Keysight & Our Distributor Network

RIGHT *Instrument.* RIGHT *Expertise.*
Delivered RIGHT *Now.*

Keysight Technologies
Distribution Products Catalog

November 2022



KEYSIGHT TECHNOLOGIES

Table of Contents

PathWave BenchVue Control and Analysis Software / **3**

Curriculum Based Teaching Solutions and Lab Management Software / **4-5**

The Keysight Essential Bench / **6**

Oscilloscopes, Applications, and Probes / **7-14**

Digital Multimeters / **15-16**

Performance Meters / **17**

Frequency Counters/Timers / **18**

Function/Arbitrary Waveform Generators / **19-20**

Data Acquisition/Switch Units / **21-22**

USB Products and Connectivity / **23**

The Keysight RF Bench and Handheld Instruments / **24**

FieldFox Handheld Analyzers / **25-27**

Spectrum Analyzers, Signal Analyzer and Applications / **28-29**

Signal Generators and Audio Analyzer / **30-31**

Power Sensors and Power Meters / **32**

RF and Microwave Test Accessories / **33**

Vector Network Analyzers / **34**

ECal Modules / **35**

Power Supplies / **36**

Bench Power Supplies / **37-38**

System Power Supplies / **39-40**

Precision Power Supplies and DC Power Analyzer / **41**

SMUs and DC Electronic Loads / **42**

AC Power Sources / **43**

LCR Meters / **44**

Handheld Instruments / **45-47**

What's New

InfiniiVision 3000G Series Oscilloscopes



Now you can capture and isolation elusive glitches and anomalies better than ever with access to new waveform and measurement features that are typically only found on more expensive scopes.

See page 9

www.keysight.com/find/3000G

E36150 Series DC high-power supply



The E36150 series provides even more power on the bench with an 800W output and new features to power your devices and test applications. The power supply is safe and easy to use with 4.3-inch LCD color display and individually adjustable controls for voltage and current.

See page 38

www.keysight.com/find/dcpowersupplies

U9422A/B/C, U9424A/B/C, and U9428A/B/C FET Solid State Switches up to 54 GH in SPDT, SP4T, and SP8T configurations



The switches' flexible, multiport USB provides connection to the PXIe and USB VNAs, and a soldering connector option.

See page 33

www.keysight.com/find/mta

8509xD Series electronic calibration modules (ECal)



The Keysight 85093D RF electronic calibration (ECal) module makes calibration of vector network analyzers fast, easy, and accurate. Performing a full two-port calibration takes less than half the time using ECal versus mechanical calibration kits.

See page 35

https://www.keysight.com/find/ecal

KeysightCare Technical Support

Look for this icon throughout the catalog to identify products with KeysightCare Technical Support included or supported.

See page 48

www.KeysightCare.com

KEYSIGHTCARE

Keysight & Our Distributor Network

RIGHT *Instrument.* **RIGHT** *Expertise.*
Delivered **RIGHT** *Now.*

Keysight and our network of Keysight Authorized Distributors have teamed up to provide fast, easy access to the world's largest selection of off-the-shelf T&M instruments. It's the best of both worlds: Keysight's measurement expertise and product breadth combined with speed, convenience and same-day shipping from our distribution partners.

It's never been easier to get the right instrument in the right hands, right away.

To find a Keysight Authorized Distributor nearest you visit www.keysight.com/find/distributors

PathWave BenchVue Software: Control. Automate. Simplify.

Keysight PathWave BenchVue software for the PC eliminates the many of the issues around bench testing. By making it simple to connect, control instruments, and automate test sequences you can quickly move past the test development phase and access results faster than ever before. Dedicated instrument apps allow you to quickly configure the most commonly used measurements and setups for each instrument family. Rapidly build custom test sequences with the integrated Test Flow app to automate and visualize test results without the need for instrument programming. A variety of powerful PathWave BenchVue apps enable you to significantly reduce test development time.

Lab management apps provide centralized lab instrument configuration, track assets, and lab administration.



Use PathWave BenchVue apps to:

- Configure the most commonly used controls and measurements from your Keysight instruments
- Visualize multiple measurements simultaneously
- Easily log and export data and screen images in just a few clicks for faster analysis
- Create automated test sequences fast with minimal instrument knowledge
- Centrally manage and configure lab stations



Look For This Icon

throughout the catalog to identify products with PathWave BenchVue software included or supported.

PathWave BenchVue software supports over 700 Keysight instruments including digital multimeters, power supplies, function/waveform generators, spectrum analyzers, data acquisition units, network analyzers, oscilloscopes, power meters, power sensors, electronic loads, universal counters and more — look for the PathWave BenchVue supported icon for compatible products.

Start accelerating your workflow today. PathWave BenchVue apps are included with most products in this catalog. Visit www.keysight.com/find/benchvueinstruments for details.

Remotely control your bench instruments

Configure PathWave BenchVue to remotely monitor and control bench instruments from a different location. This allows remote teaching/learning labs to be monitored by a teacher or for engineers to remotely control systems across the world.

Remote Learning with PathWave Lab Operations Software



DOWNLOAD YOUR NEXT INSIGHT

Keysight software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight.

Learn more at www.keysight.com/find/software

Curriculum-based teaching solutions and lab management software

Keysight Industry-ready Remote Access Lab

Keysight's industry-ready remote access lab solution offers you a convenient way to make the switch to online learning. This end-to-end solution is designed for complete remote setup of your basic instrument lab and covers your needs from web-based lab management and scheduling administration to instrument control and remote access for measurement and analysis.

Learn more at https://www.keysight.com/us/en/industries/education/teaching-solutions.html



PW9111EDU PathWave BenchVue Lab Management and Control Solution

Integrate with existing Learning Management Systems (LMS) such as Moodle, Blackboard, Canvas, and others.

- PathWave BenchVue Lab is a LAN-based lab management solution, providing centralized instrument configuration lab overview and asset tracking for educators teaching labs.
- Includes Keysight PathWave BenchVue Lab apps (instrument control, automation, analysis, and instrument firmware update) and the BV9001B BenchVue Complete Control Collection.
- Easy instrument control, data capture, data logging, monitoring and report generation for test bench students

Learn more at www.keysight.com/find/PW9111EDU



U3851A RF Microwave Teaching Solution

- RF Microwave circuit design, simulation and measurement courseware, 5G NR n3
- Brings industry design experience into the classroom and covers the complete design flow to successfully develop 5G and IoT wireless application
- Courseware includes a modular prototype kit using a 1.8 GHz receiver module, lab sheets and problem-based assignments for use with recommended instruments and design software

Learn more at www.keysight.com/find/u3851a



Smart Bench Essentials Series General Purpose Bench Instruments

Accelerate Your Design with Connected Insights

Keysight's instruments test station solution is ideal for university teaching labs. The remote accessible basic instrument lab offers optional web-based lab management and scheduling administration for instrument measurement and analysis. The small benchtop hardware provides industry-grade performance, with Signature 7" color displays, USB and LAN for PC connections, and is paired with PathWave application software. The DMM, function generator, triple-output DC power supply and 1000 X-Series oscilloscope measurement capabilities provide a reliable test station solution at an attractive price.

EDU34450A Digital Multimeter



- 5.5 digit resolution and up to 0.015% basic DCV accuracy
- 11 measurement functions including temperature
- 5,000 points logging memory
- USB flash drive support

Learn more at www.keysight.com/find/EDU34450A

EDU36311A Triple Output Power Supply



- Three independent power supplies: 5 V, 6 A; 30 V, 1 A; 30 V, 1 A
- Output ripple and noise: < 5 mVpp/1 mVrms
- Fast load transient response time (<50 µs)
- Overvoltage, over current, and over-temperature protection

Learn more at www.keysight.com/find/EDU36311A

EDU33210A Series Function Generators



- 20 MHz Bandwidth EDU33211A (single ch), and EDU33212A (dual ch)
- Built-in modulation and 17 popular waveforms
- 16-bit arbitrary waveform capability with memory of up to 8 MSa/channel

Learn more at www.keysight.com/find/EDU33212A

EDUX/DSOX 1000 X-Series Oscilloscopes



- 50 MHz to 200 MHz bandwidth
- 2- and 4-channel models
- Up to 2 GSa/s sampling rate
- Standard serial analysis and Bode plot measurements (G models)

Learn more at www.keysight.com/find/1000X-Series

U3810 Series Advanced IoT Teaching Lab Solution

Keysight's IoT teaching solution combines instruments, software, and courseware including slides and a training kit for lots of hands-on learning. Students learn practical design and test techniques with topics that include IoT fundamentals and cybersecurity, wireless communication, battery power analysis, pre-compliance, and more.

Learn more at https://www.keysight.com/us/en/industries/education/teaching-solutions.html



Ask your salesperson about Remote Teaching solutions from Keysight

The Keysight Essential Bench

The deepest bench in the industry

Only Keysight delivers the industry's largest selection of bench instruments and groundbreaking PathWave BenchVue software — the zero-programming way to view, capture, and export the data you collect from your bench. To see the full portfolio of essential bench products offered by Keysight Authorized Distributors, visit: www.keysight.com/find/essentialbench

1. PathWave BenchVue software

Capture, visualize, and share data from multiple instruments with no need for programming.
See page 3

2. Oscilloscopes

See more of your signals and solve your toughest challenges with innovative scope technology.
See pages 7-14

3. Power supplies

Enable faster, safer testing with built-in measurements, battery drain analysis/characterization, full DUT protection, and output sequencing.
See pages 36-41

4. Function/arbitrary waveform generators

Validate the most challenging designs with True*form* arbitrary waveforms, modulation, and two-channel synchronization.
See pages 19-20

5. Data acquisition/switch units

Simplify ad hoc testing with temperature and electrical signal measurement flexibility, universal channels, and no external signal conditioning.
See pages 21-22

6. Frequency counters/timers

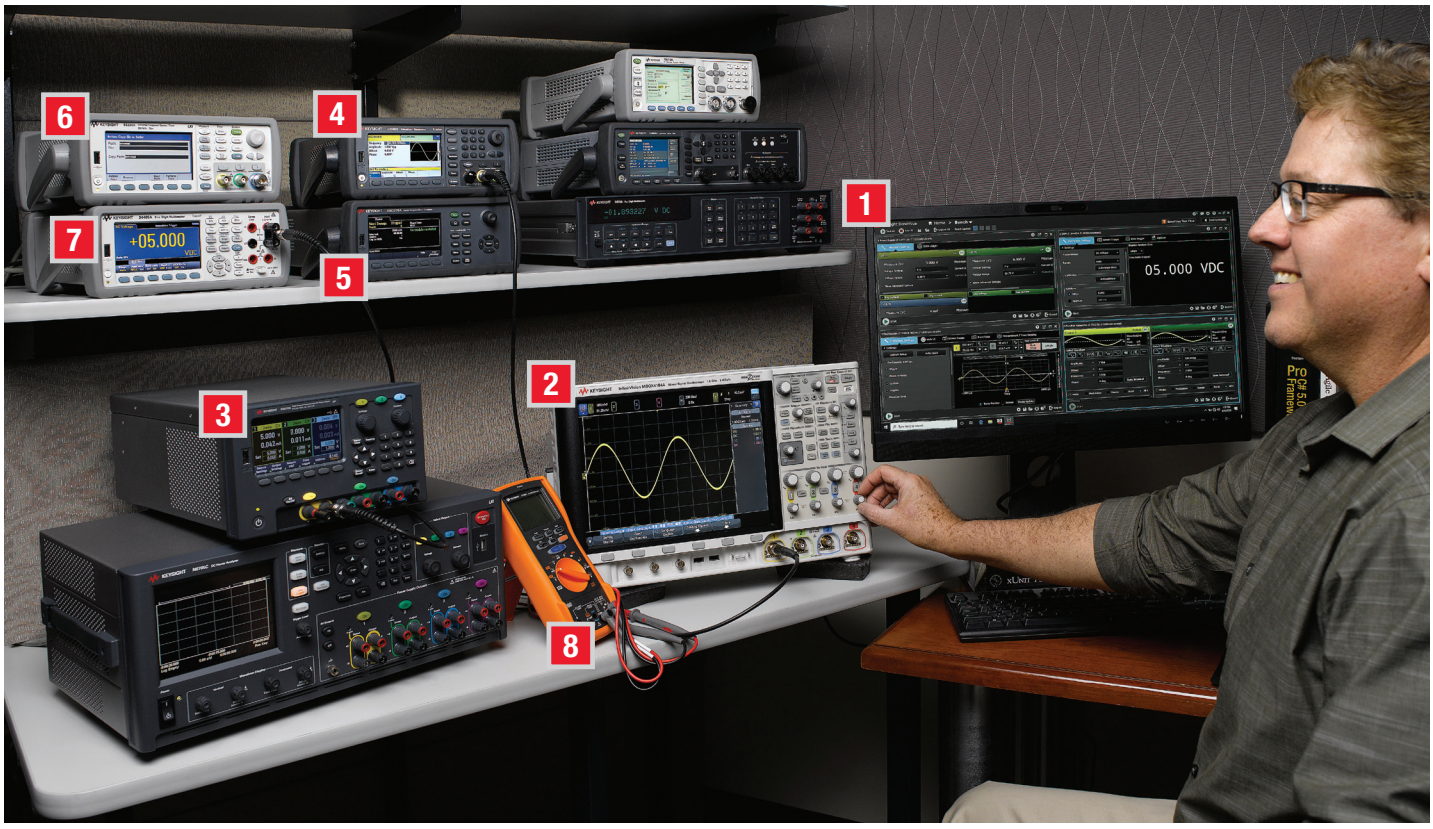
Expand your measurement and analysis capabilities with histograms, trend/strip charts, statistics, data logging, and more.
See page 18

7. Digital multimeters (DMMs)

Capture measurements quickly with graphical displays, on-screen analysis, and auto calibration.
See pages 15-17

8. Handheld instruments

Handle a wider range of challenges with thermal image temperature measurements and fully featured multimeters with frequency counters, square waves, and wireless connectivity.
See pages 24-27

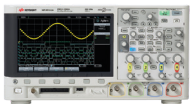


Digital Storage (DSO) and Mixed Signal (MSO) Oscilloscopes

Get products to market faster. Keysight's award-winning oscilloscopes provide the fastest update rates, capacitive touch screen, and the most software options.

Produce the highest-performing products. Keysight's scopes make measurements you can trust, thanks to industry-leading signal integrity and the largest selection of oscilloscope probes.

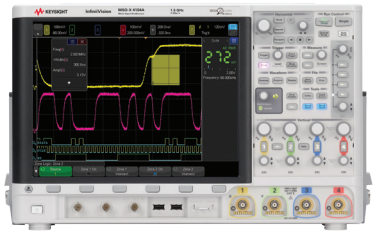
Achieve the lowest cost of ownership. Keysight's oscilloscopes let you integrate several instruments in one mainframe and easily upgrade.

