

# 2013 Bench Products

## Test & Measurement Solutions



# Overachiever.

The most powerful scope you can buy for \$1,290.



MSO/DPO2000B Mixed Signal Oscilloscope Series\*

Introducing the MSO/DPO2000B Mixed Signal Oscilloscope Series. Like all of our MSO/DPO oscilloscopes, these powerful performers have the accuracy and craftsmanship you expect from Tektronix. Only the low price is surprising. Designed with you in mind, they are packed with innovative features to help speed every stage of debug. These scopes boast 16 digital channels, automated search, Wave Inspector® for navigating long records and even automated serial decode. All at a starting price that makes perfect sense, and backed by a 5-year warranty.



MSO/DPO2000B Series

|                    |  |
|--------------------|--|
| Bandwidth          | 200 MHz, 100 MHz, 70 MHz                             |
| Channels           | 2 or 4 analog<br>16 digital (MSO Series)             |
| Record Length      | 1 Mpoints  |
| Display            | 7.0"   |
| Serial Bus Options | I <sup>2</sup> C, SPI, RS-232/422/485/UART, CAN, LIN |
| Optional Analysis  | --   |
| Starting Price     | \$1,290  |



MSO/DPO3000 Series

|                    |  |
|--------------------|--|
| Bandwidth          | 500 MHz, 300 MHz, 100 MHz  |
| Channels           | 2 or 4 analog<br>16 digital (MSO Series)   |
| Record Length      | 5 Mpoints  |
| Display            | 9.0"   |
| Serial Bus Options | I <sup>2</sup> C, SPI, RS-232/422/485/UART, CAN, LIN, FlexRay, I <sup>2</sup> S/L/RJ/TDM, MIL-STD 1553 |
| Optional Analysis  | Power Analysis, HDTV & Custom Video Triggering   |
| Starting Price     | \$3,380  |



MSO/DPO4000B and MDO4000 Series

|                    |   |
|--------------------|---|
| Bandwidth          | 1 GHz, 500 MHz, 350 MHz, 100 MHz  |
| Channels           | 2 or 4 analog<br>16 digital (MSO & MDO Series)<br>1 RF (MDO Series)   |
| Record Length      | Up to 20 Mpoints  |
| Display            | 10.4"   |
| Serial Bus Options | I <sup>2</sup> C, SPI, RS-232/422/485/UART, CAN, LIN, FlexRay, I <sup>2</sup> S/L/RJ/TDM, MIL-STD 1553, USB, Ethernet |
| Optional Analysis  | Power Analysis, Limit & Mask Testing, HDTV & Custom Video Triggering  |
| Starting Price     | \$7,150   |

See the scope in action, analyze the specs and learn more at [www.tektronix.com/mso2000](http://www.tektronix.com/mso2000)

\*MSO2024B shown in picture and priced at \$3,570.

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# Highlights



SourceMeters  
Switch Systems  
Semiconductor Test  
Systems  
Digital Multimeters  
Data Acquisition  
Low-level Instruments  
Power Supplies

## Tektronix and Keithley - From Nanovolts to Gigahertz.

As part of the Tektronix portfolio, Keithley Instruments brings the DC test tools you need to do your job better and with greater confidence. Take a look inside to see the capabilities we provide. Together Tektronix and Keithley address your measurement needs from low level precision measurements to powerful time domain measurements.



## MDO4000 Mixed Domain Oscilloscope - Transforming the way you test.

### The world's first oscilloscope with a built-in spectrum analyzer

For the first time ever, you can capture time-correlated analog, digital and RF signals for a complete system view of your device. Solve the most complicated design issues, quickly and efficiently, with an oscilloscope as integrated as your design.

See page 17 for more details.



## PA4000 Power Analyzer

The PA4000 performs accurate measurements, even when power is distorted or noisy. It's versatile, too, with harmonics analysis, motor measurements, PC interfaces and dual current shunts per channel all standard.

See page 28 for more details.

For an in-depth look at all of our products, including demos and 360-degree product explorers, please visit [www.tektronix.com](http://www.tektronix.com).

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# Choosing Your Oscilloscope

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.

## 1 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 all relevant frequency components of your signal. If you regularly work with digital signals, it may be easier to consider bandwidth by comparing signal and oscilloscope rise time specifications. Use an oscilloscope with a rise time specification five times faster than your signal rise time to keep error below 2%.

**Rule: Bandwidth > 5 X Highest Signal Frequency**

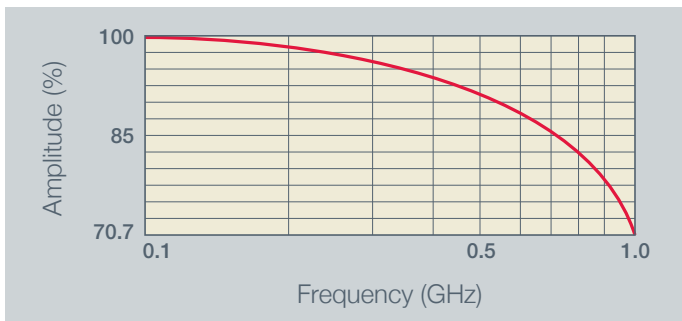


Figure 1: Typical frequency response curve for a general purpose oscilloscope

## 2 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)**

## 3 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)**

## 4 Digital Channels and Spectrum Analyzer Input

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.
















## 5 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.



|   | TBS1000   | TDS2000C  | TPS2000B  | THS3000   | TDS3000C  |
|---|---|---|---|---|---|
| Channels                                | 2   | 2, 4  | 2, 4 (isolated)   | 4 (isolated)  | 2, 4  |
| Bandwidth                               | 25 MHz to 150 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*<br>*Optional  |
| Optional Serial Bus Decode and Analysis | --  | --  | --  | --  |   |
| Connectivity                            | USB Host, USB Device, GPIB*<br>*Optional  | USB Host, USB Device, GPIB*<br>*Optional  | RS-232 (includes RS-232-to-USB Host Serial Cable), Centronics, CompactFlash   | USB Host, USB Device  | USB Host, LAN (10Base-T Ethernet)<br>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<br><b>Optional:</b><br>TPS2PWR1: Power Measurement and Analysis   | 11 Automated Measurements, Arithmetic Waveform Math, FFT<br><b>Optional:</b><br>TPS2PWR1: Power Measurement and Analysis  | 21 Automated Measurements, Arithmetic Waveform Math, FFT  | 25 Automated Measurements, Arithmetic Waveform Math, FFT<br>TDS3AAM: Advanced Analysis<br><b>Optional:</b><br>TDS3LIM: Limit Testing<br>TDS3TMT: Telecom Mask Testing<br>TDS3VID: HDTV and Custom Video Triggering  |
| Software                                | PC Communications Software: OpenChoice® Desktop, Educator Classroom and Lab Resource CD | 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   |
| Starting Price                          | \$520   | \$890   | \$2,990   | \$4,110   | \$5,080   |
| 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 + spectrum analyzer. 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/DPO2000B   | MSO/DPO3000  | MSO/DPO4000B  | MDO4000   |
|---|--|--|---|---|
| Channels                                | 2, 4 analog channels;<br>16 digital channels (MSO2000B)  | 2, 4 analog channels;<br>16 digital channels (MSO3000)   | 2, 4 analog channels;<br>16 digital channels (MSO4000B)   | 4 analog channels;<br>16 digital channels;<br>1 spectrum analyzer input   |
| Bandwidth                               | 70 MHz, 100 MHz and 200 MHz  | 100 MHz to 500 MHz   | 100 MHz to 1 GHz  | 100 MHz to 1 GHz (analog)   |
| Spectrum Analyzer Frequency Range       | --   | --   | --  | 50 kHz - 3 GHz or<br>50 kHz - 6 GHz (RF)  |
| Sample Rate                             | 1 GS/s (analog);<br>1 GS/s (digital, only 1 pod);<br>500 MS/s (digital, both pods)   | 2.5 GS/s (analog);<br>121.2 ps (8.25 GS/s) MagniVu™<br>(digital)   | 2.5 GS/s to 5 GS/s (analog);<br>60.6 ps (16.5 GS/s) MagniVu™<br>(digital)   | 2.5 GS/s to 5 GS/s (analog);<br>60.6 ps (16.5 GS/s) MagniVu™<br>(digital)   |
| Max Record Length                       | 1 Mpoints  | 5 Mpoints  | Up to 20 Mpoints  | 20 Mpoints  |
| Trigger Types                           | Edge, Logic, Pulse Width, Runt, Set-up and Hold, Rise/Fall Time, Video, I²C*, SPI*, CAN*, LIN*, RS-232/422/485/UART*, Parallel (MSO2000B)<br>*Optional | Edge, Sequence, Logic, Pulse Width, Runt, Timeout, 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)<br>*Optional | Edge, Sequence, Logic, Pulse Width, Runt, Timeout, 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 (MSO4000B)<br>*Optional                | RF Power Level, Edge, Sequence, Logic, Pulse Width, Runt, Timeout, 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<br>*Optional<br>**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<br>DPO2COMP: RS-232/422/485/UART<br>DPO2EMBD: I²C, SPI   | DPO3AERO: MIL-STD-1553<br>DPO3AUDIO: I²S, LJ, RJ, TDM<br>DPO3AUTO: CAN and LIN<br>DPO3COMP: RS-232/422/485/UART<br>DPO3EMBD: I²C, SPI<br>DPO3FLEX: FlexRay   | DPO4AERO: MIL-STD-1553<br>DPO4AUDIO: I²S, LJ, RJ, TDM<br>DPO4AUTO: CAN and LIN<br>DPO4AUTOMAX: CAN, LIN and FlexRay<br>DPO4COMP: RS-232/422/485/UART<br>DPO4EMBD: I²C, SPI<br>DPO4ENET: Ethernet<br>DPO4USB: USB  | DPO4AERO: MIL-STD-1553<br>DPO4AUDIO: I²S, LJ, RJ, TDM<br>DPO4AUTO: CAN and LIN<br>DPO4AUTOMAX: CAN, LIN and FlexRay<br>DPO4COMP: RS-232/422/485/UART<br>DPO4EMBD: I²C, SPI<br>DPO4ENET: Ethernet<br>DPO4USB: USB  |
| Connectivity                            | USB Host, USB Device, GPIB*<br>Optional DPO2CONN Module, LAN (10/100 Base-T Ethernet) and Video Out<br>*Optional                                       | USB Host (x2), USB Device, LAN (10/100 Base-T Ethernet), Video Out, GPIB*<br>*Optional   | USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), Video Out, GPIB*<br>*Optional  | USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), Video Out, GPIB*<br>*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<br><b>Optional:</b><br>DPO3PWR: Power Analysis<br>DPO3VID: HDTV and Custom Triggering                   | 41 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, Measurement Statistics, Waveform Histograms<br><b>Optional:</b><br>DPO4LMT: Limit and Mask Testing<br>DPO4PWR: Power Analysis<br>DPO4VID: HDTV and Custom Triggering | 44 Automated Measurements, Waveform and Screen Cursors, Arithmetic Waveform Math, Spectrum Math, FFT, Advanced Math, Measurement Statistics, Waveform Histograms<br><b>Optional:</b><br>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  | 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. Vector Signal Analysis Software: SignalVu-PC  |
| Battery Operation                       | --   | --   | --  | --  |
| Starting Price                          | \$1,290  | \$3,380  | \$7,150   | \$12,220  |
| Additional Resources                    |  |  |   |   |

## Performance Oscilloscopes

Tektronix performance oscilloscopes give you the cleanest, most trustworthy signal in the world. Discover signal fidelity issues fast with patented DPX<sup>®</sup> acquisition technology and reliably capture complex events with the advanced Pinpoint<sup>®</sup> 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.



|   |   |
|---|---|
|   | <b>MSO/DPO5000</b>  |
| Channels                                | 4 analog channels;<br>16 digital channels (MSO5000)   |
| Bandwidth                               | 350 MHz to 2 GHz  |
| Sample Rate                             | 5 GS/s to 10 GS/s (analog);<br>60.6 ps (16.5 GS/s) MagniVu™ (digital)   |
| Max Record Length                       | Up to 250 Mpoints   |
| Trigger Types                           | Edge, Sequence, Logic, Pulse Width, Glitch, Runt, Timeout, Transition, Set-up and Hold, Rise/Fall Time, Video, I <sup>2</sup> C*, SPI*, USB (Low, Full, High)*, RS-232/422/485/UART*, Parallel (MSO5000), Visual Trigger*<br>*Optional  |
| Optional Serial Bus Decode and Analysis | SR-ENET: 10/100Base-T Ethernet<br>SR-AERO: Aerospace (MIL-STD 1553)<br>SR-AUTO: Automotive (CAN/LIN/FlexRay)<br>SR-COMP: RS-232/422/485/UART<br>SR-CUST: Custom Serial Analysis Kit<br>SR-DPHY: MIPI D-PHY<br>SR-EMBD: I <sup>2</sup> C, SPI<br>SR-PCIE: PCI Express<br>SR-USB: USB<br>VNM: CAN, LIN  |
| Connectivity                            | USB Host (x6), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), Video Out, GPIB*<br>*Optional  |
| Waveform Math and Analysis              | 53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms<br><b>Optional:</b><br>DDRA: DDR Memory Bus Analysis;<br>DJA: DPOJET Advanced Jitter and Eye Diagram Analysis; ET3: Ethernet Compliance Test Solution; LT: Waveform Limit Testing; MTM: Mask Testing; PWR: Power Analysis; SignalVu Vector Signal Analysis; USB: USB Compliance Test Solution; VET: Visual Triggering; MOST: MOST 50/150 Compliance Test Solution |
| Software                                | PC Communications Software: NI LabVIEW Signal Express™ Tektronix Edition LE   |
| Battery Operation                       | --  |
| Starting Price                          | \$12,000  |
| Additional Resources                    |       |

### Additional Resources Key

Product Demo



Product Explorer



Data Sheet



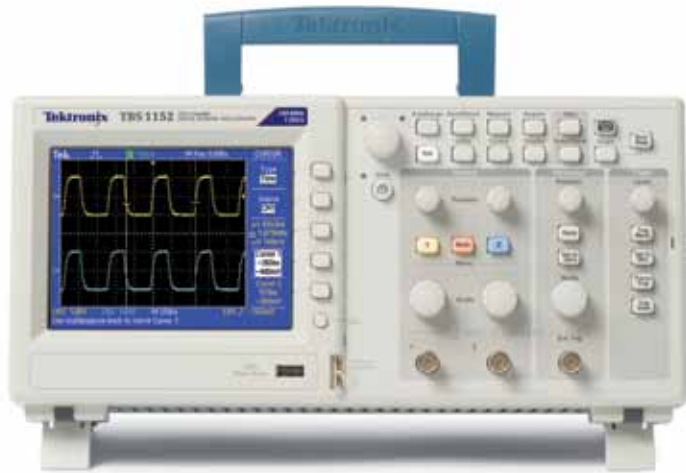
Technical Content



### 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](http://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



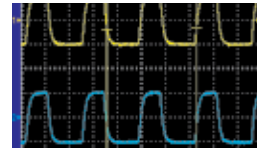
## TBS1000 Series

Usually, entry-level instruments are as light in features as they are in price. But Tektronix TBS1000 Series aren't usual instruments. Ideal for students, hobbyists or any person or organization on a tight budget, TBS1000 Series oscilloscopes deliver outstanding performance, including best-in-class digital real-time sampling, pass/fail testing, and familiar, easy-to-use controls. All at a price that's equally impressive.



### Product Highlights

- Up to 1 GS/s sample rate on all channels
- 16 automated measurements, and FFT analysis
- Built-in waveform limit testing
- 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 oversampling on all channels with Digital Real-Time Sampling technology.



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

| Models  | Analog Channels | Analog Bandwidth | Analog Sample Rate | Pricing (USD) |
|---------|-----------------|------------------|--------------------|---------------|
| TBS1022 | 2               | 25 MHz           | 500 MS/s           | \$520         |
| TBS1042 | 2               | 40 MHz           | 500 MS/s           | \$680         |
| TBS1062 | 2               | 60 MHz           | 1.0 GS/s           | \$830         |
| TBS1102 | 2               | 100 MHz          | 1.0 GS/s           | \$1,100       |
| TBS1152 | 2               | 150 MHz          | 1.0 GS/s           | \$1,520       |

### Recommended Probes

#### Passive Voltage Probes

|         |  |       |
|---------|--|-------|
| TPP0201 | 10X, 200 MHz, 300 V CAT II                       | \$81  |
| TPP0101 | 10X, 100 MHz, 300 V CAT II                       | \$66  |
| P2220   | 10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II | \$127 |

#### High Voltage Probes

|        |                                    |         |
|--------|------------------------------------|---------|
| P5200A | 500X/50X, 50 MHz, ± 1300 V/± 130 V | \$945   |
| P5100A | 100X, 500 MHz, 2500 V Peak         | \$945   |
| P6015A | 1000X, 75 MHz, 20 kV Peak          | \$1,880 |

### Recommended Probes

#### Current Probes

|         |  |         |
|---------|--|---------|
| P6021   | 60 MHz, 10.6 A RMS/250 A Peak/10 mA Min          | \$1,570 |
| P6022   | 120 MHz, 4 A RMS/100 A Peak/1 mA Min             | \$1,680 |
| A621    | 5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min | \$628   |
| A622    | 100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min  | \$634   |
| TCP2020 | 50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min    | \$2,610 |

### Recommended Accessories

|        |                       |         |
|--------|-----------------------|---------|
| 1103   | TEKPROBE Power Supply | \$2,280 |
| AC2100 | Soft Carrying Case    | \$130   |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV200 | 5-year Extended Warranty | \$260 |
|---------|--------------------------|-------|

### Another Product for Consideration

Need 4 channels? The TDS2000C Series offers the same great performance as the TBS1000 on both 2- and 4-channel models, and includes a Lifetime Warranty.

### Ships with Product

- Two TPP0x01 100 MHz or 200 MHz, 10X Passive Probes
- OpenChoice® Desktop Software
- Educator Classroom and Lab Resource CD
- Calibration Certificate, Quick Reference Manual, & Documentation on CD
- Power Cord
- 5-year Warranty

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







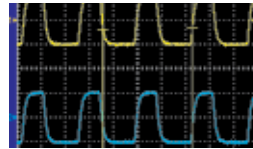
## TDS2000C Series

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.

