Keysight
Basic Instruments

August 2019 - October 2019

PATHWAVE
Control. Automate. Simplify.

Keysight PathWave BenchVue software is now included on all Keysight instruments.
Get Test and Measurement Results Faster with Your Instrument and PC Together

Today’s bench setups are complex. This complexity increases exponentially as you need to pull and correlate data from multiple pieces of equipment. It’s time to ditch the homegrown spreadsheets and use a dedicated, enterprise-level tool for instrument control and data analysis.

Keysight’s PathWave BenchVue PC software is now included with qualifying benchtop products, including most Keysight benchtop oscilloscopes, multimeters, function generators, DC power supplies, data acquisition units, and more!

With PathWave BenchVue, you can get more from your instruments. Easily connect, record results, automate tests, and visualize measurements across multiple instruments simultaneously. Access your data on your PC for better analysis and reporting. Quickly move through the test development phase and get test results faster than ever.

**ACCESS AND EXPORT DATA**
PathWave BenchVue apps provide extensive data, trace and measurement logging capabilities. You can find answers faster than ever by easily viewing, logging and exporting measurement data and screen captures with only a few clicks.

**BUILD CUSTOM, AUTOMATED TEST SEQUENCES**
A dedicated instrument app allows you to quickly configure the most commonly used measurements and setups for each instrument family. Or quickly build custom test sequences with the integrated Test Flow app to automate and visualize test results without the need for instrument programming or coding knowledge.

**ACCESS DEEPER INSTRUMENT CONTROLS**
Gain access to more instrument capabilities and solutions on hundreds of Keysight instruments with Command Expert sequences integrated into Test Flow. The intuitive interface enables you to quickly create instrument test sequences and significantly reduce test development time.

For more information about BenchVue, visit: www.keysight.com/BenchVue

For more information about BenchVue included with your instrument, visit: www.keysight.com/find/IncludedBenchVue
Signal Generators  |  www.keysight.com/find/sg

**NEW** N5166B CXG vector signal generator*

To keep up with today’s expanding consumer electronic market you need an economic and versatile test and measurement system that can handle diverse devices and provide the performance required for receiver tests across multiple wireless standards. The CXG X-Series RF Vector signal generator provides great all-around performance, while also being standards-compliant, to meet the needs of engineers designing outstanding IoT and general-purpose devices.

- Characterize signals and devices with general-purpose spectrum analysis and one-button PowerSuite measurements
- Frequency: 9 kHz – 3/6 GHz
- Specified output power range -110 to +18 dBm
- Switching speed ≤5 ms
- Phase noise (1 GHz, 20 kHz offset) -119 dBc/Hz (typical)
- Amplitude accuracy ±0.6 dB
- Internal baseband RF BW 60 or 120 MHz
- External I/Q inputs RF BW 200 MHz
- Baseband amplitude flatness ±0.2 dB, measured with channel correction
- Baseband memory 32 MSa (standard), 512 MSa optional

* From selected distributors only

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**Signal Generators**  |  www.keysight.com/find/sg

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- External I/Q inputs RF BW 200 MHz
- Baseband amplitude flatness ±0.2 dB, measured with channel correction
- Baseband memory 32 MSa (standard), 512 MSa optional

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**Signal Analyzers**  |  www.keysight.com/find/sa

N9000B CXA signal analyzer*

Whether you are 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 enable you to perform essential frequency, power, spurious and distortion measurements without overspending your budget.

