M5600/U5600 Software Manual

Wireless Pressure Transducers (Rev 3.0)

your distributor
AMSYS GmbH & Co.KG
An der Fahrt 4, 55124 Mainz, Germany
Tel. +49 (0) 6131 469 875 0
info@amsys.de | www.amsys.de

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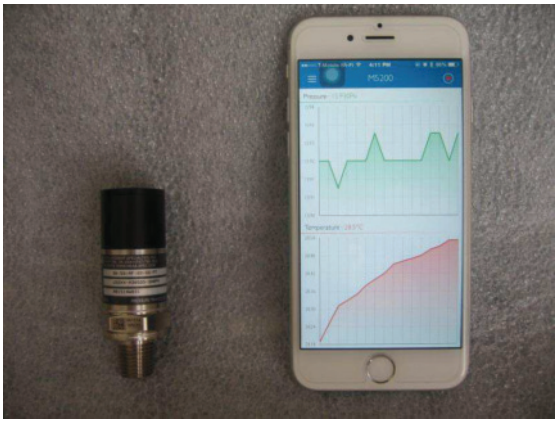
1 Introduction

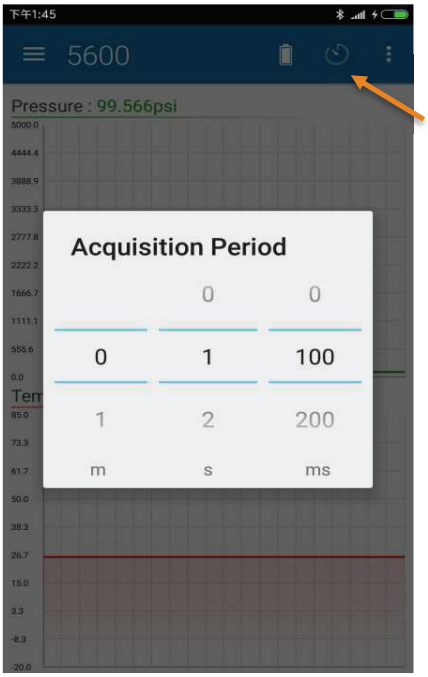
The M5600 and U5600 pressure transducers use standard 2.4GHz wireless communication tag. The long battery life and integration design make these transducers a perfect fit for many industrial and commercial applications including marine, residential, campers, water, hydraulic, irrigation, pool, medical and sprinkler systems, or anywhere you would need to monitor pressure without the need for wires.

By installing the Windows® version software on your PC or embedding the wireless signal in your integrated system, you can monitor pressure and temperature in real time.

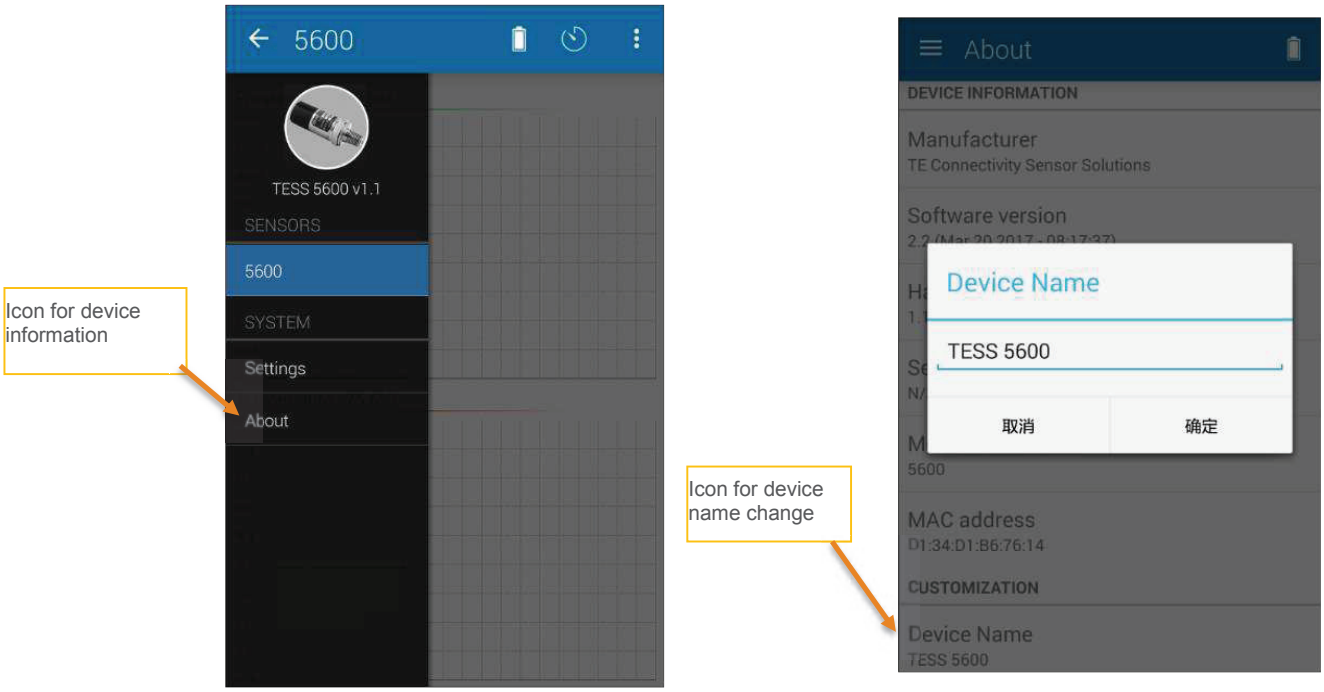
2 Smartphone/Tablet Software Installation

1. Download and install the "TE Sensor Tag" app for iOS or Android™ from the Apple App Store or Google Play Store.
2. Install the battery into the transducer.
3. Turn on standard 2.4GHz wireless communication tag for smartphone/tablet.
4. Run "TE Sensor Tag" app on smartphone/tablet and it will start searching for the transducer.
5. Select the transducer (M5600 or U5600) found by the app to pair it to your smartphone/tablet.
6. Once paired, the pressure and temperature charting will begin automatically. Data is collected every 5 seconds (default interval for best battery life). Data collecting rate can be adjusted from 0.1s to 5s by step 0.1s.





