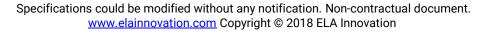


IDENTIFY Locate Measure

## Application Note

# **Bluetooth LOW ENERGY** WIRELESS TEMPERATURE SENSOR

## DATALOGGER USE AND SPECIFICATIONS





#### **1** INTRODUCTION

This document describes how to use the **Blue** PUCK **T** datalogger and provides precise information for setting up the device using the ELA Device Manager configuration application.

#### 2 APPLICABLE PRODUCT



It is important to note that the above product list is not exhaustive. It reflects our product line of Bluetooth Low Energy (BLE) sensors with datalogging features at the time this document was written. Nonetheless, all our wireless BLE-enabled sensor products offering datalogging are based on the same principles.

**3 OPERATION** 

**Blue** PUCK **T** is designed to provide temperature information. Temperature data is included in the **BLE advertising frame**:

# Name: Temperature

### Type: org.bluetooth.characteristic.temperature Download / View

### Assigned Number: 0×2A6E

#### Value Fields

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
Temperature	Mandatory	sint16	N/A	N/A	None
Information:					
Unit is in degrees Celsius with a resolution of 0.01 degrees Celsius					
Unit:					
org.bluetooth.unit.thermodynamic_temperature.degree_celsius					
Exponent: Decimal, -2					



The temperature information contained in the advertising frame is also stored on the device. Device memory holds up to 4,000 values.

You may configure the time period for recording temperature values.



#### Note

Data storage is based on a **First-in First-Out** (FIFO) mechanism, with the most recent temperature value overwriting the oldest value when memory is full.

#### 4 CONFIGURATION

- 4.1 Launch the **Device Manager** application
  - 1. Click on **Programmers**
  - 2. Select the NFC **reader connected to your PC** (the reader is detected automatically by the Windows Device Manager)
  - 3. Place the product on the reader
  - 4. Read parameters by clicking on  $\square$
  - 5. **Configure** settings as shown below, then click on

Sea Core N	Manager					-	×
				Prog	irammers		
<u> </u>			ACS ACR122 0				
ŵ	Home						 
8	Profile		ACS ACR122 0	(හි Configure Ta	an 🔗		
្តែរ	Configuration		$\sim$	Configure ra	ag 🕘		
	Readers	$\odot$	State				
{}	Programmers	$\odot$		Parameters	🗟 🕐 🖉		
		0	Features				
$\Diamond$	Tags			Firmware Version :	v0.7		
<u></u>	Applications	0	<b>\$</b>	Name :	BPUCK 800A12		
?	About			Enable :	True ~		
			Informations	Power :	0		
			Device Name : ACS At	Format : Advertising interval :	T ~ 10000		
				Log interval :	120000		
				UUID (iBeacon) :	0102030405060708090A0B0C0D0E0F10		
				Major (iBeacon) :	020B		
				Minor (iBeacon) :	010A		
				NID (Eddystone) :	0102030405060708090A		
				BID (Eddystone) :	010203040A0B		
							 $\vee$

3/8

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#### 4.1.1 Information about temperature values

1. The value contained in the advertising frame at the interval configured in the field:

Intervale d'émission 10000 : 10000 ms corresponds to 10 seconds.

Value range in milliseconds: [100 ms ; 10000 ms] ; from 0.1s to 10s.

2. Temperature value recorded at the interval configured in the field:

IDENTIFY LOCATE <u>MEAS</u>URE

Intervale de log : 120000 : 120000 : 120000 ms corresponds to 120 seconds.

Value range in milliseconds: [10000 ms ; 86400000ms] ; from 10s to 24h.

#### ⇒ Summary

- In the previous configuration example, the BLE frame is emitted once every 10 seconds and contains temperature information.
- That information is also recorded in device memory every 120 seconds.
- Recorded information is available at any time using the device in **Connected Mode**.

#### 5 RETRIEVING STORED TEMPERATURE DATA

- 5.1 Connecting to an ELA Innovation BLE TAG
  - 5.1.1 BLE Connected Mode to download data
    - Using a BLE device that allows connections to other devices
    - Using the NUS Service: Nordic UART Service (Tx and Rx characteristics)
  - 5.1.2 Tools

Here is an example of using an application to view stored temperature data. Using the **nRF Toolbox application** on a smartphone.



Available on the Google Play Store.