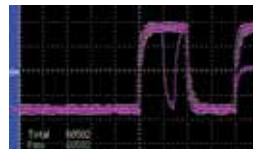


### Product Highlights

- 10x oversampling on all channels
- 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<sup>2</sup>



Accurately capture signals with at least 10X oversampling 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.

| Models   | Analog Channels | Analog Bandwidth | Analog Sample Rate | Pricing (USD) |
|----------|-----------------|------------------|--------------------|---------------|
| TDS2001C | 2               | 50 MHz           | 500 MS/s           | \$890         |
| TDS2002C | 2               | 70 MHz           | 1.0 GS/s           | \$1,080       |
| TDS2004C | 4               | 70 MHz           | 1.0 GS/s           | \$1,640       |
| TDS2012C | 2               | 100 MHz          | 2.0 GS/s           | \$1,300       |
| TDS2014C | 4               | 100 MHz          | 2.0 GS/s           | \$1,950       |
| TDS2022C | 2               | 200 MHz          | 2.0 GS/s           | \$1,850       |
| TDS2024C | 4               | 200 MHz          | 2.0 GS/s           | \$2,280       |

### Recommended Probes

#### Passive Voltage Probes

|         |  |       |
|---------|--|-------|
| TPP0201 | 10X, 200 MHz, 300 V CAT II                       | \$81  |
| TPP0101 | 10X, 100 MHz, 300 V CAT II                       | \$66  |
| P2220   | 10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II | \$127 |

#### High Voltage Probes

|        |                                  |         |
|--------|----------------------------------|---------|
| P5200A | 500X/50X, 50 MHz, ±1300 V/±130 V | \$945   |
| P5100A | 100X, 500 MHz, 2500 V Peak       | \$945   |
| P6015A | 1000X, 75 MHz, 20 kV Peak        | \$1,880 |

<sup>1</sup>For complete details visit [www.tektronix.com/lifetimewarranty](http://www.tektronix.com/lifetimewarranty)

### Recommended Probes

#### Current Probes

|         |  |         |
|---------|--|---------|
| P6021   | 60 MHz, 10.6 A RMS/250 A Peak/10 mA Min          | \$1,570 |
| P6022   | 120 MHz, 4 A RMS/100 A Peak/1 mA Min             | \$1,680 |
| A621    | 5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min | \$628   |
| A622    | 100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min  | \$634   |
| TCP2020 | 50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min    | \$2,610 |

### Recommended Accessories

|        |                       |         |
|--------|-----------------------|---------|
| 1103   | TEKPROBE Power Supply | \$2,280 |
| AC2100 | Soft Carrying Case    | \$130   |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV200 | 5-year Extended Warranty | \$260 |
|---------|--------------------------|-------|

### Another Product for Consideration

If you work with serial or parallel buses, the MSO/DPO2000B 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<sup>1</sup>

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





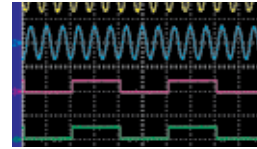
## TPS2000B Series

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

- 10x oversampling on all channels
- 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 | Pricing (USD) |
|----------|-----------------|------------------|--------------------|---------------|
| TPS2012B | 2               | 100 MHz          | 1.0 GS/s           | \$2,990       |
| TPS2014B | 4               | 100 MHz          | 1.0 GS/s           | \$3,950       |
| TPS2024B | 4               | 200 MHz          | 2.0 GS/s           | \$4,480       |

### Application Modules

|          |                                       |         |
|----------|---------------------------------------|---------|
| TPS2PBN2 | TPS2PWR1 Module and Four P5122 Probes | \$1,550 |
| TPS2PWR1 | Power Measurement and Analysis Module | \$670   |

### Recommended Accessories

|        |   |         |
|--------|---|---------|
| 1103   | TEKPROBE Power Supply   | \$2,280 |
| AC2100 | Soft Carrying Case  | \$130   |
| TPSBAT | Additional Lithium-Ion Battery Pack (one included standard with instrument) | \$292   |
| TPSCHG | External Battery Charger  | \$507   |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV200 | 5-year Extended Warranty | \$260 |
|---------|--------------------------|-------|

### Recommended Probes

#### Passive Voltage Probes

|         |  |       |
|---------|--|-------|
| TPP0201 | 10X, 200 MHz, 300 V CAT II                       | \$81  |
| TPP0101 | 10X, 100 MHz, 300 V CAT II                       | \$66  |
| P2220   | 10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II | \$127 |

#### High Voltage Probes

|       |  |       |
|-------|--|-------|
| P5150 | 50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II | \$500 |
| P5122 | 100X, 200 MHz, 1000 V RMS CAT II             | \$278 |

#### Current Probes

|         |  |         |
|---------|--|---------|
| P6021   | 60 MHz, 10.6 A RMS/250 A Peak/10 mA Min          | \$1,570 |
| P6022   | 120 MHz, 4 A RMS/100 A Peak/1 mA Min             | \$1,680 |
| A621    | 5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min | \$628   |
| A622    | 100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min  | \$634   |
| TCP2020 | 50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min    | \$2,610 |

### Another Product for Consideration

For very accurate low frequency 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 with 4-hour Battery Life
- 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.





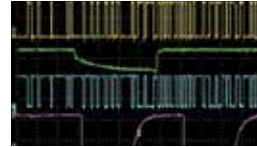
## THS3000 Series

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.

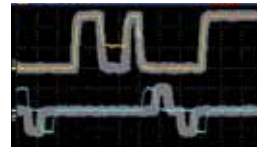


### Product Highlights

- 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 | Pricing (USD) |
|------------|-----------------|------------------|--------------------|---------------|
| THS3014    | 4               | 100 MHz          | 2.5 GS/s           | \$4,110       |
| THS3014-TK | 4               | 100 MHz          | 2.5 GS/s           | \$4,550       |
| THS3024    | 4               | 200 MHz          | 5.0 GS/s           | \$4,650       |
| THS3024-TK | 4               | 200 MHz          | 5.0 GS/s           | \$5,100       |

### Recommended Probes

#### Passive Voltage Probes

|                   |                             |       |
|-------------------|-----------------------------|-------|
| THP0301 - Y/B/M/G | 300 MHz, 10X, 300 V CAT III | \$183 |
|-------------------|-----------------------------|-------|

#### High Voltage Probes

|                    |  |       |
|--------------------|--|-------|
| P5150 <sup>1</sup> | 50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II | \$500 |
| P5122              | 100X, 200 MHz, 1000 V RMS CAT II             | \$278 |

#### Current Probes

|         |  |         |
|---------|--|---------|
| P6021   | 60 MHz, 10.6 A RMS/250 A Peak/10 mA Min          | \$1,570 |
| P6022   | 120 MHz, 4 A RMS/100 A Peak/1 mA Min             | \$1,680 |
| A621    | 5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min | \$628   |
| A622    | 100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min  | \$634   |
| TCP2020 | 50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min    | \$2,610 |

<sup>1</sup>The P5150 is compatible with THS oscilloscopes, but 50X vertical scaling is not offered.

### Recommended Accessories

|                     |                          |       |
|---------------------|--------------------------|-------|
| THSBAT              | Additional Spare Battery | \$312 |
| THSCHG <sup>2</sup> | Battery Charger          | \$104 |
| 119-7900-00         | AC Power Adapter         | \$280 |

<sup>2</sup> Does not include AC power adapter.

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV400 | 5-year Extended Warranty | \$415 |
|---------|--------------------------|-------|

### Another Product for Consideration

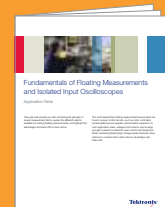
For very accurate ripple measurements on high voltage signals, the P5122 probe offers high impedance with minimal capacitive loading.

### 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<sup>3</sup>, AC Power Adapter with Power Cord
- Hard-sided Travel Case<sup>4</sup>
- Soft-sided Probe Case, Two Probe Replacement Accessory Kits<sup>4</sup>
- 3-year Warranty

<sup>3</sup> Non-TK models only, <sup>4</sup> TK models only

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





## 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.



### Product Highlights

- 10 kpoints record length on all channels, all the time
- 3,600 wfms/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.

| Models   | Analog Channels | Analog Bandwidth | Analog Sample Rate | Pricing (USD) |
|----------|-----------------|------------------|--------------------|---------------|
| TDS3012C | 2               | 100 MHz          | 1.25 GS/s          | \$5,080       |
| TDS3014C | 4               | 100 MHz          | 1.25 GS/s          | \$6,220       |
| TDS3032C | 2               | 300 MHz          | 2.5 GS/s           | \$7,500       |
| TDS3034C | 4               | 300 MHz          | 2.5 GS/s           | \$8,930       |
| TDS3052C | 2               | 500 MHz          | 5 GS/s             | \$10,800      |
| TDS3054C | 4               | 500 MHz          | 5 GS/s             | \$12,800      |

### Application Modules

|         |                                  |         |
|---------|----------------------------------|---------|
| TDS3LIM | Limit Testing                    | \$765   |
| TDS3TMT | Telecom Mask Test Triggering     | \$1,430 |
| TDS3VID | HDTV and Custom Video Triggering | \$765   |

### Recommended Accessories

|           |   |         |
|-----------|---|---------|
| 1103      | TEKPROBE Power Supply                       | \$2,280 |
| TDS3GV    | GPIB, RS-232, and VGA Communications Module | \$765   |
| TDS3BATC  | Lithium-ion Battery                         | \$637   |
| TDS3ION   | Battery Charger                             | \$159   |
| AC3000    | Soft Carrying Case                          | \$249   |
| HCTEK4321 | Hard Carrying Case (requires AC3000)        | \$796   |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV400 | 5-year Extended Warranty | \$415 |
|---------|--------------------------|-------|

### Recommended Probes

| Passive Voltage Probes      |  |  |         |
|-----------------------------|--|--|---------|
| P6139B                      | 10X, 500 MHz, 300 V CAT II                     |  | \$435   |
| Active Voltage Probes       |  |  |         |
| P6243                       | 10X, 1 GHz, ± 8 V                              |  | \$1,080 |
| Differential Voltage Probes |  |  |         |
| P6246 <sup>1</sup>          | 10X/1X, 400 MHz, ± 8.5 V/± 850 mV              |  | \$3,470 |
| High Voltage Probes         |  |  |         |
| P5205A                      | 500X/50X, 100 MHz, ± 1300 V/± 130 V            |  | \$1,390 |
| P5210A                      | 1000X/100X, 50 MHz, ± 5600 V/± 560 V           |  | \$2,780 |
| P5100A                      | 100X, 500 MHz, 2500 V Peak                     |  | \$945   |
| Current Voltage Probes      |  |  |         |
| TCP202A                     | 50 MHz, 15 A DC/10.6 A RMS/50 A Peak/10 mA Min |  | \$2,260 |

<sup>1</sup>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.





## MSO/DPO2000B 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.



### Product Highlights

- 1 Mpoint record length on all channels
- 5,000 wfms 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
- 5-year warranty



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



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

| Models   | Analog Channels | Digital Channels | Analog Bandwidth | Analog Sample Rate | Pricing (USD) |
|----------|-----------------|------------------|------------------|--------------------|---------------|
| DPO2002B | 2               | --               | 70 MHz           | 1 GS/s             | \$1,290       |
| MSO2002B | 2               | 16               | 70 MHz           | 1 GS/s             | \$2,140       |
| DPO2004B | 4               | --               | 70 MHz           | 1 GS/s             | \$1,970       |
| MSO2004B | 4               | 16               | 70 MHz           | 1 GS/s             | \$2,810       |
| DPO2012B | 2               | --               | 100 MHz          | 1 GS/s             | \$1,620       |
| MSO2012B | 2               | 16               | 100 MHz          | 1 GS/s             | \$2,460       |
| DPO2014B | 4               | --               | 100 MHz          | 1 GS/s             | \$2,370       |
| MSO2014B | 4               | 16               | 100 MHz          | 1 GS/s             | \$3,170       |
| DPO2022B | 2               | --               | 200 MHz          | 1 GS/s             | \$2,280       |
| MSO2022B | 2               | 16               | 200 MHz          | 1 GS/s             | \$3,130       |
| DPO2024B | 4               | --               | 200 MHz          | 1 GS/s             | \$2,810       |
| MSO2024B | 4               | 16               | 200 MHz          | 1 GS/s             | \$3,650       |

### Application Modules

#### Serial Bus Triggering and Protocol Analysis

|          |                                  |       |
|----------|----------------------------------|-------|
| DPO2AUTO | Automotive (CAN, LIN)            | \$350 |
| DPO2COMP | Computer (RS-232)                | \$350 |
| DPO2EMBD | Embedded (I <sup>2</sup> C, SPI) | \$350 |

### Recommended Accessories

|             |  |       |
|-------------|--|-------|
| DPO2CONN    | Ethernet and Video Out Connectivity Module | \$425 |
| 119-7465-xx | TekVPI External Power Supply               | \$82  |
| ACD2000     | Soft Carrying Case                         | \$249 |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV200 | 5-year Extended Warranty | \$260 |
|---------|--------------------------|-------|

### Recommended Probes

#### Passive Voltage Probes

|         |                            |        |
|---------|----------------------------|--------|
| TPP0200 | 10X, 200 MHz, 300 V CAT II | \$2620 |
|---------|----------------------------|--------|

#### Active Voltage Probes

|         |                     |        |
|---------|---------------------|--------|
| TAP1500 | 10X, 1.5 GHz, ± 8 V | \$2140 |
|---------|---------------------|--------|

#### Differential Voltage Probes

|                      |                                  |         |
|----------------------|----------------------------------|---------|
| TDP0500 <sup>1</sup> | 50X/5X, 500 MHz, ± 42 V/± 4.25 V | \$3,430 |
|----------------------|----------------------------------|---------|

#### High Voltage Probes

|                       |                                     |         |
|-----------------------|-------------------------------------|---------|
| THDP0200 <sup>1</sup> | 500X/50X, 200 MHz, ± 1500 V/± 150 V | \$1,730 |
|-----------------------|-------------------------------------|---------|

|                       |                                   |         |
|-----------------------|-----------------------------------|---------|
| TMDP0200 <sup>1</sup> | 250X/25X, 200 MHz, ± 750 V/± 75 V | \$1,730 |
|-----------------------|-----------------------------------|---------|

|                       |                                       |         |
|-----------------------|---------------------------------------|---------|
| THDP0100 <sup>1</sup> | 1000X/100X, 100 MHz, ± 6000 V/± 600 V | \$2,960 |
|-----------------------|---------------------------------------|---------|

#### Current Probes

|         |                 |         |
|---------|-----------------|---------|
| TCP0020 | 50 MHz, 20 A DC | \$2,460 |
|---------|-----------------|---------|

|                      |                  |         |
|----------------------|------------------|---------|
| TCP0030 <sup>1</sup> | 120 MHz, 30 A DC | \$3,460 |
|----------------------|------------------|---------|

|                      |                  |         |
|----------------------|------------------|---------|
| TCP0150 <sup>1</sup> | 20 MHz, 150 A DC | \$4,090 |
|----------------------|------------------|---------|

<sup>1</sup> 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 TPP0100 100MHz, 10X Passive Probe Per Analog Channel (70 MHz model)
- One TPP0200 200 MHz, 10X Passive Probe Per Analog Channel (100 MHz & 200 MHz models)
- One P6316 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD, Power Cord
- 5-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
- >50,000 wfms 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™ | Pricing (USD) |
|---------|-----------------|------------------|------------------|--------------------|-----------------------------------|---------------|
| DPO3012 | 2               | --               | 100 MHz          | 2.5 GS/s           | --                                | \$3,380       |
| MSO3012 | 2               | 16               | 100 MHz          | 2.5 GS/s           | 500 MS/s / 8.25 GS/s              | \$4,800       |
| DPO3014 | 4               | --               | 100 MHz          | 2.5 GS/s           | --                                | \$4,050       |
| MSO3014 | 4               | 16               | 100 MHz          | 2.5 GS/s           | 500 MS/s / 8.25 GS/s              | \$5,500       |
| DPO3032 | 2               | --               | 300 MHz          | 2.5 GS/s           | --                                | \$6,380       |
| MSO3032 | 2               | 16               | 300 MHz          | 2.5 GS/s           | 500 MS/s / 8.25 GS/s              | \$8,520       |
| DPO3034 | 4               | --               | 300 MHz          | 2.5 GS/s           | --                                | \$7,680       |
| MSO3034 | 4               | 16               | 300 MHz          | 2.5 GS/s           | 500 MS/s / 8.25 GS/s              | \$10,300      |
| DPO3052 | 2               | --               | 500 MHz          | 2.5 GS/s           | --                                | \$8,600       |
| DPO3054 | 4               | --               | 500 MHz          | 2.5 GS/s           | --                                | \$10,500      |
| MSO3054 | 4               | 16               | 500 MHz          | 2.5 GS/s           | 500 MS/s / 8.25 GS/s              | \$13,700      |

### Application Modules

#### Serial Bus Triggering and Protocol Analysis

|           |  |         |
|-----------|--|---------|
| DPO3AERO  | Aerospace (MIL-STD-1553)                 | \$1,100 |
| DPO3AUDIO | Audio (I <sup>2</sup> S, LJ, RJ and TDM) | \$1,100 |
| DPO3AUTO  | Automotive (CAN, LIN)                    | \$1,100 |
| DPO3COMP  | Computer (RS-232)                        | \$1,100 |
| DPO3EMBD  | Embedded (I <sup>2</sup> C, SPI)         | \$1,100 |
| DPO3FLEX  | Automotive (FlexRay)                     | \$1,100 |

#### Additional Analysis

|         |                                  |         |
|---------|----------------------------------|---------|
| DPO3PWR | Power Analysis                   | \$1,370 |
| DPO3VID | HDTV and Custom Video Triggering | \$695   |

### Recommended Accessories

|         |                    |       |
|---------|--------------------|-------|
| ACD4000 | Soft Carrying Case | \$247 |
|---------|--------------------|-------|

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV400 | 5-year Extended Warranty | \$415 |
|---------|--------------------------|-------|

### Recommended Probes

#### Passive Voltage Probes

|        |                            |       |
|--------|----------------------------|-------|
| P6139B | 10X, 500 MHz, 300 V CAT II | \$435 |
|--------|----------------------------|-------|

#### Differential Voltage Probes

|         |                                  |         |
|---------|----------------------------------|---------|
| TDP0500 | 50X/5X, 500 MHz, ± 42 V/± 4.25 V | \$3,430 |
| TDP1000 | 50X/5X, 1 GHz, ± 42 V/± 4.25 V   | \$4,840 |