7. The sensor name can be changed in “device information” as below illustration. (Default sensor name is “TESS 5600”.)



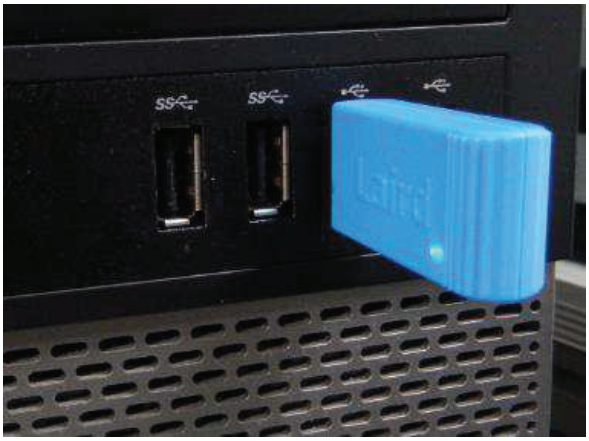
3 Windows Version Software Installation and Operation Manual

Hardware & System Requirement

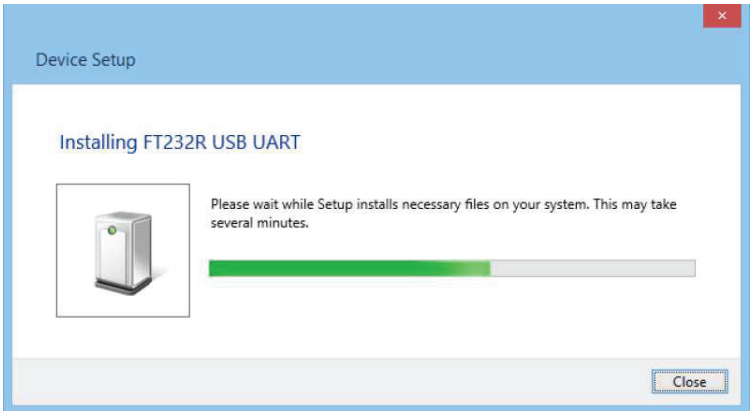
- PC with USB serial port support
- USB Dongle: BT900-US
- Operation system: Windows XP, Windows 7 or above
- Microsoft .NET Framework4.5 or above

Dongle Installation and Programming

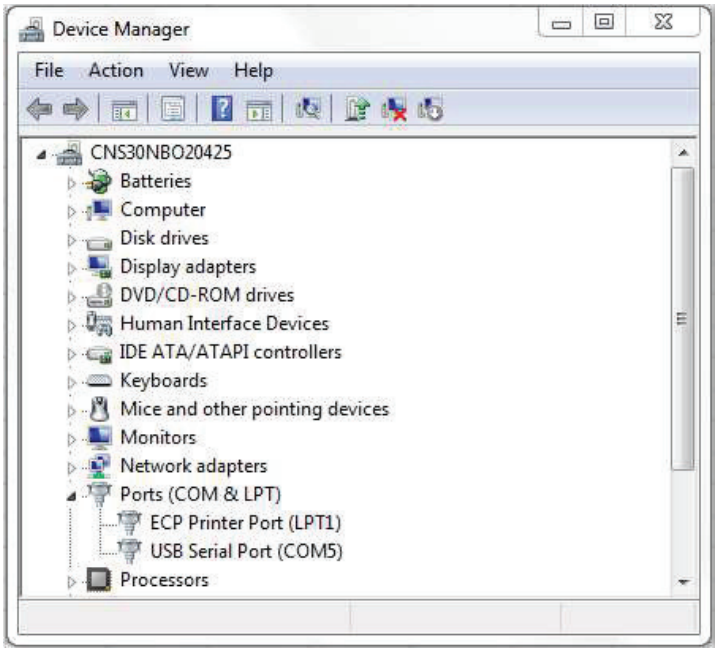
1. Insert the USB Dongle (BT900-US) into the USB socket of the PC.



The PC will install the related USB drivers automatically.



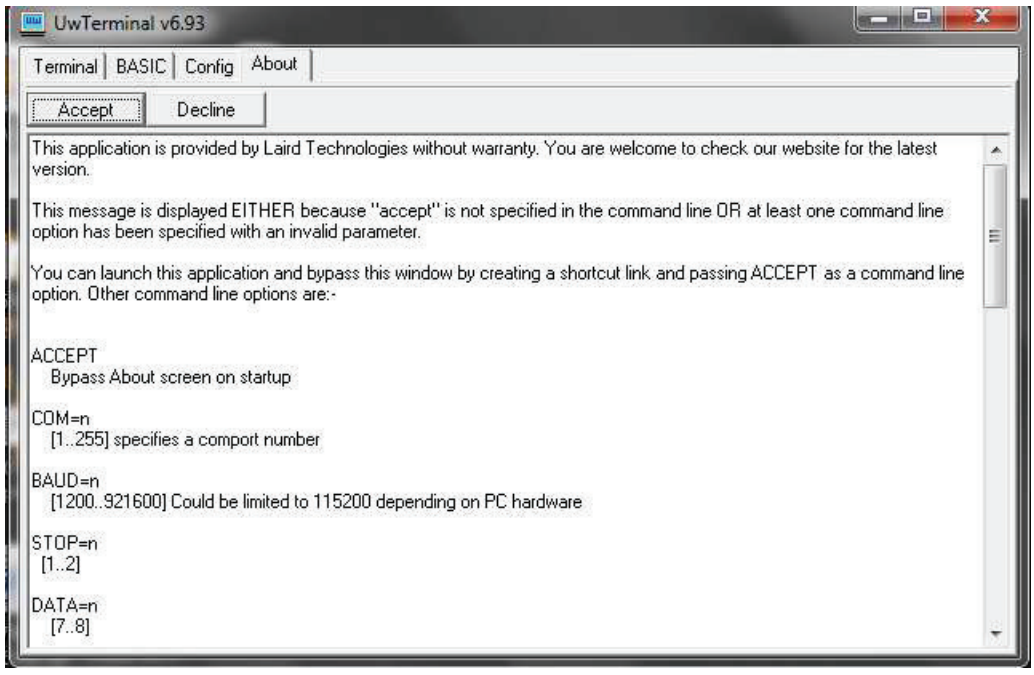
2. After installing FT232R USB UART, open the PC's Device Manager and check if the USB Dongle has the port number assigned as below (COM5 in this example):



