

M5600/U5600 Software Manual



Wireless Pressure Transducers

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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 "<u>TE Sensor Tag</u>" 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.





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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.

Device Setup		×
Installing FT23	2R USB UART	
Ĵ	Please wait while Setup installs necessary files on your system. This may take several minutes.	1
	Cto	se

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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: <u>https://learn.sparkfun.com/tutorials/how-to-install-ftdi-drivers/windows---in-depth</u>

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 <u>UwTerminal</u> in folder: <u>TESS 5600\UwTerminal\</u>. User interface should display as below:

🛄 UwTerminal v6.93	<u> </u>
Terminal BASIC Config About	
Accept Decline	
This application is provided by Laird Technologies without warranty. You are welcome to check our website for the latest version.	-
This message is displayed EITHER because "accept" is not specified in the command line OR at least one command line option has been specified with an invalid parameter.	(III)
You can launch this application and bypass this window by creating a shortcut link and passing ACCEPT as a command line option. Other command line options are:-	
ACCEPT Bypass About screen on startup	
COM=n [1255] specifies a comport number	
BAUD=n [1200921600] Could be limited to 115200 depending on PC hardware	
STOP=n [12]	
DATA=n [78]	÷

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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.

UwTerminal v6.93	
OK Cancel Quit Image: Comport COM Image: Comport C Top Socket Baudrate Poll for port Line Terminator Parity None Image: Comport Image: C CR C CR Stop Bits Image: Comport C CR C CR Data Bits Image: Comport C LF CR Handshaking CTS/RTS Image: Comport	If you just want to enter the BASIC tab and you do not have a comport, please select 'Top Socket' and then untick 'Client' so that streaming communications happen over a top/ip connection from within a smartBASIC application
Trace/Log BASIC comms traffic in Terminal Window	Use AT+FWRH Command 70 Max AT+FWRH Command Len
Log Filename	Append

Then click "OK" to enter the command-line interface:

wTerminal v6.93		_ 0	23
Terminal BASIC Config About			
CTS DSR DCD RIB RTS DTR BREAK LocalEcho LineMode	Clear Clo	sePort	
Right-click for pop-up menu for more options.			
Right-click for pop-up menu for more options.			
[COM5:115200.N.8.1]{cr}	Тх	Rx	
[] [] [] [] [] [] [] [] [] [] [] [] [] [J. 34 J	

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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.

WTerminal v6.93		X
Terminal BASIC Config About		
CTS DSR DCD RICE RTS DTR BREAK LocalEcho LineMode	Clear ClosePort	
Right-click for pop-up menu for more options.		
Right-click for pop-up menu for more options. at &F *		
FFS Erased, Rebooting		
00		
[COM5:115200,N,8,1]{cr}	Tx 8 Rx 30	

6. Run "<u>BT900UartFwUpgrade.exe</u>" in folder: <u>TESS 5600\BT900 9.1.10.3</u> 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."



Firmware	Upgrade	- All
Platform	COM	
Jpgrade File	1255	
ENG01040_09A_BT900_	9_1_10_3_384KB_Uart.uwf	

Laird	Quit	Start Upgrade	and the second
Firmware Upgrade Running on DS: Windows Vista or newer This application upgrades firmware in the After the upgrade, it's configuration may and compiled scripts may have to be rec After the upgrade please reset/power cy appropriate value to enable your app to or Please click on the appropriate button to Upgrade file is: IENG01040_09A_BT900 Attached to comport 5	e device from Laird be reset to default compiled to be com vole the device and work. o continue. 0_9_1_10_3_384K	Technologies. values patible with the new firmware. I then set the Baudrate to an B_Uart.uwf	





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."

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 Right-click inside the window and click "load precompiled BASIC" After the "Open" window pops up, select "smartZ.umc" in folder "<u>TESS 5600\</u>" and press "Open"

Look in	🧾 Software	•	← 🗈 💣 🗖 -	
e.	Name		Date modified	Туре
Recent Places	smartZ.uwc		3/30/2016 10:38 AM	UWC File
Desktop				
Libraries				
Computer				
Network				
	< [III		•
	File name: smartZ.uv	NC	•	Open
	Files of type:		-	Cancel

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

UwTerminal v6.93	
Terminal BASIC Config About	
CTS DSR DCD RIC RTS DTR BREAK LocalEcho LineMode Clear Clear	osePort
AT+FWRH "009001EE220000FA301E000201CC10CA210100E62102000110CD207	0408620" 🔺
AT+FWRH "984101100110D23000000100852098410110F82072428480FFFF530	702000E"
AT+FWRH "4204000000400FB6007005345544D4F444500806004424D0500000	4000100"
AT+FWRH "FB5005004D53474944008060FFFF4303020004000100FB400300434	D440001"
AT+FWRH "10EE220200D2300000000BD14F63425426C4201108730060098410	110D230"
AT+FWRH "00000000E9221C000110AF201742EE220200D23000000100BD14F62	4344201"
AT+FWRH "10873006005D310110AF201742EE220200D23000000200BD14F6246	C420110"
AT+FWRH "CE211000FB00230042000A4C697374656E696E6720666F72206E6F7	4696669"
AT+FWRH "636174696F6E732F696E6469636174696F6E732E20466F722068616	E677570"
AT+FWRH "2C2074797065202273746F70220ACC213F42A520000001108730060	0132D01"
AT+FWRH "100110D230000001008520EB410110873006009841011087312400E	B410110"
AT+FWRH "C920123F01108060FFFF4205380004000100FB500500424C4552430	00110D2"
AT+FWRH "300000000D2300000028FA307C000400E92238000110D23000000	100D230"
AT+FWRH "00000028FA307C000400E92238000110D2300000300D2300000320	0FA307C"
AT+FWRH "000400E922380001108910F724AE420110FD10F510"	
AT+FCL	
+++ DONE +++	
[COM5:115200,N,8,1]{cr}	'5 Rx 4450

