Start Here! It’s easy...

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This Startup Guide selects the “default” project and runs the “vds-id” test. If you wish to select a different project and/or test, you must modify the procedures accordingly. **Figure 1** shows how the KITE window will look after the “default” project and “vds-id” test is selected.

**Figure 1:** KITE interface (“default” project shown with “vds-id” test selected)
Step 1  Unpack your Keithley 4200-SCS

What’s in the box:

• 4200-SCS System – SMUs are built-in, and PreAmps are installed on the rear panel of the mainframe. A PreAmp adds five lower current source-measure ranges to an SMU (10nA, 1nA, 100pA, 10pA, and 1pA). The PreAmps can be removed from the rear panel and mounted remotely on a tester.

• Cables – 2 for each SMU.

• Y-Cable – Use to connect keyboard (with pointing device) to mainframe.

• Power cord

• 4200-SCS KTE Interactive CD-ROM

• 4200-SCS Complete Reference CD-ROM

How to lift:

• Lift the 4200-SCS from the bottom.

• Do not lift from the front bezel.

• Set on a bench or install in a rack with the optional slide rack mounting kit.

Step 2  System connections – Power cord, keyboard, and printer (optional)

Basic system connections to the 4200-SCS (shown in Figure 2) include the keyboard (which has a built-in pointing device), the supplied power cord, and an optional printer. If using a USB printer, connect it to the USB port.

**WARNING**  Plug the female end of the supplied power cord into the 4200-SCS, but DO NOT connect the male end to line power at this time. Steps 2 and 3 of this Startup Guide must be performed with the line power disconnected.

Figure 2: System connections
**Step 3**  
Connect DUT test fixture to 4200-SCS

*Figure 3* shows how to connect a test fixture for a 4-terminal device to the 4200-SCS. The test fixture must be equipped with standard 3-lug female triax connectors.

- **Connections to SMUs** – To connect directly to an SMU, use a Mini triax cable that is terminated with a miniature male triax connector on one end and a standard 3-slot male triax connector on the other end.

- **Connections to PreAmps** – To connect to a PreAmp, use a cable that is terminated with a standard 3-slot male triax connector on both ends.

**NOTE**  Connections are snug; push firmly.

*Figure 3: DUT test fixture connections to 4200-SCS*

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**Step 4**  
Power-up & log-in

A. Make sure the power switch is in the O (out) position. The POWER switch is located on the front panel in lower right-hand corner.

B. Plug the male end of the line cord into a properly grounded AC line power receptacle.

C. Turn on the 4200-SCS by pushing in the POWER switch to the I (in) position.

D. When prompted, simultaneously press Ctrl - Alt - Del.

E. At the KIUSER prompt, press ENTER. There is no password for this account.

**CAUTION** When first starting a KTE-Interactive software tool, you must answer “Yes” to an on-screen license agreement. Answering “No” makes your system nonfunctional until you reinstall the software.
Step 5  
Start KITE, open the “default” project, and select the “vds-id” test
A. Start KITE by double-clicking the following KITE icon on the Windows desktop:

![Double-click to start KITE.](image)

B. When KITE starts, the “default” project will open automatically if it has been set as the default project. If a different project opens, perform the three steps in Figure 4 to open the “default” project. The Project Navigator for the “default” project is shown in Figure 1.

**NOTE** If the Project Navigator is not displayed when KITE is started, click the View menu and select the Project Navigator item. The View menu is located at the upper left-hand side of the KITE window.

**Figure 4: Open “default” project**

1. From the File menu, click Open Project.
2. Use the browser to select the default project*.
3. Click Open to open the “default” project.

* When browsing, use the following directory path to locate the “default.kpr” project file: C:\S4200\kiuser\Projects\default\default.kpr
C. Select the “vds-id” test and display the test Definition tab as shown in Figure 5. The Definition tab for the “vds-id” test is shown in Figure 6.

**Figure 5: “default” Project Navigator – selecting the “vds-id” test**

Double-click “vds-id” to select the test and display the test Definition tab. The checkbox for “vds-id” must be checked in order to run the test. If unchecked, click the checkbox to insert a ✔.

**Step 6**  
Test definition

The test is defined from the test Definition tab shown in Figure 6. As shown in the tab, the device is connected to three SMUs and the Ground Unit (GNDU). In general, SMU3 is used as a voltage step function to provide four different gate voltages (2V, 3V, 4V, and 5V). SMU2 is used to perform a 51 point sweep of drain voltage (0V to 5V) at each gate voltage. A current measurement is performed at each voltage sweep point.

