

# Keysight PathWave BenchVue Lab Management and Control Solution

Providing Efficient and Centralized Lab Control for Educators

## Introduction

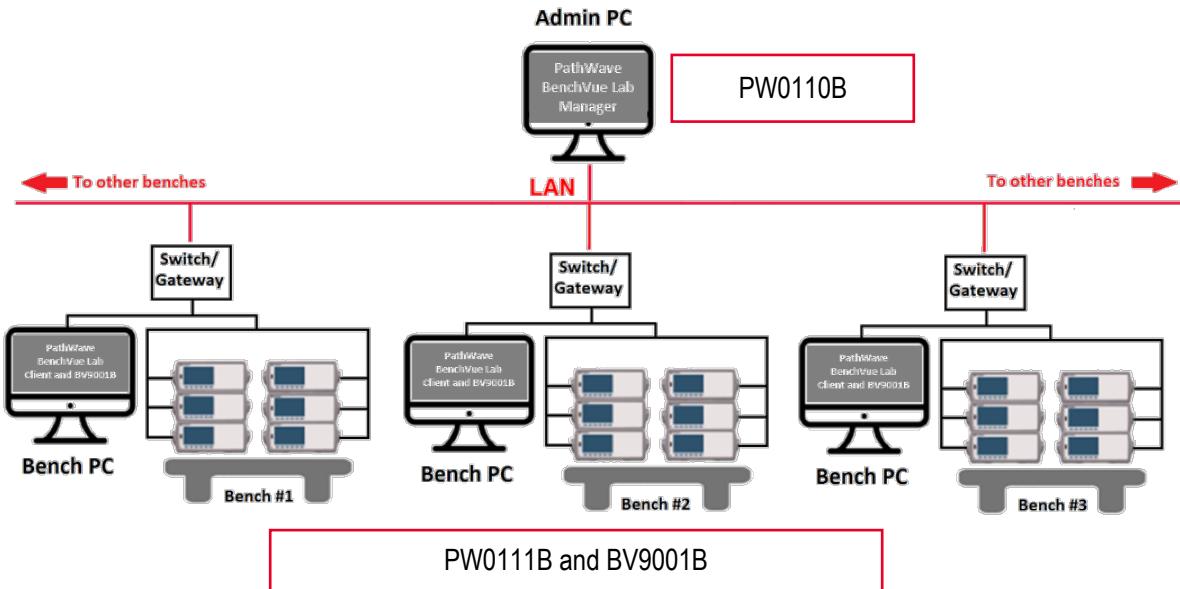
Hands-on learning using real, industry-standard bench instruments is one of the most valuable experiences universities and teaching institutes can offer students, ensuring that the next generation of engineers get practical knowledge using the same industry-grade equipment that they would use when they graduate and are out in the industry. But to manage an engineering lab with dozens of test benches, each equipped with multiple instruments, educators must spend significant amounts of time manually setting up test benches, configuring and updating the firmware for the instruments, and tracking the lab's assets for calibration and repair.

Now, with Keysight PW9111EDU PathWave BenchVue Lab Management and Control Solution, educators can spend less time on manual set up and tracking but focus on what really matters – providing high-quality teaching. This solution is built upon the PathWave BenchVue software platform, leveraging its strengths such as easy control, data capture, logging and report generation, all without requiring programming. Consisting of the LAN-based PathWave BenchVue Lab apps and the BV9001B PathWave BenchVue Complete Control Collection, Keysight PathWave BenchVue Lab Management and Control Solution is a lab management solution that not only provides centralized control for educators to seamlessly connect and monitor all the instruments within the teaching lab, but also serves as a powerful teaching tool for instruction laboratories.

