

TPP0502 500 MHz 2X Passive Probe Instructions

Revision A

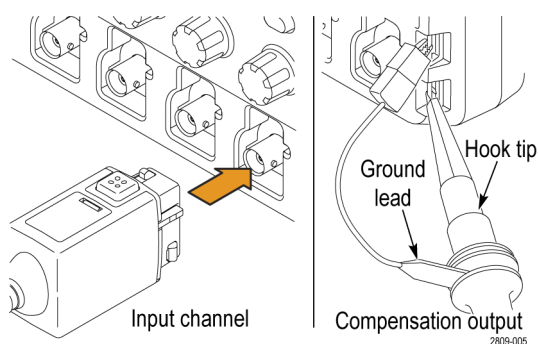


071-2883-03

Operating information

The TPP0502 2X Passive Probe is a high impedance probe with 2X attenuation that is designed for use with Tektronix FlexChannel™ and MDO3000, MDO/MSO/DPO4000B, MSO/DPO5000 series ground-referenced oscilloscopes.

Connect the probe as shown in the illustrations below.



Compensating the probe

You should compensate the probe after you attach it to an oscilloscope for the first time, or after you have changed the probe tip cartridge.

1. Connect the probe to an oscilloscope channel.
2. Connect the probe tip and ground to the probe compensation terminals on the oscilloscope.

NOTE. When using the MMCX tip (206-0666-xx), the following part numbers are required to connect the tip to the Probe Comp connections: 131-9717-xx (1), 196-3434-xx (1), and 206-0569-xx (2). See *Connecting the MMCX tip to the oscilloscope Probe Comp*.

3. On FlexChannel™ instruments:
 - a. Double tap the Channel Badge for the connected probe.
 - b. Select the Probe Setup.
 - c. Select Compensate Probe.
 - d. Select Compensate Probe in the pop up window.
4. On MSO/DPO5000 instruments:
 - a. Select Vertical > Probe Cal....
 - b. Select the tab of the channel for the connected probe.
 - c. In the Calibration section, click Calibrate Probe.

5. On MDO3000 and MDO/MSO/DPO4000B instruments:

- Press the Channel Menu front panel button for the channel that you connected the probe to.
- Push the More button until Probe Setup is selected.
- Push the Calibrate Probe button and follow the on-screen instructions.

If the probe compensation fails, verify that the signal and ground connections are secure at the Probe Comp connections. Also check that the ground connection is secure at the probe head, the rigid, MMCX or pogo tip is secured tightly in the probe head, and the hook tip is securely connected to the tip.

Standard accessories

WARNING. To avoid electric shock when using the probe or accessories, keep fingers behind the finger guard of probe body and accessories.

Item	Description
2809-009	Probe tips – pogo (white) and rigid (gray) The white pogo tip is pre-installed on the probe, and is spring-loaded for compliant testing of circuit boards. Reorder Tektronix part numbers: 206-0610-xx (rigid tip) 206-0611-xx (pogo tip)
2809-010	Insulator sleeve Unscrew this sleeve to replace the probe tips. Reorder Tektronix part number 342-1194-xx
2809-011	Hook tip Press the hook tip onto the probe tip and then clamp the hook onto the circuit. Rating: 300 V CAT II Reorder Tektronix part number 013-0362-xx
2809-006	Micro hook tip Use this tip to access test points in tight spaces. Press the hook tip onto the probe tip and then extend the pincers around the circuit. Rating: 300 V CAT II Reorder Tektronix part number 013-0363-xx
2809-007	Universal IC cap Use this cap to prevent shorting the probe tip between IC pins. Press the cap on the probe tip until it snaps on, and then spin the cap to expose the probe tip toward the IC lead. Reorder Tektronix part number 013-0366-xx
2809-012	Ground springs To limit aberrations on high frequency signals caused by ground path inductance, bend the spring to reach nearby ground connections (<0.75 in, long; <0.25 in, short). WARNING. Do not use on circuits that exceed 30 V _{RMS} Reorder Tektronix part numbers: 016-2028-xx (long, 2 ea.) 016-2034-xx (short, 2 ea.)
2809-013	Ground lead, with alligator clip Secure the lead to the probe head ground and then to your circuit ground. Reorder Tektronix part number 196-3521-xx
2809-014	Color bands Use these bands to identify the oscilloscope channel at the probe head. Reorder Tektronix part number 016-0633-xx (5 pairs)

Optional accessories

NOTE. The accessories shown below are available for the probes and are rated ≤30 V unless indicated otherwise.

