Connecting Hardware: Detailed Explanation

Installing Hardware Drivers

Before connecting or installing your multifunction DAQ device, you need to install the proper hardware driver. Most NI multifunction DAQ devices communicate to your computer via the NI-DAQmx driver. You can access NI educational devices such as NI ELVIS II and NI myDAQ using the NI ELVISmx driver, which is built on and uses the NI-DAQmx driver to communicate to your computer. Plus the NI ELVISmx driver has additional functionality such as the NI ELVISmx Instrument Launcher, as seen in Figure 1.

![NI ELVISmx Instrument Launcher](image1.png)

Figure 1. NI ELVISmx Instrument Launcher

NI Measurement & Automation Explorer (MAX)

Similar to the Windows Device Manager, which manages all peripherals connected to a Windows PC, MAX manages all NI hardware and software. This application is installed with most NI software packages. Take a look at the most used features of MAX: Software and Devices and Interfaces.

*Note:* You can access two systems in MAX: the locally installed hardware and software, which is listed under My System, and Remote Systems, which contains all the remote targets you have detected on your network such as NI CompactRIO hardware or a real-time PXI system.

![MAX User Interface](image2.png)

Figure 2. MAX User Interface
Software

Knowledge of the software and drivers on your system is beneficial for setting up and troubleshooting your measurement system. The Software section of MAX contains all of the installed NI software on your local machine, as seen in Figure 3.

When you select an installed software package such as LabVIEW 2010 Service Pack 1 (SP1), more detailed information is displayed in the pane to the right of the software list. For a development system such as LabVIEW, all installed toolkits and modules, the version, a description, and the path to the executable are displayed in the right window pane, as shown in Figure 4.

![Figure 3. Locally Installed NI Software in the MAX User Interface](image3.png)

![Figure 4. Detailed Information Displayed for LabVIEW 2010 SP1 (Version 10.0.1) in MAX](image4.png)
Hardware
By being able to view and manage all of the hardware connected to your local machine, you can easily manage and configure your hardware all in one place. All of the NI hardware, as well as the peripherals that can be accessed by NI hardware and software, are listed in the **Devices and Interfaces** section of MAX, as shown in **Figure 5**.

![My System - Measurement & Automation Explorer](image)

**Figure 5.** Locally Installed NI Hardware

On the system shown in **Figure 5**, an NI myDAQ and an NI ELVIS II are installed. Because the NI myDAQ device was installed and detected first, it was enumerated in the system as **Dev1** (Device 1); the NI ELVIS II device was installed and detected second, so it is **Dev2** (Device 2). You can rename the device by right-clicking it to display the shortcut menu and selecting **Rename**, as shown in **Figure 6**.
In this example, the devices were renamed to match their product names, NI myDAQ and NI ELVIS II (see Figure 7). This can make the device selection more intuitive when you are programming.

The shortcut menu also features the Create Task… option, which you can use to create a data acquisition task in LabVIEW for analog input, analog output, and so on. With a MAX task to program your data acquisition or data generation, you can generate a step-by-step graphical interface rather than using the low-level NI-DAQmx API in LabVIEW.

The option for Device Pinouts, as shown for the NI myDAQ device in Figure 8, provides a visual reference for the I/O terminals on each device, which helps you identify the proper terminal for signal or device connection. Note that this is not available for every device.
Figure 8. Device Pinouts for NI myDAQ

Two other useful resources in the shortcut menu are **Reset Device** and **Self-Test**. Resetting the device clears all of the references to the device as well as any routes and tasks associated with the device. A dialog box appears with the result of the reset (see **Figure 9**).

![Dialog Box After Successfully Resetting a NI-DAQmx Device](image)

**Figure 9.** Dialog Box After Successfully Resetting a NI-DAQmx Device
Self-test checks to see if the NI-DAQmx driver is able to successfully communicate with the device. A dialog box appears with the result of the self-test; a successful self-test dialog box is shown in Figure 10.

![Figure 10. Dialog Box After Successfully Self-Testing an NI-DAQmx Device](image)

If either the self-test or reset fails, the error number is displayed, which you can research at ni.com to investigate the cause.

**Test Panels**

It is beneficial to be able to quickly test if the voltages or signals you are receiving or outputting are correct. The NI-DAQmx test panels, which you can access in the shortcut menu of your device, provide this option. You are able to test analog input, analog output, digital I/O, and counter I/O for a multifunction DAQ device such as an NI myDAQ or NI ELVIS II (see Figure 11). You can also set the input range, sample mode, and configuration as well as the channel to test.

![Figure 11. Analog Input Test Panels for the NI myDAQ Device](image)
Figure 12 is a graphical representation of the analog input voltage data acquired from the ai0 pin. Notice that there is also an instantaneous value displayed in the lower right-hand corner.

Figure 12. Data From Analog Input Test Panel