

KEITHLEY

A Tektronix Company

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Startup Software Quick Start Guide

Safety precautions

Observe the following safety precautions before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product warranty may be impaired.

The types of product users are:

Responsible body is the individual or group responsible for use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Keithley Instruments products are designed for use with electrical signals that are measurement, control, and data I/O connections, with low transient overvoltages and must not be directly connected to mains voltage or to voltage sources with high transient overvoltages. Measurement Category II (as referenced in IEC 60664) connections require protection for high transient overvoltages often associated with local AC mains connections. Certain Keithley measuring instruments may be connected to mains. These instruments will be marked as category II or higher.

Unless explicitly allowed in the specifications, operating manual, and instrument labels, do not connect any instrument to mains.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 V DC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance-limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

For safety, instruments and accessories must be used in accordance with the operating instructions. If the instruments or accessories are used in a manner not specified in the operating instructions, the protection provided by the equipment may be impaired.

Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.

When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as protective earth (safety ground) connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.



If a screw is present, connect it to protective earth (safety ground) using the wire recommended in the user documentation.



This symbol on an instrument means caution, risk of danger. The user should refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.



This symbol on an instrument means caution, risk of electric shock. Use standard safety precautions to avoid personal contact with these voltages.



This symbol on an instrument shows that the surface may be hot. Avoid personal contact to prevent burns.



This symbol indicates a connection terminal to the equipment frame.



If the mercury symbol is on a product, it indicates that mercury is present in the display lamp. Please note that the lamp must be properly disposed of according to federal, state, and local laws.

WARNING This heading in the user documentation explains dangers that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

CAUTION This heading in the user documentation explains hazards that could damage the instrument. Such damage may invalidate the warranty.

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Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits — including the power transformer, test leads, and input jacks — must be purchased from Keithley Instruments. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keithley Instruments to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley Instruments office for information.

To clean an instrument, remove power from the instrument. Use a damp cloth or mild, water-based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., a data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning and servicing.

Safety precaution revision as of January 2013.

What is KickStart?

Keithley KickStart is a software program that allows you to set up your instrument and run a test in a few simple steps:

- Select your instrument
- Select the test type
- Configure the test
- Run the test

The flexible plug-in architecture of the KickStart software allows you to create and run tests for different instrument types from a single interface.

Instrument and test plug-ins

Keithley KickStart uses plug-in modules for instrument types and test types. These modules simplify instrument connection and test set up. They automatically configure some of the settings you need to get you started.

The Keithley KickStart software comes with the following instrument and test plug-ins:

- Model 2450 instrument plug-in (TSP mode only)
- Model 2400 instrument plug-in
- SMU Simulator instrument plug-in
- Communication terminal test-type plug-in
- IV Characterizer test-type plug-in

NOTE

The Model 2450 instrument plug-in only works when the Model 2450 is using the TSP command set. The Model 2450 is shipped with the SCPI command set enabled; you must change it to TSP before attempting to use the Model 2450 instrument plug-in in KickStart.

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KickStart features

Features of the Keithley Instruments KickStart software include:

- Simple, customizable user interface
- Automatic discovery of compatible instruments on a network
- Communicate with instruments connected to your computer through the GPIB, USB, and ethernet remote interfaces
- Test-type plug-ins allow you to use advanced testing functions without knowledge of programming languages
- Tests can be saved and used on other compatible instruments
- Flexible graphing option allows you to see the results of your tests in real time
- Spreadsheet view allows you to see individual data points
- Recall, manipulate, and view data graphically from previously saved tests
- Save test data to the Microsoft® Excel® 2007 .xlsx and .csv formats for use in Excel or other statistical analysis software
- Save graph images to the portable network graphics (.png) file format for use in reports and presentations

About the KickStart documentation

This guide contains basic instructions and a few example applications for the KickStart software. Topics in this guide include:

- Installation instructions
- A tour of the KickStart interface and how to customize it
- Basic instructions
- Answers to frequently asked questions
- References to additional sources of information

Additional user information is available in the KickStart software help files. The help content can be found in several places in the KickStart interface:

- Each test-type plug-in has a tab with additional information specific to the test type.
- The blue help icon in the upper right corner of the interface links to a copy of this guide.

Additional information specific to the Keithley instruments that you have is available on the Keithley Instruments website at <http://www.keithley.com>.

