TECHNICAL OVERVIEW

KS8400B PathWave Test Automation built on OpenTAP®

PATHWAVE

built on OPENTAP

PathWave Test Automation software provides powerful, flexible, and extensible test sequence and test plan creation with additional capabilities that optimize your test software development and overall performance. PathWave Test Automation built on OpenTAP® is a modern, Microsoft .NET Core platform that can be employed stand-alone or in combination with higher-level test executive software environments through native C#, Python, or RESTful, APIs. Leveraging C# and the power of visual IDEs such as Microsoft Visual Studio, Visual Studio Code, or JetBrains Rider, PathWave Test Automation is not just another programming language. It's a platform for building rich test solutions and maximizing productivity with existing software development tools and infrastructure.

Features

Included with PathWave Test Automation are the OpenTAP sequencing engine, tools and plugins to accelerate your test system development time and test execution.

Figure 1. The OpenTAP Core Sequencing Engine and Plugins

KEYSIGHT TECHNOLOGIES

Product Summary

- User interfaces

  PathWave Test Automation provides a Graphical Editor that enables both beginning and experienced programmers to quickly construct multi-step test plans. Flow control and conditional operations are supported, along with parallel testing. Controlling and switching among complex hardware configurations are implemented using the Connection Manager. A command line interface (CLI) is provided for integration with other manufacturing applications and workflows, along with a full Application Programing Interface (API) to ease integration with existing software and to create custom solutions. Two versions of the Editor exist for support on Windows and Linux platforms.

- Modular plugin software architecture

  An innovative and flexible capability of the platform lies in plugins. Test steps, instrument/DUT (device under test) interfaces, and test results storage are architected as plugins. You can build unique test solutions quickly using the provided pre-built plugins or use, adapt and modify available open source plugins available from the OpenTAP ecosystem. You can also create new plugins to optimize your test application and enable re-use within your own organization and beyond.

- SDK for test step development

  PathWave Test Automation makes it easy to implement new test steps and plugins by leveraging

  .NET 6 and Python to provide an SDK for building all types of plugins.

- Fast execution and test flow analysis

  The OpenTAP core engine is optimized for speedy execution. Additional tools and plugins provide visualization, analysis and insights to maximize your overall test performance.

Key Applications

Applications for PathWave Test Automation span all aspects of product development from R&D to Manufacturing across a range of industries including:

- Wireless Chipsets, Devices and Operator Infrastructure
- Automotive & Energy
- General Purpose Electronics
- Internet and Infrastructure
- Aerospace/Defense, Government and Customer Solutions
- Semiconductor Manufacturing Infrastructure and Wafer Testing

Key Benefits

PathWave Test Automation is designed to make your test software development simpler, faster, and scalable as your needs evolve.

- Simplicity

  Why develop your own test sequencer when the OpenTAP engine and PathWave Test Automation Editor make it easy for beginning and experienced programmers to develop customized test sequences quickly and easily. Experienced programmers will appreciate the accompanying command line interface and easy integration with a variety of programming languages and APIs (C#, Python, REST, and others).

- Speed

  PathWave Test Automation accelerates test performance with fast test software development, faster test execution and straightforward test optimization. The platform makes It simple to progress from prototype to production and includes tools like a Timing Analyzer to help optimize test plan execution and analysis.

- Scalability

  The modular plugin architecture is centered around the lightweight OpenTAP core sequencing engine. Additional tools and plugins are provided to help scale your test software to meet your specific requirements – Timing Analyzer, Result Viewer, Editor and a growing number of other plugins from the OpenTAP ecosystem. You can also develop your own plugins to extend test automation capabilities, including interfacing with a wide variety of device handlers, measurement, and signal generation hardware.

OpenTAP Engine

The OpenTAP sequencing engine lies at the heart of the platform, designed from its inception for speed-optimized test step execution. Test plans can include simple flow control operations such as if statements, sweep loops, and parallelization. Complex setups including hardware from any vendor are also supported.