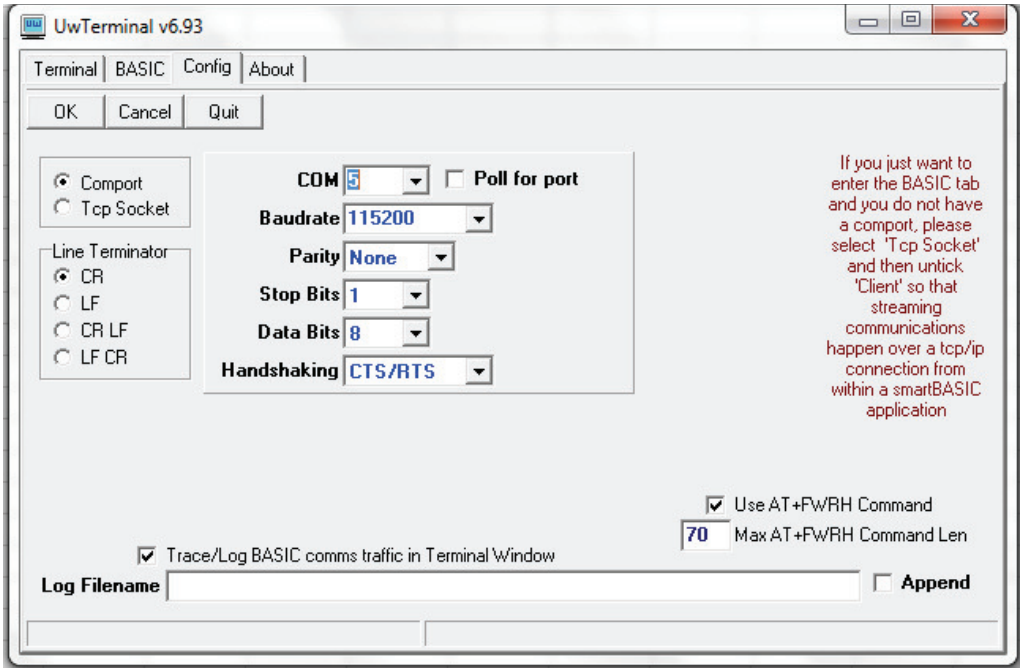
If not assigned, then it is necessary to install the FTDI FT232 USB Serial Converter Driver following instructions from the below link:
https://learn.sparkfun.com/tutorials/how-to-install-ftdi-drivers/windows---in-depth

Verify COM port is assigned to the Dongle in the Device Manager before proceeding to the next step.

3. Copy Window's client software "TESS-M5600_U5600_Software.zip" to the PC and unzip it. Double-click to run UwTerminal in folder: TESS 5600\UwTerminal\. User interface should display as below:

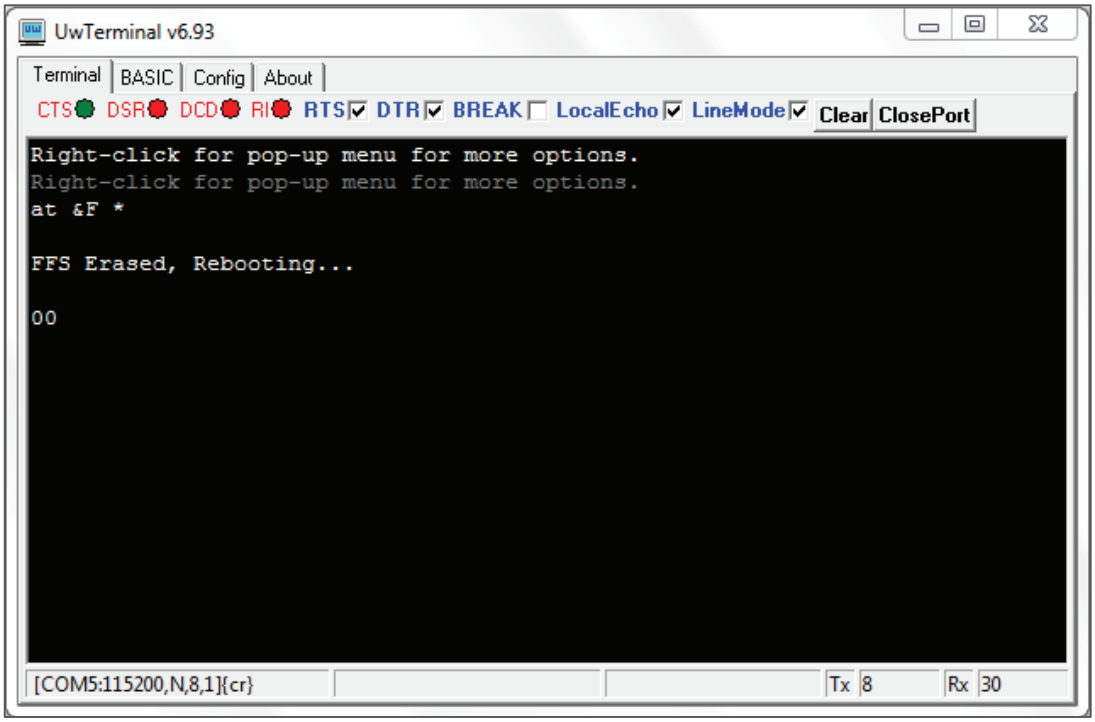


4. Click “Accept” to enter the configuration interface. Select the proper COM port where the Dongle is installed and leave the others at default settings.

