Tektronix®

Drive Innovation

PRODUCT CATALOG

2018 – VOL. 1

TEST & MEASUREMENT

Solutions that Accelerate Technology Innovation

Every day we embrace the challenge to advance the horizon of what's possible. Working with you, Tektronix is committed to resolve the great challenges - and help you unleash the incredible opportunities - of this digital age.

Tektronix is focused on your applications, working to make complex test & measurement even faster, more simplified and with higher precision. And with these solutions, we'll help you close the distance between your moments of inspiration and the commercial realization of world-changing innovation.

We invite you to join us, as we accelerate the future.

REVOLUTIONEERING™

Software | Services | Hardware

CONTENTS

Tektronix®

DRIVE INNOVATION FASTER

We celebrate this Age of the Engineer. Our experts will help you frame the future. With regular updates on applications and technology trends to achieve measurement insight, Tektronix will boost your productivity and accelerate your time to market.

Power Efficiency

ENERGIZE »

As always-on devices proliferate, power efficiency becomes an increasingly critical design consideration. Ensure safe, precise and fast Si, SiC and GaN MOSFET testing in a lab and wafer test environment. Learn more about the testing challenges resulting from the adoption of SiC and GaN into your designs and how to solve them. Discover how to minimize power draw and maximize battery life for your end-products. Accelerate the time-to-market for your designs.

Wired Communication

CONNECT »

As data rates increase, get the measurement insight to get ahead. Accelerate PCIe, SAS, SATA Compliance Testing with a single test solution including automation and debug capabilities. Speed up your 400G product development with PAM4 testing to efficiently validate your technology advances. Get to compliance faster with your Type-C devices.

Next Gen Media

SEE »

Simplify your 4K HDR Video test and monitoring. Get true visibility into your cloud video delivery network for more efficient quality control and compliance. Close the knowledge gap between SDI and IP worlds and foster collaboration between broadcast engineers and IT experts. Accelerate your video delivery or creation evolution with the most robust test and monitoring tool sets in the industry.

Connected Car

MOBILIZE »

As data rates increase, get the measurement insight to get ahead. Accelerate PCIe, SAS, SATA Compliance Testing with a single test solution including automation and debug capabilities. Speed up your 400G product development with PAM4 testing to efficiently validate your technology advances. Get to compliance faster with your Type-C devices.

Mil/Gov

ADVANCE »

Accurately simulate threat radar in operational environments while measuring ECM Techniques. Utilize powerful DSP technology to characterize spectrum and identify signals of interest. Integrate, scale and deploy low Swap, high fidelity RF sensors to characterize spectrum. Ensure complex modulation techniques used in Satcom systems are low in bit error rate and provide secure, reliable communications.

3D Sensing

DISCOVER »

Many depth sensing technologies use structured light or Time of Flight (ToF). Learn more about Laser Diode Array Test for 3D Sensing and also about enhancing Trigger Synchronization for High Volume Production Testing of VCSELs.

REVOLUTIONEERING™

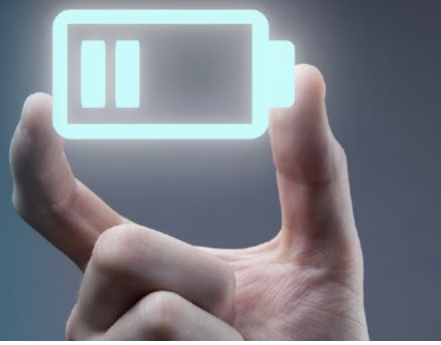
Reducing the Distance Between Inspiration and Realization

We are the measurement insight company committed to performance, and compelled by possibilities.

Tektronix designs and manufactures test and measurement solutions to break through the walls of complexity, and accelerate global innovation. Together we empower engineers to create and realize technological advances with ever greater ease, speed and accuracy. Tektronix solutions have supported many of humankind's greatest advances of the past 70 years. Health. Communication. Mobility. Space. We are committed to the scientists, engineers and technicians around the world who will define the future.

POWER EFFICIENCY

Ensure safe, precise and fast Si, SiC and GaN MOSFET testing in a lab and a wafer test environment. Learn more about the testing challenges resulting from the adoption of SiC and GaN into your designs and how to solve them. Discover how to minimize power draw and maximize battery life for your end-products. Accelerate the time-to-market for your designs.



Power Device Characterization

- Safe, Precise, Fast MOSFET Testing for Si, SiC and GaN devices
- Wide power envelope
- Safely set up your test
- 2X Faster Device Characterization for improved time to market
- Avoid expensive overdesigning of your wide bandgap device

Automated Parametric Test

- Fully-automated HV Wafer-level testing
- Move from high voltage to low voltage without changing test setup
- Measure capacitance without manual reconfiguration Fast automation

Faster Time to Market for your Power Conversion Designs

- Overcome high common mode voltages
- Simultaneously measure multiple control and timing signals
- Faster automated power measurements
- Don't fail compliance

Maximizing Battery Life of IoT Devices

- Determine the load current profile
- Simulate any battery
- Model any type of battery

WIRED COMMUNICATIONS

Accelerate PCIe, SAS and SATA testing with a single test solution including automation and debug capabilities. Speed up your 400G product development with PAM4 testing to efficiently validate your technology advances. Get to compliance faster with your Type-C devices.

400G PAM4 Testing

- Accelerate 400G product development
- Validate faster and increase yield

Coherent Optical

- No more trial and error
- Automate to reduce calibration times and measure accurately

PCIe, SAS, SATA Test and Debug

- Automate calibration
- Close the loop on loopback debug
- Superior signal integrity and debug

Consumer Standards Over Type-C

- Get to compliance faster for next gen USB, DisplayPort, HDMI
- Build confidence on the margin of devices
- Avoid expensive overdesigning

NEXT GEN MEDIA

Simplify your 4K HDR video test and monitoring. Get true visibility into your cloud video delivery network for more efficient quality control and compliance. Close the knowledge gap between SDI and IP worlds and foster collaboration between broadcast engineers and IT experts. Accelerate your video delivery or creation evolution with the most robust test and monitoring tool sets in the industry.

4K HDR Video Test & Monitoring

- Meet Challenges of 4K HDR Production & Delivery
- Capturing in UHD
- Adapting to new color gamuts
- Simplifying quality and compliance checks

Cloud Video Delivery Quality Control

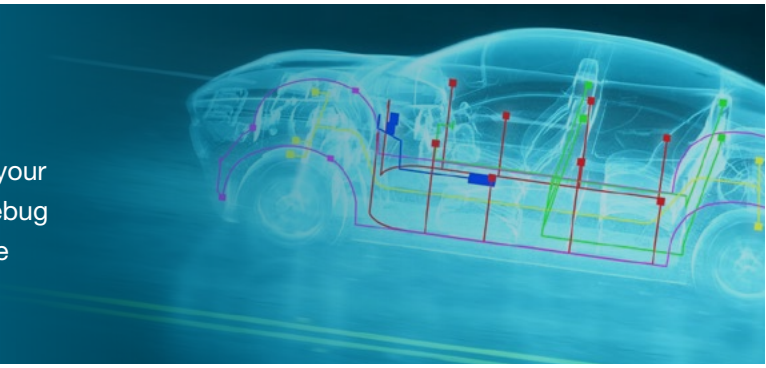
- Automated Live Stream Monitoring
- Maintaining quality in OTT environments
- Proactive automated monitoring
- Encryption and DRM

Live IP Media Analysis

- Solutions for Live IP Video Production
- Diagnosing faults in an IP environment
- Bridging the gap from SDI to IP
- An invisible transition

CONNECTED CAR

Speed through validation, debugging and compliance testing of your Automotive Ethernet PHY design. Reduce ECU validation and debug time with automated protocol analysis of important standards like CAN and CAN FD.



CAN Bus Troubleshooting

- Debugging ECUs with Automated Decode & Trigger
- Debug the decoded protocol
- Troubleshoot signal faults
- Visualize multiple channels/ sensors/actuators

Automotive Ethernet Testing

- Achieving Reliability and Interoperability
- Validate your designs
- Speed through debugging and troubleshooting
- Get to compliance with confidence

Faster Time to Market for Power Conversion Designs

- Overcome high common mode voltages
- Simultaneously measure multiple control and timing signals
- Faster automated power measurements
- Don't fail compliance

EMI/EMC

- Don’t fail EMI/EMC testing
- Avoid time-to-market delays

MILITARY/GOVERNMENT

Accurately simulate threat radar in operational environments while measuring ECM techniques. Utilize powerful DSP technology to characterize spectrum and identify signals of interest. Integrate, scale and deploy low Swap, high fidelity RF sensors to characterize spectrum. Ensure complex modulation techniques used in Satcom systems are low in bit error rate and provide secure, reliable communications.

Electronic Warfare

- Accurately recreate Electromagnetic and Physical Environments
- Evaluated ECM techniques – system testing with Hardware-in-the-loop

Broadband SATCOM

- System Level and Module Level Test
- Quickly and accurately measure SATCOM Channel Performance Vector Magnitude
- Create complex modulations schemes

RF Sensor Applications

- Monitor the RF spectrum in real- time with high fidelity, signal capture
- Monitor the RF spectrum with high fidelity signal capture
- Integrate, deploy and scale while reducing project risk

Radar Test Applications

- Detect advanced radar signals
- Create Signals that look real to radar

3D SENSING

3D Sensing Defining Requirements for Electrical Test of Optical Devices.

3D Sensing Augments a Camera's Object and Facial Recognition

3D sensing is a depth sensing technology that augments camera capabilities for facial and object recognition in augmented reality, gaming, autonomous driving and a wide range of applications.

Get 2 in-depth Application Notes:

- Laser Diode Array Test for 3D Sensing
- Enhancing Trigger Synchronization for High Volume Production Testing of VCSELs

DOWNLOAD NOW »

Diode-based Optical Devices Enable 3D Sensing

Diode-based devices such as laser diodes, high brightness LEDs (HBLED), and photodiodes (PD) are key optical devices that enable 3D sensing.

Learn 10 Tests for Laser Diodes

WATCH NOW »

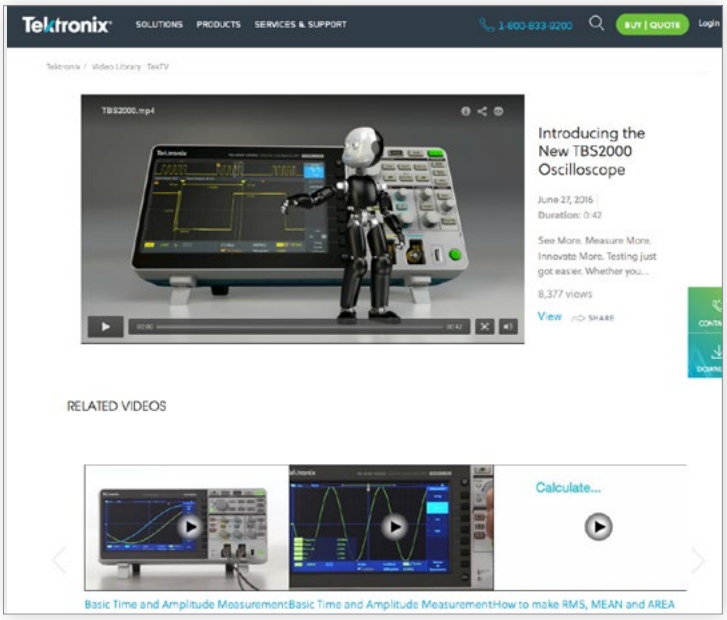
Keithley Instruments Perform Electrical Testing on Diode-based Devices

Wavelength stability over the entire operating temperature of these devices is critical to maintaining precision and minimize noise in received signals. Electrical efficiency measurement through precision trigger and synchronization of pulse width and duty cycle further optimize the required intensity and resolution of illumination. These directly impact the heat dissipation, power consumption, and battery life of the end system.

Keithley instruments perform such electrical tests as light intensity, forward voltage, lasing threshold current, quantum efficiency, dark current, the presence of “kink” or kink test, slope efficiency, thermistor resistance, temperature, capacitance, and L-I-V pulse testing.

FIND APPLICATION ADVICE NOW »

TEK RESOURCES

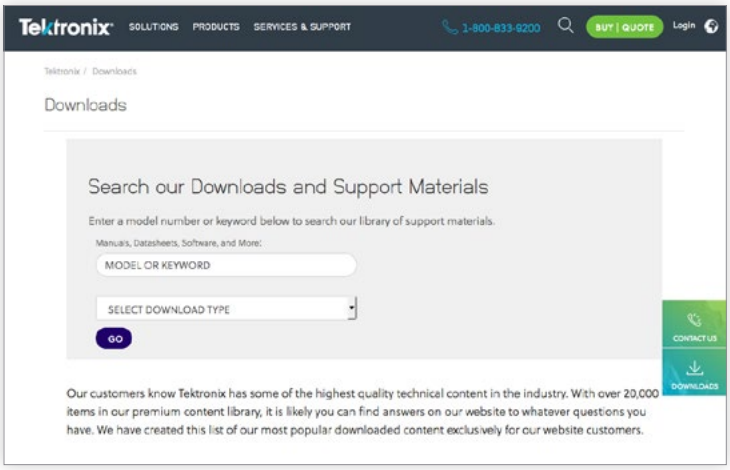


TEK TV

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**

CHECK OUT OUR SPECIAL OFFERS

Go to **tek.com/promotions**



DOWNLOAD LIBRARY

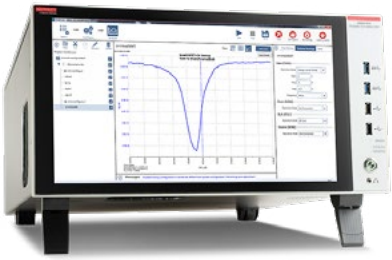
Our customers know Tektronix has some of the highest quality technical content in the industry. With over 20,000 items in our premium content library, you can find answers that enhance your understanding and help to solve your measurement challenges. Go to **tek.com/downloads**

WONDERING WHAT ELSE TEKTRONIX IS UP TO?

PRODUCTS OF INTEREST

5 SERIES MSO

The largest display. The most channels. The greatest experience.The 5 Series MSO is ready for today's (and tomorrow's) toughest challenges and sets a new standard for performance, analysis, and overall user experience.



4200A-SCS PARAMETER ANALYZER

This modular, customizable, and fully integrated parameter analyzer provides synchronized insight into current-voltage (I-V), capacitance-voltage (C-V), and ultra-fast pulsed I-V electrical characterization. The 4200A-SCS is our highest performance analyzer; it accelerates testing of complex devices for materials research, semiconductor device design, process development, or production.

EMCVu

EMCVu is a new all-in-one pre-compliance and debug solution for **all Real-time Spectrum Analyzers**. Incorporating pre-compliance testing into your development process reduces project risks and program costs, increases the probability of successfully passing EMI compliance testing the first time. Key featres include: Easy-to-use setup wizard; Built-in standards and accessory setup with push-button selection; Ambient noise calibration and comparison; Advanced debug functionality.

TTR500 VECTOR NETWORK ANALYZER

The TTR500 Series delivers better RF performance on key parameters like dynamic range, and now includes a built-in Bias Tee. Weather you're designing for RF device or teaching in the lab, the TTR500 Series VNA gives you all the capability and performance you need in a 6 GHz 2-port VNA at a price you can afford.

BSX SERIES BERTSCOPE

The BSX Series BERTScope bit error rate tester simplifies and accelerates receiver testing of Gen3 and Gen4 devices (up 32 Gb/s). With built in Tx equalization, protocol-aware pattern sequencing, and fast programmable handshaking support, the BSX Series is ideal for addressing the needs of test engineers from debug through compliance test.

TBS2000 SERIES

The new TBS2000 is designed to be great at performing an oscilloscope's most important jobs – looking at and measuring signals. It's a basic scope with class-leading performance: 70 MHz and 100 MHz models, 2 or 4 channels, large 9" WVGA display and 20M record length. The TBS2000 captures and displays significantly more signal to help you evaluate designs faster. The only thing it's missing is your imagination.

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, spectrum analyzers and vector network 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.

→ Page 64

DMM2110

This cost-effective, high precision instrument offers 5.5 digit resolution and is ideal for a wide range of manual, semi-automatic, and production test applications. It can be used as stand-alone benchtop instrument and as a component in test systems.

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TTR500

The TTR500 Series rivals the leading bench-top competition, at 40% lower price! It delivers better RF performance on key parameters like dynamic range, and now includes a built-in Bias Tee. Weather you're designing for RF device or teaching in the lab, the TTR500 Series VNA gives you all the capability and performance you need in a 6 GHz 2-port VNA at a price you can afford.

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TBS2000 Series

Students can take a hands-on approach, thanks to features that make learning engineering fundamentals easier.

- HelpEverywhere tips provide context for complex settings.
- Courseware ecosystem lets instructors load information into the TBS2000, to help students during labs.
- Full compatibility with TekSmartLab™ network software helps instructors set up and monitor many instruments from one PC.

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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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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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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

Premium and Extended Warranty Plans from Tektronix

Tektronix offers a diverse range of repair and calibration plans designed to safeguard your investment and extend the life of your products. With more than 70 years of experience in test and measurement solutions, Tektronix delivers the industry's highest level of quality calibration and repair services. TEK.COM/SERVICE

TEKTRONIX FACTORY CERTIFIED SERVICE PLANS:

TEK CARE AND KEITHLEY CARE

- Extends the life of your warranty (3 or 5 year plans available).
- Quick and convenient. One phone call starts the repair process.
- Covers equipment, parts, labor and transportation.
- Includes applicable software, safety and reliability updates.
- Reduces repair turnaround time.

TOTAL PROTECTION

- Choose between a 3 or 5 year extended warranty plan.
- First and only plan in the industry to offer coverage for accidental damage.
- Wear and tear protection.
- Covers damage caused by electrostatic discharge and electrical overstress.
- Free Factory certified calibration with repair (if necessary).

GOLD CARE

- Choose between a 3 or 5 year extended warranty plan.
- Loaner product (of equal or higher performance) shipped within 48 hours.
- Technical Support – Priority access to Global Tektronix Customer Call Center.
- Covers damage caused by electrostatic discharge and electrical overstress.
- Free Factory certified calibration with repair (if necessary)

ANNUAL CALIBRATION

- Choose from multi-year contracts or single-event calibrations.
- Fast, accurate and accredited service.
- Restored performance adjustments included.
- Applicable software, safety, and reliability updates.
- Calibration records retention using CalWeb®, a Tektronix web-based calibration management application.

TEKTRONIX SERVICE OPTION SUMMARY:

	TEK CARE PLAN		KEITHLEY CARE PLAN		TOTAL PRODUCT PROTECTION	GOLD CARE
TYPE OF SERVICE	REPAIR	CALIBRATION	REPAIR	CALIBRATION	REPAIR	REPAIR
Options available at Point of Sale	R3 R5	C3 C5	EW 3Y-EW 5Y-EW	3Y - STD 3Y - 17025 5Y - STD 5Y - 17025	T3 T5	G3 G5
Software firmware, safety, and reliability updates as applicable	✓	✓	✓	✓	✓	✓
Priority on-bench service	✓	✓	✓	✓	✓	✓
Provides for 2 or 4 calibration events		✓				
Provides for 3 or 5 calibration events				✓		
Includes adjustments as necessary to return product to near factory performance		✓		✓		
Extension of product warranty 2 or 4 additional years to maximum 5 years	✓				✓	✓
Extension of product warranty 1, 2 or 4 additional years to maximum 5 years			✓			
Free factory certified calibration with each repair (if necessary)	✓		✓		✓	✓
Free in-country shipping	✓		✓		✓	✓
Coverage of user-caused EOS and ESD damage					✓	✓
Coverage of accidental damage plus wear and tear					✓	
Loaner shipped within 48 hours[1]						✓

[1] Plan guarantees 90% immediate loaner availability or 99% availability within 5 days

MULTI-BRAND CALIBRATION AND ASSET MANAGEMENT

Global Reach & Comprehensive Calibration Service Capabilities

As the world's leading provider of multi-brand calibration services, we calibrate more than 140,000 instruments from 9,000 different manufactures using commercially available service documentation. Tekronix offers a variety of calibration service levels including ANSI Z540.1, ISO/IEC 17025, and ISO 9001 at our accredited laboratories.

- Electrical
- Pressure/Vacuum
- Physical/Dimensional
- Flow
- Mass
- Telecom
- RF/Microwave
- Xray/Radiography
- Fiber Optics
- Temperature
- Humidity
- Sound
- Light
- Magnetics
- Vibration
- and More!

*Capabilities may vary by region

LEARN MORE »

Asset Management and SaaS Software Platform

CalWeb®

- One-Stop Shop for Managing your Calibration Program
- Compliant with the FDA's 21 CFR Parts 11 and 820
- Cloud-Based with Flexible Configurations
- Multi-layered Security
- Excellent Reliability with 99.5% Uptime
- Intuitive User Interface
- Mobile Device Support
- Global Support in 10 Languages

Managed Services

Tektronix frees managers of the burden of day-to-day management of their calibration programs. By relying on Tektronix' asset management expertise, our clients can focus on their core competencies and leave the calibration management to us.

Asset Exchange Program:
Tek delivers calibrated assets in exchange for non-calibrated assets.

Assets On Demand: Tek manages equipment pool to deploy, withdraw and loan equipment.

Procurement: Tek manages the procurement and delivery of equipment and supplies.

Inventory Control/Tagging: Tek labels and tracks customer equipment.

Equipment Disposal: Tek manages disposal of unneeded assets.

Preventative Maintenance: Tek manages non-calibration related equipment maintenance.

OSCILLOSCOPES

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

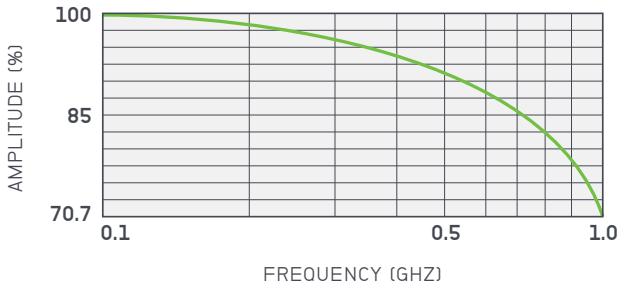


FIG 01 /
Typical frequency response curve for a general purpose oscilloscope

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.

CHOOSING YOUR OSCILLOSCOPE

Engineers, technicians and educators all have different workloads, different measurement needs, and different environments. To meet your needs Tektronix offers a wide range of oscilloscopes. This guide gives an overview of the various types of oscilloscopes currently available, along with high-level specifications that you can use for comparison.

If you need a refresher on oscilloscope specifications, download the XYZs of Oscilloscopes Primer.

TYPES OF OSCILLOSCOPES

Mixed Domain Oscilloscopes – 100 MHz to 1 GHz

The new standard for design and debug work. They offer the same capabilities as mixed signal oscilloscopes, but they also offer a built-in spectrum analyzer, adding RF debugging to the analog/digital capabilities.

Mixed Signal Oscilloscopes – 70 MHz to 2 GHz

The engineer's choice for design and debug. They combine traditional oscilloscope input channels with digital input channels, long record length with powerful search features, and protocol support for serial buses.

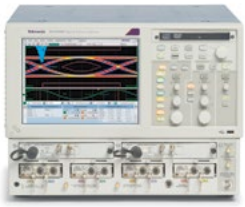
Advanced Signal Analysis Oscilloscopes – 350 MHz to 70 GHz

The emphasis is on analysis. They provide high acquisition performance and run Windows, thus supporting a wide range of analysis software. MSO versions include digital channels. They can be equipped for serial data analysis, jitter analysis, standards testing, and serial decoding capability.

This Changes Everything

With a remarkably innovative pinch-swipe-zoom touchscreen user interface, the industry's largest high-definition display, and 4, 6, or 8 FlexChannel™ inputs that let you measure one analog or eight digital signals, the 5 Series MSO is ready for today's toughest challenges, and tomorrow's too. It sets a new standard for performance, analysis, and overall user experience.

LEARN MORE



Sampling Oscilloscopes – DC to 80 GHz

For very high speed signal analysis, both electrical and optical, our sampling oscilloscopes support jitter and noise analysis with ultra-low jitter acquisitions. They also perform TDR and S-parameter measurements.

Basic Oscilloscopes – 30 MHz to 200 MHz

For basic signal visualization and more, these instruments are solid performers with ample supporting materials, and generous warranties. Special features for education.

Battery Powered Oscilloscopes with Isolated Channels – 100 MHz to 200 MHz

Safely and easily make 4-channel floating measurements, including 3-phase power measurements

TDS Series Oscilloscopes – 50 MHz to 500 MHz

These capable industry-favorites have a large installed base, and thousands of companies rely on them as part of their test and measurement fleets. They continue to be fully supported.

MIXED SIGNAL AND MIXED DOMAIN OSCILLOSCOPES

	MSO/DPO2000B	MDO3000
Additional Resources	DATA SHEET	DATA SHEET VIRTUAL TOUR
Channels	2, 4 analog channels; 16 digital channels (MSO2000B)	2, 4 analog channels; 16 digital channels (MDO3MSO option) 1 spectrum analyzer input 1 Arbitrary/Function Generator (MDO3AFG 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 FD*, 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 FD, 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	44 Automated Measurements, Waveform and Screen Cursors, Advanced Math, FFT, Measurement Statistics, Waveform Histograms 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
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 • Add security for password control of ports and firmware updates

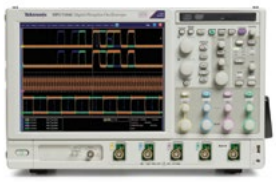
MIXED SIGNAL AND MIXED DOMAIN OSCILLOSCOPES

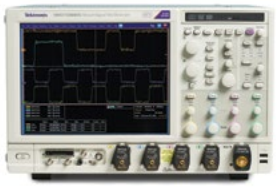
	MDO4000C
Additional Resources	DATA SHEET
Channels	4 analog channels; 16 digital channels (with MDO4MSO option); 1 spectrum analyzer input (with SA3 or SA6 option); 1 Arbitrary/Function Generator (with MDO4AFG option)
Bandwidth	200 MHz to 1 GHz
Spectrum Analyzer Frequency Range	Optional: 9 kHz - 3 GHz 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)
Max Record Length	20 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 FD*, 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
Optional Serial Bus Decode and Analysis	DPO4AERO: ARINC 429, MIL-STD-1553 DPO4AUDIO: I²S, LJ, RJ, TDM DPO4AUTO: CAN FD, CAN and LIN DPO4AUTOMAX: CAN FD, CAN, LIN and FlexRay DPO4COMP: RS-232/422/485/UART DPO4EMBD: I²C, SPI DPO4ENET: 10Base-T, 100Base-TX Ethernet DPO4USB: USB DPO4BND: Enables DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID
Connectivity	USB Host (x4), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Core 2011 Compliant), Video Out, GPIB* *Optional
Waveform Math and Analysis	44 Automated Measurements, Waveform and Screen Cursors,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
Software	PC Communications Software: OpenChoice® Desktop Vector Signal Analysis Software: SignalVu-PC
Upgrade	• Increase bandwidth • Add Arbitrary/Function Generator • Add 16 digital channels • Add or upgrade spectrum analyzer channel • Add measurements & analysis (power, limit/mask, video, RF trigger) • Add serial bus triggering and decode • Add security for password control of ports and firmware updates

ADVANCED SIGNAL ANALYSIS OSCILLOSCOPES

	MSO/DPO5000B	5 SERIES MSO
Additional Resources	DATA SHEET	DATA SHEET
Channels	4 analog channels; 16 digital channels (MSO5000B)	4, 6, and 8 FlexChannels® Input; 8 digital channels per FlexChannel (optional); 1 Arbitrary/Function Generator (with 5-AFG option)
Bandwidth	350 MHz to 2 GHz	350 MHz to 2 GHz
Sample Rate	5 GS/s to 10 GS/s (analog); 60.6 ps (16.5 GS/s) MagniVu™ (digital)	6.25 GS/s (analog); 6.25 GS/s (digital)
Max Record Length	Up to 250 Mpoints	Up to 125 Mpoints
Trigger Types	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*, USB*, Ethernet*, CAN*, LIN*, FlexRay*, MIL-STD-1553*, Parallel (MSO5000B), Visual Trigger *Optional	Edge, Sequence, Logic, Pulse Width, Runt, Timeout, Window, Setup and Hold, Rise/Fall Time, I²C*, SPI*, USB*, Ethernet*, CAN*, CAN FD*, LIN*, FlexRay*, RS-232/422/485/UART*, I²S/LJ/RJ/ TDM*, MIL-STD-1553*, ARINC 429*, Parallel *Optional
Optional Serial Bus Decode and Analysis	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	5-SRAERO: MIL-STD-1553, ARINC 429 5-SRAUDIO: I²S, LJ, RJ, TDM 5-SRAUTO: CAN, CAN FD, LIN, FlexRay 5-SRCOMP: RS-232/422/485/UART 5-SREMBD: I²C, SPI 5-SRENET: Ethernet 5-SRUSB2: USB 2.0
Connectivity	USB Host (x6), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), Video Out, GPIB* *Optional	USB Host (x7), USB 3.0 Device, LAN (10/100/1000 Base-T Ethernet, 1.4 LXI Core 2011 Compliant), Display Port, DVI-D, Video Out
Waveform Math and Analysis	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.	36 Automated Measurements, Waveform and Screen Cursors, Arithmetic Waveform Math, FFT, Advanced Math, Measurement Statistics Optional: 5-DJA: DPOJET Advanced Jitter and Eye Diagram Analysis; DVM/Trigger Frequency Counter (free with product registration); 5-PWR: Advanced Power Measurements.
Software	Optional: TekScope Anywhere™	Optional: TekScope Anywhere™
Upgrade	• 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	• Add serial bus triggering and decode • Add digital channels with each TLP058 logic probe • Add extended record length, up to 125 Mpoints • Add measurements and analysis (jitter)

ADVANCED SIGNAL ANALYSIS OSCILLOSCOPES





	DPO7000C	MSO/DPO70000
Additional Resources	DATA SHEET	DATA SHEET VIRTUAL TOUR
Channels	4 analog channels	4 analog channels; 16 digital channels (MSO70000)
Bandwidth	500 MHz to 3.5 GHz	4 GHz to 33 GHz Analog
Sample Rate	10 GS/s to 40 GS/s	25 GS/s to 100 GS/s (analog); 80 ps (12.5 GS/s) (digital)
Max Record Length	Up to 500 Mpoints	Up to 1Gpoints
Trigger Types	Pinpoint™ Triggering, Edge, Glitch, Pulse Width, Runt, Time-out, Transition. Setup/Hold, Pattern, State, Window, Trigger Delay (by Time and by Event), I²C*, SPI*, USB (Low, Full)*, RS-232/422/485/UART*, I²C*, SPI*, USB*, Ethernet*, CAN*, LIN*, FlexRay*, RS-232/422/485/UART*, MIL-STD-1553*, Visual Trigger *Optional	Pinpoint™ Triggering, Edge, Glitch, Pulse Width, Runt, Time-out, Transition, Setup/Hold, Pattern, State, Window, Trigger Delay (by Time and by Event), I²C*, SPI*, USB (Low, Full)*, RS-232/422/485/UART*, Serial Pattern*, Visual Trigger* *Optional
Optional Serial Bus Decode and Analysis	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-PCIE: PCI Express SR-USB: USB	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-PCIE: PCI Express; SR-USB: USB; SR-810B: 8b/10b; 10G-KR: 10GBASE-KR/KR4
Connectivity	USB Host (x5), LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), GPIB, eSATA, DVI, VGA	USB Host (x5), LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), GPIB, eSATA, DVI, VGA
Waveform Math and Analysis	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; D-PHY: MIPI D-PHY Essentials; 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	53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms Optional: BRR: BroadR-Reach Compliance Test; DDR Memory Bus Analysis; DPOJET Advanced Jitter and Eye Diagram Analysis; Ethernet Compliance; Waveform Limit Testing; Mask Testing; Power Analysis; USB2 and USB3 Compliance and Analysis; USB Power Adapter/ EPS Compliance Automated Test Solution; MOST 50/150 Compliance Test; SignalVu Vector Signal Analysis; HDMI Compliance Test; HSIC Electrical Validation; MIPI D-PHY and M-PHY Characterization and Analysis; SAS Testing; SFP+ Compliance and Debug; Serial Data Link Analysis; 10G-KR Compliance and Debug; PCIe Compliance and Debug; Thunderbolt Characterization, Compliance and Debug; UHS Measurements; PAM4 Transmitter Analysis Software; SignalCorrect Cable, Channel and Probe Compensation Software
Software	Optional: TekScope Anywhere™	Optional: TekScope Anywhere™
Upgrade	• Trade in older DPO7000 Series models for credit toward the newest DPO7000C version (50% credit of the old scope price) • Add extended record length, up to 500 Mpoints • Add serial bus compliance testing • Add measurements and analysis (power, jitter, mask, RF) • Add serial bus triggering and decode	• Increase bandwidth • Add 16 digital channels • Upgrade older platforms to the latest platforms • Add extended record length, up to 1 Gpoints • Add serial bus compliance testing • Add measurements and analysis (jitter, DDR, mask, RF) • Add serial bus triggering and decode

ADVANCED SIGNAL ANALYSIS AND SAMPLING OSCILLOSCOPES

	DP070000SX	DSA8300
Additional Resources	DATA SHEET	DATA SHEET
Channels	2 or 4 analog channels	Six modules support up to 8 single ended or 4 differential channels and/or 2 optical channels
Bandwidth	23 GHz to 70 GHz	Up to 70+ GHz Electrical bandwidth and 80+ Optical bandwidth modules available with intrinsic jitter as low as <100 fs RMS
Sample Rate	50 GS/s to 200 GS/s	300 ks/s Maximum sample rate
Max Record Length	Up to 1Gpoints	50 to 16,000 per channel native record length; with up to 1M points when using available IConnect Signal Integrity Software, 10M samples (100k unit intervals, 100 samples per unit interval) when equipped with available 80SJNB Jitter, Noise and BER Analysis software
Trigger Types	Pinpoint™ Triggering, Edge, Glitch, Pulse Width, Runt, Time-out, Transition, Setup/Hold, Pattern, State, Window, Trigger Delay (by Time and by Event), Visual Trigger* *Optional	Clock Input/Prescale Trigger, TDR clock (generated internally), Clock Recovery from Optical Sampling modules and Electrical Clock Recovery modules, and Phase Reference time base supports acquisitions Free Run mode and Trigger Direct Input for <100 fs RMS intrinsic jitter typical
Optional Serial Bus Decode and Analysis	SR-COMP: RS-232/422/485/UART; SR-EMBD: I2C, SPI; SR-ENET: 10/100Base-T Ethernet SR-PCIE: PCI Express; SR-USB: USB; SR-810B: 8b/10b	80SJNB Jitter, Noise, BER, Serial Data Link and PAM4 Analysis Software; IConnect Signal Integrity Software; 100GBASE-SR4 Transmitter & Dispersion Eye Closure (TDEC) Automation Test Solution
Connectivity	USB2.0 Host (4 on front)/3.0 Host (4 on rear), USB Device, LAN (10/100/1000 Base-T Ethernet, LXI Class C Compliant), DVI, VGA, DisplayPort (2)	3 USB 2.0 Port(s) connector on the front panel, 4 USB 2.0 Ports on the rear panel; LAN PORT, RJ-45 connector, supports 10BASE-T, 100BASE-T, 1000BASE-T on rear panel; 1 Serial Port, DB-9 COM1, COM2 ports; 1 DVI IEEE488.2 connector on rear panel; 1 DVI connector, female on rear panel, DVI to VGA 15-pin D-sub connector adapter provided; PS2 Serial Ports Mouse and keyboard inputs; Audio Ports 1/8 in. microphone input and line output
Waveform Math and Analysis	53 Automated Measurements, Waveform and Screen Cursors, Arithmetic and Advanced Waveform Math, FFT, Measurement Statistics, Waveform Histograms **Optional:** DPOJET Noise, Jitter and Eye Analysis Tools; Frequency Counter-Timer; PAM4 Transmitter Analysis Software; Serial Data Link Analysis; 10G/40G/100G KR4/CR4 Transmitter Compliance; DDR Memory Bus Analysis; DisplayPort 1.2/1.4 Test Software; MIPI D-PHY Transmitter Debug and Compliance Test Solution; EDP Compliance Test Package; Ethernet Compliance Testing; Fiber Channel Essentials; HDMI 2.0 Analysis and Compliance; High Speed Serial Link Training Analysis; HDMI Compliance Testing; MIPI M-PHY Debug and Compliance Test; NBASE-T TekExpress Conformance and Debug Software; PCI Express Gen1/2/3/4 TekExpress Compliance/Debug; Power Measurement and Analysis Software; SAS-3 Tx Compliance Test; SATA PHY Transmitter Test; SignalCorrect Cable, Channel, and Probe Compensation Software; SFP+ Compliance and Debug Solution; Embedded Serial Triggering and Analysis (I2C, SPI); USB 2.0/3.0/3.1 Automated Compliance Test; SignalVu Vector Signal Analysis	Over 120 automated measurements include RZ, NRZ, and pulse signal types, and the following measurement types, plus 8 math waveforms using the following math functions: Add, Subtract, Multiply, Divide, Average, Differentiate, Exponential, Integrate, Natural Log, Log, Magnitude, Min, Max, Square Root, and Filter. In addition, measurement values can be utilized as scalars in math waveform definitions; Mask support for many applications, standard masks are available as predefined, built-in masks; Automated Masked Margin based on Mask Hit Ratio as required by many standards.
Software	**Optional:** TekScope Anywhere™	Windows® 7 Ultimate (32-bit) Operating System; IConnect Signal Integrity Software for frequency domain analysis, S-parameter measurements, and impedance characterization 80SJNB Jitter, Noise, BER, and Serial Link analysis including Cross-Talk aware TJ (BUJ and PAM4 Analysis); 80SJARB Jitter Analysis of Arbitrary Data with J2-J9 measurements, and support for pattern lengths to PRBS31; 100GBASE-SR4 (IEEE 802.3bm) optical transmitter characterization measurements, including TDEC, signaling rate, Average Launch Power, OMA, ER, Transmitter Eye Mask
Upgrade	• Increase bandwidth • Upgrade older platforms to the latest platforms • Add extended record length, up to 1 G points • Add measurements and analysis (jitter, mask, RF)	• Modular architecture lets you add channels or bandwidth • Add TDR, optical and electrical standards support • Add advanced analysis, compliance test, frequency domain analysis software • Add clock recovery trigger pickoff (CRTP) to select optical modules • Enhance system jitter floor performance to <100 fs RMS

BASIC OSCILLOSCOPES

	TBS1000	TBS1000B/ TBS1000B-EDU	TBS2000
Additional Resources	DATA SHEET VIRTUAL TOUR	DATA SHEET VIRTUAL TOUR	DATA SHEET VIRTUAL TOUR
Channels	4	2	2, 4
Bandwidth	60 MHz to 150 MHz	30 MHz* to 200 MHz * 30 MHz TBS1032B available in North America and Europe	70 MHz , 100 MHz
Sample Rate	1 GS/s	500 MS/s to 2 GS/s	1 GS/s
Max Record Length	2.5 k points	2.5 k points	20 M points
Trigger Types	Edge, Pulse (width), Video	Edge, Pulse (width), Video	Edge, Pulse (width), Runt
Optional Serial Bus Decode and Analysis	—	—	—
Connectivity	USB Host, USB Device, **Optional:** GPIB	USB Host, USB Device, **Optional:** GPIB	USB Host, Wi-Fi adapter support, 10/100 Base-T Ethernet port
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	32 Automated Measurements, Arithmetic Waveform Math, FFT, Frequency Counter
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 Courseware Editor
Battery Operation	—	—	—

Teaching Oscilloscopes

TBS2000 and TBS1000B-EDU Oscilloscopes have unique features designed to meet the needs of schools and universities. They use an innovative courseware system that enables educators to build teaching materials into the oscilloscope. Along with a powerful PC Courseware Editor Tool and a courseware website, these oscilloscopes support a complete education ecosystem that makes it easier to teach engineering and easier to learn.

