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SimplePack 2.0 User Modes (API 5)

What user modes are supported in the SimplePack 2.0?

Introduction

SimpleBox provides 6 preconfigured modes of SimplePack. It shows the versatility and efficiency of Sigfox technology where using only 12 Bytes uplink and 8 Bytes downlink one can build a myriad of solutions.

Leveraging the IP 67 waterproofness, ultra long battery life, excellent radio performance, open-source documentation and affordability, the scope of SimplePack usage is endless.

Get inspired by examples at www.simplehw.eu or post your own. Complete API description is there as well.

Please read carefully the [main document about SimplePack/SimpleBox](#).

Common parameters in all modes

Heartbeat - A heartbeat message is sent if no other message has been sent for a specified period of time (specified in time interval since any message sent)

Departure delay - Time between pressing the button and arming the system

Automatic arm - In API 5. Starts from last movement disarm. Is non-linear

Accelerometer sensitivity - Movement detection sensitivity.

Sleep time - Time in minutes after alarm/stop message is sent when the device does not send any more messages (ignoring any movements to save battery and Sigfox subscription message count). This value is non linear in API 5.

Arrival delay - Time in minutes after which if device doesn't move a message is sent. (Track me / Trace me mode / Put me back / Don't drop me) or in Trace me mode period when the device does not stop the Tracing (non linear in API 5)

Tracing interval - Time in minutes how often a message (notification) is sent while the device moves.

Downlink period - Applicable for Monitor me (Maintain me) mode. Downlink is requested after specified number of uplink messages.

Vibration measurement window - Applicable for Monitor me mode.

Value 1 to 255 represents repetitions of acceleration measurement (when making decision if there is vibration or not). Smaller value increases risk of ignoring vibration.

Higher value increases current consumption of the device (longer detection time)

LED lights

LED lights while pressing the button (blinks quickly in API5).

LED lights while radio transmission.

LED blinks (1 / 1 sec.) while in departure delay.

LED blinks (1 / 3 sec.) while in sleep period.

API4

LED light is slowly blinking to confirm successful downlink.

LED light is slowly blinking to confirm manual downlink request (button press for more than 10 seconds).

API5

LED is blinking fast while pressing

LED is blinking slow during transmission

LED is lit for 40 secs while waiting for downlink

LED blinks 20 times fast to acknowledges successful downlink

No LED light if downlink is not successful

All LED lights can be switched off by the downlink with the exception of press indication.

Downlink request/change of mode

To force downlink request do Extra-long press of 10 secs (more than 6 secs in API5) It forces downlink to get new downlink payload.

API5

LED is blinking fast while pressing

LED is blinking slow during transmission

LED is lit for 40 secs while waiting for downlink

LED blinks 20 times fast to acknowledges successful downlink

Battery voltage and temperature

In API4 battery and temperature is reported in OOB message after downlink.

In API5 battery voltage and MCU temperature is reported in all heartbeats.

In API5 battery voltage and MCU temperature can be appended to all payloads (with exception of Monitor me).

Voltage during transmission is reported (VDD tx)

For RC1 and RC3

Full power is at 2.0V - 3.0V

Weaker transmission is in range of 1.8V - 2.0V

Device stops working under 1.8V

For RC2 and RC4

Full power is at 2.4V - 3.0V

Weaker transmission is in range of 2.3V - 2.4V

Device stops working under 2.3V

Modes

Press me

Use single click, double click or long press (3 - 6 secs.)

No arming or disarming.

Recommended values are:

Downlink payload: 01 18 00 00 00 00 00 00

Downlink payload: 41 18 00 00 00 00 00 00 (API 5 - can provide battery voltage and temperature information in payload if set up to do so)

Bytes:

- 01 - Press me mode
- 18 - Heartbeat is switched off
- Not used in this mode
- Not used in this mode
- Not used in this mode
- Not used in this mode

7. Not used in this mode
8. Not used in this mode (can be used for more functions in API5)

Estimated/typical battery life:

More than 4000 clicks.

When clicked daily the battery lasts for ten years.

