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## Step 5: Testing Your Hardware

### Topics

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- A. Testing Tools
- B. Troubleshooting Resources
- C. Self-Review

## A. Testing Tools

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In general, the testing phase is divided into two subphases. The first one deals with the hardware portion of your application, and the later one deals with the software portion of it. When dealing with a potential problem for your application, the best approach is to first detect whether the source of the problem resides in the hardware or the software. When such a conclusion has been reached, it is possible to go through various techniques, to isolate the root of the problem and resolve it. MAX is a great resource and a starting point in helping you decide whether the problem you are encountering resides in the hardware or the software portion of your application.

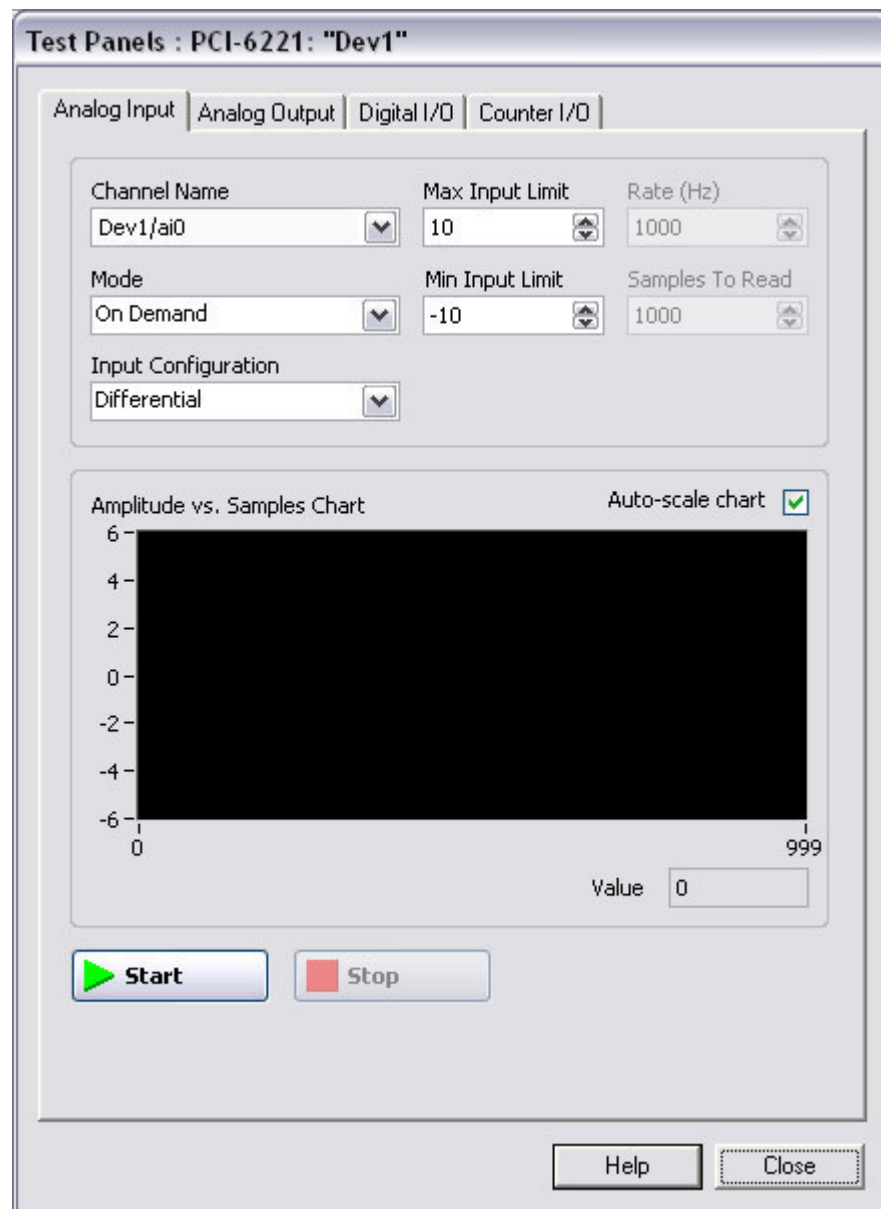
Set milestones while building your application to test your progress: one after connecting and configuring your device and another before programming your application.

