Ambient Temperature/ Remote Temperature

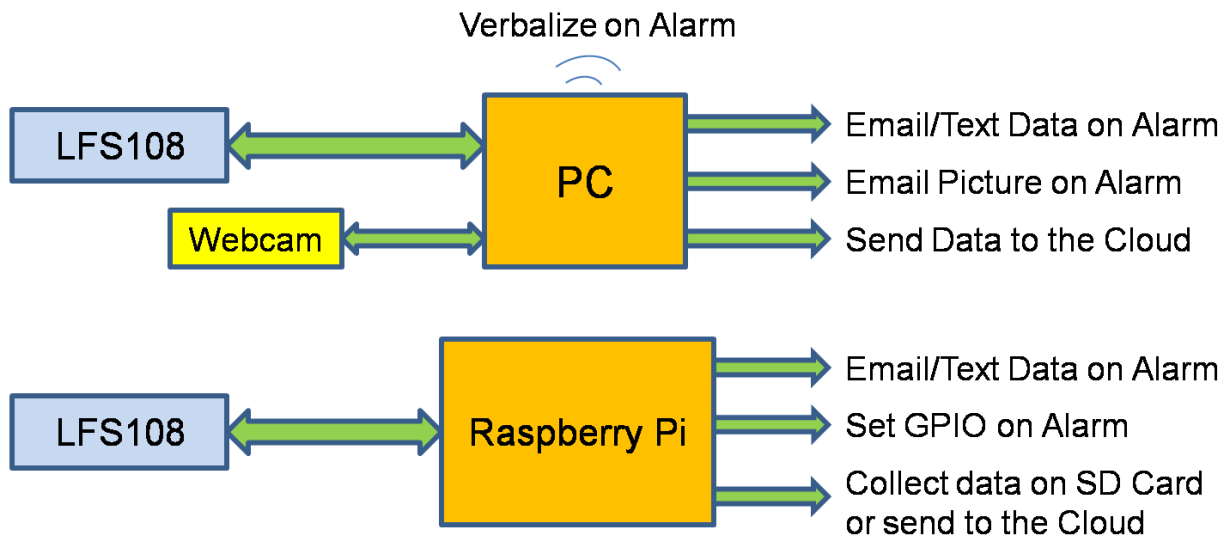# Sensors to USB Output

Model LFS108A

Table of Contents

Quick Start

To quickly setup and start your board, follow the steps below:

- Download the software (LFS108A.zip) from the website to your desktop.

- Unzip the file. Run setup.exe to install the software.

- Connect the remote probe to the board. See Figure 2.

- Connect the board to your PC USB port via USB cable provided.

- The PC should recognize the board and install the USB drivers. Otherwise, go to Device Manager/Ports to install the USB driver which is located on your desktop.

- Now you can run the PC software and communicate with the board.

Other Options

If you are not using a PC, you can connect the board to a Raspberry Pi computer board. Communicate with the board using the sample Python code provided. You can collect data from the board, or send data to the cloud, email data on alarm, etc.

1- Introduction

LFS108A is an ambient temperature & remote temperature sensors to USB output. First, install the application software. Simply download the software from the website LookingForSolutions.com. Save the zipped file (LFS108A.zip) onto your desktop. Unzip the file. Run setup.exe to install the software. The software will place a shortcut of the program on the desktop. Save the USB driver directory (from the zipped file) on the desktop.

Second, connect the board to your PC USB port with the cable provided. The PC will recognize the board and will start installing the USB drivers. You can view the COM port by going to the Device Manager/Ports. You can also install the USB drivers from the Device Manager/Port/Driver/Update Driver and point the PC to the USB driver directory on the desktop. Now you can run the software from the shortcut on the desktop.

