IsoTest®

2012 Bench Products
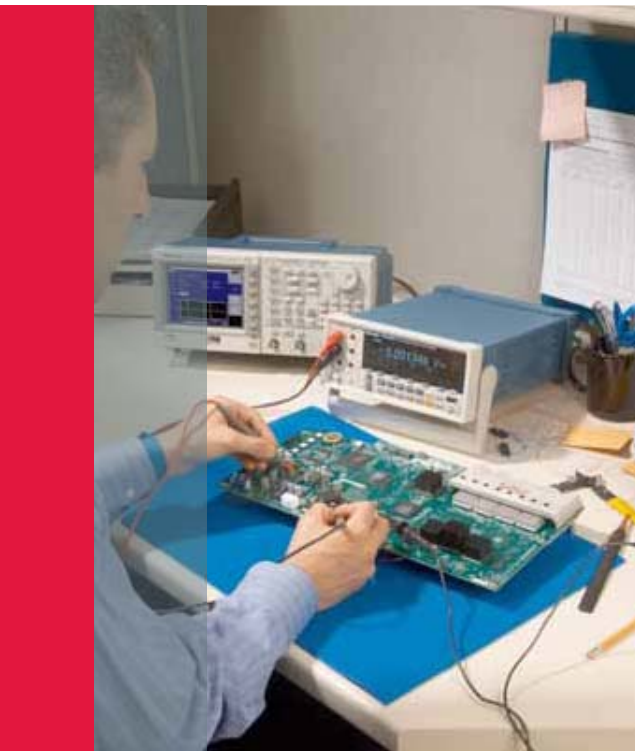## Test & Measurement Solutions

Tektronix®

Table of Contents

Tektronix: The World's Standard in Oscilloscopes

8 out of 10 engineers around the world trust Tektronix to help them speed debug and test of tomorrow's designs. To complement our oscilloscopes, we offer a portfolio of bench instruments designed with the same ease-of-use you've come to expect from us over the last 65 years. From dedicated buttons for common functions to USB ports for saving data. Our instruments are designed to be quick to learn and simple to operate.

About Tektronix:

For 65 years, engineers have turned to Tektronix for test, measurement and monitoring instrumentation to solve design challenges, improve productivity and dramatically reduce time to market. You can always count on us to give you the domain expertise, innovation, performance, practical advice and quality you need.

Tektronix offers a wide range of test and measurement solutions, from oscilloscopes and probes to signal generators and spectrum analyzers, with much more in between including our comprehensive line of bench instruments.

For an in-depth look at all of our products, including demos and 360-degree product explorers, please visit www.tektronix.com.

Choosing Your Oscilloscope

With over 50 models to choose from, Tektronix offers oscilloscopes for many different applications and uses. To help you choose the right scope for your needs, the most common criteria for selecting a scope are listed below, along with helpful tips for determining your requirements.

❶ Bandwidth

All oscilloscopes have a low-pass frequency response that rolls off at higher frequencies. Oscilloscope bandwidth is specified as being the frequency at which a sinusoidal input signal is attenuated to 70.7% of the signal's true amplitude – the -3 dB point. Your oscilloscope must have sufficient bandwidth to capture the higher frequency components of your signal, and therefore show signal transitions accurately. Since the edge speed (rise time) of a digital signal can carry much higher frequency components than its repetition rate might imply, choose an oscilloscope with a bandwidth greater than the 5th harmonic of your signal to ensure a measurement error of less than +/- 2%.
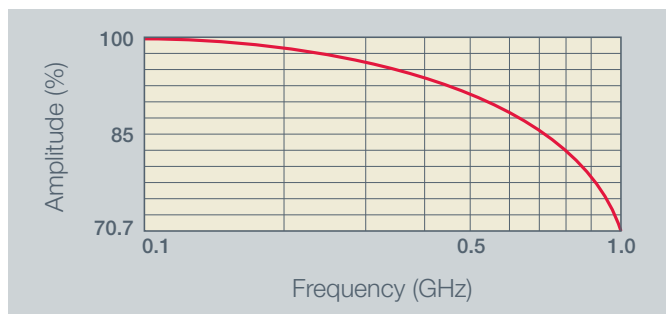
Rule: Bandwidth > 5th Harmonic of Signal

Figure 1: Typical frequency response curve for a general purpose oscilloscope

❷ Sample Rate

The faster an oscilloscope samples, the greater the resolution and detail of the displayed waveform, and the less likely that critical information or events will be lost. Tektronix recommends at least 5X oversampling to ensure signal details are captured and to avoid aliasing.

Rule: Sample Rate > 5 x (Highest Frequency Component)

❸ Record Length

Record length is the number of samples the oscilloscope can digitize and store in a single acquisition. Since an oscilloscope can store only a limited number of samples, the waveform duration – or length of "time" captured – will be inversely proportional to the oscilloscope's sample rate. A longer record length enables a longer time window to be captured with high resolution.

Rule: Captured Time = (Record Length) / (Sample Rate)

❹ Digital and RF Channels

Today's oscilloscopes offer more than just analog channels for system-level troubleshooting of complex designs.

- If you need to analyze a parallel bus or multiple serial buses, the Tektronix MSO Series of mixed signal oscilloscopes offers 16 digital channels and up to 4 analog channels for analyzing multiple signals at once.

- If you are working with RF signals, the Tektronix MDO Series of mixed domain oscilloscopes offers a built-in spectrum analyzer for time-correlated analysis of analog, digital and RF signals.

❺ Features and Analysis Capability

Tektronix oscilloscopes offer a range of features and analysis capabilities. When choosing your scope, you should review available triggers, waveform search tools, automated measurements, and analysis packages such as serial bus analysis, jitter and power analysis to ensure they meet your needs.

Basic Oscilloscopes

To accurately visualize the intricate details of fast changing signals, you need an oscilloscope with uncompromised performance. Tektronix basic oscilloscopes feature Digital Real-Time Sampling with at least x5 over sampling on all channels, all the time, to precisely capture today's complex signals.

	TDS1000C-EDU	TDS2000C	TPS2000B	THS3000	TDS3000C
Channels	2	2, 4	2, 4 (isolated)	4 (isolated)	2, 4
Bandwidth	40 MHz to 100 MHz	50 MHz to 200 MHz	100 MHz to 200 MHz	100 MHz to 200 MHz	100 MHz to 500 MHz
Sample Rate	500 MS/s to 1 GS/s	500 MS/s to 2 GS/s	1 GS/s to 2 GS/s	2.5 GS/s to 5 GS/s	1.25 GS/s to 5 GS/s
Max Record Length	2.5 k points	2.5 k points	2.5 k points	10 k points	10 k points
Trigger Types	Edge, Pulse (width), Video	Edge, Pulse (width), Video	Edge, Pulse (width), Video	Edge, Pulse (width), Event, Video, Non-interlaced	Edge, Logic (Pattern, State), Pulse (Glitch, Width, Runt, Slew Rate), Video, Extended Video*, Comm* *Optional
Optional Serial Bus Decode and Analysis	--	--	TPS2PWR1: Power Measurement and Analysis	--	TDS3AAM: Advanced Analysis TDS3LIM: Limit Testing TDS3SDI: 601 Serial Digital Video Analysis TDS3TMT: Telecom Mask Testing TDS3VID: HDTV and Custom Video Triggering
Connectivity	USB Host, USB Device, GPIB* *Optional	USB Host, USB Device, GPIB* *Optional	RS-232 (includes RS-232-to-USB Host Serial Cable), Centronics, CompactFlash	USB Host, USB Device	USB Host, LAN (10Base-T Ethernet) Optional TDS3GV Module: GPIB, RS-232, and Video Out
Waveform Math and Analysis	16 Automated Measurements, Arithmetic Waveform Math, FFT	16 Automated Measurements, Arithmetic Waveform Math, FFT, Waveform Limit Testing, Automated Datalogging	11 Automated Measurements, Arithmetic Waveform Math, FFT	21 Automated Measurements, Arithmetic Waveform Math, FFT	25 Automated Measurements, Arithmetic Waveform Math, FFT, Advanced Math* *Optional
Software	Educator Classroom and Lab Resource CD Included Standard. PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop, NI LabVIEW SignalExpress™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop, NI LabVIEW SignalExpress™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop	PC Communications Software:OpenChoice® Desktop, NI LabVIEW SignalExpress™ Tektronix Edition LE
Battery Operation	--	--	One TPSBAT Battery Pack Included Standard	One THSBAT Battery Pack Included Standard	Requires Optional TDS3BATC Battery Pack
Additional Resources					

Bench Oscilloscopes

With the MSO/DPO Series of bench oscilloscopes, you can analyze analog and digital signals with a single instrument. And now, you can analyze your RF signals too with the MDO Series - the World's first and only mixed domain oscilloscope. Combine that with automated serial and parallel bus analysis, innovative Wave Inspector® controls for rapid waveform navigation, and automated power measurements, and the Tektronix bench oscilloscopes provide the feature-rich tools you need to simplify and speed debug of your complex design.

	MSO/DPO2000	MSO/DPO3000	MSO/DPO4000B	MDO4000
Channels	2, 4 analog channels; 16 digital channels (MSO2000)	2, 4 analog channels; 16 digital channels (MSO3000)	2, 4 analog channels; 16 digital channels (MSO4000B)	4 analog channels; 16 digital channels; 1 RF input
Bandwidth	100 MHz and 200 MHz	100 MHz to 500 MHz	350 MHz to 1 GHz	500 MHz or 1 GHz (analog) 50 kHz - 3 GHz or 50 kHz - 6 GHz (RF)
Sample Rate	1 GS/s (analog); 1 GS/s (digital, only 1 pod); 500 MS/s (digital, both pods)	2.5 GS/s (analog); 121.2 ps (8.25 GS/s) MagniVU™ (digital)	2.5 GS/s to 5 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVU™ (digital)	2.5 GS/s to 5 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVU™ (digital)
Max Record Length	1 Mpoints	5 Mpoints	Up to 20 Mpoints	20 Mpoints
Trigger Types	Edge, Logic, Pulse Width, Set-up and Hold, Rise/Fall Time, Video, I²C*, SPI*, CAN*, LIN*, RS-232/422/485/UART*, Parallel (MSO2000) *Optional	Edge, Sequence, Logic, Pulse Width, Runt, Set-up and Hold, Rise/Fall Time, Video, Extended Video*, I²C*, SPI*, CAN*, LIN*, FlexRay*, RS-232/422/485/ UART*, I²S/LJ/RJ/TDM*, MIL-STD-1553*, Parallel (MSO3000) *Optional	Edge, Sequence, Logic, Pulse Width, Runt, Set-up and Hold, Rise/Fall Time, Video, Extended Video*,I²C*, SPI*, USB*, Ethernet*,CAN*, LIN*, FlexRay*, RS-232/422/485/UART*, I²S/LJ/RJ/TDM*, MIL-STD-1553*, Parallel (MSO4000) *Optional	RF Power Level, Edge, Sequence, Logic, Pulse Width, Runt, Set-up and Hold, Rise/Fall Time, Video, Extended Video*, I²C*, SPI*, USB*, Ethernet*,CAN*, LIN*, FlexRay*, RS-232/422/485/UART*, I²S/LJ/ RJ/TDM*, MILSTD-1553*, Parallel *Optional **With optional MDO4TRIG module, RF power level can be used as source for Pulse Width, Timeout, Runt, Logic, Sequence
Optional Serial Bus Decode and Analysis	DPO2AUTO: CAN and LIN DPO2COMP: RS-232/422/485/ UART DPO2EMBD: I²C, SPI	DPO3AERO: MIL-STD-1553 DPO3AUDIO: I²S, LJ, RJ, TDM DPO3AUTO: CAN and LIN DPO3COMP: RS-232/422/485/ UART DPO3EMBD: I²C, SPI DPO3FLEX: FlexRay	DPO4AERO: MIL-STD-1553 DPO4AUDIO: I²S, LJ, RJ, TDM DPO4AUTO: CAN and LIN DPO4AUTOMAX: CAN, LIN and FlexRay DPO4COMP: RS-232/422/485/ UART DPO4EMBD: I²C, SPI DPO4ENET: Ethernet DPO4USB: USB	DPO4AERO: MIL-STD-1553 DPO4AUDIO: I²S, LJ, RJ, TDM DPO4AUTO: CAN and LIN DPO4AUTOMAX: CAN, LIN and FlexRay DPO4COMP: RS-232/422/485/ UART DPO4EMBD: I²C, SPI DPO4ENET: Ethernet DPO4USB: USB
Connectivity	USB Host, USB Device, GPIB* Optional DPO2CONN Module: LAN (10/100 Base-T Ethernet) and Video Out *Optional	USB Host (x2), USB Device, LAN (10/100 Base-T Ethernet), Video Out, GPIB* *Optional	USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet), Video Out, GPIB* *Optional	USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet), Video Out, GPIB* *Optional
Waveform Math and Analysis	29 Automated Measurements, Waveform and Screen Cursors, Arithmetic Waveform Math, FFT	29 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics **Optional:** DPO3PWR: Power Analysis DPO3VID: HDTV and Custom Triggering	41 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, Measurement Statistics, Waveform Histograms **Optional:** DPO4LMT: Limit and Mask Testing DPO4PWR: Power Analysis DPO4VID: HDTV and Custom Triggering	44 Automated Measurements, Waveform and Screen Cursors, Arithmetic Waveform Math, FFT, Advanced Math, Measurement Statistics, Waveform Histograms **Optional:** DPO4LMT: Limit and Mask Testing, MDO4TRIG: Adv. RF Power Level Trigger, DPO4PWR: Power Analysis DPO4VID: HDTV and Custom Triggering
Software	PC communications software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE
Battery Operation	--	--	--	--
Additional Resources	▶ 360°VIEW 📚 ⬇	▶ 360°VIEW 📚 ⬇	▶ 360°VIEW 📚 ⬇	▶ 360°VIEW 📚 ⬇

