

# TriMode™ Probe Family

## P7500 Series Data Sheet



P7520 with optional P75PDPM

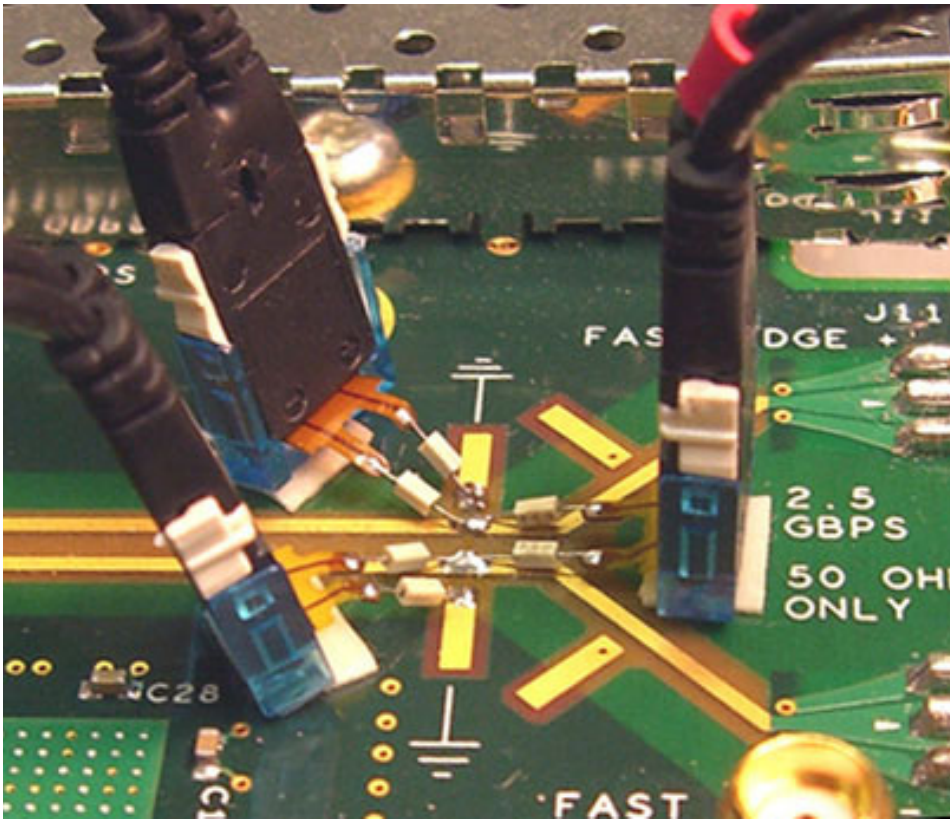
### Features & Benefits

- **TriMode™ Probe** – One Setup, Three Measurements without Adjusting Probe Tip Connections
  - Differential
  - Single Ended
  - Common Mode (Requires only one probe vs. conventional probing techniques)

- **Signal Fidelity**
  - 20 GHz P7520
  - 16 GHz P7516
  - 13 GHz P7513A
  - 8 GHz P7508
  - 6 GHz P7506
  - 4 GHz P7504
- **Versatile Connectivity – Solder Down, Handheld, Fixtured**
  - Variety of Solder-down Options
    - TriMode™ Solder Tips
    - Small Form Factor for High-density Probing
    - Bandwidth Choices from 4 to 20 GHz
    - 1.5 m Extension Cable for High-temperature Probing
    - Quickly and Reliably Connect to Multiple Probe Tips
  - Precision Differential Probing Module – Optional Handheld and Fixtured Probing
    - Small Precision Tapered Tips, an Articulated Joint for Compliance, and Variable Tip Spacing
- **TekConnect® Interface** – TekConnect Scope/Probe Control and Usability
  - Direct Control from Probe Compensation Box or from Scope Menu
  - Automated Measurement Control through the TekConnect® Interface to Connect to Tektronix Real-time Oscilloscopes
  - View TriMode/Attenuation Settings on Probe Compensation Box from Top or End Panel