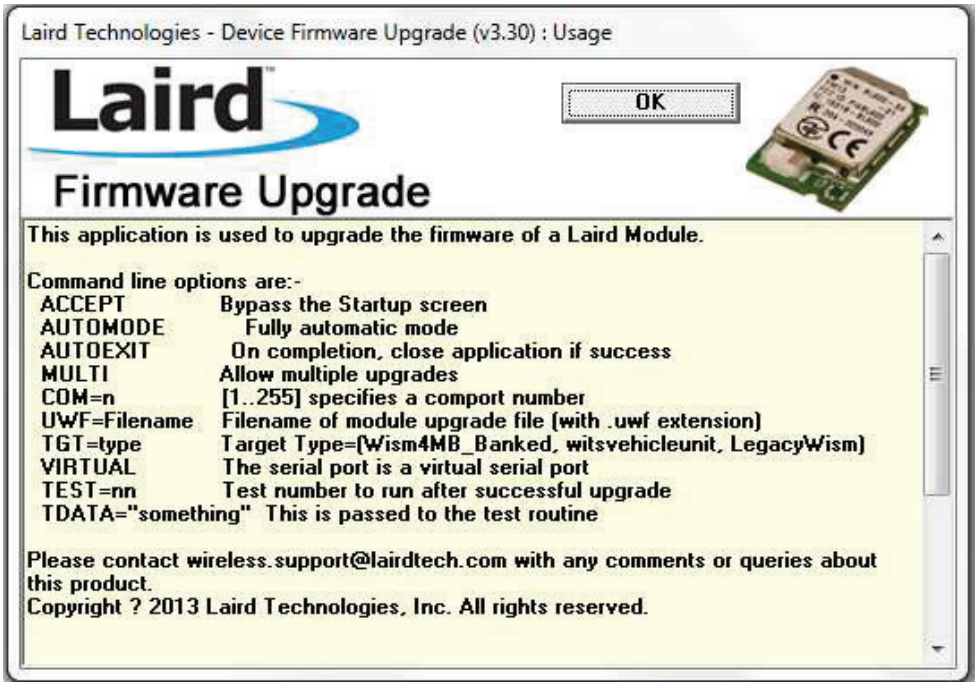


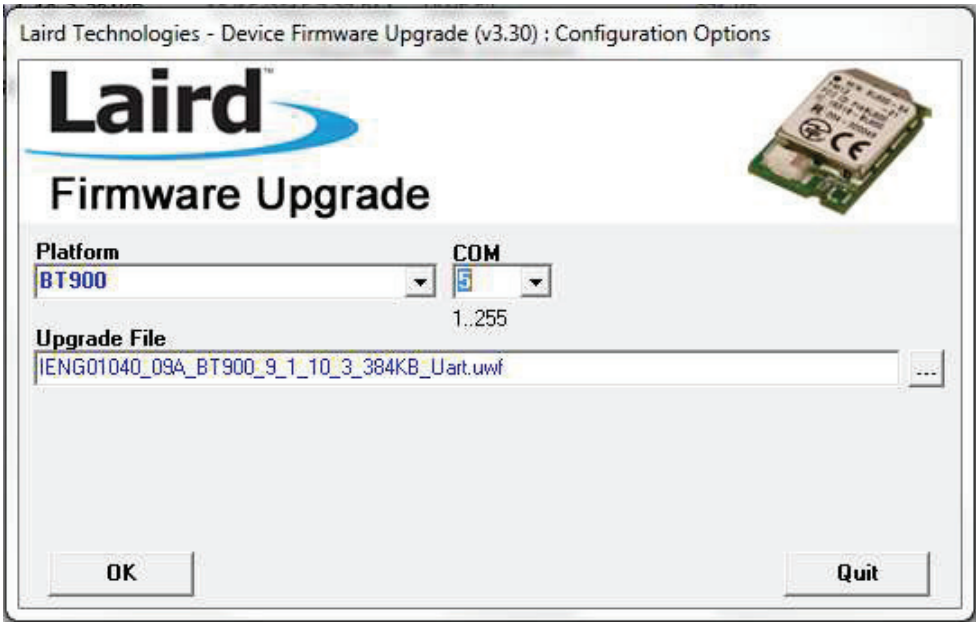
Then click “OK” to enter the command-line interface:

5. Input “at &F *” (at space &F space *) and press “Enter”. The screen will display “ FFS Erased, Rebooting…”
Close the window by clicking the “X” at the upper right corner.



6. Run “BT900UartFwUpgrade.exe” in folder: TESS 5600\BT900_9.1.10.3 to update the firmware. Follow these steps: Press “OK” → specify the correct COM port → press “OK” → press “Start Upgrade” → let it run until finish → pressing “Quit.”





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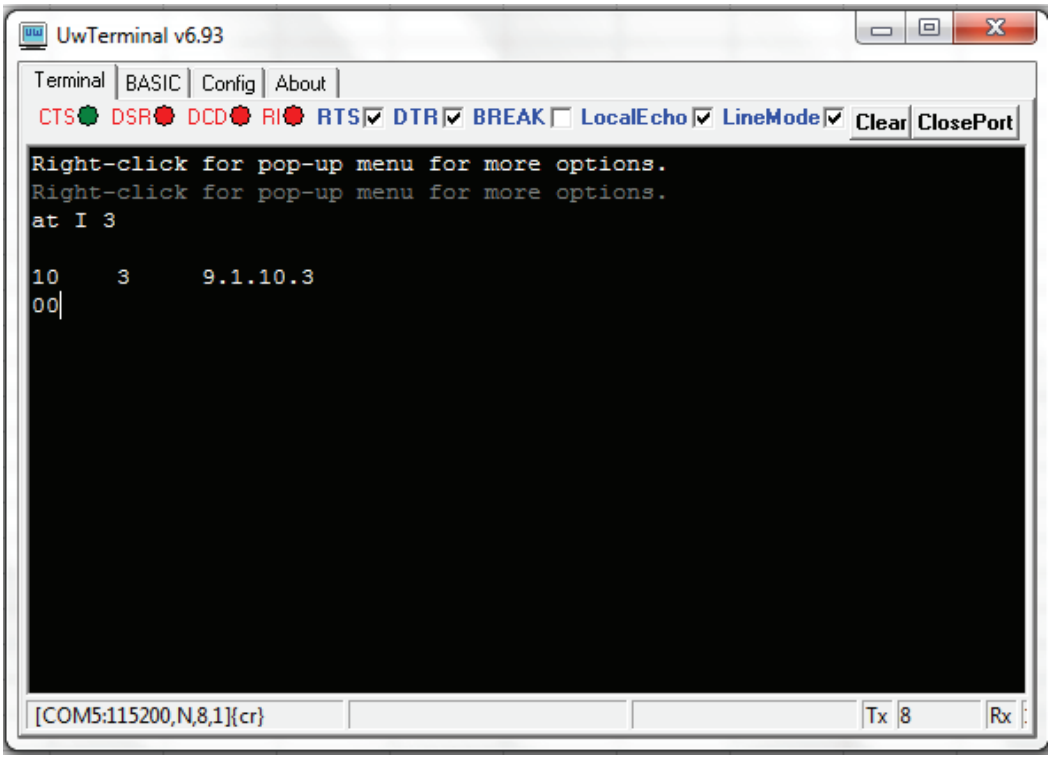
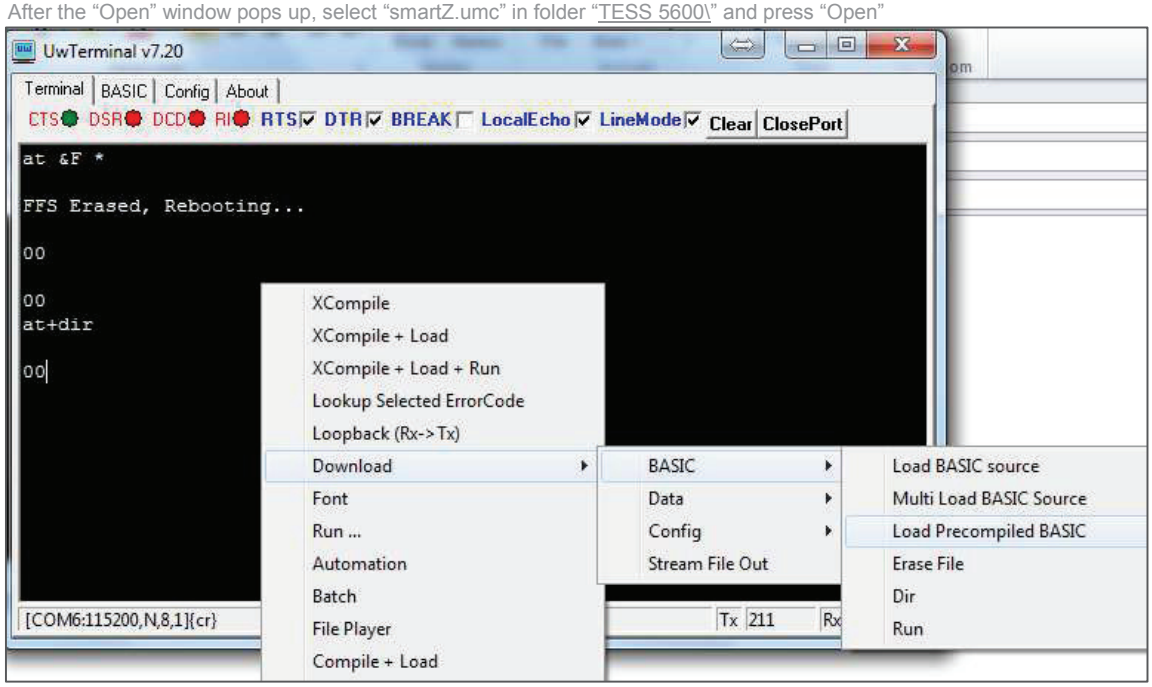
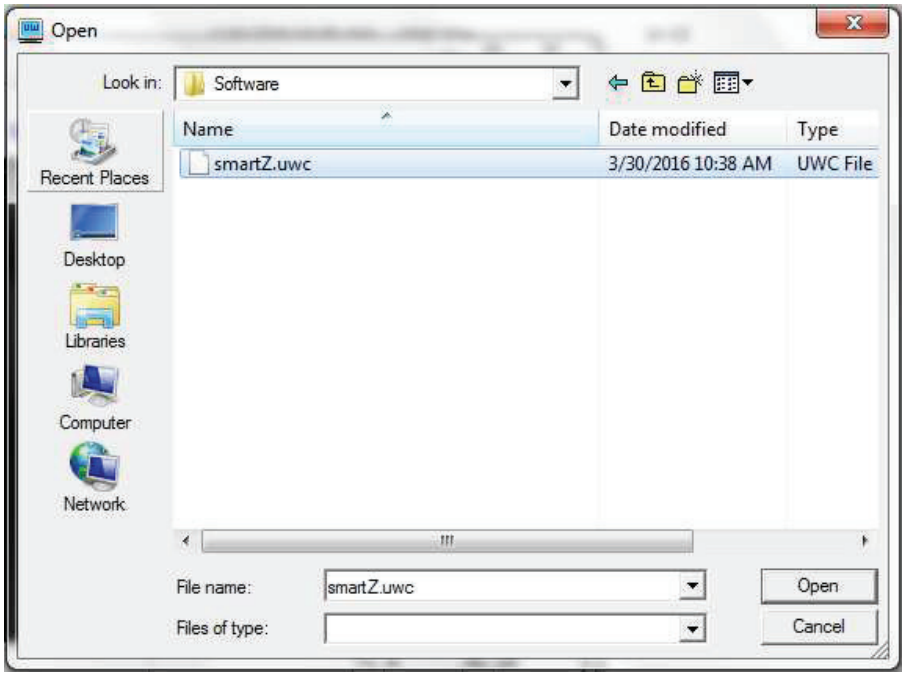
7. Remove the USB Dongle and re-insert, repeat above steps 3 & 4.
   Input “at I 3” and press “Enter,” displaying “9.1.10.3” which is the latest version of the firmware.



