Hands-On: CompactDAQ and FlexLogger™

Contents

Introduction

Each exercise in this hands-on manual has three sections:

1. **OVERVIEW:** The overview specifies a task to accomplish in the exercise and is useful for those who want to explore FlexLogger on their own with limited guidance.

2. **DETAILED HELP:** This section expands on the overview and includes step-by-step instructions for completing the exercise.

3. **REVIEW:** The review at the end of each exercise asks follow-up questions on what you have accomplished or how the task could benefit your application.

Hardware Configuration

Overview Hardware Connection and Setup

Estimated time: 5 minutes

Connect the CompactDAQ system to the PC.

Detailed Help

The hardware for this seminar includes several measurement modules that explore temperature, accelerometer, and strain measurements. For more information about the modules you see in the chassis or to learn more about CompactDAQ, check out ni.com/compactdaq.

1. Before beginning any of the following exercises, ensure that your chassis is connected to your PC through the supplied USB cable and that both the PC and the CompactDAQ Chassis have power. Both the green Power LED and amber Ready LED on the chassis should be lit before the hardware can be detected in FlexLogger.

2. Take a moment to go over the connections in the demo box. Make sure all modules are securely seated in the chassis. Additionally, if any wires are loose or something appears missing or broken, alert your instructor.

3. After you have confirmed everything is connected and powered on, proceed to the next exercise.

Create a FlexLogger Project

Overview

Opening FlexLogger

Estimated time: 10 minutes

Set up a FlexLogger project to automatically detect connected hardware and view available channels.

Detailed Help

1. Open the **FlexLogger** application by navigating to:
   Windows 7: **Start » All Programs » National Instruments » FlexLogger**
   Windows 10: **Start » All Apps » National Instruments » FlexLogger**
2. Select **Launch a Project.**
3. Select the **New Project** button to open a new project.

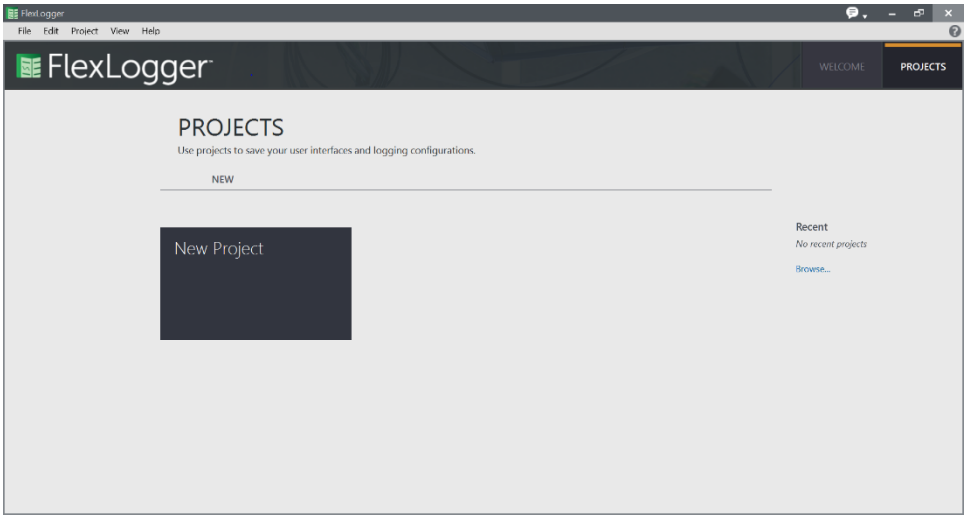

Figure 1. The FlexLogger Projects tab gives the option to open a new or an existing project.

You can open existing projects to reuse configurations from previous tests.

4. Type a project name into the New Project dialog box. Select **Create.**

FlexLogger automatically detects and loads the connected hardware.

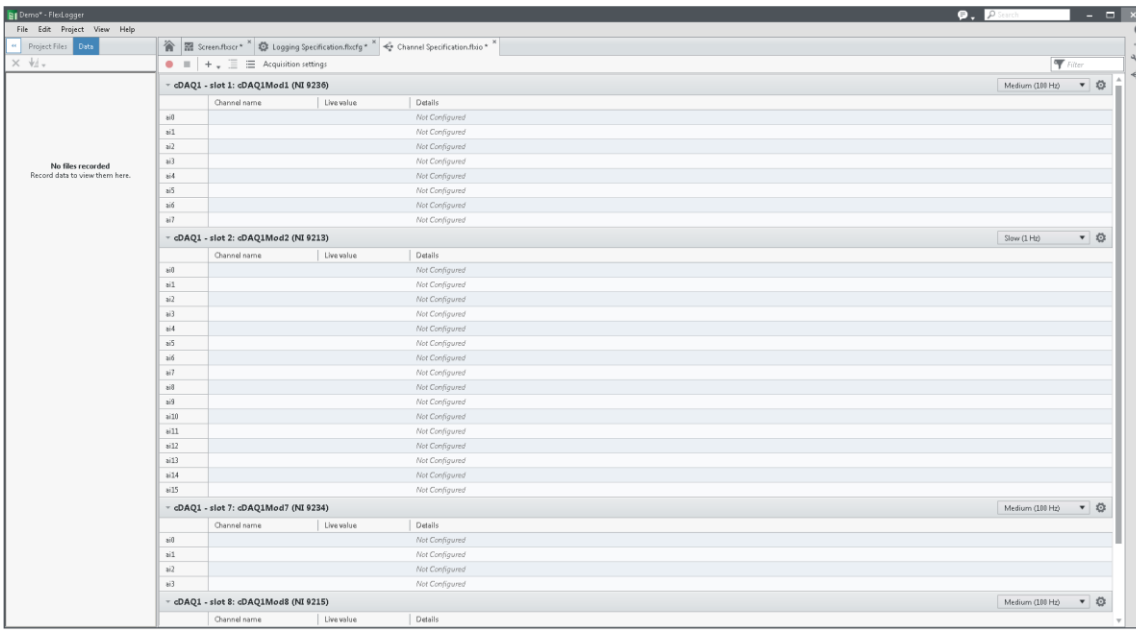

Figure 2. FlexLogger Project

When you open a new FlexLogger project, you can see the **Screen.flxscr**, **Logging Specification.flxcfg**, and **Channel Specification.flxio** tabs across the top of the project. You will learn the purpose of each tab later, but, as you select tabs, different screens and options become available in the center pane. When you first open the project, you can see the **Channel Specification.flxio** tab, which shows the hardware that is connected to the computer and the CompactDAQ modules and channels available in the project.

5. Select **Collapse All** at the top of the **Channel Specifications** tab to view the table of modules available for use. Select **Expand All** to view each channel available for each module.

   If you are using the CompactDAQ demo box, then you should see the NI 9236 (strain/bridge input), NI 9213 (temperature input), NI 9234 (sound and vibration input), and NI 9215 (voltage input). If you create simulated devices, they also show up here.

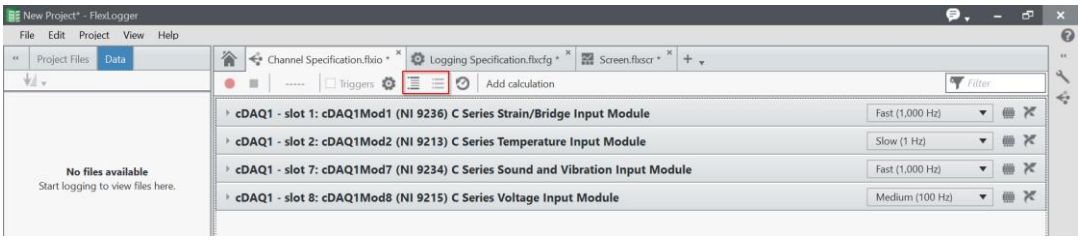

Figure 3. In the Channel Specifications tab, you can expand, view, and configure any module and channel.

The **Channel Specifications** tab also corresponds to a Channel Specification.flxio file. This allows you to save and reuse common sensor and hardware configurations. Rather than create a new configuration for each test, you can open a default configuration and make changes if the sensors differ slightly from the previous data-logging session.

6. Save the project by selecting **File » Save All.**

When you save a FlexLogger project, several files get saved to the same folder:

File Type	Purpose
.flxproj	This is the project file. It allows FlexLogger to view and organize other file types.
.flxio	This file saves the channel configurations that have already been set up in FlexLogger. These can include properties such as the channel's input range or sensor type.
.flxcfg	This file saves the logging configuration that has already been set up in FlexLogger, such as triggered logging and custom file names.
.flxscr	This file saves a user interface that allows the user to view data updates during a data-logging session or test.

Review

- How many channels are on the NI 9215?
- What is the benefit of having a separate Channel Specification.flxio file?

Acquire Temperature Measurements

Overview

Acquiring Temperature Measurements

Estimated time: 10 minutes

A J-type thermocouple is connected to the NI 9213 at ai0 (analog input 0). Configure a channel in FlexLogger to acquire the temperature data from this sensor at 10 Hz.

Detailed Help

1. Using the same project that you created before, select the **NI 9213** tab to expand the available channels.

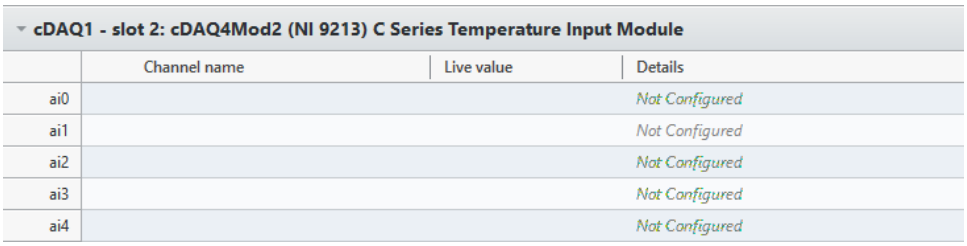

Figure 11. Expanded Channel View of the NI 9213

2. Click the **Pinout** button  (located to the right of the module name) to view a diagram of the module you are using.

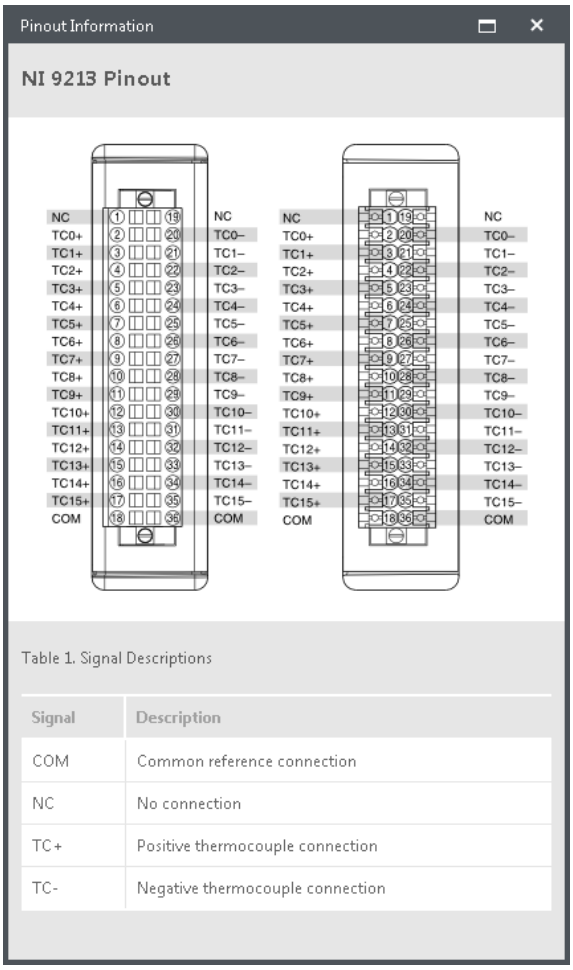

Figure 2. Pinout Information Window

With the pinout information, you can verify wiring schemes and inputs for a module, in this case the NI 9213.