#### High Voltage Probes

|          |                                       |         |
|----------|---------------------------------------|---------|
| TMDP0200 | 250X/25X, 200 MHz, ± 750 V/± 75 V     | \$1,730 |
| THDP0200 | 500X/50X, 200 MHz, ± 1500 V/± 150 V   | \$1,730 |
| THDP0100 | 1000X/100X, 100 MHz, ± 6000 V/± 600 V | \$2,960 |
| P5100A   | 100X, 500 MHz, 2500 V Peak            |         |

#### Current Probes

|         |                  |         |
|---------|------------------|---------|
| TCP0020 | 50 MHz, 20 A DC  | \$2,460 |
| TCP0030 | 120 MHz, 30 A DC | \$3,460 |
| TCP0150 | 20 MHz, 150 A DC | \$4,090 |

### 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.



## 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.

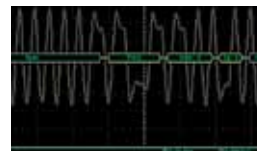


### Product Highlights

- Up to 20 Mpoint record length on 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 bus.

| Models     | Analog Channels | Digital Channels | Bandwidth | Record Length (Max) | Analog Sample Rate (Max) | Digital Sample Rate Main/MagniVu™ | Pricing (USD) |
|------------|-----------------|------------------|-----------|---------------------|--------------------------|-----------------------------------|---------------|
| DPO4014B   | 4               | --               | 100 MHz   | 20M                 | 2.5 GS/s                 | --                                | \$7,150       |
| MSO4014B   | 4               | 16               | 100 MHz   | 20M                 | 2.5 GS/s                 | 500 MS/s /16.5 GS/s               | \$9,500       |
| DPO4034B   | 4               | --               | 350 MHz   | 20M                 | 2.5 GS/s                 | --                                | \$10,700      |
| MSO4034B   | 4               | 16               | 350 MHz   | 20M                 | 2.5 GS/s                 | 500 MS/s /16.5 GS/s               | \$13,600      |
| DPO4054B   | 4               | --               | 500 MHz   | 20M                 | 2.5 GS/s                 | --                                | \$14,000      |
| MSO4054B   | 4               | 16               | 500 MHz   | 20M                 | 2.5 GS/s                 | 500 MS/s /16.5 GS/s               | \$17,400      |
| DPO4102B-L | 2               | --               | 1 GHz     | 5M                  | 5 GS/s                   | --                                | \$9,990       |
| DPO4102B   | 2               | --               | 1 GHz     | 20M                 | 5 GS/s                   | --                                | \$12,600      |
| DPO4104B-L | 4               | --               | 1 GHz     | 5M                  | 5 GS/s                   | --                                | \$13,300      |
| DPO4104B   | 4               | --               | 1 GHz     | 20M                 | 5 GS/s                   | --                                | \$17,100      |
| MSO4102B-L | 2               | 16               | 1 GHz     | 5M                  | 5 GS/s                   | 500 MS/s /16.5 GS/s               | \$12,800      |
| MSO4102B   | 2               | 16               | 1 GHz     | 20M                 | 5 GS/s                   | 500 MS/s /16.5 GS/s               | \$16,200      |
| MSO4104B-L | 4               | 16               | 1 GHz     | 5M                  | 5 GS/s                   | 500 MS/s /16.5 GS/s               | \$16,400      |
| MSO4104B   | 4               | 16               | 1 GHz     | 20M                 | 5 GS/s                   | 500 MS/s /16.5 GS/s               | \$21,500      |

### Application Modules

#### Serial Bus Triggering and Analysis

|                         |  |         |
|-------------------------|--|---------|
| DPO4AERO                | Aerospace (MIL-STD 1553)                 | \$1,610 |
| DPO4-AUDIO <sup>1</sup> | Audio (I <sup>2</sup> S, LJ, RJ and TDM) | \$1,450 |
| DPO4AUTO                | Automotive (CAN, LIN)                    | \$1,450 |
| DPO4-AUTOMAX            | Automotive (CAN, LIN, FlexRay)           | \$5,040 |
| DPO4COMP                | Computer (RS-232)                        | \$1,450 |
| DPO4EMBD <sup>2</sup>   | Embedded (I <sup>2</sup> C, SPI)         | \$1,450 |
| DPO4ENET                | Ethernet (10Base-T, 100Base-Tx)          | \$1,610 |
| DPO4USB <sup>3</sup>    | USB 2.0 (LS, FS, HS)                     | \$1,610 |
| DPO4PWR                 | Power Analysis                           | \$1,800 |
| DPO4LMT                 | Limit and Mask Testing                   | \$888   |
| DPO4VID                 | HDTV & Custom Video Triggering           | \$888   |

### Recommended Probes

#### Passive Voltage Probes

|         |                           |       |
|---------|---------------------------|-------|
| TPP0502 | 2X, 500 MHz, 300 V CAT II | \$609 |
|---------|---------------------------|-------|

#### Active Voltage Probes

|         |                     |         |
|---------|---------------------|---------|
| TAP1500 | 10X, 1.5 GHz, ± 8 V | \$2,140 |
|---------|---------------------|---------|

#### Differential Voltage Probes

|         |                                  |         |
|---------|----------------------------------|---------|
| TDP0500 | 50X/5X, 500 MHz, ± 42 V/± 4.25 V | \$3,430 |
| TDP1000 | 50X/5X, 1 GHz, ± 42 V/± 4.25 V   | \$4,840 |

#### High Voltage Probes

|          |                                   |         |
|----------|-----------------------------------|---------|
| TMDP0200 | 250X/25X, 200 MHz, ± 750 V/± 75 V | \$1,730 |
| TPP0850  | 50X, 800 MHz, 2500 V Peak         | \$627   |

#### Current Probes

|         |                  |         |
|---------|------------------|---------|
| TCP0030 | 120 MHz, 30 A DC | \$3,460 |
|---------|------------------|---------|

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV600 | 5-year Extended Warranty | \$620 |
|---------|--------------------------|-------|

### 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

<sup>1</sup> Not available on DPO4102B, DPO4102B-L models.

<sup>2</sup> For SPI, only 2-wire support is available on DPO4102B, DPO4102B-L.

<sup>3</sup> USB 2.0 HS only available on 1 GHz analog bandwidth models.

# Only scope

with a built-in spectrum analyzer.

# Only

\$12,200.\*



- 1 Time Domain Display
- 2 Frequency Domain Display



## The world's first mixed domain oscilloscope is now even more accessible.

The award-winning Tektronix MDO4000 Series Mixed Domain Oscilloscope is turning heads with its revolutionary built-in spectrum analyzer. For the first time, you can capture up to 21 time-correlated analog, digital and RF signals with one instrument. You can even view the RF spectrum at different points in time to see critical changes. Now the year's top scope is even more impressive, with new models starting at just \$12,200. Which means you can capture more signal types with one instrument than ever before. For less than ever before.

### MDO4000 Mixed Domain Oscilloscope

- 4 analog channels
  - 100 MHz to 1 GHz bandwidth models
- 16 digital channels
- Parallel and serial bus triggering and analysis
- Built on the MSO4000B mixed signal oscilloscope platform
- 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

► Find the right scope for your project and budget at [www.scoperevolution.com](http://www.scoperevolution.com).

\* MSRP USD Starting Price  
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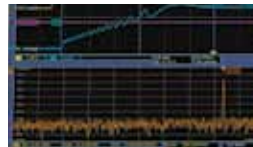
## MDO4000 Series

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.

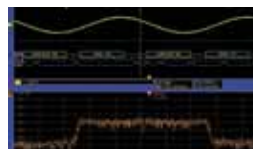


### Product Highlights

- The world's first oscilloscope with a built-in spectrum analyzer
- Up to 3 GHz capture bandwidth on the spectrum analyzer input
- 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™ | Spectrum Analyzer Input | Spectrum Analyzer Frequency Range | Pricing (USD) |
|-----------|-----------------|------------------|------------------|--------------------|-----------------------------------|-------------------------|-----------------------------------|---------------|
| MDO4014-3 | 4               | 16               | 100 MHz          | 2.5 GS/s           | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 3 GHz                    | \$12,220      |
| MDO4034-3 | 4               | 16               | 350 MHz          | 2.5 GS/s           | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 3 GHz                    | \$16,700      |
| MDO4054-3 | 4               | 16               | 500 MHz          | 2.5 GS/s           | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 3 GHz                    | \$20,700      |
| MDO4054-6 | 4               | 16               | 500 MHz          | 2.5 GS/s           | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 6 GHz                    | \$24,200      |
| MDO4104-3 | 4               | 16               | 1 GHz            | 5 GS/s             | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 3 GHz                    | \$25,200      |
| MDO4104-6 | 4               | 16               | 1 GHz            | 5 GS/s             | 500 MS/s /16.5 GS/s               | 1                       | 50 kHz – 6 GHz                    | \$29,200      |

### Application Modules

#### Serial Bus Triggering and Protocol Analysis

|                      |  |         |
|----------------------|--|---------|
| DPO4AE-RO            | Aerospace (MIL-STD 1553)                 | \$1,610 |
| DPO4 AUDIO           | Audio (I <sup>2</sup> S, LJ, RJ and TDM) | \$1,450 |
| DPO4AUTO             | Automotive (CAN, LIN)                    | \$1,450 |
| DPO4-AUTOMAX         | Automotive (CAN, LIN, FlexRay)           | \$5,040 |
| DPO4COMP             | Computer (RS-232)                        | \$1,450 |
| DPO4EMBD             | Embedded (I <sup>2</sup> C, SPI)         | \$1,450 |
| DPO4ENET             | Ethernet (10BASE-T, 100BASE-TX)          | \$1,610 |
| DPO4USB <sup>1</sup> | USB 2.0 (LS, FS, HS)                     | \$1,610 |

#### Additional Analysis

|          |                                |         |
|----------|--------------------------------|---------|
| MDO4TRIG | Adv. RF Power Level Triggering | \$1,750 |
| DPO4PWR  | Power Analysis                 | \$1,800 |
| DPO4LMT  | Limit and Mask Testing         | \$888   |
| DPO4VID  | HDTV & Custom Video Triggering | \$888   |

<sup>1</sup>USB 2.0 HS only available on 1 GHz analog bandwidth models.

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV900 | 5-year Extended Warranty | \$930 |
|---------|--------------------------|-------|

### Recommended Probes

#### Passive Voltage Probes

|         |                            |       |
|---------|----------------------------|-------|
| TPP1000 | 10X, 1 GHz, 300 V CAT II   | \$948 |
| TPP0500 | 10X, 500 MHz, 300 V CAT II | \$627 |
| TPP0502 | 2X, 500 MHz, 300 V CAT II  | \$609 |

#### Active Voltage Probes

|         |                     |         |
|---------|---------------------|---------|
| TAP1500 | 10X, 1.5 GHz, ± 8 V | \$2,140 |
|---------|---------------------|---------|

#### Differential Voltage Probes

|         |                                 |         |
|---------|---------------------------------|---------|
| TDP0500 | 50X/5X, 500 MHz, ± 42 V/± 4.2 V | \$3,430 |
| TDP1000 | 50X/5X, 1 GHz, ± 42 V/± 4.2 V   | \$4,840 |

#### High Voltage Probes

|          |                                     |         |
|----------|-------------------------------------|---------|
| THDP0200 | 500X/50X, 200 MHz, ± 1500 V/± 150 V | \$1,730 |
| TPP0850  | 50X, 800 MHz, 2500 V Peak           | \$781   |

#### Current Probes

|         |                  |         |
|---------|------------------|---------|
| TCP0030 | 120 MHz, 30 A DC | \$3,460 |
|---------|------------------|---------|

### 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





## 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.

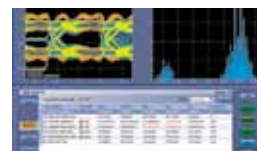


### Product Highlights

- Windows 7 Ultimate 64-bit operating system and touch-screen display
- >250,000 wfms 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 essentials jitter and eye pattern analysis software package - free.

| Models  | Analog Channels | Digital Channels | Analog Bandwidth | Analog Sample Rate (4 Channels/2 Channels) | Digital Sample Rate Main/MagniVu™ | Pricing (USD) |
|---------|-----------------|------------------|------------------|--|-----------------------------------|---------------|
| DPO5034 | 4               | --               | 350 MHz          | 5 GS/s                                     | --                                | \$12,000      |
| MSO5034 | 4               | 16               | 350 MHz          | 5 GS/s                                     | 500 MS/s /16.5 GS/s               | \$15,800      |
| DPO5054 | 4               | --               | 500 MHz          | 5 GS/s                                     | --                                | \$15,600      |
| MSO5054 | 4               | 16               | 500 MHz          | 5 GS/s                                     | 500 MS/s /16.5 GS/s               | \$19,300      |
| DPO5104 | 4               | --               | 1 GHz            | 5 GS/s /10 GS/s                            | --                                | \$19,700      |
| MSO5104 | 4               | 16               | 1 GHz            | 5 GS/s /10 GS/s                            | 500 MS/s /16.5 GS/s               | \$23,400      |
| DPO5204 | 4               | --               | 2 GHz            | 5 GS/s /10 GS/s                            | --                                | \$25,000      |
| MSO5204 | 4               | 16               | 2 GHz            | 5 GS/s /10 GS/s                            | 500 MS/s /16.5 GS/s               | \$28,700      |

### Software Packages

#### Serial Bus Triggering and Protocol Analysis

|         |                                  |         |
|---------|----------------------------------|---------|
| SR-AERO | MIL-STD-1553B                    | \$2,060 |
| SR-AUTO | CAN/LIN/FlexRay                  | \$2,060 |
| SR-COMP | Computer (RS-232)                | \$2,060 |
| SR-DPHY | MIPI D-PHY                       | \$2,060 |
| SR-EMBD | Embedded (I <sup>2</sup> C, SPI) | \$2,060 |
| SR-ENET | Ethernet                         | \$2,060 |
| SR-PCIE | PCI Express                      | \$2,060 |
| SR-USB  | USB 2.0 (LS, FS, HS)             | \$2,060 |

#### Compliance Test

|      |            |         |
|------|------------|---------|
| ET3  | Ethernet   | \$5,600 |
| MOST | MOST50/150 | \$2,690 |
| USB  | USB 2.0    | \$2,860 |

#### Additional Analysis

|           |   |         |
|-----------|---|---------|
| DDRA      | DDR Memory  | \$6,030 |
| DJA       | Advanced Jitter and Eye Diagram                       | \$4,450 |
| PS1, 2, 3 | Power Solution Bundles                                | Varies  |
| PWR       | Power Analysis  | \$3,400 |
| SVE       | SignalVu Essentials - Vector Signal Analysis Software | \$1,990 |
| VET       | Visual Trigger/Search                                 | \$2,420 |

Additional software packages are available. For a complete listing, please visit [www.tektronix.com/mso5000](http://www.tektronix.com/mso5000)

### Recommended Probes

#### Passive Voltage Probes

|         |                           |       |
|---------|---------------------------|-------|
| TPP1000 | 10X, 1 GHz, 300 V CAT II  | \$948 |
| TPP0502 | 2X, 500 MHz, 300 V CAT II | \$609 |

#### Active Voltage Probes

|         |                     |         |
|---------|---------------------|---------|
| TAP1500 | 10X, 1.5 GHz, ± 8 V | \$2,140 |
| TAP2500 | 10X, 2.5 GHz, ± 4 V | \$3,740 |

#### Differential Voltage Probe

|         |                                   |         |
|---------|-----------------------------------|---------|
| TDP0500 | 50X/5X, 500 MHz, ± 42 V/± 4.2 V   | \$3,430 |
| TDP1000 | 50X/5X, 1 GHz, ± 42 V/± 4.2 V     | \$4,840 |
| TDP1500 | 10X/1X, 1.5 GHz, ± 8.5 V/± 850 mV | \$5,540 |

#### High Voltage Probes

|          |                                       |         |
|----------|---------------------------------------|---------|
| TMDP0200 | 50X, 800 MHz, 2500 V Peak             | \$1,730 |
| THDP0200 | 500X/50X, 200 MHz, ± 1500 V/± 150 V   | \$1,730 |
| THDP0100 | 1000X/100X, 100 MHz, ± 6000 V/± 600 V | \$2,960 |
| TPP0850  | 50X, 800 MHz, 2500 V Peak             | \$627   |

#### Current Probes

|         |                  |         |
|---------|------------------|---------|
| TCP0020 | 50 MHz, 20 A DC  | \$2,460 |
| TCP0030 | 120 MHz, 30 A DC | \$3,460 |
| TCP0150 | 20 MHz, 150 A DC | \$4,090 |

### 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)
- 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  | \$3,270  |
| Opt. 5RL  | 50M/Ch  | \$5,450  |
| Opt. 10RL | 125M/Ch | \$11,900 |

Limitations apply. See data sheet for full details.

### Recommended Service

|    |                          |        |
|----|--------------------------|--------|
| R3 | 3-year Extended Warranty | Varies |
| R5 | 5-year Extended Warranty | Varies |

# 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

## Carrying Cases and Accessories

- TekVPI Interface Adapter for TekProbe probes
- Probe holders and positioners
- Probe power supply
- Soft- and hard-sided cases

## 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](http://www.tektronix.com/probes)

Select your requirements below. The list of matching products will update with each click.

Probe Recommendation Selector (Start by clicking the arrow to the left or clicking inside this box). Use this Selector to find out what are the most commonly used probes.

**122 Matches** [Compare](#) [Start Over](#)

**Select the Instrument Series:**

HSO/DPO2000E  HSO/DPO3000  HSO/DPO4000E  
 HSO/DPO8000  DPO7000C  DPO/DSEA/HSD70000  
 HD04000  HD04000 [RF]  TDS2000B  
 TDS2000C  TDS3000C  TDS3000  
 TDS2000B  TDS1200  HSA3000/9000

**Choose the Desired Measurement:**

If an option is grayed out a recommended solution is not available.

High Voltage Differential  Low Voltage Differential  
 High Voltage Single-ended  Low Voltage Single-ended  
 Current  General Purpose

Probe Compatibility Selector (Start by clicking the arrow to the left or clicking inside this box). Use this Selector to determine if a probe or accessory is compatible with an instrument series.

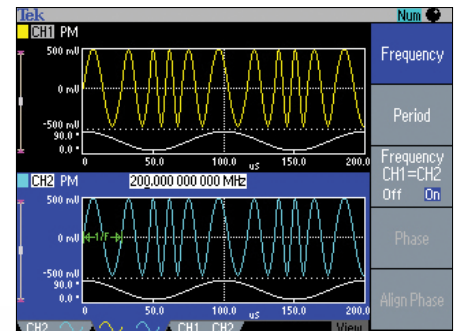
|         |         |         |
|---------|---------|---------|
|         |         |         |
| THP0200 | THP0100 | THP0150 |
|         |         |         |
| TCP020  | TCP020  | TCP150  |
|         |         |         |
| TR0020  | ES100A  | ES120   |
|         |         |         |
| TAP150  | TR0050  | TR0100  |
|         |         |         |
| TCP220  | TCP200  | TCP210  |
| 1100    | 2500    | 300000  |
| 2000    | 2500    | 2000000 |
| 2001    | 2000    | 200000  |

Images appear for the first 15 matches. The rest of the matches are listed below.