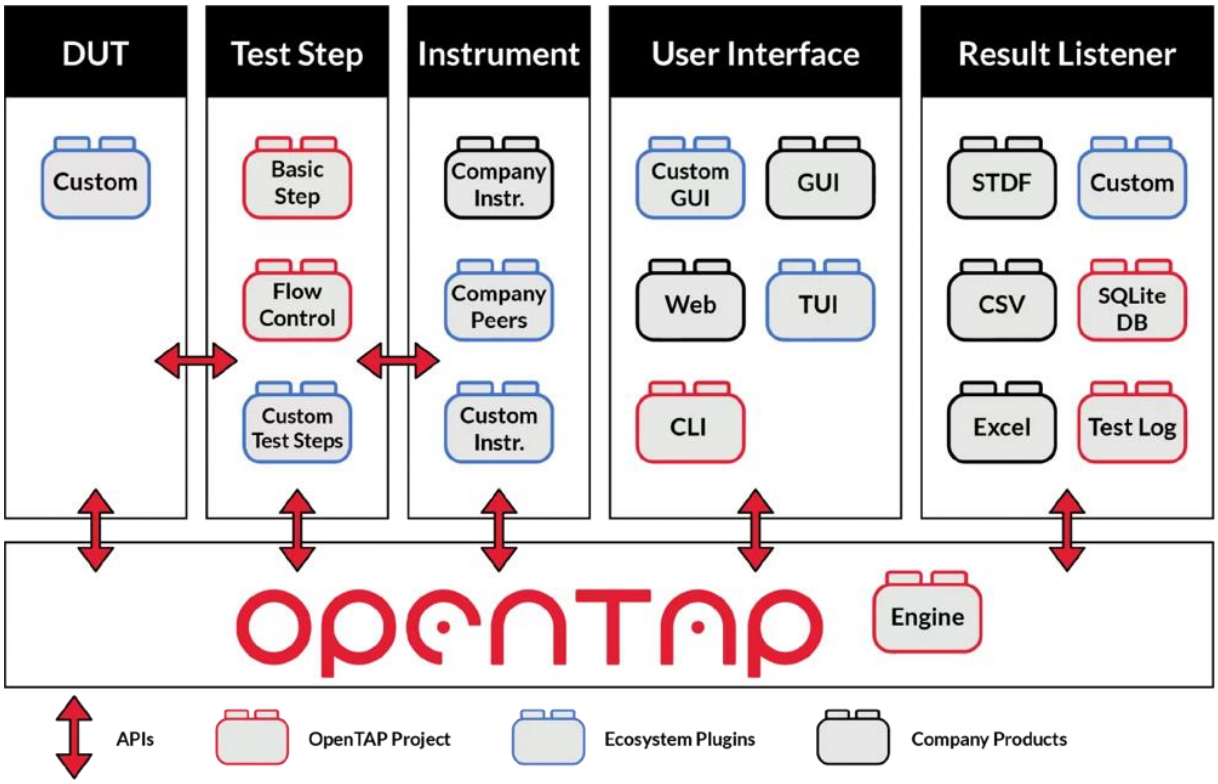

Figure 2. Detail of OpenTAP core and plugin architecture

OpenTAP Engine

The OpenTAP Engine is the core component in the software. It includes a plugin manager that discovers and manages plugins (test steps, DUT and instrument plugins, etc.). It also controls test plan execution (list of test steps) and provides access to functionality offered by the plugins. This functionality includes logging, result storage and instrument communication (e.g., user-developed hardware plugins. The OpenTAP Engine also includes an API for controlling the platform from external applications, such as a 3rd party and legacy test applications, the Editor, or the Command Line Interface (CLI) allows for headless execution of Test Plans that can be run in any environment. The CLI can also be easily integrated into scripts and execution tools.