Contact information

If you have any questions after you review the information in this documentation, please contact your local Keithley Instruments representative or call Keithley Instruments corporate headquarters (toll-free inside the U.S. and Canada only) at 1-888-KEITHLEY (1-888-534-8453), or from outside the U.S. at + 1-440-248-0400. For worldwide contact numbers, visit the Keithley Instruments website at <http://www.keithley.com>.

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Install the software

You can install the KickStart software from the CD-ROM that came with your instrument, or you can download the software from <http://www.keithley.com/support>.

Before you install the KickStart software:

- You must have NI-VISA™ Runtime Engine installed on your computer. If you do not already have it installed, you can install it from the KickStart CD-ROM.
- You must have the Microsoft® .NET Framework 4.0 installed on your computer. Most computers already have this installed, but if you do not have the 4.0 version, you can download it from the Microsoft website.

To install the KickStart software on your computer:

1. Insert the KickStart CD-ROM into the CD-ROM drive of your computer.
2. Double-click the `KickStartSetup.exe` file to start the installation.
3. Follow the prompts to complete the installation.
4. Reboot your computer.

Instrument and test-type plug-ins

You can expand the test capabilities of KickStart by adding additional instrument-type and test-type plug-ins as they become available from Keithley Instruments.

To download and install a new instrument or test-type plug-in:

1. Use a web browser to go to <http://www.keithley.com/support>.
2. Enter `kickstart` in the search box.
3. Click the arrow on the box next to the search box and select **Software**.
4. Click the search icon. A list of software and software-related items for KickStart is returned.
5. Select the plug-in file you want. Instrument plug-ins have a `.kipi` file extension; test-type plug-ins have a `.ktpi` file extension.
6. Download the file to your computer.
7. Open the KickStart software.
8. On the **File** tab, click **Load Plug-Ins**.
9. Select **Instrument Plug-In** or **Test Type Plug-In**.
10. Navigate to the downloaded plug-in, select the plug-in you want, and click **Open**.
11. Close the KickStart software and then reopen it. The new plug-ins are now visible in the Instrument Configuration or Test Types panel, as applicable.

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Explore the interface

To start the KickStart software, from the Start menu, select:



KickStart opens to a welcome screen that has some general information about the software.

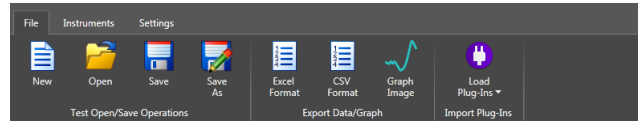
The main screen areas of the KickStart software interface are:

- The ribbon
- The Instrument Configuration panel
- The Test Types Panel
- The main test window
- KickStart Help

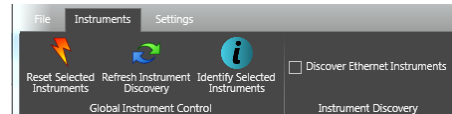
The ribbon

The ribbon at the top of the KickStart interface contains the File, Instruments, and Settings tabs.

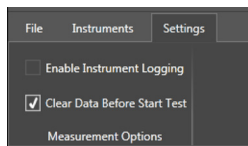
File tab. Contains options that allow you to create, open, and save tests, export data and graphs, and import plug-ins.



Instruments tab. Contains global instrument control options that you can use to reset selected instruments, discover instruments on your ethernet network, and identify the instruments selected for test.



Settings tab. Allows you to adjust how measurement data is saved.



The Instrument Configuration panel

The Instrument Configuration panel displays a list of instruments that are available to use with KickStart. When you click an instrument in the list, the lower part of the panel shows details about the instrument you have chosen.

When you start the KickStart software, it searches for instruments that are compatible with the instrument plug-ins loaded in your installation of the software.

If you do not see your instrument in the list:

1. Click the **Instruments** tab.
2. Click **Refresh Instrument Discovery**.

KickStart searches for any compatible instruments on the network subnet.

If you do not want to search for all instruments on the network subnet, clear the **Discover Ethernet Instruments option**.

Instrument plug-ins

The KickStart software comes with the following instrument plug-ins:

- Model 2450 instrument plug-in (TSP command language only)
- Model 2400 instrument plug-in
- SMU Simulator instrument plug-in

You can load additional instrument plug-ins as they become available from Keithley Instruments. For more information, see [Install instrument or test-type plug-ins](#).

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The Test Types panel

Click the Test Types tab to display a list of the test-type plug-ins that are loaded into your installation of the KickStart software.