LEARN MORE

BATTERY POWERED OSCILLOSCOPES WITH ISOLATED CHANNELS AND TDS SERIES OSCILLOSCOPES




	THS3000	TPS2000B	TDS2000C	TDS3000C
Additional Resources	DATA SHEET	DATA SHEET	DATA SHEET	DATA SHEET
Channels	4 (isolated)	2, 4 (isolated)	2, 4	2, 4
Bandwidth	100 MHz to 200 MHz	100 MHz to 200 MHz	50 MHz to 200 MHz	100 MHz to 500 MHz
Sample Rate	2.5 GS/s to 5 GS/s	1 GS/s to 2 GS/s	500 MS/s to 2 GS/s	1.25 GS/s to 5 GS/s
Max Record Length	10 k points	2.5 k points	2.5 k points	10 k points
Trigger Types	Edge, Pulse (width), Event, Video, Non-interlaced	Edge, Pulse (width), Video	Edge, Pulse (width), Video	Edge, Logic (Pattern, State), Pulse (Glitch, Width, Runt, Slew Rate), Video, **Optional:** Extended Video, Comm
Optional Serial Bus Decode and Analysis	—	—	—	—
Connectivity	USB Host, USB Device	RS-232 (includes RS-232-to-USB Host Serial Cable), Centronics, CompactFlash	USB Host, USB Device, **Optional:** GPIB	USB Host, LAN (10Base-T Ethernet) **Optional:** TDS3GV Module: GPIB, RS-232, and Video Out
Waveform Math and Analysis	21 Automated Measurements, Arithmetic Waveform Math, FFT	11 Automated Measurements, Arithmetic Waveform Math, FFT Optional: TPS2PWR1: Power Measurement 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 & Custom Video Triggering
Software	PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop	PC Communications Software: OpenChoice® Desktop
Battery Operation	One THSBAT Battery Pack Included Standard	One TPSBAT Battery Pack Included Standard	—	Requires Optional TDS3BATC Battery Pack

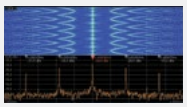
DATA SHEET

VIRTUAL TOUR

360° VIEW

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
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
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
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
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
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
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
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
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
MDO3102	2	16	1 GHz	5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 1 GHz / 9 kHz - 3 GHz
MDO3104	4	16	1 GHz	5 GS/s	500 MS/s / 8.25 GS/s	1	9 kHz - 1 GHz / 9 kHz - 3 GHz

INSTRUMENT OPTIONS**

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

APPLICATION MODULES

MDO3BND	Enables MDO3AERO, MDO3AUDIO, MDO3AUTO, MDO3COMP, MDO3EMBD, MDO3FLEX, MDO3LMT, MDO3PWR, MDO3USB
Serial Bus Triggering and Protocol Analysis	
MDO3AERO	Aerospace (ARINC 429, MIL-STD-1553)
MDO3AUDIO	Audio (I^2S, LJ, RJ and TDM)
MDO3AUTO	Automotive (CAN FD, CAN, LIN)
MDO3COMP	Computer (RS-232)

APPLICATION MODULES

Serial Bus Triggering and Protocol Analysis	
MDO3EMBD	Embedded (I^2C, SPI)
MDO3FLEX	Automotive (FlexRay)
MDO3USB*	USB 2.0 (LS, FS, HS)
Additional Analysis	
MDO3PWR	Power Analysis
MDO3LMT	Limit/Mask Test

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0502	2X, 500 MHz, 300 V CAT II
High Voltage Probes	
TMDP0200	250X/25X, 200 MHz, ± 750 V / ± 75 V
THDP0200	1000X/100X, 100 MHz, ± 6000 V / ± 600 V
TPP0850	50X, 800 MHz, 2500 V Peak
Isolated Probes	
TIVH Series	Up to 800 MHz, ± 2500 V_{Diff}, 60 kV_{CM}, 160 dB CMRR
TIVM Series	Up to 1 GHz, ± 50 V_{Diff}, 60 kV_{CM}, 160 dB CMRR

RECOMMENDED PROBES

Current Probes	
TCP0020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min
TCP0150	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 mA Min

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

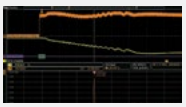
* USB 2.0 HS only available on 1 GHz analog bandwidth models and only for HS analysis.

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

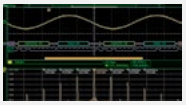
DATA SHEET

PRODUCT HIGHLIGHTS

- 6-in-1 oscilloscope offers a spectrum analyzer, arbitrary/function generator, logic analyzer, protocol analyzer and digital voltmeter
- Spectrum analyzer available in 3 GHz or 6 GHz frequency ranges with up to 3.75 GHz capture bandwidth
- 20 Mpoint record length on all channels
- >340,000 wfm/s max. waveform capture rate with FastAcq



Use it as an oscilloscope OR a spectrum analyzer OR combined to capture synchronized analog, digital and RF signals.



See how your RF spectrum changes over time or device state.

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 – perfect for troubleshooting problems with EMI or wireless communications.

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS*	ANALOG BANDWIDTH	ANALOG SAMPLE RATE	DIGITAL SAMPLE RATE MAIN/MAGNIVU™	SPECTRUM ANALYZER INPUT*	OPTIONAL SPECTRUM ANALYZER FREQUENCY RANGE
MDO4024C	4	16	200 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz
MDO4034C	4	16	350 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz
MDO4054C	4	16	500 MHz	2.5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz
MDO4104C	4	16	1 GHz	5 GS/s	500 MS/s /16.5 GS/s	1	9 kHz – 3 GHz or 6 GHz

* Optional

APPLICATION MODULES

DPO4BND	Enables DPO4AERO, DPO4AUDIO, DPO4AUTO, DPO4COMP, DPO4EMBD, DPO4ENET, DPO4LMT, DPO4PWR, DPO4USB, DPO4VID
Serial Bus Triggering and Protocol Analysis	
DPO4-AERO	Aerospace (ARINC 429, MIL-STD 1553)
DPO4-AUDIO	Audio (I^2S, LJ, RJ and TDM)
DPO4AUTO	Automotive (CAN FD, CAN, LIN)
DPO4-AUTOMAX	Automotive (CAN FD, CAN, LIN, FlexRay)
DPO4COMP	Computer (RS-232)
DPO4EMBD	Embedded (I^2C, SPI)
DPO4ENET	Ethernet (10BASE-T, 100BASE-TX)
DPO4USB*1	USB 2.0 (LS, FS, HS)
Additional Analysis	
MDO4TRIG	Adv. RF Power Level Triggering
DPO4PWR	Power Analysis
DPO4LMT	Limit and Mask Testing
DPO4VID	HDTV & Custom Video Triggering
SignalVu-PC-SVE	Vector Signal Analysis Software

RECOMMENDED PROBES

Passive Voltage Probes	
TPP1000	10X, 1 GHz, 300 V CAT II
TPP0500B	10X, 500 MHz, 300 V CAT II
TPP0502	2X, 500 MHz, 300 V CAT II
Active Voltage Probes	
TAP1500	10X, 1.5 GHz, ± 8 V
Differential Voltage Probes	
TDP0500	50X/5X, 500 MHz, ± 42 V/± 4.2 V
TDP1000	50X/5X, 1 GHz, ± 42 V/± 4.2 V
High Voltage Probes	
THDP0200	500X/50X, 200 MHz, ± 1500 V/± 150 V
TPP0850	50X, 800 MHz, 2500 V Peak
Current Probes	
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min
Isolated Probes	
TIVH Series	Up to 800 MHz, ± 2500 V_{Diff}, 60 kV_{CM}, 160 dB CMRR
TIVM Series	Up to 1 GHz, ± 50 V_{Diff}, 60 kV_{CM}, 160 dB CMRR

RECOMMENDED SERVICE

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

INSTRUMENT OPTIONS

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

SHIPS WITH PRODUCT

- Four TPP0500B (≤500 MHz models) or TPP1000 (1 GHz models) Passive Voltage Probes
- OpenChoice® Desktop Software, SignalVu-PC Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD
- Front Panel Cover, Accessory Bag, Power Cord
- 3-year Warranty

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

DATA SHEET

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
DPO2002B	2	—	70 MHz	1 GS/s
MSO2002B	2	16	70 MHz	1 GS/s
DPO2004B	4	—	70 MHz	1 GS/s
MSO2004B	4	16	70 MHz	1 GS/s
DPO2012B	2	—	100 MHz	1 GS/s
MSO2012B	2	16	100 MHz	1 GS/s
DPO2014B	4	—	100 MHz	1 GS/s
MSO2014B	4	16	100 MHz	1 GS/s
DPO2022B	2	—	200 MHz	1 GS/s
MSO2022B	2	16	200 MHz	1 GS/s
DPO2024B	4	—	200 MHz	1 GS/s
MSO2024B	4	16	200 MHz	1 GS/s

APPLICATION MODULES

Serial Bus Triggering and Protocol Analysis	
DPO2BND	Includes DPO2AUTO, DPO2COMP, DPO2EMBD
DPO2AUTO	Automotive (CAN, LIN)
DPO2COMP	Computer (RS-232/422/485/UART)
DPO2EMBD	Embedded (I^2C, SPI)

RECOMMENDED ACCESSORIES

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

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0200	200 MHz, 300 V CAT II
Active Voltage Probes	
TAP1500[*1]	10X, 1.5 GHz, ± 8 V
Differential Voltage Probes	
TDP0500[*1]	500 MHz, ± 42 V/± 4.25 V
High Voltage Probes	
THDP0200[*1]	200 MHz, ± 1500 V/± 150 V
TMDP0200[*1]	200 MHz, ± 750 V/± 75 V
THDP0100[*1]	100 MHz, ± 6000 V/± 600 V
Current Probes	
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min
TCP0030A[*1]	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min
TCP0150[*1]	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 mA Min

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

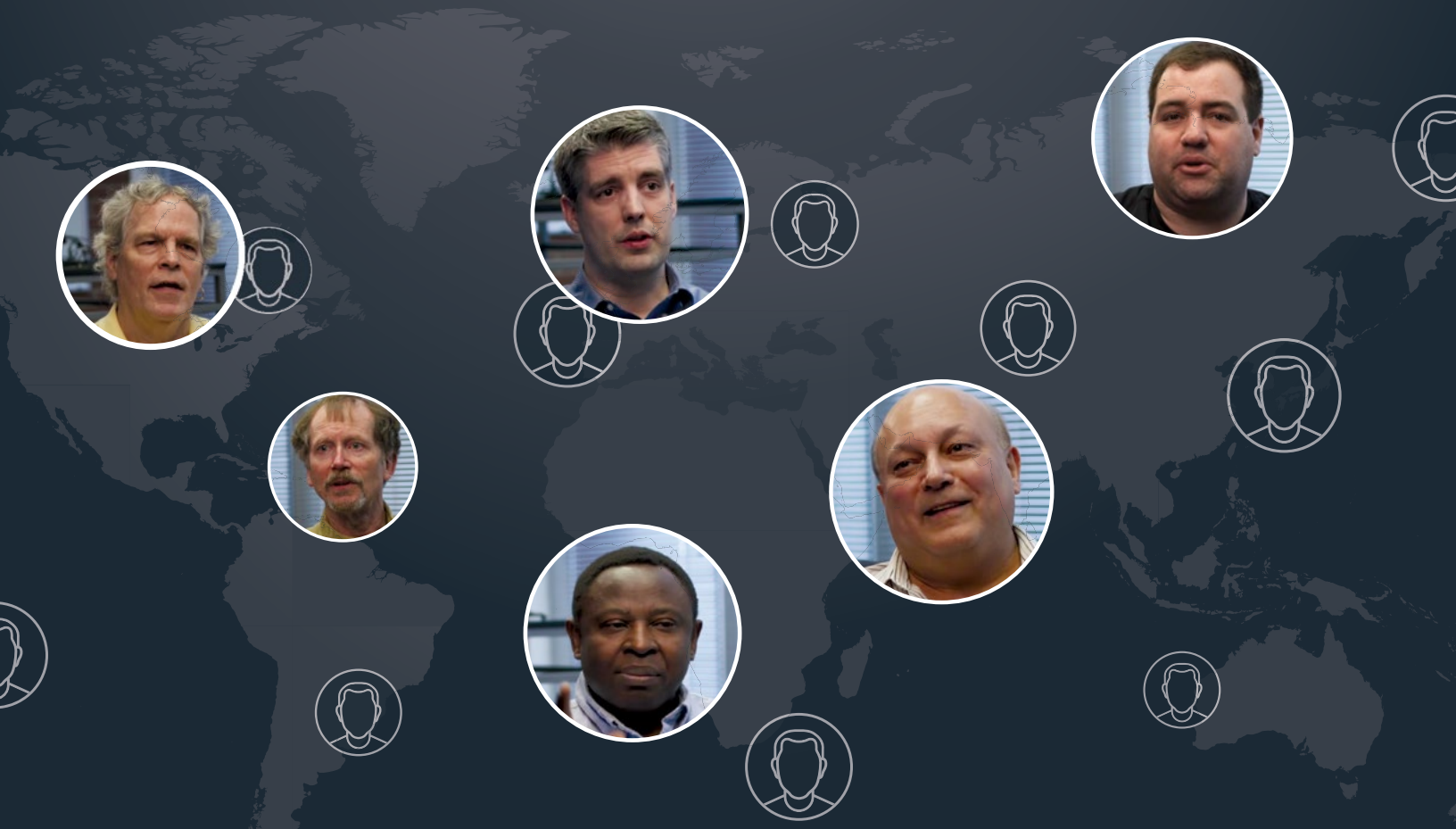
- One TPP0100 100MHz, 10X Passive Probe Per Analog Channel (70 MHz model)
- One TPP0200 200 MHz, 10X Passive Probe Per Analog Channel (100 MHz & 200 MHz models)
- One P6316 16 Channel Logic Probe (MSO only)
- OpenChoice® Desktop Software
- Calibration Certificate, Quick Reference Manual & Documentation on CD, Power Cord
- 5-year Warranty

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

THE NEW 5 -SERIES MSO:

“Just about everything I can think of that I would want in a scope.”

Habib H.
Design Engineer



“That big screen helps to manage the fact that you need all that data up there at the same time.”

David O.
Embedded Software Engineer

“I like the fact that it’s beautiful to look at!”

Jean T.
Test Engineer

“I was learning faster on this scope than I usually learn a new scope. The touch screen definitely makes it easier to use.”

Greg P.
Design Engineer

Tektronix®

15.6" HD (1,920 x 1,080) Display with Capacitive Touchscreen

FlexChannel Inputs

- 1 analog or 8 digital signals each

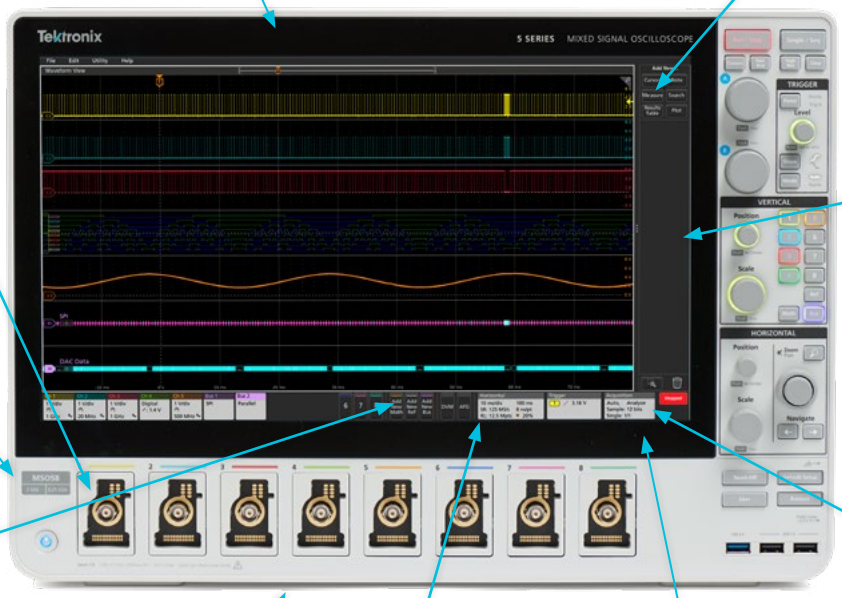
Available Bandwidth (upgradeable)

- 350 MHz
- 500 MHz
- 1 GHz
- 2 GHz

Protocol Options

Serial bus trigger and analysis

- I²C/SPI
- RS-232/UART
- CAN/CAN FD/LIN/FlexRay
- USB 2.0
- Ethernet
- Audio
- MIL-STD-1553/ARINC 4299



When removable SSD w/ Windows license is:

- Installed: scope boots as open Windows OS (w/ desktop)
- Not installed: scope boots as a dedicated scope

Built in Arbitrary/Function Generator Option

12-bit ADC and new High Res mode offer up to 16-bit vertical resolution.

Powerful Analysis

- 36 standard measurements with trend, histogram, and spectrum plots
- Advanced Jitter Analysis Option
- Advanced Power Measurement Options

Next generation user interface designed for both touch and mouse.

- Provides simple, intuitive scope operation
- Access controls directly through objects on the display rather than navigating menus to get to menus

Record Length

- 62.5 Mpts Standard
- 125 Mpts Optional

15.6" HD display | Pinch-swipe-zoom touchscreen | 4, 6, or 8 FlexChannel™ inputs | 12-bit analog to digital converters | 350 MHz to 2 GHz bandwidth

More than a remarkably intuitive user interface: a delightful experience.

Get the big picture and take total control, with the 15.6-inch HD touchscreen display. Use the capacitive pinch-zoom-swipe touchscreen, front panel controls, or mouse to analyze and manage multiple signals without fighting through menus.

Let no detail go unseen, with up to 16 bits of vertical resolution.

12-bit analog to digital converters deliver up to 16 bits of vertical resolution using advanced digital signal processing. See and measure small signal details, even if they're riding on large signals.

Buy what you need now. Add on as your needs change.

Performance - Bandwidth up to 2 GHz. Record Length up to 125 Mpoints.

Digital Inputs - TLP058 Logic Probes each provide 8 digital channels.

Operating System - Add Windows OS to run PC Software.

Signal Generation - Add a built-in Arbitrary/Function Generator.

Serial Bus - Decode/Trigger Support for key buses like I²C, SPI, USB 2, Ethernet, CAN, LIN, and many others.

Advanced Jitter Analysis -Comprehensive jitter decomposition and eye-diagram analysis.

Advanced Power Measurements -Automated, repeatable power measurements.

Don't run out of channels.

Available with 4, 6, or 8 FlexChannel® inputs. Each can be used to look at 1 high-resolution analog waveform or 8 digital logic waveforms, just by changing the probe.

DATA SHEET

VIRTUAL TOUR

VOTED 2017 INDUSTRY BEST - LEARN MORE!

5 Series MSO

With a remarkably innovative pinch-swipe-zoom touchscreen user interface, the industry's largest high-definition display, and 4, 6, or 8 FlexChannel® inputs that let you measure one analog or eight digital signals, the 5 Series MSO is ready for today's toughest challenges, and tomorrow's too. It sets a new standard for performance, analysis, and overall user experience.

PRODUCT HIGHLIGHTS

- 15.6 inch, HD capacitive touch display delivers unmatched signal visibility
- 4, 6 or 8 FlexChannel® inputs can each handle 1 analog or 8 digital signals
- 12-bit Analog-to-digital converts with enhanced resolution up to 16 bits
- Optional Arbitrary/Function Generator

Get the big picture with a 15.6 HD display. Use the capacitive pinch-zoom-swipe touchscreen, front panel controls, or mouse to analyze multiple signals with ease.

Don't run out of channel with 4, 6, or 8 FlexChannel inputs. Each can be used to look at 1 analog or 8 digital waveforms, just by changing the probe.

MODELS	INPUT CHANNELS	DIGITAL CHANNELS	BANDWIDTH	SAMPLE RATE
MSO54	4 FlexChannel inputs	8 to 32, in increments of 8 (optional)	350 MHz to 2 GHz (optional)	6.25 GS/s (analog); 6.25 GS/s (digital)
MSO56	6 FlexChannel inputs	8 to 48, in increments of 8 (optional)	350 MHz to 2 GHz (optional)	6.25 GS/s (analog); 6.25 GS/s (digital)
MSO58	8 FlexChannel inputs	8 to 64, in increments of 8 (optional)	350 MHz to 2 GHz (optional)	6.25 GS/s (analog); 6.25 GS/s (digital)

SOFTWARE PACKAGES

Serial Bus Triggering and Protocol Analysis	
5-SRAERO	MIL-STD-1553, ARINC 429
5-SRAUDIO	I²S, LJ, RJ, TDM
5-SRAUTO	CAN, CAN FD, LIN, FlexRay
5-SRCOMP	RS-232/422/485/UART
5-SREMBD	I²C, SPI
5-SRENET	Ethernet
5-SRUSB2	USB 2.0
Additional Analysis	
5-DJA	Advanced jitter and eye analysis
5-PWE	Advanced power measurements and analysis

INSTRUMENT OPTIONS

Bandwidth	
Opt. 5-BW-350	350 MHz
Opt. 5-BW-500	500 MHz
Opt. 5-BW-1000	1 GHz
Opt. 5-BW-2000	2 GHz
Extended Record Length	
Opt. 5-RL-125M	125 M/ch maximum
Arbitrary/Function Generator	
Opt. 5-AFG	
Windows Operating System on SSD	
Opt. 5-WIN	Removable SSD with Windows license

RECOMMENDED PROBES

Logic Probes	
TLP058	8-channel general purpose logic probe
Passive Voltage Probes	
TPP0502	2X, 500MHz, 300 V CAT II TekVPI
TPP1000	10X, 1 GHz, 300 V CAT II TekVPI
TPP0500B	10X, 500 MHz, 300 V CAT II TekVPI
Active Voltage Probes	
TAP1500	10x, 1.5 GHz, 8 V
TAP2500	10x, 2.5 GHz, 4 V
TAP3500	10x, 3.5 GHz, 4 V
Differential Voltage Probes	
TDP1500	10X, 1.5 GHz, ±8.5 V
TDP3500	5X, 3.5 GHz, ±2 V
Isolated Probes	
TIVM1/L	1 GHz, +/- 50 V Differential, > 60 kV Common Mode, 3m/10m
TIVH08/L	800 MHz, +/- 2.5kV Differential, > 60 kV Common Mode, 3m/10m
TIVH05/L	500 MHz, +/- 2.5 kV Differential, > 60 kV Common Mode, 3m/10m
TIVH02/L	200 MHz, +/- 2.5 kV Differential, > 60 kV Common Mode, 3m/10m

RECOMMENDED SERVICE

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

NEW! The 4 Series MSO is now available in a low-profile rackmount version called MSO58-LP

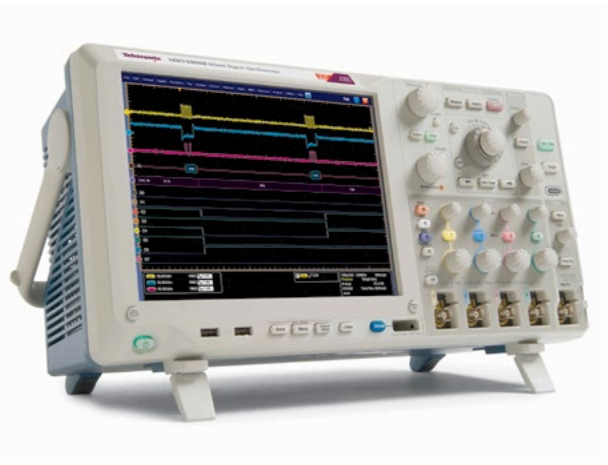
LEARN MORE »

RECOMMENDED PROBES

High Voltage Probes	
THDP0100	100x/1000x, 100MHz, 6 kV
THDP0200	**50x/500x, 200MHz, 1.5 kV**
TMDP0200	**25x/250x, 200MHz, 750 V**
TDP0500	**5X/50X, 500 MHz, ±42 V**
TDP1000	**5X/50X, 1 GHz, ±42 V**
Current Probes	
TCP0030A	DC - 120 MHz, DC: 30 A, Max RMS: 30 A, Peak: 50 A
TCP0020	DC - 50 MHz, DC: 20 A, Max RMS: 20 A, Peak: 100 A
TCP0150	DC - 20 MHz, DC: 150 A, Max RMS: 150 A, Peak: 500 A

SHIPS WITH PRODUCT

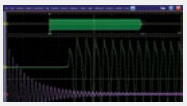
- One passive probe per FlexChannel; TPP0500B (for models with 350 MHz or 500 MHz bandwidth) or TPP1000 (for models with 1 GHz or 2 GHz bandwidth)
- Calibration certificate, Installation and safety manual
- Accessory pouch with integrated front cover, Mouse, Power cord
- 3-year warranty



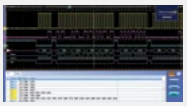
DATA SHEET

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)
- Windows 10 Enterprise 64-bit operating system with touch-screen display
- 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).

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.

MODELS	ANALOG CHANNELS	DIGITAL CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (4 CHANNELS/2 CHANNELS)	DIGITAL SAMPLE RATE MAIN/MAGNIVU™
DPO5034B	4	—	350 MHz	5 GS/s	—
MSO5034B	4	16	350 MHz	5 GS/s	500 MS/s /16.5 GS/s
DPO5054B	4	—	500 MHz	5 GS/s	—
MSO5054B	4	16	500 MHz	5 GS/s	500 MS/s /16.5 GS/s
DPO5104B	4	—	1 GHz	5 GS/s /10 GS/s	—
MSO5104B	4	16	1 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s
DPO5204B	4	—	2 GHz	5 GS/s /10 GS/s	—
MSO5204B	4	16	2 GHz	5 GS/s /10 GS/s	500 MS/s /16.5 GS/s

SOFTWARE PACKAGES

Serial Bus Triggering and Protocol Analysis	
SR-AERO	MIL-STD-1553B
SR-AUTO	CAN/LIN/FlexRay
SR-COMP	Computer (RS-232)
SR-DPHY	MIPI D-PHY
SR-EMBD	Embedded (I^2C, SPI)
SR-ENET	Ethernet
SR-USB	USB 2.0 (LS, FS, HS)
Compliance Test	
BRR	BroadR-Reach
ET3	Ethernet
MOST	MOST50/150
USB2	USB 2.0
Additional Analysis	
DDRA	DDR Memory
DJA	Advanced Jitter Analysis
HSIC	HSIC Electrical Characterization
PS2, PS3	Power Solution Bundles
PWR	Power Analysis
SVE	SignalVu RF Analysis
USBPWR	USB Power Compliance

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

RECOMMENDED PROBES

Passive Voltage Probes	
TPP1000	10X, 1 GHz, 300 V CAT II
TPP0502	2X, 500 MHz, 300 V CAT II
Active Voltage Probes	
TAP1500	10X, 1.5 GHz, ± 8 V
TAP2500	10X, 2.5 GHz, ± 4 V
Differential Voltage Probe	
TDP0500	500 MHz, ± 42 V/± 4.2 V
TDP1000	1 GHz, ± 42 V/± 4.2 V
TDP1500	1.5 GHz, ± 8.5 V/± 850 mV
High Voltage Probes	
TMDP0200	200 MHz, ± 750 V/± 75 V
THDP0200	200 MHz, ± 1500 V/± 150 V
THDP0100	100 MHz, ± 6000 V/± 600 V
TPP0850	50X, 800 MHz, 2500 V Peak
Current Probes	
TCP0020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min
TCP0150	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 m
Isolated Probes	
TIVH Series	Up to 800 MHz, ± 2500 V_{Diff}, 60 kV_{CM}, 160 dB CMRR
TIVM Series	Up to 1 GHz, ± 50 V_{Diff}, 60 kV_{CM}, 160 dB CMRR

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
Opt. 10RL	125M/Ch

Limitations apply. See data sheet for full details.

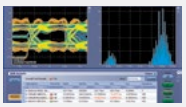
RECOMMENDED SERVICE

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

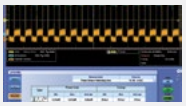
DATA SHEET

PRODUCT HIGHLIGHTS

- 500 MHz,1 GHz, 2.5 GHz, and 3.5 GHz models
- Windows 10 Enterprise 64-bit operating system and touch-screen display
- >250,000 wfm/s max. waveform capture rate with FastAcq™ technology
- Over 1400 available trigger combinations with Pinpoint® triggering
- Automated search and mark for waveform events
- 53 automated measurements and FFT analysis



Includes the DPOJET essentials jitter and eye pattern analysis software package - free.



Over 30 optional software packages available for specialized applications.

DPO7000C Series

Get into the details of critical high-speed signals and find the most elusive signal anomalies. These oscilloscopes offer measurement and decoding packages for many of today's communications and memory bus standards. Fast waveform capture rate, Pinpoint® triggering, and Visual Trigger & Search will help you solve the most frustrating troubleshooting mysteries, fast. And jitter analysis comes in every box.

MODELS	ANALOG CHANNELS	BANDWIDTH	RECORD LENGTH (1/2/4 CHANNELS)	ANALOG SAMPLE RATE
DPO7054C	4	500 MHz	125/50/25 M	20/10/5 GS/s
DPO7104C	4	1 GHz	125/50/25 M	20/10/5 GS/s
DPO7254C	4	2.5 GHz	125/50/25 M	40/20/10 GS/s
DPO7354C	4	3.5 GHz	125/50/25 M	40/20/10 GS/s

SOFTWARE PACKAGES

Serial Bus Triggering and Protocol Analysis	
SR-AERO	MIL-STD-1553B
SR-AUTO	CAN/LIN/FlexRay
SR-COMP	Computer (RS-232)
SR-DPHY	MIPI D-PHY
SR-EMBD	Embedded (I^2C, SPI)
SR-ENET	Ethernet
SR-PCIE	PCI Express
SR-USB	USB 2.0 (LS, FS, HS)
Compliance Test	
BRR	BroadR-Reach
ET3	Ethernet
MOST	MOST50/150
USB2	USB 2.0
Additional Analysis	
DDRA	DDR memory
DJA	Advanced Jitter Analysis
HSIC	HSIC Electrical Characterization
PS2, PS3	Power Solution Bundles
PWR	Power Analysis
SVE	SignalVu RF Analysis
USBPWR	USB Power Compliance

Additional software packages are available.
For a complete listing, please visit tek.com/dpo7000

RECOMMENDED PROBES

Active Voltage Probes	
TAP1500	10X, 1.5 GHz, ± 8 V
TAP2500	10X, 2.5 GHz, ± 4 V
TAP3500	10X, 3.5 GHz, ± 4 V
Differential Voltage Probe	
TDP0500	500 MHz, ± 42 V/± 4.2 V
TDP1000	1 GHz, ± 42 V/± 4.2 V
TDP1500	1.5 GHz, ± 8.5 V/± 850 mV
TDP3500	3.5 GHz, ± 2 V
High Voltage Probes	
TMDP0200	200 MHz, ± 750 V/± 75 V
THDP0200	200 MHz, ± 1500 V/± 150 V
THDP0100	100 MHz, ± 6000 V/± 600 V
Current Probes	
TCP0020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min
TCP0030A	120 MHz, 30 A DC/30 A RMS/50 A Peak/1 mA Min
TCP0150	20 MHz, 150 A DC/150 A RMS/500 A Peak/5 mA Min
Isolated Probes	
TIVH Series	Up to 800 MHz, ± 2500 V_{Diff}, 60 kV_{CM}, 160 dB CMRR
TIVM Series	Up to 1 GHz, ± 50 V_{Diff}, 60 kV_{CM}, 160 dB CMRR

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

- Four P6139B 500 MHz, 10X Passive Voltage Probes
- Calibration Certificate, Accessory Pouch, Mouse
- Front Panel Cover, Power Cord
- 1-year Warranty

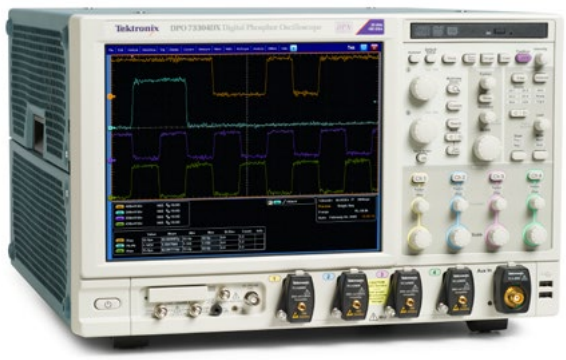
INSTRUMENT OPTIONS

Record Length	
Opt. 5RL	50M/Ch
Opt. 10RL[*1]	125M/Ch

Limitations apply. See data sheet for full details.
[*1] Not available on DPO7054C, DPO7104C

LEARN MORE DOWNLOAD

"Understanding and Characterizing Timing Jitter" Primer.

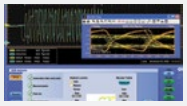


DATA SHEET

VIRTUAL TOUR

PRODUCT HIGHLIGHTS

- 4 to 33 GHz true analog bandwidth for measurements on the latest high-speed serial standards
- 100 GS/s Sample Rate on 2 Channels
- 16 Logic Channels with 80 ps Timing Resolution for Debug of Digital and Analog Signals (MSO70000 models)
- iCapture – One Connection for both Analog and Digital Signals (MSO70000 models)
- Fastest Waveform Capture Rate with >300,000 wfms/s Maximum
- Up to 1 Gpoints Record Length with MultiView Zoom™ for Quick Navigation and Advanced Search
- Visual Trigger to Precisely Qualify Triggers and Find Unique Events in Complex Waveforms



Nearly 50 Application-specific Solutions Enable Standard-specific Certification, Measurement Automation, and Extended Signal Analysis.

MSO/DPO70000 and DX Series

Whether you're at first power-up on your latest design, verifying compliance to the fastest standards, or researching fundamentals of the universe, you have the performance, precision, and tools to get your job done faster.

MODELS	ANALOG CHANNELS + DIGITAL CHANNELS	ANALOG BANDWIDTH	SAMPLE RATE (2/4 CHANNELS)	RECORD LENGTH (STD/OPT)
MSO/DPO70404C	4 (DPO), 4 + 16 (MSO)	4 GHz	25 GS/s	31 Mpoints/125 Mpoints
MSO/DPO70604C	4 (DPO), 4 + 16 (MSO)	6 GHz	25 GS/s	31 Mpoints/125 Mpoints
MSO/DPO70804C	4 (DPO), 4 + 16 (MSO)	8 GHz	25 GS/s	31 Mpoints/125 Mpoints
MSO/DPO71254C	4 (DPO), 4 + 16 (MSO)	12.5 GHz	100/50 GS/s	31 Mpoints/250 Mpoints
MSO/DPO71604C	4 (DPO), 4 + 16 (MSO)	16 GHz	100/50 GS/s	31 Mpoints/250 Mpoints
MSO/DPO72004C	4 (DPO), 4 + 16 (MSO)	20 GHz	100/50 GS/s	31 Mpoints/250 Mpoints
MSO/DPO72304DX	4 (DPO), 4 + 16 (MSO)	23 GHz	100/50 GS/s	31 Mpoints/1 Gpoints
MSO/DPO72504DX	4 (DPO), 4 + 16 (MSO)	25 GHz	100/50 GS/s	31 Mpoints/1 Gpoints
MSO/DPO73304DX	4 (DPO), 4 + 16 (MSO)	33 GHz	100/50 GS/s	31 Mpoints/1 Gpoints

SOFTWARE PACKAGES

Serial Bus Triggering and Protocol Analysis	
SR-AERO	MIL-STD-1553B
SR-AUTO	CAN/LIN/FlexRay
SR-COMP	Computer (RS-232)
SR-DPHY	MIPI D-PHY
SR-EMBD	Embedded (I^2C, SPI)
SR-ENET	10/100Base-T Ethernet
SR-PCIE	PCI Express
SR-USB	USB 2.0 (LS, FS) , USB 3.0
Compliance Test	
DisplayPort, Ethernet, HDMI, HSIC, MHL, MIPI D-PHY/M-PHY, SATA/SAS, SFP+, Thunderbolt, MOST50/150, USB 2.0/ USB 3.0/USB 3.1, USB Power Adapter/ EPS, 10GBASE-KR/KR4	
Additional Analysis	
MTH	Communications Mask Testing
DDRA	DDR Memory
DJA	Advanced Jitter and Eye Diagram
PWR	Power Analysis
SDLA64	Serial Data Link Analysis Visualizer
SVE	SignalVu RF Analysis
VET	Visual Trigger/Search
PAM4	Transmitter Analysis Software
Signal Correct	Cable, Channel and Probe Compensation Software

RECOMMENDED PROBES

DPO7OE1	Optical Probe, DC to 33 GHz
P7700	8 GHz to 20 GHz TriMode with TekFlex Connector Technology
P7600	25 GHz to 33 GHz TriMode with Remote Head Design
P6780	Differential Input Logic Probe (MSO Models)
P6750	D-Max Technology Probe (MSO Models)
P6717A	General-purpose Logic Probe (Standard on MSO Models)
P6250/ P6251	500 MHz/1 GHz 42 V Differential
TCPA300/ TCPA400	Series Current Measurement Systems

RECOMMENDED SERVICE

G3	Gold Care 3-year Extended Warranty
G5	Gold Care 5-year Extended Warranty
R3	3-year Extended Warranty
R5	5-year Extended Warranty

INSTRUMENT OPTIONS

Opt. ERRDT	Frame and Bit Error Rate Detector for High-speed Serial Standards
Opt. ST6G	Protocol Triggering and Decoding for 8b/10b-encoded Serial Signals up to 6.25 Gb/s
Opt. SSD	Solid State Drive
Opt. 5XL	62.5M/Ch Record Length (Standard on MSO Models)
Opt. 10XL	125M/Ch Record Length
Opt. 20XL	250M/Ch Record Length

SHIPS WITH PRODUCT

Accessory pouch, front cover, mouse, keyboard, user manual, (4) TekConnect® to 2.92 mm adapters and (1) TekConnect-to-BNC adapter, static protection wrist strap, MSO/DPO70000 software/GPIB reference on instrument HDD, performance verification procedure PDF file, calibration certificate documenting NIST traceability, Z 540-1 compliance and ISO9001, power cord, one-year warranty, MSO Models Include: P6717A Logic Probe, Logic Probe Deskew Fixture

Please see datasheet for a complete list of current software packages and options.

