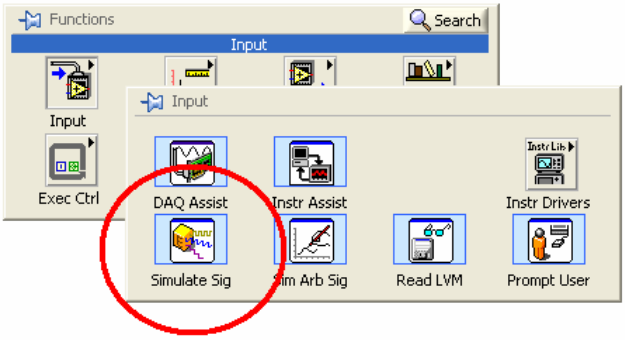
Step-by-Step Data Acquisition Part II Exercise 2:
Generating an Analog Output Waveform

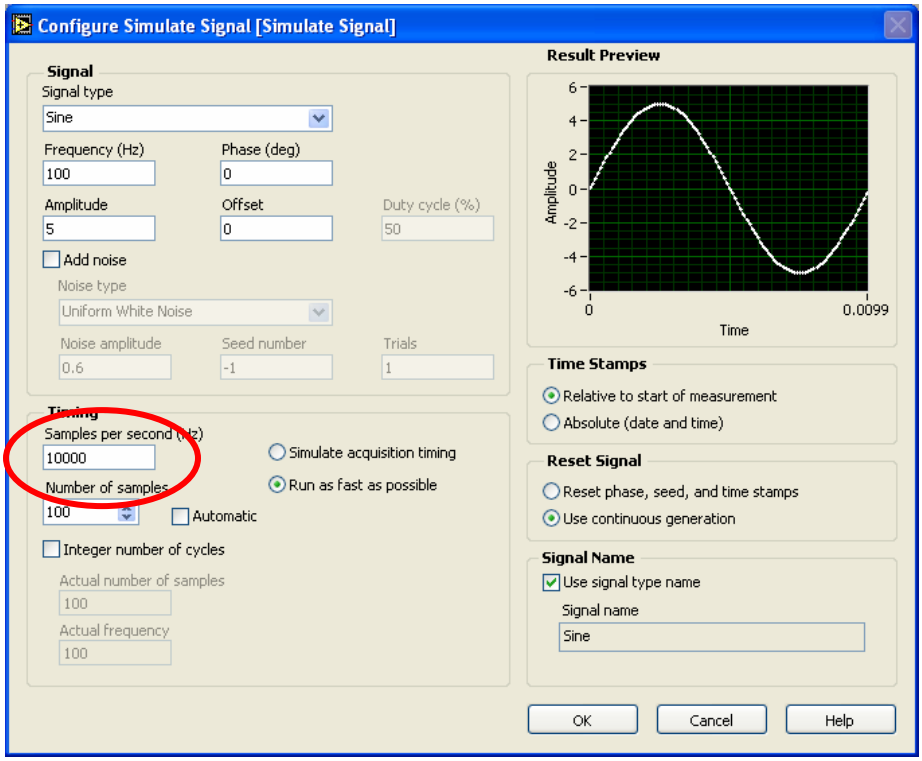
In this exercise, you will use the DAQ Assistant to build a LabVIEW VI that generates and outputs an analog waveform.

Note: This exercise uses simulated hardware. You will not be able to verify that the data you output since you have no physical way to connect the output to an input. However, this exercise will show you the process for developing a waveform generation application using NI data acquisition hardware and NI LabVIEW.

1. Visit http://ni.com/trylabview and click on the **Try LabVIEW Online** link to access the LabVIEW Online Evaluation. Once your browser has been tested, click Continue and you will be directed to the remote desktop.
2. If you have just logged on to the LabVIEW Online Evaluation, you will first need to configure your measurement system. Refer to Part I, Exercise 1 Configuring a DAQ System in Measurement & Automation Explorer (MAX).
3. Launch LabVIEW from the desktop.
4. Click **New** to start a new program. At the next splash screen, select **Blank VI** and click **OK**.
5. Press <Ctrl-E> to switch to the LabVIEW Block Diagram.
6. Right-click on the white space to bring up the Functions palette. Browse to the **Input** subpalette and click the **Simulate Signal** Express VI as shown below. Place the VI on the Block Diagram.