- Characterize signals and devices with general-purpose spectrum analysis and one-button PowerSuite measurements
- Frequency: 9 kHz to 26.5 GHz
- Frequency options: 3, 7.5, 13.6, 26.5 GHz
- -163 dBm DANL at 1 GHz (preamp on)
- 110 dBc/Hz Phase Noise at 1 GHz (10 kHz offset)
- Built-in tracking generator
- USB 2.0, LAN, GPIB and LXI Class C compliance

* From selected distributors only

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**Signal Analyzers**  |  www.keysight.com/find/sa

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- Built-in tracking generator
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* From selected distributors only
### InfiniiVision oscilloscopes

**Supercharge your Bandwidth** For a limited time, get more bandwidth for the same price on select 4-channel mixed signal oscilloscopes.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>BANDWIDTH</th>
<th>CHANNELS</th>
<th>SAMPLE RATE</th>
<th>MEMORY DEPTH</th>
<th>STANDARD WARRANTY</th>
<th>CALIBRATION PERIOD</th>
<th>SPECIAL TRIGGERS</th>
<th>BUILT-IN INSTRUMENTS*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1000 X-Series</strong></td>
<td>Basic R&amp;D bench</td>
<td>50 MHz to 200 MHz</td>
<td>2, 4</td>
<td>Up to 2 GSa/s</td>
<td>Up to 1 Mpts and segmented memory standard</td>
<td>3 years</td>
<td>5 years</td>
<td>Serial protocol</td>
<td>20 MHz FG, 5-digit counter, and frequency response analyzer on G models only</td>
</tr>
<tr>
<td><strong>2000 X-Series</strong></td>
<td>Basic R&amp;D bench</td>
<td>70 MHz to 200 MHz</td>
<td>2, 2+8, 4, 4+8</td>
<td>Up to 2 GSa/s</td>
<td></td>
<td>5 years</td>
<td>2 years</td>
<td>Serial protocol</td>
<td>20 MHz FG, 5-digit counter</td>
</tr>
<tr>
<td><strong>3000 T-Series</strong></td>
<td>Everything the 2000X has plus</td>
<td>100 MHz to 1 GHz</td>
<td></td>
<td>Up to 5 GSa/s</td>
<td>4 Mpts and segmented memory standard</td>
<td>3 years</td>
<td></td>
<td>Near Field Communication (NFC) Trigger, Serial protocol, Zone touch</td>
<td>20 MHz AWG, 8-digit counter, totalizer and frequency response analyzer</td>
</tr>
<tr>
<td><strong>4000 X-Series</strong></td>
<td>Everything the 3000T has plus</td>
<td>200 MHz to 1.5 GHz</td>
<td>2, 2+16, 4, 4+16</td>
<td>Up to 5 GSa/s</td>
<td>4 Mpts and segmented memory standard</td>
<td>3 years</td>
<td></td>
<td>Dual 20 MHz AWG, 5-digit counter and frequency response analyzer</td>
<td></td>
</tr>
<tr>
<td><strong>6000 X-Series</strong></td>
<td>Everything the 4000X has plus</td>
<td>1 GHz to 6 GHz</td>
<td></td>
<td>Up to 20 GSa/s</td>
<td></td>
<td>2 years</td>
<td>Serial protocol, Zone touch</td>
<td>Dual 20 MHz AWG, 10-digit counter, totalizer and frequency response analyzer</td>
<td></td>
</tr>
</tbody>
</table>

*All models have built-in protocol analyzer and 3-digit DVM.*

NEW Added value software packages - now get more functionality.

### PathWave BenchVue software included with instrument

Find a Keysight distributor today at www.keysight.com/find/distributor

**DOWNLOAD YOUR NEXT INSIGHT**

Keysight software is downloadable expertise. www.keysight.com/find/software
### Data Acquisition / Switch Units

Get the next-generation data acquisition (DAQ) system with a 3-slot mainframe and your choice of 8 plug-in modules. Interface with the DAQ using Keysight BenchVue DAQ software, the intuitive graphical front panel with task oriented, self-guiding menus, or a web browser.

