simple hw

simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Quick Start Guide

NEXTIndustry, NextLabel, and NEXTPack WIFI + BLE Tracker

V.01 29/04/2024

Document revision and revision history

Version	Date	Changes
V01	29/04/2024	Document creation
	18/11/2024	Minor update in Manual Device Commands
	02/01/2025	Minor update in Remote commands, Added de-passivation process & Uplink Message

Firmware Type

Generic API 7 version 7.0.x (Downlinks and Settings are not backward compatible with API 6)

Device provisioning, reconfiguring, and troubleshooting

simple hw

simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Specification

Connectivity:	Sigfox and, or LoRa
IP Rating:	IP68
Weight:	27-30 g SimplePack,
	100-200 g SimpleIndustry(Depends on the product)
Battery:	3 volts, 1500mAh, Not replaceable (SimplePack)
	3.6 volts, Replaceable (SimpleIndustry)
Sigfox Product Certificate:	RC1 P_00B1_2306_01
	RC3 P_00B1_5494_01

LoRaWan network setting

Device class:	A
Authentication:	OTAA
ADR:	enabled
MAC version	**1.0.3**, 1.0.4
Regional parameters:	RP002 1.0.4
Uplink port	1
Downlink port	1

- The device tries to join the network with the first uplink request. There are 5 join retries with different data rates and a random delay is applied before each join attempt. If the join was unsuccessful device will blink 3x every 5s with red and the device block any other request for join for 1 hour. Blocking time is canceled by a button press.
- The device needs to be activated in better radio condition/coverage area.
- It is recommended to not activate a higher number of devices at a time. It is better to do it in batches.

Physical Installation

1. To achieve maximum radio performance, ideally, it is recommended to place the device as high as possible with the antenna better in open space than near the wall.

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

2. Avoid Drilling through SimpleIndustry devices.
3. Avoid putting the device close to metal objects, the ideal distance is 20cm
4. Placing under the direct sun may cause discoloration of the case.

States of Device

Factory Mode	***Armed***	***Disarmed***
• Usecase application not running • Limited device control • Minimal consumption	• Usecase application **running** • Full device control	• Usecase application **not running** • Full device control

Factory mode

It is like a safe mode the devices are produced initially along with the intended mode of usage.
Useful for transporting and storage of the devices to our customers as it has Low Power consumption.

When in this mode, the Control of the device is limited to sending the test messages if a short press via magnet or button is done. All other functions and transmissions are blocked.

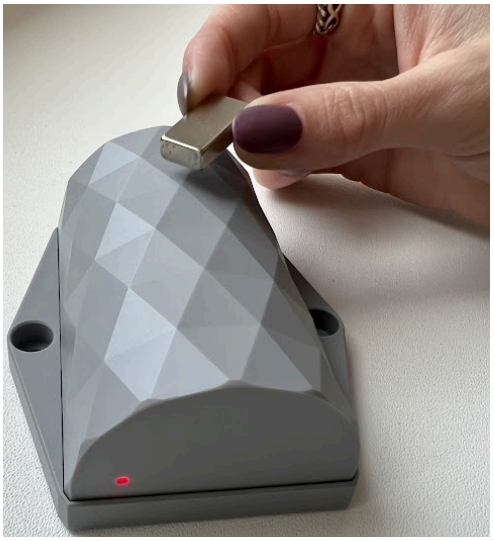
You can refer to Uplink Definition below to know the msgs received in this mode.

Operation/Device control

The device is controlled via a magnet in location [photo] (magnet acts as a button). Any “button press” mentioned in the document refers to “using a magnet”.

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu





Devices are shipped to you in ***Factory Mode,*** which is like a sleep mode where are all functions except short press and extra long press disabled.

- **To exit Factory mode, Initiate a long press via a button/magnet for 5 seconds, and you will notice the LED blinking RED in response.** Video Link
- Short press in Factory mode video link will be indicated by a 2x long LED blinking RED in response and a test message will be sent.
- The device sends a reset message after the “Manufacture mode” exits.

