

# Four Reasons to Modernize Your Test Workbench

## Spotlight

### New Smart Bench Essentials Series Products

The Keysight Smart Bench Essentials Series is a revolutionary design solution for modern teaching labs and aspiring new product development electronics engineers. The solution allows you to test, analyze, and share results collaboratively, across the room or around the world. Whether you are teaching, learning, or working on a design, from a classroom or from home, you have full access to configure and test using your connected instruments.

The hardware, leveraged from higher-performance instruments, is built into the Smart Bench Essentials Series. So you get the benefits of Keysight's measurement performance in a low-cost, compact package.

We gave the user interface and display special treatment to make them straightforward, easy to operate, and consistent with our best-selling products. With the signature 7-inch color display, you can view more information clearly, even from a distance.

The Smart Bench Essentials Series comes with KeysightCare support. You get access to technical experts from Keysight and our 24/7 knowledge center to help you get up to speed in the shortest amount of time.



The Keysight Smart Bench Essentials Series is a connected portfolio of test instruments consisting of a power supply, a function generator, a digital multimeter, and oscilloscopes. These instruments give students and general electronics test engineers a connected, modern design solution for their labs or test workbenches.



### Smart remote connectivity

Test, analyze, and share results collaboratively or remotely.



### Signature 7-inch color display

View and monitor all outputs simultaneously from any angle.



### Industry-grade performance

Measure with confidence using exceptional line and load regulation for a stable output.



### KeysightCare included

Get access to technical experts and 24/7 online knowledge center.

## Fully Connected to Accelerate Your Daily Tasks

Keysight offers a complete portfolio of instruments with a common user interface and software that allows access to the Smart Bench Essentials Series instruments remotely from anywhere. Technical support gives professors and students access to Keysight's measurement experts.

The Smart Bench Essentials Series provides reliable connectivity and usability in a compact form factor. The hardware and software together give you truly connected equipment: connected to you, connected to each other, connected to the cloud.

#### Connected to Your Next Innovation

Accelerate your design with a connected bench

- Capture elusive signals so you can perfect your design.
- Track and monitor your real-time test results through a sizeable 7-inch display.
- Store test results and export data for post-analysis review and report generation.

#### Connected to Each Other

Improve your productivity managing your lab assets

- Perform with minimal training a setup to control your test hardware.
- Manage all your lab instruments using a multibench configuration.

#### Connected to the Cloud

Get more test insights anytime from anywhere

- Test, analyze, and share results collaboratively — across the room or across the world.
- Access your lab equipment securely through cloud-based lab scheduling and session booking.

#### Streamline and Simplify Lab Management

- Test, analyze, and share results collaboratively or remotely using PathWave lab software.
- View the connection status for all instruments to enable administrators to configure measurement settings from a single administrator PC.

## How to Select Your Smart Bench Essentials Series Instrument

When testing your device, you need a complete portfolio of test instruments to do specific functions:

- The power supply should provide the exact DC biasing power to your device under test (DUT), or it will not operate properly.
- The function generator should provide the various test input signals for your DUT to respond. The output signals from your DUT are the responses to your stimulated test input signals.
- The oscilloscope measures the dynamic responses of your DUT output signals. The digital multimeter (DMM) measures — for example, the DC voltage or current consumed by the DUT and the temperature changes of the DUT.

### EDU34450A 5½-digit dual-display digital multimeter

The Keysight EDU34450A is a modern DMM designed for bench applications. It measures a broad range of input signals. The measurement engine leverages Keysight's industry-grade benchtop DMM. It features 5½ digits of resolution, 0.015% basic DCV accuracy, and up to 100 readings/s measuring rate for speed-critical tests. The EDU34450A includes generous internal memory, allowing prolonged data logging of up to 5,000 data points. It includes PathWave BenchVue DMM software for remote control and data logging.

With the EDU34450A, you get the benefits of Keysight measurement performance in a low-cost, compact package.