- **PathWave BenchVue software included with instrument**
- [www.keysight.com/find/DAQ970A](http://www.keysight.com/find/DAQ970A)
- [DAQ970 Data Sheet](http://www.keysight.com/find/DAQ970A)

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>34970/72A MODULES</th>
<th>DAQ970A MODULES</th>
<th>KEY SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-channel solid-state multiplexer</td>
<td>-</td>
<td>DAQM900A</td>
<td>Up to 450 ch/s</td>
</tr>
<tr>
<td>20-channel multiplexer + 2 current channels</td>
<td>34901A</td>
<td>DAQM901A</td>
<td>Armature 2/4 wire, 60 ch/s (80 ch/s for DAQ970A), up to 300 V, 1 A</td>
</tr>
<tr>
<td>16-channel multiplexer</td>
<td>34902A</td>
<td>DAQM902A</td>
<td>Reed 2/4 wire, 250 ch/s, up to 300 V, 50 mA</td>
</tr>
<tr>
<td>20-channel actuator/GP switch</td>
<td>34903A</td>
<td>DAQM903A</td>
<td>SPDT/Form C, 120 ch/s, up to 300 V, 1 A</td>
</tr>
<tr>
<td>4 x8 matrix</td>
<td>34904A</td>
<td>DAQM904A</td>
<td>Armature 2-wire, 120 ch/s, up to 300 V, 1 A</td>
</tr>
<tr>
<td>2 GHz, dual 4-channel, RF max, 500</td>
<td>34905A</td>
<td>DAQM905A</td>
<td>Common low (not terminated), 60 ch/s up to 42 V, 0.7 A</td>
</tr>
<tr>
<td>Multifunction module</td>
<td>34907A</td>
<td>DAQM907A</td>
<td>Two 8-bit digital I/O ports, up to 42 V, 400 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>26-bit 100 kHz event counter, up to 42 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Two 16-bit analog outputs, up to ±12 V, 10 mA</td>
</tr>
<tr>
<td>40-channel single-ended multiplexer</td>
<td>34908A</td>
<td>DAQM908A</td>
<td>Common low (no 4-wire meas.) 60 ch/s, up to 300 V, 1 A</td>
</tr>
</tbody>
</table>

- 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

PLUS

- All modules have been updated to have improved switching speeds and accuracies
- NEW DAQM900A solid state multiplexer with scan rate speed of up to 450 channels/sec
E36200 Series 200 and 400 W autoranging power supplies

- Autoranging capability to provide the highest current available at all output voltages
- Auto-parallel for higher current up to 40 A
- Auto-series for higher voltage up to 120 V
- Variable voltage slew rate to avoid a large inrush current
- 2-wire or 4-wire remote sense
- Thermally controlled fan speed for lower acoustic noise
- Data logging, output synchronization, LIST mode, low range current measurement
- 4.3-in color LCD display
- LAN (LXI Core), USB, and GPIB (optional)

PathWave BenchVue software included with instrument

E36200 Series Data Sheet

http://www.keysight.com/find/e36200

<table>
<thead>
<tr>
<th>Power output</th>
<th>E36231A</th>
<th>E36232A</th>
<th>E36233A</th>
<th>E36234A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>200 W</td>
<td>200 W</td>
<td>400 W</td>
<td>400 W</td>
</tr>
<tr>
<td>DC output rating (0 to 40 °C)</td>
<td>0 to 30 V</td>
<td>0 to 60 V</td>
<td>0 to 30 V</td>
<td>0 to 30 V</td>
</tr>
<tr>
<td></td>
<td>0 to 20 A</td>
<td>0 to 10 A</td>
<td>0 to 20 A</td>
<td>0 to 20 A</td>
</tr>
<tr>
<td>Series mode voltage</td>
<td>NA</td>
<td>NA</td>
<td>60 V</td>
<td>120 V</td>
</tr>
<tr>
<td>Parallel mode current</td>
<td>NA</td>
<td>NA</td>
<td>40 A</td>
<td>20 A</td>
</tr>
</tbody>
</table>

E36300 Series triple output DC power supplies

- Large display shows voltages and currents for all three outputs
- Programming/readback accuracy as low as 0.03%
- Low output ripple and noise less than 2 mVpp/350 uVrms
- Data logging plus output sequencing and coupling
- Front and rear output terminals
- Color-coded outputs and individual knobs for voltage and current
- LAN (LXI Core), USB, and GPIB (optional)

