

DASyLab Techniques

Create a worksheet that collects, displays and saves temperature data

This document describes how to create a worksheet that acquires and processes temperature data using Measurement Computing's USB-TC. It shows which modules to use and how to configure them. It provides a starting point for more complex applications.

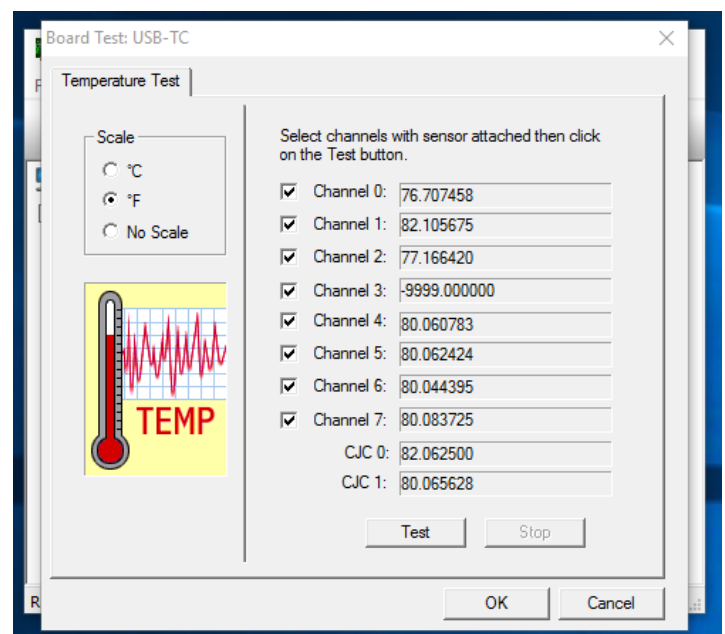
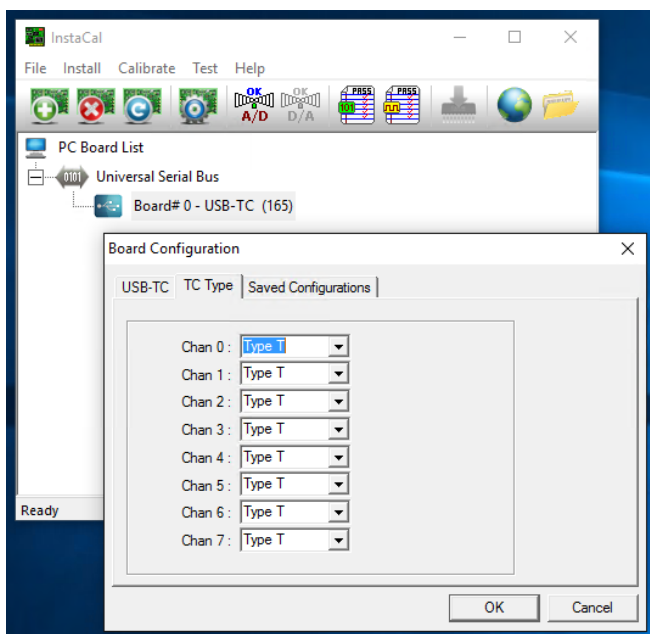
Note: this example is designed to work with all levels of DASyLab 2020, including Lite, Basic, Full and Pro.

Before you start

You will need the following:

