BENCH CATALOG

2016, VOLUME 1

TEST & MEASUREMENT SOLUTIONS

Tektronix®

REVOLUTIONEERING™
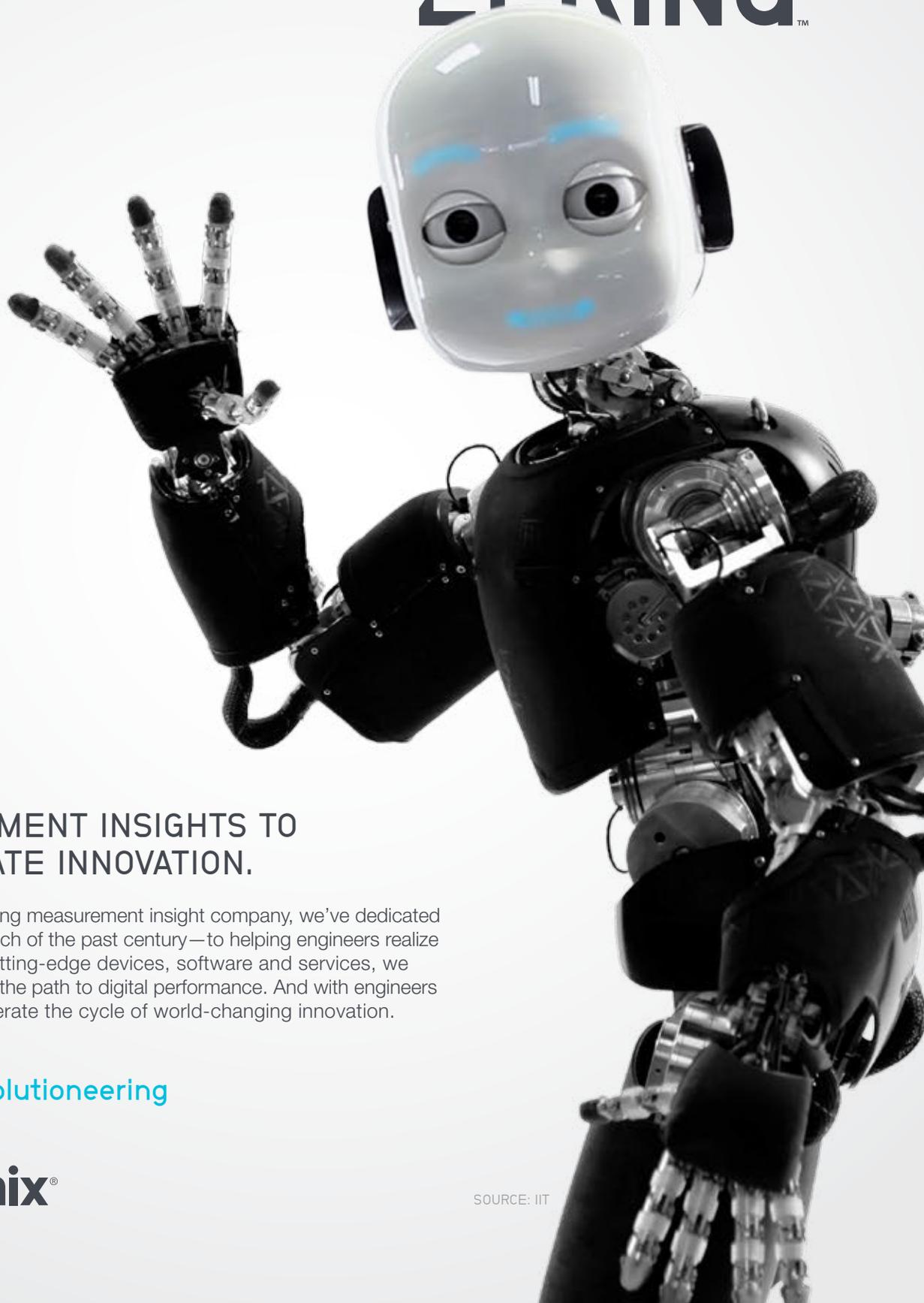
MEASUREMENT INSIGHTS TO ACCELERATE INNOVATION.

As the world's leading measurement insight company, we've dedicated ourselves—and much of the past century—to helping engineers realize the future. With cutting-edge devices, software and services, we simplify and speed the path to digital performance. And with engineers as partners, accelerate the cycle of world-changing innovation.

Learn more:

tek.com/revolutioneering

Tektronix®

SOURCE: IIT

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NEW PRODUCTS

MDO4000C SERIES

6–in–1 Versatility PLUS High Performance in One Powerful Oscilloscope

The new MDO4000C includes up to six built-in instruments, each with exceptional performance to address tough challenges. Every MDO4000C features powerful triggering, search and analysis, and these are the only scopes to offer synchronized analog, digital and RF signal analysis at the same time.

USB SPECTRUM ANALYZER FAMILY

The RSA Series offers the full features of a benchtop spectrum analyzer at a fraction of the price. With 17 automated measurements included for free, you can make common measurements - fast and easy. Over 15 SignalVu-PC Analysis Software options enable advanced analysis.

- **Powerful** – Real time analysis capability, 40 Mhz acquisition bandwidth, and frequency ranges up to 7.5 GHz

- **Affordable** – The USB spectrum analyzer family ranges from 30-70% of the cost of comparable conventional instruments

- **Small and Portable** – The RSA306B weighs just 0.75 kg, and the laboratory model RSA607A takes up 25% less space than traditional instruments

- **Programmable** – Use the programmatic interface to SignalVu-PC, or write your own measurement applications with the Applications Programming Interface

2461 SOURCEMETER® SMU INSTRUMENT

The 2461 High Current SourceMeter® SMU Instrument offers advanced capabilities for creating precisely-controlled 10 amp/100 volt, 1000 watt high-current pulses that minimize power device thermal effects and maintain device integrity. Its dual 18-bit high speed digitizers facilitate measuring actual device operation that can be graphically displayed right on the front panel for immediate analysis.

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

All information on www.tektronix.com supersedes all other information.

RESOURCES FOR YOU

TekTV

The TekTV Video Library gives you easy access to nearly all the videos on our site. Browse by product, application, most popular or video type. View a video, share a video, or give us your feedback. Check us out at tek.com/tektv.
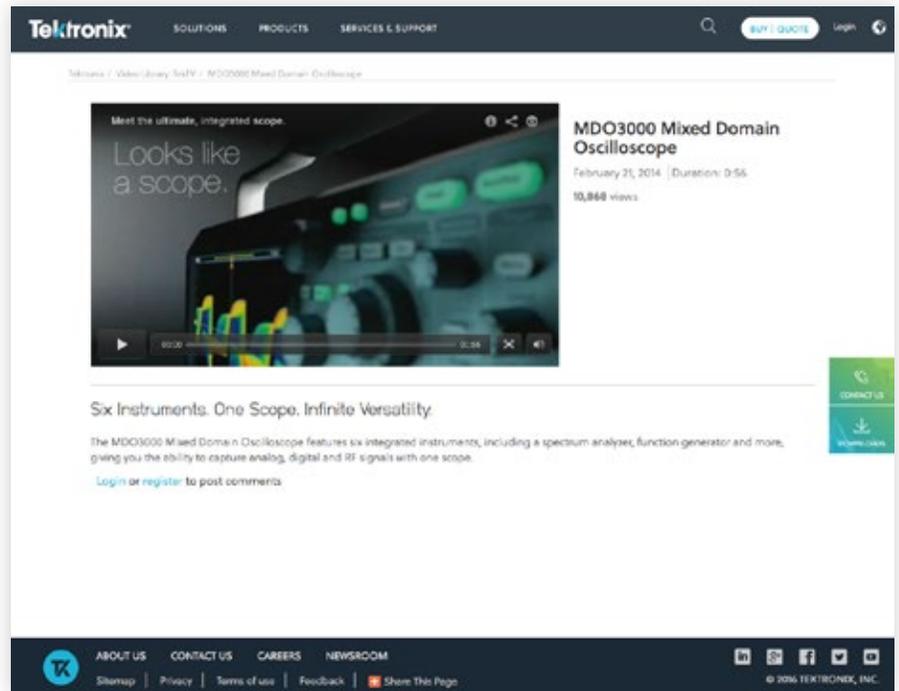
Download Library

Our customers know Tektronix has some of the highest quality technical content in the industry. With over 20,000 items in our premium content library, you can find answers that enhance your understanding and help to solve your measurement challenges. Go to tek.com/downloads.

Tektronix Encore – Factory Certified. Performance Ready.

Don't let tight budgets or timelines interfere with your work. Tektronix and Keithley refurbished test equipment is available at a substantial savings, with:

• Warranty Matching New Products

• Guaranteed Quality

• Reliable Performance

• Fast Delivery

Tektronix Encore means we have tested, calibrated and reconditioned our products to original factory specs. The latest firmware and accessories are always included – so they are just like new. For less. To find out more or to search for product availability please visit tek.com/encore.

Wondering what else Tektronix is up to?

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FAQs

Check us out at tek.com/faq.

EDUCATION SOLUTIONS

Tektronix provides a complete product portfolio to prepare students today for the real-life measurements of tomorrow. Our unique set of bench solutions includes the industry's best test and measurement instruments from oscilloscopes, power supplies, DMMs, generators, and spectrum analyzers to the industry's first network-based instrument management solution for teaching labs. So, whether learning basic design skills or progressing to more advanced electrical engineering topics, students get practical, hands-on experience for the real world now on the instruments they'll be using in the real world later.

TekSmartLab™

TekSmartLab is the industry's first network-based instrument management solution for teaching labs that brings a more efficient lab experience.

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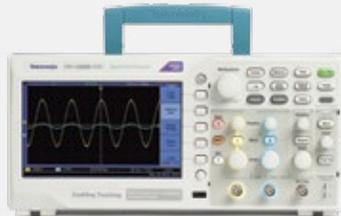
TBS1000B–EDU

Meet the world's first dedicated teaching oscilloscope: the TBS1000B-EDU. Not only does it deliver the performance you expect to see in a Tektronix scope, it comes with an innovative courseware feature that allows students to review lab material, follow step-by-step instructions and document results, all on the oscilloscope. We couldn't make engineering easier, so we made it easier to teach and learn.

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AFG1000 SERIES

The AFG1000 Series Arbitrary/Function Generator offers the best price performance ratio in its class. It's tailored for educational users with 25 MHz, 60 MHz bandwidth, 2 output channels, and 1 mVp-p to 10 Vp-p output amplitude across full bandwidth. It generates all kinds of waveforms needed in a lab.

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2231A–30–3

The Model 2231A-30-3 Triple-Channel DC Power Supply can output a total of 195W of power, providing the power levels needed to energize a wide range of circuits and devices for benchtop work. Two channels can supply up to 30V at 3A each; the third channel can provide up to 5V at 3A. The Model 2231A-30-3 does not compromise on performance or convenience features, offering the versatility and ease of use you need, so it can be the only DC power supply on your bench.

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DMM2110

These cost-effective, high precision instruments offer 5.5- and 6.5-digit resolution 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.

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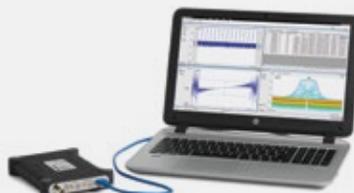
RSA306B

The RSA306B offers full-featured spectrum analysis at an unmatched price. Using the latest in commercial interfaces and available computing power, the RSA306B separates signal acquisition from measurement, dramatically lowering the cost of instrument hardware. Data analysis, storage and replay is performed on your personal computer, tablet or laptop, which makes processing upgrades easy.

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SERVICE SOLUTIONS

Tektronix Extended and Premium Service Plans

Tektronix offers a range of warranty and service plans to protect your investment and extend the length of your coverage. With over 65 years of experience in test and measurement solutions, Tektronix is committed to offering service plans that deliver the highest level of quality and expertise.

✔ **Tektronix Factory Experts**

Access to the engineering expertise that designed and built your products to ensure they are at 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 when applicable. Products are returned to you in "like-new" condition.

✔ **Efficiency and Convenience**

Our team is focused on getting your instruments back to you as soon as possible, minimizing your downtime and increasing your operational 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	TOTAL PROTECTION PLAN	GOLD CARE
• Choose between a 3- or 5-year extended warranty plan • No purchase orders, quotes, or approval delays – one phone call starts the repair process • Covers equipment, parts, labor and transportation • Includes applicable software, safety and reliability updates • Faster repair time than without coverage (average is 5 days faster)	• First repair plan in the industry to cover accidental damage • Protection from wear and tear • Coverage for electrostatic discharge and electrical overstress • Factory-certified calibration and cleaning with each repair event	• Choose between a 3- or 5-year extended warranty plan • Loaner product of equal or higher performance shipped within 24 hours • Priority access to Global Tektronix Customer Call Center for technical support • 30% discount on scheduled factory-certified calibration • Coverage of user-caused EOS and ESD damage • Typical downtime of 48 hours or less

PLATINUM CARE	CALIBRATION
• Custom-tailored plan with a typical downtime of less than 1 hour • Identically configured spare products dedicated to your facility • On-site calibration event and repair coverage • Priority access to technical support, and flexible contract duration and payment terms	• Choose from multi-year contracts and single event calibrations • Accredited and traceable calibration • Adjustments included to restore performance • Applicable software, safety, and reliability updates • Calibration records retention

MULTI–BRAND SERVICES

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
- 100+ global points of service

Performance

Calibration is the cornerstone of measurement confidence. Now Tektronix can manage all of your calibration requirements, regardless of product brand. Our comprehensive service offerings 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. Our CalWeb® asset management system allows you to actively manage your calibration program and provides you with global, web-based instrument visibility.

Global Reach with Local Presence

Tektronix has the most extensive global network of labs. With more than 100 points of service and 1,100 highly trained experts, our suite of capabilities and services is available to meet all of your calibration needs, worldwide.

Quality & Accuracy

A rigorous quality system is the key to our robust calibration processes. Choose from multiple NIST-traceable certificate options, including ANSI Z540.1, ISO/IEC 17025 and ISO 9001:2008. Our customers benefit fromfrom Tektronix 70-year legacy as an industry leader in test, measurement and monitoring solutions.

For more information on Tektronix multi-vendor service, visit service-solutions.tektronix.com

Or call us at 1-800-438-8165

OSCILLOSCOPES

Oscilloscope Selection Guides, Pages 10–15

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

FIG 01 /
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 and MDO Series of mixed domain oscilloscopes offer 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.

MIXED SIGNAL AND MIXED DOMAIN OSCILLOSCOPES

	MSO/DPO2000B	MDO3000
Additional Resources		
Channels	2, 4 analog channels; 16 digital channels (MSO2000B)	2, 4 analog channels; 16 digital channels (with MDO3MSO option)
Bandwidth	70 MHz to 200 MHz	100 MHz to 1 GHz
Spectrum Analyzer Frequency Range	—	Standard: 9 kHz to Analog Bandwidth Optional: 9 kHz to 3 GHz
Sample Rate	1 GS/s (analog); 1 GS/s (digital, only 1 pod); 500 MS/s (digital, both pods)	2.5 GS/s to 5 GS/s (analog); 121.2 ps (8.25 GS/s) MagniVu™ (digital)
Max Record Length	1 Mpoints	10 Mpoints
Trigger Types	Edge, Logic, Pulse Width, Runt, Setup and Hold, Rise/Fall Time, Video, I²C*, SPI*, CAN*, LIN*, RS-232/422/485/UART*, Parallel (MSO2000B) *Optional	Edge, Sequence, Logic, Pulse Width, Runt, Timeout, Setup 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*, USB 2.0*, Parallel (with MDO3MSO option) *Optional
Optional Serial Bus Decode and Analysis	DPO2AUTO: CAN and LIN DPO2COMP: RS-232/422/485/UART DPO2EMBD: I²C, SPI DPO2BND: Includes DPO2AUTO, DPO2COMP, DPO2EMBD	MDO3AERO: MIL-STD-1553 MDO3AUDIO: I²S, LJ, RJ, TDM MDO3AUTO: CAN and LIN MDO3COMP: RS-232/422/485/UART MDO3EMBD: I²C, SPI MDO3FLEX: FlexRay MDO3USB: USB2.0 MDO3BND: Enables MDO3AERO, MDO3AUDIO, MDO3AUTO, MDO3COMP, MDO3EMBD, MDO3FLEX, MDO3LMT, MDO3PWR, MDO3USB
Connectivity	USB Host, USB Device, GPIB*, Optional DPO2CONN Module: LAN (10/100 Base-T Ethernet) and Video Out *Optional	USB Host (x2), USB Device, LAN (10/100 Base-T Ethernet, LXI Core 2011 Compliant), Video Out, GPIB* *Optional
Waveform Math and Analysis	29 Automated Measurements, Waveform and Screen Cursors: Arithmetic Waveform Math, FFT	30 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics Optional: MDO3PWR: Power Analysis MDO3LMT: Limit/mask test MDO3BND: Enables MDO3AERO, MDO3AUDIO, MDO3AUTO, MDO3COMP, MDO3EMBD, MDO3FLEX, MDO3LMT, MDO3PWR, MDO3USB
Software	PC communications software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop
Battery Operation	—	—
Upgrade	• Add serial bus triggering and decode	• Increase bandwidth • Add Arbitrary/Function generator • Add 16 digital channels • Increase spectrum analyzer maximum frequency to 3 GHz • Add measurements and analysis (power, limit/mask) • Add serial bus triggering and decode
Starting Price	$1,140	$3,450

MIXED SIGNAL AND MIXED DOMAIN OSCILLOSCOPES AND ADVANCED SIGNAL OSCILLOSCOPES

|	MDO4000C	MSO/DPO5000B
Additional Resources		
Channels	4 analog channels; 16 digital channels (with MDO4MSO option); 1 spectrum analyzer input (with SA3 or SA6 option); 1 Arbitrary/Function Generator (with MDO4AFG option)	4 analog channels; 16 digital channels (MSO5000B)
Bandwidth	200 MHz to 1 GHz (analog)	350 MHz to 2 GHz
Spectrum Analyzer Frequency Range	Optional: 9 kHz - 3 GHz or 9 kHz - 6 GHz	—
Sample Rate	2.5 GS/s to 5 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVu™ (digital)	5 GS/s to 10 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVu™ (digital)
Max Record Length	Up to 20 Mpoints	Up to 250 Mpoints
Trigger Types	RF Power Level**, Edge, Sequence, Logic, Pulse Width, Runt, Timeout, Setup 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* *Optional **With optional MDO4TRIG module, RF power level can be used as source for Pulse Width, Timeout, Runt, Logic, Sequence	Edge, Sequence, Logic, Pulse Width, Glitch, Runt, Timeout, Transition, Setup and Hold, Rise/Fall Time, Video, I²C*, SPI*, USB (Low, Full, High)*, RS-232/422/485/UART*, I²C*, SPI*, USB*, Ethernet*, CAN*, LIN*, FlexRay*, RS-232/422/485/UART*, MIL-STD-1553*, Parallel (MSO5000B), Visual Trigger *Optional
Optional Serial Bus Decode and Analysis	DPO4AERO: MIL-STD-1553 DPO4AUDIO: I²S, LJ, RJ, TDM DPO4AUTO: CAN and LIN DPO4AUTOMAX: CAN, LIN and FlexRay DPO4COMP: RS-232/422/485/UART DPO4EMBD: I²C, SPI DPO4ENET: Ethernet DPO4USB: USB DPO4BND: Enables DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID	SR-AERO: MIL-STD-1553 SR-AUTO: CAN/LIN/FlexRay SR-COMP: RS-232/422/485/UART SR-DPHY: MIPI D-PHY SR-EMBD: I²C, SPI SR-ENET: 10/100Base-T Ethernet SR-USB: USB
Connectivity	USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Core 2011 Compliant), Video Out, GPIB* *Optional	USB Host (x6), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), Video Out, GPIB* *Optional
Waveform Math and Analysis	44 Automated Measurements, Waveform and Screen Cursors, Arithmetic Waveform Math, Spectrum Math, FFT, Advanced Math, Measurement Statistics, Waveform Histograms Optional: DPO4LMT: Limit and Mask Testing MDO4TRIG: Adv. RF Power Level Trigger DPO4PWR: Power Analysis DPO4VID: HDTV and Custom Triggering DPO4BND: Enables DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID	53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms, Waveform Limit Testing Optional: BRR: BroadR-Reach Compliance Test; DDRA: DDR Memory Bus Analysis; DJA: DPOJET Advanced Jitter and Eye Diagram Analysis; ET3: Ethernet Compliance Test Solution; MTM: Mask Testing; PWR: Power Analysis; SignalVu Vector Signal Analysis; USB2: USB Compliance Test Solution; MOST: MOST 50/150 Compliance Test Solution; HSIC: HSIC Electrical Validation; USBPWR: USB Power Adapter/ EPS Compliance Automated Test Solution
Software	PC Communications Software: OpenChoice® Desktop Vector Signal Analysis Software: SignalVu-PC	Optional: TekScope Anywhere™
Battery Operation	—	—
Upgrade	• Increase bandwidth • Add Arbitrary/Function Generator • Add 16 digital channels • Add or upgrade spectrum analyzer channel • Add measurements and analysis • Add serial bus triggering and decode	• Add 16 digital channels • Add extended record length, up to 250 Mpoints • Add serial bus compliance testing • Add measurements and analysis (power, jitter, mask, RF) • Add serial bus triggering and decode
Starting Price	$6,900	$12,300

BASIC OSCILLOSCOPES AND BATTERY POWERED OSCILLOSCOPES WITH ISOLATED CHANNELS

	TBS1000	TBS1000B/ TBS1000B–EDU	THS3000	TPS2000B
Additional Resources				
Channels	4	2	4 (isolated)	2, 4 (isolated)
Bandwidth	60 MHz to 150 MHz	30 MHz* to 200 MHz * 30 MHz TBS1032B available in North America and Europe	100 MHz to 200 MHz	100 MHz to 200 MHz
Sample Rate	1 GS/s	500 MS/s to 2 GS/s	2.5 GS/s to 5 GS/s	1 GS/s to 2 GS/s
Max Record Length	2.5 k points	2.5 k points	10 k points	2.5 k points
Trigger Types	Edge, Pulse (width), Video	Edge, Pulse (width), Video	Edge, Pulse (width), Event, Video, Non-interlaced	Edge, Pulse (width), Video
Optional Serial Bus Decode and Analysis	—	—	—	—
Connectivity	USB Host, USB Device, GPIB* *Optional	USB Host, USB Device, GPIB* *Optional	USB Host, USB Device	RS-232 (includes RS-232-to-USB Host Serial Cable), Centronics, CompactFlash
Waveform Math and Analysis	16 Automated Measurements, Arithmetic Waveform Math, FFT, Waveform Limit Testing, Automated Datalogging	34 Automated Measurements, Arithmetic Waveform Math, FFT, Dual-Channel Frequency Counter, Waveform Limit Testing*, TrendPlot™ function*, Automated Datalogging* * Not available on EDU models	21 Automated Measurements, Arithmetic Waveform Math, FFT	11 Automated Measurements, Arithmetic Waveform Math, FFT Optional: TPS2PWR1: Power Measurement and Analysis
Software	PC Communications Software: OpenChoice® Desktop, Educator Classroom and Lab Resource CD	PC Communications Software: OpenChoice® Desktop Software, PC Courseware Editor Tool, Product Documentation and Lab Resource CD	PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop
Battery Operation	—	—	One THSBAT Battery Pack Included Standard	One TPSBAT Battery Pack Included Standard
Starting Price	$1,030	$450	$4,400	$3,280
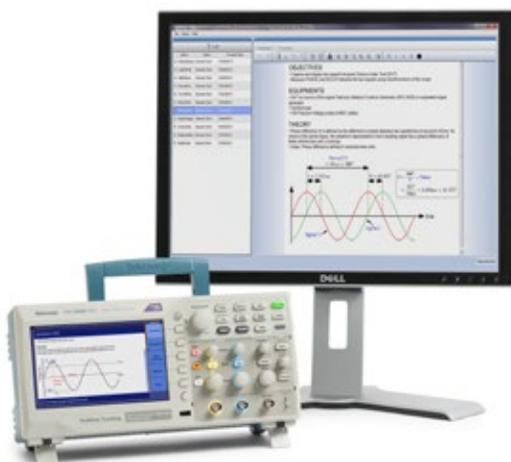
The World's First Dedicated Teaching Oscilloscope

The TBS1000B-EDU Digital Storage Oscilloscope Series is designed specifically to meet the needs of today's schools and universities. It's the first oscilloscope to use the innovative new courseware system that enables educators to seamlessly integrate teaching materials onto an oscilloscope. Along with a powerful PC Courseware Editor Tool and a courseware website, the TBS1000B-EDU supports a complete education ecosystem that uncovers new ways of enhancing the teaching and learning experience.