PathWave BenchVue software included with instrument

E36300 Series Data Sheet

www.keysight.com/find/e36300

<table>
<thead>
<tr>
<th>MODEL</th>
<th>E36311A</th>
<th>E36312A</th>
<th>E36313A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy model</td>
<td>80 W</td>
<td>Most popular</td>
<td>Twice the current</td>
</tr>
<tr>
<td>Channels</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>DC output Rating (0 to 40 °C)</td>
<td>0 to 6 V</td>
<td>0 to +25 V</td>
<td>0 to –25 V</td>
</tr>
<tr>
<td></td>
<td>0 to 5 A</td>
<td>0 to 1 A</td>
<td>0 to 1 A</td>
</tr>
</tbody>
</table>
### Waveform Generators | www.keysight.com/find/functiongenerators

#### 33500B and 33600A Series waveform generators

- Generate Trueform arbitrary waveforms with high fidelity and less jitter and harmonic distortion
- Ease of use features, such as modulation, sweep, burst, dual-channel coupling and IQ baseband signal player

---

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>CHANNELS</th>
<th>FREQUENCY RANGE</th>
<th>PULSE</th>
<th>STD/OPT ARB</th>
<th># BITS</th>
<th>SAMPLE RATE</th>
<th>MEMORY/CHANNEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>33509B</td>
<td></td>
<td>1 2</td>
<td>20 MHz</td>
<td>20 MHz</td>
<td>Optional</td>
<td>16</td>
<td>160 MSa/s</td>
<td>1 M Standard, 16 M Optional</td>
</tr>
<tr>
<td>33510B</td>
<td></td>
<td>1 2</td>
<td>30 MHz</td>
<td>30 MHz</td>
<td>Standard</td>
<td></td>
<td>250 MSa/s</td>
<td></td>
</tr>
<tr>
<td>33511B</td>
<td>Exclusive Trueform waveform technology with &lt; 40 ps jitter and &lt; 0.04% THD.</td>
<td>1 2</td>
<td>80 MHz</td>
<td>80 MHz</td>
<td>Standard</td>
<td>14</td>
<td>660 MSa/s</td>
<td>4 M Standard, 64 M Optional</td>
</tr>
<tr>
<td>33512B</td>
<td></td>
<td>1 2</td>
<td>120 MHz</td>
<td>100 MHz</td>
<td></td>
<td></td>
<td>1 GSa/s</td>
<td></td>
</tr>
<tr>
<td>33519B</td>
<td></td>
<td>1 2</td>
<td>20 MHz</td>
<td>20 MHz</td>
<td>Optional</td>
<td>16</td>
<td>160 MSa/s</td>
<td>1 M Standard, 16 M Optional</td>
</tr>
<tr>
<td>33520B</td>
<td></td>
<td>1 2</td>
<td>30 MHz</td>
<td>30 MHz</td>
<td>Standard</td>
<td></td>
<td>250 MSa/s</td>
<td></td>
</tr>
<tr>
<td>33521B</td>
<td></td>
<td>1 2</td>
<td>80 MHz</td>
<td>80 MHz</td>
<td>Standard</td>
<td>14</td>
<td>660 MSa/s</td>
<td>4 M Standard, 64 M Optional</td>
</tr>
<tr>
<td>33522B</td>
<td></td>
<td>1 2</td>
<td>120 MHz</td>
<td>100 MHz</td>
<td></td>
<td></td>
<td>1 GSa/s</td>
<td></td>
</tr>
</tbody>
</table>

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### Digital Multimeters | www.keysight.com/find/dmm

#### Truevolt digital multimeters

- 6½ and 7½ digit performance
- Graphical capabilities such as trend and histogram charts
- Measure very low current, 1 µA range with pA resolution, allowing measurements on very low power devices
- Auto calibration to compensate for temperature drift
- Basic measurements: DCV, ACV, DCI, ACI, 2- and 4-wire resistance, frequency, period, continuity, diode, temperature, capacitance