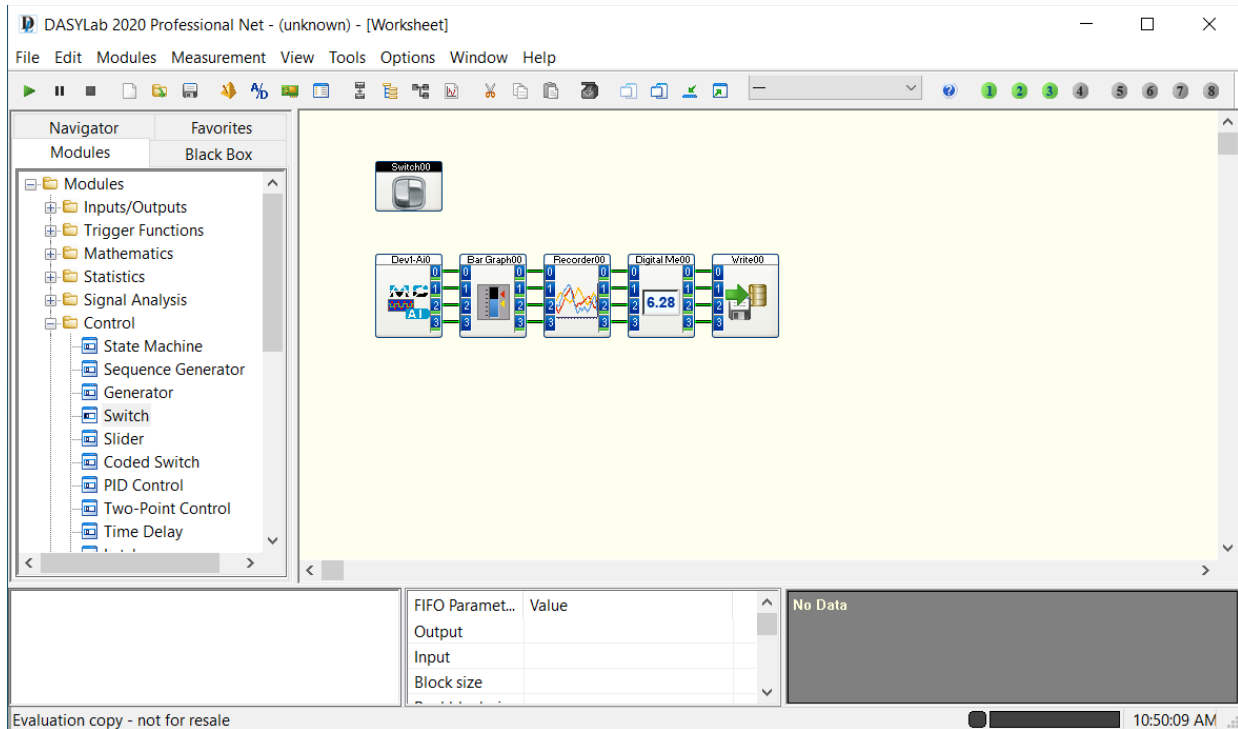
- Measurement Computing USB-TC configured with four or more thermocouples.
 - If you do not have a USB-TC, this scenario can be simulated using the DEMO BOARD Ti channels or you can use another temperature device, such as the USB-TEMP, E-TC or TC-32.
- MCC-DAQ CD with InstaCal and the Universal Library, correctly installed
- DASyLab 2020, any level, except Runtime

Connect the Measurement Computing USB-TC device to your computer. Once the device is ready to use, run the InstaCal program to configure the device. This is a USB-TC configured for type T thermocouples. When tested, it shows that channel 3 is open (not connected) and the rest of the channels are reading correctly. The two CJC sensors are also displayed at the bottom of the channel list. Close InstaCal to save the device settings.



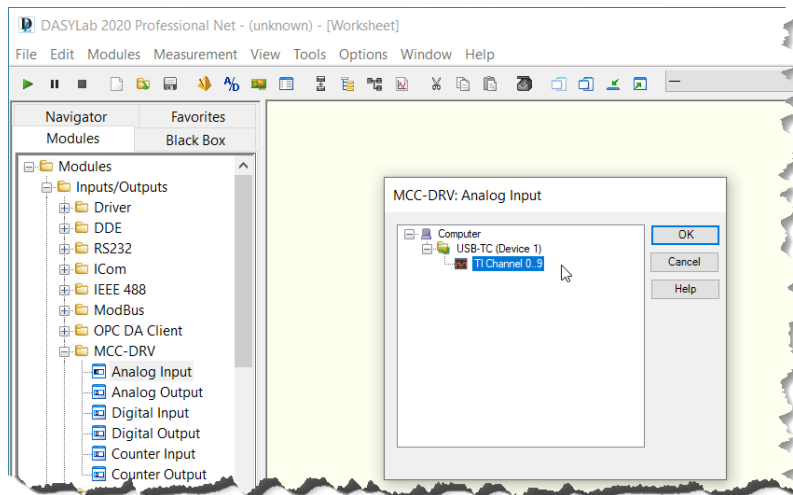
Worksheet Overview

The figure shows the completed worksheet. Using the USB-TC from Measurement Computing, the worksheet collects data at two samples/second (the base rate of the device), and displays it as a thermometer styled bar graph, as a plotted graph on a chart recorder, and as digital values on a digital meter. Correct units are applied, and custom channel names are used. A Start/Stop switch is used to provide the operator with program control (not available in DASYLab Lite).



