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TekConnect™ Adapters

TCA75 • TCA-BNC • TCA-SMA • TCA-N • TCA-292MM • TCA292D Datasheet

TekConnect TCA Series Adapters expand the functionality of Tektronix high-performance oscilloscopes. This family of adapter systems provide better performance and less signal distortion than traditional connections used to move a signal from one environment to another, such as BNC to N or BNC to SMA.

Key performance specifications

TCA-BNC – TekConnect-to-75 Ω BNC

- DC to ≥8 GHz (instrument dependent)
- VSWR – 1.1:1 (26.45 dB)
- 75 Ω input
- Auto Attenuation Factor Correction

TCA-BNC – TekConnect-to-TekProbe™ BNC 50 Ω

- DC to ≥4 GHz (instrument dependent)
- 50 Ω input (only)
- For control of TekProbe BNC (50 Ω) probes

TCA-N – TekConnect-to-N

- DC to ≥11 GHz (instrument dependent)
- 50 Ω input (only)

TCA-SMA – TekConnect-to-SMA

- DC to ≥18 GHz (instrument dependent)
- 50 Ω input (only)

TCA-292MM – TekConnect-to-2.92 mm

- DC to ≥25 GHz (instrument dependent)
- 50 Ω input (only)
- SMA compatible

TCA-292D – TekConnect-to-2.92 mm

- DC to ≥33 GHz (instrument dependent)
- 50 Ω input (only)
- SMA compatible

Applications

- Signal integrity, jitter, and timing analysis
- Verification, characterization, and debug of sophisticated designs
- High-speed digital devices and circuits
- Power supplies/inverters
- Semiconductor devices
- Electronic ballasts
- Industrial/consumer electronics
- Mobile communications
- Motor drives
- Transportation systems
- Disk drive analysis
- Investigation of transient phenomena
- Spectral analysis
- Video design and development
- HDTV and streaming digital video

TekConnect interface delivers superior signal fidelity, unparalleled versatility, and ease of use

The TekConnect interface ensures superior signal fidelity with useful bandpass up to 33 GHz, 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 robust oscilloscope interface with multi-GHz analog bandwidths. 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.

TCA75 Adapter (75 to 50 Ω)

The TCA75 adapter allows Tektronix oscilloscopes with a TekConnect interface to easily access and measure 75 Ω terminated circuitry. The TCA75 attenuation factor is automatically corrected to provide the end user with correctly displayed signal magnitudes.

TCA-BNC Adapter (50 Ω only)

A direct 50 Ω input with TekProbe BNC 50 Ω capability, this adapter may be used as a direct 50 Ω BNC input or with Tektronix high-speed active and differential probes requiring the TekProbe BNC 50 Ω interface.

TCA-SMA and TCA-N Adapters (50 Ω only)

The high-speed SMA- and N-type adapters allow a more direct connection to the signal under test requiring N or SMA connections without losing performance by adding other external conversion adapters.

TCA-292D and TCA-292MM Adapters (50 Ω only)

These high-speed 2.92 mm-type adapters allow a more direct connection to the signal under test requiring a 2.92 mm connection without losing performance by adding other external conversion adapters. The locking screw must be used to ensure full bandwidth performance. The 2.92 mm connector is more robust and performs at higher frequencies than an SMA connector. The 2.92 mm connector is compatible with SMA connectors, but the electrical performance will be limited to the bandwidth of the SMA connector.

TCA-1MEG High-impedance Buffer Amplifier

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 MΩ path that is easily removed and replaced with a wide array of TekConnect probes, amplifiers, and adapters.