Performance Oscilloscopes

Tektronix performance oscilloscopes give you the cleanest, most trustworthy signal in the world. Discover signal fidelity issues fast with patented DPX® acquisition technology and reliably capture complex events with the advanced Pinpoint® triggering system. Quickly navigate through long record lengths with an intuitive Search and Mark capability and accelerate your design validation efforts with more than 30 different software analysis packages.

	MSO/DPO5000	DPO7000C Series
Channels	4 analog channels; 16 digital channels (MSO5000)	4 analog channels
Bandwidth	350 MHz to 2 GHz	500 MHz to 3.5 GHz
Sample Rate	5 GS/s to 10 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVU™ (digital)	10 GS/s to 40 GS/s (analog)
Max Record Length	Up to 250 Mpoints	Up to 400 Mpoints
Trigger Types	Edge, Sequence, Logic, Pulse Width, Glitch, Runt, Timeout, Transition, Set-up and Hold, Rise/Fall Time, Video, I²C*, SPI*, USB (Low, Full, High)*, RS-232/422/485/UART*, Parallel (MSO5000), Visual Trigger* *Optional	Pinpoint™ Triggering, Edge, Glitch, Pulse Width, Runt, Time-out, Transition. Setup/Hold, Pattern, State, Window, Trigger Delay (by Time and by Event), I²C*, SPI*, USB (Low, Full)*, RS-232/422/485/UART*, Visual Trigger* *Optional
Optional Serial Bus Decode and Analysis	SR-COMP: RS-232/422/485/UART SR-EMBD: I²C, SPI SR-USB: USB VNM: CAN, LIN SR-CUST: Custom Serial Analysis Kit	SR-COMP: RS-232/422/485/UART SR-EMBD: I²C, SPI SR-USB: USB LSA: CAN, LIN SR-CUST: Custom Serial Analysis Kit
Connectivity	USB Host (x6), USB Device, LAN (10/100/1000 Base-T Ethernet), Video Out, GPIB* *Optional	USB Host (x4), LAN (10/100/1000 Base-T Ethernet), Video Out, GPIB
Waveform Math and Analysis	53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms **Optional:** DDRA: DDR Memory Bus Analysis DJA: DPOJET Jitter and Eye Diagram Analysis ET3: Ethernet Compliance Test Solution LT: Waveform Limit Testing MTM: Mask Testing PWR: Power Analysis USB: USB Compliance Test Solution VET: Visual Triggering	53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms **Optional:** DDRA: DDR Memory Bus Analysis DJA: DPOJET Jitter and Eye Diagram Analysis ET3: Ethernet Compliance Test Solution LT: Waveform Limit Testing MTM: Mask Testing PWR: Power Analysis USB: USB Compliance Test Solution VET: Visual Triggering
Software	PC Communications Software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE	PC Communications Software: OpenChoice® Desktop, NI LabVIEW Signal Express™ Tektronix Edition LE
Battery Operation	--	--
Additional Resources	▶ 360°VIEW 📖 📥	▶ 360°VIEW 📖 📥

Tektronix Reference Library

With over 20,000 items in our premium content library, it is likely you can find answers on our website to whatever questions you have. Here is a list of our most popular downloaded content for oscilloscopes. Visit www.tektronix.com to download your copy.

1. XYZs of Oscilloscopes Primer

2. ABCs of Probes Primer

3. Fundamentals of Signal Integrity Primer

4. Debugging Serial Buses in Embedded Systems Designs Application Note

5. Power Supply Measurement and Analysis Primer

Additional Resources Key	
Product Demo	▶
Product Explorer	360°VIEW
Data Sheet	📖
Technical Content	📥

Product Highlights

- 2.5 kpoints record length on all channels, all the time
- Bright color display
- 16 automated measurements and FFT analysis
- Built-in help system and probe check wizard
- Front-panel USB host port and rear-panel USB device port
- Qualifies for Education Discount

Accurately capture signals with at least 10X over-sampling on all channels with Digital Real-Time Sampling technology.

Quickly store and transfer your waveforms and setting with the front panel USB port.

TDS1000C-EDU Series

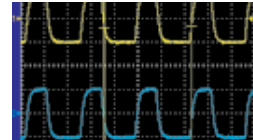The best teach with the best. Easy to use and operate, this oscilloscope prepares students for real-world engineering challenges with the same interface found on over 500,000 Tektronix oscilloscopes worldwide. Add in a low price point and tools that make it easy to implement into your existing curriculum and you have an oscilloscope that your students—and your department—can't live without.

Models	Analog Channels	Analog Bandwidth	Display	Analog Sample Rate
TDS1001C-EDU	2	40 MHz	Color	500 MS/s
TDS1002C-EDU	2	60 MHz	Color	1.0 GS/s
TDS1012C-EDU	2	100 MHz	Color	1.0 GS/s

Recommended Probes

Passive Voltage Probes

TPP0101	100 MHz, 10X, 300V
TPP0201	200 MHz, 10X, 300V
P2220	200 MHz, 1X/10X, 150V/300V

High Voltage Probes

P5200A	50 MHz, 50X/500X, 1.3 kV Differential
P5205A[*1]	100 MHz, 50X/500X, 1.3 kV Differential

Current Probes

P6021	60 MHz, 15 A AC
P6022	120 MHz, 6 A AC
A621	5 to 50 kHz, 2000 A AC
A622	100 kHz, 100 A AC/DC

[*1] Requires 1103 TEKPROBE Power Supply.

Recommended Accessories

1103	TEKPROBE Power Supply
AC2100	Soft Carrying Case

Another Product for Consideration

Need 4 channels? The TDS2000C Series offers the same great performance as the TDS1000C-EDU on both 2- and 4-channel models, and includes a Lifetime Warranty.

Ships with Product

- Two TPP0101 100 MHz, 10X Passive Probes
- Educator Classroom and Lab Resource CD
- OpenChoice® Desktop Software
- Calibration Certificate, Quick Reference Manual, & Documentation on CD
- Power Cord
- 3-year Warranty

Help your students master the use of an oscilloscope with the included classroom labs and resources.

Product Highlights

- 2.5 kpoints record length on all channels, all the time
- Bright color display
- 16 automated measurements and FFT analysis
- Built-in help system and probe check wizard
- Front-panel USB host port and rear-panel USB device port
- Lifetime Warranty[2]

Accurately capture signals with at least 10X over-sampling on all channels with Digital Real-Time Sampling technology.

Easily check if your waveforms pass or fail your specifications with built-in waveform limit testing.
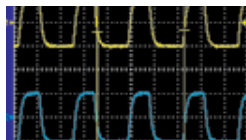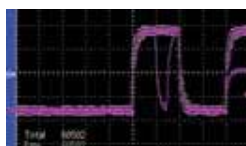
TDS2000C Series

Big performance has never been so small. Featuring Digital Real-Time Sampling, you can trust your scope to accurately capture your signal. Add in USB connectivity, 16 automated measurements and even a built-in help system, this compact oscilloscope helps you get more done in less time. It's true: big things do come in small packages.

Models	Analog Channels	Analog Bandwidth	Analog Sample Rate
TDS2001C	2	50 MHz	500 MS/s
TDS2002C	2	70 MHz	1.0 GS/s
TDS2004C	4	70 MHz	1.0 GS/s
TDS2012C	2	100 MHz	2.0 GS/s
TDS2014C	4	100 MHz	2.0 GS/s
TDS2022C	2	200 MHz	2.0 GS/s
TDS2024C	4	200 MHz	2.0 GS/s

Recommended Probes

Passive Voltage Probes

TPP0101	100 MHz, 10X, 300V
TPP0201	200 MHz, 10X, 300V
P2220	200 MHz, 1X/10X, 150V/300V

High Voltage Probes

P5200A	50 MHz, 50X/500X, 1.3 kV Differential
P5205A[1]	100 MHz, 50X/500X, 1.3 kV Differential

Current Probes

P6021	60 MHz, 15 A AC
P6022	120 MHz, 6 A AC
A621	5 to 50 kHz, 2000 A AC
A622	100 kHz, 100 A AC/DC

[1] Requires 1103 TEKPROBE Power Supply

[2] For complete details visit www.tektronix.com/lifetimewarranty

Recommended Accessories

1103	TEKPROBE Power Supply
AC2100	Soft Carrying Case

Another Product for Consideration

If you work with serial or parallel buses, the MSO/DPO2000 Series offers trigger, decode and search options for common protocols.

Ships with Product

- One TPP0x01 100 MHz or 200 MHz, 10X Passive Probe Per Analog Channel
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Power Cord
- Lifetime Warranty[2]

## 2011 Winner of the EETimes Annual Creativity in Electronics (ACE) Award

TPS2000B Series

Great performance goes beyond the lab. This compact, battery-powered oscilloscope packs big-time performance and versatility. Make floating or differential measurements with up to four isolated channels. Tackle tough electronics and power systems in challenging environments with backlit buttons and optional power analysis software. Accurately capture your signals with Digital Real-Time Sampling. Huge performance. Small footprint.

Product Highlights

- 2.5 kpoints record length on all channels, all the time
- 4 isolated analog channels
- 11 automated measurements and FFT analysis
- Optional power analysis software
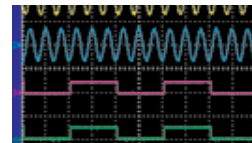
Safely and easily make floating measurements with the four isolated channels.

