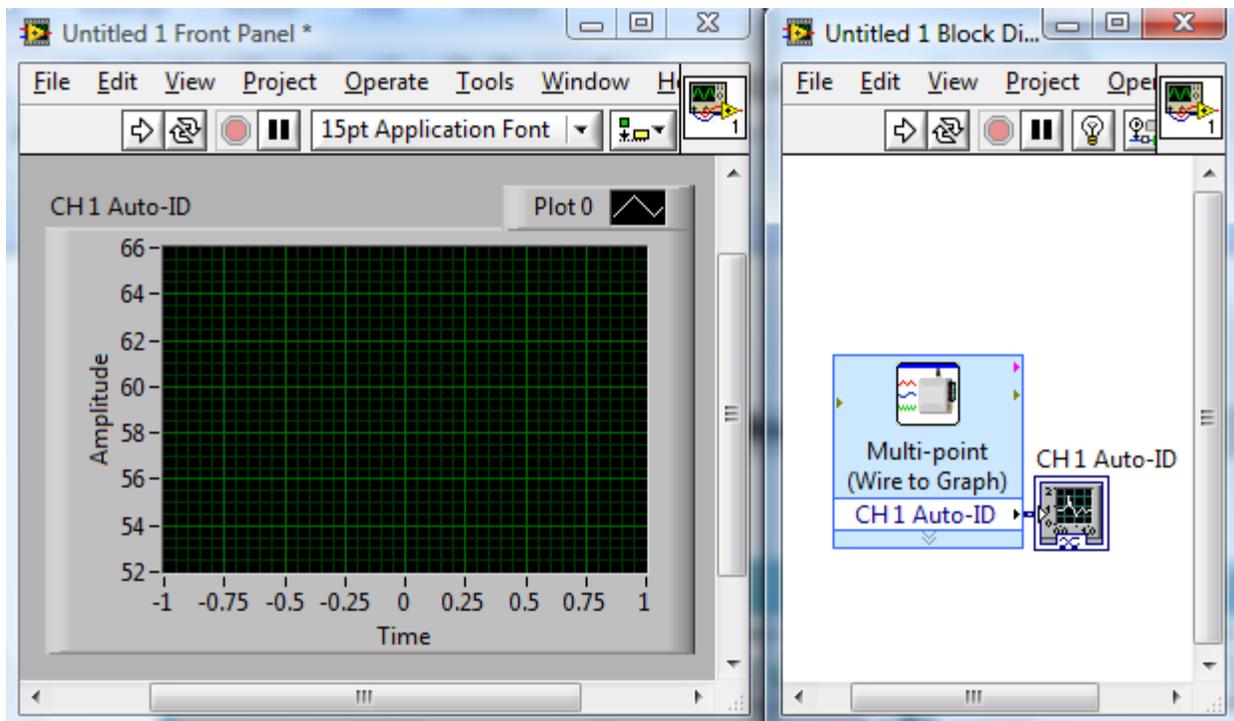


# Read Microphone Data



*Completed front panel and block diagram*

In this exercise, you will create a simple program using the Analog Express VI to collect data for a length of 0.1 second at a rate of 10,000 samples/second. This timing configuration results in 1001 data points. It is important to note how the data are displayed in this example. Namely, this is an example of multi-point data collection, where all data points are displayed on the graph following the collection of all 1001 data points. The Express VI is designed to return data in this multi-point method whenever the data-collection rate is greater than 200 samples/second. At slower rates, data are returned on a point-by-point basis.

## OBJECTIVES

In this exercise, you will

- Create a LabVIEW VI.
- Become familiar with the LabVIEW environment.
- Acquire Microphone data.
- Display data in a graphical form.