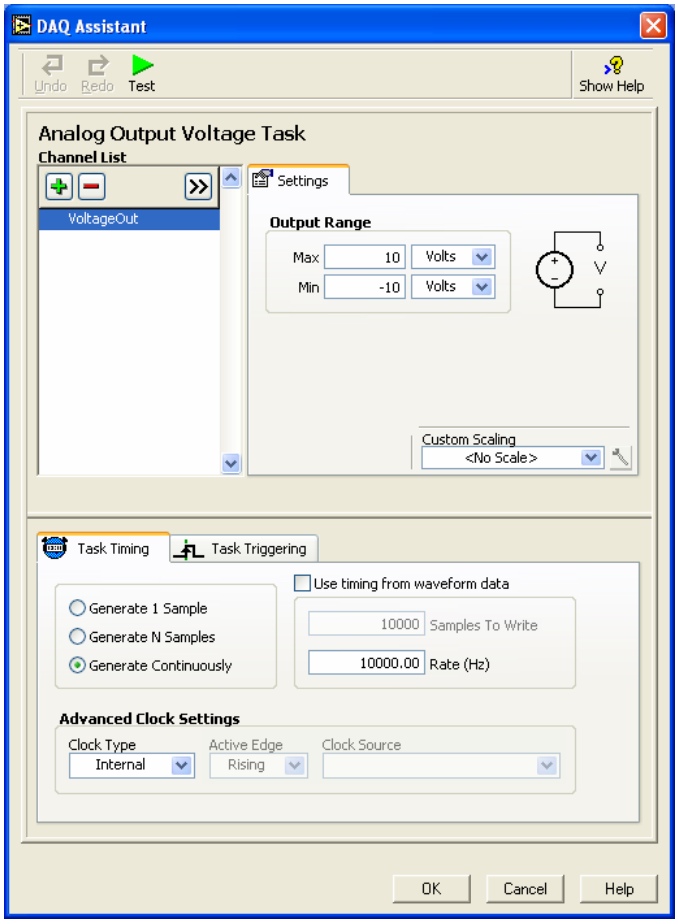
7. In the **Timing** section of the window, set the Samples per second (Hz) to 10,000. Click **OK**.



8. Bring up the **Functions** palette again, and browse to the DAQ Assistant VI on the **Output** subpalette of the **Functions** palette. Place the VI on the Block Diagram.

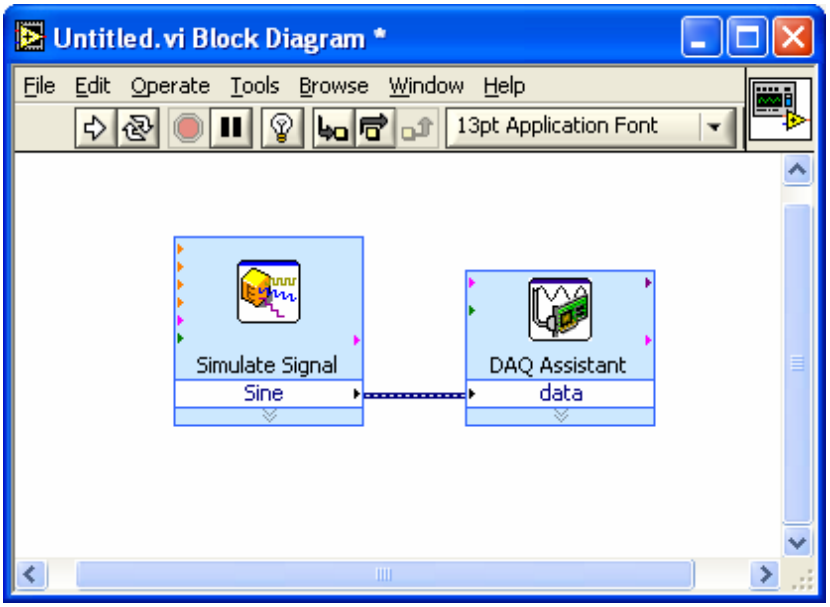
9. In the Create New window, select **Analog Output** as the Measurement Type. In the next window, select **Voltage**. In the next window, click the + sign next to SCC1Mod17 (SCC-FT01), select **ao0**, and click the **Finish** button.