# 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 and AFG2000 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 Tektronix Arbitrary/Function Generators are controllable from your PC, so you can analyze data across your Tektronix bench instruments. Put simply, we designed both the AFG3000 and AFG2000 Series to do more, so you don't have to.



- Dual-channel—Save cost and bench space by replacing two signal generators with one AFG3000 2 channel instrument

- 12 standard waveforms
- AM, FM, PM, FSK, PWM
- Arbitrary waveform capabilities and signal impairment options
- Up to 2 GS/s sample rate
- 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® Arbitrary/Function Generators

Detailed specs, virtual demos and more at  
[www.tektronix.com/afg](http://www.tektronix.com/afg)

## 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.



|                    | AFG2000   | AFG3000 Series  |
|--------------------|---|---|
| Bandwidth          | 20 MHz  | 240 MHz, 100 MHz, 25 MHz, 10 MHz  |
| Channels           | 1   | 1 or 2 (independent or synchronized)  |
| Memory Depth       | 4 x 128 k points  | 128 k points  |
| Standard Waveforms | Sine, Sine(x)/x, Square, DC, Ramp, Gaussian, Exponential Decay, Pulse, Lorentz, Noise, Arbitrary, Haversine, Exponential Rise | Sine, Sine(x)/x, Square, DC, Ramp, Gaussian, Exponential Decay, Pulse, Lorentz, Noise, Arbitrary, Haversine, Exponential Rise |
| Modulation         | AM, FM, PM, FSK, PWM, External  | AM, FM, PM, FSK, PWM, External  |
| Additional Modes   | Sweep, Burst, Add Noise Impairment  | Sweep, Burst, Add Noise Impairment  |
| Starting Price     | \$1,590   | \$1,890   |

## 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.

### 1 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.

### 2 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.

### 3 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.

### 4 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.



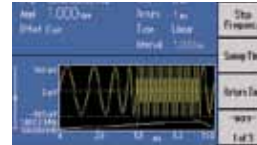
## AFG2000

Usually, generating a range of signals requires investment in a high-end signal generator. Introducing the Tektronix AFG2000. With 20 MHz bandwidth, 14-bit resolution, and 250 MS/s sample rate, the AFG2021 Arbitrary Function Generator can create simple and complex signals. But perhaps its most impressive feature is its entry-level price.



### Product Highlights

- 12 standard waveforms – Sine, Square, Pulse, Ramp, Noise, DC, Sine(x)/x, Gaussian, Lorentz, Exponential Rise, Exponential Decay and Haversine
- Arbitrary waveform capability
- AM, FM, PM, FSK, PWM, sweep and burst modes
- Front-panel USB host port and rear-panel USB device port, optional Ethernet and GPIB ports (Opt. GL)



Wide frequency range (1  $\mu$ Hz to 20 MHz) supports amplifier and filter testing applications.



Quickly modify, create and transfer waveforms using the included ArbExpress® software.

| Models  | Analog Channels | Output Bandwidth | Analog Sample Rate | Memory Depth | Amplitude (into 50 $\Omega$ )               | Pricing (USD) |
|---------|-----------------|------------------|--------------------|--------------|---|---------------|
| AFG2021 | 1               | 20 MHz           | 250 MS/s           | 128 k        | 10 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$1,590       |

### Recommended Accessories

#### Cables

|             |                             |       |
|-------------|-----------------------------|-------|
| 012-0482-00 | BNC cable shielded, 3 ft.   | \$217 |
| 012-1256-00 | BNC cable shielded, 9 ft.   | \$89  |
| 012-0991-00 | GPIB cable, double shielded | \$515 |
| 011-0049-02 | 50 $\Omega$ BNC Terminator  | \$143 |

#### Accessories

|             |                              |       |
|-------------|------------------------------|-------|
| RMU2U       | Rackmount kit                | \$152 |
| 013-0345-00 | Fuse adapter, BNC-P to BNC-R | \$329 |
| 159-0454-00 | Fuse set, 3pcs, 0.125 A      | \$22  |

### Instrument Options

|         |   |       |
|---------|---|-------|
| Opt. GL | GPIB/LAN Interface (configured at time of purchase) | \$100 |
|---------|---|-------|

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV200 | 5-year Extended Warranty | \$260 |
|---------|--------------------------|-------|

### Ships with Product

- ArbExpress™ Software and NI LabVIEW SignalExpress™ TE (LE version) Software
- LabView & IVI drivers
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- USB Cable
- 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.





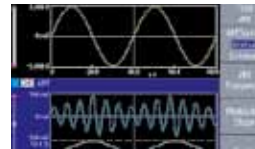
## AFG3000C Series

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.

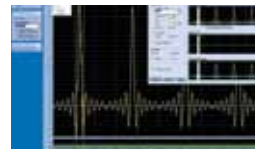


### Product Highlights

- 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 at a single glance.



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

| Models   | Analog Channels | Output Bandwidth | Analog Sample Rate             | Memory Depth | Amplitude (into 50 Ω)                       | Pricing (USD) |
|----------|-----------------|------------------|--------------------------------|--------------|---|---------------|
| AFG3011C | 1               | 10 MHz           | 250 MS/s                       | 128 k        | 20 mV <sub>p-p</sub> to 20 V <sub>p-p</sub> | \$4,220       |
| AFG3021C | 1               | 25 MHz           | 250 MS/s                       | 128 k        | 10 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$1,890       |
| AFG3022C | 2               | 25 MHz           | 250 MS/s                       | 128 k        | 10 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$2,790       |
| AFG3051C | 1               | 50 MHz           | 250 MS/s                       | 128 k        | 10 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$2,470       |
| AFG3052C | 2               | 50 MHz           | 250 MS/s                       | 128 k        | 10 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$3,650       |
| AFG3101C | 1               | 100 MHz          | 1 GS/s (≤16k), 250 MS/s (>16k) | 128 k        | 20 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$4,290       |
| AFG3102C | 2               | 100 MHz          | 1 GS/s (≤16k), 250 MS/s (>16k) | 128 k        | 20 mV <sub>p-p</sub> to 10 V <sub>p-p</sub> | \$6,090       |
| AFG3251C | 1               | 240 MHz          | 2 GS/s (≤16k), 250 MS/s (>16k) | 128 k        | 50 mV <sub>p-p</sub> to 5 V <sub>p-p</sub>  | \$8,660       |
| AFG3252C | 2               | 240 MHz          | 2 GS/s (≤16k), 250 MS/s (>16k) | 128 k        | 50 mV <sub>p-p</sub> to 5 V <sub>p-p</sub>  | \$11,900      |

### Recommended Accessories

#### Cables

|             |                             |       |
|-------------|-----------------------------|-------|
| 012-0482-xx | BNC cable shielded, 3 ft.   | \$217 |
| 012-1256-xx | BNC cable shielded, 9 ft.   | \$89  |
| 012-0991-xx | GPIB cable, double shielded | \$515 |

#### Accessories

|             |                              |       |
|-------------|------------------------------|-------|
| RM3100      | Rackmount kit                | \$450 |
| 013-0345-xx | Fuse adapter, BNC-P to BNC-R | \$329 |
| 159-0454-xx | Fuse set, 3pcs, 0.125A       | \$22  |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV400 | 5-year Extended Warranty | \$415 |
|---------|--------------------------|-------|

### 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.



## SourceMeter® SMU Instruments

Keithley Instruments SourceMeter® SMU instruments source current or voltage and simultaneously measure current, voltage and resistance with high speed and accuracy. SourceMeter® SMU instruments offer a smart alternative to separate power supplies and DMMs, saving money and limited test bench space.



|                             | Series 2400 SourceMeter® SMU Instruments  | Series 2600B System SourceMeter® SMU Instruments  |
|-----------------------------|---|---|
| Channels                    | 1   | 1-2 (optional expansion to 64 via TSP-Link®)  |
| Accuracy                    | 6½-digit measurements   | 6½-digit measurements   |
| Max. Readings / Second      | 2,000   | 20,000  |
| Interface                   | GPIB, RS-232, Digital I/O   | GPIB, LAN (LXI), USB and RS-232, Digital I/O  |
| Application Features        | Convenient DMM-like user interface; 2/4/6 wire resistance with force I or V source modes, V-Force from 1ΩV to 1.1KV, 10pA to 5A cont., 10A pulsed, 2W to 110W | True multi-channel parallel test via TSP-Link. Up to 0.1 fA resolution.   |
| Test Sequencing / Scripting | Built-in ramp generator and list sweep modes, 100 point global machine state sequencer for fast test setup and execution                                      | TSP® (Test Script Processing) technology embeds complete test programs inside the instrument for unmatched system-level speed |
| Included Software           | LabTracer 2.0 I-V curve utility and IV and LabVIEW drivers included.  | Built-in, web browser-based characterization software, IV and Labview drivers.  |
| Starting Price              | \$3,170   | \$6,090   |

## Choosing Your Source Measure Unit (SMU) Instrument

A SMU instrument integrates precision power supply and digital multimeter (DMM) capabilities in one instrument while covering a wide dynamic range. SMUs source and measure simultaneously, making them ideal for characterizing and testing semiconductors and other non-linear devices and materials.

### 1 System-Level Speed or Throughput

The true measure of speed is how quickly a final measurement or set of measurements (such as a suite of current vs. voltage parameters) is returned to the PC controller. This involves not only the number of readings/second, but also range and function change times.

### 2 Sourcing Resolution and Output Stability

An SMU's usable maximum resolution depends on its overall accuracy and the resolution of its analog-to-digital converter (ADC). In general, the higher the resolution is, the higher the bit count on the ADC and the higher the accuracy will be.

### 3 Measurement Settling Time, Offset Error, and Noise

When choosing between instruments, compare the time it takes a SMU to settle the specified offset error. This can be seen in the "bumpiness" of the resulting data curve which indicates measurement noise; the smoother the data curve the less measurement noise. SMUs having a fast, flat, and noise-free settling time achieve more consistent results during a series of measurements taken over time.

### 4 Cabling

Triaxial cables offer significant advantages over coaxial cables when making low current measurements. Triaxial cables have an extra shield that ensures lower leakage, better response, and greater noise immunity.





## Series 2400 SourceMeter® SMU Instruments



Series 2400 SourceMeter® SMU instruments are single-channel models with I-V capability from 1100V to 100nV and 10.5A pulse to 1pA. They offer a smart alternative to separate power supplies and digital multimeters (DMMs) and provide a convenient DMM-like user interface.

### Product Highlights

- Wide I-V range from 1100V to 100nV and 10.5A pulse to 1pA
- 4-quadrant design simultaneously measures voltage, current, and resistance
- Remote sense on V-source and measure plus guarded ohms mode
- Built-In test sequencer
- Includes LabTracer 2.0 I-V curve utility and IVI and LabVIEW drivers
- Standard GPIB and RS-232 interfaces; Banana (front / rear) Connectors



Model 2400 four-quadrant operation characteristics, a feature of all SourceMeter SMU instruments.



Free LabTracer software for remote control and data sharing for applications ranging from the simple to complex.

| Model              | Current Max / Min   | Voltage Max / Min | Power | Pricing (USD)               |
|--------------------|---------------------|-------------------|-------|-----------------------------|
| 2400 / 2401        | 1.05A / 10pA        | 200V/1μV          | 22W   | \$4,320 / \$3,170           |
| 2420 / 2425 / 2440 | 5.25A / 100pA       | 100V/1μV          | 110W  | \$6,180 / \$7,360 / \$7,030 |
| 2410               | 1.05A / 10pA        | 1100V/1μV         | 22W   | \$6,180                     |
| 2430               | 10.5A pulse / 100pA | 200V/1μV          | 1100W | \$10,700                    |

### Recommended Service

|                 |   |         |
|-----------------|---|---------|
| C/2400-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2400* | \$842   |
| C/2401-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Model 2401*  | \$842   |
| C/2410-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2410* | \$924   |
| C/2420-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2420* | \$924   |
| C/2425-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2425* | \$985   |
| C/2430-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2430* | \$1,010 |
| C/2440-3Y-17025 | (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2440* | \$974   |

### Recommended Service

|      |                                 |        |
|------|---------------------------------|--------|
| R3   | 3-year Extended Warranty        | Varies |
| R5   | 5-year Extended Warranty        | Varies |
| C3   | Calibration Service 3 Years     | Varies |
| C5   | Calibration Service 5 Years     | Varies |
| R3DW | Repair Service Coverage 3 Years | Varies |
| R5DW | Repair Service Coverage 5 Years | Varies |

### Ships with Product

- Model 8605 Test Leads
- LabVIEW Software Driver (downloadable)
- LabTracer Software (downloadable)
- Calibration Certificate (Basic)
- Manual CD
- Power Cord
- Warranty

Read the white paper, "Choosing the Optimal Source Measurement Unit Instrument for Your Test and Measurement Application."



\*Not available in all countries.



## Series 2600B System SourceMeter® SMU Instruments

Series 2600B SourceMeter® SMU instruments are the industry's most powerful, fastest, and highest resolution SMU instruments. Now they're easier than ever to use with USB 2.0 connectivity, Model 2400 software emulation, and Java-based plug & play test software. Series 2600B models offer the industry's widest dynamic range: 10A pulse to 0.1fA and 200V to 100nV.



### Product Highlights

- 4-quadrant design simultaneously measures voltage, current, and resistance
- TSP® (embedded Test Script Processor) architecture enables industry-best system-level speed
- Arbitrary waveform generation with 1% to 100% duty cycle
- Built-in software for quick and easy I-V test through web browser
- GPIB, LAN (LXI), USB and RS-232



Built-in, Java-based test software runs directly from any web browser to boost productivity.



TSP technology executes complete test programs from the 2600B's non-volatile memory.

| Model | Current Max / Min         | Voltage Max / Min | Max readings / sec | No. of Channels | Pricing (USD) |
|-------|---------------------------|-------------------|--------------------|-----------------|---------------|
| 2601B | 3A DC, 10A pulse/100 fA   | 40V/100nV         | 20,000             | 1               | \$6,090       |
| 2602B | 3A DC, 10A pulse/100 fA   | 40V/100nV         | 20,000             | 2               | \$8,930       |
| 2604B | 3A DC, 10A pulse/100 fA   | 40V/100nV         | 20,000             | 2               | \$7,150       |
| 2611B | 1.5A DC, 10A pulse/100 fA | 200V/100nV        | 20,000             | 1               | \$6,090       |
| 2612B | 1.5A DC, 10A pulse/100 fA | 200V/100nV        | 20,000             | 2               | \$8,930       |
| 2614B | 1.5A DC, 10A pulse/100 fA | 200V/100nV        | 20,000             | 2               | \$7,150       |
| 2634B | 1.5A DC, 10A pulse/1fA    | 200V/100nV        | 20,000             | 2               | \$11,200      |
| 2635B | 1.5A DC, 10A pulse/0.1 fA | 200V/100nV        | 20,000             | 1               | \$9,060       |
| 2636B | 1.5A DC, 10A pulse/0.1 fA | 200V/100nV        | 20,000             | 2               | \$13,900      |

### Recommended Accessories

|              |                                      |         |
|--------------|--------------------------------------|---------|
| 2600-BAN     | Banana Test Leads Adapter            | \$154   |
| 8606         | Probe Kit for 2600-BAN               | \$57    |
| 2600-Std-Res | Calibration Standard 1G ohm Resistor | \$1,920 |

### Recommended Service

|      |                                 |        |
|------|---------------------------------|--------|
| R3   | 3-year Extended Warranty        | Varies |
| R5   | 5-year Extended Warranty        | Varies |
| C3   | Calibration Service 3 Years     | Varies |
| C5   | Calibration Service 5 Years     | Varies |
| R3DW | Repair Service Coverage 3 Years | Varies |
| R5DW | Repair Service Coverage 5 Years | Varies |

### Ships with Product

- Operators and Programming Manuals
- 2600-ALG-2: Low Noise Triax Cable with Alligator Clips, 2m (6.6 ft.) (two supplied with 2634B and 2636B, one with 2635B)
- 2600-Kit: Mating Screw Terminal Connectors with strain relief and covers (2601B/2602B/2604B/2611B/2612B/2614B)
- CA-180-3A: TSP-Link/Ethernet Cable (two per unit)
- TSP Express Software Tool (embedded)
- Test Script Builder Software (supplied on CD)
- LabVIEW Driver
- ACS Basic Edition Software (optional)

## Power Analyzers

Fully characterize your power-electronics design from input to output with Tektronix power analyzers. Designed for precision measurement of power-electronics circuits and devices, these analyzers give you what you need to measure conversion efficiency and perform compliance testing on single-phase or 3-phase devices.



|                                 | PA4000   |
|---------------------------------|--|
| Multi-Channel Power Analyzer    | PA4000_1CH, PA4000_2CH, PA4000_3CH, PA4000_4CH |
| Power Input Modules             | 1 – 4 (factory configured)                     |
| Basic Accuracy (V & I)          | 0.04% of Reading (45-850 Hz)                   |
| Measurement Bandwidth           | DC, 0.1 Hz - 1 MHz                             |
| Voltage Range                   | 2V peak to 2000V peak                          |
| Current Range (internal shunts) | 0.0025 A to 30 Arms                            |
| Starting Price                  | \$10,500                                       |

## Choosing Your Power Analyzer

Power analyzers are used for testing a wide range of power-electronics devices, from cell-phone chargers to 1000kW grid-connected inverters. To help you choose the best analyzer for your application, consider the criteria below.

### 1 Number of Inputs

Power analyzers are available in both fixed configurations (typically single-channel) and modular configurations. If your application is limited to single-phase devices, a single-channel analyzer may meet your needs. But if you need to measure conversion efficiency on these devices, a two-channel analyzer is required.

Testing of 3-phase devices of course requires a multi-phase analyzer. In many cases, two channels will be all you need for a two-wattmeter measurement on 3-wire inputs or outputs. A four-channel analyzer can measure both input and output simultaneously, to determine conversion efficiency.