## MATERIALS

SensorDAQ or LabQuest interface  
USB cable  
computer

LabVIEW  
Vernier Microphone

## COMPUTER PROCEDURE

### Part I Connect Equipment

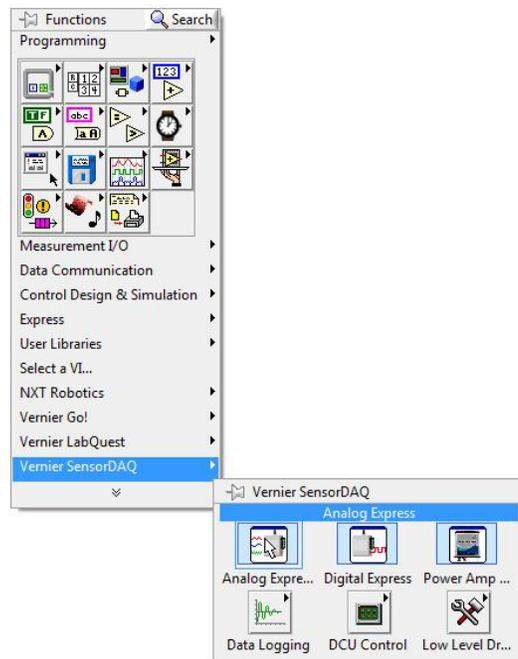
1. Connect the USB cable to the SensorDAQ or LabQuest interface.
2. Connect the other end of the USB cable to any available USB port on your computer. If you are using a LabQuest interface with a power button, turn it on.
3. Connect the Microphone to Ch. 1.

### Part II Start LabVIEW and Create a VI to Collect Data

4. Start LabVIEW.
5. In the Getting Started window, click the Blank VI link in the New category.
6. View the block diagram by choosing Show Block Diagram from the Window menu (or use the <Ctrl-E> shortcut).
7. Place an Analog Express VI in the block diagram workspace.

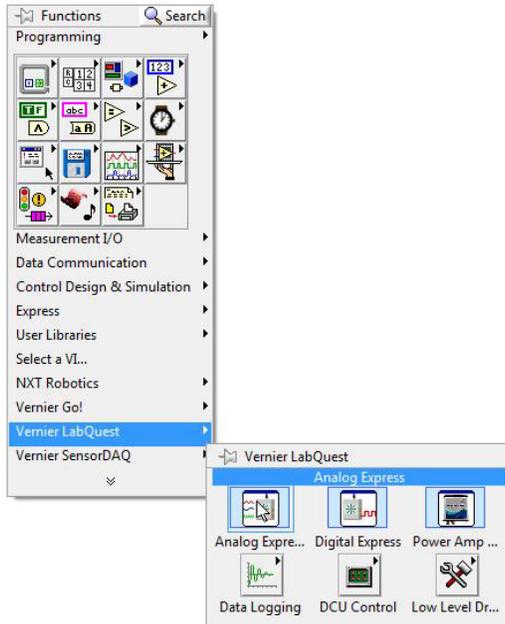
#### SensorDAQ

If you are using a SensorDAQ, right-click in the block diagram workspace and select Vernier SensorDAQ from the Functions palette. Click and drag the Analog Express VI to the block diagram workspace.

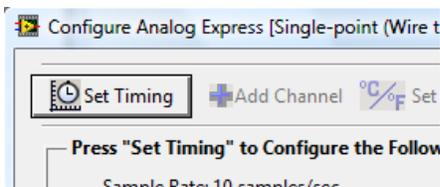


**LabQuest Interface**

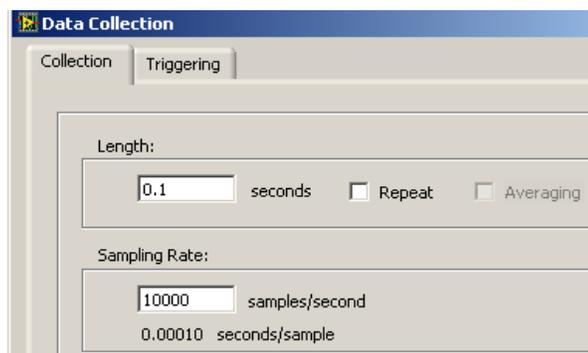
If you are using a LabQuest interface, right-click in the block diagram workspace and select Vernier LabQuest from the Functions palette. Click and drag the Analog Express VI to the block diagram.