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# Instrument Lab Management (Simplified)



**Figure 1.** Different components of the PW9111EDU in a typical lab setup

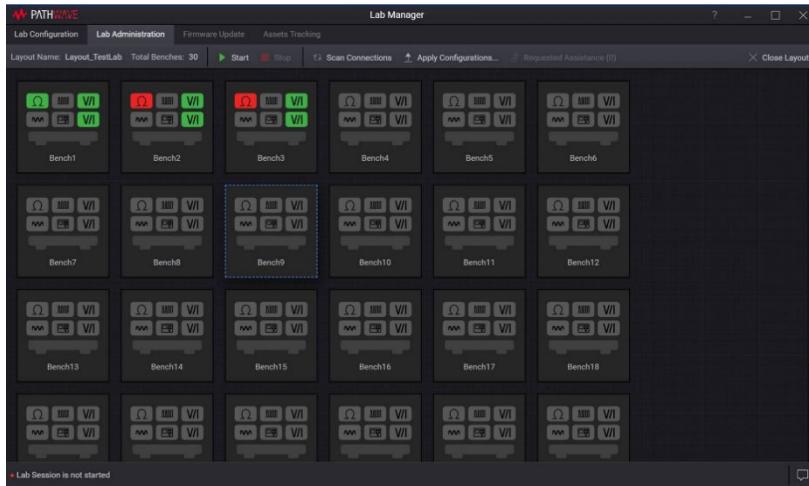
PW9111EDU PathWave BenchVue Lab Management and Control Solution consist of the PathWave BenchVue Lab and BV9001B PathWave BenchVue Complete Control Collection.

- PathWave BenchVue Lab
  - Manager App - acts as the main software application installed on the lab administrator's PC for centralized control, monitoring and management
  - Client App - runs on test bench PCs and connects all the instruments at individual test benches. This app readily links to the Manager app.
- BV9001B PathWave BenchVue Complete Control Collection
  - Contains the following apps to control unique instrument types: Data acquisition, digital multimeter, electric load, FieldFox handheld analyzer, function generator, network analyzer, oscilloscope, power meter, power supply, signal generator and spectrum analyzer, and universal counter
  - Test Flow feature – enables users to build automated test sequence blocks from multiple instruments with a drag-and-drop interface, without requiring programming within the legacy BenchVue platform
  - Extensive data trace and measurement logging capabilities, with report generation

# Key Features

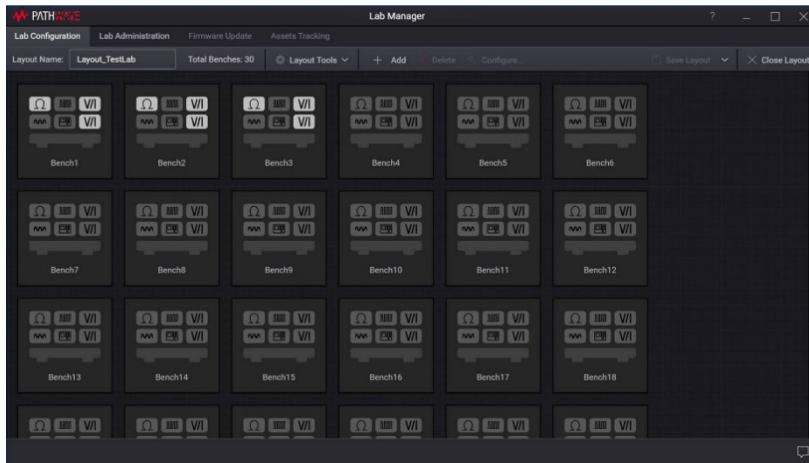
PathWave BenchVue Lab Management and Control Solution provide several core features to simplify the teaching in the laboratories with multiple test benches.

## Lab Administrator



The Lab Administrator provides a quick overview of the current instrument's connection status, so the lecturer or lab manager can monitor the condition of the lab. This feature allows them to easily identify which instrument, and on which bench, that is not correctly connected.

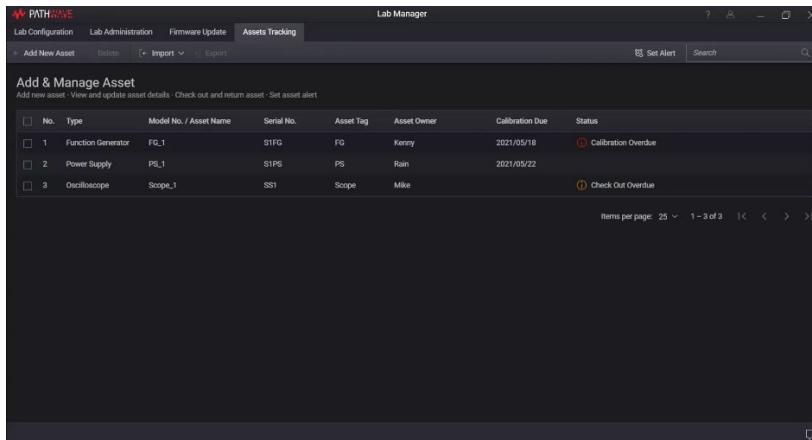
## Lab Configuration



The Lab Configuration tab allows educators to have custom benches arrangement to configure the lab layout, number of benches, type and number of instruments, and name of the benches accordingly to mimic the actual lab physical bench position. Maximum six instruments supported per bench.

