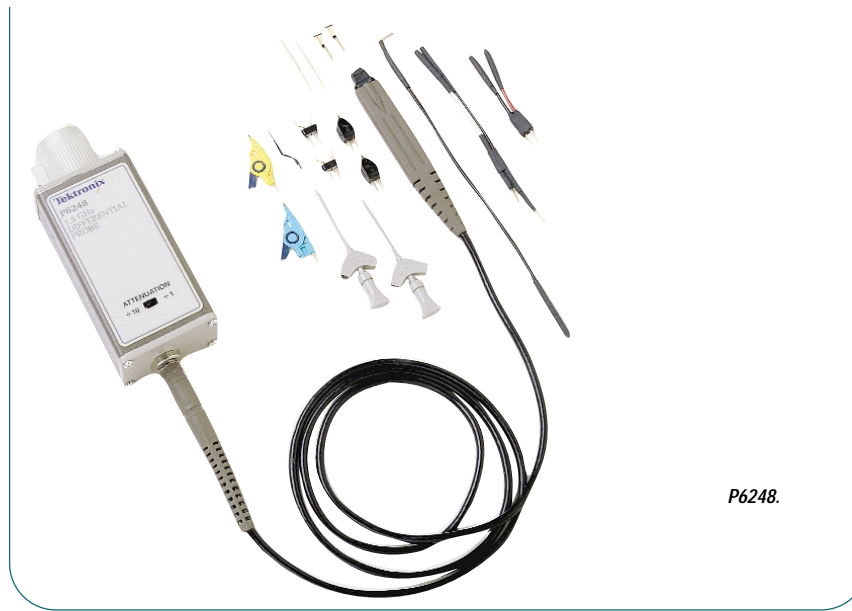


# Differential Probes

► P6248 • P6247 • P6246



P6248.

## The P6246, P6247 and P6248 Differential Probes

The P6248, P6247 and P6246 enable users to make time domain or frequency domain measurements on high bandwidth signals commonly found in disk drive, digital IC design (RAMBUS), and communication applications (Gigabit Ethernet, IEEE 1394 Firewire and Fibre Channel). The P6248 includes accessories that allow RAMBUS via probing and IEEE 1394 interconnect access. The small probe head geometry and assorted probe tip accessories allow these probes to easily accommodate manual probing of surface mount devices while maintaining high CMRR.

The P6246, P6247 and P6248 are ideal for design verification of disk drive read channel electronics and timing analysis for troubleshooting ground bounce problems associated with high speed logic. They can also be used for pulse shape or cross talk compliance testing of high speed communication signals.

### ► Characteristics

#### Bandwidth (guaranteed) –

P6248: DC to 1.5 GHz.

P6247: DC to 1.0 GHz.

P6246: DC to 400 MHz.

#### Rise Time (specified) –

<265 ps (P6248), <350 ps (P6247), <875 ps (P6246).

#### DC Attenuation Accuracy –

±2%.

#### Common Input Voltage Range –

±7.0 V, 1X; ±7.0 V, 10X.

#### Differential Input Voltage Range –

±850 mV, 1X; ±8.5 V, 10X.

#### Max. Nondestruct Input Voltage –

±25 V (DC + peak AC).

#### Electrostatic Immunity – >15 kV.

**TEKPROBE Interface** – Probe power, auto-scaling, auto-termination with TDS scopes.

**Bandwidth Limit** – Switchable, 200 MHz (P6246 & P6247).

**DC Reject** – 0.4 Hz, 1X; 4.0 Hz, 10X (P6246 & P6247).

### ► Features & Benefits

#### P6248

1.7 GHz (Typical Probe Only  
≤27°C) 1X Mode

1.5 GHz Bandwidth  
(Guaranteed)

1.85 GHz (Typical Probe Only  
≤27°C) 10X Mode

#### P6247

> 1.0 GHz Bandwidth  
(Guaranteed)

#### P6246

400 MHz Bandwidth  
(Guaranteed)

### Family Features & Benefits

Low Input Capacitance: <1 pF  
Differential

Probe Input Connector: Two  
Standard 0.025 in./0.63 mm  
(0.1 in. center) Square Pin  
Receptacle (Female)

Electrostatic Discharge Tolerant  
(IEC 801-2)

Connects to TEKPROBE™  
Interface on TDS Series Scope,  
or Other Instruments Using 1103  
TEKPROBE® Power Supply

For Use with Oscilloscopes,  
Spectrum or Network Analyzers

>60 dB (1000:1) Common  
Mode Rejection Ratio (CMRR)

Small Probe Head Allows Easy  
Probing of SMDs

### ► Applications

Communications (Gigabit  
Ethernet, IEEE 1394, Fibre  
Channel)

Semiconductor  
Characterization (RAMBUS)

Disk Drive Read Channel Design

Communication Pulse Shape  
Compliance

Jitter, Cross-Talk, BERT  
Measurements

Location of Ground Bounce

COMPUTING

TELECOM

VIDEO

# Differential Probes

► P6248 • P6247 • P6246

## Typical Specifications

### Input C –

< 1 pF (differential mode),  
< 2 pF (common mode).