Create the Analog Input and configure it

Add an Analog Input module from the module browser. To do this, click on the “+” to open the Module→Input/Output group, and click again to open the MCC-DRV group. Select the Analog Input module, and drag it to the work area. When you drop it on the work area, the following dialog appears, prompting you to select the channel group to use.



Select the USB-TC Inputs, TI Channel 0..9, and click OK. The module icon will appear on the work area.

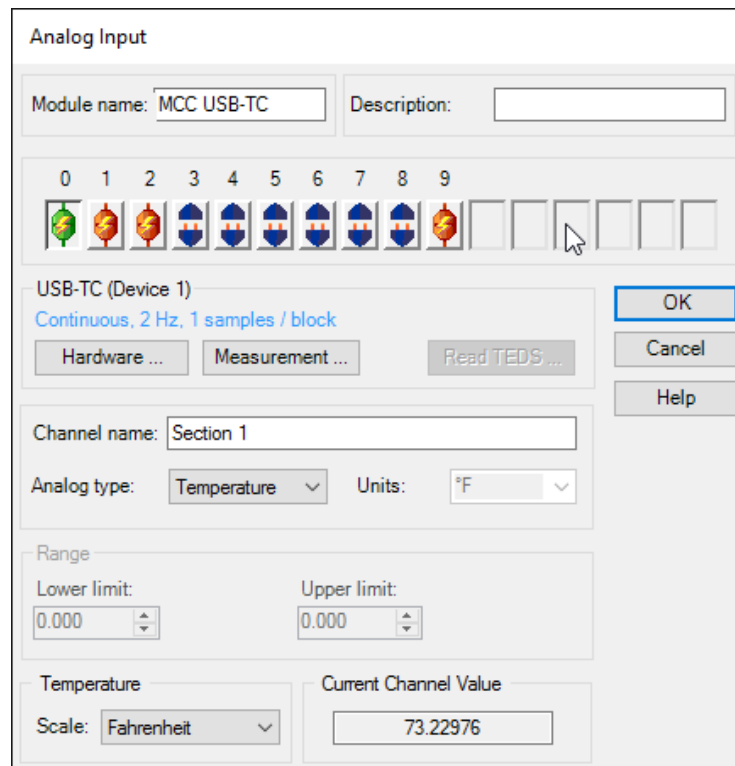
Open the module properties by double-clicking over the module icon, or by right-clicking over the module icon and selecting Module Properties.

First, double click on the Channel 1 button.



The active channel moves to channel 1, and the button changes from disconnected to connected.

Modules that connect directly to hardware have a fixed channel bar, reflecting the channels available on the device. Repeat, double-clicking over channel 2, and then over channel 9, so that you have four active channels, 0, 1, 2 and 9. Channels 8 and 9 are the USB-TC CJC (cold junction compensation) channels.




Module properties to change:

- Module Name – I used MCC USB-TC
- Channel Name for each channel – I used Section 1, Section 2, Section 3 and CJC-2
- Scale – select Fahrenheit at the bottom of the dialog box. The Units automatically change to °F and the Current Channel Value reflects degrees Fahrenheit. Ensure that you change each channel.