There are two options to configure the lab layout - either manually or by importing from a CSV file. Multiple lab layouts can be saved and exported for easy interchange, to allow flexibility for different classes sharing a lab.

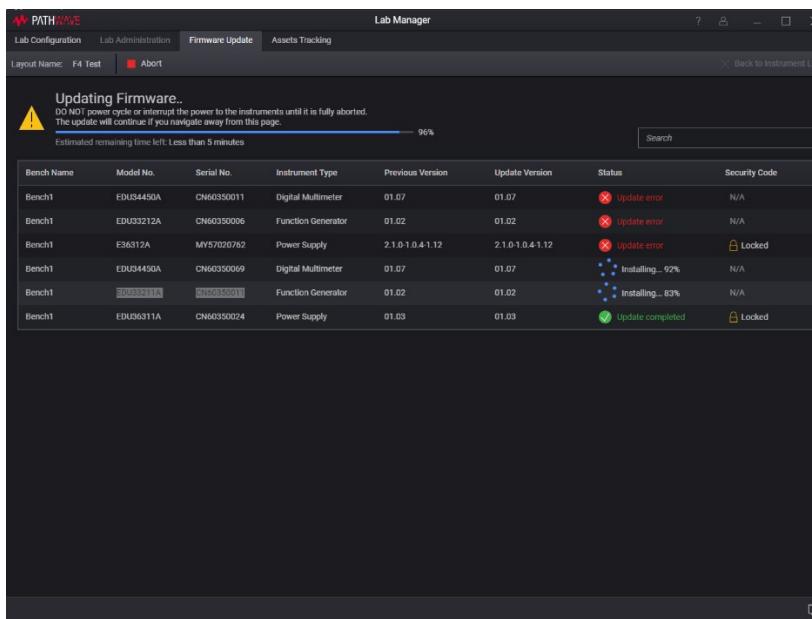
# Asset Tracking



The screenshot shows the 'Assets Tracking' tab in the Lab Manager application. The interface includes a header with 'Lab Configuration', 'Lab Administration', 'Firmware Update', and 'Assets Tracking'. Below the header is a toolbar with 'Add New Asset', 'Delete', 'Import', 'Export', 'Set Alert', 'Search', and a magnifying glass icon. The main area is titled 'Add & Manage Asset' with the sub-instruction 'Add new asset · View and update asset details · Check out and return asset · Set asset alert'. A table lists three assets: 1. Function Generator (Model No.: FG\_1, Serial No.: STFG, Asset Tag: FG, Asset Owner: Kenny, Calibration Due: 2021/05/18, Status: Calibration Overdue). 2. Power Supply (Model No.: PS\_1, Serial No.: STPS, Asset Tag: PS, Asset Owner: Rain, Calibration Due: 2021/05/22). 3. Oscilloscope (Model No.: Scope\_1, Serial No.: SS1, Asset Tag: Scope, Asset Owner: Mike, Status: Check Out Overdue). At the bottom, there are buttons for 'Items per page: 25', '1 - 3 of 3', and navigation arrows.

The lab manager Asset Tracking provides an intuitive management tool for educators to easily keep track of a long list of assets in the lab, including the instruments, equipment, and accessories. The asset alert feature allows lab admin to manage instrument loaning, calibration schedule tracking with an alert reminder via email and in-app notification. The asset tracking feature allows lab admin to view, add, modify, and delete assets in the asset list as well as to export the asset reports. Items can be added to the asset tracking list manually or imported from the lab layout or CSV file.