### Applications

- Examples Include, but are Not Limited To:
  - PCI Express II, Serial ATA III, DDR2, DDR3, QPI, XAUI



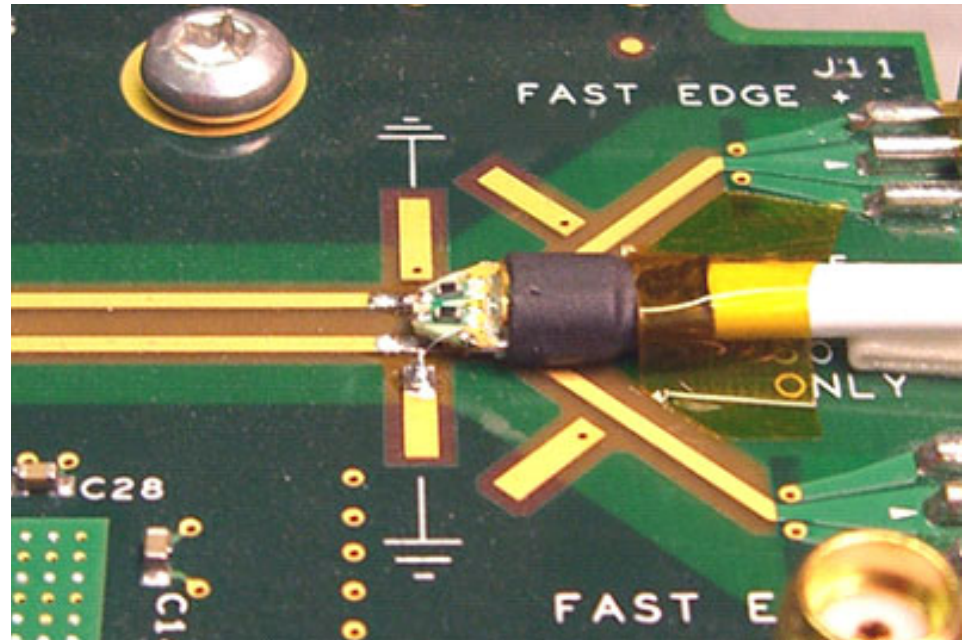
**Before TriMode:** 1 Probe for Differential; 2 Probes for SE and Common Mode; or 1 Probe Soldered and Resoldered 3 times; 2 Probes for Common Mode.

## TriMode™ Probing, Connectivity, and Performance

### TriMode™ Probing Architecture

One-probe setup makes differential, single ended, and common mode measurements accurately and definitively.

Tektronix is a known leader when it comes to signal fidelity and signal acquisition. Building on our history of market-leading innovations in probing,



**After TriMode (P75TLRST):** 1 Probe for Differential, Single Ended, and Common Mode, with only 1 setup required.

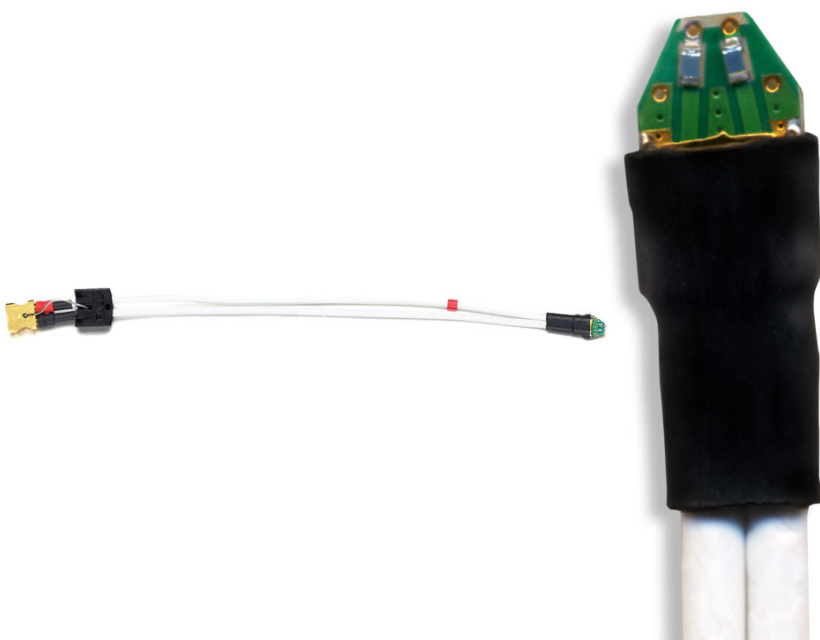
we invented a revolutionary probing architecture called “TriMode™ Probing” that defines the next-generation industry benchmark for usability and signal fidelity. This architecture changes the rules of probing and allows you to work more effectively and efficiently. By enabling unique functionality, the P7500 Series TriMode probes allow you to switch between differential, single ended, and common mode measurements without moving the probe from its connection points.