Click OK to close the properties and save them. Your module icon now looks like this:

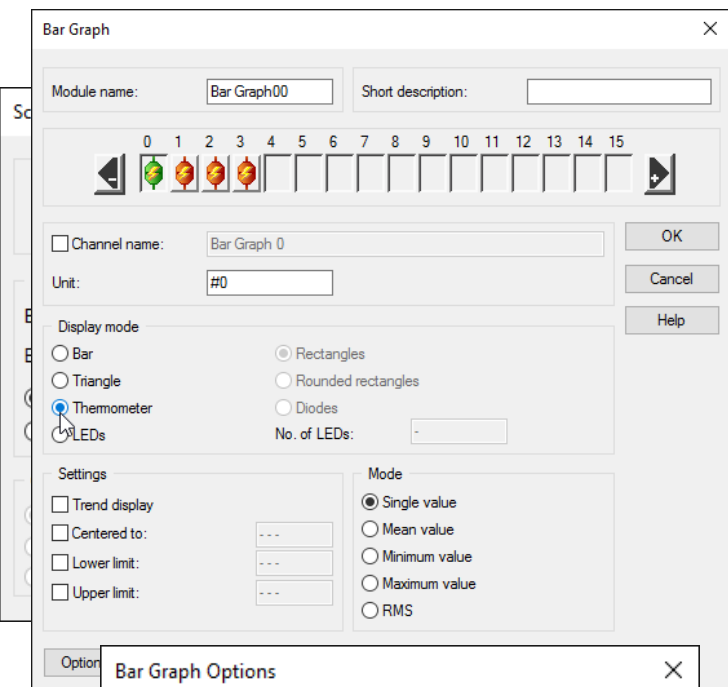


Create Display Modules

On the module browser, click the “-” to close the Input/Output group, and then click the “+” to open the Display Group. Select the Bar Graph module, and drag it to the work area, to the right of the Analog Input module. Open the module properties, and click the  button to add three channels, for a total of four.

Change the Display Mode from Bar to Thermometer. To quickly replicate this for all four channels, click the F7 key on your keyboard. This will copy the Display Mode setting to all activated channels.

Next, click on the Scaling... button at the bottom of the properties dialog. Change each channel to an appropriate scale. For this example, I used 0.00 to 100.00. Ensure that you configure all four channels; you can click F8 to copy all of the Scaling Bar Graph settings to each channel.

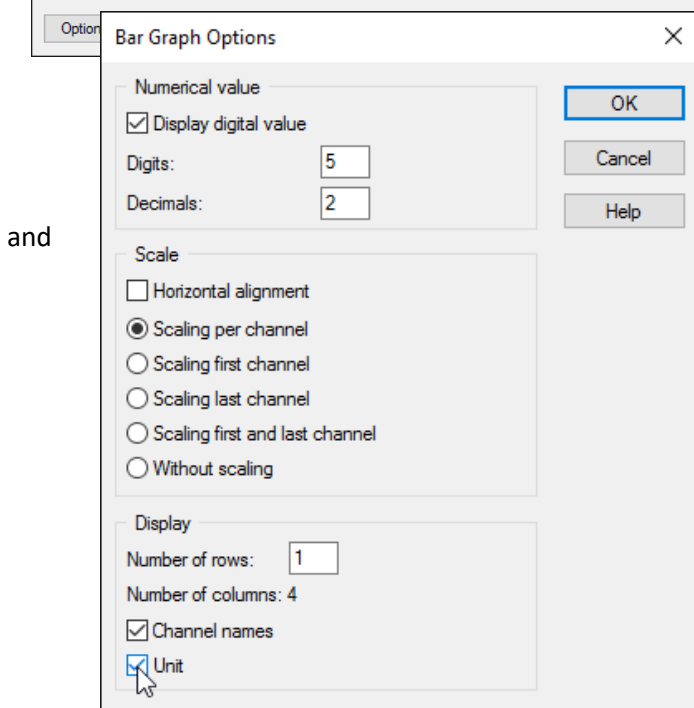


Click OK to close the Scaling dialog.

Click on the Options... button on the lower left of the main properties.

Check the Unit selection at the bottom of the dialog box.

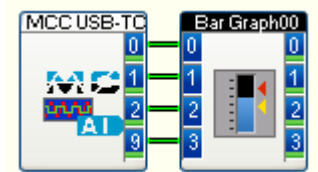
Check the “Copy Inputs” box at the bottom right of the main properties, and click OK to close the module properties.