Guard me

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

after specified time of movement inactivity (API5)

After departure delay, any movement is reported. Arming can be reported (API5). Sensitivity can be adjusted. In case of repeated movements a time frame can be set between alerts (so no message is sent)

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are:

Downlink payload: 02 18 1E 07 0A 00 00 00

Downlink payload: 02 18 1E 07 4A 00 00 00 (API 5)

Bytes:

1. 02 - Guard mode - disarmed
2. 18 - Heartbeat is sent if no message has been sent for 24 hours
3. 1E - Departure delay = 30 seconds (0x1E = 30)
4. 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
5. 0A - Sleep time = 10 minutes (=0x4A in API5 due to non-linear time value spec.)
6. 00 - Not used in this mode
7. 00 - Not used in this mode (can be used for more functions in API5)
8. 00 - Not used in this mode (can be used for more functions in API5 e.g. automatic downlink switch off)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink).

With daily heartbeat the device can guard for 10 years.

Track me

Imagine a luggage. You don't care about position while in move but once it gets stationary for prolonged period of time. It sends a message while being in still for defined period of time and then again when it starts to move.

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

after specified time of movement inactivity (API5)

After departure delay (arming) detection starts. Arming can be reported (API5). If object doesn't move for Arrival delay Stop notification is sent and downlink can be requested. The device stops reacting for Sleep time interval. If the device starts to move again an Alarm is sent and the device starts detecting stillness again.

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are in API4:

Downlink payload: 03 18 1E 07 01 0A 00 00

Downlink payload: 03 18 1E 07 41 4A 00 00 (API 5)

Bytes:

1. 03 - Track me mode - disarmed
2. 18 - Heartbeat is sent if no message has been sent for 24 hours
3. 1E - Departure delay = 30 seconds (0x1E = 30)
4. 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
5. 01 - Sleep time = 1 minute (=0x41 in API5 due to non-linear time value spec.)
6. 0A - Arrival delay = 10 minutes (=0x4A in API5 due to non-linear time value spec.)
7. Not used in this mode (can be used for more functions in API5)
8. Not used in this mode (can be used for more functions in API5)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink).

A typical luggage journey takes 24 hours and the luggage stops 8 times for more than 10 minutes.

So you can use it for 500 journeys.

Trace me

Imagine a parcel / package. You want to trace the approximate position and time while in move using Sigfox geolocation service. It sends periodic messages while in move.

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

After departure delay(arming) detection starts. Arming can be reported (API5). If object moves a message is sent periodically set by Tracing interval. If the object stops to move for Arrival delay Stop notification is sent and downlink can be requested. The device stops reacting for Sleep time interval. If the device starts to move again an Alarm is sent and the device starts detecting movement again.

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are in API4:

Downlink payload: 04 18 1E 07 01 0A 0A 00

Downlink payload: 04 18 1E 07 41 4A 0A 00 (API 5)

Bytes:

1. 04 - Trace me mode - disarmed
2. 18 - Heartbeat is sent if no message has been sent for 24 hours
3. 1E - Departure delay = 30 seconds (0x1E = 30)
4. 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
5. 01 - Sleep time = 1 minute (=0x41 in API5 due to non-linear time value spec.)
6. 0A - Arrival delay = 10 minutes (=0x4A in API5 due to non-linear time value spec.)
7. 0A - Tracing interval = 10 minutes
8. Not used in this mode (can be used for more functions in API5)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink).

A typical parcel journey takes 48 hours and the parcel is moving 10 hours of that, which equals 60 messages.

So you can use it for 66 parcels.

Put me back (formally Turn me over)

Imagine anything leaning or turning or displaced.

It measures min and max positions while moving. When movement stops (device is steady for defined time) a message is sent with current orientation data. Garbage bins, road signs, electricity poles. Possibilities are endless.

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

after specified time of movement inactivity (API5)

After departure delay(arming) detection starts. Arming can be reported (API5).

If a movement is detected a measurement starts. Sensitivity can be adjusted.