Improved productivity is achieved by reducing setup time. One setup can be used to make the three different types of measurements all with the press of a button. The TriMode Probe architecture for the P7500 Series probes continues the Tektronix tradition of high-bandwidth and low-DUT loading while providing improved connectivity and value.

## Connectivity Plus – Solder Down – Handheld – Fixtured

The P7500 Series TriMode probe architecture offers various levels of connectivity and provides the highest probe fidelity available for real-time oscilloscopes. The multipoint connectivity solutions of the P7500 Series include:

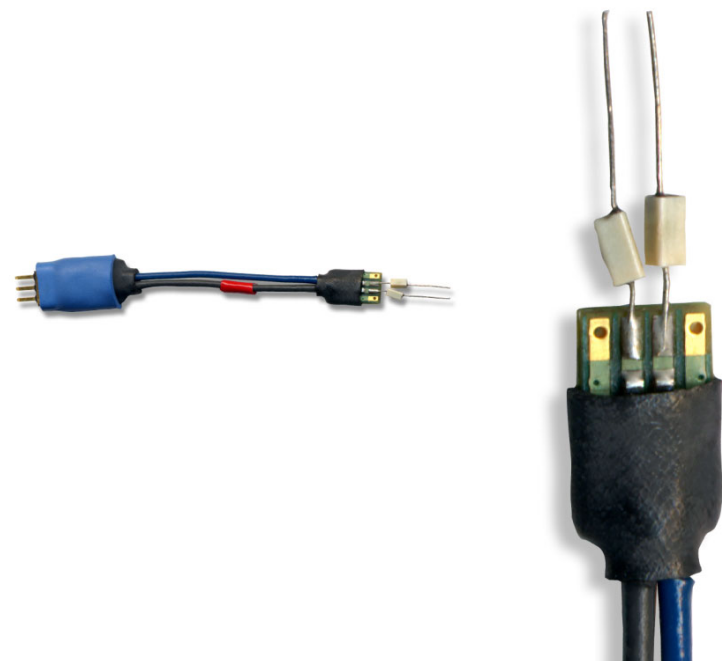
- **TriMode Long-reach Solder Tip** The highest-performance solder tip with a long reach and very small, low-profile form factor.
- **TriMode Extended-resistor Solder Tip** Medium-performance solder tip with long easy-to-solder tip resistors.



- **TriMode Resistor Solder Tip** High-performance solder tip with easy-to-solder tip resistors.

