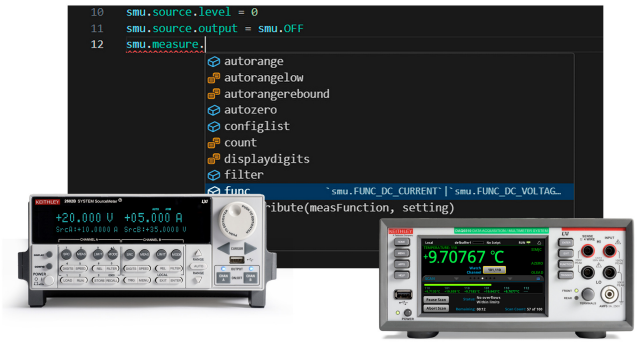
TSP Toolkit

Visual Studio Code Extension



Test Script Processor (TSP™) technology is a unique instrument automation command set and programming language. TSP-enabled instruments contain an embedded scripting engine that's capable of executing both instrument control commands and basic programming functionality.

The TSP Toolkit is a Visual Studio Code extension that provides rich support for TSP technology to edit and execute scripts. The extension includes command-set documentation and language features such as syntax error detection and code navigation, as well as code completion suggestions, inline help, and built-in TSP command documentation.

Key features

The TSP Toolkit allows you to:

- Write your code with the assistance of autocompletion and syntax checking
- Access detailed information on individual commands such as definition, accepted parameters and usage examples
- Send commands and interact directly with your instruments through the terminal
- Export and save instrument buffers to a PC
- Debug TSP Scripts
- Discover available instruments on your local network and save them to the instruments pane for quick access
- Remotely upgrade the instrument firmware
- Import TSP example scripts to your workspace
- Export the output of a TSP script from the terminal to a *.csv or *.txt file
- Leverage all the benefits of TSP scripting more easily than ever

Applications

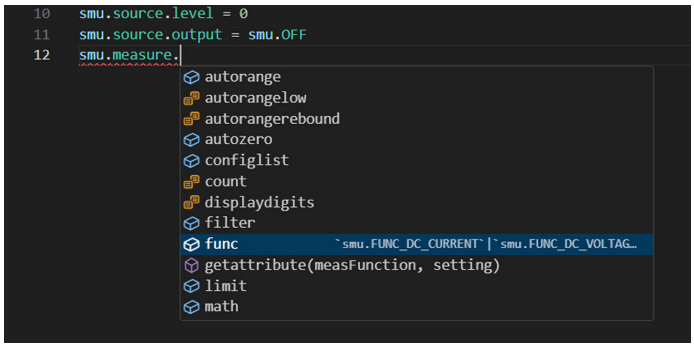
- Test automation via embedded script execution
- Scalable test systems
- Synchronized test system control

A New Era in Test Script Development

The TSP Toolkit is an updated script development environment that includes instrument support for a majority of TSP-enabled instrumentation plus many quality-of-life features that improve the script development experience.

TSP Toolkit features the modern user interface of the Visual Studio Code IDE, complete with syntax highlighting and the increased readability it affords, along with the convenience of the many extensions available on the VSCode marketplace.