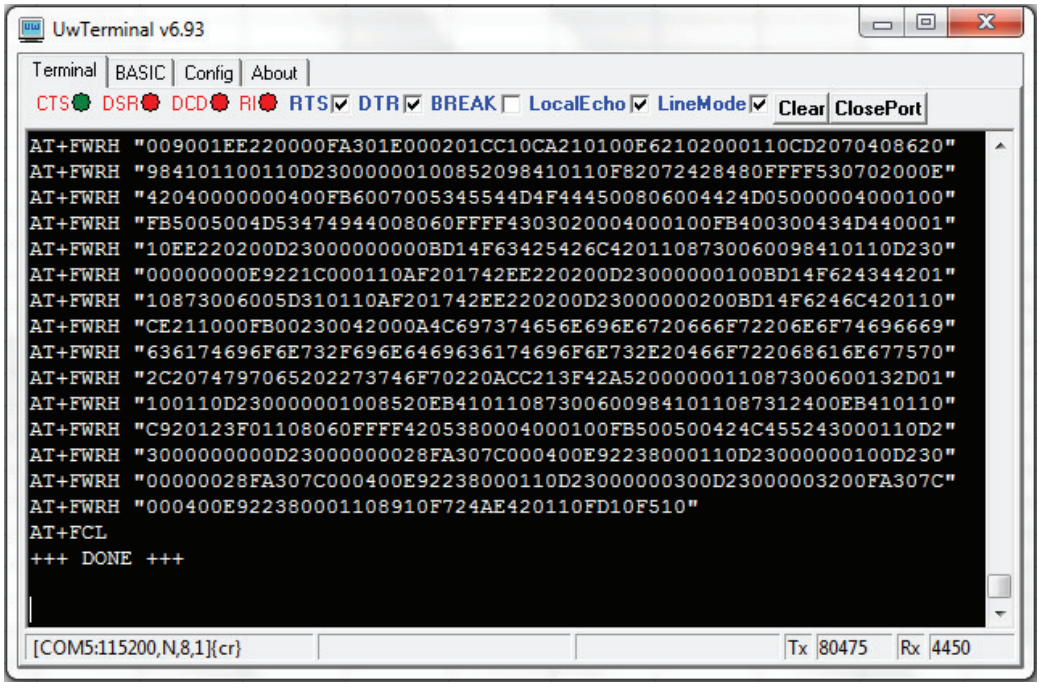
Input “at &F *” and press “Enter.” Screen will display “FFS Erased, Rebooting…”
Input “at+dir” and press “Enter.”

8. Right-click inside the window and click “load precompiled BASIC”
After the “Open” window pops up, select “smartZ.umc” in folder “TESS 5600\” and press “Open”