	1000 X-Series	2000 X-Series [1]	3000G X-Series	4000 X-Series	6000 X-Series	EXR-Series
			NEW 			
Bandwidth	50 to 200 MHz	70 to 200 MHz	100 MHz to 1 GHz	200 MHz to 1.5 GHz	1 GHz to 6 GHz	500 MHz to 2.5 GHz [3]
Memory (Max)	2 Mpts	1 Mpts	4 Mpts	4 Mpts	4 Mpts	1.6 Gpts
Sample rate (Max)	2 GSa/s	2 GSa/s	5 GSa/s	5 GSa/s	20 GSa/s	16 GSa/s [3]
Channels	2 or 4 analog	2 or 4 analog + 8 digital [2]	2 or 4 analog + 16 digital [2]	2 or 4 analog + 16 digital [2]	2 or 4 analog + 16 digital [2]	4 or 8 analog + 16 digital (optional)
Display	7.0"	8.5"	8.5" capacitive touch	12.1" capacitive touch	12.1" capacitive touch	15.6" capacitive touch
Update rate	200,000 wfms/s on DSO models	200,000 wfms/s	1,000,000 wfms/s	1,000,000 wfms/s	450,000 wfms/s	200,000 wfms/s
Touch zone triggering	—	—	Yes	Yes	Yes	Yes
Instrument integration	FRA (Bode plot) 5-digit counter 3-digit DVM 20 MHz WaveGen Protocol analyzer	5-digit counter 3-digit DVM 20 MHz Function Gen Protocol Analyzer Logic Analyzer	FRA (Bode plot) 8-digit counter 3-digit DVM 20 MHz AWG Protocol Analyzer Logic Analyzer	FRA (Bode plot) 5-digit counter 3-digit DVM 20 MHz dual AWG Protocol Analyzer Logic Analyzer	FRA (Bode plot) 10-digit counter 3-digit DVM 20 MHz dual AWG Protocol Analyzer Logic Analyzer	FRA (bode plot) 10-digit counters 4-digit DVM 50 MHz AWG Protocol Analyzer Logic Analyzer

1. 2000X specifications for models manufactured after March 5, 2018, older models can be upgraded using DSOX2PLUS option.
2. +8 or +16 digital channels on mixed-signal oscilloscope models or DSO-to-MSO upgrade kits.
3. On all channels simultaneously – no interleaving of memory or sample rate

InfiniiVision USB oscilloscopes, P9241/42/43A, See page 23 for details.






InfiniiVision 1000 X-Series 50 to 200 MHz

Get measurements you can count on to create designs that will change the future.

- Fast 200,000 waveforms/second update rate enhances signal visibility
- Key features for education customers: Automatic Bode plot measurements with Bode plot training kit (standard on "G" models), integrated waveform generator, free education kit, online help, standard 10:1/1:1 switchable passive probes
- Enhanced usability with PathWave BenchVue software to quickly capture and log measurement data, get screen images, and traces for insight into your test challenges
- Standard serial protocol analysis and trigger on all models

www.keysight.com/find/1000X-Series



Model series	Bandwidth (–3 dB)	Input channels	Sampling rate	Memory depth	Waveform update rate	Serial (standard)	Built-in WaveGen
EDUX1052A	50 MHz	2	1 GSa/s	200 kpts	100,000 wfms/s	I^2C and UART/RS232	No
EDUX1052G							Yes
DSOX1202A	70 MHz, upgradeable to 200 MHz		2 GSa/s	2 Mpts	200,000 wfms/s	I^2C, SPI, UART/RS232, CAN, and LIN	No
DSOX1202G							Yes
DSOX1204A	70 MHz, upgradeable to 100 and 200 MHz	4					No
DSOX1204G							Yes

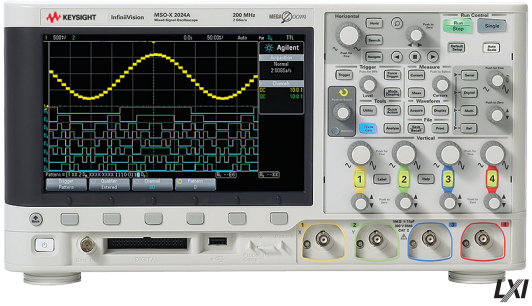
Standard LAN connection now available on all models

InfiniiVision 2000 X-Series oscilloscopes

Breakthrough technology delivers more scope for the same budget

- 70 to 200 MHz economy scopes
- Hardware based mask testing as well as serial protocol trigger and decode for I^2C, SPI, RS-232/UART, CAN, LIN
- Fully upgradeable: add bandwidth, digital channels, serial protocol trigger and decodes, measurement applications and WaveGen
- 5-year standard warranty

www.keysight.com/find/2000X-Series



Model series [1]	Bandwidth (–3 dB)	Input channels DSOX	Input channels MSOX	Sampling rate	Memory depth	Waveform update rate
2002A	70 MHz	2	2 + 8	2 GSa/s	1 Mpts	200,000 wfms/s
2004A		4	4 + 8			
2012A	100 MHz	2	2 + 8			
2014A		4	4 + 8			
2022A	200 MHz	2	2 + 8			
2024A		4	4 + 8			

1. 2000X specifications for models manufactured after January 1, 2018, older models can be upgraded using DSOX2PLUS option.

NEW InfiniiVision 3000G X-Series oscilloscopes

Touch, discover, solve

- 100 MHz to 1 GHz digital storage and mixed signal scopes
- Standard zone triggering
- 1,000,000 waveforms/sec update rate
- Mixed domain analysis with time/frequency measurement correlation
- 8 additional standard features including a built-in waveform generator, waveform and measurement histograms, protocol decodes, mask limit testing, and more
- Fully upgradeable: add bandwidth, digital channels, or measurement applications are customer installable at anytime
- Calibration period of 3 years

www.keysight.com/find/3000G



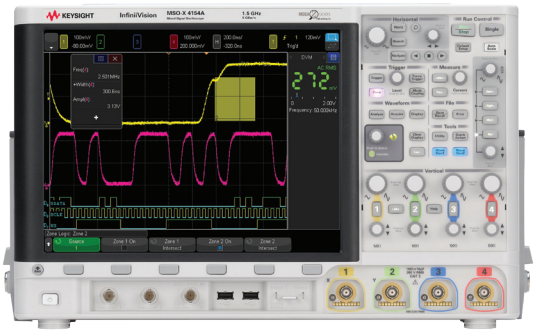
LXI

InfiniiVision 4000 X-Series oscilloscopes

Oscilloscope experience redefined

- 200 MHz to 1.5 GHz digital storage and mixed signal scopes
- 12.1-inch capacitive touch display
- Standard zone triggering
- 1,000,000 waveforms/sec update rate
- Built-in dual channel 20 MHz WaveGen function/arbitrary generator with modulation capability

www.keysight.com/find/4000X



LXI

Model series	Bandwidth (–3 dB)	Input channels DSOX	Input channels MSOX	Sampling rate	Memory depth	Display size and type	Waveform update rate	Calculated rise time (10 to 90%)
3012G	100 MHz	2	2 + 16	5 GSa/s half channel, 2.5 GSa/s all channel	Standard 4 Mpts, standard segment memory	8.5-inch capacitive touch display with standard zone trigger	> 1 million wfms/s	≤ 3.5 ns
3014G		4	4 + 16					
3022G	200 MHz	2	2 + 16					≤ 1.75 ns
3024G		4	4 + 16					
3032G	350 MHz	2	2 + 16					≤ 1 ns
3034G		4	4 + 16					
3052G	500 MHz	2	2 + 16					≤ 700 ps
3054G		4	4 + 16					
3102G	1 GHz	2	2 + 16					≤ 450 ps
3104G		4	4 + 16					
4022A	200 MHz	2	2 + 16			12.1-inch high-definition capacitive touch display		≤ 1.75 ns
4024A		4	4 + 16					
4032A	350 MHz	2	2 + 16					≤ 1 ns
4034A		4	4 + 16					
4052A	500 MHz	2	2 + 16					≤ 700 ps
4054A		4	4 + 16					
4104A	1 GHz	4	4 + 16					≤ 450 ps
4154A	1.5 GHz[1]	4	4 + 16					≤ 300 ps

1. 1.5 GHz real-time bandwidth in half-channel mode or full-channel equivalent time mode.

InfiniiVision 6000 X-Series oscilloscopes

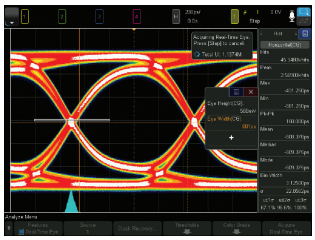
The new standard in price performance

- 1 to 6 GHz digital storage and mixed signal scopes
- 12.1-inch capacitive multi-touch screen with Zone touch trigger
- Superior noise floor and waveform update rate
- Standard histogram and color grade, plus enhanced color FFT
- Optional jitter and real-time eye-diagram analysis
- Voice control in 14 languages

www.keysight.com/find/6000X-Series

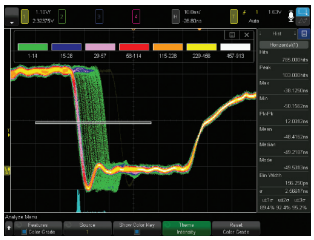


LXI



Bandwidth standard

- Performance meets price: two opposing concepts meet in a portable 6-GHz oscilloscope



New visualization standard

- Quickly troubleshoot your design by visualizing your challenges



Integration standard

- Get the power of 6 instruments in 1, fully upgradeable

Model series	Bandwidth (–3 dB)	Input channels DSOX	Input channels MSOX	Sampling rate	Memory depth	Display size and type	Waveform update rate
6002A	1 to 6 GHz	2	2 + 16	20 GSa/s	4 Mpts	12.1-inch capacitive multi-touch screen, Hardware InfiniiScan Zone touch trigger	450,000 wfms/s
6004A		4	4 + 16				

Applications — Engineered to Turn Measurements into Answers

You need fast, accurate answers to your measurement questions. That's why Keysight offers the broadest selection of compliance and debugging applications in the industry. Keysight applications work with your oscilloscope to quickly and easily provide exceptional insight into your signals.

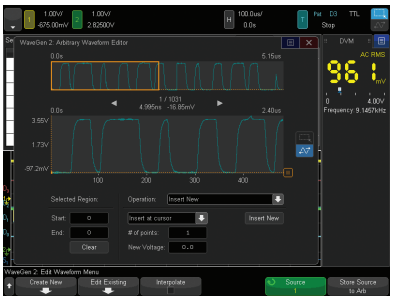
Increase specialized functionality

Instantly integrate instruments or upgrade your scope's functionality

The Education Training Kit and built-in DVM are now standard on all InfiniiVision oscilloscopes.

Applications	1000 X-Series	2000 X-Series	3000G X-Series	4000 X-Series	6000 X-Series	P924xA
WaveGen function generator	Standard on G models	DSOX-2WAVEGEN	Standard on G models			
WaveGen arbitrary/function generator			Standard on G models	DSOX-4WAVEGEN2	DSOX-6WAVEGEN2	P9240AWGA
Frequency Response Analysis (FRA)	Standard on G models		Standard on G models	Included with any software option[1]		
DSO to MSO upgrade kit		DSOX2MSO	DSOXT3MSO	DSOXPERFMSO	DSOX6MSO	
Bode plot training kit	DSOXBODE available on all models except 2000 X-Series					

[1] Excluding the NFC software option.

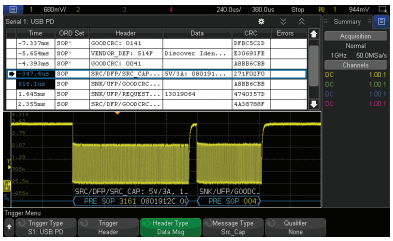


Debug your designs faster

Industry-specific software options

Applications	1000 X-Series	2000 X-Series	3000G X-Series	4000 X-Series	6000 X-Series	P924xA[2]
Automotive	Standard[1]	D2000AUTB	D3000AUTB	D4000AUTB	D6000AUTB	P9240AUTC
Aerospace & Defense			D3000AERB	D4000AERB	D6000AERB	P9240AERC
Embedded	Standard	D2000GENB	D3000GENB	D4000GENB	D6000GENB	P9240GENC
Power			D3000PWRB	D4000PWRB	D6000PWRB	
USB			D3000USBB	D4000USBB	D6000USBB	
Ultimate Bundle		D2000BDLB	D3000BDLB	D4000BDLB	D6000BDLB	P9240BDLC

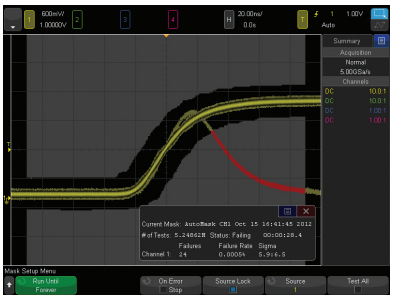
[1] DSO models only [2] Refer to page 23 for P924xA oscilloscopes



Simplify your job

PC-based software, limit testing and segmented memory all help organize your data

Applications	1000 X-Series	2000 X-Series	3000G X-Series	4000 X-Series	6000 X-Series
Mask/waveform limit testing	Standard on DSO models	●	Standard	●	●
Segmented memory	Standard on DSO models	Standard	Standard	Standard	Standard
Infiniium Offline PC-based analysis software	●	●	●	●	●
PathWave BenchVue software included	√	√	√	√	√
Software application bundle		●	●	●	●
Jitter					●



Infiniium EXR-Series oscilloscopes

An 8 channel MSO that's powerful, easy to own, intuitive to use

– Identify physical-layer issues as fast as possible with fast update rate of >200,000 wfm/s and exclusive Fault Hunter technology
– Debug even the most sensitive signals with up to 16 bits of resolution and typical noise as low as 43 µV
– Test power supply and distribution easily with dedicated probes, accessories, and automated applications with step-by-step setup wizards
– Troubleshoot serial buses at the protocol layer with dozens of automatic measurements, triggers, decodes, and compliance applications

www.keysight.com/find/EXR



Keep track of instrument calibration intervals with your instrument's built-in PathWave Calibration Advisor software and make measurements with confidence.

4 Channel Models	8 Channel Models	Bandwidth	Optional MSO	Sampling rate	Memory depth	Display size and type	Waveform Update Rate	Vertical resolution
EXR054A	EXR058A	500 MHz	16 ch	16 GSa/s	100 Mpts/ch (std) Options up to 400 Mpts/ch or 1.6 Gpts/ch	15.6" Full HD touchscreen, VGA and DisplayPort for external monitors	>200,000 wfm/s	10 bits at full bandwidth Up to 16 bits in high resolution
EXR104A	EXR108A	1 GHz						
EXR204A	EXR208A	2 GHz						
EXR254A	EXR258A	2.5 GHz						

Optimize Your Lab Time with Purpose-Built Application Software

Get the measurement capabilities you need at purchase or as an upgrade.

View all software at www.keysight.com/find/exrsoftware



EZJIT Complete (D9110JITA) lets you quickly and easily view jitter in the form of a TIE histogram, trend, and spectrum.

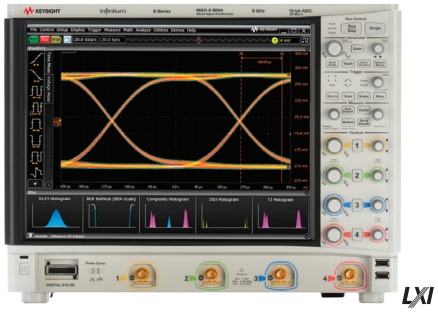


The D9110LSSP software package for Infiniium oscilloscopes gives you the ability to trigger and decode on a large and ever-expanding suite of low-speed serial protocols: I2C, SPI, eSPI, Quad SPI, Quad eSPI, RS232/UART, JTAG, I2S, SVID, and Manchester.