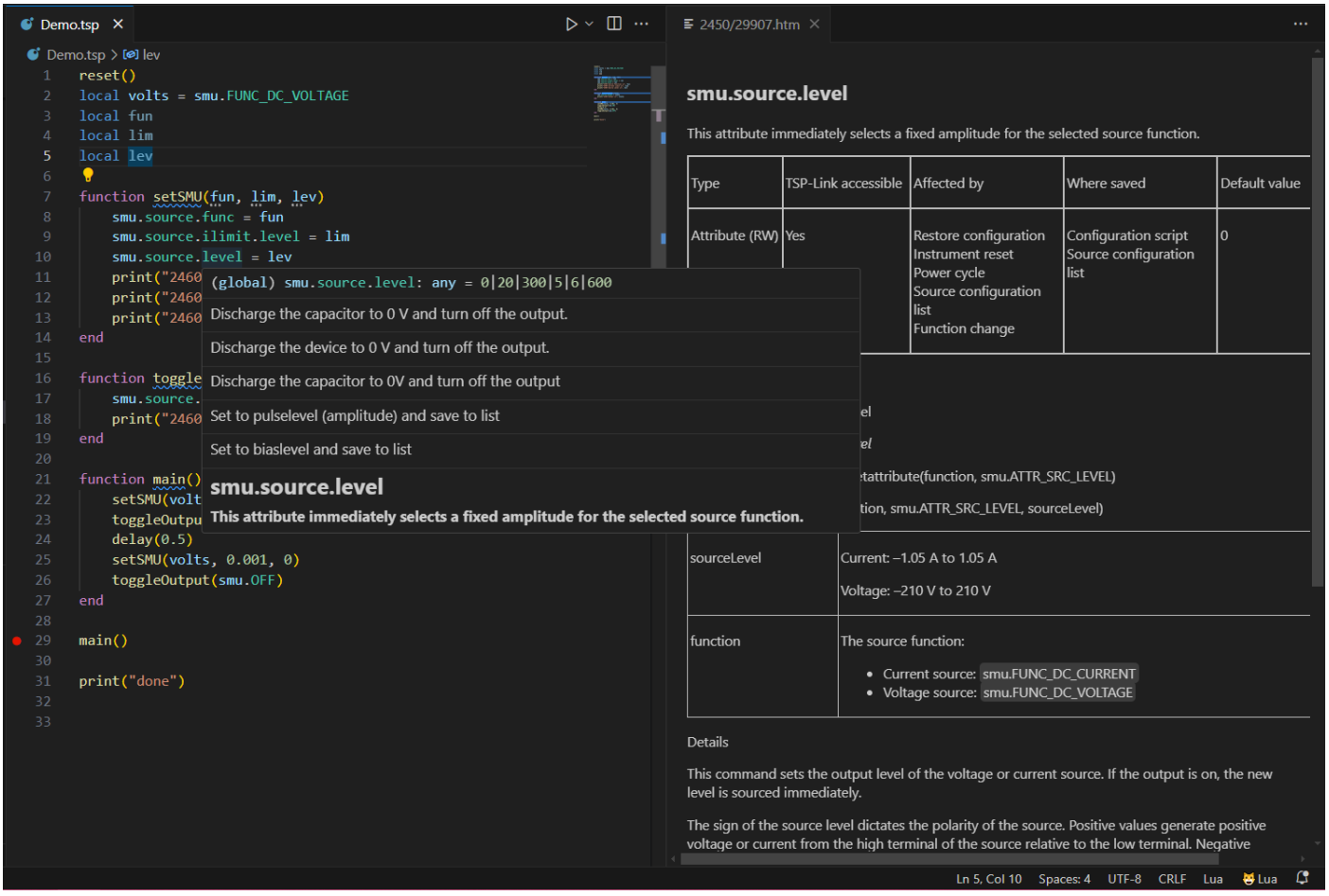
The TSP Toolkit extension also features autocompletion alongside in-line and hover help, reducing pesky mistakes from copying/pasting TSP commands improperly and eliminating the need to manually parse through dense reference manuals to confirm proper command usage and syntax.



The autocompletion feature assists with writing code and reducing mistakes

Optimizing Productivity and Increasing Throughput

TSP technology is both an instrument automation command set and programming language. TSP-enabled instruments, like source measure units (SMU), data acquisition (DAQ) systems, and digital multimeters (DMMs), contain an embedded scripting engine that can execute basic programming functionality and instrument control commands.