Step 5 discusses hardware testing and troubleshooting, while software testing and troubleshooting is covered in a later step. Hardware testing allows you to ensure that the operation and functionality of your connection and configuration is correct. When you are confident in these, you can move on to building the software application.

### Testing Your DAQ Hardware Device

To test your device, complete the following steps:

1. Open your device test panel by right clicking your device under **Device and Interfaces»NI-DAQmx Devices**.
2. Select **Test Panel**. The Test Panel allows you to test all the available channels on your device including: Analog Inputs, Analog Output, Digital I/O, and Counters.



**Figure 5-1.** Test Panel of a device

To test the different types of operations select them from the tabs. To test the different channels select them from the drop down menus.

## Tips

- ❑ To test analog input or analog output you can connect an analog output channel to an analog input channel. If you set the analog output to generate a sine wave, and you can read the sine wave on your analog input panel, you can verify that both the input channel and the output channel operate correctly.

- ❑ To test the accuracy of your analog input channel, you can use an analog source with a constant value, such as a battery connected as a floating source input configuration: differential, and verify the reading of its voltage through the analog input channel.
- ❑ If your board has a 5 Volt pin (use device pinout to verify whether such pin exists on your board), wire the pin directly to one of your analog input channels to verify the reading as the expected 5 Volts.

## Testing Your Tasks

If you configured your task in MAX, you can test your task, and your individual channels within the task to ensure that your settings are correct.

First, ensure that the task you create does not contain any errors. To do so, verify that your task icon, under **Data Neighborhood»NI-DAQmx Tasks** does not appear to have a small red x on it. If the task seem to have errors in it, then:

3. Verify that your task is saved with its latest changes.
4. Run the **Test** button located at the top tool bar. A window appears indicating the occurrence of the error, the reason for the occurrence, and ways to fix the error. Use this information given in the pop-up window to reconfigure the parameters in your task so that it is correct.