Figure 2 shows how to connect the remote probe (included) to the board terminal block. Figure 3 shows the main screen. You can set the COM port and the Chart Speed (Time interval per data point) from the drop down menus. Click the Start button. The program asks for the name of data file to be saved. You can name your data file (Filename.txt or Filename.csv) and the location where you want to save it. Click the Save (or Cancel) button. The program will start reading and displaying the ambient temperature, and the remote temperature from the board and provides a line graph of the two parameters. It also shows the model number of the board (LFS108A) and the running Elapsed time.

The program keeps track of the Maximum and Minimum values of the ambient temperature, and the remote temperature since the start of the session which can be reset individually by pressing the corresponding Reset button. The two temperatures can be displayed and saved in either Degrees Fahrenheit or Celsius by pressing the temperature engineering unit button. You can display High & Low alarm lines over the two temperature line graphs. If the remote sensor is not connected (Open sensor) it will display 999 °F (537 °C).

Live Video - There is a Live Video button on the upper right corner of the screen. Clicking the button will open a new window connecting you to the built-in webcam of your PC or an external webcam connected to the PC USB port. If there are multiple webcams, you will see a drop down menu to select the one you want to connect to. Once connected, you will see a live video of the

event through the selected webcam. This feature allows monitoring an event live and take a picture of the event when there is an alarm condition. The picture and the corresponding data can also be emailed to alert the user. Figure 1 shows how the webcam is setup.
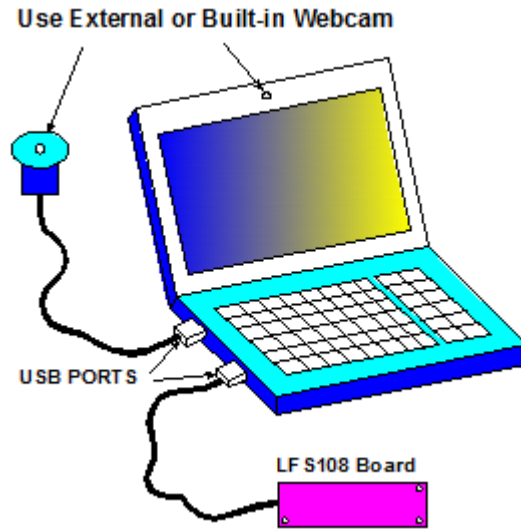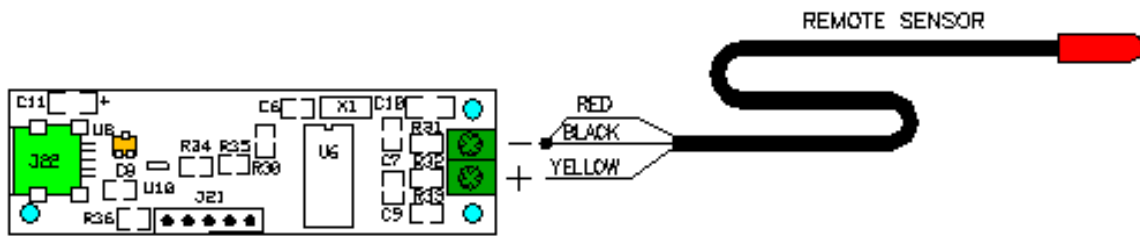