3. Exit out of the **Pinout Information** window.
4. Click the settings button for ai0 to open the **General Info** window for that channel. The gear appears when you hover over the channel ai0.

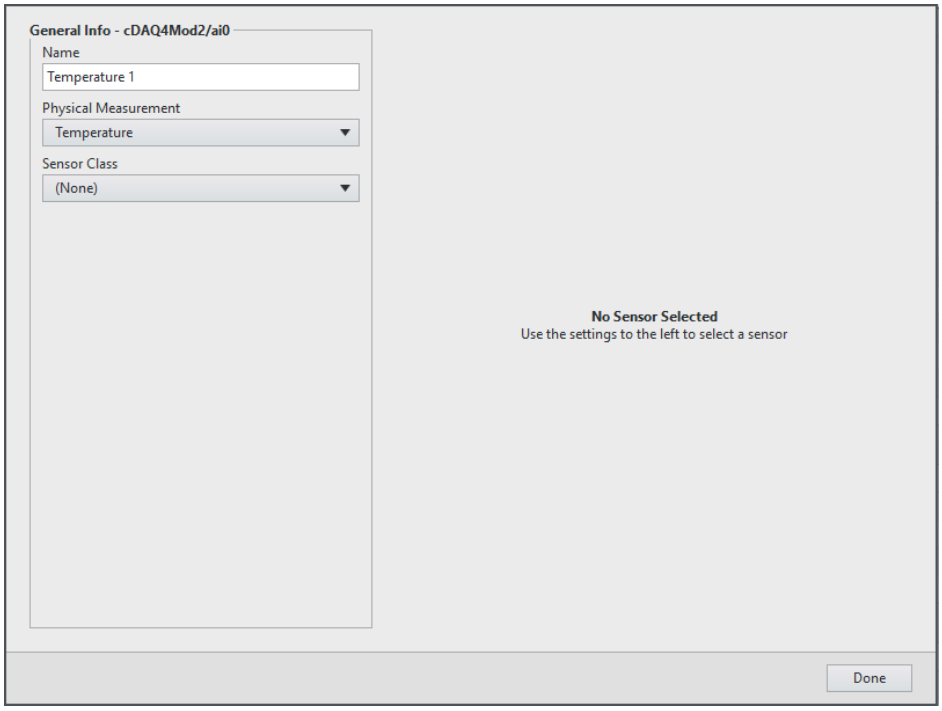

Figure 3. General Info Window

5. Rename the channel from **cDAQ1Mod2/ai0** to **Temperature 1.**
6. Select **Temperature** from the **Physical Measurement** pull-down menu.
7. Select **Thermocouple** from the **Sensor Class** pull-down menu.

After you have selected a physical measurement and sensor class, the **General Info** window populates with physical, electrical, and scaling properties. There is also a live value update on a graph, so you can see how the settings you specify affect the measurement immediately.

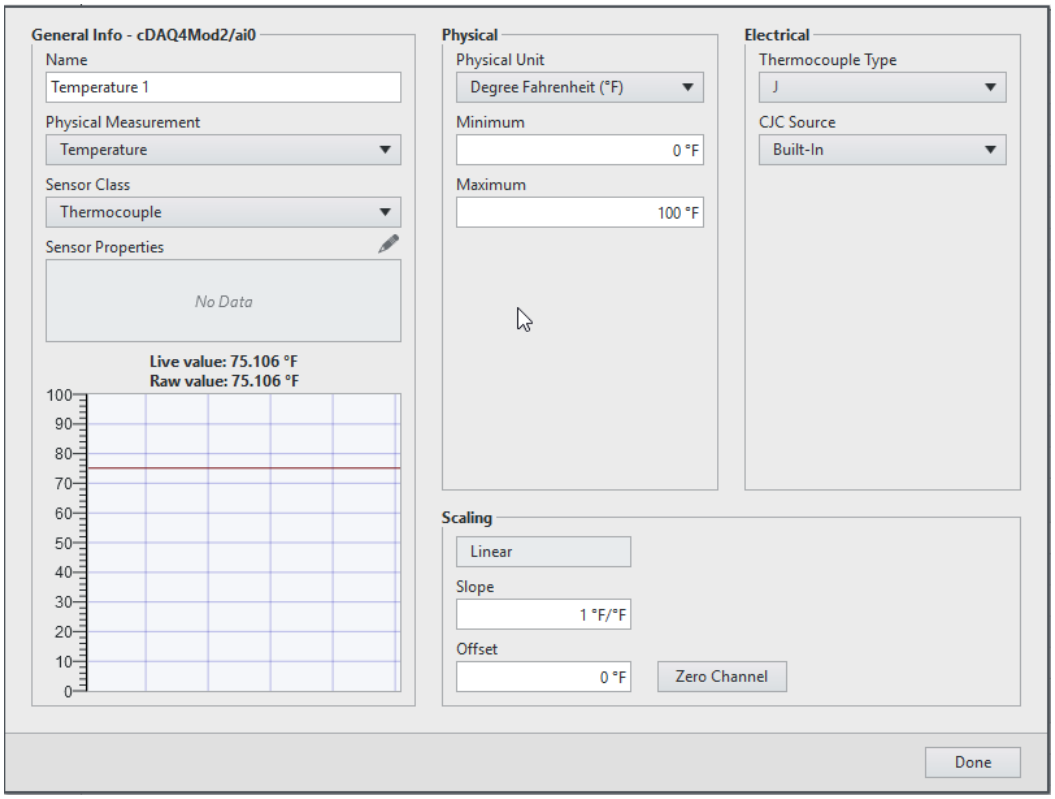

Figure 4. Settings in General Info Window

8. Select **J** from the **Thermocouple Type** pull-down menu.

9. Select **Fahrenheit** instead of **Celsius** from the **Physical Unit** pull-down menu to see the live value adjust.

10. Type **0** and **100** for the **Minimum** and **Maximum,** respectively.

11. Select **Done** or click outside the **General Info** window to go back to the channel.

Now in the **Channel Configurations** tab, the new channel name is visible along with the live value and details about the channel.

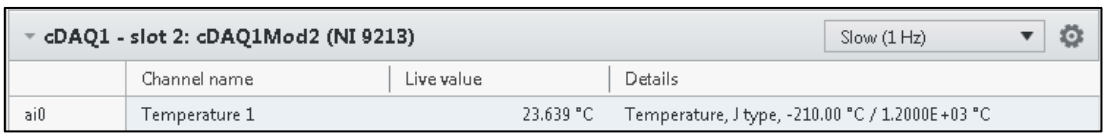

Figure 5. Temperature 1 Channel View—The list of modules and channels that have been configured will always be available from the Channel Specifications tab. This allows for quick validation of measurements while setting up a test.

After the channel has been configured, it is time to set the sample rate. The cDAQ-9178 has three timing engines, so there are three samples rates: slow, medium, and fast.

12. Make sure the sample rate for the NI 9213 is set to **Slow** 

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13. Change the slow sample rate from 1 Hz to 10 Hz by selecting **Configure Sample Rates/Intervals**  .

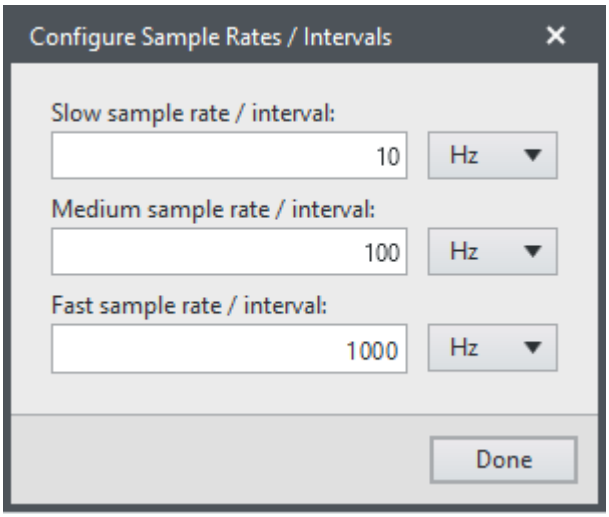


Figure 6. Configure Sample Rates/Intervals—This allows the channels to be synchronized across modules if they are using the same sample rate.

The acquisition settings allow for measurements to be synchronized across modules in your CompactDAQ Chassis.

14. **Save** the project. You will add more measurement types in later sections.

Review

- If you needed to validate the wiring for a module, where would you go to view the pinout diagram?
- How would you change the thermocouple type if you need to connect a K-type thermocouple?

Acquire Accelerometer Measurements

Overview

Acquiring Accelerometer Measurements

Estimated time: 10 minutes

An unbalanced fan is connected to the NI 9234 module to acquire accelerometer measurements.

Detailed Help

1. Using the same project, select the **Channel Specification.flxio** tab and expand the **NI 9234** tab to view the available channels.

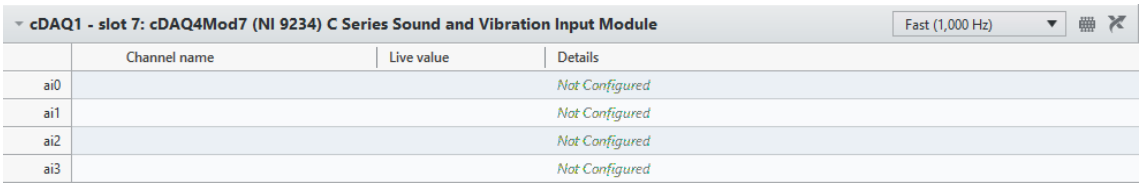


Figure 1. Expanded Channel View of the NI 9234

2. Click the **Pinout** button  (located to the right of the module name) to view the connections of the module you are using.