Battery pack gives you up to 4 hours of portable operation. Hot-swap the pack for 4 more hours!

Models	Analog Channels	Analog Bandwidth	Analog Sample Rate
TPS2012B	2	100 MHz	1.0 GS/s
TPS2014B	4	100 MHz	1.0 GS/s
TPS2024B	4	200 MHz	2.0 GS/s

Application Modules

TPS2PBND2	TPS2PWR1 Module and Four P5122 Probes
TPS2PWR1	Power Measurement and Analysis Module

Recommended Accessories

1103	TEKPROBE Power Supply
AC2100	Soft Carrying Case
TPSBAT	Additional Lithium-Ion Battery Pack (one included standard with instrument)
TPSCHG	External Battery Charger

Recommended Probes

Passive Voltage Probes

TPP0101	100 MHz, 10X, 300V
TPP0201	200 MHz, 10X, 300V
P2220	200 MHz, 1X/10X, 150V/300V

High Voltage Probes

P5205A[*1]	100 MHz, 50X/500X, 1.3 kV Differential
P5210A[*1]	50 MHz, 50X/500X, 5.6 kV Differential
P5122	200 MHz, 100X, 1 kV Single-ended

Current Probes

P6021	60 MHz, 15 A AC
P6022	120 MHz, 6 A AC
A621	5 to 50 kHz, 2000 A AC
A622	100 kHz, 100 A AC/DC

[*1] Requires 1103 TEKPROBE Power Supply

Another Product for Consideration

For very accurate voltage and current measurements, the DMM Series offers up to 0.0024% basic DC voltage accuracy.

Ships with Product

- One TPP0101 100 MHz, 10X Passive Probe Per Analog Channel (TPS2012B & TPS2014B)
- One TPP0201 200 MHz, 10X Passive Probe Per Analog Channel (TPS2024B)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- RS-232 to USB Adapter Cable
- One Lithium-Ion Battery
- Calibration Certificate, Quick Reference Manual, & Documentation on CD
- Front Panel Cover, AC Adapter with Power Cord
- 3-year Warranty

Learn more with the "Fundamentals of Floating Measurements and Isolated Input Oscilloscopes" application note.

THS3000 Series

Affordable performance in a rugged, portable design. This handheld, battery-powered oscilloscope is packed with features and analysis tools. With up to 5 GS/s sampling rate and four isolated channels that can measure up to 1000 Volts you can quickly, reliably and accurately evaluate your signal characteristics on the bench or in the field.

Product Highlights

- 4 fully isolated and floating channels
- 21 automated measurements
- 600 VRMS CAT III, 1000 VRMS CAT II rated inputs
- Measurement data logging with TrendPlot™
- 7 hours of continuous battery operation
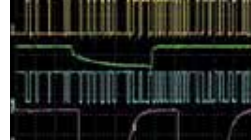
Four isolated input channels easily handle any type of mixed signal inputs.
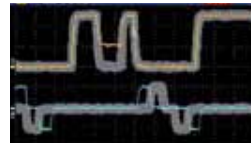
User-defined limit testing can automatically monitor your signals and output Pass or Fail results.

Models	Analog Channels	Analog Bandwidth	Analog Sample Rate
THS3014	4	100 MHz	2.5 GS/s
THS3014-TK	4	100 MHz	2.5 GS/s
THS3024	4	200 MHz	5.0 GS/s
THS3024-TK	4	200 MHz	5.0 GS/s

Recommended Probes

High Voltage Probes

P5122	200 MHz, 100X high-voltage probe
P5150	500 MHz 50X high-voltage probe[1]

Current Probes

A621	2000 A, 5 kHz to 50 kHz AC
A622	100 A, 100 kHz AC/DC
CT2	2.5 A, 200 MHz AC

[1] The P5150 is compatible with THS oscilloscopes, but 50X vertical scaling is not offered.

Recommended Accessories

THSBAT	Additional spare battery
THSCHG[2]	Battery charger

[2] Does not include AC power adapter.

Another Product for Consideration

For very accurate ripple measurements on high voltage signals, the P5122 probe offers high impedance with minimal capacitive loading.

Ships with Product

- Four THP0301-Y/B/M/G 300 V CAT III, 300 MHz 10X Passive Probes
- OpenChoice® Desktop Software
- USB-A to Mini USB-B Cable for PC communication
- Lithium-ion Battery with 7-hour battery life
- Calibration Certificate, Installation/Safety Manual, Documentation on CD
- Carrying Handle, Hanging Strap
- ACHHS Soft-sided Carry Case[3], AC Power Adapter with Power Cord
- Hard-sided travel case[4]
- Soft-sided probe case, two probe replacement accessory kits[4]
- 3-year Warranty

[3] Non-TK models only

[4] TK models only

Learn more with the "Fundamentals of Floating Measurements and Isolated Input Oscilloscopes" application note.

Fundamentals of Floating Measurements and Isolated Input Oscilloscopes
Application Note

Tektronix

Product Highlights

- 10 kpoints record length on all channels, all the time
- 3,600 wfm/s max. waveform capture rate with DPO technology
- 25 automated measurements and FFT analysis
- Front-panel USB host port and optional rear-panel Ethernet, GPIB, and RS-232 ports

Optional battery pack gives you up to 3 hours of portable operation.

Accurately capture signals with at least 5X over-sampling on all channels with Digital Real-Time Sampling technology.

TDS3000C Series

Performance meets portability. Featuring up to 500 MHz bandwidth and optional battery-powered operation, this oscilloscope is as capable as it is convenient. Capture fast-changing signals with Digital Real-Time Sampling. Maximize efficiency with WaveAlert® Anomaly Detection and 25 automated measurements. Performance and versatility. Turns out, you can take it with you.

Models	Analog Channels	Analog Bandwidth	Analog Sample Rate
TDS3012C	2	100 MHz	1.25 GS/s
TDS3014C	4	100 MHz	1.25 GS/s
TDS3032C	2	300 MHz	2.5 GS/s
TDS3034C	4	300 MHz	2.5 GS/s
TDS3052C	2	500 MHz	5 GS/s
TDS3054C	4	500 MHz	5 GS/s

Application Modules

TDS3LIM	Limit Testing
TDS3TMT	Telecom Mask Test Triggering
TDS3VID	HDTV and Custom Video Triggering

Recommended Accessories

1103	TEKPROBE Power Supply
TDS3GV	GPIB, RS-232, and VGA Communications Module
TDS3BATC	Lithium-ion Battery
TDS3ION	Battery Charger
AC3000	Soft Carrying Case
HCTEK4321	Hard Carrying Case (requires AC3000)

Recommended Probes

Passive Voltage Probes

P6139B	500 MHz, 10X, 300V

Active Voltage Probes

P6243	1 GHz, 10X, ±15V Single-ended

Differential Voltage Probes

P6246[1]	400 MHz, 1X/10X, 8.5 V Differential

High Voltage Probes

P5205A	100 MHz, 50X/500X, 1.3 kV Differential
P5210A	50 MHz, 100X/1000X, 5.6 kV Differential

Current Voltage Probes

TCP202	50 MHz, 15 A AC/DC

[1] Requires 1103 TEKPROBE Power Supply

Another Product for Consideration

If you work with serial or parallel buses, the MSO/DPO3000 Series offers trigger, decode and search options for common protocols.

Ships with Product

- One P6139B 500 MHz, 10X Passive Probe Per Analog Channel
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual, & Documentation on CD
- Front Panel Cover, Power Cord
- 3-year Warranty

Learn more about Digital Real-Time Sampling with the "Be Sure to Capture the Complete Picture" application note.

Product Highlights

- 1 Mpoint record length on all channels, all the time
- 5,000 wfm/s max. waveform capture rate with DPO technology
- Over 125 available trigger combinations, including setup/hold, serial packet and parallel data
- Automated search and easy waveform navigation with Wave Inspector®
- 29 automated measurements and FFT analysis

Quickly pan/zoom and automatically search your waveforms with Wave Inspector®.

Automatically trigger, decode and search your serial buses with optional analysis modules.

MSO/DPO2000 Series

Test more, spend less with an oscilloscope that's packed with features and is also light on price. Measure as many as 20 channels of analog and digital signals. Speed debug with automated serial and parallel bus analysis. Search your entire record instantly with Wave Inspector®. Entry level has never been so powerful.

Models	Analog Channels	Digital Channels	Analog Bandwidth	Analog Sample Rate
DPO2012	2	--	100 MHz	1 GS/s
MSO2012	2	16	100 MHz	1 GS/s
DPO2014	4	--	100 MHz	1 GS/s
MSO2014	4	16	100 MHz	1 GS/s
DPO2024	4	--	200 MHz	1 GS/s
MSO2024	4	16	200 MHz	1 GS/s

Application Modules

Serial Bus Triggering and Protocol Analysis

DPO2AUTO	Automotive (CAN, LIN)
DPO2COMP	Computer (RS-232)
DPO2EMBD	Embedded (I²C, SPI)

Recommended Accessories

DPO2CONN	Ethernet and Video Out Connectivity Module
119-7465-xx	TekVPI External Power Supply
TPA-BNC	TekVPI Interface Adapter
ACD2000	Soft Carrying Case

Recommended Probes

Passive Voltage Probes

TPP0200	200 MHz, 10X

Active Voltage Probes

TAP1500[*1]	1.5 GHz, 10X, ±8V TekVPI Single-ended

Differential Voltage Probes

TDP0500[*1]	500 MHz, 50X/500X, ±42V TekVPI
TDP1000[*1]	1 GHz, 50X/500X, ±42V TekVPI

High Voltage Probes

THDP0200[*1]	200 MHz, 50X/500X, 1.5 kV Differential
TMDP0200[*1]	200 MHz, 25X/250X, 750 V Differential
THDP0100[*1]	100 MHz, 100X/1000X, 6.0 kV Differential

Current Probes

TCP0030[*1]	120 MHz, 30A AC/DC TekVPI
TCP0150[*1]	20 MHz, 150A AC/DC TekVPI

[*1] Requires 119-7465-xx TekVPI External Power Supply

Another Product for Consideration

Need more bandwidth? The MSO/DPO3000 Series offers up to 500 MHz analog bandwidth and additional performance.

Ships with Product

- One TPP0200 200 MHz, 10X Passive Probe Per Analog Channel
- One P6316 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Power Cord
- 3-year Warranty

"It combines scope, logic analyzer, and protocol analyzer features into an easy-to-use, portable package. The mixed signal functionality, serial decode, small footprint, and affordable price provide compelling value."

Alfred Mora
Electrical Engineer, Datalogic Scanning, Inc.

MSO/DPO3000 Series

Looking for an all-purpose oscilloscope? Look no further. Measure up to 20 channels of analog and digital signals with one instrument. Save time with automated measurements, and built-in serial and parallel bus analysis. Instantly search your entire record with Wave Inspector®. Efficiency. Versatility. Performance. One oscilloscope.

Product Highlights

- 5 Mpoint record length on all channels, all the time
- >50,000 wfm/s max. waveform capture rate with DPO technology
- Over 125 available trigger combinations, including setup/hold, serial packet and parallel data
- Automated search and easy waveform navigation with Wave Inspector®
- 29 automated measurements and FFT analysis

Analyze your digital signals with up to 121.2 ps timing resolution with MagniVu™ (MSO Series)

Automatically trigger, decode and search your serial buses with optional analysis modules.

