Signal Processing Analysis: Step by Step Procedure

Before starting this procedure, you need to complete the exercise and use the solution in the Taking a Measurement module. You can also create a numeric control to simulate the data acquisition input.

**Note:** This exercise works best when a variable frequency sine wave generator is connected to the ai0 terminals of your device.

1. Right-click the block diagram, select **Express >> Signal Analysis >> Filter**, and left-click to place the Filter Express VI to the right of the DAQ Assistant
   a. Select **Lowpass** for **Filtering Type**
   b. Enter **500** for the **Cutoff Frequency (Hz)**
   c. Increase the **Order** of the filter to **5**
   d. Select **OK** to apply the configuration

2. Wire the **Data** output terminal of the DAQ Assistant to the **Signal** input terminal of the Filter Express VI

3. Wire the **Error Out** output terminal of the DAQ Assistant to the **Error In** input terminal of the Filter Express VI

4. Right-click the block diagram, select **Express >> Signal Analysis >> Spectral Measurements**, and left-click to place the Spectral Measurements Express VI to the right of the Filter Express VI
   a. Select **Power Spectrum** for **Selected Measurement**
   b. Select **Linear** for the **Result**
   c. Select **OK** to apply the configuration

5. Wire the **Filtered Signals** output terminal of the Filter Express VI to the **Signals** input terminal of the Spectral Measurements Express VI

6. Wire the **Error Out** output terminal of the Filter Express VI to the **Error In** input terminal of the Spectral Measurements Express VI

7. Create graphical indicators for the filtered time and frequency spectrum signals
   a. Delete the existing graph indicator
   b. Right-click the **Filtered Signals** output wire of the Filter Express VI and select **Create >> Graph Indicator**
   c. Right-click the **Power Spectrum** output terminal of the Spectral Measurements Express VI and select **Create >> Graph Indicator**

8. Unwire the input to the Unbundle by Name function and then wire the **Error Out** output terminal of the Spectral Measurements Express VI
   a. Ensure **Status** is selected to be unbundled

9. Run the VI to visualize the results
   a. Vary the frequency of the sine wave input to see when the filter begins to attenuate the input signal

You can convert your DAQ Assistant Express VIs into low-level NI-DAQmx functions by right-clicking the DAQ Assistant and selecting **Generate NI-DAQmx Code**. The low-level NI-DAQmx API exposes more functionality and customization options for programming.