Exercise 3-1: Connecting Hardware (Non-NI Instrument)

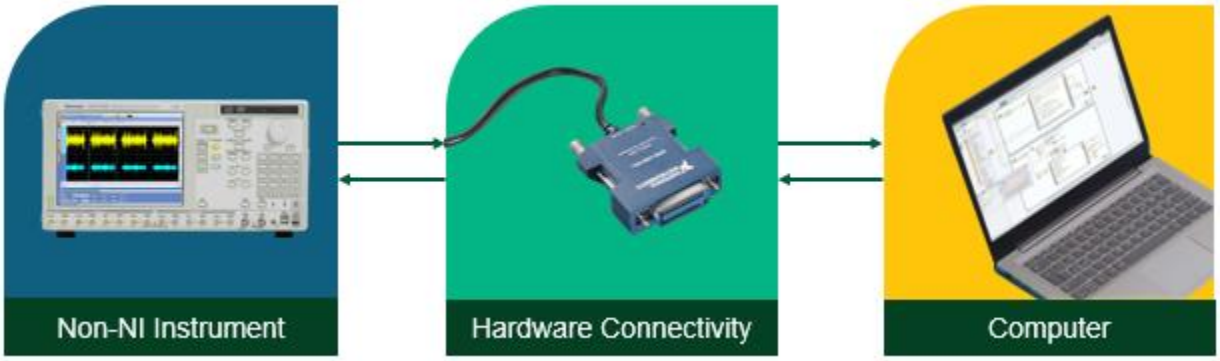
Goal

- Connect a non-NI instrument to your computer so that the instrument can be programmatically controlled by LabVIEW.

Scenario

You are creating an application that acquires data from a non-NI instrument (for example, a non-NI oscilloscope or non-NI digital multimeter).

In this exercise, you will explore how to connect a non-NI instrument to your computer.



Connect a Non-NI Instrument to Your Computer

For this course, imagine that the NI Instrument Simulator represents a non-NI oscilloscope instrument that has a GPIB port.

Furthermore, imagine that your computer has a GPIB instrument control device, such as the GPIB-USB-HS, which allows your computer to communicate with a GPIB instrument.

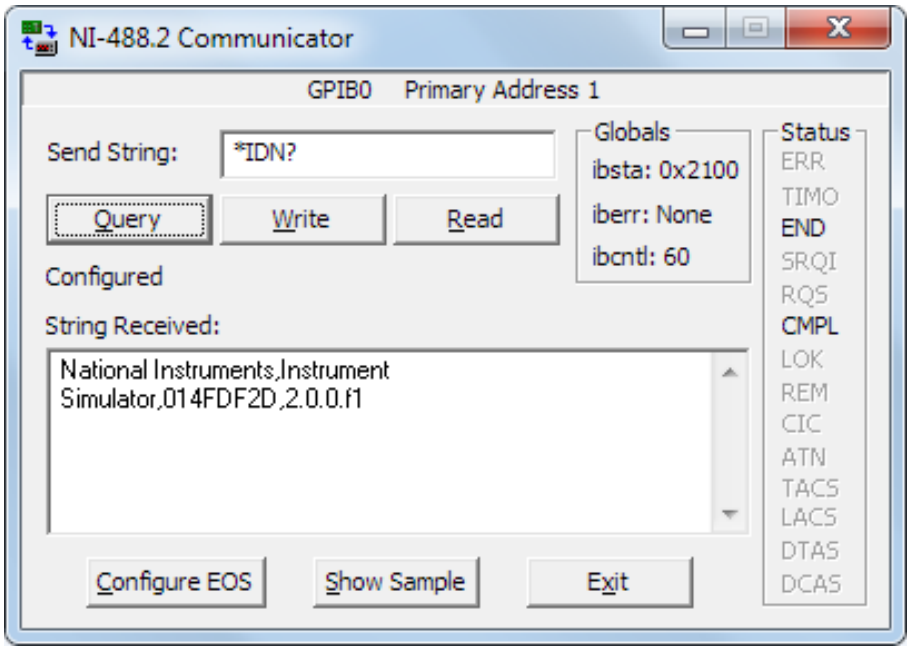
Complete the following steps to connect the GPIB instrument to your computer:

1. Notice that the NI Instrument Simulator has a GPIB port.
2. Connect the NI Instrument Simulator to your computer GPIB interface with a GPIB cable. For example, connect the USB end of the GPIB-USB-HS to your computer and the GPIB end of the GPIB-USB-HS to the GPIB port of the NI Instrument Simulator.
3. Now you can programmatically control (send commands to, receive data from) the NI Instrument Simulator (that is a non-NI instrument).