8. After dragging the Express VI from the palette to the block diagram workspace, the Express VI's configuration window will open. Note that this step can be slow, depending on your computer.
9. Click the Set Timing button, located in the upper-left corner of the configuration dialog.

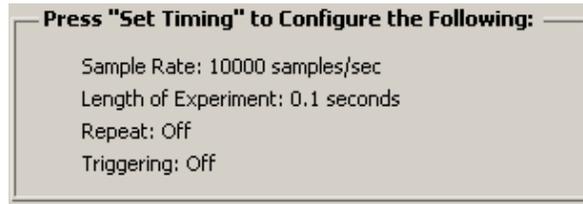


10. Set up data collection for a length of 0.1 seconds and a sampling rate of 10,000 samples/second.

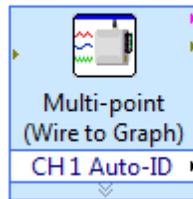


## Exercise 2

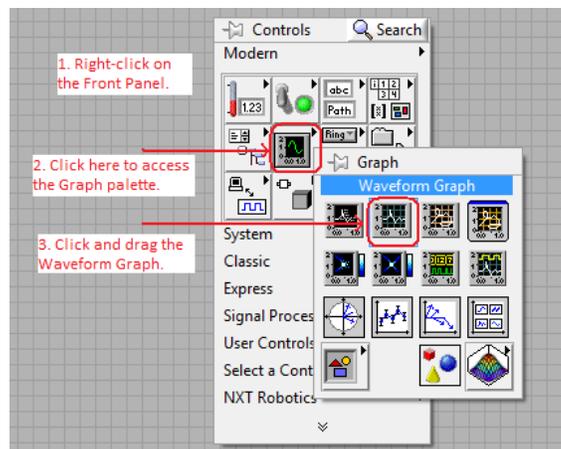
- Click Done to close the Set Timing dialog. The Express VI Configuration should now be updated with the new settings.



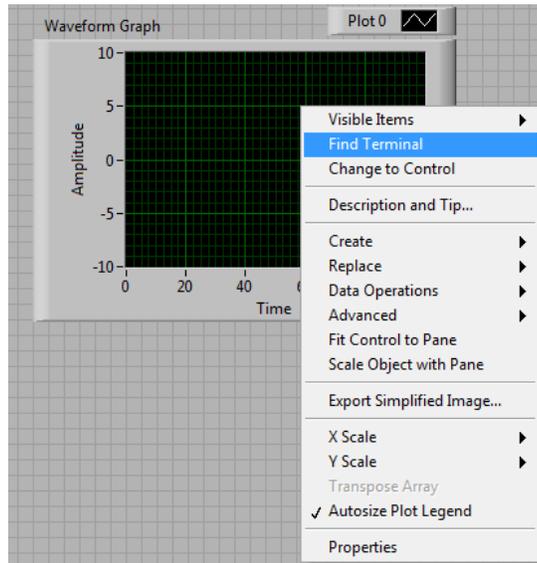
- Click OK to close the Express VI's Configuration dialog. The Express VI will now be located in your block diagram workspace.



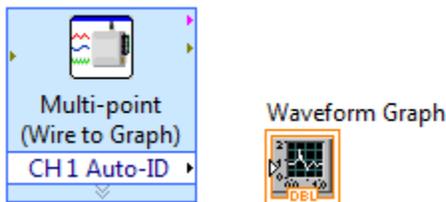
- View the front panel by choosing Show Front Panel from the Window menu (or use the <Ctrl-E> shortcut).
- Place a Waveform Graph on the front panel. Access the graph by right-clicking in the front panel workspace and finding the Modern ► Graph palette.