TDS SERIES OSCILLOSCOPES

	TDS2000C	TDS3000C
Additional Resources		
Channels	2, 4	2, 4
Bandwidth	50 MHz to 200 MHz	100 MHz to 500 MHz
Sample Rate	500 MS/s to 2 GS/s	1.25 GS/s to 5 GS/s
Max Record Length	2.5 k points	10 k points
Trigger Types	Edge, Pulse (width), Video	Edge, Logic (Pattern, State), Pulse (Glitch, Width, Runt, Slew Rate), Video, Extended Video*, Comm* *Optional
Optional Serial Bus Decode and Analysis	—	—
Connectivity	USB Host, USB Device, GPIB* *Optional	USB Host, LAN (10Base-T Ethernet) Optional: TDS3GV Module: GPIB, RS-232, and Video Out
Waveform Math and Analysis	16 Automated Measurements, Arithmetic Waveform Math, FFT, Waveform Limit Testing, Automated Datalogging	25 Automated Measurements, Arithmetic Waveform Math, FFT Optional: TDS3LIM: Limit Testing TDS3TMT: Telecom Mask Testing TDS3VID: HDTV and Custom Video Triggering
Software	PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop
Battery Operation	—	Requires Optional TDS3BATC Battery Pack
Starting Price	$1,030	$5,930

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 tek.com to download your copy.

1. XYZs of Oscilloscopes Primer
2. ABCs of Probes Primer
3. Fundamentals of the MDO4000C Series Mixed Domain Oscilloscopes
4. Fundamentals of Signal Integrity Primer
5. Debugging Serial Buses in Embedded Systems Designs Application Note
6. Power Supply Measurement and Analysis Primer

PRODUCT HIGHLIGHTS

- 1 Mpoint record length on all channels
- 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.

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.

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	PRICING (USD)
DPO2002B	2	—	70 MHz	1 GS/s	$1,140
MSO2002B	2	16	70 MHz	1 GS/s	$1,610
DPO2004B	4	—	70 MHz	1 GS/s	$2,090
MSO2004B	4	16	70 MHz	1 GS/s	$2,750
DPO2012B	2	—	100 MHz	1 GS/s	$1,630
MSO2012B	2	16	100 MHz	1 GS/s	$2,410
DPO2014B	4	—	100 MHz	1 GS/s	$2,440
MSO2014B	4	16	100 MHz	1 GS/s	$3,100
DPO2022B	2	—	200 MHz	1 GS/s	$2,300
MSO2022B	2	16	200 MHz	1 GS/s	$3,070
DPO2024B	4	—	200 MHz	1 GS/s	$2,930
MSO2024B	4	16	200 MHz	1 GS/s	$3,610

APPLICATION MODULES

Serial Bus Triggering and Protocol Analysis

DPO2BND	Includes DPO2AUTO, DPO2COMP, DPO2EMBD	$750
DPO2AUTO	Automotive (CAN, LIN)	$500
DPO2COMP	Computer (RS-232/422/485/UART)	$500
DPO2EMBD	Embedded (I²C, SPI)	$500

RECOMMENDED ACCESSORIES

DPO2CONN	Ethernet and Video Out Connectivity Module	$551
119-7465-xx	TekVPI External Power Supply	$94
ACD2000	Soft Carrying Case	$259

RECOMMENDED PROBES

Passive Voltage Probes

TPP0200	200 MHz, 300 V CAT II	$59

Active Voltage Probes

TAP1500[*1]	10X, 1.5 GHz, ± 8 V	$2,260

Differential Voltage Probes

TDP0500[*1]	500 MHz, ± 42 V/± 4.25 V	$3,570

High Voltage Probes

THDP0200[*1]	200 MHz, ± 1500 V/ ± 150 V	$1,870
TMDP0200[*1]	200 MHz, ± 750 V/± 75 V	$1,870
THDP0100[*1]	100 MHz, ± 6000 V/ ± 600 V	$3,170

Current Probes

TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/ 10 mA Min	$2,540
TCP0030A[*1]	120 MHz, 30 A DC/30 A RMS/50 A Peak/ 1 mA Min	$3,850
TCP0150[*1]	20 MHz, 150 A DC/150 A RMS/500 A Peak/ 5 mA Min	$4,550

ANOTHER PRODUCT FOR CONSIDERATION

Need an arbitrary/function generator for your project? The MDO3000 Series features six integrated instruments to capture analog, digital and RF signals with one scope.

Need more bandwidth? The MDO3000 Series offers up to 1 GHz analog bandwidth.

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

*1 Requires 119-7465-xx TekVPI External Power Supply.

PRODUCT HIGHLIGHTS

- Integrated 6-in-1 oscilloscope that offers a spectrum analyzer, arbitrary function generator, logic analyzer, protocol analyzer and digital voltmeter
- Spectrum Analyzer standard on all models
- 10 Mpoint record length on all channels
- >280,000 wfm/s max. waveform capture rate with FastAcq
- Automated search and waveform navigation with Wave Inspector®

Monitor slowly changing RF events at a glance with spectrogram display.

MDO3000 Series

This scope features six integrated instruments to capture analog, digital and RF signals with one scope. And add instruments, analysis functions and bandwidth as your needs change.

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS (OPTIONAL)	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	DIGITAL SAMPLE RATE MAIN/MAGNIVU™	SPECTRUM ANALYZER INPUT	SPECTRUM ANALYZER FREQUENCY RANGE STANDARD/OPTIONAL	PRICING (USD)
MDO3012	2	16	100 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 100 MHz / 9 kHz - 3 GHz	$3,450
MDO3014	4	16	100 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 100 MHz / 9 kHz - 3 GHz	$4,110
MDO3022	2	16	200 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 200 MHz / 9 kHz - 3 GHz	$4,120
MDO3024	4	16	200 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 200 MHz / 9 kHz - 3 GHz	$4,590
MDO3032	2	16	350 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 350 MHz / 9 kHz - 3 GHz	$7,110
MDO3034	4	16	350 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 350 MHz / 9 kHz - 3 GHz	$8,550
MDO3052	2	16	500 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 500 MHz / 9 kHz - 3 GHz	$9,020
MDO3054	4	16	500 MHz	2.5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 500 MHz / 9 kHz - 3 GHz	$11,500
MDO3102	2	16	1 GHz	5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 1 GHz / 9 kHz - 3 GHz	$10,800
MDO3104	4	16	1 GHz	5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 1 GHz / 9 kHz - 3 GHz	$14,300

INSTRUMENT OPTIONS**

MDO3AFG	Arbitrary function generator	$800
MDO3MSO	16 digital channels; includes P6316 digital probe and accessories	$1,550
MDO3SA	Increase spectrum analyzer input frequency range to 9 kHz – 3 GHz	$2,550
MDO3SEC	Add password protected security to enable or disable all communication ports and firmware upgrades	$475

APPLICATION MODULES

MDO3BND	Enables MDO3AERO, MDO3AUDIO, MDO3AUTO, MDO3COMP, MDO3EMBD, MDO3FLEX, MDO3LMT, MDO3PWR, MDO3USB	$2,900

Serial Bus Triggering and Protocol Analysis

MDO3AERO	Aerospace (MIL-STD-1553)	$1,150
MDO3 AUDIO	Audio (I²S, LJ, RJ and TDM)	$1,150
MDO3AUTO	Automotive (CAN, LIN)	$1,150
MDO3 COMP	Computer (RS-232)	$1,150

APPLICATION MODULES

Serial Bus Triggering and Protocol Analysis

MDO3EMBD	Embedded (I²C, SPI)	$1,150
MDO3FLEX	Automotive (FlexRay)	$1,150
MDO3USB*	USB 2.0 (LS, FS, HS)	$1,150

Additional Analysis

MDO3PWR	Power Analysis	$1,450
MDO3LMT	Limit/Mask Test	$800

RECOMMENDED PROBES

Passive Voltage Probes

TPP0502	2X, 500 MHz, 300 V CAT II	$652

High Voltage Probes

TMDP0200	250X/25X, 200 MHz, ± 750 V / ± 75 V	$1,870
THDP0200	1000X/100X, 100 MHz, ± 6000 V / ± 600 V	$1,870
TPP0850	50X, 800 MHz, 2500 V Peak	$821

RECOMMENDED PROBES

Current Probes

TCP0020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min	$2,700
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min	$3,850
TCP0150	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 mA Min	$4,550

SHIPS WITH PRODUCT

- One Low C Passive Probe Per Channel, TPP1000 on 1 GHz Models, TPP0500B on 350 and 500 MHz Models, TPP0250 on all 100 and 200 MHz Models
- One P6316 16 Channel Logic Probe (with option MDO3MSO only)
- N-to-BNC Adapter
- OpenChoice® Desktop
- Calibration Certificate, Installation and Safety Manual, & Documentation on CD
- Accessory Bag
- Front Panel Language Overlay (if other than English)
- Power Cord
- 3-year Warranty

* USB 2.0 HS only available on 1 GHz analog bandwidth models and only for HS analysis.

** Can be preconfigured from the factory or ordered as stand-alone upgrade kits.
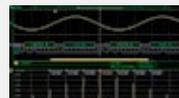
MDO4000C Series

The MDO4000C offers up to six built-in instruments, each with exceptional performance to address tough challenges. It's completely customizable and fully upgradable. Every MDO4000C features powerful triggering, search and analysis, and these are the only scopes to offer synchronized analog, digital and RF signal analysis at the same time.

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS*	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	DIGITAL SAMPLE RATE MAIN/MAGNIVU™	SPECTRUM ANALYZER INPUT*	SPECTRUM ANALYZER FREQUENCY RANGE	PRICING (USD)
MDO4024C	4	16	200 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz	$6,900
MDO4034C	4	16	350 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz	$10,700
MDO4054C	4	16	500 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz	$14,100
MDO4104C	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz	$17,400

* Optional

APPLICATION MODULES

DPO4BND	Enables DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID	$3,900

Serial Bus Triggering and Protocol Analysis

DPO4-AERO	Aerospace (MIL-STD 1553)	$1,660
DPO4-AUDIO	Audio (I²S, LJ, RJ and TDM)	$1,550
DPO4AUTO	Automotive (CAN, LIN)	$1,550
DPO4-AUTOMAX	Automotive (CAN, LIN, FlexRay)	$5,190
DPO4COMP	Computer (RS-232)	$1,500
DPO4EMBD	Embedded (I²C, SPI)	$1,500
DPO4ENET	Ethernet (10BASE-T, 100BASE-TX)	$1,660
DPO4USB*1	USB 2.0 (LS, FS, HS)	$1,660

Additional Analysis

MDO4TRIG	Adv. RF Power Level Triggering	$1,800
DPO4PWR	Power Analysis	$1,850
DPO4LMT	Limit and Mask Testing	$938
DPO4VID	HDTV & Custom Video Triggering	$938
SignalVu-PC-SVE	Vector Signal Analysis Software	Varies

RECOMMENDED PROBES

Passive Voltage Probes

TPP1000	10X, 1 GHz, 300 V CAT II	$996
TPP0500B	10X, 500 MHz, 300 V CAT II	$595
TPP0502	2X, 500 MHz, 300 V CAT II	$652

Active Voltage Probes

TAP1500	10X, 1.5 GHz, ± 8 V	$2,260

Differential Voltage Probes

TDP0500	50X/5X, 500 MHz, ± 42 V/± 4.2 V	$3,570
TDP1000	50X/5X, 1 GHz, ± 42 V/± 4.2 V	$4,030

High Voltage Probes

THDP0200	500X/50X, 200 MHz, ± 1500 V/± 150 V	$1,870
TPP0850	50X, 800 MHz, 2500 V Peak	$821

Current Probes

TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min	$3,850

RECOMMENDED SERVICE

T3/T5	3-/5-year Total Protection Plan	Varies

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

INSTRUMENT OPTIONS

MDO4AFG	Arbitrary/function generator	$1,000
MDO4MSO	16 digital channels, includes P6616 digital probe and accessories	$3,000
SA3	3 GHz Spectrum Analyzer	$3,000
SA6	6 GHz Spectrum Analyzer	$6,000
MDO4SEC	Add password protected security to enable or disable communications and firmware upgrades	$500

MSO/DPO5000B Series

Today's faster data rates and tighter timing margins require an oscilloscope with outstanding signal acquisition performance and analysis capabilities. Tektronix MSO/DPO5000B Series oscilloscopes provide exceptional signal fidelity, with 2 GHz and 10 GS/s sample rate, along with advanced analysis and math capabilities. MSO models include 16 digital timing channels, and all models can be equipped to decode common serial protocols, to provide a comprehensive view of your systems.

PRODUCT HIGHLIGHTS

- 350 MHz, 500 MHz, 1 GHz, and 2 GHz models
- >250,000 wfm/s max. waveform capture rate with FastAcq™ technology
- 10 GS/s max sampling and 250 Mpoints memory (optional)
- Extensive analysis including jitter/timing and user defined math (i.e., MATLAB)
- Visual triggering standard with search and mark

Achieve greater than 11 bits vertical resolution with HiRes sampling and reduce unwanted noise while capturing signal details.

Perform advanced protocol triggering and decode on mid-speed and low-speed serial and buses (optional).

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (4 CHANNELS/2 CHANNELS)	DIGITAL SAMPLE RATE MAIN/MAGNIVU™	PRICING (USD)
DPO5034B	4	—	350 MHz	5 GS/s	—	$12,300
MSO5034B	4	16	350 MHz	5 GS/s	500 MS/s /16.5 GS/s	$15,600
DPO5054B	4	—	500 MHz	5 GS/s	—	$15,300
MSO5054B	4	16	500 MHz	5 GS/s	500 MS/s /16.5 GS/s	$18,600
DPO5104B	4	—	1 GHz	5 GS/s /10 GS/s	—	$18,800
MSO5104B	4	16	1 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s	$22,100
DPO5204B	4	—	2 GHz	5 GS/s /10 GS/s	—	$21,500
MSO5204B	4	16	2 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s	$24,800

SOFTWARE PACKAGES

Serial Bus Triggering and Protocol Analysis

SR-AERO	MIL-STD-1553B	$1,850
SR-AUTO	CAN/LIN/FlexRay	$1,850
SR-COMP	Computer (RS-232)	$1,850
SR-DPHY	MIPI D-PHY	$3,000
SR-EMBD	Embedded (I²C, SPI)	$1,850
SR-ENET	Ethernet	$1,850
SR-USB	USB 2.0 (LS, FS, HS)	$1,850

Compliance Test

BRR	BroadR-Reach	$2,120
ET3	Ethernet	$6,170
MOST	MOST50/150	$2,970
USB2	USB 2.0	$3,090

Additional Analysis

DDRA	DDR Memory	$6,650
DJA	Advanced Jitter Analysis	$4,580
HSIC	HSIC Electrical Characterization	$5,520
PS2, PS3	Power Solution Bundles	Varies
PWR	Power Analysis	$2,300
SVE	SignalVu RF Analysis	$2,020
USBPWR	USB Power Compliance	$1,990

Additional software packages are available. For a complete listing, please visit www.tektronix.com/mso5000

RECOMMENDED PROBES

Passive Voltage Probes

TPP1000	10X, 1 GHz, 300 V CAT II	$996
TPP0502	2X, 500 MHz, 300 V CAT II	$652

Active Voltage Probes

TAP1500	10X, 1.5 GHz, ± 8 V	$2,260
TAP2500	10X, 2.5 GHz, ± 4 V	$3,990

Differential Voltage Probe

TDP0500	500 MHz, ± 42 V/± 4.2 V	$3,570
TDP1000	1 GHz, ± 42 V/± 4.2 V	$4,030
TDP1500	1.5 GHz, ± 8.5 V/± 850 mV	$4,000

High Voltage Probes

TMDP0200	200 MHz, ± 750 V/± 75 V	$1,870
THDP0200	200 MHz, ± 1500 V/± 150 V	$1,870
THDP0100	100 MHz, ± 6000 V/± 600 V	$3,170
TPP0850	50X, 800 MHz, 2500 V Peak	$821

Current Probes

TCP0020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min	$2,700
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min	$3,850
TCP0150	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 mA Min	$4,550

SHIPS WITH PRODUCT

- Four TPP0500B (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)
- Calibration Certificate, Mouse, Stylus
- Front Panel Cover, Accessory Bag, Power Cord
- 1-year Warranty

INSTRUMENT OPTIONS

Record Length

Opt. 5RL	50M/Ch	$5,670
Opt. 10RL	125M/Ch	$12,300

Limitations apply. See data sheet for full details.

RECOMMENDED SERVICE

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

PRODUCT HIGHLIGHTS

- Two channel instruments
- Extensive monitoring capability using TrendPlot™ testing
- Pass/Fail analysis with built in waveform limit testing
- Automated data logging feature
- Up to 2 GS/s sample rate on all channels
- Dual-channel frequency counters
- Front-panel USB host port and rear-panel USB device port
- TekSmartLab™ supported
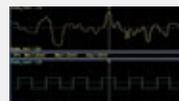
Use the TrendPlot™ function to evaluate signal behavior over extended time periods.
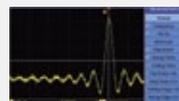
Thoroughly analyze your waveforms with convenient math tools and 34 automated measurements.

TBS1000B Series

More features, more scope; the TBS1000B is in a class all on its own. With up to 200 MHz bandwidth, 34 automated measurements, limit testing, data logging, dual-channel frequency counters, waveform trending and sample rates of up to 2 GS/s, the TBS1000B Series is designed for extensive monitoring and analysis activities. It can handle everyday test challenges without challenging your budget.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (PER CHANNEL)	PRICING (USD)
TBS1032B*	2	30 MHz	500 MS/s	$450
TBS1052B	2	50 MHz	1 GS/s	$550
TBS1072B	2	70 MHz	1 GS/s	$890
TBS1102B	2	100 MHz	2 GS/s	$1,190
TBS1152B	2	150 MHz	2 GS/s	$1,520
TBS1202B	2	200 MHz	2 GS/s	$1,850

*Available only for North America and Europe.

RECOMMENDED PROBES

Passive Voltage Probes

TPP0201	10X, 200 MHz, 300 V CAT II	$59
TPP0101	10X, 100 MHz, 300 V CAT II	$49
TPP0051	10X, 50 MHz, 300 V CAT II	$25
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II	$100

High Voltage Probes

P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V	$1,010
P5100A	100X, 500 MHz, 2500 V Peak	$488
P6015A	1000X, 75 MHz, 20 kV Peak	$2,000

RECOMMENDED PROBES

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/ 10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min	$699
A622	100 kHz, 100 A DC/ 71 A RMS/100 A Peak/10 mA Min	$704

RECOMMENDED ACCESSORIES

TEK-USB-488	GPIB-to-USB converter	$830
AC2100	Soft Carrying Case	$136

ANOTHER PRODUCT FOR CONSIDERATION

Need an oscilloscope that simplifies the way you distribute lab work to students? The TBS1000B-EDU models have many of the same features and include integrated courseware capabilities.

SHIPS WITH PRODUCT

- Two TPP0xx1 200 MHz, 100 MHz or 50 MHz Passive Probes
- Certificate of Calibration
- CD with Customer Documentation
- Installation & Safety Manual
- Power Cord
- 5-year Warranty

PRODUCT HIGHLIGHTS

- Two-channel instruments
- Integrated courseware feature—perform labs directly on the oscilloscope
- Autoset enable/disable capability
- Included PC editor tool for easy lab creation
- Up to 2 GS/s sample rate on all channels
- Dual-channel frequency counters
- 34 automated measurements and FFT analysis
- TekSmartLab™ supported

The Courseware Resource Center is an interactive, multi-lingual website where educators can share lab material and ideas.

The FFT function can show both frequency and time domain waveforms simultaneously.

TBS1000B–EDU Series

Meet the world's first dedicated teaching oscilloscope: the TBS1000B-EDU. Not only does it deliver the performance you expect to see in a Tektronix scope, it comes with an innovative courseware feature that allows students to review lab material, follow step-by-step instructions and document results, all on the oscilloscope. We couldn't make engineering easier, so we made it easier to teach and learn.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (PER CHANNEL)	PRICING (USD)
TBS1052B-EDU	2	50 MHz	1 GS/s	$520
TBS1072B-EDU	2	70 MHz	1 GS/s	$790
TBS1102B-EDU	2	100 MHz	2 GS/s	$1,090
TBS1152B-EDU	2	150 MHz	2 GS/s	$1,420
TBS1202B-EDU	2	200 MHz	2 GS/s	$1,750

RECOMMENDED PROBES

Passive Voltage Probes

TPP0201	10X, 200 MHz, 300 V CAT II	$59
TPP0101	10X, 100 MHz, 300 V CAT II	$49
TPP0051	10X, 50 MHz, 300 V CAT II	$25
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II	$100

High Voltage Probes

P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V	$1,010
P5100A	100X, 500 MHz, 2500 V Peak	$488
P6015A	1000X, 75 MHz, 20 kV Peak	$2,000

RECOMMENDED PROBES

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min	$699
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min	$704

RECOMMENDED ACCESSORIES

TEK-USB-488	GPIB-to-USB converter	$830
AC2100	Soft Carrying Case	$136

ANOTHER PRODUCT FOR CONSIDERATION

Need more analysis features? The TBS1000B models offer the same great performance and include Trendplot™, data logging and limit test capability.