# Mass Firmware Update



The screenshot shows the 'Firmware Update' tab in the Lab Manager application. The interface includes a header with 'Lab Configuration', 'Lab Administration', 'Firmware Update', and 'Assets Tracking'. Below the header is a toolbar with 'Layout Name: F4 Test', 'Abort', and a progress bar showing '96%'. The main area is titled 'Updating Firmware.' with the sub-instruction 'DO NOT power cycle or interrupt the power to the instruments until it is fully aborted. The update will continue if you navigate away from this page.' A progress bar indicates the update is 96% complete. A table lists the instruments being updated: Bench1 (EDU04450A, CN60350011, Digital Multimeter, Previous Version: 01.07, Update Version: 01.07, Status: Update error, Security Code: N/A), Bench1 (EDU03212A, CN60350006, Function Generator, Previous Version: 01.02, Update Version: 01.02, Status: Update error, Security Code: N/A), Bench1 (E58312A, MY57020762, Power Supply, Previous Version: 2.1.0-1.0.4-1.12, Update Version: 2.1.0-1.0.4-1.12, Status: Update error, Security Code: Locked), Bench1 (EDU04450A, CN60350009, Digital Multimeter, Previous Version: 01.07, Update Version: 01.07, Status: Installing... 92%, Security Code: N/A), Bench1 (EDU03211A, CN60350011, Function Generator, Previous Version: 01.02, Update Version: 01.02, Status: Installing... 83%, Security Code: N/A), and Bench1 (EDU06311A, CN60350024, Power Supply, Previous Version: 01.03, Update Version: 01.03, Status: Update completed, Security Code: Locked).

The Mass Firmware Update provides the lab manager an intuitive tool to view and manage simultaneous firmware updates on all the connected Keysight instruments in the teaching lab with a single click. The firmware file manager provides manual or automated ways for lab admin to add the latest firmware file into the lab manager app. Automated mode helps lab admin to identify the latest available firmware version, download and setup the selected instrument type's firmware files with just a few clicks. This feature saves lab admin's time and improves efficiency to keep the entire laboratory up to date.

## Multiple instruments control, data log, analysis and automation



PathWave BenchVue Complete Control Collection provides dedicated apps for twelve Keysight instrument families:

|                        |                        |                       |                       |
|------------------------|------------------------|-----------------------|-----------------------|
| Digital Multimeter App | Function Generator App | Power Supply App      | Oscilloscopes App     |
| Data Acquisition App   | Power Meter/Sensor App | FieldFox App          | Universal Counter App |
| Electric Load App      | LCR Meter App          | Spectrum Analyzer App | Signal Generator App  |

and supports several more instruments. These apps allow users to easily log and export data and images in a few clicks for faster analysis, and then quickly create automated test sequences with minimal instrument knowledge. They also support data log and print screen capability and allow users to visualize and automate multiple instruments simultaneously.

Prerequisite to use BenchVue Test Flow is to have all the instruments apps running within the legacy BenchVue platform.

# Benefits for Using PathWave BenchVue Lab Management and Control Solution

- **Streamline and simplify lab management, saving lab administrators and educators time and freeing them to focus on teaching**

PathWave BenchVue Lab provides overview connection statuses of all instruments, tracks assets with advanced management tools and allows administrators to configure the measurement settings of all instruments at once, all from a single admin PC. PathWave BenchVue Lab also provides an easier way to update firmware for all the connected Keysight instruments.

- **Enhance the learning experience of students by utilizing this solution as an education lab teaching software platform**

The PathWave BenchVue instrument control apps allow users to easily control, analyze and measure. Full desktop and application sharing allows for easy remote monitoring and student assistance in the test lab. And with the PathWave BenchVue Lab Client App installed at each test bench computer, students can easily control instruments, log data and screenshots, and automatically join lab sessions.

- **Easily integrate the solution into the existing lab setup**

This solution supports over hundreds of Keysight test and measurement instruments and will also connect to non-Keysight test instruments that are compliant with the VISA connection protocol. Together with an intuitive GUI and the ability to import CSV files, PathWave BenchVue Lab enables educators to quickly set up and configure large labs.