Accessory	Part number
MMCX probe tip (gold) ¹	206-0666-xx
MMCX to 0.1-inch (2.54 mm) square pin adapter (blue), 0.025-inch (0.635 mm) sq. pins	131-9717-xx
MMCX to 0.062 inch (1.57 mm) square pin adapter (white), 0.016 - 0.018 inch (0.4 - 0.46 mm) sq. pins	131-9677-xx
Electrical Y-Lead	196-3434-xx
MicroCKT Test Tip	206-0569-xx
BNC to Tip Adapter, Underterminated	013-0367-xx
Circuit Board Test Point/PCB Adapter	016-2016-xx
Chassis-Mount Probe Test Jack	131-4210-xx
6" Clip-on Ground Lead	196-3198-xx
12" Alligator Ground Lead	196-3512-xx
Wire, spool, 32 AWG	020-3045-xx
DUT Interface pin kit with (qty. 20) 0.018 inch (0.46 mm) round solder-in pins	020-3169-xx
Probe tip tripod support with living hinge, 2 each ²	352-1170-xx
Solder aid for 0.062-inch (1.57 mm) pitch square pins, 0.016 - 0.018-inch (0.4 - 0.46 mm) sq. pins	003-1946-xx

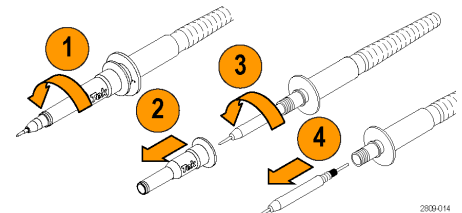
¹ See *Connecting the MMCX tip to the oscilloscope Probe Comp* for connection instructions.

² The tripod probe tip support is pictured with the probe tip and adapter attached.

Interchanging the probe tip

Only use tips with the light red-colored tail section for the TPP0502 probe; other tips will degrade performance.

WARNING. To reduce the risk of shock, disconnect the probe before changing the probe tips.



For optimal performance, do a probe compensation after the tip has been replaced.

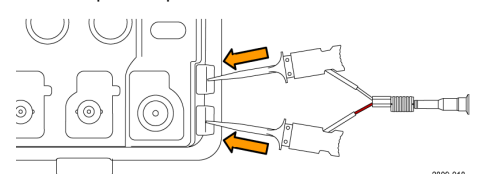
Connecting the MMCX tip to the oscilloscope Probe Comp

WARNING. To reduce the risk of shock, disconnect the probe before connecting accessories.

Item	Description
2809-015	Connect the MMCX tip to adapter ¹ The MMCX adapter (131-9717-xx) snaps onto the MMCX tip.
2809-016	Connect the Y-lead to MMCX adapter ¹ Push the Y-lead (196-3434-xx) adapter into the MMCX adapter until it is seated. The signal input (red) connects to the center of the MMCX adapter.
2809-017	Connect the MicroCKT test tips to Y-lead Push the Y-lead into the handles of the MicroCKT test tips (206-0569-xx).

Connect the MicroCKT test tips to Probe Comp terminals

Attach the two MicroCKT test tips to the Probe Comp terminals on the oscilloscope front panel.



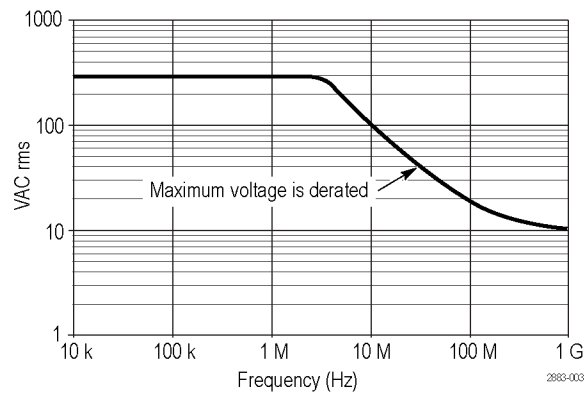
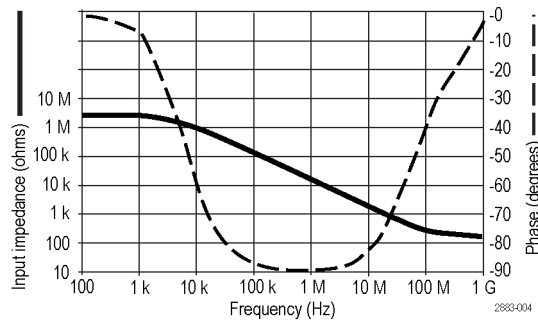
¹ MMCX tip, adapter, and Y-lead is limited to 30 vrms, 42 Vpk, 60 VDC, and OVT <500 Vpk.