The D9110PWRA software package enables a broad range of automated power supply characterization measurements including unique frequency response analysis for performing control loop response and power supply rejection ratio (PSRR) measurements.

Infiniium S-Series oscilloscopes



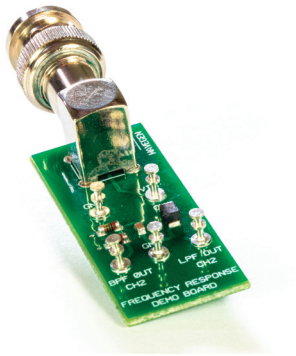
- 10-bit ADC to full 8 GHz bandwidth
- Up to 16 bits resolution (at reduced bandwidth)
- Low-noise front end and RF capability
- Dedicated software/probes for Power Integrity and Signal Integrity test
- Advanced jitter measurements
- Supports many probe technologies
- PathWave BenchVue software not included

www.keysight.com/find/s-series

DSO/MSO models	Bandwidth	Channels	Sampling rate	Memory depth	Display size and type	Vertical resolution
S054A	500 MHz	DSO: 4 analog MSO: 4 analog, 16 digital	20 GSa/s on 2 channels, 10 GSa/s on 4 channels	100 Mpts/ch (standard) Option up to 800 Mpts/ch (2 channel)	15" XGA capacitive Touchscreen, VGA and DisplayPort for external monitors	10 bits at full bandwidth Up to 16 bits in high resolution
S104A	1 GHz					
S204A	2 GHz					
S254A	2.5 GHz					
S404A	4 GHz					
S604A	6 GHz [1]					
S804A	8 GHz [1]					

[1] Bandwidth is for 2 channels. Bandwidth for 4 channels is 4 GHz.

DSOXBODE Bode Plot Training Kit



The DSOXBODE Bode plot training kit is compatible with most InfiniiVision scopes, including all "G" model InfiniiVision 1000 X-Series oscilloscopes, and consists of a series R-L-C circuit board with a BNC input that attaches directly to the output of an oscilloscope's WaveGen function generator. The labeled test points are for probing V_{IN} and bandpass filter output (BPF_{OUT}) or low-pass filter output (LPF_{OUT}). The training kit includes a downloadable comprehensive tutorial and lab guide for engineering students and professors. The training guide begins with a frequency response measurements tutorial, fill-in-the-blank questions, and step-by-step lab instructions for performing both manual and automatic Bode plots measurements using Keysight InfiniiVision oscilloscopes.

Probes — Engineered for Signal Access and Measurement Accuracy

To get top performance from your scope, you need the right probe for your application. Keysight offers a broad selection.

Hi-Z+ Passive Probing System

The best of passive and active probes in one.

– PP001A: high bandwidth and higher input voltages up to 3000 V CAT II.
– PP0002A: 800 MHz passive probe that provides more than 1 kV of input voltage.
– PP0003A: Keysight's first ever MMCX compatible probe

https://www.keysight.com/us/en/product/PP0003A/hi-z-probe.html
https://www.keysight.com/us/en/product/PP0002A/hi-z-probe.html
https://www.keysight.com/us/en/product/PP0001A/hi-z-probe.html



DP0001A high voltage differential probe

Confidently Test Your Power Converters, WBG Devices, and More

– High voltage differential probe for high voltage, high speed power device testing
– Measure up to 2 kV mains isolated, 1 kV CAT III and 400 MHz
– Unmatched electrical performance - flat frequency response and high CMRR

www.keysight.com/find/DP0001A

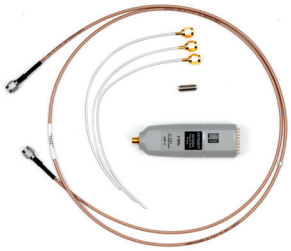


N7020A power rail probe

Industry's most accurate view of DC power rail behavior up to 2 GHz

– 2 GHz single-ended active probe for power rail noise measurements
– 16x less noise than a conventional 1:1 differential probe
– Low DC loading with input impedance of 50 kΩ
– Large offset range (±24 V) enables use of a scope's max vertical sensitivity

www.keysight.com/find/N7020A



	1000 X-Series	2000 X-Series	3000G X-Series	4000 X-Series	6000 X-Series
Scope bandwidth	50 to 200 MHz	70 to 200 MHz	100 MHz to 1 GHz	200 MHz to 1.5 GHz	1 to 6 GHz
Probe interface	BNC	BNC	AutoProbe Lite	AutoProbe	
Standard probe (scope bandwidth)	N2140A (70 MHz/100 MHz) N2142A (50 MHz)	N2841A (70 MHz/100 MHz) N2842A (200 MHz)	N2843A (all)	N2894A (all)	
Passive probe 1:1	N2140A/ N2142A	10070D, N2870A	10070D, N2870A, PP0001A/2A/3A (requires PP0004A adapter)		
10:1	N2140A/ N2142A	N2841A, N2842A, N7007A	N2841A, N2842A, N2890A, N2871A, N7007A	N2894A, N7007A	
High-voltage passive probe 100:1	10076C				
Low Z passive probe	—	—	N2874A, N2876A		
Active differential probes (high speed)	—	—	N2750A, 1130B [1]		N2750A/51A/52A, 1130B/31B/32B [1]
(high voltage)	N2791A, N2891A	N2791A, N2891A	N2790A/91A/92A/93A, N2818A/19A, N2891A, N2804A/05A, DP0001A		
Active single-ended probe	—	—	N2795A/96A/97A, N7020A	N2795A/96A/97A, N7020A	N2795A/96A/97A, N7020A [3]
Current probe	1146B, N2780B/81B/82B/83B [2], N7040A/41A/42A	1146B, N2780B/81B/82B/83B [2], N7040A/41A/42A	1146B, 1147B, N2893A, N2780B/81B/82B/83B [2], N2820A/21A , N7026A, N7040A/41A/42A		

[1] Order one or more InfiniiMax. Probe heads or connectivity kits required per amplifier model shown. [2] Requires N2779A power supply. [3] With 6000X Series ordered after February 1, 2016

True*volt* Digital Multimeters

Lower DC current ranges and faster reading rates, allows enhanced measurements

Get more details quickly. True*volt* digital multimeters (DMMs) graphical capabilities, such as trend and histogram charts, offer more details quickly. Both models include a data logging mode for easier trend analysis and a digitizing mode for capturing transients.

Measure low-power devices. The ability to measure very low current, 1 µA range with pA resolution, allows you to make measurements on very low power devices.

Maintain calibrated measurements. Auto calibration allows you to compensate for temperature drift so you can maintain measurement accuracy throughout your workday.

34460A/34461A Basic True*volt* DMMs

- Up to 1,000 readings/s at 6½ digits
- 12 measurement functions including temperature
- Up to 10 k readings internal memory
- Color, graphical display, with built-in graphics, math, and statistics
- 34461A DMM is a replacement for the previous-generation 34401A model



34465A / 34470A Performance True*volt* DMMs

- DCV measurement accuracy of 16-30 ppm
- Measure sleep and standby current with pico-amp resolution
- View DC and AC volts with dual display
- 1 µA range and up to 50,000 rdgs/sec
- Up to 50 k readings standard internal memory and 2 M readings option



	Bench / System		Performance	
	34460A	**34461A**	**34465A**	**34470A**
Digits of resolution	6½	6½	6½	7½
1 year DCV accuracy	0.0075%	0.0035%	0.0030%	0.0016%
Maximum measurement speed (readings/s)	300	1,000	50,000	50,000
DC, True RMS AC voltage ranges	100 mV – 750 V	100 mV – 750 V	100 mV – 750 V	100 mV – 750 V
DC, True RMS AC current ranges	100 µA – 3 A	100 µA – 10 A	1 µA – 10 A	1 µA – 10 A
2- and 4-wire resistance ranges	100 Ω – 100 MΩ	100 Ω – 100 MΩ	100 Ω – 1 GΩ	100 Ω – 1 GΩ
Frequency range	3 Hz – 300 kHz	3 Hz – 300 kHz	3 Hz – 300 kHz	3 Hz – 300 kHz
Diode/continuity	5 V / yes	5 V / yes	5 V / yes	5 V / yes
Other measurements	Capacitance, temperature, period			
Connectivity	USB, LAN (opt), and GPIB (opt)	USB, LAN, and GPIB (opt)		

Digital Multimeters

Lab accuracy at production-line speeds

U3606B 5½ digit multimeter/30 W DC power supply

Get twice the measurement functionality in half the space

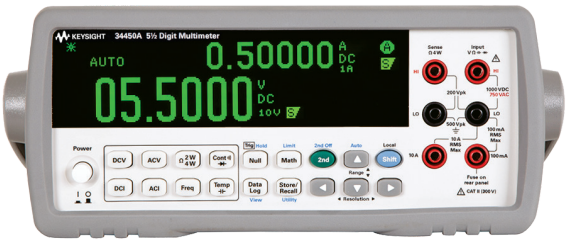
- Allows simultaneous supply-and-measure operations
- DMM: 120,000 count resolution with DCV accuracy 0.025%
- Power supply: Four output ranges with over-voltage and over-current protection, auto ramp and scan function and square-wave output
- Securable with PC-grade physical lock
- PathWave BenchVue software not included



34450A 5½ digit dual-display DMM

Achieve throughput breakthrough in a low-cost DMM

- 11 measurement functions, including temperature and capacitance
- Built-in histogram and basic statistical functions
- Ultra-bright OLED with dual display capability
- Up to 50,000 memory points, log up to 14 hours of data



B2980B Series femto / picoammeter and electrometer / high resistance meter

Confidently measure down to 0.01 fA and up to 10 PΩ with the world's only graphical picoammeter/electrometer.

- Current measurement resolution of 0.01 fA (0.01 x 10^{-15} A)
- Resistance measurements up to 10 PΩ (10 x 10^{15} Ω)
- 4.3" liquid crystal display for numeric, graph, trend chart, and histogram viewing
- Battery-powered versions available for low-level measurements in the presence of AC power line noise
- PathWave BenchVue software not included

http://www.keysight.com/find/b2980



34420A 7½ digit nanovolt/micro-ohm meter

High sensitivity for low-level measurements, plus resistance and temperature

- 1.3 nVrms, 8 nVpp noise performance
- 100 pV/100 nΩ sensitivity
- Low-noise voltage measurements with resistance and temperature functions



3458A 8½ digit performance DMM

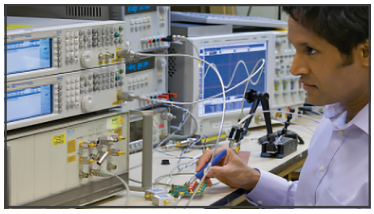
High precision and high-performance measurement solution

- 8½ digit resolution with 0.1 ppm transfer accuracy
- Measurements include DC & AC voltage, DC & AC current, 2- and 4-wire resistance, frequency and temperature
- Up to 100,000 readings/s
- Similar performance, specifications, and 100% code compatible with the previous version
- 148K memory for data logging
- RoHS compliant
- PathWave BenchVue software not supported



Knowledge Center "How To" Videos

Within the Knowledge Center, KeysightCare Technical and Application Support provides "How to" instrument and software videos with answers and demonstrations to solve instrument setup and feature usability questions. Here are just a few examples.
(*Please note: Some of these high value videos are exclusive to customers with KeysightCare entitled assets.*)



Signal Sources (4 courses)

Explore the source of common signal source measurement issues; their detrimental effect to the optimum measurement results and how to resolve them.

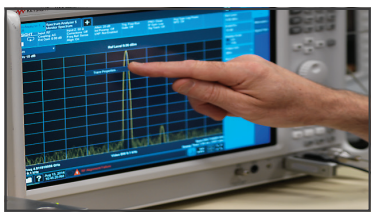
https://technicalsupport.keysight.com/series/signal-sources-measurement-issues



Software

Learn about Pathwave, Signal Studio, 86900 VSA, X-Apps, and other Keysight software applications

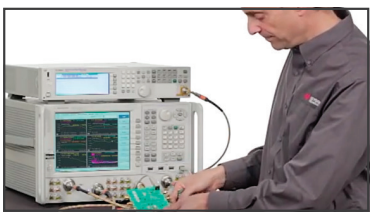
https://technicalsupport.keysight.com/page/software



Spectrum Analyzers (5 courses)

Explore the source of common spectrum analyzer measurement issues; their detrimental effect to the optimum measurement results and how to resolve them.

https://technicalsupport.keysight.com/series/spectrum-analyzer-issues



Vector Network Analyzers (5 courses)

Explore the source of common vector network analyzer measurement issues; their detrimental effect to the optimum measurement results and how to resolve them.

https://technicalsupport.keysight.com/series/vna-issues

53200 Series RF and universal frequency counters/timers

Accelerate measurement and analysis with histograms, trend charts and statistics

- 350 MHz, with options up to 15 GHz
- Advanced capabilities: histograms, trending, data logging, optional pulse/burst microwave measurements
- Up to 20 ps single-shot time interval measurements
- Continuous, gap-free measurements, with time stamps on signal edges
- Onboard memory for 1 M readings
- 53181A, 53131A, 53132A counter emulation mode