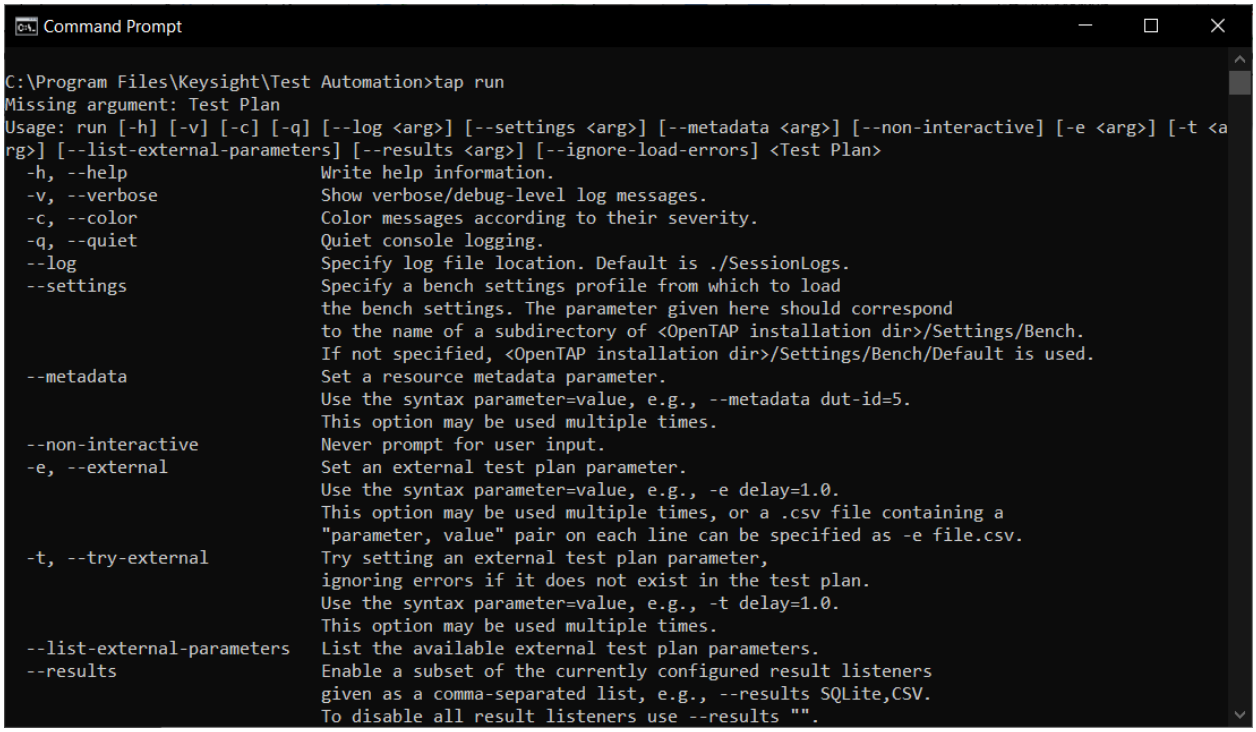

Figure 3. OpenTAP Command Line Interface

Graphic Test Editor

PathWave Test Automation Editor

The Editor allows for simple and intuitive creation and execution of tests. The tests are stored in a single file as human-readable XML, easing inspection and version control. Various built-in features allow for high levels of flexibility including:

- Built in steps for sweeping settings, logging, and parallelization
- Easily enable, disable, and reorder steps
- Single step through a test plan execution
- Attached to code debugging tools
- Creating External Test Plan settings to handle varying test types.

A second Editor application (EditorX) also exists to support Linux-based development and deployment.