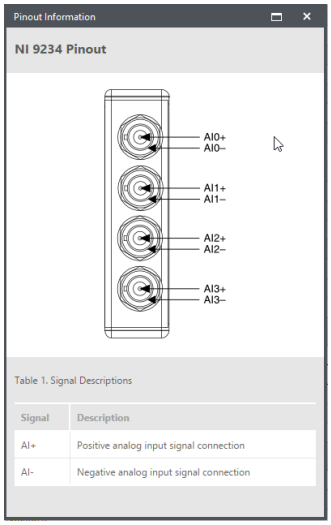


Figure 2. Pinout Information Window

3. Exit out of the **Pinout Information** window.
4. Click the settings button  for ai0 to open the **General Info** window for that channel. The gear lights up when you hover over the channel.
5. Rename **cDAQ1Mod6/ai0** to **Accelerometer 1.**
6. Select **Acceleration** from the **Physical Measurement** pull-down menu.
7. Select **IEPE** from the **Sensor Class** pull-down menu.
8. Type -**0.5** and **0.5** for the **Minimum** and **Maximum,** respectively.

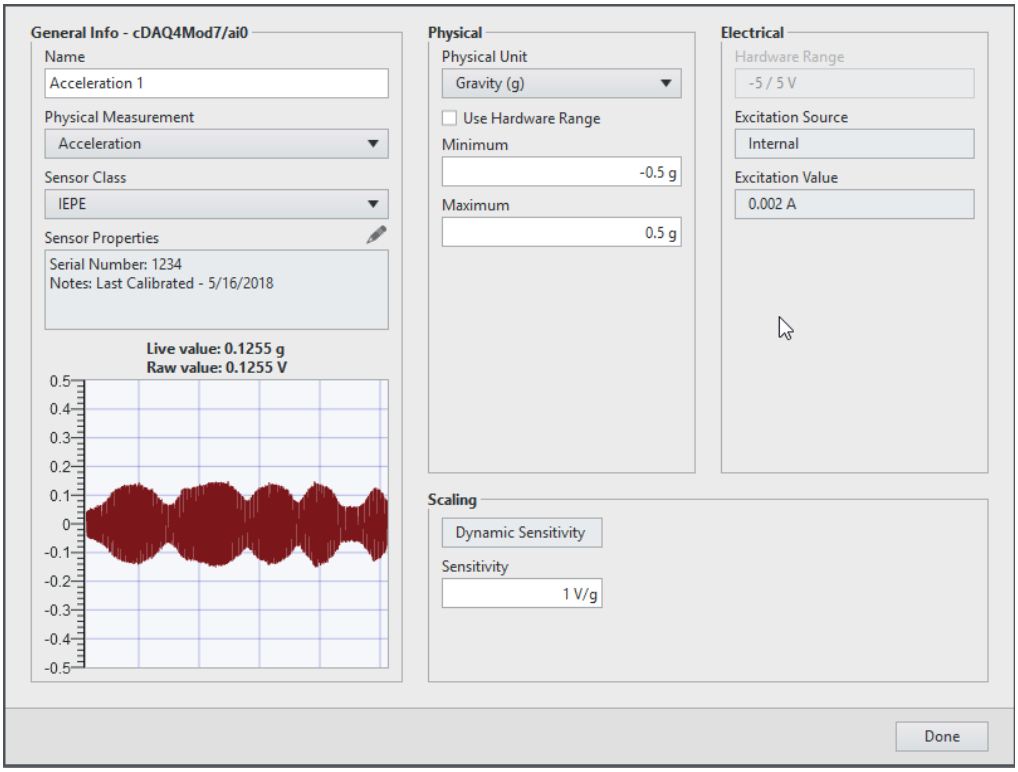
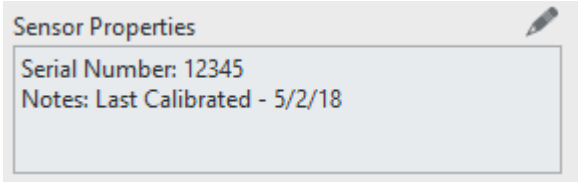


Figure 3. Settings in General Info Window

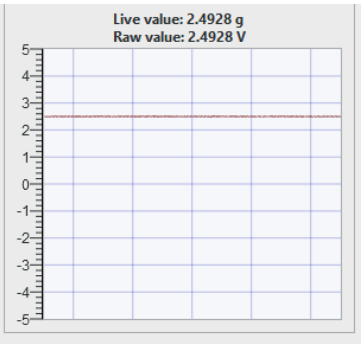
Just like with the temperature measurement setups, there are measurement- and module-specific settings available.

8. Edit the Sensor Properties  to add metadata about the device under testing.
9. Type **1234** in the **Serial Number** field.
10. Navigate to the accelerometer calibration sheet at `C:\Users\Public\Documents\FlexLogger Files\Calibration Sheet.pdf`. Find the last calibrated date of the sensor and type it in the **Notes** section (Example: **Last Calibrated - XX/XX/XXXX**).

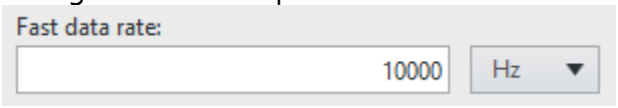


11. On your demo box, make sure the switch on the Sound and Vibration Signal Simulator is switched to **Unbalanced Fan**.
12. Change the **Sensitivity** to **0.175V/g**.

13. Turn the **Fan Speed Control** knob on the Sound and Vibration Signal Simulator and watch the live values update in FlexLogger.



14. When you are finished, select **OK**.
15. Select **Done** or click outside the **General Info** window to go back to the channel.
16. Configure the **Fast data rate** by selecting **Configure Data Rates**  **.**
17. Change the **Fast** sample rate to **10k Hz**.



18. **Save** the project. You will add to the project in the next exercise.

Review

- How would you decrease the rate your module is sampling the data?
- How would you change the sensitivity of the sensor readings?

Acquire Strain Measurements

Overview Acquiring Strain Measurements

Estimated time: 10 minutes

Configure the NI 9236 to acquire strain measurements.

Detailed Help

1. Using the same project, select the **Channel Specifciation.flxio** tab and expand the **NI 9236** to view the available channels. There is a strain gage connected to the metal bar on the demo box that you will use to take strain measurements.

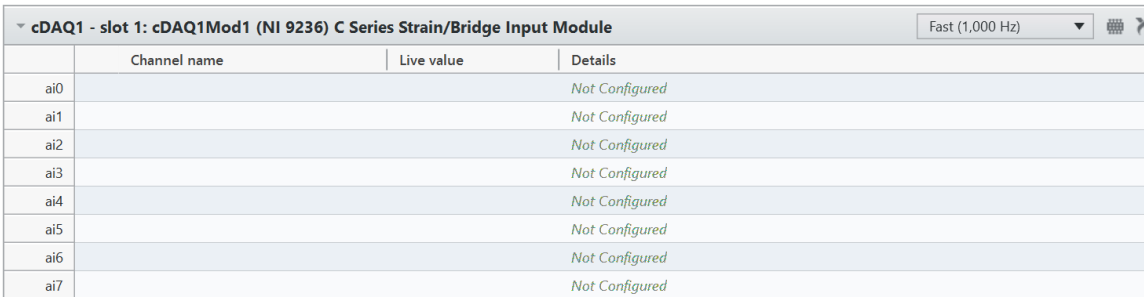


Figure 1. Expanded Channel View of the NI 9236

2. Click the **Pinout** button to view the wiring for the channels of the NI 9236.
3. Exit out of the **Pinout Information** window.
4. Click the settings button for ai0 to open the **General Info** window for that channel. The gear will light up when you hover over the channel.
5. Rename **cDAQ1Mod1/ai0** to **Strain 1.**
6. Select **Strain** from the **Physical Measurement** pull-down menu.

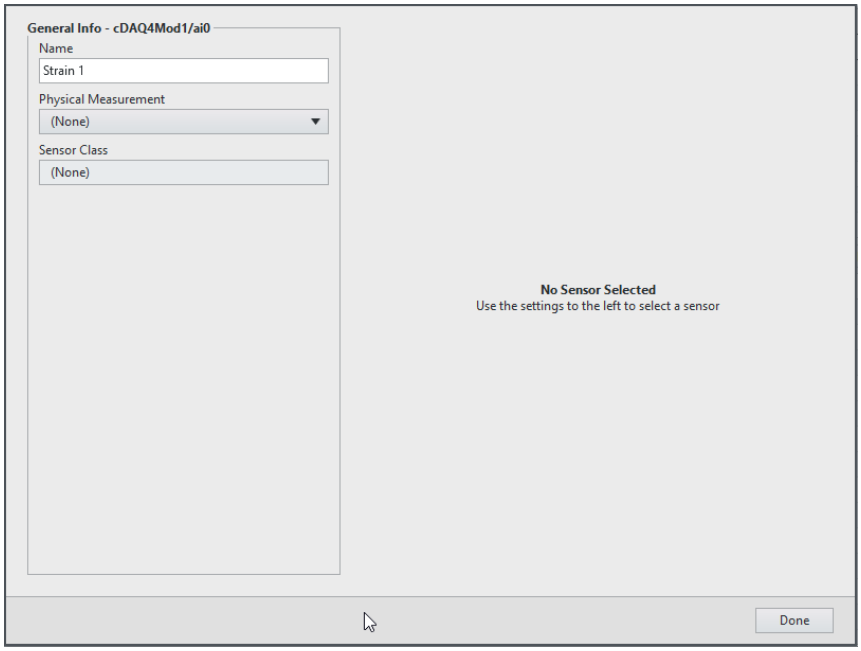


Figure 2. Settings in General Info Window

After you have selected the physical measurement and sensor class, the **General Info** window shows configurations specific to the type of measurement you have selected.