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<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>DIGITS OF RESOLUTION</th>
<th>MAX READING RATE AT 4½ DIGITS (RDGS/S)</th>
<th>BUILT-IN PC INTERFACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>34460A</td>
<td>New industry standard. Display DMM results in ways you never have before and measure with unquestioned Truevolt confidence.</td>
<td>6½</td>
<td>300</td>
<td>USB; optional GPIB, LAN</td>
</tr>
<tr>
<td>34461A</td>
<td></td>
<td>6½</td>
<td>1,000</td>
<td>USB, LAN; optional GPIB</td>
</tr>
<tr>
<td>34465A</td>
<td>More measurements, higher speed, better accuracy, and more memory than the 34461A. Comes with digitizer and advanced triggering capability.</td>
<td>6½</td>
<td>50,000</td>
<td>USB, LAN; optional GPIB</td>
</tr>
<tr>
<td>34470A</td>
<td></td>
<td>7½</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vector Network Analysis | www.keysight.com/find/E5063A

E5063A ENA vector network analyzer*

- Various frequency options to suit your test needs and budget, upgradable at any time
- PCB manufacturing test capability with Option 011
- Support for six languages via softkey and the embedded help manual in English/Simplified Chinese
- Supports all Keysight calibration kits including the N755xA economy ECal module

<table>
<thead>
<tr>
<th>ENA SERIES E5063A HIGHLIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Test port</strong></td>
</tr>
<tr>
<td><strong>Dynamic range</strong></td>
</tr>
<tr>
<td><strong>Trace noise</strong></td>
</tr>
<tr>
<td><strong>Source power</strong></td>
</tr>
<tr>
<td><strong>Key software capability</strong></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
</tr>
</tbody>
</table>

1. Optional capability.
2. External software (Keysight N1500A Material Measurement Suite) required.

Keysight Streamline Series | USB Instruments

Vector Network Analyzers and Oscilloscopes

- Multiple new compact, faceless, USB instruments
- Common technology and measurement capabilities as benchtop and modular instruments
- Perfect for component and subassembly test, R&D labs, and light manufacturing
- Small footprint in size, weight, and power
- Perfect for a rack at 1U high

| www.keysight.com/find/usb-vna |
| www.keysight.com/find/usb-scope |

Compact form. Zero compromise.

<table>
<thead>
<tr>
<th>VECTOR NETWORK ANALYZER (VNA)*</th>
<th>OSCILLOSCOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Models:</strong></td>
<td>P9370A, P9371A</td>
</tr>
<tr>
<td><strong>Bandwidth:</strong></td>
<td>300 kHz to 6.5 GHz</td>
</tr>
<tr>
<td><strong>Additional capabilities:</strong></td>
<td>2 analog channels</td>
</tr>
<tr>
<td>Full 2-port</td>
<td>5 GSa/s</td>
</tr>
<tr>
<td>Ability to extend the number of ports</td>
<td>1,000,000 wfms/s</td>
</tr>
<tr>
<td>Same calibration and metrology as all trusted Keysight VNAs</td>
<td>Zone triggering</td>
</tr>
<tr>
<td>6-in-1 instrument: Arbitrary Waveform Generator, Frequency Response Analyzer, Digital Voltmeter, Counter, Protocol Analyzer</td>
<td></td>
</tr>
</tbody>
</table>

* From selected distributors only
Supercharge your Bandwidth

For a limited time, get more bandwidth for the same price on select 4-channel mixed signal oscilloscopes.

Boost your Benchtop

For a limited time, get a free handheld DMM with your purchase of an eligible digital multimeter, function/waveform generator, or power supply mainframe.

See our complete list of current promotions:
www.keysight.com/find/promotions

PathWave BenchVue Lab Management and Control Solution

Control. Automate. Simplify.

PathWave BenchVue Lab management and control solution BV9111B allows centralized control of instruments, and provides control and automation of the instruments.

- Configure the most commonly used controls and measurements from instruments.
- 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.

BenchVue is now PathWave BenchVue, part of Keysight’s PathWave Software Platform

Download a free 30-day trial
BenchVue Data Sheet