Figure 1 – Typical Webcam Setup

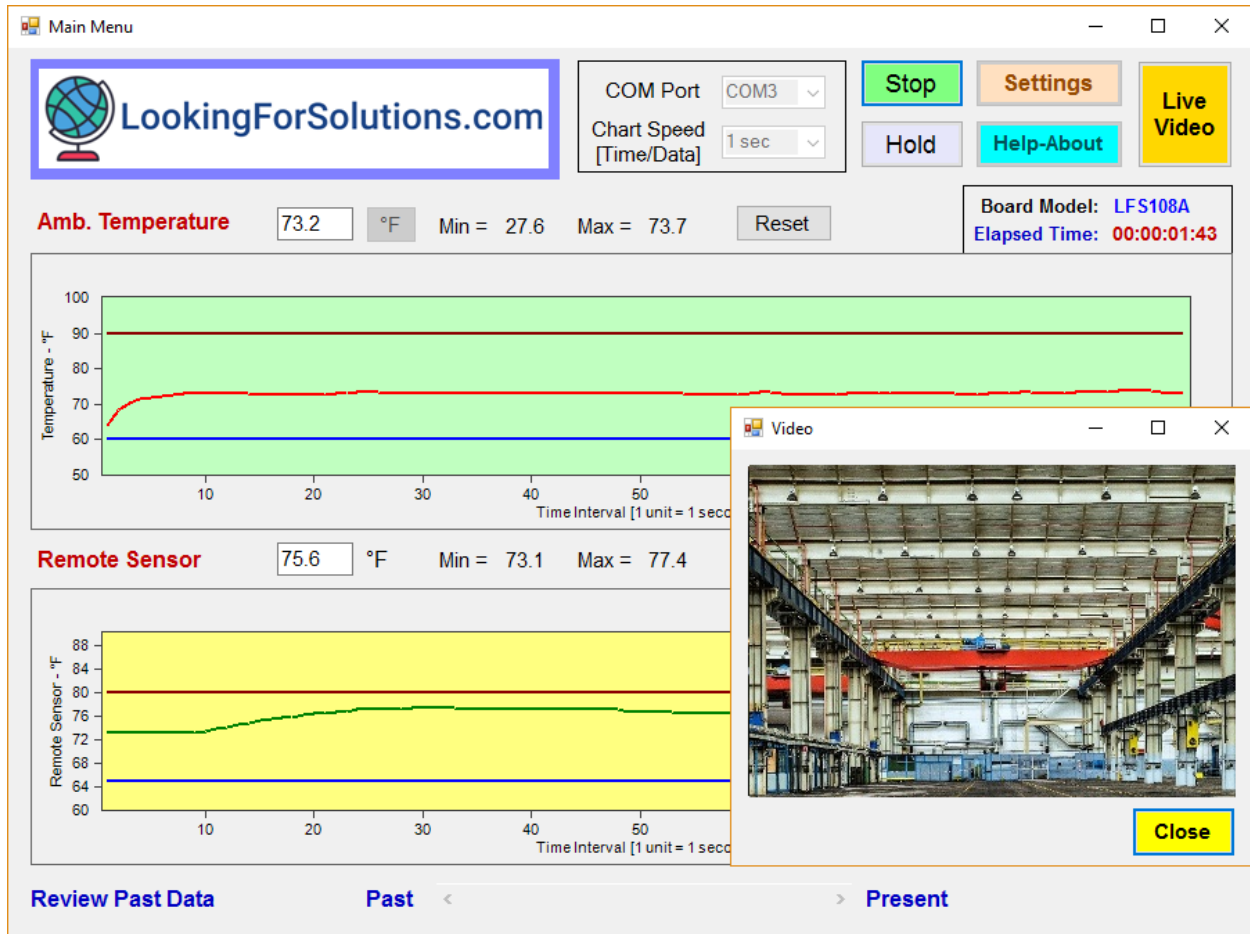Figure 2 – Wiring connection of the Remote Probe to the board

Figure 3 – Main Screen – Real Time

Review Past Data - Clicking the Hold or Stop button will stop the monitoring. You can now review the past data by scrolling through the line graphs back and forth in time as shown in Figure 4. Clicking the Hold button temporarily will stop the monitoring, you can continue by clicking the Go (Same) button. Clicking the Stop button will stop the monitoring permanently. You will need to start a new monitoring session by clicking the Start button.

When saving a data file (.txt or .csv), the program opens a file and saves up to 20,000 sets of data with date/time stamping, before closing the file and opening a new one.