Any button**(magnet acts as a button)** pressed is indicated with LED while is pressed

- GREEN = normal state
- RED = blocked state (the device will ignore button press, eg. press during arming)

Operational mode

- Single press - arms device - indicated by blinking green LED
- Long press (5-7s) - disarms arms device - indicated by blinking red LED
- Extra long press - initiate downlink sequence

De-passivation Process for 3.6 volts Lithium Batteries

Read through our article on ask about this topic.

Device Behavior/Description and Intended Usage

Control:

- A short Press will arm the device. **ARMING DELAY = 1 minute**
- A long press (more than 5s) will disarm the device. (disarm capability can be disabled)

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

- Extra long press (more than 10s) will reboot the device and request a downlink

While the device is armed:

- Sends periodic message (heartbeat 1) every **7 days** with appended battery voltage and temperature with downlink request
- Sends periodic message (heartbeat 0) every **24h** with appended battery voltage and temperature with downlink request
- Short press, double press, multi-click, and long press will report appropriate uplink messages.

- Every 10 minutes device
  - Scan for BLE Beacon if found sends a message with 3x MINOR ID
  - In BLE not found scan for WIFI if found sends a message with 3x MINOR ID

Priority	Location Technology	Payload
1	BLE	F9 + 3x MINOR ID
2	WIFI	FA + 3x WIFI MAC

NOTE - Sigfox Only: Because 3x MAC address + mandatory headers will not fit into one Sigfox message (12Bytes), a message will be fragmented into more messages. See the section "Sigfox Payload Fragmentation" for more details. We recommend implementing message de-fragmentation as the first step in data processing.

GPS coordinates, BLE IDs, and WIFI MACs are cached - if there was no movement from the acquisition (the device is on the same spot) then old ID, MAC, or coordinates are used to preserve the battery

All parameters above are configurable

BLE beaconing setup

Note: Randomisation of Message Sending

To prevent many devices from sending messages at the same time, the device adds a small **randomisation delay** to each transmission.

This delay is usually **1 or 2 minutes**, and it can be adjusted if needed.

Example:
If the device is set to send a heartbeat every **1 hour**, it may actually send it randomly between:

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

- **1 hour and 1 hour + 1 minute**, or
- **1 hour and 1 hour + 2 minutes**

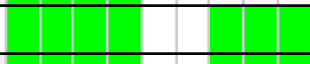
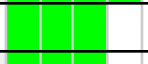
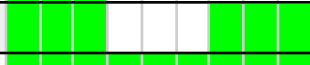
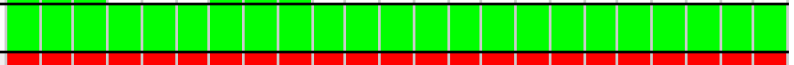
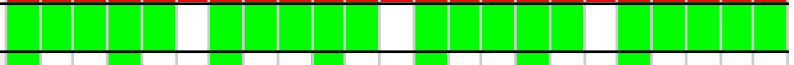
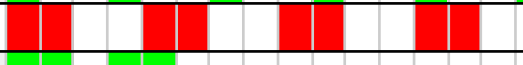
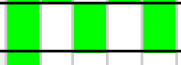
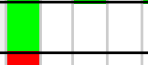
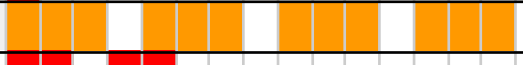
depending on the chosen randomisation setting.

> **Note:** This feature is available from **FW 7.0.19l onwards**.

Changing the Randomisation Delay

The randomisation delay value can be changed via **downlink**.
You can find the register details in the section **“Registers for Tuning”**.
If the setting is not listed there, please contact **Simple Hardware Support**, and we will assist you.