Connect the Bar Graph module to the Analog Input. Click drag the Bar Graph module until it just touches the Analog Input. Touch 0 to 0, 1 to 1, 2 to 2 and 3 to 3.

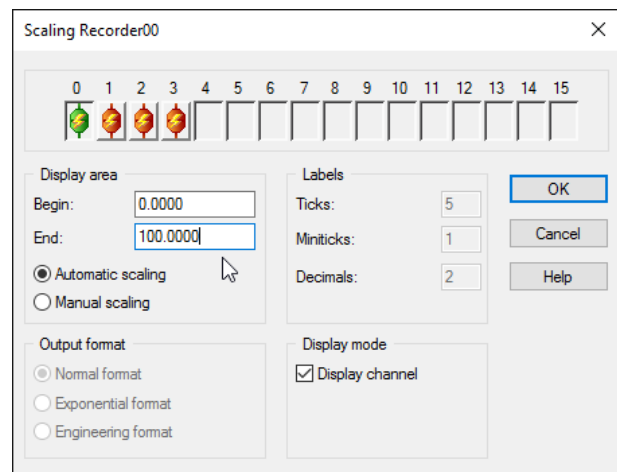
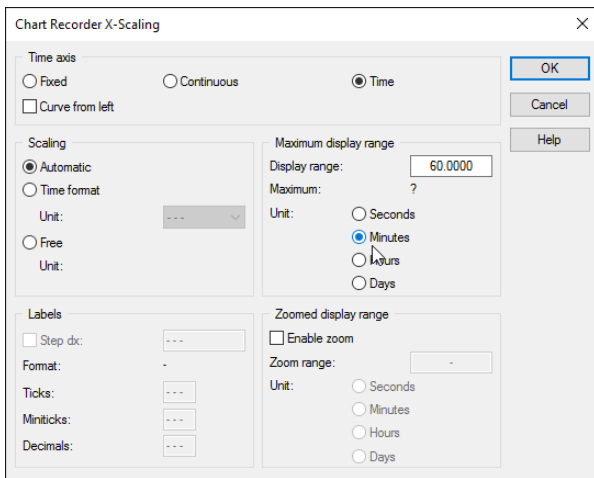


Let go, and DASyLab should draw the wires between the modules.



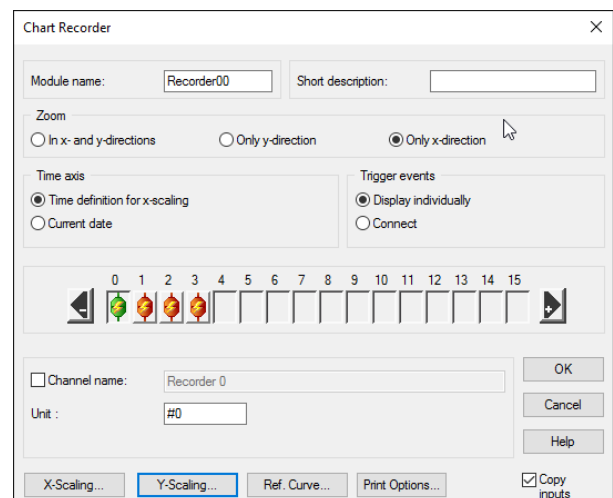
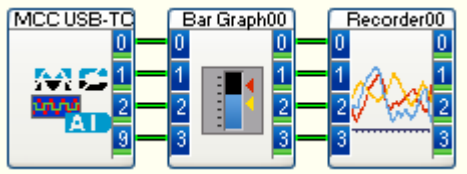
Create a Chart Recorder module in the same way. Select the Chart Recorder from the Display group and drag it onto the work area, to the right of the Bar Graph. Double click to open the module properties.

Click the  button to add three channels, for a total of four. Click the X-Scaling button to configure the Display Range (to the right). The default is 60.00 seconds. Change it to 60 minutes or 1 hour. Click OK to save the X-Scaling. Click on the Y-Scaling button to configure the amplitude scale for each channel. Select an appropriate range for each channel, for example, 0.00 to 100.00. You can use the F8 key to copy the settings to all four channels. Click OK to save the Y-Scaling.