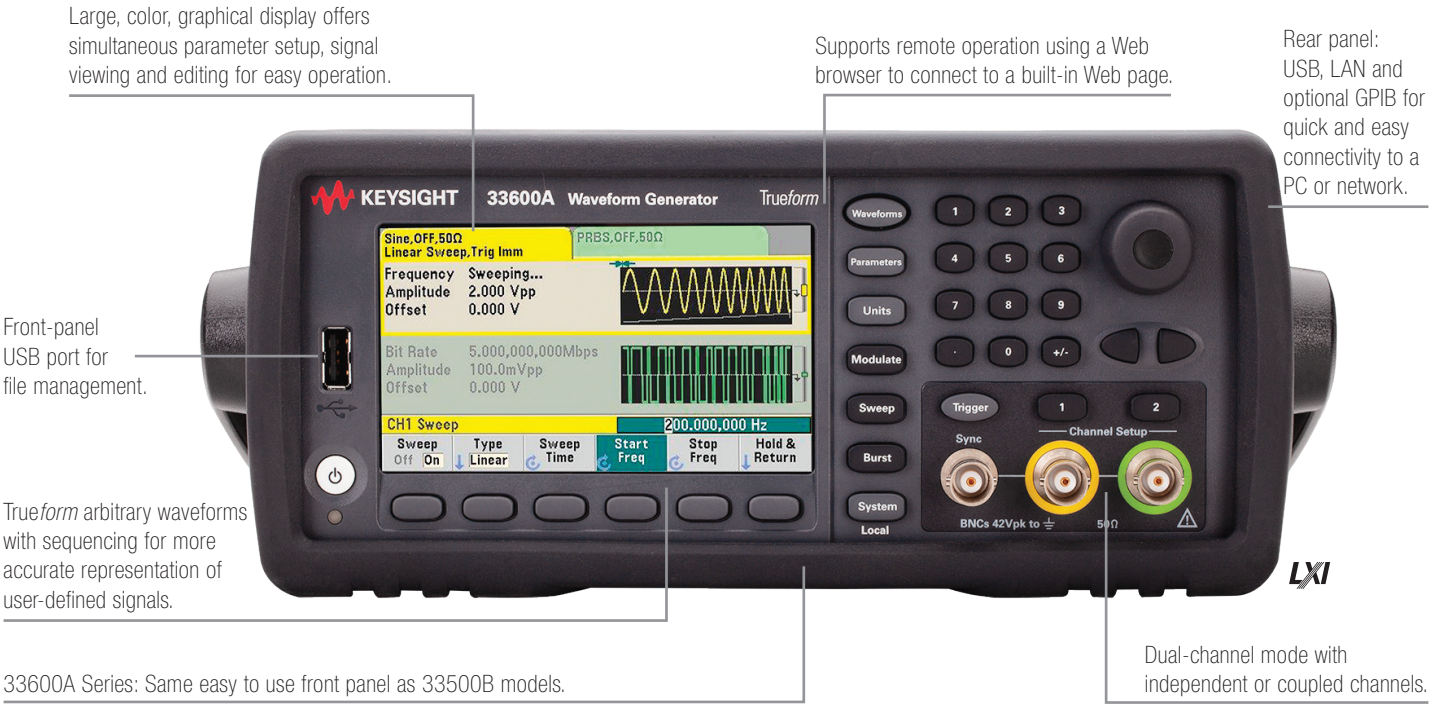


53210A
53220A
53230A

	53210A	53220A	53230A
Type	1 channel; optional RF channel	2-channel universal; optional RF channel	
Measurements	Frequency, frequency ratio, period, max./min./peak-to-peak input voltage		
		Time interval, rise/fall time, single period, pulse width, duty cycle, phase, totalize	
		NA	Timestamp/modulation domain analysis
Analysis	Math: smoothing (reading moving average), scaling, Δ-change, null		
	Statistics: mean, standard deviation, max., peak-to-peak, count; full color display for trendline, histograms		
		Allan deviation	
Frequency range (optional)	DC to 350 MHz (6 or 15 GHz)		
Frequency resolution	10 digits/s	12 digits/s	
Time interval	NA	100 ps	20 ps
Connectivity	USB, LAN, and GPIB		

True*form* Waveform Generators

Superior signal fidelity with True*form* technology provides the highest resolution, lowest distortion and lowest jitter when compared to DDS function/arbitrary waveform generators all at a comparable price.



33600A Series True*form* waveform generators

Four upgradeable models are available at 80 and 120 MHz with 1- and 2-channels. The 33600A Series offers a full set of standard features and an optional baseband IQ signal player.

- 80 and 120 MHz, 1- and 2-channel models
- 2-channnel coupling and synchronization
- True*form* arbitrary waveforms with sequencing
- PRBS serial patterns

	33611A	33612A	33621A	33622A
Number of channels	1	2	1	2
Frequency	1 µHz to 80 MHz sine		1 µHz to 120 MHz sine	
Standard waveforms	Sine, square, ramp, pulse, triangle, Gaussian noise, PRBS, DC, standard on all models IQ baseband standard for 2-channel arbitrary capable models only and is not optional for 1-channel models			
Arbitrary waveforms	True*form* arbitrary waveforms with sequencing, 4 MSa/channel memory, optional 64 MSa/channel			
Sampling rate, resolution	660 MSa/s, 14-bits		1 GSa/s, 14-bits	
Modulation types	AM, FM, PM, FSK, BPSK, PWM, Sum (carrier + modulation)			
Burst	Counted or gated			
Sweep	Linear, logarithmic and frequency list			
Total harmonic distortion and jitter	<0.03% THD and < 1 ps jitter			
Timebase	TCXO standard, OCXO optional for higher stability			
Options and security	NISPOM and file security, OCXO high-stability timebase			
Connectivity	USB, LAN, GPIB (optional)			

33500B Series True*form* waveform generators

Eight upgradeable models are available at 20 and 30 MHz with 1- and 2-channels. The 33500B Series offers a full set of standard features and an optional baseband IQ signal player.

- Sine waves with up to 5x lower harmonic distortion
- Pulses up to 30 MHz with <40 ps jitter
- Individual arbitrary waveform segments that can be sequenced
- 16 bits of resolution with 1 mVpp to 10 Vpp amplitude
- IQ baseband signal player standard for 2-channel models

	33509B	33510B	33511B	33512B	33519B	33520B	33521B	33522B
Number of channels	1	2	1	2	1	2	1	2
Frequency	20 MHz				30 MHz			
Standard waveforms	Sine, square, ramp, pulse, triangle, Gaussian noise, PRBS (pseudorandom binary sequence), DC							
Arbitrary waveforms	Optional arbitrary waveforms		True*form* arbitrary waveforms with sequencing, 1 MSa/channel standard, 16 MSa/channel optional		Optional arbitrary waveforms		True*form* arbitrary waveforms with sequencing, 1 MSa/channel standard, 16 MSa/channel optional	
Sampling rate, resolution	160 MSa/s, 16 bits				250 MSa/s, 16 bits			
Modulation types	AM, FM, PM, FSK, BPSK, PWM, sum (carrier + modulation)							
Burst	Counted or gated							
Sweep	Linear, logarithmic and frequency list							
Timebase	TCXO standard, OCXO optional for higher stability							
Total harmonic distortion and jitter	<0.04% THD and <40 ps jitter (rms)							
Options and security	NISPOM and file security, OCXO high-stability timebase							
Connectivity	USB, LAN, GPIB							

EDU33210A Series Function Generators

Get all the standard functions and waveforms with the most stable, lowest-distortion function generator in its class. It offers the standard signals and features you expect and features that give you the capabilities and flexibility you need to get your job done quickly, no matter how complex

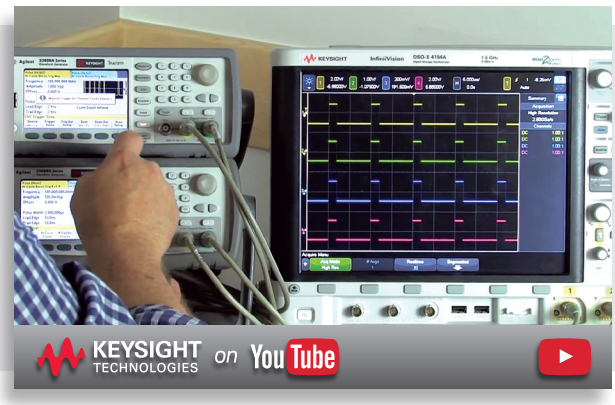


	EDU33211A	EDU33212A
Maximum frequency	20 MHz	
Number of Channels	1	2
Standard waveforms	Sine, Square, Ramp, Pulse, Triangle, Gaussian Noise, PRBS Pseudorandom Binary Sequence, DC	
Built-in arbitrary waveforms	Cardiac, Exponential Fall, Exponential Rise, Gaussian Pulse, Haversine, Lorentz, D-Lorentz, Negative Ramp, Sinc	
User-defined arbitrary waveforms	Up to 8 Msa per channel; with up to 1 MSA per waveform	
Operating modes	Continuous, Modulate, Frequency Sweep, Gated Burst	
Modulation types	AM, FM, PM, FSK, BPSK, PWM	

Don't know how to phase synchronize multiple waveform generators?

Watch this video to see how easy it is.

Synchronizing Multiple Waveform Generators



PathWave BenchVue Software

Data Acquisition Control & Analysis

Easily control Keysight data acquisition units to configure channels, execute scan lists and log data. Clearly analyze or view measurement data using visualization tools and a broad choice of display options.

PathWave BenchVue software supports 34970A, 34972A, 34980A, DAQ970A, DAQ973A and modules.

http://www.keysight.com/find/benchvueDAQapp

34980A multifunction data acquisition switch / measure unit

Achieve maximum versatility in a minimum footprint

This 8-slot mainframe includes a choice of 21 optional plug-in modules for custom configurations. As a one-instrument solution it is ideal for medium to high-density switch/measure applications in design verification, automated test, and data acquisition applications.

- Optional built-in 6½ digit DMM — make 11 measurements with up to 3,000 readings/s
- High-performance switching — up to 560 2-wire multiplexer channels or 4,092 matrix cross-points in one mainframe
- Built-in USB, LAN, and GPIB



21 modules to choose from

Model	Description	Key specifications
34921A-25A	Multiplexers	Up to 300 V/1 A
34931A-33A	Matrix switches	Up to 128 crosspoints
34934A	High-density matrix switch	512-crosspoint reed matrix
34937A/38A	GP switches	1 A and 5 A
34939A	High-density GP switch	64-channel Form A channels up to 60 W
34941A/42A	RF switches	50 Ω or 75 Ω
34945A	µW switch/attenuation driver	Drive 64 coils
34946A/47A	µW switches	SPDT switch to 26.5 GHz
34950A-34959A	System control	Choose from D/A, DIO, counter and breadboard



DAQ970A/DAQ973A data acquisition systems

Get the next-generation data acquisition (DAQ) system with a 3-slot mainframe and your choice of 9 plug-in modules. Interface with the DAQ using Keysight PathWave BenchVue DAQ software, the intuitive graphical front panel with task oriented, self-guiding menus, or a web browser.



- Advanced 6½ digit internal DMM with improved accuracy and faster measurement speed
- Ability to measure very low current ranges (1 µA DC and 100 µA AC) and higher resistance range (1000 MΩ)
- New auto-calibration that compensates for internal drifts caused by time and temperature changes
- 3497XA compatible, program and configuration
- LAN and USB for easy PC connectivity (DAQ973A includes additional GPIB)

PLUS

- All modules have been updated to have improved switching speeds and accuracies
- DAQM900A solid state multiplexer and DAQM909A 4-channel digitizer modules
- DAQM909A 4 channel simultaneous sampling digitizer module, up to 800 kSa/sec sample rate

Modules for DAQ970A and DAQ973A Systems

Description	Modules	Key specifications
20-channel solid-state multiplexer	DAQM900A	Up to 450 ch/s
20-channel multiplexer + 2 current channels	DAQM901A	Armature 2/4 wire, 60 ch/s (80 ch/s for DAQ970A), up to 300 V, 1 A
16-channel multiplexer	DAQM902A	Reed 2/4 wire, 250 ch/s, up to 300 V, 50 mA
20-channel actuator/GP switch	DAQM903A	SPDT/Form C, 120 ch/s, up to 300 V, 1 A
4x8 matrix	DAQM904A	Armature 2-wire, 120 ch/s, up to 300 V, 1 A
2 GHz, dual 4-channel, RF mux, 50 Ω	DAQM905A	Common low (not terminated, 60 ch/s up to 42 V, 0.7 A
Multifunction module	DAQM907A	Two 8-bit digital I/O ports, up to 42 V, 400 mA 26-bit 100 kHz event counter, up to 42 V Two 16-bit analog outputs, up to ±12 V, 10 mA
40-channel single-ended multiplexer	DAQM908A	Common low (no 4-wire meas.) 60 ch/s (80 ch/s for DAQ970A), up to 300 V, 1 A
4-channel simultaneous sampling digitizer	DAQM909A	Differential inputs, up to 800kSa/s sampling rate, 24-bit resolution

USB Products

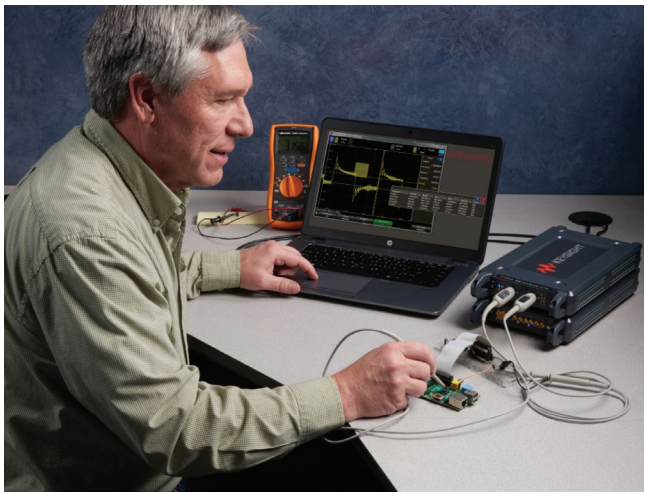
Compact form with zero compromise in performance

- Faceless USB instruments controlled via PC
- Same technology and measurements as Keysight benchtop and modular instruments
- High-performance USB 3.0 or Thunderbolt 3 interface

www.keysight.com/find/streamline-series

	Vector Network Analyzer (VNA)	Oscilloscope
Model	P9370A to P9375A, P9370B to P9375B, P9377B, P9382B, P9384B	P9241A, P9242A, P9243A[1]
Bandwidth	300 kHz to 26.5 GHz (P937xA) 9 kHz to 20 GHz (P937xB, P938xB) 100 kHz to 26.5, 44 GHz (P937xB)	200 MHz, 500 MHz and 1 GHz
Key Features	– Full 2- or 4-port – Extendable number of ports – Same calibration and metrology as all trusted Keysight VNAs – Automatic fixture removal – Time domain analysis – Enhanced time-domain analysis with TDR (P937xB/8xB only) – Scalar/mixer converter measurements	– 2 analog channels – 5 GSa/s – 1,000,000 wfms/s – Zone triggering – 6-in-1 instrument: arbitrary waveform generator, frequency response analyzer, digital voltmeter, counter, protocol analyzer
PathWave BenchVue supported	No	Yes

[1] See page 12 for P924xA supported X-Series oscilloscope software application bundles.



www.keysight.com/find/connectivity

USB modular instruments

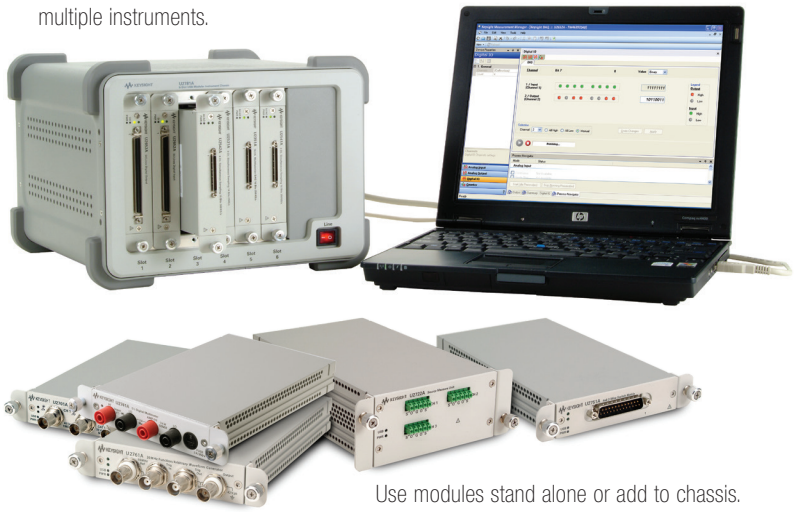
U2701A/02A	100/200 MHz oscilloscope
U2722A/23A	3-channel source measure unit
U2741A	5½ digit digital multimeter
U2761A	20 MHz function generator
U2751A	4x8 switch matrix

USB modular data acquisition

U2300 Series	USB modular multifunction DAQ devices
U2600 Series	USB modular isolated digital I/O devices
U2802A	31-channel thermocouple input module

PathWave BenchVue software supports U2300 and U2600 series modular DAQ instruments.