Default LED blinking patterns:

0	SINGLE PRESS	
1	DOUBLE PRESS	
2	TRIPLE PRESS	
3	LONG PRESS	
4	EXTRALONG PRESS	
5	BUTTON PRESSED STATE	
6	BUTTON PRESSED BLANKED STATE	
7	DOWNLINK IN PROGRESS STATE	
8	ARMING	
9	DISARMING	
10	APPLICATION START	
11	UPLINK	
12	MINOR EVENT	
13	BLANKED MINOR EVENT	
14	RESTORE MF DEFAULT	
15	FACTORY MODE SHORTPRESS	
16	FACTORY MODE EXIT	
17	RESET	
18	LPWAN NOT AVAILABLE	
19	Button depressed/Magnet applied	as long as pressed/magnet applied
20	Button depressed/Magnet applied	red in case the device is busy and doesn't register the press(magnet)

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Selected registers for tuning

Parameter	Register	Default value	Value	Format
Heartbeat 0	0x005	0xC1	1 day	Simple time
Heartbeat 1	0x009	0xC1	1 day	Simple time
Heartbeat 2 - active tag	0x00D	0x4A	10 min	Simple time
Heartbeat 3 - resting tag	0x011	0x86	6 h	Simple time
Min movements	0x0A8	0x05	5	movements
Heartbeats selection	0x98	0x03	HB1,HB2	Binary LSB=HB1, 1=on,0=off

NOTE: This is just a selection of the most important registers. In case of need please contact Simple Hardware for additional information.

Uplink definition

Factory Mode Link

Short press

E4	BTL										

F0(0) msg type
BTL(1) battery voltage with load (transmission) - should be used to determine the battery

User Mode

Armed by autoarm

D3											

D3(0) msg type

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

When the device is disarmed/deactivated manually or via the downlink and you want to arm/activate the device again by short press via magnet, you get D0 and D1 msgs. Link

Start of arming

D0											

D0(0) msg type

Armed by user

D1											

D0(0) msg type

Button Press using a magnet**(magnet acts as a button)**

Short Press Video

30											

30(0) msg type

Double click Video

31											

31(0) msg type

Multi click Video(3 click example)

32	CLK										

32(0) msg type
CLK(1) Number of clicks

Long Press

33											

33(0) msg type

Extra Long Press + DL request in Sigfox

34	RF	MC	AF	AF	GEN	MAJ	MIN	PCH	BC	BC	AC

34(0) msg type
RF(1) reset flag
MC(2) monitor code
AF(3-4) application flag
GEN(5) firmware general version
MAJ(6) firmware major version
MIN(7) firmware minor version
PCH(8) firmware patch version
BC(9-10) board code
AC(11) application code

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

WIFI

Start of Activity (movement)

22	10	FA	MAC1	MAC2	MAC3

End of Activity (movement)

23	10	FA	MAC1	MAC2	MAC3

```
22,23(0)          msg-type
10(1)             source
F9(2)             custom payload set  "F9"
```

Periodic messages

Periodic message 0 - heartbeat

00	00	0A	BTL	TMP						

```
00(0)             msg-type - periodic msg 0
00(1)             mode
0A(2)             payload set (appended payload preset index)
BTL(3)            battery voltage with load (transmission) - should be used to
                  determine battery
TMP(4)            simpletemp format
```

Periodic Message 1 - heartbeat

01	00	09	BTL	GEN	MAJ	MIN	PCH	HW Ver	HW Ver	CRC	CRC

```
01(0)             msg-type- periodic message 1
00(1)             mode
09(2)             appended payload
BTL(3)            battery voltage with load (transmission) - should be used to
determine battery
GEN(4)            firmware general version
MAJ(5)            firmware major version
MIN(6)            firmware minor version
PCH(7)            firmware patch version
HW Ver(8-10)      HW version
CRC(11-12)        Content of all registers
```

BLE

Periodic message 2

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

02	00	F9	MIN1	MIN2	MIN3					

02,03(0) msg-type - periodic msg 0
00(1) mode
F9(2) custom payload set "f9"
MIN1(3-4) MINOR ID from the strongest BLE beacon
MIN2(5-6) MINOR ID from the 2nd strongest BLE beacon
MIN3(7-8) MINOR ID from the 3rd strongest BLE beacon