### Input R –

200 k $\Omega$  (differential mode),  
100 k $\Omega$  (common mode).

### Linearity – $\pm 2\%$ .

Noise – < 50 nV/ $\sqrt{\text{Hz}}$ .

Harmonic Distortion –  $\leq 1.5\%$  @ 100 MHz.

Passband Ripple – <  $\pm 0.25$  dB.

P6248: DC to 1.5 GHz.  
P6247: DC to 850 MHz.  
P6246: DC to 400 MHz.

### Output Termination –

Terminate into 50  $\Omega$ .

## Physical Characteristics

Weight (probe only) – 160 g (0.36 lb.).

Probe Head Volume – 6 cm<sup>3</sup> (0.3 in.<sup>3</sup>).

Probe Head Input Connection – 0.63 mm (0.025 in.)  
square pins on 2.54 mm (0.1 in.) centers.

Output Cable Length – 1.2 m (4.0 ft.).

## Environmental Characteristics

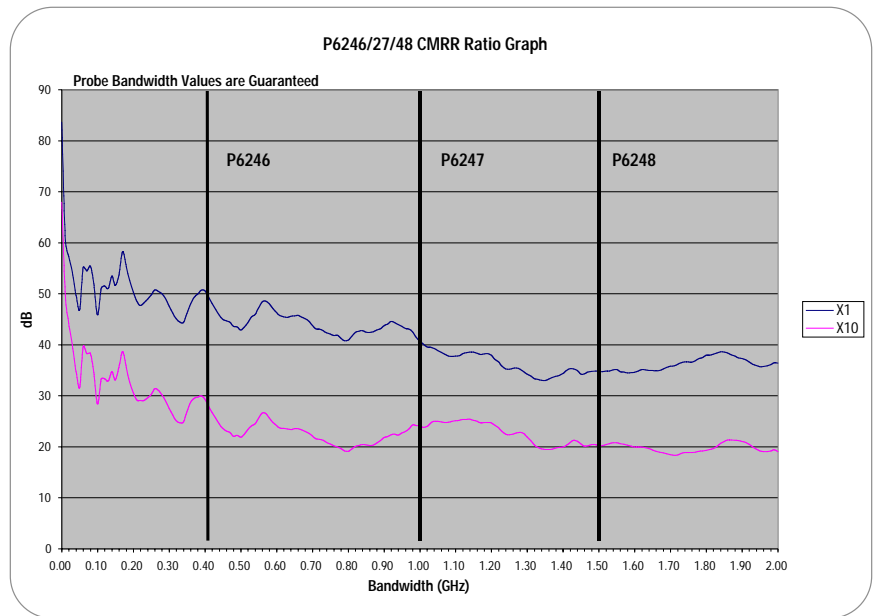
### Temperature –

Operating: 0 to 50°C.  
Nonoperating: –55 to +75°C.

### Humidity (0 to 90% RH) –

Operating: 30 to 50°C.  
Nonoperating: 30 to 60°C.

Frequency	Attenuation Setting	P6246	P6247	P6248
1 MHz	$\div 1$	> 60 dB	> 60 dB	> 60 dB
	$\div 10$	> 45 dB	> 45 dB	> 45 dB
100 MHz	$\div 1$	> 38 dB	> 38 dB	> 38 dB
	$\div 10$	> 25 dB	> 25 dB	> 25 dB
500 MHz	$\div 1$	N/A	> 35 dB	> 35 dB
	$\div 10$	N/A	> 20 dB	> 20 dB
1 GHz	$\div 1$	N/A	> 30 dB	> 30 dB
	$\div 10$	N/A	> 18 dB	> 18 dB
1.5 GHz	$\div 1$	N/A	N/A	> 25 dB (typical)
	$\div 10$	N/A	N/A	> 18 dB (typical)



## ▶ Ordering Information

**P6248**1.7 GHz Differential Probe (Typical  $\leq 27^{\circ}\text{C}$ ).

1.5 GHz Differential Probe (Guaranteed).

**P6247**

1.0 GHz Differential Probe (Guaranteed).

**P6246**

400 MHz Differential Probe (Guaranteed).

**Certificate of Traceable Calibration****P6246 and P6247 User Manual Set –**

English, German, French and Japanese: Order 070-9898-02.

