



User Manual

Smilio Action - FW 2.0.1.4



Test our Smilio Action Simulator



<https://skipllyfrance.github.io/simulator.html>

skiplly
Push to action

Welcome in the Smilio Action world.

Before starting your Smilio Action, read carefully this user manual. It will help you to use your device in the best and most efficient way.

To install and ensure correct operation of your Smilio Action, please read carefully and follow the instructions contained in this user manual.

SKIPLY SAS

Rue Henri Bouvier
73630 LE CHATELARD
France

Phone: +33 4 79 52 29 31

Technical support: +33 4 58 16 01 53

www.skiply.eu

contact@skiplly.org

Table of contents

1.	Legal Information	5
1.1.	Right to make changes	5
1.2.	Suitability for use	5
1.3.	Applications	5
1.4.	No offer to sell or license	5
1.5.	Trademarks	5
1.6.	Revision History	5
2.	Overview	6
3.	Package contents	6
4.	Requirements	7
5.	Environment	7
6.	Contact information	7
7.	LoRa™ or SIGFOX® configuration	8
8.	Insert or replace batteries	9
9.	Boot sequence	10
9.1.	Sigfox® boot sequence	10
9.2.	Sigfox® Downlink Query	11
9.3.	LoRaWAN™ boot sequence	11
9.4.	LoraWan™ Downlink	11
9.4.1.	Smilio Action Uplink/Downlink port	11
10.	Manual Reset	12
11.	Hard-Reset	12
12.	Buttons configuration	12
13.	Data Frames	13
13.1.	« Keep alive » data frame	13
13.2.	Normal data frame	14
13.3.	Hall effect sensor activation data frame	15
13.4.	Special data frame	15
14.	Config settings & setting frames	16
14.1.	Config settings	16

14.2.	Downlink Query Frame.....	18
14.3.	Downlink Result Frame.....	19
14.4.	Online Downlink Frame configurator	20
15.	Default settings	21
16.	Settings and use cases	22
16.1.	Smilio Action Cancellation / Validation	22
16.2.	Smilio Action Multiservices	22
16.3.	Smilio Action 3 Smileys	22
17.	Settings description	23
17.1.	Duty Cycle.....	23
17.2.	ADR (Adaptative Data Rate) - Useable only with LoRaWAN.....	23
17.1.	Force DR0 at join procedure - Useable only with LoRaWAN.....	23
17.2.	Backoff parameters - Useable only with LoRaWAN	23
17.3.	Piggyback - Useable only with LoRaWAN	24
18.	Running Mode description.....	25
18.1.	Running Mode 6.....	25
18.2.	Running Mode 7	26
18.3.	Running Mode 8: PULSE.....	27
18.4.	Running Mode 9: CODE	28
18.4.1.	Code Data Frame format	28
19.	Dimensions	30
20.	Safety recommendations.....	31
21.	Symbols	31
22.	Declaration of Conformity	32
23.	Certificates	33
23.1.	Sigfox® Ready certificate RC1	33
23.2.	Sigfox® Ready certificate RC2	34
23.3.	Sigfox® Ready certificate RC3	35
23.4.	IP 65 Certification	36

1. Legal Information

1.1. Right to make changes

SKIPLY reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice.

1.2. Suitability for use

SKIPLY accepts no liability for inclusion and/or use of SKIPLY products in commercial products or applications and therefore such inclusion and/or use it at the customer's own risk. In no event shall SKIPLY be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits, or business interruption) however caused and on any theory of liability, arising in any way out the use of the hardware and software.

1.3. Applications

Applications that are described herein for any of these products are for illustrative purposes only. SKIPLY makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

1.4. No offer to sell or license

Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

1.5. Trademarks

Notice: All referenced trademarks, product names, service names, and trademarks are the property of their respective owners.

1.6. Revision History

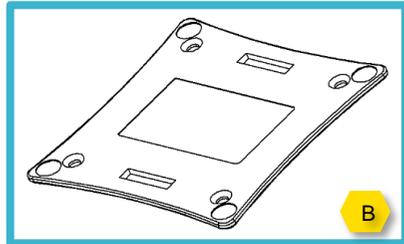
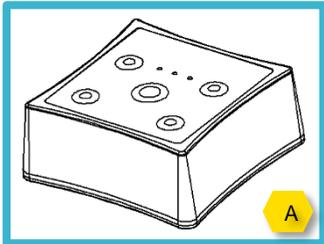
Date	Reference	Description	Author	Version
12 th March 2018	NU_0007	Initial	C.S.	0.1
23 th July 2018	NU_008	Firmware 1.19	C.S.	0.1
28 th August 2018	NU_008	Downlink Frame "UU" sequence	C.S.	0.2
21 th September 2018	NU_009	Firmware 2.0.1.0	C.S.	0.3
27 th November 2018	NU_010	Firmware 2.0.1.x (various default settings)	C.S.	0.4
25 th July 2019	NU_010	Firmware 2.0.1.4 – Running mode 7 et 8 – SIGFOX RC certificates	C.S.	0.5

