LabVIEW - Instructions for Modifying a Virtual Instrument: Write Sampled Data to an Excel File

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Introduction

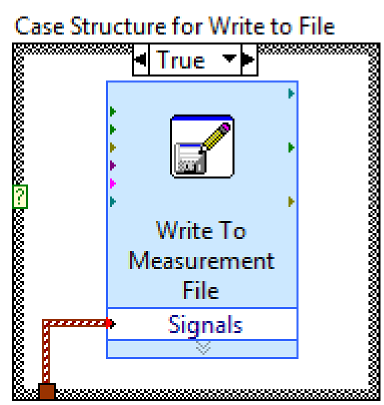
This module assumes that you have already have available a virtual instrument that samples and plots voltage data, and calculates and plots a frequency spectrum using the fast Fourier transform (FFT).

Initial setup

1. Turn on the function generator and the USB data acquisition system (remember that the power switch is in the back of the device).
2. Start LabVIEW (Start-All Programs-National Instruments LabVIEW). Continue.
3. If not already open, open the virtual instrument called LabVIEW_DAQPad_FFT_Analysis.vi that is posted on the course website (you may need to first copy the file onto your desktop): File-Open-*filename*.
4. You may need to move or close the *Controls* window, if it pops up blocking your view.

Set up the ability to write data to a file

1. Click on Window-Show Block Diagram. In the *Block Diagram* window that opens up, R-Express-Exec Control-Case Structure. [R- means right click.] Deposit this new item somewhere in an unused (white) area ***inside the FFT while loop box*** (the gray box surrounding the FFT portion of the Block Diagram – if you are not inside this box, it will not work!). Click and drag a corner of the new item to make it bigger.
2. With the mouse on the border, R-Visible Items-Label to show a label, and name it Case Structure for Write To File.
3. With the cursor somewhere inside the *Case Structure* block, R-Output-Write-Write Meas. File. Deposit the new item inside the *Case Structure* block.
4. A *Configure…* window will appear. Under *File name*, browse to your desktop and enter a data file name for the data to be saved. Use a descriptive file name such as "Data_Group_B_Section_5.lvm". *Note*: The file is a simple *text* file, but LabView saves it with the default ".lvm" extension, where "l" is an L not a one. The complete path for this file should appear. Write down the path so that you can find your file later on.
5. [*Note*: Later on, to view the file, R-Open With. Chose Notepad or Wordpad to view the text file.]
6. Turn on the following three options: Overwrite file, No headers, and One column only. OK.
7. Wire from the red striped data wire going into the *Spectral Measurements* VI to the *Signals* input of the *Write LVM* VI. This wire should also be striped and red in color.
8. With the cursor on the little green question mark on the left side of the *Case Structure* block, R-Create Control.
9. Double-click on this new *Boolean* control item. (Double-clicking on an item in the *Block Diagram* window automatically opens up the *Front Panel* window, highlighting the new item.) Move it to a convenient location so that it can function as an on/off switch. (The left side of the front panel, under the inputs, is recommended.)
10. Double-click on the label of this switch and rename it "Save Data to File".
11. There are various switch options including toggles, spring-loaded switches, etc. We want one that turns on for a short time, and then turns off again. With the mouse cursor on the switch, R-Mechanical Action-Latch When Released.



12. With the mouse cursor on the switch, R-Visible Items-Boolean Text. This will add a label "ON" or "OFF" on the switch to make the status of the switch more clear.
13. Return to the *Block Diagram* window. Enlarge the *Write LabVIEW Measurement File* VI by clicking and dragging on its bottom border. This will expand it, revealing more available options. With the cursor on the Reset arrow, R-Create-Constant. Change the default "F" (false) to "T" (true). This ensures that the data are reset and re-written to the file every time you push the switch.
14. Your final block diagram should look something like that on the next page.