### 2 Measurement Bandwidth

How much bandwidth is enough? The measurement bandwidth you need is usually determined by the switching speed of the device-under-test, or the highest-order harmonic that your testing requires. Switching speeds of tens or hundreds of kHz are common in today's designs. But new semiconductor technologies promise to increase speeds up to 2x or more in the near future. Choose an analyzer that is capable of measuring your highest frequencies of interest, with some headroom for future-proofing.

### 3 Compliance Testing for Regulatory Standards

If your application requires you to know that your device is

compliant with regulatory standards such as IEC61000 for harmonics, or EnergySTAR for energy efficiency, you need an analyzer capable of meeting the test requirements specified by the standard. Even better, look for an analyzer supported by software applications that can automate instrument setup and reporting of test results in the exact format required for your application.

### 4 Current Shunts: Internal or External?

Will you be measuring milliamperes, or hundreds of amperes? Power analyzers vary in the features they offer for direct current inputs or connection to external current transducers. Ideally, the analyzer should have internal current shunts that allow you to connect your device directly, for best accuracy. If you will be testing a range of devices at different power levels, you may value both high and low-range shunts. Finally, if your application requires external current transducers (usually required for current >30Amps), make sure there are transducers available that are well-matched to the analyzer and offer the accuracy you need.

### 5 Remote Communication

Will you have a need to control the analyzer remotely, or transfer measurement data to your PC? If so, you will want to look for an instrument that features the communication ports you need. Depending on the analyzer model, some ports may be standard features or extra-cost options; be careful to choose the right instrument configuration that meets your requirements.



## PA4000 Power Analyzers

Tektronix PA4000 Power Analyzers provide you with highly accurate power, energy and efficiency measurements. Precisely-matched inputs and advanced signal processing deliver high measurement accuracy, even when power is distorted or noisy. The PA4000 performs all power measurements – and harmonics analysis, application-specific measurements, PC interfaces, and dual current shunts per channel are all standard features.



### Product Highlights

- 1 to 4 input modules with precision phase-matched V & I inputs, 1000 Vrms, 30 Arms direct input
- Measurement BW: DC to 1 MHz
- 0.04% basic accuracy
- Application specific test modes for Motor Drives, Ballasts, Standby Power and Energy Integration
- Harmonics measurement to 100th harmonic
- Full-color TFT display with waveform graphics, vector, bar chart, trend



Each input module features both high- and low-range current shunts.



USB, Ethernet and RS-232 ports are standard.

| Model      | Description                                | Basic Accuracy (V & I) | Voltage Input Range   | Current Range (internal shunts) | Pricing (USD) |
|------------|--|------------------------|-----------------------|---------------------------------|---------------|
| PA4000 1CH | PA4000 Power Analyzer with 1 input module  | 0.04% (45-850 Hz)      | 2V peak to 2000V peak | 0.0025 A to 30 Arms             | \$10,500      |
| PA4000 2CH | PA4000 Power Analyzer with 2 input modules | 0.04% (45-850 Hz)      | 2V peak to 2000V peak | 0.0025 A to 30 Arms             | \$13,400      |
| PA4000 3CH | PA4000 Power Analyzer with 3 input modules | 0.04% (45-850 Hz)      | 2V peak to 2000V peak | 0.0025 A to 30 Arms             | \$16,200      |
| PA4000 4CH | PA4000 Power Analyzer with 4 input modules | 0.04% (45-850 Hz)      | 2V peak to 2000V peak | 0.0025 A to 30 Arms             | \$18,900      |

### Recommended Accessories

|           |  |
|-----------|--|
| CT-60-S   | Fixed-Core Current Transducer, High Accuracy, up to 60A                                    |
| CT-200-S  | Fixed-Core Current Transducer, High Accuracy, up to 200A                                   |
| CT-400-S  | Fixed-Core Current Transducer, High Accuracy, up to 400A                                   |
| CT-1000-S | Fixed-Core Current Transducer, High Accuracy, up to 1000A (requires external power supply) |
| CT-100-M  | Fixed-Core Current Transducer, Hall Effect, up to 100A                                     |
| CT-200-M  | Fixed-Core Current Transducer, Hall Effect, up to 200A                                     |
| CT-500-M  | Fixed-Core Current Transducer, Hall Effect, up to 500A                                     |
| CT-1000-M | Fixed-Core Current Transducer, Hall Effect, up to 1000A                                    |

### Recommended Accessories

|            |   |
|------------|---|
| CL200      | Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers                 |
| CL1200     | Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers                |
| PA-LEADSET | Replacement Lead Set for Tektronix Power Analyzers (One Channel Lead Set) |

### Recommended Service

|    |                             |        |
|----|-----------------------------|--------|
| R5 | 5-year Extended Warranty    | Varies |
| C3 | Calibration Service 3 Years | Varies |
| C5 | Calibration Service 5 Years | Varies |

### Ships with Product

- Lead set (1 set per input module)
- User Manual
- AC Power Cord
- Certificate of Traceable Calibration
- 3-year Product Warranty

**Learn more** about power measurements, from switching loss to compliance testing at [www.tektronix.com/power](http://www.tektronix.com/power).

## Digital Multimeters

Designed to save time and reduce headaches, Tektronix and Keithley Digital Multimeters are built to do more so you don't have to. Each one is loaded with time-saving features like automated measurements, built-in analysis modes and front-panel shortcut buttons. Keithley's highly regarded high performance digital multimeters (DMMs,) include 7½ or 8½-digit solutions as well as flexible broad-purpose DMMs.



|                           | Tektronix Model DMM4020                       | Tektronix Models DMM4040/4050   | Keithley Models 2001, 2100                     | Keithley Model 2002 | Keithley Models 2000, 2100                        | Keithley Model 2110 |
|---------------------------|---|---|--|---------------------|---|---------------------|
| Resolution                | 5½ digit                                      | 6½ digit  | 7½ digit                                       | 8½ digit            | 6½ digit  | 5½ digit            |
| Basic Accuracy            | 0.015%  | 0.0035% (DMM4040)<br>0.0024% (DMM4050)                                  | 0.0018%  | 0.0006%             | 0.0038% (Model 2100)<br>0.0020% (Model 2000)      | 0.012%              |
| Optional Switch Functions | Not Applicable                                | Not Applicable  | 10 Channel                                     | 10 Channel          | 10 Channel (Model 2000)                           | Not Applicable      |
| Interface                 | RS-232, RS-232 to USB Device Adapter Included | USB host, RS-232, GPIB, Ethernet, RS-232 to USB Device Adapter Included | GPIB, RS-232 (Model 2010)<br>GPIB (Model 2001) | GPIB                | GPIB, RS-232 (Model 2000)<br>USB-TMC (Model 2100) | USB-TMC GPIB Option |
| Starting Price            | \$792   | \$1,150   | \$2,790  | \$5,740             | \$862   | \$595               |

## 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 Extra Channel Capacity

Most of Keithley's DMM's (excluding Models 2100 and 2110) include an option slot located in the rear, to accommodate a scanner card enabling automated multipoint measurements.



## DMM4020

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) | Pricing (USD) |
|---------|---------------|---------------------|--|---|---------------|
| DMM4020 | Dual; Numeric | 5.5                 | V ac, V dc, I dc, I ac, Ω, Cont, Diode, Freq | 0.015 + 0.004 (yr.)                       | \$792         |

### Recommended Test Leads

| Test Leads  |  |       |
|-------------|--|-------|
| 196-3520-xx | Premium Test Leads (TL710 replacement/spare) | \$34  |
| TL705       | 2x4 Wire Ohm 1000V Test Lead                 | \$78  |
| TL725       | 2x4 Wire Ohm SMD Test Tweezers               | \$104 |

### Recommended Accessories

| Accessories |                                      |       |
|-------------|--------------------------------------|-------|
| ACD4000     | Soft Carrying Case                   | \$249 |
| HCTEK-4321  | Hard Carrying Case                   | \$796 |
| RMU2U       | Rackmount Kit                        | \$152 |
| 013-0369-xx | Calibration Fixture 4-terminal short | \$45  |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV100 | 5-year Extended Warranty | \$156 |
|---------|--------------------------|-------|

### 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.



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



DMM4040/4050

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.



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) | Pricing (USD) |
|---------|---------------------------|---------------------|--|---|---------------|
| DMM4040 | Dual; Numeric & Graphical | 6.5                 | V ac, V dc, I dc, I ac, Ω, Continuity, Diode, Freq, Period                     | 0.0035 + 0.0005                           | \$1,150       |
| 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                           | \$1,420       |

Recommended Test Leads

| Temperature Probes |  |       |
|--------------------|--|-------|
| TP750              | 100 Ohm RTD Temperature Probe (DMM4050 only) | \$528 |
| Test Leads         |  |       |
| 196-3520-xx        | Premium Test Leads (TL710 replacement/spare) | \$34  |
| TL705              | 2x4 Wire Ohm 1000V Test Lead                 | \$78  |
| TL725              | 2x4 Wire Ohm SMD Test Tweezers               | \$104 |

Recommended Accessories

| Accessories |                                      |       |
|-------------|--------------------------------------|-------|
| ACD4000     | Soft Carrying Case                   | \$249 |
| HCTEK-4321  | Hard Carrying Case                   | \$796 |
| RMU2U       | Rackmount Kit                        | \$152 |
| 013-0369-xx | Calibration Fixture 4-terminal short | \$45  |

Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV100 | 5-year Extended Warranty | \$156 |
|---------|--------------------------|-------|

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.





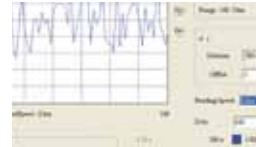
## Models 2000, 2100, 2110

These cost effective, high precision instruments offer 5.5- and 6.5-digit accuracy and are ideal for a wide range of manual, semi-automatic, and production test applications. They can be used as stand-alone benchtop instruments and as components in test systems.



### Product Highlights

- Exceptional measurement integrity and high speed throughput
- Large number of measurement functions, including temperature and capacitance (2110)
- Intuitive front panel gets users up and running quickly
- USB Test and Measurement Class (USB-TMC) interface (2100/2110)



The KI-Tool application for the Model 2100 and Model 2110 provides charting and graphing capabilities without programming.



For multipoint measurement, plug a scanner card into the Model 2000.

| Model | Resolution | Basic V DC Accuracy, 1 Year (% Reading + % Range) | Measurements  | Interface         | Pricing (USD) |
|-------|------------|---|---|-------------------|---------------|
| 2000  | 6½         | 0.0030 + 0.0005                                   | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode               | GPIB, RS-232      | \$1,140       |
| 2100  | 6½         | 0.0038 + 0.0006                                   | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode                        | USB               | \$862         |
| 2110  | 5½         | 0.012 + 0.004                                     | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode, Cap., Therm. | USB (GPIB Option) | \$595         |

### Recommended Accessories

|            |   |         |
|------------|---|---------|
| 2000-SCAN  | 10-channel Scanner Card (Model 2000)                              | \$580   |
| 2001-SCAN  | 10-channel Scanner Card with Two High-speed channels (Model 2000) | \$775   |
| 2001-TSCAN | 9-channel Thermocouple Scanner Card (Model 2000)                  | \$1,040 |
| 5808       | Low cost, Single Pin, Kelvin Probes                               | \$105   |
| 5805       | Kelvin Probes, 0.9m (3ft)   | \$217   |
| 5805-12    | Kelvin Probes, 3.6m (12ft)  | \$287   |
| 5809       | Low Cost, Kelvin Clip Lead Set                                    | \$159   |

### Recommended Accessories

|             |  |       |
|-------------|--|-------|
| 7007-1      | Shielded GPIB Cable, 1m (3.3ft)                | \$108 |
| 7007-2      | Shielded GPIB Cable, 2m (6.6ft)                | \$119 |
| KPCI-488LPA | IEEE-488 Interface/Controller for the PCI Bus  | \$431 |
| KUSB-488B   | IEEE-488 USB to GPIB Interface Adapter         | \$502 |
| 4288-1      | Single Fixed Rack Mount Kit (Model 2000, 2100) | \$87  |
| 4299-3      | Single Rack Mount Kit (Model 2100 and 2110)    | \$99  |
| 4299-4      | Dual Rack Mount Kit (Model 2100 and 2110)      | \$209 |

### Ships with Product

- Safety Test Leads
- Product CD (Includes Users Manual, Drivers, Etc.)
- USB Cable (2100/2110)
- KI Tool and KI Link Software (2100/2110)
- Calibration Certificate
- Power Cord
- 1-year Warranty

Learn more with the “Using the Dual Measurement Functionality and Dual Measurement Display on the Keithley Model 2110 5½-Digit Dual-Display Digital Multimeter” Application Note.





## Product Highlights

- Measurement functions include temperature, 4-wire resistance, peak detection, low ohms, and Agilent 3458A emulation (2002)
- Built-in slot for scanner card
- Multiple measurement display (2001/2002)
- Dry circuit measure function limits test voltage when testing contact or connector resistances (2010)



Add a plug-in scanner card to turn any of these DMMs into a complete scan and measure system.



Use the multiple display capability (Model 2001/2002) to simultaneously display different aspects of one signal.



## Models 2001, 2002, 2010

Each Model 2001, 2002, and 2010 digital multimeter (DMM) offers superior measurement precision, sensitivity, and traceability. They also support plug-in scanner cards that allow you to quickly and economically create multi-channel measurement systems.

| Model | Resolution | Basic V DC Accuracy, 1 Year (% Reading + % Range) | Measurements  | Interface    | Pricing (USD) |
|-------|------------|---|---|--------------|---------------|
| 2001  | 7½         | 0.0024 + 0.0004                                   | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak                             | GPIB         | \$4,290       |
| 2002  | 8½         | 0.0010 + 0.00012                                  | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak                             | GPIB         | \$5,740       |
| 2010  | 7½         | 0.0024 + 0.0004                                   | Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode, Therm., Dry Circ.Ω, Ratio | GPIB, RS-232 | \$2,790       |

## Recommended Accessories

|             |   |         |
|-------------|---|---------|
| 2000-SCAN   | 10-channel Scanner Card                             | \$580   |
| 2001-SCAN   | 10-channel Scanner Card with Two Highspeed Channels | \$775   |
| 2001-TSCAN  | 9-channel Thermocouple Scanner Card                 | \$1,040 |
| 5805        | Kelvin Probes, 0.9m (3ft)                           | \$217   |
| 5805-12     | Kelvin Probes, 3.6m (12ft)                          | \$287   |
| 5808        | Low Cost, Single Pin, Kelvin Probes                 | \$105   |
| 5809        | Low Cost, Kelvin Clip Lead Set                      | \$159   |
| 7007-1      | Shielded GPIB Cable, 1m (3.3ft)                     | \$108   |
| 7007-2      | Shielded GPIB Cable, 2m (6.6ft)                     | \$119   |
| KPCI-488LPA | IEEE-488 Interface/Controller for the PCI Bus       | \$431   |
| KUSB-488B   | IEEE-488 USB to GPIB Interface Adapter              | \$502   |
| 4288-1      | Single Fixed Rack Mount Kit                         | \$87    |

## Ships with Product

- Model 8605 High Performance Modular Test Leads (Models 2001, 2002)
- Model 1751 Safety Test Leads (Model 2010)
- Option Slot Cover (Models 2001, 2002)
- Calibration Data
- User Manual, Service Manual
- Power Cord
- 1-year Warranty

Learn more with the “Peak Detection with the Model 2001 DMM” Application Note.



## Data Acquisition Systems

Keithley data acquisition systems combine precision measurement, switching, and control into a single, tightly integrated enclosure. They offer affordable alternatives to separate DMMs and switch systems, dataloggers/recorders, plug-in card data acquisition equipment, and VXI/PXI systems.



|                   | Series 2700   | Series 3700  |
|-------------------|---|--|
| DMM Resolution    | 6½ Digits   | 7½ Digits  |
| Switching Density | Up to 80, 2-pole channels (2700/2701)<br>Up to 200, 2-pole channels (2750)          | Up to 576, 2-pole channels   |
| Special Features  | Front panel DMM jacks, Non-volatile memory buffer, Solid State temperature scanning | USB Flash Drive support, 1 Ohm measure range, Solid State temperature scanning |
| Switch Features   | Up to 40, 2-pole Channels and 12 card options                                       | Up to 96, 2-pole Channels and 10 card options                                  |
| Interface         | GPIB, RS-232 (Models 2700 and 2750)<br>LAN, RS-232 (Model 2701)                     | GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus                      |
| Starting Price    | \$1,550   | \$1,950  |

## Choosing Your Data Acquisition System

Designing the switching for an automated test system demands an understanding of the signals to be switched and the tests to be performed. The following is a cursory look at key decision points in the design of a switching system.

### 1 Switch Configuration

Multiplex switching can be used to connect one instrument to multiple devices or multiple instruments to a single device. Multiplex switching permits multiple simultaneous connections and sequential or non-sequential switch closures. A matrix switch configuration is the most versatile because it can connect multiple inputs to multiple outputs. The isolated, or independent, switch configuration consists of individual relays, often with multiple poles, with no connections between relays. For scanner (or multiplex) cards, the channel is used as a switched input in measuring circuits or as a switched output in sourcing circuits. For switch cards, each channel's signal paths are independent of other channels.

### 2 Relay Types

Three key relay types are used. Electromechanical offer the widest power range and a good life and speed at a relatively low cost. Reed relays cost more but offer less contact wear and bounce for a better life and speed than electromechanical. Solid state cost still more, but offer the best life and speed with no contact wear or bounce.

### 3 Systemization

Connection types found on switch cards include both screw terminals and mass-terminated connectors. At the instrument level, TSPLink master/slave connection offers easy system expansion between Series 3700A mainframes and to connect to Series 2600B SourceMeter instruments.



## Series 2700

The Series 2700 System Switch/Multimeter combines precision measurement, switching, and control in a single, tightly integrated enclosure for either rack-mount or bench-top applications used by data loggers. The 2700 Series offers two- and five-slot models, as well as an Ethernet-based model for high speed and long distance communication.



### Product Highlights

- 6½-digit measurement engine
- Front panel DMM jacks
- 300 volt isolation between channels and from any channel to ground to maintain signal integrity
- Mass terminated or screw terminal connector options
- Full per-channel card configurability
- Non-volatile memory buffer
- Choice of 12 switch/control plug-in modules



Install up to five switch/control modules in the 2750 mainframe or up to two in the 2700 and 2701 mainframes.