Test-type plug-ins

KickStart comes with the following test-type plug-ins:

- **Communication Terminal.** Allows you to communicate with an instrument using the Test Script Processor (TSP®) or SCPI command language. KickStart displays the commands that are sent and any output received from the instrument in the Communication Terminal output window.
- **I-V Characterizer.** Allows you to quickly configure an instrument to perform complex source and measure tests without using a programming language. View the test data in real-time in a graph or spreadsheet view.
- You can load additional test-type plug-ins as they become available from Keithley Instruments.

The main test window

The contents of the main window in KickStart varies depending on the test type you have chosen for your application. When a test is open, the main window contains several tabs that give you access to additional functionality and test-type specific help.

Communication Terminal test window

When the Communication Terminal test-type plug-in is selected, the main test window displays a simple command-line interface. You can use this interface to send commands to and view output from the instrument.

The Communication Terminal test window contains these tabs:

- **Communication Terminal tab.** Enter and send SCPI or TSP commands one line at a time. The Output Window displays the commands you send and any output from the commands.
- **Notes tab.** Click in the window and type notes about the test. The text that you enter here is saved with the test project.
- **Help tab.** Access user documentation that is specific to the test-type you are using.

IV Characterizer test window

The IV Characterizer test type allows you to set up and run complex tests with no command-language programming.

The tabs in the IV Characterizer test window are described in the following text.

Source Measure tab

Contains all of the source and measure settings you need to set up your test. If you cannot select an option, it is not available for your instrument.

Spreadsheet tab

When you execute an IV Characterizer test, you can see the values of data points in your test on this tab as they are being recorded. Data from your test is saved with the project and remains with the test until you execute the test again. When you execute the test again, data is overwritten.

To save the data to an `.xlsx` or `.csv` file format, from the File menu, select the **Excel Format** or **CSV Format** option.

Graph tab

You can view your data in a graphical format as you run your test. You can set X-axis and Y1 and Y2-axis settings for measurement value or time. You can also select linear or logarithmic representation of your data, and you can change the color of graphed lines.

After testing, you can change the presentation of your data on the graph by changing any of the settings on the graph tab. Data from your test is saved with the project. You can view it on the graph at a later time by selecting the data for each of the axes again. To save the graph to a `.png` file, from the File menu, select the **Graph Image** option.

Notes tab

Click in the window and type notes about the test. Text you type here is saved with the test project for future reference.

Help tab

Access user documentation specific to the test-type you are using.

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KickStart Help

There are two places in the KickStart software interface that you can view help content:

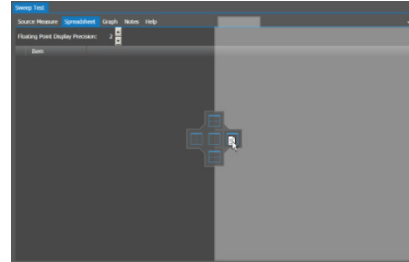
- Click  in the upper right corner of the interface to open this document as an Adobe Acrobat PDF file.
- Click the Help tab in the main measurement window to open information specific to the communication terminal or the test type that you are using.

Customizing the interface

You can customize the appearance of the KickStart interface:

- **Hide or show the ribbon.** Click the arrow in the upper right corner of the ribbon to hide or show it.
- **Dock, undock, show, hide, and close panels.** Right-click the arrow next to the pin icon in a panel to open a menu of options for the panel.
- **Drag tabs in the main test window to reposition them.** Click and hold the tab and drag it to the new location.

- **Display multiple window in the main test window.** Select a tab and drag it to the graphic in the center of the main test window. The figure below shows the screen as the spreadsheet tab is clicked and dragged to the right side of the window.



NOTE

Changes you make to the layout and views in a project are not saved with the project.

Create and run a test

When you create a new test project in KickStart, you can set up and run a test in KickStart in a few simple steps:

1. Select an instrument.
2. Select the test type, test settings, and data view settings.
3. Run the test.

The following topics guide you through the steps to set up a KickStart test.

Create a new test project

To use KickStart, you must create a new test project or open an existing test project file, if you have one.

To create a new test project:

1. Select the **File** tab and click **New**. The Save As dialog box opens.
2. Go to the location where you want to save your test projects. The default location for KickStart projects is My Documents\Keithley Instruments\KickStart.
3. Enter a name for your test.
4. Click **Save**. KickStart creates a new folder with the name of your test project.