U2781A USB modular product chassis can host up to six modules and synchronize multiple instruments.



Use modules stand alone or add to chassis.

Converters	
82357B	USB/GPIB interface
E5810B	LAN/GPIB/USB gateway

GPIB cards, cables, and adapters	
82350C	High performance PCIe GPIB interface card
10834A	GPIB to GPIB adapter
10833A/B/C/D/F or G	GPIB cables

The Keysight RF Bench and Handheld Instruments

Reach higher in RF — with confidence

Keysight Authorized Distributors now offer a range of RF instruments that deliver tremendous value, balancing excellent performance with affordable pricing. To see the full portfolio of RF products offered by Keysight Authorized Distributors, visit: www.keysight.com/find/rf

1. FieldFox Handheld Analyzers

Quality measurements in the field with rugged handheld instruments.

See pages 25-27

2. Spectrum/signal analyzers

From general purpose spectrum analysis to next-level signal demodulation analysis, we have you covered.

See pages 28-29

3. Audio analyzer and signal generators

Assure quality while minimizing the cost of your general-purpose testing with reliable RF performance and capability.

See pages 30-31

4. Power sensors and meters

Meters and sensors cover numerous frequency and power ranges to accurately measure the power of RF and microwave signals.

See page 32

5. RF & Microwave test accessories

Keysight test accessories complete your test solution and eliminate the weak links in your measurement system.

See page 33

6. Network analyzers

Industry standard of middle-range vector network analyzer, providing best-in-class performance, for passive device test.

See page 34

7. LCR meters

Bring unparalleled accuracy to your lab for component evaluation.

See page 44



FieldFox Handheld Analyzers

Quality measurements ranging from RF to mmWave in the field: carry precision with you

Measuring up and earning a spot in your field kit is the driving idea behind Keysight's FieldFox handheld analyzers. Compact and lightweight at 3.34 kg or 7.35 lbs, FieldFox eliminates the need to transport benchtop equipment to the field or carry multiple instruments. FieldFox offers budget flexibility allowing you to choose the capabilities you need today and easily upgrade later.

Precise and portable

- Maximum frequency from 4 to 54 GHz across family of 44 models
- Measurement results agree with those obtained with benchtop analyzers
- Compact form factor measures 29 x 19 x 8 cm (11.5 x 7.4 x 3.2 in) approximately
- Light weight at just 3.34 kg (7.35 lbs) approximately

Rugged and weather resistant

- Dust-free design with no internal fans or vents extends reliability in harsh environments
- Weather-resistant design withstands salty, humid environments
- MIL-PRF-28800F Class 2 compliant



	Combination analyzers			Vector network analyzers		Spectrum analyzers	
Model number		**N9913/4/5/6/7/8B**	**N9950/1/2/3B**			**N9933/4/5/6/7/8B**	**N9960/1/2/3B**
Maximum frequency range		4, 6.5, 9, 14, 18, 26.5 GHz	32, 44, 50, 54 GHz			4, 6.5, 9, 14, 18, 26.5 GHz	32, 44, 50, 54 GHz
Model number	**N9912A**	**N9913/4/5/6/7/8A**	**N9950/1/2A**	**N9923A**	**N9925/6/7/8A**	**N9935/6/7/8A**	**N9960/1/2A**
Maximum frequency range	4, 6 GHz	4, 6.5, 9, 14, 18, 26.5 GHz	32, 44, 50 GHz	4, 6 GHz	9, 14, 18, 26.5 GHz	9, 14, 18, 26.5 GHz	32, 44, 50 GHz
Minimum starting frequency	2 MHz	30 kHz, 5 kHz (Optional A-Series only)	300 kHz	2 MHz	2 MHz	9 kHz (usable to 5 kHz), 100 kHz (usable to 5 kHz) for N993xA	
Cable and antenna analyzer	Standard			Optional		Optional (VSWR & RL)	
Vector network analyzer	Optional (1 port)	Optional		Standard		—	
QuickCal	Optional	Optional[1]	—	Optional		—	
Full 2-port S-parameters	—	Optional		Optional		—	
VNA time domain	Optional			Optional		—	
Spectrum analyzer	Optional			—		Standard	
Analysis bandwidth	—	10 MHz (standard) (Optional 40, 120 MHz[2])		—		10 MHz (standard) (Optional 40, 120 MHz[2])	
Real-time spectrum analyzer	—	Optional		—		Optional	
Indoor/Outdoor mapping	—	Optional		—		Optional	
Pathwave VSA software support	—	Optional		—		Optional	
Over-the-Air 5G NR	—	Optional (B-Series only)		—		Optional (B-Series only)	
Over-the-Air LTE FDD	—	Optional		—		Optional	
Over-the-Air LTE TDD	—	Optional		—		Optional	
EMF measurements	—	Optional		—		Optional	
Analog Demodulation	Optional			—		Optional	
Noise figure analyzer	—	Optional		—		Optional	
IQ analyzer	Optional			—		Optional	
IQ streaming	Optional			—		Optional	
EMI measurement	Optional			—		Optional	
Interference analyzer	Optional			—		Optional	
Extended range transmission analysis (ERTA)	Optional			—		Optional	
Tracking generator	Optional			—		Optional	
Vector voltmeter	Optional			Optional		—	
Built-in power meter	Optional			—	Optional	Optional	
USB power sensor support	Optional			Optional		Optional	
DC voltage source	—	Optional		—	Optional	Optional	
GPS receiver	Optional			Optional		Optional	
Remote control capability[3]	Optional			Optional		Optional	

[1] QuickCal is not available on models N991xB or N995xA/B.

[2] Available on B models only. 40 and 120 MHz bandwidth options are supported with RTSA, I/Q analyzer, OTA and PathWave VSA (89600 VSA) software.

[3] Supports an iOS device or an Android device to remotely control a FieldFox analyzer.

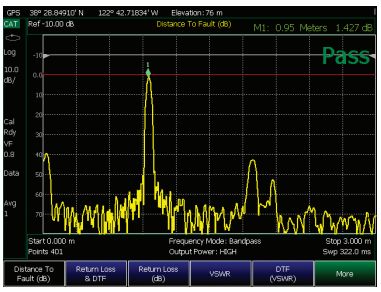
Increased Precision is Here with Wider Bandwidth

Given the new dynamics of wideband, microwave and millimeter wave (mmWave) communications, Keysight has developed the next generation FieldFox Microwave / mmWave Analyzer with 120 MHz of real-time bandwidth and enhanced RF performance to address the ever increasing demands of 5G NR (FR1 and FR2), satellite communications, signal monitoring, and RADAR/EW applications.

The FieldFox base combination model functions as a cable and antenna tester and can be configured to support over 20 key RF, microwave, and mmWave instrument functions including signal analyzer, full 2-port vector network analyzer, real-time spectrum analyzer, over-the-air demodulation, CW signal source, power meter, and many more, in an all-in-one field proof package.

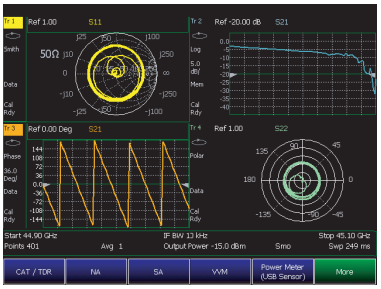
Cable and antenna analyzer

- Distance-to-fault (DTF) and return loss/VSWR
- 1-port cable loss, optional 2-port insertion loss, and time-domain reflectometry (TDR)
- Optional integrated QuickCal for simple field measurements – no calibration kit required



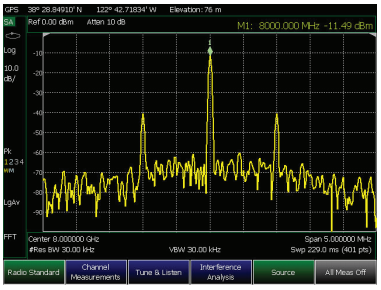
Vector network analyzer

- All four S-parameters, magnitude and phase
- Time-domain analysis, mixed-mode reflection S-parameters
- CalReady, QuickCal, full 2-port cal, TRL, waveguide cal, ECal support, and a Guided Calibration Wizard



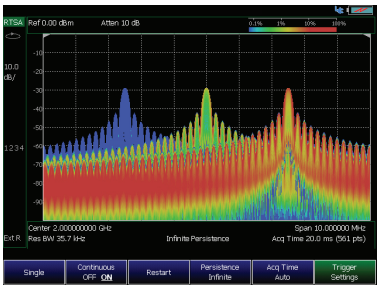
Spectrum analyzer

- Unprecedented amplitude accuracy of ± 0.2 dB with InstAlign — no warm-up required
- Tracking generator, independent source, and preamplifier covering the full frequency range
- Channel power (CHP), occupied bandwidth (OBW), interference analysis, analog demodulation



Real-time spectrum analyzer (RTSA)

- Capture signals as short as 5.52 µs with 100% POI with a maximum 120 MHz real-time bandwidth and full amplitude accuracy
- Cover signal frequency up to 54 GHz



Enhancement continues...

Keysight continues to invest in FieldFox to make it more versatile helping customers to address the increasing demands due to rapidly evolving technologies. The latest enhancements include:

- IQ data streaming (option 353)
- EMI measurements (option 361)
- VNA low frequency extension to 5 kHz (available for N991xA, x>2 only)

Basic Spectrum Analyzers (BSA) Series

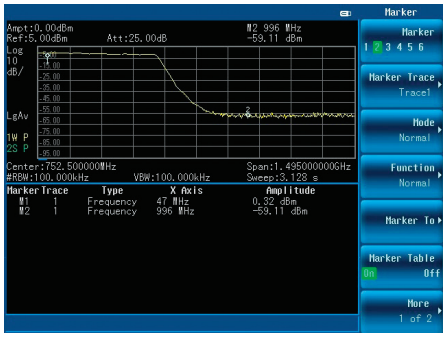
Proven reliability on your bench

For a low-cost spectrum analyzer, targeting GP and consumer electronics test, the BSA-C family has grown and now includes the N9321C (4 GHz), N9323C (13 GHz) and N9324C (20 GHz). The BSA-C modules provide a full frequency range from RF to µW with one code set.



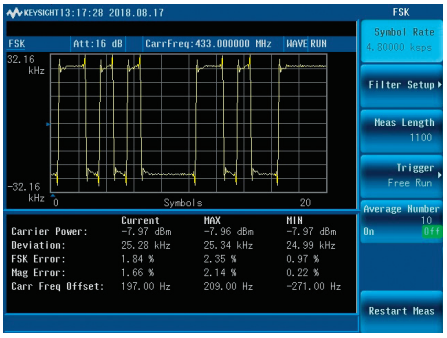
N9324C

Key specifications	N9320B	N9321C	N9322C	N9323C	N9324C
Frequency range	9 kHz – 3 GHz	9 kHz – 4 GHz	9 kHz – 7 GHz	1 MHz – 13.6 GHz	1 MHz – 20 GHz
Reference aging rate	± 1 ppm	± 1 ppm, ± 0.1 ppm (w/Opt. PFR)			
Amplitude accuracy	± 0.5 dB	± 0.6 dB		± 0.7 dB	
Displayed average noise level, 1 GHz	-145 dBm	-149 dBm		-140 dBm	
Resolution bandwidth	10 Hz – 1 MHz	10 Hz – 3 MHz			
Third-Order Intercept (TOI)	+13 dBm	+15 dBm			
Standard attenuator	70 dB, in 1 dB steps	50 dB, in 1 dB steps		50 dB, in 5 dB steps	
Phase noise, 1 MHz offset	-112 dBc/Hz	-121 dBc/Hz		-119 dBc/Hz	



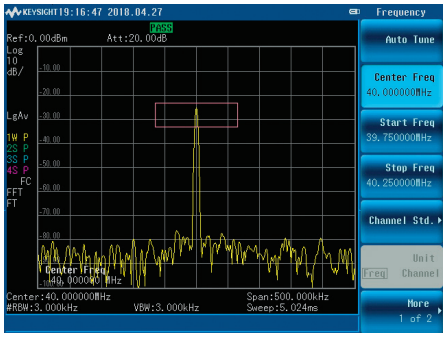
Tracking generator option
(N9320B-TG3, N9321C-TG4, N9323/24C-TG7)

This option provides a signal source with an RF output that follows the tuning of the spectrum analyzer and increases test coverage for component-level characterization, such as insertion loss, amplifier gain, and frequency response.



ASK/FSK demodulation analysis (DMA) option

Make one-button ASK/FSK signals measurements in low power, low data rate RF, and IoT device applications for fast signal characterizations, including transmission power, FSK deviation, FSK error, and carrier frequency offset.



Window limit feature

Quickly determine the pass/fail of measurement results for frequency and power test criteria using the automatic signal peak marker. This feature will simultaneously analyze the upper and lower limits of signal frequency and power and generate an audio alert for signals outside the passing margins.

RF and microwave accessories kit

An assortment of antenna, filters, attenuators, cables, adapters, and close-field probes provide a complete solution when using Keysight handheld and benchtop solutions.

www.keysight.com/find/n9311x

N9311X-100
Near Field Probes



N9000B CXA X-Series signal analyzer

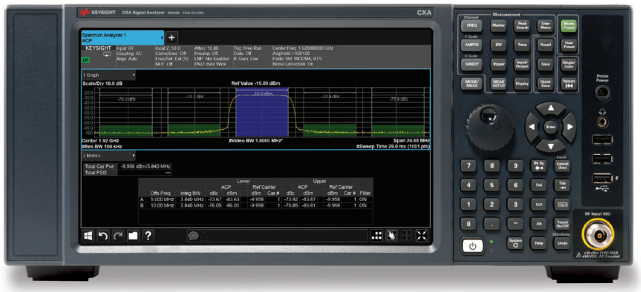
(9 kHz to 3.0, 7.5, 13.6 or 26.5 GHz)

Master the essentials with the CXA

Whether you're rapidly updating a next-generation product or revising an existing design, the CXA signal analyzer helps you perform signal characterization, circuit design verification, and troubleshooting. The CXA's built-in capabilities let you perform essential measurements of frequency, power, spurious and distortion without overspending your budget.

- Characterize signals and devices with general-purpose spectrum analysis and one-button PowerSuite measurements
- -163 dBm DANL @ 1 GHz (preamp on)
- Phase Noise (10 kHz offset) -110 dBc/Hz at 1 GHz
- 25 MHz analysis bandwidth
- Up to 6 GHz built-in tracking generator for stimulus/response measurements
- USB 2.0, LAN, GPIB and LXI Class C compliance
- Use X-Series measurement applications for signal demodulation analysis

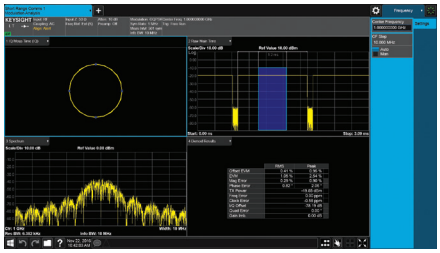
www.keysight.com/find/cxa

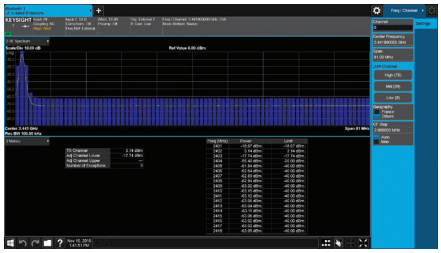


Enable deeper insight into signal quality – Equip your CXA signal analyzer with X-Series measurement applications

X-Series measurement applications for CXA

These apps provide fast, one-button RF conformance measurements to help you design, evaluate, and manufacture devices and equipment.