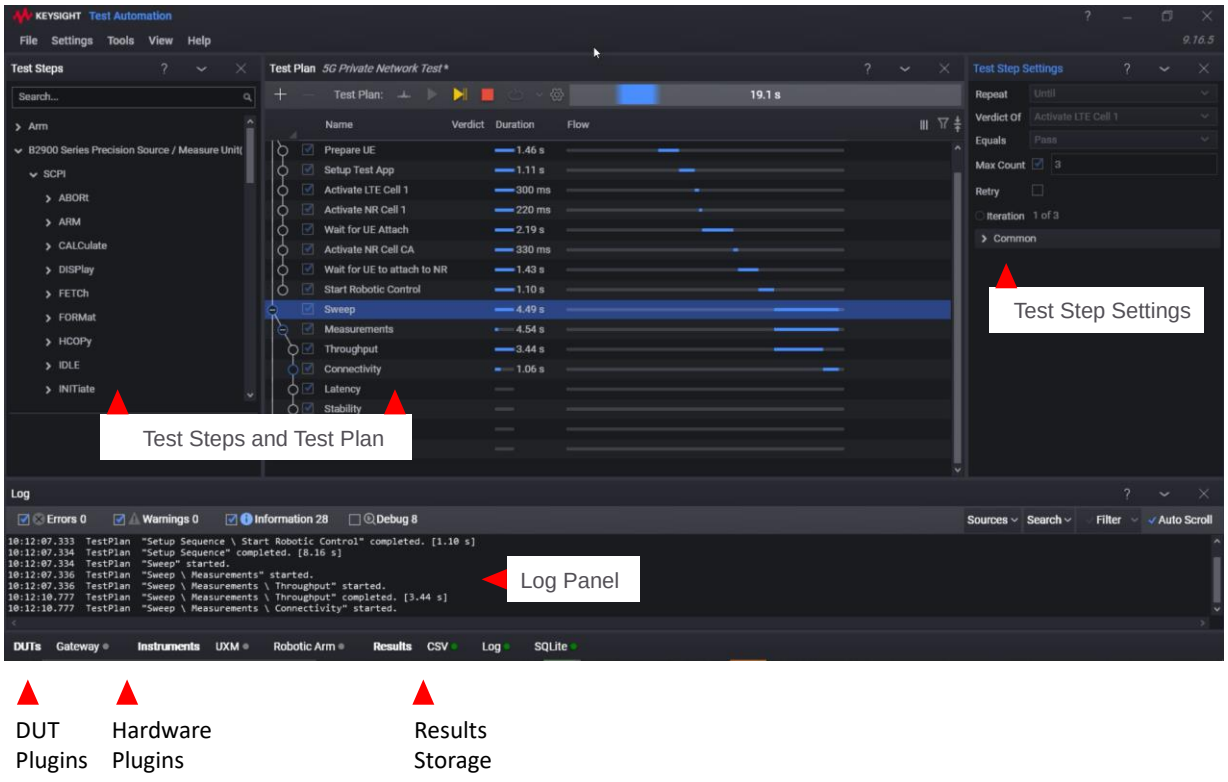

Figure 4. Using the Editor to view Test Steps, a Test Plan, test logging and Test Step settings.

Custom Operator User Interfaces

Shown in Figure 4. is an example of an operator UI that can built on top of the core OpenTAP Engine allowing for existing plugins and tests plans to scale to high volume manufacturing.

The platform provides an API to support creation of your own user interfaces for test operators to assess go/no-go, pass/fail, and key test result values.

Figure 5. The platform API enables user-developed GUIs that help operators easily visualize test results.

Interactive Mode

A recent addition to PathWave Graphical Editor functionality is Interactive Mode that allows users to create dockable panels to customize the Editor user interface in support of operation in advance of full test automation. As users transition from working interactively to increasing degrees of automation, they can swap out and re-arrange panels without need to write new code.

Figure 6. Real-time data displays built from dockable panels in the PathWave Graphical Editor

Timing Analyzer

The PathWave Timing Analyzer Tool provides powerful insights into optimizing test plan execution speed. This tool helps you visualize the overall test plan execution time, with the execution time contribution of each test step broken out in detail. A Pareto chart helps focus optimization efforts. Side-by- side viewing lets you compare various test plans. You can also review multiple test plans together for additional insights and creation of statistics.