Figure 1. EDU34450A 5½-digit dual-display DMM



#### Key features

- measures 11 input signals (DC voltage, DC current, true RMS AC voltage, AC current, two- and four-wire resistance, frequency, continuity, diode test, temperature, and capacitance)
- 7-inch dual-measurement color display
- 0.015% basic DCV accuracy
- standard USB and LAN for flexible PC connectivity
- USB flash drive support to copy / load configuration for repeated test setup

## EDU33210 Series 20 MHz function / arbitrary waveform generator

The Keysight EDU33210 Series function / arbitrary waveform generator offers the standard signals and features you expect — such as modulation, sweep, and burst. Additional features provide the capabilities and flexibility you need to get the job done quickly, no matter how complex. An intuitive, information-packed front-panel interface enables you to easily resume where you left off.



Figure 2. EDU33210 Series 20 MHz function / arbitrary waveform generator

## EDU36311A triple-output bench power supply

The Keysight EDU36311A triple-output DC bench power supply comes with a robust design and usability at an affordable price. Its 90 W electrically isolated channels supply clean and reliable power. The 7-inch color wide video graphics array display gives you a clear view — from instrument setup to output status. You can control the EDU36311A triple-output DC bench power supply remotely via USB or LAN. This solution includes Keysight's PathWave BenchVue power supply application software for the PC.

The EDU36311A provides excellent programming / readback accuracy, convenient benchtop capabilities, low acoustic noise, and intuitive, easy-to-use interfaces.



### Key features

- 7-inch color display for simultaneous parameter setup, signal viewing, and editing
- six built-in modulation types and 17 popular waveforms to simulate typical applications for testing
- 16-bit arbitrary waveform capability with memory up to 8 M samples per channel
- USB and LAN input / output interface for remote connectivity



### Key features

- low output ripple and noise
- exceptional line / load regulation
- superior overvoltage, overcurrent, and overtemperature protection
- three independent power supplies in one box
- distinctive color-coded channels and individual knobs for voltage and current



Figure 3. EDU36311A triple-output bench power supply

## InfiniiVision 1000 X-Series oscilloscopes, 50 MHz, analog channels

The Keysight InfiniiVision 1000 X-Series (EDUX1052A and EDUX1052G) oscilloscopes provide a quality education for students and prepare them for industry with professional-level instruments.

The 1000 X-Series leverages the technology used in our higher-end oscilloscopes, allowing students to learn on the same hardware and software used in leading research and development labs. Built-in training signals enable students to quickly learn to capture and analyze signals.

The educator's resource kit includes dynamic teaching labs, a comprehensive lab guide, a tutorial written specifically for undergraduate students, and an oscilloscope fundamentals PowerPoint slide set for professors and lab assistants.

BenchVue software with the BV0004B BenchVue oscilloscope application (standard) lets you control and visualize the 1000 X-Series and multiple measurements simultaneously.



### Key features

- compatible with the U3800A Internet of Things (IoT) Systems Design Applied Courseware
- optional DSOXBODE Bode plot training kit
- available frequency response analyzer capability to help students understand the gain and phase performance of passive RLC circuits or active operational amplifiers (G model only)



Figure 4. InfiniiVision 1000 X-Series oscilloscopes, 50 MHz, analog channels

## Select the PathWave Software That Supports Smart Bench Essentials Instruments

Keysight has several software solutions for the EDU series. The BV0001B/2B/3B/4B PathWave application, included with the instrument purchase, allows you to control the instruments and test remotely. It comes with a smaller installation package than BenchVue and has a more responsive user interface.

If you have many instruments in your lab, consider the PW9111EDU PathWave lab Manager and control software. It allows you to configure your lab from a single PC, track your assets, check for the latest firmware, and perform a mass firmware update on all the instruments.

For universities practicing remote learning, we are launching the PW9112EDU PathWave lab operation for remote learning solution. It allows students to access your lab setup and perform lab work through a web browser.

## BV0001B/2B/3B/4B PathWave instrument application



- simple instrument setup and test
- accurate data logging and screen capture
- in-depth data for analysis

## PW9111EDU PathWave lab management and control software



- lab configuration
- asset tracking
- mass firmware update

## PW9112EDU PathWave lab operation for remote learning solution



- execute remote user authentication and lab scheduling / booking
- get remote access to lab setup
- perform lab work through a web browser

Get more information about the Keysight Smart Bench Essentials Series and Keysight PathWave software [here](#).

Learn more at: [www.keysight.com](http://www.keysight.com)

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)