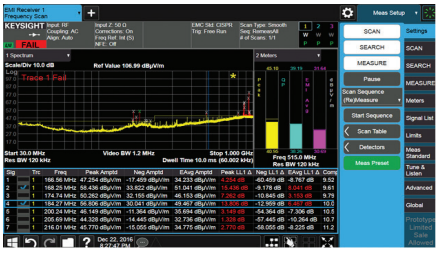












Featured apps	Description
General purpose	Analog demodulation, phase noise, noise figure, pulse analysis, vector modulation analyzer (VMA), EMI emission measurements
Cellular communications	W-CDMA / HSPA+, LTE / LTE-Advanced FDD, NB-IoT and eMTC, LTE / LTE-Advanced TDD, GSM/EDGE / EVO
Wireless connectivity	WLAN 802.11, *Bluetooth*®, *Bluetooth 5*, ZigBee / Z-Wave

Complete offering available at www.keysight.com/find/x-series_apps

Need an ESA spectrum analyzer replacement?

Migrate from the ESA to the CXA on Keysight's website: www.keysight.com/find/CXA

X-Series Signal Generators

To know your device's behavior, you'll take many paths. That's the idea behind the X-Series signal generators. They produce the signals you need to test your design within and beyond its limits.

CXG X-Series RF vector signal Generator

Cost-effective RF vector signal generation



With a flexible, dependable vector signal generator, you're ready for your next measurement challenge. The Keysight N5166B CXG RF vector signal generator supports essential receiver and general-purpose tests. Produce the signals you need from simple to complex, or clean to dirty. You may also playback Signal Studio waveforms for functional verification of your devices.

Accelerate product testing on multiple levels: design/engineering verification, design enhancement, throughput, cost reduction, and beyond. The CXG signal generator offers you with dependable performance at the right price.

MXG X-Series RF analog signal generator

Reach better performance



The pure and precise MXG X-Series signal generators are fine-tuned to be your "golden transmitter" in R&D. Whether you're pushing for a linear RF chain or an optimized link budget, MXG models deliver what you need: phase noise, output power, and more.

– Test radar receiver sensitivity or characterize ADCs
– Characterize nonlinear PA behavior

EXG X-Series RF analog signal generator

Achieve faster throughput



The cost-effective EXG X-Series signal generators are optimized for manufacturing test. Analog models provide the signals you need for basic parametric testing of components, functional verification of receivers, and virtually anything in between.

– Verify receiver performance by simulating complex analog modulation scenarios
– Maximize throughput with < 800 µs of frequency and power switching

To reduce cost of ownership, the X-Series signal generators are designed for high reliability and fast, easy calibration, service, and repair.

	MXG: N5181B RF analog	EXG: N5171B RF analog	CXG: N5166B RF vector
Frequency range	9 kHz to 3 or 6 GHz	9 kHz to 1, 3 or 6 GHz	9 kHz to 3 or 6 GHz
Phase noise (20 kHz offset)	–146 dBc/Hz at 1 GHz	–122 dBc/Hz at 1 GHz	–119 dBc/Hz typical
Spurious (non-harmonic)	–96 dBc at 1 GHz	–72 dBc at 1 GHz	–72 dBc at 1 GHz
Output power (1 GHz)	+26 dBm	+26 dBm	+18 dBm
Switching speed	≤ 800 µs	≤ 800 µs	5 ms
Internal IQ modulation			60 or 120 MHz
Features	LF function generator, Step/list sweep USB power meter, PathWave BenchVue software supported		Narrow pulse modulation Custom digital modulation
	AM, FM, PM, Pulse, Pulse train		

N9310A signal generator

Professional performance and compact size for general-purpose testing needs

- Ideal for benchtop R&D, education, field measurements, and manufacturing
- 9 kHz to 3 GHz frequency coverage with 0.1 Hz resolution
- Rugged body, large display and full-size front panel
- USB connectivity for test automation and memory stick support
- Extensive analog modulation: AM, FM, phase, & pulse modulation
- Optional I/Q modulator (40 MHz RF bandwidth)
- Optional precision frequency reference



KEYSIGHTCARE

U8903B performance audio analyzer

Measure and quantify analog and digital audio signals with a single box

- Combined functionality of a distortion meter, SINAD meter, frequency counter, AC voltmeter, DC voltmeter and FFT analyzer with a low-distortion audio source
- Configure 2 to 8 analog analyzer channels
- Two-in-one digital card covers AES3, SPDIF and DSI formats
- Measure speech quality with PESQ and POLQA options
- Measure audio quality directly from *Bluetooth* signal



KEYSIGHTCARE

USB and LAN Power Sensors



USB power sensors plug directly into your PC or enabled Keysight instrument and give you the capability to measure power in a compact and portable form factor. All models feature internal zeroing to eliminate external calibration. Setup is fast and easy; just connect and start measuring immediately with PathWave BenchVue software.

U/L2050/60 X-Series USB/LAN peak and average wide dynamic range power sensors

- 10 MHz to 6/18/33/40/50/54/67 GHz; wide power range, from –70 to +0/26 dBm
- Extremely fast measurement speed of 50,000 readings per second
- LAN/power over Ethernet (PoE) based sensor with thermal vacuum option (U2049XA-TVA, or L2065/66/67XT LAN power sensor)

U2020 X-Series USB peak and average power sensors

- 50 MHz to 18/40/50 GHz; –45 to +20 dBm power range
- Fast pulse analysis with 30 MHz video bandwidth
- Greater than 25,000 readings per second

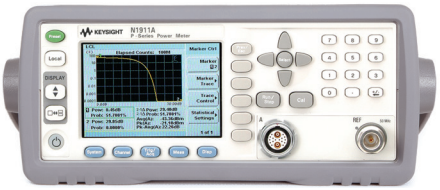
U8480 Series USB thermocouple power sensors

- Wide frequency range DC/10 MHz to 18/33/50/67/120 GHz; –35 to +20 dBm power range
- Fastest available thermal power sensor
- Reference level accuracy with linearity less than 0.8 percent

U2000 Series USB average power sensors

- 9 kHz to 6/18/24/26 GHz
- –60 to +20 dBm or -30 to +44 dBm power range

Power Meters



P-Series N1911/12A (single-channel/dual-channel)

- Key measurements: peak, average, peak-to-average ratio, rise time, fall time, and pulse width
- 30 MHz video bandwidth; 13 ns rise/fall time
- Single-shot real-time capture at 100 Msamples per second
- 22 predefined signal formats, including LTE
- USB, LAN and GPIB standard; LXI Core compliant



EPM Series N1913/14B (single-channel/dual-channel)

- Color LCD screen with Keysight color code front panel
- Compatible with all legacy average (except thermistor) and all USB power sensors (including USB peak power sensors with limited to average power measurement)
- Multi-channel power measurement up to 4 (2 legacy + 2 USB power sensors)
- USB, LAN, and GPIB standard; LXI Core compliant

Use these compatible sensors with your Keysight power meters

	Model number	N8480 Series sensors	P-Series sensors	E-Series E9320 sensors	E-Series E9300 sensors	E-Series CW sensors	8480D Series sensors	E/V/W8486A waveguide sensors
P-Series	N1912A	–35 to +20 dBm –5 to +44 dBm	–35 to +20 dBm	–65 to +20 dBm	–60 to +20 dBm –30 to +44 dBm	–70 to +20 dBm	–70 to –20 dBm	–70 to –20 dBm –35 to +20 dBm
	N1911A							
EPM Series	N1914A		N/A	N/A				
	N1913A							
	E4417A			–65 to +20 dBm				
	E4416A							

Eliminate the Weak Links in Your Measurement System

RF and microwave manual and programmable step attenuators

- Fast, precise signal-level control up to 50 GHz
- High reliability and exceptional repeatability reduces downtime
- Attenuation range of 121 dB in 1 dB steps



Fixed attenuators

- Precise attenuation, flat frequency response, and low SWR over broad frequency range up to 67 GHz

Model	Frequency range (DC to)	Type	Attenuation
8494G	4 GHz	Programmable	0 to 11 dB, 1 dB steps
8491A	12.4 GHz	Fixed	3, 6, 10, 20, 30, 40, 50, 60 dB
8495B	18 GHz	Manual	0 to 70 dB, 10 dB steps
8495D	26.5 GHz	Manual	0 to 110 dB, 10 dB steps

Model	Frequency range (DC to)	Type	Attenuation
84904L	40 GHz	Programmable	0 to 11 dB, 1 dB steps
8490G	67 GHz	Fixed	3, 6, 10, 20, 30, 40 dB
J7204/5 A/B	6/18 GHz	One box 4/5 channels	0 to 121 dB, 1 dB steps

J7201A/B/C attenuation control units, DC to 6/18/26.5 GHz, 0 to 101/121 dB, 1 dB steps

- Attenuation sweep function defines the sweep time (- 50 ms to 10 s; 50 ms incremental), number of cycles and step size
- Relative attenuation step function
- Attenuation steps - 0 dB to 101/121 dB, 101/121 dB to 0 dB for the preset number of cycles (1 to 1000)
- 0.03 dB insertion loss repeatability



NEW U9422A/B/C SPDT, U9424A/B/C SP4T, and U9428A/B/C SP8T FET Solid State Switches, 300 kHz to 26.5/50/54 GHz

- Broad operating frequency range from 300 kHz to 26.5/50/54 GHz
- Prevent damage to sensitive components with low video leakage
- Flexible USB with multiport configuration to PXIe and USB VNA, or solder options



U7104/6E/N/F, U7108/10A/B/C

- Broad selection of configuration SP4T, SP6T, SP8T and SP10T with operating frequency from DC to 9/20/26.5/50/54/67 GHz
- Superior isolation of more than 65 dB to 67 GHz and low VSWR
- Extend the number of test ports and achieve lower cost-per-port test without compromising performance for multi-DUT or multiport device measurement



E5061B ENA Series vector network analyzer



- Choose 50 Ω or 75 Ω inputs
- Hardware options 3L3, 3L4/3L5 for applications, including power integrity
- Down to 5 Hz frequency
- Combine network and impedance analysis (+Option 005)
- PathWave BenchVue software supported

E5063A ENA vector network analyzer



- Many frequency options, upgradable at any time
- Option 011 for PCB manufacturing test
- Six languages supported via softkey
- Help in English/Simplified Chinese
- All Keysight calibration kits supported, including ECal modules
- PathWave BenchVue software supported

P937xA/B and P938xB vector network analyzers



- Most compact VNA for easy sharing between test locations
- Wide choice of frequency ranges up to 44 GHz
- Ability to extend the number of test ports (max 8-port)
- Measurements, automated code capabilities, calibration metrology and intuitive GUI are the same as trusted Keysight VNAs
- Support of Electronic Calibration (ECal) modules for easy and quick calibration

	E5061B	E5063A	P937xA	P937xB / P938xB
Form factor	Benchtop	Benchtop	Compact	Compact
Test port	2-port 50 Ω or 75 Ω	2-port 50 Ω	2-port 50 Ω	2-port 50 Ω (P937xB), 4-port 50 Ω (P938xB)
Connector type	Type-N	Type-N	3.5 mm	3.5 mm (up to 26.5 GHz), 2.4 mm (44 GHz)
Minimum frequency	5 Hz (Option 3L3/3L4/3L5) 100 kHz (Option 1xx/2xx)	100 kHz (Settable to 50 kHz)	300 kHz	9 kHz (up to 20 GHz models), 100 kHz (above 20 GHz models)
Maximum frequency	0.5, 1.5, 3 GHz	0.5, 1.5, 3, 4.5, 6,5, 8.5, 14, 18 GHz	4.5, 6.5, 9, 14, 20, 26.5 GHz	4.5, 6.5, 9, 14, 20, 26.5, 44 GHz (P937xB) 9, 20 GHz (P938xB)
Dynamic range	120 dB (spec.)	117 dB (spec.), 122 dB (typ.)	115 dB (spec.), 122 dB (typ.)	115 dB (spec.), 122 dB (typ)
Cycle time (2-port measurements, 201 points, narrowband)	21 msec	19 msec	23 msec	15 msec

ECal Modules

Achieve faster calibration with zero wait time using the Keysight ECal modules with three series offering a choice of frequency and connections.

NEW 8509xD Series electronic calibration modules (ECal)

- 2-ports, frequency coverage from DC/300 kHz to 6/7.5/9 GHz frequency range.
- Connector choices of type Type-N (50 ohm), Type-N (75 Ohm), 3.5 mm, 7-16, 4.3-10, Type F (75 ohm) with mixed connector option available for one of the port.
- USB interface for direct control with PNA, ENA, PXIe and Streamline series of network analyzers.
- Precision, accurate transfer standards of calibration
- Supported by trusted Keysight vector network analyzer



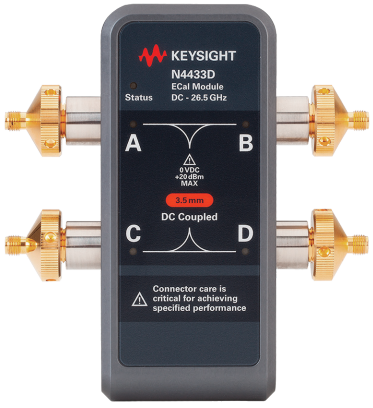
N7550 Series electronic calibration modules (ECal)

- Frequency coverage from DC to 4, 6.5, 9, 14, 18, 26.5 GHz
- Supports Type-N and 3.5 mm connectors
- Smaller, lighter 2-port ECal module
- Zero wait time for faster calibration
- Convenience of ECal with the performance of an economy mechanical kit



N443xD Series electronic calibration modules (ECal)

- 4-ports, frequency coverage from DC to 13.5, 18, 26.5 GHz
- Connector choices of Type-N, 3.5 mm, 7-16, 4.3-10
- Efficient single calibration standard
- Precision, accurate transfer standards
- Supported by Keysight vector network analyzers



Power Supply Collection

Low-noise, accuracy and speed

Our broad selection of both bench-friendly and system-ready instruments meet your test challenges from basic to your most complex.