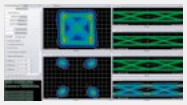
DATA SHEET

DPO70000SX Series

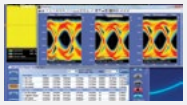
DPO70000SX 70 GHz Oscilloscope provides lowest-noise, real-time acquisition using Tektronix' patented Asynchronous Time Interleaving technology. Its compact, scalable package allows flexible system configurations. Get the most accurate real-time performance for ultra-bandwidth applications like coherent optical modulation, 100G/400G Datacom, wideband RF, and leading-edge research.

PRODUCT HIGHLIGHTS

- 70 GHz bandwidth with the industry's lowest noise, highest ENOB
- Compact, scalable package allows you to position units very close to the device under test
- UltraSync architecture ensures precise data synchronization and convenient Master/Extension operation in multi-unit systems
- 200 GS/s sample rate for 5 ps timing resolution
- Up to 1 Gpoints Record Length with MultiView Zoom for Quick Navigation and Advanced Search



Enable comprehensive analysis and presentation of optical modulation systems with Coherent Optical Modulation Analysis software.



Precisely characterize your system's performance with DPOJET Advanced Jitter and Eye Diagram measurement application.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	SAMPLE RATE	RECORD LENGTH (STD/OPT)
DPO77002SX	1, 2	70 GHz, 33 GHz	200GS/s, 100GS/s	62.5 Mpoints/1 Gpoints
DPS77004SX (2-unit system)	2, 4	70 GHz, 33 GHz	200GS/s, 100GS/s	62.5 Mpoints/1 Gpoints
DPO75002SX	1, 2	50 GHz, 33 GHz	200GS/s, 100GS/s	62.5 Mpoints/1 Gpoints
DPS75004SX (2-unit system)	2, 4	50 GHz, 33 GHz	200GS/s, 100GS/s	62.5 Mpoints/1 Gpoints
DPO73304SX	2, 4	33 GHz, 23 GHz	100GS/s, 50GS/s	62.5 Mpoints/1 Gpoints
DPS73308SX (2-unit system)	4, 4	33 GHz, 23 GHz	100GS/s, 50GS/s	62.5 Mpoints/1 Gpoints
DPO72304SX	2, 4	23 GHz, 23 GHz	100GS/s, 50GS/s	62.5 Mpoints/1 Gpoints

SOFTWARE PACKAGES

DJA	DPOJET Advanced Jitter and Eye Diagram Analysis
SDLA64	Serial Data Link Analysis Visualizer
SVE	SignalVu RF Analysis
VET	Visual Trigger/Search
PAM4	Transmitter Analysis Software
SC	SignalCorrect Cable, Channel and Probe Compensation Software
DDRA	DDR Memory Bus Analysis
D-PHY	MIPI D-PHY Debug and Compliance Test Software
DP13	DisplayPort 1.4 Source Test Automation Software
ET3	Ethernet Compliance Testing
FRQCNT	Frequency Counter-Timer
HSSLTA	High Speed Serial Link Training Analysis
HT3	HDMI Compliance Testing
M-PHYTX M-PHY	Automated Transmitter Solution
SDLA64	Serial Data Link Analysis Visualizer
PCE4	PCI Express Gen1/2/3/4 Compliance/Debug Software
SAS3	SAS-3 Tx Compliance Test Application

SOFTWARE PACKAGES

100G-TXE	100G Ethernet KR4/CR4/CAUI4 Transmitter Test
SATA-TSG	SATA PHY/TSG/OOB Transmitter Tests
USB2	USB 2.0 Automated Compliance Test
USBSSP-TX	USB 3.1 Automated TX Compliance Test
Serial Bus Analysis	
SR-810B	8b/10b
SR-COMP	Computer (RS-232)
SR-EMBD	Embedded (I2C, SPI)
SR-ENET	10/100Base-T Ethernet
SR-PCIE	PCI Express
SR-USB	UB 2.0 (LS, FS)

RECOMMENDED ACCESSORIES

DPO7RFK1	60 GHz RF Attenuator Kit
DPO7RFK2	60 GHz RF RF Signal Path Kit
DPO7RFK3	65 GHz RF Channel Timing Deskew Kit
DPO7RFC1	24-inch Matched Cable Pair
DPO7RFC2	24-inch Phase-Stable Coaxial Cable
DPO7RFC3	36-inch Phase-Stable Coaxial Cable

SHIPS WITH PRODUCT

Accessory pouch, front cover, mouse, keyboard, user manual, TekConnect® to 2.92 mm adapters, static protection wrist strap, DPO70000SX software/GPIB reference on instrument SSD, performance verification procedure PDF file, calibration certificate documenting NIST traceability, Z 540-1 compliance and ISO9001, power cord, one-year warranty

RECOMMENDED PROBES

DPO7OE1	Optical Probe, DC to 33 GHz
P7600	25 GHz to 33 GHz TriMode with Remote Head Design
P7700	8 GHz to 20 GHz TriMode with TekFlex Connector Technology

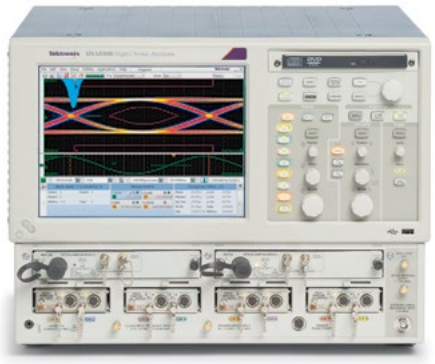
INSTRUMENT OPTIONS

Opt. 10XL	125M/Ch Record Length
Opt. 20XL	250M/Ch Record Length
Opt. 50XL	500M/Ch Record Length/1G on 2 Channels

RECOMMENDED SERVICE

G3	Gold Care 3-year Extended Warranty
G5	Gold Care 5-year Extended Warranty
R3	3-year Extended Warranty
R5	5-year Extended Warranty

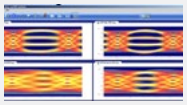
Please see datasheet for a complete list of current software packages and options.



DATA SHEET

PRODUCT HIGHLIGHTS

- High Optical Sensitivity, Low Noise, and Wide Dynamic Range of the Optical Sampling Modules
- Remote Samplers or Compact Sampling Extender Module Cables allowing the Sampler to be located at the DUT
- Fully Calibrated Clock Recovery Solutions – No need to manually calibrate for data pick-off losses



The PAM-4 analysis has full signal path emulation tools that support Continuous Time Linear Equalizer (CTLE), channel emulators described by S-parameters or TDR waveforms, and receiver equalizers Feed Forward (FFE) and Decision Feedback (DFE).

Design characterization is supported beyond 100GBASE-SR4 compliance requirements for all measurements.

DSA8300 Series

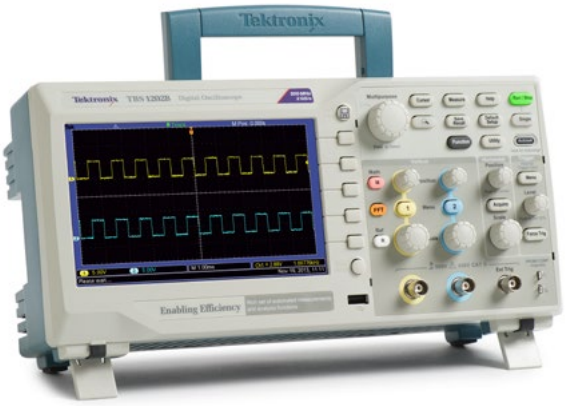
With an industry-leading intrinsic jitter of less than 100 femtoseconds for extremely accurate device characterization, the DSA8300 Series provides comprehensive support for Optical Communications Standards, Time Domain Reflectometry and S-parameters. The DSA8300 Digital Sampling Oscilloscope is a complete high-speed PHY Layer testing platform for data communications from 155 Mb/sec to 100 Gb/sec.

OPTICAL MODULES	CHANNELS	BANDWIDTH	CLOCK RECOVERY (MIN/MAX)	FILTER RATES SUPPORTED (MIN/MAX)
80C07B	1	2.5 GHz	155 Mb/s - 2.666 Gb/s	155 Mb/s - 2.5 Gb/s
80C08D	1	12.5 GHz	9.8 Gb/s - 12.6 Gb/s	9.953 Gb/s - 12.5 Gb/s
80C10C	1	80+ GHz	Provided by Opt. CRTP and CR286A	25.8 Gb/s - 43.018 Gb/s
80C11B	1	30 GHz	9.8 Gb/s - 12.6 Gb/s	9.953 - 12.5 Gb/s
80C12B	1	12 GHz	Provided by CR125A	155 Mb/s - 11.3 Gb/s
80C14	1	14 GHz	Provided by CR175A or CR286A	8.500 Gb/s - 14.025 Gb/s
80C15	1	32 GHz	Provided by CR286A	25.781 Gb/s - 28.05 Gb/s
80C17	1	>30 GHz	NA	25.781 Gb/s - 28.05 Gb/s
80C18	2	>30 GHz	NA	25.781 Gb/s - 28.05 Gb/s

TDR / ELECTRICAL MODULES	CHANNELS	VERTICAL RESOLUTION	BANDWIDTH	TDR SYSTEM INCIDENT RISE TIME (10%-90%)	TDR SYSTEM REFLECTED RISE TIME (10%-90%)	MONOLITHIC OR REMOTE
80E04	2	16 bits	20 GHz	23 ps	28 ps	Monolithic
80E08B	2	16 bits	30 GHz	18 ps	20 ps	Remote (2 meter)
80E10B	2	16 bits	50 GHz	12 ps	15 ps	Remote (2 meter)

ELECTRICAL MODULES	CHANNELS	VERTICAL RESOLUTION	BANDWIDTH	RISE TIME (10%-90%)	MONOLITHIC OR REMOTE
80E03	2	16 bits	20 GHz	17.5 ps	Monolithic
80E07B	2	16 bits	30 GHz	11.7 ps	Remote (2 meter)
80E09B	2	16 bits	60 GHz	5.8 ps	Remote (2 meter)
80E11	2	16 bits	70+ GHz	5 ps	Monolithic
80E11X1	1	16 bits	70+ GHz	5 ps	Monolithic

ACCESSORIES MODULES	DESCRIPTION	FUNCTIONALITY
82A04B	Phase Reference Module	<100 fs RMS timebase jitter
80A02	EOS/ESD Protection Module	EOS/ESD protection
80A03	Probe Adapter Module	Sampling Scope Probe Connectivity
80X01	1 Meter Extender Cable	Clock Recovery Phase Alignment
80X02	2 Meter Extender Cable	Position Module Close To DUT
80A08	Accessory Kit	Connection to DUT and CRU @ 25G
CR125A, CR175A, CR286A	Clock Recovery Instrument	Continues Clock Recovery, 150 Mb/s to 28.6 Gb/s
80A09	EOS/ESD Static Protection Device	26 GHz EOS/ESD Static Protection

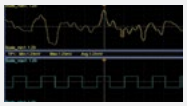


DATA SHEET

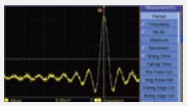
VIRTUAL TOUR

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)
TBS1032B*	2	30 MHz	500 MS/s
TBS1052B	2	50 MHz	1 GS/s
TBS1072B	2	70 MHz	1 GS/s
TBS1102B	2	100 MHz	2 GS/s
TBS1152B	2	150 MHz	2 GS/s
TBS1202B	2	200 MHz	2 GS/s

*Available only for North America and Europe.

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0201	10X, 200 MHz, 300 V CAT II
TPP0101	10X, 100 MHz, 300 V CAT II
TPP0051	10X, 50 MHz, 300 V CAT II
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II
High Voltage Probes	
P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V
P5100A	100X, 500 MHz, 2500 V Peak
P6015A	1000X, 75 MHz, 20 kV Peak

RECOMMENDED PROBES

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

RECOMMENDED ACCESSORIES

TEK-USB-488	GPIB-to-USB converter
AC2100	Soft Carrying Case

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

LEARN WHY

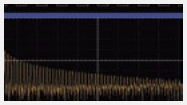
The TBS1000B or TDS2000C instrument can be your most reliable and cost effective scope. Download “Reliability by Design” Technical Brief.

DATA SHEET

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 course-ware 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)
TBS1052B-EDU	2	50 MHz	1 GS/s
TBS1072B-EDU	2	70 MHz	1 GS/s
TBS1102B-EDU	2	100 MHz	2 GS/s
TBS1152B-EDU	2	150 MHz	2 GS/s
TBS1202B-EDU	2	200 MHz	2 GS/s

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0201	10X, 200 MHz, 300 V CAT II
TPP0101	10X, 100 MHz, 300 V CAT II
TPP0051	10X, 50 MHz, 300 V CAT II
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II
High Voltage Probes	
P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V
P5100A	100X, 500 MHz, 2500 V Peak
P6015A	1000X, 75 MHz, 20 kV Peak

RECOMMENDED PROBES

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

RECOMMENDED ACCESSORIES

TEK-USB-488	GPIB-to-USB converter
AC2100	Soft Carrying Case

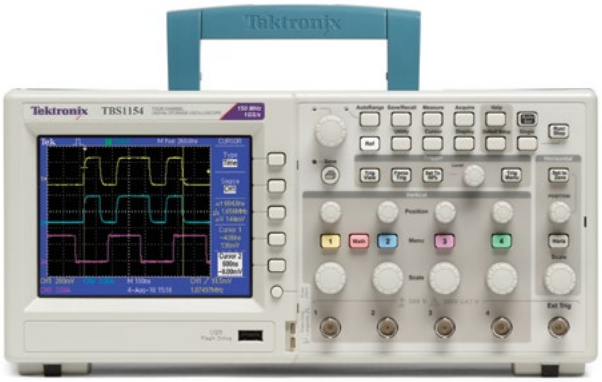
ANOTHER PRODUCT FOR CONSIDERATION

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

HELP STUDENTS master the use of an oscilloscope with the included courseware software and labs. Click here to learn more.

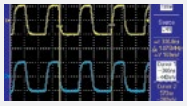


DATA SHEET

VIRTUAL TOUR

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)
TBS1064	4	60 MHz	1 GS/s
TBS1104	4	100 MHz	1 GS/s
TBS1154	4	150 MHz	1 GS/s

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0201	10X, 200 MHz, 300 V CAT II
TPP0101	10X, 100 MHz, 300 V CAT II
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II
High Voltage Probes	
P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V
P5100A	100X, 500 MHz, 2500 V Peak
P6015A	1000X, 75 MHz, 20 kV Peak

RECOMMENDED PROBES

Current Probes	
P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply
AC2100	Soft Carrying Case

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

LEARN HOW

to capture your signals accurately.
Download the Technical Brief "Be Sure to Capture the Complete Picture."

Tektronix®

SEE MORE.
MEASURE MORE.
INNOVATE MORE.

THE TBS2000 OSCILLOSCOPE

Testing just got easier. Whether you need a scope every day or just every now and then, it's an affordable scope that delivers class-leading performance. The only thing it's missing is your imagination.

INNOVATE MORE

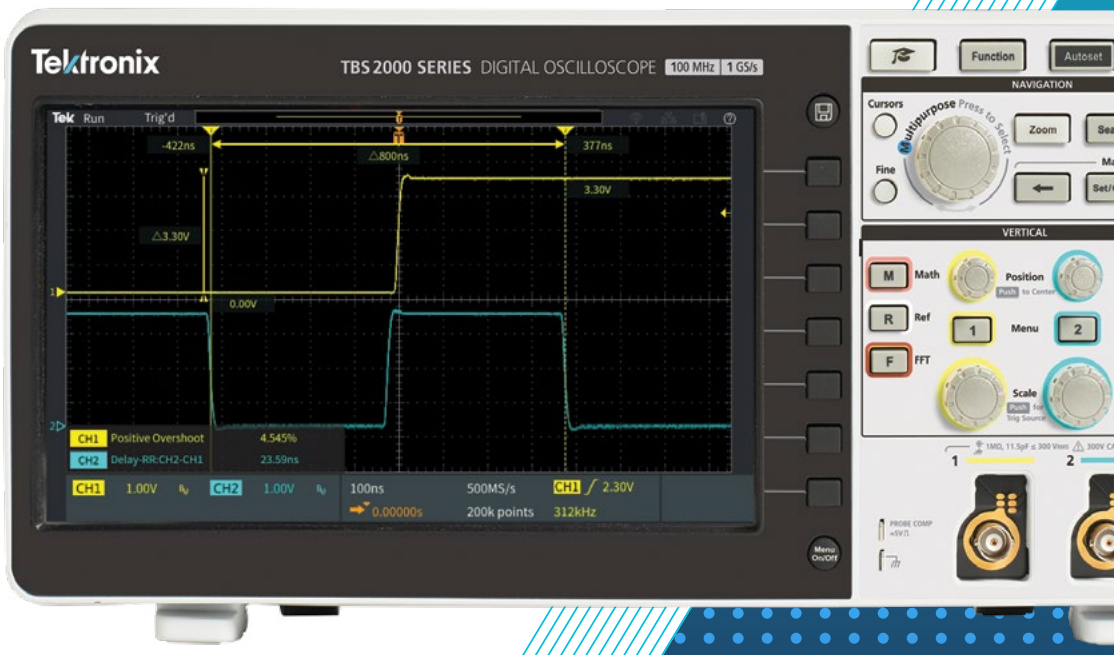
- 2 or 4 analog channels
- 70 / 100 MHz
- 20M record length—longest in class
- 5-year warranty

SEE MORE

- Big 9" display
- 15 horizontal divisions

MEASURE MORE

- 32 automated measurements
- on-waveform cursor readouts



DATA SHEET

PRODUCT HIGHLIGHTS

- 9-inch WVGA display with 15 horizontal divisions
- Long 20M record length
- 32 automated measurements with gating
- TekVPI® Probe Interface allows you to use latest-generation active voltage and current probes

A large, 9-inch display, with 15 horizontal divisions lets you see more of your signal.

Select any of the 32 available measurements from a single screen, with helpful tips on each.

TBS2000 Series

When you see more signal, you find anomalies faster. With an impressive 9-in. WVGA display and 15 horizontal divisions—the most in its class—the TBS2000 not only helps you see the big picture, it gives you a clearer picture. Plus a 20-million point record length lets you easily capture long time windows. The TBS2000 also includes courseware support for education labs.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE (PER CHANNEL)
TBS2072	2	70 MHz	1 GS/s
TBS2102	2	100 MHz	1 GS/s
TBS2074	4	70 MHz	1 GS/s
TBS2104	4	100 MHz	1 GS/s

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0100	100 MHz, 10X Passive Voltage Probe
P2221	1X/10X, 200 MHz Passive Voltage Probe
Differential Voltage Probes	
TDP0500	500 MHz TekVPI® differential voltage probe with ±42 V differential input voltage
Hight Voltage Probes	
P5100A	±2.5 kV, 500 MHz, 100X high-voltage passive probe
THDP0200	±1.5 kV 200 MHz high-voltage differential probe
THDP0100	±6 kV 100 MHz high-voltage differential probe

RECOMMENDED PROBES

Current Probes	
TCP0020	50 MHz TekVPI® 20 Ampere AC/DC current probe
TCP0030A	120 MHz TekVPI 30 Ampere AC/DC current probe
TCP0150	20 MHz TekVPI 150 Ampere AC/DC current probe

RECOMMENDED ACCESSORIES

TPA-BNC	TekVPI to TekProbe® BNC adapter
ACD2000	Soft transit case, for TBS2072 and TBS2102
ACD4000	Soft transit case, for TBS2074 and TBS2104
TEK-USB-WIFI	USB Wi-Fi 2 dongle for TBS2000 series only

SHIPS WITH PRODUCT

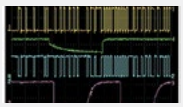
- TPP0100 100 MHz, 10x passive probe (one per analog channel)
- Documentation CD
- Installation and safety manual
- Programmer manual, available on documentation CD and on Tek Web
- Power Cord
- Calibration certificate documenting traceability to National Metrology Institute(s) and ISO9001 quality system registration

LEARN MORE with "The Anatomy of Digital Oscilloscopes" poster that shows many of parts that work together in an oscilloscope. It includes a block diagram of a scope's signal path to show you what happens between the signal input and the display.

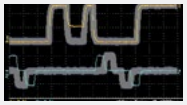
DATA SHEET

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
THS3014	4	100 MHz	2.5 GS/s
THS3014-TK	4	100 MHz	2.5 GS/s
THS3024	4	200 MHz	5 GS/s
THS3024-TK	4	200 MHz	5 GS/s

RECOMMENDED PROBES

Passive Voltage Probes	
THP0301 - Y/B/M/G	300 MHz, 10X, 300 V CAT III
High Voltage Probes	
P5150*1	50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II
P5122	100X, 200 MHz, 1000 V RMS CAT II
Current Probes	
P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min

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

RECOMMENDED ACCESSORIES

THSBAT	Additional Spare Battery
THSCHG*2	Battery Charger
119-7900-XX	AC Power Adapter

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty

*2 Does not include AC power adapter.

ANOTHER PRODUCT FOR CONSIDERATION

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

SHIPS WITH PRODUCT

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

*3 Non-TK models only
*4 TK models only

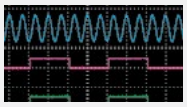
LEARN MORE DOWNLOAD

"Fundamentals of Floating Measurements and Isolated Input Oscilloscopes" Application Note.

DATA SHEET

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
TPS2012B	2	100 MHz	1 GS/s
TPS2014B	4	100 MHz	1 GS/s
TPS2024B	4	200 MHz	2 GS/s

APPLICATION MODULES

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0201	10X, 200 MHz, 300 V CAT II
TPP0101	10X, 100 MHz, 300 V CAT II
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II
High Voltage Probes	
P5150	50X, 500 MHz, 2500 V Peak, 1000 V RMS CAT II
P5122	100X, 200 MHz, 1000 V RMS CAT II
Current Probes	
P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min

ANOTHER PRODUCT FOR CONSIDERATION

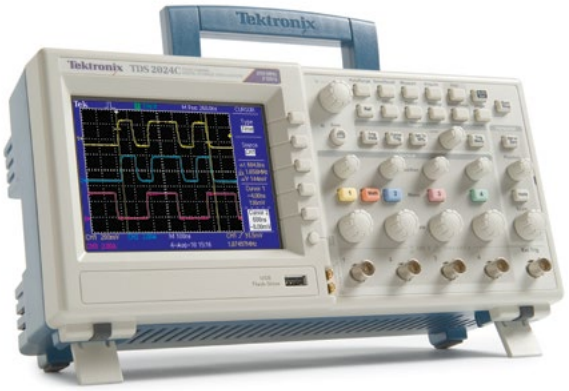
For very accurate power measurements, the PA1000 Power Analyzer offers 0.05% basic accuracy.

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

LEARN MORE DOWNLOAD

"Fundamentals of Floating Measurements and Isolated Input Oscilloscopes" Application Note.



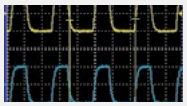
DATA SHEET

TDS2000C Series

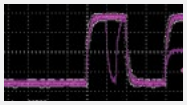
Big performance has never been so small. Featuring Digital Real-Time Sampling, you can trust your scope to accurately capture your signal. Add in USB connectivity, 16 automated measurements and even a built-in help system; this compact oscilloscope helps you get more done in less time. It's true: big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

PRODUCT HIGHLIGHTS

- 10X oversampling on all channels
- Bright color display
- 16 automated measurements and FFT analysis
- Built-in help system and probe check wizard
- Front-panel USB host port and rear-panel USB device port
- Lifetime Warranty*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.

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE
TDS2001C	2	50 MHz	500 MS/s
TDS2002C	2	70 MHz	1 GS/s
TDS2004C	4	70 MHz	1 GS/s
TDS2012C	2	100 MHz	2 GS/s
TDS2014C	4	100 MHz	2 GS/s
TDS2022C	2	200 MHz	2 GS/s
TDS2024C	4	200 MHz	2 GS/s

RECOMMENDED PROBES

Current Probes	
P6021A	60 MHz, 10.6 A RMS/250 A Peak/10 mA Min
P6022	120 MHz, 4 A RMS/100 A Peak/1 mA Min
A621	5 Hz to 50 kHz, 1000 A RMS/2000 A Peak/10 mA Min
A622	100 kHz, 100 A DC/71 A RMS/100 A Peak/10 mA Min
TCP2020	50 MHz, 20 A DC/20 A RMS/100 A Peak/10 mA Min

RECOMMENDED ACCESSORIES

1103	TEKPROBE Power Supply
AC2100	Soft Carrying Case

RECOMMENDED PROBES

Passive Voltage Probes	
TPP0201	10X, 200 MHz, 300 V CAT II
TPP0101	10X, 100 MHz, 300 V CAT II
P2220	10X/1X, 200 MHz/6 MHz, 300 V CAT II/150 V CAT II
High Voltage Probes	
P5200A	500X/50X, 50 MHz, ± 1300 V/± 130 V
P5100A	100X, 500 MHz, 2500 V Peak
P6015A	1000X, 75 MHz, 20 kV Peak

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

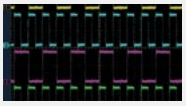
*1 For complete details visit www.tektronix.com/lifetimewarranty

DATA SHEET

PRODUCT HIGHLIGHTS

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

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



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

TDS3000C Series

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

MODELS	ANALOG CHANNELS	ANALOG BANDWIDTH	ANALOG SAMPLE RATE
TDS3012C	2	100 MHz	1.25 GS/s
TDS3014C	4	100 MHz	1.25 GS/s
TDS3032C	2	300 MHz	2.5 GS/s
TDS3034C	4	300 MHz	2.5 GS/s
TDS3052C	2	500 MHz	5 GS/s
TDS3054C	4	500 MHz	5 GS/s

APPLICATION MODULES

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty

RECOMMENDED PROBES

Passive Voltage Probes	
P6139B	10X, 500 MHz, 300 V CAT II
Active Voltage Probes	
P6243	10X, 1 GHz, ± 8 V
Differential Voltage Probes	
P6246*1	10X/1X, 400 MHz, ± 8.5 V/± 850 mV
High Voltage Probes	
P5205A	500X/50X, 100 MHz, ± 1300 V/± 130 V
P5210A	1000X/100X, 50 MHz, ± 5600 V/± 560 V
P5100A	100X, 500 MHz, 2500 V Peak
Current Voltage Probes	
TCP202A	50 MHz, 15 A DC/10.6 A RMS/50 A Peak/10 mA Min

*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 APPLICATION SOFTWARE

The newest wireless, embedded systems technologies, serial data and video designs present you with unprecedented measurement challenges. Our standards expertise and measurement tools help you meet them all. You can shorten your design cycle, gain greater technical insight and improve team productivity to bring new products and services to market much faster.

Advanced Analysis Applications

Jitter, Eye Diagram, Timing and Noise Analysis

- DPOJET provides a comprehensive set of timing, amplitude, jitter and noise measurements with integrated clock recovery, reporting and plotting capability to quickly analyze and root cause issues related to next generation designs.

Serial Data Link Analysis

- SDLA Visualizer provides channel de-embed, emulation, reference equalizers and IBI-ABI model support to enable characterization, performance and what-if analysis of next generation high speed designs.

Vector Signal Analysis

- SignalVu allows users to characterize wideband spectral events, demodulate the signal and verify designs such as wideband radar, high datarate satellite links and frequency hopping radios, WLAN, WiGig or Bluetooth devices

Power Analysis

- DPOPWR provides automated measurements for analyzing power quality, current harmonics, switching loss, slew rate, modulation and ripple

SignalCorrect

- SignalCorrect allows quick characterization and de-embed of the cables, fixtures and other types of interconnects using the DPO/MSO70000 series of oscilloscopes enabling signal margin recovery leading to more accurate measurements.

DDR Memory Bus Analysis

- DDRA provides a comprehensive validation and debug suite for most DDR versions, speeding the resolution of complex memory signaling issues

Visual Trigger

- Precisely qualify triggers and find unique events in complex waveforms

Protocol Decode and Triggering

- Observe specific system behavior to isolate specific states or locate invalid bus sequences
- Automotive
- Wi-Fi

Compliance and Debug Applications

TekExpress Automation software provides automated instrument setup, multi-instrument control, test execution, and reporting to characterize Transmitter/Receiver performance and easily verify designs comply with the latest High Speed Serial Standards. Additionally, standard specific DPOJet software allows the user to seamlessly debug designs in the event of compliance failure.

A sample of the supported technologies are:

Computer Peripherals

- PCI Express
- USB
- Thunderbolt

Storage

- SATA
- SAS

Mobile

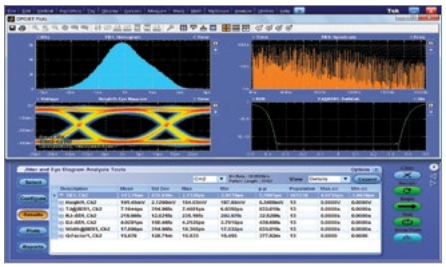
- MIPI M-PHY
- MIPI D-PHY
- MIPI C-PHY

Display

- HDMI
- MHL
- DisplayPort

Data Communications

- 10/100/1000 BaseT
- 10G BaseT
- SFP+
- 10GKR
- 16G FibreChannel
- 100G/400G
- QSFP



Jitter/Noise Analysis

Solving Jitter Debug and Analysis Challenges Made Easy

Tektronix offers 3 different platforms to root cause and debug Jitter related issues on next generation high speed interfaces.

The DPO/MSO70000 Series of Real-Time Oscilloscopes with DPOJET software offer a complete suite of timing, amplitude, jitter and noise measurement with integrated clock recovery, powerful plotting capability and reporting capability on a flexible platform enabling debug and validation of multi-gigabit interfaces.

The DSA8300 Series of sampling oscilloscopes with 80SJNB Jitter, Noise and BER analysis software offers separation of both jitter and noise provides highly accurate extrapolation of BER and eye contour.

The BSX Series BERTScope JMAP option offers BER-based jitter separation, including deterministic jitter decomposition and long pattern support, for data rates up to 32 Gbits/sec.

For solving jitter problems on low level and low noise signals or for measuring the very small amounts of jitter often found on clocks, Tektronix offers Real-Time Spectrum Analyzers (RTSA) that enable engineers to measure and characterize jitter over a wide dynamic range.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000, DPO7000, MSO/DPO5000 Series Real-time Oscilloscopes
- DPOJET Jitter, Timing and Eye Diagram and Analysis software
- DSA8300 Sampling Oscilloscopes
- 80SJNB Jitter, Noise and BER Analysis software
- IConnect® and MeasureXtractor™ Signal Integrity TDR and S-parameter software

Bit Error Rate Analyzers:

- BSX Series BERTScope
- CR Series Clock Recovery Modules

Probing:

- P7700 Differential Probes with P77C292MM
- P7700 TriMode Differential Probes

Real-Time Spectrum Analyzers:

- RSA5000 Series

For more information visit: tek.com/jitter

Signal Integrity, Time Domain Reflectometry (TDR) and S-parameter Measurements

Improve Connector and Channel Visibility

Signal integrity measurements are a critical step in the process of developing digital systems. The task of isolating and eliminating signal integrity problems anywhere in the system is challenging. These solutions let you quickly locate and trace faults back to their source, eliminating schedule delays and reliability issues.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- DSA8300 Sampling Oscilloscope
  - True-differential TDR up to 50 GHz bandwidth
  - 15 ps reflected rise time and 12 ps incident rise time
  - Up to 4 dual-channel TDR modules for fast, accurate multi-lane impedance and S-parameter characterization
- IConnect® advanced and MeasureXtractor™
- Signal Integrity TDR and S-parameter software
- 80SJNB Jitter, Noise and BER Analysis software

Probing:

- P8018 Single Ended/P80318 Differential Hand-Held TDR Probes

For more information visit: tek.com/signal_integrity

SignalCorrect

SignalCorrect software with the TCS70902 step generator offers quick characterization capability of cables, fixtures and other connectors on a DPO/MSO70000 series of real-time oscilloscopes and automatically remove their effects to gain margin and reduce failures or costly over design.

The step by step characterization process driven by a wizard like user interface enables even novice users to quickly and easily perform the characterization in a repeatable manner.

RECOMMENDED PRODUCTS:

- DPO/MSO70000 Series Real-Time Oscilloscopes
- Opt SC SignalCorrect Software
- TCS70902 Calibration Source
- Opt 292 Kit
- Opt 240 Kit

For more information visit: http://www.tek.com/datasheet/signalcorrect%E2%84%A2-software-and-tcs70902-calibration-source-datasheet

Serial Data Link Analysis Solutions

Unmatched Visibility for Greater Insight into Your Design

Tektronix offers serial data link analysis solutions for high speed serial and memory interfaces for both real-time and sampling oscilloscopes. Reflections, loss, and cross-coupling resulting from the measurement setup can be accurately removed from the acquired signal using Serial Data Link Analysis (SDLA) Visualizer. SDLA Visualizer also provides the functionality to model transmitter equalization, embed channel models, and apply receiver equalization to open closed eyes. Jitter and Eye measurements can be taken at any point in the measurement or simulated link using DPOJET Jitter and Eye Analysis software. SDLA Visualizer and DPOJET are Tektronix' advanced analysis solutions for MSO/DPO70000 Series real-time oscilloscopes.

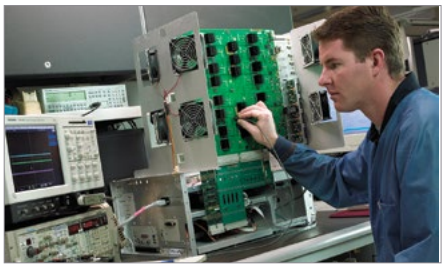
For those applications that require a sampling scope, Tektronix offers the DSA8300 sampling oscilloscope with 80SJNB Jitter, Noise, and BER analysis software. 80SJNB provides the capability to specify a de-embed filter, Time Domain Waveform or S-Parameter for channel de-embedding and DFE/FFE Equalization. 80SJNB analysis software also performs timing and noise-based analysis to get a 3-D view of the eye diagram performance for deep, accurate evaluation on signals with speeds up to and beyond 50 GHz.

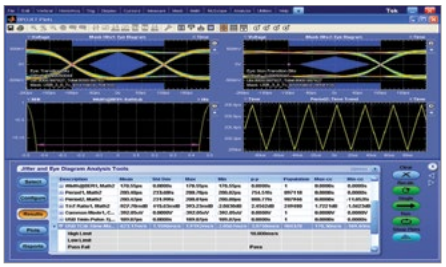
RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000 Series Real-time Oscilloscopes
- SDLA Visualizer
- DPOJET Jitter and Eye Diagram Analysis Tools
- DSA8300 Sampling Oscilloscopes
- 80SJNB Jitter, Noise and BER Analysis software

For more information visit: tek.com/sdla





PCI Express®

PCI Express Design Challenges Need Fast, Accurate Answers

PCI Express testing requires dual-port acquisition and million unit interval analysis. Tektronix oscilloscopes provide full sample rate and deep record length on all channels required for compliance testing and debug. The MSO/DPO70000 features channel emulation, equalization and up to 70 GHz Bandwidth, which enables accurate measurements on 4th generation data rates up to 16 Gb/s.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000C/DX/SX Series Real-Time Oscilloscopes
- Opt PCE4 Automated Compliance & Debug Software for PCIe Gen 1/2/3/4
- Opt PCE Debug Software for PCIe1/2
- Opt DJA Advanced eye diagram, jitter and timing analysis
- Opt DJAN Advanced DPOJet noise analysis
- Opt SDLA64 Serial Data Link Analysis
- Signal Correct™ software and TCS70902 calibration source
- IConnect® S-parameters and Z-Line software 80SSPAR

Probing:

- P7600, and P7700 Series TriMode Differential Probes and Remote Probe Heads
- P80318 TDR hand Probes
- Midbus and Solder Down Probes

Bit Error Rate Analyzers:

- BSX240, BSXPCIBSE, BSXPCI4CEM SW
- CR125/CR175/CR286

For more information visit:
tek.com/pci_express

Serial ATA/SAS

Powerful Serial ATA/SAS Automated Compliance Toolset Saves Time and Effort

Serial ATA/SAS test requirements are some of the most complex among current serial data standards. With a full toolset for characterization you will know how much margin your design really has.