Models	Analog Channels	Digital Channels	Analog Bandwidth	Analog Sample Rate	Digital Sample Rate Main/MagniVu™
DPO3012	2	--	100 MHz	2.5 GS/s	--
MSO3012	2	16	100 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s
DPO3014	4	--	100 MHz	2.5 GS/s	--
MSO3014	4	16	100 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s
DPO3032	2	--	300 MHz	2.5 GS/s	--
MSO3032	2	16	300 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s
DPO3034	4	--	300 MHz	2.5 GS/s	--
MSO3034	4	16	300 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s
DPO3052	2	--	500 MHz	2.5 GS/s	--
DPO3054	4	--	500 MHz	2.5 GS/s	--
MSO3054	4	16	500 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s

Application Modules

Serial Bus Triggering and Protocol Analysis

DPO3AERO	Aerospace (MIL-STD-1553)
DPO3AUDIO	Audio (I²S, LJ, RJ and TDM)
DPO3AUTO	Automotive (CAN, LIN)
DPO3COMP	Computer (RS-232)
DPO3EMBD	Embedded (I²C, SPI)
DPO3FLEX	Automotive (FlexRay)

Additional Analysis

DPO3PWR	Power Analysis
DPO3VID	HDTV and Custom Video Triggering

Recommended Accessories

TPA-BNC	TekVPI Interface Adapter
ACD4000	Soft Carrying Case

Recommended Probes

Passive Voltage Probes

P6139B	500 MHz, 10X TekVPI

Active Voltage Probes

TAP1500	1.5 GHz, 10X, ±8V TekVPI

Differential Voltage Probes

TDP0500	500 MHz, 50X/500X, ±42V TekVPI
TDP1000	1 GHz, 50X/500X, ±42V TekVPI

High Voltage Probes

THDP0200	200 MHz, 50X/500X, 1.3 kV Differential
TMDP0200	200 MHz, 25X/250X, 750 V Differential

Current Probes

TCP0030	120 MHz, 30A AC/DC TekVPI
TCP0150	20 MHz, 150A AC/DC TekVPI

Ships with Product

- One P6139B 500 MHz, 10X TekVPI Passive Probe Per Analog Channel
- One P6316 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Front Panel Cover, Power Cord
- 3-year Warranty

Upgrade the bandwidth of your MSO/DPO3000 Series any time after your purchase up to 500 MHz, ensuring your scope can grow with your needs.
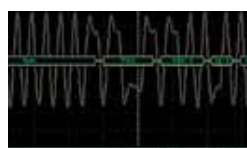
Product Highlights

- Up to 20 Mpoint standard record length, all channels
- >50,000 wfm/s max. waveform capture rate with DPO technology
- Over 125 available trigger combinations, including setup/hold, serial packet and parallel data
- Automated search and easy waveform navigation with Wave Inspector®
- 41 automated measurements and FFT analysis

Ships with one passive probe per analog channel, with up to 1 GHz bandwidth and an industry-best 3.9 pF of capacitive loading.

Automatically trigger, decode and search your serial and parallel buses

MSO/DPO4000B Series

Debug complex designs faster with an oscilloscope that's as versatile as it is powerful. Measure up to 20 channels of analog and digital signals. Analyze serial and parallel buses. Instantly search your entire record with the time-saving Wave Inspector®. Finally, an oscilloscope that multitasks as well as you do.

Models	Analog Channels	Digital Channels	Bandwidth	Analog Sample Rate (Max)	Digital Sample Rate Main/MagniVu™
DPO4034B	4	--	350 MHz	2.5 GS/s	--
MSO4034B	4	16	350 MHz	2.5 GS/s	500 MS/s /16.5 GS/s
DPO4054B	4	--	500 MHz	2.5 GS/s	--
MSO4054B	4	16	500 MHz	2.5 GS/s	500 MS/s /16.5 GS/s
DPO4102B-L	2	--	1 GHz	5 GS/s	--
DPO4102B	2	--	1 GHz	5 GS/s	--
DPO4104B-L	4	--	1 GHz	5 GS/s	--
DPO4104B	4	--	1 GHz	5 GS/s	--
MSO4102B-L	2	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s
MSO4102B	2	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s
MSO4104B-L	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s
MSO4104B	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s

Application Modules

Serial Bus Triggering and Analysis

DPO4AERO	Aerospace (MIL-STD 1553)
DPO4-AUDIO[*1]	Audio (I²S, LJ, RJ and TDM)
DPO4AUTO	Automotive (CAN, LIN)
DPO4-AUTOMAX	Automotive (CAN, LIN, FlexRay)
DPO4COMP	Computer (RS-232)
DPO4EMBD[*2]	Embedded (I²C, SPI)
DPO4ENET	Ethernet (10Base-T, 100Base-Tx)
DPO4USB[*3]	USB 2.0 (LS, FS, HS)
DPO4PWR	Power Analysis
DPO4LMT	Limit and Mask Testing
DPO4VID	HDTV & Custom Video Triggering

[*1] Not available on DPO4102B, DPO4102B-L models.
[*2] For SPI, only 2-wire support is available on DPO4102B, DPO4102B-L.
[*3] USB 2.0 HS only available on 1 GHz analog bandwidth models.

Recommended Probes

Passive Voltage Probes

TPP0500	500 MHz, 10X TekVPI
TPP1000	1 GHz, 10X TekVPI

Active Voltage Probes

TAP1500	1.5 GHz, 10X TekVPI

Differential Voltage Probes

TDP0500	500 MHz, 50X/500X, ±42V TekVPI
TDP1000	1 GHz, 50X/500X, ±42V TekVPI

High Voltage Probes

TPP0850	800 MHz, 50X, 2.5 kV TekVPI
TMDP0200	200 MHz, 25X/250X, 750 V Differential

Current Probes

TCP0030	120 MHz, 30A AC/DC TekVPI

Another Product for Consideration

Working with RF? The MDO4000 Series is the world's only oscilloscope with a built-in spectrum analyzer for analyzing analog, digital and RF signals.

Ships with Product

- One TPP0500 (500 MHz models) or TPP1000 (1 GHz models) Passive Voltage Probe per Analog Channel
- One P6616 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Front Panel Cover, Power Cord
- 3-year Warranty

$$\left(\text{analog} + \text{digital} + \text{RF} \right) =$$

analog   digital   RF
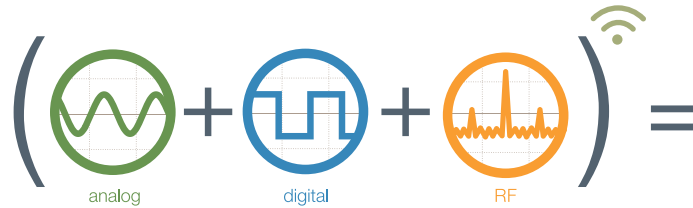
The World's First
Mixed Domain Oscilloscope

MDO4000 Mixed Domain Oscilloscope

❶ Time Domain	❷ Frequency Domain

- 4 analog channels
  - 500 MHz and 1 GHz bandwidth models
- 16 digital channels
- 1 RF channel
  - 50 kHz–3 GHz and 50 kHz–6 GHz frequency range models
  - Ultra-wide capture bandwidth up to 3 GHz
  - Unique RF analysis tools: automated markers, spectrogram display, RF vs. time traces, advanced RF triggers
- Parallel bus triggering and analysis, included standard
- Serial bus triggering and analysis options
- Built on the award-winning MSO4000B mixed signal oscilloscope platform

Introducing the MDO4000 Series from Tektronix, the revolutionary oscilloscope with a built-in spectrum analyzer.
It's more than just a new scope—it will transform the way you test. Capture time-correlated analog, digital and RF signals for a complete system view of your device. See both time and frequency domains in one glance. View the RF spectrum at any point in time to see how it changes. Quickly and efficiently solve the most complicated design issues—with an oscilloscope as integrated as your designs. Two domains. One remarkable scope. Only from Tektronix.

Take a look at how we've transformed testing: See the scope in action, analyze the specs and learn more at **www.tektronix.com/revolutionary**.

MDO4000 Series

The new revolutionary oscilloscope with a built-in spectrum analyzer. Capture time-correlated analog, digital and RF signals for a complete system view of your device. See both time and frequency domains in one glance. View the RF spectrum at any point in time to see how it changes. Quickly and efficiently solve the most complicated design issues— with an oscilloscope as integrated as your designs.

Product Highlights

- The world's first oscilloscope with a built-in spectrum analyzer
- Up to 3 GHz capture bandwidth on the RF channel
- Integrated spectral analysis tools: automated and manual markers, spectrogram display, RF vs. time traces
- Advanced RF power level triggers available
- Built on the MSO4000B Series mixed signal oscilloscope platform
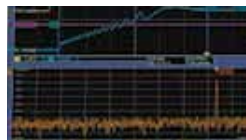
Capture time-correlated analog, digital and RF signals.
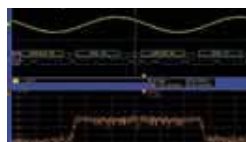
See how your RF spectrum changes over time or device state.

Models	Analog Channels	Digital Channels	Analog Bandwidth	Analog Sample Rate	Digital Sample Rate Main/MagniVu™	RF Channel	RF Frequency Range
MDO4054-3	4	16	500 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	50 kHz – 3 GHz
MDO4054-6	4	16	500 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	50 kHz – 6 GHz
MDO4104-3	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s	1	50 kHz – 3 GHz
MDO4104-6	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s	1	50 kHz – 6 GHz

Application Modules

Serial Bus Triggering and Protocol Analysis

DPO4AERO	Aerospace (MIL-STD 1553)
DPO4 AUDIO	Audio (I²S, LJ, RJ and TDM)
DPO4AUTO	Automotive (CAN, LIN)
DPO4-AUTOMAX	Automotive (CAN, LIN, FlexRay)
DPO4COMP	Computer (RS-232)
DPO4EMBD	Embedded (I²C, SPI)
DPO4ENET	Ethernet (10BASE-T, 100BASE-TX)
DPO4USB[*1]	USB 2.0 (LS, FS, HS)

Additional Analysis

MDO4TRIG	Adv. RF Power Level Triggering
DPO4PWR	Power Analysis
DPO4LMT	Limit and Mask Testing
DPO4VID	HDTV & Custom Video Triggering

[*1] USB 2.0 HS only available on 1 GHz analog bandwidth models.

Recommended Probes

Passive Voltage Probes

TPP0500	500 MHz, 10X TekVPI
TPP0502	500 MHz, 2X TekVPI
TPP1000	1 GHz, 10X TekVPI

Active Voltage Probes

TAP1500	1.5 GHz, 10X TekVPI

Differential Voltage Probes

TDP0500	500 MHz, 50X/500X, ±42V TekVPI
TDP1000	1 GHz, 50X/500X, ±42V TekVPI

High Voltage Probes

TPP0850	800 MHz, 50X, 2.5 kV TekVPI
THDP0200	200 MHz, 50X/500X, 1.5 kV Differential

Current Probes

TCP0030	120 MHz, 30A AC/DC TekVPI

Recommended Accessories

119-4146-xx	Near Field Probe Set, 100 kHz - 1 GHz
119-6609-xx	Flexible Monopole Antenna
TPA-N-VPI	N-to-TekVPI Adapter

Ships with Product

- Four TPP0500 (500 MHz models) or TPP1000 (1 GHz models) Passive Voltage Probes
- One P6616 16 Channel Logic Probe
- N-to-BNC Adapter (103-0045-00)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Front Panel Cover, Power Cord
- 3-year Warranty

2012 "Product of the Year" Award Winner

- Test & Measurement World

Test & Measurement World
BEST IN TEST
2012 AWARD WINNER

MSO/DPO5000 Series

The performance you've wanted. A price you never thought possible. Measure up to 20 channels of analog and digital signals. Analyze specialty applications with over 10 optional software packages. View up to 16 decoded serial and parallel buses on your display at once. Performance and value. Some engineers have all the luck.