DC bench power supplies

E3600 Series	E36100 Series	E36300 Series	E36200 Series	E36150 Series
				
– 15 models – 1 or 2 outputs – 30 to 200 W – A model for every application	– 5 models – 1 output – 30 to 40 W – Testing low power devices	– 3 models – 3 outputs – 80 or 160 W – Power and characterizing devices	– 4 autoranging models – 1 or 2 outputs – 200 or 400 W – Mid-power characterization	– 2 autoranging models – 1 output – 800 W – High power and advanced features

DC system power supplies

N6700 Modular Series	N5700 Series	N8700 Series	N8900 Series
			
– 35+ modules – 1 to 4 outputs per mainframe – 50 to 500 W per output – Modular flexible to expand and change with your testing needs over time	– 24 models – 1 output – 750 or 1500 W – Meets your test needs up to 1500 W in a compact 1 U size	– 21 models – 1 output – 3300 or 5200 W – Meets your high-power test needs in a compact size	– 28 models – 1 output – 5000, 10000, or 15000 W – Flexibility to expand up to 100 kW to meet your highest power test needs

DC power analyzer and sources

N6705 DC power analyzer	B2961/62B low-noise source	B2900B/BL source measure units
		
– 35+ modules – 1 to 4 outputs – 50 to 500 W per output – Characterize your devices in real-time without a PC	– 2 models – 1 or 2 output – 6.5 digit resolution – Component testing, low noise voltage/current source 10 µVrms	– 6 models – 1 or 2 output – 5.5 or 6.5 digit resolution – Component I-V measurements without PC programming

Power Supplies

Keysight offers more than 300 power products to meet your specific needs

The Keysight Power Products Selection Guide helps you choose your instrument by the number of outputs, output power characteristics, packaging, special features and application specific solutions.

www.keysight.com/find/PowerBrochureDisty



E36100B Series DC power supplies

Designs change — and so should your DC power supply. Meet the E36100, engineered to power your designs safely during manual tests or automated sequences.

- Choose the best model for your needs: five models offer up to 5 A or 100 V
- Save space on your bench, 2U ¼-form factor
- Connect for computer control with standard LAN (LXI Core) and USB connectivity
- Easily view the high-contrast OLED display from anywhere on your bench, even from a sharp angle



Model	Voltage	Current	Power
E36102B	6 V	5 A	30 W
E36103B	20 V	2 A	40 W
E36104B	35 V	1 A	35 W
E36105B	60 V	0.6 A	36 W
E36106B	100 V	0.4 A	40 W

E3600 Series DC power supplies

Reliable power, repeatable results

For environments that need to watch test costs as closely as they watch test results.

- Extremely low output noise—as low as 1 mV_{pp}/0.2 mVrms
- Tight 0.01% load and line regulation for steady output power levels
- Fast load transient response time (<50 µs)
- 15 models from 30 to 200 W output power, 2-3U high
- Convenient front-panel, GPIB, and RS-232 programming (except on E3620A and E3630A)



E3640A

Model	Output	Range	Voltage	Current	Power
E3632A	1	2	15 V 30 V	7 A 4 A	120 W
E3633A	1	2	8 V 20 V	20 A 10 A	200 W
E3634A	1	2	25 V 50 V	7 A 4 A	200 W
E3620A	2	1	25 V	1 A	50 W
E3630A	3	1	6 V 20 V -20 V	2.5 A 0.5 A 0.5 A	35 W
E3640A	1	2	8 V 20 V	3 A 1.5 A	30 W
E3641A	1	2	35 V 60 V	0.8 A 0.5 A	30 W
E3642A	1	2	8 V 20 V	5 A 2.5 A	50 W
E3643A	1	2	35 V 60 V	1.4 A 0.8 A	50 W
E3644A	1	2	8 V 20 V	8 A 4 A	80 W
E3645A	1	2	35 V 60 V	2.2 A 1.3 A	80 W
E3646A	2	2	8 V 20 V	3 A 1.5 A	60 W
E3647A	2	2	35 V 60 V	0.8 A 0.5 A	60 W
E3648A	2	2	8 V 20 V	5 A 2.5 A	100 W
E3649A	2	2	35 V 60 V	1.4 A 0.8 A	100 W

E36300A Series DC power supplies

With low output ripple/noise and accurate voltage/current measurement, you can test with confidence — and power your next insight.

- Triple output power supply with independent or tracking outputs
- Low output ripple and noise: < 2 mVpp/350 µVrms
- Data logging plus output sequencing and coupling
- Modern I/O (USB, LAN and optional GPIB)



E36200A Series DC power supplies

Autoranging architecture provides more current at all voltage setting. More usable power means that these 200 and 400 W supplies can test your power hungry devices.

- Single or dual outputs. Dual outputs can be internally combined into a single output with 400 W
- Low output ripple and noise: < 350 µVrms
- Data logging plus output sequencing and coupling
- Modern I/O (USB, LAN and optional GPIB)



NEW E36150A Series DC high-power supply

Built for performance with advanced characterization capabilities to meet your high-power test requirements. The E36150A Series offers great performance at an affordable price.

- Two autoranging modes, 30V/80A and 60V/40A
- Detachable high current front binding post for safe/easy wire connection
- Peak power handling
- Software options: PathWave PS App with BenchVue Test Flow, and BV9200/1B Pathwave BenchVue Advance Power Control and Analysis
- Scope view (option), and AWG (option)



Model	Power	Outputs	DC output Rating (0 to 40 °C)	
E36300A Series				
E36311A	80 W	1	0 to 6 V	0 to 5 A
		2	0 to +25 V	0 to 1 A
		3	0 to –25 V	
E36312A	80 W	1	0 to 6 V	0 to 5 A
		2	0 to 25 V	0 to 1 A
		3		
E36313A	160 W	1	0 to 6 V	0 to 10 A
		2	0 to 25 V	0 to 2 A
		3		
E36200A Series				
E36231A	200 W	1	0 to 30 V	0 to 20 A
E36232A			0 to 60 V	0 to 10 A
E36233A	400 W	1	0 to 30 V	0 to 20 A
		2		
E36234A	400 W	1	0 to 60 V	0 to 10 A
		2		
E36150A Series				
E36154A	800 W	1	0 to 30 V	0 to 80 A
E36155A			0 to 60 V	0 to 40 A

N6700 low-profile modular power system

Accelerate ATE with small, flexible, fast DC power



- Small size: up to 4 power supply outputs and/or electronic load inputs in 1U of rack space
- Streamline tasks with built-in measurements, output sequencing, flexible triggering and digital I/O; LIST mode for user-defined arbitrary waveforms (module dependent)
- Fast output response and command processing (<1 ms)
- Perform remote programming with USB, LAN, and GPIB



LXI

Mainframes

Model	Description
N6700C	Low-profile MPS (400 W)
N6701C	Low-profile MPS (600 W)
N6702C	Low-profile MPS (1200 W)

Modules

Model	Type	Maximum power	Voltage	Current	Number of slots used	Number of ranges	Ripple & noise (Vp-p)	Programming accuracy	Up or down programming time with load (typical)
N6731B	Basic	50 W	0-5 V	0-10 A	1	1	10 mV	0.1% + 19 mV	20 ms
N6732B		50 W	0-8 V	0-6.25 A			12 mV	0.1% + 19 mV	
N6733B		50 W	0-20 V	0-2.5 A			14 mV	0.1% + 20 mV	
N6734B		50 W	0-35 V	0-1.5 A			15 mV	0.1% + 35 mV	
N6735B		50 W	0-60 V	0-0.8 A			25 mV	0.1% + 60 mV	
N6736B		50 W	0-100 V	0-0.5 A			30 mV	0.1% + 100 mV	
N6741B		100 W	0-5 V	0-20 A			20 mV	0.1% + 19 mV	
N6742B		100 W	0-8 V	0-12.5 A			12 mV	0.1% + 19 mV	
N6743B		100 W	0-20 V	0-5 A			14 mV	0.1% + 20 mV	
N6744B		100 W	0-35 V	0-3 A			15 mV	0.1% + 35 mV	
N6745B		100 W	0-60 V	0-1.6 A			25 mV	0.1% + 60 mV	
N6746B		100 W	0-100 V	0-1 A			30 mV	0.1% + 100 mV	
N6773A		300 W	0-20 V	0-15 A			20 mV	0.1% + 20 mV	
N6774A		300 W	0-35 V	0-8.5 A			22 mV	0.1% + 35 mV	
N6775A		300 W	0-60 V	0-5 A			35 mV	0.1% + 60 mV	
N6776A		300 W	0-100 V	0-3 A			45 mV	0.1% + 100 mV	
N6777A		300 W	0-150 V	0-2 A			68 mV	0.1% + 150 mV	
N6751A	Performance	50 W	0-50 V	0-5 A	1	Autoranging	4.5 mV	0.06% + 19 mV	0.2 ms
N6752A		100 W	0-50 V	0-10 A	1		4.5 mV	0.06% + 19 mV	0.2 ms
N6753A		300 W	0-20 V	0-50 A	2		5 mV	0.06% + 10 mV	0.4 ms
N6754A		300 W	0-60 V	0-20 A	2		6 mV	0.06% + 25 mV	0.35 ms
N6755A		500 W	0-20 V	0-50 A	2		5 mV	0.06% + 10 mV	0.5 ms
N6756A		500 W	0-60 V	0-17 A	2		6 mV	0.06% + 25 mV	0.7 ms
N6761A	Precision	50 W	0-50 V	0-1.5 A	1	Autoranging	4.5 mV	0.016% + 6 mV	0.6 ms
N6762A		100 W	0-50 V	0-3 A	1		4.5 mV	0.016% + 6 mV	0.6 ms
N6763A		300 W	0-20 V	0-50 A	2		5 mV	0.03% + 5 mV	0.4 ms
N6764A		300 W	0-60 V	0-20 A	2		6 mV	0.03% + 12 mV	0.35 ms
N6765A		500 W	0-20 V	0-50 A	2		5 mV	0.03% + 5 mV	0.5 ms
N6766A		500 W	0-60 V	0-17 A	2		6 mv	0.03% + 12 mV	0.7 ms
N6781A	Source Measure Unit (SMU)	20 W	0-20 V	0±3 A	1	Multiple	12 mV	0.025% + 200 µV	15-300 µs
N6782A		20 W	0-20 V	0±3 A	1		12 mV	0.025% + 200 µV	
N6784A		20 W	0±20 V	0±3 A	1		12 mV	0.025% + 200 µV	
N6785A		80 W	0-20 V	0±8 A	2		15 mV	0.025% + 1.8 mV	12-300 µs
N6786A		80 W	0-20 V	0±8 A	2		15 mV	0.025% + 1.8 mV	
N6791A	DC Electronic Load	100 W	0-60 V	0-20 A	1	Multiple	N/A	0.03% + 7.2 mV	N/A
N6792A		200 W	0-60 V	0-40 A	2		N/A	0.03% + 7.2 mV	N/A

N5700 and N8700 Series DC system power supplies

Basic high-power, single output power supplies

- 45 affordable models in compact 1U (750 and 1500 W) and 2U (3.3 and 5 kW) packages
- Built-in measurements and advanced programming features simplify system design
- Perform remote programming with USB, LAN, and GPIB



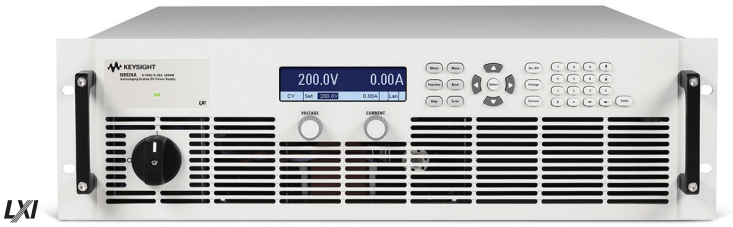
750 W models		1500 W models		3.3 kW models		5 kW models	
N5741A	0-6 V, 0-100 A, 600 W	N5761A	0-6 V, 0-180 A, 1080 W	N8731A	0-8 V, 0-400 A, 3200 W	N8754A	0-20 V, 0-250 A, 5000 W
N5742A	0-8 V, 0-90 A, 720 W	N5762A	0-8 V, 0-165 A, 1320 W	N8732A	0-10 V, 0-330 A, 3300 W	N8755A	0-30 V, 0-170 A, 5100 W
N5743A	0-12.5 V, 0-60 A, 750 W	N5763A	0-12.5 V, 0-120 A, 1500 W	N8733A	0-15 V, 0-220 A, 3300 W	N8756A	0-40 V, 0-125 A, 5000 W
N5744A[1]	0-20 V, 0-38 A, 760 W	N5764A[1]	0-20 V, 0-76 A, 1520 W	N8734A	0-20 V, 0-165 A, 3300 W	N8757A	0-60 V, 0-85 A, 5100 W
N5745A	0-30 V, 0-25 A, 760 W	N5765A[1]	0-30 V, 0-50 A, 1500 W	N8735A	0-30 V, 0-110 A, 3300 W	N8758A	0-80 V, 0-65 A, 5200 W
N5746A	0-40 V, 0-19 A, 760 W	N5766A[1]	0-40 V, 0-38 A, 1520 W	N8736A	0-40 V, 0-85 A, 3300 W	N8759A	0-100 V, 0-50 A, 5000 W
N5747A[1]	0-60 V, 0-12.5 A, 750 W	N5767A[1]	0-60 V, 0-25 A, 1500 W	N8737A[1]	0-60 V, 0-55 A, 3300 W	N8760A	0-150 V, 0-34 A, 5100 W
N5748A	0-80 V, 0-9.5 A, 760 W	N5768A	0-80 V, 0-19 A, 1520 W	N8738A	0-80 V, 0-42 A, 3300 W	N8761A	0-300 V, 0-17 A, 5100 W
N5749A	0-100 V, 0-7.5 A, 750 W	N5769A	0-100 V, 0-15 A, 1500 W	N8739A	0-100 V, 0-33 A, 3300 W	N8762A	0-600 V, 0-8.5 A, 5100 W
N5750A[1]	0-150 V, 0-5 A, 750 W	N5770A[1]	0-150 V, 0-10 A, 1500 W	N8740A	0-150 V, 0-22 A, 3300 W		
N5751A	0-300 V, 0-2.5 A, 750 W	N5771A	0-300 V, 0-5 A, 1500 W	N8741A	0-300 V, 0-11 A, 3300 W		
N5752A	0-600 V, 0-1.3 A, 780 W	N5772A	0-600 V, 0-2.6 A, 1560 W	N8742A	0-600 V, 0-5.5 A, 3300 W		

1. Non-GPIB option are available for these models. Not available in Korea.

N8900 Series autoranging high-power system supplies

Do the job of multiple power supplies with a single high-power autoranging DC power supply

- 5, 10 and 15 kW single output, autoranging programmable DC power for Automated Test Equipment (ATE) applications
- 28 models that offer up to 1500 V or 510 A
- Easily parallel to create "one" power supply with up to 100 kW of power
- Director/follower (group) operation, 10 store/recall states, Web server



N8924A

DC output ratings

5 kW models (1 phase line-to line)			10 kW models (L1, L2, L3, PE)			15 kW models (L1, L2, L3, PE)		
N8920A	80 V, 170 A	208 VAC (187 – 229 VAC)	N8925A	80 V, 340 A	208 VAC (187 – 229 VAC)	N8931A	80 V, 510 A	208 VAC (187 – 229 VAC)
N8921A	200V, 70 A		N8926A	200V, 140 A		N8932A	200V, 210 A	
N8923A	500V, 30 A		N8928A	500V, 60 A		N8934A	500V, 90 A	
N8924A	750 V, 20 A		N8929A	750 V, 40 A		N8935A	750 V, 60 A	
			N8930A	1000 V, 30 A		N8937A	1500 V, 30 A	
N8940A	80 V, 170 A	400 VAC (360 – 440 VAC)	N8945A	80 V, 340 A	400 VAC (360 – 440 VAC)	N8951A	80 V, 510 A	400 VAC (360 – 440 VAC)
N8941A	200V, 70 A		N8946A	200V, 140 A		N8952A	200V, 210 A	
N8943A	500V, 30 A		N8948A	500V, 60 A		N8954A	500V, 90 A	
N8944A	750 V, 20 A		N8949A	750 V, 40 A		N8955A	750 V, 60 A	
			N8950A	1000 V, 30 A		N8957A	1500 V, 30 A	

B2960B Series low-noise power sources

Best-in-class noise performance

- Ultra-low noise performance with the external low-noise filter (10 µVrms)
- High sourcing resolution (6.5 digit, 100 nV / 10 fA)
- Innovative sourcing capability and superior GUI

www.keysight.com/find/B2960



B2962B

Model	B2961B/62B Low Noise Power Source	N1298C Low Noise Filter	N1298B Ultra-Low Noise Filter	N1298A High Current Ultra-Low Noise Filter
Number of channels	1 or 2			
Maximum voltage	210 V		42 V	21 V
Maximum current (DC)	3.03 A		105 mA	500 mA
Output noise (10 Hz to 20 MHz)	3 mVrms	350 µVrms	10 µVrms	
Measurement resolution	4.5 digit			

B2900B/BL Series source measure unit (SMU)

Best-in-class source and measurement performance

- Innovative graphical user interface: I-V measurement without PC programming
- High sourcing and measurement resolution 10 fA/100 nV
- Wide output range (210 V / 3 A DC / 10.5 A pulse)
- Complimentary software control options for your application needs

www.keysight.com/find/B2900



B2912B

Model	B2901BL	B2910BL	B2901B	B2902B	B2911B	B2912B
Number of channels	1	1	1	2	1	2
Maximum voltage	21 V	210 V				
Maximum current (DC)	1.5 A		3.03 A			
Output resolution	5.5 digit				6.5 digit	
Output noise (10 Hz to 20 MHz)	3 mVrms					
Measurement resolution	6.5 digit					

N6705C DC power analyzer and N6781/85A SMUs

Use the N6705C DC power analyzer for sourcing and measuring DUT DC voltage and current.

