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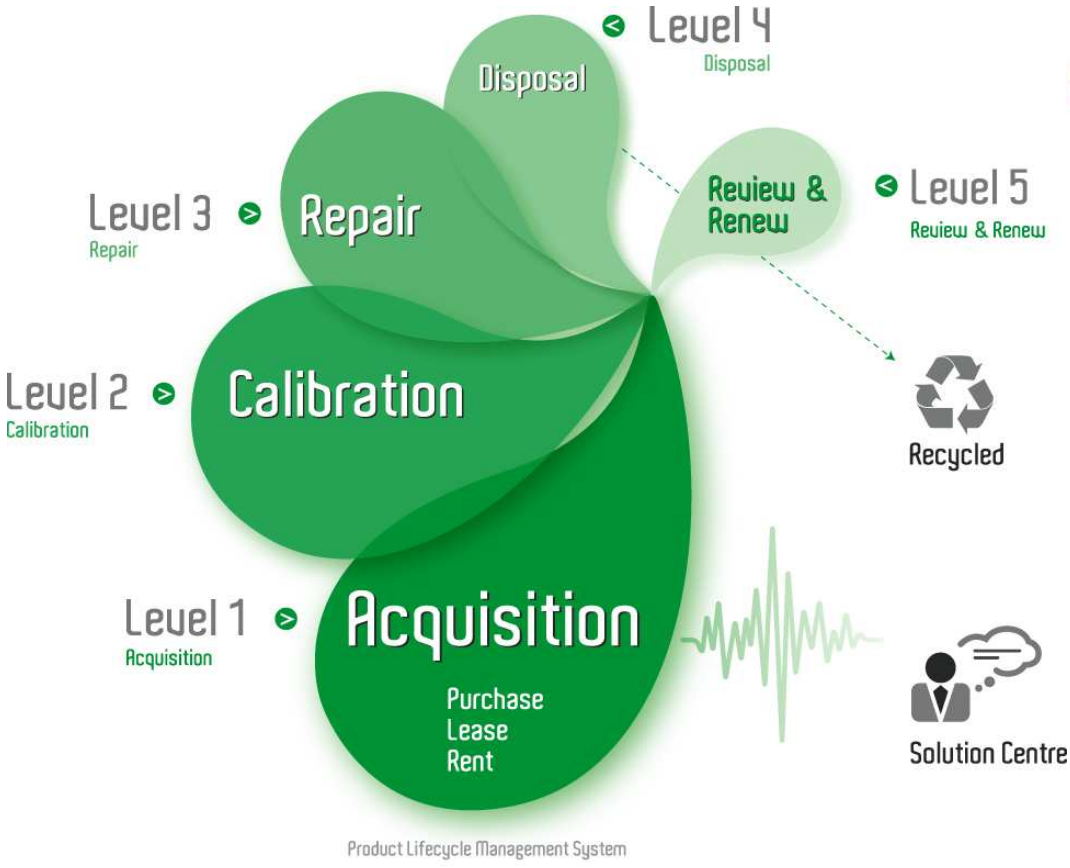

Instructions

Tektronix

P6158
20X 1 kΩ Low Capacitance Probe
For 50 Ohm Oscilloscopes

071-0123-00

Printed in the U.S.A.

Tektronix, Inc., P.O. Box 1000, Wilsonville, OR 97070–1000

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

To Avoid Fire or Personal Injury

Connect and Disconnect Properly. Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground from the circuit under test before disconnecting the probe from the measurement instrument.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Connect the ground lead of the probe to earth ground only.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols on the Product. The following symbols may appear on the product:

CAUTION
Refer to Manual

Protective Ground
(Earth) Terminal

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations. http://www.tek.com
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000

Features and Accessories

The P6158 probe is a DC to 3 GHz, 20X, low capacitance probe. (This type of probe is also known as a voltage divider probe or low impedance Z_0 probe.) The P6158 probe is designed for use with wide-band oscilloscope amplifiers that have 50 Ω inputs. For compatible oscilloscopes, the BNC connector has TekProbe Level I encoding so that the oscilloscope will display the correct 20X scale factor.

The P6158 probe is fully compatible with the Tektronix family of 3.5 mm compact probe accessories.

Table 1 illustrates the features and accessories of the P6158 probe.