SHIPS WITH PRODUCT

- Two TPP0xx1 200 MHz, 100 MHz or 50 MHz, Passive Probes
- Certificate of Calibration
- CD with Customer Documentation
- Education CD with Course Editor SW and Lab Examples
- Installation & Safety Manual
- Power Cord
- 5-year Warranty

PRODUCT HIGHLIGHTS

- Four-channel instruments
- 1 GS/s sample rate on all channels
- 7-inch WVGA high-res display
- 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
- TekSmartLab™ supported
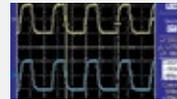
Accurately capture signals with at least 10X oversampling on all channels with Digital Real-Time Sampling technology.

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

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.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (PER CHANNEL)	PRICING (USD)
TBS1064	4	60 MHz	1 GS/s	$1,030
TBS1104	4	100 MHz	1 GS/s	$1,520
TBS1154	4	150 MHz	1 GS/s	$1,860

RECOMMENDED PROBES

Passive Voltage Probes

TPP0201	10X, 200 MHz, 300 V CAT II	$59
TPP0101	10X, 100 MHz, 300 V CAT II	$49
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II	$100

High Voltage Probes

P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V	$1,010
P5100A	100X, 500 MHz, 2500 V Peak	$488
P6015A	1000X, 75 MHz, 20 kV Peak	$2,000

RECOMMENDED PROBES

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/ 10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/ 10 mA Min	$699
A622	100 kHz, 100 A DC/ 71 A RMS/100 A Peak/10 mA Min	$704
TCP2020	50 MHz, 20 A DC/ 20 A RMS/100 A Peak/10 mA Min	$2,540

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply	$2,380
AC2100	Soft Carrying Case	$136

ANOTHER PRODUCT FOR CONSIDERATION

Need a Lifetime Warranty? The TDS2000C Series offers the same great performance as the TBS1000 and includes a Lifetime Warranty.

SHIPS WITH PRODUCT

- Four 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

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™ testing
- 7 hours of continuous battery operation

Four isolated input channels easily handle any type of mixed signal inputs.
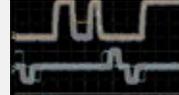
User-defined limit testing can automatically monitor your signals and output Pass or Fail results.

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.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	PRICING (USD)
THS3014	4	100 MHz	2.5 GS/s	$4,400
THS3014-TK	4	100 MHz	2.5 GS/s	$4,890
THS3024	4	200 MHz	5 GS/s	$4,950
THS3024-TK	4	200 MHz	5 GS/s	$5,500

RECOMMENDED PROBES

Passive Voltage Probes

THP0301 - Y/B/M/G	300 MHz, 10X, 300 V CAT III	$190

High Voltage Probes

P5150[1]	50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II	$515
P5122	100X, 200 MHz, 1000 V RMS CAT II	$287

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/ 10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/ 10 mA Min	$699
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/ 10 mA Min	$704
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/ 10 mA Min	$2,540

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

RECOMMENDED ACCESSORIES

THSBAT	Additional Spare Battery	$325
THSCHG[2]	Battery Charger	$108
119-7900-XX	AC Power Adapter	$320

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty	$509

[2] Does not include AC power adapter.

ANOTHER PRODUCT FOR CONSIDERATION

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

SHIPS WITH PRODUCT

- Four THP0301-Y/B/M/G 300 V CAT III, 300 MHz 10X Passive Probes
- OpenChoice® Desktop Software
- USB-A to Mini USB-B Cable for PC Communication
- Lithium-ion Battery with 7 Hour Battery Life
- Calibration Certificate, Installation/Safety Manual, Documentation on CD
- Carrying Handle, Hanging Strap
- ACHHS Soft-sided Carry Case[3], AC Power Adapter with Power Cord
- Hard-sided Travel Case[4]
- Soft-sided Probe Case, Two Probe Replacement Accessory Kits[4]
- 3-year Warranty

[3] Non-TK models only
[4] TK models only

PRODUCT HIGHLIGHTS

- 10X oversampling on all channels
- 4 isolated analog channels
- 11 automated measurements and FFT analysis
- Optional power analysis software
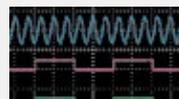
Safely and easily make floating measurements with the four isolated channels.

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

TPS2000B Series

Great performance goes beyond the lab. Make floating or differential measurements with up to four isolated channels. Tackle challenging environments with backlit buttons and optional power analysis software. Capture signals with Digital Real-Time Sampling.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	PRICING (USD)
TPS2012B	2	100 MHz	1 GS/s	$3,280
TPS2014B	4	100 MHz	1 GS/s	$4,340
TPS2024B	4	200 MHz	2 GS/s	$4,890

APPLICATION MODULES

TPS2PBND2	TPS2PWR1 Module and Four P5122 Probes	$1,690
TPS2PWR1	Power Measurement and Analysis Module	$735

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply	$2,380
AC2100	Soft Carrying Case	$136
TPSBAT	Additional Lithium-Ion Battery Pack (one included standard with instrument)	$304
TPSCHG	External Battery Charger	$530

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty	$318

RECOMMENDED PROBES

Passive Voltage Probes

TPP0201	10X, 200 MHz, 300 V CAT II	$59
TPP0101	10X, 100 MHz, 300 V CAT II	$49
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II	$131

High Voltage Probes

P5150	50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II	$515
P5122	100X, 200 MHz, 1000 V RMS CAT II	$287

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min	$699
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min	$704
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min	$2,540

ANOTHER PRODUCT FOR CONSIDERATION

For very accurate power measurements, the PA1000 Power Analyzer offers 0.05% basic 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 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

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[*1]
- TekSmartLab™ supported

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

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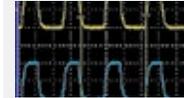
TDS2000C Series

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

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	PRICING (USD)
TDS2001C	2	50 MHz	500 MS/s	$1,030
TDS2002C	2	70 MHz	1 GS/s	$1,230
TDS2004C	4	70 MHz	1 GS/s	$1,910
TDS2012C	2	100 MHz	2 GS/s	$1,490
TDS2014C	4	100 MHz	2 GS/s	$2,240
TDS2022C	2	200 MHz	2 GS/s	$2,150
TDS2024C	4	200 MHz	2 GS/s	$2,590

RECOMMENDED PROBES

Current Probes

P6021A	60 MHz, 10.6 A RMS/250 A Peak/ 10 mA Min	$1,700
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min	$1,870
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/ 10 mA Min	$699
A622	100 kHz, 100 A DC/ 71 A RMS/100 A Peak/10 mA Min	$704
TCP2020	50 MHz, 20 A DC/ 20 A RMS/100 A Peak/10 mA Min	$2,540

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply	$2,380
AC2100	Soft Carrying Case	$136

RECOMMENDED PROBES

Passive Voltage Probes

TPP0201	10X, 200 MHz, 300 V CAT II	$59
TPP0101	10X, 100 MHz, 300 V CAT II	$49
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II	$100

High Voltage Probes

P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V	$1,010
P5100A	100X, 500 MHz, 2500 V Peak	$488
P6015A	1000X, 75 MHz, 20 kV Peak	$2,000

TDS2000 SERIES

The **TDS2000 Series** is one of the most popular oscilloscopes of all time. It has a proven track record and comes with a lifetime warranty. We are pleased to continue to offer it.

For new applications, make sure you learn about: **MSO/DPO2000B Series Oscilloscopes**

- 70, 100 and 200 MHz models
- 2 or 4 analog channels
- 16 digital channels (MSO models)
- 1 Mpoint record length
- Serial bus decoding and triggering options
- 5-year warranty

SHIPS WITH PRODUCT

- One TPP0x01 100 MHz or 200 MHz, 10X Passive Probe Per Analog Channel
- OpenChoice® Desktop Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Power Cord
- Lifetime Warranty[*1]

*1 For complete details visit www.tektronix.com/lifetimewarranty

PRODUCT HIGHLIGHTS

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

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

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

TDS3000C Series

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

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	PRICING (USD)
TDS3012C	2	100 MHz	1.25 GS/s	$5,930
TDS3014C	4	100 MHz	1.25 GS/s	$7,030
TDS3032C	2	300 MHz	2.5 GS/s	$8,730
TDS3034C	4	300 MHz	2.5 GS/s	$10,100
TDS3052C	2	500 MHz	5 GS/s	$12,500
TDS3054C	4	500 MHz	5 GS/s	$14,500

APPLICATION MODULES

TDS3LIM	Limit Testing	$865
TDS3TMT	Telecom Mask Test Triggering	$1,620
TDS3VID	HDTV and Custom Video Triggering	$865

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply	$2,380
TDS3GV	GPIB, RS-232, and VGA Communications Module	$865
TDS3BATC	Lithium-ion Battery	$685
TDS3ION	Battery Charger	$170
AC3000	Soft Carrying Case	$259
HCTEK4321	Hard Carrying Case (requires AC3000)	$829

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty	$524

RECOMMENDED PROBES

Passive Voltage Probes

P6139B	10X, 500 MHz, 300 V CAT II	$479

Active Voltage Probes

P6243	10X, 1 GHz, ± 8 V	$1,130

Differential Voltage Probes

P6246[*1]	10X/1X, 400 MHz, ± 8.5 V/± 850 mV	$3,620

High Voltage Probes

P5205A	500X/50X, 100 MHz, ± 1300 V/± 130 V	$1,480
P5210A	1000X/100X, 50 MHz, ± 5600 V/± 560 V	$2,980
P5100A	100X, 500 MHz, 2500 V Peak	$488

Current Voltage Probes

TCP202A	50 MHz, 15 A DC/10.6 A RMS/50 A Peak/10 mA Min	$2,490

*1 Requires 1103 TEKPROBE Power Supply

TDS3000 SERIES

The **TDS3000C Series** performs reliably in test stations around the world. It is also available with a battery pack, making it especially well-suited for field applications that require high bandwidth.

For new applications, make sure you learn about:
MDO3000 Series Mixed Domain Oscilloscopes

- 100, 200, 350, 500 MHz, and 1 GHz models
- 2 or 4 analog channels
- 16 digital channels (optional)
- 10 Mpoint record length
- Integrated arbitrary/function generator (optional)
- Serial bus decoding and triggering options

SHIPS WITH PRODUCT

- One P6139B 500 MHz, 10X Passive Probe Per Analog Channel
- OpenChoice® Desktop Software
- Calibration Certificate, Quick Reference Manual, & Documentation on CD
- Front Panel Cover, Power Cord
- 3-year Warranty

OSCILLOSCOPE 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.

Low Voltage Differential Probes

- Bandwidth up to 33 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

tek.com/differential-probe-low-voltage

High Voltage Differential Probes

- Dynamic range to ± 6000 V
- Bandwidth up to 200 MHz
- Most extensive set of probe accessories

tek.com/differential-probe-high-voltage

Current Probes

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

tek.com/current-probe

Passive Probes

- Best-in-class bandwidth up to 1 GHz
- Best-in-class input capacitance as low as 3.9 pF, which minimizes probe loading effects
- Dynamic range to 300 V CAT II
- Rugged and reliable

tek.com/passive-probe

Low Voltage Single–ended Probes

- Bandwidth up to 4 GHz
- True signal reproduction and fidelity
- Low input capacitance: down to < 0.8 pF
- Small, compact probe heads for probing small geometry circuit elements

tek.com/low-voltage-probe-single-ended

High Voltage Single–ended Probes

- Bandwidth up to 800 MHz
- Dynamic range to 2500 V
- Best-in-class probe loading with input capacitance as low as 1.8 pF

tek.com/high-voltage-probe-single-ended
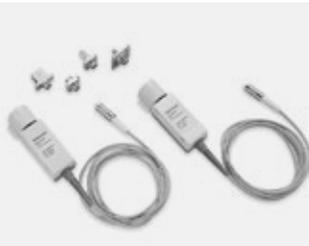
Optical

- Broad Wavelength Response: 500 to 950 nm or 1100 to 1700 nm
- High-bandwidth DC up to 1.2 GHz
- High Gain 1 V/mW
- Low Noise <11 pW/√Hz

tek.com/optical-probe

Carrying Cases and Accessories

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

tek.com/probe-accessories

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**

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.

	TSG4100A SERIES	AFG3000C SERIES	AFG2000	AFG1000
Bandwidth	Internal 6 MHz, External 200 MHz	240 MHz, 150 MHz, 100 MHz, 50MHz, 25 MHz, 10 MHz	20 MHz	25 MHz, 60 MHz
Channels	1 LF and 1 RF	1 or 2 (independent or synchronized)	1	2
Memory Depth	16M bits	4 x 128 k points	4 x 128 k points	8 k -1 M points
Standard Waveforms	CW	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	Sine, Square, Pulse, Ramp, Noise, and 45 Frequently Used Arbitrary Waveforms
Modulation	AM/FM/PM/Pulse, ASK/FSK/PSK/QAM/CPM/ VSB, GSM, GSM-EDGE, W-CDMA,APCO-25, DECT, NADC, PDC,TETRA, and Audio clip (Analog AM and FM)	AM, FM, PM, FSK, PWM, External	AM, FM, PM, FSK, PWM, External	AM, FM, PM, FSK, ASK, PSK, PWM, External
Additional Modes	External IQ Waveform Input, Custom IQ Waveform Generation, ARB Waveform Generation (Remote Mode), Additive White Gaussian noise	Sweep, Burst, Add Noise Impairment	Sweep, Burst, Add Noise Impairment	Sweep, Burst
Starting Price	$7,800	$4,220	$1,490	$751

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 reproduced waveform. Although 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.

PRODUCT HIGHLIGHTS

- Full functional AFG with multiple run modes and a built-in 200 MHz frequency counter
- 1 mVpp to 10 Vpp output amplitude across full frequency range
- Intuitive UI with 3.95" color display provides quick access to functions and parameters, and gives full confidence on settings
- Fully supports TekSmartLab™
- 5-year warranty
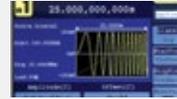
A full functional AFG with modulation, sweep and burst modes.

AFG1000 fully supported by TekSmartLab™.

AFG1000 Series

The AFG1000 Series Arbitrary/Function Generator offers the best price performance ratio in its class. It's tailored for educational users with 25 MHz, 60 MHz bandwidth, 2 output channels, and 1 mVp-p to 10 Vp-p output amplitude across full bandwidth. It generates all kinds of waveforms needed in a lab.

MODEL	ANALOG CHANNELS	OUTPUT BANDWIDTH	ANALOG SAMPLE RATE	MEMORY DEPTH	AMPLITUDE (INTO 50 OHM)	BUILT—IN FREQUENCY COUNTER	PRICING (USD)
AFG1022	2	25 MHz	125 MS/s	8 k	1 mV$_{p-p}$ to 10V$_{p-p}$	200 MHz, 6 digits	$751
AFG1062	2	60 MHz	300 MS/s	1 M	1 mV$_{p-p}$ to 10V$_{p-p}$	200 MHz, 6 digits	$999

RECOMMENDED ACCESSORIES

174-4401-00	USB type A to type B cable – three feet	$10
174-6053-00	Cable; USB 2.0 Compliant, type A Male to type B male, 6 feet long	$31
012-1732-00	BNC to BNC CABLE - three feet	$29
159-0107-00	Fuse, cartridge; 5 x 20 mm, 2 A, 250 V, time-delay	$10
159-0397-00	Fuse, cartridge; 5 x 20 mm, 4 A, 250 V, time-delay	$11

SHIPS WITH PRODUCT

- Power Cord
- USB Cable
- CD-ROM with Programmer Manual, Service Manual,
- BNC to BNC cables
- Fuses
- Calibration Certificate

AFG2000

Usually, generating a range of signals requires investing in a high-end signal generator. But with the Tektronix AFG2000 Arbitrary Function Generator, that's no longer the case. With 20 MHz bandwidth, 14-bit resolution, and 250 MS/s sample rate, it can create simple and complex signals. But perhaps its most impressive feature is its entry-level price.

PRODUCT HIGHLIGHTS

- NIST-traceable calibration with high reliability
- Form factor is ideal for both benchtop and rack mount applications
- Powerful pulse generation combined with adjustable edge time, flexible duty cycle, and PWM mode

Wide frequency range (1 µHz 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 Ω)	PRICING (USD)
AFG2021	1	20 MHz	250 MS/s	4 x 128 k	10 mV$_{p-p}$ to 10 V$_{p-p}$	$1,490

RECOMMENDED ACCESSORIES

Cables

012-1732-00	BNC cable shielded, 3 ft.	$29
012-0991-00	GPIB cable, double shielded	$591
011-0049-02	50Ω BNC Terminator	$164

Accessories

RMU2U	Rackmount kit	$163
159-0454-00	Fuse set, 3pcs, 0.125 A	$27

INSTRUMENT OPTIONS

Opt. GL	GPIB/LAN Interface (configured at time of purchase)	$102

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty	$263

SHIPS WITH PRODUCT

- User Manual
- Power Cord
- USB Cable
- BNC to BNC cable
- CD-ROM with Programmer Manual, Service Manual, LabVIEW and IVI Drivers
- CD-ROM with ArbExpress® Software
- NIST-traceable Calibration Certificate

PRODUCT HIGHLIGHTS

- High sample rate and stable time base ensure signal precision and stability
- 25 shortcut buttons and 5.6" color display provide quick access to functions and parameters, and give full confidence on settings
- 9 models with up to 240 MHz bandwidth and up to 20 Vp-p output amplitude cover customer needs in most applications
- Free ArbExpress software enables an easy way to create, edit and load arbitrary waveforms
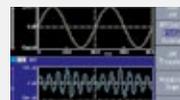
Large color display shows your settings and waveforms at a single glance.

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

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.

MODELS	ANALOG CHANNELS	OUTPUT BANDWIDTH	ANALOG SAMPLE RATE	MEMORY DEPTH	AMPLITUDE (INTO 50 W)	PRICING (USD)
AFG3011C	1	10 MHz	250 MS/s	4 x 128 k	20 mV$_{p-p}$ to 20 V$_{p-p}$	$4,220
AFG3021C	1	25 MHz	250 MS/s	4 x 128 k	10 mV$_{p-p}$ to 10 V$_{p-p}$	$1,730
AFG3022C	2	25 MHz	250 MS/s	4 x 128 k	10 mV$_{p-p}$ to 10 V$_{p-p}$	$2,560
AFG3051C	1	50 MHz	1 GS/s (<=16k), 250 MS/s (>16k)	4 x 128 k	10 mV$_{p-p}$ to 10 V$_{p-p}$	$2,620
AFG3052C	2	50 MHz	1 GS/s (<=16k), 250 MS/s (>16k)	4 x 128 k	10 mV$_{p-p}$ to 10 V$_{p-p}$	$3,870
AFG3101C	1	100 MHz	1 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	20 mV$_{p-p}$ to 10 V$_{p-p}$	$3,990
AFG3102C	2	100 MHz	1 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	20 mV$_{p-p}$ to 10 V$_{p-p}$	$5,720
AFG3151C	1	150 MHz	1 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	20 mV$_{p-p}$ to 10 V$_{p-p}$	$4,690
AFG3152C	2	150 MHz	1 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	20 mV$_{p-p}$ to 10 V$_{p-p}$	$6,690
AFG3251C	1	240 MHz	2 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	50 mV$_{p-p}$ to 5 V$_{p-p}$	$8,230
AFG3252C	2	240 MHz	2 GS/s (≤16k), 250 MS/s (>16k)	4 x 128 k	50 mV$_{p-p}$ to 5 V$_{p-p}$	$11,300

RECOMMENDED ACCESSORIES

Cables

012-1732-00	BNC cable shielded, 3 ft.	$29
011-0049-02	50 Ω BNC terminator	$164
012-0991-00	GPIB cable, double shielded	$591

Accessories

RM3100	Rackmount kit	$450

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty	$498

SHIPS WITH PRODUCT

- Quick Start User Manual
- Power Cord
- USB cable
- BNC to BNC cable
- CD-ROM with Specifications and Performance Verification Manual, Programmer Manual, Service Manual, LabVIEW and IVI Drivers
- CD-ROM with ArbExpress™ Software
- NIST-traceable Calibration Certificate

PRODUCT HIGHLIGHTS

- True DC to 2/4/6 GHz
- ≤±0.30 dB (typ) amplitude accuracy from 10 MHz to 6 GHz
- Phase Noise: -113 dBc/Hz @ 20kHz offset from 0 dBm, 1 GHz CW carrier
- Soft key upgrade to vector/digital modulation at very low cost, supporting 10 widely used formats
- USB, GPIB, RS-232, and LAN interfaces
- I/Q modulation inputs (max 400 MHz RF bandwidth)
- Supports NI LabVIEW programming

A versatile RF solution for the generation, receiving and analysis of both analog and vector signals at budget point.

Good performance and flexible configurations for debug and troubleshooting.

TSG4100A Series

The TSG4100A Series RF Vector Signal Generator offers mid-range performance at an entry-level RF signal generator price, generating both analog and vector/digital signals for most popular applications. It's only 5.6 kg, half a rack wide, and 2U high with LAN/RS-232/USB/GPIB interfaces. A 4.3-inch LCD screen displays the parameters clearly, so you'll understand your results intuitively.

MODEL	DESCRIPTION	PHASE NOISE (20KHZ OFFSET FROM 0 DBM, 1 GHZ CW CARRIER)	AMPLITUDE RANGE	MODULATION FORMATS	PRICING (USD)
TSG4102A	0 to 2 GHz RF SG, basic model	-113 dBc/Hz	+16.5 to -110 dBm	AM/FM/PM/Pulse; ASK/FSK/PSK/QAM/CPM/MSK/VSB; GSM/EDGE/TETRA/NADC/W-CDMA/P-25/DECT, etc. All the vector/digital modulation formats upgrade by soft keys	From $7,800
TSG4104A	0 to 4 GHz RF SG, basic model	-113 dBc/Hz	+16.5 to -110 dBm		From $9,820
TSG4106A	0 to 6 GHz RF SG, basic model	-113 dBc/Hz	+16.5 to -110 dBm (< 4 GHz) +10 to -110 dBm (> 4 GHz)		From $13,200

RECOMMENDED ACCESSORIES

TSG4100A-ATT	30 dB, 5 W RF attenuator up to 6 GHz	$292
Option VM00	Basic vector modulation package with internal 6 MHz modulation bandwidth	$3,850
Option EIQ	External 200 MHz modulation bandwidth (requires Option VM00)	$1,660

SHIPS WITH PRODUCT

- RF Cable
- Documentation CD
- Installation and Safety Instructions
- Calibration Certificate
- Power Cord

EDUCATION SOLUTION – TEKSMARTLAB™

TekSmartLab is the industry's first network-based instrument management solution for teaching labs that brings a more efficient lab experience.

