

TekConnect™ High-impedance Buffer Amplifier System

► TCA-1MEG



Tektronix award-winning TDS7000, CSA7000 and TDS6000 Series oscilloscopes allow engineers to make high-speed measurements quickly and efficiently. In addition to these high-speed measurements, many of today's designers also face the challenges of measuring high voltage, current, power or even micro-volt level signals to gain a more complete understanding of their designs.

The TekConnect family of amplifiers, probes and adapters make it the ideal solution for such challenges, delivering a variety of acquisition capabilities through the use of existing compatible TekConnect and TEKPROBE measurement tools.

TekConnect TCA-1MEG Buffer Amplifier System Expands the Functionality of Tektronix High-performance Oscilloscopes

The TCA-1MEG high-impedance buffer amplifier system extends the capabilities of Tektronix high-performance oscilloscopes, making them ideal for a variety of general-purpose measurements. The TCA-1MEG amplifier system provides a 1 M Ω path that is easily removed and replaced with a wide array of TekConnect probes, amplifiers and adapters.

This amplifier system delivers versatility to Tektronix high-performance oscilloscopes through the addition of input coupling (selectable), bandwidth limit (selectable), and a 1 M Ω input that provides access to a wide array of measurement solutions. These solutions include general-purpose passive probes, high voltage probes (passive single-ended and active differential), micro-volt differential probes and current probes.

► Features & Benefits

Bandwidth – DC to ≥ 500 MHz

Input Impedance – 1 M Ω /10 pF

Bandwidth Limiting – Full/100 MHz/20 MHz

Input Coupling – DC/AC/GND

Includes P6139A, 500 MHz, 10X Passive Probe

TekConnect Interface Delivers Superior Signal Fidelity, Unparalleled Versatility and Ease-of-use

► Applications

Verification, Characterization and Debug of Sophisticated Designs in Communications, Computer and Semiconductor Electronic Environments

- Jitter and Timing Analysis (Computer Systems)
- Disk Drive Analysis
- Investigation of Transient Phenomena
- Spectral Analysis
- Power Supplies/Inverters (Switching and Linear)
- Semiconductor Devices (SCRs, IGBTs, FETs, CMOS)
- Electronic Ballasts
- Industrial/Consumer Electronics
- Mobile Communications (Phone, Satellite, Relay Stations)
- Motor Drives
- Transportation Systems (Electronic Vehicles, Electric Trains, Locomotives, Avionics)

COMPUTING

COMMUNICATIONS

VIDEO

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With this tool, Tektronix high-performance oscilloscopes may now perform measurements such as primary and secondary power supply voltage levels, currents and elevated voltages, and assess the power requirements of the device-under-test.

For today's high-speed measurement solutions, having the 50 Ω and 1 M Ω terminations on the same input path compromises signal fidelity. By making the 1 M Ω path replaceable, the TCA-1MEG high impedance buffer amplifier system eliminates a permanent degradation of the high-speed signal path. This also allows users to easily and quickly configure each channel for the input characteristics required for their measurements. By exchanging the TCA-1MEG for a high-performance 50 Ω path or other high-speed probing solution, maximum signal fidelity is maintained at the oscilloscope's input.

TekConnect Interface Delivers Superior Signal Fidelity, Unparalleled Versatility and Ease-of-use

The TekConnect interface ensures superior signal fidelity with useful bandpass up to 18 GHz at the oscilloscope input, while offering unparalleled versatility with the world's widest array of accessory signal acquisition solutions for high-performance, real-time oscilloscopes. This interface delivers a more robust oscilloscope interface for next-generation products with multi-GHz analog bandwidths, overcoming many of the inherent bandwidth limitations of BNC-based interfaces. The TekConnect interface preserves a low voltage standing wave ratio (VSWR) 50 Ω environment as well as a reliable electrical connection. A convenient, one-button release and locking mechanism provides quick, easy installation and removal of probes, amplifiers and adapters.

► Characteristics

► Model Specifications

Bandwidth (-3 dB)	DC to ≥ 500 MHz (in a host instrument with bandwidth > 1.5 GHz)
Probe Tip Bandwidth (with P6139A at -3 dB)	DC to ≥ 500 MHz (host instrument bandwidth > 1.5 GHz)
BW Limit	Full, 100 MHz $\pm 25\%$, 20 MHz $\pm 25\%$
DC Gain Accuracy	$\pm 3\%$ (TCA-1MEG with or without P6139A probe)* ¹
Propagation Delay (Input-to-Output)	< 2 ns
Input Impedance	1 M Ω /10 pF (at DC)
Maximum Input Voltage (Derated with Frequency)	150 V _{RMS} CAT I 100 V _{RMS} CAT II Above 200 kHz derate at 20 dB per decade; limit to 13 V _{pk} AC at 3 MHz and above

*¹Probe calibration required in TekConnect host instrument.