Table 1: Features and accessories

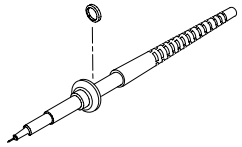
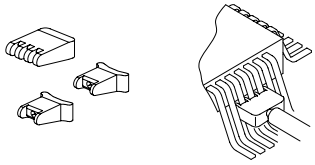
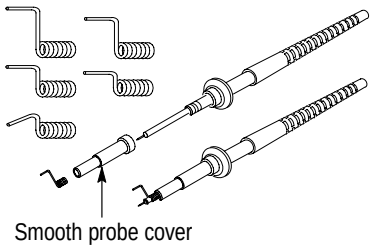
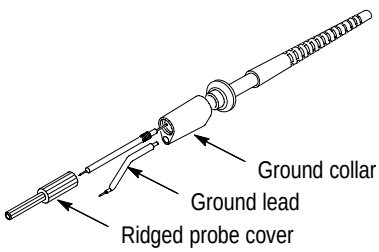
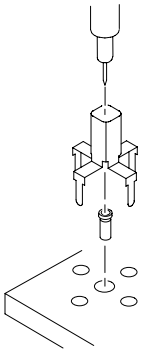
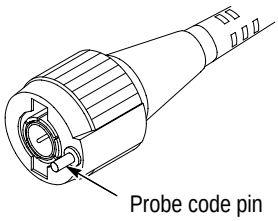
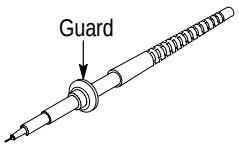
Feature/Accessory	Description	Applications/Notes
	Marker band set	Identifies each probe head with its respective input connection.
	SureFoot probe tip set	Provides fault-free probing of SMD packages that have lead spacings of 0.50 mm/20 mil (red), 0.65 mm/25 mil (blue), or 50 mil (orange).
	Ground contact kit	Connects the probe ground close to the signal source. Select the appropriate size ground spring depending on how close the reference is to the signal source. The short lead length minimizes inductance that can cause signal aberrations at high frequencies. To install, slip the smooth probe cover over the probe tip and slide it firmly onto the probe head. Twist the ground spring onto the probe tip.
	Ground lead	Connects the probe ground to a ground reference close to the signal source. Because of the longer length, this method may allow more aberrations than the ground springs. To install, slip the ground collar onto the probe head then screw the ridged probe cover down over the probe tip. Insert the socket end of the ground lead into the hole of the ground collar.

Table 1: Features and accessories (cont.)

Feature/Accessory	Description	Applications/Notes
	Probe tip to circuit board connector	Allows the probe connection to be integrated into the circuit board design. This method provides the highest quality connection to a signal. To order additional quantities, see page 10.
	Probe code pin	Communicates the correct scale factor to oscilloscopes with the compatible firmware (TekProbe I).
	Guard	Keeps fingers away from the probe tip for protection against electric shock.

WARNING. *To avoid electric shock when using the probe, keep fingers behind the guard on the probe body.*

Operating Basics

For the best results, make the proper input and output connections to the probe and use the probe within the specified input ratings.

50 Ω Input Oscilloscopes

The P6158 probe connects directly onto the input of 50 Ω wide-band oscilloscope; no other adapter or terminator is necessary. The probe code pin on the probe output communicates the correct scale factor for display on instruments with compatible firmware (TekProbe I).

NOTE. *Degradation of system performance can result if you attempt to adapt the probe to 1 MΩ inputs or employ some means of capacitive (AC) coupling.*

Maximum Input Voltage

Estimate the RMS voltage of a pulse signal before measurement. The combination of pulse width, duty factor, and DC level determine the RMS signal voltage.

The P6158 probe can measure peak voltages up to 150 volts as long as the duty factor, pulse width, and RMS equivalent do not exceed the ratings listed in the *Specifications* section. See page 5.

Probe Tip Connections

To minimize inductive effects that cause ringing at high frequencies, keep all signal and ground contacts as short as possible (see Figure 1). Accessories are included with the probe that provide convenient means to make short connections (see page 1).

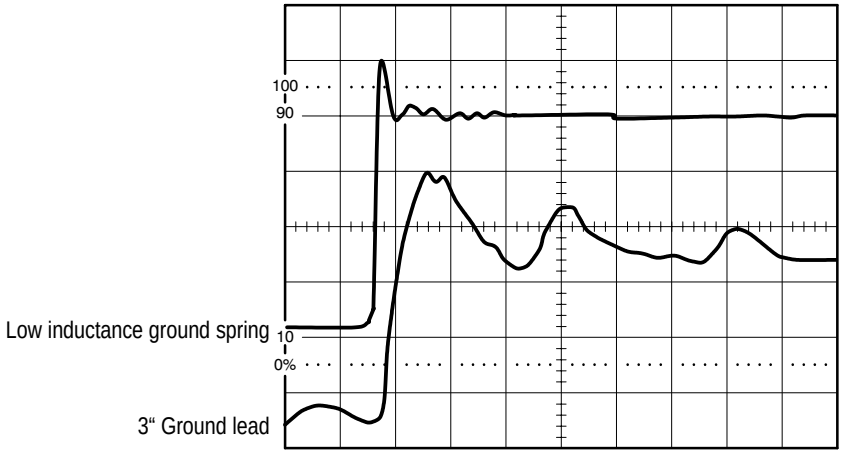


Figure 1: Ground lead effects

Specifications

The specifications in Table 2 apply when the P6158 probe is operated in an environment that does not exceed the limits described in Table 3 on page 7. Table 4 lists the physical characteristics of the P6158 probe.