Electrical and mechanical specifications

Bandwidth (-3 dB)	500 MHz
System rise time (typical)	<700 ps
System input capacitance	Rigid tip: 12.7 pF Pogo pin tip: 13.6 pF MMCX tip: 13.0 pF
System attenuation accuracy	2:1 ±2.2%
System input resistance @DC	2 MΩ ±2%
Propagation delay	~5.7 ns
Maximum input voltage	300 V _{RMS} CAT II ¹
Cable length	1.3 m
Weight (includes accessories and packaging)	<454 gm (1.0 lb)

¹ MMCX tip, adapter, and Y-lead is limited to 30 vrms, 42 Vpk, 60 VDC, and OVT <500 Vpk.

Performance graphs




Environmental specifications

Characteristics	Description
Temperature	
Operating	-15 °C to +65 °C (+5 °F to +149 °F)
Nonoperating	-62 °C to +85 °C (-80 °F to +185 °F)
Humidity	
Operating	5% to 95% relative humidity (%RH) up to +30 °C, 5% to 75% RH above +30 °C up to +65 °C. Noncondensing.
Nonoperating	5% to 45% RH above +65 °C up to +85 °C. Noncondensing.

Characteristics	Description
Altitude	
Operating	3.0 km (10,000 ft) maximum
Nonoperating	12.2 km (40,000 ft) maximum

Certifications and compliances

Characteristics	Description
EU Directives	Compliance was demonstrated to the following specification as listed in the Official Journal of the European Communities: Low Voltage Directive 2014/35/EU: EN61010-031/A1: 2008 RoHS Directive 2011/65/EU
Measurement Category	CAT III: Distribution-level mains, fixed installation
Product Examples	CAT II: Local-level mains, appliances, portable equipment CAT I: Circuits not directly connected to mains.
Pollution Degree 2	Do not operate in environments where conductive pollutants may be present (as defined in IEC 61010-1). Rated for indoor use only.
Additional Safety Standards	UL61010-031;2010 CAN/CSA C22.2 No. 61010-031:07/A1:2010 IEC61010-031; IEC 61010-031/A1:2008
	Equipment Recycling. This product complies with the European Union's requirements according to Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). For more information about recycling options, check the Support/Service section of the Tektronix Web site (www.tek.com/productrecycling).

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. Using the probe or accessories in a manner not specified could result in a shock or fire hazard. This product is intended for use by professionals and trained personnel only; it is not designed for use in households or by children.

To avoid fire or personal injury

Ground-Referenced Oscilloscope Use. Do not float the reference lead of this probe when using with ground referenced oscilloscopes (for example, DPO, MSO, and TDS series oscilloscopes). The reference lead must be connected to earth potential (0 V).

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 reference lead from the circuit under test before disconnecting the probe from the measurement instrument.

Avoid Electric Shock. To avoid injury or loss of life, do not connect or disconnect probes or test leads while they are connected to a voltage source.

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.

Avoid Electric Shock. When using probe accessories, never exceed the lowest rating of the probe or its accessory, whichever is less, including the measurement category and voltage rating.

Avoid Electric Overload. To avoid injury or fire hazard, do not apply potential to any input, including the reference inputs, that varies from ground by more than the maximum rating for that input.

Avoid Exposed Circuitry and Do Not Operate Without Covers. Do not touch exposed connections and components when power is present.

Inspect The Probe and Accessories. Before each use, inspect probe and accessories for damage (cuts, tears, defects in the probe body, accessories, cable jacket, etc.). Do not use if damaged.


Do Not Operate in Wet/Damp Conditions.


Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Safety Terms and Symbols 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. These symbols may appear on the product:



Contacting Tektronix

Web site: www.tek.com
Phone: 1-800-833-9200
Address: Tektronix, Inc.
Department or name (if known)
14200 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077 USA
Email: techsupport@tektronix.com

Warranty information

For warranty information, go to <http://www.tek.com/warranty>.