10. In the DAQ Assistant configuration window, select **Generate Continuously** from the **Task Timing** tab in the lower part of the window. Uncheck **Use timing from waveform data**, and set the Rate (Hz) to 10,000. Click the **OK** button.

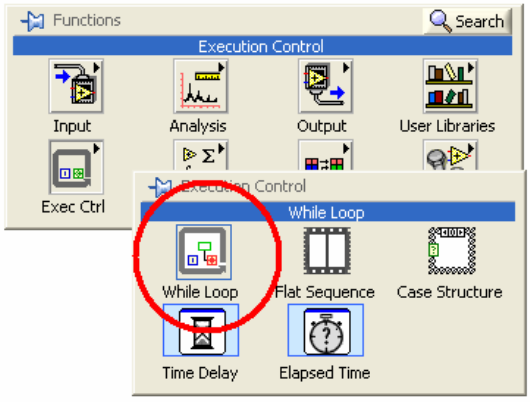


11. On the Block Diagram, move the DAQ Assistant Express VI to the right side of the Simulate Signal Express VI. Wire the **Sine** output of the Simulate Signal VI to the data input of the DAQ Assistant VI. To create a wire, move your cursor over the blue arrow on the **Sine output terminal** of the Simulate Signal VI and left-click to start the wire. Move your cursor to the **data input terminal** of the DAQ Assistant VI and left-click again to attach the wire.

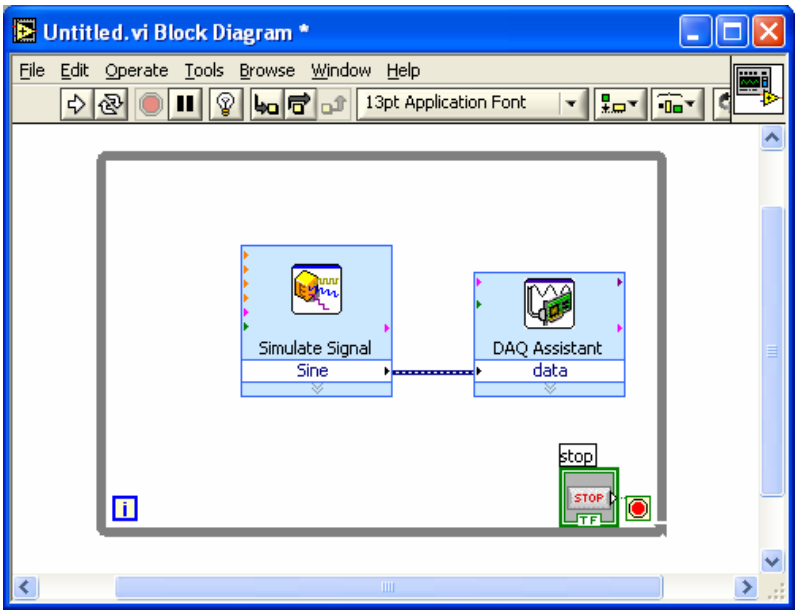
Your Block Diagram should resemble the following figure.