The following shows a sample setup of a TekSmartLab system with 20 benches and 80 instruments connected through Wi-Fi.

PRODUCT HIGHLIGHTS

TekSmartLab network diagram

Centralize configuration

Centralize monitoring and remote assistance

Test Results online retrieving and saving

Automatic Instrument Asset Information Recording

SAMPLE TEKSMARTLAB CONFIGURATION

ITEM	QTY	SUPPLIER	COMMENTS
TSL3000B	1	Tektronix	One per lab
TBX3000A	20	Tektronix	One per bench
Instruments	80	Tektronix	Supported instruments. 1 one oscilloscope, one arbitrary function generator, one digital multimeter, and one power supply per bench. Option 2231A-001 required for the power supply 2231A-30-3.
USB WIFI dongle	20	Provided by customer	Compatible USB-WIFI dongle
Router	1	Provided by customer	WIFI Router that can meet WI-FI networking requirements.
Lab server	1	Provided by customer	

INSTRUMENTS SUPPORTED

- Oscilloscope
  Tektronix TDS1000B, TDS1000C-SC, TDS1000C-EDU, TBS1000, TBS1000B(-EDU), TDS2000C, DPO/MSO2000 (B), MDO3000

- Arbitrary Function Generators
  Tektronix AFG1000, AFG2021, AFG3000(C)

- Digital Multimeters
  Keithley DMM2110, DMM2100

- Power Supplies
  Keithley 2230G(J)-30-1, 2220G(J)-30-1, 2220(J)-30-1, 2230(J)-30-1, 2231A-30-3 (requires Option 2231A-001)

SPECTRUM ANALYZERS

Choosing your Wireless/RF Test Solution

See an RF world others can't with affordable real-time performance. This guide gives an overview of the signal analysis capabilities required to overcome the most challenging wireless and RF design challenges with confidence. Spend your time fixing the problem, not looking for it.

If you need a refresher on Real-Time Spectrum Analysis, download the Fundamentals of Real-Time Spectrum Analysis Primer.

	RS306B USB SPECTRUM ANALYZER	RSA600A USB SPECTRUM ANALYZER	RSA500A USB SPECTRUM ANALYZER	MDO3000 MIXED DOMAIN OSCILLOSCOPE	MDO4000C MIXED DOMAIN OSCILLOSCOPE
Frequency Range	9 kHz to 6.2 GHz	9 kHz to 3.0/7.5 GHz	9 kHz to 3.0/7.5 GHz	9 kHz to 3 GHz	9 kHz to 6 GHz
Demod/Capture BW	40 MHz	40 MHz	40 MHz	Up to 3 GHz	Up to 3.75 GHz
Integrated Instruments	Real Time Spectrum Analyzer	Real Time Spectrum Analyzer	Real Time Spectrum Analyzer	Spectrum Analyzer, Oscilloscope, Logic Analyzer, Protocol Analyzer, Digital Voltmeter/ Counter	Spectrum Analyzer, Oscilloscope, Logic Analyzer, Protocol Analyzer
Correlation of RF with other analog/ digital signals	NA	NA	NA	NA	Yes
Real-Time Spectrum Analysis	Yes	Yes	Yes	NA	NA
Vector Signal Analysis Software	SignalVu-PC (Standard)	SignalVu-PC (Standard)	SignalVu-PC (Standard)	NA	SignalVu-PC (Optional)
Commonly used for	General Purpose RF Design, Education, Interference Hunting/ Spectrum Management, Field Installation and Maintenance	Wireless Internet of Things R&D and automated testing, EMI troubleshooting, EMI Pre Compliance, General Purpose RF design	Interference Hunting, Spectrum Management, Field Installation and Maintenance	Basic Embedded Design and Debug, General Purpose RF Design, Education	Advanced Embedded Design and Debug, General Purpose RF Design, EMI Troubleshooting
Starting Price	$3,890	$6,900	$5,900	$3,450	$6,900

CHOOSING YOUR REAL–TIME SPECTRUM ANALYZER
Key items for consideration in selecting your spectrum analyzer.

❶ Frequency Range

Of course, the analyzer chosen must cover all of the frequencies you need to measure. Consider harmonics and spurious signals when making your selection. For example, your fundamental signal may be at 2.4 GHz, but perhaps you will want to see up to 10 harmonics of the signal to meet all the needs of your design.

❷ Acquisition/Real–Time Bandwidth

In a real-time spectrum analyzer, this sets the maximum bandwidth for guaranteed capture and triggering on brief signals, and is also the limiting factor in modulation measurements. For example, 802.11n signals require a minimum acquisition bandwidth of 40 MHz so that all signal elements can be acquired and demodulated. However, the entire operating frequency of your signal of interest may need to be considered. For example, a Bluetooth signal is relatively narrow band, and may be demodulated with the standard acquisition bandwidth of an RTSA, but you may want to observe the full hopping pattern of the Bluetooth transmitter as it operates, requiring at least 85 MHz bandwidth for your application.

❸ Dynamic Range

This can be a complex subject. Your definition of dynamic range may be highly specific. Consideration of Adjacent Channel Power Ratio dynamic range, spurious-free dynamic range in a particular frequency range, or harmonic distortion specifications may or may not be important to your application. For example, the RSA6100B Series real-time analyzer has our best ACLR specifications, but the low-frequency (1 Hz – 32 MHz) spurious-free dynamic range of the RSA5100B is the best available.

❹ Features and Capabilities

Tektronix RTSAs offer a range of features and capabilities, with a wealth of performance and analysis options. Optional features include preamplifiers, acquisition bandwidth options, and analysis options that include WLAN, Bluetooth, P25 and general purpose modulation analysis, pulse measurements and mapping. Consulting with a Tektronix applications engineer can be the best way to learn which optional feature may be useful in your RTSA.

USB SPECTRUM ANALYZERS

Big Performance Has Never Been So Small.

The RSA Series **offers full-featured spectrum analysis** and deep signal analysis at a price unmatched by any previous offering.

Using the **latest in commercial interfaces** and available computing power, the RSA Series separates signal acquisition from measurement, dramatically lowering the cost of instrument hardware. Data analysis, storage and replay is performed on your **personal computer, tablet or laptop**.

Managing the PC separately from the acquisition hardware makes processing upgrades easy, and helps to make the RSA Series an **extremely portable** spectrum analyzer family **for many different applications**.

RSA306B

Full-featured RF analysis in your hands at a breakthrough price

- 9 kHz to 6.2 GHz
- Design, spectrum management/interference hunting, EMC troubleshooting, education

RSA503A and RSA507A

Fast, light, and all-in-one field tool for spectrum analysis

- 9 kHz to 3 GHz or 7.5 GHz
- Rugged chassis and battery operated
- Spectrum management/interference hunting, network installation and maintenance, field service
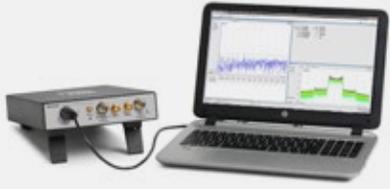
RSA603A and RSA607A

The essential tool for wireless analysis and testing

- 9 kHz to 3 GHz or 7.5 GHz
- Design, EMC Pre-compliance

KEY FEATURES

❶ 40 MHz Capture Bandwidth

Make complex modulation measurements on wideband standards – 802.11 a/b/d/g/n, Bluetooth, and more.

❷ Built-in Tracking Generator

Measure VSWR/Return Loss and distance to fault for component and antenna characterization. (RSA500 and RSA600 Series only)

❸ Real-time Analysis

Included DPX Spectrum/Spectrogram measurements minimize time spent on transient discovery and interference hunting. Get immediate insight into your toughest problems.

❹ SignalVu–PC Software

Full-featured spectrum analysis software is included free with 17 built-in measurements including spectrum, spur search, spectral emissions, and DPX.

❺ Optional Advanced Analysis

Software modules that support modulation analysis, popular wireless standards, pulse, playback of recorded files, mapping, signal classification and more are available for SignalVu-PC software.

❻ Portable and Lightweight

With units ranging from 1.7 to 6.6 lbs., the RSA Series is easy to move, when and where you need to go.

PRODUCT HIGHLIGHTS

- Frequency Range: 9 kHz to 6.2 GHz
- Acquisition Bandwidth: 40 MHz
- Full featured spectrum analysis capability with Tektronix SignalVu PC (TM) software
- 17 spectrum and signal analysis measurements standard
- Over 15 options for mapping, modulation analysis, standards support, pulse, playback of recorded files, and more
- Very small form factor, power consumption less than 4.5 Watts
- Weight: 1.7 pounds (0.75 kg)

APPLICATIONS

R&D

Interference Hunting

Field installation and maintenance

Education

RSA306B USB Spectrum Analyzer

RF signal analysis in your hands!

From basic RF measurements to advanced analysis, the RSA306B offers the full features of a benchtop spectrum analyzer at a fraction of the price. With 17 automated measurements included for free, you can make common measurements - fast and easy. Additional software options enable you to tackle advanced analysis tasks, including modulation analysis, pulse measurements, mapping and more. At just 1.7 pounds, the RSA306B takes little space on your bench, and fits easily in your hand, bag, pocket or tool belt.

MODEL	DESCRIPTION	FREQUENCY RANGE	CAPTURE BANDWIDTH	SPURIOUS FREE DYNAMIC RANGE	MINIMUM SIGNAL DURATION FOR 100% PROBABILITY OF INTERCEPT	PRICING (USD)
RSA306B	Portable real time USB spectrum analyzer	9 kHz - 6.2 GHz	40 MHz	-60 dBc to 3 GHz	100 µs	$3,890

RECOMMENDED ACCESSORIES

OPT CTRL-G1-x	Portable controller, availability varies by region	$7,200
DFA0047	Smart Directional Antenna, 20-8500 MHz, with electronic compass and preamp	$2,200
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz, requires DF-A0047	$2,300

RECOMMENDED SERVICE

R5	5-year Extended Warranty	$608

APPLICATION MODULES

SVMxx-SVPC	General Purpose Modulation Analysis, including demodulation for Zigbee and Bluetooth Enhanced Data Rate	Varies
SV2Cxx-SVPC	WLAN 802.11a/b/g/j/p/n/ac measurement applications	Varies
SV27xx-SVPC	Bluetooth Basic LE TX SIG measurements	Varies
SV28xx-SVPC	LTE FDD and TDD BTS power and BTS ID	Varies
SV54xx-SVPC	Signal Classification/Survey	Varies
SV56xx-SVPC	Playback of recorded signal files	Varies
SV54xx-SVPC	Signal Classification/Survey	Varies

Recommended SignalVu-PC application licenses (Floating and node-locked licenses available). Other applications available, see SignalVu-PC data sheet for details.

SHIPS WITH PRODUCT

- USB 3.0 cable (1 M)
- USB stick with SignalVu-PC and all documentation
- Three-year Warranty

RSA500A Series

The RSA500A series offers rugged, portable real time spectrum analysis for interference hunting, spectrum management and network maintenance tasks. Combined with an available tablet and SignalVu-PC software, the RSA500A series solves your toughest interference challenges, and the available tracking generator can be used for network maintenance tasks. Mapping, signal strength, signal recording and playback and many other options are available to tailor the RSA500A to your requirements.

PRODUCT HIGHLIGHTS

- Frequency range: 9 kHz-3.0/7.5 GHz
- Acquisition bandwidth: 40 MHz
- Spurious-free dynamic range: 70 dB
- Full featured spectrum analysis capability with Tektronix SignalVu-PC software
- 17 spectrum and signal analysis measurements standard
- Over 15 options for modulation analysis, standards support, pulse, playback of recorded files, mapping, signal classification and more
- Tracking generator with gain/loss, cable loss, distance to fault, VSWR options available
- Ruggedized Mil-Std PRF-28800F Class 2
- Weight: ~6.6 pounds (3 kg)

Find weak and transient interferers, even co-channel interference using the RSA500A with standard real time spectrum analysis.

Mapping with SignalVu-PC.

MODEL	DESCRIPTION	FREQUENCY RANGE	CAPTURE BANDWIDTH	SPURIOUS FREE DYNAMIC RANGE	MINIMUM SIGNAL DURATION FOR 100% PROBABILITY OF INTERCEPT	PRICING (USD)
RSA503A	Portable real time USB spectrum analyzer	9 kHz - 3.0 GHz	40 MHz	-70 dBc	100 µs	$5,900
RSA507A	Portable real time USB spectrum analyzer	9 kHz - 7.5 GHz	40 MHz	-70 dBc	100 µs	$9,900

SIGNALVU–PC LICENSES*

SVMxx-SVPC	General purpose modulation analysis, 27 modulation types including Zigbee	Varies
SV26xx-SVPC	APCO P25 phase 1 and 2 measurements	Varies
SV28xx-SVPC	LTE FDD and TDD BTS power and BTS ID	Varies
SV54xx-SVPC	Signal Classification/Survey	Varies
SV56xx-SVPC	Signal Playback: Enables playback and re-analysis of recorded R3F files	Varies
SV60xx-SVPC	VSWR, Return Loss, Distance To Fault, Cable Attenuation Measurements. Requires tracking generator on your spectrum analyzer	Varies

Recommended SignalVu-PC application licenses (Floating and node-locked licenses available). Other applications available, see SignalVu-PC data sheet for details.

RECOMMENDED ACCESSORIES

DF-A0047	Smart Directional Antenna, 20-8500 MHz, with electronic compass and preamp	$2,200
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz, requires DF-A0047	$2,300

INSTRUMENT OPTIONS

OPT 04	Tracking Generator: 10 MHz – to maximum range of instrument	$1,490
OPT CTRL-G1-x	Portable controller, availability varies by region. Also available as separate item.	$7,200

SHIPS WITH PRODUCT

- Battery pack and charger
- Carrying case
- Ruggedized USB 3.0 cable
- USB stick with SignalVu-PC software and all documentation

RECOMMENDED SERVICE

C3	Calibration service 3 years	$1,370
C5	Calibration service 5 years	$2,530
R5	Standard warranty extended to 5 years	$1,190
D1	Calibration data report	$125
D3	Calibration data report, 3 years (with option C3)	$235
D5	Calibration data report, 5 years (with option C5)	$445
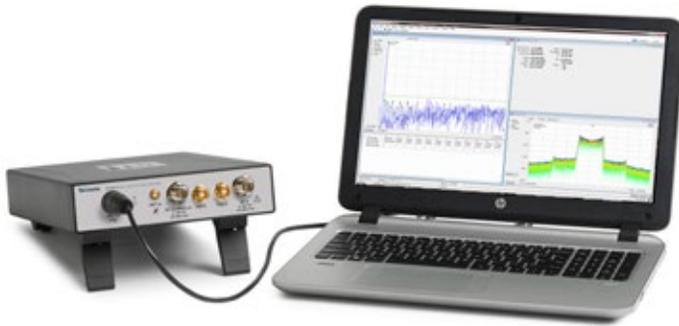
RSA600A Series

The RSA600A series offers mid-range laboratory spectrum analysis at a remarkable price. Forty megahertz of standard analysis bandwidth enables analysis of the latest communications standards up to 802.11n, and real-time spectrum analysis reduces troubleshooting time by finding transient problems that other spectrum analyzers may miss. An available tracking generator with options for VSWR/Return loss and distance to fault enables component and antenna characterization. The RSA600A runs with SignalVu-PC or an application programming interface for automated measurements.

PRODUCT HIGHLIGHTS

- Frequency range: 9 kHz-3.0/7.5 GHz
- Acquisition bandwidth: 40 MHz
- Spurious-free dynamic range: 70 dB
- Full featured spectrum analysis capability with Tektronix SignalVu PC (TM) software
- 17 spectrum and signal analysis measurements standard
- Over 15 options for mapping, modulation analysis, standards support, pulse, playback of recorded files, and more
- Tracking generator with gain/loss, cable loss, distance to fault, VSWR options available
- Small Laboratory form factor, power consumption less than 45 W
- Weight: ~6.6 pounds (3 kg)

Wideband modulation analysis.

Smaller than conventional spectrum analyzers.

MODEL	DESCRIPTION	FREQUENCY RANGE	CAPTURE BANDWIDTH	SPURIOUS FREE DYNAMIC RANGE	MINIMUM SIGNAL DURATION FOR 100% PROBABILITY OF INTERCEPT	PRICING (USD)
RSA603A	Laboratory real time USB spectrum analyzer	9 kHz - 3.0 GHz	40 MHz	-70 dBc	100 µs	$6,900
RSA607A	Laboratory real time USB spectrum analyzer	9 kHz - 7.5 GHz	40 MHz	-70 dBc	100 µs	$9,900

INSTRUMENT OPTIONS

OPT 04	Tracking Generator: 10 MHz – to maximum range of instrument	$1,490

SIGNALVU–PC LICENSES*

SVMxx-SVPC	General purpose modulation analysis, 27 modulation types including Zigbee	$1,390
SV26xx-SVPC	APCO P25 phase 1 and 2 measurements	Varies
SV28xx-SVPC	LTE FDD and TDD BTS power and BTS ID	Varies
SV54xx-SVPC	Signal Classification/ Survey	Varies
SV56xx-SVPC	Signal Playback: Enables playback and re-analysis of recorded R3F files	Varies
SV60xx-SVPC	VSWR, Return Loss, Distance To Fault, Cable Attenuation Measurements. Requires tracking generator on your spectrum analyzer	Varies

Recommended SignalVu-PC application licenses (Floating and node-locked licenses available). Other applications available, see SignalVu-PC data sheet for details.

RECOMMENDED SERVICE

C3	Calibration service 3 years	$1,370
C5	Calibration service 5 years	$2,530
R5	Standard warranty extended to 5 years	$1,190
D1	Calibration data report	$125
D3	Calibration data report, 3 years (with option C3)	$235
D5	Calibration data report, 5 years (with option C5)	$445

SHIPS WITH PRODUCT

- AC power cord
- USB 3.0 cable
- SignalVu-PC software and all documentation on USB stick
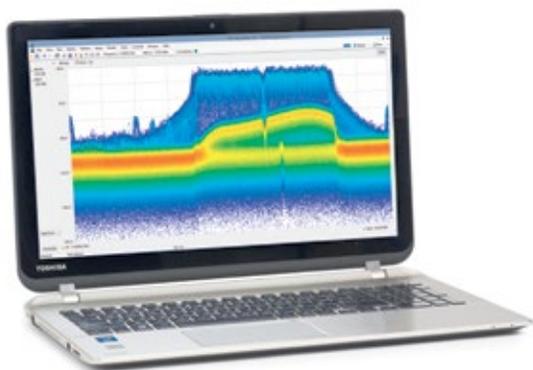
SignalVu–PC

SignalVu-PC vector signal analysis software helps you easily validate wideband designs. Using the signal analysis engine of the RSA5000 Series on your computer or Windows tablet, you can now move your analysis of acquisitions off the instrument, and anywhere. SignalVu-PC directly controls the RSA306B and RSA500A/600A USB Spectrum Analyzers or the MDO4000C Mixed Domain Oscilloscope RF acquisition, enabling powerful measurements for spectrum analysis, vector signal analysis, pulse measurements, commercial wireless standards, and more. Whether your design validation needs include wideband radar, high data rate satellite links, wireless LAN or frequency-hopping communications, SignalVu-PC vector signal analysis software can speed your time-to-insight by showing you the time-variant behavior of these wideband signals.

APPLICATION MODULES

SVAxx-SVPC	AM/FM/PM/Direct Audio Analysis
SVTxx-SVPC	Settling Time (frequency and phase) measurements
SVMxx-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SVPxx-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SVOxx-SVPC	Flexible OFDM Analysis
SV23xx-SVPC	WLAN 802.11a/b/g/j/p measurement
SV24xx-SVPC	WLAN 802.11n measurement (requires SV23)
SV25xx-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40MHz (requires SV23 and SV24) or MDO
SV26xx-SVPC	APCO P25 measurement

APPLICATION MODULES

SV27xx-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40MHz or MDO
MAPxx-SVPC	Mapping
SV56xx-SVPC	Playback of recorded files
CONxx-SVPC	SignalVu-PC live link to the MDO4000C series mixed-domain oscilloscopes
SV2Cxx-SVPC	WLAN 802.11a/b/g/j/p/n/ac and live link to MDO4000C to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SV28xx-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SV54xx-SVPC	Signal survey and classification
EDUxx-SVPC	Education-only version of all modules for SignalVu-PC

PRODUCT HIGHLIGHTS

- Record/Playback of signals is available for the USB Spectrum Analyzers.
- Power measurements and signal statistics help you characterize components and systems: ACLR, Multicarrier ACLR, Power vs. Time, CCDF, and OBW/EBW.
- PC-based multi-domain vector signal analysis for waveforms acquired by Tektronix real-time signal analyzers and oscilloscopes.
- The basic features for SignalVu-Pc are free of charge and available for download from Tek.com.
- Each option for SignalVu-PC is available as a Node Locked license or a Floating license. You can also try them for free with a trial license.
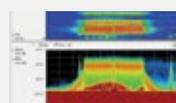
DPX Spectrum

Mapping and Signal Geolocation

Bluetooth Signal Analysis

FREE DOWNLOAD

Free download available on Tek.com:
tek.com/model/rsa306-software

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 Average Power	Power Meter Average / Peak / Pulse	Power Meter Average / Peak / Pulse + Profiling
Frequency Range	10 MHz - 8 / 18 / 26.5 GHz	10 MHz - 8 / 18.6 / 20 GHz	50 MHz - 8 / 18.6 / 20 GHz
Dynamic Range	-55 to +20 dBm	-60 to +20 dBm	-60 to +20 dBm
Data Transfer Rate	2000 Reads/sec	2000 Reads/sec	2000 Reads/sec
Measurements	True Average Power; Duty Cycle Corrected Pulse Power; Measurement Logging	Average Power (CW); Duty Cycle Corrected Pulse Power; Peak Power, Duty Cycle; Peak and Average Burst Power; Measurement Logging	Average Power (CW); Duty Cycle Corrected Pulse Power; Peak Power, Pulse Power, Duty Cycle; Peak and Average Burst Power; Measurement Logging; Pulse Width, Rise/Fall, Overshoot, Droop, Time Gated Measurements, Pulse Waveform Display with Markers
Starting Price	$2,680	$2,890	$3,830

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.

❶ 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.

❷ 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 trigger inputs and outputs increases the utility of the power sensor/meter combination.

❸ 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.

❹ 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/sec

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.