WIFI

Periodic message 2

02	00	FA	MAC1	MAC2	MAC3

02,03(0) msg type - periodic msg 0
00(1) mode
FA(2) custom payload set "fa"
MAC1(3-9) MAC from the strogest WIFI AP
MAC2(10-16) MAC from the 2nd strogest WIFI AP
MAC3(17-23) MAC from the 3rd strogest WIFI AP

Misc

Wifi Atlas

MAC1 6B	**MAC2 6B**

Downlink confirmation

DA											

DA(0) msg type

Downlink confirmation (multi-downlink)

DB											

DA(0) msg type

Low battery alert

F0	BT	BTL									

F0(0) msg-type
BT(1) battery voltage without load
BTL(2) battery voltage with load (transmission) - should be used to determine battery

Disarmed by the user(via long press)

D4											

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

D4(0) msg type

Reset message

E0	RF	MC	AF	AF	GEN	MAJ	MIN	PCH	BC	BC	AC

E0(0) msg-type
RF(1) reset flag
MC(2) monitor code
AF(3-4) application flag
GEN(5) firmware general version
MAJ(6) firmware major version
MIN(7) firmware minor version
PCH(8) firmware patch version
BC(9-10) board code
AC(11) application code

Exception

FB	FC	FC	SM	SM	SM	SM	AL	AL	AL	AL	FL

FB(0) msg-type
FC(1-2) fail code
SM(3-6) source code mark
SM(7-10) arm link register value
FL(11) arm flags

Remote command done

EE	RCC										

EE(0) msg type
RCC(1) remote command done

Phrasing Examples:

"00 00 ff 31 4f a0"
0x00 periodic message 0 event
0x00 mode 0
0xFF custom payload set
0x31 3.1V bat voltage
0x4fa 1274 / 10 - 100 = 27,4°C

Examples of 12 bit Temp calculation

"22 10 ff 45 e4 50 09 f3 86 10 28 15"
22 event type - start movement
10 source - 10=acc
FF custom payload
45 e4 50 LAT: 4580432/92000 = 49.78730435 (800000 = nofix)

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

```
09 f3 86     LON: 652166/46000 = 14.17752174 (800000 = nofix)
10           16 seconds to initial fix
28           0010 1000 → [5-7] → 001 → fix = 1
28           0010 1000 → [0-4] → 01000 → sat = 8
15           HDOP = 21 / 10 = 2.1
```

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Sigfox Payload Fragmentation

In case the configured payload is longer than 12B (sigfox maximum), the payload will be automatically fragmented into multiple 12B messages. Fragmented messages have always accending seq. number without gaps and we recommend checking it during the de-fragmentation process

Fragmented messages format:

Cx	PAYLOAD 11B

x = LNNN

- L is single bit marking last fragment
- N is number of current fragment

Example 1:

```
Payload: 0x0000ffb4fbe421b87db4fbe497136db4fbe491bc95

SGF1: c0 00 00 ff b4 fb e4 21 b8 7d b4 fb  (12B)
SGF2: c9 e4 97 13 6d b4 fb e4 91 bc 95  (11B)
```

Example 2:

```
Payload: 0000ffb4fbe421b87db4fbe497136db4fbe491bc95b4fbe497136db4

SGF1: c0 00 00 ff b4 fb e4 21 b8 7d b4 fb  (12B)
SGF2: c1 e4 97 13 6d b4 fb e4 91 bc 95 b4 (12B)
SGF3: ca fb e4 97 13 6d b4 (7B)
```

Data encoding

Simpletime (8bit time interval definition)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	0	1	0	Reserved			
1	0	1	1	Time Interval (0 - 15) * 1 ms			
1	1	1	0	Time Interval (0 - 15) * 10 ms			
1	1	1	1	Time Interval (0 - 15) * 100 ms			
0	0	Time interval 0 – 63 seconds					
0	1	Time interval 0 – 63 minutes					
1	0	0	Time interval 0 – 31 hours				
1	1	0	Time interval 0 – 31 days				