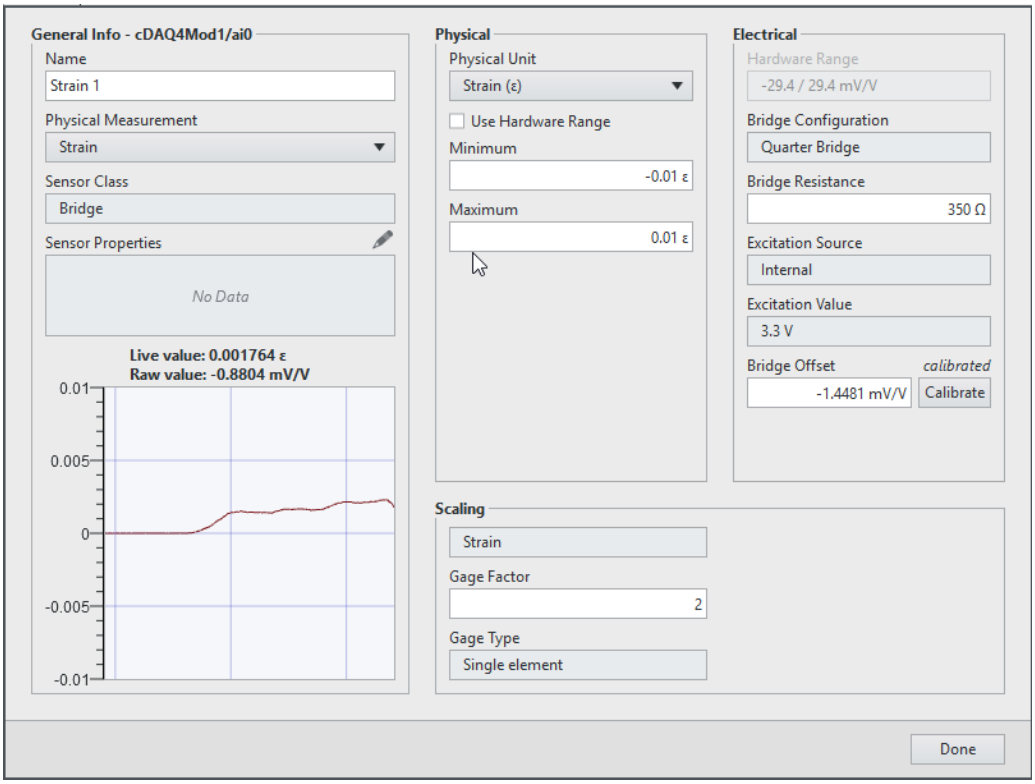
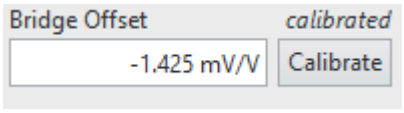


Figure 3. Settings in General Info Window

7. Click the **Calibrate** button in the **Electrical** configurations box to set the strain sensor to zero when no stress is being applied.



8. Type -**0.01** and **0.01** for the **Minimum** and **Maximum**, respectively.
9. Press down on the strain bar on the demo box to watch the live values update.
10. Select **Done** or click outside the **General Info** window to return to the channel.
11. **Save** the project. You will add to the project in the next exercise.

Review

- Where would you change the bridge resistance?
- How do you change the units of the strain data you are collecting?

Set Up Logging Specifications

Overview

Setting Up Logging Specifications

Estimated time: 10 minutes

Set a custom file name and settings before starting the data-logging session.

Detailed Help

1. Select the **Logging Specification.flxcfg** tab 

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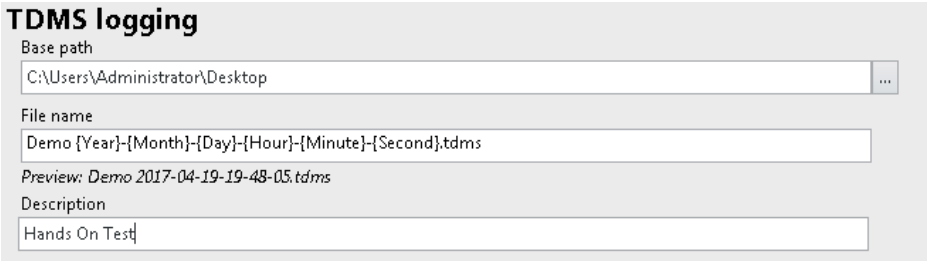


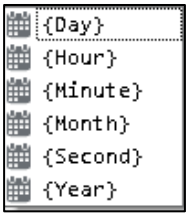
Figure 1. TDMS Logging Specifications

FlexLogger logs data using Technical Data Management Streaming (TDMS) files to increase logging speed and ease of access. The TDMS file also includes information about the data that you are acquiring in the form of metadata.

2. Change the Logging **Base Path** to `C:\Users\Public\Documents\FlexLogger Files` on the computer.
3. Replace the **Log File** portion of the **File Name** with a custom name of your choice.
4. You have the choice to insert the **year, month, day, hour, minute,** or **second** in the file name.

Flexlogger automatically adds timing information to the log file to create unique file names. You can add or delete timing information as necessary from the file path.

To add a new timing parameter, you can type a bracket **{** in the file path where you want to add the parameter and a list of options drop down.

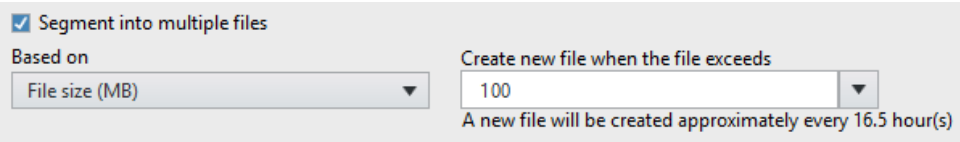


A preview of the file name is shown so, before you begin logging, you can verify you have the name you need and that multiple data-logging sessions have unique file names.

5. Add your own description.

Metadata enables a user to view details about the data in the same file: how a measurement was taken, what hardware was used, the range of the measurement, and so on. For example, the description that you added in the logging specifications appears in the metadata of the TDMS file when you view it later.

If a data-logging session is especially long, then it may be necessary to segment the session into multiple files.

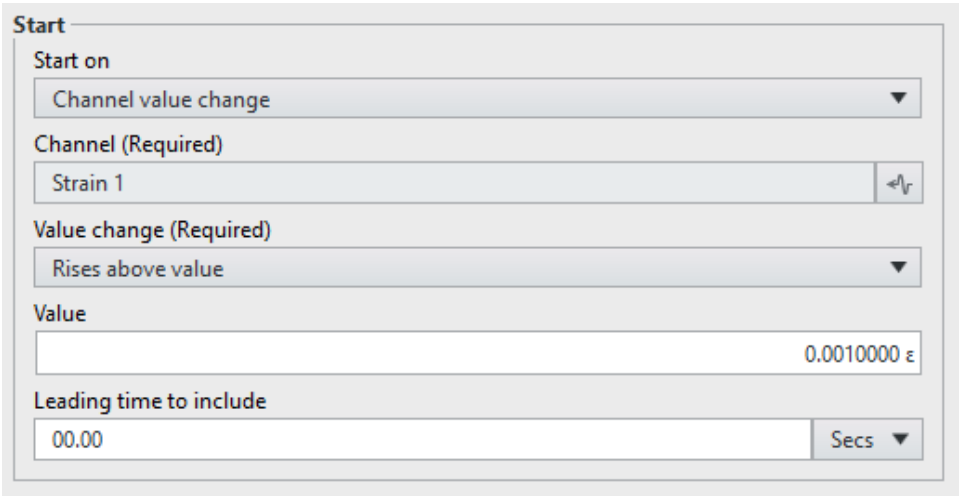


This allows for easier data management and saved data if the test is stopped unexpectedly or an unexpected power down occurs. Leave this option unselected for now.

FlexLogger also has the capability of triggered logging, so that you can specify under what condition you want your system to begin writing data to a file.

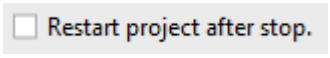
6. In the triggering start configuration, choose **Channel value change** from the **Start on** pull-down menu.
7. Choose **Strain 1** from the **Channel** configuration  .
8. Choose **Rises above value** from the **Value change (Required)** pull-down menu.

9. Type in **.001** for the **Value**.



10. In the triggering stop configuration, choose **Duration** from the **Stop on** pull-down menu.

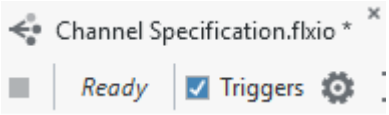
    There is a checkbox option to restart the project after it stops under the conditions that you have set. For now, leave this checkbox cleared.



11. Choose **10 seconds** for the duration.

Here you have configured your project to begin logging the recorded data for 10 seconds (or whatever duration you have chosen) after the strain has reached a specified value. This is just one of the many ways you can set up custom triggering for your system.

Notice at the top of the **Channel Specification.flxio** and the **Logging Specification.flxcfg** tabs, you can easily disable the trigger you have set up with a simple checkbox.



You will test out your trigger in the next section.

12. **Save** the project.

Review

- Why would you want to consider segmenting a data-logging session into multiple files rather than one?
- What is the benefit of having a separate Logging Specification.flxcfg tab and file inside of a FlexLogger project?
- What tool can you use to view your data after logging has completed?

Record and Display Data

Overview

Recording Data

Estimated time: 10 minutes

Start a data-logging session.

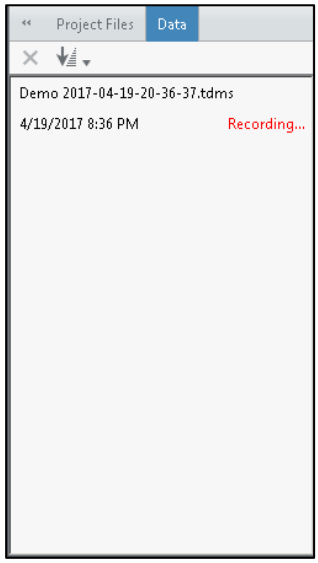
Configure the Screen.flxscr to view temperature and acceleration data during the logging session.

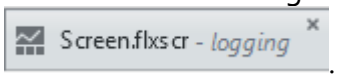
Detailed Help

Now that you have configured the measurements and logging settings, it is time to begin a recording session.