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	$2,680
PSM3120	True RMS Average	10 MHz - 8 GHz	-55 to +20 dBm	N-Male	$2,680
PSM3310	True RMS Average	10 MHz - 18 GHz	-55 to +20 dBm	3.5mm male	$3,570
PSM3320	True RMS Average	10 MHz - 18 GHz	-55 to +20 dBm	N-Male	$3,570
PSM3510	True RMS Average	10 MHz - 26.5 GHz	-55 to +20 dBm	3.5mm male	$4,550
PSM4110	Power Meter (Avg / Peak / Pulse)	10 MHz - 8 GHz	-60 to +20 dBm	3.5mm male	$2,890
PSM4120	Power Meter (Avg / Peak / Pulse)	10 MHz - 8 GHz	-60 to +20 dBm	N-Male	$2,890
PSM4320	Power Meter (Avg / Peak / Pulse)	50 MHz - 18.6 GHz	-40 to +20 dBm	N-Male	$5,480
PSM4410	Power Meter (Avg / Peak / Pulse)	50 MHz - 20 GHz	-40 to +20 dBm	3.5mm male	$5,480
PSM5110	Power Meter (Avg / Peak / Pulse + Profiling)	100 MHz - 8 GHz	-60 to +20 dBm	3.5mm male	$3,830
PSM5120	Power Meter (Avg / Peak / Pulse + Profiling)	100 MHz - 8 GHz	-60 to +20 dBm	N-Male	$3,830
PSM5320	Power Meter (Avg / Peak / Pulse + Profiling)	50 MHz - 18.6 GHz	-40 to +20 dBm	N-Male	$6,510
PSM5410	Power Meter (Avg / Peak / Pulse + Profiling)	50 MHz - 20 GHz	-40 to +20 dBm	3.5mm male	$6,510

RECOMMENDED ACCESSORIES

174-6150-xx	USB Cable, 2 m, 20 AWG	$52
174-6164-xx	SMB Female to BNC Male, 1 m Trigger Cable	$80
348-2013-xx	Replacement Rubber Boot	$27

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty (PSM3110, PSM3120)	$311
SILV400	5-year Extended Warranty (PSM3310, PSM3320)	$450
SILV600	5-year Extended Warranty (PSM3510)	$608

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

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 GRAPHICAL BENCH SOURCEMETER SMU INSTRUMENTS	SERIES 2400 BENCH SOURCEMETER® SMU INSTRUMENTS	SERIES 2600B SYSTEM SOURCEMETER® SMU INSTRUMENTS	2650A HIGH POWER SYSTEM SOURCEMETER® SMU INSTRUMENTS	2450/2460–EC GRAPHICAL POTENTIONSTATS
Channels	1 (optional expansion to 32 via TSP-Link®)	1	1-2 (optional expansion to 64 via TSP-Link®)	1 (optional expansion to 32 via TSP-Link®)	1
Accuracy	6½-digit measurements	6½-digit measurements	6½-digit measurements	6½-digit measurements	6 ½-digit measurements
Max. Readings / Second	Up to 1,000,000	2,000	20,000	38,500 1µSec/pt., 18-bit digitizer	3000
Interface	GPIB, USB 2.0, LXI/Ethernet, Digital I/O	GPIB, RS-232, Digital I/O	GPIB, LAN (LXI), USB, RS-232, Digital I/O	GPIB, LAN (LXI), RS-232, Digital I/O	GPIB, USB 2.0, LXI/Ethernet. Digital I/O
Application Features	Capabilities of analyzers, curve tracers, and I-V systems at a fraction of their cost; touchscreen and icon menu system; built-in graphing	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.	2 pairs of A/D converters for simultaneous V and I measurement; up to 2000W pulsed power	Perform Cyclic, Squarewave, or Galvanic Voltammetry, Chronoamperometry, and Chronopotentiometry
Test Sequencing / Scripting	TSP® (Test Script Processing) technology embeds complete test programs inside the instrument for unmatched system-level speed	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	TSP® (Test Script Processing) technology embeds complete test programs inside the instrument for unmatched system-level speed	TSP® (Test Script Processing) technology embeds complete test programs inside the instrument for unmatched system-level speed
Software	Test Script Builder and KickStart Startup Software, LabVIEW and IVI drivers	LabVIEW and IVI drivers	Built-in, web browser-based characterization software, LabVIEW and IVI drivers	Built-in, web browser-based characterization software, LabVIEW and IVI drivers	Test Script Builder, Pre-loaded application scripts, LabVIEW and IVI drivers
Starting Price	$5,400	$3,590	$6,970	$17,500	$5,400

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.

❶ 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.

❷ 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.

❸ 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.

❹ 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.

Model 2450/2460/2461 Graphical Touchscreen SourceMeter® SMU Instruments

Touch, Test, Invent® with the intuitively smart, interactive SMU Instruments. Model 2450, 2460, and 2461 SMU Instruments are innovative, compact I-V solutions that offer the capabilities of I-V systems, curve tracers, and semiconductor analyzers at a fraction of their cost. With the intuitive touchscreen and icon-based control that novice SMU users can appreciate and the exceptional versatility that experienced users need, these graphical user interface instruments enable users to learn faster, work smarter, and invent easier. Their user experience, performance, and application versatility, combined with proven Keithley precision and accuracy, will make the 2450, 2460, and 2461 the favorite go-to instruments in the lab for years to come.

A Smart Toolkit Beyond the Touchscreen

Speed, ease of use, and learnability don't stop with the advanced touchscreen. Each instrument's front panel features a context-sensitive HELP system, rotary navigation/control knob, front/rear input selector button, and banana jacks for basic bench applications. A USB 2.0 memory I/O port makes it easy to store data, save instrumentation configurations, load test scripts, and upgrade the system.
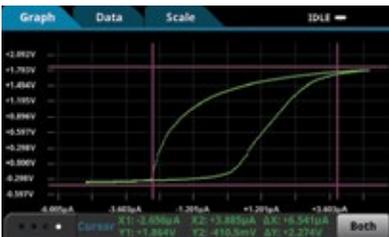
Built-in functions like real-time graphing, histogram charting, and scope-like cursors simplify converting test results into useful information.

PRODUCT HIGHLIGHTS

- Highly flexible, source and sink (four-quadrant) operation simultaneously measures voltage, current, and resistance in a single, integrated I-V instrument

- Advanced, five-inch touchscreen user interface with multi-point, pan-pinch-zoom-swipe operation minimizes the learning curve and improves productivity

- Graphical interface provides I-V curve tracing functionality for much less than the cost of traditional curve tracers

- Lower current and voltage measurements ranges (100nA, 10nA, 20mV) reduce need for additional expensive low level instruments (Model 2450)

- High current and high power ranges (7A, 100W DC, Model 2460; 10A, 1000W Pulse, Model 2461) for characterizing and testing high power materials and devices

- Front panel banana jack inputs and rear panel connections (triaxial connectors on 2450, mass terminated screw terminal on 2460/2461) optimize signal integrity and convenience and save money on adapter accessories

- PC-based instrument and control software enable instrument control without programming hassles

- Four programming modes provide unmatched programming flexibility and system integration

Home page advanced source and measure display enables faster speed to answer.

Icon-based, flat menu system can reduce configuration steps by 50% and eliminates cumbersome, multi-layer menu structures.

TYPICAL APPLICATIONS

The Series 2400 Graphical SMU instruments are ideal for I-V functional test and characterization of a wide range of today's modern devices, including:

- Low and High Power Semiconductors
- LEDs, High Brightness LEDs
- Solar Cells, Solar Panels
- Nanomaterials and Devices
- Graphene
- Printed/Flexible Electronics
- Batteries/Electrochemistry
- Sensors
- Biotechnology

Model 2450/2460/2461 Graphical SourceMeter® SMU Instruments

Trusted Precision, Accuracy, and Performance

The 2450, 2460 and 2461 are based on the trusted analog performance of Keithley's Series 2400 SourceMeter SMU Instruments and offer a highly flexible, four-quadrant voltage and current source/load coupled with precision voltage and current meters. These fourth-generation members of Keithley's award-winning SMU family provide the superior precision, resolution, accuracy, and dependability that users have come to expect from Keithley SMU instruments.

PRODUCT HIGHLIGHTS

- 4-quadrant design simultaneously sources and measures voltage, current, and resistance
- Advanced, five-inch touchscreen user interface with multi-point, pan-pinch-zoom-swipe operation
- Graphical interface provides I-V curve tracing functionality
- Lower current and voltage measurements ranges (100nA, 10nA, 20mV) on Model 2450
- High current and high power ranges (7A, 100W DC, Model 2460; 10A, 1000W Pulse, Model 2461)
- Front panel banana jack inputs and rear panel connections (triaxial connectors on 2450, mass terminated screw terminal on 2460/2416)
- GPIB, LAN (LXI), USB interfaces
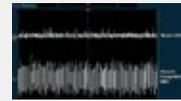
With significantly lower wideband noise than its closest competitor, the 2450 is the perfect solution for I-V testing of next-generation devices.

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	POWER	PRICING (USD)
2450	1.000000A / 10.00000nA	200.0000V / 20.00000mV	20W	$5,400
2450-NFP (with No Front Panel)				$5,100
2450-RACK (without Handle)				$5,400
2450-NFP-RACK (with No Front Panel or Handle)				$5,100
2460	7.000000A / 1.000000µA	100.0000V / 200.0000mV	100W	$7,500
2460-NFP (with No Front Panel)				$7,200
2460-RACK (without Handle)				$7,500
2460-NFP-RACK (with No Front Panel or Handle)				$7,200
2461	10.00000A / 1.000000µA	100.0000V / 200.0000mV	1000W	$8,500
2461-NFP (with No Front Panel)				$8,500
2461-RACK (without Handle)				$8,500
2461-NFP-RACK (with No Front Panel or Handle)				$8,200

RECOMMENDED ACCESSORIES

5805	Kelvin (4-Wire) Spring-Loaded Probes	$253
5808	Low Cost Single-pin Kelvin Probe Set	$123
8607	2-Wire, 1000V Banana Cables, 1m (3.3 ft.)	$66
CS-1616-3	Safety Interlock Mating Connector	$11

RECOMMENDED SERVICE

24XX-3Y-EW	1-year factory warranty extended to 3 years from date of shipment	Varies
24XX-5Y-EW	1-year factory warranty extended to 5 years from date of shipment	Varies
C/24XX-3Y-17025	KeithleyCare® 3-year ISO 17025 Calibration Plan	Varies
C/24XX-3Y-DATA	KeithleyCare® 3-year Calibration w/Data Plan	Varies
C/24XX-3Y-STD	KeithleyCare® 3-year Std. Calibration Plan	Varies
C/24XX-5Y-17025	KeithleyCare® 5-year ISO 17025 Calibration Plan	Varies
C/24XX-5Y-DATA	KeithleyCare® 5-year Calibration w/Data Plan	Varies
C/24XX-5Y-STD	KeithleyCare® 5-year Std. Calibration Plan	Varies

SHIPS WITH PRODUCT

- 8608 High Performance Test Leads
- 2460-KIT Rear Panel Mating Mass Terminated Screw Connector (Model 2460/2461 ONLY)
- USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)
- CS-1616-3 Safety Interlock Mating Connector
- CA-180-3A TSP-Link®/Ethernet Cable
- Documentation CD
- QuickStart Guide
- Test Script Builder Software (available at www.tek.com)
- KickStart Startup Software (available at www.tek.com)
- LabVIEW® and IVI Drivers (available at www.tek.com)

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
- IVI and LabVIEW drivers available (tek.com)
- Standard GPIB and RS-232 interfaces; Banana (front /rear) Connectors

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.

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

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	POWER	PRICING (USD)
2400 / 2401	1.05A /10pA	200V/1µV (20V 2401)	20W	$4,900 / $3,590
2410	1.05A /10pA	1100V/1µV	20W	$7,010
2440	5.25A /100pA	40V/1µV	50W	$8,110
2420 / 2425	3.15A /100pA	Up to 100V/1µV	60W/100W	$7,190 / $8,450

RECOMMENDED ACCESSORIES

5804	Kelvin (4-Wire) Universal 10-Piece Test Lead Kit	$227
5805	Kelvin (4-Wire) Spring-Loaded Probes	$253
5809	Low Cost Kelvin Clip Lead Set	$184
8607	2-Wire, 1000V Banana Cables, 1m (3.3 ft)	$66
CA-18-1	Shielded Dual Banana Cable, 1.2m (4 ft)	$36
7007-1	Shielded GPIB Cable, 1m (3.3 ft)	$126
7007-2	Shielded GPIB Cable, 2m (6.6 ft)	$139
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568
8501-1	Trigger Link Cable, DIN-to-DIN, 1m (3.3 ft)	$73
8501-2	Trigger Link Cable, DIN-to-DIN, 2m (6.6 ft)	$79

RECOMMENDED SERVICE

C/2400-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2400*	$321
C/2401-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Model 2401*	$318
C/2410-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2410*	$417
C/2420-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2420*	$419
C/2425-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2425*	$496
C/2430-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2430*	$584
C/2440-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2440*	$491

*Not available in all countries.

SHIPS WITH PRODUCT

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

The 2450-EC can be easily connected to a 3-electrode cell.

Built-in real-time graphing, charting, and scope-like cursors simplifies converting test results into useful information.

2450–EC and 2460–EC Graphical Potentionstats

The 2450-EC and 2460-EC Potentiostats are versatile instruments, particularly well-suited for research and development in fundamental electrochemical lab research, characterizing the next generation of materials and electrolytes, new energy storage devices, and faster, smaller sensors. The 2450-EC/2460-EC comes preloaded with application tests to perform Cyclic Voltammetry, Chronoamperometry, and Chronopotentiometry right out of the box.

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	CV SCAN RATE	APPLICATIONS	PRICING (USD)
2450-EC	1.000000A / 10.00000nA	200.0000V / 20.00000mV	0.1mV/s to 3500mV/s	Cyclic Voltammetry, Open Circuit Potential, Potential Pulse and Square Wave, Current Pulse and Square Wave, Chronoamperometry, Chronopotentiometry	$7,900
2460-EC	7.000000A / 1.000000µA	100.0000V / 200.0000mV	0.1mV/s to 3500mV/s		$10,000

RECOMMENDED ACCESSORIES

5805	Kelvin (4-Wire) Spring-Loaded Probes	$227
5808	Low Cost Single-pin Kelvin Probe Set	$123
8607	2-Wire, 1000V Banana Cables, 1m (3.3 ft.)	$66

RECOMMENDED SERVICE

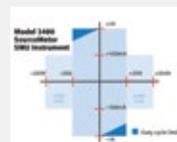|		
24XX-EC-3Y-EW	1 Year Factory Warranty extended to 3 years from date of shipment	Varies
24XX-EC-5Y-EW	1 Year Factory Warranty extended to 5 years from date of shipment	Varies
C/24XX-3Y-17025	KeithleyCare® 3 Year ISO 17025 Calibration Plan	Varies
C/24XX-3Y-DATA	KeithleyCare 3 Year Calibration w/Data Plan	Varies
C/24XX-3Y-STD	KeithleyCare 3 Year Std. Calibration Plan	Varies
C/24XX-5Y-17025	KeithleyCare 5 Year ISO 17025 Calibration Plan	Varies
C/24XX-5Y-DATA	KeithleyCare 5 Year Calibration w/Data Plan	Varies
C/24XX-5Y-STD	KeithleyCare 5 Year Std. Calibration Plan	Varies
C/New Data	Calibration Data for New Units	$86
C/New Data ISO	ISO-17025 Calibration Data for New Units	$171

SHIPS WITH PRODUCT

- Electrochemistry Translation Cable Accessory Kit
- 8608 High Performance Test Leads
- USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)
- CS-1616-3 Safety Interlock Mating Connector
- CA-180-3A TSP-Link/Ethernet Cable
- Documentation CD
- Application Test Scripts and Documentation
- Test Script Builder Software (available at www.tek.com)
- LabVIEW and IVI Drivers (available at www.tek.com)

PRODUCT HIGHLIGHTS

- 4-quadrant design simultaneously sources and measures voltage, current, and resistance
- TSP® (embedded Test Script Processor) architecture enables industry-best system-level speed
- TSP-Link® for true SMU-per-pin and parallel test
- 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.

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.

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	$6,970
2602B	3A DC, 10A pulse/100 fA		20,000	2	$10,100
2604B	3A DC, 10A pulse/100 fA		20,000	2	$8,550
2611B	1.5A DC, 10A pulse/100 fA	200V/100nV	20,000	1	$6,970
2612B	1.5A DC, 10A pulse/100 fA		20,000	2	$10,100
2614B	1.5A DC, 10A pulse/100 fA		20,000	2	$8,550
2634B	1.5A DC, 10A pulse/1fA		20,000	2	$13,400
2635B	1.5A DC, 10A pulse/0.1 fA		20,000	1	$10,500
2636B	1.5A DC, 10A pulse/0.1 fA		20,000	2	$16,100

RECOMMENDED ACCESSORIES

2600-BAN	Banana Test Leads Adapter	$179
8606	Probe Kit for 2600-BAN	$66

RECOMMENDED SERVICE

26XXB-3Y-EW_	3-Year KeithleyCare Gold Plan	Varies
26XXB-5Y-EW_	5-Year KeithleyCare Gold Plan	Varies
C/26xxB-3Y-XXXX	Calibration Service 3 Years (17025 or DATA or STD)	Varies
C/26xxB-5Y-XXXX	Calibration Service 5 Years (17025 or DATA or STD)	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 (downloadable at www.tek.com)
- LabVIEW Driver (downloadable at www.tek.com)
- ACS Basic Edition Software (optional)

PRODUCT HIGHLIGHTS

- Source and measure up to 3kV or 50A pulse, with best-in-class low current resolution
- Up to 2000W pulse or 200W DC power per instrument
- Optimized for characterizing and testing high power semiconductors, electronics, and materials

TSP and TSP-Link technology enables SMU-per-pin parallel testing without the channel limits of a mainframe-based system.
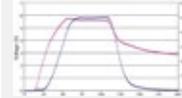
The dual digitizing A/D converters sample at up to 1µs/point, enabling full simultaneous characterization of both current and voltage waveforms.

2650A High Power System SourceMeter® SMU Instruments

The high current Model 2651A and high voltage Model 2657A High Power System SourceMeter SMU instruments address such applications as testing power semiconductor devices, including diodes, FETs, and IGBTs, as well as characterizing newer materials such as gallium nitride, silicon carbide, and other compound semiconductor materials or devices.

MODEL	POWER CHARACTERISTICS	4 QUADRANT SOURCE OR SINK CAPABILITIES	RESOLUTION	APPLICATIONS	PRICING (USD)
2651A	Up to 50A (or 100A with 2 units) and up to 2000W pulse / 200W DC power	Up to ±40V and ±50A	100fA/1µV resolution	High Current, High Power Device Testing	$17,300
2657A	Up to 3,000V and up to 180W of power	Up to 3000V @ 20mA or 1500V @ 120mA	1fA/100µV resolution	High Voltage, High Power, Low Current Device Testing	$21,500

RECOMMENDED ACCESSORIES

2600-KIT	Low Impedance Cable Assemble, 1m (3.3 ft)	$49
ACS-BASIC	Component Characterization Software	$5,780
4299-6	Rack Mount Kit	$156
8011	Test Socket Kit	$1,250
8010	High Power Device Test Fixture (Model 2657A)	$8,030
8020	High Power Interface Panel	$5,270
2657A-LIM-3	Low Interconnect Module (Model 2657A)	$1,790
2657A-PM-200	200V Protection Module (Model 2657A)	$1,260
SHV-CA-553-2	High Voltage Triax to SHV Cable (1, 2, 3m) (Model 2657A)	$707
HV-CA-554-2	High Voltage Triax to Triax Cable (0.5, 1, 2, 3m) (Model 2657A)	$827
HV-CA-571-3	High Voltage Triax to Unterminated Cable (Model 2657A)	$884
HV-CS-1613	High Voltage Triax Feedthrough Connector (Model 2657A)	$827

RECOMMENDED SERVICE

2651A-3Y-EW	3-Year KeithleyCare Gold Plan	$1,040
2657A-3Y-EW	3-Year KeithleyCare Gold Plan	$1,200
C/2651A-3Y-STD	KeithleyCare 3-Yr Std Cal Plan	$905
C/2657A-3Y-STD	KeithleyCare 3-Yr Std Cal Plan	$1,400
C/2651A-5Y-STD	KeithleyCare 5-Yr Std Cal Plan	$1,490
C/2657A-5Y-STD	KeithleyCare 5-Yr Std Cal Plan	$2,320

SHIPS WITH PRODUCT

- 7709-308A Digital I/O and Interlock Connector
- CA-180-3A TSP-Link/Ethernet Cable
- Documentation CD
- Software Tools and Drivers CD
- 2651A-KIT-1A: Low Impedance Cable Assembly (1m) (Model 2651)
- CS-1592-2: High Current Phoenix Connector (male) (Model 2651)
- CS-1626-2: High Current Phoenix Connector (female) (Model 2651)
- CA-557-1: Sense Line Cable Assembly (1m) (Model 2651)

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.
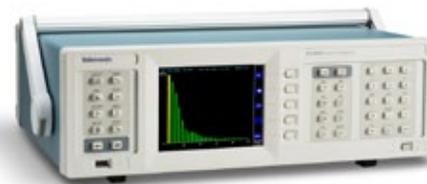
	PA1000 SINGLE—PHASE	PA3000
Channels	1	4
Basic Accuracy (V & I)	± 0.04%	± 0.04%
Measurement Bandwidth	DC, 0.1Hz - 1MHz	DC, 0.1Hz - 1MHz
Max Voltage and Current (internal shunt)	600Vrms / 20A RMS	600Vrms / 30A RMS
Starting Price	$2,920	$7,000

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 you are 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 ENERGY STAR™ 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 >30 Amps), 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.

PRODUCT HIGHLIGHTS

- Harmonic analysis to IEC/EN 61000-3-2 / 4-7 (pre-compliance testing to the 50th order)
- Standby power analysis to IEC 62301 / EN 50564 (full compliance testing as low as 5mW)
- 1 MHz bandwidth
- ± 0.04% basic accuracy
- USB, LAN, and GPIB interfaces (standard)

 Easily and accurately measure harmonic performance, standby power, and more with the PA1000, optional breakout box, and free PWRVIEW software.

PA1000 Power Analyzer

The Tektronix PA1000 is a single-phase, single-channel power analysis solution that is optimized for fast, efficient, and accurate power consumption testing to international standards. Its compact size, DMM-like user-interface, graphical display, and powerful software enable users to quickly visualize, analyze, and document the power consumption efficiency of next-generation devices, including standby power measurements and harmonic analysis.