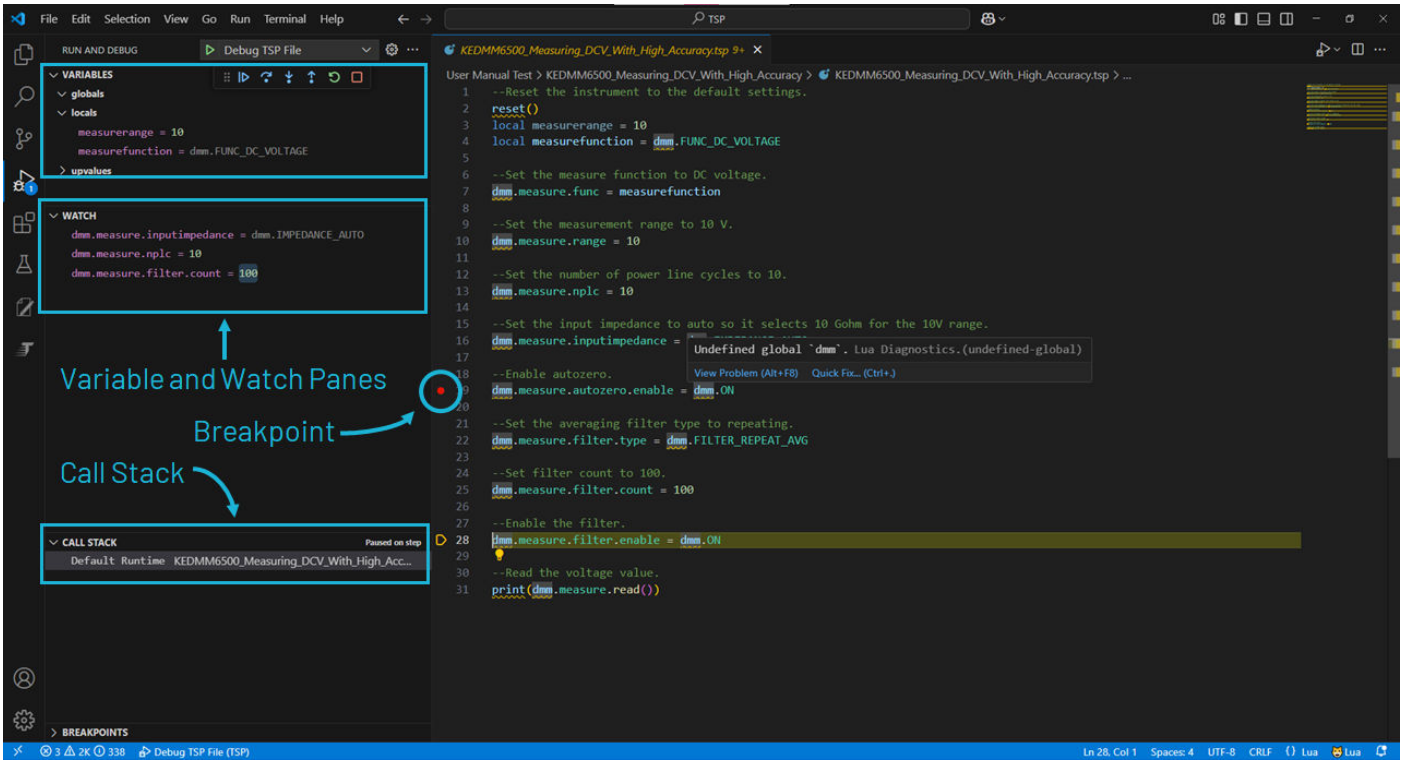
The automated TSP script generation feature allows you to configure a variety of bias and sweep sourcing operations

Advanced Features

On-Instrument Debugger

Gives a user the ability to debug scripts as they run in the instrument environment.

- **Variable Pane:** Monitor the status of declared variables and edit values dynamically
- **Watch Pane:** Monitor the status of selected variables, commands, tables, and expressions dynamically as the debugger steps through the code
- **Call Stack:** View the function or procedure calls that are currently on the stack
- **Compatible with all currently-supported instrumentation**



The debugger feature allows you to monitor variables, watch expressions and view the call stack

Automated TSP Script Generation

Perform current vs. voltage (I-V) test on a variety of materials, such as two-terminal and multi-terminal semiconductor devices, solar cells, and more. You can configure each SMU or PSU for a variety of bias and sweep sourcing operations, then run, edit, and leverage the resulting TSP code.

- **Interactive GUI:** Quickly create I-V characterization routines by entering test parameters in a user interface and generate TSP scripts with a single mouse click
- **Waveform Previews:** Verify sourcing behavior prior to generating a script to eliminate guesswork
- **Compatible with MP5000 Series SMUs and PSUs**