Tektronix' one-button SATA solution for device state control and test automation allows you to focus your attention on other priorities. SAS characterization and conformance testing requires voltage, equalization, and jitter analysis across multiple data rates and operating conditions. Tektronix' SAS test solution provides powerful design insight with end to end link analysis including ISI and crosstalk effects.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000 Series Real-Time Oscilloscopes
- TekExpress SATA/SAS Compliance Automation software
- DPOJET Jitter and Eye Analysis software

Signal Generators:

- AWG70000 Series Arbitrary Waveform Generators

Bit Error Rate Analyzers:

- BSX240

For more information visit:
tek.com/technology/sata-sas

USB and Type-C

Flexible Tools for Compliance and Debug of USB Hosts and Peripherals

Tektronix USB software solutions meet the electrical validation, compliance, characterization and debug needs of engineers designing USB 3.1 Type-C, USB 3.1, and USB 2.0 based systems, which are compliant to the USB-IF test standards. USB-PD electrical parametric and protocol measurements and serial decoding solutions are also available. Quickly find the root cause of issues when testing SuperSpeed USB 3.1 Type-C designs with the combination of full SigTest support and DPOJET.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MDO3000 Series
- MDO4000C Series
- MSO/DPO5000 Series
- DPO7000C Series
- MSO/DPO70000 Series Real-Time Oscilloscopes
- TekExpress USB Compliance Automation Software
- DPOJET Jitter and Eye Analysis Software

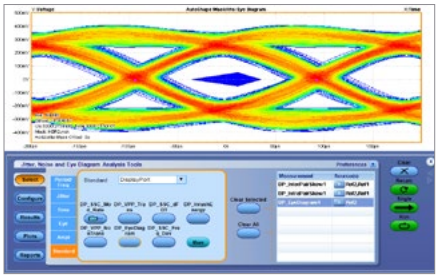
Signal Generators:

- AWG7000 Series Arbitrary Waveform Generators

Bit Error Rate Analyzers:

- BSA125C, DPP125C, CR125A

For more information visit: tek.com/usb



HDMI, MHL and DisplayPort

Complete HDMI, DisplayPort and MHL Transmitter, Receiver and Protocol Test Solutions

Tektronix provides comprehensive TX and RX test solutions for Display solutions. For DisplayPort, the DPOJET based DisplayPort Essentials package helps engineers to characterize their devices and stress their devices to the maximum potential, leading to margin specifications for their chips. The TekExpress based solution provides a python based fully automated conformance testing solution reducing test times and helping companies claim conformance and go to markets quicker. For HDMI and MHL, Tektronix offers complete automated testing conforming to the latest standards (HDMI 2.0 and MHL 3.3).

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000 Series Real-Time Oscilloscopes

DisplayPort and Embedded DisplayPort Software:

- Opt. DP12, Opt. DP13, Opt. EDP14, Opt. TEK-GRL-DP-SINKSW

HDMI Software:

- Opt. HT3, Opt. HT3DS, Opt. HDM, Opt. HDM-DS, Opt. HDM-DSM

MHL Software:

- Opt.MHD, Opt.MHD3

Display Protocol Analysis Software:

- Opt. TEK-PGY-HDMI, Opt. TEK-GRL-DP-DEC, Opt. TEK-GRL-DP-AUX-DEC

Probing:

- P7700 with P77C292MM for HDMI, MHL and DisplayPort
- P7600 for MHL clock
- P7700 with P77C292MM for solder-in probing for RBR/HBR/HBR2 DisplayPort signals

Signal Generators:

- AWG70000 Series Arbitrary Waveform Generators for HDMI
- BERTSCOPE BSX Series for DisplayPort

Test Fixtures:

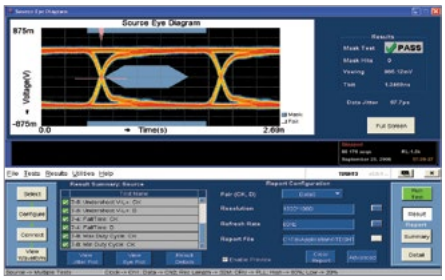
- HDMI:
  - TEK-HDMIA2-TPA-PRRT
- DisplayPort Type-C:
  - TEK-DPC-TPA-PRCB

For more information visit:

HDMI: tek.com/technology/hdmi-dvi

MHL: tek.com/technology/mhl

DisplayPort: tek.com/technology/displayport



Memory

Comprehensive Tools for Memory Interface Verification and Debug

Each new generation of memory technology brings in higher speeds, lower I/O voltage for reduced power consumption, and form factors for different applications. These factors result in debug and validation challenges as new, more complex tests are required to validate and debug devices operating with tighter margins, faster edge rates, and more complex bus protocols.

The sophisticated triggering and analysis packages on the DPO Series oscilloscopes provide broad coverage by supporting verification of multiple memory standards with each package. Standards supported include DDR, DDR2, DDR3, DDR3l, DDR4, LPDDR, LPDDR2, LPDDR3, LPDDR4, LPDDR4x and GDDRx.

The TLA7000 Series logic analyzers with their 20ps high speed timing combined with analog mux and various types of protocol views enable logic debug and protocol validation of memory interfaces.

Easy signal access is provided by a wide variety of probing solutions that support various memory standards and package types with minimal signal loading.

RECOMMENDED PRODUCTS:

Logic Analyzers:

- TLA7000 Series
- TLA7BB4 Logic Analyzer Module
- Memory Support Package
- Memory Compliance Software

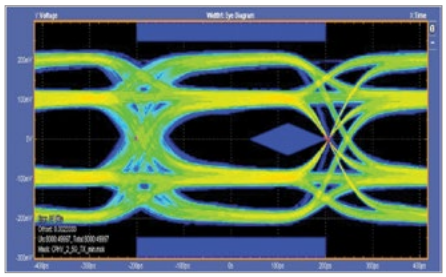
Oscilloscopes:

- MSO/DPO5000, DPO7000C, MSO/DPO70000 Series Real-Time Oscilloscope
- Visual Trigger Option (Opt. VET)
- DDR Analysis Option (Opt. DDRA)
- LPDDR4/LPDDR4x Analysis Option (Opt. DDR-LP4)
- DPOJET Jitter and Eye Diagram Analysis Tool
- SDLA Serial Data Link Analysis ToolKit
- ONFI Electrical Timing Analysis (Option TEK-PGY-ONFI)
- eMMC Electrical and Protocol Analysis (PGY-MMC-SD-SDIO)

Probing Solutions:

- P7700 TriMode Differential Probes
- P6780 Differential Logic Probes
- Oscilloscope and Logic Analyzer Interposers for standard BGA and PoP packages, DIMM's and SODIMM's for all popular memory standards

For more information visit: tek.com/memory



MIPI®

Complete MIPI D-PHY, C-PHY and M-PHY Transmitter, Receiver and Protocol Test Solutions

Tektronix provides comprehensive TX & RX test solutions for MIPI D-PHY v1.2, C-PHY v1.1 and M-PHY v3.1. Tektronix provides the TekXpress based automated compliance solution and DPOJET based Essentials package for Transmitter test. The TekExpress based solution provides a python based fully automated conformance testing solution, reducing test times and helping companies claim conformance and go to markets quicker. The DPOJET based solution helps engineers to characterize their devices, perform Root Cause Analysis of Failures and stress their devices to the maximum potential, leading to margin specifications for their chips.

Tektronix launched a new AWG based D-PHY and C-PHY Receiver test solution for compliance and Margin testing with 100% coverage for Rx test as per CTS.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO70000 Series Real-Time Oscilloscopes

M-PHY Software:

- Opt.M-PHYTX, Opt.M-PHY, PGY-LLI, PGY-UPRO

C-PHY Software: Opt.C-PHY

D-PHY Software:

- Opt.TEKEXP D-PHYTX, Opt.SR-DPHY

Probing:

- P7600 Series of Low Noise Probes for M-PHY
- P7700 Series TriMode Differential Probes
- TMPC-CTB Termination Board

AWG and Application Software:

- AWG70000A Arbitrary Waveform Generators for D-PHY and C-PHY Receiver PHY testing
- BERTScope for M-PHY RX testing

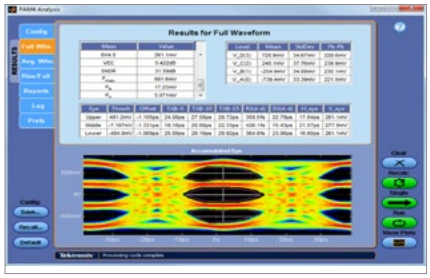
M-PHY Software: Opt. M-PHYRX

D-PHY Software: Opt. DPHYNL-SSV1

C-PHY Software: Opt. CPHYNL-SSV1

- P344: D-PHY Generator
- D-PHY Decoder HS: D-PHY Decoder
- P339: D-PHY Generator
- Oscilloscope based Protocol Decode: TMPC-CPHYVIEW, PGY-DGRF, PGY-HIS, PGY-I3C-PD, PGY-LLI, PGY-RFFE, PGY-SSIC, PGY-UFS, PGY-UPRO

For more information visit: tek.com/mipi



Data Communications

Tektronix offers comprehensive, integrated tool sets for validating the physical layer of IEEE 802.3 Ethernet devices, and for developing and debugging Ethernet-based systems from 10BASE-T up to 400Gbps. Tektronix also provides comprehensive Compliance and Debug solutions for technologies that don't fall into IEEE brackets such as SFF 8431, SFP+, OIF-CEI, InfiniBand and FC-16G.

RECOMMENDED PRODUCTS:

Software Solution:

- DPOJET PAM4 - Comprehensive PAM4 Analysis Tools
- 400G-TXE - OIF-CEI 56G VSR/MR/LR Compliance Tools
- 100G-TXE - IEEE 802.3 KR4/CR4/CAUI-4 Compliance Tools
- SR-ENET – Ethernet Decoding and Analysis
- TDSET3 – 10/100/1000BASE-T Ethernet Compliance Testing
- DPO4ENET – Ethernet Triggering and Analysis
- 2.5G/5G/10GBASE-T Automated Compliance Software
- SFP-TX & SFP-WDP - Compliance and Debug solution for SFF 8431 SFP+
- 10G-KR - 10GBASE-KR/KR4 Compliance, Debug & Decode Solution
- FC-16G – Compliance and Debug solution for FC-PI-5 Clause 9 Electrical Physical Layer Testing
- DPOJET Jitter and Eye Diagram Analysis Tool
- SDLA Serial Data Link Analysis ToolKit

Oscilloscopes:

- DPO70000SX Series
- MSO/DPO70000 Series Real-Time Oscilloscopes
- DPO7000 Series Real-Time Scopes
- MSO/DPO5000 Series Oscilloscopes
- MDO4000C Series

Probe:

- DPO7OE1 – Optical Probe, DC to 33 GHz

Test Fixtures:

- TF-GBE-ATP
- TF-GBE-EE
- TF-XGbT
- TF-SFP-TPA-HCB-PK

For more information visit:
tek.com/technology/ethernet-test

100G/400G Rx/Tx Technology and Application Solutions

IEEE802.3BJ,BM,BS, CD, 32GFIBRE CHANNEL AND OIF/VSR STANDARDS

- High precision jitter characterization and impaired receiver stimulus system.
- The Tektronix 70kSX Real-time instrument portfolio is now supported in 100G and 400G testing.
- The PAM4 analysis solution offers full featured 400G measurement support of emerging OIF-CEI and IEEE Datacom standards.
- The DSA8300's exceptionally high dynamic range makes it well-suited for PAM4 and Transmitter Distortion Eye Closure (TDEC) based measurements on both electrical and optical based signals.
- DSA8300, CEI-VSR lets you easily automate measurements for CEI-28G-VSR testing. With a simple measurement setup, you can perform all the measurements with a single button click.
- DSA8300, 80SSR4 offers fully automated 802.3BM based SR4 Optical test automation, where all optical measurements can be performed without intimate knowledge of the optical specifications and with easy to reproduce results.
- The BSA286CL has similarly low jitter noise floor specifications, which make it invaluable to generate stressed eyes and performing Bit Error Ratio analysis on single or multi-channel applications.

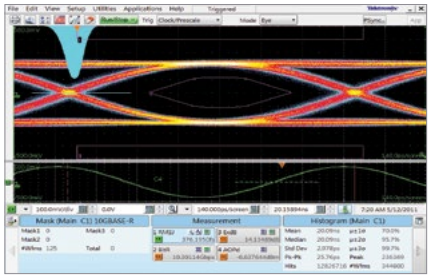
NRZ CHIP-TO-CHIP AND SILICON CHARACTERIZATION (ELECTRICAL)

- Requires stimulus and impairment capabilities as well as high bandwidth (70+GHz), ultra-low jitter (<100 fs) electrical / TDR acquisition and reference receivers, eye diagram mask testing, precision jitter, noise analysis.
- Ultra low noise BERT Signal Generation and comprehensive impairment capabilities (BUJ, RJ, SJ) at full data rates.
- 400G-TXO offers fully automated FR/LR and DR based optical compliance testing.
- 100G-TXE offers fully automated KR4, CR4 and CAUI-4 based electrical transmitter conformance testing. IConnect provides S-parameters.
- All systems can be fully integrated into automation frameworks for PV characterization and test.

RECOMMENDED PRODUCTS:

- DPO7OE1 High Bandwidth Optical Probe
- BSA286CL 28.6 Gb/s BERTScope
- DSA8300 Sampling Scope with low jitter electrical/TDR modules
- DSA8300 Opt. CEI-VSR
- CR286A 28.6Gbps Clock Recovery Instrument
- IConnect for S-Parameter and Time Domain Network Analysis

For more information visit: tek.com/dsa8300
tek.com/bertscope • tek.com/100G
tek.com/400G



Optical Testing

Tools and Analysis Software for Testing the Latest Short-Haul and Long-Haul Optical Standards and Technologies

The DSA8300 with its highly configurable mainframe and a wide variety of optical modules provide complete optical test solutions with superior system fidelity from 125 Mb/s to 100 Gb/s and beyond. The modules cover a range of wavelengths for both single- and multi-mode fibers. Each module can be optionally configured with a number of selectable Optical Reference Receiver (ORR) filters or a full bandwidth path.

The ever-increasing demand for long-haul network bandwidth has driven network operators from the on-off keying used with today's 10G infrastructure to coherent optical modulation that can support 40G, 100G, 400G, and beyond. Coherent modulation is often achieved using formats such as DP-QPSK and 64QAM. Tektronix has hardware and analysis software to allow receiver, transmitter, and system manufacturers to design and debug their next generation long-haul products.

RECOMMENDED PRODUCTS:

Oscilloscopes:

- DSA8300 Series
- 80C15 32 GHz Broad Wavelength Module; supports both SMF and MMF; now available with optional CRTP (Clock Recovery Trigger Pickoff)
- 80C10C 80+ GHz Optical Bandwidth Module
- 80C12B 10 Gb/s and Trib Rate Optical Module
- 80C14 14+ GHz Bandwidth Broad Wavelength Optical Module
- 80SJNB Jitter and BER Analysis Software
- 80SJARB Arbitrary Data Jitter Analysis Software
- DPO70000SX Series

Coherent Optical Modulation Analyzers:

- OM4000 Series
- OM2000 Series

Application Software:

- OM1106 Coherent Lightwave Signal Analyzer Software

For more information visit: tek.com/optical

Power Measurements

Power Analysis and Compliance Solution with Tektronix Oscilloscopes, Probes, and Power Analyzers

Today's power supplies achieve higher levels of efficiency in response to tighter regulations and consumer expectations. Specialized power mesurements and compliance tests are time-consuming and critical. Tektronix power measurement solutions help you achieve fast, accurate, repeatable results and compliance reports.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- TPS2000 Series
  - TPS2PWR1 Power Measurement and Analysis Software
- MDO3000 Series
  - MDO3PWR
- MDO4000C Series
  - DPO4PWR Power Analysis Module
- MSO/DPO5000, DPO7000, MSO/DPO70000 Series
  - DPOPWR Power Measurement and Analysis software
  - USBPWR Automated Compliance testing for USB EPS Adapter

Probing:

- TIVM/TIVH Series Isolated Probes
- TCP0030A / TCP0150 / TCP202A AC/DC Current Probes
- TCPA300/400 Series Current Probes and Amplifiers
- TMDP0200/THDP0200/THDP0100 High Voltage Differential Probes
- P5100A Passive High Voltage Probe
- TDP0500/TDP1000 Differential Probes

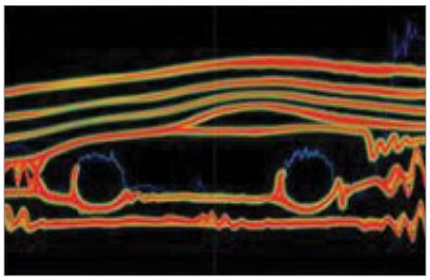
Power Analyzers:

- PA1000 Power Analyzer

Signal Generators:

- AFG3000 Series Arbitrary Function Generator

For more information visit:
tek.com/power



Automotive

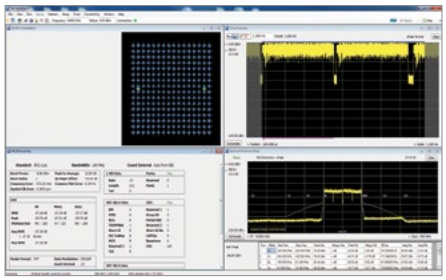
Intelligent embedded systems are the new driving force in today's automotive designs. The latest safety and efficiency technologies are made possible by the incorporation of an extensive variety of complex embedded devices that make thousands of decisions per second. Efficient verification and debug of common automotive serial buses like CAN, CAN FD, LIN, FlexRay, BroadR-Reach and MOST will speed integration of these embedded technologies and build confidence in test engineering.

RECOMMENDED PRODUCTS:

Oscilloscopes and Application Software:

- MSO/DPO2000 Series
  - CAN, LIN
- MDO3000 Series
  - CAN, CAN FD, LIN
  - FlexRay
- MDO4000C Series
  - CAN, CAN FD, LIN
  - FlexRay
- MSO/DPO5000 Series
  - CAN, LIN
  - FlexRay
  - BroadR-Reach
  - MOST
- DPO7000 Series
  - CAN, LIN
  - FlexRay
  - BroadR-Reach
  - MOST

For more information visit:
tek.com/industry/automotive



WLAN (IEEE 802.11)

Whether you are testing a new chipset, designing a new WLAN module, or integrating a module into your latest design, Tektronix provides Wi-Fi testing solutions to help you get the job done. Speed up your RF testing with automatic transmitter PHY measurements defined by the standard. Support is available for multiple 802.11 standards, including 802.11a/b/g/j/p/n/ac.

RECOMMENDED PRODUCTS:

Instruments:

- RSA300 Series Real-Time Spectrum Analyzer
- RSA500 Series Real-Time Spectrum Analyzer
- RSA600 Series Real-Time Spectrum Analyzer
- RSA5000 Series Real-Time Spectrum Analyzer
- RSA7000 Series Real-Time Spectrum Analyzer
- MDO4000C Series Mixed Domain Oscilloscopes
- MSO/DPO70000 Series Oscilloscopes
- DPO7000C Series Oscilloscopes

Software Solutions:

- WLAN options for RSA5000 Real-Time Spectrum Analyzers
- SignalVu with WLAN options on Windows oscilloscopes
- SignalVu-PC with WLAN options for the MDO4000B/C and the RSA USB Spectrum Analyzer Series

For more information visit:
tek.com/wi-fi

Bluetooth®

Whether you are validating a new chipset, designing a new wireless module or integrating Bluetooth into your latest design, Tektronix provides RF PHY testing solutions to help you get the job done and get your design to market faster.

Support is available for Basic Rate, Enhanced Data Rate and Bluetooth Low Energy. Contact Tektronix for Bluetooth 5 support.

RECOMMENDED PRODUCTS:

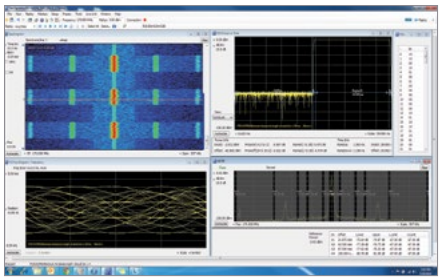
Instruments:

- RSA300 Series Real-Time Spectrum Analyzer
- RSA500 Series Real-Time Spectrum Analyzer
- RSA600 Series Real-Time Spectrum Analyzer
- RSA5000 Series Real-Time Spectrum Analyzer
- RSA7000 Series Real-Time Spectrum Analyzer
- MDO4000C Series Mixed Domain Oscilloscopes
- MSO/DPO70000 Series Oscilloscopes
- DPO7000C Series Oscilloscopes

Software Solutions:

- Bluetooth option 27 RSA5000 for Real-Time Spectrum Analyzers
- SignalVu with Bluetooth option SV27 on Windows Oscilloscopes
- SignalVu-PC with Bluetooth option SV27 for the MDO4000B/C and the RSA USB Spectrum Analyzer Series

For more information visit:
tek.com/bluetooth



APCO Project 25 (P25)

Whether you are testing a P25 mobile, portable radio transmitter, or a base station for Phase 1 or Phase 2, Tektronix provides P25 RF transmitter testing solutions to help you get the job done. Tektronix solutions give you a simple setup of 28 TIA-102 measurements with pass/fail results so that you can pass performance and compliance tests accurately and quickly.

Support is available for Phase 1 and Phase 2 transmitter compliance test solution.

RECOMMENDED PRODUCTS:

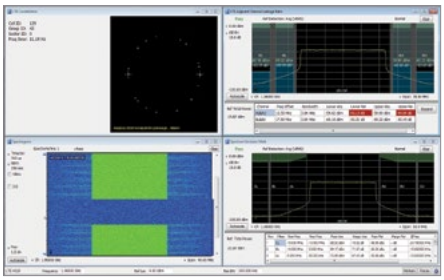
Instruments:

- RSA300 Series Real-Time Spectrum Analyzer
- RSA500 Series Real-Time Spectrum Analyzer
- RSA600 Series Real-Time Spectrum Analyzer
- RSA5000 Series Real-Time Spectrum Analyzer
- RSA7000 Series Real-Time Spectrum Analyzer
- SPECMON Series Real-Time Spectrum Analyzer
- MDO4000C Series Mixed Domain Oscilloscopes
- MSO/DPO70000 Series Oscilloscopes
- DPO7000C Series Oscilloscopes
- MSO/DPO5000 Series Oscilloscopes

Software Solutions:

- P25 option 26 for RSA5000/SPECMON Real-Time Spectrum Analyzers
- SignalVu with P25 option SV26 on Windows Oscilloscopes
- SignalVu-PC with P25 option SV26 for the MDO4000B/C and the RSA USB Spectrum Analyzer Series

For more information visit:
tek.com/application/P25-testing-and-analysis



LTE™ Downlink

Are you planning to do a quick RF verification of your Small Cell transmitter design? Tektronix provides an LTE solution to help get your job done quickly. Support is provided for RF-PHY measurements and Cell Identification for TDD and FDD.

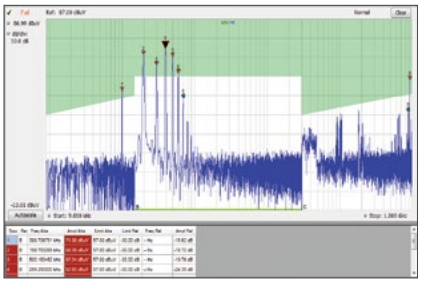
RECOMMENDED PRODUCTS:

Instruments:

- RSA300 Series Real-Time Spectrum Analyzer
- RSA500 Series Real-Time Spectrum Analyzer
- RSA5000 Series Real-Time Spectrum Analyzer
- RSA7000 Series Real-Time Spectrum Analyzer
- MDO4000B/C Series Mixed Domain Oscilloscopes
- MSO/DPO70000 Series Oscilloscopes
- DPO7000 Series Oscilloscopes

Software Solutions:

- LTE DL option 28 for RSA5000 Real-Time Spectrum Analyzers
- SignalVu with LTE DL option SV28 on Windows Oscilloscopes
- SignalVu-PC with LTE DL option SV28



EMI Diagnostics and Precompliance

Reduced time to solution for EMI problems

Time-saving solutions for the EMI problems you never planned for. Today's biggest EMI challenges are identifying the location and source of an EMI problem and capturing a transient EMI event. Tektronix MDO4000C Series Mixed Domain Oscilloscopes combine the functionality of a mixed signal oscilloscope with a spectrum analyzer; capture synchronized analog, digital and RF signals, all time correlated for a complete system view of your device.

The MDO3000 Series also feature a built-in spectrum analyzer. Tektronix Real-Time Spectrum Analyzers are able to view, trigger on and analyze the effects of the briefest of signals as they occur in frequency domain and include limit-line scans with pass/fail testing, EMI filter, detectors and averaging for high-confidence precompliance testing.

The RSA300/500/600 Series with SignalVu-PC provide you with a real time DPX spectrum display. This real time display allows you to see interference or other signal problems that other analyzers would miss.

Additionally, SignalVu-PC offers user definable limit lines, a logarithmic scale, and CISPR and MIL-STD filters and some detectors that can be helpful to perform a worst case, low cost EMI sweep before final compliance is sought. This powerful combination of signal discovery for troubleshooting and measurements against real EMI limit lines is helpful to better prepare yourself for taking your design through some basic checks for major EMI violations

RECOMMENDED PRODUCTS:

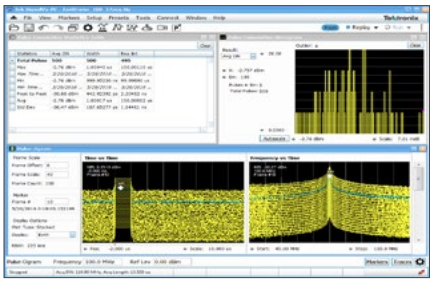
Diagnostics:

- RSA300 Series Real-Time Spectrum Analyzer
- RSA600 Series Real-Time Spectrum Analyzer
- MDO3000 Series Mixed Domain Oscilloscope
- MDO4000C Series Mixed Domain Oscilloscopes + Spectrum Analyzer
- RSA5000 Series Real-Time Spectrum Analyzers

Precompliance:

- EMCVu: Advanced EMI/EMC pre-compliance plug-in
- RSA5000 Series Real-Time Spectrum Analyzers

For more information visit:
tek.com/rf



Radar/EW

Performance, Precision and Insight for Your Radar/Electronic Warfare Design

With today's rapid advances in radar/ electronic warfare technology, developing and manufacturing highly specialized and innovative electronic products requires leading-edge technology and tools. Our innovative test equipment captures millions of pulses and reduces uncertainty during the design process and delivers confidence in the integrity of increasingly complex designs.

RECOMMENDED PRODUCTS:

Receiver/Stimulus Test and Threat Emitter Simulation:

- AWG5000 Series Arbitrary Waveform Generator with RFXpress® software
- AWG70000A Series Arbitrary Waveform Generator with RFXpress® software

Transmitter Analysis:

- RSA5000 Series Spectrum Analyzer
- RSA7000 Series Real-Time Spectrum Analyzer
- RSA600 Series Real-Time Spectrum Analyzer
- Pulse analysis option 20 for RSA5000B Spectrum Analyzers
- SignalVu Oscilloscope Software with Pulse analysis option SVP
- SignalVu-PC with Pulse analysis option SVP for the MDO4000C and the RSA Series
- MSO/DPO70000 and DPO70000SX Series Oscilloscope with SignalVu option SVP software
- MSO/DPO5000, DPO7000C Series Oscilloscopes with SignalVu option SVP software
- MDO4000C Series Mixed Domain Oscilloscope

For more information visit:
tek.com/radar

IEEE 802.11ad/WiGig Transmitter Design

Design Leading-Edge Performance with Confidence

Push your design to the highest level performance with an easy test setup calibrated up to 70 GHz in manufacturing. You can view the entire spectrum and analyze up to 70 GHz bandwidth per acquisition. In addition, you can conduct complete verification per the standard and perform troubleshooting, debugging within the same software tool.

RECOMMENDED PRODUCTS:

Transmitter Analysis:

- DPO77002SX ATI oscilloscope with SIgnalVu options SVE and SV30

Receiver/ Signal Generation:

- AWG70000A Series Arbitrary Waveform Generator with option AC and SourceXpress with pre-compensation plug-in

For more information search: 802.11ad on tek.com

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. 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.

LEARN MORE ON THE GO!

Isolated Probes

- High-resolution measurements in the presence of common mode signals or noise
- Up to 1 GHz bandwidth
- Complete galvanic isolation
- 1 Million to 1 (120 dB) of common mode rejection at 100 MHz

http://www.tek.com/isolated-measurement-systems

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

NEW

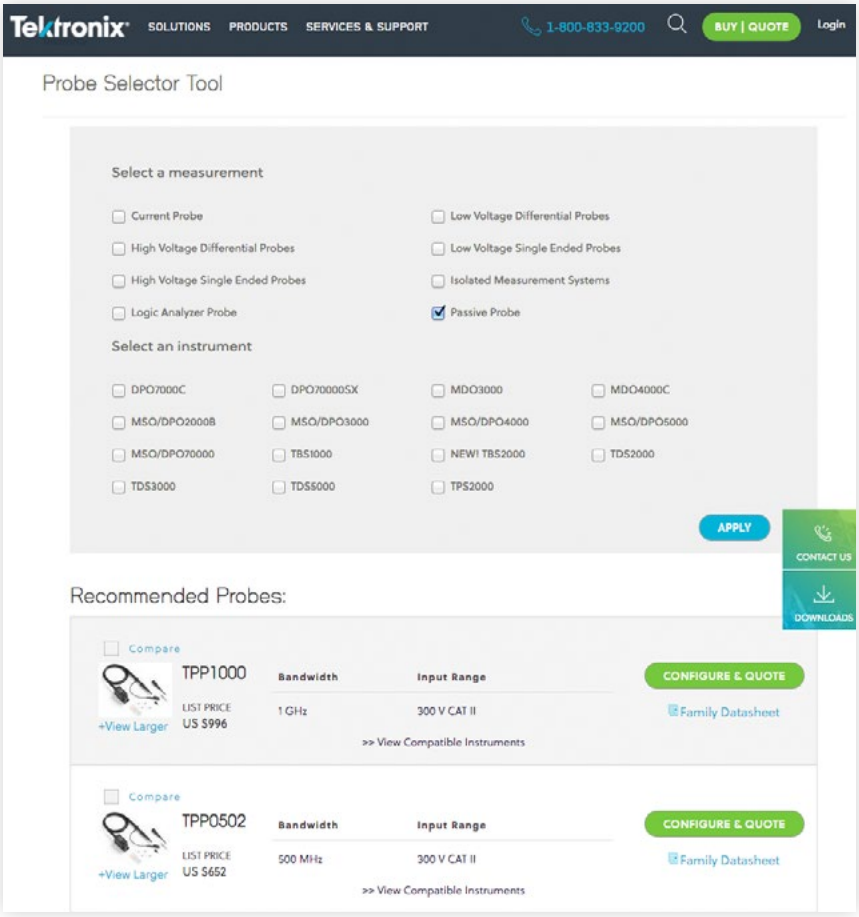
Optical Probe
DC to 33 GHz
DPO7OE1

tek.com/optical-probe

INTERACTIVE PROBE SELECTOR TOOL

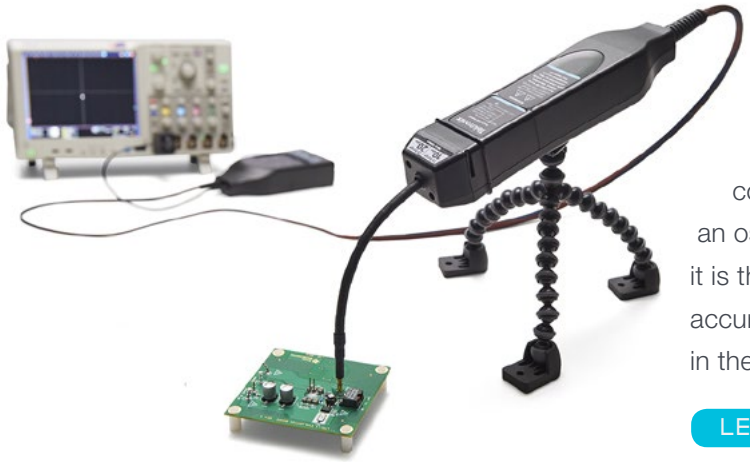
Need help finding the right probe for your application? The online Tektronix Probe Selector Tool will guide you through a few easy questions to match your need to the right probe. Visit us anytime, anywhere at: tektronix.com/probes.

LEARN MORE ON THE GO!



IsoVu® Isolated Probes

See What's Been Hidden - Until Now



Common mode interference often causes engineers to design, debug, evaluate, and optimize "blind." Revolutionary IsoVu™ technology uses optical communications and power-over-fiber for complete galvanic isolation. When combined with an oscilloscope equipped with the TekVPI interface, it is the first, and only, measurement system capable of accurately resolving high bandwidth differential signals in the presence of large common mode voltage.

LEARN MORE

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	AFG3000C	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

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.

SIGNAL GENERATORS:
ARBITRARY WAVEFORM GENERATORS

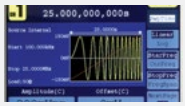
Tektronix arbitrary waveform generators enable complex signal generation with simple, easy to use tools. The AWG family provides leading-edge performance with sample rates up to 50 GS/s, up to 4 channels, and software packages that simplify the creation of these complex signals. The unparelleled flexibility, speed, and fidelity of the Tektronix AWGs make them an ideal solution for high speed serial, optical communications, radar test, and electronic warfare.

	AWG5000	AWG5200	AWG70000
Channel	2-4	2-8	1-2
Sampling Rate	Up to 1.2 GS/s	Up to 10 GS/s	1.5 KS/s – 50 GS/s
Bandwidth	300MHz	2GHz	14GHz
Analog Channel Vertical Resolution	14 bits	16 bits	10 bits
Memory	16M point per channel (32M optional)	Up to 2Gpts per channel	2GS - 8GS
Output Frequency Range	480 MHz	2 GHz (4 GHz)	20 GHz
Portability	Rack Mounted	Rack Mounted	Rack Mounted
Code Compatibility (with current AWG5k)	Yes	Yes	—
AFG Mode	No	No	No
Digital Outputs	28-bit optional on 2-ch models, 1-2 markers/channel	4 markers/channel, 32 max	None
Multi-unit Synchronization	—	Yes	Yes
Output Amplitude	370ns (basic)/2µs (adv.)	Up to 1.5Vpp	250mV – 500mV (single ended), 500mV – 1.0V (differential)
Sequencing	YES	Yes	YES
Applications	Radar, research, and electrical test	Radar, electronic warfare, threat emitters, advanced research: quantum research, baseband 5G, electrical test and advanced labs	RF/MW communications and defense electronics, high-speed serial communications, mixed signal design and test, clock source, optical and dvanced research
Additional Modes	—	SourceXpress	SourceXpress

DATA SHEET

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 fullly 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
AFG1022	2	25 MHz	125 MS/s	8 k	1mV$_{p-p}$ to 10V$_{p-p}$	200 MHz, 6 digits
AFG1062	2	60 MHz	300 MS/s	1 M	1mV$_{p-p}$ to 10V$_{p-p}$	200 MHz, 6 digits

RECOMMENDED ACCESSORIES

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

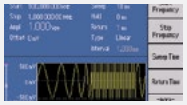
SHIPS WITH PRODUCT

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

DATA SHEET

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.

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.

MODELS	ANALOG CHANNELS	OUTPUT BANDWIDTH	ANALOG SAMPLE RATE	MEMORY DEPTH	AMPLITUDE (INTO 50 Ω)
AFG2021	1	20 MHz	250 MS/s	4 x 128 k	10 mV_{p-p} to 10 V_{p-p}

RECOMMENDED ACCESSORIES

Cables	
012-1732-00	BNC cable shielded, 3 ft.
012-0991-00	GPIB cable, double shielded
011-0049-02	50Ω BNC Terminator
Accessories	
RMU2U	Rackmount kit
159-0454-00	Fuse set, 3pcs, 0.125 A

INSTRUMENT OPTIONS

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

RECOMMENDED SERVICE

SILV200	5-year Extended Warranty

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

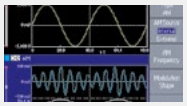
LEARN MORE

about the time-saving features of ArbExpress by downloading the Application Note "Replicating Real World Signals with an Arbitrary/Function Generator."

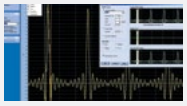
DATA SHEET

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 Ω)
AFG3011C	1	10 MHz	250 MS/s	4 x 128 k	20 mV_{p-p} to 20 V_{p-p}
AFG3021C	1	25 MHz	250 MS/s	4 x 128 k	10 mV_{p-p} to 10 V_{p-p}
AFG3022C	2	25 MHz	250 MS/s	4 x 128 k	10 mV_{p-p} to 10 V_{p-p}
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}
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}
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}
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}
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}
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}
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}
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}

RECOMMENDED ACCESSORIES

Cables	
012-1732-00	BNC cable shielded, 3 ft.
011-0049-02	50 Ω BNC terminator
012-0991-00	GPIB cable, double shielded
Accessories	
RM3100	Rackmount kit

RECOMMENDED SERVICE

SILV400	5-year Extended Warranty

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

LEARN MORE

about the time-saving features of ArbExpress. Download the “Replicating Real World Signals with an Arbitrary/Function Generator” Application Note.

Tektronix®

FOCUS ON REVOLUTIONIZING THE WORLD.

WITH FLEXIBLE, PRECISE INTEGRATION AND SCALING

The Tektronix 5200A Arbitrary Waveform Generator has the cleanest signal on the market at an unbeatable price per channel. With code compatibility, you can fast forward integration and scaling while simplifying waveform design. Test and validate complex, sensitive devices with the accuracy and quality you expect from Tektronix AWGs.

- 16 bit resolution, 2GS of memory per channel, and low SFDR ensure accurate, detailed signals
- Up to 8 channels and multi-unit synchronization help you scale efficiently
- Code compatible with older AWG5k models and can take Matlab commands so replacement and upgrade is easy
- Direct generation of RF signals
- Build setups with pre-calibration and pre-compensation S-parameter software

DATA SHEET

AWG5200 Series

The Tektronix 5200A Arbitrary Waveform Generator has the cleanest signal on the market at an unbeatable price per channel. With code compatibility, you can fast forward integration and scaling while simplifying waveform design. Test and validate sensitive devices that require lots of inputs at a low cost, without sacrificing performance.

PRODUCT HIGHLIGHTS

- 16 bits of DAC resolution, low noise floor, good RF performance ensures accurate, detailed signals
- Up to 8 channels/unit at a low cost per channel
- 2 GS of memory per channel and a sequencer conserves memory
- Multi-unit synchronization ensures efficient scaling for research or radar applications
- Quick, flexible test setup

Easily integrate AWG5200 with complex test set ups.

Scale based on your needs with multi-unit synchronization.