- **Save on investment**

Educators can take advantage of the license bundling for the PathWave BenchVue Lab Management and Control Solution, which includes:

- One PathWave BenchVue Lab Manager app license
- 100 PathWave BenchVue Lab Client app licenses
- 100 PathWave BenchVue Complete Control Collection app licenses

# System Installation and Requirements

## System requirements

### PathWave BenchVue Lab Manager and Lab Client

#### Computer Operating System

- Windows 10 – 64-bit (versions 1809 or later)

#### Computer Hardware Requirements

- Processor: Intel Core i5 (or equivalent)
- RAM: 8 GB
- Display Resolution: 1366 x 768 minimum

### PathWave BenchVue Complete Control Collection

#### Computer operating system

- Windows 10 – 32-bit and 64-bit (Professional, Enterprise, Education, Home versions)
- Windows 8 – 32-bit and 64-bit (Professional, Enterprise, Core versions)
- Windows 7 – SP1 and later, 32-bit and 64-bit (Professional, Enterprise, Ultimate, Home Basic, Home Premium versions)

#### Computer hardware requirements

- Processor: 1 GHz or faster (2 GHz or greater recommended)
- RAM: 1 GB for 32-bit or 2 GB for 64-bit (3 GB or greater recommended)
- Display Resolution: 1280x1024 minimum for single instrument view (higher resolution recommended for multiple instrument view)

Note: An Internet connection is required when installing the BenchVue application and updates from the Keysight web site or an FTP site. An Internet connection is not required when installing from a DVD. Administrator privileges are required when installing BenchVue.

#### Data exports

- For data exports to Microsoft Excel and Microsoft Word, BenchVue supports Microsoft Office 2003 and later.

### PathWave BenchVue Lab setup requirements

- All instruments MUST be connected to the administrator PC via LAN, either directly or through a bench PC, so that the Manager App can connect, configure and monitor the instrument status.
- It is recommended to install the Client App at test bench PCs (or student laptops). Remote instrument status monitoring, ability to send instrument state file and other features will be available.
- Recommended USB connection between test bench PCs and instruments

## System requirements

### Supported instruments

#### For PathWave BenchVue Lab

- Support up to 100 benches, each bench supports a maximum of 6 instruments.
- Supported Keysight instrument family for state file sending: Oscilloscope, power supply, digital multimeter and function generator
- For Non-Keysight Instruments that comply with IEEE-488 standards, user is able to check the connectivity status of the instruments, but not for sending state file to the instruments. Able to send the configuration as SCPI command in text form to instrument provided the instrument must be able to work with SCPI commands.

#### For BV9001B PathWave BenchVue Complete Control Collection

Note: For Keysight Instruments, users can refer to the following link to view the list of supported instruments:  
[www.keysight.com/find/benchvueinstruments](http://www.keysight.com/find/benchvueinstruments)

### Supported interfaces

#### For PathWave BenchVue Lab

- LAN connection (Wired LAN recommended)

#### For BV9001B PathWave BenchVue Complete Control Collection

- USB, LAN, GPIB, and RS-232 (not supported on all instruments). Requires Keysight IO Libraries Suite v16.0 or later.

# Ordering Information

| Solution number | Description   |
|-----------------|---|
| PW9111EDU       | <p>PathWave BenchVue Lab Management and Control Solution</p> <ul style="list-style-type: none"><li>• 1x PathWave BenchVue Lab Manager App network license</li><li>• 100 x PathWave BenchVue Lab Client App, network licenses, this is part of BV9001B</li><li>• 100 x BV9001B PathWave BenchVue Complete Control Collection, network licenses, which cover control collection apps</li></ul> <p>Note: PW9111EDU offers 4 license terms:</p> <ul style="list-style-type: none"><li>• 12 Months</li><li>• 24 Months</li><li>• 36 Months</li><li>• Perpetual</li></ul> |

## PW9111EDU – License Types and Terms

| Model number                          | Description                |
|---------------------------------------|----------------------------|
| PW9111EDU<br>(Perpetual)              | R-X5Y-002B/<br>R-X6Y-002-L |
|                                       | R-X5Y-002B/<br>R-X6Y-002-X |
|                                       | R-X5Y-002B/<br>R-X6Y-002-Y |
| PW9111EDU<br>(12-months Subscription) | R-X4Y-002-L                |
| PW9111EDU<br>(24-months Subscription) | R-X4Y-002-X                |
| PW9111EDU<br>(36-months Subscription) | R-X4Y-002-Y                |

## Further Information

Please visit our solution page for more information <http://www.keysight.com/find/PW9111EDU>

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