Screw terminals use oversize connectors for easier, mistake-free wiring. Removable terminals available for some models.

| Model | Mainframe Size | Interfaces      | Resolution (Digits), Accuracy | Advance Measure Functions                | Pricing (USD) |
|-------|----------------|-----------------|-------------------------------|--|---------------|
| 2700  | 2U, ½ Rack     | GPIB, RS232     | 6½ Digits, 0.003%             | Temperature, 4-Wire Resistance           | \$1,550       |
| 2701  | 2U, ½ Rack     | Ethernet, RS232 | 6½ Digits, 0.003%             | Temperature, 4-Wire Resistance           | \$1,860       |
| 2750  | 2U, Full Rack  | GPIB, RS232     | 6½ Digits, 0.003%             | Temperature, 4-Wire Resistance, Low Ohms | \$2,430       |

### Plug-in Cards

|      |  |         |
|------|--|---------|
| 7700 | Dual 1x10 / Electromechanical Relay            | \$470   |
| 7701 | Dual 1x16 / Electromechanical Relay            | \$681   |
| 7702 | Dual 1x20 / Electromechanical Relay            | \$892   |
| 7703 | Dual 1x16 / Reed Relay                         | \$1,060 |
| 7705 | 40 Independent Relay / Electromechanical Relay | \$787   |

### Recommended Accessories

|        |  |       |
|--------|--|-------|
| 7007-1 | Shielded IEEE-488 Cable, 1m (2700, 2750)             | \$108 |
| 7007-2 | Shielded IEEE-488 Cable, 2m (2700, 2750)             | \$119 |
| 7788   | 50-Pin D-Shell Connector Kit (for 7703 & 7705 Mods.) | \$83  |
| 7789   | 50-Pin/25-Pin D-Shell Kit                            | \$83  |
| 7790   | 50-Pin Male/Female, 25-Pin Male IDC D-Shell Con. Kit | \$83  |

### Plug-in Cards

|      |  |         |
|------|--|---------|
| 7706 | 16 Digital I/O, 2 Analog Outputs, 1x20 Multiplexer | \$892   |
| 7707 | 32 Digital I/O, 1x10 Multiplexer                   | \$787   |
| 7708 | Dual 1x20 / Electromechanical Relay                | \$892   |
| 7709 | 6x8 / Electromechanical Relay                      | \$892   |
| 7710 | Dual 1x10 / Solid State Relay                      | \$681   |
| 7711 | Dual 1x4, 2GHz / RF Relay                          | \$576   |
| 7712 | Dual 1x4, 3.5GHz / RF Relay                        | \$2,110 |

### Ships with Product

- Product CD (Includes Users Manual, Drivers, Etc.)
- Ethernet Crossover Cable (Model 2701 Only)
- Calibration Certificate
- Quick Reference Manual
- ExcelLINX Software
- Power Cord
- 1-year Warranty

Learn more with the "Switching Handbook: A Guide to Signal Switching in Automated Test Systems".





## Series 3700A

The Series 3700A DMM/switch system offers a scalable, instrument grade switching and multi-channel measurement solution for automated testing of electronic devices. The system includes a high performance DMM with up to six switch/control cards and can support up to 576 two-wire multiplexer channels for unrivaled density and low per channel cost.



### Product Highlights

- Mainframe variations (DMM and keypad/display optional)
- High performance (1 Ohm resistor, 10µA DCI range) 7.5 Digit multimeter
- High density switching (Up to 720 one-wire multiplexer channels, 2,688 one-wire matrix crosspoints)
- Optimized for high throughput scanning and pattern switching
- Embedded startup/control software



Use the built-in web server interface to configure the system, build and run an automated scan list, and analyze data.



Model 3706A-NFP eliminates keypad and display for automated test rack applications.

| Model (Mainframe) | DMM | Front Panel Keypad & Display | Resolution (Digits), Accuracy | Interface   | Pricing (USD) |
|-------------------|-----|------------------------------|-------------------------------|---|---------------|
| 3706A             | Yes | Yes                          | 7½ Digits, 0.0025%            | GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus | \$2,820       |
| 3706A-S           | No  | Yes                          | NA                            | GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus | \$2,170       |
| 3706A-NFP         | Yes | No                           | 7½ Digits, 0.0025%            | GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus | \$2,610       |
| 3706A-SNFP        | No  | No                           | NA                            | GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus | \$1,950       |

### Plug-in Cards

|      |  |         |
|------|--|---------|
| 3720 | Dual 1x30 Multiplexer: 300V, 2A, Auto-CJC with 3720-ST accessory                       | \$1,140 |
| 3721 | Dual 1x20 Multiplexer: 300V, 3A, Auto-CJC with 3721-ST accessory                       | \$977   |
| 3722 | Dual 1x48 Multiplexer: 300V, 2A  | \$1,580 |
| 3723 | Dual 1x30 Multiplexer: 200V, 1.25A, Reed Relay   | \$1,330 |
| 3724 | Dual 1x30 Multiplexer: 200V, 0.12A, Solid State Relay, Auto-CJC with 3724-ST accessory | \$1,650 |

### Plug-in Cards

|      |  |         |
|------|--|---------|
| 3730 | 6x16 Matrix: 300V, 2A  | \$1,580 |
| 3731 | 6x16 Matrix: 200V, 2A, Reed Relay                            | \$2,070 |
| 3732 | Quad 4x28 Matrix: 200V, 1.2A, Reed Relay                     | \$5,590 |
| 3740 | Independent Relay: 28 Form C: 300V, 3A; 4 Form A: 250VAC, 7A | \$977   |
| 3750 | Control: 40 Digital I/O 2 Analog Outputs, 4 Counter          | \$1,330 |

### Recommended Accessories

|           |  |       |
|-----------|--|-------|
| 3706-BAN  | DMM Adapter Cable                      | \$203 |
| 3706-TLK  | Test Lead Kit                          | \$308 |
| KUSB-488B | IEEE-488 USB to GPIB Interface Adapter | \$502 |
| 4288-1    | Single Fixed Rack Mount Kit            | \$87  |
| 4288-10   | Fixed Rear Rack Mount Kit              | \$110 |

### Ships with Product

- Test Script Builder Software Suite CD
- Series 3700A Product CD (Includes LabVIEW, IMI C, and IMI.COM Drivers)
- Ethernet Crossover Cable
- Calibration Certificate
- Quick Reference Manual
- Power Cord
- 1-year Warranty

Learn more with the "Optimizing Switched Measurements with the Series 3700 System Switch/Multimeter and Series 2600 System SourceMeter® Instruments Through the Use of TSP" application note.



## Low-Level Instruments

Scientists and researchers worldwide rely on Keithley Electrometers, Picoammeters, and Nanovoltmeters for making low-level measurements beyond the capabilities of a typical digital multimeter. Keithley Electrometers and Picoammeters provide low current and high resistance measurements and Keithley Nanovoltmeters measure low voltages.



|                                 | 2182A<br>Nanovoltmeter                   | 6220 / 6221<br>Current Sources               | 6485, 6487 / 6482<br>Picoammeters / Picoammeter<br>& Voltage Source | 6514 / 6517B / 6430<br>Electrometers        |
|---------------------------------|--|--|---|---|
| Current Min/Max                 | --                                       | 100fA / 100mA                                | 1fA / 20mA  | 10aA / 100mA                                |
| Voltage Min/Max                 | 1nV / 100V                               | --   | --  | 1mV / 200V                                  |
| Resistance Min/Max              | 10nΩ / 1G Ω<br>(with Model 6220 or 6221) | 10nΩ/1GΩ<br>(with Model 2182A)               | 10Ω/1PΩ<br>(with Model 6487)  | 10mΩ / 10PΩ                                 |
| Resolution                      | 7½ Digits                                | 4½ Digits                                    | 5½ Digits (6485, 6487)<br>6½ Digits (6482)                          | 5½ Digits (6514, 6517B)<br>6½ Digits (6430) |
| Input Connection /<br>Interface | Low Thermal / GPIB, RS-232               | 3 Slot Triax / GPIB,<br>RS-232 (LAN on 6221) | BNC (6485) 3 Slot Triax (6482, 6487) /<br>GPIB, RS-232              | 3 Slot Triax / GPIB, RS-232                 |
| Starting Price                  | \$2,980                                  | \$3,360                                      | \$1,640   | \$4,440                                     |

## Choosing Your Specialized Low Level Instrument

To help you choose the appropriate specialized low level instrument for your application, the most common selection criteria are listed below, including helpful tips for determining the correct specialized low level instrument for your requirements.

### 1 Resolution

Resolution means how fine a meter's measurement is and lets you determine if it's possible to see a small change in the signal. Resolution is described by digits and counts. A 6.5-digit instrument can display six full digits ranging from 0 to 9, and one "half" digit that displays either a 1 or is left blank. A 6.5-digit instrument can display up to 1,999,999 counts of resolution.

### 2 Accuracy

Accuracy is the largest allowable error that will occur under specific operating conditions and is an indication of how close the instrument's displayed measurement is to the actual value of the signal measured. Accuracy is typically expressed as a percent of reading. For example, an accuracy of 1% of reading means that, for a displayed reading of 100 volts, the actual value of the voltage is between 99 volts and 101 volts.

### 3 Low Current/High Resistance Measurements

Low current/high resistance measurements evaluate the insulation qualities of materials or components. Typically, a voltage up to 500 or 1000 volts is applied and the resulting current is measured, which can be in the range of picoamperes (10E-12A) or lower. A digital multimeter may seem like the right instrument for these measurements. But if the current is below 1μA or the resistance is above 10MΩ, the correct solution is an Electrometer or Picoammeter.

### 4 Low Voltage/Low Resistance Measurements

Low resistance/low voltage measurements evaluate the conduction or contact qualities of materials or components. Typically, a current under 100mA but as low as 1μA is applied and the resulting voltage is measured, which can be in the range of microvolts and even nanovolts. For low voltage, choose a Nanovoltmeter or low noise multimeter. For low resistance, a Nanovoltmeter/current source combination or switch/multimeter is the correct solution.



## 2182A Nanovoltmeter

The two-channel Model 2182A Nanovoltmeter is optimized for making stable, low noise voltage measurements and for characterizing low resistance materials and devices reliably and repeatably. It provides higher measurement speed and significantly better noise performance for voltage meters than alternative low voltage measurement solutions.

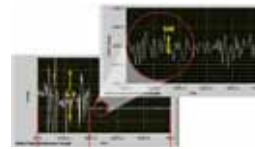


### Product Highlights

- Low noise voltage measurements at high speeds
- Delta mode coordinates measurements with a reversing current source at up to 24Hz with 30nV p-p noise (typical) for one reading. Averages multiple readings for greater noise reduction
- Built-in thermocouple linearization and cold junction compensation
- Dual channels



Comparison of the Model 2182A's DC noise performance with a nanovolt/micro-ohmmeter's.



Results from a Model 2182A and Model 6220 using the delta mode to measure a 10mΩ resistor with a 20μA test current.

| Model | Voltage    | Temperature     | Resistance                            | Channels | Buffer Size | Pricing (USD) |
|-------|------------|-----------------|---------------------------------------|----------|-------------|---------------|
| 2182A | 1nV – 100V | -200°C – 1820°C | 10nΩ to 200MΩ (requires 6220 or 6221) | 2        | 1,024 rdgs  | \$2,980       |

### Recommended Accessories

|             |   |         |
|-------------|---|---------|
| 6220        | DC Precision Current Source (used with 2182A for low current/voltage measurement) | \$3,360 |
| 6221        | AC and DC Current Source (used with 2182A for low current/voltage measurement)    | \$4,480 |
| 4288-1      | Single Fixed Rack Mounting Kit  | \$87    |
| 4288-2      | Dual Fixed Rack Mounting Kit  | \$121   |
| KPCI-488LPA | IEEE-488 Interface/Controller for the PCI Bus                                     | \$431   |
| KUSB-488B   | IEEE-488 USB-to-GPIB Interface Adapter  | \$502   |
| 2107-30     | Low Thermal Input Cable with spade lugs, 9.1m (30 ft)                             | \$306   |
| 2182-KIT    | Low Thermal Connector with strain relief  | \$173   |
| 2187-4      | Input Cable with safety banana plugs  | \$363   |

### Recommended Accessories

|        |   |       |
|--------|---|-------|
| 2188   | Low Thermal Calibration Shorting Plug       | \$204 |
| 7007-1 | Shielded GPIB Cable, 1m (3.2 ft)            | \$108 |
| 7007-2 | Shielded GPIB Cable, 2m (6.5 ft)            | \$119 |
| 7009-5 | Shielded RS-232 Cable, 1.5m (5 ft)          | \$54  |
| 8501-1 | Trigger Link Cable, 1m (3.2 ft)             | \$62  |
| 8501-2 | Trigger Link Cable, 2m (6.5 ft)             | \$68  |
| 8503   | Trigger Link Cable to 2 male BNC connectors | \$85  |

### Ships with Product

- 2107-4 Low Thermal Input Cable with Spade Lugs, 1.2m (4 ft)
- User Manual
- Service Manual
- Contact Cleaner
- Power Cord
- Alligator Clips

Learn more with the “Low-Level Pulsed Electrical Characterization with the Model 6221/2182A Combination” application note.



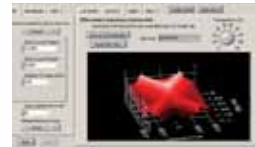
Product Highlights

- 10E+14 Ohms output impedance ensures stable current sourcing into variable loads
- 64k-point source memory for comprehensive test current sweeps
- (Model 6221) Source AC currents from 4pA to 210mA peak to peak for AC characterization of components and materials. The 10MHz output update rate generates smooth sine waves up to 100kHz

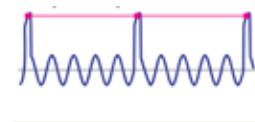


6220 / 6221 Current Sources

Keithley precision current sources include both broad-purpose Model 6220 and high-performance Model 6221. Their high sourcing accuracy and built-in control functions make them ideal for Hall Effect, resistance (using delta mode), pulsed, and differential conductance measurements. Programmable pulse widths limit power dissipation.



Perform, analyze, and display differential conductance measurements.



Measurements are line synchronized to minimize 50/60Hz interference.

| Model | Current       | Resistance                     | Sweep Points | PC Interface           | Pricing (USD) |
|-------|---------------|--------------------------------|--------------|------------------------|---------------|
| 6220  | 100fA – 100mA | 10nΩ to 200MΩ (requires 2182A) | 65,536 (64k) | GPIB, RS-232           | \$3,360       |
| 6221  | 100fA – 100mA | 10nΩ to 200MΩ (requires 2182A) | 65,536 (64k) | GPIB, RS-232, Ethernet | \$4,480       |

Recommended Accessories

|             |   |         |
|-------------|---|---------|
| 2182A       | Nanovoltmeter (used with 6220/6221 for low current/voltage measurement) | \$2,980 |
| 237-ALG-2   | Low Noise Triax Cable, 3-slot triax to alligator clips                  | \$214   |
| 7007-1      | Shielded GPIB Cable, 1m (3.2 ft)  | \$108   |
| 7007-2      | Shielded GPIB Cable, 2m (6.5 ft)  | \$119   |
| 7007-4      | Shielded IEEE-488 Cable, 4m (13.1 ft)                                   | \$135   |
| 7009-5      | Shielded RS-232 Cable, 1.5m (5 ft)                                      | \$54    |
| 7078-TRX-3  | Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft)             | \$150   |
| 7078-TRX-5  | Low Noise Triax Cable, 3-Slot Triax Connectors, 1.5m (5 ft)             | \$161   |
| 7078-TRX-10 | Low Noise Triax Cable, 3-Slot Triax Connectors, 3m (10 ft)              | \$174   |
| 7078-TRX-20 | Low Noise Triax Cable, 3-Slot Triax Connectors, 6m (20 ft)              | \$195   |

Recommended Accessories

|             |  |       |
|-------------|--|-------|
| 8501-1      | Trigger Link Cable with male Micro-DIN connectors at each end, 1m (3.3 ft) | \$62  |
| 4288-1      | Single Fixed Rack Mounting Kit   | \$87  |
| 4288-2      | Dual Fixed Rack Mounting Kit   | \$121 |
| KPCI-488LPA | IEEE-488 Interface/Controller for the PCI Bus                              | \$431 |
| KUSB-488B   | IEEE-488 USB-to-GPIB Interface Adapter                                     | \$502 |

Ships with Product

- 6.6 ft (2m), Low Noise, Input Cable with Triax-to-Alligator Clips
- 6.6 ft (2m) Trigger Link Cable to connect 622x to 2182A
- Ethernet Crossover Cable (6221 only)
- Communication Cable between 2182A and 622x
- Safety Interlock Connector
- Instruction manual on CD
- Getting Started manual (hardcopy)
- Software (downloadable)

Learn more with the “Determining Resistivity and Conductivity Type using a Four-Point Collinear Probe and the Model 6221 Current Source” application note.





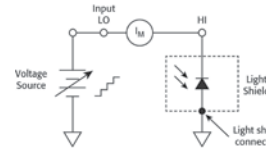
## 6485, 6487 Picoammeters, 6482 Picoammeter & Voltage Source

Keithley Picoammeters combine sensitive current measurement with high speed. The Model 6485 Picoammeter offers fast, sensitive current measurement. The Model 6487 offers improved measurement capability, and adds a high resolution 500V source. The Model 6482 offers two independent Picoammeter/voltage source channels.

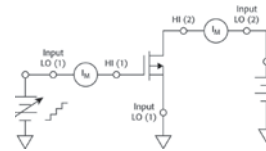


### Product Highlights

- Measure currents down to 1fA
- Voltage and resistance measurement options
- Voltage burden <200µV (most models)
- 5-1/2 to 6-1/2 digit resolution (most models)
- Feedback ammeter design for higher accuracy



Dark current characterization of a photodiode using Picoammeter and voltage source (such as the Model 6482).