MODELS	CHANNEL	SAMPLE RATE/ FREQUENCY	RESOLUTION	SFDR (DC-1.25GHZ)	ANALOG BW (AT -3 db x)	OUTPUT
AWG5202	2	1.5 KS/s - 10 GS/s (4 GHz)	16 bit	<-70 dBc	2 GHz	DC Out: 1.5Vp-p Diff (standard)
AWG5204	4	1.5 KS/s - 10 GS/s (4 GHz)	16 bit	<-70 dBc	2 GHz	AC Out: -17 to -5 dBm single-ended, BW 10MHz to 2.0 GHz (standard)
AWG5208	8	1.5 KS/s - 10 GS/s (4 GHz)	16 bit	<-70 dBc	2 GHz	Amp AC Out: -85 to +10 dBm single-ended, BW 10MHz to 2GHz (option)

RECOMMENDED ACCESSORIES

Cables	
012-1690-xxSMA	Cable, 40 in. (102 cm)
012-1503-xx SMB	Cable, 20 in. (51 cm)
Accessories	
GF-RACK3U	Rackmount kit
016-1979-xx	Front Removable HDD Bay

SOFTWARE AND PLUGINS

- Multitone, Notches & Chirp Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®
- Environment Plug-in for the AWG5200, AWG70000, and SourceXpress
- Generic Pre-compensation Plug-in for AWG70000 Series, AWG 5200 Series, and SourceXpress
- Spread Spectrum Clocking (SSC) Plug-in for AWG70000 series, AWG 5200 Series and SourceXpress
- S-Parameters Plug-in for AWG70000A, AWG 5200 Series and SourceXpress
- RF Generic Plug-in for AWG70000 Series, AWG 5200 Series and SourceXpress
- High Speed Serial Plug-in for AWG70000, AWG 5200 Series and SourceXpress
- Optical Plug-In for AWG70000, AWG 5200 Series and SourceXpress
- Radar Plug-In for AWG70000, AWG 5200 Series and SourceXpress
- OFDM Plug-In for AWG70000, AWG 5200 Series and SourceXpress

See page 62-63 for more information

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

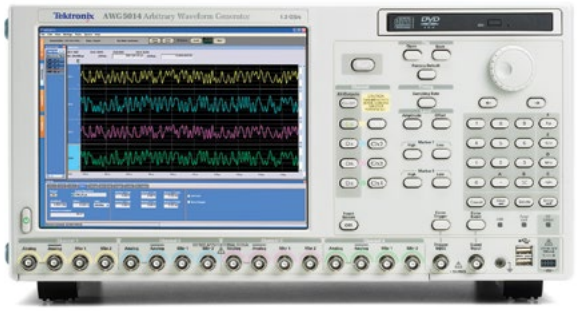
- USB Mouse
- Compact USB Keyboard
- Power Cord
- One 50 Ω SMA Terminator per Channel
- Installation and Safety Manual
- Certificate of Calibration

LEARN MORE DOWNLOAD

the “Fundamentals of Radar Measurements" Primer.

LEARN MORE DOWNLOAD

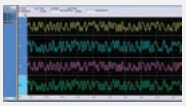
"Overcoming RF Signal Generation Challenges in Quantum Computing."



DATA SHEET

PRODUCT HIGHLIGHTS

- I/Q modulator test
- Consumer electronics
- Serial data
- RF Baseband Signal Generation



4 synchronized channels in a single instrument.

Quickly modify, create and transfer waveforms using either RFXpress or SerialXpress.

AWG5000 Series

With 14-bit vertical resolution up to 1.2 GS/s, 4 analog and 32 digital channel outputs, the AWG5000 Series Arbitrary Waveform Generator is the ideal solution for versatile mixed signal generation. The AWG5000 Series gives you a unique combination of analog and digital output performance, allowing you to generate analog and digital IQ, as well as IF signals in a single instrument. With the addition of advance sequencing and dynamic jump capability, extremely complex waveforms can easily be created to more closely simulate real-world environments.

MODELS	ANALOG CHANNEL	ANALOG BANDWIDTH	DIGITAL CHANNEL	OUTPUT FREQUENCY	RECORD LENGTH	MAX SAMPLE RATE	VERTICAL RESOLUTION
AWG5002C	2	Up to 230 MHz	28	240 MHz	16M point per channel (32M optional)	600 MS/s	14 bits
AWG5012C	2	Up to 300 MHz	28	480 MHz	16M point per channel (32M optional)	1.2 GS/s	14 bits
AWG5014C	4	Up to 300 MHz	—	480 MHz	16M point per channel (32M optional)	1.2 GS/s	14 bits

RECOMMENDED ACCESSORIES

Cables	
012-1690-xx	Pin Header Cable, SMA Cable, 40 in. (102 cm)
012-1503-xx	SMB Cable, 20 in. (51 cm)
Accessories	
016-1983-xx	Rackmount kit
016-1979-xx	Front Removable HDD Bay

RECOMMENDED SERVICE

R3DW	Repair Service Coverage 3 Years
R5DW	Repair Service Coverage 5 Years

SOFTWARE

RFXpress® Software for AWG5000, AWG70000 (RFX100)

SerialXpress® Software for AWG5000, AWG70000 (SDX100)

See page 62-63 for more information

SHIPS WITH PRODUCT

- USB Mouse
- Compact USB Keyboard
- Front Cover
- Power Cable
- Lead set for DC output
- Software CD and Instructions
- Documentation CD with Browser
- Quick Start User Manual and Registration Card
- Certificate of Calibration

DATA SHEET

VIRTUAL TOUR

PRODUCT HIGHLIGHTS

- Generate wide bandwidth signals at baseband, IF and RF frequencies with excellent dynamic range
- Accelerate designs and research by generating waveforms that could not previously be created
- Add impairments to waveforms, eliminating the need for additional hardware
- Ability to sync multiple units together to increase transmission bandwidth

Seamlessly import waveforms from MATLAB, and other software packages.

Waveforms captured on scopes or spectrum analyzers can be played back on the AWG.

AWG70000 Series

The industry-leading AWG70000 Series arbitrary waveform generator represents the cutting edge in sample rate, signal fidelity, and waveform memory. Featuring up to up to 50 GS/s, 10-bit vertical resolution and unparalleled signal fidelity, the AWG70000 Series enables the easy generation of complex signals in wideband RF, coherent optical, high speed serial receiver test and advanced physics research applications.

	AWG70001A	AWG70002A
Sample Rate	1.5 KS/s to 50 GS/s	1.5 KS/s to 25 GS/s
Maximum Frequency	20.0 GHz	10.0 GHz
Analog Bandwidth	14 GHz	14 GHz
Rise Time	27 ps	22 ps
Dynamic Range (SFDR)	Up to -80 dBc	Up to -80 dBc
DAC Resolution	10 bits	10 bits
Output Voltage	1.0 Vp-p (Differential)	1.0 Vp-p (Differential)
Output Amplitude (single-ended)	-70 dBm to 25 dBm (Option-AC)	-70 dBm to 25 dBm (Option-AC)
Waveform Memory	Standard: 2G Samples, Optional: 16G Samples	Standard: 2G Samples, Optional: 8G Samples
Channels	1 (Differential)	2 (Differential)

SOFTWARE AND PLUGINS

Multitone, Notches & Chirp Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®

Environment Plug-in for the AWG5200, AWG70000, and SourceXpress

Generic Pre-compensation Plug-in for AWG70000 Series, AWG 5200 Series, and SourceXpress

Spread Spectrum Clocking (SSC) Plug-in for AWG70000 series, AWG 5200 Series and SourceXpress

S-Parameters Plug-in for AWG70000A, AWG 5200 Series and SourceXpress

RF Generic Plug-in for AWG70000 Series, AWG 5200 Series and SourceXpress

High Speed Serial Plug-in for AWG70000, AWG 5200 Series and SourceXpress

Optical Plug-In for AWG70000, AWG 5200 Series and SourceXpress

Radar Plug-In for AWG70000, AWG 5200 Series and SourceXpress

OFDM Plug-In for AWG70000, AWG 5200 Series and SourceXpress

See page 62-63 for more information

RECOMMENDED SERVICE

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

OPTION AC FOR AWG70001

Option AC adds a single-ended AC coupled connector to the front panel of the single channel AWG70001A Arbitrary Waveform Generator. This option adds an additional amplified and attenuated path to the AWG70001, expanding its output to -77 dBm to 18 dBm at 11 GHz and -90 dBm to 20 dBm at 14 GHz.

For more information visit:
tek.com/datasheet/awg70001a-arbitrary-waveform-generator-option-ac-datasheet

SHIPS WITH PRODUCT

- Keyboard
- Mouse
- Power Cord

RECOMMENDED ACCESSORIES

Option-AC

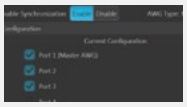
DATA SHEET

AWGSYNC01 AWG Synchronization Hub

The AWGSYNC01 enables synchronization of up to four AWG70001A or AWG70002A units, allowing up to eight channels to be aligned to the same clock, pattern jump and trigger inputs.

PRODUCT HIGHLIGHTS

- Synchronize signal output from two to four AWG70000 instruments
- Synchronize each channel to within ±10 ps
- Enable validation and compliance testing of high speed silicon and communications devices



Controlled directly in the AWG and requires no additional AWG software.

MODEL	DESCRIPTION	KEY SPEC	KEY SPEC	KEY SPEC
AWGSYNC01	AWG Synchronization Hub	Random Jitter (typical): 315 fs RMS Skew Repeatability/ Accuracy: ≤5 ps	Total Jitter (typical): 13 ps_{p-p}	Instrument to Instrument Skew: ± 10 ps

SHIPS WITH PRODUCT

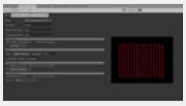
- AWG Communication Cables
- Phase-matched Clock Cables
- Calibration Deskew Cables
- Power Cord

DATA SHEET

DOWNLOAD SOFTWARE

PRODUCT HIGHLIGHTS

- Build, add impairments and customize your signals before emulating them on an AWG instrument running on your PC
- Create waveforms, sequences, and sub-sequences and control multiple, synchronized AWGs from one instance
- Import common waveform files, including Matlab, SerialXpress, RFXpress, and more
- Pre-compensate, apply S-parameters, or add jitter, impairments, multipath, and Doppler to waveforms
- Install plug-ins that expand your signal design capabilities and use one interface



Applications specific plug-ins, like Optical, seamlessly integrate as tabs into the SourceXpress UI.

The SourceXpress pulse train allows users to add an array of impairments, modulation schemes, and more.

SourceXpress™

SourceXpress signal design and generation software allows you to build complex, difficult to code waveforms on your PC. SourceXpress is free software that controls, runs waveform generation plug-ins and emulates the AWG5200 and AWG70000 environment on your PC. Create custom signals in its sophisticated, easy to use interface, before loading and playing them on Tektronix AWGs. SourceXpress plug-ins provide specialty generation solutions for RF, radar, high speed serial, and optical applications.

SOURCEXPRESS PLUG-INS

PRECOM	General Precompensation
HSS	High Speed Serial
MTONE	Multi-Tone and Chirp
RFGEN	RF Generic
SPARA	S-Parameter
SSC	Spread Spectrum Clock (SSC)
OPTICAL	Optical
ENVM	Environment Plug-in

SOFTWARE AND PLUGINS

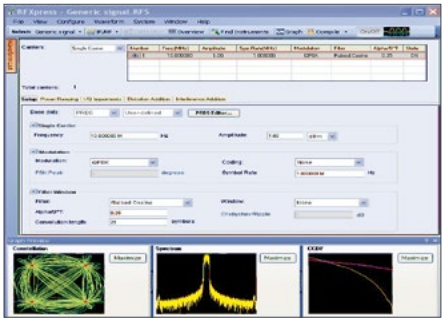
Multitone, Notches & Chirp Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®
Environment Plug-in for the AWG5200, AWG70000, and SourceXpress
Generic Pre-compensation Plug-in for AWG70000 Series, AWG 5200 Series, and SourceXpress
Spread Spectrum Clocking (SSC) Plug-in for AWG70000 series, AWG 5200 Series and SourceXpress
S-Parameters Plug-in for AWG70000A, AWG 5200 Series and SourceXpress
RF Generic Plug-in for AWG70000 Series, AWG 5200 Series and SourceXpress
High Speed Serial Plug-in for AWG70000, AWG 5200 Series and SourceXpress
Optical Plug-In for AWG70000, AWG 5200 Series and SourceXpress
Radar Plug-In for AWG70000, AWG 5200 Series and SourceXpress
OFDM Plug-In for AWG70000, AWG 5200 Series and SourceXpress

See page 62-63 for more information

LEARN MORE

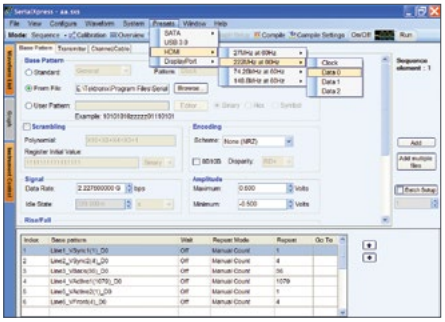
View the SourceXpress Software Demo.

SIGNAL GENERATOR SOFTWARE, OPTIONS, & PLUG-INS



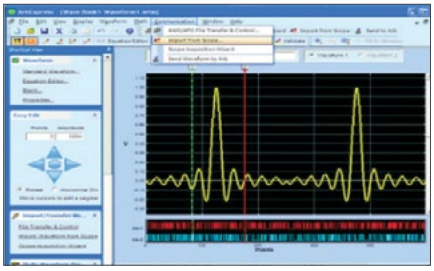
RFXpress® Software for the AWG5000

If you are doing RF designs requiring signal modulation, Tektronix' RFXpress software for the AWG Series delivers advanced capabilities to synthesize digitally modulated baseband, IF and RF/microwave signals supporting a wide range of modulation schemes. RFXpress simplifies waveform creation. Special options are available for Radar, OFDM, S-Parameter, and UWB signals specifically.



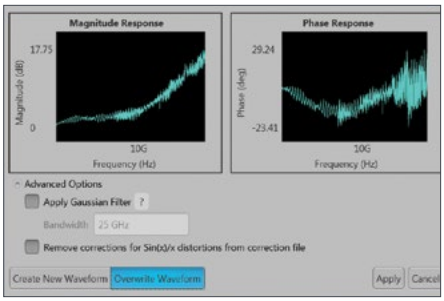
SerialXpress® Software for the AWG5000

Recreate exact waveforms required for thorough and repeatable design validation, margin/characterization and conformance testing with SerialXpress and AWG Series signal generators. SerialXpress' easy-to-use graphical user interface allows for a combination of test signals and various impairments, including Inter Symbol Interferences (ISI), Duty Cycle Distortion (DCD), Spread Spectrum Clocking (SSC), Pre-emphasis and noise.



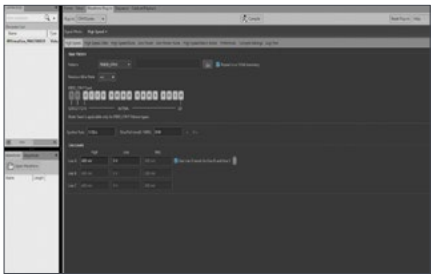
ArbExpress® Signal Generator Software for AFGA2000, AFG3000, AWG5000, AWG70000

Designers often need to validate their designs under real-world conditions, requiring complex stimulus signals during test. With ArbExpress® software, waveforms can be quickly created and transferred to Tektronix arbitrary waveform and function generators to meet custom stimulus requirements.



Waveform Creation Plug-Ins for SourceXpress® and AWG70000

Whether you're working remotely on SourceXpress or generating waveforms on your AWG, Tektronix is developing a growing library of plug-ins to give you the waveform creation functionality you need. Small, powerful waveform creation and AWG application plug-ins allow for added integrated, fast and easy to use in SourceXpress or the AWG70000.



D-PHYXpress and C-PHYXpress Software for AWG70000 for D-PHY and C-PHY Rx Testing

D-PHY and C-PHY standards are moving up the speed to meet Camera and Display Application requirements. Users need to perform Receiver testing to meet Bit Error Requirements. The D-PHYXpress and C-PHYXpress applications allows user to create patterns for High Speed (HS), Low Power (LP) and High Speed Low Power (HS-LP) mode with Jitter and Noise as per MIPI CTS requirement. These applications can be used for Conformance and Margin testing as per CTS specifications. Users can use these applicationa remotely as well to generate D-PHY and C-PHY waveforms on AWG.

S-Parameters Plug-in for AWG70000A Series, AWG5200 Series, and SourceXpress®

Emulation Tools for Arbitrary Waveform Generators is an integrated software plug-in that provides emulation of RF components from touchstone files. You can cascade multiple touchstone files to emulate an RF chain. The effect of the RF component can also be de-embedded by selecting the Inversion option. This option also adds a provision to characterize a two-port device (DUT).

- Channel emulation through S-parameter filter
- Enables ISI feature in High Speed Serial

RF Generic Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®

RF Generic has all the features and functionality of RFXpress basic in a seamless interface that integrates with the AWG 70000 or SourceXpress. Customers no longer need to run a separate program to access RF, IQ and IF waveform creation. Smaller and faster, the RF Generic Plug-in has faster compile times and an intuitive GUI with help available directly in the GUI.

- Quickly and simply create digitally modulated IQ, IF, and RF waveforms
- Great flexibility to customize waveform
- Define baseband IQ, IF, and RF signals using a variety of modulation schemes
- Create single and multicarrier signals where each carrier is independently defined

SIGNAL GENERATOR SOFTWARE, OPTIONS, & PLUG-INS

Radar Plug-In

The RADAR plug-in is a simple and flexible tool to create RADAR pulsed waveforms with various modulations and impairments for the purpose of building complex and real world RADAR test signals. The plug-in integrates into the SourceXpress waveform creation platform, and the AWG70000 series and AWG5200 series arbitrary waveform generators.

- Define multiple pulse trains that can be assigned to different channels for applications like simulating phase array radars and creating scenarios to test EW receivers.
- Define multiple pulse group(s) or dead time for each pulse train.
- Each pulse group can be independently set up to have different pulse shapes, pulse modulation, offsets, hopping, noise and other features.
- Modulation types supported include LFM, Piecewise LFM, Chirp Sequence, Custom Modulation, Barker codes, and many others.
- Define frequency, phase and amplitude offsets (constant & variable) across pulses in the pulse group.
- Apply noise on entire pulse, including Off time or just on the Pulse On time.
- Define frequency hopping.

Environment Plug-In

The Environment plug-in is used to emulate the interference between Radar and other communication standards to test Radar receivers under realistic and worst-case conditions. The users can configure the various standard-specific parameters of these interfering signals including power levels, start time, and duration. The time and frequency overview enables them to adjust the above parameters to quickly create worst-case scenarios.

For more information visit: tek.com/environment-plug-awg5200-series-and-awg70000-series

Multitone, Notches & Chirp Plug-in for AWG70000 Series,AWG5200 Series, and SourceXpress®

This software plug-in for the AWG70000 Series instruments allows for the effortless generation of notches, chirps and tones. Essential for customers in the military, aerospace, threat emitter and RF applications where creating and generating tones are required for a successful mission.

High Speed Serial Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®

Serial Data Signal and Impairment Generation Tool for Arbitrary Waveform Generators.

The High Speed Serial waveform creation plug-in is a powerful, easy-to-use plug-in to synthesize high-speed serial data signals for Arbitrary Waveform Generators (AWG). It runs directly integrated into on the native GUI of the AWG 70000 Series arbitrary waveform generators or from an external PC on SourceXpress. **Key Features:**

- Flexibility: Jitter generation has become so flexible that the user now has the freedom to try various permutations and combinations of jitter parameters like Pj, Rj, ISI, Noise, Delay, etc.
- Replicate scenarios: The signals are digitally synthesized. All AWG setups can be recalled and the scenarios can be replicated on any other AWG within seconds.
- Analog nature of digital signals: In reality all digital signals are analog in nature and hence SerialXpress exploits the capabilities of an AWG to generate real-world signals.

OFDM Plug-In

The OFDM plug-in is simple and flexible. It create Single or Multiple OFDM based Frames as per standards with one or more bursts in a single compile. The plug-in integrates into the SourceXpress waveform creation platform, and the AWG70000 series and AWG5200 series arbitrary waveform generators.

- Configure and create complete multiple OFDM Frames with Preamble, Header and Payload.
- Preset for Standard compliant Frames for various wireless standards like Wi-Fi, WiMAX
- Define Frame with Preamble, Header and Payload selectively to simulate different OFDM signals
- Configure Symbols with Data, Pilot and Guard sub carriers with different base pattern type, amplitude profile and phase offsets.
- Subcarrier Modulation Formats including BPSK, QPSK, QAM (16, 32, 64, 256, 512, 1024), and 8-PSK
- Add Impairments such as Phase Noise, Multipath to simulate realistic propagation scenarios.
- Define Frequency Hopping and Gated Noise to simulate practical environment for receiver testing
- Allows user to emulate channels using S-Parameter files and observe impact on the waveform..

Generic Precompensation Plug-in for AWG70000, AWG5200 Series, and SourceXpress®

The Generic Precompensation plug-in creates correction coefficients that can be applied on waveforms to get flat frequency and linear phase response.

For more information visit: tek.com/signal-generator-software/generic-precompensation-plug

Spread Spectrum Clocking (SSC) Plug-in for AWG70000 Series, AWG5200 Series, and SourceXpress®

Add an SSC module with precise control over modulation profile, spread and frequency deviation. **Key Features:**

- Supports commonly used modulation profiles like Triangular and Sinusoidal
- Handles Up-/Down-/Center- and User-Defined frequency spreading schemes
- Flexibility to customize the SSC profile through controlled injection of modulation distortions with regard to:
  - Exact location of occurrence of distortions on the profile
  - The duration and magnitude of the distortions

Optical Plug-In for AWG70000 Series, AWG5200 Series, and SourceXpress®

The Optical Waveform Generation Plug-in addresses the needs of optical customers with complex modulation schemes for the purpose of testing optical communications components and other devices. The Optical Signal Plug-in integrates into both the SourceXpress waveform creation platform and the AWG70000A series arbitrary waveform generator.

- Easily define complex dual polarization modulation schemes with separately configured baseband data. Independently adjust baseband offset for both X and Y data streams.
- Define optical waveforms using a variety of predefined modulation schemes such as BPSK, QPSK, OQPSK, OOK, NRZ, up to 8 PAM, and up to QAM1024 – including QAM8. Define and apply custom modulation schemes
- Generate data streams from variety of predefined patterns, a PRBS 31 generator, or define your own custom arbitrary data stream.

EDUCATION SOLUTION – TEKSMARTLAB™

DATA SHEET

VIRTUAL TOUR

PRODUCT HIGHLIGHTS

Easy setup via Wi-Fi with instruments automatically recognized

Instant remote configuration of large fleets of instruments

Centralized monitoring and remote assistance

Test report online editing and submission

Increased utilization with instrument asset information auto-recording

- With TekSmartLab, you can wirelessly configure, control and monitor up to 600 instruments (100 test benches) from a single platform.
- Students can retrieve test results wirelessly, edit and submit the test reports online through the web browser of their mobile or laptop.
- Instrument asset info including utilization time is recorded automatically.

TEKSMARTLAB CONFIGURATION SAMPLES (20 BENCHES WITH 80 INSTRUMENTS)

ITEM	QTY	SUPPLIER	COMMENTS
TSL3000B- FL	1	Tektronix	Server softward floating license, one per lab
TBX3000A	20	Tektronix	One per bench
Instruments	80	Tektronix	Supported instruments. 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), TBS2000, 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)

LOGIC ANALYZERS

With Tektronix Logic Analyzers, you can acquire fast edges with the industry's highest acquisition speed. Support packages tuned to your specific application make it easier for you to probe, acquire, decode, analyze, and validate the performance of your microprocessor, FPGA or memory design.

	TLA6400	TLA7000
Description	Pre-configured Portable Logic Analyzer	Modular Portable and Benchtop Logic Analyzers
Channels	34, 68, 102, 136	68, 102, 136 modules 2 – 6 modules per frame
Timing	1.6 GHz on all channels 3.2 GHz on ½ channels	Up to 6.4 GHz
MagniVu™ Timing	25 GHz	50 GHz
State Clock Rate	333 MHz (standard) 667 MHz (optional)	750 MHz to 1.4 GHz
Maximum State Data Rate	1.33 Gb/s	3.0 Gb/s
Record Length	2Mb, 4Mb, 8Mb, 16Mb, 32Mb, 64Mb	2Mb to 64Mb
Analog Mux	Available	Available

CHOOSING YOUR LOGIC ANALYZER

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

1 Number of Channels

Logic analyzers are available in both modular and pre-configured forms. A modular logic analyzer allows you to add additional acquisition cards to increase the number of available channels. A pre-configured logic analyzer has a fixed number of channels and can't be changed after purchase.

2 Timing Resolution

Timing resolution is simply the inverse of the sample rate of the logic analyzer. Higher timing resolution allows you to more precisely place the edges of signals relative to one another, giving more accurate timing measurements.

3 State Clock Rate

In addition to timing mode, logic analyzers have a second acquisition mode called state mode. In this mode, a clock from your circuit tells the logic analyzer when to sample the date. The state clock specification indicates the maximum frequency of clock that the logic analyzer can use.

4 Record Length

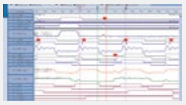
Record length, or memory depth, indicates the number of samples that can be stored. Longer record lengths can be helpful in troubleshooting problems whose cause and symptom are widely separated in time.

DATA SHEET

PRODUCT HIGHLIGHTS

- 15-inch display, with optional touch screen lets you see more of your data and navigate through it efficiently
- Drag-and-Drop Triggering – Simply drag any one of eight different trigger types onto the waveform
- Drag-and-Drop Measurements – Simply drag an icon from the measurement toolbar and drop it on your signal of interest

iCapture allows you to use one probe for both your logic analyzer and scope, eliminating the need to double-probe.



Integrate the display of digital and analog data with iView.

TLA6400 Series

The affordable TLA6400 Series Logic Analyzer offers the performance needed to debug, validate, and optimize the functionality of your digital system. Quickly isolate, identify, and characterize elusive and hard-to-find problems with a comprehensive set of signal integrity debug tools.

MODEL	CHANNELS	STATE CLOCK RATE	MAGNIVU TIMING	TIMING	RECORD LENGTH
TLA6401	34	333 MHz (standard) 667 MHz (optional)	25 GHz	1.6 GHz on all channels 3.2 GHz on ½ channels	2Mb, 4Mb, 8Mb, 16Mb, 32Mb, 64Mb
TLA6402	68	333 MHz (standard) 667 MHz (optional)	25 GHz	1.6 GHz on all channels 3.2 GHz on ½ channels	2Mb, 4Mb, 8Mb, 16Mb, 32Mb, 64Mb
TLA6403	102	333 MHz (standard) 667 MHz (optional)	25 GHz	1.6 GHz on all channels 3.2 GHz on ½ channels	2Mb, 4Mb, 8Mb, 16Mb, 32Mb, 64Mb
TLA6404	136	333 MHz (standard) 667 MHz (optional)	25 GHz	1.6 GHz on all channels 3.2 GHz on ½ channels	2Mb, 4Mb, 8Mb, 16Mb, 32Mb, 64Mb

RECOMMENDED PROBES

P5910	17-channel General Purpose Probe
P5934	34-channel Mictor Probe
P5960	34-channel DMAX Probe

RECOMMENDED SERVICE

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

RECOMMENDED ACCESSORIES

PG3L-B	Stand-Alone Digital Pattern Generator
LACART	Accessory Cart
K4000	2 Shelf Accessory Cart
020-2664-xx	Rack Mount Kit

SHIPS WITH PRODUCT

- Power Cord
- Quick Start Guide
- Keyboard and Mouse
- Front Cover
- Documentation CD
- Calibration Certificate

LEARN MORE
DOWNLOAD
the “XYZs of Logic Analyzers” Primer.

DATA SHEET

PRODUCT HIGHLIGHTS

- Modular mainframes provide flexibility and expandability
- Supports up to 6,528 logic analyzer channels, 48 independent buses
- Trace problems from symptom back to root cause in real time across multiple modules by viewing time-correlated data in a wide variety of display formats
- Choose from a variety of acquisition and stimulus modules

Debug and validate the latest DDR technology with the TLA7000 Series.

PCI Express Debug from Protocol to Physical Layer.

TLA7000 Series

The modular TLA7000 Logic Analyzer Series provides the speed and flexibility you need to capture logic detail on today's fastest microprocessors and memory designs.

TLA7000 MAINFRAME MODELS	DESCRIPTION	NUMBER OF MODULES	BUILT-IN COMPUTER	DISPLAY
TLA7012	Portable Mainframe	2	Yes	15"
TLA7016	Benchtop Mainframe	6	Requires an external computer	none

ACQUISITION MODULE MODELS	CHANNELS	STATE CLOCK RATE	MAGNIVU TIMING	TIMING
TLA7BBx	68, 102, 136	750 MHz (standard) 1.4 GHz (optional)	50 GHz	1.6 GHz on all channels; 3.2 GHz on ½ channels; 6.4 GHz on ¼ channels

PATTERN GENERATOR MODEL	MAXIMUM DATA RATE	NUMBER OF CHANNELS	MEMORY DEPTH	DATA MODELS
PG3ACAB-B	300 Mbps 600 Mbps with DDR Option	64 (mergeable to 256 channels)	32M Vectors	Flat or Block Based

RECOMMENDED PROBES

Acquisition Probes	
P6910	34-channel General Purpose Probe
P6960	34-channel Single-Ended DMAX Probe
P6980	34-channel Differential DMAX Probe
Pattern Generator Probes	
P370	TTL Output
P373	LVDS Output
P375	Output Programmable from -2V to +6.5V

RECOMMENDED ACCESSORIES

LACART	Accessory Cart
K4000	2 Shelf Accessory Cart
020-2664-xx	Rack Mount Kit

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

- Power Cord
- Quick Start Guide
- Keyboard and Mouse
- Front Cover (TLA7012)
- Documentation CD
- Calibration Certificate

LEARN HOW

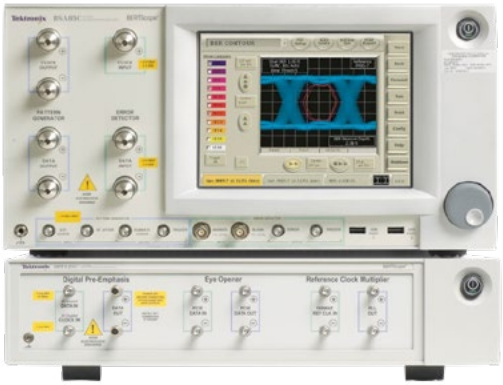
the TLA7012 can help in the debug of signal integrity problems. Download the "Fundamentals of Signal Integrity" Primer.

BIT ERROR RATE TESTERS

Bridging the Information Gap

Each Tektronix Bit Error Rate Tester delivers unprecedented flexibility and performance to help compress your product development cycles and reduce verification testing costs. Quickly and confidently identify errors in digital bit streams with these highly advanced test and measurement instruments.

	BA SERIES	BSA SERIES	BSX SERIES
Product Series	BA1500, BA1600	BSA125C, BSA175C, BSA286CL	BSX125. BSX240, BSX320
Channels	1	1	1
Maximum Bitrate	1.5-1.6 Gbps	12.5-28.6 Gbps	12.5-32 Gbps
Maximum Native Error Detector Rate	1.6 Gbps	26 Gbps	26 Gbps, sub-sampled 26 to 32 Gbps
Maximum Pattern Length	8Mbits	128Mbits	512Mbits with Protocol Sequencing
Stress Impairments	External Stressed Clock	External Stressed Clock Internal: (STR) Rj, Sj, Si, Pj, BUJ	External Stressed Clock Internal (STR) Rj, Sj, Di Pj, BUJ
Output Signal Amplitude	4V Differential	4V Differential	Variable, 100 mV to 3V Differential
Detector Functions	BER, BER Contour, BER Mask, Error Location, Eye Diagram, Jitter Peak	BER, BER Contour, BER Mask, Error Location Analysis, Eye Diagram, Jitter Peak, Jitter Map, Jitter Tolerance	BER, BER Contour, BER Mask, Error Location Analysis, Eye Diagram, Jitter Peak, Jitter Map, Jitter Tolerance, Programmable Pattern Matching
Input Sensitivity	40mV Typical	50mV Typical	50mV Typical
Applications	Digital Radio and Satellite Test	PCIe, USB, Thunderbolt, SATA, SAS, FC, IEEE802.x, OIF, CEI	PCIe Gen 3/4, USB 3.1 Gen1/2, Thunderbolt, SAS, FC, IEEE802.x, OIF, CEI
Software	–	BSAUSB3: USB (Gen3) and BSAUSB3.1L USB (Gen 3.1) Automated Loopback Control, Auto Impairment Calibration and Receiver Compliance Test System; BSAPCI3: PCI Express (Gen3) Automated Loopback control, auto impairment calibration and receiver compliance test system.	BSXUSB31: USB 3.1 Gen1 and Gen2 Automated Loopback Control, Auto Impairment Calibration and Receiver Compliance Test System; BSXPCI: PCI Express Gen3/4 Automated Loopback Control, Auto Impairment Calibration and Receiver Compliance Test System.



DATA SHEET BA

DATA SHEET BSA

BA/BSA Bit Error Rate Tester

As high performance SERDES receiver validation is now frequently required as part of industrial conformance programs (SATA, PCIe, USB, etc.) or for the validation and comparison of silicon receiver sensitivity, the BERT is an essential piece of all silicon and system validation labs.

MODEL	OUTPUT CHANNELS	BIT RATE	MAXIMUM USER DEFINED PATTERN LENGTH
BA1500	1	1.5 Gbps	8 Mbits
BA1600	1	1.6 Gbps	8 Mbits
BSA125C	1	12.5 Gbps	128 Mbits
BSA175C	1	17.5 Gbps	128 Mbits
BSA286CL	1	28.6 Gbps	128 Mbits

RECOMMENDED ACCESSORIES

Digital Pre-Emphasis Processor	
DPP125C	1-12.5 Gb/s 3-Tap, opt. 4-Tap
Clock Recovery Instruments	
CR125A	1-12.5 Gb/s
CR175A	1-17.5 Gb/s
CR286A	1-28.6 Gb/s
Linear Equalizer Options	
LE160	16Gbps Linear Equalizer
LE320	32Gbps Linear Equalizer
Common Options	
CDS	Channel Designer SW
SPM	S-Parameter Modeler
Software Packages	
BSAUSB3	USB3 Automation SW and accessories needed for compliance testing
BSAPCI3	PCI Express (Gen3) Automated SW for compliance testing

RECOMMENDED ACCESSORIES

Adapters

BARACK BA-Rack Mount Kits; BSA12500ISI Differential ISI Board; BSARACK BSA-Rack Mount Kits; BSASWITCH Hardware switch for receiver testing in applications such as USB3 compliance testing allowing attainment of loopback; PMCABLE1M Precision Phase Matched Cable Pair

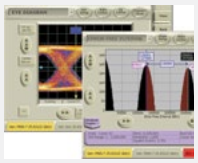
INSTRUMENT OPTIONS

BA1500/BA1600: ECC: Error Correction and Coding Emulation; MAP: Error Mapping Analysis; PL: Physical Layer Test Suite Software.

BSA125C-BSA286CL: F2: F/2 Jitter Generation (requires STR); STR Stressed Signal Generation; J-MAP Jitter Decomposition SW; ECC Error Correction Coding; LDA Live Data Analysis SW; MAP Error Mapping SW; PL Physical Layer Test Suite; SF Symbol Filtering SW; SLD Stressed Live Data SW

PRODUCT HIGHLIGHTS

- BA1500/BA1600:
  - 1.6Gbps performance and low entry cost with full featured analysis capabilities key for telecommunications and satellite systems testing
- BSA125C-BSA286CL:
  - 12.5 to 28.6Gbps performance and the industry's most comprehensive precision signal impairments, jitter measurement and error location analysis tools make this family of products key to all validation labs
  - Ultra low noise floor (<300fs RMS Rj) coupled with 28.6Gbps performance makes these instruments key for all forms of receiver characterization and debug.



The BSA offers a complete and continuous analysis of any given bit stream, allowing in-depth BER contouring and examinations of very low probability and infrequent errors, which other instruments overlook.

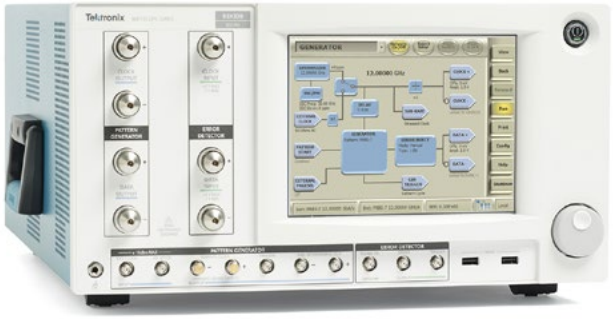
SHIPS WITH PRODUCT

- All Models Include:
  - Quick Start user manual, power cord, mouse, three (3) short low-loss SMA cables, DVI adapter
  - Standard 1-year warranty
- Certifications:
  - EU EMC Directive (CE-Marked)*
  - LVD Low Voltage Directive
  - US Listed UL61010-1
  - Canada Certified CAN/CSA 61010-1

*BSA models only.

RECOMMENDED SERVICE

G3	Gold Care 3-year Extended Warranty
G5	Gold Care 5-year Extended Warranty
R3	3-year Extended Warranty
R5	5-year Extended Warranty



DATA SHEET

BSX Series Bit Error Rate Tester

The new protocol enabled BSX Series BERTScope simplifies and accelerates receiver testing of Gen3 and Gen4 devices (up 32 Gb/s) – with the most comprehensive tools to shorten the time required to debug link training and bit error rate issues. Pattern sequencing and pattern matching allows users to observe their devices response to loop-back and link training test cases. The BERTScope family also provides unique visibility into the underlying root cause of physical layer issues by capturing the exact location and timing of bit errors.