Implementation

1. Launch **NI MAX** from the Windows **Start** menu.
    - In NI MAX, expand the **Devices and Interfaces** to display the installed interfaces. If a GPIB interface is listed, the NI-488.2 software is correctly loaded on the computer.
    - Select the **GPIB interface**.
    - Examine but do not change the settings for the GPIB interface.
2. Communicate with the GPIB instrument.
    - Make sure the GPIB interface is still selected in the **Devices and Interfaces**.
    - Click the **Scan for Instruments** button on the toolbar.
    - Expand the GPIB interface selected in the **Devices and Interfaces**. An instrument named `Instrument Simulator` appears. If the Instrument Simulator does not appear, please complete the next section—*Set Up the NI Instrument Simulator*.
    - Click **`Instrument Simulator`** to display information about it in the right pane of NI MAX.
    - Click the **Settings** tab at the bottom. Notice the NI Instrument Simulator has a GPIB primary address.
    - Click the **Communicate with Instrument** button on the toolbar. An interactive window appears. You can use it to query, write to, and read from that instrument.

- Enter `*IDN?` in the **Send String** text box and click the **Query** button. The instrument returns its manufacturer and model number in the **String Received** indicator as shown in the figure. You can use this communicator window to debug instrument problems or to verify that specific commands work as described in the instrument documentation.



- Enter `MEASURE:VOLTAGE:DC?` in the **Send String** text box and click the **Query** button. The NI Instrument Simulator returns a simulated voltage measurement.
- Click the **Query** button again to return a different value.
- Click the **Exit** button when done.

3. You can communicate with your non-NI instrument using VISA Test Panel as well.
   - Select your **instrument** and click the **Open VISA Test Panel** tab.
   - Navigate to the **Input/Output** and enter your SCPI command.
4. Set a VISA alias of `MyGPIBInstrument` for the NI Instrument Simulator so you can use the alias instead of having to remember the primary address.
   - While Instrument Simulator is selected in **NI MAX**, click the **VISA Properties** tab.
   - Enter `MyGPIBInstrument` in the **VISA Alias on My System** field. You use this alias later in the course.
   - Click **Save**.
5. Exit NI MAX
6. Click **Yes** if prompted to save the instrument.

Set Up the NI Instrument Simulator (Optional—Skip this section if you have passed the previous section successfully)

1. Configure the NI Instrument Simulator.
   - Power off the NI Instrument Simulator.
   - Set the configuration switch on the rear panel to CFG, as shown in the figure below.

   - Power on the NI Instrument Simulator using the power switch on the front of the unit.
   - Verify that the **PWR** LED is lit and the **RDY** LED is flashing.
   - Launch the NI Instrument Simulator Wizard from **Start»All Programs»National Instruments»Instrument Simulator»Instrument Simulator Wizard.**

     Note: This wizard is installed with the NI Instrument Simulator Software, available for download at ni.com.

   - Click **Next**.
   - Click **Next**.
   - On the Select **Interface** page, select **GPIB Interface** and click **Next**.
   - Select **Change GPIB Settings** and click **Next**.
   - Select **Single Instrument Mode** and click **Next**.
   - Set **GPIB Primary Address** to `1`.
   - Set **GPIB Secondary Address** to `0(disabled)`.
   - Click **Next**.
   - Click **Update**.
   - Click **OK** when you get the message that the update was successful.
   - Power off the NI Instrument Simulator using the power switch on the front of the unit.
   - Set the configuration switch on the rear panel to **NORM**.
   - Power on the NI Instrument Simulator using the power switch on the front of the unit.
   - Verify that both the **PWR** and **RDY** LEDs are lit.
   - Close all opened programs and windows.

End of Exercise 3-1