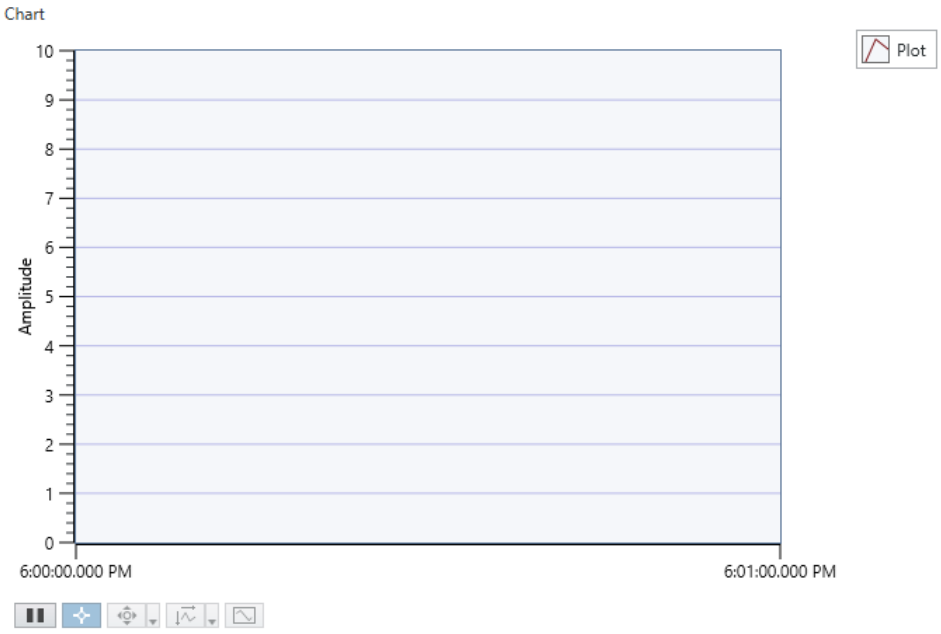
1. Start recording from any tab by selecting  .
2. Press on the strain gage to trigger the data logging.

After the data logging begins, a log file appears in the **Data** pane on the left side of the screen.

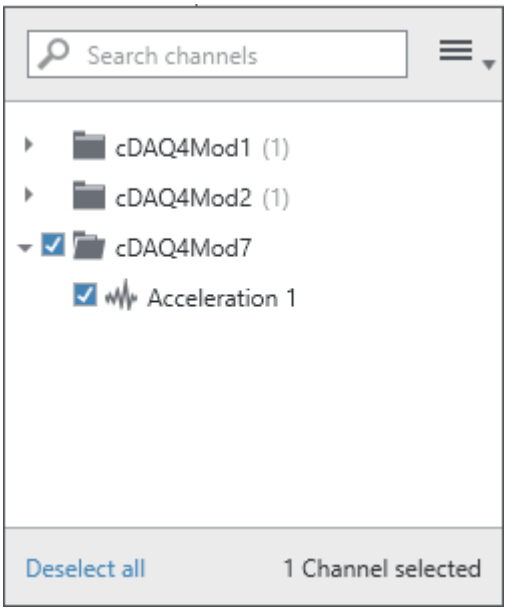


3. While the data is being acquired, select the **Screen.flxscr** tab  .

4. Open the **Charts** palette  . Then select and drag the **Chart (Long History)** onto the workspace.

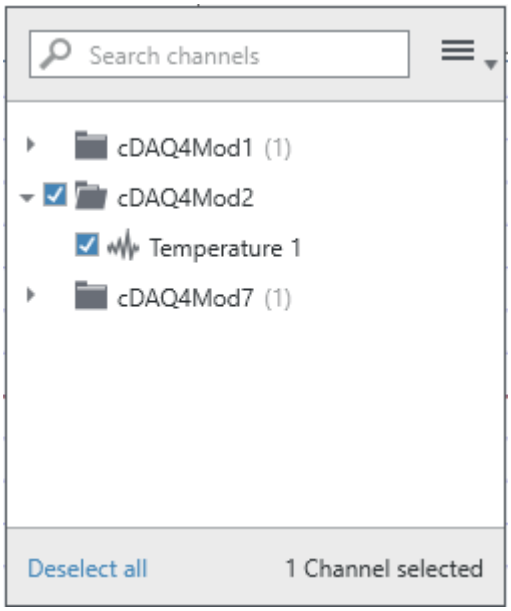


5. In the channel pop-up window, select the **Acceleration 1** channel that you configured earlier. If the pop-up window goes away, you can also select the  button in the upper right-hand corner.



The acceleration data that you configured earlier from the unbalanced fan is now populated in the graph for easy viewing, so you can make sure you're getting the right measurements during the test. Note that you have your trigger enabled, so you will not begin to see the data until you hit the trigger value on the strain gage.

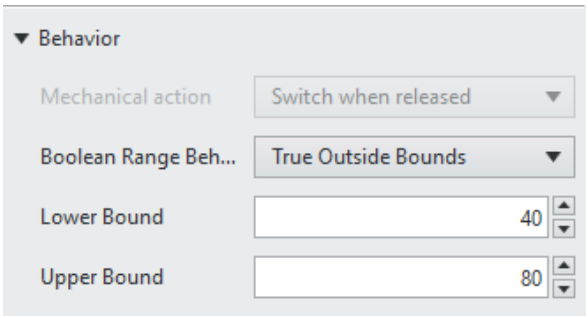
6. Open the Boolean palette  and select and drag a **Round LED** onto the workspace.
7. In the Channel pop-up window, select **Temperature 1.**



8. Select the **Item** tab in the top-right corner  .
9. Scroll down to the **Behavior** tab.

You can configure indicators in the **Behavior** tab to alert the user when a measurement is outside an expected range. This could alert the user that a test is no longer valid and would prevent the user from having to wait until the data was being analyzed to discover the problem. This functionality saves time.

10. Change the LED behavior to **True Outside Bounds.**
11. Adjust lower and upper bounds of the Boolean indicator to **40** and **80** degrees, respectively.



When you touch the thermocouple sensor with your hand, the temperature goes above 80 degrees, which causes the indicator to light up.

12. After you have configured the acceleration and temperature indicators, place your finger on the thermocouple to raise the temperature and spin the dial to affect the data.
13. Now add **Temperature 1** to the graph.
14. Hover over the right corner of the graph and select  .
15. Select **Temperature 1.**

You can view multiple channels on the same graph or view them separately. Take some time to hold onto the thermocouple or change the speed of the fan to verify that your measurements are reflecting accurate readings during the test.

You can also configure your screen and configure graphs and indicators before you start logging data.

You may have noticed a toolbar on the top of the graph. These are interactive tools that allow you to pause what you see on the graph, zoom in to the data both horizontally and vertically, and pan the data to move around the graph. Using these tools does not affect how the data is logged.

Figure 1. Interactive Graph Tools

16. Select **Stop**  to end the recording session.

Now in the **Data** tab on the left pane, the log file that was configured earlier is visible along with the start time for the data-logging session.

17. **Save** the project.

Review

- Is it possible to make changes to the screen tab before and during a logging session?
- What is the benefit of having the screen tab?

Review Data in DIAdem

Overview

Detailed Help

Reviewing Data

Estimated time: 10 minutes

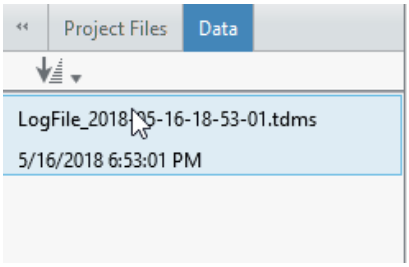
Demonstrate the DIAdem DataFinder and its capabilities. Manipulate and view FlexLogger data in DIAdem to make sense of your temperature measurement tests. Put all the data into a formal report to present to colleagues.

Now that you have learned how to configure your hardware to take measurements in FlexLogger, you can analyze the data and format it into a report to present to your team of engineers. You can easily do this through DIAdem.

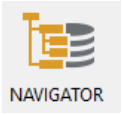
1. Open **DIAdem** by searching for it in the Windows start bar.

DIAdem is software outside of FlexLogger that is specifically designed to equip you to quickly locate, inspect, analyze, and generate reports on various measurement data. The following steps demonstrate how DIAdem can help you create custom reports and analysis from FlexLogger data. For more information about DIAdem, visit ni.com/diadem.

You can also open your data in DIAdem from FlexLogger directly by double-clicking on the log files that are generated in the data column on the left.

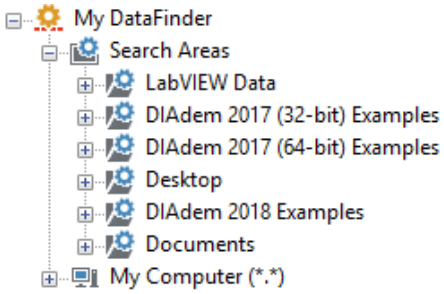


If you do not have a DIAdem license, FlexLogger comes with the TDMS File Viewer by default. With the TDMS viewer, you can view data from multiple channels in one place, customize the view to verify the test ran correctly, and export the data to other file types. The FlexLogger TDMS viewer is built on DIAdem. DIAdem has more advanced data analysis capabilities if your application requires it.

2. Go to the Navigator panel by clicking **Navigator** 

on the left.
3. Right-click **Search Areas » Add Search Area.**
4. Navigate to your `C:\Users\Public\Documents\FlexLogger Files` in the **Path** field and click **OK**.
5. Click **OK** to exit the **Add Search Area** window.

You have just added the file path to the list of locations that the DIAdem DataFinder will search. All file paths with a blue gear next to them are in the DataFinder's search area. DataFinder is an indexing service that parses through any custom file format in the search area for descriptive properties and creates a database of this information. You can quickly search all your data to find channels or groups of channels that meet the properties you specify.



6. Click the down arrow  in the search bar at the top of the search area.

You have been given a collection of data logged by tests done on several different sensors and operators. Now you want to use DataFinder to find the tests that were run by a specific operator on the sensor whose serial number is specified.

7. Use the following parameters in **C1** to search with DataFinder and find the tests done by the operator Danielle.

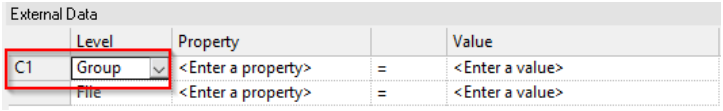


Figure 1. After Group is selected, C1 appears.

Level: Group

Property: Description

Operator: =

Value (you can type this parameter or choose the three dots on the right  **):** Danielle

8. Use the following parameters in **C2** to search with DataFinder and find the tests done by the operator Danielle on the sensor with the serial number.

Level: Channel

Property: SensorSerialNumber

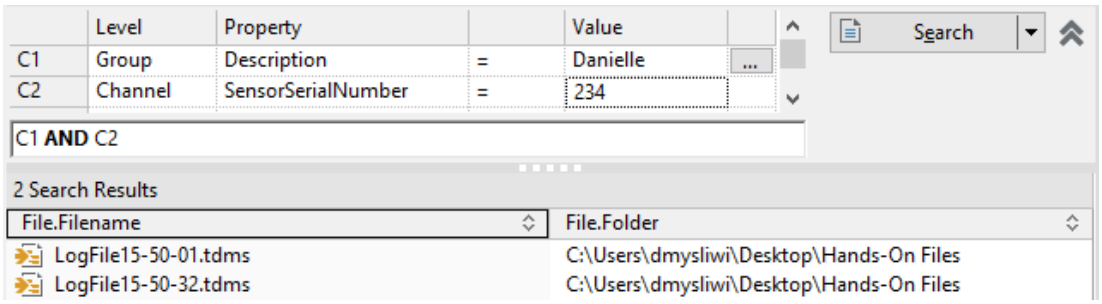
Operator: =

Value: 234

Note: The **C1** and **C2** fields may show up with a different number (C3, C4, and so on). This is OK because the same search takes place.