A. If desired, the setup for SMUs and the GNDU can be changed. A settings window is displayed by clicking the appropriate FORCE MEASURE bar as shown in Figure 6. Figure 7 shows the settings window for SMU3. The settings windows for the other SMUs and GNDU are similar.
B. After making any changes to the test definition, click **Save All** on the toolbar to save the settings:

- Click **Save All** to save settings.
Step 7 Run “vds-id” test

A. In the Project Navigator (see Figure 5), make sure the “vds-id” test is highlighted and the checkbox is checked.

B. On the toolbar, click the green Run Test button to run the test one time:

While the test is running, the Run Test button turns gray and the Abort Test button turns red. Also the MEASURING indicator (located on lower right-hand corner of the front panel) will be on while the test is running. When the test is finished, the Run Test button turns green.

Troubleshooting hints:

• A selected test will not run if the Run Test button is not green. Here are a few reasons why the Run Test button will not be green:
  - A test is still running.
  - The checkbox for the test is not checked (see Figure 5).
  - Changes to the test setup were not saved (see Step 6B).

• If a selected test still will not run, click the Status tab for the test. This tab provides status information for the test.
### Step 8  View data sheet

The data sheet for the “vds-id” test is displayed by clicking the **Sheet** tab for the test. Use the tabs at the bottom of the **Sheet** to display the data type. A sample data sheet for the “vds-id” test is shown in **Figure 8**.

#### Figure 8: Sample data sheet for “vds-id” test

<table>
<thead>
<tr>
<th></th>
<th>Gate(V)</th>
<th>Drain(V)</th>
<th>Gate(V)</th>
<th>Drain(V)</th>
<th>Gate(V)</th>
<th>Drain(V)</th>
<th>Charge(Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.000E+4</td>
<td>5.00E+3</td>
<td>4.000E+4</td>
<td>5.000E+3</td>
<td>3.000E+4</td>
<td>5.000E+3</td>
<td>3.000E+4</td>
</tr>
<tr>
<td>2</td>
<td>3.000E+4</td>
<td>5.00E+3</td>
<td>4.000E+4</td>
<td>5.000E+3</td>
<td>3.000E+4</td>
<td>5.000E+3</td>
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<td>3.000E+4</td>
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<td>4.000E+4</td>
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<td>4</td>
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<td>5.000E+3</td>
<td>3.000E+4</td>
<td>5.000E+3</td>
<td>3.000E+4</td>
</tr>
</tbody>
</table>

* To select more than one sheet for selective printing, hold down the **Ctrl** key and then click the tab. See Step 10 to print Sheet data.
Step 9  View graph

The graph for the “vds-id” test is displayed by clicking the Graph tab for the test. A sample graph for the “vds-id” test is shown in Figure 9. As shown, there are four I-V curves – one for each gate voltage. The graph was customized to include the Legend box and use different colors for the graph series. The Graph Settings menu (shown in Figure 10) was used to select the Legend box and change series colors.

Figure 9: Sample graph for “vds-id” test
Click Graph Properties and then Series to change the properties for each of the four series.

To display the Graph Settings menu: Right-click mouse anywhere in the graph area.

OR

From the Tools menu, select Graph Settings.

Click to select (✓) Legend box.
Step 10 Printing and exporting data

Printing Sheet data
A. In the KITE workspace, click the Sheet tab to display test data. You can selectively print the Data sheet, Calc sheet, and/or the Settings sheet. Figure 8 shows how to select sheets for printing.

B. From the FILE menu (at the upper left-hand side of the KITE window), select the Print option.

C. In the Print setup window, there are two print options. You can print the Selected Sheet(s) (Data, Calc, and/or Sheet) or the Entire Workbook (Data, Calc, and Sheet).

D. In the Print setup window, click OK to print the data.

Printing the Graph
A. In the KITE workspace, click the Graph tab to display the graph.

B. From the FILE menu (at the upper left-hand side of the KITE window), select the Print option.

C. In the Print setup window, click OK to print the graph.

Exporting data into MS Excel-compatible Worksheet
A. In the KITE workspace, click the Sheet tab to display the test data.

B. In the Sheet tab, click the Save As button as shown in Figure 8.

C. From the Save As setup window, specify a file name and path and click Save. The default directory path for exporting data is C:\S4200\kiuser\export.