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Simpletemp (8bit temperature)
= DEC2HEX (Real temp + 40) * 2

Simplehum (8bit humidity)
= DEC2HEX (Real hum * 2)

12bit temperature
= DEC2HEX (Real temp + 100) * 10

12bit humidity
= DEC2HEX (Real hum * 10)

Battery voltage
BCD encoding
3.2V = 0x32

Exp number
[bit7-4] EXP
[bit3-0] NUM

VALUE = NUM * 10^EXP

Examples of 12 bit Temp calculation

Downlink

Downlink Process (Sigfox case)

- Downlinks are processes in so-called Downlink sequences
- The downlink sequence can consist of up to 8 downlinks.
- For the purpose of downlinks, the registers are split into pages of 255 registers.

Downlink sequence:

- The downlink sequence starts with any uplink with a downlink request.
- When this downlink is processed and resolved if more downlinks should be processed or not.
    - If no more downlink is requested: Then the device sends uplink type "Downlink confirmation" without a downlink request (“DA”).
    - If more downlink is requested: Then the device sends uplink type "Downlink confirmation next downlinks pending" with the downlink request (“DB”).
- More downlinks are requested WHEN:
    - The previous downlink payload doesn't try to update the virtual register 0x000 (register 0x00 on page 0).
    - **All registers are written in ascending order**.

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

        - If write to equal or descending register is detected then evaluation of payload is stopped.
    - The length of the previous sequence is less than 7.

Writing to registers 0RR
RR VALUE RR VALUE RR VALUE RR VALUE

Writing to registers 1-7RR
FF 1-7 RR VALUE RR VALUE RR VALUE

Examples:

Change periodic message 0:
Register: 0x005
Value: 0x02C (2days)

Downlink string: 00 00 00 00 00 00 05 2C

Change battery threshold:
Register: 0x718 (page 7)
Value: 0x023 (2,3V)

Downlink string: 00 00 00 00 FF 07 18 23

When it comes to downlinks for LoRa, the limitation is 51 bytes, so 25 registers can be used in one single downlink in LoRa.

Remote Commands

Syntax:

FF <REMOTE_COMAND>
Eg. SGF downlink: 0000 0000 0000 FF17 -> disarm device

Command HEX	Function
0x10	Store current configuration as factory default
0x11	Restore factory (or previously stored) config
0x15	Switch to factory(transport) mode
0x16	Arm device

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

0x17	Disarm Device
0x18	Force re-arm (e.g. new for new tilt reference)
0x19	Clear LoRaWan join keys (de-join)
0x1C	Sends CRC16 of current configuration
0x1E	SET_LORAWAN_ACT_TYPE
0x24	Execute de-passivation procedure (immediately w/o reset) (FW 7.0.26e)

Registers for tuning

Parameter	Register	Default value	Value	Format
Heartbeat 0	0x005	0x81	1 hour	Simple time
Heartbeat 1	0x009	0xC7	7 days	Simple time
Heartbeat 2	0x00D	0x4A	10 min	Simple time

NOTE: This is just a selection of the most important registers and commands. In case of need please contact Simple Hardware for additional information.

Factory Reset

It will reset the device to the same state as was delivered.

Via Downlink

1. Setup downlink “000000000000**FF11**”
2. Wait.
3. The device sends message 0xE1

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Manual Device Commands

Allow simple re-configuration of the device using the button or magnet (Next Industry).

To enter command mode do: (Up to FW 7.0.25d)

1. Press the button**(magnet acts as a button)** to achieve Extra-Long-Press (typically more than 10s)
2. The device will play a red-green pattern and reset.
3. After reset will the device indicate:
    - 1s green (if Sigfox radio service is enabled in reg 0x710)
    - 1s orange (if LoRaWAN radio service is enabled in reg 0x710)
    - both above if both radio services are enabled
4. You have a 2-second window to do any of the below-mentioned actions.