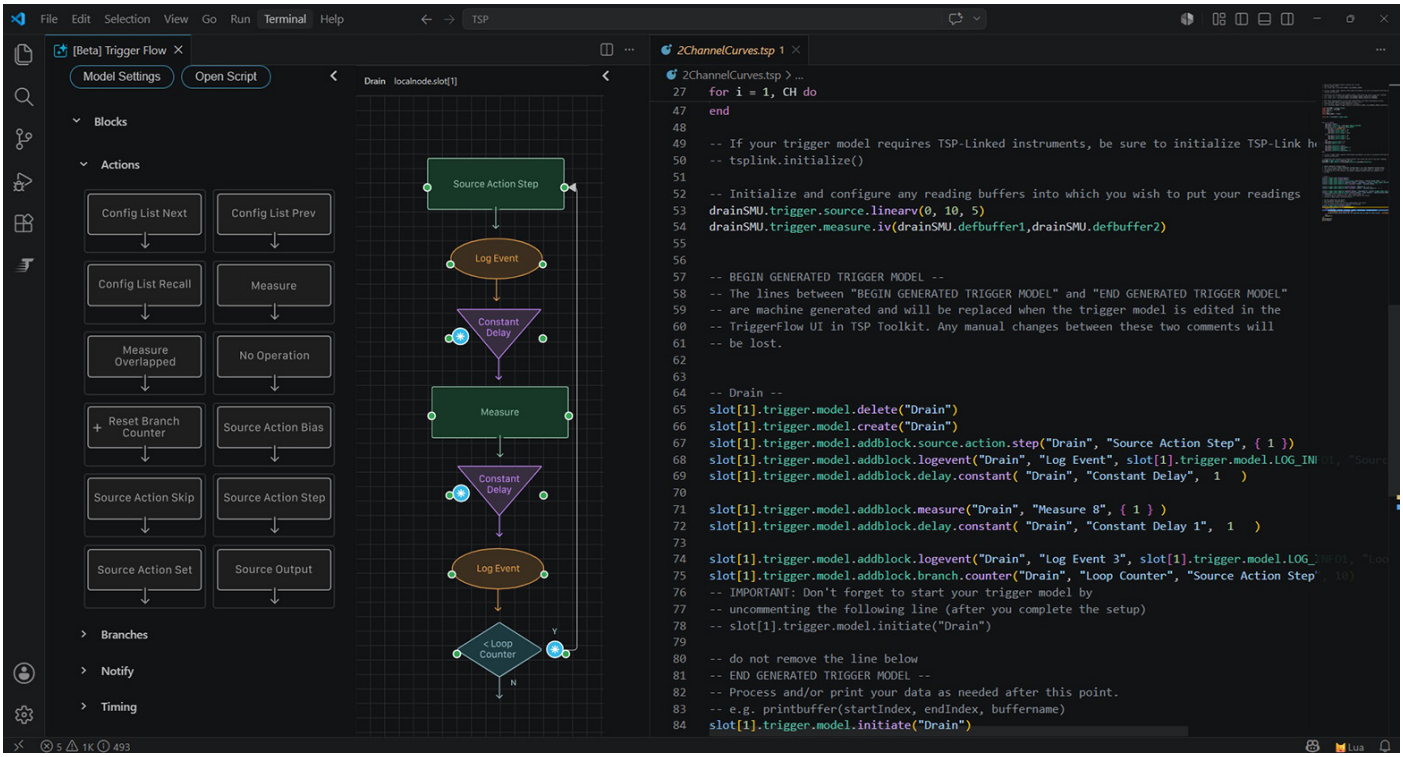


The automated TSP script generation feature allows you to configure a variety of bias and sweep sourcing operations

TriggerFlow for Building Trigger Models

The trigger model of the MP5000 can be represented through a graphical display within TSP Toolkit called TriggerFlow™. The TriggerFlow™ UI allows complex trigger models to be configured visually by simply arranging the operation blocks that the instrument executes.

- **Interactive GUI:** Drag and drop trigger model blocks to build complex trigger flows in an infinite canvas
- **Templates:** Pre-configured groups of trigger model blocks that perform common operations such as pulse sweeps can be added to a TriggerFlow
- **Help Text:** Comments within the generated test script define which additional TSP commands are needed to create a functional trigger model
- **Compatible with MP5000 Series SMUs and PSUs**