Product Highlights

- Windows 7 Ultimate 64-bit operating system and touch-screen display
- >250,000 wfm/s max. waveform capture rate with FastAcq™ technology
- Over 350 available trigger combinations, including setup/hold, serial packet and parallel data
- Automated search on up to 8 waveform events with Wave Inspector®
- 53 automated measurements and FFT analysis

Ships with four passive probes with up to 1 GHz bandwidth and an industry-best 3.9 pF of capacitive loading.
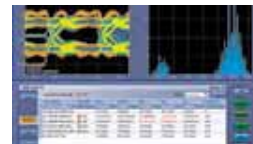
Includes the DPOJET jitter and eye pattern analysis software package - free.

Models	Analog Channels	Digital Channels	Analog Bandwidth	Analog Sample Rate 4ch/2ch	Digital Sample Rate Main/MagniVu™
DPO5034	4	--	350 MHz	5 GS/s	--
MSO5034	4	16	350 MHz	5 GS/s	500 MS/s /16.5 GS/s
DPO5054	4	--	500 MHz	5 GS/s	--
MSO5054	4	16	500 MHz	5 GS/s	500 MS/s /16.5 GS/s
DPO5104	4	--	1 GHz	5 GS/s /10 GS/s	--
MSO5104	4	16	1 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s
DPO5204	4	-	2 GHz	5 GS/s /10 GS/s	--
MSO5204	4	16	2 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s

Software Packages

Serial Bus Triggering and Protocol Analysis

SR-COMP	Computer (RS-232)
SR-EMBD	Embedded (I²C, SPI)
SR-USB	USB 2.0 (LS, FS, HS)
VNM	CAN/LIN Protocol Analysis

Compliance Test

ET3	Ethernet
USB	USB 2.0

Additional Analysis

DDRA	DDR memory
DJA	Advanced Jitter and Eye Diagram
LT	Waveform Limit Testing
MTM	Mask Testing
PS1	Power Solution Bundle
PWR	Power Measurements
SVE	SignalVu Wideband RF Analysis
VET	Visual Trigger and Search

Recommended Probes

Passive Voltage Probes

TPP0500	500 MHz, 10X TekVPI
TPP0502	500 MHz, 2X TekVPI
TPP1000	1 GHz, 10X TekVPI

Active Voltage Probes

TAP1500	1.5 GHz, 10X TekVPI
TAP2500	2.5 GHz, 10X TekVPI

Differential Voltage Probe

TDP0500	500 MHz, 50X/500X, ±42V TekVPI
TDP1000	1 GHz, 50X/500X, ±42V TekVPI

High Voltage Probes

TPP0850	800 MHz, 50X, 2.5 kV TekVPI
THDP0200	200 MHz, 50X/500X, 1.5 kV Differential

Current Probes

TCP0030	120 MHz, 30A AC/DC TekVPI
TCP0150	20 MHz, 150A AC/DC TekVPI

Ships with Product

- Four TPP0500 (350 MHz and 500 MHz models) or TPP1000 (1 GHz and 2 GHz models) Passive Voltage Probes
- One P6616 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Front Panel Cover, Power Cord
- 1-year Warranty

Instrument Options

Record Length

Opt. 2RL	25M/Ch
Opt. 5RL	50M/Ch
Opt. 10RL	125M/Ch

Limitations apply. See data sheet for full details.

Product Highlights

- 500 MHz,1 GHz, 2.5 GHz, and 3.5 GHz models
- Windows 7 Ultimate 64-bit operating system and touch-screen display
- >250,000 wfm/s max. waveform capture rate with FastAcq™ technology
- Over 1400 available trigger combinations with Pinpoint® triggering
- Automated search and mark for waveform events
- 53 automated measurements and FFT analysis
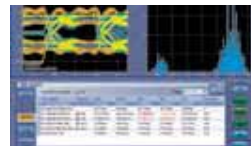
Includes the DPOJET jitter and eye pattern analysis software package - free.

Over 15 optional software packages available for specialized applications.

DPO7000C Series

Complex designs tremble before this oscilloscope. Packed with features like DPX® technology for fast waveform capture rates, advanced Pinpoint® triggering, and over 15 application software packages, it speeds debug and analysis of performance devices. It's a time-strapped engineer's dream come true.

Models	Analog Channels	Bandwidth	Record Length (1/2/4 Channels)	Analog Sample Rate
DPO7054C	4	500 MHz	50/25/12.5 M	20/10/5 GS/s
DPO7104C	4	1 GHz	50/25/12.5 M	20/10/5 GS/s
DPO7254C	4	2.5 GHz	50/25/12.5 M	40/20/10 GS/s
DPO7354C	4	3.5 GHz	50/25/12.5 M	40/20/10 GS/s

Software Packages

Serial Bus Triggering and Protocol Analysis

SR-COMP	Computer (RS-232)
SR-EMBD	Embedded (I²C, SPI)
SR-USB	USB 2.0 (LS, FS, HS)
LSA	Automotive (CAN/LIN)

Compliance Test

ET3	Ethernet
USB	USB 2.0

Additional Analysis

DDRA	DDR memory
DJA	Advanced Jitter and Eye Diagram
LT	Waveform Limit Testing
MTM	Mask Testing
PS1	Power Solution Bundle
PWR	Power Measurements
SVE	SignalVu Wideband RF Analysis
VET	Visual Trigger and Search

Recommended Probes

Active Voltage Probes

TAP1500	1.5 GHz, 10X TekVPI
TAP2500	2.5 GHz, 10X TekVPI
TAP3500	3.5 GHz, 10X TekVPI

Differential Voltage Probe

TDP0500	500 MHz, 50X/500X, ±42V TekVPI
TDP1000	1 GHz, 50X/500X, ±42V TekVPI
TDP1500	1.5 GHz, 1X/10X, ± 8.5V TekVPI
TDP3500	3.5 GHz, 5X, ± 2V TekVPI

High Voltage Probes

THDP0200	200 MHz, 50X/500X, 1.5 kV Differential
TMDP0200	200 MHz, 25X/250X, 750 V Differential
THDP0100	100 MHz, 100X/1000X, 6.0 kV Differential

Current Probes

TCP0030	30A, 120 MHz AC/DC Current probe
TCP0150	150A, 20 MHz AC/DC Current probe

Ships with Product

- Four P6139B 500 MHz, 10X TekVPI Passive Voltage Probes
- OpenChoice® Desktop and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
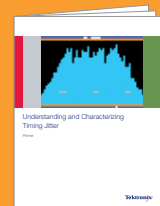- Front Panel Cover, Power Cord
- 1-year Warranty

Instrument Options

Record Length

Opt. 2RL	25M/Ch
Opt. 5RL	50M/Ch
Opt. 10RL*1	125M/Ch

Limitations apply. See data sheet for full details.

*1 Not available on DPO7054C, DPO7104C

Learn more with "Understanding and Characterizing Timing Jitter" primer.

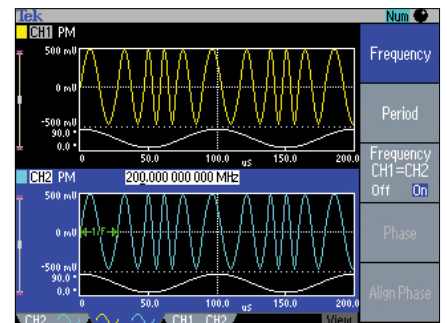Understanding and Characterizing Timing Jitter

Tektronix

Fast, accurate and efficient. Just like the engineers who use them.

Debug today's complex designs faster than ever with the feature-packed Tektronix AFG3000 Arbitrary/Function Generator Series. Best-in-class performance, up to 12 standard waveforms, arbitrary waveform capability and signal impairment options offer the flexibility to test a variety of applications with one instrument. Plus, all AFG3000 Arbitrary/Function Generators are controllable from your PC, so you can analyze data across your Tektronix bench instruments. Put simply, we designed the AFG3000 Series to do more, so you don't have to.

∘ Dual-channel—Save cost and bench space by replacing two signal generators with one instrument

∘ 12 standard waveforms

∘ AM, FM, PM, FSK, PWM

∘ Arbitrary waveform capabilities and signal impairment options

∘ Up to 2 GS/s sample rate

∘ 25 shortcut keys for fast input

∘ USB, LAN, GPIB connectivity

∘ Connect and control from your PC with included National Instruments LabVIEW SignalExpress™ software

∘ Industry-leading, 3-year warranty

Tektronix® AFG3000 Arbitrary/Function Generator

Detailed specs, virtual demos and more at
Tektronix.com/AFG3000

Signal Generators

The definition of versatility, Tektronix signal generators create a virtually unlimited range of standard and custom signals, from sine or pulse to ideal or distorted and anything in between.

	AFG3000 Series						
Bandwidth	240 MHz, 100 MHz, 25 MHz, 10 MHz						
Channels	1 or 2 (independent or synchronized)						
Memory Depth	128 k points						
Standard Waveforms	Sine	Sine(x)/x	Square	DC	Ramp	Gaussian	Exponential Decay
	Pulse	Lorentz	Noise	Arbitrary	Haversine	Exponential Rise	
Modulation	AM, FM, PM, FSK, PWM, External						
Additional Modes	Sweep, Burst, Add Noise Impairment						
Connectivity	Front panel: USB host Rear panel: USB device, LAN, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE version) & AWX100 ArbExpress™ Waveform Tool						

Choosing Your Signal Generator

In electronic test and measurement, more often than not, a signal source is required to generate signals that are not available unless externally provided. Below is a list of common features that you may want to consider when choosing a signal generator for your application.

❶ Sample (Clock) Rate

Sample rate, usually specified in terms of megasamples or gigasamples per second, denotes the maximum clock or sample rate at which the instrument can operate. The sample rate affects the frequency of the main output signal. In general, you should choose an instrument where the sampling frequency is twice that of the highest spectral frequency component of the generated signal to ensure accurate signal reproduction. The maximum sample rate also determines the smallest time increment that can be used to create waveforms. Typically this figure is simply the result of the calculation; $T = 1/F$, where T is the timing resolution in seconds and F is the sample rate.

❷ Memory Depth (Record Length)

Memory depth, or record length, plays an important role in signal fidelity because it determines how many points of data can be stored to define a waveform. Deeper memory enables you to store more waveform detail and/or more cycles of the desired waveform.

❸ Vertical (Amplitude) Resolution

Vertical resolution pertains to the binary word size, in bits, of the instrument's DAC, with more bits equating to higher resolution. The vertical resolution of the DAC defines the amplitude accuracy and distortion of the re-produced waveform. While more is better there is a general trade-off for most arbitrary waveform instruments, the higher the resolution the lower the sample rate.

❹ Features and Capabilities

Tektronix signal generators offer a range of features and output capabilities. When choosing your signal generator, you should also evaluate standard waveforms, modulation capabilities, output amplitude and waveform editing software to ensure that the instrument meets your needs.
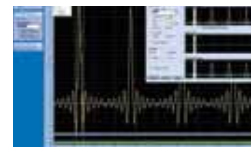
Product Highlights

- 12 standard waveforms - Sine, DC, Pulse, Exponential Decay, Sine(x)/x, Ramp, Lorentz, Haversine, Exponential Rise, Square, Gaussian, Noise
- Arbitrary waveform capability
- AM, FM, PM, FSK, PWM modulation
- Front-panel USB host port and rear-panel Ethernet and GPIB ports
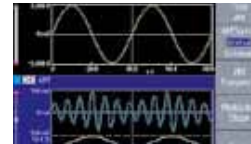
Large color display shows your settings and waveforms in a single glance.

Create and modify waveforms with ease with the included ArbExpress® software.