To enter command mode do: (FW 7.0.25e onwards)

1. Press the button**(magnet acts as a button)** to achieve 9 clicks
2. The device will play a red-green pattern and reset.
3. After reset will the device indicate:
    - 1s green (if Sigfox radio service is enabled in reg 0x710)
    - 1s orange (if LoRaWAN radio service is enabled in reg 0x710)
    - both above if both radio services are enabled
4. You have a 3-second window to do any of the below-mentioned actions.

Supported manual device commands

Button Action	***Command***
2x Press	Clear LoraWAN Join Info and join again (feature enabled from FW17.0.17s)
3x Press	Enter Factory Mode
4x Press	Restore Manufactured Default
Extra Long Press	Toggle LoRaWAN/SigFox Service (Manipulate 2 LSB in reg 0x710)

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Firmware update

It is available via OTA and is a proprietary protocol. There is the possibility to update many devices at once. (Broadcast)
For more information on this, contact support.

LoRaWan network setting

- OTAA authentication
- ADR enabled

Device tries to join the network with the first uplink request. There are 5 join retries with different data rates and a random delay is applied before each join attempt. If the join was unsuccessful device will blink 3x every 5s with red and the device blocks any other request for join for 1 hour. Blocking time is canceled by a button press.

Switch device operation from Sigfox to LoRa:
Register the device into Sigfox backend and then initiate a downlink as such to use in LoRa

SGF -> LR - set 0x710 0x22 -->
00 00 00 00 FF 07 10 22

LoRa to Sigfox
 - set 0x710 0x01 -->
00 00 00 00 FF 07 10 01

Miscellaneous

Storage and transportation

The devices are stored and transported to you in factory mode.

Battery and battery replacement instructions

To replace the batteries, the devices are to be sent to Simple Hardware Office and is done as per the refurbishment service procedure.

Troubleshooting and support

Incase of issue with the devices, please contact our Support team by raising a ticket at https://www.simplehw.eu/helpdesk and we will be happy to assist you.

Make sure to provide us with as much information as possible to understand the issue.
For example,
Firmware

simple hw

simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Device ID
Number of Messages received approximately

Warranty

Simple Hardware manufactures high quality and durable Sigfox devices that have been tested and approved in accordance with our stringent Quality Control standards.

For our Warranty terms and conditions, please view here: https://www.simplehw.eu/terms-conditions

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

IO Frog Platform

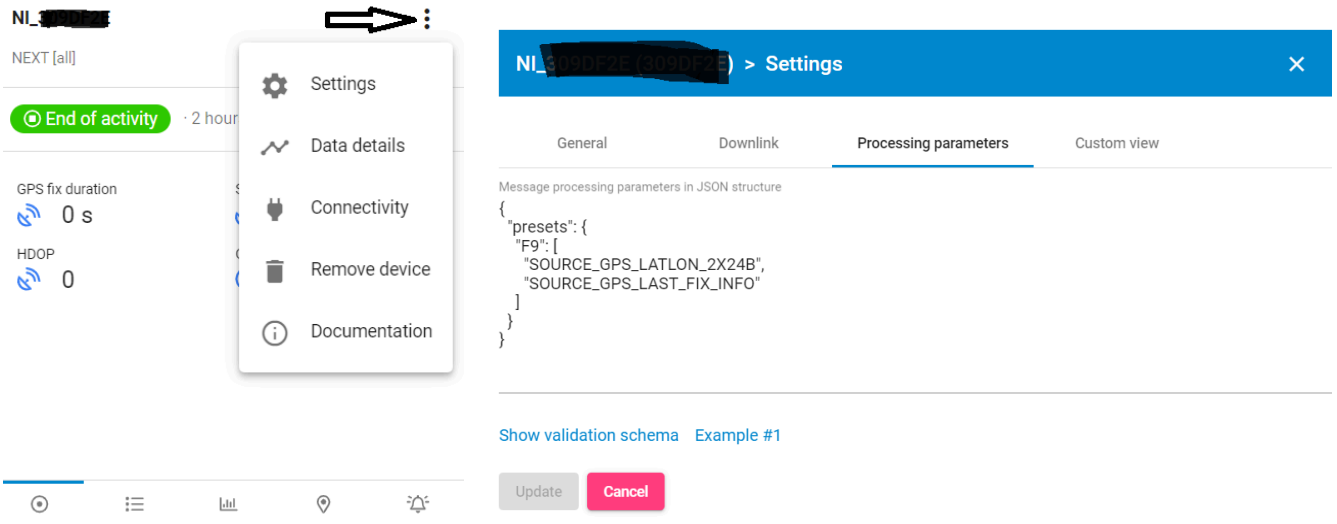
IO Frog is an IoT data management platform. We **endorse** the use of this platform for Simple Hardware devices.