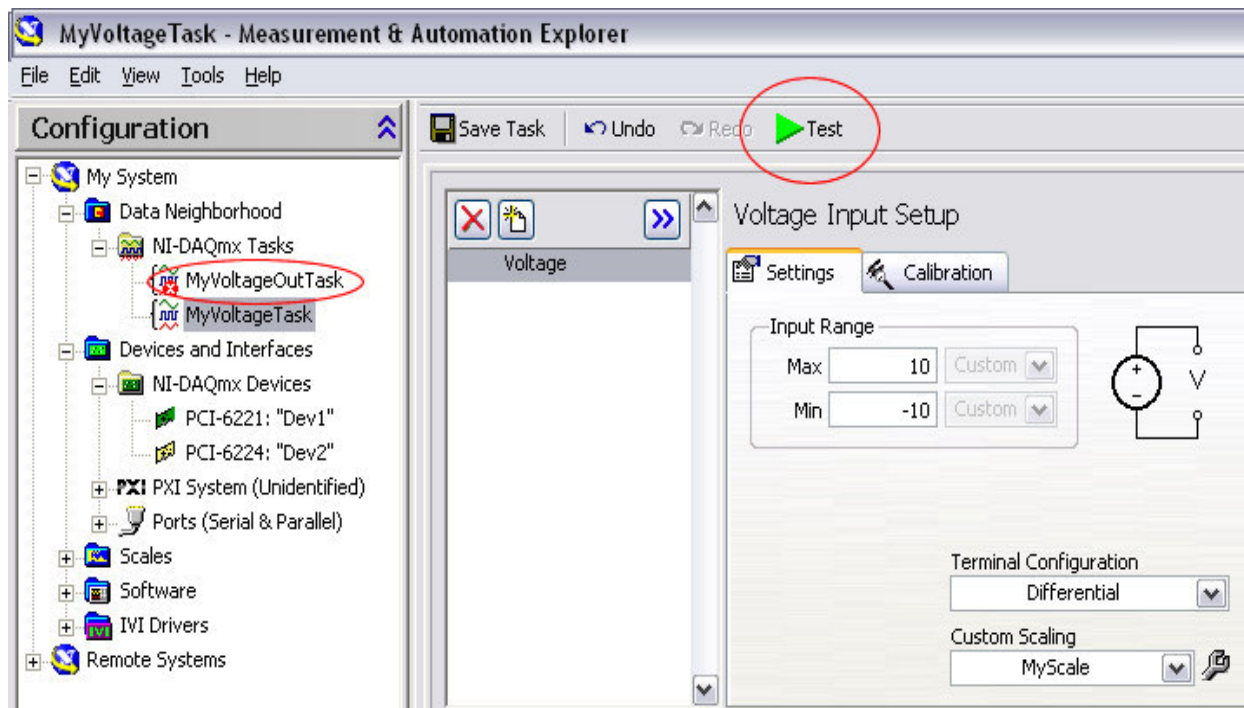
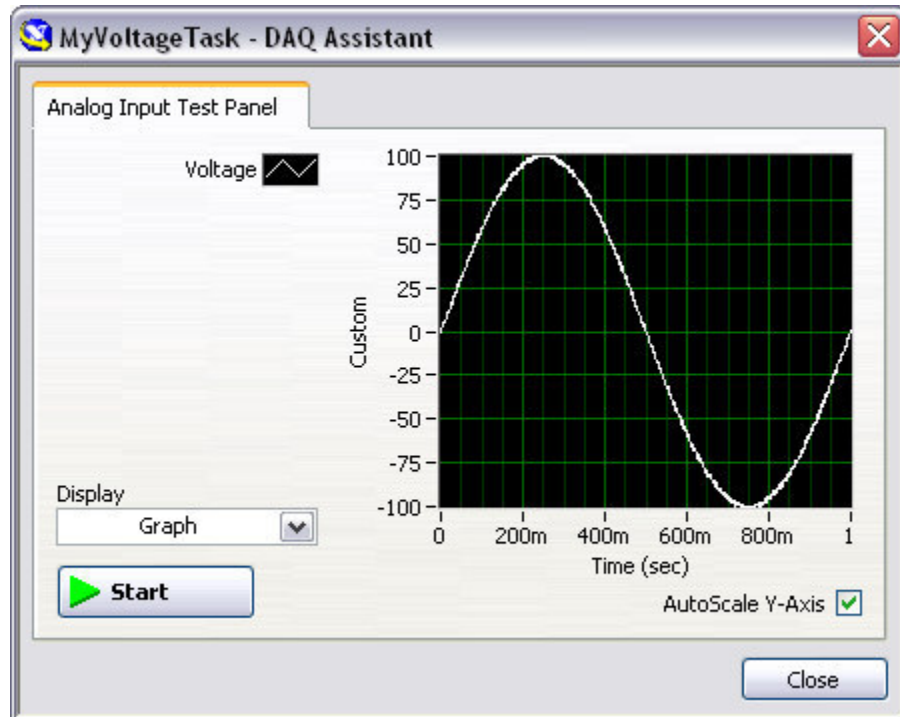
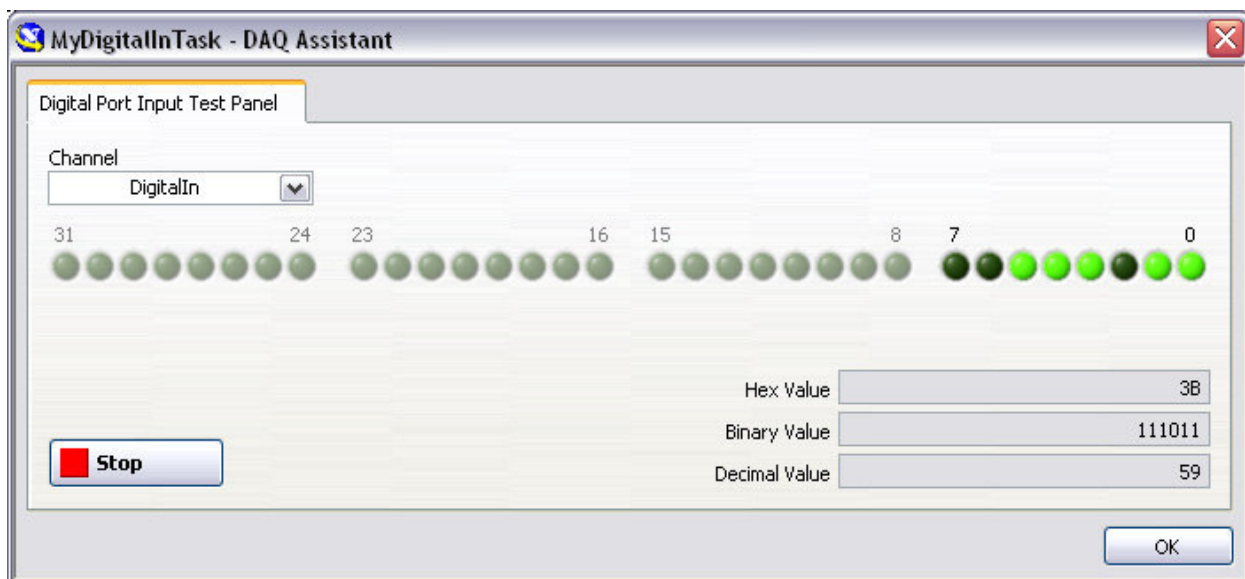