Figure 4 – Main Menu – Review Past Data

Help-About - Clicking the Help-About button will open a new window showing the board picture, firmware version, hardware version, serial number, and the PC software version as shown in Figure 5.
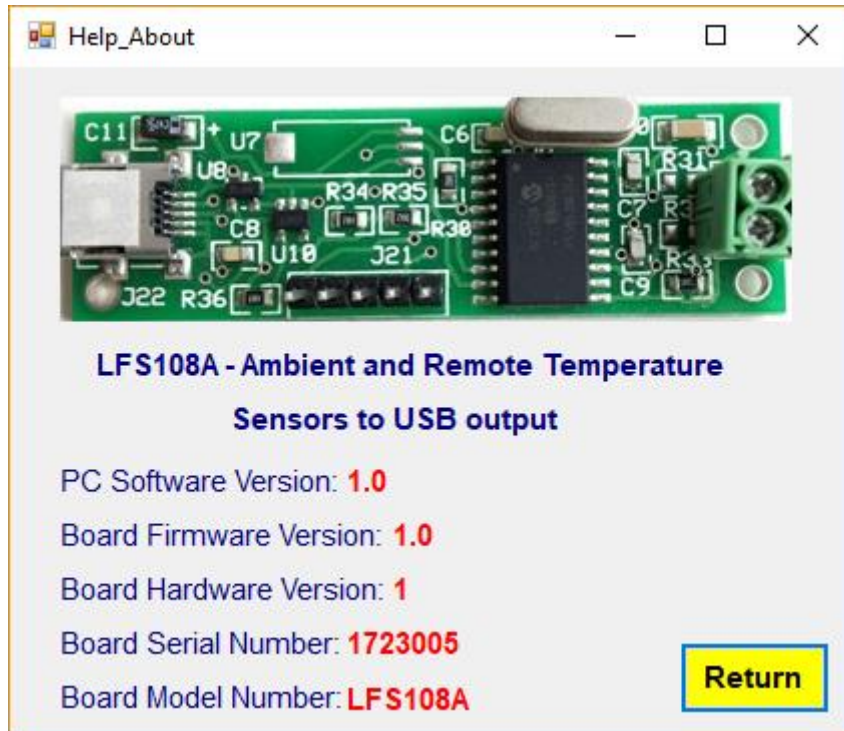
Figure 5 – Typical Help-About Screen

2- Settings Menu

Figure 6 shows the Settings Menu. Here is a list of functions you can perform:

- Re-scale the Ambient Temperature Y-Axis.

- Re-scale the Remote Temperature Y-Axis.

- Customize the Remote sensor name

- Set High and Low Alarm set points for Ambient Temperature.

- Set High and Low Alarm set points for Remote Temperature.

- Calibrate the board for Ambient Temperature

- Record (Save) data to a file on alarm conditions.

- Email Data/Picture on alarm conditions. Send a test email.

- Send Text Message on alarm condition. Send a test Text Message.

- Send data to the Cloud – IoT (Thingspeak.com)

- Take a Picture on alarm condition

- Verbalize on alarm condition

Figure 6 – Settings Menu

2.1- Sensor Board Calibration

You need to Turn ON the calibration function by clicking the OFF button. The current Ambient Temperature value will be displayed in the text box.

Ambient Temperature – You can calibrate the board for ambient temperature at one point. Set the calibration point in °F based on a known ambient temperature. Click Calibrate button. You will see a windows popup "Temp Cal OK" to confirm the calibration.

2.2- Record Data on Alarm conditions

If you select this Checkbox, the program only saves data to a file when there is an alarm condition due to temperature or relative humidity.

2.3- Email Data/ Picture on alarm condition

If you select this Checkbox, the software application can send an email every time the ambient or remote temperature goes into alarm condition. Check "Email Data/ Picture on alarm" checkbox and fill in the following items:

- Sender's email address and password.

- Sender's smtp mail server. Either select from the drop down list menu, or type in your specific mail server if it is not in the list.

- Port number and the SSL. It is already set for gmail & yahoo accounts.