NOTE

KickStart test files have a `.kst` file extension. Creating the test project does not create the `.kst` file. You must select an instrument and test type before you can save your test to a `.kst` file.

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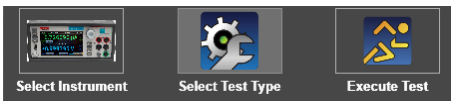
To open an existing test project on your computer:

NOTE

The KickStart software installation includes one or more example projects. These examples are installed on your computer in the My Documents\Keithley Instruments\KickStart folder.

1. From the File tab, click **Open**. The Open dialog box is displayed.
2. Go to the folder that contains the test that you want to open.
3. Select the .kst file.
4. Click **Open**.

When you create or open a test project, the KickStart interface changes. You can now see large icons at the bottom of the screen that represent the remaining steps to set up and run your test. The following topics describe these steps.



Step 1: Select an instrument

To select an instrument:

1. Click the **Select Instrument** icon. A panel opens that shows the instruments that are connected to your computer.

NOTE

If the instrument that you want to connect to is not shown in the Instrument Configuration panel, click the Instruments tab on the ribbon and click Refresh Instrument Discovery.

If you still do not see your instrument, check the connections from your computer to your instrument. For more information about remote communication interfaces and test connections, refer to the Reference Manual on the Product Information CD-ROM that came with your instrument.

2. Right-click the instrument that you want to connect and select **Add Instrument**.

Step 2: Select the test type

After you have selected an instrument, the Select Test Type icon at the bottom of the KickStart interface is highlighted. Click the icon to open the Test Types panel.

NOTE

You can also open the Test Types panel by clicking the Test Types tab on the left side of the interface.

The KickStart software comes with the following test-types:

- Communication Terminal
- IV Characterizer

To select the test type:

1. Right-click the test type you want and select **Add Test Type**. A new tab opens with the name of your test in the main area of the KickStart interface.
2. On the ribbon, click **Save**. KickStart saves your test file with a `.kst` extension in the folder that you specified when you created your new test project.

Select your test settings

The settings for your test depend on the test type you are using. For more information about the settings for your test type, open your test and click the **Help** tab in the main test window.

For additional information about how to use your instrument, see the documentation on the Product Information CD-ROM that came with your instrument. You can also access this information on the Keithley Instruments support website at www.keithley.com/support.

Select your data view settings

Some of the KickStart test-type plug-ins have options to view and save your test data on the Graph and Spreadsheet tabs in the main test window. The following topics describe these options.

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Graph tab

You can see your data in a graph view as your test is running. You can also change the settings for the test data to see the data in a different way.

NOTE

If you save your test data, it remains through a power cycle until you run the test again. Every time a test is run in the same test project, the previous data is overwritten if the Clear Data Before Start Test check box is selected on the Settings tab on the ribbon.

To set up the graph view:

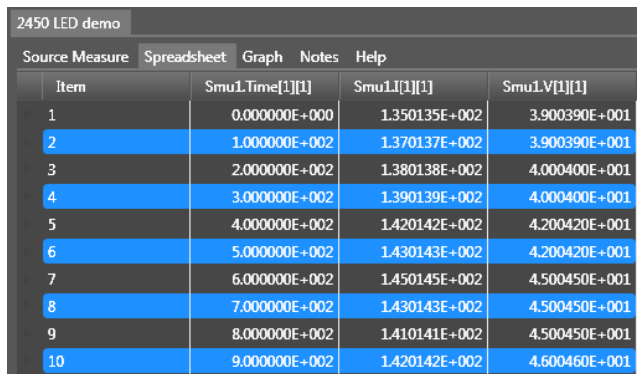
1. Click the **Graph Tab**.
2. Click **X-Axis** on the left side of the main window.
3. From the submenu that opens, select the data to plot to the X-axis.
4. Click **Y1-Axis** to open a submenu of choices.
5. Select the data to plot to the Y-axis.
6. You can also select the Y2-Axis and select a second type of data to plot.
7. If you want to change the color of the data on the Y1-axis or the Y2-axis, click **Axis Color** to open the color palette.
8. Drag the new color to the submenu of the Y-axis that you want to change. The color updates immediately in the main graph window.
9. To change from Linear to Log (logarithmic) representation of the data, click **Options** and select the option you want.
10. In the Options submenu, you can also choose to display or hide the legend and series information.

When you run your test, your data is graphed in real-time on the Graph tab. If you save your test data after running the test, you can re-open the test at a later time. You can view the data or change the view settings to see the data in a different way.