MODEL	DESCRIPTION	BASIC ACCURACY (V & I)	VOLTAGE INPUT RANGE	CURRENT RANGE (INTERNAL SHUNTS)	PRICING (USD)
PA1000	PA1000 Single-Phase Power Analyzer	0.04% (45-850 Hz)	Up to 600 V$_{rms}$	0.0002 A to 20 A$_{RMS}$	$2,920

RECOMMENDED ACCESSORIES

CL200	Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers	$268
CL1200	Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers	$422
BALLAST-CT	Differential current transformer for lighting applications. 1A, 1MHz	$366
BB1000-XX	Breakout Box simplifies connections to AC power cords. NA, EU and UK versions.	$303
PA-LEADSET	Replacement Lead Set for Tektronix Power Analyzers (One Channel Lead Set)	$233

RECOMMENDED SERVICE

C3	Calibration Service 3 Years	$481
C5	Calibration Service 5 Years	$928
D1	Calibration Data Report	$46
D3	Calibration Data Report 3 Years (with Opt. C3)	$94
D5	Calibration Data Report 5 Years (with Opt. C5)	$188

AVAILABLE FOR FREE DOWNLOAD

- PWRVIEW PC Software for visualizing signals, analyzing data and documenting results
- Application notes, whitepapers and videos at: tek.com/application/power-measurement

SHIPS WITH PRODUCT

- Lead Set
- User Manual
- AC Power Cord
- Certificate of Traceable Calibration
- 3-year Product Warranty

BB1000-UN Universal Breakout Box

PA3000 Power Analyzers

The Tektronix PA3000 is a 1 to 4 channel power analyzer optimized for testing today's single and multi-phase, high efficiency power conversion products and designs. Use it to quickly visualize, analyze, and document power efficiency, energy consumption, and electrical performance to the latest regional and international standards including Level VI, EnergyStar, CEC, IEC 62301, and CQC-3146.

PRODUCT HIGHLIGHTS

- 1 to 4 channels supports single-and three phase applications; Up to 600 V_{RMS} (2000Vpk) and 30 A_{RMS} direct input
- 10 mW standby power measurement
- 1 MHz bandwidth and harmonic analysis to 100th order
- ±0.04% basic voltage and current accuracy
- USB and LAN interfaces standard (GPIB option)
- Free PWRVIEW software
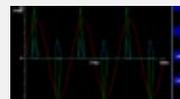
The PA3000's full color display provides intuitive readout of measured values. View measurements in full color graphical, tabular, or vector format.

Application specific test modes simplify test setup and analysis for Standby Power, Energy Integration, Ballasts, and Motor Drives.

MODEL	DESCRIPTION	BASIC ACCURACY (V & I)	VOLTAGE INPUT	CURRENT INPUT	PRICING (USD)
PA3000 1CH	PA3000 Power Analyzer with 1 input module	± 0.04%	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A	$7,000
PA3000 2CH	PA3000 Power Analyzer with 2 input modules	± 0.04%	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A	$9,000
PA3000 3CH	PA3000 Power Analyzer with 3 input modules	± 0.04%	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A	$11,000
PA3000 4CH	PA3000 Power Analyzer with 4 input modules	± 0.04%	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A	$13,000

RECOMMENDED ACCESSORIES

CT-60-S	Fixed-Core Current Transducer, High Accuracy, up to 60A	$914
CT-200-S	Fixed-Core Current Transducer, High Accuracy, up to 200A	$914
CT-400-S	Fixed-Core Current Transducer, High Accuracy, up to 400A	$1,070
CT-1000-S	Fixed-Core Current Transducer, High Accuracy, up to 1000A (requires external power supply)	$410
CT-100-M	Fixed-Core Current Transducer, Hall Effect, up to 100A	$231
CT-200-M	Fixed-Core Current Transducer, Hall Effect, up to 200A	$252
CT-500-M	Fixed-Core Current Transducer, Hall Effect, up to 500A	$336
CT-1000-M	Fixed-Core Current Transducer, Hall Effect, up to 1000A	$410

RECOMMENDED ACCESSORIES

CL200	Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers	$268
CL1200	Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers	$422
BALLAST-CT	Differential current transformer for lighting applications. 1A, 1MHz	$366
BB1000-XX	Breakout Box simplifies connections to AC power cords. NA, EU and UK versions.	$303
PA-LEADSET	Replacement Lead Set for Tektronix Power Analyzers (One Channel Lead Set)	$233

RECOMMENDED SERVICE

PA3000 C3	Calibration Service 3 Years	$800
PA3000 C5	Calibration Service 5 Years	$1,530
PA3000 D1	Calibration Data Report	$10
PA3000 D3	Calibration Data Report 3 Years (with Option C3)	$20
PA3000 D5	Calibration Data Report 5 Years (with Option C5)	$40
PA3000 G3	3 Year Gold Care Plan	$1,320
PA3000 G5	5 Year Gold Care Plan	$2,720
PA3000 R5	Standard Warranty Extended to 5 Years	$658

SHIPS WITH PRODUCT

- Stackable Test Lead Set (1 set per input channel)
- Built-in +/- 15V power supply for external current transducers
- PWRVIEW PC Software for instrument control, data transfer, and offline analysis (download)
- Calibration Certificate
- User Manual and AC Power Cord
- 3-year Product Warranty

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.

	KEITHLEY 2110	TEKTRONIX DMM4020	KEITHLEY 2000, 2100	KEITHLEY DMM7510	TEKTRONIX DMM4040/4050	KEITHLEY 2001, 2010	KEITHLEY 2002
Resolution	5½ digit	5½ digit	6½ digit	7½ digit	6½ digit	7½ digit	8½ digit
Basic Accuracy	0.012%	0.015%	0.0038% (2100) 0.0030% (2000)	0.0014%	0.0035% (DMM4040) 0.0024% (DMM4050)	0.0024%	0.0010%
Optional Switch Functions	Not Applicable	Not Applicable	10 Channel (2000)	Future	Not Applicable	10 Channel	10 Channel
Interface	USB-TMC GPIB Option	RS-232, RS-232 to USB Device Adapter Included	GPIB, RS-232 (2000) USB-TMC (2100)	GPIB, USB Device-TMC, Ethernet-LXI, USB-Host	USB host, RS-232, GPIB, Ethernet, RS-232 to USB Device Adapter Included	GPIB, RS-232 (2010) GPIB (2001)	GPIB
Software	KI-Tool and KI-Link Startup Software, LabVIEW and IVI drivers. Available at tek.com/keithley	—	KI-Tool and KI-Link Startup Software (2100 only), LabVIEW and IVI drivers. Available at tek.com/keithley	KickStart Startup Software, LabVIEW, IVI-COM/IVI-C, drivers, Keithley LXI Discovery Browser, Test Script Builder	—	LabVIEW Driver	LabVIEW Driver
Starting Price	$628	$866	$1,140	$3,990	$1,190	$3,100	$6,530

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

Many of Keithley's DMMs include the capability to add a scanner accessory, enabling measurements on multiple test points or devices.

PRODUCT HIGHLIGHTS

- Exceptional 6½-digit measurement integrity with high speed throughput (Model 2000)
- Built-in slot for scanner card (Model 2000)
- 15 built-in measurement functions including thermocouples (Model 2110)
- Full featured DMMs at a value price
- USB Test and Measurement Class (USBTMC) interface (Models 2110 and 2100)

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

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

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.

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	$888
2110	5½	0.012 + 0.002	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode, Cap., Therm.	USB (GPIB Option)	$628

RECOMMENDED ACCESSORIES

2000-SCAN	10-channel Scanner Card (Model 2000)	$882
2001-SCAN	10-channel Scanner Card with Two High-speed channels (Model 2000)	$882
2001-TSCAN	9-channel Thermocouple Scanner Card (Model 2000)	$1,180
5808	Low cost, Single Pin, Kelvin Probes	$123
5805	Kelvin Probes, 0.9m (3ft)	$253
5805-12	Kelvin Probes, 3.6m (12ft)	$333
5809	Low Cost, Kelvin Clip Lead Set	$184

RECOMMENDED ACCESSORIES

7007-1	Shielded GPIB Cable, 1m (3.3ft)	$126
7007-2	Shielded GPIB Cable, 2m (6.6ft)	$139
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter	$568
4288-1	Single Fixed Rack Mount Kit (Model 2000, 2100)	$101
4299-3	Single Rack Mount Kit (Model 2100 and 2110)	$114
4299-4	Dual Rack Mount Kit (Model 2100 and 2110)	$242

SHIPS WITH PRODUCT

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

PRODUCT HIGHLIGHTS

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

Add a plug-in scanner card to turn any of these DMMs into a complete scan and measure system.
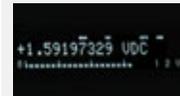
Use the multiple display capability (Model 2001/2002) to simultaneously display different aspects of one signal.

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	$4,880
2002	8½	0.0010 + 0.00015	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak	GPIB	$6,530
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	$3,100

RECOMMENDED ACCESSORIES

2000-SCAN	10-channel Scanner Card	$622
2001-SCAN	10-channel Scanner Card with Two Highspeed Channels	$882
2001-TSCAN	9-channel Thermocouple Scanner Card	$1,180
5805	Kelvin Probes, 0.9m (3ft)	$253
5805-12	Kelvin Probes, 3.6m (12ft)	$333
5808	Low Cost, Single Pin, Kelvin Probes	$123

RECOMMENDED ACCESSORIES

5809	Low Cost, Kelvin Clip Lead Set	$184
7007-1	Shielded GPIB Cable, 1m (3.3ft)	$126
7007-2	Shielded GPIB Cable, 2m (6.6ft)	$139
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter	$568
4288-1	Single Fixed Rack Mount Kit	$101

SHIPS WITH PRODUCT

- Model 8605 High Performance Modular Test Leads (Models 2001, 2002)
- Model 1751 Safety Test Leads (Model 2010)
- Calibration Data (Models 2001, 2002)
- Calibration Certificate (Model 2010)
- Quick Reference Guide
- User Manual, Service Manual
- Power Cord
- 1-year Warranty

PRODUCT HIGHLIGHTS

- Precision multimeter with 3½- to 7½-digit resolution
- 100mV, 1Ω, and 10µA ranges offer the sensitivity needed for measuring low level signals
- Capture and display waveforms or transients with 1MS/sec digitizer
- Large internal memory buffer; store over 11 million readings in standard mode or 27.5 million in compact mode
- Display more with five-inch, high resolution touchscreen interface
- Extensive software available including: Test Script Builder, KickStart Startup Software, and LabVIEW and IVI Drivers (available at tek.com/keithley)

The high speed digitizing function allows capturing and displaying voltage and current waveforms.

Advanced triggering options make it possible to capture a signal at precisely the right point.

DMM7510 7½–Digit Graphical Sampling Multimeter

The DMM7510 combines all the advantages of a precision digital multimeter, a graphical touchscreen display, and a high speed, high resolution digitizer to create an industry first: a graphical sampling multimeter. The digitizer gives the Model DMM7510 unprecedented signal analysis flexibility; the five-inch capacitive touchscreen display makes it easy to observe, interact with, and explore measurements with "pinch and zoom" simplicity. This combination of high performance and high ease of use offers unparalleled insight into your test results.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE	PRICING (USD)
DMM7510	7 ½	0.0014 + 0.00012	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode, Ratio, Cap, Digitize V, Digitize I	GPIB, USB-TMC, LAN-LXI	$3,990

RECOMMENDED ACCESSORIES

Test Leads and Probes

1754	2-Wire Universal 10-Piece Test Lead Kit	$62
1756	General Purpose Test Lead Kit	$52
5804	Kelvin (4-Wire) Universal 10-Piece Test Lead Kit	$227
5805	Kelvin (4-Wire) Spring-Loaded Probes	$253
5806	Kelvin Clip Lead Set	$300
5808	Low Cost Single-pin Kelvin Probe Set	$123
5809	Low Cost Kelvin Clip Lead Set	$184
8606	High Performance Modular Probe Kit	$66
8610	Low Thermal Shorting Plug	$66

Replacement Fuse

DMM7510-FUSE-10A	11A Current Fuse For DMM7510	$20
DMM7510-FUSE-3A	3.5A Current Fuse For DMM7510	$20

RECOMMENDED ACCESSORIES

Communication Interfaces & Cables

KPCI-488LPA	IEEE-488 Interface for PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568
7007-x	Shielded GPIB Cable	Varies
CA-180-3A	CAT5 Crossover Cable for TSP-Link / Ethernet	$10
USB-B-1	USB Cable, Type A to Type B, 1m (3.3 ft)	$15

Triggering and Control

2450-TLINK	DB-9 to Trigger Link Connector Adapter	$52
8501-x	Trigger Link Cable, DIN-to-DIN, 1m or 2m	Varies
8503	DIN-to-BNC Trigger Cable	$99

SHIPS WITH PRODUCT

- 1756 Test Leads
- USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)
- CA-180-3A TSP-Link/Ethernet Cable
- Documentation CD
- DMM7510 QuickStart Guide
- KickStart Software Quick Start Guide
- Calibration Certificate
- Power Cord
- 1-Year Warranty
- Test Script Builder Software (available at www.tek.com)
- KickStart Startup Software (available at www.tek.com)
- LabVIEW® and IVI Drivers (available at www.tek.com)

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.)	$866

RECOMMENDED TEST LEADS

Test Leads

196-3520-xx	Premium Test Leads (TL710 replacement/spare)	$39
TL705	2x4 Wire Ohm 1000V Test Lead	$86
TL725	2x4 Wire Ohm SMD Test Tweezers	$114

RECOMMENDED ACCESSORIES

Accessories

ACD4000	Soft Carrying Case	$259
HCTEK-4321	Hard Carrying Case	$829
RMU2U	Rackmount Kit	$163
013-0369-xx	Calibration Fixture 4-terminal short	$52

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty	$170

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
- Statement of Calibration Practices
- User Manual & Documentation on CD
- Power Cord
- 3-year Warranty

PRODUCT HIGHLIGHTS

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

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

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

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™ testing and statistics analysis modes. Get unparalleled ease of use with a dual display and USB connectivity. Hello, efficiency. Goodbye, complexity.

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	$1,190
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	$1,480

RECOMMENDED TEST LEADS

Temperature Probes

TP750	100 Ohm RTD Temperature Probe (DMM4050 only)	$577

Test Leads

196-3520-xx	Premium Test Leads (TL710 replacement/ spare)	$39
TL705	2x4 Wire Ohm 1000V Test Lead	$86
TL725	2x4 Wire Ohm SMD Test Tweezers	$114

RECOMMENDED ACCESSORIES

Accessories

ACD4000	Soft Carrying Case	$259
HCTEK-4321	Hard Carrying Case	$829
RMU2U	Rackmount Kit	$163
013-0369-xx	Calibration Fixture 4-terminal short	$52

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty	$170

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

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 3700A
DMM Resolution	6½ Digits	7½ Digits
Switching Density	Up to 80, 2-pole channels (2700/2701) 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) LAN, RS-232 (Model 2701)	GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus
Software	KickStart Startup Software, LabVIEW and IVI drivers. Available at www.tek.com	Test Script Builder, LXI Discovery Browser, LabVIEW and IVI drivers. Available at www.tek.com
Starting Price	$1,700	$2,930

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.

❶ 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.

❷ Relay Types

Three key relay types are used. Electromechanical relays 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 relays cost still more, but offer the best life and speed with no contact wear or bounce.

❸ Systemization

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

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.

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.

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	$1,700
2701	2U, ½ Rack	Ethernet, RS232	6½ Digits, 0.003%	Temperature, 4-Wire Resistance	$1,990
2750	2U, Full Rack	GPIB, RS232	6½ Digits, 0.003%	Temperature, 4-Wire Resistance, Low Ohms	$2,670

PLUG–IN CARDS

7700	Dual 1x10 / Electromechanical Relay	$509
7701	Dual 1x16 / Electromechanical Relay	$737
7702	Dual 1x20 / Electromechanical Relay	$965
7703	Dual 1x16 / Reed Relay	$1,160
7705	40 Independent Relay / Electromechanical Relay	$852

PLUG–IN CARDS

7706	16 Digital I/O, 2 Analog Outputs, 1x20 Multiplexer	$965
7707	32 Digital I/O, 1x10 Multiplexer	$852
7708	Dual 1x20 / Electromechanical Relay	$965
7709	6x8 / Electromechanical Relay	$965
7710	Dual 1x10 / Solid State Relay	$737
7711	Dual 1x4, 2GHz / RF Relay	$624
7712	Dual 1x4, 3.5GHz / RF Relay	$2,270

RECOMMENDED ACCESSORIES

7007-1	Shielded IEEE-488 Cable, 1m (2700, 2750)	$126
7007-2	Shielded IEEE-488 Cable, 2m (2700, 2750)	$139
7788	50-Pin D-Shell Connector Kit (for 7703 & 7705 Mods.)	$97
7789	50-Pin/25-Pin D-Shell Kit	$97
7790	50-Pin Male/Female, 25-Pin Male IDC D-Shell Con. Kit	$97

SHIPS WITH PRODUCT

- Product CD (Includes Users Manual, Drivers, Etc.)
- Ethernet Crossover Cable (Model 2701 Only)
- Calibration Certificate
- Quick Reference Manual
- Kickstart Instrument Control Software (available at www.tek.com)
- Power Cord
- 1-year Warranty

PRODUCT HIGHLIGHTS

- Mainframe variations (DMM and keypad/display optional)
- High performance (1 Ohm resistance, 10µA DCI range) 7.5 Digit multimeter
- High density switching (Up to 720 one-wire multiplexer channels, 2,688 one-wire matrix crosspoints)
- TSP control and TSP-Link for Intelligent distributed control
- 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.

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.

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	$2,930
3706A-S	No	Yes	NA	GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus	$2,260
3706A-NFP	Yes	No	7½ Digits, 0.0025%	GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus	$2,030
3706A-SNFP	No	No	NA	GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus	$2,030

PLUG–IN CARDS

3720	Dual 1x30 Multiplexer: 300V, 2A, Auto-CJC with 3720-ST accessory	$1,240
3721	Dual 1x20 Multiplexer: 300V, 3A, Auto-CJC with 3721-ST accessory	$1,070
3722	Dual 1x48 Multiplexer: 300V, 2A	$1,710
3723	Dual 1x30 Multiplexer: 200V, 1.25A, Reed Relay	$1,400
3724	Dual 1x30 Multiplexer: 200V, 0.12A, Solid State Relay, Auto-CJC with 3724-ST accessory	$1,780

PLUG–IN CARDS

3730	6x16 Matrix: 300V, 2A	$1,710
3731	6x16 Matrix: 200V, 2A, Reed Relay	$2,230
3732	Quad 4x28 Matrix: 200V, 1.2A, Reed Relay	$6,050
3740	Independent Relay: 28 Form C: 300V, 3A; 4 Form A: 250VAC, 7A	$1,070
3750	Control: 40 Digital I/O 2 Analog Outputs, 4 Counter	$1,430

RECOMMENDED ACCESSORIES

3706-BAN	DMM Adapter Cable	$235
3706-TLK	Test Lead Kit	$360
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter	$568
4288-1	Single Fixed Rack Mount Kit	$101
4288-10	Fixed Rear Rack Mount Kit	$128

SHIPS WITH PRODUCT

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

ULTRA–SENSITIVE MEASUREMENT 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 NANOVOLTMETER	6220 / 6221 CURRENT SOURCES	6485 / 6487 / 6482 PICOAMMETERS / PICOAMMETER & VOLTAGE SOURCE	6514 / 6517B / 6430 ELECTROMETERS
Current Min/Max	—	100fA / 100mA	1fA / 20mA	1aA/100mA
Voltage Min/Max	1nV / 100V	—	—	1µV / 200V
Resistance Min/Max	10nΩ /1GΩ (with Model 6220 or 6221)	10nΩ/1GΩ (with Model 2182A)	10Ω/1PΩ (with Model 6487)	1µΩ - 1000PΩ
Resolution	7½ Digits	4½ Digits	5½ Digits (6485, 6487) 6½ Digits (6482)	5½ Digits (6514) 6½ Digits (6517B, 6430)
Input Connection / Interface	Low Thermal / GPIB, RS-232	3 Slot Triax / GPIB, RS-232 (LAN on 6221)	BNC (6485) 3 Slot Triax (6482, 6487) / GPIB, RS-232	3 Slot Triax / GPIB, RS-232
Starting Price	$3,530	$7,070	$1,930	$5,310

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.

❶ 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.

❷ 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.

❸ 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.

❹ 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.

- 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.

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.

MODEL	VOLTAGE	TEMPERATURE	RESISTANCE	CHANNELS	CURRENT SOURCE	PRICING (USD)
2182A	1nV – 100V	-200°C – 1820°C		2	—	$3,530
6220/2182A*	1nV – 100V	-200°C – 1820°C	10nΩ – 1GΩ	—	±100fA – 100mA	$7,070
6221/2182A*	1nV – 100V	-200°C – 1820°C	10nΩ – 1GΩ	—	±100fA – 100mA, with 1mHz – 100kHz, 10Msamples/s, 64k arbitrary waveform generator	$8,280

*Delta Mode Resistance Measurement System

RECOMMENDED ACCESSORIES

4288-1	Single Fixed Rack Mounting Kit	$101
4288-2	Dual Fixed Rack Mounting Kit	$141
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	I EEE-488 USB-to-GPIB Interface Adapter	$568
2107-30	Low Thermal Input Cable with spade lugs, 9.1m (30 ft)	$358
2182-KIT	Low Thermal Test Lead Kit	$201
2187-4	Input Cable with safety banana plugs	$430

RECOMMENDED ACCESSORIES

2188	Low Thermal Calibration Shorting Plug	$236
7007-1	Shielded GPIB Cable, 1m (3.2 ft)	$126
7007-2	Shielded GPIB Cable, 2m (6.5 ft)	$139
7009-5	Shielded RS-232 Cable, 1.5m (5 ft)	$62
8501-1	Trigger Link Cable, 1m (3.2 ft)	$73
8501-2	Trigger Link Cable, 2m (6.5 ft)	$79
8503	Trigger Link Cable to 2 male BNC connectors	$99

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

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.

PRODUCT HIGHLIGHTS

- $10^{14}\Omega$ 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

Perform, analyze, and display differential conductance measurements.

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

MODEL	CURRENT SOURCE	ARBITRARY WAVEFORM GENERATOR	PULSE GENERATOR	RESISTANCE	PC INTERFACE	PRICING (USD)
6220	±100fA – 100mA	—	—	—	GPIB, RS-232	$4,000
6221	±100fA – 100mA	1mHz – 100kHz, 10Msamples/s sample rate, 64k point waveform length	Programmable, 5µs minimum width	—	GPIB, RS-232, Ethernet	$5,320
6220/2182A	±100fA – 100mA			10nΩ – 1GΩ	GPIB, RS-232	$7,070
6221/2182A	±100fA – 100mA	1mHz – 100kHz, 10Msamples/s sample rate, 64k point waveform length	Programmable, 50µs minimum width, for pulsed I-V measurements	10nΩ – 1GΩ	GPIB, RS-232, Ethernet	$8,280

*Delta Mode Resistance Measurement System

RECOMMENDED ACCESSORIES

237-ALG-2	Low Noise Triax Cable, 3-slot triax to alligator clips	$249
7007-1	Shielded GPIB Cable, 1m (3.2 ft)	$126
7007-2	Shielded GPIB Cable, 2m (6.5 ft)	$139
7007-4	Shielded IEEE-488 Cable, 4m (13.1 ft)	$156
7009-5	Shielded RS-232 Cable, 1.5m (5 ft)	$62
7078-TRX-3	Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft)	$175
7078-TRX-5	Low Noise Triax Cable, 3-Slot Triax Connectors, 1.5m (5 ft)	$186
7078-TRX-10	Low Noise Triax Cable, 3-Slot Triax Connectors, 3m (10 ft)	$202
7078-TRX-20	Low Noise Triax Cable, 3-Slot Triax Connectors, 6m (20 ft)	$227

RECOMMENDED ACCESSORIES

8501-1	Trigger Link Cable with male Micro-DIN connectors at each end, 1m (3.3 ft)	$73
4288-1	Single Fixed Rack Mounting Kit	$101
4288-2	Dual Fixed Rack Mounting Kit	$141
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	I EEE-488 USB-to-GPIB Interface Adapter	$568

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)

6485 Picoammeter,
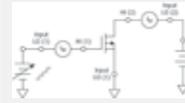# 6487, 6482 Picoammeter & Voltage Sources

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)
- 5½- to 6½-digit resolution (most models)
- Feedback ammeter design for higher accuracy
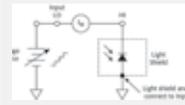
 Dark current characterization of a photodiode using Picoammeter and voltage source (such as the Model 6482).