- Message title and the Recipient's email address.

You can send a test email to make sure it is functional. Click OK-Save button to save settings and exit.

2.4- Sending Text Message on alarm condition

The software can send a text message to a cell phone every time the ambient or remote temperature goes into alarm condition. Check "Send a Text message on alarm" checkbox and fill in the following additional items:

- Recipient's Cellular Carrier

- Recipient's cell phone number.

You can send a test Text Message to make sure it is functional. Click OK-Save button to save settings and exit.

2.5- Send Data to the Cloud – IoT (Thingspeak.com)

The software can send the ambient and remote temperature data to Thingspeak.com web site for data storage and data visualization.

You need to create an account with Thingspeak.com. After login process, create a new Channel. The Channel can be either Public or Private. Fill in the Channel settings such as Name, Description, Field 1 (Ambient Temperature), and Field 2 (Remote Temperature). Go to API keys tab and look for "Write API Key". Copy the API key code.

Go back to the settings menu software. Check off the "Send Data to the Cloud - IoT" checkbox and enter (Paste) the API key in the text box. Click OK and go back to the main menu. Make sure the Chart speed selection is at least 30 seconds or longer before starting the session.

Thingspeak.com provides many features such as data visualization and export, MATLAB analysis and Tweet alerts. Figure 7 shows a typical Thingspeak.com screen.
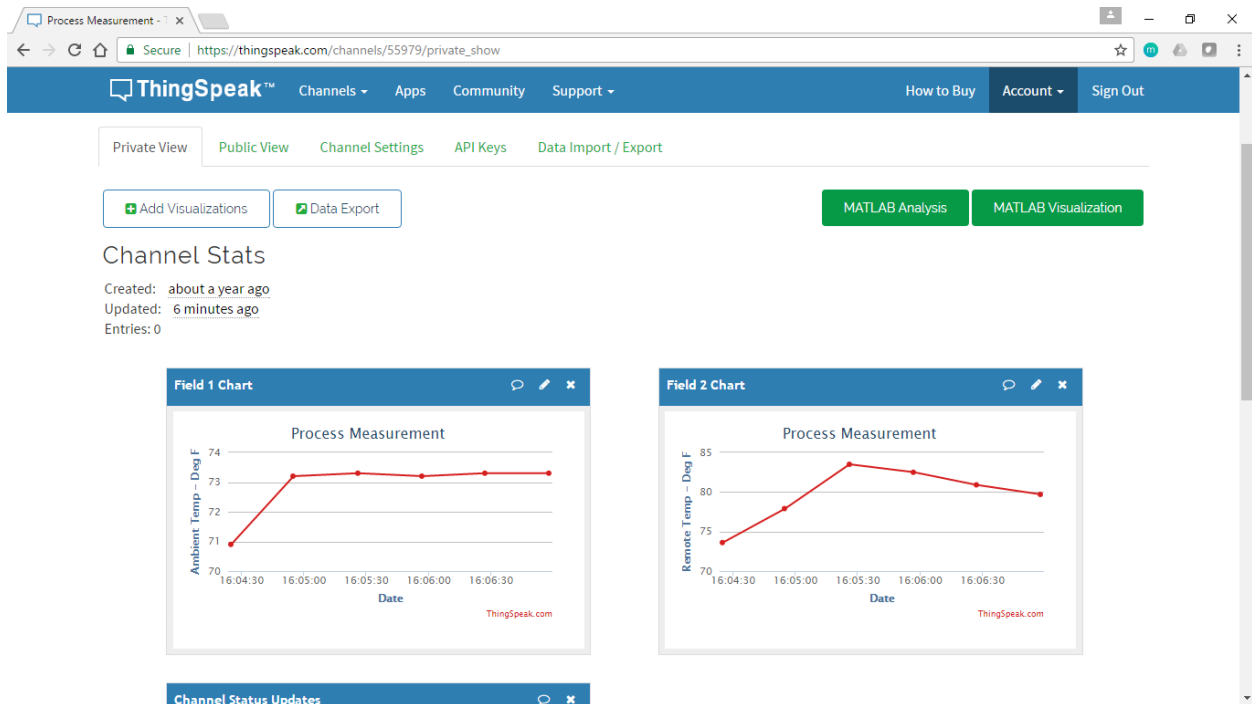