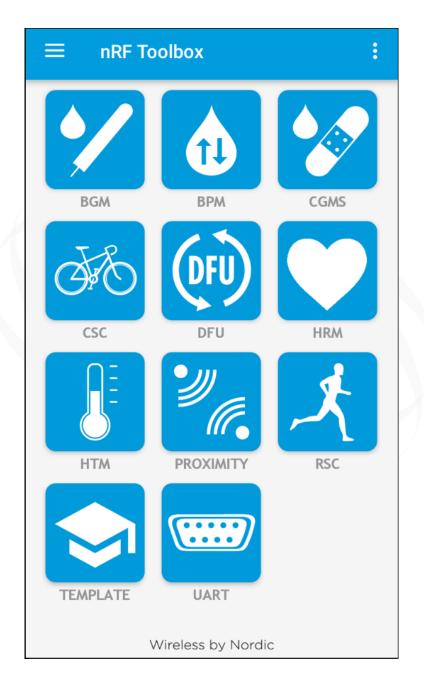


#### 5.1.3 Installation and use

- 1. Use the Play Store to install the nRF Toolbox application on your Android® smartphone
- 2. Activate Bluetooth on your smartphone

IDENTIFY LOCATE MEASURE

3. Launch the application





IDENTIFY Locate Measure

4. Launch the **UART widget**, which is the NUS service used to download data



5. The connection window is displayed



#### 6. Click on CONNECT

A list of Bluetooth devices appears

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7.	<b>Select</b> the <b>Bluetooth device</b> to which you want to connect, such as the above: BLUET0800A09	÷	First configuration 🔹	EDIT :	
8.	Once the smartphone is connected to the selected device, that device is shown as being <b>Connected</b> .		BLUET0800A09		
		JART			
			DISCONNECT		
			Wireless by Nordic		

9. Swipe the screen from left to right with your finger to see the UART service terminal

IDENTIFY

LOCATE MEASURE

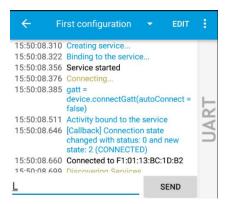
← Fi	rst configuration 👻 EDIT	1	
15:50:08.310	Creating service		
15:50:08.322	Binding to the service		
15:50:08.356	Service started		
15:50:08.376	Connecting		
15:50:08.385	<pre>gatt = device.connectGatt(autoConnect = false)</pre>		
15:50:08.511	Activity bound to the service		
	[Callback] Connection state changed with status: 0 and new state: 2 (CONNECTED)		
15:50:08.660	Connected to F1:01:13:BC:1D:B2		
15:50:08.699	Discovering Services		
15:50:08.718	gatt.discoverServices()		
15:50:09.219	Services Discovered		
15:50:09.229	Primary service found		
15:50:09.256	gatt.setCharacteristicNotificatio n(6e400003-b5a3-f393-e0a9- e50e24dcca9e, true)	D	
15:50:09.279	Enabling notifications for 6e400003-b5a3-f393-e0a9- e50e24dcca9e		
15:50:09.287	gatt.writeDescriptor(00002902-0 000-1000-8000-00805f9b34fb, value=0x01-00)		
15:50:09.382	Data written to descr. 00002902- 0000-1000-8000-00805f9b34fb, value: (0x) 01-00		
1 5.50.00 201	Notifications apphlad		
Write comm	nand SEND		

7/8

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10. Enter an "L" character in the Write command zone and tap on SEND



- 11. Temperature values are listed on the screen
- The following information is displayed in green:
   "Interval Log": "Temperature"
   "0:2700"
   "10:2706"
   "20:2700"
- "30:2700"
- The log interval here is set to 10 seconds:



Scroll through the terminal page by swiping upwards (bottom to top) with your finger to see all recorded values

← El	A INNOVATION	•	EDIT	:	
16:41:58.805	Writing characteristic b5a3-f393-e0a9-e50e (WRITE REQUEST)				
16:41:58.812	gatt.writeCharacterist b5a3-f393-e0a9-e50e				
16:41:58.881	Data written to 6e400002-b5a3- f393-e0a9-e50e24dcca9e, value: (0x) 4C				
16:41:58.892	"L" sent				
16:41:58.902	Notification received from 6e400003-b5a3-f393-e0a9- e50e24dcca9e, value: (0x) 54-65-6D-70-65-72-61-74-75-72-65- 20-4C-6F-67-3A-20-0A				
16:41:58.912	"Temperature Log: " received			R	
16:41:58.981	Notification received from 6e400003-b5a3-f393-e0a9- e50e24dcca9e, value: (0x) 30-3A-32-37-30-30-0A-31-30-3A-32 -37-30-36-0A-32-30-3A-32-37-30-30 -0A-33-30-3A-32-37-30-30-A-00-0 0-00-00-00-00-00-00-00-00-00-00-00			NA	
16:41:58.988					
Write comr	nand	SI	END		

8/8

AN Datalogger

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BLE temperature



**Important: Remember to disconnect the device after transferring data** After all values have been retrieved, disconnect from the BLE device so that the device switches back to advertising mode and continues to record subsequent temperature values.

#### Note

- Recorded values are automatically erased following transmission after receiving the "L" command.
- **Values are not time-stamped**. We recommend using the time on the receiving system as T0.