9. Click **Search.**

You should now see two TDMS files that meet these parameters.



10. In the **Data Portal** on the right, click the **Delete Internal Data** button.
11. Drag the TDMS files to the **Data Portal** on the right.

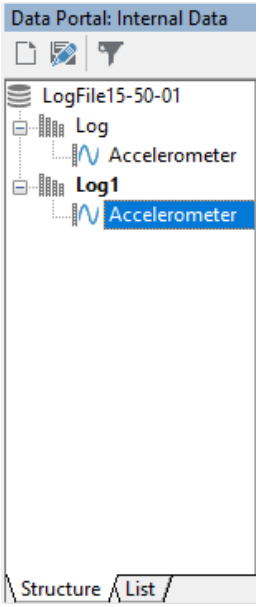


Figure 2. DIAdem Data Portal

While previewing the data in the Data Portal, you realize that the data coming from one of the sensors is showing unexpected data. You decide that you want to pull all the data measured on this sensor and put it into a report.

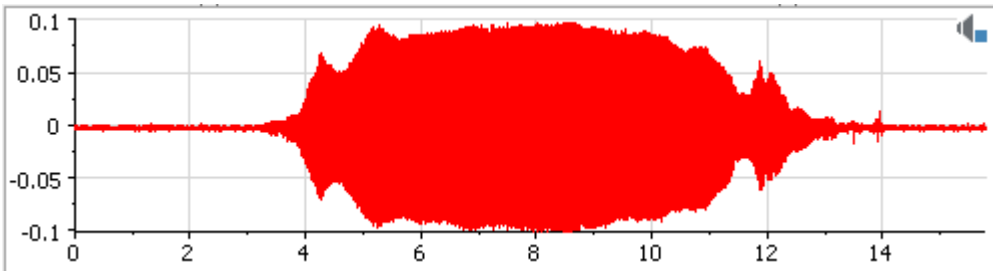
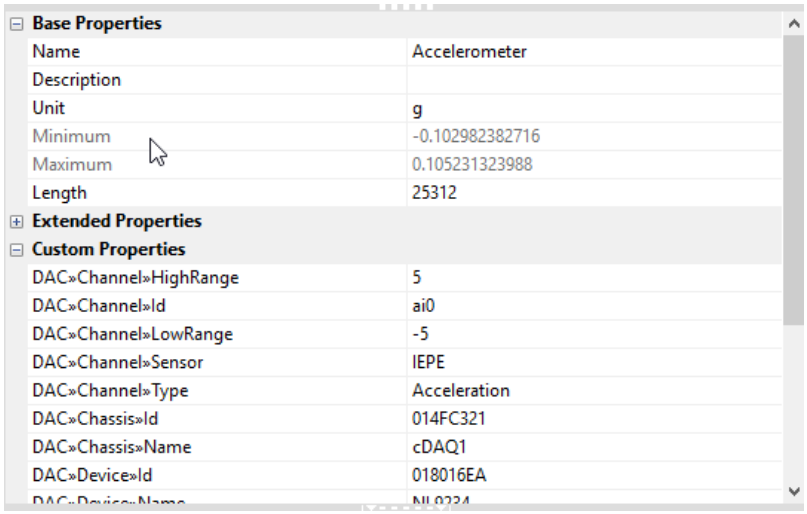


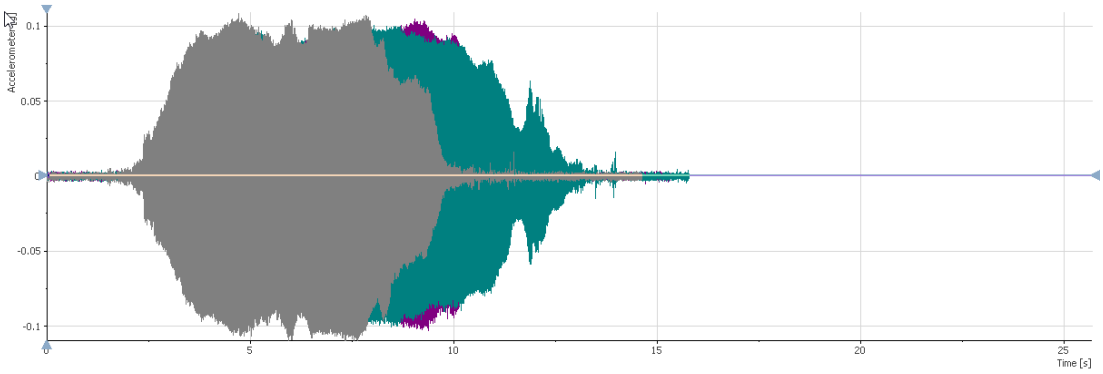
Figure 3. This preview is in the bottom right of the Data Portal.

In the Data Portal, you can also find all the metadata and configuration settings that you set up in FlexLogger.



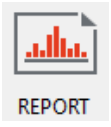
12. Right-click **C1** and select **Delete Selected Rows** to delete the operator search.
13. In the **Data Portal** on the right, click the **Delete Internal Data** button .
14. Drag the TDMS files to the **Data Portal** on the right.
15. Navigate to the DIAdem **View** VIEW panel on the left.

16. Drag all your accelerometer channels from the Data Portal to the **2D Axis** to view all your channel data on top of each other.



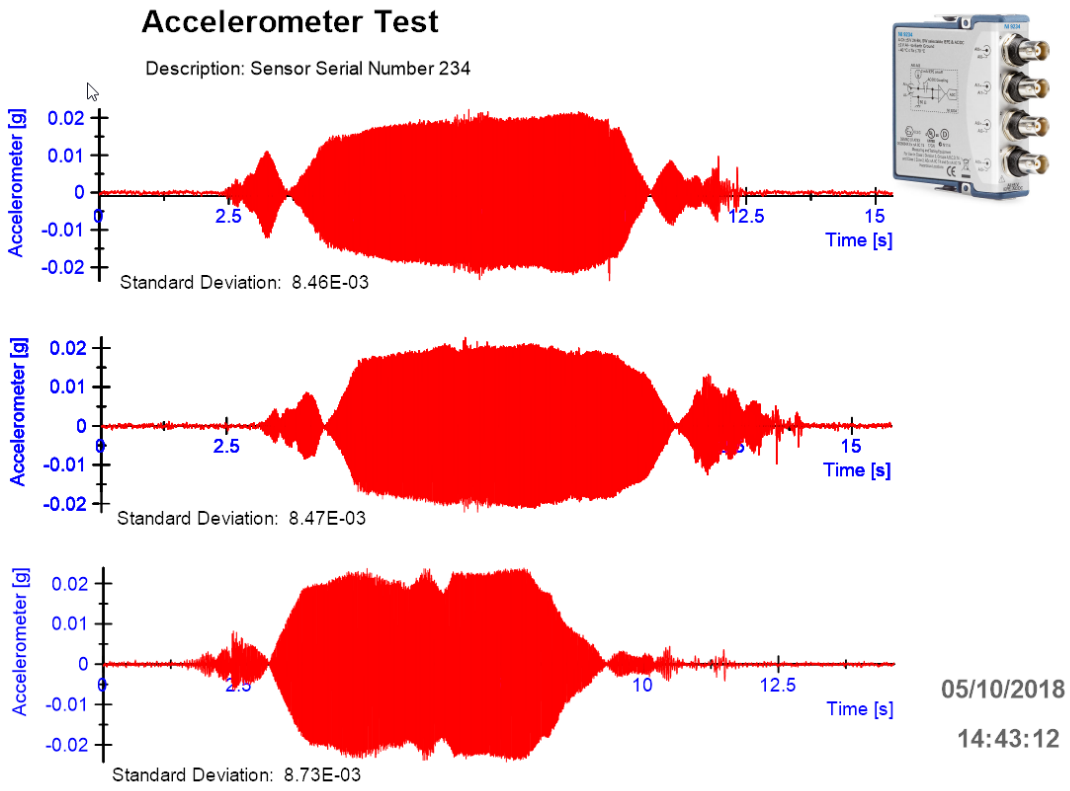
Now you will run a script that has already been written in DIAdem to capture all the accelerometer data from sensor 234, perform the same calculations, and format the relevant information into a formal report that you can then use to present your FlexLogger data.

17. Go to the **Script** panel 

on the left.
18. On the toolbar at the top, select **Open File**  .
19. Navigate to `C:\Users\Public\Documents\FlexLogger Files\Acceleration Script.vbs`
20. **Run**  the script.
21. Go to the **Report** 

panel on the left.

You should now see a formal report that is generated with some calculated measurements. Writing scripts in DIAdem can help automate the analysis of your FlexLogger data, especially if your tests result in many data sets.



Review

- What types of properties does FlexLogger save to TDMS files?
- What types of statistics can DIAdem calculate for your FlexLogger data?

Appendix A: Acquire Voltage Measurements

Overview

Acquiring Voltage Measurements

Estimated time: 10 minutes

A solar panel is connected to the NI 9215. Configure the NI 9215 to acquire the voltage from the solar panel.

Detailed Help

1. Using the same project that you created before, click the **NI 9215** tab to expand and view the available channels.

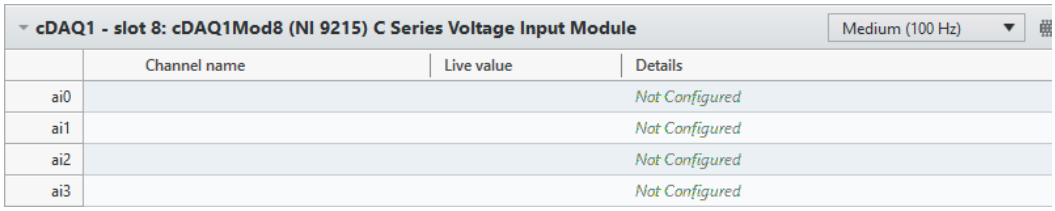


Figure 1. Expanded Channel View of the NI 9215

2. Click the settings button for ai0 to open the **General Info** window for that channel. The gear lights up when you hover over the channel.