You can also zoom in and out in the graph view by dragging the graph to change the view.

Spreadsheet tab

If your test-type supports the spreadsheet view, you can view test data after the test is run. You can see your data in a spreadsheet view after execution of your test.



Item	SmuI.Time[1][1]	SmuI.I[1][1]	SmuI.V[1][1]
1	0.000000E+000	1.350135E+002	3.900390E+001
2	1.000000E+002	1.370137E+002	3.900390E+001
3	2.000000E+002	1.380138E+002	4.000400E+001
4	3.000000E+002	1.390139E+002	4.000400E+001
5	4.000000E+002	1.420142E+002	4.200420E+001
6	5.000000E+002	1.430143E+002	4.200420E+001
7	6.000000E+002	1.450145E+002	4.500450E+001
8	7.000000E+002	1.430143E+002	4.500450E+001
9	8.000000E+002	1.410141E+002	4.500450E+001
10	9.000000E+002	1.420142E+002	4.600460E+001

Step 3: Run the test

Once you have configured your test and view settings, you are ready to run your test.

1. To run the test, click the **Execute Test** icon in the lower right corner of the interface.
2. To view the results of the test, you can click the **Spreadsheet** or **Graph** tab.
3. To record notes about the test, click the **Notes** tab and type notes.
4. To get information about the test type you are using, click the **Help** tab.
5. After running the test, you can select different data from the test to show on the graph.

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Frequently asked questions

Why is it taking so long to open KickStart?

If the KickStart Software is taking a long time to open or is not opening at all, you may need to download a patch for a known Microsoft bug.

For more information, see Microsoft Article ID 2484841 at <http://support.microsoft.com/kb/2484841/en-us>

Link to download the patch:

<http://archive.msdn.microsoft.com/KB2484841/Release/ProjectReleases.aspx?ReleaseId=5583>

Why can't I move to step 2 when creating a new test?

When you create a new test in KickStart, you must add the discovered instrument. Right-click the instrument and select **Add Instrument**.

Once you have added an instrument, you can move to step 2, Select Test Type. To select the test type, right-click the test and select **Add Test Type**.

Why are no ethernet instruments displayed in the Instrument Configuration window?

There is a check box on the Instrument Settings tab in the ribbon that enables or disables discovery of ethernet instruments. Verify that instrument discovery is enabled.

Only the instrument simulators are displayed in the Instrument Configuration panel. Why can't I see my instrument?

Check the prerequisites to KickStart installation in the [Install the software](#) section of this guide.

How do I know which instrument is selected for testing by KickStart?

On the Instruments tab, select the **Identify Selected Instruments** icon. The instrument that is selected for testing displays a message that shows which channel they are set to.

Why doesn't my Model 2450 show up in the list of instruments?

The Model 2450 must be set to use the TSP command set to use it with the KickStart software.

To select the TSP command set:

1. On the Model 2450 front panel, press the **MENU** key.
2. Under System, select **Settings**.
3. Next to Command Set, select **TSP**.
4. Reboot the Model 2450.

If you select the SCPI 2400 command set, the Model 2450 appears as a Model 2400 in KickStart and some Model 2450 features are not enabled.

Next steps

For more information and to view documentation specific to your instrument, see the **Keithley Instruments website**, www.keithley.com.

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A Greater Measure of Confidence

KEITHLEY INSTRUMENTS, INC. ■ 28775 AURORA RD. ■ CLEVELAND, OH 44139-1891 ■ 440-248-0400 ■ Fax: 440-248-6168 ■ 1-888-KEITHLEY ■ www.keithley.com

BENELUX

+31-40-267-5506
www.keithley.nl

FRANCE

+33-01-69-86-83-60
www.keithley.fr

ITALY

+39-049-762-3950
www.keithley.it

MALAYSIA

60-4-643-9679
www.keithley.com

SINGAPORE

01-800-8255-2835
www.keithley.com.sg

BRAZIL

55-11-4058-0229
www.keithley.com

GERMANY

+49-89-84-93-07-40
www.keithley.de

JAPAN

81-120-441-046
www.keithley.jp

MEXICO

52-55-5424-7907
www.keithley.com

TAIWAN

886-3-572-9077
www.keithley.com.tw

CHINA

86-10-8447-5556
www.keithley.com.cn

INDIA

080-30792600
www.keithley.in

KOREA

82-2-6917-5000
www.keithley.co.kr

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www.keithley.ru

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