AFG3000 Series

Test complex designs faster with a fully loaded function generator. Featuring 12 standard waveforms, plus arbitrary capability and many modulation options, this generator supports a wide range of application needs. Add in best-in-class performance and 25 shortcut keys and you have a generator that's loaded with features and light on complexity.

Models	Analog Channels	Output Bandwidth	Analog Sample Rate	Memory Depth	Amplitude (into 50 W)
AFG3011	1	10 MHz	250 MS/s	128 K	20 mV$_{p-p}$ to 20 V$_{p-p}$
AFG3021B	1	25 MHz	250 MS/s	128 K	10 mV$_{p-p}$ to 10 V$_{p-p}$
AFG3022B	2	25 MHz	250 MS/s	128 K	10 mV$_{p-p}$ to 10 V$_{p-p}$
AFG3101	1	100 MHz	1 GS/s (≤16K) 250 MS/s (>16K)	128 K	20 mV$_{p-p}$ to 10 V$_{p-p}$
AFG3102	2	100 MHz	1 GS/s (≤16K) 250 MS/s (>16K)	128 K	20 mV$_{p-p}$ to 10 V$_{p-p}$
AFG3251	1	240 MHz	2 GS/s (≤16K) 250 MS/s (>16K)	128 K	50 mV$_{p-p}$ to 5 V$_{p-p}$
AFG3252	2	240 MHz	2 GS/s (≤16K) 250 MS/s (>16K)	128 K	50 mV$_{p-p}$ to 5 V$_{p-p}$

Recommended Accessories

Cables

012-0482-xx	BNC cable shielded, 3 ft.
012-1256-xx	BNC cable shielded, 9 ft.
012-0991-xx	GPIB cable, double shielded

Accessories

RM3100	Rackmount kit
013-0345-xx	Fuse adapter, BNC-P to BNC-R
159-0454-xx	Fuse set, 3pcs, 0.125A

Ships with Product

- ArbExpress™ Software and NI LabVIEW SignalExpress™ TE (LE version) Software
- LabView & IVI drivers
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Power Cord
- 3-year Warranty

Learn more about the time-saving features of ArbExpress with the "Replicating Real World Signals with an Arbitrary/Function Generator" application note.

Digital Multimeters

Designed to save time and reduce headaches, Tektronix Digital Multimeters are built to do more so you don't have to. Loaded with time-saving features like automated measurements, built-in analysis modes and front-panel shortcut buttons.

	DMM4020	DMM4040	DMM4050
Resolution	5.5 digit	6.5 digit	6.5 digit
Basic Vdc Accuracy	Up to 0.015%	Up to 0.0035%	Up to 0.0024%
Measurements	V ac, V dc, I ac, I dc, Resistance, Continuity, Diode, Frequency	V ac, V dc, I ac, I dc, Resistance, Continuity, Diode, Frequency, Period	V ac, V dc, I ac, I dc, Resistance, Continuity, Diode, Frequency, Period, Temperature, Capacitance
Analysis Modes	Limit Compare	Trend Plot, Statistics, Histogram	Trend Plot, Statistics, Histogram
Connectivity	Rear panel: RS-232, RS-232 to USB adapter included PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Front panel: USB host Rear panel: RS-232, RS-232 to USB adapter included, GPIB and Ethernet PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Front panel: USB host Rear panel: RS-232, RS-232 to USB adapter included, GPIB and Ethernet PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)

Choosing Your Digital Multimeter

To help you choose the right digital multimeter for your needs, the most common selection criteria are listed below, along with helpful tips for determining your requirements.

① Resolution

Resolution refers to how fine a measurement a meter can make. By knowing the resolution of a meter, you can determine if it is possible to see a small change in your signal. The terms digits and counts are used to describe a meter's resolution. A 6.5-digit multimeter can display 6 full digits ranging from 0 to 9, and one "half" digit which displays only a 1 or is left blank. A 6.5-digit meter will display up to 1,999,999 counts of resolution.

② Accuracy

Accuracy is the largest allowable error that will occur under specific operating conditions. In other words, it is an indication of how close the DMM's displayed measurement is to the actual value of the signal being measured. Accuracy is usually expressed as a percent of reading. An accuracy of one percent of reading means that for a displayed reading of 100 volts, the actual value of the voltage could be anywhere between 99 volts and 101 volts.

③ Measurements

Digital multimeters are capable of making a variety of different measurements. A basic DMM typically can measure voltage, current and resistance. Other measurements commonly supported are continuity and diode measurements. Continuity is a quick go/no-go resistance test that distinguishes between an open and a closed circuit. A diode test mode measures the actual voltage drop across a junction. Other possible measurement modes are frequency, period, temperature and capacitance.

④ Analysis Capability

When choosing your digital multimeter, you should review available analysis modes, such as trend plotting, measurement statistics and histograms, to ensure your needs are met.

DMM4020 Series

Make measurements, not compromises. Measure a variety of parameters— from volts, ohms and amps to frequency—with one instrument. Save time with front-panel shortcut keys and built-in limit testing. Performance. Reliability. Legendary ease-of-use. One instrument. Looks like you can have it all.

Product Highlights

- 5.5 digit resolution
- Basic V dc accuracy of up to 0.015%
- Volts, ohms, amps and frequency measurements
- Dedicated dc leakage current measurement
- CAT I 1000 V, CAT II 600 V

Make accurate 4-wire resistance measurements with only two test leads!

With the unique dual display, you can measure two different parameters of the same signal from one test connection.

Models	Display	Resolution (Digits)	Measurements	Basic V dc accuracy (% Reading + % Range)
DMM4020	Dual; Numeric	5.5	V ac, V dc, I dc, I ac, Ω, Cont, Diode, Freq	0.015 + 0.004 (yr.)

Recommended Test Leads

Test Leads	
196-3520-xx	Premium Test Leads (TL710 replacement/spare)
TL705	2X4 Wire Ohm 1000V Test Lead
TL725	2x4 Wire Ohm SMD Test Tweezers

Recommended Accessories

Accessories	
ACD4000	Soft Carrying Case
HCTEK-4321	Hard Carrying Case
RMU2U	Rackmount Kit
013-0369-xx	Calibration Fixture 4-terminal short

Another Product for Consideration

If you need greater accuracy, the DMM4050 provides 6.5 digits of resolution and up to 0.0024% basic V dc accuracy.

Ships with Product

- One Set TL710 Test Leads
- RS-232 to USB Adapter Cable
- NI LabVIEW SignalExpress™ TE (LE version) Software
- Statement of Calibration Practices
- User Manual & Documentation on CD
- Power Cord
- 3-year Warranty

Learn more with the "Using the DMM Series to Make Simple and Accurate Resistance Measurements" application note.

DMM4040/4050 Series

Meet the multimeter to rule them all. Make a wide range of measurements—from volts, ohms and amps to frequency, temperature and capacitance—with one instrument. Monitor and record measurements over time, or environmental changes with built-in histogram, Trendplot™ and statistics analysis modes. Get unparalleled ease-of-use with a dual display and USB connectivity. Hello, efficiency. Goodbye, complexity.

Product Highlights

- 6.5 digit resolution
- Basic V dc accuracy of up to 0.0024%
- Volts, ohms, amps, frequency and period measurements
- Capacitance and temperature measurements (DMM4050)
- CAT I 1000 V, CAT II 600 V

Make accurate 4-wire resistance measurements with only two test leads!

See how your device is changing over time with built-in analysis modes – Trendplot™, histograms and statistics.

Models	Display	Resolution (Digits)	Measurements	Basic V dc accuracy (% Reading + % Range)
DMM4040	Dual; Numeric & Graphical	6.5	V ac, V dc, I dc, I ac, Ω, Continuity, Diode, Freq, Period	0.0035 + 0.0005
DMM4050	Dual; Numeric & Graphical	6.5	V ac, V dc, I dc, I ac, Ω, Continuity, Diode, Freq, Period, Temp., Capacitance	0.0024 + 0.0005

Recommended Test Leads

Temperature Probes

TP750	100 Ohm RTD Temperature Probe (DMM4050 only)

Test Leads

196-3520-xx	Premium Test Leads (TL710 replacement/ spare)
TL705	2X4 Wire Ohm 1000V Test Lead
TL725	2x4 Wire Ohm SMD Test Tweezers

Recommended Accessories

Accessories

ACD4000	Soft Carrying Case
HCTEK-4321	Hard Carrying Case
RMU2U	Rackmount Kit
013-0369-xx	Calibration Fixture 4-terminal short

Another Product for Consideration

The PWS DC Power Supply Series is designed to stack with the DMM Series, saving you bench space.

Ships with Product

- One Set TL710 Test Leads
- RS-232 to USB Adapter Cable
- NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate
- User Manual & Documentation on CD
- Power Cord
- 3-year Warranty

Learn more with the "Measurement Statistics and Histograms with the Tektronix DMM4050 and DMM4040 Multimeters" application note.

Power Supplies

Tektronix Power Supplies deliver a wide range of voltage and current, along with precision, accuracy and a long list of convenient features. Which means faster debug of complex designs.

	PWS2000	PWS4000
Output Voltage/ Current	▪ 18V/5A ▪ 32V/6A ▪ 32V/3A ▪ 72V/1.5A	▪ 20V/5A ▪ 60V/2.5A ▪ 30V/5A ▪ 72V/1.2A ▪ 32V/3A
Basic Accuracy	▪ 0.05% Voltage ▪ 0.2% Current	▪ 0.03% Voltage ▪ 0.05% Current
Ripple and Noise	Less than 3 mVpp	Less than 5 mVpp
Features	▪ 20 Setup Memories ▪ User-defined Password Lock Out	▪ 40 Setup Memories ▪ Adjustable Overvoltage Protection ▪ User-defined Password Lock Out ▪ Remote Sense ▪ List Mode
Connectivity	--	Rear panel: USB device port PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)

Choosing Your DC Power Supply

To help you choose the right power supply for your needs, the most common selection criteria are listed below, along with helpful tips for determining your requirements.

❶ Output Voltage and Current

At any given time, either voltage or current is being regulated by the power supply.

- In constant voltage (CV) mode, the output voltage will match the voltage setting within the accuracy specifications of the instrument. The current will be determined by the impedance of the load.

- In constant current (CC) mode, the output current will match the current setting within the accuracy specifications. The voltage will be determined by the impedance of the load.

When choosing a power supply, the most important selection criteria is the output voltage and current range of the supply. You will want to select a power supply that meets your different application needs.

❷ Setting Resolution and Accuracy

Voltage and current settings (sometimes called limits or programmed values) each have resolution and accuracy specifications associated with them. The resolution of these settings determines the minimum increment in which the output may be adjusted. The accuracy describes the extent to which the value of the output matches international standards and is typically expressed as ± (% of reading + offset).

❸ Ripple and Noise

Spurious AC components on the output of a DC supply are called ripple and noise. The term "ripple" refers to periodic AC on the output. When viewed in the frequency domain, ripple shows up as spurious responses. Unlike ripple, which is periodic, noise is random. A power supply's ripple and noise is specified within a bandwidth, and should be specified for both current and voltage.

❹ Features and Programmability

When choosing your power supply, you should review available features, such as remote sense, list mode and set up memories, to ensure your needs are met. Some power supplies are also programmable, allowing you to remotely control your supply from your PC.

Product Highlights

- Linear regulation
- 0.05% basic DC voltage accuracy
- 0.2% basic DC current accuracy
- Less than 3 mVp-p ripple and noise
- 20 user-defined setup memories

The numeric keypad makes it easy to specify a precise current limit before you start your test.

PWS Series power supplies are designed to be stacked with other Tektronix bench instruments to save you valuable bench space.

