

Quick start guide

Indoor UNI LoRaWAN

Revize: 0.1.0**Date: 23rd of July 2016**

Thanks for purchasing Indoor UNI sensor dedicated for LoRaWAN infrastructure. Check infrastructure availability and needed setting parameters for subscription with your provider.

Delivery content:

Standard delivery contains following:

- Sensor Indoor UNI with SMA antenna connector
- Lithium battery 3.6V/2400mAh in AA housing
- Omni antenna 2dBi for 868MHz band

Optional:

- FTDI USB/UART converter needed for initial setting of the sensor.

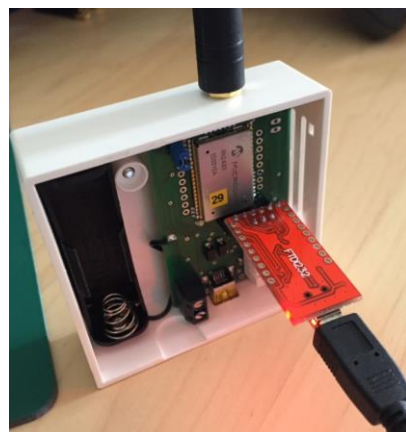
FTDI USB/UART converter driver installation

Before first usage of the sensor under LoRaWAN infrastructure, it's necessary to insert initial parameters using USB/UART converter. First, a proper driver should be installed to your operating system. The converter is based on FTDI chip and drivers for Windows 7 and above should be available automatically from standard Windows repository. Simply connect the converter to USB port with USB mini cable (not included). After short time a virtual COM port (VCP) should appear in your PC – check the status at Device Manager. Terminal communication is available at installed VCP.

If some troubles during installation process come up, we recommend downloading proper driver from producer webpage: <http://www.ftdichip.com/Drivers/VCP.htm> - it's necessary to select proper version of your operating system and a download corresponding driver.

USB/UART converter connection with the sensor

PC and sensor should be connected with over installed USB/UART converter by inserting it to a socket according picture below.



If converter is accidentally reversed, the sensor is not powered and communication with the sensor is not possible. No damage can be caused by reversing the converter. Please, take into account, that communication with the sensor is possible only 2 minutes after power up, then the sensor goes into sleep mode and the communication is not possible. In this case, it's necessary to turn power off and on again by removing and inserting the converter again. 2 minutes counter renews each time you send something to serial terminal communication.

Terminal communication

The sensor is available for terminal communication and it's necessary to use some proper terminal software, which allows <CR><LF> characters to be transmitted on each end of line. We recommend to use Hercules environment by HW Group company and you can download it from following webpage:

http://www.hw-group.com/products/hercules/index_cz.html

Detailed description in English is available. No special settings are required for the sensor's communication, please set standard parameters as follow:

Baudrate = 115 200 b/s

Stop bits = 1

Parity = N

Data length = 8 bits

Once the terminal is ready and open, you can use DTR checkbox at Hercules to restart the sensor (if the sensor is not in sleep mode) just check and uncheck DTR. If everything is OK, then initial communication pop up with some important parameters taken from the sensor. First communication usually ends up with **No keys entry** message due to the fact, that no subscription has not been set yet.

Now you can configure the sensor. Internal counter supervise the time to sleep mode (aprox. 2 minutes) and the counter is restarted after each serial terminal channel activity, so you have enough time to make all necessary setting.

Indoor UNI setting

Get necessary parameters from your LoRaWAN provider needed for initialization of the sensor under selected LoRaWAN infrastructure. For ABP authorization insert following parameters:

1. mac set deveui xxxxxx
2. mac set devaddr xxxxxx
3. mac set nwkskey xxxx
4. mac set appskey xxxx

For OTAA authorization you need insert following:

1. mac set deveui xxxxxx
2. mac set devaddr xxxxxx
3. mac set appkey xxxx
4. mac set appeui xxxx

5. Save now all inserted parameters with **save** command!
6. Set Data Rate (DR) with **dr:xx** command, where xx is value between 0 and 5 and defines Spreading Factor 12 to 7, in fact robustness of modulation influencing a range of the sensor
7. Set automatic DR change. If Network Controller, which control automatic DR, is NOT present within

the network, set **adr:off**. If you are sure that ADR works properly and is supported within selected LoRaWAN infrastructure, set **adr:on**.

8. According to defined parameters, select mode of authorization. For ABP mode set **joinmode:abp**, or for OTAA mode set **joinmode:otaa**.
9. Define communication port with **port:xx** command, where xx is defined between 1 and 250. Consult this setting with your provider parameters defined at points 1 to 4 can be generated for certain port number.

Communication test

After defining all parameters, just restart the sensor (power off/on or check/uncheck DTR checkbox). The sensor should try to join under selected infrastructure and sends first payload – own DevEUI to network server. If everything OK, then you should see following messages:

```
*****LoRa RN2483 set*****
RN2483 chip detected!
*****HELP*****
1.Dev Address:mac set devaddr
2.Dev EUI:mac set deveui
3.Network key:mac set nwkskey
4.App key:mac set appskey
5.Join GW:mac join [abp,otaa]
6.Set port:port:1-255
7.Send payload:sendU:data(hex)
*****Sensor ready*****
FW version:
 1.0.0 Oct 23 2015 14:46:12RN2483 1.0.0 Oct 23 2015 14:46:12
Voltage byte:2726
SNR byte:FF80
*****
Sleep Time:0060
Port:10
Join mode:abp
Rejoining...
Successfully joined!
ok
DEVEUI:CAFE0033FC2EE74F
First communication ...
Command response:ok
Link response:mac_tx_ok
Teplo: +22.5°C
Vlhkost:42.8%
```

If no activity has not been detected over following 2 minutes, then the sensor goes to sleep mode and next communication will be initiated after 60 minutes – time set by default. Should you want to send some real payload before sleep mode, you can do this with **sendU:xyyyz** command, where xyyyz is sequence of hexastrings – bytes interpreted as string value, e.g. sendU:ABBA1234 sends sequence of 4 bytes AB BA 12 34.

Sleep mode interval change

Should you change sleep interval, you have to use **sleep:xx** command before the sensor goes into sleep mode. Xx can be defined between 1 to 2880 minutes (2 days). Immediately after inserting the sleep command, the sensor goes to sleep mode – real payload is sent before yet and remains in this status until set interval has been reached. Then all the cycle repeats periodically.

Battery power

After all necessary parameters setting and communication test, you can disconnect USB/UART converter and insert included battery. The sensor electronic is protected against polarity reverse, so you should not

damage it. Inserting the battery will cause short green LED blink near the transceiver. From this moment, the sensor waits around 2 minutes and after then it goes to sleep mode automatically. Initial payload corresponding DevEUI is sent, then real payloads in defined interval are periodically sending.

Indoor UNI sensor parameters

Should you need set of parameters read from the sensor, use **show** command from terminal and the output should be similar to following (may alter according different HW and SW version and parameters setting):

```
*****Parameters stored in Flash:*****
Device EUI:CAFE0033FC2EE74F
Device address:07908E99
Application EUI:FEED0074CB4F5B16
LIB version:0.2
FW version:0.2.3
Transciever:RN2483 1.0.0 Oct 23 2015 14:46:12
Voltage:3923mV
DR:5
ADR:off
```

Revision

0.1.0	Initial document
0.1.1	