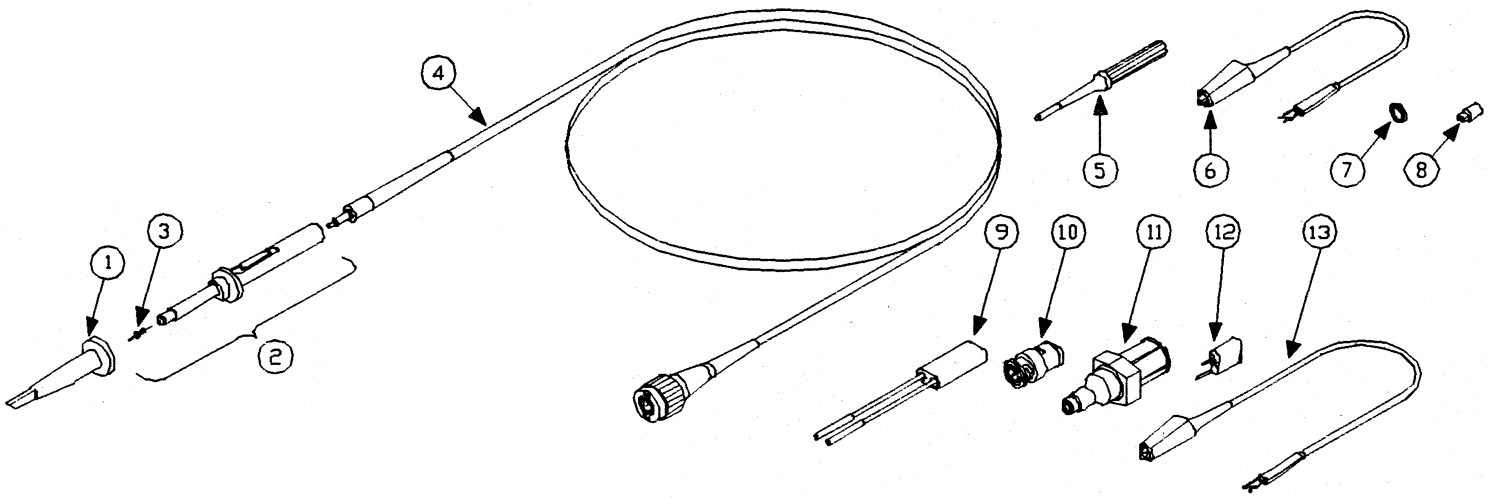



**Figure 4. High Frequency Compensation Adjustment.**




Replaceable Parts List P6119.

| Fig. & Index No. | Tektronix Part No. | Serial/Assembly No. Effective | Dscont | Qty | 12345 Name & Description | Mfr. Code | Mfr. Part No. |
|---|---|---|---|---|---|---|---|
| 3-1 | 013-0107-06 | | 9139 | 1 | .TIP,PROBE:MINIATURE/COMPACT SIZE RETRACTABLE HOOK ASSY | 80009 | 013-0107-06 |
| | 013-0107-07 | 9140 | | 1 | .TIP,PROBE:MINIATURE/COMPACT SIZE | 80009 | 013-0107-07 |
| -2 | 206-0405-00 | | | 1 | .PROBE HEAD ASSY:<br>(STANDARD ONLY) | 80009 | 206-0405-00 |
| | 206-0405-00 | | | 1 | .PROBE HEAD ASSY:<br>(OPTION 03 ONLY) | 80009 | 206-0405-00 |
| -3 | ------- -------- | | | 1 | CONTACT,TIP:SIGNAL<br>..(SEE OPTIONAL ACCESSORIES) | | |
| -4 | 174-0395-00 | | | 1 | CABLE ASSY,RF:50 OHM COAX,2.0m,SMOKE TAN<br>(STANDARD ONLY) | 80009 | 174-0395-00 |
| | 174-0396-00 | | | 1 | CABLE ASSY,RF:39 OHM COAX, 3.0M,SLATE GRAY<br>(OPTION 03 ONLY) | 80009 | 174-0396-00 |
| | | | | | STANDARD ACCESSORIES | | |
| -5 | 003-1433-00 | | | 1 | SCREWDRIVER:ADJUSTMENT TOOL,METAL TIP | 80009 | 003-1433-00 |
| -6 | 196-3120-00 | | | 1 | LEAD,ELECTRICAL:23 AWG,6.0 L,GROUND | 80009 | 196-3120-00 |
| -7 | -------- ------- | | | 2 | BAND,MARKER:0.371 DIA,WHITE,PLASTIC | | |
| | ------- -------- | | | 2 | BAND,MARKER:0.371 DIA,YELLOW,PLASTIC | | |
| | ------- -------- | | | 2 | BAND,MARKER:0.371 DIA,RED ,PLSTC | | |
| | ------- -------- | | | 2 | BAND,MARKER:0.371 DIA,GREEN,PLSTC<br>(SEE OPTIONAL ACCESSORIES) | | |
| -8 | ------- -------- | | | 1 | TIP,PROBE:IC TEST<br>(SEE OPTIONAL ACCESSORIES) | | |
| | 070-7432-00 | | | 1 | MANUAL,TECH:INSTRUCTION,P6119 | 80009 | 070-7432-00 |
| | | | | | OPTIONAL ACCESSORIES | | |
| -9 | 015-0325-00 | | | 1 | ADAPTER,PROBE:PROBE TO CONNECTOR PINS | 80009 | 015-0325-00 |
| -10 | 013-0084-00 | | | 1 | ADAPTER,CONN:BNC TO PROBE | 80009 | 013-0084-00 |
| -11 | 017-0088-00 | | | 1 | CONN,PLUG,ELEC:50 OHM,GR | 80009 | 017-0088-00 |
| -12 | 013-0085-00 | | | 1 | TIP,PROBE:GROUNDING | 80009 | 013-0085-00 |
| -13 | 196-3121-00 | | | 1 | LEAD,ELECTRICAL:23 AWG,12.0 L | 80009 | 196-3121-00 |
| | 015-0201-07 | | | 1 | TIP,PROBE:IC TEST,PKG OF 10 | 80009 | 015-0201-07 |
| | 015-0201-08 | | | 1 | TIP,PROBE:IC TEST,PKG OF 100 | 80009 | 015-0201-08 |
| | 016-0633-00 | | | 1 | MARKER SET,CA:2 EA VARIOUS COLORS | 80009 | 016-0633-00 |
| | 131-3723-03 | | | 1 | CONTACT,TIP:SIGNAL,CU BE,SET OF 5 | 80009 | 131-3723-03 |
| | 003-1433-01 | | | 1 | SCREWDRIVER:ADJUSTMENT TOOL,PKG OF 5 | 80009 | 003-1433-01 |

## CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer | Address | City, State, Zip Code |
|---|---|---|---|
| 24931 | SPECIALITY CONNECTOR CO INC | 2100 EARLYWOOD DR, PO BOX 547 | FRANKLIN 46131 |
| 80009 | TEKTRONIX INC | 14150 SW KARL BRAUN DR<br>PO BOX 500 | BEAVERTON OR 97077-0001 |