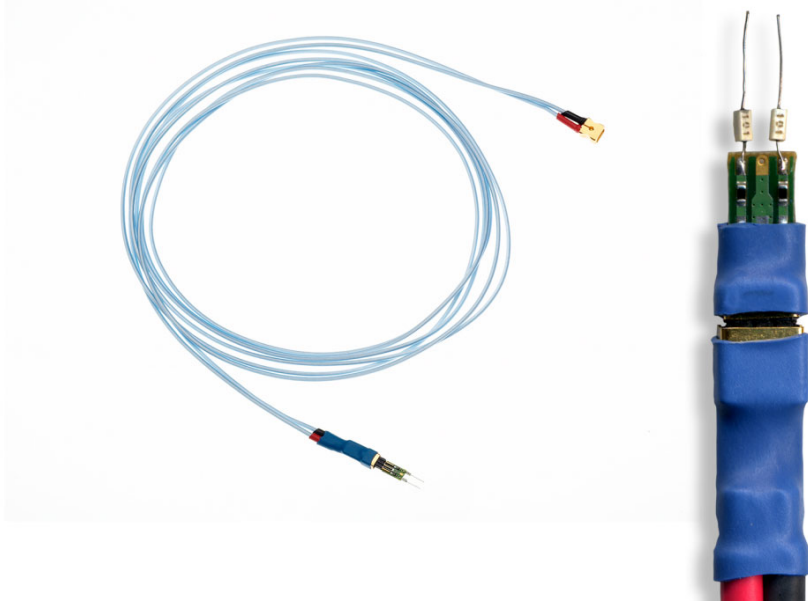


- **TriMode Micro-coax Tip** Low-cost, quick-connect solder tips.

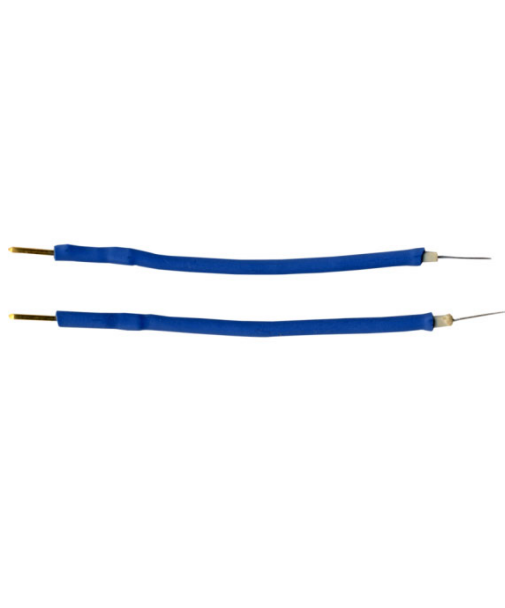


## Data Sheet

- **TriMode High-temperature Tip** When used with the 1.5 m Socket Cable XL, this tip can be used in environments from  $-55\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ .



- **Damped Wire Tip** Low-cost solder tips ideal for high-density probing.



- **Precision Differential Probing Module** High-performance handheld probing module.



Handheld and fixtured probing needs are met using the optional **Precision Differential Probing Module (P75PDPM)**. Its small precision tapered tips, variable articulation of the probe tip, and quick-adjusting variable tip spacing provides the needed flexibility for adapting to vias and other test points of differing sizes from 30 mils to 180 mils.

These precision connectivity tools enable you to access multiple signals on anything from convenient test pads to hard-to-reach, high-density circuitry.