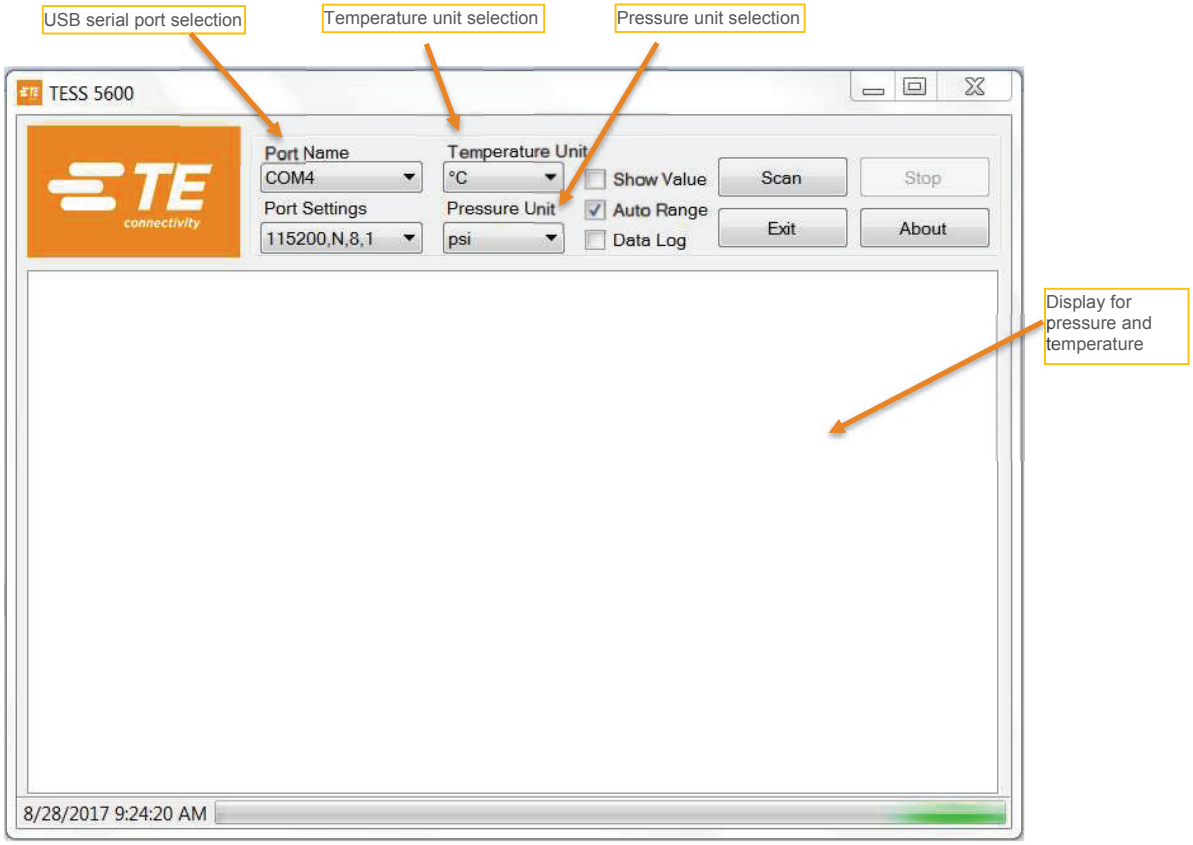
Text will scroll and after 1-2 minutes, it will display “DONE.”



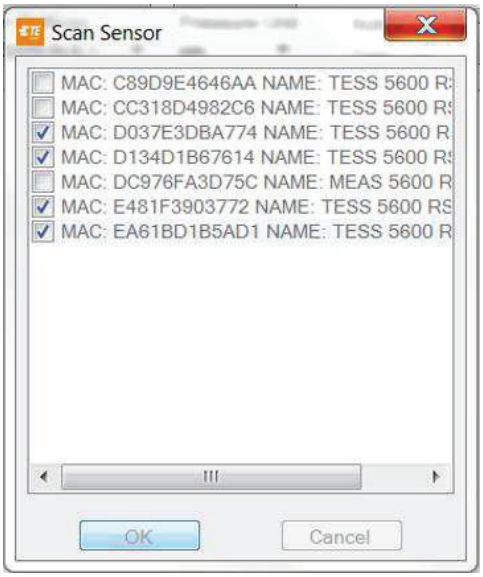
Close the “UwTerminal” window. Remove the USB Dongle and re-insert.

Monitoring Software Operation Manual

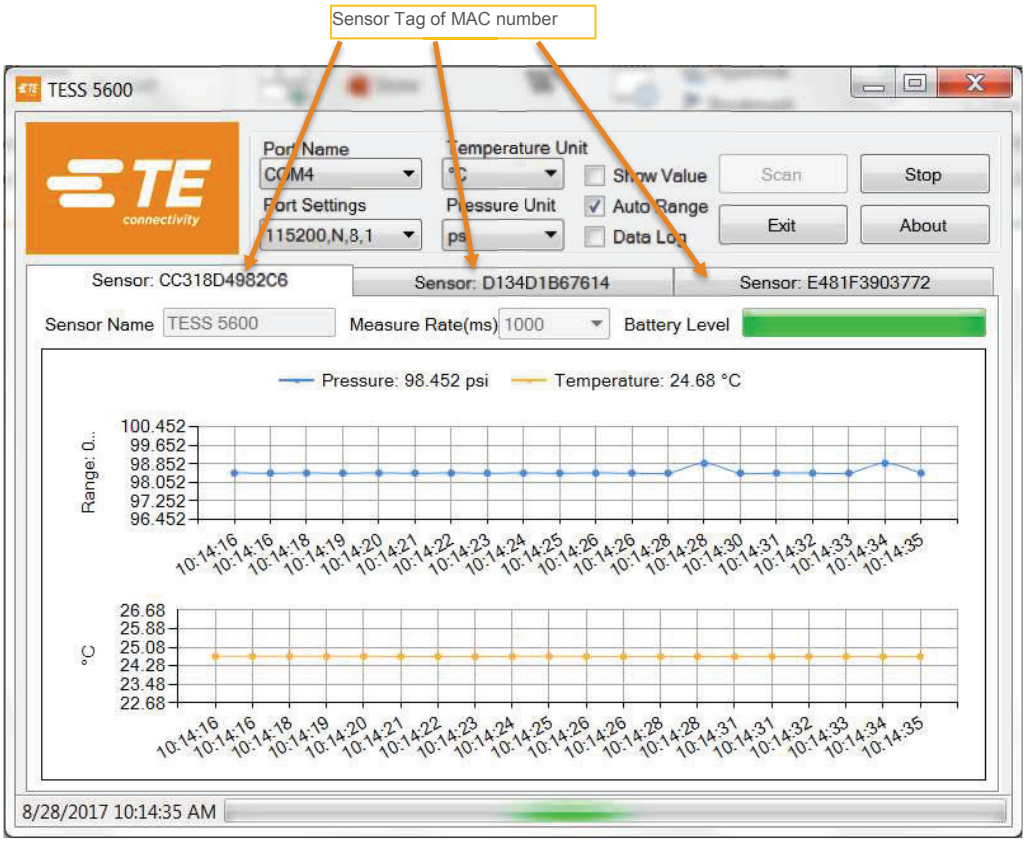
1. Double-click to run TESS 5600 for Windows in folder: TESS 5600\bin\Release\. The client software user interface should display as below. Certain explanations can be found when moving the cursor onto the words.



2. Ensure the Port Name matches the COM number in the Device Manager. Click the “Scan” button, and then a “Scan” window will pop up to search for available wireless devices. Tick the MAC number to match the target device. Maximum 5 units can be selected.