Figure 7 – Typical Thingspeak.com Screen

2.6- Verbalize on Alarm conditions

The software can announce a message when either the ambient or remote temperature goes into an alarm condition. Check "Verbalize on Alarm conditions" checkbox and click on the Speech button will open a new window that shows the default alarm messages. You can either use the default messages or make your own messages. You can click Test Voice Message button to test the voice function. Figure 8 shows the Speech window screen.
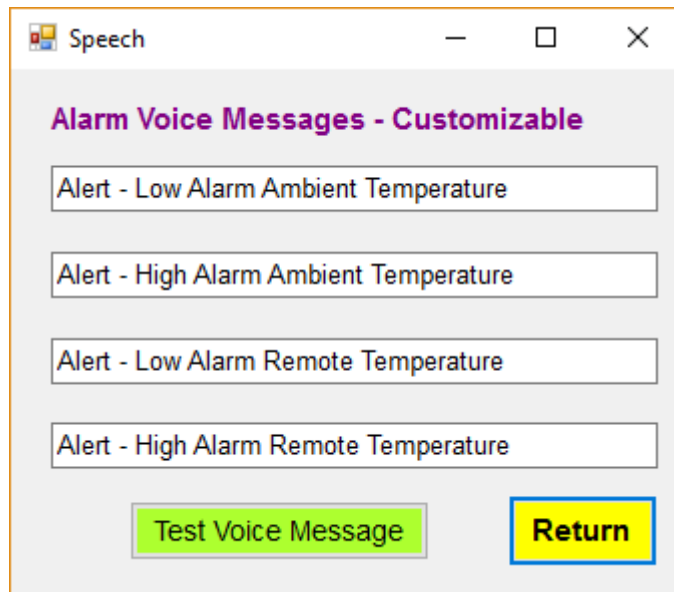
Figure 8 – Speech Screen

2.7- Take a Picture on Alarm conditions

You can take a picture of the event via the connected webcam when there is an alarm condition. When you start a monitoring session, you need to create a jpeg file and click on Live Video button to start the live video. Every time there is an alarm condition, the software takes a picture of the event and saves it under the jpeg file name. There could be multiple alarm conditions in a session, so multiple jpeg files will be created to save pictures. If "Email Data/Picture on alarm condition" checkbox is checked, the picture and the corresponding data will be emailed when an alarm condition occurs.

3- Saving Data to the Storage Cloud

You can save the ambient and remote temperature data to any storage cloud service such as Google Drive, One Drive, Dropbox, etc. as follows:

- Install the storage cloud service app on your PC as well as your smart phone or Tablet.

- Run our PC application, and Start the data monitoring/logging session.

- Create a data file under the cloud storage folder (Google Drive, One Drive, etc.), name the data file, and click Save.

Your data file is now created in the cloud storage folder. After closing the data file, you can review the data from your smart phone or tablet.

4- Specifications

Ambient Temperature

Range	-15 to 85 °C (5 to 185 °F)
Accuracy	1.4 °C (2.5 °F)
Resolution	0.1 Degree

Remote Temperature

Range	-55 to 125 °C (-67 to 257 °F)
Accuracy	0.5 °C (1 °F) from -10 to 85 °C
	2 °C (3.6 °F) from -55 to 125 °C
Resolution	0.1 %RH