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

MODEL	CHANNELS	CURRENT	RESISTANCE	READING RATE	VOLTAGE SOURCE	PRICING (USD)
6482	2	1fA – 20mA (2 ch)	N/A	900 rdgs/s	2, ±30V	$4,370
6487	1	10fA – 20mA	Up to $10^{15}\Omega$	1000 rdgs/s	±500V	$4,280
6485	2	10fA – 20mA	N/A	1000 rdgs/s	—	$1,930

RECOMMENDED ACCESSORIES

4802-10	Low noise BNC Input Cable, 3m (10ft) (for 6485)	$90
4803	Low Noise Cable Kit (for 6485)	$163
6517-ILC-3	Interlock Cable for 8009 Resistivity Test Fixture (6487 Only)	$100
7007-1	Shielded IEEE-488 Cable, 1m (3.3 ft)	$126
7007-2	Shielded IEEE-488 Cable, 2m (6.6 ft)	$139
7007-4	Shielded IEEE-488 Cable, 4m (13.1 ft)	$156
7009-5	RS-232 Cable	$62
7078-TRX-10	Low Noise Triax Cable, 3.0m (10 ft) (6487 Only)	$202
7078-TRX-20	Low Noise Triax Cable, 6.0m (20 ft) (6487Only)	$227
7754-3	BNC to Alligator Cable (for 6485)	$50
8501-1	Trigger Link Cable with male Micro-DIN connectors at each end, 1m (3.3 ft)	$73

RECOMMENDED ACCESSORIES

CS-565	BNC Barrel (for 6485)	$18
237-TRX-BAR	Triax Barrel (for 6487)	$123
7078-TRX-BNC	Triax-to-BNC Adapter	$85
8009	Resistivity Test Fixture (for 6487)	$2,580
4288-1	Single Fixed Rack Mounting Kit	$101
4288-2	Dual Fixed Rack Mounting Kit	$141
KPCI-488LPA	IEEE-488 Interface/ Controller for the PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568

SHIPS WITH PRODUCT

- 7078-TRX-BNC Triax-to-BNC Connector (2×) (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)

PRODUCT HIGHLIGHTS

- Measure low current & high voltage, resistance, and charge
- Resistance measurements to 1000P‡ (6517B)
- Current sensitivity as low as 1aA (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.

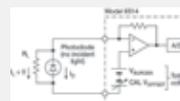A Model 6517B is well suited for applications where the volume resistivity needs to be measured.
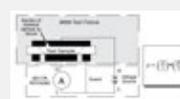
6514 / 6517B / 6430 Electrometers

Our Electrometers provide a voltage source and the most current sensitivity to make extremely high resistivity measurements. They combine flexible interfacing capabilities with high impedance voltage measurement, charge measurement capabilities, resolution, and speed. The Model 6430 offers unmatched low current sensitivity.

MODEL	CURRENT	VOLTAGE	RESISTANCE	CHARGE	SOURCES	PRICING (USD)
6517B	10aA - 20mA	1µV - 200V	1Ω - 1000PΩ	1fC - 2µC	±5mV to 1000V	$8,110
6514	100aA – 20mA	10µV – 200V	10mΩ – 200GΩ	10fC – 20µC	—	$5,310
6430	1aA - 100mA	100nV - 200V	1µΩ – >20TΩ	—	±5µV to 200V, ±50aA to 100mA	$15,100

RECOMMENDED ACCESSORIES

237-ALG-2	Low Noise Triax Cable, 3-slot triax to alligator clips	$249
6517B-ILC-3	Interlock Cable (For 6517B only)	$118
7078-TRX-3	Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft)	$175
7007-1	Shielded IEEE-488 Cable, 1m (3.2 ft)	$126
8501-1	Trigger Link Cable, 1m (3.3 ft)	$73
8503	Trigger Link DIN-to-BNC Trigger Cable	$99
8607	1kV Source Banana Cables (for 6517B only)	$65
6517-RH	Humidity Probe with Extension Cable (6517B only)	$589
6517-TP	Temperature Bead Probe (included with 6517B) (6517B only)	$59
8009	Resistivity Test Fixture (for 6517B)	$2,580

RECOMMENDED ACCESSORIES

237-BNC-TRX	Male BNC to 3-Lug Female Triax Adapter (for 6517B)	$123
237-TRX-NG	Triax Male-Female Adapter with Guard Disconnected	$160
7078-TRX-BNC	3-Slot Male Triax to BNC Adapter	$85
7078-TRX-GND	3-Slot Male Triax to BNC Adapter with guard removed (for 6517B)	$73
4288-1	Single Fixed Rack Mounting Kit	$101
4288-2	Dual Fixed Rack Mounting Kit	$141
6521	Low Current Scanner Card (for 6517B)	$2,350
6522	Voltage/Low Current Scanner Card (for 6517B)	$3,180
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568

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) (6430)
- Dual Test Leads (6430, 6517B)
- 6517-TP Thermocouple Bead Probe (6517B)
- CS-1305 Interlock Connector (6517B)
- PreAmp Cable 2m (6.6ft) (6430)

POWER SUPPLIES

Tektronix and Keithley power supplies offer a wide range of performance. Get single-channel models with superior accuracy and 10nA current measurement resolution. New high voltage power supplies combine high voltage with sensitive, low current measurement for high voltage device testing and characterization and high voltage research. 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.

CATEGORY	DESCRIPTION	CHANNELS	MAX VOLTAGE/ MAX CURRENT	RESOLUTION	VOLTAGE ACCURACY	CURRENT ACCURACY	INTERFACE	STARTING PRICE
Tektronix PWS2000 Series (4 models)	Manual	1	18V-72V/1.5A-6A	10mV, 10mA	± (0.05% + 15 mV)	± (0.1% + 15 mA)	Not applicable	$436
Tektronix PWS4000 Series (5 models)	USB Programmable Single-Channel	1	20V-72V /1.2A-5A	1mV, 0.1mA	± (0.02% + 2.5 mV)	± (0.05% + 1 mA)	USB	$922
Keithley 2200 Series (5 models)	USB and GPIB Programmable Single-Channel	1	20V-72V /1.2A-5A	1mV, 0.1mA	± (0.02% + 2.5 mV)	± (0.05% + 1 mA)	USB, GPIB	$968
Keithley Model 2231A-30-3	Optional USB Triple-Channel	3	CH1/2: 30V/3A CH3: 5V/3A	10mV, 1mA	± (0.06% + 20mV)	± (0.2% + 10 mA)	Optional USB	$670
Keithley 2220/2230 Series (8 models)	USB Multi-Channel; USB and GPIB Multi-Channel	2 (2220 Series) 3 (2230 Series)	CH1/2-30V / 1.5A (2220 Series) CH1/2-30V / 1.5A, CH3-6V / 5A (2230 Series)	1mV, 1mA	± (0.03% + 10 mV)	± (0.1% + 5 mA)	USB USB & GPIB (-G versions)	$993
Keithley 2260B Series (12 models)	360W, 720W and 1080W Wide output range USB, LAN, and Optional GPIB	1	30V-800V / 1.44A-108A	1mV, 1mA	± (0.1% + 10 mV)	± (0.1% + 10 mA)	USB, LAN, analog, and optional GPIB	$1,460
Keithley 2268 Series (6 models)	850W 1U high, half-rack wide, programmable, with 5V and 15V auxiliary outputs	1	20V-150V/ 5.6A-42A	2.4mV, 0.67mA	0.1% of Full Scale	0.2% of Full Scale	USB, GPIB, LAN,RS-232, RS-485, and analog	$2,550
Keithley Models 2280S-32-6 2280S-60-3	Precision measurement 6½-digit measurement resolution	1	32V-60V/3.2A-6A	0.1mV, 10nA	± (0.02% + 2 mV)	± (0.05% + 10 µA)	USB, GPIB, and LAN	$2,090
Keithley Models 2281S-20-6	Single-Channel, Precision DC Power Supply & Battery Simulator	1	20V/6A	0.1mV, 10nA	± (0.02% + 2 mV)	± (0.05% + 10 uA)	USB, GPIB, and LAN	$2,990
Keithley Models 2290-5 2290-10	High Voltage	1	5kV / 5mA (2290-5) 10kV / 1mA (2290-10)	1V, 1µA	±0.01% (2290-5), ±6V (2290-10)	±0.01% (2290-5), ±5µA (2290-10)	GPIB (2290-5), GPIB, RS-232 (2290-10)	$4,040
Keithley Models 2302, 2302-PJ, 2306, 2306-PJ, 2306-VS, 2308	Battery simulator	1 (2302) 2 (2306, 2308)	15V / 5A	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB	$2,880
Keithley Models 2303, 2303-PJ, 2304A	Fast Transient Response	1	15V / 5A (2303) 20V / 5A (2304A)	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB	$2,180

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 ± (% 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.

PRODUCT HIGHLIGHTS

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

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

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

PWS2000 Series Single–Channel Power Supplies

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

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE	PRICING (USD)
PWS2185	18 V	5 A	No	$436
PWS2323	32 V	3 A	No	$436
PWS2326	32 V	6 A	No	$527
PWS2721	72 V	1.5 A	No	$436

RECOMMENDED ACCESSORIES

RMU2U	Rackmount Shelf Kit for 1 or 2 Units	$163
386-7598-xx	Rackmount Cosmetic Filler Panel	$39

RECOMMENDED SERVICE

R5	5-year Extended Warranty	$157

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

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.

PWS4000 Series USB Programmable, Single–Channel Power Supplies

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

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE	PRICING (USD)
PWS4205	20 V	5 A	Yes	$922
PWS4305	30 V	5 A	Yes	$1,090
PWS4323	32 V	3 A	Yes	$922
PWS4602	60 V	2.5 A	Yes	$1,090
PWS4721	72 V	1.2 A	Yes	$922

RECOMMENDED ACCESSORIES

RMU2U	Rackmount Shelf Kit for 1 or 2 Units	$163
386-7598-xx	Rackmount Cosmetic Filler Panel	$39

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty	Varies

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

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.

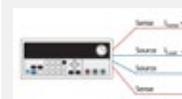# 2200 Programmable Single—Channel DC Power Supplies with Remote Sensing

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.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE AND NOISE	PRICING (USD)
2200-20-5	20V	5A	100W	$<1mV_{RMS}$, $<3mVP\text{-}P$	$968
2200-30-5	30V	5A	150W	$<1mV_{RMS}$, $<4mVP\text{-}P$	$1,140
2200-32-3	32V	3A	96W	$<1mV_{RMS}$, $<4mVP\text{-}P$	$968
2200-60-2	60V	2.5A	150W	$<1mV_{RMS}$, $<5mVP\text{-}P$	$1,140
2200-72-1	72V	1.2A	86W	$<1mV_{RMS}$, $<3mVP\text{-}P$	$968

RECOMMENDED ACCESSORIES

CS-1638-12	Rear Panel Mating Connector, Single Channel	$18
USB-B-1	USB Cable	$15
4299-7	Fixed Rack Mount Kit	$413
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus	$501
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)	$121
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)	$126
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)	$139
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)	$150
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)	$156

RECOMMENDED SERVICE

Model Number*-EW	1 additional year of factory warranty	Varies
C/Model Number*-3Y-STD	3 calibrations within 3 years of purchase	$477
C/Model Number*-3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase	Varies
C/Model Number*-5Y-STD	5 calibrations within 5 years of purchase	Varies
C/Model Number*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase	Varies

* Insert Model Number. Example: C/2200-20-5-3Y-DATA.

SHIPS WITH PRODUCT

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

PRODUCT HIGHLIGHTS

- 195W with two 30V@3A outputs and one 5V@3A output
- All channels are isolated and programmable
- 0.06% basic voltage accuracy and 0.2% basic current accuracy
- Double output levels by connecting two channels in series or parallel
- Optional USB interface
- Fully supported by TekSmartLab™

Connect the two 30V channels in series or parallel to double the output voltage to 60V or the supplied current to 6A.

2231A-30-3 fully supported by TekSmartLab™.

Model 2231A−30−3 Triple−Channel DC Power Supply

The Model 2231A-30-3 Triple-Channel DC Power Supply can output a total of 195W of power, providing the power levels needed to energize a wide range of circuits and devices for benchtop work. Two channels can supply up to 30V at 3A each; the third channel can provide up to 5V at 3A. The Model 2231A-30-3 does not compromise on performance or convenience features, offering the versatility and ease of use you need, so it can be the only DC power supply on your bench.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE	PRICING (USD)
2231A-30-3	CH1:30V, CH2:30V, CH3:5V	CH1:3A, CH2:3A, CH3:3V	195W	$<1mV_{RMS}$, $<5mV_{p-p}$	$670

RECOMMENDED ACCESSORIES

2231A-001	USB Adaptor with USB Cable	$60

RECOMMENDED SERVICE

Model Number*-EW	1-Year KeithleyCare® Gold Plan	$57
Model Number*-5Y-EW	5-Year KeithleyCare Gold Plan	$116
C/Model Number*-3Y-STD	KeithleyCare 3-Yr Std Calibration Plan	Call
C/Model Number*-5Y-STD	KeithleyCare 5-Yr Std Calibration Plan	Call

* Insert Model Number. Examples: 2231A-5Y-EW, C/2200-20-5-3Y-DATA

SHIPS WITH PRODUCT

- Documentation CD
- Calibration Certificate
- Power Cord
- 3-year Warranty

2220/2230 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.

Model 2230G-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 2220G-30-1* 2220J-30-1 * 2220GJ-30-1 *	Ch 1: 30V, Ch 2:30V	Ch1: 1.5A, Ch 2: 1.5A	45W/channel; 90W total	<1mVRMS, <3mV P-P	$933
2230-30-1 2230G-30-1* 2230J-30-1* 2230GJ-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 Ch 3: 30W, 120W total	<1mVRMS, <3mV P-P	$1,190

*G versions include a GPIB interface; J versions for Japan.

RECOMMENDED ACCESSORIES

CS-1655-15	Rear Panel Mating Connector, Multi-Channel	$21
USB-B-1	USB Cable	$15
4299-7	Fixed Rack Mount Kit	$413

RECOMMENDED SERVICE

Model Number*-EW	1 additional year of factory warranty	Varies
Model Number*-5Y-EW	2 additional years of factory warranty beyond the standard 3-year warranty	Varies
C/Model Number*-3Y-STD	3 calibrations within 3 years of purchase	Varies
C/Model Number*-3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase	Varies
C/Model Number*-5Y-STD	5 calibrations within 5 years of purchase	Varies
C/Model Number*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase	Varies

* Insert Model Number. Examples: 2220-30-1-5Y-EW, C/2220-30-1-3Y-DATA

RECOMMENDED ACCESSORIES

Additional Recommended Accessories for "G" Versions

KPCI-488LPA	IEEE-488 Interface Board for PCI Bus	$501
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)	$121
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)	$126
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)	$139
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)	$150
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)	$156

SHIPS WITH PRODUCT

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

Series 2260B Programmable DC Power Supplies

Source a wide range of voltages and currents using the Series 2260B Programmable DC Power Supplies. All twelve instruments have constant power outputs to provide a wide range of voltage and output currents. The 360W supplies can output as much as 30V, 80V, 250V and 800V or as much as 36A, 13.5A, 4.5A and 1.44A, the 720W supplies can output 72A, 27A, 9A and 2.88A, the 1080W supplies can output 108A, 40.5A, 13.5A and 4.32A, with the same maximum voltage outputs. The wide range of output voltages and currents and multiple interfaces in the Series 2260B power supplies enables their use in a broad array of applications including research and design, quality control, and production test.

PRODUCT HIGHLIGHTS

- Wide output range with constant power
- Programmable voltage/current rise and fall times
- Constant current priority setting
- Programmable output resistance
- USB, LAN, Analog Control, optional GPIB

Precisely control voltage rise time with the variable slew rate control.

Rear panel of Model 2260B-30-36 or 2260B-80-13

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE	PRICING (USD)
2260B-30-36	30V	36A	360W	<7 mV$_{RMS}$, <60 mV$_{p-p}$	$1,460
2260B-80-13	80V	13.5A	360W	<7 mV$_{RMS}$, <60 mV$_{p-p}$	$1,460
2260B-250-4	250V	4.5A	360W	<15 mV$_{RMS}$, <80 mV$_{p-p}$	$1,800
2260B-800-1	800V	1.44A	360W	<30 mV$_{RMS}$, <150 mV$_{p-p}$	$1,920
2260B-30-72	30V	72A	720W	<11 mV$_{RMS}$, <80 mV$_{p-p}$	$1,940
2260B-80-27	80V	27A	720W	<11 mV$_{RMS}$, <80 mV$_{p-p}$	$1,940
2260B-250-9	250V	9A	720W	<15 mV$_{RMS}$, <100 mV$_{p-p}$	$2,520
2260B-800-2	800V	2.88A	720W	<30 mV$_{RMS}$, <200 mV$_{p-p}$	$2,640
2260B-30-108	30V	108A	1080W	<14 mV$_{RMS}$, <100 mV$_{p-p}$	$2,460
2260B-80-40	80V	40.5A	1080W	<14 mV$_{RMS}$, <100 mV$_{p-p}$	$2,460
2260B-250-13	250V	13A	1080W	<15 mV$_{RMS}$, <120 mV$_{p-p}$	$3,540
2260B-800-4	800V	4.32A	1080W	<30 mV$_{RMS}$, <200 mV$_{p-p}$	$3,660

RECOMMENDED ACCESSORIES

2260-001	Accessory Kit	$36
2260-002	Simple IDC Tool	$166
2260-003	Contact Removal Tool	$12
2260-004	Basic Accessories kit	$14
2260-005	Cable for 2 units in Series connection	$43
2260-006	Cable for 2 units in Parallel connection	$43
2260-007	Cable for 3 units in Parallel connection	$66
2260-008	Test Lead Set with Lugs	$58
2260-009	Test Leads (250V, 800V models)	$40
2260-010	Basic Accessories Kit (250V, 800V models)	$22
2260-EX TERM-HV	Extended Terminal (for 250V, 800V models)	$113
2260B-GPIB-USB	GPIB To USB Adapter	$383
2260B-EXTERM	Extended Terminal	$112
2260B-RMK-JIS	Rack Mount Kit (JIS)	$179
2260B-RMK-EIA	Rack Mount Kit (EIA)	$179

RECOMMENDED SERVICE

Model Number*-EW	3-year factory warranty extended to 1 additional year from date of shipment	Varies
Model Number*-5Y-EW	3-year factory warranty extended to 5 years from date of shipment	Varies
C/Model Number*-3Y-STD	KeithleyCare 3-Year Standard Calibration Plan	Varies
C/Model Number*-3Y-DAT	KeithleyCare 3-Year Calibration with Data Plan	Varies
C/Model Number*-5Y-STD	KeithleyCare 5-Year Standard Calibration Plan	Varies
C/Model Number*-5Y-DAT	KeithleyCare 5-Year Calibration with Data Plan	Varies

* Insert Model Number. Examples: 2260B-30-36-5Y-EW, C/2260B-30-36-3Y-DATA.

SHIPS WITH PRODUCT

- 2260B Basic Accessories Kit
- Test Leads
- USB Cable
- Quick Start Guide
- CD with Manuals and Software Drivers
- Power Cord
- 3-year Warranty

PRODUCT HIGHLIGHTS

- 10nA resolution to 6A with high accuracy, measure voltage and current with 6½-digit resolution
- Capture dynamic load currents as short as 140µs
- Output up to 192W of low noise, linear regulated power
- Programmable rise and fall times eliminate voltage overshoot and undershoot transients
- Built-in graphing simplifies analyzing trends or displaying voltage or current waveforms
- GPIB, USB, and LAN interfaces, built-in LXI web interface simplifies automated control/monitoring/data logging

Built-in graphing simplifies analyzing trends or displaying voltage or current waveforms.

Remote control or monitor the supply using its web browser over the LAN LXI interface.

KickStart software DC power supply main screen.

Series 2280S Precision Measurement DC Power Supplies

Series 2280S Precision Measurement, Low Noise, Programmable DC Power Supplies are much more than just sources of clean power; they are also precision measurement instruments. They can source stable, low noise voltages as well as monitor load currents over a wide dynamic range from amps to nanoamps. The Model 2280S-32-6 can output up to 32V at up to 6A; the Model 2280S-60-3 can output up to 60V at up to 3.2A.

MODEL	MAX OUTPUT VOLTAGE/CURRENT	OUTPUT POWER	MAX CURRENT MEASUREMENT ACCURACY	TRANSIENT RESPONSE TIME	PRICING (USD)
2280S-32-6	32V/6A	192W	±(0.05% + 10 µA)	<50µs	$2,090
2280S-60-3	60V/3.2A	192W	±(0.05% + 10 µA)	<50µs	$2,090

RECOMMENDED ACCESSORIES

2280-001	Rear Panel Mating connector and Cover	$74
2280-Test-Lead	Power Supply Test Lead Kit, 1000V, 20A Rating	$39
CA-180-3A	LAN Crossover Cable	$10
USB-B-1	USB Cable Type A to B, 1m (3.3 ft)	$15
2450-TLINK	Trigger Link cable to connect 2280S digital I/O to Trigger Link I/O on other Keithley instruments	$52
4299-8	Single Fixed Rack-Mount Kit	$332
4299-9	Dual Fixed Rack-Mount Kit	$653
4299-10	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 26xx Instrument	$676
4299-11	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 24xx, Series 2000, or 2U Agilent Instrument	$665

RECOMMENDED ACCESSORIES

7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)	$121
7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)	$126
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)	$139
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)	$150
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)	$156
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus	$501

SHIPS WITH PRODUCT

- KickStart software
- 2280-001 output mating connector
- LAN crossover cable
- Documentation CD
- QuickStart guide
- Calibrate Certificate
- Power Cord
- 3-year Warranty

Series 2281S Precision DC Power Supplies with Battery Test and Battery Simulation Functions

The Series 2281S single-channel, precision DC supply and battery simulator innovatively integrates the functions of high-precision power supply, battery test, and battery simulation. It is able to analyze the DC consumption of a device under test, test a battery and generate a battery model based on the battery charging process, and simulate a battery based on the battery model. The Model 2281S-20-6 can output power up to 20V and 6A and sink current up to 1A.