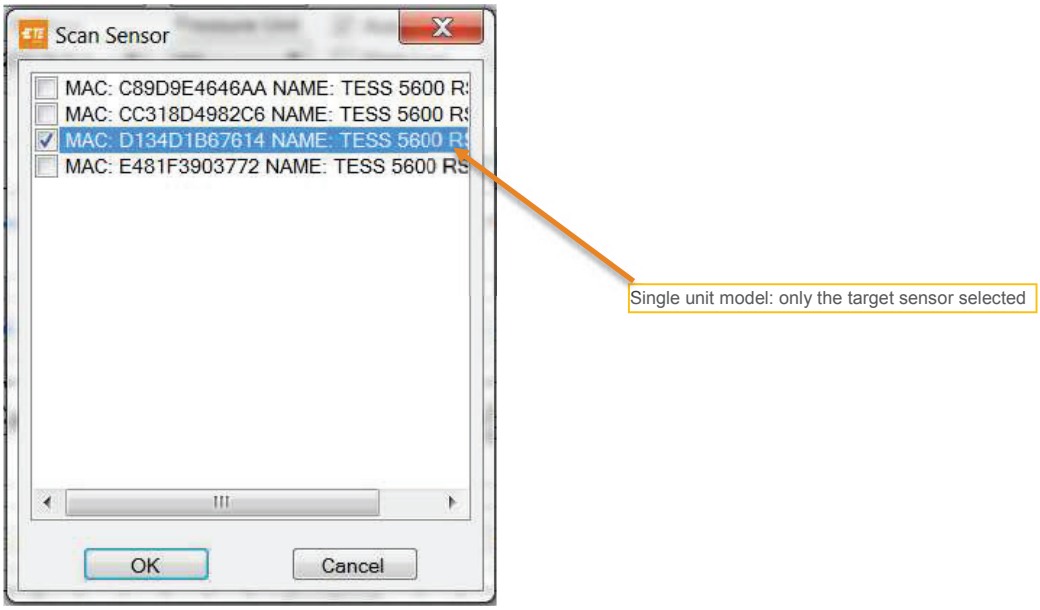


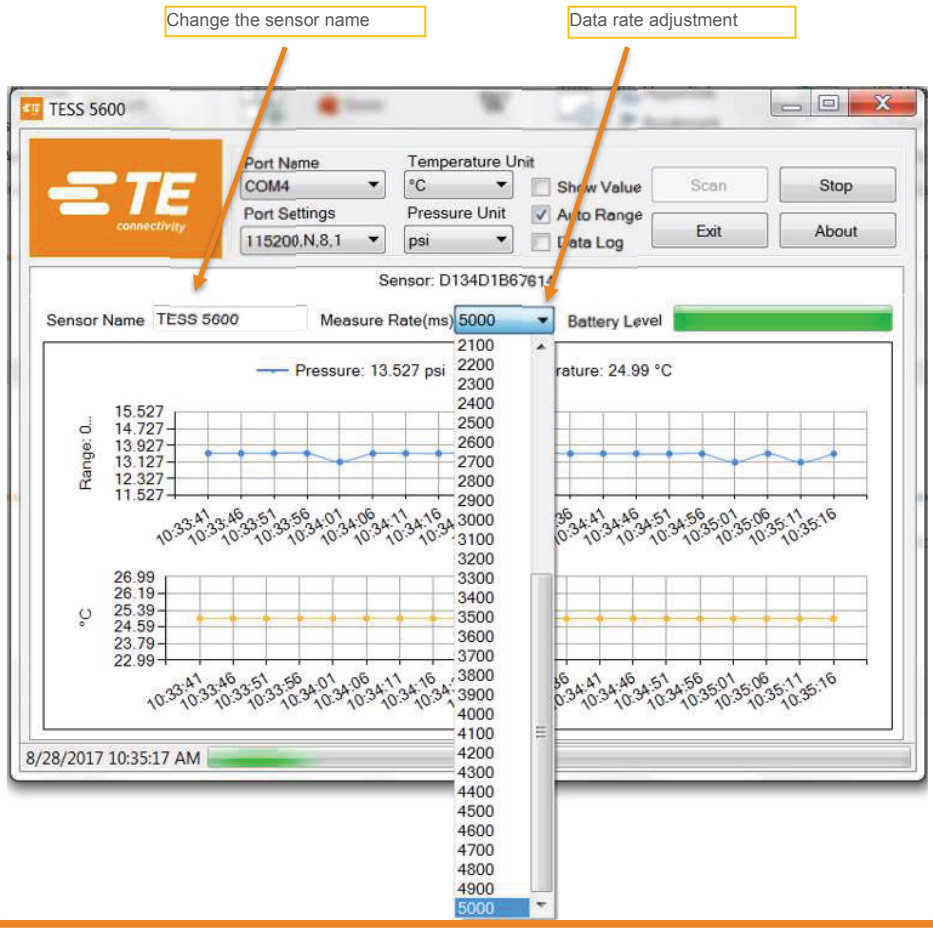
3. The software will start receiving and recording data on battery level and real-time pressure and temperature.
   Maximum 5 devices can be displayed in parallel. The initial communication time of each unit takes 30 sec approx.
   By clicking the sensor tag of Mac number, different sensor measurement can be taken.
   Clicking the “Stop” button will stop the data taking process.



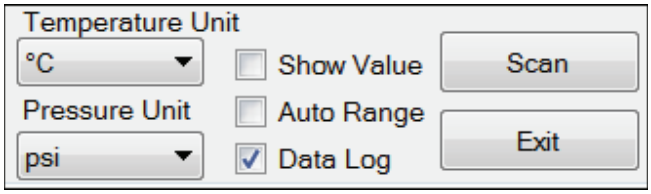
4. Data rate and sensor name can be changed in single unit model (only one sensor selected in scan window). By clicking icon “measure rate“ , data rate can be adjusted (Default value is 5000ms).And sensor name can be changed by inputing in rectangle.

   (Default sensor name is “TESS 5600“)





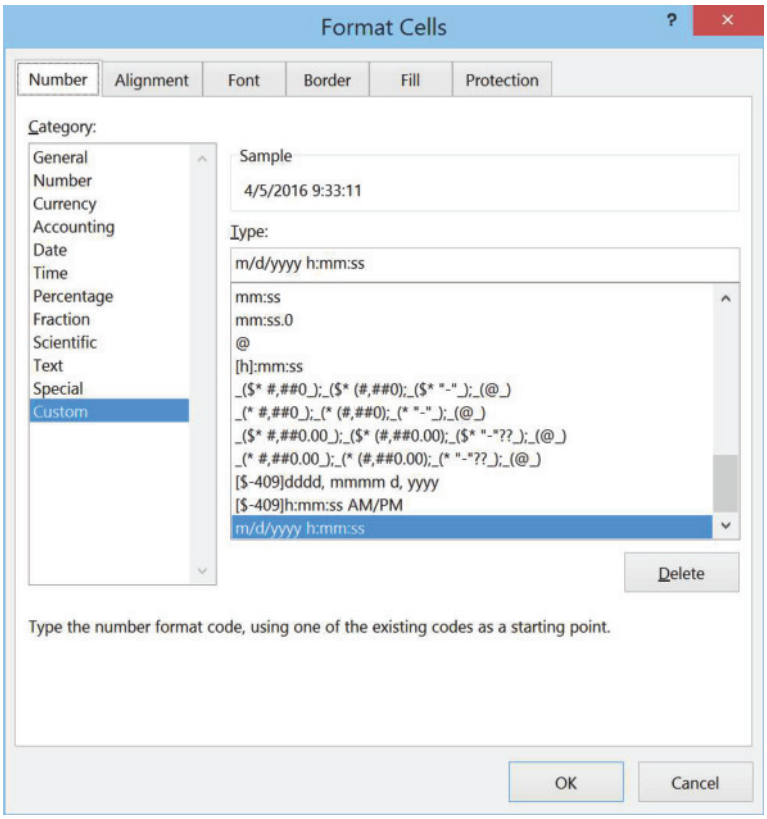
5. When “Data Log ” is enabled and the interval set, , all data will be saved in the folder (default: \\TESS\\data\\) as a *.dat file which can be opened with MS Excel.