Remote Sensor

Type	One wire Digital sensor – DS18B20
Wiring	Red (Power), Black (Ground), Yellow (Data)
Wiring to the Board	(+)Terminal to Yellow wire, (-)Terminal to Red & Black wires
	See Figure 2 for reference
Open sensor	Indicates 999 °F (537 °C)
Sensor connected in reverse	Indicates 32 °F (0 °C)

|	
Sampling Time	1 sec, 5 sec, 10 sec, 30 sec, 1 minute
Recording Interval	1 sec, 5 sec, 10 sec, 30 sec, 1 minute
Recorded value	Average value of incoming data at 1 sample/sec
Initial Warm up Period	2 minutes
PC Software	Windows 7, 8, 10
Maximum data file	20,000 sets of data per file
Review Past Data on screen	250,000 sets of data
Serial Communication	19,200 BPS, 8 bit, 1 Stop bit, No Parity
Power	USB 2.0
Webcam	Logitech C270 or Equivalent
Dimensions	2.35 x 0.70 inches (59.7 x 17.8mm)
Export Classification	EAR99
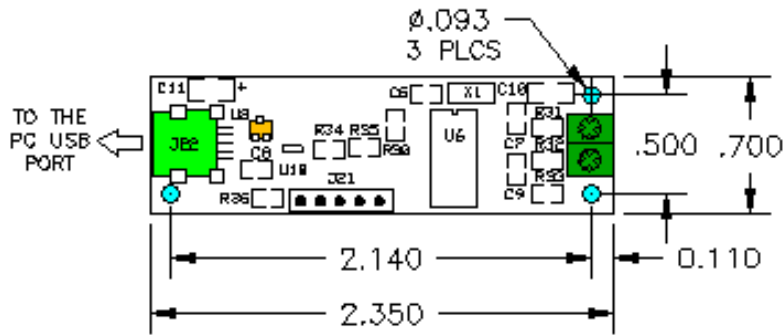
Figure 9 - General Dimensions, LFS108A

5- PC Commands

The following is a list of PC commands used to communicate with the board (CR means Carriage Return):

GETID<CR> - Read the Board ID (Model number)

GETSN<CR> - Read the Board Serial Number yywwxxx

GET1<CR> - Read the Ambient Temperature from the board. It provides the temperature in degree F times 10. For example if the temperature is 72.5 °F, it will send 725.

GETr1<CR> - Read the Remote Temperature from the board. It provides the temperature in degrees F times 10. For example if the temperature is 124.5 °F, it will send 1245.

6- Troubleshooting

Here is a list of items you need to be aware of if you get into problems:

- During the software installation, the Windows operating system may indicate "Unknown Publisher" or un-trustworthy source, please ignore and install the software. Our software has a Digital Signature and comes from a trusted source.

- Make sure the PC does not go to sleep mode, otherwise you will lose USB communication to the board. Make sure the PC sound is enabled to be able to use the verbalization (Speech) feature.

- Make sure your PC is connected to the internet if you are planning to use features like sending emails, text messages, or data to the cloud.

- Check your antivirus program for any blocking of the application to the internet.

- Check your wireless router for any blocking of the application to the internet.

Yahoo and Gmail accounts have additional security features that does not allow a third party app (Like our app) access the account. In order to access the account from our app, additional steps need to be taken as follows:

Yahoo Accounts:

You need to login to your Yahoo account and under Account Security add our app (LFS108A) and generate a Password. Then use that Password in our app for the account Password in the settings menu. Leave Port number as 25.

Gmail Accounts:

Sign into your Google account. Under Security, there is a section called "Less secure app access". You need to turn this ON. This allows you to access your Gmail account from our app. Leave Port number as 25.

7 – Third Party Software & Devices

You can interface and communicate with our products from National Instruments Labview software platform. We provide sample program for your evaluation. Figure 10 shows a typical Labview screen.