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

Monitoring Software Operation Manual

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

00 TESS 5600		(an matted fam	tion.		_ 0 <mark>_ x</mark>
	Operation Info Port Name	Temperature Unit Pressure Unit	Measure Rate(ms)		
	COM4 Choose the p	proper USB serial port where the dongle in	nstalled.	Scan	Stop
	Port Settings	Battery Level(%)	Data Log	1400	
connectivity	115200.N.8.1	•		Exat	About
Procesure Tomo	oraturo				
ressure remp	erosure				
11/16/2016 11:04:49 AM					0

	tions are provided as beio	w: mperature unit selection		
	USB serial port selection	Pressure unit select	ion Data rate adjustm	nent
TESS 5600				
=7	Coperation Info Port Name COM4 Port Settings 115200/N.8.1	Temperature Unit Pressure Unit M 'C + psi + Battery Level(%)	easure Rate(ms) Data Log	Stop About
Pressure	- Temperature		~	Display for pressure and temperature

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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. Double-click the MAC number or click the OK button matching the target device to select

亚 Scan	23
MAC:C89D9E4646AA NAME:TESS 5600 RSSI:-8 MAC:CC318D4982C6 NAME:TESS 5600 RSSI:-3 MAC:EF16C82C7C65 NAME:TESS 5600 RSSI:-3	0 3 4
MAC:F40F9B61A25D NAME:TESS 5600 RSSI:-3	8
OK Cancel	

3. The software will start receiving and recording data on battery level and real-time pressure and temperature. Clicking the "Stop" button will stop the data taking process.



4. Data rate can be adjusted by clicking icon "measuring rate" and selecting value from 100 to 5000ms. (Default value is 5000ms)



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

[Measure Rate(ms) 4000 Data Log						
	A	В	С	D	E	F	
1	Pressure Rang	e Min(psi): -14.7					
2	Pressure Rang	e Max(psi): 2					
3	Date Time	Mac Address	Product Nam	Battery Level(%)	Temperature Value(°C)	Pressure Value(psi)	
4	9:42:27 AM	E42F33EB9336	TESS 5600	100	19.39	14.5292326	
5	9:42:29 AM	E42F33EB9336	TESS 5600	100	19.39	14.5292326	
6	9:42:31 AM	E42F33EB9336	TESS 5600	100	19.47	14.52869595	
7	9:42:33 AM	E42F33EB9336	TESS 5600	100	19.47	14.52869595	
8	9:42:35 AM	E42F33EB9336	TESS 5600	100	19.47	14.52869595	
9	9:42:37 AM	E42F33EB9336	TESS 5600	100	19.48	14.52895702	
10	9:42:39 AM	E42F33EB9336	TESS 5600	100	19.48	14.52895702	
11	9:42:41 AM	E42F33EB9336	TESS 5600	100	19.48	14.52895702	
12	9:42:43 AM	E42F33EB9336	TESS 5600	100	19.48	14.52895702	

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

Nhumahan	A.I	Et	Denden	C 10	Dustantian			
Number	Alignment	Font	Border	FIII	Protection			
Category: General Number Currency Accountin Date Time Percentau Fraction Scientific Text Special Custom	ng	Sample 4/5/2016 9:33:11 Type: m/d/yyyy h:mm:ss mm:ss.0 @ [h]:mm:ss .(\$* #,##0_);_(\$* (#,##0);_(\$* "-"_);_(@_) .(* #,##0_);_(\$* (#,##0.00);_(\$* "-"??_);_(@_) .(* #,##0.00_);_(\$* (#,##0.00);_(\$* "-"??_);_(@_) .(* #,##0.00_);_(* (#,##0.00);_(\$* "-"??_);_(@_) .[\$-409]dddd, mmm d, yyyy [\$-409]dddd, mmm d, yyyy						
		m/a/yy	yyy n.min.ss					
						Delete	2	
	~	_						

4 Software Protocol Specification

UUID for the M5600/U5600 is available, which allows the user to compile their own program to recognize the sensor's wireless signal and detect pressure, temperature and battery capacity.

Pressure and Temperature:

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	F000AB31-0451-4000-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	Ρ	Ρ	P MSB	Pmin LSB	Pmin	Pmin	Pmin MSB	Pmax LSB	Pmax	Pmax	Pmax MSB

T is a 16 bits signed word, equals 0x7FFF if erroneous.

P, Pmin and Pmax are 32 bits signed words, equal 0x7FFFFFFF if erroneous.

T is a temperature value with 0.01°C resolution.

P, Pmin and Pmax are pressure values with 0.1Pa resolution

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	ОК
0x01	Sensor error

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

Battery Service:

UUID	F000180F-0451-4000-B000-00000000000

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

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