► Typical

Displayed System Input Offset	± 0.2 div
Rise Time (calculated small signal $t_r = 0.4/F_{-3\text{ dB}}$)	≤ 0.8 ns (minimum rise time)
Linear Dynamic Range	The lesser of ± 5 divisions or the dynamic range of the TekConnect host instrument
Linearity	$\pm 0.2\%$

► Nominal

Inputs	1 (TEKPROBE™ BNC 1 M Ω)	
Input Coupling	DC, AC or GND	
Safety Certifications U.S. NRTL Listing	UL3111-1 UL3111-2-032	
Canadian Certification	CAN/CSA C22.2 No.1010.1 CAN/CSA C22.2 No.1010.2.032	
European Union Compliance	EN61010-1/A2 EN61010-2-032	
Other	IEC61010-1/A2 IEC61010-2-032	
GPIO Programmable	Through Host Instrument Commands	
Power Requirements	TekConnect	
Adapter Model Compatibility	Refer to TDS7000 Series TekConnect Adapters Compatibility Table	
Warranty	One year	
Dimensions	mm	in.
Length	180.08	4.255
Width	31.5	1.240
Height	46.1	1.815

▶ TekConnect™ Amplifier, Adapters and Probes Compatibility*1

Accessory Type	Oscilloscope			TekConnect Amplifiers, Adapters and Probes			
	TDS6604 6 GHz	TDS7154 / CSA7154 / TDS7254 1.5 GHz / 1.5 GHz / 2.5 GHz	TDS7404 / CSA7404 4 GHz / 4 GHz	TCA-1MEG High Impedance Buffer Amplifier (P6139A Included)	TCA-BNC Adapter (Standard w/ TDS7154 / TDS7254 / CSA7154)	TCA-SMA Adapter (Standard w/TDS7404 / CSA7404)	TCA-N Adapter
Instrument Input Connection	TekConnect	TekConnect	TekConnect	TEKPROBE BNC 1 MΩ-to-TekConnect	TEKPROBE BNC 50 Ω-to- TekConnect	SMA-to- TekConnect	N-to- TekConnect
Instrument Input Impedance	TekConnect Probes, Amplifier and Adapter Dependent	TekConnect Probes, Amplifier and Adapter Dependent	TekConnect Probes, Amplifier and Adapter Dependent	1 MΩ/10 pF	50 Ω	50 Ω	50 Ω
Passive Voltage Probes (1X)	P6101B w/TCA-1MEG	P6101B w/TCA-1MEG	P6101B w/TCA-1MEG	P6101B	N/A	N/A	N/A
Passive Voltage Probes (10X)	P6139A w/TCA-1MEG	P6139A w/TCA-1MEG	P6139A w/TCA-1MEG	P6139A	N/A	N/A	N/A
50 Ω Divider Voltage Probes	P6150 w/TCA-SMA P6158 w/TCA-BNC	P6150 w/TCA-SMA P6158 w/TCA-BNC	P6150 w/TCA-SMA P6158 w/TCA-BNC	N/A	P6158	P6150	N/A
Active Voltage Probes General	P6245 w/TCA-BNC P6243 w/TCA-BNC	P6245 w/TCA-BNC P6243 w/TCA-BNC	P6245 w/TCA-BNC P6243 w/TCA-BNC	N/A	P6245 P6243	N/A	N/A
Active Voltage Probes < 3.3 V Logic	P7260*2 P7240*2 P6249 w/TCA-BNC	P7260*2 P7240*2 P6249 w/TCA-BNC	P7260*2 P7240*2 P6249 w/TCA-BNC	N/A	P6249	N/A	N/A
Differential Voltage Probes < 3.3 V Logic	P7330 P6330 w/ TCA-BNC	P7330 P6330 w/ TCA-BNC	P7330 P6330 w/ TCA-BNC	N/A	P6330	N/A	N/A
Differential Voltage Probes < 8 V Logic	P6248 w/TCA-BNC P6247 w/TCA-BNC P6246 w/TCA-BNC	P6248 w/TCA-BNC P6247 w/TCA-BNC P6246 w/TCA-BNC	P6248 w/TCA-BNC P6247 w/TCA-BNC P6246 w/TCA-BNC	N/A	P6248 P6247 P6246	N/A	N/A
Differential Voltage Probes Micro-volt	ADA400A w/TCA-1MEG	ADA400A w/TCA-1MEG	ADA400A w/TCA-1MEG	ADA400A	N/A	N/A	N/A
High Voltage Probes Differential	P5205 w/ TCA-1MEG P5210 w/TCA-1MEG	P5205 w/ TCA-1MEG P5210 w/TCA-1MEG	P5205 w/ TCA-1MEG P5210 w/TCA-1MEG	P5205 P5210	N/A	N/A	N/A
High Voltage Probes Single-ended	P5100 w/TCA-1MEG P6015A w/TCA-1MEG	P5100 w/TCA-1MEG P6015A w/TCA-1MEG	P5100 w/TCA-1MEG P6015A w/TCA-1MEG	P5100 P6015A	N/A	N/A	N/A
Current Probe AC/DC < 15 A	TCP202 w/TCA-BNC	TCP202 w/TCA-BNC	TCP202 w/TCA-BNC	N/A	TCP202	N/A	N/A
Current Probe AC/DC 5 mA to 20 A	AM503S w/ TCA-BNC or TCA-1MEG	AM503S w/ TCA-BNC or TCA-1MEG	AM503S w/ TCA-BNC or TCA-1MEG	AM503S	AM503S	N/A	N/A
Current Probe AC High Frequency	CT6 w/TCA-BNC CT1 w/TCA-1MEG	CT6 w/TCA-BNC CT1 w/TCA-1MEG	CT6 w/TCA-BNC CT1 w/TCA-1MEG	N/A	CT6 CT1	N/A	N/A
Current Probe AC Low Frequency	P6021 w/TCA-1MEG P6022 w/TCA-1MEG	P6021 w/TCA-1MEG P6022 w/TCA-1MEG	P6021 w/TCA-1MEG P6022 w/TCA-1MEG	P6021 P6022	N/A	N/A	N/A
O/E Converter Probes	P6701B w/TCA-BNC P6703B w/TCA-BNC	P6701B w/TCA-BNC P6703B w/TCA-BNC	P6701B w/TCA-BNC P6703B w/TCA-BNC	N/A	P6701B P6703B	N/A	N/A