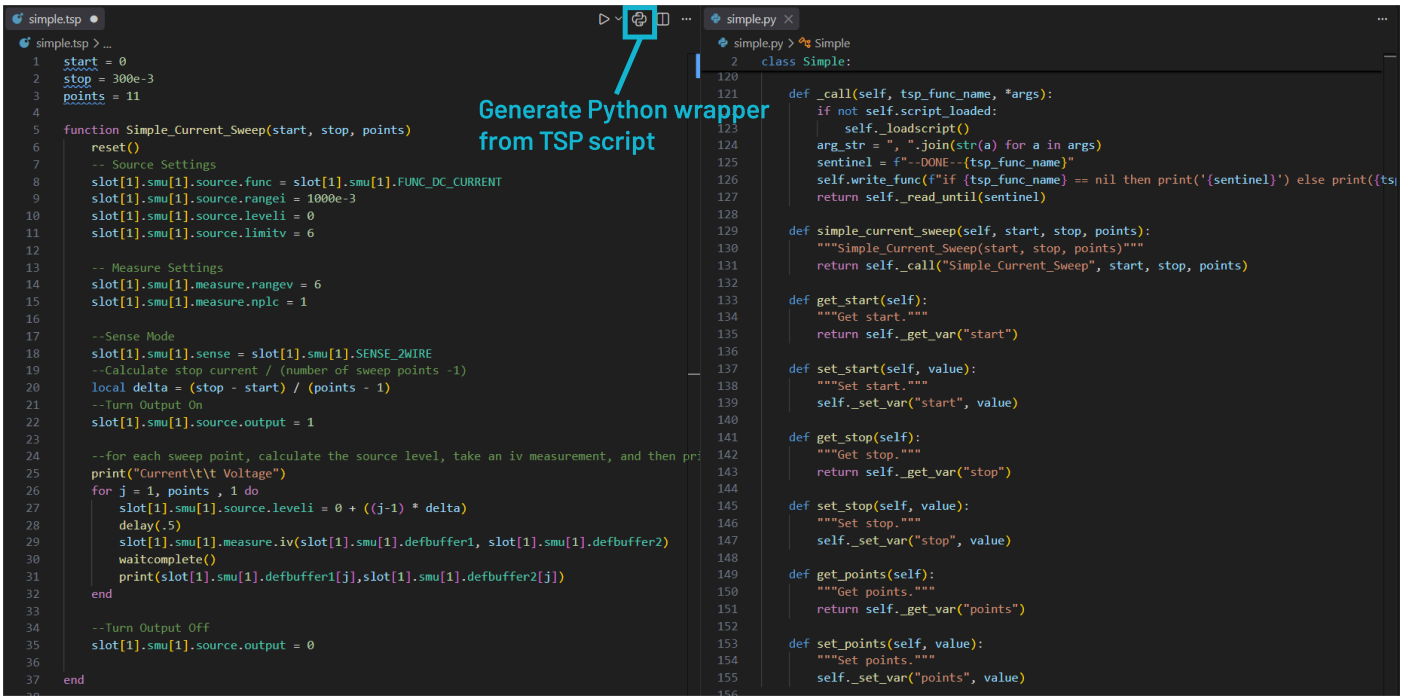
Configure a trigger model graphically with TriggerFlow

Python Interoperability

TSP Toolkit can convert a *.tsp script into a Python wrapper class. The wrapper loads the same *.tsp script onto the instrument and exposes its public functions and supported global variables to your Python application.

You can use all of the timing and synchronization benefits of TSP on-instrument scripting without needing to overhaul an existing Python code base.

- **Push-Button TSP Wrapping:** Generate a Python wrapper for any *.tsp file by selecting Generate Python Wrapper from a TSP Script from the editor, editor tab, or Explorer right-click menu. The command creates a *.py file at a specified location and opens it in VS Code.
  - Top-level TSP functions are accessed by Python methods with matching parameters.
  - Top-level global variables receive get_<name>() and set_<name>(value) methods.
  - The loaded TSP script remains the source of the instrument's behavior; the wrapper does not translate or run the function body in Python.
- **Compatible with all currently-supported instrumentation**



Generate a Python wrapper from a TSP script

Supported Instruments

Source Measure Units	Digital Multimeters	Data Acquisition Systems	Power Supplies
MP5000 SMU Series Modular Precision Test System Source Measure Units	DMM7510 7.5-Digit Graphical Sampling Meter	DAQ6510 6.5-Digit Data Acquisition and Logging Multimeter System	MP5000 PSU Series Modular Precision Test System Power Supply Units
2400 Graphical Touchscreen Series	DMM6500 6.5-Digit Multimeter with Graphical Touchscreen	3700A System Switch / Multimeter	
2600B Single and Dual Channel Systems			
2650 Series for High Power			

Install the latest version

Microsoft Visual Studio Code Marketplace

Learn More about TSP Toolkit

Visit the TSP Toolkit product page for the latest information about TSP Toolkit.

For questions, please contact your local Tektronix sales office.

Recommended System Requirements and Prerequisites

- 1.6 GHz or faster processor
- 1 GB of RAM
- Windows 10 and 11 (64-bit)
- Linux (Debian): Ubuntu Desktop 24.04, Debian 13
- Linux (Red Hat): Red Hat Enterprise Linux 10, Fedora 40
- Instrument communication interfaces: USB and LAN
  - VISA drivers are supported for instrument connectivity and required for USB connections
  - LAN communications are supported via raw sockets or via VXI-11 and HiSLIP using VISA drivers.

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