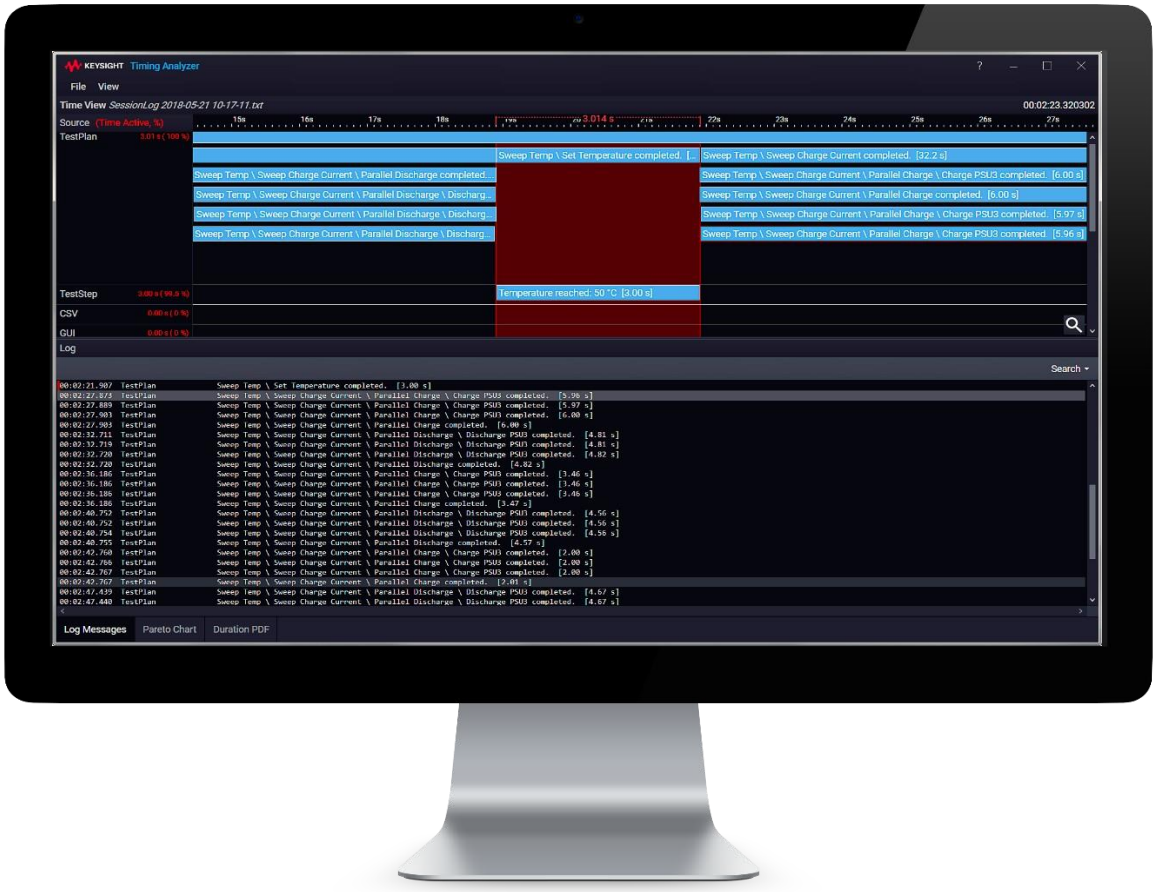

Figure 7. PathWave Timing Analyzer provides detailed information about execution speed for each test step and highlights opportunities to shorten test times by rearranging test steps and running steps in parallel.

Result Viewer

The PathWave Results Viewer brings the power of relational databases to result visualization, empowering your test plan development with a consistent view of data across multiple stages of your engineering process. Each time a test plan is executed, the results are stored in a database, the contents of which can be graphed and visualized using the Results Viewer. Multiple data sets can be viewed to compare results across different test runs. Also provided is the test plan Run Explorer to help manage test plan data, recall prior test plans, merge and compare test log timings, compare test plan settings, search for specific test results, and plot outcomes using the Results Viewer.

Figure 8. The PathWave Results Viewer provides quick and flexible test run data visualization.

Ordering Information

KS8400B software licensing

Keysight KS8400B PathWave Test Automation is licensed based on the options purchased. Licenses are sold as fixed node-locked to a single PC, transportable and network floating in either perpetual or various subscription options.

	Fixed, node-locked (single PC)	Transportable	Network floating (multiple PCs)
One-year subscription	KS8400B-1FL	KS8400B-1TL	KS8400B-1FL

6 month, 24 month, 36 month, and perpetual licenses are also available.

Try the Software Today!

Experience Keysight's powerful and flexible test sequence and creation capabilities and optimize your test software development today.

Download the 30-day trial.

keysight.com/find/taptrial

OpenTAP® engine licensing

The OpenTAP open source test automation project is licensed under the Mozilla Public License version 2.0 (MPLv2). Plugins can be licensed under the MPLv2 and compatible licenses.

Learn more about the OpenTAP project at https://www.opentap.io or view the code and available open source plugins at https://github.com/opentap

System and Installation Requirements

Recommended minimum PC configuration

- Microsoft Windows 10 and above: Home, Professional, Enterprise or Education (32- or 64-bit)
- Ubuntu Linux 18.04
- At least 1 GB free disk space
- Minimum 1024x768 video monitor

Prerequisite drivers and software

- Keysight IO Libraries Suite Version 16.0 or above
- For software development: Microsoft Visual Studio 2019 or above, Professional or Enterprise editions recommended
- Microsoft .NET 6 or Python 2.7, 3.6, or 3.7

Related Software

Keysight Command Expert www.keysight.com/find/commandexpert

Keysight I/O Libraries www.keysight.com/find/iosuite

OpenTAP Project www.opentap.io and https://github.com/opentap/opentap

Package Repository package.opentap.io

PathWave Test Automation Premium Support and Consulting Services

Software support subscriptions include access to updates and call center experts during the subscription period. Perpetual licenses must accompany a one-year support subscription which can be optionally renewed every year. Annual licenses include a support subscription.

Keysight also offers a variety of optional start-up assistance and project consulting services to help you maximize your test development productivity. Contact your Keysight sales specialist or application engineer for more details.

www.keysight.com/find/services

More Information

For additional details regarding KS8400B PathWave Test Automation, visit http://www.keysight.com/find/tap

Learn more at: 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

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