Exercise 10-2: Using the Low-Level File I/O VIs/Functions to Stream Data to a Text File

Goal

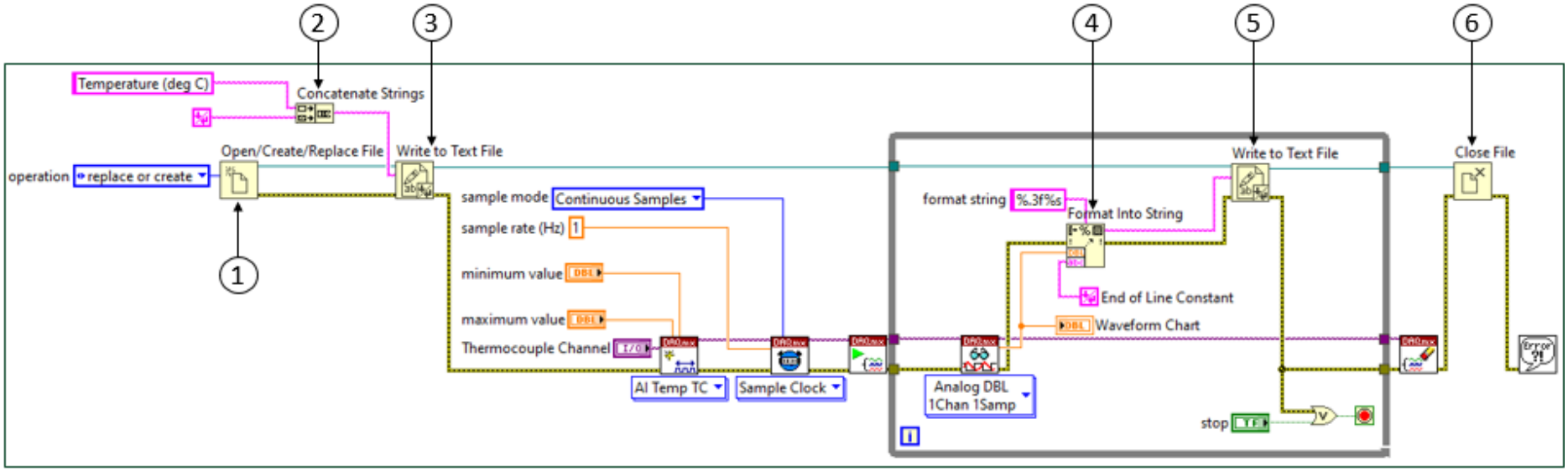
- Stream single channel, single sample temperature data to a text file.

Instructions

1. Open the following project: `C:\Exercises\LabVIEW Core 1\ Low-Level Stream to Text File (1Chan 1Samp)\Low-Level Stream to Text File (1Chan 1Samp).lvproj`.
2. From the **Project Explorer** window, open the Stream to Text File — 1 channel 1 sample VI.
3. Examine the VI.
   - Notice that the DAQmx Create Channel VI configures the task to acquire measurements from a thermocouple.
   - Notice that the DAQmx Timing VI configures the task to acquire measurements continuously at a sample rate of 1 Hz.
   - Notice that the DAQmx Read VI reads 1 sample from 1 channel as a single DBL data type.

Question 1: How frequently does the While Loop execute? _____ times per second.

4. Modify the block diagram, as shown in the following figure, to stream data to a text file.



1. **Open/Create/Replace File function** – Specify the filepath of the data log file. In this exercise, leave the file path input unwired so that when the user runs this VI, this function will launch a file dialog box for the user to choose the file path for the data log file.
2. **Concatenate Strings function** – Use this function to create the header string with an End of Line constant.
3. **Write to Text File function** – Use the first Write to Text File function to write the header to the first line of the file before the VI enters the While Loop.
4. **Format Into String function** – Use this function to convert the numeric DBL data into a string data type because the Write to Text File function requires a string input. This function, as configured in this exercise (formatting string syntax is "%.3f%s"), will format a DBL input of 5.123456789 into the string "5.123<end-of-line character>". Refer to the *LabVIEW Help* for more details on this function and the format string syntax.
5. **Write to Text File function** – Use the second Write to Text File function to continuously write data to file inside the While Loop.
6. **Close File function** – Closes the file. You should always close a file when you are done accessing the file in the VI.

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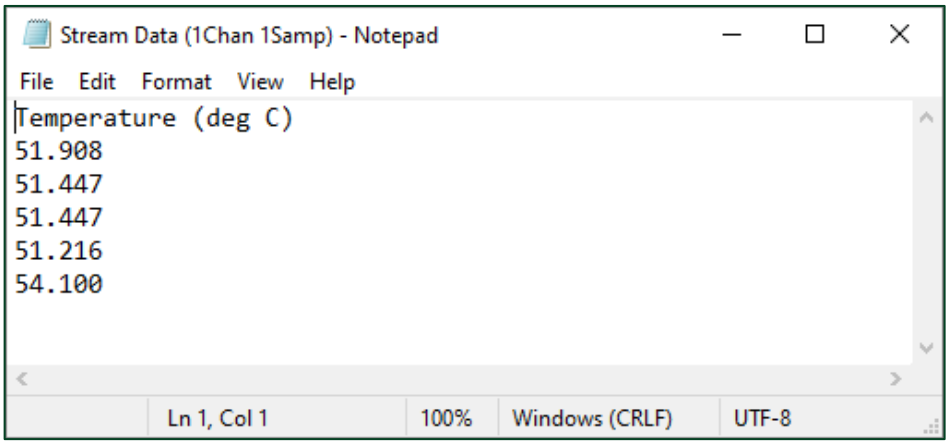
5. Save the VI.
6. Run the VI.
   - On the front panel, set the **Thermocouple Channel** control to a single thermocouple channel on your DAQ device (e.g. PCI-6221/ai1).
   - Click the **Run** button.
   - Save the file as `C:\Exercises\LabVIEW Core 1\Low-Level Stream to Text File (1Chan 1Samp)\Stream Data (1Chan 1Samp).txt`.
   - Let the VI run for about 10 seconds, so the VI can acquire and log approximately 10 temperature measurements.
   - Click the **Stop** button.

7. Explore the text file.
   - In Windows Explorer, navigate to and double-click the **data log file** to view its contents.
   - Notice the file includes a header describing each channel.
   - Verify that the log file looks similar to the following figure.



8. Try opening the text file using Microsoft Excel.

Your Turn

Create a log file with two column headers (“Current Temperature (deg C)”, “Current Temperature (deg F)”) and two columns of data.

Answers

Question 1 - Answer: The While Loop executes 1 time per second. The DAQmx Read VI reads one sample each iteration. The sample rate is 1 Hz, so the DAQ device acquires 1 sample per second. Therefore, the While Loop only executes one time per second because the DAQmx Read VI must wait until a sample is available to read.

End of Exercise 10-2