MODEL	OUTPUT CHANNELS	MAXIMUM BIT RATE	TXEQ TO MAXIMUM RATE
BSX125	1	12.5 Gbps	Yes
BSX240	1	24 Gbps	Yes
BSX320	1	32 Gbps	Yes

RECOMMENDED ACCESSORIES

Clock Recovery Instruments	
CR125A	1-12.5 Gbps
CR175A	1-17.5 Gbps
CR286A	1-28.6 Gbps
Linear Equalizer	
LE160	16Gbps Linear Equalizer
LE320	32Gbps Linear Equalizer
Software Packages	
BSXUSB31	Calibration and compliance test automation for USB31 Gen1 and Gen2
BSXPCI4Base	Calibration and compliance test automation for PCIe Gen3 and Gen4 BASE
BSX Instrument Options	
STR	Stress impairment option
TXEQ	4-tap equalization option
JMAP	Advanced jitter decomposition option
FEC	Forward Error Correction emulation
UPM	User defined pattern matching

RECOMMENDED SERVICE

G3	Gold Care 3-year Extended Warranty
G5	Gold Care 5-year Extended Warranty
R3	3-year Extended Warranty
R5	5-year Extended Warranty

SHIPS WITH PRODUCT

- All Models Include:
  - Quick Start user manual, power cord, mouse, three (3) short low-loss SMA cables, DVI adapter
  - Standard 1-year warranty
- Certifications:
  - LVD Low Voltage Directive
  - US Listed UL61010-1
  - Canada Certified CAN/CSA 61010-1

PRODUCT HIGHLIGHTS

- Up to 32 Gbps maximum data rate
- Built-in 4-tap TX equalization
- Full complement of stress impairments including RJ, SJ DI PJ, BUJ
- Protocol-aware pattern sequencing with detector pattern matching
- Error location analysis with forward error correction emulation

Protocol aware pattern editing and sequencing simplifies creation of user-defined handshaking test cases.

Error locations provide debugging information such as the exact number of errors at each bit position in the test pattern.

SPECTRUM ANALYZERS

Choosing your Wireless/RF Test Solution

See an RF world that 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. 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.

	RSA306B USB SPECTRUM ANALYZER	RSA500A USB SPECTRUM ANALYZER	RSA600A USB SPECTRUM ANALYZER	RSA5100B REAL TIME SPECTRUM ANALYZER	RSA7100A REAL TIME SPECTRUM ANALYZER
Applications	Portable for field and lab use	Field analysis, interference hunting, network management	Lab use, including EMI and wireless design validation	High performance, advanced signal analysis	Very high performance, advanced signal analysis, record and playback
Power Source	USB 3.0	Battery or Line	Line	Line	Line
Max Frequency Range	9 kHz - 6.2 GHz	9 kHz - 7.5 GHz	9 kHz - 7.5 GHz	1 Hz - 26.5 GHz	16 kHz - 26.5 GHz
Max Acquisition Bandwidth (Real Time)	40 MHz	40 MHz	40 MHz	165 MHz	800 MHz
Noise Floor (DANL at 1GHz, Preamp On, dBm/Hz)	-163	-164	-164	-167	-164
Tracking Generator		Option	Option	–	–
Full-feature Spectrum Analysis with Real Time	Yes	Yes	Yes	Yes	Yes
Modulation, Pulse, Wireless Standards Analysis	Option	Option	Option	Option	Option
Recording Time	PC SSD size dependent	PC SSD size dependent	PC SSD size dependent	NA - IQ streaming outputs availble	>2 hours
Reference Frequency Accuracy, ppm	± 3	± 1, 0.003 with GPS lock	± 1, 0.003 with GPS lock	± 1 ± 0.1 Opt PFR	±0.05

TEK MIXED DOMAIN OSCILLOSCOPES INCLUDE A SPECTRUM ANALYZER PG. 21-22

CHOOSING YOUR REAL-TIME SPECTRUM ANALYZER

Key items for consideration when choosing your Spectrum Analyzer.

1 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.

2 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. Also, wide band radar and electronic warfare signals often require as much bandwidth as possible to completely capture the full bandwidth of a signal, so it is very useful to use an analyzer with the maximum available real-time analysis bandwidth available, at 800 MHz.

3 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 RSA5100B has the best Spurious Free Dynamic Range of any wide band analyzer on the market, while the RSA306B has a much smaller form factor and is great for making quick measurements. So the RSA5100B may be more suitable for characterizing things like power amplifiers or radar systems.

4 Features and Capabilities

All of our real-time spectrum analyzers can run the same feature set and capabilities with SignalVu-PC, from our USB Spectrum Analyzers to the RSA7100A as well as the MDO4000C. Optional features include preamplifiers, acquisition bandwidth options, and analysis options that include WLAN, Bluetooth, P25 and general purpose digital modulation measurements.

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**.

KEY FEATURES

1 40MHz Capture Bandwidth

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

2 Built-in Tracking Generator

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

3 Real-time Analysis

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

4 SignalVu-PC Software

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

5 Optional Advanced Analysis

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

6 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.

RSA306B

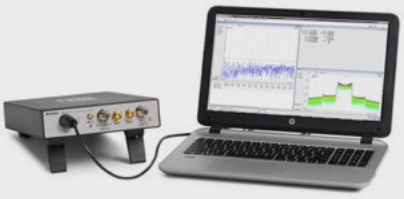
Full-featured RF Analysis in Your Hands at a Breakthrough Price

- 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

RSA7100A

Imagine New Solutions for Wideband Designs and Systems

- Frequency Range: 16 kHz- 14/26.5 GHz
- Phase Noise at 10 kHz offset
  -134 dBc/Hz at 1 GHz (typical)
  -128 dBc/Hz at 10 GHz (typical)
- 800 MHz Real Time bandwidth, recording, and playback

DATA SHEET

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)

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 pre-compliance EMI/EMC testing. At just 1.7 pounds, the RSA306B takes little space on your bench, and fits easily in your hand, bag, pocket or tool belt.

APPLICATIONS

R&D and Education

Interference Hunting

Field Installation and Maintenance

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

RECOMMENDED ACCESSORIES

DFA0047	Smart Directional Antenna, 20-8500 MHz, with electronic compass and preamp
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz, requires DF-A0047
EMI-RE-HWPARTS	Bundle of EMI accessories for radiated pre-compliance test (includes EMI-BICON-ANT, EMI-CLP-ANT, EMI-PREAMP, EMI-TRIPOD, CABLE-5M, CABLE-1M
EMI-DEBUG-HWPARTS	Bundle of EMI accessories for Debug (includes EMI-NF-PROBE & EMI-NF-AMP)
OPT CTRL-G1-x	Portable controller, availability varies by region
RSA306-BRACK	Rack mount, holds 2 RSA306B, room for 2 Mini-PC's

SIGNALVU-PC / DATAVU-PC LICENSES*

SV23xx-SVPC	WLAN 802.11a/b/g/j/p Measurement Software
SV24xx-SVPC	WLAN 802.11n Measurement Software
SV25xx-SVPC	WLAN 802.11ac Measurement Software
SV27xx-SVPC	Bluetooth Basic LE TX SIG measurements

SIGNALVU-PC / DATAVU-PC LICENSES*

EMCVUxx-SVPC	EMI Pre-compliance and Troubleshooting Software
EMCVUNL-SVPC	EMI Pre-compliance and Troubleshooting, Node Locked (includes CISPR detectors)
EMCVUFL-SVPC	EMI Pre-compliance and Troubleshooting, Floating (includes CISPR detectors)
DVPC-MREC	Operate and record two RSA/300/500/600 spectrum analyzers simultaneously
DVPC-SPAN50NL	DataVu-PC Software for 50 MHz BW playback files
SV28xx-SVPC	LTE downlink (eNB) RF measurements
SV54xx-SVPC	Signal Classification/Survey
SV56xx-SVPC	Playback of recorded signal files
SVAxx-SVPC	AM/FM/PM Direct Audio Measurements
SVMxx-SVPC	General Purpose Modulation Analysis, including demodulation for Zigbee and Bluetooth Enhanced Data Rate
SVPxx-SVPC	Pulse Measurement Software
SVTxx-SVPC	Settling Time (Frequency and Phase)
MAPxx-SVPC	Mapping Software

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

RECOMMENDED SERVICE

R5	5-year Extended Warranty

AVAILABLE DOWNLOADS

- SignalVu-PC base software
- LabVIEW drivers
- Applications programming interface
- Fully documented programmers manual (Example source code for getting started)

SHIPS WITH PRODUCT

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

DATA SHEET

RSA500A Series

The RSA500A series offers rugged, portable real time spectrum analysis for interference hunting, spectrum management, network maintenance tasks and pre-compliance EMI/EMC testing. Combined with an available tablet and SignalVu-PC software, the RSA500A series solves your toughest interference challenges. When equipped with the optional Tracking Generator with internal VSWR bridge, and Cable and Antenna testing software, the RSA500A becomes an indispensable field tool. 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 & 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)
- Standard integrated GPS receiver for mapping measurements, lock to local oscillator
- Standard Preamplifier

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
RSA503A	Portable real time USB spectrum analyzer	9 kHz - 3.0 GHz	40 MHz	-70 dBc	100 µs
RSA507A	Portable real time USB spectrum analyzer	9 kHz - 7.5 GHz	40 MHz	-70 dBc	100 µs

SIGNALVU-PC / DATAVU-PC LICENSES*

DVPC-MREC	Operate and record two RSA/300/500/600 spectrum analyzers simultaneously
DVPC-SPAN50NL	DataVu-PC Software for 50 MHz BW playback files
EMCVUxx-SVPC	EMI Pre-compliance and Troubleshooting Software
EMCVUNL-SVPC	EMI Pre-compliance and Troubleshooting, Node Locked (includes CISPR detectors)
EMCVUFL-SVPC	EMI Pre-compliance and Troubleshooting, Floating (includes CISPR detectors)
MAPxx-SVPC	Mapping Software
SV26xx-SVPC	APCO P25 phase 1 and 2 measurements
SV28xx-SVPC	LTE downlink (eNB) RF measurements
SV54xx-SVPC	Signal Classification/Survey
SV56xx-SVPC	Signal Playback: Enables playback and re-analysis of recorded R3F files
SV60xx-SVPC	VSWR, Return Loss, Distance to Fault, Cable Attenuation Measurements. Requires tracking generator on spectrum analyzer
SVAxx-SVPC	AM/FM/PM Direct Audio Measurements
SVMxx-SVPC	General Purpose Modulation Analysis, including demodulation for Zigbee and Bluetooth Enhanced Data Rate
SVPxx-SVPC	Pulse Measurement Software
SVTxx-SVPC	Settling Time (Frequency and Phase)

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

RECOMMENDED ACCESSORIES

DF-A0047	Smart Directional Antenna, 20-8500 MHz, with electronic compass and preamp
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz, requires DF-A0047
EMI-RE-HWPARTS	Bundle of EMI accessories for radiated pre-compliance test (includes EMI-BICON-ANT, EMI-CLP-ANT, EMI-PREAMP, EMI-TRIPOD, CABLE-5M, CABLE-1M
EMI-DEBUG-HWPARTS	Bundle of EMI accessories for Debug (includes EMI-NF-PROBE & EMI-NF-AMP)
FZ-G1-x	Panasonic Touchpad Instrument Controller
RSA5600 RACK	Rackmount (holds 1 RSA500), Various Calibration Kits, Cables, Adapters
Various Calibration Kits for Cable and Antenna Measurements	

INSTRUMENT OPTIONS

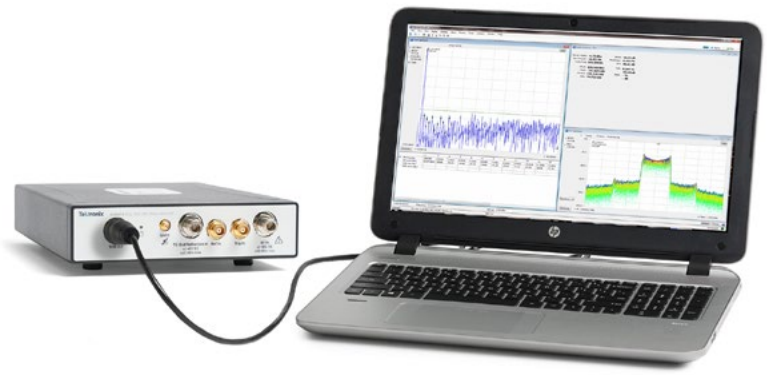
OPT 04	Tracking Generator: 10 MHz – to maximum range of instrument
OPT CTRL-G1-x	Portable controller, availability varies by region. Also available as separate item.

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
C5	Calibration Service 5 Years
R5	Standard Warranty Extended to 5 years
D1	Calibration Data Report
D3	Calibration Data Report, 3 years (with option C3)
D5	Calibration Data Report, 5 years (with option C5)
G3	Three Year Gold Care
G5	Five Year Gold Care



DATA SHEET

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 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.

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.

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

SIGNALVU-PC / DATAVU-PC LICENSES*

SV23xx-SVPC	WLAN 802.11a/b/g/j/p Measurement Software
SV24xx-SVPC	WLAN 802.11n Measurement Software
SV25xx-SVPC	WLAN 802.11ac Measurement Software
SV26xx-SVPC	APCO P25 phase 1 and 2 measurements
SV27xx-SVPC	Bluetooth Basic LE TX SIG measurements
SV28xx-SVPC	LTE downlink (eNB) RF measurements
SV54xx-SVPC	Signal Classification/Survey
SV56xx-SVPC	Playback of recorded signal files
SV60xx-SVPC	VSWR, Return Loss, Distance to Fault, Cable Attenuation Measurements. Requires tracking generator on your spectrum analyzer
SVAxx-SVPC	AM/FM/PM Direct Audio Measurements
SVMxx-SVPC	General Purpose Modulation Analysis, including demodulation for Zigbee and Bluetooth Enhanced Data Rate
SVPxx-SVPC	Pulse Measurement Software
SVTxx-SVPC	Settling Time (Frequency and Phase)

SIGNALVU-PC / DATAVU-PC LICENSES*

DVPC-MREC	Operate and record two RSA/300/500/600 spectrum analyzers simultaneously
DVPC-SPAN50NL	DataVu-PC Software for 50 MHz BW playback files
EMCVUNL-SVPC	EMI Pre-compliance and Troubleshooting, Node Locked (includes CISPR detectors)
EMCVUFL-SVPC	EMI Pre-compliance and Troubleshooting, Floating (includes CISPR detectors)

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

RECOMMENDED ACCESSORIES

EMI-RE-HWPARTS	Bundle of EMI accessories for radiated pre-compliance test (includes EMI-BICON-ANT, EMI-CLP-ANT, EMI-PREAMP, EMI-TRIPOD, CABLE-5M, CABLE-1M
EMI-DEBUG-HWPARTS	Bundle of EMI accessories for Debug (includes EMI-NF-PROBE & EMI-NF-AMP)
RSA5600 RACK	Rackmount (holds 2 RSA600), Various Calibration Kits, Cables, Adapters

Multiple Calibration Kits for Cable/Antenna measurements

SHIPS WITH PRODUCT

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

INSTRUMENT OPTIONS

OPT 04	Tracking Generator: 10 MHz – to maximum range of instrument

RECOMMENDED SERVICE

C3	Calibration Service 3 years
C5	Calibration Service 5 years
R5	Standard Warranty extended to 5 years
D1	Calibration Data Report
D3	Calibration Data Report, 3 years (with option C3)
D5	Calibration Data Report, 5 years (with option C5)
G3	Three Year Gold Care
G5	Five Year Gold Care

AVAILABLE DOWNLOADS

- SignalVu-PC base software
- LabVIEW drivers
- Applications programming interface
- Fully documented programmers manual (Example source code for getting started)

DATA SHEET

PRODUCT HIGHLIGHTS

- Discover the most difficult to find signal behavior with DPX® Live RF spectrum display
- Save time by isolating signal anomalies on which other instruments can't even trigger
- Seamless data capture of entire duration of signal events, like frequency hopping sequences, PLL settling times, turn on transients, and multiple pulses
- Accelerate troubleshooting and analysis by pinpointing the root cause of problems in any/all domains at any time with correlated markers
- Most advanced Real-time capability
- Automatic pulse measurement and detection

RSA5000B Real-Time Spectrum Analyzer

The RSA5000 Series mid-range Real-Time Spectrum Analyzer combines best-in-class RF performance with up to 165 MHz bandwidth and 6th Generation DPX® Technology. This provides the measurement confidence and functionality you demand for everyday tasks and gives you the dynamic range you expect for challenging spectrum analysis measurements.

MODEL	CAPTURE BANDWIDTH	FREQUENCY RANGE	SFDR AT 165 MHZ BW (TYPICAL)	MINIMUM EVENT DURATION FOR 100% POI
RSA5103B	25 MHz, 40 MHz, 85 MHz, 125 MHz, 165 MHz	1 Hz - 3 GHz	80 dBc	0.43 µs
RSA5106B	25 MHz, 40 MHz, 85 MHz, 125 MHz, 165 MHz	1 Hz - 6.2 GHz	80 dBc	0.43 µs
RSA5115B	25 MHz, 40 MHz, 85 MHz, 125 MHz, 165 MHz	1 Hz - 15 GHz	80 dBc	0.43 µs
RSA5126B	25 MHz, 40 MHz, 85 MHz, 125 MHz, 165 MHz	1 Hz - 26.5 GHz	80 dBc	0.43 µs

INSTRUMENT OPTIONS

Opt. 09	Enhanced Real-Time
Opt. 10	AM/FM/PM Modulation and Audio Measurements
Opt. 11	Phase Noise / Jitter Measurement
Opt. 12	Settling Time (Frequency and Phase)
Opt. 14	Noise Figure and Gain
Opt. 20	Pulse Signal Analysis
Opt. 21	General Purpose Modulation Analysis
Opt. 22	Flexible OFDM Analysis
Opt. 23	WLAN 802.1a/b/g Measurements
Opt. 24	WLAN 802.11n Measurements
Opt. 25	WLAN 802.11ac Measurements
Opt. 26	APCO P25 Measurement Application
Opt. 27	Bluetooth Basic LE TX SIG Measurements
Opt. 28	LTE FDD and TDD BTS Power and BTS ID
Opt. 32	EMI Pre-compliance and Troubleshooting
Opt. MAP	Mapping and Signal Strength
Opt. 53	Memory Extension, 4 GB Acquisition Memory Total
Opt. 54	Signal Classification/Survey
Opt. 65	Digital I and Q Output

INSTRUMENT OPTIONS

Opt. B85	85 MHz Acquisition Bandwidth
Opt. 300	High Performance Real-Time
Opt. B16x	165 MHz Acquisition Bandwidth
Opt. B16xHD	High Dynamic Range, 85 MHz acquisition bandwidth
Opt. B25	25 MHz Acquisition Bandwidth (no charge option)
Opt. B40	40 MHz Acquisition Bandwidth
Opt. B85HD	High Dynamic Range, 85 MHz acquisition bandwidth
Opt. B125	125 MHz Acquisition Bandwidth
Opt. B125HD	High Dynamic Range, 125 MHz acquisition bandwidth

RECOMMENDED ACCESSORIES

119-4146-00	Near Field Probe Kit
EMI-RE-HWPARTS	Bundle of EMI accessories for radiated pre-compliance test (includes EMI-BICON-ANT, EMI-CLP-ANT, EMI-PREAMP, EMI-TRIPOD, CABLE-5M, CABLE-1M
EMI-DEBUG-HWPARTS	Bundle of EMI accessories for Debug (includes EMI-NF-PROBE & EMI-NF-AMP)
SignalVu-PC	Vector Signal Analysis Software for your PC

SHIPS WITH PRODUCT

Quick Start Manual, Application Guide, Printable Online Help File, Programmer's manual (on CD), power cord, BNC-N adapter, USB Keyboard, USB Mouse, Front Cover, One-year Warranty

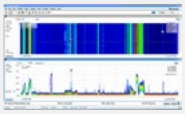
RECOMMENDED SERVICE

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

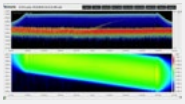
DATA SHEET

PRODUCT HIGHLIGHTS

- 16 kHz to 14/26.5 GHz frequency range covers a broad range of analysis needs
- High performance spectrum analysis for advanced design verification with -134 dBc/Hz phase noise at 1 GHz, 10kHz offset and amplitude accuracy of .05dB at 10 GHz to 26.5 GHz
- A broad range of analysis tools are standard. Standard measurements include channel power, ACLR, CCDF, OBW/EBW, spur search, EMI detectors amplitude, frequency, phase vs. time, DPX spectrum, and spectrograms. Correlated multi-domain displays
- Standard 320 MHz real-time bandwidth
- Available 800 MHz acquisition bandwidth for advanced radar, communications and spectrum management requirements



The RSA7100A combined with SignalVu-PC application licenses offers advanced analysis plus 800 MHz bandwidth and streaming to internal RAID.



With DataVu-PC you can search, mark and measure on up to 2,000,000 amplitude events or pulses in recorded files.

RSA7100A

The RSA7100A is a high performance spectrum analyzer focused on wideband analysis and signal recording. It provides real time spectrum analysis up to 800 MHz bandwidth and streaming storage of up to two hours. SignalVu-PC software is included for real time, spectrum and vector signal analysis, and DataVu-PC software is available for analysis of recorded signals.

MODEL	DESCRIPTION	FREQUENCY RANGE	CAPTURE BANDWIDTH	SPURIOUS FREE DYNAMIC RANGE	MINIMUM SIGNAL DURATION FOR 100% PROBABILITY OF INTERCEPT
RSA7100A 14*	Real-time signal analyzer, 320 MH acquisition bandwidth	16 kHz – 14 GHz	50 / 320 / 800 MHz	134 dBc at 1 GHz	700ns
RSA7100A 26*	Real-time signal analyzer, 320 MH acquisition bandwidth	16 kHz – 26.5 GHz	50 / 320 / 800 MHz	134 dBc at 1 GHz	700ns

* Only sold in UK and United States

INSTRUMENT OPTIONS

RSA7100A GPS	GPS receiver
RSA7100A CAL	Calibration report with data (ISO 17025)
RSA7100A GPS CAL	GPS receiver and calibration report with data (ISO17025)
RSA7100A C7100-A	Controller, no RAID memory
RSA7100A C7100-B	Controller, RAID memory, >20 minutes recording time (requires STREAMNL-SVPC)
RSA7100A C7100-C	Controller, RAID memory, > 120 minutes recording time (requires STREAMNL-SVPC)
RSA7100A SV09	High performance real time (export class 3A002), node-locked license

SIGNALVU-PC / DATAVU-PC LICENSES

B800NL-SVPC	License; 800 MHz acquisition bandwidth - RSA7100A; Node Locked
STREAMNL-SVPC	License; Streaming data; Node Locked
SVMHNL-SVPC	License; General Purpose Modulation Analysis to work with analyzer of any acquisition bandwidth and MDO; Node Locked

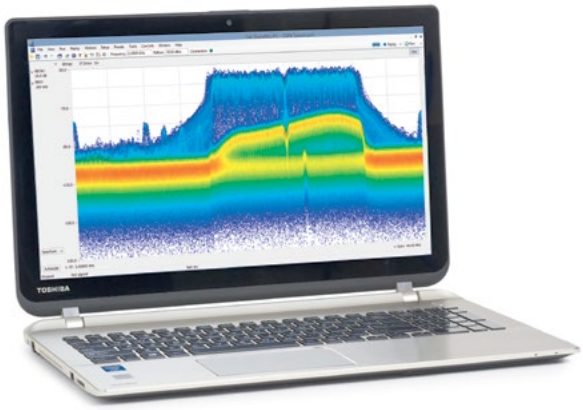
SIGNALVU-PC / DATAVU-PC LICENSES

SVPHNL-SVPC	License; Pulse Analysis to work with analyzer of any acquisition bandwidth and MDO; Node Locked
TRIGHNL-SVPC	License; Advanced triggers, RSA7100A only; Node Locked
MAPNL-SVPC	License; Mapping and signal strength; Node Locked
SV54NL-SVPC	License; Signal survey and classification; Node Locked
SVTNL-SVPC	License; Settling Time (frequency and phase) measurements; Node Locked
SV23NL-SVPC	License; WLAN 802.11a/b/g/j/p measurement; Node Locked
SV24NL-SVPC	License; WLAN 802.11n measurement (requires SV23); Node Locked
SV25HNL-SVPC	License; WLAN 802.11ac = measurement to work with analyzer of any acquisition bandwidth and MDO (requires SV23 and SV24); Node Locked
SV26NL-SVPC	License; APCO P25 measurement; Node Locked
SV27NL-SVPC	License; Bluetooth measurement; Node Locked
DVPC-SPAN1000-NL	DataVu Analysis of up to 1000mHz bandwidths; Floating

SHIPS WITH PRODUCT

Installation and safety manual, 3.5mm Crown Connector-Female, PCIe cable, mouse, keyboard, adapter, Mini-Display Port to HDMI, Mini-Display Port to DVI, Power cables, rack mount kits for acquisition unit and controller. Controller rack-mount is a 'telecom-style'. A server-style rackmount can also be used with the controller, available from third parties.

Note: A PC monitor is not included with the RSA7100A. Tektronix recommends the Dell UltraSharp U2414H 23.8 in. Widescreen IPS LCD Monitor, or any monitor that supports Display port, DVI or HDMI input and has a minimum 1920 x 1080 display resolution.

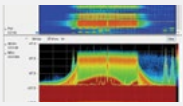


DATA SHEET

DOWNLOAD SOFTWARE

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 (NL) license or a Floating license (FL). You can try them for free with a 30-day trial license.



DPX Spectrum

Mapping and Signal Geolocation

Bluetooth Signal Analysis

SignalVu-PC

SignalVu-PC vector signal analysis software helps you easily validate wideband designs. Using the signal analysis engine of the RSA5000 and RSA7100A 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.

SIGNALVU-PC / DATAVU-PC LICENSES

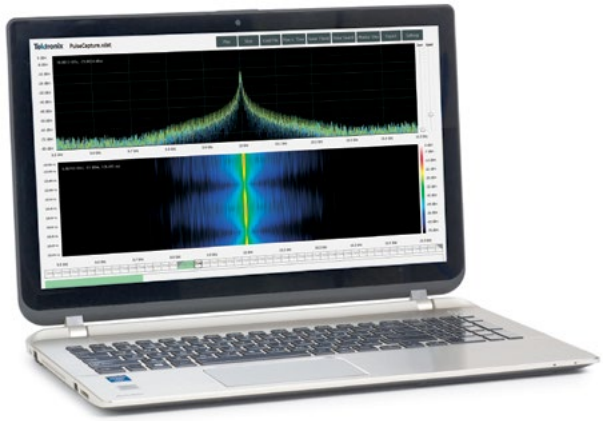
SV23NL-SVPC SV23FL-SVPC	WLAN 802.11a/b/g/j/p measurement
SV24NL-SVPC SV24FL-SVPC	WLAN 802.11n measurement (requires SV23)
SV25NL-SVPC SV25FL-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40MHz (requires SV23 and SV24) or MDO
SV26NL-SVPC SV26FL-SVPC	APCO P25 measuremenr
SV27NL-SVPC SV27FL-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SV28NL-SVPC SV28FL-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SV54NL-SVPC SV54FL-SVPC	Signal survey and classification
SV56NL-SVPC SV56FL-SVPC	Playback of recorded files
SV60NL-SVPC SV60FL-SVPC	VSWR, Return Loss, Distance to Fault cable and antenna measurements. Required tracking
SV2CNL-SVPC SV2CFL-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

SIGNALVU-PC / DATAVU-PC LICENSES

SVANL-SVPC SVAFL-SVPC	AM/FM/PM/Direct Audio Analysis
SVMNL-SVPC SVMFL-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SVONL-SVPC SVOFL-SVPC	Flexible OFDM Analysis
SVPNL-SVPC SVPFL-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40MHz or MDO
SVTNL-SVPC SVTFL-SVPC	Settling Time (frequency and phase) measurements
CONNL-SVPC CONFL-SVPC	SignalVu-PC live link to the MDO4000C series mixed-domain oscilloscopes
EDUFL-SVPC	Education-only version of all modules for SignalVu-PC
MAPNL-SVPC MAPFL-SVPC	Mapping
EMCVUNL-SVPC	License, EMI Pre-compliance and Troubleshooting (not for RSA7100), Node locked (includes CISPR detectors)
EMCVUFL-SVPC	License, EMI Pre-compliance and Troubleshooting (not for RSA7100), Floating (includes CISPR detectors)
RSA5000B Opt. 32	EMI Pre-compliance and Troubleshooting for RSA5000B

LEARN MORE

about the signals around you by downloading the SignalVu-PC "eGuide to RF Signals."

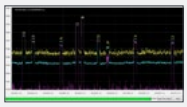


DATA SHEET

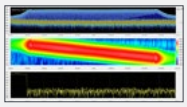
DOWNLOAD SOFTWARE

PRODUCT HIGHLIGHTS

- Record and frequency scan on 2 instruments simultaneously.
- Search based on signal amplitude characteristics, marking each event occurrence for later examination.
- Make an unlimited number of Scalar pulse measurements with the eMarker application and export the results in Pulse Descriptor Word format for integration into other.
- Export results to in-depth analysis packages like SignalVu-PC from within DataVu-PC – without any additional conversion software.



Time overview views the whole file at once, controls start-stop time of analysis.



DataVu PC basic application license based on acquisition bandwidth, three bandwidths available.

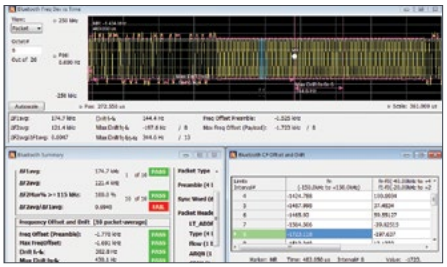
DataVu-PC

DataVu-PC can be used to record 1 or 2 USB Spectrum Analyzers. For the USB Spectrum Analyzers, this can include a controlling one instrument to search while the second instrument can stare and record the signal. Alternatively, both instruments could record simultaneously. Once the recording is made, DataVu can play back and process the larger recorded files an all USB Tektronix spectrum analyzers, as well as from the RSA7100A. DataVu-PC can turn hours of attended monitoring into fast post-acquisition search, mark, and measurement tasks. Analyzer your results and search for specific signal artifacts with a mask search.

DATAVU-PC LICENSES

DVPC-SPAN50NL	DataVu-PC operation on acquisitions to 50 MHz bandwidth-Node Locked License
DVPC-SPAN50FL	DataVu-PC operation on acquisitions to 50 MHz bandwidth-Floating License
DVPC-SPAN200NL	DataVu-PC-PC operation on acquisitions to 200 MHz bandwidth-Node Locked License
DVPC-SPAN200FL	DataVu-PC operation on acquisitions to 1000 MHz bandwidth- Floating License
DVPC-SPAN1000NL	DataVu-PC operation on acquisitions to 1000 MHz bandwidth-Node Locked License
DVPC-SPAN1000FL	DataVu-PC operation on acquisitions to 1000 MHz bandwidth- Floating License
DVPC-PULSENL	DataVu-PC pulse analysis including frequency mask, Node Locked License
DVPC-PULSEFL	DataVu-PC pulse analysis including frequency mask, Floating License
DVPC-MREC-NL	Multi-unit recording for USB analyzers; Node Locked
DVPC-MREC-FL	Multi unit recording for USB analyzers; Floating

RSA7100A Series, RSA5000B Series and SignalVu-PC

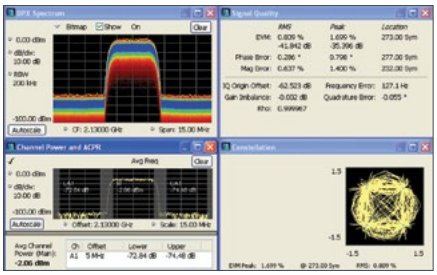


Bluetooth®

Whether you are validating a new chipset, designing a new wireless module or integrating Bluetooth into your latest design, Tektronix provides RF PHY testing solutions to help you get the job done and get your design to market faster. Capability includes correlation between different displays showing the signal in all domains of operation (RF, Time, IQ).

Support is available for Basic Rate, Enhanced Data Rate and Bluetooth Low Energy. Contact Tektronix for Bluetooth 5 support.

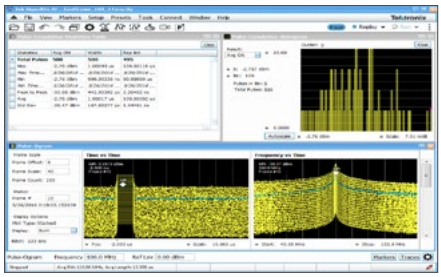
For more information visit:
tek.com/bluetooth



General Modulation Analysis

Are you designing to a proprietary wireless technology? Tektronix has a general purpose demodulation option to help you test the RF PHY layer of your device. Analysis of 27 modulation types including 16/32/64/256 QAM, QPSK, O-QPSK, GMSK, FSK, APSK is provided. Displays include Symbol Table, Constellation, Eye, Trellis, and Demodulated IQ Diagrams and gives you more insight into the quality of your signal.

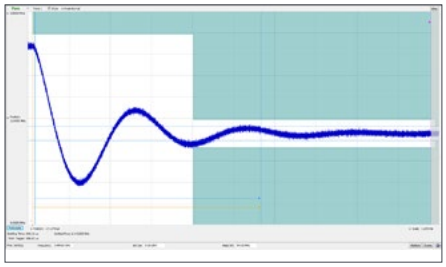
For more information visit:
tek.com/product-software-series/signalvu-pc



Pulse Analysis

Tektronix gives you the ability to gain insight into important pulsed signals with a pulse table of all results, pulse traces of specific single pulse parameters, and pulse trend information on data for the whole pulse train. You can acquire more than 200,000 pulses for post analysis and cumulative statistics. You can characterize pulsed signals with 31 automatic pulse measurements such as Rise Time, Duty Cycle, Pulse Ripple and Droop. Pulse-Ogram displays a waterfall of multiple segmented captures, with correlated amplitude vs time and spectrum of each pulse.

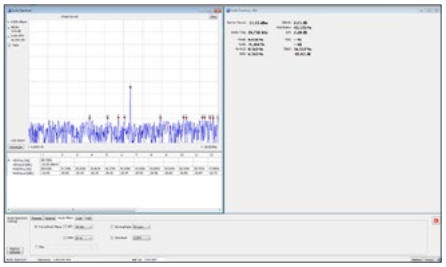
For more information visit:
tek.com/product-software-series/signalvu-pc



Settling Time (Frequency and Phase) Analysis

Easily select measurement bandwidth, tolerance bands, reference frequency (auto or manual), and establish up to 3 tolerance bands vs. time for Pass/Fail testing. Settling time may be referenced to external or internal trigger, and from the last settled frequency or phase.

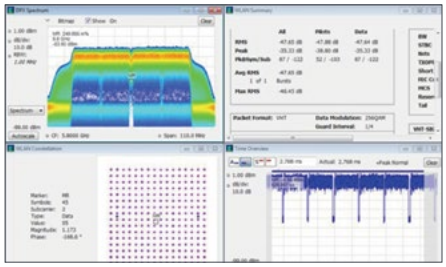
For more information visit:
tek.com/product-software-series/signalvu-pc



AM/FM/PM Direct Audio Measurements

This application software allows the RSAs to perform direct audio analysis for radio communications devices and components with basic measurements like THD, SINAD, Noise and Hum. Additionally, there are set high pass, low pass, or deemphasis filters available, which can also be user defined.

For more information visit:
tek.com/product-software-series/signalvu-pc

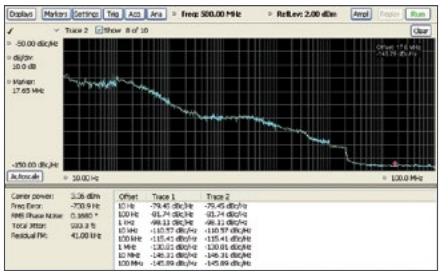


WLAN Analysis

WLAN options are available for in-depth analysis of 802.11a/b/g/j/p, 802.11n and 802.11ac standards. You can gain insight into the quality of the signal or just its mode depending on your application. Various displays allow you to analyze the signal in multiple domains such as constellation, amplitude versus time, or even the DPX spectrum. The density of the 'shoulders' of the WLAN signal are clearly seen in the DPX display.

For more information visit:
tek.com/product-software-series/signalvu-pc

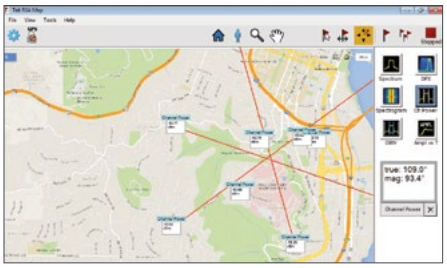
RSA7100A Series, RSA5000B Series and SignalVu-PC



Phase Noise and Jitter Measurements for the RSA5000 Series

Make important phase noise measurements quickly and easily when you characterize your wireless device. Identify timing issues with advanced jitter measurement capability like Timing Interval Error (TIE) and other jitter analysis plots.

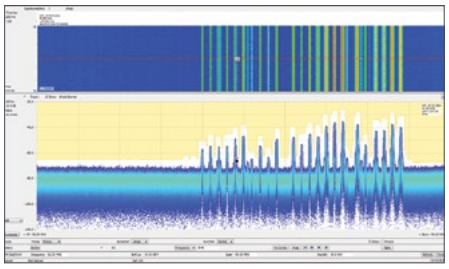
For more information visit:
tek.com/datasheet/spectrum-analyzer/rsa5000-spectrum-analyzers-datasheet



Mapping

Tektronix offers the MAP application that enables interference hunting and location analysis. Locate interference with an azimuth function that lets you draw a line or an arrow on a mapped measurement to indicate the direction your antenna was pointing when you take a measurement. You can also create and display measurement labels. Maps can be populated from the spectrum, DPX spectrum, Signal Strength, Spectrogram or Channel Power measurements. The Map It function in SignalVu-PC automatically captures GPS coordinates, time and the measurement results in a single file for later analysis.

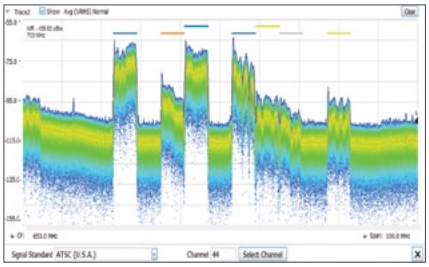
For more information visit:
tek.com/product-software-series/signalvu-pc



Playback of Recorded Files

Playback of recorded signals can reduce hours of watching and waiting for a spectral violation to minutes at your desk reviewing recorded data. Recording length is limited only by storage media size and recording is a basic feature included in SignalVu-PC. SignalVu-PC application SV56 Playback allows for complete analysis by all SignalVu-PC measurements, including DPX Spectrogram. Minimum signal duration specifications are maintained during playback. AM/FM audio demodulation can be performed. Variable span, resolution bandwidth, analysis length, and bandwidth are all available. Frequency mask testing can be performed on recorded signals up to 40 MHz in span, with actions on mask violation including beep, stop, save trace, save picture, and save data.