To have the messages from our NEXT variant devices be parsed and displayed correctly on the IO Frog Platform, Processing Parameters have to be set.

Processing Parameters JSON for this device:

```
{
    "presets": {
        "F9": [
            "SOURCE_BLE_IBEACON_MINOR1",
            "SOURCE_BLE_IBEACON_MINOR2",
            "SOURCE_BLE_IBEACON_MINOR3"
        ],
        "FA": [
            "SOURCE_WIFI_MAC1",
            "SOURCE_WIFI_MAC2",
            "SOURCE_WIFI_MAC3"
        ]
    }
}
```

Follow the steps mentioned below:



- Click on the **three dots** on the right-side corner > **Settings**> **Processing Parameters**> Fill up the JSON > **Update**.
- This step has to be done for each device.
- In case it is a Project Based on a Large Number of Devices, Contact **Simple Hardware Support** for help setting up the Processing Parameters for a batch of devices.

simple hw
simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

Manufacturing commands (configuration)

```
setrcz 1

set 0x003 0x42 // randomisation at 2 mins
```

//Choose De-passivation settings, based on the battery used w.r.t the RC zones/Products

```
//de-passivation Bobbin Batt
set 0x722 0x03 //depass 2 LED
//on factory mode enter
set 0x723 0x32 //depass 3.2V
set 0x724 0x5E //depass timeout 30min
//on factory mode exit
set 0x725 0x31 //depass 3.1V
set 0x726 0x4F //depass timeout 15min


//de-passivation Spiral Battery
set 0x722 0x03 //depass 2 LED
//on factory mode enter
set 0x723 0x34 //depass 3.4V
set 0x724 0x5E //depass timeout 30min
//on factory mode exit
set 0x725 0x32 //depass 3.2V
set 0x726 0x4F //depass timeout 15min

set 0x7F0 0x71 //mf on + depass


set 0x7F1 0x00 //mf no exit
set 0x7F2 0x12 //append battery voltage

//select bearer
set 0x710 0x12 //Lora only

//magnet instead of button
set 0x73C 0x00 //button off
set 0x73E 0x01 //hall probe as button
set 0x73F 0x80 //irq

//Battery settings
set 0x719 0xD0 //REG_BATTERY_PERCENTAGE_MIN_MV_LSB 2V
set 0x71A 0x07 //REG_BATTERY_PERCENTAGE_MIN_MV_MSB 2V
//set 0x71B 0x80 //REG_BATTERY_PERCENTAGE_MAX_MV_LSB 3.2V //industry
//set 0x71C 0x0C //REG_BATTERY_PERCENTAGE_MAX_MV_MSB 3.2V //industry

set 0x71B 0xBB //REG_BATTERY_PERCENTAGE_MAX_MV_LSB 3.0V //label
set 0x71C 0x08 //REG_BATTERY_PERCENTAGE_MAX_MV_MSB 3.0V //label
```