TekConnect® Amplifier, Adapters, and Probes Compatibility

	Oscilloscope [1]	**TekConnect Amplifiers, Adapters, and Probes**				
Accessory type	**DPO/DSA/MSO TekConnect Series (4-33 GHz)**	**TCA-1MEG High-impedance Buffer Amplifier (P6139B Probe included)**	**TCA-BNC Adapter** [2]	**TCA-292MM Adapter** [3] **TCA292D Adapter** [4]	**TCA-N Adapter**	**TCA75 Adapter**
Instrument input connection	TekConnect interface	TekProbe BNC 1 MΩ-to-TekConnect interface	TekProbe BNC 50 Ω-to-TekConnect interface	292 mm-to-TekConnect interface	N-to-TekConnect interface	75-to-50 Ω TekConnect adapter
Instrument input impedance	TekConnect interface probes, amplifier, and adapter dependent	1 MΩ / 10 pF	50 Ω	50 Ω	50 Ω	50 Ω
Passive voltage probes						
1X	P6101B w/ TCA-1MEG	P6101B	NA	NA	NA	NA
10X	P6139B w/ TCA-1MEG	P6139B	NA	NA	NA	NA
50 Ω divider voltage probes	P6150 w/ TCA-292MM P6158 w/ TCA-BNC	NA	P6158	P6150	NA	NA
Active voltage probes						
General	P6245 w/ TCA-BNC P6243 w/ TCA-BNC	NA	P6245, P6243	NA	NA	NA

1 Firmware version 6.x or greater required for all referenced oscilloscopes.

2 The TCA-BNC Adapter is a standard accessory with MSO/DPO 70000C/DX series oscilloscopes.

3 The TCA-292MM Adapter is a standard accessory with MSO/DPO 70000C series oscilloscopes.

4 The TCA-292D Adapter is a standard accessory with MSO/DPO 70000DX series oscilloscopes.

	Oscilloscope [1]	TekConnect Amplifiers, Adapters, and Probes				
Accessory type	**DPO/DSA/MSO TekConnect Series (4-33 GHz)**	**TCA-1MEG High-impedance Buffer Amplifier (P6139B Probe included)**	**TCA-BNC Adapter [2]**	**TCA-292MM Adapter [3] TCA292D Adapter [4]**	**TCA-N Adapter**	**TCA75 Adapter**
>2 GHz	P6249 w/ TCA-BNC P6241 w/ TCA-BNC	NA	NA	NA	NA	NA
Differential voltage probes						
>2 GHz	P7500 Series P7300 Series	NA	P6330	NA	NA	NA
<1.8 GHz <8 V Logic	P6248 w/ TCA-BNC P6247 w/ TCA-BNC P6246 w/ TCA-BNC	NA	P6248, P6247, P6246	NA	NA	NA
Micro-volt	ADA400A w/ TCA-1MEG	ADA400A	NA	NA	NA	NA
High-voltage probes						
Differential	P5205A w/ TCA-1MEG P5210A w/ TCA-1MEG	P5205A P5210A	NA	NA	NA	NA
Single-ended	P5100A w/ TCA-1MEG P6015A w/ TCA-1MEG	P5100A	NA	NA	NA	NA
Current probes						
AC/DC <15 A	TCP2020 w/ TCA-1MEG	TCP2020		NA	NA	NA
AC/DC 5 mA to 20 A	TCPA300, TCPA400 w/ TCA-BNC or TCA-1MEG	TCPA300, TCPA400	TCPA300, TCPA400	NA	NA	NA
AC high-frequency	CT6 w/ TCA-BNC CT2 w/ TCA-BNC CT1 w/ TCA-BNC	NA	CT6 CT2, CT1	NA	NA	
O/E converter probes	P6701B w/ TCA-BNC P6703B w/ TCA-BNC	NA	P6701B, P6703B	NA	NA	

Please refer to the individual probe data sheets for more information about probes.

1 Firmware version 6.x or greater required for all referenced oscilloscopes.

2 The TCA-BNC Adapter is a standard accessory with MSO/DPO 70000C/DX series oscilloscopes.

3 The TCA-292MM Adapter is a standard accessory with MSO/DPO 70000C series oscilloscopes.

4 The TCA-292D Adapter is a standard accessory with MSO/DPO 70000DX series oscilloscopes.

Specifications

All specifications apply to all models unless noted otherwise.