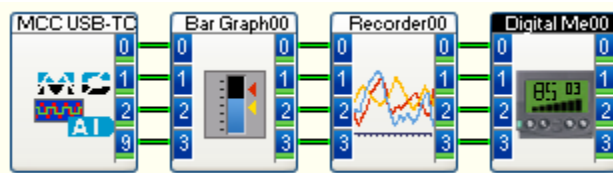


Finally, check the “Copy inputs” box at the lower right of the main dialog box. Click OK to save the settings.

Connect the Chart Recorder to the Bar Graph. Your worksheet now looks like this:



Add a Digital Meter module, in the same way. Select the Digital Meter from the module browser, and add it to the work area to the right of the Chart Recorder. Double click to open the properties, and add three channels. Check the “Copy Inputs” box at the lower right. Click OK and connect it. Your worksheet should now look like this.



Save the data to the hard drive as an ASCII file

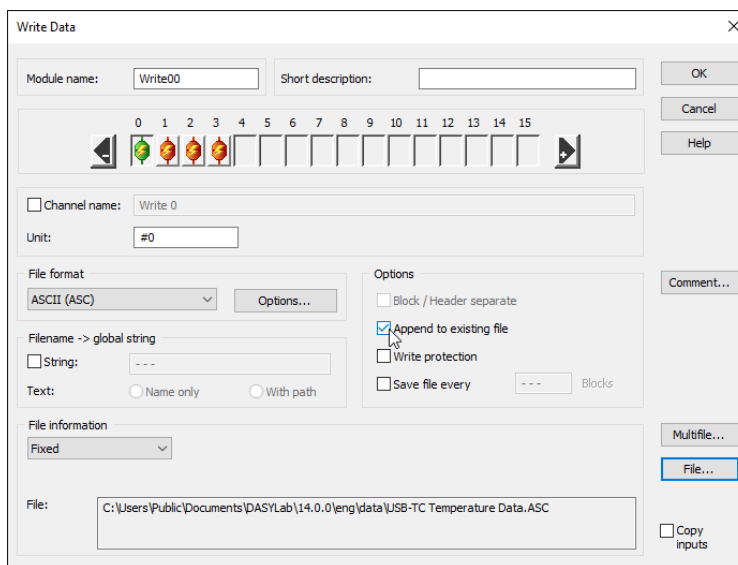
At this point, the worksheet will run, but will not store data to the hard drive. You must explicitly store data using a File→ Write Data module.

Create the Write Data module: In the module browser, click the “-” to close the Display group, and click the “+” to display the Files group.

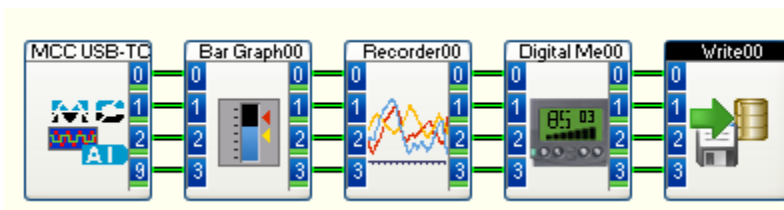
Drag the Write Data module to the work area, to the right of the Digital Meter. Double click to open the properties. Configure the module for four channels, and to store the data to an ASCII file. You can refer to the ASCII file Technique paper to configure the module.

Click on the File... button on the lower right to name the file, and to select the file location.

You can also configure the module to “Append to existing file”.

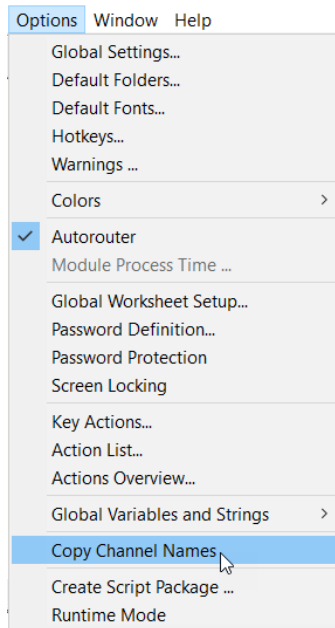


Click OK to save the module settings. Connect the Write Data module to the Digital Meter.