PWS2000 Series

More power. More features. More value. Support many different applications with wide output voltage and current ranges, and down to 10 mV/10 mA resolution. Save time with a numeric keypad for fast and accurate voltage/current selection. Strain less with a bright, large readout digital display. All backed by Tektronix reliability.

Models	Output Voltage	Output Current	Programmable
PWS2185	18 V	5 A	No
PWS2323	32 V	3 A	No
PWS2326	32 V	6 A	No
PWS2721	72 V	1.5 A	No

Recommended Accessories

RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386-7598-xx	Rackmount Cosmetic Filler Panel

Another Product for Consideration

The PWS4000 Series offers greater accuracy, additional features and programmability.

Ships with Product

- Calibration Certificate
- Technical Reference Manual & Documentation on CD
- Power Cord
- 3-year Warranty

Learn more with the "Choosing the Right Power Supply for Accurate Power Delivery" application note.

Product Highlights

- Linear regulation
- 0.03% basic DC voltage accuracy
- 0.05% basic DC current accuracy
- Less than 5 mVp-p ripple and noise
- Remote sense, list mode and 40 user-defined setup memories

The numeric keypad makes it easy to specify a precise current limit before you start your test.

PWS Series power supplies are designed to be stacked with other Tektronix bench instruments to save you valuable bench space.
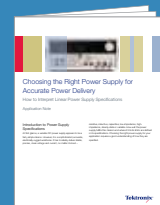
PWS4000 Series

Precision. Now available at the touch of a button. Generate the power you need with down to 1 mV/0.1 mA resolution and a basic voltage accuracy of 0.03%. Accelerate complex tests with list mode and a USB port for remote programming. Save time with a numeric keypad for fast and accurate voltage/current selection. Performance. Accuracy. Affordability. Meet your new power supply.

Models	Output Voltage	Output Current	Programmable
PWS4205	20 V	5 A	Yes
PWS4305	30 V	5 A	Yes
PWS4323	32 V	3 A	Yes
PWS4602	60 V	2.5 A	Yes
PWS4721	72 V	1.2 A	Yes

Recommended Accessories

RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386-7598-xx	Rackmount Cosmetic Filler Panel

Another Product for Consideration

The DMM Series offers accurate voltage, current and resistance measurements for AC and DC signals.

Ships with Product

- NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate
- Technical Reference Manual & Documentation on CD
- Power Cord
- 3-year Warranty

Learn more with the "Choosing the Right Power Supply for Accurate Power Delivery" application note.
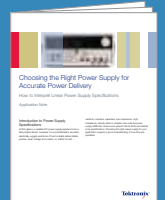
Frequency Counter/Timers

Featuring the precision and intuitive operation you've come to expect from our oscilloscopes, Tektronix Timer/Counters are built with performance and convenience in mind. Featuring industry-leading resolution, built-in measurement and analysis modes.

	FCA3000	FCA3100	MCA3000
Frequency Range	400 MHz, 3 GHz, 20 GHz	400 MHz, 3 GHz, 20 GHz	27 GHz, 40 GHz
Resolution	• 100 ps (time) • 12 digits/s (freq)	• 50 ps (time) • 12 digits/s (freq)	• 100 ps (time) • 12 digits/s (freq)
Data Transfer	• 250 k Samples/sec (internal) • 5 k Samples/sec (block)	• 250 k Samples/sec (internal) • 15 k Samples/sec (block)	• 250 k Samples/sec (internal) • 5 k Samples/sec (block)
Measurements	13 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p	14 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p, Totalize	13 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p + An Integrated Power Meter
Analysis Modes	Trend Plot, Measurement Statistics, Allan Deviation, Histogram	Trend Plot, Measurement Statistics, Allan Deviation, Histogram	Trend Plot, Measurement Statistics, Allan Deviation, Histogram
Connectivity	Rear panel: USB device port, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Rear panel: USB device port, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Rear panel: USB device port, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)

Choosing Your Timer/Counter

To help you choose the right timer/counter for your needs, the most common selection criteria are listed below, along with helpful tips for determining your requirements.

1 Frequency Resolution

The frequency resolution is the smallest change the timer/counter can detect in closely spaced frequencies. The resolution is influenced by the time setting on the instrument, i.e., longer time settings (averaged) will display more digits. In general this feature is expressed as the number of digits per second shown on the instrument's display (e.g. 12 digits/s). More digits indicate a higher frequency resolution.

2 Time Resolution

For timing measurements this feature represents the smallest "time" change that the instrument can detect. Time resolution is sometimes described as "single shot" resolution and is generally measured in pico seconds, e.g. 50 ps. The lower the number the better the time resolution feature.

3 Time Base Stability

The internal time base establishes the reference against which input signals are measured. The better the time base, the more accurate your measurements can be. Most counters employ a quartz crystal as the internal time base element which comes in 3 basic types; Room Temperature (RTXO), Temperature Compensated (TCXO) and Oven Control (OCXO). TCXO and OCXO devices are more stable and when used as the internal time base the instrument will consistently yield accurate and reliable results.

4 Analysis Capability

When choosing your timer/counter, you should review available analysis modes, such as trend plotting, measurement statistics, histograms and modulation domain analysis to ensure your needs are met.

Product Highlights

- 12 digit/sec frequency resolution
- 50 ps (FCA3100) or 100 ps (FCA3000) single-shot time resolution
- 0.001° phase resolution
- 250 k readings/sec data transfer rate to internal memory
- 13 automated frequency, time, phase and voltage measurements

See how your device is changing over time with built-in analysis modes – Trend plot, histograms and statistics.

Easily connect to a PC with the USB and GPIB ports.

FCA3100/3000

Looking to capture small frequency and time changes? Look no further than this Timer/Counter/Analyzer. Capture small changes in your signal with industry-leading frequency and time resolution. Quickly and accurately analyze signals with 13 automated measurements and comprehensive built-in analysis modes, including measurement statistics, histograms and trend plots. Get unparalleled ease-of-use with intuitive operation and USB connectivity. It's everything you need in a Timer/Counter/Analyzer. And more.
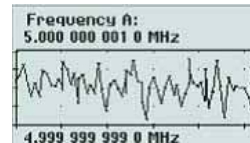
Models	Max. Frequency	Channels	Time Resolution	Frequency Resolution
FCA3000	400 MHz	2	100 ps	12 digit/s
FCA3003	3 GHz	2 – 400 MHz 1 – 3 GHz	100 ps	12 digit/s
FCA3020	20 GHz	2 – 400 MHz 1 – 20GHz	100 ps	12 digit/s
FCA3100	400 MHz	2	50 ps	12 digit/s
FCA3103	3 GHz	2 – 400 MHz 1 – 3 GHz	50 ps	12 digit/s
FCA3120	20 GHz	2 – 400 MHz 1 – 20GHz	50 ps	12 digit/s

Recommended Accessories

174-4401-xx	USB Host to Device Cable, 3 Feet
012-0991-xx	GPIB Cable, Double Shielded
012-1256-xx	BNC Male to BNC Male, 9 Feet
ACD4000	Soft Carrying Case
HCTEK-4321	Hard Carrying Case
RMU2U	Rackmount Shelf Kit for 2 Units
TVA3000	TimeView™ Modulation Domain Analysis Software
SIGEXPTE	NI LabVIEW SignalExpress™ Tektronix Edition Software – Full Version

Instrument Options

MS	Medium Stability OCXO Timebase, 2×10^{-7}
HS	High Stability OCXO Timebase, 5×10^{-8}
RP	Rear-panel Connectors

Ships with Product

- Trial Version of TimeView™ Software and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate
- User Manual on CD
- Programmers Guide & Technical Specifications
- Power Cord
- 3-year Warranty

Learn more with the "Time and Frequency Measurements for Oscillator Manufacturers" application note.

Product Highlights

- 12 digit/sec frequency resolution
- 100 ps single-shot time resolution
- 250 k readings/sec data transfer rate to internal memory
- 13 automated frequency, time, phase and voltage measurements
- Integrated power meter
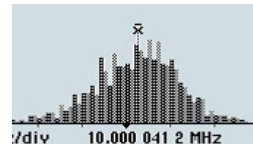
See how your device is changing over time with built-in analysis modes – Trend plot, histograms and statistics.

Easily connect to a PC with the USB and GPIB ports.

MCA3000 Series

Feature-rich. Fully loaded. No matter how you say it, this microwave timer/counter is packed with functionality. Measure up to 40 GHz signals. And, get two extra 300 MHz timer/counter ports for added versatility. Quickly and accurately analyze signals with 13 automated measurements and comprehensive analysis modes, including statistics, histograms and trend plots. Get unparalleled ease-of-use with intuitive operation and USB connectivity. Finally, fully-loaded comes standard.

Models	Max. Frequency	Channels	Time Resolution	Frequency Resolution
MCA3027	27 GHz	2 – 300 MHz 1 – 27 GHz	100 ps	12 digit/s
MCA3040	40 GHz	2 – 300 MHz 1 – 40 GHz	100 ps	12 digit/s

Recommended Accessories

174-4401-xx	USB Host to Device Cable, 3 Feet
012-0991-xx	GPIB Cable, Double Shielded
012-1256-xx	BNC Male to BNC Male, 9 Feet
AC4000	Soft Carrying Case
HCTEK-4321	Hard Carrying Case
RMU2U	Rackmount Shelf Kit for 2 Units
TVA3000	TimeView™ Modulation Domain Analysis Software
SIGEXPTE	NI LabVIEW SignalExpress™ Tektronix Edition Software – Full version

Instrument Options

HS	High Stability OCXO Timebase, 5×10^{-8}
US	Ultra High Stability OCXO Timebase, 1.5×10^{-8}

Ships with Product

- Trial Version of TimeView™ Software and NI LabVIEW SignalExpress™ TE (LE version) Software
- Calibration Certificate
- User Manual on CD
- Programmers Guide & Technical Specifications
- Power Cord
- 3-Year Warranty

Learn more with the "Measurement Statistics, Histograms and Trend Plot Analysis Modes" application note.

Measurement Statistics, Histograms and Trend Plot Analysis Modes
Using the Tektronix FCA and MCA Series Timer/Counter/Analyzers
Application Note

RF Power Meters

Tektronix PSM Power Meter Series deliver the precision accuracy you need and the features you want, including exceptional temperature stability and throughput.

	PSM3000	PSM4000	PSM5000
Description	Power Meter Average Power	Power Meter Average / Peak / Pulse	Power Meter Average / Peak / Pulse + Profiling
Frequency Range	10 MHz - 8 / 18 / 26.5 GHz	10 MHz - 8 / 18.6 / 20 GHz	50 MHz - 8 / 18.6 / 20 GHz
Dynamic Range	-55 to +20 dBm	-60 to +20 dBm	-60 to +20 dBm
Data Transfer Rate	2000 Reads/sec	2000 Reads/sec	2000 Reads/sec
Measurements	True Average Power; Duty Cycle Corrected Pulse Power; Measurement Logging	Average Power (CW); Duty Cycle Corrected Pulse Power; Peak Power, Duty Cycle; Peak and Average Burst Power; Measurement Logging	Average Power (CW); Duty Cycle Corrected Pulse Power; Peak Power, Pulse Power, Duty Cycle; Peak and Average Burst Power; Measurement Logging; Pulse Width, Rise/Fall, Overshoot, Droop, Time Gated Measurements, Pulse Waveform Display with Markers

Choosing Your RF Power Meter

Power measurements are fundamental to the development cycle of any RF or microwave product, from radios to radars. To help you choose the right Power Sensor/Meter combination, the most common selection criteria are listed below, along with helpful tips for determining your requirements.

1 Measurement Integrity

Measurement integrity is a combination of the cumulative measurement uncertainty and instrument stability. While the measurement uncertainty is usually specified, the instrument stability includes several factors. By providing calibration over the entire temperature operating ranges and not requiring zeroing prior to measurement, the improved stability of the power sensor/meter reduces possible human errors and assures the integrity of measured results.

