SWE IoT
SINCE 2021

PUCK
Settings Specification

Version 1.5.2

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Version

Version	Date	By	Description
1.5.2	2024-06-01	Knut	Define parameters

1   Preface

The PUCK sensor could be configured using the SweIoT Toolbox App or through LoRa.

There are two security modes using the units, unsecure, the app is used to set parameters in the unit or secure, meaning the settings in the unit can't be changed without the user been authorized and the message to the unit signed with a unique unit-key. The user and the device need to be registered in the SweIoT Device Management system to keep the private keys safe.

2   Getting started

Using the SweIoT Toolbox
Download, start and login to the Android "SweIoT Toolbox" App configuration application and put the sensor close to the mobile phone. Search for the sensor by pressing the "Start Scanning" button. A list with units appears sorted in order of signal strength, the closest unit will most likely be on top. Press and wait until it connects. As default the unit announce with 30s interval meaning it may take about 30 seconds until it appears in the list and then 30 seconds until it connects after pressing the select button.

Using LoRa
… TBD.

3 Configuration

The commands and the read and write settings could be applied both using the SweIoT toolbox App and via LoRa.

3.1 Commands

To communicate with R-IoT unit, use the commands in the table. The use of the commands is explained below.

command	parameters	description
version		Return current r-iot FW version number
factory		Reset all settings to factory defaults
mac		Return the R-IoT module mac address
restart		Restart the module
sys:?		Return the system parameters, see section 4
sys:[params]	see section 3.1	Set system parameters
x:?		Return the Methos parameters, see section 4
x:[params]	see section 3.1	Set one or several settings for Method x

3.2 Settings

The position in the settings string determines which parameter the value belongs to.

Basically, there are two categories of parameters, generic related to the **System** (sys), e.g.
- Selection of Method
- Bluetooth parameters
- Enabling the radar
- Etc.

And related to the selected **Method** (a figure e.g. 5 for parking), e.g.
- Measurement cycle
- Range
- Sensitivity level
- Etc.

For detailed information see section 3.1 System and Method parameters

Example, activate and deactivate the Radar

It is possible to just change one parameter by not state a value and excluding the following as in this example to activate the sensor scan:

Activate
```
sys:,,,,,1
```

Deactivate
```
sys:,,,,,0
```

Method settings

The settings for different Methods can vary but the current settings can always be shown by using the :? option.

Response

All commands will return a string in which the first position indicates whether the operation was successful or not. A '=' means success and '*' means error. After the first position the command is echoed and then possible further messages. In the case of sys and method settings commands, the actual settings will be in this part.

Example
```
sys:3
sys:5,250,5,0,8,0
3:60
```

In the first case this will select method 3 as the active one in the second one all the system parameters are updated and in the third case the number of samples setting (second in the list) is changed for method 0.

The current method list is as follows:
```
3 Well
4 Bin - under test
5 Parking
6 Seating
```

4 Appendix

4.1 System and Method parameters

Method	Command	Parmeter name	Type	Default	Max	Min	Visible to customer	Warning value	Warning text	Help text
System	**sys:**									
		Selected Method	integer	0	6	0	yes			The current selected method
		Advertisement Interval (ms)	integer	250			no			System parameters - do not change
		Advertisement timeout (s)	integer	5			no			System parameters - do not change
		Bluetooth mode	integer	0	2	0	yes	2	Warning, this value will turn on Bluetooth (BLE) long range, and unable BLE normal range	0 = Bluetooth (BLE) normal range, 1 = alternating BLE normal range / long range, 2 = BLE long range (Warning - no contact with phone)
		Tx power	integer	8			no			System parameters - do not change
		Radar on	boolean	0	1	0	yes			Turn radar off=0 / on=1
		Network configuration	integer	2	2	1	no	2	Warning, this value will turn on LoRa, and NFC wake-up is needed for BLE	Bluetooth (BLE) = 1, LoRa = 2, BLE & LoRa = 3
		Send on Change	boolean	0			no	---	---	- Not implemented -
		Periodic advertisement	integer	0			yes			This is the number of seconds between periodic advertisements in addition to those that occur during measurement. If this is greater than zero and less than the interval for the current method, advertising is started with this periodicity. Default value is zero.
		Periodic advertisement timeout	integer	15						Specifies how long, in seconds, the advertisement should be active in the case of periodic advertisement. The periodic advertisement will also always be regular, i.e. not long range. This also applies to the advertising that starts on cold start.
		NFC advertisement timeout	integer	20			No			Specifies how long, in seconds, it is announced after NFC is detected by Lora.
		Secure Mode via Lora	integer	10			No			Specifies how long, in seconds, to wait after cold start before start communicating with Lora module.

Well - under test 3:									
		Measurement cycle (s)	integer	15			yes		The time between radar measurements in seconds
		HW acceleration average samples	integer	30			no		How many measures to be done for one radar scan. Higher numbers are more stable measurement but lower battery time. From 10 to 20 almost half the battery time.
		Start of range (m)	float	0.2			yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Length of range (m)	float	4.800			yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Averange factor	float	4.00			no		How many radar scans to be done for one measurement cycle. Higher numbers make a more stable measurement but lower battery time. From 1 to 2 almost half the battery time.
		Sensitivity level	float	0.65			yes		Low sensitivity will set a high threshold, resulting in a only a few detections but might result in a missed detections. Default 0.65
		cfar threshold guard	float	0.2	0.2	0.01	no		- System parameter, do not change -
		cfar threshold window	float	0.09	0.2	0.01	no		Measurement point window in meter
		Offset	integer	0			no		- Not implemented -
Bin - under test 4:									
		Measurement cycle (s)	integer	15			yes		The time between radar measurements in seconds
		HW acceleration average samples	integer	30			no		How many measures to be done for one radar scan. Higher numbers are more stable measurement but lower battery time. From 10 to 20 almost half the battery time.
		Start of range (m)	float	0.15			yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Length of range (m)	float	1.000			yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Threshold level	integer	290			yes		High threshold, resulting in a only a few detections but might result in a missed detections. Default 290
		Offset		0			no		- Not implemented -

Parking	5:						
		Measurement cycle (s)	integer	15	yes		The time between radar measurements in seconds
		HW acceleration average samples	integer	30	no		How many measures to be done for one radar scan. Higher numbers are more stable measurement but lower battery time. From 10 to 20 almost half the battery time.
		Start of range (m)	float	0.2	yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Length of range (m)	float	4.800	yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
Seating	6:						
		Measurement cycle (s)	integer	15	yes		The time between radar measurements in seconds
		HW acceleration average samples	integer	30	no		How many measures to be done for one radar scan. Higher numbers are more stable measurement but lower battery time. From 10 to 20 almost half the battery time.
		Start of range (m)	float	0.15	yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Length of range (m)	float	1.000	yes		Start of range + Length of range = maximum 5 meter. The start and end values will be rounded to the closest measurement point available.
		Threshold level	integer	290	yes		High threshold, resulting in a only a few detections but might result in a missed detections. Default 290
		Offset		0	no		- Not implemented -