- Integrates capabilities of up to four power supplies along with DMM, scope, ARB and data logger
- Select any combination of N6700 Series modules (page 39)
- Pair with BV9200B PathWave BenchVue software to control and analyze measurements from up to four N6705 mainframes (16 power supplies) from a PC.


BV9210B PathWave BenchVue Software N6705C

The N6781A and N6785A two-quadrant SMUs will power,characterize, and test battery-powered devices like smart phones.

- Stable, glitch-free sourcing and sinking (charge/eLoad)
- Seamless dynamic measurements down to nA
- Utilize with BV9210B PathWave BenchVue software to perform battery profiling and emulation, current drain analysis, and cycle testing. Software also works with N6700C, N6701C, and N6702C low-profile mainframes.


N6781A N6785A

EL30000 Series Bench DC Electronic Loads

The EL30000 Series bench DC electronic loads provide superior performance in compact bench form factor.

- Test up to 600 W, 1 or 2 inputs
- Operate in constant current (CC), constant voltage (CV), contant resistance (CR), constant power (CP) modes
- Make accurate measurements with excellent programming/feedback accuracy
- Perform static and dynamic tests
- View measurements on a 4.3 inch LCD color display
- Transfer data via USB drive, LAN, USB, or optional GPIB
- Conduct precise analysis with built-in scope and data logger





Model	Number of inputs	Input power	DC input voltage	DC input current
EL34143A	1	350 W	150 V	60 A
EL34243A	2	600 W	150 V	60 A per input, 120 A parallel

N6790A DC electronic load modules for N6700-series

N6791A 100 W and N6792A 200 W load can be used in a system with the N6700C/01C/02C modular power supply or on the bench with the N6705C DC Power Analyzer. Characterize power supplies, batteries, supercapacitors, and PV cells using your existing modular power supply.

- Combine power supply outputs and electronic loads in 1 U rack space
- Built-in data logger records voltages and currents eliminating the need for an external oscilloscope or multimeter.
- Constant resistance (CR), constant current (CC), constant voltage (CV), constant power (CP)



N6791A



N6792A

Model	Maximum power	Voltage	Current	Number of slots used	Number of ranges
N6791A	100 W	60 V	20 A	1	2
N6792A	200 W	80 V	40 A	2	2

N3300 Series DC electronic loads

Fast electronic loads that accelerate manufacturing test

- Choose from two mainframes: The N3300A mainframe is full-rack width with 6 slots and the N3301A mainframe is half-rack width with 2 slots
- Mix and match up to 6 modules as single, parallel, or series outputs for up to 1800 W in a single mainframe
- Measure voltage and current simultaneously in constant current (CC), constant voltage (CV), and constant resistance (CR) mode
- Observe transient behavior using waveform digitization and 4,096 data point buffer



N3300A

Input ratings	N3302A	N3303A	N3304A	N3305A	N3306A	N3307A
Current	0–30 A	0–10 A	0–60 A	0–60 A	0–120 A	0–30 A
Voltage	0–60 V	0–240 V	0–60 V	0–150 V	0–60 V	0–150 V
Maximum power at 40 °C	150 W	250 W	300 W	500 W	600 W	250 W

AC6800B and 6800C Series Basic and Performance AC Power Sources

Engineer dependability into your designs with stable, reliable AC power

Test your designs with confidence, knowing that your products will perform as designed—even if they encounter fluctuating voltages from the AC power grid, extreme inrush currents, or transient spikes. Keysight's two families of AC power sources provide the capabilities you need for thorough AC testing, from basic power to more sophisticated source and measurement needs.

Both families also produce DC power, either alone or as a DC offset to an AC waveform.



AC6800 Series

6800C Series

AC6800B Series basic AC sources

A basic AC source alternative featuring stable and reliable power

- Four models, up to 4000 VA
- Intuitive user interface—if you've used a Keysight DC power supply, these will feel very familiar to you
- Flexible I/O: USB and LAN (standard), and GPIB (optional)
- Access and control the source remotely using a standard Web browser

6800C Series performance AC sources/analyzers

The complete AC power test solution

- Three models, up to 1750 VA
- Virtual front panel
- Extensive power measurement capabilities
- I/O: USB, LAN, GPIB and RS-232
- Built-in arbitrary waveform generator to simulate many types of power waveforms

	AC6800B Series Basic AC Sources				6800C Series Performance AC Sources		
	AC6801B	**AC6802B**	**AC6803B**	**AC6804B**	**6811C**	**6812C**	**6813C**
Phases	Single-phase						
Maximum output power	500 VA	1000 VA	2000 VA	4000 VA	375 VA	750 VA	1750 VA
AC output mode							
Voltage range	155 Vrms/310 Vrms				300 Vrms		
Maximum rms current	5 A/2.5 A	10 A/5 A	20 A/10 A	40 A/20 A	3.25 A	6.5 A	13 A
Maximum peak current	15 A/7.5 A	30 A/15 A	60 A/30 A	120 A/60 A	40 A	40 A	80 A
Frequency	40 to 500 Hz				45 Hz to 1 kHz		
DC output mode							
Voltage range	219 V/438 V				425 V		
Max current	4 A/2 A	8 A/4 A	16 A/8 A	32 A/16 A	2.5 A	5 A	10 A
Max instantaneous current	12 A/6 A	24 A/12 A	48 A/24 A	96 A/48 A	40 A	40 A	80 A
Power capacity	400 W	800 W	1600 W	3200 W	285 W	575 W	1350 W
Measurements and I/O							
Measurements	Voltage, current, power				Voltage, current, power		
Transients and advanced measurements	N/A Basic transient capability via optional analog card (AC68ALGU)				Includes preprogrammed standard waveforms and transient generation system		
					AC source analyzer graphical user interface		
I/O	USB and LAN/LXI Core with remote Web interface Optional GPIB (AC68GPBU)				USB, LAN/LXI Core, GPIB, RS-232, and remote Web interface		

LCR Meters

Keysight LCR meters provide the best combination of accuracy, speed, and versatility at affordable prices for both R&D and production applications.

E4980A/AL precision LCR meter

Industry-leading combination of accuracy, speed, versatility and upgradability



- Exceptionally low noise at both low and high impedance
- 20 Hz to 2 MHz, test frequency with 4-digit resolution (E4980A)
- 20 Hz to 300 kHz / 500 kHz / 1 MHz, test frequency with 4-digit resolution (E4980AL)
- Frequency upgradable to 500 kHz or 1 MHz (E4980AL)
- 0.05% basic impedance accuracy
- 5.6 ms (SHORT), 88 ms (MED) at 1 MHz (E4980A)
- 12 ms (SHORT), 118 ms (MED) at 1 MHz (E4980AL)
- 20 Vrms test signal, 40 V DC bias, (and DC source with E4980A Option 001)
- 201-point programmable list sweep. Sweep type: frequency, OSC level, DC bias, (and DC source with E4980A Option 001)
- Open/short/load compensation
- Available material measurement software N1500A-006
- PathWave BenchVue software supported

E4981A capacitance meter

Fast, accurate, and repeatable measurement



- Ideal for reliable high-speed measurements for high-volume ceramic capacitor manufacturing
- 120 Hz / 1 kHz / 1 MHz test frequencies (E4981A-001)
- 120 Hz / 1 kHz test frequencies (E4981A-002)
- High-speed measurement: 2.3 ms (1 MHz), 3.0 ms (1 kHz), 11.0 ms (120 Hz)
- Accurate C-D testing: 0.07%, 0.0005

E4982A LCR meter

Best performance for the passive component manufacturing such as SMD inductors and EMI filters



- Four frequency options: 1 MHz to 300 MHz / 500 MHz / 1 GHz / 3 GHz, upgradable
- High-speed measurement: 0.9 ms (Mode 1), 2.1 ms (Mode 2), 3.7 ms (Mode 3)
- 0.8% basic accuracy with unparalleled measurement repeatability
- Wide impedance measurement range from 140 mΩ to 4.8 kΩ
- 1 kHz frequency resolution

Handheld Digital Multimeters

Rich features and robust design for real-world conditions

- Up to 60,000 counts and 0.025% basic DCV accuracy, accurate true-RMS AC measurements and up to 800 hours of battery life (U1280 Series)
- High-contrast OLED display with 160° viewing angle (U1273AX, U1273A, U1253B)
- Re-invented with ergonomic design and dust- and water-resistant with IP 67 (U1240C, U1280 Series), and operating temperature as low as -40 °C (U1273AX)
- CAT III 1000 V and CAT IV 600 V over-voltage protection (U1240, U1240C, U1250, U1270 and U1280 Series)



Recommended for	Model	Counts	Bandwidth	Voltage AC/DC	Current AC/DC	Battery life	Additional features	Additional features
Electrical, HVAC and utilities	U1231A	6,000	1 kHz	600 mV to 600 V	NA	500 hours	Built-in flashlight, continuity alert with flashing backlight, Z_{Low}	N/A
	U1232A				60 µA to 10 A			
	U1233A							V_{sense}*
Installation and maintenance	U1241B	10,000	2 kHz	1 V to 1000 V	1 mA to 10 A	300 hours	Switch counter	N/A
	U1242B							Harmonic ratio, dual and differential temperature measurements
	U1241C			100 mV to 1000 V		400 hours	Built-in LED flashlight	N/A
	U1242C							Harmonic ratio, dual and differential temperature measurements, V_{sense}*, Z_{Low}
Electronics troubleshooting	U1251B	50,000	30 kHz	50 mV to 1000 V	500 µA to 10 A	72 hours	NA	N/A
	U1252B		100 kHz			36 hours	20 MHz frequency counter, programmable square wave generator	
	U1253B					8 hours**		
Industrial	U1271A	30,000	20 kHz	300 mV to 1000 V	300 µA to 10 A	300 hours	Low pass filter High altitude rated (3000 m)	AC and/or DC voltage check
	U1272A		100 kHz	30 mV to 1000 V				Low impedance mode, offset compensation
	U1273A/AX					30–60 hours		
Electronics troubleshooting	U1281A	60,000	30 kHz	60 mV to 1000 V	600 µA to 10 A	800 hours	N/A	
	U1282A		100 kHz				Frequency counter, square wave output, V_{sense}*, low pass filter	

*V_{sense} is a non-contact voltage detector. ** Rechargeable.

The Remote Link solution

Safely measure, view and log test measurements up to 100 meters away from your handheld meter by simply plugging in the U1117A IR-to-*Bluetooth* adapter. Display results on the U1115A remote logging display or Windows PCs, or iOS/Android-based smart devices.

Only shippable to countries with country type approval, refer to the product page for more information.



U1700 Series handheld capacitance and LCR meters

Save time with auto-ID and one-button access

- Auto-identification of L, C and R; and detailed component analysis with DCR, Z, ESR, D, Q and θ functions.
- Tolerance and compare modes for quick component sorting
- One-button access to measurements



U1733C

	U1701B	U1731C	U1732C	U1733C
Counts	11,000	20,000	20,000	20,000
Capacitance	1000 pF to 199.99 mF	200 pF to 20 mF	20 pF to 20 mF	20 pF to 20 mF
Inductance	N/A	200 µH to 2000 H	20 µH to 2000 H	20 µH to 2000 H
Resistance	N/A	2 Ω to 200 MΩ	2 Ω to 200 MΩ	2 Ω to 200 MΩ
Frequency	N/A	100 Hz, 120 Hz , 1 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz	100 Hz, 120 Hz, 1 kHz, 10 kHz, 100 kHz
Additional features	Dual display, min./max./avg. recording, data logging to PC			

Handheld clamp meters

Save money without compromising safety or convenience

Use clamp meters to measure high voltage and current (up to 1000V and 1000A) and avoid the need to disconnect high current cables. The clamp meters have built-in DMMs, with lower resolutions than typical dedicated DMMs, to be used for preventative maintenance and quick verifications.

- Large 2-inch jaw size (U1210 Series); LED light, wire separator and hook to grab the right wire (U1190 Series)
- Includes DMM capabilities: resistance, capacitance, frequency and temperature
- CAT IV 600 V and CAT III 1000 V safety ratings (U1210 Series)



U1213A



U1194A

U1600 Series handheld oscilloscopes

Maximum versatility for more rigorous troubleshooting

- 5.7-inch VGA TFT LCD display with indoor, outdoor, and night-vision viewing modes
- Two independent, isolated channels
- Up to 2 GSa/s sample rate and up to 2 Mpts deep memory to zoom in on critical details



U1610A U1620A

	U1610A	U1620A
Oscilloscope channel count	2	2
Bandwidth	100 MHz	200 MHz
Maximum sampling rate	1 GSa/s interleaved, 500 MSa/s per channel	2 GSa/s interleaved, 1 GSa/s per channel
Maximum recording length	120 kpts interleaved, 60 kpts per channel	2 Mpts interleaved, 1 Mpts per channel
Internal scope storage	10 setups and waveforms can be saved and recalled internally	
Rise time	3.50 ns typical	1.75 ns typical
Additional features	Indoor, outdoor and night vision mode, built-in DMM, data logger capability, dual windows zoom	

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