3. Rename the channel from **cDAQ1Mod8/ai0** to **Voltage 1.**

4. Type **-2** and **2** for the **Minimum** and **Maximum**, respectively.

5. Select **Voltage** from the **Physical Measurement** pull-down menu.

Just like with the thermocouple measurement setup, there are measurement- and module-specific settings available.

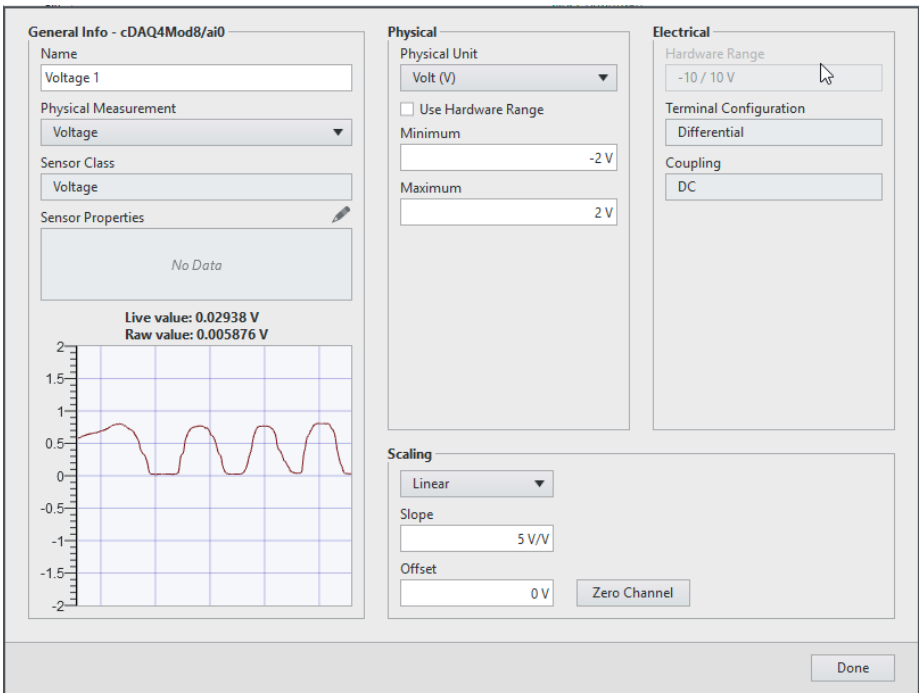


Figure 2. Settings in General Info Window

6. Change the Scaling settings to **Linear** and change the Slope to **5**.

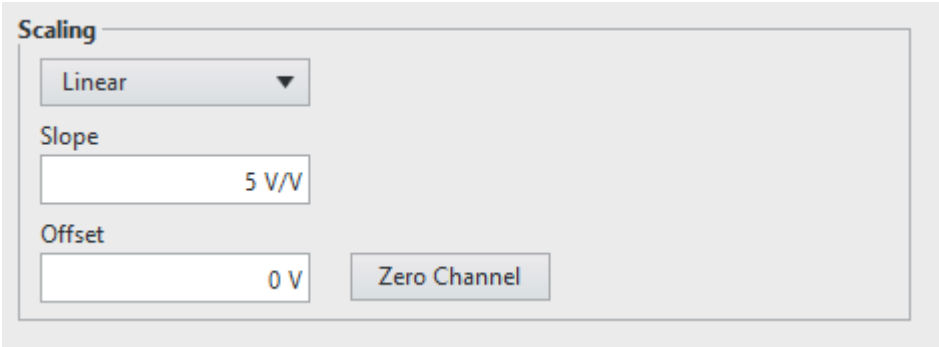


Figure 3. Scaling Settings

Notice that the live value now updates with the applied gain to the channel.

7. Test your solar panel by blocking the light to the panel on the right side of the CompactDAQ demo box. You should see the voltage output decrease as you block the light.

8. Select **Done** or click outside the **General Info** window to return to the channel.
9. Click the **Pinout** button  to verify correct wiring for the AI channel of the NI 9215.
10. Exit out of the **Pinout** window.

Now in the **Channel Configurations** tab, the new channel name is visible with the live value and details about the channel.

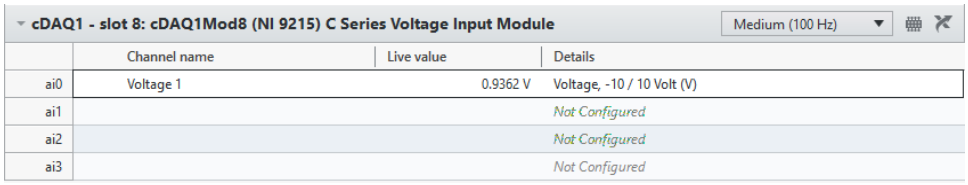
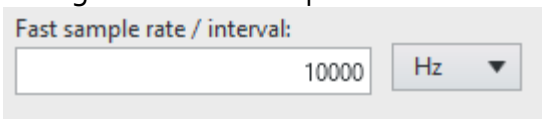


Figure 4. Voltage 1 Channel View

11. Configure the **Fast** sample rate for the NI 9215 to



12. After the settings are verified, collapse the modules to view all configured channels for the project.

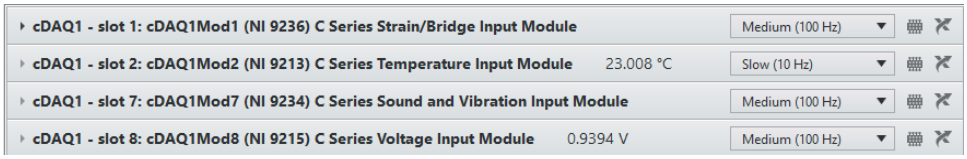


Figure 5. Module View—For the thermocouple (NI 9213) and voltage (NI 9215) modules, you can see the measurements you have already configured. This allows you to verify measurements before starting your data-logging session, which prevents retests and saves time.

13. **Save** the project.

Review

- How would you verify that a scale has been properly applied to a channel?
- How would you change the value of the slow acquisition rate?

Appendix B: Calculated Channels

Overview

Configuring a Calculated Channel

Estimated time: 5 minutes

Set up a calculated channel in FlexLogger to analyze certain measurements while they are being acquired.

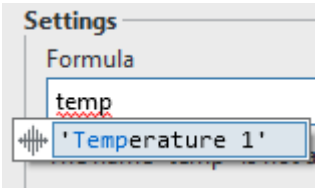
Detailed Help

1. Using the same project that was created before, select **Add Calculation** Add calculation from the toolbar.

A **Calculated channel** tab is added to the Channel Specifications.

Figure 1. Calculated Channel

2. Double-click on the settings button next to the blank channel to open the **General Info** window.
3. Add the custom name **Temperature Safety Factor.** In this case, you're going to add 10 degrees to your measured temperature to monitor a Factor of Safety.
4. Enter **F** for the **Units.**
5. Rename the **Description** to **Temperature Buffer.**
6. In the **Formula,** start typing **Temperature 1**, select the channel, and then add 10 to the channel.



7. Select **Done** or click outside the **General Info** window to return to the channel.

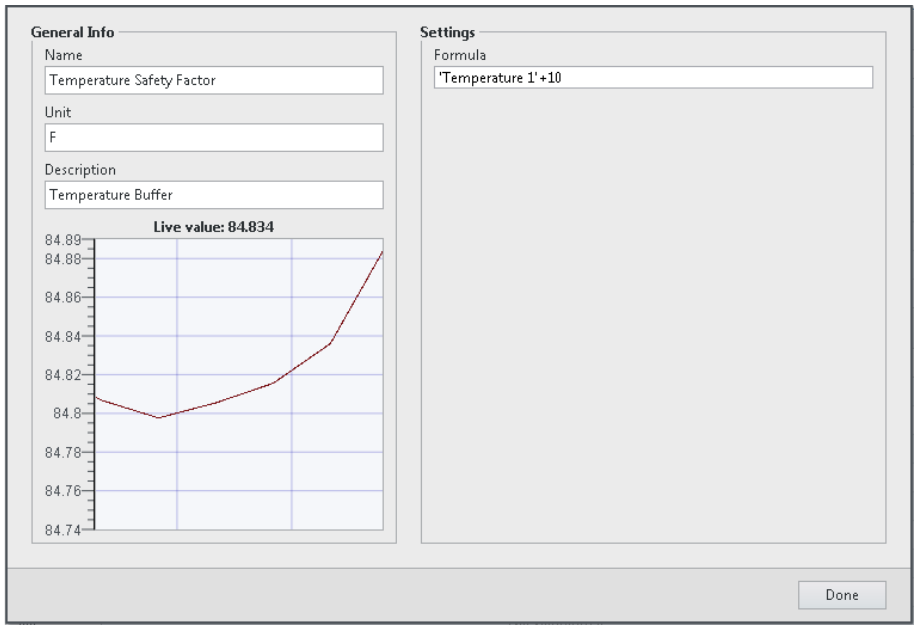


Figure 2. Settings in General Info Window

Now, in the data file, you can view the actual channel and the calculated channel side by side. You can view these calculated channels on the graphs and indicators that are configured in the screen tab and side by side in the TDMS file.

The calculated channel could be useful for applying scales to some channels or taking averages of multiple channels.

Review

- How would you want to use a calculated channel in your applications?

Appendix C: Configure CAN

Overview

Configuring CAN

Estimated time: 15 minutes

Set up a CAN channel to read simulated data.

Detailed Help

1. Ensure the hardware is set up and connected correctly. This example uses an NI USB-8502, but you may be using a different model.
2. Make sure the USB device is connected to your computer and the two CAN ports are connected to each other for a loopback test. If your computer has only one USB, you may need to unplug the demo box for this section and use it for the CAN USB device.

FlexLogger should automatically detect the available CAN buses.

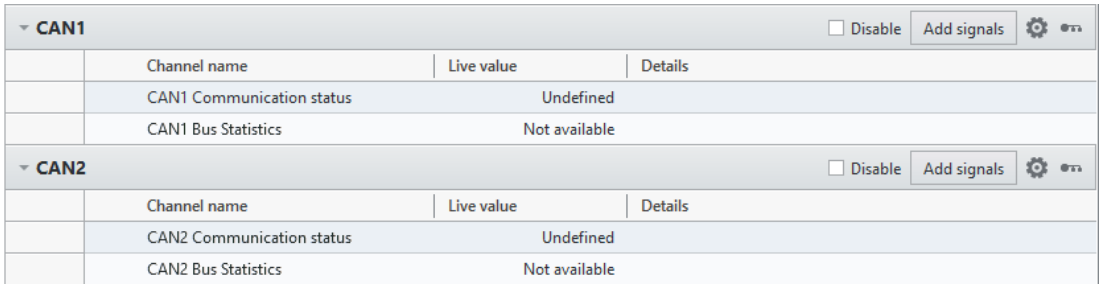


Figure 1. CAN Buses in the Channel Specifications Tab

3. In the **CAN1** tab, click the settings button  to open the **Interface Settings** for the CAN1 bus. The button is located on the right side of the CAN channel, next to the **Add signals** button.