Figure 5-2. MAX: Task with error indication, and Test button

If your task does not contain any errors in it, simply test the different channels (each channel individually) to ensure the range, the timing, and the other parameters operate the way you intend.



**Figure 5-3.** Test Panel of an Analog Input Task



**Figure 5-4.** Test Panel on a Digital Input Task

## Tips

- Check the input range and adjust it such that it includes all possible values you expect from your signal AFTER scaling.
- Ensure your scaling is correct.
- Ensure your signal connects according to the type of input configuration you specify, and to the correct physical channel. (Use Connection Diagram for assistance, if available).
- Verify your sampling rate and your Samples to Read are sufficient.
- For digital tasks, ensure the line or ports are not inverted unless you want them to be.

## B. Troubleshooting Resources

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The following list of resources can help you with further troubleshooting in case your device or your task does not respond appropriately, and you were not able to overcome this behavior using the above information.

- The online Hardware Installation/Configuration Troubleshooter accessible through [www.ni.com/support/daq](http://www.ni.com/support/daq), allows you to choose the type of hardware you are using, your bus type, and operating system. It returns troubleshooting techniques and possible solutions for the issues you may be encountering.
- NI Developer Zone- developer zone offers a wide variety of resources including:
  - A large database of KnowledgeBase documents, allowing you to search for the symptoms you are experiencing based on the device you use.
  - Discussion Forums- The community forum provides a place for customers to discuss, support topics, and learn. At its heart are the message boards, where members post questions and answers. You may visit the Discussion Forums as a guest and may browse or search the boards for information. Registered members can post messages, track discussions, and get e-mail notifications on new posting activity. By posting questions and sharing answers, you not only contribute to a unique, customer-built knowledgebase, but you also become part of a virtual support network extending across literally hundreds of thousands of potential users.
- NI Support Center- you can contact National Instruments for support through e-mail or through the phone. For more information on NI support center, please refer to [www.ni.com/support](http://www.ni.com/support).