The 2281S uses linear regulation to ensure low output noise and superior load current measurement sensitivity. A high resolution color thin film transistor (TFT) screen displays a wide range of information on measurements. Soft-key buttons and a navigation wheel combine with the TFT display to provide an easy-to-navigate user interface that speeds instrument setup and operation. In addition, built-in plotting functions allow monitoring trends such as drift. These features provide the flexibility required for both benchtop and automated test system applications. In addition, the 2281S provides a list mode, triggers, and other speed optimization functions to minimize test time in automated testing applications.

PRODUCT HIGHLIGHTS

- One box integrates the functions of high-precision power supply, battery test, and battery simulation
- Battery test with charging and discharging function
- Sink current up to 1A and source current up to 6A
- Build a battery model based on measurement results automatically. Use the model for battery simulation
- Simulate real output during the charging/discharging process with a battery model. Set the SOC/Voc, capacity, and resistance of a simulated battery according to test requirements
- Manually create, edit, import and export battery models

Log battery charge/discharge process and data (V, I, R and Amp-Hour information).

Offers both dynamic and static simulation modes to simulate battery output.

MODEL	DESCRIPTION	MAXIMUM OUTPUT VOLTAGE/CURRENT	OUTPUT POWER	MAXIMUM CURRENT MEASUREMENT ACCURACY	PRICING (USD)
2281S-20-6	Single-Channel, Precision DC Power Supply & Battery Simulator	20V/6A	120W	±(0.05% + 10 µA)	$2,990

RECOMMENDED ACCESSORIES

2450-TLINK	Trigger Link Cable to connect 2281S Digital I/O to Trigger Link I/O on other Keithley instruments	$52
4299-8	Single Fixed Rack-Mount Kit	$332
4299-9	Dual Fixed Rack-Mount Kit	$653
4299-10	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 26xx Instrument	$676
4299-11	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 24xx, Series 2000, or 2U Agilent Instrument	$665
CA-180-3A	LAN crossover cable	$10
7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)	$121

RECOMMENDED ACCESSORIES

7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)	$126
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)	$139
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)	$150
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)	$156
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus	$501
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB Port with 2m (6.6 ft) cable	$568
USB-B-1 USB Cable	Type A to B, 1 m (3.3 ft)	$15

SHIPS WITH PRODUCT

- Quick Start Guide
- KickStart Quick Start Guide
- User Documentation CD
- LAN Crossover Cable
- Power Cord
- Rear Panel Mating
- Connector with Cover

PRODUCT HIGHLIGHTS

- Compact 1U high, half-rack wide
- 5V and 15V auxiliary outputs
- Isolated and non-isolated analog inputs and outputs
- Foldback mode with programmable delay
- Control up to 30 supplies through one interface
- LAN, USB, GPIB, RS-232, RS-485, and analog I/O are all standard

Series 2268 rear panel showing all the interfaces.

Control a 2268 supply with analog inputs and control external devices with the auxiliary outputs.
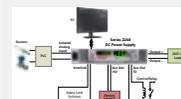
Series 2268 850W DC Power Supplies

Series 2268 power supplies provide both analog and digital control options and a number of digital interface options and can operate in constant voltage (CV), constant current (CC), or constant power modes to address a broad array of applications. These high-efficiency, soft-starting power supplies provide reliable performance and long life. Packaged in low profile 1U high, half-rack-width enclosures, they offer the highest power density in the smallest package.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE	NOISE	PRICING (USD)
2268-20-42	20V	42A	850W	$50mV_{p-p}$	$8mV_{RMS}$	$2,550
2268-40-21	40V	21A	850W	$50mV_{p-p}$	$8mV_{RMS}$	$2,550
2268-60-14	60V	14A	850W	$50mV_{p-p}$	$8mV_{RMS}$	$2,550
2268-80-10	80V	10.5	850W	$80mV_{p-p}$	$8mV_{RMS}$	$2,550
2268-100-8	100V	8.5A	860W	$80mV_{p-p}$	$8mV_{RMS}$	$2,550
2268-150-5	150V	5.6A	850W	$100mV_{p-p}$	$10mV_{RMS}$	$2,550

RECOMMENDED ACCESSORIES

2268-HDR	Hardware to Connect Test Lead Lugs to the 2268-20-42 or 2268-40-21	$8.16
2268-RMK-1	Rack Mount Kit for One Series 2268 DC Power Supply	$224
2268-RMK-2	Rack Mount Kit for Two Series 2268 DC Power Supplies	$143
CA-180-3A	LAN Crossover Cable	$10
USB-B-1	USB Cable Type A to B, 1m (3.3 ft)	$15
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus	$501
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB Port	$568

RECOMMENDED ACCESSORIES

7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)	$121
7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)	$126
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)	$139
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)	$150
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)	$156

SHIPS WITH PRODUCT

- CD with user manual
- Test lead connection hardware (for 2268-20-42 and 2268-40-21 only)
- Power cord

RECOMMENDED SERVICE

Model Number*-EW	1 additional year of factory warranty	$375
Model Number*-5Y-EW	2 additional years of factory warranty beyond the standard 3-year warranty	$626
C/Model Number*-3Y-STD	3 calibrations within 3 years of purchase	$1,910
3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase	$3,210
C/Model Number*-5Y-STD	5 calibrations within 5 years of purchase	$3,020
C/Model Number*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase	$4,240

* Insert Model Number. Example: 2268-40-21-5Y-EW, C/2268-40-21-3Y-DATA.

PRODUCT HIGHLIGHTS

- Source voltages up to 5kV and 10kV
- 1μA current measurement resolution
- Low noise for precision sourcing and sensitive measurements; selectable filters reduce noise to less than 3mVRMS on the 5kV supply
- Safety interlock controls high voltage output
- GPIB programmable
- Protection module prevents damage to low voltage instrumentation

The Model 2290-PM-200 Protection Module protects low voltage measurement equipment from voltages greater than 200V.

Reverse breakdown testing of a high voltage diode using a Keithley SourceMeter® SMU instrument to measure leakage currents down to picoamp levels. The Model 2290-PM-200 SMU Protection Module protects the SourceMeter SMU instrument from high voltage when the diode breaks down.

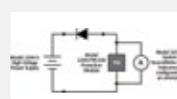# 2290 High Voltage Power Supplies

Series 2290 High Voltage Power Supplies facilitate high voltage device and material testing, as well as high energy physics experimentation. The Model 2290-5 5kV Power Supply provides voltage outputs up to 5000V, and the Model 2290-10 10kV Power Supply offers up to 10,000V. These supplies measure both output voltage with 1V resolution and output current with 1μA resolution.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE	PRICING (USD)
2290-5	5kV	5mA	25W	3mV$_{RMS}$ maximum with filter	$4,040
2290-10	10kV	1mA	10W	1V$_{RMS}$	$5,090

RECOMMENDED ACCESSORIES

For 2290-5:

2290-5-SHV	5kV SHV Female–SHV Female Cable, 3m (10 ft)	$301
2290-5-MHV	5kV SHV Female–MHV Male Cable, 3m (10 ft)	$363
2290-5-SHVBH	5kV SHV Male Bulkhead Connector	$54
2290-5-RMK-1	Single Fixed Rack Mount Kit for 5kV Power Supply	$218
2290-5-RMK-2	Dual Fixed Rack Mount Kit for 5kV Power Supply	$239

For 2290-10:

2290-10-SHVUC	10kV SHV Male to Unterminated Cable, 3m (10ft)	$1,530
2290-10-SHV	10kV SHV Male–SHV Male Cable, 3m (10 ft)	$1,730
2290-10-SHVBH	10kV SHV Female Bulkhead Connector	$135
2290-10-RMK-1	Single Fixed Rack Mount Kit for 10kV Power Supply	$218
2290-10-RMK-2	Dual Fixed Rack Mount Kit for 10kV Power Supply	$239

RECOMMENDED ACCESSORIES

For both:

2290-PM-200	10kV Protection Module	$1,240
2290-INT-CABLE	3-Pin Connector to Unterminated Interlock Cable	$32
4299-7	Fixed Shelf Rack Mount Kit	$413
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus	$501
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB port with built-in 2m (6.6 ft) cable	$568
7007-05	Double Shielded Premium IEEE-488 Interface Cable, 0.5m (1.6 ft)	$121
7007-1	Double Shielded Premium IEEE-488 Interface Cable, 1m (3.2 ft)	$126
7007-2	Double Shielded Premium IEEE-488 Interface Cable, 2m (6.5 ft)	$139
7007-3	Double Shielded Premium IEEE-488 Interface Cable, 3m (10 ft)	$150
7007-4	Double Shielded Premium IEEE-488 Interface Cable, 4m (13 ft)	$156

SHIPS WITH PRODUCT

- CD with User Manual, Software Drivers, and Accessory Information
- Power Cord

RECOMMENDED SERVICE

Model Number*-3Y-EW	1-Year Factory Warranty extended to 3 years from date of shipment	Varies
Model Number*-5Y-EW	1-Year Factory Warranty extended to 5 years from date of shipment	Varies
C/Model Number*-3Y-STD	KeithleyCare 3-Year Standard Calibration Plan	Varies

* Insert Model Number. Examples: 2290-5-3Y-EW, C/2290E-10-3Y-STD.

PRODUCT HIGHLIGHTS

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

Model 2306 Rear Panel.

Simplified schematic of a battery and the 2302/2306.

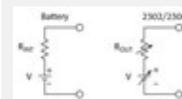# Series 2300 Portable Device Battery/Charger Simulators

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	CHANNELS	MAX OUTPUT VOLTAGE / CURRENT	POWER	TRANSIENT RESPONSE TO A 10X LOAD CURRENT CHANGE	CURRENT SINK CAPACITY	PRICING (USD)
2302, 2302-PJ	1	15 V / 5 A	42W	<40µs recovery time and <75mV voltage drop	3A	$2,880
2306, 2306-PJ	2	15 V / 5 A	45W	<40µs recovery time and <75 mV voltage drop	3A	$3,570
2306-VS	2	15 V / 5 A	45W	<40µs recovery time and <75 mV voltage drop	3A	$4,080
2308	2	15 V / 5 A	45W	<35µs recovery time and <90 mV voltage drop	3A	$3,260

RECOMMENDED ACCESSORIES

2306-DISP	Remote Display (2302, 2306, 2308)	$379
CS-846	Mating Output Connector	$20
SC-182	Low Inductance Coaxial Cable	$0.53
4288-1	Single Fixed Rack Mount Kit	$101
4288-2	Dual Fixed Rack Mount Kit	$141
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568

RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)	$121
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)	$126
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)	$139
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)	$150
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)	$156

RECOMMENDED SERVICE

Model Number*-3Y-EW	1-year factory warranty extended to 3 years from date of shipment	Varies
Model Number*-PJ-3Y-EW	1-year factory warranty extended to 3 years from date of shipment	Varies

* Insert Model Number. Example: 2302-3Y-EW.

SHIPS WITH PRODUCT

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

PRODUCT HIGHLIGHTS

- Ultra-fast response times to load changes
- Optimized for battery-powered device testing
- 100nA current measurement sensitivity
- Load pulse current measurement: 33μs - 833μs
- 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.

Keithley's high speed power supplies maintain a stable voltage during large load changes.

2303/2304A 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.

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	<40μs recovery time and <100mV voltage drop	2A	$2,180
2304A	Single Output	20V/5A	100W	<40μs recovery time and <100mV voltage drop	3A	$2,940

RECOMMENDED ACCESSORIES

2304-DISP	Remote Display (2303, 2304A)	$235
CS-846	Mating Output Connector	$20
SC-182	Low Inductance Coaxial Cable	$0.53
4288-1	Single Fixed Rack Mount Kit	$101
4288-2	Dual Fixed Rack Mount Kit	$141
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus	$501
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter	$568

RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)	$121
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)	$126
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)	$139
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)	$150
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)	$156

RECOMMENDED SERVICE

Model Number*-3Y-EW	1-year factory warranty extended to 3 years from date of shipment	Varies
C/Model Number*-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2303, 2303-PJ*	Varies

* Insert Model Number. Examples: 2303-3Y-EW, C/2303-3Y-ISO.

SHIPS WITH PRODUCT

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

DC ELECTRONIC LOADS

Keithley DC electronic loads are stand-alone, high accuracy instruments for testing and for performance characterization of power conversion devices such as power supplies, battery chargers, solar cells, DC/DC converters, and other power components. Keithley electronic loads offer high resolution as low as 0.1mV and 0.01mA to enable detection of subtle changes in power devices. The loads also have high bandwidth dynamic cycling and slew rates as fast as 2.5A/µs to thoroughly test the transient performance of power conversion devices.

	2380 SERIES
Channels	1
Maximum power	200 W, 250 W, 750 W
Maximum Voltage/Current	500V/15A, 120V/60A, 500V/30A
Operation Modes	Constant Current (CC), Constant Voltage (CV), Constant Resistance (CR), and Constant Power (CP), Battery Test, LED Simulation
Connectivity	GPIB, USB, RS232
Starting Price	$1,980

CHOOSING YOUR DC ELECTRONIC LOAD

DC electronic loads have a wide range of performance to enable testing both static and dynamic performance of power devices. Key capabilities to consider when selecting DC electronic loads are presented below.

❶ Output Power, Output Voltage, and Output Current

Ensure that the electronic load can dissipate the output power that your devices can generate. Also make sure that the load is rated for the maximum voltage and maximum current that your devices or components can supply. It is essential that all three parameters are factored in to your selection decision on the dissipation requirements for your DC electronic load.

❷ Electronic Load Operating Modes

All electronic loads offer a constant current (CC) operating mode. Most also offer constant voltage (CV) and constant power (CP) operating modes. Some also provide constant resistance (CR) loading. More advanced electronic loads offer battery discharge loading to test battery life characteristics and LED simulation loading to test LED driver modules. Make sure the electronic load you select has the operating modes that you will need.

❸ Dynamic Load Testing

If you need to test how your device performs with load changes, ensure that the load you select has a dynamic mode with a transition speed that is fast enough to test the specified transient response of your device. Dynamic modes are typically specified as the range of times that the load will be at each of two current levels. The inverse of twice the shortest time interval determines maximum cycling rate. Shorter time intervals, with fast transitions between loading, stress the power source and provide insight into its stability.

In addition to testing response to fast load changes, it can also be important to determine whether your device can respond at the rate that the load is changing. Ensure electronic load slew rates, often specified in A/µs, are high enough to test your device to its slew rate specifications. Ensure these rates are programmable so the electronic load's range of slew rates meets your application needs.

❹ Safety Testing

Verifying that your power source does not fail under fault conditions is of critical importance. This is particularly true for a short circuit load condition. Electronic loads can be set for short circuits conditions with the load operating near 0V with milliohm load impedance. Make sure the electronic load you select has short circuit test features.

PRODUCT HIGHLIGHTS

- Multiple operating modes: CV, CC, CR, CP, Battery Test, and LED Simulation
- 0.1 mV/0.01mA V/I readback resolution and 0.025%/0.05% V/I readback accuracy
- Up to 25 kHz dynamic cycling mode with adjustable slew rates up to 2.5A/μs
- Helpful features include voltage rise and fall time measurement, a current monitor output, and list mode load profiles
- Built-in GPIB, USB, RS232 interfaces

0.1 mV/0.01mA voltage/current readback resolution give you more confidence in the reading when testing your device.

Dynamic Mode up to 25kHz for faster transient validation of DC power sources.
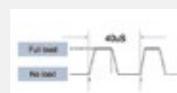
2380 Series

Series 2380 programmable DC Electronic Loads are single output, standalone loads with 200W, 250W and 750W models. Multiple operation modes with up to 25 kHz of dynamic cycling, superior voltage/current resolution and readback accuracy together with multiple interface choices make the Series 2380 ideal for testing a power source in your bench.

MODEL	NUMBER OF OUTPUT	MAXIMUM POWER	MAXIMUM VOLTAGE	MAXIMUM CURRENT	OPERATING MODES	CONNECTIVITY	PRICING (USD)
2380-500-15	1	200 W	500 V	15 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232	$1,980
2380-120-60	1	250 W	120 V	60 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232	$1,880
2380-500-30	1	750 W	500 V	30 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232	$3,300

RECOMMENDED ACCESSORIES

2380-001	9-pin Rear Panel Mating Connector	$28
2380-002	DUT Connection Protective Cover	$45
7007-2	Double-Shielded Premium IEEE-488 Interface Cable, 2m (6.5 ft)	$139
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus	$501
USB-B-1	USB Cable, Type A Connector to Type B Connector, 1m (3.3 ft)	$15
4299-7	Universal Fixed Rack Mount Kit for 2380-500-15 and 2380-120-60	$413
RMU2U	Fixed Rack Mount Kit for 2380-500-15 and 2380-120-60	$163
386759800	RMU2U Rack Mount Cosmetic Filler Panel for 2380-500-15 and 2380-120-60	$39
2380-RM	Full-Rack-Width Instrument Fixed Rack Mount Kit for 2380-500-30	$267

RECOMMENDED SERVICE

Model Number*-1-EW	3-year factory warranty from date of shipment extended 1 additional year	Varies
Model Number*-5Y-EW	3-year factory warranty from date of shipment extended to 5 years	Varies
C/Model Number*-3Y-STD	KeithleyCare 3 YR STD Calibration Plan	Varies
C/Model Number*-3Y-DAT	KeithleyCare 3 YR Calibration w/Data Plan	Varies
C/Model Number*-5Y-STD	KeithleyCare 5 YR STD Calibration Plan	Varies
C/Model Number*-5Y-DAT	KeithleyCare 5 YR Calibration w/Data Plan	Varies

* Replace the specific power supply model number in place of Model Number to generate the appropriate model number for a service item. Example for a 2380-500-15, a 1-year extended warranty model number would be 2380-500-15-EW.

SHIPS WITH PRODUCT

- Quick Start Guide
- Documentation CD
- Power Cords
- 9-Pin Rear Mating Connector

FREQUENCY COUNTER/TIMERS

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

	FCA3000	FCA3100	MCA3000
Frequency Range	400 MHz, 3 GHz, 20 GHz	400 MHz, 3 GHz, 20 GHz	27 GHz, 40 GHz
Resolution	• 100 ps (time) • 12 digits/s (freq)	• 50 ps (time) • 12 digits/s (freq)	• 100 ps (time) • 12 digits/s (freq)
Data Transfer	• 250 k Samples/sec (internal) • 5 k Samples/sec (block)	• 250 k Samples/sec (internal) • 15 k Samples/sec (block)	• 250 k Samples/sec (internal) • 5 k Samples/sec (block)
Measurements	13 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p	14 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p, Totalize	13 Automated Measurements Frequency, Period, Ratio, Time Interval, Time Interval Error, Pulse Width, Rise/Fall Time, Phase Angle, Duty Cycle, Vmax, Vmin, Vp-p + An Integrated Power Meter
Analysis Modes	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 PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Rear panel: USB device port, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)	Rear panel: USB device port, GPIB PC communications software: NI LabVIEW SignalExpress™ Tektronix Edition (LE Version)
Starting Price	$2,440	$3,810	$9,820

CHOOSING YOUR COUNTER/TIMER

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

❶ Frequency Resolution

The frequency resolution is the smallest change the counter/timer 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.

❷ 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 picoseconds, e.g., 50 ps. The lower the number, the better the time resolution feature.

❸ 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.

❹ Analysis Capability

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

PRODUCT HIGHLIGHTS

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

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

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

FCA3100/3000 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 trending. Get unparalleled ease of use with intuitive operation and USB connectivity. It's everything you need in a Timer/Counter/Analyzer. And more.

MODELS	MAX. FREQUENCY	CHANNELS	TIME RESOLUTION	FREQUENCY RESOLUTION	PRICING (USD)
FCA3000	400 MHz	2	100 ps	12 digit/s	$2,440
FCA3003	3 GHz	2 – 400 MHz 1 – 3 GHz	100 ps	12 digit/s	$3,570
FCA3020	20 GHz	2 – 400 MHz 1 – 20 GHz	100 ps	12 digit/s	$7,070
FCA3100	400 MHz	2	50 ps	12 digit/s	$3,810
FCA3103	3 GHz	2 – 400 MHz 1 – 3 GHz	50 ps	12 digit/s	$4,950
FCA3120	20 GHz	2 – 400 MHz 1 – 20 GHz	50 ps	12 digit/s	$8,430

RECOMMENDED ACCESSORIES

174-4401-xx	USB Host to Device Cable, 3 Feet	$10
012-0991-xx	GPIB Cable, Double Shielded	$591
012-1256-xx	BNC Male to BNC Male, 9 Feet	$102
ACD4000	Soft Carrying Case	$259
HCTEK-4321	Hard Carrying Case	$829
RMU2U	Rackmount Shelf Kit for 2 Units	$163
TVA3000	TimeView™ Modulation Domain Analysis Software	$872

INSTRUMENT OPTIONS

MS	Medium Stability OCXO Timebase, 2 X 10⁻⁷	$757
HS	High Stability OCXO Timebase, 5 X 10⁻⁸	$1,190
RP	Rear-panel Connectors	$175

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty (FCA3000, FCA3003, FCA3100, FCA3103)	$322
SILV400	5-year Extended Warranty (FCA3020, FCA3120)	$516

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

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.

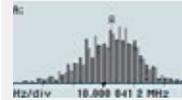Easily connect to a PC with the USB and GPIB ports.

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

MODELS	MAX. FREQUENCY	CHANNELS	TIME RESOLUTION	FREQUENCY RESOLUTION	PRICING (USD)
MCA3027	27 GHz	2 – 300 MHz 1 – 27 GHz	100 ps	12 digit/s	$9,820
MCA3040	40 GHz	2 – 300 MHz 1 – 40 GHz	100 ps	12 digit/s	$14,500

RECOMMENDED ACCESSORIES

174-4401-xx	USB Host to Device Cable, 3 Feet	$10
012-0991-xx	GPIB Cable, Double Shielded	$591
012-1256-xx	BNC Male to BNC Male, 9 Feet	$102
AC4000	Soft Carrying Case	$259
HCTEK-4321	Hard Carrying Case	$829
RMU2U	Rackmount Shelf Kit for 2 Units	$163
TVA3000	TimeView™ Modulation Domain Analysis Software	$872

INSTRUMENT OPTIONS

HS	High Stability OCXO Timebase, 5 X 10⁻⁸	$1,230
US	Ultra High Stability OCXO Timebase, 1.5 X 10⁻⁸	$2,470

RECOMMENDED SERVICE

SILV600	5-year Extended Warranty	$770

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

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