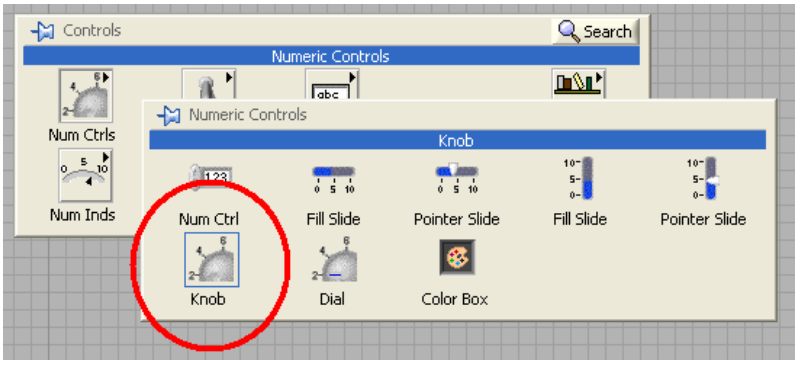
12. To make the VI run continuously, create a While Loop. A While Loop causes all parts of the program inside the loop to run continuously until a Stop button is clicked. To create the While Loop, browse to the **Exec Ctrl** subpalette of the **Functions** palette and select a While Loop.



13. Draw the While Loop around your entire Block Diagram. Your Block Diagram should resemble the following figure.



14. Create a knob to control the frequency of your sine wave. To create a knob, press <Ctrl-E> to switch to the LabVIEW Front Panel. Right-click on the empty gray space to pull up the **Controls** palette. Select a **Knob** from the **Numeric Controls** subpalette of the **Controls** palette. Place the knob on the Front Panel.

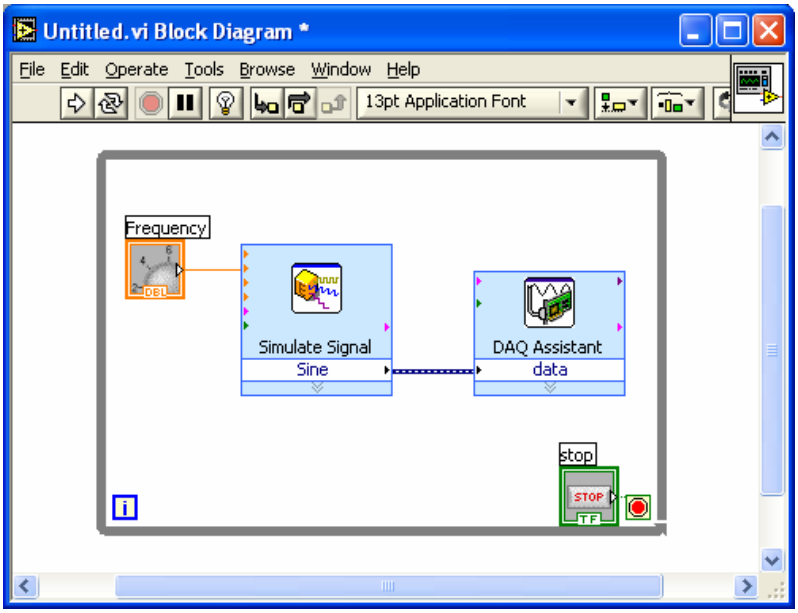


15. Right-click the knob and select **Properties**. On the **Appearance** tab, change the label to `Frequency`. On the **Scale** tab, change the **Scale Range** so Minimum equals 0.00 and Maximum equals 1000.00. Click **OK** to close the Properties window.

16. Press <Ctrl-E> to switch to the Block Diagram. Notice the orange Frequency knob control terminal. Move the control inside the While Loop to the left side of the Simulate Signal Express VI. Wire the knob control to the Frequency input terminal of the Simulate Signal Express VI (the second orange arrow on the left side of the Simulate Signal Express VI).

    Note: Make sure that you wire the knob control to the correct input terminal of the Simulate Signal Express VI. If you make a bad wire connection, double-click the wire to select it and press <Delete>.

    Your Block Diagram should resemble the following figure.



17. Run the VI. It will now use the frequency knob on the LabVIEW Front Panel to generate a sine wave at the specified frequency. This sine wave is then generated on analog output channel 0 by the DAQ Assistant Express VI.

End of Part II, Exercise 2