- Right-click the Graph and select Find Terminal. This will take you to the Graph's terminal in the block diagram workspace. You can also double-click the graph to find the corresponding terminal.



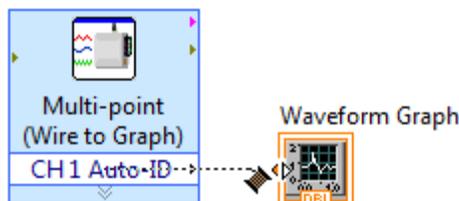
- Move the graph terminal icon (click and drag the icon with your mouse) and place it to the right of the Analog Express VI. Note that the icon distinguishes this as an indicator (a thin border and an arrow showing the data entering the terminal).



- Wire the Analog Express VI CH 1 Auto-ID data output terminal to the Graph's terminal icon.

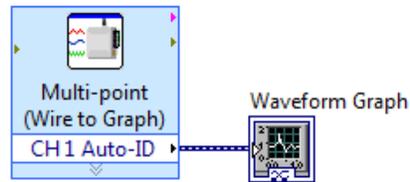
**Tip:** As you move your cursor close to the terminal icon, the cursor will automatically configure itself as a wiring tool. Click directly on the terminal and drag the wiring tool to the other terminal to make the full wire connection.

**Tip:** The Graph terminal icon changes automatically to match the wire's data type. Wires and data types are explained in more detail in Chapter 3.

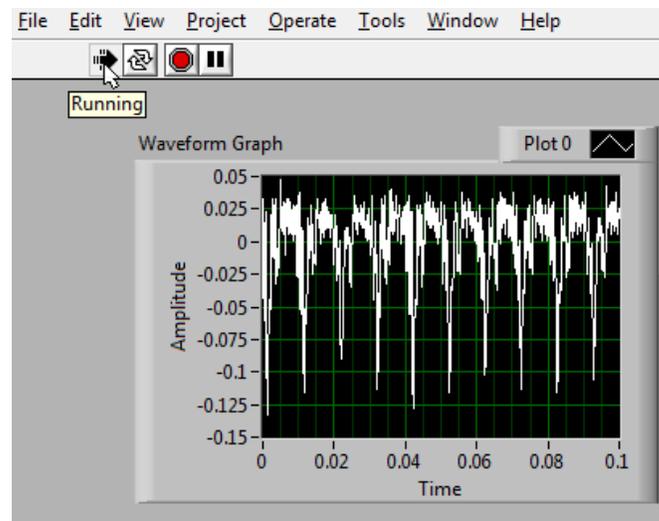


## Exercise 2

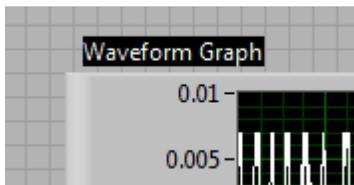
- The block diagram is now complete with an Express VI to read the sensor and output the value through the CH 1 Auto-ID terminal. This sensor value is wired to a front panel Graph terminal, providing the user with a front panel display of the sensor reading.



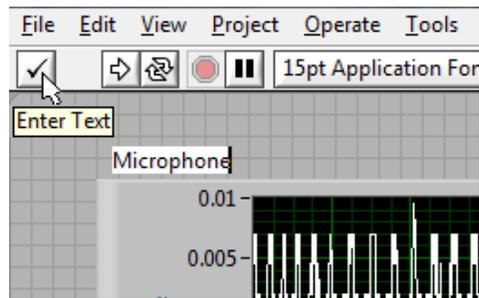
- View the front panel by choosing Show Front Panel from the Window menu (or use the <Ctrl-E> shortcut).
- Hum into the microphone as you click the white Run arrow on the left side of the Toolbar to run the program.



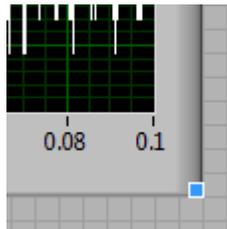
- Rename the graph by locating the cursor directly over the graph's label called Waveform Graph, and double-clicking the label to highlight both words.