MOSFET sub-threshold voltage test using Picoammeters and voltage sources (such as the Model 6482).

| Model | Current           | Resistance  | Reading Rate | Input Connections                        | Pricing (USD) |
|-------|-------------------|-------------|--------------|--|---------------|
| 6482  | 1fA – 20mA (2 ch) | N/A         | 900 rdgs/s   | 3-slot triax, BNC (via included adapter) | \$3,650       |
| 6487  | 10fA – 20mA       | 10E+16 Ohms | 1000 rdgs/s  | 3-slot triax                             | \$3,580       |
| 6485  | 10fA – 20mA       | N/A         | 1000 rdgs/s  | BNC                                      | \$1,640       |

### Recommended Accessories

|             |  |       |
|-------------|--|-------|
| 4802-10     | Low noise BNC Input Cable, 3m (10ft) (for 6485)                            | \$78  |
| 4803        | Low Noise Cable Kit (for 6485)   | \$140 |
| 6517-ILC-3  | Interlock Cable for 8009 Resistivity Test Fixture (6487 Only)              | \$86  |
| 7007-1      | Shielded IEEE-488 Cable, 1m (3.3 ft)                                       | \$108 |
| 7007-2      | Shielded IEEE-488 Cable, 2m (6.6 ft)                                       | \$119 |
| 7007-4      | Shielded IEEE-488 Cable, 4m (13.1 ft)                                      | \$135 |
| 7009-5      | RS-232 Cable   | \$54  |
| 7078-TRX-10 | Low Noise Triax Cable, 3.0m (10 ft) (6487 Only)                            | \$174 |
| 7078-TRX-20 | Low Noise Triax Cable, 6.0m (20 ft) (6487 Only)                            | \$195 |
| 7754-3      | BNC to Alligator Cable (for 6485)  | \$43  |
| 8501-1      | Trigger Link Cable with male Micro-DIN connectors at each end, 1m (3.3 ft) | \$62  |

### Recommended Accessories

|              |   |         |
|--------------|---|---------|
| CS-565       | BNC Barrel (for 6485)                         | \$16    |
| 237-TRX-BAR  | Triax Barrel (for 6487)                       | \$105   |
| 7078-TRX-BNC | Triax-to-BNC Adapter                          | \$73    |
| 8009         | Resistivity Test Fixture (for 6487)           | \$2,210 |
| 4288-1       | Single Fixed Rack Mounting Kit                | \$87    |
| 4288-2       | Dual Fixed Rack Mounting Kit                  | \$121   |
| KPCI-488LPA  | IEEE-488 Interface/Controller for the PCI Bus | \$431   |
| KUSB-488B    | IEEE-488 USB-to-GPIB Interface Adapter        | \$502   |

### Ships with Product

- 7078-TRX-BNC Triax-to-BNC Connector (2x) (Model 6482)
- CA-186-1B Ground Connection Cable, Banana to Screw-Lug (Model 6487)
- CAP-31 Protective Shield/Cap (3-lug) (Model 6487)
- CS-459 Safety Interlock Plug (Model 6487)
- 7078-TRX-3 Low Noise Triax Input Cable, 1m (3 ft) (Model 6487)
- 8607 High Voltage Banana Cable Set for Voltage Source Output (Model 6487)
- CAP-18 Protective Shield/Cap (2-lug) (Model 6485)
- 4801 Low Noise BNC Input (Model 6485)

Learn more with the “Low Current Measurements” application note.







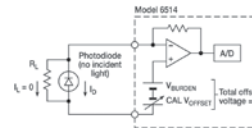
## 6514 / 6517B / 6430 Electrometers

Our high resistance Electrometers provide voltage source and high resistivity measurements for sensitive measurement. They combine flexible interfacing capabilities with current sensitivity, charge measurement capabilities, resolution, and speed. The Model 6430 offers unmatched low current sensitivity.

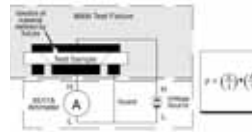


### Product Highlights

- Measure low current & high voltage, resistance, and charge
- Resistance measurements to 10PΩ ohm
- Current sensitivity as low as 10aA (6430)
- Voltage burden as low as 200μV
- Superior accuracy and sensitivity



This illustrates how the Model 6514's measurement can be adjusted to reflect the true dark current of the photodiode.



A Model 6517B is well suited for application where the volume resistivity needs to be measured.

| Model | Current      | Voltage     | Resistance    | Charge       | Input Connections | Pricing (USD) |
|-------|--------------|-------------|---------------|--------------|-------------------|---------------|
| 6517B | 100aA – 20mA | 10mV – 200V | 10E+16        | 10fC to 2mC  | 3-slot triax      | \$7,460       |
| 6514  | 100aA – 20mA | 10mV – 200V | 10mΩ to 200GΩ | 10fC to 20mC | 3-slot triax      | \$4,440       |
| 6430  | 10aA – 100mA | 1mV – 200V  | 1mΩ to >20TΩ  | --           | 3-slot triax      | \$12,800      |

### Recommended Accessories

|             |   |         |
|-------------|---|---------|
| 237-ALG-2   | Low Noise Triax Cable, 3-slot triax to alligator clips      | \$214   |
| 6517B-ILC-3 | Interlock Cable (For 6517B only)                            | \$100   |
| 7078-TRX-3  | Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft) | \$150   |
| 7007-1      | Shielded IEEE-488 Cable, 1m (3.2 ft)                        | \$108   |
| 8501-1      | Trigger Link Cable, 1m (3.3 ft)                             | \$62    |
| 8503        | Trigger Link Cable to 2 male BNCs, 1m (3.3 ft)              | \$85    |
| 8607        | 1kV Source Banana Cables (for 6517B only)                   | \$57    |
| 6517-RH     | Humidity Probe with Extension Cable (6517B only)            | \$505   |
| 6517-TP     | Temperature Bead Probe (included with 6517B) (6517B only)   | \$51    |
| 8009        | Resistivity Test Fixture (for 6517B)                        | \$2,210 |

### Recommended Accessories

|              |   |         |
|--------------|---|---------|
| 237-BNC-TRX  | Male BNC to 3-Lug Female Triax Adapter (for 6517B)              | \$105   |
| 237-TRX-NG   | Triax Male-Female Adapter with Guard Disconnected               | \$138   |
| 7078-TRX-BNC | 3-Slot Male Triax to BNC Adapter                                | \$73    |
| 7078-TRX-GND | 3-Slot Male Triax to BNC Adapter with guard removed (for 6517B) | \$62    |
| 4288-1       | Single Fixed Rack Mounting Kit                                  | \$87    |
| 4288-2       | Dual Fixed Rack Mounting Kit                                    | \$121   |
| 6521         | Low Current Scanner Card (for 6517B)                            | \$2,030 |
| 6522         | Voltage/Low Current Scanner Card (for 6517B)                    | \$2,730 |
| KPCI-488LPA  | IEEE-488 Interface/ Controller for the PCI Bus                  | \$431   |
| KUSB-488B    | IEEE-488 USB-to-GPIB Interface Adapter                          | \$502   |

### Ships with Product

- Low Noise Triax Cable, 3-slot triax to alligator clips (6514, 6517B)
- 6430-322-1B Low noise Triax Cable, 3-slot triax to alligator clips (20cm)
- Dual Test Leads (6430)
- 6517-TP Thermocouple Bead Probe (6517B)
- CS-1305 Interlock Connector (6517B)
- PreAmp Cable 2m (6.6ft)

Learn more with the “Volume and Surface Resistivity Measurements of Insulating Materials Using the Model 6517A Electrometer/High Resistance Meter” application note.



## Power Supplies

Tektronix and Keithley power supplies offer a wide range of performance. Get single channel models with superior accuracy and 0.1mA current measurement resolution. For multiple source needs, select a dual channel or triple channel supply. All channels are isolated and fully programmable. For testing battery-operated devices, consider a battery simulator.



|                           | Tektronix PWS2000 Series (4 models) | Tektronix PWS4000 Series (5 models) | Keithley Models 2200 (5 models)          | Keithley Models 2220-30-1 & 2230-30-1                           | Keithley Models 2302, 2306, 2308 | Keithley Models 2303, 2304A         |
|---------------------------|-------------------------------------|-------------------------------------|--|---|----------------------------------|-------------------------------------|
| Description               | Manual                              | USB Programmable Single Channel     | USB and GPIB Programmable Single Channel | USB Multi-Channel   | Battery Simulator                | Fast Transient Response             |
| Channels                  | 1                                   | 1                                   | 1  | 2 (2220-30-1)<br>3 (2230-30-1)                                  | 1 (2302)<br>2 (2306, 2308)       | Single Output                       |
| Max Voltage / Max Current | 18V-72V / 1.5A-6A                   | 20V-72V / 1.2A-5A                   | 20V-72V / 1.2A-5A                        | 2-30V / 1.5A (2220-30-1)<br>2-30V / 1.5A, 1-6V / 5A (2230-30-1) | 15V / 5A                         | 15V / 5A (2303)<br>20V / 5A (2304A) |
| Resolution                | 10mV, 10mA                          | 1mV, 0.1mA                          | 1mV, 0.1mA                               | 1mV, 1mA  | 1mV, 100nA                       | 1mV, 100nA                          |
| Voltage Accuracy          | 0.05%                               | 0.03%                               | 0.03%                                    | 0.03%   | 0.05%                            | 0.05%                               |
| Current Accuracy          | 0.2%                                | 0.05%                               | 0.05%                                    | 0.1%  | 0.2%                             | 0.2%                                |
| Interface                 | Not Applicable                      | USB                                 | GPIB, USB                                | USB   | GPIB                             | GPIB                                |
| Starting Price            | \$407                               | \$904                               | \$939                                    | \$964   | \$2,610                          | \$1,980                             |

## Choosing Your Programmable Power Supply

To help you choose the appropriate power supply for your application, the most common selection criteria are listed below.

### 1 Output Voltage, Current, and Power

Ensure that the power supply has sufficient voltage output and current output to meet your needs. Also ensure that the supply can deliver the required power. Some power supply V-I output characteristics offer a trade-off between maximum voltage and maximum current (hyperbolic V-I output).

### 2 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  $\pm$  (% of reading + offset).

### 3 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.

### 4 Features and Programmability

When selecting your power supply, select the supply that has the functionality you need. Consider a multiple-channel supply as a cost-effective solution for applications requiring multiple power sources. For maximum accuracy, consider supplies that have remote sensing. When developing and testing battery-operated devices, consider a special purpose battery-simulating supply.



## 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.



### 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.

| Models  | Output Voltage | Output Current | Programmable | Pricing (USD) |
|---------|----------------|----------------|--------------|---------------|
| PWS2185 | 18 V           | 5 A            | No           | \$407         |
| PWS2323 | 32 V           | 3 A            | No           | \$407         |
| PWS2326 | 32 V           | 6 A            | No           | \$470         |
| PWS2721 | 72 V           | 1.5 A          | No           | \$407         |

### Recommended Accessories

|             |                                      |       |
|-------------|--------------------------------------|-------|
| RMU2U       | Rackmount Shelf Kit for 1 or 2 Units | \$152 |
| 386-7598-xx | Rackmount Cosmetic Filler Panel      | \$34  |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV100 | 5-year Extended Warranty | \$156 |
|---------|--------------------------|-------|

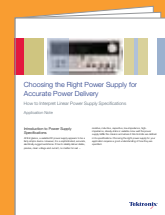
### Another Product for Consideration

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.





## 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.



### Product Highlights

- Linear regulation
- 0.03% basic DC voltage accuracy; 0.05% basic DC current accuracy
- USB interface for remote programming
- 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.

| Models  | Output Voltage | Output Current | Programmable | Pricing (USD) |
|---------|----------------|----------------|--------------|---------------|
| PWS4205 | 20 V           | 5 A            | Yes          | \$904         |
| PWS4305 | 30 V           | 5 A            | Yes          | \$1,070       |
| PWS4323 | 32 V           | 3 A            | Yes          | \$904         |
| PWS4602 | 60 V           | 2.5 A          | Yes          | \$1,070       |
| PWS4721 | 72 V           | 1.2 A          | Yes          | \$904         |

#### Recommended Accessories

|             |                                      |       |
|-------------|--------------------------------------|-------|
| RMU2U       | Rackmount Shelf Kit for 1 or 2 Units | \$152 |
| 386-7598-xx | Rackmount Cosmetic Filler Panel      | \$34  |

#### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV100 | 5-year Extended Warranty | \$156 |
|---------|--------------------------|-------|

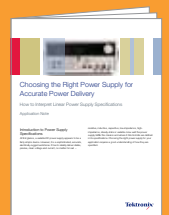
#### Another Product for Consideration

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.





## Programmable Single Channel DC Power Supplies with Remote Sensing

Keithley programmable single-channel DC power supplies offer an excellent combination of performance, versatility, and ease of use including 0.03% basic accuracy, 0.1mA measurement resolution, and keypad data entry. Select from a variety of DC power supplies with voltages from 20V to 72V.

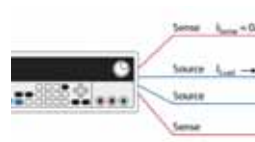


### Product Highlights

- Low noise, linear regulation
- 0.03% basic voltage output
- 0.05% basic current accuracy
- 1mV and 0.1mA output and measurement resolution
- Seven programmable output lists with up to 80 steps/list
- GPIB and USB interfaces



Series 2200 rear panel.



Remote sensing compensates for voltage drops in the test leads by extending the power supply feedback loop to the input of the load.

| Model     | Max Output Voltage | Max Output Current | Power | Ripple and Noise | Pricing (USD) |
|-----------|--------------------|--------------------|-------|------------------|---------------|
| 2200-20-5 | 20V                | 5A                 | 100W  | <1mVRMS, <3mVP-P | \$939         |
| 2200-30-5 | 30V                | 5A                 | 150W  | <1mVRMS, <4mVP-P | \$1,110       |
| 2200-32-3 | 32V                | 3A                 | 96W   | <1mVRMS, <4mVP-P | \$939         |
| 2200-60-2 | 60V                | 2.5A               | 150W  | <1mVRMS, <5mVP-P | \$1,110       |
| 2200-72-1 | 72V                | 1.2A               | 86W   | <1mVRMS, <3mVP-P | \$939         |

### Recommended Accessories

|             |  |       |
|-------------|--|-------|
| CS-1638-12  | Rear Panel Mating Connector, Single Channel  | \$14  |
| USB-B-1     | USB Cable                                    | \$14  |
| 4299-7      | Fixed Rack Mount Kit                         | \$425 |
| KPCI-488LPA | IEEE-488 Interface Board for PCI Bus         | \$431 |
| 7007-05     | Double Shielded IEEE-488 Cable, 0.5m (1.6ft) | \$103 |
| 7007-1      | Double Shielded IEEE-488 Cable, 1m (3.2 ft)  | \$108 |
| 7007-2      | Double Shielded IEEE-488 Cable, 2m (6.5 ft)  | \$119 |
| 7007-3      | Double Shielded IEEE-488 Cable, 3m (10 ft)   | \$129 |
| 7007-4      | Double Shielded IEEE-488 Cable, 4m (13 ft)   | \$135 |

### Ships with Product

- User Documentation and Driver CD
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 3-year Warranty

Learn more with the "Understanding Linear Power Supply Specifications" application note.





## Programmable Multiple Channel DC Power Supplies with Remote Sensing

Keithley programmable multi-channel DC power supplies offer an excellent combination of performance, versatility, and ease of use including fully isolated channels, fully programmable channels, and all channel measurements displayed simultaneously. Choose either the dual channel DC power supply or the triple channel DC power supply.

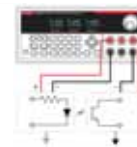


### Product Highlights

- Dual and triple channel models
- Two 30V/1.5A channels
- One 6V/5A channel (on triple channel model)
- All channels are isolated
- All channels are programmable
- USB interface



Model 2230-30-1 rear panel.



Power two isolated circuits with isolated output channels.

| Model     | Max Output Voltage            | Max Output Current              | Power  | Ripple and Noise  | Pricing (USD) |
|-----------|-------------------------------|---------------------------------|--|-------------------|---------------|
| 2220-30-1 | Ch 1 : 30V, Ch 2:30V          | Ch1: 1.5A, Ch 2: 1.5A           | 45W/channel; 90W total                           | <1mVRMS, <3mV P-P | \$964         |
| 2230-30-1 | Ch1: 30V, Ch 2: 30V, Ch 3: 6V | Ch1: 1.5A, Ch 2: 1.5A, Ch 3: 5A | Ch 1 and Ch 2: 45W each<br>Ch 3: 30W, 120W total | <1mVRMS, <3mV P-P | \$1,170       |

### Recommended Accessories

|            |  |       |
|------------|--|-------|
| CS-1638-12 | Rear Panel Mating Connector, Multi-Channel | \$14  |
| USB-B-1    | USB Cable                                  | \$14  |
| 4299-7     | Fixed Rack Mount Kit                       | \$425 |

### Ships with Product

- User Documentation and Driver CD
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 3-year Warranty

Learn more with the “Ensuring that Power Supply Performance Meets Your Requirements” application note.



Product Highlights

- Optimized for battery-powered device testing
- 100nA current measurement sensitivity
- Load pulse current measurement: 33 $\mu$ s - 833 $\mu$ s
- Variable output resistance: 0 - 1 $\Omega$  with 10m $\Omega$  resolution
- Measure sleep, currents, standby currents, and full load currents to determine power consumption
- Sink current to simulate a discharged battery

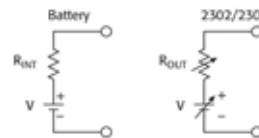


Portable Device Battery/Charger Simulator

Keithley's battery simulating power supplies can simulate a battery's output characteristics and its discharged state. These supplies can measure low, sleep mode load current and pulsed output load current. Dual channel models facilitate testing portable device, charge control circuitry with a battery channel and a charger simulator channel.



Model 2306 Rear Panel.



Simplified schematic of a battery and the 2302/2306.

| Model | Channels | Max Output Voltage / Current | Power | Transient Response to a 10X Load Current Change   | Current Sink Capacity | Pricing (USD) |
|-------|----------|------------------------------|-------|---|-----------------------|---------------|
| 2302  | 1        | 15 V / 5 A                   | 60W   | <40 $\mu$ s recovery time and <75mV voltage drop  | 3A                    | \$2,610       |
| 2306  | 2        | 15 V / 5 A                   | 50W   | <40 $\mu$ s recovery time and <75 mV voltage drop | 3A                    | \$3,240       |
| 2308  | 2        | 15 V / 5 A                   | 50W   | <35 $\mu$ s recovery time and <90 mV voltage drop | 3A                    | \$2,890       |

Recommended Accessories

|             |  |       |
|-------------|--|-------|
| 2306-DISP   | Remote Display (2302, 2306, 2308)      | \$335 |
| CS-846      | Mating Output Connector                | \$18  |
| SC-182      | Low Inductance Coaxial Cable           | \$1   |
| 4288-1      | Single Fixed Rack Mount Kit            | \$87  |
| 4288-2      | Dual Fixed Rack Mount Kit              | \$121 |
| KPCI-488LPA | IEEE-488 Interface Board for PCI Bus   | \$431 |
| KUSB-488B   | IEEE-488 USB-to-GPIB Interface Adapter | \$502 |

Recommended Accessories

|         |  |       |
|---------|--|-------|
| 7007-05 | Double Shielded IEEE-488 Cable, 0.5m (1.6ft) | \$103 |
| 7007-1  | Double Shielded IEEE-488 Cable, 1m (3.2 ft)  | \$108 |
| 7007-2  | Double Shielded IEEE-488 Cable, 2m (6.5 ft)  | \$119 |
| 7007-3  | Double Shielded IEEE-488 Cable, 3m (10 ft)   | \$129 |
| 7007-4  | Double Shielded IEEE-488 Cable, 4m (13 ft)   | \$135 |

Ships with Product

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 1-year Warranty

Learn more with the "Simulating Battery Impedance with the Models 2302 and 2306 Battery Simulators/Chargers" application note.