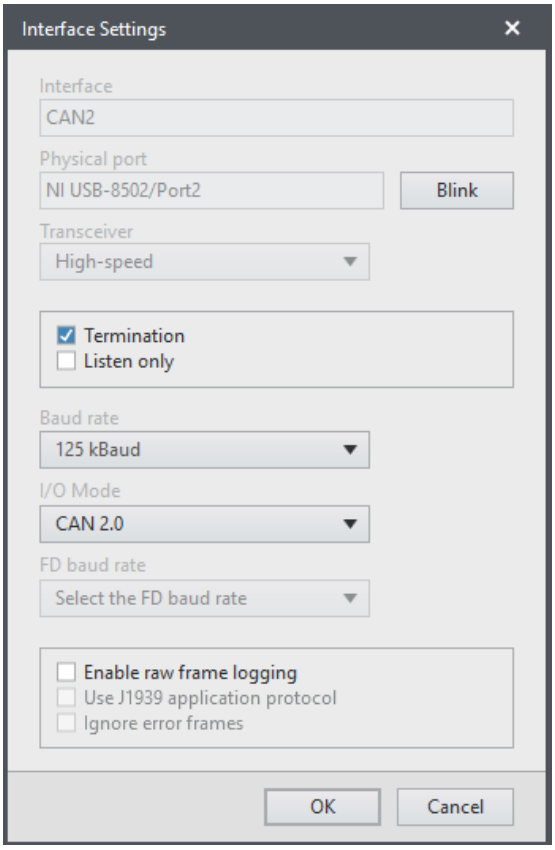


Figure 2. Interface Settings

From the interface settings, you can change baud rates, change I/O mode, and test the communication by blinking the indicator on the CAN1 port.

4. Click the **Blink** button to identify which port you are configuring. The LED on your hardware should be blinking.
5. Set the **Baud rate** to **125k**.
6. Place a checkmark in the **Termination** checkbox.
7. Select **OK** to close the **Interface Settings** window.
8. On your computer navigate to `C:\Users\Public\Documents\FlexLogger Files\CAN Simulator\CAN Simulator.exe`.
9. Run the LabVIEW executable called **CAN Simulator** by double-clicking it.

You will be using a CAN device simulator, which sends the signals that you selected across the bus to be read by the port that was already configured.

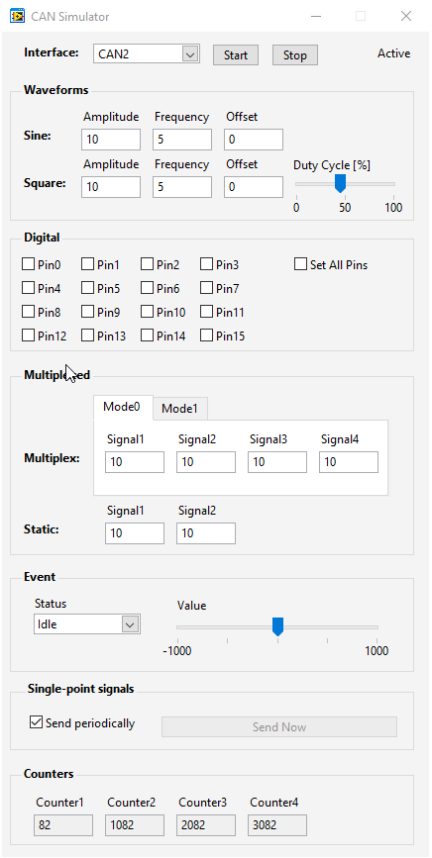


Figure 3. Virtual CAN Device Simulator

10. On the CAN Simulator VI, select **CAN2** for the **Interface** to specify which CAN port will be sending the data.
11. Place a checkmark in the **Pin0** checkbox in the **Digital** signal configuration.
12. Go back to your FlexLogger project and click the Add signals button to load a database and add signals to the **CAN1** tab.
13. Here you can set the **Database** and **Cluster**. For this exercise, set the database as **CanSimDb**. If you don't see this option in the pull-down menu, you can find it by navigating to `C:\Users\Public\Documents\FlexLogger Files\CAN Simulator\CanSimDb.db`.

After you have added your database, it shows up in the Database field in the **Add Signals for CAN1** window.

14. Set the cluster as **CAN_Cluster.**

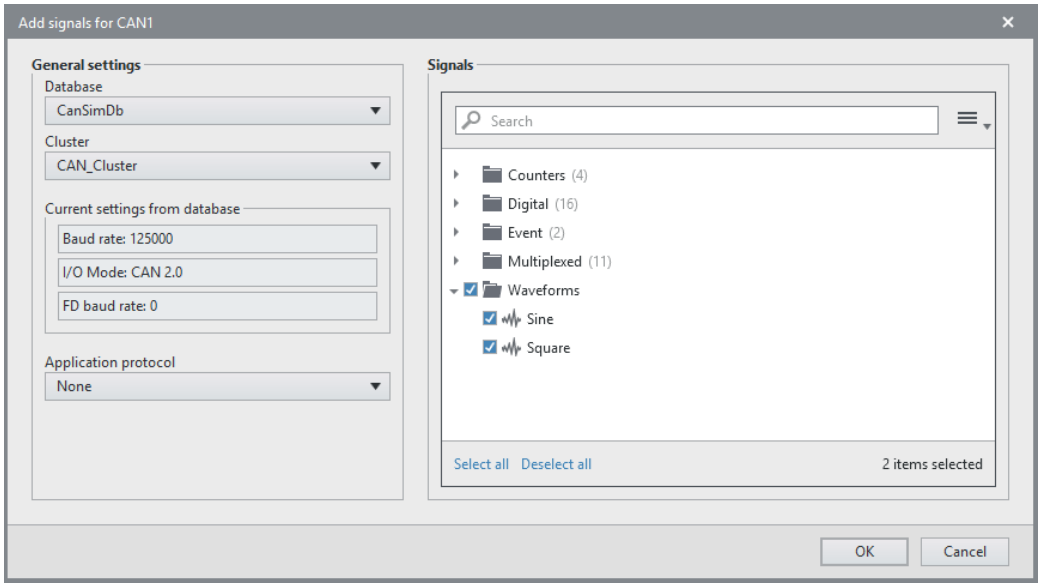


Figure 4. From the Add signals for CAN1 window, you can load databases, clusters, and select signals to log during the test.

15. After the cluster is selected, a list of signals on the right are going to be populated. Select the drop-down folder **Waveforms** and the drop-down folder **Digital**.

The selected signals under these drop-down folders is CAN data sent across the bus by the CAN device simulator. You can load your own database for your application and select the signals that are important for each test that you want to run.

16. Place checkmarks in the **Pin0**, **Sine**, and **Square** checkboxes.
17. Select **OK.**

Now that the database and signals are configured. Generate simulated data to read across the bus.

18. Open the CAN Simulator VI and click **Start** to begin sending CAN data.
19. In the FlexLogger project, verify the signal change in the **Specifications** tab.

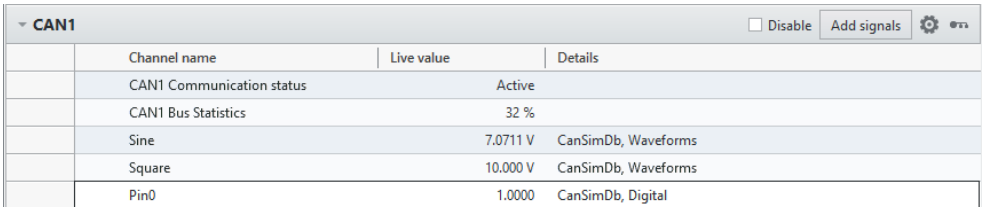
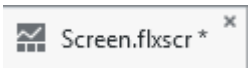


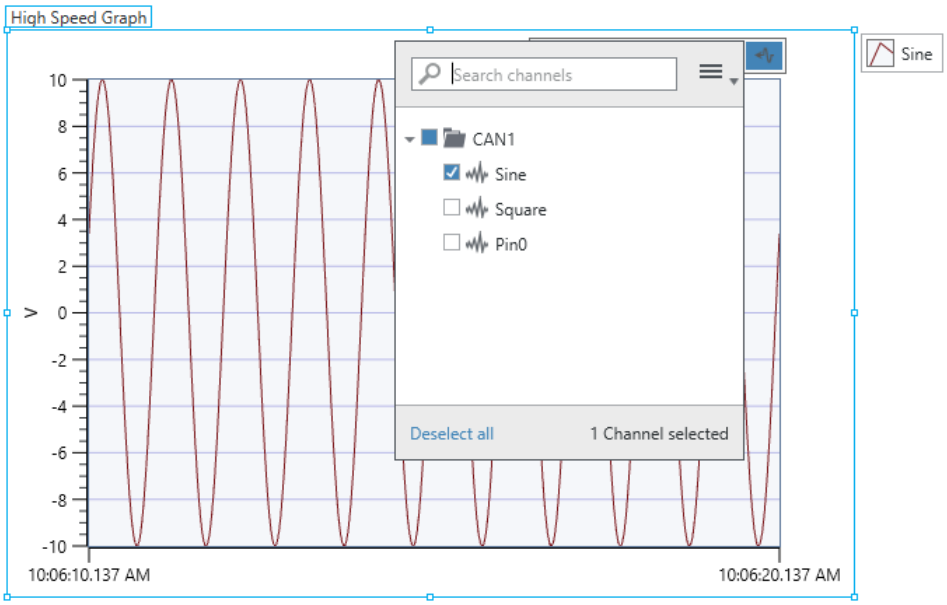
Figure 5. CAN1 Signals

As you change the settings on the CAN device simulator, the live value in FlexLogger should update.

20. Go to the **Screen.flxscr** tab in FlexLogger.



21. Drop down a **High Speed Graph** from the charts menu  .
22. Select the **CAN1 » Sine** for the channel mapping.



23. Adjust the **Amplitude** in the CAN simulator and watch the values on the FlexLogger screen change accordingly.

Now that the CAN channels are configured, you can view them from the screen tab and log them with other sensors and measurements. You can also view them in the same TDMS file to take advantage of the metadata, analysis, and visualization options in both the FlexLogger TDMS viewer and DIAdem.

Review

- Will CAN data be logged to a separate file?
- How would you change the baud rate for your interface?