2 Performance and Functionality

Basic power measurements of continuous wave (CW) signals are fundamental to power sensor/meters. However, today's modern signals include modulation, pulses, or other time-varying attributes. Being able to correct for duty cycle, measure peak power, signal statistics, and triggering inputs and outputs increase the utility of the power sensor/meter combination.

3 Speed and Connectivity

Power measurements tend to dominate the test process of wireless device test. The speed of measurement should remain constant over the entire dynamic range of the sensor. USB connectivity and power enable high speed measurement throughput and help reduce system rack space.

4 Analysis

When integrating power measurements into a full system measurement process, you should review the available analysis software and hardware capabilities to determine if equipment redundancies can be eliminated. Advanced measurement analysis, like trend graphing, statistical measurements, measurement logging, and pulse profiling can replace more complex and expensive equipment needs and simplify device test.

Product Highlights

- True average power, duty cycle corrected pulse power, and data logging
- 10 MHz to 26.5 GHz
- High dynamic range (-55 dBm to +20 dBm)
- 2000 reads per second industry benchmark
- USB connectivity and power

True average power and measurement logging software is provided in a Windows® environment.

In addition to USB power & connectivity, the TTL trigger input and output ports extend measurement functionality and ATE system integration.

PSM3000 Series

The PSM3000 Series Power Sensor/Meters provide true average power measurements, giving accurate power measurements independent of signal modulation and bandwidth.

Models	Description	Frequency Range	Dynamic Range	Connector Style
PSM3110	True RMS Average	10 MHz - 8 GHz	-55 to +20 dBm	3.5mm male
PSM3120	True RMS Average	10 MHz - 8 GHz	-55 to +20 dBm	N-Male
PSM3310	True RMS Average	10 MHz - 18 GHz	-55 to +20 dBm	3.5mm male
PSM3320	True RMS Average	10 MHz - 18 GHz	-55 to +20 dBm	N-Male
PMS3510	True RMS Average	10 MHz - 26.5 GHz	-55 to +20 dBm	3.5mm male

Recommended Accessories

174-6150-xx	USB Cable, 2 m, 20 AWG
174-6164-xx	SMB Female to BNC Male, 1 m Trigger Cable
348-2013-xx	Replacement Rubber Boot

Ships with Product

- 2-meter USB cable
- Calibration Certificate, USB flash drive with User and Safety Manual, Technical Reference Manual and the Programmer Manual.
- 3-year Warranty

Learn more with the "Selecting an RF or Microwave Power Sensor/Meter" application note.

Product Highlights

- Average power, duty cycle, pulse power, peak/average power, and data logging functionality

- 10 MHz to 20 GHz

- High dynamic range (-60 dBm to +20 dBm)

- 2000 reads per second industry benchmark

- USB connectivity and power

Peak power, average power, duty cycle, and crest factor values are all reported on a simple user interface.

High speed logging software utilizes the USB interface and performs over 2000 reads per second.

PSM4000 Series

The PSM4000 Series Power Sensor/Meters deliver average power (CW) measurements, and add pulse and peak power measurements for gathering basic data on pulsed RF and microwave signals.

Models	Description	Frequency Range	Dynamic Range	Connector Style
PSM4110	Power Meter (Avg / Peak / Pulse)	10 MHz - 8 GHz	-60 to +20 dBm	3.5mm male
PSM4120	Power Meter (Avg / Peak / Pulse)	10 MHz - 8 GHz	-60 to +20 dBm	N-Male
PSM4320	Power Meter (Avg / Peak / Pulse)	50 MHz - 18.6 GHz	-40 to +20 dBm	N-Male
PSM4410	Power Meter (Avg / Peak / Pulse)	50 MHz - 20 GHz	-40 to +20 dBm	3.5mm male

Recommended Accessories

174-6150-xx	USB Cable, 2 m, 20 AWG
174-6164-xx	SMB Female to BNC Male, 1 m Trigger Cable
348-2013-xx	Replacement Rubber Boot

Ships with Product

- 2-meter USB cable

- Calibration Certificate, USB flash drive with User and Safety Manual, Technical Reference Manual and the Programmer Manual.

- 3-year Warranty

Learn more with the "Selecting an RF or Microwave Power Sensor/Meter" application note.

Product Highlights

- Average power, duty cycle, pulse power, peak/average power, pulse measurements (pulsewidth, rise/fall, PDF, CCDF, overshoot, droop), time gated measurements, pulse waveform display, and data logging functionality.

- 50 MHz to 20 GHz

- High dynamic range (-60 dBm to +20 dBm)

- 2000 reads per second industry benchmark

- USB connectivity and power

Pulse profiling software enable a thorough analysis of pulse characteristics.

Power meter application burst measurement window enables time gated measurements.

PSM5000 Series

The PSM5000 Series Power Sensor/Meters provide the same measurements as the PSM4000, and add pulse profiling functionality for signal viewing and characterization in pulsed RF and microwave systems.

Models	Description	Frequency Range	Dynamic Range	Connector Style
PSM5110	Power Meter (Avg / Peak / Pulse + Profiling)	100 MHz - 8 GHz	-60 to +20 dBm	3.5mm male
PSM5120	Power Meter (Avg / Peak / Pulse + Profiling)	100 MHz - 8 GHz	-60 to +20 dBm	N-Male
PSM5320	Power Meter (Avg / Peak / Pulse + Profiling)	50 MHz - 18.6 GHz	-40 to +20 dBm	N-Male
PSM5410	Power Meter (Avg / Peak / Pulse + Profiling)	50 MHz - 20 GHz	-40 to +20 dBm	3.5mm male

Recommended Accessories

174-6150-xx	USB Cable, 2 m, 20 AWG
174-6164-xx	SMB Female to BNC Male, 1 m Trigger Cable
348-2013-xx	Replacement Rubber Boot

Ships with Product

- 2-meter USB cable

- Calibration Certificate, USB flash drive with User and Safety Manual, Technical Reference Manual and the Programmer Manual.

- 3-year Warranty

Learn more with the "Selecting an RF or Microwave Power Sensor/Meter" application note.

Probes and Accessories

Tektronix probes and accessories are perfectly matched to our industry-leading oscilloscopes. With over 100 choices available, you will find the probe you need.

Active Probes

- Bandwidth up to 4 GHz
- True signal reproduction and fidelity
- Low input capacitance: down to < 0.5 pF
- Small compact probe heads for probing small geometry circuit elements

Current Probes

- Easy to use and accurate AC/DC current measurements
- DC up to 2 GHz
- Amplitude measurements from 1 mA to 20,000 A
- Split core and solid core construction

Differential Probes

- Bandwidth up to 20 GHz
- Easily measure differential signals
- Low input capacitance: down to < 0.3 pF
- High common mode rejection ratio (CMRR)
- Wide range of probe tips for easier circuit access

Passive Probes

- DC to 1 GHz
- Wide range of performance to meet the demands of many applications
- Lightweight, ergonomic designs to fit your needs
- Wide range of probe tips for easier circuit access

High Voltage Probes

- Wide range of voltage measurements - Up to 40 kV peak (100 ms pulse)
- Single-ended or differential

Carry Cases

- Soft- and hard-sided cases available

Interactive Probe Selector Tool

Need help finding the right probe for your application? The online Tektronix Probe Selector Tool will guide you through a few easy questions to match your need to the right probe. Visit us anytime, anywhere at: **www.tektronix.com/probes**

Connect Your Test Bench

With the Tektronix Edition of National Instruments LabVIEW SignalExpress™
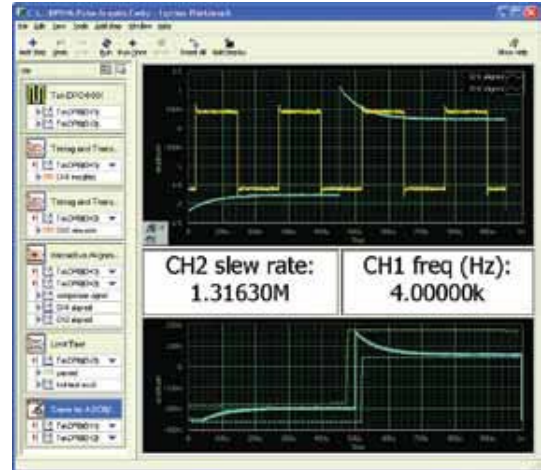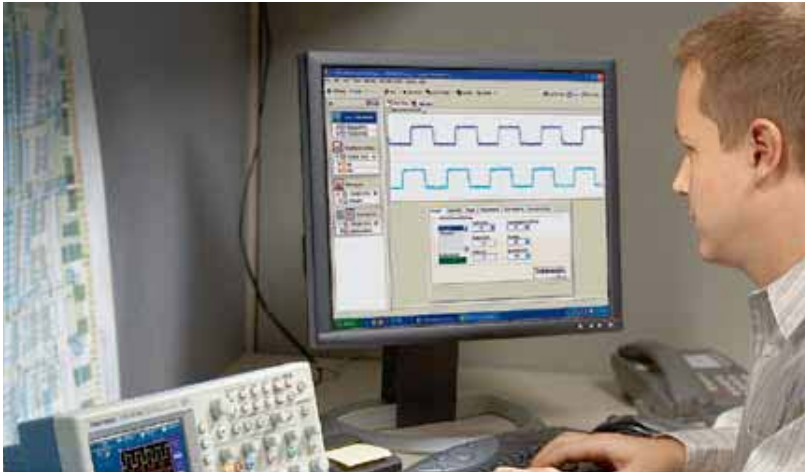
To simplify your most complicated tasks, connect your test bench with the Tektronix Edition of LabVIEW SignalExpress™ from National Instruments, included standard with Tektronix bench instruments*. Control your Tektronix instruments right from your PC. Automate measurements and analyze data across multiple instruments. Capture and save results. Create reports. All from one intuitive software package.

The optional Professional Version of SignalExpress (SIGEXPTE) offers over 200 built-in functions for extended analysis including time and frequency domain analysis, limit testing, advanced data logging and customizable reports.

To experience the Tektronix Edition of SignalExpress, download your free copy of the software at: **www.tektronix.com/signalexpress**

* For a list of qualifying instruments, visit: www.tektronix.com/signalexpress.

Your Tektronix Service Advantage

Tektronix offers a range of repair and calibration plans to extend your coverage and keep your instrument operating at optimal performance.

Summary of Service Plans

Repair Service Extended Coverage	Calibration Service Coverage	Multi-Vendor Calibration Services	High Availability Service Plan
• Save money with multi-year coverage • Priority service • Covers equipment, parts, labor and transportation • Applicable software, safety and reliability updates	• Accredited calibration • Traceable calibration • Functional verification • Applicable software, safety and reliability updates • Calibration records retention	• Single point of contact for all of your calibration needs • Simplify your operations and reduce administrative costs • On-site delivery for convenience and reduced downtime	• Identically configured dedicated spare products • Flexible contract duration and payment terms • Priority access to technical support

Tektronix Factory Experts

Access to the engineering expertise that designed and built your products to ensure they are in peak performance. Over 20 man years of training per support engineer.

Comprehensive and Thorough Treatment

Software updates, safety and reliability modifications, and cosmetic enhancements are included if applicable. Products are returned to you in a "like new" condition. Worldwide support is available through the Tektronix network.

Efficiency and Convenience

Team of professionals focused on getting your instruments back to you as soon as possible to keep your downtime to a minimum and your service management easy.

Flexible Repair and Calibration Service

Choice of cost effective, flexible options and service packages to meet your needs.

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**

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