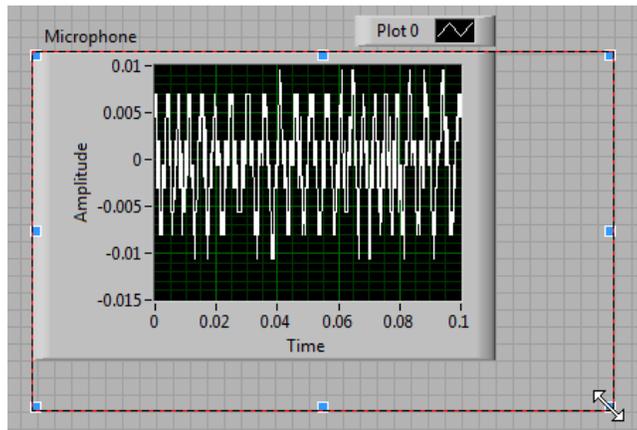
22. Enter “Microphone” as the new label for the graph, and click the Enter Text button.



23. View the block diagram using <Ctrl-E> and note the graph terminal icon label has been modified with the new name.
24. View the front panel using <Ctrl-E>.
25. Place your cursor on the bottom-right corner of the graph window and note the blue squares in the corners and midpoint.



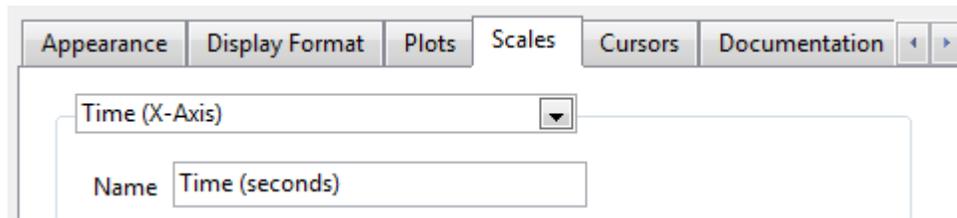
26. Click and drag the bottom-right corner of the graph (on the blue square) to resize the graph window.



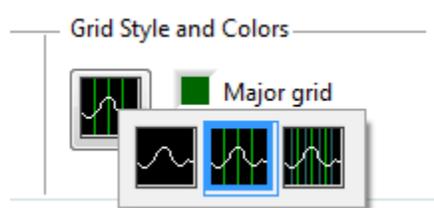
27. Right-click the graph and select Properties.

## Exercise 2

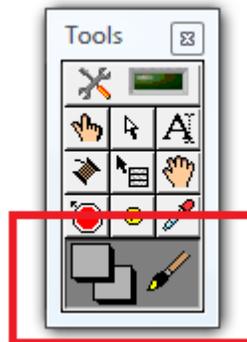
28. Click the Scales tab and change the Name of the x-axis scale to Time (seconds).



29. On the same tab, click the Grid Style icon and select the center icon to display the Major grid (the minor grid is made translucent).



30. Select OK to close the Properties dialog box.  
31. Select the Coloring tool from the Tools palette.



**Tip:** If the Tools Palette is not visible, choose Tools Palette from the View menu.

32. Locate the cursor (your cursor should look like a paint brush) on the border of the graph and right-click to view the color palette. Select a new color from the color palette.  
33. Selecting the Coloring tool disables the automatic tool selection; therefore, you must click the Automatic Tool Selection tool button to enable this feature again.



## **EXTENSIONS**

1. Run the VI using the Run Continuously toolbar button.
2. The y-scale is set to Autoscale the plot. Turn off Autoscale and configure the Y scale with appropriate minimum and maximum scale values.
3. Study the sound of your voice when you make an “o” sound versus an “e” sound.
4. The front panel control palette has a subpalette called Decorations. Choose some decorations for your front panel, and use the Color tool to modify the color of the decorations.