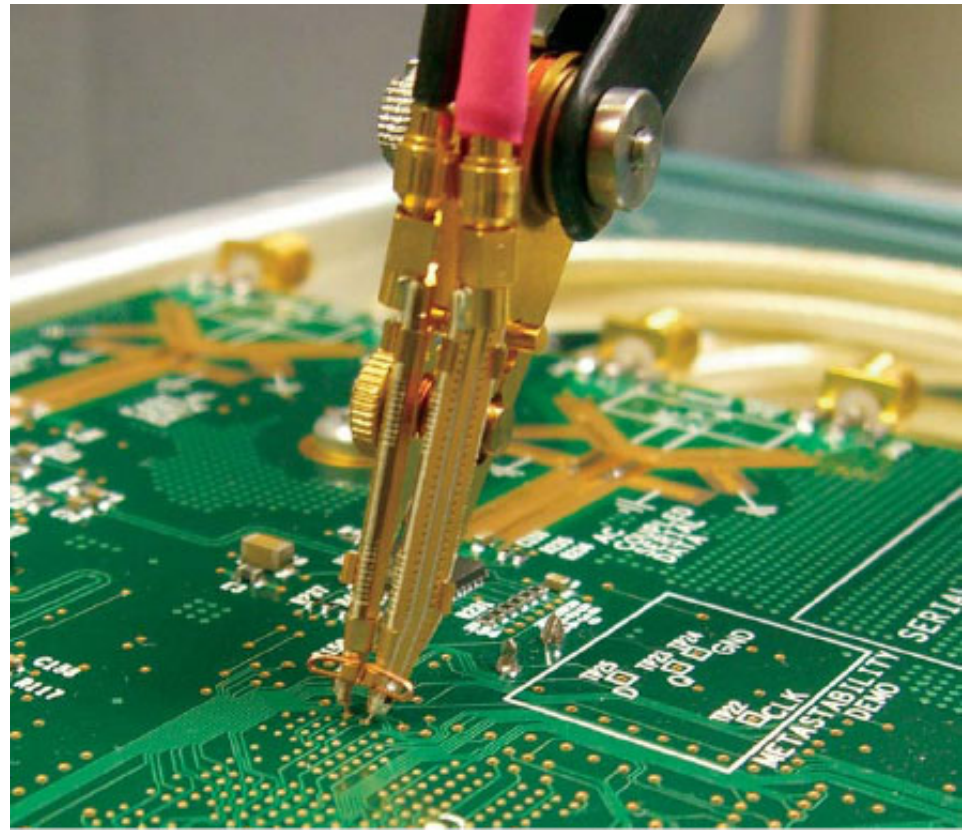
## Signal Fidelity

You can be confident in the signal fidelity of your measurements. The innovative new Tektronix differential architecture, coupled with the superior electrical performance of IBM SiGe Technology, provides the bandwidth and fidelity to meet the industry needs of today as well as tomorrow.

The P7500 Series Probe Architecture provides:

- Highest bandwidth available >20 GHz
- Excellent step response
- Low-DUT loading
- High CMRR
- Differential, single ended, or common mode measurements using one probe

## Characteristics



P7500 with P75PDPM

TriMode Probe Architecture	P7520	P7516	P7513A	P7508	P7506	P7504
Bandwidth (Typical)	>20 GHz, A-B mode >18 GHz, P75PDPM, other modes	>16 GHz	>13 GHz	>8 GHz	>6 GHz	>4 GHz
Rise Time (10-90%) (Typical)	<27 ps, A-B mode <29 ps, other modes	<32 ps	<40 ps	<55 ps	<75 ps	<105 ps
Rise Time (20-80%) (Typical)	<18 ps, A-B mode <20 ps, other modes	<24 ps	<28 ps	<35 ps	<50 ps	<70 ps
Attenuation (User Selectable)	5X or 12.5X	5X or 12.5X	5X or 12.5X	5X or 12.5X	5X or 12.5X	5X or 12.5X
Differential Input Range	±0.625 V (5X) ±1.6 V (12.5X)	±0.75 V (5X) ±1.75 V (12.5X)	±0.75 V (5X) ±1.75 V (12.5X)	±0.75 V (5X) ±1.75 V (12.5X)	±0.75 V (5X) ±1.75 V (12.5X)	±0.75 V (5X) ±1.75 V (12.5X)
Operating Voltage Window	+3.7 to -2.0 V	+4.0 to -2.0 V	+4.0 to -2.0 V	+4.0 to -2.0 V	+4.0 to -2.0 V	+4.0 to -2.0 V
Offset Voltage Range	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes	+2.5 to -1.5 V, A-B mode +3.4 to -1.8 V, other modes
DC Input Resistance (Differential)	100k ohms	100k ohms	100k ohms	100k ohms	100k ohms	100k ohms
Noise	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)	<33 nV / √Hz (5X) <48 nV / √Hz (12.5X)
CMRR, (Differential Mode)	>60 dB at DC >40 dB at 50 MHz >30 dB at 1 GHz >20 dB at 10 GHz >12 dB at 20 GHz	>60 dB at DC >40 dB at 50 MHz >30 dB to 1 GHz >20 dB to 8 GHz >15 dB to 16 GHz	>60 dB at DC >40 dB at 50 MHz >30 dB to 1 GHz >20 dB to 7 GHz >15 dB to 13 GHz	>60 dB at DC >40 dB at 50 MHz >30 dB at 1 GHz >25 dB at 4 GHz >20 dB at 8 GHz	>60 dB at DC >40 dB at 50 MHz >30 dB at 1 GHz >25 dB at 3 GHz >20 dB at 6 GHz	>60 dB at DC >40 dB at 50 MHz >30 dB at 1 GHz >28 dB at 2 GHz >25 dB at 4 GHz
Nondestructive Input Range	±15 V	±15 V	±15 V	±15 V	±15 V	±15 V
Interface	TekConnect™	TekConnect™	TekConnect™	TekConnect™	TekConnect™	TekConnect™
Cable Length	1 meter	1 meter	1.3 meters	1.3 meters	1.3 meters	1.3 meters