*1Firmware version 2.1 or greater required for all referenced oscilloscopes.

*2P7240, P7260 and P7330 are high-speed active and differential probing solutions for Tektronix oscilloscopes with TekConnect interface. These probes require no other adapters.

Please refer to TekConnect Adapters data sheet for more information about adapters.

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▶ Ordering Information

TCA-1MEG – TekConnect-to-1MEG High-impedance Buffer Amplifier.

Includes: Buffer Amplifier; Instruction/Service Manual; 1 – P6139A; Certificate of Traceable Calibration; TDS6000, TDS7000 and CSA7000 Series product software upgrade CD(s).

Service Options

C3 – Three years of Calibration Services (initial certification + 2 calibrations).

C5 – Five years of Calibration Services (initial certification + 4 calibrations).

D1 – Test data on delivery and with further calibrations; Must order with C3.

D3 – Test data on delivery and with further calibrations; Must order with C3.

D5 – Test data on delivery and with further calibrations; Must order with C5.

R3 – Repair warranty extended to cover three years.

R5 – Repair warranty extended to cover five years.

Recommended Accessories

Passive Voltage Probes

P6101B – 15 MHz, 1X, Passive.

P6139A – 500 MHz, 10X, Passive.

High Voltage Probes

P5205 – 1.3 kV_{RMS}, 100 MHz, Active Differential.

P5210 – 4.4 kV_{RMS}, 50 MHz, Active Differential.

P6015A – 20 kV, 1000X, 75 MHz, Passive.

P5100 – 2.5 kV, 100X, 250 MHz, Passive.

Micro-volt Differential Probe

ADA400A – 1 MHz, 100X/10X/1X/0.1X, Micro-volt Differential Preamplifier.

Current Measurement Tools

AM503S – AC/DC, 5 mA to 700 Amp, Current Amplifier Measurement System. (Extended Current Capability by ordering additional Current Probes).

P6021 – AC, 60 MHz, Current Probe.

P6022 – AC, 120 MHz, Current Probe.

Cables and Terminations

012-0057-01 – 50 Ω BNC to BNC Coaxial Cable.

012-0482-00 – 50 Ω BNC to BNC Coaxial Cable, Precision 1%, Male to Male.

011-0049-02 – 50 Ω feed through termination.

Contact Tektronix:

ASEAN Countries & Pakistan (65) 6356 3900

Australia & New Zealand (65) 6356 3900

Austria +43 2236 8092 262

Belgium +32 (2) 715 89 70

Brazil & South America 55 (11) 3741-8360

Canada 1 (800) 661-5625

Central Europe & Greece +43 2236 8092 301

Denmark +45 44 850 700

Finland +358 (9) 4783 400

France & North Africa +33 (0) 1 69 86 80 34

Germany +49 (221) 94 77 400

Hong Kong (852) 2585-6688

India (91) 80-2275577

Italy +39 (02) 25086 1

Japan (Sony/Tektronix Corporation) 81 (3) 3448-3111

Mexico, Central America & Caribbean 52 (55) 56666-333

The Netherlands +31 (0) 23 569 5555

Norway +47 22 07 07 00

People's Republic of China 86 (10) 6235 1230

Poland +48 (0) 22 521 53 40

Republic of Korea 82 (2) 528-5299

Russia, CIS & The Baltics +358 (9) 4783 400

South Africa +27 11 254 8360

Spain +34 (91) 372 6055

Sweden +46 8 477 6503/4

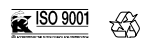
Taiwan 886 (2) 2722-9622

United Kingdom & Eire +44 (0) 1344 392400

USA 1 (800) 426-2200

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

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