The measurement continues until stillness for a time period set in Arrival delay is achieved. A message with min, max and final values of device orientation related to ground (Earth gravity) is sent and downlink can be requested. The device stops reacting for Sleep time interval. If a movement is detected a measurement starts again.

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are in API4:

Downlink payload: 06 18 1E 07 0A 01 00 00

Downlink payload: 06 18 1E 07 4A 41 01 00 (API 5)

Bytes:

- 06 - Put me back mode - disarmed
- 18 - Heartbeat is sent if no message has been sent for 24 hours
- 1E - Departure delay = 30 seconds (0x1E = 30)
- 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
- 0A - Sleep time = 10 minutes (=0x4A in API5 due to non-linear time value spec.)
- 01 - Arrival delay = 1 minute
- Not used in this mode (0x01 = sampling period in API5)
- Not used in this mode (can be used for more functions in API5)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink)

Dust bin is emptied each day.

So the battery life is over 10 years.

Monitor me (formally Maintain me)

Measures any vibration within predefined time slots and after 11 slots sends the message. Suitable to monitor running hours of any bridge, engine, car, animal. Or put under a chair and monitor office space usage.

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

After departure delay (arming) detection starts. Arming can be reported (API5). A movement is detected each second (can be increased in API 5). Each detected movement increases the counter from 0 to 255, e.g. number 200 means that the movement was detected in 200 samplings from 255, or in another words, the vibrations were detected in 78% (= 200/255) of 4 min 15 seconds interval (=255 seconds in default setup). There are 11 counters in every message, so the message contains 11 numbers, representing 2805 (= 255x11) measurements. If at least one movement is detected within 2805 sampling interval (default is 2805 secs which equals 46 minutes) the whole record with 11 counters is sent within one message. If no movement detected nothing is sent. Sensitivity can be adjusted. The time window in API5 is flowing so the first sample is always a movement.

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are in API4:

Downlink payload: 05 18 1E 07 DC 14 00 00

Downlink payload: 05 18 1E 07 DC 14 00 00 (API 5)

Bytes:

- 05 - Monitor me mode - disarmed
- 18 - Heartbeat is sent if no message has been sent for 24 hours
- 1E - Departure delay = 30 seconds (0x1E = 30)
- 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
- DC - Downlink period = 220 (approx. once a week)
- 14 - Vibration measurement window
- Not used in this mode (can be used for more functions in API5)
- Not used in this mode (can be used for more functions in API5)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink). A typical engine runs 4 hours daily that represents 5 messages. **So the battery life is over 2 years.**

Don't drop me (API5)

Monitors and measures any major impact during transportation.

Arm by:

pressing the button

downlink forced by extra long press or forced by heartbeat

after specified time of movement inactivity (API5)

After departure delay(arming) detection starts. Arming can be reported (API5).

If major acceleration is detected (throwing, banging, falling) with adjustable sensitivity an alarm is sent.

The device stops reacting for Sleep time interval. If major acceleration is detected an alarm is sent again.

Disarm by:

automatic downlink after alarm or heartbeat

automatic disarm (API5)

long press (if active) (API5)

Recommended values are:

Downlink payload: 07 18 1E 07 01 0A 30 00

Downlink payload: 07 18 1E 07 41 4A 30 00 (API 5)

Bytes:

- 07 - Don't drop me mode - disarmed
- 18 - Heartbeat is sent if no message has been sent for 24 hours
- 1E - Departure delay = 30 seconds (0x1E = 30)
- 07 - Accelerometer sensitivity (maximum = 0x07, minimum = 0x40)
- 01 - Sleep time = 1 minute (=0x41 in API5 due to non-linear time value spec.)
- 00 - Not used in this mode
- 00 - Not used in this mode (can be used for more functions in API5)
- 00 - Not used in this mode (can be used for more functions in API5 e.g. automatic downlink switch off)

Estimated/typical battery life:

More than 4000 messages (uplink plus downlink) plus the permanent acceleration measuring takes some energy.

The battery life is over 8 years.

End notes

Please read carefully the [main document about SimplePack/SimpleBox](#).

Support

Please consult and use [ask.simplehw.eu](#) for any support, ideas, praise.

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