You can interface and communicate with our products from single computer boards such as Raspberry Pi. We provide sample Python program for your evaluation.
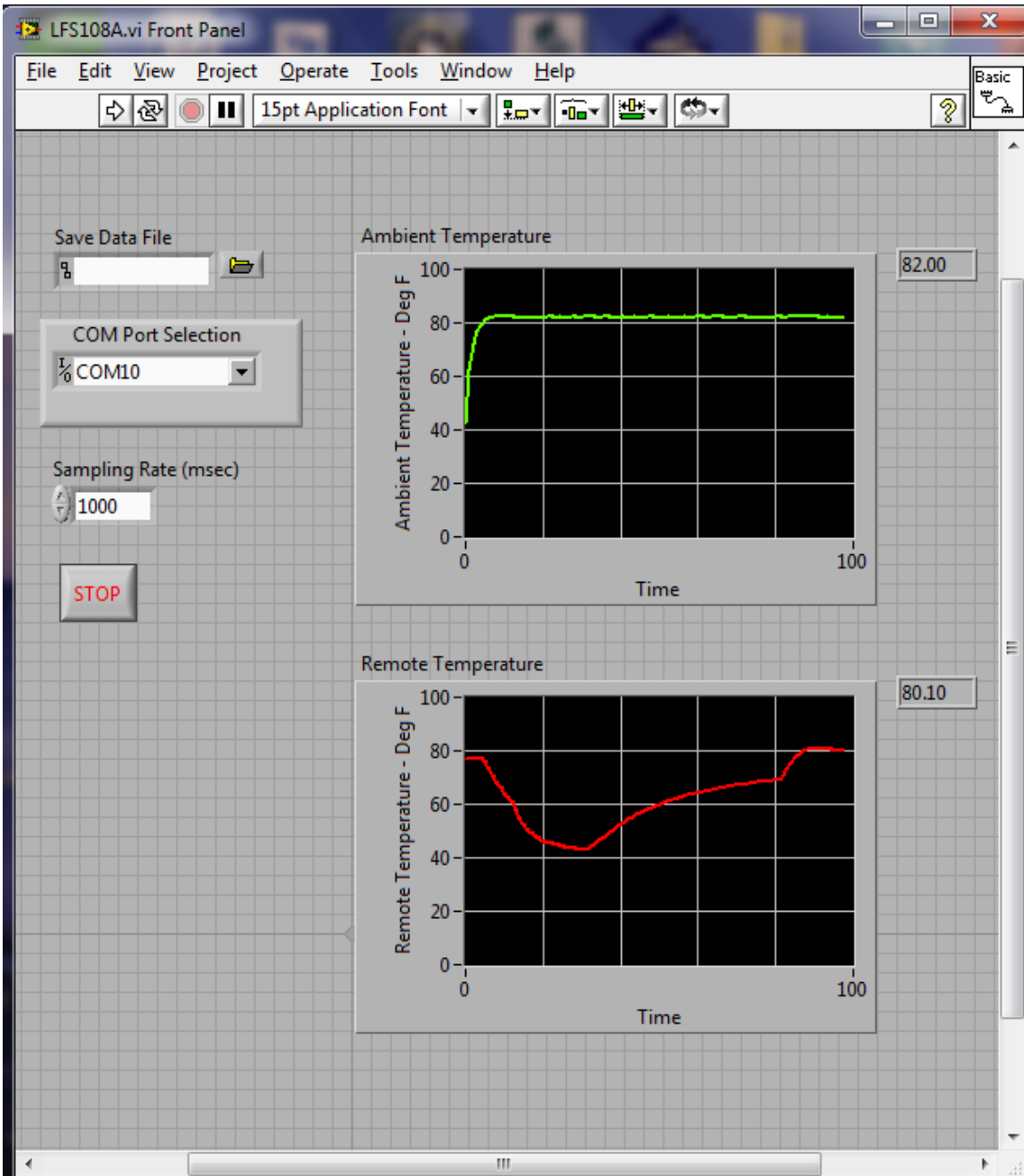
Figure 10 – Typical Labview screen