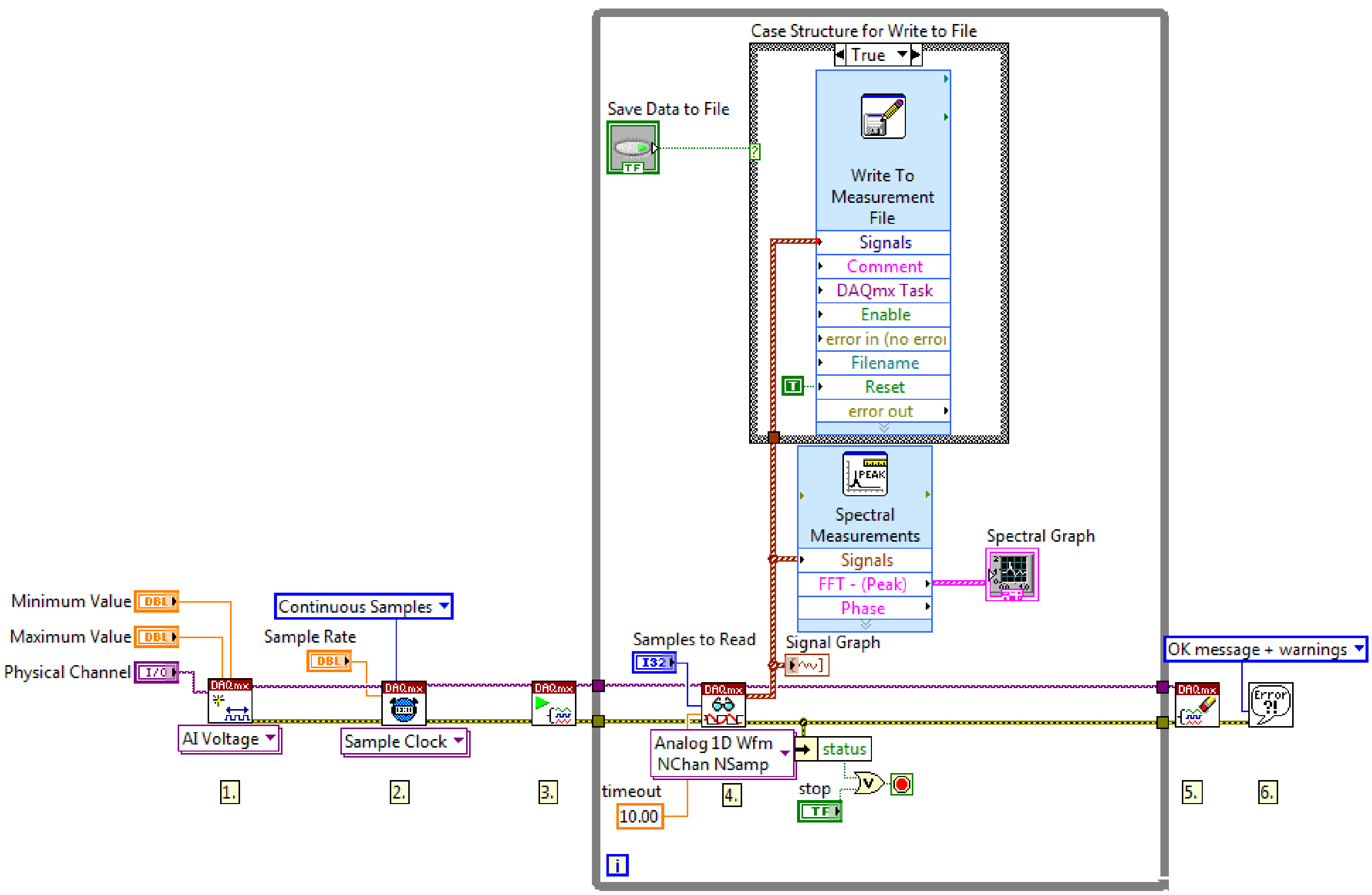
Test writing data to a file

1. In the *Front Panel* window, set the Sample Rate to 500 Hz and set the number of data points ("Samples to read") as 200. Run, using a 50 Hz sine wave. The frequency spectrum should show a peak at 50 Hz. Note: If you get an error, try again. Sometimes LabVIEW gets confused. If all else fails, turn off the DAQ device, and then turn it back on and try again. The error should eventually clear itself.
2. Turn on the "*Save Data to File*" switch that you just created, and then look at the folder where the file was written (either on the desktop or in some other directory/folder). A file should appear there, with the name you previously assigned. Double-click that file, and view the data in Notepad. Verify that it contains two columns: time (seconds) and voltage signal (volts). In future labs, you will be able to capture voltage data in this manner, and then copy and paste those data into an Excel spreadsheet for further analysis.

Complete the rest of the lab

1. Back in LabVIEW, File-Save to save the program for future use. *Note*: You will need to use this virtual instrument later on in the course, so it is a good idea to save it to a USB drive or e-mail it to yourself or something. It is also good if all group members have a copy of the file for future use.

Refer back to the lab manual for further instructions on which measurements to take for the lab report.



Steps:
1. Create an analog input voltage channel.
2. Set the rate for the sample clock. Additionally, define the sample mode to be continuous.
3. Call the Start VI to start the acquisition.
4. Read the waveform data in a loop until the user hits the stop button or an error occurs.

Note: This example reads data from one or more channels and returns an array of data. Use the Index Array function to access an individual channel of data.

5. Call the Clear Task VI to clear the Task.
6. Use the popup dialog box to display an error if any.