Model specification	TCA75	TCA-BNC	TCA-SMA	TCA-N	TCA-292MM	TCA-292D
Attenuation accuracy at DC	2.46X ±1.5%	Refer to host instrument specification				
Input resistance at DC	75 Ω ±1.5%	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Typical						
Bandwidth (–3 dB, maximum frequency, limited by host instrument)	DC to 8 GHz	DC to 4 GHz	DC to 18 GHz	DC to 11 GHz	DC to 25 GHz	DC to 33 GHz
Propagation delay (input-to-output)	<200 ps				<185 ps	<185 ps
RMS noise	Refer to host instrument specification					
VSWR (return loss)	Refer to host instrument specification					
RF insertion loss (adapter only)	6.05 dB	0.25 dB max	0.06×SQRT (F) (GHz)	0.3 dB max	0.04×SQRT (F) (GHz)	0.04×SQRT (F) (GHz)
Rise time (minimum rise time), limited by host instrument	<50 ps [5]	≤100 ps	≤22 ps	≤36 ps	≤16 ps	≤13 ps
Maximum input voltage (derated with frequency)	≤12 V DC or ≤12 V_{RMS} (2 W max)	Refer to host instrument specification				
Nominal						
Inputs	1 (BNC 75 Ω)	1 (TekProbe BNC 50 Ω)	1 (SMA 50 Ω)	1 (N 50 Ω)	1 (2.92 mm 50 Ω)	1 (2.92 mm 50 Ω)
Adapter model compatibility	Refer to TekConnect amplifier, adapters, and probes compatibility table					
Warranty	1 year					

5 Calculated small signal $t_r = 0.4/F_3$ dB

Ordering information

Models

TCA75	TekConnect-to-75 Ω Adapter
TCA-BNC	TekConnect-to-BNC Adapter
TCA-SMA	TekConnect-to-SMA Adapter
TCA-292MM	TekConnect-to-2.92 mm Adapter (≥25 GHz)
TCA-292D	TekConnect-to-2.92 mm Adapter (≥33 GHz)
TCA-N	TekConnect-to-N Adapter

All include: Instruction manual and Certificate of Compliance.

Recommended accessories

Passive voltage probes

P6150	9 GHz, 1X/10X, 50 Ω divider probe (use with TCA-SMA)
P6158	3 GHz, 20X, 50 Ω divider probe (use with TCA-BNC)

High-speed active voltage probes

P6205	750 MHz, 10X, <2 pF / 10 MΩ (use with TCA-BNC)
P6243	1 GHz, 10X, <1 pF / 1MΩ (use with TCA-BNC)
P6245	1.5 GHz, 10X, <1 pF / 1 MΩ (use with TCA-BNC)

High-speed active differential voltage probes

P6247	1 GHz, 1X/10X, <1 pF / 200 kΩ differential (use with TCA-BNC)
P6248	1.5 GHz, 1X/10X, <1 pF / 200 kΩ differential (use with TCA-BNC)
P6330	3.5 GHz, 1X/10X, <1 pF / 200 kΩ differential (use with TCA-BNC)

Current measurement tools

TCP202A	AC/DC, 20 A, TekProbe™ interconnect current probe (use with TCA-BNC)
CT-1	1 GHz, AC current transformer (use with TCA-BNC)
CT-2	200 MHz, AC current transformer (use with TCA-BNC)
CT-6	2 GHz, AC current transformer (use with TCA-BNC)

Cables and terminations

012-0057-01	50 Ω BNC-to-BNC coaxial cable (use with TCA-BNC)
012-0482-00	50 Ω BNC-to-BNC coaxial cable, precision 1%, male-to-male (use with TCA-BNC)
011-0049-02	50 Ω feed-through termination (use with TCA-BNC)

CE

Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

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