## High Speed Power Supplies

The Model 2303/2304A Power Supplies provide both voltage control and power consumption monitoring for automated testing of portable, battery-operated devices. They are optimized for testing battery-operated, wireless communication devices such as cellular phones that undergo substantial load changes for very short time intervals.

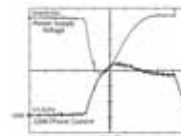


### Product Highlights

- Ultra-fast response times to load changes
- Optimized for battery-powered device testing
- 100nA current measurement sensitivity
- Load pulse current measurement: 33 $\mu$ s - 833 $\mu$ s
- Measure sleep, standby currents, and full load currents to determine power consumption
- Sink current to simulate a discharged battery



Model 2303 or 2304A rear panel.



Typical power supply transient response vs. Keithley's high speed power supply transient response.

| Model | Channels      | Max Output Voltage / Current | Power | Transient Response to a 10X Load Current Change   | Current Sink Capacity | Pricing (USD) |
|-------|---------------|------------------------------|-------|---|-----------------------|---------------|
| 2303  | Single Output | 15V/3A or 9V/5A              | 45W   | <40 $\mu$ s recovery time and <100mV voltage drop | 2A                    | \$1,980       |
| 2304A | Single Output | 20V/5A                       | 100W  | <40 $\mu$ s recovery time and <100mV voltage drop | 3A                    | \$2,660       |

#### Recommended Accessories

|             |  |       |
|-------------|--|-------|
| 2304-DISP   | Remote Display (2303, 2304A)           | \$209 |
| CS-846      | Mating Output Connector                | \$18  |
| SC-182      | Low Inductance Coaxial Cable           | \$1   |
| 4288-1      | Single Fixed Rack Mount Kit            | \$87  |
| 4288-2      | Dual Fixed Rack Mount Kit              | \$121 |
| KPCI-488LPA | IEEE-488 Interface Board for PCI Bus   | \$431 |
| KUSB-488B   | IEEE-488 USB-to-GPIB Interface Adapter | \$502 |

#### Recommended Accessories

|         |  |       |
|---------|--|-------|
| 7007-05 | Double Shielded IEEE-488 Cable, 0.5m (1.6ft) | \$103 |
| 7007-1  | Double Shielded IEEE-488 Cable, 1m (3.2 ft)  | \$108 |
| 7007-2  | Double Shielded IEEE-488 Cable, 2m (6.5 ft)  | \$119 |
| 7007-3  | Double Shielded IEEE-488 Cable, 3m (10 ft)   | \$129 |
| 7007-4  | Double Shielded IEEE-488 Cable, 4m (13 ft)   | \$135 |

#### Ships with Product

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 1-year Warranty

Learn more with the "Stabilizing Fast Transient Response Power Supply/Load Circuits" 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      | <ul style="list-style-type: none"> <li>100 ps (time)</li> <li>12 digits/s (freq)</li> </ul>   | <ul style="list-style-type: none"> <li>50 ps (time)</li> <li>12 digits/s (freq)</li> </ul>  | <ul style="list-style-type: none"> <li>100 ps (time)</li> <li>12 digits/s (freq)</li> </ul>   |
| Data Transfer   | <ul style="list-style-type: none"> <li>250 k Samples/sec (internal)</li> <li>5 k Samples/sec (block)</li> </ul>   | <ul style="list-style-type: none"> <li>250 k Samples/sec (internal)</li> <li>15 k Samples/sec (block)</li> </ul>  | <ul style="list-style-type: none"> <li>250 k Samples/sec (internal)</li> <li>5 k Samples/sec (block)</li> </ul>   |
| Measurements    | 13 Automated Measurements<br>Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p | 14 Automated Measurements<br>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<br>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  | TrendPlot™, Measurement Statistics, Allan Deviation, Histogram  | TrendPlot™, Measurement Statistics, Allan Deviation, Histogram  | TrendPlot™, Measurement Statistics, Allan Deviation, Histogram  |
| Connectivity    | Rear panel: USB device port, GPIB<br>PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)   | Rear panel: USB device port, GPIB<br>PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)   | Rear panel: USB device port, GPIB<br>PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)   |
| Starting Price  | \$2,270   | \$3,550   | \$8,860   |

## 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.



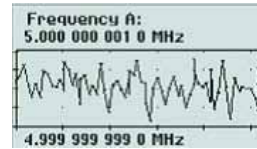
## FCA3000/3100 Series

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 TrendPlots. Get unparalleled ease-of-use with intuitive operation and USB connectivity. It's everything you need in a Timer/Counter/Analyzer. And more.



### 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 – TrendPlot™, histograms and statistics.



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

| Models  | Max. Frequency | Channels                  | Time Resolution | Frequency Resolution | Pricing (USD) |
|---------|----------------|---------------------------|-----------------|----------------------|---------------|
| FCA3000 | 400 MHz        | 2                         | 100 ps          | 12 digit/s           | \$2,270       |
| FCA3003 | 3 GHz          | 2 – 400 MHz<br>1 – 3 GHz  | 100 ps          | 12 digit/s           | \$3,320       |
| FCA3020 | 20 GHz         | 2 – 400 MHz<br>1 – 20 GHz | 100 ps          | 12 digit/s           | \$6,580       |
| FCA3100 | 400 MHz        | 2                         | 50 ps           | 12 digit/s           | \$3,550       |
| FCA3103 | 3 GHz          | 2 – 400 MHz<br>1 – 3 GHz  | 50 ps           | 12 digit/s           | \$4,610       |
| FCA3120 | 20 GHz         | 2 – 400 MHz<br>1 – 20 GHz | 50 ps           | 12 digit/s           | \$7,840       |

### Recommended Accessories

|             |   |       |
|-------------|---|-------|
| 174-4401-xx | USB Host to Device Cable, 3 Feet                                    | \$10  |
| 012-0991-xx | GPIB Cable, Double Shielded   | \$515 |
| 012-1256-xx | BNC Male to BNC Male, 9 Feet  | \$89  |
| ACD4000     | Soft Carrying Case  | \$249 |
| HCTEK-4321  | Hard Carrying Case  | \$796 |
| RMU2U       | Rackmount Shelf Kit for 2 Units                                     | \$152 |
| TVA3000     | TimeView™ Modulation Domain Analysis Software                       | \$811 |
| SIGEXPTE    | NI LabVIEW SignalExpress™ Tektronix Edition Software – Full Version | \$779 |

### Instrument Options

|    |   |         |
|----|---|---------|
| MS | Medium Stability OCO Timebase, 2 X 10 <sup>-7</sup> | \$704   |
| HS | High Stability OCO Timebase, 5 X 10 <sup>-8</sup>   | \$1,110 |
| RP | Rear-panel Connectors                               | \$163   |

### Recommended Service

|         |   |       |
|---------|---|-------|
| SILV200 | 5-year Extended Warranty (FCA3000, FCA3003, FCA3100, FCA3103) | \$260 |
| SILV400 | 5-year Extended Warranty (FCA3020, FCA3120)                   | \$415 |

### 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.





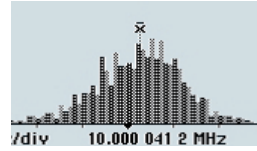
## MCA3000 Series

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 TrendPlots. Get unparalleled ease-of-use with intuitive operation and USB connectivity. Finally, fully-loaded comes standard.



### 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 – TrendPlot™, histograms and statistics.



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

| Models  | Max. Frequency | Channels                  | Time Resolution | Frequency Resolution | Pricing (USD) |
|---------|----------------|---------------------------|-----------------|----------------------|---------------|
| MCA3027 | 27 GHz         | 2 – 300 MHz<br>1 – 27 GHz | 100 ps          | 12 digit/s           | \$8,860       |
| MCA3040 | 40 GHz         | 2 – 300 MHz<br>1 – 40 GHz | 100 ps          | 12 digit/s           | \$13,000      |

### Recommended Accessories

|             |   |       |
|-------------|---|-------|
| 174-4401-xx | USB Host to Device Cable, 3 Feet                                    | \$10  |
| 012-0991-xx | GPIB Cable, Double Shielded   | \$515 |
| 012-1256-xx | BNC Male to BNC Male, 9 Feet  | \$89  |
| AC4000      | Soft Carrying Case  | \$249 |
| HCTEK-4321  | Hard Carrying Case  | \$796 |
| RMU2U       | Rackmount Shelf Kit for 2 Units                                     | \$152 |
| TVA3000     | TimeView™ Modulation Domain Analysis Software                       | \$811 |
| SIGEXPTE    | NI LabVIEW SignalExpress™ Tektronix Edition Software – Full Version | \$779 |

### Instrument Options

|    |  |         |
|----|--|---------|
| HS | High Stability OCXO Timebase, 5 X 10 <sup>-8</sup>         | \$1,110 |
| US | Ultra High Stability OCXO Timebase, 1.5 X 10 <sup>-8</sup> | \$2,230 |

### Recommended Service

|         |                          |       |
|---------|--------------------------|-------|
| SILV600 | 5-year Extended Warranty | \$620 |
|---------|--------------------------|-------|

### 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 TrendPlot™ Analysis Modes” application note.



## RF Power Meters

Tektronix PSM Power Meter Series delivers the precision accuracy you need and the features you want, including exceptional temperature stability and throughput. Plus, with 13 models to choose from, it also delivers exceptional versatility.



|                    | PSM3000   | PSM4000   | PSM5000  |
|--------------------|---|---|--|
| Description        | Power Meter<br>Average Power  | Power Meter<br>Average / Peak / Pulse   | Power Meter<br>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 |
| Starting Price     | \$2,630   | \$2,830   | \$3,750  |

## 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

- 8 GHz, 18 GHz, 20 GHz, and 26.5 GHz Models
- Models Available with N and 3.5 mm Connectors
- Dynamic Range as Low as -60 dBm and as High as +20 dBm
- Uncertainty as Low as 2.6%
- Reading Rates up to 2000 Readings/sr



Control the power meter and perform measurements using intuitive Windows® based software.

## PSM3000, 4000 and 5000 Series

The PSM3000, PSM4000, and PSM5000 Series are compact power sensors/meters that deliver fast, accurate RF and microwave power measurements. A broad range of CW and pulse modulation measurements are available, depending on the series you choose.



In addition to the USB power & Connectivity port the meters include TTL trigger inputs and outputs for synchronization.

| Models  | Description                                     | Frequency Range   | Dynamic Range  | Connector Style | Pricing (USD) |
|---------|---|-------------------|----------------|-----------------|---------------|
| PSM3110 | True RMS Average                                | 10 MHz - 8 GHz    | -55 to +20 dBm | 3.5mm male      | \$2,630       |
| PSM3120 | True RMS Average                                | 10 MHz - 8 GHz    | -55 to +20 dBm | N-Male          | \$2,630       |
| PSM3310 | True RMS Average                                | 10 MHz - 18 GHz   | -55 to +20 dBm | 3.5mm male      | \$3,500       |
| PSM3320 | True RMS Average                                | 10 MHz - 18 GHz   | -55 to +20 dBm | N-Male          | \$3,500       |
| PSM3510 | True RMS Average                                | 10 MHz - 26.5 GHz | -55 to +20 dBm | 3.5mm male      | \$4,460       |
| PSM4110 | Power Meter<br>(Avg / Peak / Pulse)             | 10 MHz - 8 GHz    | -60 to +20 dBm | 3.5mm male      | \$2,830       |
| PSM4120 | Power Meter<br>(Avg / Peak / Pulse)             | 10 MHz - 8 GHz    | -60 to +20 dBm | N-Male          | \$2,830       |
| PSM4320 | Power Meter<br>(Avg / Peak / Pulse)             | 50 MHz - 18.6 GHz | -40 to +20 dBm | N-Male          | \$5,370       |
| PSM4410 | Power Meter<br>(Avg / Peak / Pulse)             | 50 MHz - 20 GHz   | -40 to +20 dBm | 3.5mm male      | \$5,370       |
| PSM5110 | Power Meter<br>(Avg / Peak / Pulse + Profiling) | 100 MHz - 8 GHz   | -60 to +20 dBm | 3.5mm male      | \$3,750       |
| PSM5120 | Power Meter<br>(Avg / Peak / Pulse + Profiling) | 100 MHz - 8 GHz   | -60 to +20 dBm | N-Male          | \$3,750       |
| PSM5320 | Power Meter<br>(Avg / Peak / Pulse + Profiling) | 50 MHz - 18.6 GHz | -40 to +20 dBm | N-Male          | \$6,380       |
| PSM5410 | Power Meter<br>(Avg / Peak / Pulse + Profiling) | 50 MHz - 20 GHz   | -40 to +20 dBm | 3.5mm male      | \$6,380       |

### Recommended Accessories

|             |   |      |
|-------------|---|------|
| 174-6150-xx | USB Cable, 2 m, 20 AWG                    | \$45 |
| 174-6164-xx | SMB Female to BNC Male, 1 m Trigger Cable | \$69 |
| 348-2013-xx | Replacement Rubber Boot                   | \$22 |

### Recommended Service

|         |   |       |
|---------|---|-------|
| SILV200 | 5-year Extended Warranty (PSM3110, PSM3120) | \$260 |
| SILV400 | 5-year Extended Warranty (PSM3310, PSM3320) | \$415 |
| SILV600 | 5-year Extended Warranty (PSM3510)          | \$620 |

### 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






# The Tektronix Service Advantage

Tektronix offers unequalled expertise, global reach and a customer-centric approach with every service option. From our full suite of service plans for Tektronix equipment to our Multi-Vendor Service (MVS) calibration, we can ensure optimal performance for your entire inventory of test and measurement instruments.

## Tektronix Service Highlights

- **Tektronix Factory Experts**  
Access to the engineering expertise that designed and built your products to ensure they are in peak performance. Our support engineers hold an average of 20 years of training and experience.
- **Comprehensive and Thorough Treatment**  
Software updates, safety and reliability modifications, and cosmetic enhancements are included if applicable. Products are returned to you in “like-new” condition. The Tektronix network of service centers offers worldwide support.
- **Efficiency and Convenience**  
Our team of professionals focus on getting your instruments back to you as soon as possible, minimizing your downtime and increasing your operating efficiency.
- **Flexible Repair and Calibration Service**  
Tektronix offers you the choice of a cost effective, flexible service package to meet your specific business needs.

## Tektronix Factory-Certified Service Plans

| Silver Care    | Silver Care Packages   | Gold Care    |
|---|--|---|
| <ul style="list-style-type: none"> <li>▪ Choose between a 3 or 5 year extended warranty plan</li> <li>▪ No purchase orders, quotes, or approval delays – one phone call away starts the repair process</li> <li>▪ Covers equipment, parts, labor and transportation</li> <li>▪ Includes applicable software, safety and reliability updates</li> <li>▪ Faster repair time than without coverage (average is 5 days faster)</li> </ul> | <ul style="list-style-type: none"> <li>▪ All the benefits of our popular Silver Care Plan in a convenient take-home package.</li> <li>▪ Each package includes a unique activation code to effortlessly initiate and manage your service coverage online.</li> <li>▪ May be purchased any time during the original warranty period</li> </ul> | <ul style="list-style-type: none"> <li>▪ Choose between a 3 or 5 year extended warranty plan</li> <li>▪ Loaner product of equal or higher performance shipped within 24 hours</li> <li>▪ Priority access to Global Tektronix Customer Call Center for technical support</li> <li>▪ 30% discount on scheduled Factory-certified calibration</li> <li>▪ Coverage of user-caused EOS and ESD damage</li> <li>▪ Typical downtime of 48 hours or less</li> </ul> |
| Platinum Care    | Calibration   |   |
| <ul style="list-style-type: none"> <li>▪ Custom-tailored plan with a typical downtime of less than 1 hour.</li> <li>▪ Identically configured spare products dedicated to your facility</li> <li>▪ On-site calibration event and repair coverage</li> <li>▪ Priority access to technical support, and flexible contract duration and payment terms,</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Choose from multi-year contracts and single event calibrations</li> <li>▪ Accredited and traceable calibration</li> <li>▪ Adjustments included to restore performance</li> <li>▪ Applicable software, safety, and reliability updates</li> <li>▪ Calibration records retention</li> </ul>           |   |



## Multi-Vendor Service

### Comprehensive Calibration and Repair for All Your Test, Measurement and Control Equipment

- Service for more than 140,000 instruments from over 9,000 manufacturers
- Broadest scope of accreditation; manage 100% of repairs and calibration
- 100+ global points of service
- 1 million calibrations annually

### Performance

Calibration is the cornerstone of measurement confidence. Now Tektronix can manage 100% of your calibration and repairs, irrespective of product brand or origin. Our multi-vendor service tools simplify your calibration management program, minimizing downtime and improving operational efficiency.

### Optimize Asset Availability & Utilization

Tektronix provides industry-leading calibration and repair turnaround time on more than 140,000 products from over 9,000 manufacturers. The CalWeb® Asset Management System allows you to actively manage any downtime required for regular equipment maintenance and provides you with online, enterprise-wide instrument visibility.

### Global Reach with Local Presence

Tektronix has the most extensive global network of resources. With more than 100 points of service and 1,000 highly trained experts, our unmatched suite of capabilities and services are available locally to most of the world's research and manufacturing centers.

### Quality & Accuracy

Our comprehensive quality system is unmatched. Choose from multiple NIST traceable certificate options, including ANSI Z540.1, ISO/IEC 17025 and ISO 9001:2008. Our customers have direct access to the quality they expect from Tektronix' 65 years as an industry leader in test, measurement and monitoring solutions.

### Industry Leader

Tektronix is the industry leading provider of calibration services for the life science, aerospace, and defense industries. With consistent high quality and comprehensive service, customers have turned to Tektronix, making us their first choice for outsourced calibration needs.

For more information on Tektronix multi-vendor service, visit [service-solutions.tektronix.com](http://service-solutions.tektronix.com)

Or call us at 1-800-438-8165

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\* If the European phone number above is not accessible,  
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Contact List Updated March 2013

**For Further Information**

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



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03/13 EA/FCA

48A-25025-11 Standard