Table 2: P6158 specifications

Specifications	Description
Attenuation, typical[1,2,3]	÷ 20 (–26 dB)
Input resistance, typical[1,2,5]	1000 Ω at DC
Input capacitance, typical[1,2,5]	1.5 pF
Maximum continuous nondestructive input voltage	22 V_{RMS}
Maximum peak nondestructive input voltage	150 V_{peak} 2% duty factor returning to 0V, 5 μs maximum pulse width
Probe bandwidth, typical[3,4]	DC to 3 GHz
Rise time, typical[4]	< 100 ps
Signal delay, typical	5.0 ns

1 **System characteristic**

2 **Oscilloscope input 50 Ω ±1%**

3 **See Figure 2**

4 **Probe only, driven from a 25 Ω source (use 013-0227-00, 50 Ω adapter)**

5 **See Figure 3**

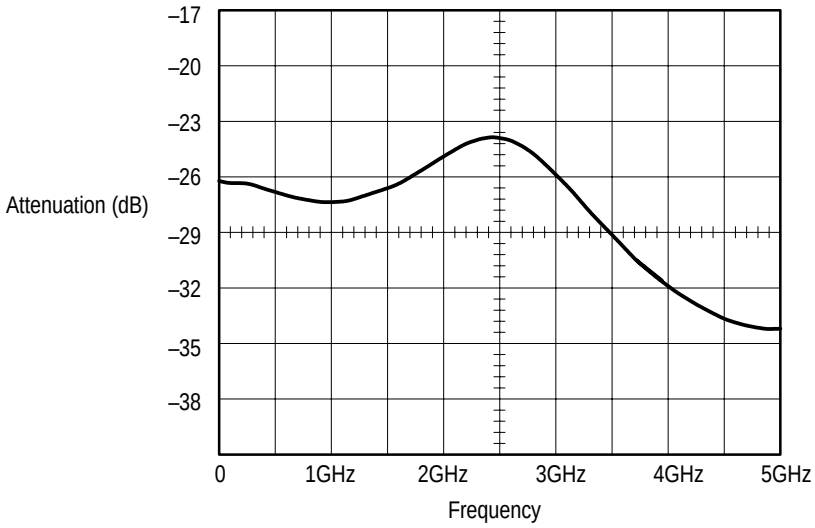


Figure 2: P6158 attenuation vs frequency

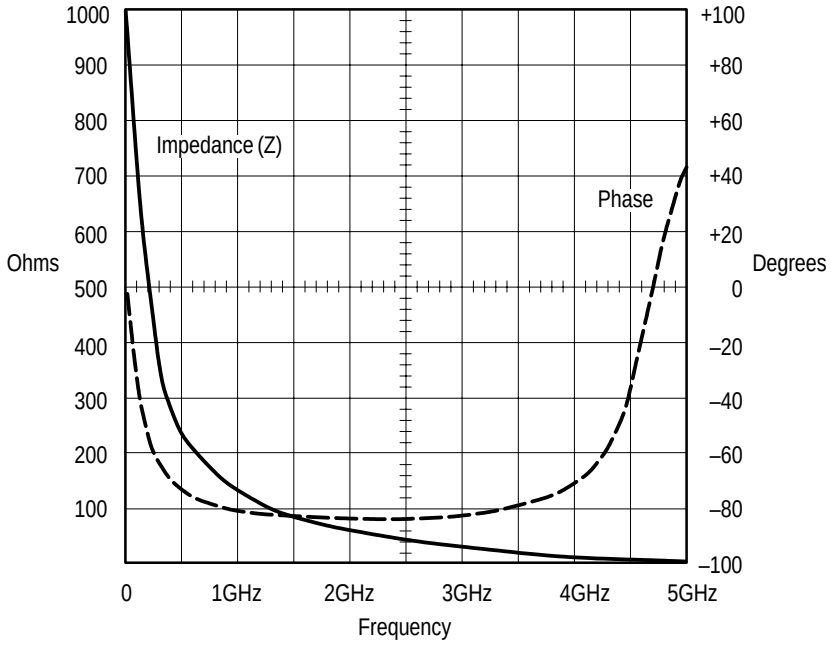


Figure 3: P6158 Input impedance and phase

Table 3: Environmental characteristics

Characteristic	Description
Temperature range	
operating[1]	–15° C to +55° C (+5° F to +131° F)
nonoperating[1]	–62° C to +85° C (–80° F to +185° F)
Humidity, operating[1]	Five cycles (120 hr) at 95% to 97% relative humidity 30° C to 55° C