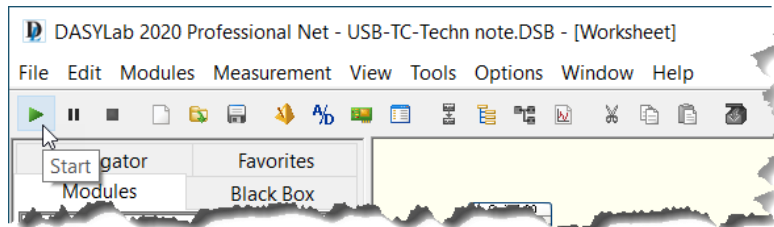
Copy channel names to all modules

When you configured the Analog Input, you named each channel. You can quickly copy the channels names to all connected modules. Go to the Options menu, and select the Copy Channel Names setting.



Add a Switch module to control start and stop

You can start and stop the DASYLab measurement by clicking on the green start button on the left of the function bar.

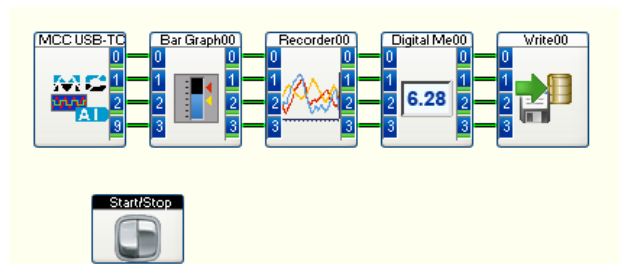


You can also add a Switch module to give you more control over where the button is on the screen. Click on the “+” to open the Control Group on the module browser. Select the Switch module, and drop it on the work area below the other modules.

Open the module properties, and change the mode to “Start/Stop”. If you choose, name the module, also.

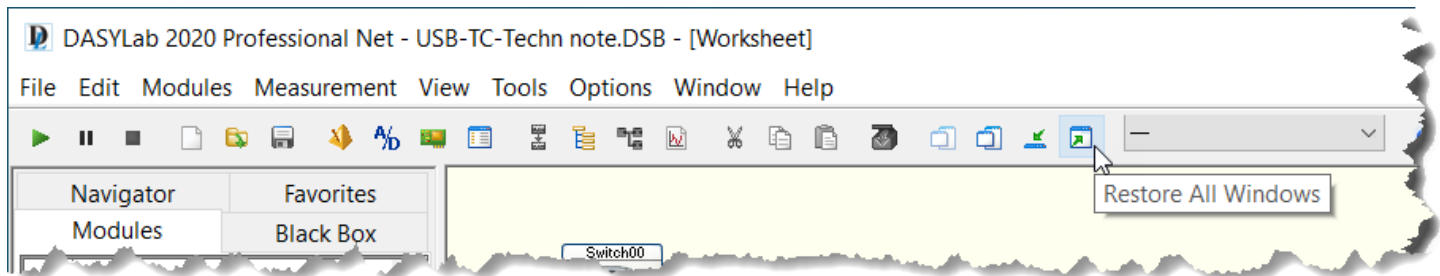
Click on the Options button, and turn off the “With channel name” and “With status text” settings.

Your worksheet now looks like this:



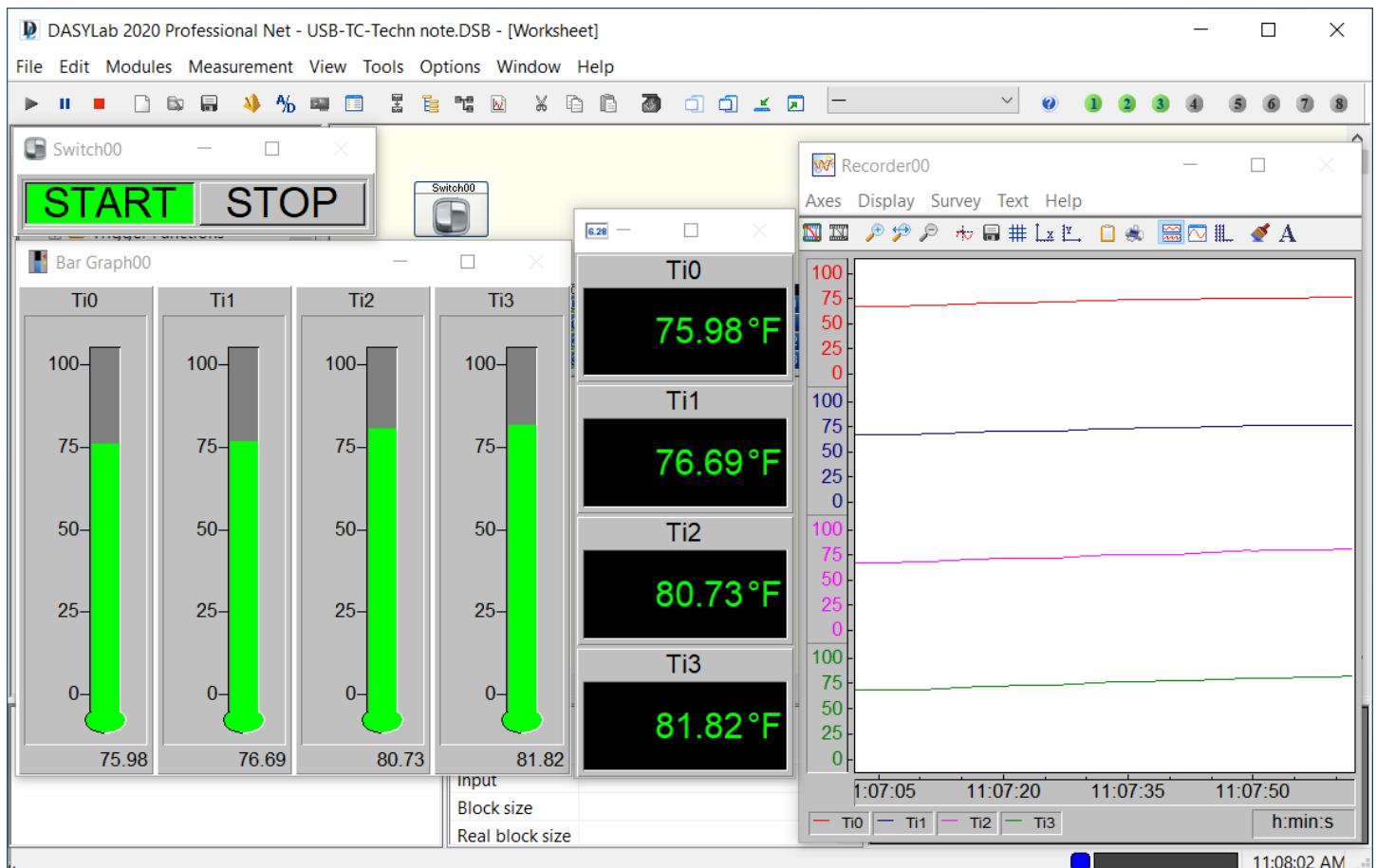
Run the worksheet and arrange the displays

The worksheet is ready to run. Before starting it, restore the displays from the bottom of the screen using the “Restore all windows” button on the function bar.



Rearrange the displays, and resize them, so that you can see them all at once. Start the worksheet by clicking on the Start button.

Your running worksheet should look something like this:



Note that the channel names and units appear in the Bar Graph and Digital Meter display windows.

You can try changing various options in the modules, to see how the appearance changes. For example, open the module properties for the Digital Meter, click on Options, and uncheck the “Unit in separate row” setting. Turn on the trend indicator, or activate the color coded high and low value alarms in the Bar Graph and Digital Meter modules.

Summary

Save the completed worksheet to a folder on the computer so that you can open it later to use or to make changes.

This example showed you how to set up and configure a four channel temperature application, displaying the data in three different ways, and saving the data to a file.

Additional DASYLab resources can be found at <http://www.mccdaq.com/DASYLab-index.aspx>.