	A	B	C	D	E	F
1	Pressure Range Min(psi): 0					
2	Pressure Range Max(psi): 5000					
3	Date Time	MAC Address	Product Name	Battery Level(%)	Temperature Value(°C)	Pressure Value(psi)
4	10:53:33 AM	D134D1B67614	TESS 5600	100	24.81	13.338
5	10:53:38 AM	D134D1B67614	TESS 5600	100	24.81	13.336
6	10:53:43 AM	D134D1B67614	TESS 5600	100	24.81	13.34
7	10:53:48 AM	D134D1B67614	TESS 5600	100	24.81	13.336
8	10:53:53 AM	D134D1B67614	TESS 5600	100	24.81	13.337
9	10:53:58 AM	D134D1B67614	TESS 5600	100	24.81	13.337
10	10:54:03 AM	D134D1B67614	TESS 5600	100	24.81	13.337
11	10:54:08 AM	D134D1B67614	TESS 5600	100	24.81	13.335
12	10:54:13 AM	D134D1B67614	TESS 5600	100	24.81	13.744
13	10:54:18 AM	D134D1B67614	TESS 5600	100	24.81	13.339
14	10:54:23 AM	D134D1B67614	TESS 5600	100	24.81	13.337
15	10:54:28 AM	D134D1B67614	TESS 5600	100	24.81	13.334
16	10:54:33 AM	D134D1B67614	TESS 5600	100	24.81	13.336
17	10:54:38 AM	D134D1B67614	TESS 5600	100	24.81	13.335

Note: Temperature unit is fixed centi-degree and pressure unit is fixed PSI in data file.

The “Date Time“ column can be formatted to display seconds as shown below:


Format Cells
Number
Alignment
Font
Border
Fill
Protection
Category:
General
Number
Currency
Accounting
Date
Time
Percentage
Fraction
Scientific
Text
Special
Custom
Sample
4/5/2016 9:33:11
Type:
m/d/yyyy h:mm:ss
mm:ss
mm:ss.0
@
[h]:mm:ss
_($* #,##0_);_($* (#,##0);_($* "-"_);_(@_)
_(* #,##0_);_(* (#,##0);_(* "-"_);_(@_)
_($* #,##0.00_);_($* (#,##0.00);_($* "-"??_);_(@_)
_(* #,##0.00_);_(* (#,##0.00);_(* "-"??_);_(@_)
[$-409]dddd, mmmm d, yyyy
[$-409]h:mm:ss AM/PM
m/d/yyyy h:mm:ss
Delete
Type the number format code, using one of the existing codes as a starting point.
OK
Cancel

4 Software source code

1. Souce code file are all in the folder : TESS 5600\ Source code V2.0 , compiled based on **Microsoft visual studio 2013, C sharp** language.
2. SmartZ command lines are quoted to interact with BT900 dongle for data communcation.

   Note: SmartZ is a smartBASIC application provied by **LairdTech .** See "Application Note - BT900 with smartZ Sample Application" for details in folder： TESS 5600\

5 Software Protocol Specification

UUID	F000AB30-0451-4000-B000-000000000000

AVAILABLE CHARACTERISTICS

Name	UUID	Bytes	Read / Write	Notified
Data	F000AB31-0451-4000-B000-000000000000	14	Read	YES
Data Rate	F000AB32-0451-4000-B000-000000000000	12	Read / Write	YES
Status	F000AB3F-0451-4000-B000-000000000000	1	Read	NO

DATA CHARACTERISTIC BYTES FIELDS

0	1	2	3	4	5	6	7	8	9	10	11	12	13
T LSB	T MSB	P LSB	P	P	P MSB	Pmin LSB	Pmin	Pmin	Pmin MSB	Pmax LSB	Pmax	Pmax	Pmax MSB

T is a 16 bits signed integer, equals 0x7FFF if erroneous.
P, Pmin and Pmax are 32 bits signed integers, equal 0x7FFFFFFF if erroneous.

T is a temperature value with 0.01°C accuracy.
P, Pmin and Pmax are pressure values with 0.1Pa accuracy

CONVERSION

Temperature (°C) = T / 100

Pressure (Pa) = P / 10

Pressure (Psi) = P / 10 / 6894.7

DATA RATE CHARACTERISTIC BYTES FIELDS

0	1	2	3	4	5	6	7	8	9	10	11
Data rate LSB	Data rate	Data rate	Data rate MSB	Min LSB	Min	Min	Min MSB	Max LSB	Max	Max	Max MSB

Data rate, Min and Max are 32 bits unsigned integers.

Data rate is the actual sensor data rate in milliseconds.
Min is the minimum admissible data rate in milliseconds.
Max is maximum minimum admissible data rate in milliseconds.

NB. Only Data rate can be written.

STATUS

0x00	OK
0x01	Sensor error

NB. All signed integers use two's complement representation.

Battery Service

UUID	F000180F-0451-4000-B000-000000000000

AVAILABLE CHARACTERISTICS

Name	UUID	Bytes	Read / Write	Notified
Data	F0002A19-0451-4000-B000-000000000000	2	Read	YES

DATA CHARACTERISTIC BYTES FIELDS

Byte 0	Byte 1
Battery Level (%)	Status

0% to 100% represents a supply voltage from 2.0V to 3.0V with 1%/bit resolution.

STATUS

0x00	Discharging
0x01	Charging

Device Name Service

UUID	F000FA00-0451-4000-B000-000000000000

AVAILABLE CHARACTERISTICS

Name	UUID	Bytes	Read / Write	Notified
Device Name	F000FA01-0451-4000-B000-000000000000	18	Read/Write	NO
Default Device Name	F000FA02-0451-4000-B000-000000000000	18	Read	NO

Both Device Name and Default Device name are in ASCII format. Unused bytes should be nulled.

Default Device Name is “TESS 5600”.

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