For additional characteristics, refer to the individual probe Technical Reference Manuals.

**Minimum System Requirements / Instrument Compatibility**

P7500 Series TriMode Differential Probes are compatible with the DPO/DSA70000 and TDS6000B/C Series TekConnect Oscilloscopes. The chart below shows recommended probe/oscilloscope model combinations.

Instrument	BW (Scope)	FW Version	Recommended Probe
DPO/DSA72004	20 GHz	V3.0 or higher	P7520
DPO/DSA71604	16 GHz	V3.0 or higher	P7516
DPO/DSA71254	12.5 GHz	V3.0 or higher	P7513A
DPO/DSA70804	8 GHz	V3.0 or higher	P7508
DPO/DSA70604	6 GHz	V3.0 or higher	P7506
DPO/DSA70404	4 GHz	V3.0 or higher	P7504
TDS6000C	12.5 GHz, 15 GHz	V5.1.7	P7516, P7513A
TDS6000B	8 GHz, 6 GHz	V5.1.3	P7508, P7506
80A03 TekConnect Probe Interface		V2.3	All P7500 Series probes
RTPA2A TekConnect Probe Interface		V2.3	All P7500 Series probes

**Ordering Information**

**P7520**

TriMode™ Differential Probe, 20 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**P7516**

TriMode™ Differential Probe, 16 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**P7513A**

TriMode™ Differential Probe, 13 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**P7508**

TriMode™ Differential Probe, 8 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**P7506**

TriMode™ Differential Probe, 6 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**P7504**

TriMode™ Differential Probe, 4 GHz, for TekConnect Interface Oscilloscopes.

**Includes:** See accessories table below.

**User Manual Options**

Opt. L5 – Japanese.

Opt. L7 – Simplified Chinese.

**Service Options**

Option	Description
CA1	A single calibration event or coverage for the designated calibration interval, whichever comes first
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
D1	Calibration Data Report – Ships standard with probe
D3	Calibration Data Report 3 Years (with Option C3)
D5	Calibration Data Report 5 Years (with Option C5)
R3	Repair Service 3 Years
R5	Repair Service 5 Years

**Additional Service Products Available During Warranty (DW) or Post Warranty (PW)**

CA1	A single calibration event or coverage for the designated calibration interval, whichever comes first
R1PW	Repair service coverage 1-year post warranty
R2PW	Repair service coverage 2-year post warranty
R3PW	Repair service coverage 3 years (includes product warranty period). 3-year period starts at time of customer instrument purchase
R5PW	Repair service coverage 5 years (includes product warranty period). 5-year period starts at time of customer instrument purchase