1 **This environmental exposure is more severe than that stated in MIL-T-28800E for Class 3 Equipment.**

Table 4: Physical characteristics

Characteristic	Description
Length	1.2 m (4.0 ft.)
Net weight	< 64 g (0.14 lb) including standard accessories
Accessory compatibility	Accommodates all 3.5 mm “compact” probe accessories
SureFoot adapter lead pitch spacings	0.50 mm/20 mil (red), 0.65 mm/25 mil (blue), 50 mil (orange)

Replaceable Parts

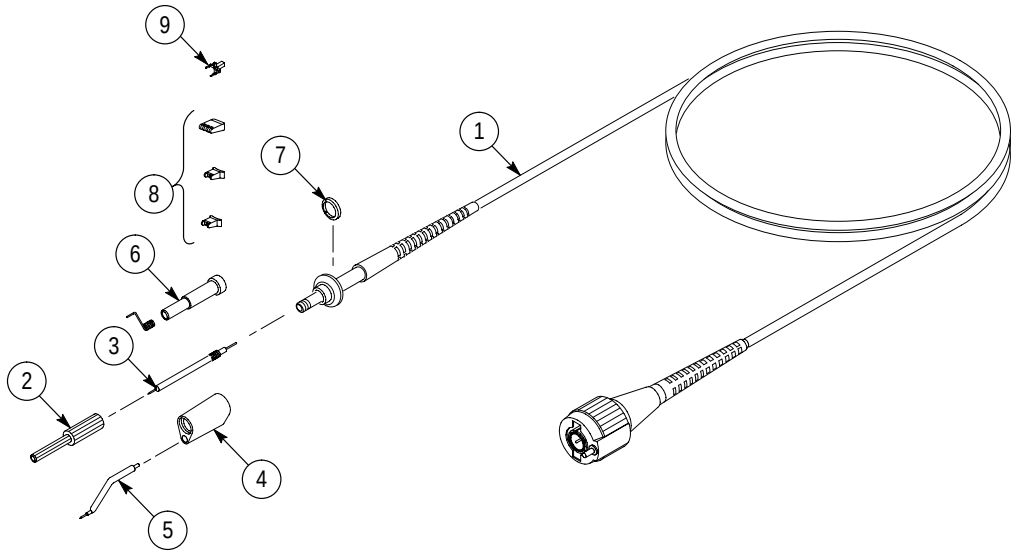


Figure 4: P6158 probe and accessories

Replaceable parts

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
4–1	174–3889–00			1	CA,ASSY:COAXIAL,P6158	80009	174–3889–00
–2	204–1049–00			1	BODY SHELL:TIP COVER	80009	204–1049–00
–3	206–0381–00			1	PROBE TIP ASSY:20X	80009	206–0381–00
					STANDARD ACCESSORIES		
	020–2232–00			1	ACCESSORY KIT, P6158 (includes Figures 4–4, through 4–9)	80009	020–2232–00
–4	343–1003–01			1	COLLAR,GND	80009	343–1003–01
–5	195–4240–00			1	LEAD,ELECTRICAL:0.025 DIA,COPPER,2.3 L	80009	195–4240–00
–6	016–1077–00			1	ACCESSORY KIT:GND TIP CONTACT,PKG OF 2 EAOF 5 LENGHTS W/COVER SHELL	80009	016–1077–00
–7	016–0633–00			1	MARKER SET,CA:2 EA VARIOUS COLORS	80009	016–0633–00
–8	See Optional Accessories			1	ADAPTER,SMD KIT 2 EA 0.50 mm/20 mil (red), 0.65 mm/25 mil (blue), and 50 mil (orange)	80009	See Optional Accessories
–9	See Optional Accessories			2	ACCESSORY PKG:PROBE TO CIRCUIT BOARD ADAPTER,PKG OF 2	80009	See Optional Accessories
	071–0123–00			1	MANUAL,TECH:INSTRUCTION,P6158,DP	80009	071–0123–00

Replaceable parts (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
					OPTIONAL ACCESSORIES		
4–8	SF201A			12	INSULATOR: ADAPTER, SMD, ORANGE, 50 MIL	80009	SF201A
	SF202A			12	INSULATOR: ADAPTER, SMD, BLUE, 0.65 mm/25 mil	80009	SF202A
	SF203A			12	INSULATOR: ADAPTER, SMD, RED, 0.50 mm/20 mil	80009	SF203A
–9	131–5031–00			1	CONNECTOR,PROBE:PKG OF 25,COMPACT	80009	131–5031–00
	131–4244–00			1	CONNECTOR,PROBE:PKG OF 100,COMPACT	80009	131–4244–00

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077–0001