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

```
//Generic settings
set 0x0F0 0x19 //arm by click, disarm by long press
set 0x0F5 0x41 //1 min arming delay
set 0x718 0x24 //low battery warning

//ACC settings
set 0x790 0x02 //acc shock event
set 0x792 0x60 //acc threshold LSB
set 0x793 0x00 //acc threshold MSB

//main start stop
set 0x0A4 0x10 //source1 event - ACC
set 0x0A6 0xC2 //EF options uplink, no led indication, activity mode
set 0x0A7 0x01 //EF input blanking time 1s
set 0x0A8 0x05 //EF input counter 5 movements
set 0x0A9 0x1E //EF input timeout 30s
set 0x0AA 0x1E //EF input max time without activity 30s
set 0x0AB 0x00 //EF output blanking
set 0x0AC 0xF9 //ALTERNATING PAYLOAD 1

//cache reset event
set 0x0B8 0x10 //source1 event - ACC
set 0x0BA 0x00 //EF options no uplink, no led indication, discrete mode
set 0x0BB 0x01 //EF input blanking time 1s
set 0x0BC 0x05 //EF input counter 5 movements
set 0x0BD 0x1E //EF input timeout 30s
set 0x0BE 0x00 //EF input max time without activity 0m
set 0x0BF 0x00 //EF output blanking
set 0x0C0 0x00 //append payload

//cache def
set 0x1B0 0x68 //souce GPS
set 0x1B1 0x00 //cache options
set 0x1B2 0xC7 //cache validity
set 0x1B3 0x18 //cache reset by event 3 rise

set 0x1B6 0x6C //souce WIFI123
set 0x1B7 0x00 //cache options
set 0x1B8 0xC7 //cache validity
set 0x1B9 0x18 //cache reset by event 3 rise

set 0x1BC 0xAF //souce MINOR123
set 0x1BD 0x00 //cache options
set 0x1BE 0xC7 //cache validity
set 0x1BF 0x18 //cache reset by event 3 rise

//GPS settings
set 0x7A0 0x03 //GNSS when armed
set 0x7A1 0x28 //GNSS time fix 40s
set 0x7A2 0x43 //GNSS max fix 3m
set 0x7A3 0x0F //GNSS improve 15s
```

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu

```
set 0x7A4 0x00 //GNSS ephemeris download
set 0x7A5 0x85 //GNSS max ephemeris validity 5h

//WIFI and BLE settings
set 0x1A0 0x07 //REG_WIFI_BLE_SCAN_CONFIG: ENABLE Wifi, Enable BLE, Filter BLE
set 0x1A2 0x01 //scan time 1s
set 0x1A3 0xFF
set 0x1A4 0xFF
set 0x1A5 0x06 //minimal count BLE, WIFI to be valid 1,2


//payload definition
//ALTERNATING 1 definition
set 0x3C0 0xAF //F9 - MINOR123
set 0x3C7 0x01 //alternating 1 options

//ALTERNATING 2 definition
set 0x3C8 0x6C //FA - MAC123
//set 0x3CF 0x01 //alternating 2 options
set 0x3CF 0x00 //alternating 2 options - NO GPS(switch off GPS)

//ALTERNATING 3 definition
set 0x3D0 0x68 //FB - GPS coordinates 2x24b
set 0x3D1 0x6A //FB - GPS fix info
set 0x3D7 0x00 //alternating 2 options

set 0x005 0xC1 //hb1 1d
set 0x006 0x02 //armed only
set 0x007 0x03 //voltage batt load, temp

set 0x009 0xC7 //hb2 7d
set 0x00A 0x01 //DL
set 0x00B 0x01 //ver

set 0x00D 0x4A //hb3 10min
set 0x00E 0x02 //armed only
set 0x00F 0xF9 //ALTERNATING PAYLOAD 1

commit
valid
```

Internal Information

MO Number	Firmware version

simple hw

simple things

Simple Hardware s.r.o.
Nad Spadem 650/12,
147 00, Prague, Czech Republic
https://simplehw.eu | +420 228 882 205 | info@simplehw.eu