**Standard Accessories**

<b>Description</b>	<b>P7520/P7516</b>	<b>P7513A/P7508</b>	<b>P7506/P7504</b>	<b>Reorder Part Number</b>
The documentation kit contains: Printed Quick Start User Manuals, CD-ROM contains PDFs of basic probe and measurement literature, and the probe manuals (Quick Start User Manual and Technical Reference Manual)	1 each	1 each	1 each	020-2790-xx (English w/ Standard)
				020-2791-xx (Japanese w/ Opt. L5)
				020-2792-xx (Simplified Chinese w/ Opt. L7)
Anti-static Wrist Strap	1 each			006-3415-xx
Certificate of Traceable Calibration	1 each	1 each	1 each	Standard with probe
Data Calibration Report: Lists the manufacturing test results of your probe at the time of shipment and is included with every probe	1 each	1 each	1 each	Standard with probe
DC Probe Calibration Fixture	1 each			067-1821-xx
DC Probe Calibration Fixture		1 each	1 each	067-1967-xx
50 Ω Coax Cable – Male BNC to Male BNC	1 each	1 each	1 each	012-0208-xx
50 Ω Coax Cable – Male SMA to Male SMA	1 each	1 each	1 each	174-1120-xx
P7520/P7516/P7513A/P7508 Accessory Box (See contents listing below 1 through 7)				
1) TriMode Long-reach Solder Tip	2 each	2 each		P75TLRST
2) G3PO Bullet Kit (includes 4 bullets)	1 each			013-0359-xx
3) G3PO Bullet Removal Tool	1 each			003-1896-xx
4) Solder Kit: Solder Spool, Wire Spool	1 each	1 each		020-2754-xx
5) Tape, Adhesive (Strip, 10 each)	1 each	1 each		006-8237-xx
6) Marker Band Set (2 each of 5 colors)	1 each	1 each		016-0633-xx
7) Socket Cable		1 each		020-2954-xx
P7506/P7504 Accessory Box (See contents listing below 1 through 6)				
1) Socket Cable			1 each	020-2954-xx
2) TriMode Micro-coax Tip			4 each	020-2955-xx
3) TriMode High-temperature Tip			2 each	020-2958-xx
4) Solder Kit: Solder Spool, Wire Spool			1 each	020-2754-xx
5) Tape, Adhesive (Strip, 10 each)			1 each	006-8237-xx
6) Marker Band Set (2 each of 5 colors)			1 each	016-0633-xx

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**Optional Tip Accessories**

Description	Part Number
P7500 Series Precision Differential Probing Module P7500 Precision Differential Probing Module Accessory Kit (See 1 through 7 below)	P75PDPM
1) Tip Cable (1 ps matched pair, 1 each)	P75TC
2) Probing Module Tip Probe Tips Replacement Kit 1 Each (Right and left side)	P75PMT
3) Accessory Kit; Ground Spring, Large 4 Each	016-1998-xx
4) Accessory Kit; Ground Spring Small 4 Each	016-1999-xx
5) Handle, Adapter (Probing Module)	367-0545-xx
6) G3PO Separator Tool	003-1897-xx
7) Ground Spring Tool	003-1900-xx
TriMode Resistor Solder Tip	020-2936-xx
TriMode Extended-resistor Solder Tip	020-2944-xx
Resistor Replacement Kit	020-2937-xx
Socket Cable	020-2954-xx
Socket Cable, XL	020-2960-xx
TriMode High-temperature Tip	020-2958-xx
TriMode Micro-coax Tip	020-2955-xx
Damped Wire Tip	020-2959-xx
Nexus Interposer DDR Solder Tip	020-3022-xx
Deskew Fixture	067-1586-xx
Probe Positioner	PPM100
Precision, 3 Position, Probe Positioner	PPM203B
8200 Series TekConnect® Probe Interface	80A03 (FW Version >2.3)
RTSA Series TekConnect® Probe Interface	RTPA2A (FW Version >2.3)



Product(s) are manufactured in ISO registered facilities.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

For other areas contact Tektronix, Inc at: 1 (503) 627-7111

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**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tektronix.com](http://www.tektronix.com)



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