For more information visit:
tek.com/product-software-series/signalvu-pc



Signal Survey/Classification

The signal classification application (SV54) enables an expert systems guidance to aid the user in classifying signals. It provides graphical tools that allow you to quickly create a spectral region of interest, enabling you to classify and sort signals efficiently. The spectral profile mask, when overlaid on top of a trace, provides signal shape guidance, while frequency, bandwidth, channel number, and location are displayed allowing for fast classification.

For more information visit:
tek.com/product-software-series/signalvu-pc

VECTOR NETWORK ANALYZERS

Legendary support and quality meet ease-of-use and affordability. The Tektronix TTR500 Series 2-port, 2-path vector network analyzer is our latest breakthrough – an unmatched combination of measurement performance and convenience at 40% lower price than leading benchtop alternatives!

	TTR500 SERIES
Frequency Range	100 kHz to 3.0 or 6.0 GHz
Dynamic Range	> 122 dB
Trace Noise	< 0.008 dBrms
Output Power	-50 to +7 dBm
Bias Tee (internal)	Yes
Weight	3.5 lbs.
Applications	S-parameter Measurements (S11, S21, S12, S22), Antenna Matching, RF Component Design and Testing, Return Loss, Insertion Loss/Gain, Impedance
Typical DUTs	Filters, Amplifiers, Cables, Connectors, Antennas, RF Components, Discrete Components

CHOOSING YOUR VECTOR NETWORK ANALYZER

To help you choose the right VNA, the most common selection criteria are listed below, along with helpful tips.

1 DUT Performance Requirements

The Vector Network Analyzer (VNA) you select should match your measurement requirements for your device under test (DUT). Important parameters to consider are the number of ports, frequency range, dynamic range, and whether or not the instrument is capable of measuring passive or active components. With its two ports, more than 122 dB dynamic range, less than 0.008 dB rms trace noise, and hardware designed specifically for measuring both passive and active components, the TTR500 Series VNA is capable of making everyday S-parameter measurements with the accuracy and confidence you expect from Tektronix, all while saving you money.

2 Size, Weight and Power (SWaP)

Whether you plan to use the VNA in the lab, in the field, at your desk, or on the manufacturing floor, you need to consider the SWaP of the instrument. Traditionally, VNAs are large and bulky, requiring a cart so it can migrate among groups more easily. VNAs also require proper ventilation and heat management. Thanks to an innovative design centered around a tightly integrated ASIC, the TTR500 Series VNA consumes less than 16 watts of power, is fanless, weighs less than 3.5 lbs, and can be easily stacked, moved, or stored.

3 Calibration

Before you can make any measurements with the VNA, you must calibrate it to reduce errors that can affect the measurement. This is what makes the VNA one of the most accurate RF test instruments available. User calibration enables the VNA to factor out the effects of cables, adaptors, and most things used in the connection of the DUT. There are many different calibration methods and standards available, each with varying levels of accuracy. You will want to make sure that the VNA supports your required calibration method. The TTR500 Series VNA supports 8 and 12-term error correction and is compatible with the industry's most popular mechanical cal standards.

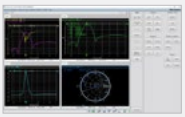
DATA SHEET

TTR500 Series

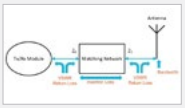
The TTR500 has a form factor small enough to fit in a briefcase with a price tag to match. You can put a VNA on every engineering bench to improve efficiency and uptime. In a classroom, students can get hands-on experience with industry standard test instrumentation. Weather you're designing for RF device or teaching in the lab, the TTR500 Series VNA gives you all the capability and performance you need in a 6 GHz 2-port VNA at a price you can afford.

PRODUCT HIGHLIGHTS

- Full 2-port 2-path S-parameter measurement in a variety of formats
- Complete vector network analysis capability with Tektronix VectorVu-PC™ software
- Built-in bias tee accessible on both ports to bias active devices
- Application programming interface (API) for Microsoft Windows environment and LabView
- Robust SCPI command interface to optimize code migration



RF Component Troubleshooting and Design Validation



Antenna Matching and Tuning

Education

MODEL	FREQUENCY RANGE	NUMBER OF PORTS	DYNAMIC RANGE	OUTPUT POWER	TRACE NOISE
TTR503A	100 KHz to 3 GHZ	2, type-N female connectors	>122 dB	-50 to +7 dBm	<0.008 dB RMS
TTR506A	100 KHz to 6 GHZ	2, type-N female connectors	>122 dB	-50 to +7 dBm	<0.008 dB RMS

RECOMMENDED CALIBRATION KITS

CALSOLT35F	3.5mm Female SOLT 4-in-1 Cal Kit, 0 to 13 GHz (SPINNER BN 53 38 28)
CALSOLT35M	3.5mm Male SOLT 4-in-1 Cal Kit, 0 to 13 GHz (SPINNER BN 53 38 29)
CALSOLTNF	Type-N Female SOLT 4-in-1 Cal Kit, 0 to 9 GHz (SPINNER BN 53 38 43)
CALSOLTNM	Type-N Male SOLT 4-in-1 Cal Kit, 0 to 9 GHz (SPINNER BN 53 38 44)
CALSOLT716F	7/16 Female SOLT 4-in-1 Cal Kit, 0 to 6 GHz (SPINNER BN 53 38 45)
CALSOLT716M	7/16 Male SOLT 4-in-1 Cal Kit, 0 to 6 GHz (SPINNER BN 53 38 45)
CALSOLTNF-75	Type-N Female SOLT 4-in-1 Cal Kit, 0 to 3 GHz (SPINNER BN 53 38 57 R000)
CALSOLTNM-75	Type-N Male SOLT 4-in-1 Cal Kit, 0 to 3 GHz (SPINNER BN 53 38 58 R000)

STORAGE SOLUTIONS

TTR500TRANSIT	TTR500 Carrying Case
TTR500RACK	TTR500 Rack Mount Kit; Holds 2 VNAs side-by-side

CABLES

012-1768-00 (60 cm) 012-1767-00 (1 m) 012-1746-00 (1.5 m)	Type-N(m) to Type-N(m) Cable, Rugged, Phase-stable
012-1765-00 (60 cm) 012-1766-00 (1 m) 012-1745-00 (1.5m)	Type-N(m) to Type-N(f) Cable, Rugged, Phase-stable
012-1752-00 (60 cm) 012-1750-00 (1 m) 012-1751-00 (1.5 m)	Type-N(m) to 7/16(m) Cable, Rugged, Phase-stable
012-1747-00 (60 cm) 012-1748-00 (1 m) 012-1749-00 (1.5m)	Type-N(m) to 7/16(f) Cable, Rugged, Phase-stable
012-1772-00 (60 cm) 012-1773-00 (1 m) 012-1774-00 (1.5 m)	Type-N(m) to SMA(m) Cable, Rugged, Phase-stable
012-1769-00 (60 cm) 012-1770-00 (1 m) 012-1771-00 (1.5 m)	Type-N(m) to SMA(f) Cable, Rugged, Phase-stable

SHIPS WITH PRODUCT

- USB 2.0 cable (6 Ft)
- Power supply
- Country-specific power cord
- USB stick (internal) with VectorVu-PC and all documentation
- Three-year Warranty

RECOMMENDED SERVICE

R5	5-year Extended Warranty

LEARN MORE
DOWNLOAD
the White Paper "Performance, size, reliability affordability. Choose four."

COHERENT OPTICAL SOLUTIONS

Characterization of Signals at 100 Gb/s, 400 Gb/s, and Beyond

As network demands increase, long-haul communications are becoming more complex. Advanced test tools are required to test the latest communication systems for 100G, 400G, 1Tb/s and beyond. Tektronix is the only test and measurement vendor that can offer a complete coherent optical test system from signal generation to modulation, acquisition, and analysis.

	OM4225 OPTICAL MODULATION ANALYZER	OM4245 OPTICAL MODULATION ANALYZER	OM2210 COHERENT RECEIVER CALIBRATION SOURCE	OM2012 TUNABLE LASER SOURCE
Bandwidth	25 GHz	45 GHz	N/A	N/A
Band Options	C	C or C+L	C, L, or C+L	C, L, or C+L
Description	Optical modulation analyzer cmpatible with both real-time and equivalent time oscilloscopes	Optical modulation analyzer compatible with both real-time and equivalent time oscilloscopes	Measures key performance parameters for receiver calibration	Low-noise, narrow-linewidth, single-mode tunable laser source

CHOOSING YOUR OPTICAL MODULATION ANALYZER

Tektronix Optical Modulation Analyzer solutions enable efficient and accurate characterization of serial communications in fiber at 100 Gb/s and beyond. With coherent optical modulation analysis capabilities, Tektronix provides the acquisition and display of constellation diagrams, Q plots, polarization analysis, and source laser stability to better understand fiber-based signal quality. The Tektronix Optical Modulation Analyzer series are tightly coupled with the DPO70000SX performance oscilloscopes series to enable comprehensive analysis and presentation of your data, so you're no longer in the dark.

1 Receiver Bandwidth

Receiver bandwidth determines the maximum baud rate that can be accurately measured by the optical modulation analyzer (OMA). A receiver bandwidth of 25GHz can accurately measure signals up to 40GBaud. Using the 45GHz OMA, signals as high as 80GBaud can be measured.

2 Frequency Band

100G communications typically occur in the C-band, however L-band is also supported. The Tektronix coherent optical products support testing in C-band, L-band, or both. Accompanying coherent receiver calibration sources also support flexible choices of frequency band.

3 Homodyne or Heterodyne Measurements

Homodyne measurements can often be conducted with equivalent-time oscilloscopes offering superior oscilloscope bandwidth and very low noise. When used in this mode, an externally-referenced local oscillator is required (option EXT). Heterodyne measurements do not require an external local oscillator and can utilize the high sample rate offered by real-time oscilloscopes.

DATA SHEET

OM2210 Coherent Receiver Calibration Source

The OM2210 Coherent Receiver Calibration Source includes the capability and software needed for coherent optical receiver calibration. Equipped with two independent free-running lasers and a precision polarization switch, the OM2210 is able to excite the coherent receiver with a known-polarization signal so that the receiver's linear transfer function can be extracted.

PRODUCT HIGHLIGHTS

- Measure key performance parameters for coherent receivers such as quadrature phase angle, path gains, and channel skew.
- Obtain calibration data over wavelength for use in calibrated optical field measurements.
- Calibrate any sufficiently stable coherent receiver to make it capable of optical field measurements.
- Measure receiver hybrid parameters at any heterodyne frequency within the oscilloscope bandwidth.
- Measure optical hybrid properties in higher-level receiver modules.

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Optical Output Power Adjustment Range (BOL set points)	PcwBOL	+7	—	+15.5	dBm
Operating Frequency Range (50 GHz channel spacing on ITU grid)	ν (C-band)	196.25	—	191.25	THz
	ν (L-band)	191.25	—	186.25	THz
Operating Wavelength Range (50 GHz channel spacing on ITU grid)	λ (C-band)	1527.60	—	1567.54	nm
	λ (L-band)	1567.54	—	1609.62	nm
Wavelength Accuracy EOL	Δλacc	—	—	±2.5	GHz
Linewidth [FWHM (–3 dB), instantaneous]	Δλ	—	—	100	kHz
Side Mode Suppression Ratio	SMSR	40	55	—	dB
Polarization Extinction Ratio (Unconnectorized)	Er, p	20	—	—	dB

INSTRUMENT OPTIONS

Opt. C	Single C-band laser with polarization switch
Opt. L	Single L-band laser with polarization switch
Opt. CC	Dual C-band lasers with polarization switch
Opt. LL	Dual L-band lasers with polarization switch
Opt. CL	Coupled C- and L-band lasers with polarization switch
Opt. NL	No lasers, polarization switch only

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

Coherent Receiver Calibration Source. Contains the laser source(s), polarization switch, optical power meter, power splitter, hardware control drivers, and calibration software needed for optical receiver characterization. It is used together with the OM4000 or OM1106 products to provide calibrated optical signal measurements.

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	150	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; 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 Instrument Control 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

CHOOSING YOUR SOURCE MEASURE (SMU) INSTRUMENT

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

1 System-Level Speed or Throughput

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

2 Sourcing Resolution and Output Stability

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

3 Measurement Settling Time, Offset Error, and Noise

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

4 Cabling

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

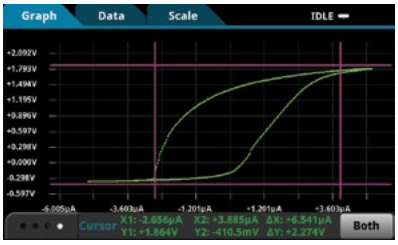
DATA SHEET

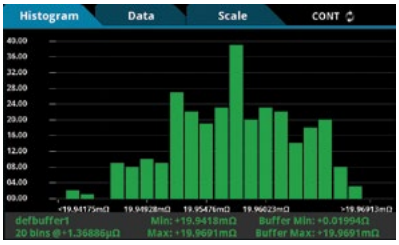
Model 2450/2460/2461 Graphical Touchscreen SourceMeter® SMU Instruments

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.

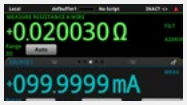




Built-in functions like real-time graphing, histogram charting, and scope-like cursors simplify converting test results into useful information.

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
- Kickstart,a PC-based instrument control software, enables 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

DATA SHEET

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
2450	1.000000A / 10.00000nA	200.0000V / 20.00000mV	20W
2450-NFP (with No Front Panel)			
2450-RACK (without Handle)			
2450-NFP-RACK (with No Front Panel or Handle)			
2460	7.000000A / 1.000000µA	100.0000V / 200.0000mV	100W
2460-NFP (with No Front Panel)			
2460-RACK (without Handle)			
2460-NFP-RACK (with No Front Panel or Handle)			
2461	10.00000A / 1.000000µA	100.0000V / 200.0000mV	1000W
2461-NFP (with No Front Panel)			
2461-RACK (without Handle)			
2461-NFP-RACK (with No Front Panel or Handle)			

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

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

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
- 174694600 TSP-Link®/Ethernet Cable (1.5 m)
- User Documentation
- QuickStart Guide
- Test Script Builder Software (available at www.tek.com)
- KickStart Instrument Control Software (available at www.tek.com)
- LabVIEW® and IVI Drivers (available at www.tek.com)

LEARN MORE DOWNLOAD

"There's an Unsung Hero on Your Workbench: The SourceMeter® Source Measure Unit (SMU) Instrument."

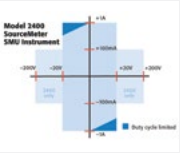
DATA SHEET

Series 2400 SourceMeter® SMU Instruments

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

PRODUCT HIGHLIGHTS

- Wide I-V range from 1100V to 100nV and 3.15A to 10pA
- 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



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

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	POWER
2400 / 2401	1.05A /10pA	200V/1µV (20V 2401)	20W
2410	1.05A /10pA	1100V/1µV	20W
2440	5.25A /100pA	40V/1µV	50W
2420	3.15A /100pA	Up to 60V/1µV	60W

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

C/2400-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2400*
C/2401-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Model 2401*
C/2410-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2410*
C/2420-3Y-17025	(ISO-17025 accredited) calibrations within 3 years of purchase for Models 2420*

*Not available in all countries.

SHIPS WITH PRODUCT

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

LEARN MORE
DOWNLOAD
the White Paper - “Choosing the Optimal Source Measurement Unit Instrument for Your Test and Measurement Application.”

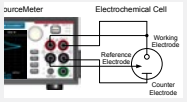
DATA SHEET

2450-EC, 2460-EC, and 2461-EC Graphical Potentionstats

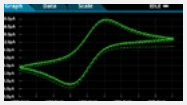
The 2450-EC, 2460-EC, and 2461-EC Potentiostats are versatile instruments, particularly well-suited for research and development in fundamental electrochemical lab research, characterizing the next generation of materials and electrolytes, new energy storage devices, and faster, smaller sensors. Each potentiostat comes preloaded with application tests to perform Cyclic Voltammetry, Chronoamperometry, and Chronopotentiometry.

PRODUCT HIGHLIGHTS

- Perform Cyclic, Squarewave, or Galvanic Voltammetry, Chronoamperometry, and Chronopotentiometry
- Simplified user interface for faster test setup and analysis of results
- Real-time plotting of voltammograms on the front panel
- Analytical graph cursors for immediate analysis of results without the need for a PC
- Create libraries of reusable, customizable experimental software with built-in open source scripting
- Screen capture function allows copying test results from the display to reports



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.

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	CV SCAN RATE	APPLICATIONS
2450-EC	1A/10nA	200V/20mV	0.1mV/s to 3500mV/s	Cyclic Voltammetry, Open Circuit Potential, Potential Pulse and Square Wave, Current Pulse and Square Wave, Chronoamperometry, Chronopotentiometry
2460-EC	7A/1µA	100V/200mV	0.1mV/s to 3500mV/s	
2461-EC	10A/1µA	100V/200mV	0.1mV/s to 3500mV/s	

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

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

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
- 174694600 TSP-Link/Ethernet Cable (1.5m)
- User Documentation
- Application Test Scripts and Documentation
- Test Script Builder Software (available at www.tek.com)
- LabVIEW and IVI Drivers (available at www.tek.com)

LEARN MORE DOWNLOAD

"Performing Cyclic Voltammetry Measurements Using 2450-EC or 2460-EC Electrochemistry Lab Systems" Application Note.

DATA SHEET

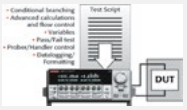
Series 2600B System SourceMeter® SMU Instruments

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

PRODUCT HIGHLIGHTS

- 4-quadrant design simultaneously 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
- Download IVy mobile app for quick and easy device characterization. Available for iPhone, iPad and for Android devices.
- GPIB, LAN (LXI), USB and RS-232

Use IVy to quickly visualize, interact with, and share test results.



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

MODEL	CURRENT MAX / MIN	VOLTAGE MAX / MIN	MAX READINGS / SEC	NO. OF CHANNELS
2601B	3A DC, 10A pulse/100 fA	40V/100nV	20,000	1
2602B	3A DC, 10A pulse/100 fA		20,000	2
2604B	3A DC, 10A pulse/100 fA		20,000	2
2611B	1.5A DC, 10A pulse/100 fA	200V/100nV	20,000	1
2612B	1.5A DC, 10A pulse/100 fA		20,000	2
2614B	1.5A DC, 10A pulse/100 fA		20,000	2
2634B	1.5A DC, 10A pulse/1fA		20,000	2
2635B	1.5A DC, 10A pulse/0.1 fA		20,000	1
2636B	1.5A DC, 10A pulse/0.1 fA		20,000	2

RECOMMENDED ACCESSORIES

2600-BAN	Banana Test Leads Adapter
8606	Probe Kit for 2600-BAN

RECOMMENDED SERVICE

26XXB-3Y-EW_	3-Year KeithleyCare Gold Plan
26XXB-5Y-EW_	5-Year KeithleyCare Gold Plan
C/26xxB-3Y-XXXX	Calibration Service 3 Years (17025 or DATA or STD)
C/26xxB-5Y-XXXX	Calibration Service 5 Years (17025 or DATA or STD)

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)
- 174694600 TSP-Link®/Ethernet Cable (1.5 m) (two per unit)
- TSP Express Software Tool (embedded)
- Test Script Builder Software (download at www.tek.com)
- LabVIEW Driver (downloadable at www.tek.com)
- ACS Basic Edition Software (optional)
- Download IVy mobile app for quick and easy device characterization. Download available for iPhone, iPad and for Android devices from the App Store and from Google Play Store.

LEARN MORE DOWNLOAD

"Simplifying DC-DC Converter Characterization with a Series 2600B System SourceMeter and an MSO/DPO5000 or DPO7000 Series Scope."

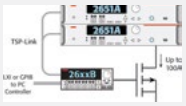
DATA SHEET

2650A High Power System SourceMeter® SMU Instruments

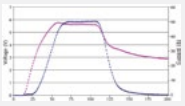
The high current Model 2651A and high voltage Model 2657A High Power System SourceMeter SMU instruments address such applications as testing power semiconductor devices, including diodes, FETs, and IGBTs, as well as characterizing newer materials such as gallium nitride, silicon carbide, and other compound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

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.

MODEL	POWER CHARACTERISTICS	4 QUADRANT SOURCE OR SINK CAPABILITIES	RESOLUTION	APPLICATIONS
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
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

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

2651A-3Y-EW	3-Year KeithleyCare Gold Plan
2657A-3Y-EW	3-Year KeithleyCare Gold Plan
C/2651A-3Y-STD	KeithleyCare 3-Yr Std Cal Plan
C/2657A-3Y-STD	KeithleyCare 3-Yr Std Cal Plan
C/2651A-5Y-STD	KeithleyCare 5-Yr Std Cal Plan
C/2657A-5Y-STD	KeithleyCare 5-Yr Std Cal Plan

SHIPS WITH PRODUCT

- 7709-308A Digital I/O and Interlock Connector
- 174694600 TSP-Link®/Ethernet Cable (1.5 m)
- User Documentation
- Test Script Builder Software (available at www.tek.com)
- 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)

LEARN MORE
DOWNLOAD

"Creating Multi-SMU Systems with High Power System SourceMeter Instruments" Application Note.

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	PA4000 MULTI-PHASE*
Channels	1	4	4
Basic Accuracy (V & I)	± 0.04%	± 0.04%	± 0.01%
Measurement Bandwidth	DC, 0.1Hz - 1MHz	DC, 0.1Hz - 1MHz	DC, 0.1Hz - 1MHz
Max Voltage and Current (internal shunt)	600Vrms / 20A RMS	600Vrms / 30A RMS	600Vrms / 30A RMS

* Limited Availablity thru Tektronix Encore

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

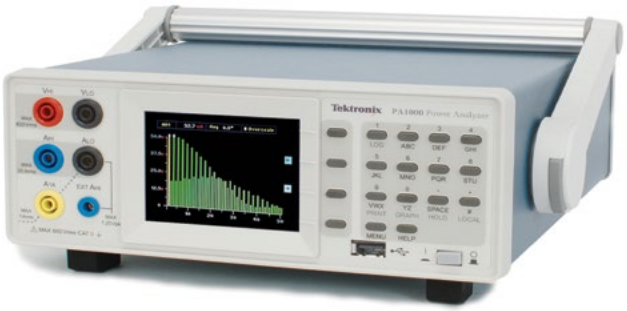
If your application requires you to know that your device is compliant with regulatory standards such as IEC61000 for harmonics, or ENERGY STAR™ for energy efficiency, you need an analyzer capable of meeting the test requirements specified by the standard. Even better, look for an analyzer supported 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.



DATA SHEET

VIRTUAL TOUR

360° VIEW

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)	BANDWIDTH	VOLTAGE INPUT RANGE	CURRENT RANGE (INTERNAL SHUNTS)
PA1000	PA1000 Single-Phase Power Analyzer	0.04% (45-850 Hz)	1MHz	Up to 600V_{rms}	20µA to 20A_{RMS}

RECOMMENDED ACCESSORIES

CL200	Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers
CL1200	Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers
BB1000-XX	Breakout Box simplifies connections to AC power cords. NA, EU and UK versions.
PA-LEADSET	Replacement Lead Set for Tektronix Power Analyzers (One Channel Lead Set)

RECOMMENDED SERVICE

C3	Calibration Service 3 Years
C5	Calibration Service 5 Years
D1	Calibration Data Report
D3	Calibration Data Report 3 Years (with Opt. C3)
D5	Calibration Data Report 5 Years (with Opt. C5)

AVAILABLE FOR FREE DOWNLOAD

- PWRVIEW - Complete Power Analysis PC Suite for compliance testing, 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

LEARN MORE

about making measurements of power, harmonics and efficiency using the PA1000 Power Supply.

BB1000-UN Universal Breakout Box

DATA SHEET

PA3000 Power Analyzer

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)	BANDWIDTH	VOLTAGE INPUT	CURRENT INPUT
PA3000 1CH	PA3000 Power Analyzer with 1 input module	± 0.04%	1MHz	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A
PA3000 2CH	PA3000 Power Analyzer with 2 input modules	± 0.04%	1MHz	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A
PA3000 3CH	PA3000 Power Analyzer with 3 input modules	± 0.04%	1MHz	Up to 600 V_{RMS} (2000Vpk)	80µA to 30A

RECOMMENDED ACCESSORIES

CT-60-S	Fixed-Core Current Transducer, High Accuracy, up to 60A
CT-200-S	Fixed-Core Current Transducer, High Accuracy, up to 200A
CT-1000-S	Fixed-Core Current Transducer, High Accuracy, up to 1000A (requires external power supply)
CT-100-M	Fixed-Core Current Transducer, Hall Effect, up to 100A
CT-200-M	Fixed-Core Current Transducer, Hall Effect, up to 200A
CT-1000-M	Fixed-Core Current Transducer, Hall Effect, up to 1000A
CL200	Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers
CL1200	Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers

RECOMMENDED ACCESSORIES

BB1000-XX	Breakout Box simplifies connections to AC power cords. NA, EU and UK versions.
PA-LEADSET	Replacement stackable banana test leads, safety shrouded with insulated alligator clips, 1000V CAT II, 30A. (Set of four for one channel)
PA-EXT-LEADSET	Replacement stackable 2mm Test Leads for External Current Sensor Input

RECOMMENDED SERVICE

PA3000 C3	Calibration Service 3 Years
PA3000 C5	Calibration Service 5 Years
PA3000 D1	Calibration Data Report
PA3000 D3	Calibration Data Report 3 Years (with Option C3)
PA3000 D5	Calibration Data Report 5 Years (with Option C5)
PA3000 G3	3 Year Gold Care Plan
PA3000 G5	5 Year Gold Care Plan
PA3000 R5	Standard Warranty Extended to 5 Years

SHIPS WITH PRODUCT

- PWRVIEW - Complete Power Analysis PC Suite for compliance testing, visualizing signals, analyzing data and documenting results.
- Stackable Test Lead Set (1 set per input channel)
- Built-in +/- 15V power supply for external current transducers
- Calibration Certificate
- User Manual and AC Power Cord
- 3-year Product Warranty

LEARN MORE
DOWNLOAD
the "Fundamentals of AC Power Measurements" Application Note.

SWITCH SYSTEMS

Keithley provides a wide array of high integrity switch systems to address the need for switching DC, RF, microwave, and digital I/O signals, whether in matrix, multiplexer, or a combination of configurations. Within our product portfolio you will also find data acquisition systems and digital multimeters with switching options.

	SERIES 3700A*	SYSTEM 46 /46T	707B / 708B
Max Channels / Crosspoints	576 / 2688	32	576 / 96
Card Slots	6	Not applicable	6 / 1
Unique optional card capabilities	High density switching, automatic CJC, long-life switching, FET switching	Not applicable	7072-HV provides 1kV and low current
Interface	GPIB, LAN (LXI), USB-TMC, TSP-Link® Channel Expansion Bus	GPIB	GPIB, LAN (LXI), ACS software, 4200-SCS KTEI software

* Series 3700A Switch Systems are found in this catalog on page 117 under the Data Acquisition product category.

CHOOSING YOUR SWITCH SYSTEMS

The most common selection criteria to help you choose the appropriate switch mainframe for your application.

1 Multiplex Switching

Multiplex switching can be used to connect one instrument to multiple devices (1:N) or multiple instruments to a single device (N:1). Multiplex switching permits multiple simultaneous connections, and sequential or non-sequential switch closures.

2 Matrix Switching

The matrix switch configuration is the most versatile because it can connect multiple inputs to multiple outputs. A matrix is useful when connections must be made between several signal sources and a multi-pin device, such as an integrated circuit or resistor network.

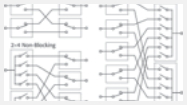
3 Isolated Switch Configurations

The isolated, or independent, switch configuration consists of individual relays, often with multiple poles, with no connections between relays. Isolated relays are not connected to any other circuit, so the addition of external wiring makes them suitable for building very flexible and unique combinations of input/output configurations. Isolated relays are commonly used in power and control applications to open and close different parts of a circuit that are at substantially different voltage levels.

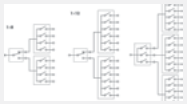
DATA SHEET

PRODUCT HIGHLIGHTS

- Compact RF/microwave switching system only 2U high
- Built-in contact closure counter to monitor switch cycles
- Standard configuration allows up to 32 channels of switching
- Simple control with built-in GPIB/IEEE-488 interface bus
- Channel characterization (S-parameter) data storage



Maximum Configuration: (8) – Unterminated (S46) or Terminated (S46T) SPDT relays.



Maximum Configuration: (4) – Unterminated (S46) or Terminated (S46T) multi-pole relays (SP4T, SP6T).

System 46 RF Microwave Switch System

Both terminated and unterminated versions of the Model S46 Switch System are available for testing devices such as cellular and cordless phones, specialized mobile radios, base stations, and RF components, including RFICs. Series 2700 data acquisition systems also offer RF/microwave switch options.

MODEL	MAX. CHANNELS OR CROSSPOINTS PER CHASSIS	FREQUENCY RANGES	RELAYS
S46 (unterminated)	Up to 32 RF/microwave chs	Up to 40GHz	Up to 8 unterminated SPDT coaxial microwave relays and 4 unterminated multi-pole coaxial microwave relays
S46T (terminated)	Up to 32 RF/microwave chs	Up to 26.5GHz	Up to 8 terminated or unterminated SPDT coaxial microwave relays and 4 terminated or unterminated multi-pole coaxial microwave relays

SHIPS WITH PRODUCT

- Power Cord
- Instruction Manual
- Rack Mount Kit

LEARN MORE
DOWNLOAD

"Configuring an Optimal RF/Microwave Switch System" Application Note.

DATA SHEET

Semiconductor Switch Matrix Mainframes

Models 707B/708B are specifically designed for semiconductor lab and production test environments, delivering ultra low current switching performance using standard triax connectors and cables. For smaller test systems, the Model 708B supports a single 8x12 switch card. For larger systems, the Model 707B can accommodate up to six 8×12 cards.

PRODUCT HIGHLIGHTS

- Remote and manual programming support
- Integrates seamlessly with the Model 4200A-SCS and Series 2600B SourceMeter SMU instruments
- Stores hundreds of switching configurations and channel patterns
- LXI Class C interface supports remote programming and control
- 14 bits of digital I/O

Series 2600B SMUs have an on-board test script processor (TSP) that executes test scripts and controls the switch matrix via the TSPLink.

Models 707B and 708B support a family of matrices designed specifically for low-level semiconductor device testing.

MODEL	MAX. VOLTAGE/CURRENT	MAX. OFFSET CURRENT	REC. FREQUENCY	CONNECTION TYPE
7072	200V / 1A	<1pA	15 MHz	3-lug triax
7072-HV	1300V / 1A	<1pA	4 MHz	3-lug triax
7174A	200V / 2A	<100fA	30 MHz	3-lug triax
7073	200V / 1A	<200pA	30 MHz	BNC

RECOMMENDED ACCESSORIES

CA-126-5A	25-pin Female Digital I/O to 25-pin Male Cable, 3m (10 ft)
2600-TLINK	Digital I/O to Trigger Link Cable, 1m (3.3 ft)
4299-6	Universal Full Rack Mount Kit (for Model 708B)
7007-1	Double-shielded GPIB Cable, 1m (3.3 ft)
7007-2	Double-shielded GPIB Cable, 2m (6.6 ft)
7072	Semiconductor Matrix Card
7072-HV	High Voltage Semiconductor Matrix Card
7072-TRT	Triax Fastening Tool
7079	Slide Rack Mount Kit (for Model 707B)
7173-50	High Frequency, 2-pole, 4×12 Matrix Card
7174A	Low Current Matrix Card

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

- User Documentation
- Test Script Builder Software (available at www.tek.com)
- CA-180-4A: CAT 5 Ethernet Crossover Cable, 1m (3.3 ft)
- CA-179-2A: CAT 5 Ethernet Cable, 3m (10 ft)
- CO-7: Line Cord
- Rear Fixed Rack Mount Hardware (707B only)

LEARN MORE DOWNLOAD

"Designing a High Throughput Switch System for Semiconductor Measurements with the Model 707B or 708B Semiconductor Switch Matrix Mainframe" Application Note.

Tektronix®

Get Up to 2X Faster Characterization Insight for Your Bold Discoveries.

Accelerate I-V, C-V, and ultra-fast pulsed I-V testing of your complex devices for materials research, semiconductor device design, process development, or production. With Keithley's 4200A-SCS Parameter Analyzer, running on Windows 10 OS, connecting to your next bold discoveries has never been faster or easier.

- Up to 2X faster characterization insight with new Clarius™ GUI-based software with touch-and-swipe or point-and-click control
- Reduced complexity and learning curve with built-in, context-sensitive measurement videos and over 250 application tests
- Easily switch between I-V and C-V measurements or move the C-V measurement to any terminal without re-cabling or lifting prober needles
- Largest parameter analyzer display in the industry enables more viewing for interactive testing
  - 15.6" LCD widescreen
  - Capacitive touchscreen
  - 1920x1080 HD display

SEMICONDUCTOR TEST SYSTEMS

From lab to fab, Keithley continues to bring the next generation of semiconductors to market with the industry's most cost-effective, fully automatic parametric testers; parameter analyzers that increase test throughput, reduce time to market, and test more device types; and software for semiconductor device testing and analysis.

	4200A-SCS	PCT CONFIGURATIONS	S500 & 530 PARAMETRIC TEST SYSTEMS	S540 POWER SEMICONDUCTOR TEST SYSTEM
Definition	Parameter Analyzer for semiconductor devices and materials	Parametric Curve Tracer configurations for power device characterization	Automated Parametric Test Systems used in production and lab environments. Up to 60 pins.	Automated Parametric Test System that enables testing up to 3kV
Typical Devices Tested	Devices and materials associated with CMOS, non-volatile memory, MEMS, III-V devices, TFTs, solar cells, nanoscale devices/structures	Semiconductor components including: IGBTs, MOSFETs, BJTs, Triacs/SCRs, diodes, and other power control devices	Wafer-level testing of semiconductor devices associated with CMOS, LDMOS, III-V, MEMS, and TFT process technologies	SiC, GaN, and other high voltage semiconductor devices and structures
Applications	Semiconductor device characterization, materials research, device reliability, and failure analysis	Semiconductor component characterization, inspection, and failure analysis	Semiconductor process control monitoring, automated characterization, wafer level reliability analysis, and die sort testing	Automated Characterization, Process Integration, Process Control Monitoring, Production Die Sort
Measurement Capabilities	I-V, C-V, Ultra-fast I-V, Pulse I-V	Low-power I-V, high-power I-V, and C-V	I-V, C-V, frequency, and pulse up to 1100V	I-V, C-V, frequency, and pulse. Up to 3kV. 2- and 3-terminal capacitance measurements.

CHOOSING YOUR SEMICONDUCTOR TEST SYSTEM

The following is a brief overview of key aspects of Semiconductor Characterization Systems.

1 Parametric Test Systems

Semiconductor Parametric Test Systems are engineered to handle the DC and C-V measurements required in process control monitoring, process reliability monitoring, and device characterization and are used in production and lab environments that entail a broad range of devices and technologies.

2 Characterization Software

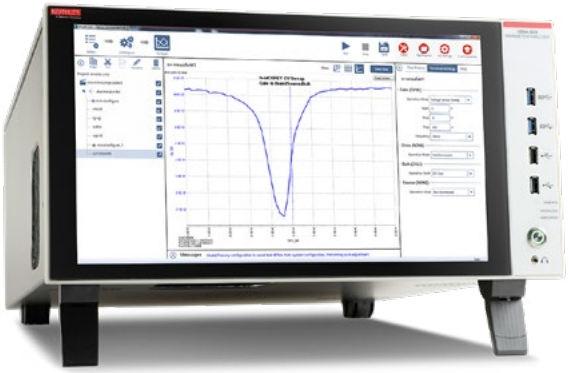
Characterization software automates semiconductor device characterization at the device, wafer, or cassette level, and when combined with source measure instrumentation or integrated test systems, can fill the gap between interactive lab-based setups and high-speed production test systems.

3 Parameter Analyzers

Parameter analyzers support all aspects of parametric testing, from basic DC I-V and C-V sweeps to advanced ultra-fast pulse I-V, transient, and waveform capture.

4 Curve Tracer Solutions

Complete solutions for power device characterization that are configured with a variety of high quality instruments, cables, test fixturing, and software.



DATA SHEET

PRODUCT HIGHLIGHTS

- Modular architecture - configurable and scalable to test needs
- 10aA and 0.2µV SMU/PA measure resolution
- Multi-frequency, Quasistatic and VLF C-V measurement capabilities
- Two-channel, Ultra-Fast Pulse I-V module for transient & self-heating analysis
- Includes software drivers for leading analytical probers

4200A-CVIV I-V/C-V Multi-Switch Module

4200A-SCS Parameter Analyzer

The modular, fully integrated 4200A-SCS parameter analyzer performs electrical characterization of materials, semiconductor devices and processes. The software guides the user in performing complex characterization tests using I-V and C-V measurement sweeps, ultra-fast pulsed & transient I-V and arbitrary waveform to fully characterize their device under test. Now running Windows 10 OS.

MODEL	TOTAL # OF SMUs	CURRENT RANGE & RESOLUTION (SMU)	VOLTAGE RANGE & RESOLUTION (SMU)	CAPACITANCE-VOLTAGE C-V MODULE	ULTRA-FAST PULSED I-V MODULE
4200A-SCS	Up to 9 high or medium power	1 A / 10aA	± 210 V / 0.2µV	Optional	Optional
4200A-SCS-PK1	2 medium power	100 mA / 10aA	210 V / 0.2µV	No	No
4200A-SCS-PK2	2 medium power	100 mA / 10aA	210 V / 0.2µV	Yes	No
4200A-SCS-PK3	2 medium power 2 high power	1 A / 10aA	± 210 V / 0.2µV	Yes	No

INSTRUMENT MODULES

4200-SMU	Medium Power Source Measure Unit
4210-SMU	High Power Source Measure Unit
4200-PA	Remote PreAmp Option for 4200-SMU and 4210-SMU
4210-CVU	Multi-frequency Capacitance Unit
4200A-CVIV	I-V/C-V Multi-Switch Module
4225-PMU	Ultra-Fast I-V Pulse Measure Unit
4225-RPM	Remote Amplifier/Switch
4220-PGU	High Voltage Pulse Generator
4210-MMPC/X	Multi-measurement Performance Cables

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

RUNNING WINDOWS 10

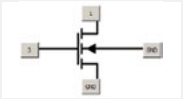
- Reference and User Manual
- 236-ILC-3 Interlock Cable
- All Cables and Adapters

Learn what upgrade options are available for your Model 4200-SCS.