Service: 070-9899-01.

**P6248 Instruction Manual –** English: Order

071-0566-00.

**Service Manual –** English: Order 071-0573-00.**Carrying Case –** Differential Probe, Inserts and Label, Plastic Storage Case:

(P6246) Order 016-0156-06.

(P6247) Order 016-1787-00.

(P6248) Order 016-1787-00.

## Measurement Service Options

**Opt. D1 –** Calibration Data.**Opt. R3 –** 3 Years Extended Warranty.**Opt. C3 –** 3 Years Calibration Services.

## Recommended/Replacement Accessories

**IEEE 1394 Breakout Connector-** Order 679-5027-00.**50  $\Omega$ , BNC (M) to BNC (M) Coaxial Cable –** 18 in. Order 012-0076-00.**50  $\Omega$ , BNC Coaxial Terminator –** Order 011-0049-02.**50  $\Omega$ , SMA (F) to BNC (M) Adapter –** Order 015-0572-00.**P6046/HP1141A Probe Tip Adapter –** Order 013-0309-00.

## Related Products

**1103 –** TEKPROBE® Power Supply w/standard North America/Japan Power Cord.

## International Power Plugs

**Opt. A1 –** Europe Power Cord.**Opt. A2 –** UK Power Cord.**Opt. A3 –** Australia Power Cord.**Opt. A4 –** Switzerland Power Cord.**Opt. A6 –** Japanese Power Cord.

## ▶ Included Accessories

Product Name/ Description	P6246 & P6247 Quantity	P6248 Quantity	Re-order
Y Lead Adapter	2 Each	2 Each	196-3462-00*1
3 in. Ground Lead	2 Each	4 Each	196-3462-00*1
6 in. Ground Lead	2 Each	2 Each	196-3462-00*1
SMT KlipChip™	3 Each	4 Each	206-0364-00 (1 per package)
BNC to Probe Tip Adapter	1 Each	1 Each	679-4094-00
TwinFoot™ Adapter	2 Each	4 Each	016-1785-00 (1 package of 4)
TwinTip™ Adapter	2 Each	4 Each	016-1786-00 (1 package of 4)
Short Ground Contact	2 Each	10 Each	016-1783-00
Spring Loaded Grounds	2 Each	6 Each	016-1782-00
Probe Tip Connector Saver	2 Each	2 Each	016-1781-00  (2 per package)
RAMBUS "Longhorn" Via Probe	None	5 Each	016-1780-00 (5 per package)
Vari Tip	1 Each	1 Each	016-1891-00 (8 per package)
Straight Tip	1 Each	1 Each	016-1890-00 (8 per package)
Color Coding Clips, 2 each of 5 colors	1 Each	1 Each	016-1315-00
IC Grabber	1 Each	1 Each	013-0309-00 (set of 2)

\*1 Part number 196-3462-00 includes: 2 each 196-3434-00 Y Lead Adapter; 2 each 196-3436-00 6 inch ground lead; and 4 each 196-3437-00 3 inch ground lead.

# Differential Probes

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 <p><b>Tektronix</b> 016-1783-00 SHORT GROUND CONTACTS SET OF 10</p> 	 <p><b>Tektronix</b> 016-1782-00 SPRING LOADED GROUNDED PINS SET OF 6</p> 	 <p><b>Tektronix</b> 016-1786-00 TwinTip™ ADAPTER SET OF 4</p> 	 <p><b>Tektronix</b> 016-1780-00 LONGHORN VIA ADAPTER SET OF 5</p> 
 <p><b>Tektronix</b> 016-1785-00 TwinTip™ ADAPTER SET OF 4</p> 	 <p><b>Tektronix</b> 016-1781-00 TIP SAVER SET OF 2</p> 	 <p>016-1315-00 Coding Color Clips</p>	 <p>679-4094-00 BNC to Probe Tip Adapter</p>
 <p>Straight Tip 016-1891-00</p>	 <p>VariTip 016-1890-00</p>	 <p>013-0309-00</p>	 <p>206-0364-00 Quantity 1 SMT Clip</p>
<p>Ground Lead Set 196-3462-00</p>  <p>Y Lead 196-3434-00</p>  <p>6" Ground Leads 196-3436-00</p>  <p>3" Ground Lead 196-3437-00</p> 			

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 Taiwan 886 (2) 2722-9622  
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For other areas, contact: Tektronix, Inc.  
 Export Sales, P.O. Box 500, M/S 50-255,  
 Beaverton, Oregon 97077-0001, USA 1 (503) 627-1916

For the most up-to-date product information  
 visit our web site at [www.tektronix.com](http://www.tektronix.com)



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