DATA SHEET

PRODUCT HIGHLIGHTS

- Economical power device characterization that is field upgradeable and reconfigurable
- Highest accuracy and resolution
- DC or fast pulse capability
- High resolution 24-bit A/D converters and high speed 18-bit digitizers
- Trace mode for real-time control and parametric mode for parameter extraction
- Interlocked test fixture with safe access ports



Test libraries supplied for most device types.

ACS Basic Edition Software quickly captures output characteristics of an IGBT device.

Parametric Curve Tracer (PCT) Configurations

Keithley's Parametric Curve Tracer configurations are complete solutions configured with a variety of high quality instruments, cables, test fixturing, and software for power device characterization. This building block approach offers the advantages of easy upgrading or modification to meet changing test needs.

MODEL	TYPE	COLLECTOR/DRAIN SUPPLY HIGH VOLTAGE MODE	COLLECTOR/DRAIN SUPPLY HIGH CURRENT MODE	STEP GENERATOR BASE/ GATE SUPPLY
2600-PCT-1	Low Power	200 V/10 A	200 V/10 A	200 V/10 A
2600-PCT-2	High Current	200 V/10 A	40 V/50 A	200 V/10 A
2600-PCT-3	High Voltage	3 kV/120 mA	200 V/10 A	200 V/10 A
2600-PCT-4	High Current / High Voltage	3 kV/120 mA	40 V/50 A	200 V/10 A
PCT-CVU	Multi Frequency C-V Meter	Measures Capacitance vs. Voltage on 2, 3 and 4 Terminal Devices up to 3 kV		

RECOMMENDED ACCESSORIES

2651A	High Power System SourceMeter® SMU Instrument
2657A	High Power System SourceMeter® SMU Instrument
8010-CTB	Customizable Test Board
8010-DTB	Device Test Board with TO-247 Socket
8010-DTB-CT	Curve Tracer Socket Adaptor
CVU-3K-KIT	Bias Tee Kit for Up to 3 kV
CVU-200-KIT	Bias Tee Kit for Up to 200 V
70161-MSA	Keyboard/Monitor Arm for K420 and K475 Carts
8020	High Power Interface Panel
K475	Workstation Tower Mobile Cart for All PCT Configurations
K420	Workbench Cart Mobile Cart for Smaller PCT Configurations

RECOMMENDED SERVICE

R3	3-year Extended Warranty
R5	5-year Extended Warranty
C3	Calibration Service 3 Years
C5	Calibration Service 5 Years

SHIPS WITH PRODUCT

- ACS-Basic Component Test Software
- KUSB-488B USB to GPIB Adapter (2600 configurations only)
- All Cables and Adapters
- Sample Parts

LEARN MORE DOWNLOAD

"Testing to 100A by Combining Keithley Model 2651A High Power SourceMeter Instruments" Application Note.

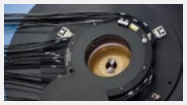
DATA SHEET S530

DATA SHEET S500

PRODUCT HIGHLIGHTS

- C-V measurements up to 1MHz
- Compatible with fully automatic probers
- 20W SMUs provide up to 1A or 200V
- 1kV SMU to any system pin (S530 High V)
- pA current measurement capability (S530 Low I)
- Up to 60 pins full Kelvin (S530 High V or S530 Low I)

S530 systems five layers: instruments, switch pathways, cable interface, probe card adapter, and probe card.



The Model 9139A Probe Card Adapter combines low current performance and high voltage capability.

S530 Parametric Test System and S500 Integrated Test System

Keithley's S530 Semiconductor Parametric Test Systems are engineered to handle the DC and C-V measurements required in process control monitoring, process reliability monitoring, and device characterization. These parametric test systems are used in production and lab environments that entail a broad range of devices and technologies. For specialized applications, S500 Integrated Test Systems offer semi-custom configurability.

MODEL	WIRING & PIN COUNT	SMU CHANNELS	MAX VOLTAGE	MAX CURRENT
S530 Low Current Parametric Test System	Up to 60 pins (4-wire or "Kelvin")	2 to 8	200V (2636B SMU)	1A
S530 High Voltage Parametric Test System	Up to 60 pins (4-wire or "Kelvin")	2 to 8	1100V (2410 SMU)	1A
S500 Integrated Test System	Up to 60 pins with switch (2-wire), or 32pins (direct wiring from SMU)	1 to 8 with switch, or 1 to 32 without switch	1100V with 7072-HV switch, or Max voltage of SMU with no switch	1A with switch, or Max current of SMU with no switch

RECOMMENDED ACCESSORIES

- Probe Card Adapter
- Capacitance-Voltage (C-V) Unit
- Pulse Generator Unit
- 7½-Digit Digital Multimeter (DMM) for use as a sensitive DC-voltmeter
- Frequency Measurement Option
- Switching Matrix (Standard in S530)

SHIPS WITH PRODUCT

- System Source Measure Units (SMUs)
- Switching Matrix (optional in S500)
- System Cabinet, Controller, and Integration
- System Software
- High-voltage Safety Interlock

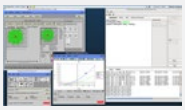
LEARN MORE DOWNLOAD

"Programming and Erasing Flash Memory Devices" Application Note.

DATA SHEET

PRODUCT HIGHLIGHTS

- Up to 48 pins
- Capacitance measurements such as Ciss, Coss, Crss up to 3kV
- pA current measurement capability
- Perform all tests in a single probe touch-down



KTE v5.7 software for fast test development and execution

Model 9140 PCA combines high voltage and low current performance

S540 Power Semiconductor Test System

The Keithley S540 is a fully automated, wafer-level parametric test system that can perform all high voltage, low voltage, low current, and capacitance tests up to 3kV in a single probe touch-down to maximize productivity and minimize cost of ownership. It is fully configurable from 12 to 48 pins.

MODEL	WIRING & PIN COUNT	SMU CHANNELS	MAX VOLTAGE	CURRENT RESOLUTION
S540HV	12 pins	Up to 4	3kV	10fA
S540HV/LC	Up to 48 pins (12 pins HV, 36 pins LC)	Up to 8	3kV	1fA

RECOMMENDED ACCESSORIES

- Probe Card Adapter (Keithley 9140 or Celeadon VC20)
- Capacitance Meter
- High Resolution DMM
- Pulse Generator
- Frequency Meter

SHIPS WITH PRODUCT

- System Source Measure Units (SMUs)
- Switching Matrices
- System Cabinet, Controller, and Integration
- System Software
- High-voltage Safety Interlock

LEARN MORE
DOWNLOAD
the “Wafer Level Testing up to 3kV” Application Note.

DATA SHEET

PRODUCT HIGHLIGHTS

- ACS is a flexible, interactive software test environment that supports many Keithley instruments and parametric test systems
- Model ACS-2600-RTM option with Series 2600B System SourceMeter® instruments provides a wafer level reliability solution.
- ACS Basic Edition is optimized for component and discrete device testing

ACS's hardware support ranges from bench-top instruments used in a QA lab to automated rack-based parametric testers.

For component and discrete device testing, ACS Basic Edition maximizes research and development productivity.

Automated Characterization Suite (ACS) Software, ACS Basic, ACS Wafer Level Reliability Option

Automated Characterization Suite (ACS) software automates semiconductor device characterization at the device, wafer, or cassette level. Combined with Keithley's wide range of source-measure instrumentation or S500 Integrated Test Systems, ACS-based solutions fill the gap between interactive lab-based setups and high-speed production test systems.

MODEL	DESCRIPTION
ACS	Intuitive GUI simplifies test plan development, test execution, and results analysis; Develop and execute tests at the device, site, wafer and cassette level; Supports a wide range of instruments and system configurations including multi-SMU parallel test systems; Full control of semi-automatic and fully automatic probers; Interactive and real-time data plotting
ACS Basic Edition	Easy-to-use GUI with a wide range of device libraries for characterizing MOSFETs, BJTs, IGBTs, diodes, resistors, etc.; Supports wide range of instruments including 2600B SourceMeter® SMU Instruments and 2650A High Power SourceMeter® SMU instruments; ACS Basic is included in Keithley's Parametric Curve Tracer (PCT) configurations; Interactive and real-time data plotting; Use unlicensed copies on stand-alone PCs for test development
ACS-2600-RTM	Wafer Level Reliability option for ACS; Configurable from 2 to 44 source-measure channels; Supports both sequential and parallel test; Integrated multi-site capability; Comprehensive JEDEC-compliant test suite; Real-time plotting and wafer mapping

RECOMMENDED ACCESSORIES

4200-SCS	Semiconductor Characterization System
2602B	Dual-channel System SourceMeter Instrument (3A DC, 10A Pulse)
2612B	Dual-channel System SourceMeter Instrument (200V, 10A Pulse)
2636B	Dual-channel System SourceMeter Instrument (1fA, 10A Pulse)

RECOMMENDED ACCESSORIES

2657A	Model 2657A High Power System SourceMeter Instrument (High Voltage)
2651A	Model 2651A High Power System SourceMeter Instrument (High Current)
707B	Six-slot Switch Mainframe
7174A	Low-current switch matrix for 707B

SHIPS WITH PRODUCT

- User Documentation
- License Key

LEARN MORE
DOWNLOAD
the "ACS Basic Edition Semiconductor Parametric Test Software for Component and Discrete Devices" Data Sheet.

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.

	2110	DMM4020	2000, 2100	DMM7510	DMM4040/4050	2001, 2010	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 Instrument Control Software, LabVIEW, IVI-COM/ IVI-C, drivers, Keithley LXI Discovery Browser, Test Script Builder	—	LabVIEW Driver	LabVIEW Driver

CHOOSING YOUR DIGITAL MULTIMETER

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

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.

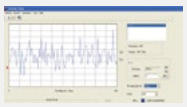
DATA SHEET 2000

DATA SHEET 2100

DATA SHEET 2110

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
2000	6½	0.0030 + 0.0005	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode	GPIB, RS-232
2100	6½	0.0038 + 0.0006	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Cont., Diode	USB
2110	5½	0.012 + 0.002	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, dB, dBm, Cont., Diode, Cap., Therm.	USB (GPIB Option)

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- Safety Test Leads
- User Documentation
- 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)

LEARN MORE

"Using the Dual Measurement Functionality and Dual Measurement Display on the Keithley Model 2110 5½-Digit Dual-Display Digital Multimeter" Application Note.

DATA SHEET 2001 2002

DATA SHEET 2010

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.

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.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE
2001	7½	0.0024 + 0.0004	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak	GPIB
2002	8½	0.0010 + 0.00015	Vac, Vdc, Idc, Iac, 2WΩ, 4WΩ, Temp, Freq, Period, Crest, Peak	GPIB
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

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

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

LEARN MORE
about Peak Detection with the Model 2001 DMM.

DATA SHEET

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.

PRODUCT HIGHLIGHTS

- Precision multimeter with 3½- to 7½-digit resolution
- 100mV, 1Ω, and 10µA ranges offer the sensitivity needed for measuring low level signals such as sleep mode current
- Capture and display waveforms such as current drain 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 Instrument Control 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.

MODEL	RESOLUTION	BASIC V DC ACCURACY, 1 YEAR (% READING + % RANGE)	MEASUREMENTS	INTERFACE
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

RECOMMENDED ACCESSORIES

Test Leads and Probes	
1754	2-Wire Universal 10-Piece Test Lead Kit
1756	General Purpose Test Lead Kit
5804	Kelvin (4-Wire) Universal 10-Piece Test Lead Kit
5805	Kelvin (4-Wire) Spring-Loaded Probes
5806	Kelvin Clip Lead Set
5808	Low Cost Single-pin Kelvin Probe Set
5809	Low Cost Kelvin Clip Lead Set
8606	High Performance Modular Probe Kit
8610	Low Thermal Shorting Plug
CA-180-3A	LAN Crossover Cable (3 m)
Replacement Fuse	
DMM7510-FUSE-10A	11A Current Fuse For DMM7510
DMM7510-FUSE-3A	3.5A Current Fuse For DMM7510

RECOMMENDED ACCESSORIES

Communication Interfaces & Cables	
KPCI-488LPA	IEEE-488 Interface for PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter
7007-x	Shielded GPIB Cable
CA-180-3A	CAT5 Crossover Cable for TSP-Link / Ethernet
USB-B-1	USB Cable, Type A to Type B, 1m (3.3 ft)
Triggering and Control	
2450-TLINK	DB-9 to Trigger Link Connector Adapter
8501-x	Trigger Link Cable, DIN-to-DIN, 1m or 2m
8503	DIN-to-BNC Trigger Cable

SHIPS WITH PRODUCT

- 1756 Test Leads
- USB-B-1 USB Cable, Type A to Type B, 1m (3.3 ft)
- 174694600 TSP-Link/Ethernet Cable (1.5 m)
- User Documentation
- DMM7510 QuickStart Guide
- Calibration Certificate
- Power Cord
- 1-Year Warranty
- Test Script Builder Software (available at www.tek.com)
- KickStart Instrument Control Software (available at www.tek.com)
- LabVIEW® and IVI Drivers (available at www.tek.com)

LEARN MORE

DOWNLOAD " Measuring Ultra-Low Power Using the Model DMM7510 7½-Digit Graphical Sampling Multimeter" Application Note.

DATA SHEET

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.

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.

MODELS	DISPLAY	RESOLUTION (DIGITS)	MEASUREMENTS	BASIC V DC ACCURACY (% READING + % RANGE)
DMM4020	Dual; Numeric	5.5	V_{AC}, V_{DC}, I_{DC}, I_{AC}, Ω, Cont, Diode, Freq	0.015 + 0.004 (yr.)

RECOMMENDED TEST LEADS

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty

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 Documentation
- Power Cord
- 3-year Warranty

LEARN MORE

Download “Using the DMM Series to Make Simple and Accurate Resistance Measurements” Application Note.

DATA SHEET

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)
DMM4040	Dual; Numeric & Graphical	6.5	V_{AC}, V_{DC}, I_{DC}, I_{AC}, Ω, Continuity, Diode, Freq, Period	0.0035 + 0.0005
DMM4050	Dual; Numeric & Graphical	6.5	V_{AC}, V_{DC}, I_{DC}, I_{AC}, Ω, Continuity, Diode, Freq, Period, Temp., Capacitance	0.0024 + 0.0005

RECOMMENDED TEST LEADS

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty

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 Documentation
- Power Cord
- 3-year Warranty

LEARN MORE

DOWNLOAD the “Measurement Statistics and Histograms with the Tektronix DMM4050 and DMM4040 Multimeters” Application Note.

DATA ACQUISITION SYSTEMS

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

	SERIES 2700	SERIES 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 Instrument Control 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

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 quick look at basic key decision points in the design of a switching system.

1 Switch Configuration

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

2 Relay Types

Three key relay types are used. Electromechanical 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.

3 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 Series 2600B SourceMeter instruments.

DATA SHEET

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
- KickStart, the PC-based instrument-control software, provides an easy way to configure channels and log data from long scans

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.

2700 Series

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
2700	2U, ½ Rack	GPIB, RS232	6½ Digits, 0.003%	Temperature, 4-Wire Resistance
2701	2U, ½ Rack	Ethernet, RS232	6½ Digits, 0.003%	Temperature, 4-Wire Resistance
2750	2U, Full Rack	GPIB, RS232	6½ Digits, 0.003%	Temperature, 4-Wire Resistance, Low Ohms

PLUG-IN CARDS

7700	Dual 1x10 / Electromechanical Relay
7701	Dual 1x16 / Electromechanical Relay
7702	Dual 1x20 / Electromechanical Relay
7703	Dual 1x16 / Reed Relay
7705	40 Independent Relay / Electromechanical Relay

RECOMMENDED ACCESSORIES

7007-1	Shielded IEEE-488 Cable, 1m (2700, 2750)
7007-2	Shielded IEEE-488 Cable, 2m (2700, 2750)
7788	50-Pin D-Shell Connector Kit (for 7703 & 7705 Mods.)
7789	50-Pin/25-Pin D-Shell Kit
7790	50-Pin Male/Female, 25-Pin Male IDC D-Shell Con. Kit
CA-180-3A	LAN Crossover Cable (3 m)

PLUG-IN CARDS

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

SHIPS WITH PRODUCT

- User Documentation
- 174694600 Ethernet Crossover Cable (1.5 m) (Model 2701 Only)
- Calibration Certificate
- Quick Reference Manual
- Kickstart Instrument Control Software (available at www.tek.com)
- Power Cord
- 1-year Warranty

LEARN MORE
DOWNLOAD
the “Switching Handbook: A Guide to Signal Switching in Automated Test Systems”

DATA SHEET

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

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

3700A Series

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

PLUG-IN CARDS

3720	Dual 1x30 Multiplexer: 300V, 2A, Auto-CJC with 3720-ST accessory
3721	Dual 1x20 Multiplexer: 300V, 3A, Auto-CJC with 3721-ST accessory
3722	Dual 1x48 Multiplexer: 300V, 2A
3723	Dual 1x30 Multiplexer: 200V, 1.25A, Reed Relay
3724	Dual 1x30 Multiplexer: 200V, 0.12A, Solid State Relay, Auto-CJC with 3724-ST accessory
3730	6x16 Matrix: 300V, 2A
3731	6x16 Matrix: 200V, 2A, Reed Relay
3732	Quad 4x28 Matrix: 200V, 1.2A, Reed Relay
3740	Independent Relay: 28 Form C: 300V, 3A; 4 Form A: 250VAC, 7A
3750	Control: 40 Digital I/O 2 Analog Outputs, 4 Counter

PLUG-IN CARDS

3760	1x10 Multiplexer: 300V, 5A
3761	1x10 Multiplexer: <1pA offset current, 30V
3762	1x10 Multiplexer: 1000V, 500mA
3765	Hall Effect Measurement System

RECOMMENDED ACCESSORIES

3706-BAN	DMM Adapter Cable
3706-TLK	Test Lead Kit
KUSB-488B	IEEE-488 USB to GPIB Interface Adapter
4288-1	Single Fixed Rack Mount Kit
4288-10	Fixed Rear Rack Mount Kit
CA-180-3A	LAN Crossover Cable (3 m)

SHIPS WITH PRODUCT

- User Documentation
- Test Script Builder Software (available at www.tek.com)
- 174694600 TSP-Link/Ethernet Cable (1.5 m)
- Calibration Certificate
- Quick Reference Manual
- Power Cord
- 1-year Warranty

LEARN MORE DOWNLOAD

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

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

CHOOSING YOUR SPECIALIZED LOW LEVEL INSTRUMENT

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

1 Resolution

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

2 Accuracy

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

3 Low Current/High Resistance Measurements

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

4 Low Voltage/Low Resistance Measurements

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

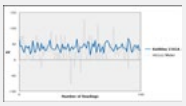
DATA SHEET

2182A Nanovoltmeter

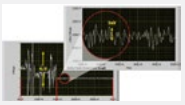
The two-channel Model 2182A Nanovoltmeter is optimized for making stable, low noise voltage measurements and for characterizing low resistance materials and devices reliably and repeatably. It provides higher measurement speed and significantly better noise performance for voltage meters than alternative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

PRODUCT HIGHLIGHTS

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



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



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

MODEL	VOLTAGE	TEMPERATURE	RESISTANCE	CHANNELS	CURRENT SOURCE
2182A	1nV – 100V	-200˚C – 1820˚C		2	—
6220/2182A*	1nV – 100V	-200˚C – 1820˚C	10nΩ – 1GΩ	—	±100fA – 100mA
6221/2182A*	1nV – 100V	-200˚C – 1820˚C	10nΩ – 1GΩ	—	±100fA – 100mA, with 1mHz – 100kHz, 10Msamples/s, 64k arbitrary waveform generator

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

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

LEARN MORE DOWNLOAD

the Application Note "Low-Level Pulsed Electrical Characterization using Model 6221/2182A Combination."

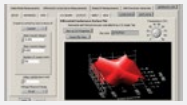
DATA SHEET

6220 / 6221 Current Sources

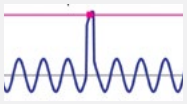
Keithley precision current sources include both broad-purpose Model 6220 and high-performance Model 6221. Their high sourcing accuracy and built-in control functions make them ideal for Hall Effect, resistance (using delta mode), pulsed, and differential conductance measurements. Programmable pulse widths 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
6220	±100fA – 100mA	—	—	—	GPIB, RS-232
6221	±100fA – 100mA	1mHz – 100kHz, 10Msamples/s sample rate, 64k point waveform length	Programmable, 5µs minimum width	—	GPIB, RS-232, Ethernet
6220/2182A	±100fA – 100mA			10nΩ – 1GΩ	GPIB, RS-232
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

*Delta Mode Resistance Measurement System

RECOMMENDED ACCESSORIES

237-ALG-2	Low Noise Triax Cable, 3-slot triax to alligator clips
7007-1	Shielded GPIB Cable, 1m (3.2 ft)
7007-2	Shielded GPIB Cable, 2m (6.5 ft)
7007-4	Shielded IEEE-488 Cable, 4m (13.1 ft)
7009-5	Shielded RS-232 Cable, 1.5m (5 ft)
7078-TRX-3	Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft)
7078-TRX-5	Low Noise Triax Cable, 3-Slot Triax Connectors, 1.5m (5 ft)
7078-TRX-10	Low Noise Triax Cable, 3-Slot Triax Connectors, 3m (10 ft)
7078-TRX-20	Low Noise Triax Cable, 3-Slot Triax Connectors, 6m (20 ft)
CA-180-3A	LAN Crossover Cable (3 m)

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- 237-ALG-2 Low Noise, Input Cable with Triax-to-Alligator Clips 6.6 ft (2 m)
- 8501-2 Trigger Link Cable to connect 622x to 2182A 6.6 ft (2 m)
- 174694600 Ethernet Crossover Cable (1.5 m) (6221 only)
- CA-351 Communication Cable between 2182A and 622x
- CS-1195-2 Safety Interlock Connector
- User Documentation
- Getting Started manual (hardcopy)
- Software (downloadable)

LEARN MORE DOWNLOAD

"Determining Resisitivity and Conductivity Type using a Four-Point Collinear Probe and the Model 6221 Current Source" Application Note.

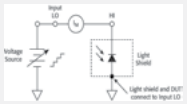
DATA SHEET 6485

DATA SHEET 6487

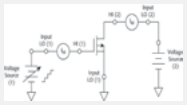
DATA SHEET 6482

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).

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.

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

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)
- User Documentation

LEARN MORE
DOWNLOAD
the “Low Current Measurements” Application Note.

DATA SHEET 6514

DATA SHEET 6517

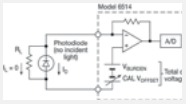
DATA SHEET 6430

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.

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
- Perform insulation resistivity measurements in accordance with ASTM D257 standard



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.

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

RECOMMENDED ACCESSORIES

237-ALG-2	Low Noise Triax Cable, 3-slot triax to alligator clips
6517B-ILC-3	Interlock Cable (For 6517B only)
7078-TRX-3	Low Noise Triax Cable, 3-Slot Triax Connectors, 0.9m (3 ft)
7007-1	Shielded IEEE-488 Cable, 1m (3.2 ft)
8501-1	Trigger Link Cable, 1m (3.3 ft)
8503	Trigger Link DIN-to-BNC Trigger Cable
8607	1kV Source Banana Cables (for 6517B only)
6517-RH	Humidity Probe with Extension Cable (6517B only)
6517-TP	Temperature Bead Probe (included with 6517B) (6517B only)
8009	Resistivity Test Fixture (for 6517B)
KICKSTARTFL-HRMA Hig	High Resistance Measurement Application for KickStart Instrument Control Software (6517B only)
	Fixture (for 6517B)

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- 237-ALG-2 Low Noise Triax Cable, 3-slot triax to alligator clips (2 m) (6514, 6517B)
- 6430-322-1B Low noise Triax Cable, 3-slot triax to alligator clips (20cm) (6430)
- 8607 Safety High Voltage Dual Test Leads (6430, 6517B)
- 6517-TP Thermocouple Bead Probe (6517B)
- CS-1305 Interlock Connector (6517B)
- PreAmp Cable 2m (6.6ft) (6430)
- User Documentation

LEARN MORE DOWNLOAD

the Application Note “Volume and Surface Resistivity Measurements of Insulating Materials Using the Model 6517A Electrometer/High Resistance Meter.”

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
Tektronix PWS2000 Series (4 models)	Manual	1	18V-72V/1.5A-6A	10mV, 10mA	± (0.05% + 15 mV)	± (0.1% + 15 mA)	Not applicable
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
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
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
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)
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
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
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
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)
Keithley Models 2302, 2302-PJ, 2306, 2306-PJ, 2308	Battery simulator	1 (2302) 2 (2306, 2308)	15V / 5A	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB
Keithley Models 2303, 2303-PJ	Fast Transient Response	1	15V / 5A (2303) 20V / 5A (2304A)	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB

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.

DATA SHEET

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-ChannePower Supply

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.

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE
PWS2185	18V	5A	No
PWS2323	32V	3A	No
PWS2326	32V	6A	No
PWS2721	72V	1.5A	No

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

R5	5-year Extended Warranty

ANOTHER PRODUCT FOR CONSIDERATION

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

SHIPS WITH PRODUCT

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

LEARN MORE DOWNLOAD

the Application Note “Choosing the Right Power Supply for Accurate Power Delivery.”

DATA SHEET

PWS4000 Series USB Programmable, Single-Channel Power Supply

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

PRODUCT HIGHLIGHTS

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

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

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

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE
PWS4205	20 V	5 A	Yes
PWS4305	30 V	5 A	Yes
PWS4323	32 V	3 A	Yes
PWS4602	60 V	2.5 A	Yes
PWS4721	72 V	1.2 A	Yes

RECOMMENDED ACCESSORIES

RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386759800	Rackmount Cosmetic Filler Panel

RECOMMENDED SERVICE

SILV100	5-year Extended Warranty

ANOTHER PRODUCT FOR CONSIDERATION

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

SHIPS WITH PRODUCT

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

LEARN MORE DOWNLOAD

"Choosing the Right Power Supply for Accurate Power Delivery" Application Note.

DATA SHEET

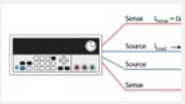
2200 Programmable Single-Channel DC Power Supplies with Remote Sensing

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.

PRODUCT HIGHLIGHTS

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

Series 2200 rear panel.



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

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE AND NOISE
2200-20-5	20V	5A	100W	<1mV$_{RMS}$, <3mVP-P
2200-30-5	30V	5A	150W	<1mV$_{RMS}$, <4mVP-P
2200-32-3	32V	3A	96W	<1mV$_{RMS}$, <4mVP-P
2200-60-2	60V	2.5A	150W	<1mV$_{RMS}$, <5mVP-P
2200-72-1	72V	1.2A	86W	<1mV$_{RMS}$, <3mVP-P

RECOMMENDED ACCESSORIES

CS-1638-12	Rear Panel Mating Connector, Single Channel
USB-B-1	USB Cable
4299-7	Fixed Rack Mount Kit
RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386759800	Rackmount Cosmetic Filler Panel
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

RECOMMENDED SERVICE

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

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

SHIPS WITH PRODUCT

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

LEARN MORE
DOWNLOAD
the “Understanding Linear Power Supply Specifications” Application Note.

DATA SHEET

2231A-30-3 Triple-Channel DC Power Supply

The 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.

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	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE
2231A-30-3	CH1:30V, CH2:30V, CH3:5V	CH1:3A, CH2:3A, CH3:3V	195W	<1mV$_{RMS}$, <5mV$_{p-p}$

RECOMMENDED ACCESSORIES

2231A-001	USB Adaptor with USB Cable

RECOMMENDED SERVICE

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

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

SHIPS WITH PRODUCT

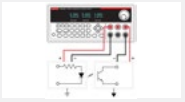
- User Documentation
- Calibration Certificate
- Power Cord
- 3-year Warranty

DATA SHEET

PRODUCT HIGHLIGHTS

- Dual- and triple-channel models
- Two 30V/1.5A channels
- One 6V/5A channel (on triple-channel model)
- All channels are isolated and programmable
- USB interface, USB and GPIB on G versions
- Fully supported by TekSmartLab™

Model 2230G-30-1 rear panel.



Power two isolated circuits with isolated output channels.

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	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE AND NOISE
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
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

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

RECOMMENDED ACCESSORIES

CS-1655-15	Rear Panel Mating Connector, Multi-Channel
USB-B-1	USB Cable
4299-7	Fixed Rack Mount Kit
RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386759800	Rackmount Cosmetic Filler Panel

RECOMMENDED SERVICE

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

* 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
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

SHIPS WITH PRODUCT

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

LEARN MORE DOWNLOAD

"Ensuring that Power Supply Performance Meets Your Requirements" Application Note.

DATA SHEET

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

2260B Series Programmable DC Power Supply (360W, 720W, 1080W)

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 wide range of output voltages and currents and multiple interfaces in the 2260B power supplies enables their use in a broad array of applications including research and design, quality control, and production test. 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.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE
2260B-30-36	30V	36A	360W	<7 mV_{RMS}, <60 mV_{p-p}
2260B-80-13	80V	13.5A	360W	<7 mV_{RMS}, <60 mV_{p-p}
2260B-250-4	250V	4.5A	360W	<15 mV_{RMS}, <80 mV_{p-p}
2260B-800-1	800V	1.44A	360W	<30 mV_{RMS}, <150 mV_{p-p}
2260B-30-72	30V	72A	720W	<11 mV_{RMS}, <80 mV_{p-p}
2260B-80-27	80V	27A	720W	<11 mV_{RMS}, <80 mV_{p-p}
2260B-250-9	250V	9A	720W	<15 mV_{RMS}, <100 mV_{p-p}
2260B-800-2	800V	2.88A	720W	<30 mV_{RMS}, <200 mV_{p-p}
2260B-30-108	30V	108A	1080W	<14 mV_{RMS}, <100 mV_{p-p}
2260B-80-40	80V	40.5A	1080W	<14 mV_{RMS}, <100 mV_{p-p}
2260B-250-13	250V	13A	1080W	<15 mV_{RMS}, <120 mV_{p-p}
2260B-800-4	800V	4.32A	1080W	<30 mV_{RMS}, <200 mV_{p-p}

RECOMMENDED ACCESSORIES

2260-001	Accessory Kit
2260-002	Simple IDC Tool
2260-003	Contact Removal Tool
2260-004	Basic Accessories Kit
2260-005	Cable for 2 units in Series connection
2260-006	Cable for 2 units in Parallel connection
2260-007	Cable for 3 units in Parallel connection
2260-008	Test Lead Set with Lugs
2260-009	Test Leads (250V, 800V)
2260-010	Basic Accessories Kit (250V, 800V models)
2260-EXTERM-HV	Extended Terminal (250V, 800V models)
2260B-GPIB-USB	GPIB To USB Adapter
2260B-EXTERM	Extended Terminal
2260B-RMK-JIS	Rack Mount Kit (JIS)
2260B-RMK-EIA	Rack Mount Kit (EIA)

RECOMMENDED SERVICE

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

* 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
- User Documentation
- Power Cord
- 3-year Warranty

LEARN MORE DOWNLOAD

"Avoiding Inrush Current when Testing High Power LEDs with Series 2260B Power Supplies" Application Note.

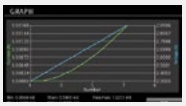
DATA SHEET

2280S Series Precision Measurement DC Power Supply

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.

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.

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- KickStart Instrument Control Software (available at tek.com)
- 2280-001 output mating connector
- 174694600 LAN crossover cable (1.5 m)
- User Documentation
- QuickStart guide
- Calibrate Certificate
- Power Cord
- 3-year Warranty

LEARN MORE DOWNLOAD

"Making Low Current Measurements with the Series 2280S Precision Measurement DC Power Supply" Application Note.

DATA SHEET

PRODUCT HIGHLIGHTS

- One box integrates the functions of high-precision power supply, battery test, and battery simulation
- Sink current up to 1A and source current up to 6A
- Build a battery model based on charging a battery measurement. Use the model for battery simulation.
- Simulate real output during discharge 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.

2281S Series Precision DC Power Supply 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 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.

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

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- Quick Start Guide
- KickStart Instrument Control Software (available at tek.com)
- User Documentation
- 174694600 LAN Crossover Cable (1.5 m)
- Power Cord
- Rear Panel Mating
- Connector with Cover

LEARN MORE DOWNLOAD

"How to Accelerate a Power Management Unit Test Using the Keithley 2281S Battery Simulator" Application Note.

DATA SHEET

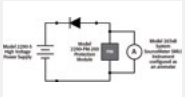
2290 High Voltage Power Supply

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.

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.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE
2290-5	5kV	5mA	25W	3mVRMS maximum with filter
2290-10	10kV	1mA	10W	1VRMS

RECOMMENDED ACCESSORIES

For 2290-5:	
2290-5-SHV	5kV SHV Female–SHV Female Cable, 3m (10 ft)
2290-5-MHV	5kV SHV Female–MHV Male Cable, 3m (10 ft)
2290-5-SHVBH	5kV SHV Male Bulkhead Connector
2290-5-RMK-1	Single Fixed Rack Mount Kit for 5kV Power Supply
2290-5-RMK-2	Dual Fixed Rack Mount Kit for 5kV Power Supply
For 2290-10:	
2290-10-SHVUC	10kV SHV Male to Unterminated Cable, 3m (10ft)
2290-10-SHV	10kV SHV Male–SHV Male Cable, 3m (10 ft)
2290-10-SHVBH	10kV SHV Female Bulkhead Connector
2290-10-RMK-1	Single Fixed Rack Mount Kit for 10kV Power Supply
2290-10-RMK-2	Dual Fixed Rack Mount Kit for 10kV Power Supply

RECOMMENDED ACCESSORIES

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

SHIPS WITH PRODUCT

- User Documentation
- Power Cord

RECOMMENDED SERVICE

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

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

LEARN MORE DOWNLOAD

the Application Note “Breakdown and Leakage Current Measurements on High Voltage Semiconductor Devices Using Series 2290 Power Supplies and Series 2600B System SourceMeter Source Measure Unit Instruments.

DATA SHEET

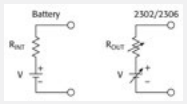
2300 Series Portable Device Battery/Charger Simulator

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

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.

MODEL	CHANNELS	MAX OUTPUT VOLTAGE / CURRENT	POWER	TRANSIENT RESPONSE TO A 10X LOAD CURRENT CHANGE	CURRENT SINK CAPACITY
2302, 2302-PJ	1	15V/5A	42W	<40µs recovery time and <75mV voltage drop	3A
2306, 2306-PJ	2	15V/5A	45W	<40µs recovery time and <75 mV voltage drop	3A
2308	2	15V/5A	45W	<35µs recovery time and <90 mV voltage drop	3A

RECOMMENDED ACCESSORIES

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

RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

RECOMMENDED SERVICE

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

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

SHIPS WITH PRODUCT

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

LEARN MORE DOWNLOAD

"Simulating Battery Impedance with the Models 2302 and 2306 Battery Simulators/Chargers" Application Note.

DATA SHEET

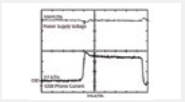
2303 High Speed Power Supply

The Model 2303 Power Supply provides both voltage control and power consumption monitoring for automated testing of portable, battery-operated devices. It is optimized for testing battery-operated, wireless communication devices such as cellular phones that undergo substantial load changes for very short time intervals.

PRODUCT HIGHLIGHTS

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

Model 2303 rear panel.



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

MODEL	CHANNELS	MAX OUTPUT VOLTAGE / CURRENT	POWER	TRANSIENT RESPONSE TO A 10X LOAD CURRENT CHANGE	CURRENT SINK CAPACITY
2303, 2303-PJ	Single Output	15V/3A or 9V/5A	45W	<40µs recovery time and <100mV voltage drop	2A

RECOMMENDED ACCESSORIES

CS-846	Mating Output Connector
SC-182	Low Inductance Coaxial Cable
4288-1	Single Fixed Rack Mount Kit
4288-2	Dual Fixed Rack Mount Kit
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter

RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

RECOMMENDED SERVICE

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

* 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

LEARN MORE DOWNLOAD

"Stabilizing Fast Transient Response Power Supply Load Circuits" Application Note.

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	200W, 250W, 750W
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

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.

1 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.

2 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.

3 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.

4 Safety Testing

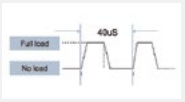
Verifying that your power source does not fail under fault conditions is of critical importance. This is particularly true for a short circuit load condition. Electronic loads can be set for short circuits conditions with the load operating near 0V with milliohm load impedance. Make sure the electronic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

DATA SHEET

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 operating 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
2380-500-15	1	200 W	500 V	15 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232
2380-120-60	1	250 W	120 V	60 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232
2380-500-30	1	750 W	500 V	30 A	CV, CC, CR, CP, Battery Test, LED Simulation	GPIB, USB, RS232

RECOMMENDED ACCESSORIES

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

RECOMMENDED SERVICE

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

* 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
- User Documentation
- Power Cords
- 9-Pin Rear Mating Connector

LEARN MORE

with the "AC-DC Power Supply Efficiency Testing for Regulatory Standards" Application Note.

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
Frequency Range	400 MHz, 3 GHz, 20 GHz	400 MHz, 3 GHz, 20 GHz
Resolution	• 100 ps (time) • 12 digits/s (freq)	• 50 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)
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
Analysis Modes	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)

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.

1 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.

2 Time Resolution

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

3 Time Base Stability

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

4 Analysis Capability

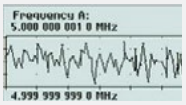
When choosing your counter/timer, you should review available analysis modes, such as trend plotting, measurement statistics, histograms and modulation domain analysis to ensure your needs are met.

DATA SHEET

360° VIEW

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
FCA3000	400 MHz	2	100 ps	12 digit/s
FCA3003	3 GHz	2 – 400 MHz 1 – 3 GHz	100 ps	12 digit/s
FCA3020	20 GHz	2 – 400 MHz 1 – 20 GHz	100 ps	12 digit/s
FCA3100	400 MHz	2	50 ps	12 digit/s
FCA3103	3 GHz	2 – 400 MHz 1 – 3 GHz	50 ps	12 digit/s
FCA3120	20 GHz	2 – 400 MHz 1 – 20 GHz	50 ps	12 digit/s

RECOMMENDED ACCESSORIES

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

INSTRUMENT OPTIONS

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

RECOMMENDED SERVICE

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

SHIPS WITH PRODUCT

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

LEARN MORE

Download the "Time and Frequency Measurements for Oscillator Manufacturers" Application Note.