2. Overview

- LoRa™ WAN 1.0.2 EU Class A & C
- SIGFOX® ready
- Certified on major LoraWan networks: Objenious, Orange, ...
- Certified on Sigfox® networks – Certificate P-0056-99E6-01
- Easy to use and deploy
- 2 AA limited power 3.6 V Primary lithium-thionyl chloride (Li-SOCI2) 2600 mAh batteries.
- IP65 certified waterproof enclosure
- UV resistant and antibacterial keypad available
- Class III equipment
- RoHS Compliant - REACH Compliant

3. Package contents

- A. Smilio Action without its battery lid
- B. Battery lid
- C. 4 Philips screws for battery lid
- D. User manual



4. Requirements

- LPWAN network subscription (SIGFOX® or LoRa™) or Gateway
- LoRaWAN ID:
 - dev_uid
 - app_uid
 - app_key
 - dev_addr
 - nwk_skey
 - app_skey
- SIGFOX® ID:
 - sfx_id
 - sfx_pac
- Network LoRa™WAN and/or SIGFOX® coverage (the indoor and outdoor coverage can be different. Please check the real coverage).
- Phillips screwdriver.

NOTE: To obtain the LoRa/SIGFOX® IDs, please contact our technical support at support@skiplly.org .

5. Environment

- Operating temperature -10°C to +45°C
- Storage temperature -40°C to 85°C
- Relative humidity 0% to 80% (not condensing)
- Maximum altitude for operation: 2000 meters above sea level

6. Contact information

For more information and for sales office addresses, please visit:

<https://www.skiplly.eu/>

7. LoRa™ or SIGFOX® configuration

To configure the network (LoRa™ or SIGFOX®), please use the jumper on the motherboard behind the battery compartment lid.

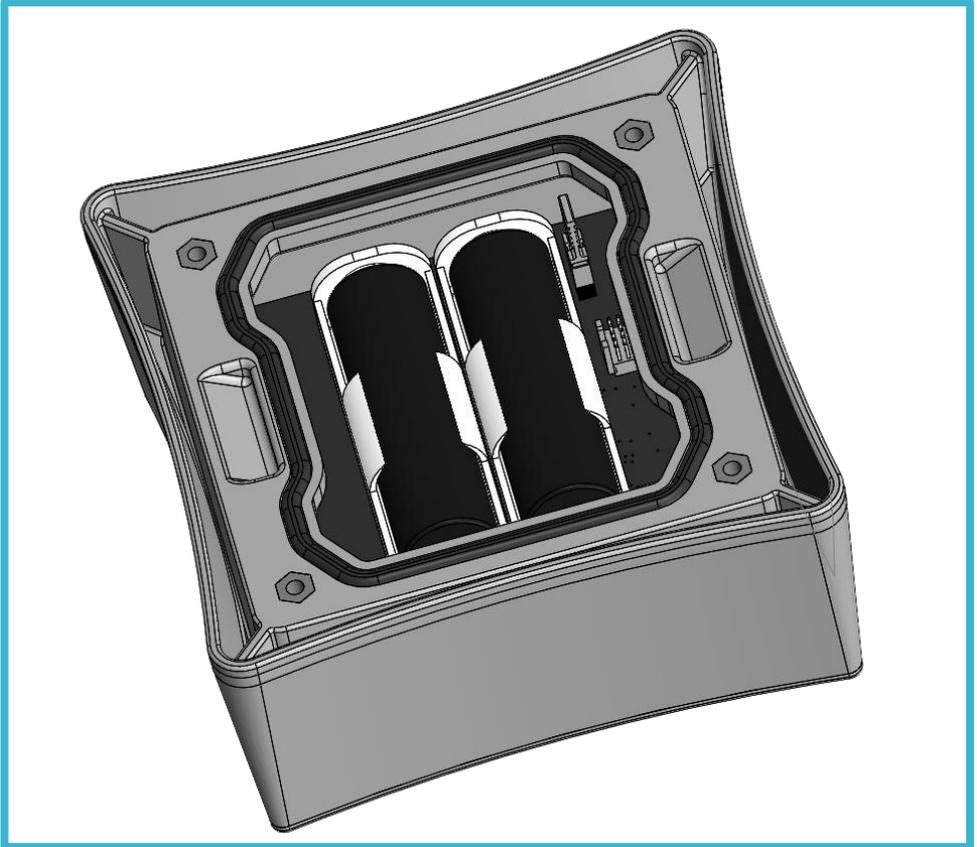


Figure 1

⚠ NOTE: Before remove or place the jumper, remove all batteries to turn off the device. NOT HOT SWAPPING.

- For LoRa™ use and configuration, remove the jumper.
- For SIGFOX® use and configuration, place the jumper on its pin headers.

8. Insert or replace batteries

! NOTE: Use only limited power 3.6 V Primary lithium-thionyl chloride (Li-SOCl₂) batteries. We recommend using batteries SAFT LS14500 or EEMB ER14505.

! NOTE: Batteries replacement must be done in a dry indoor environment.

! NOTE: Loading the batteries with their polarities inverted is forbidden and might cause fire and injury, or damage to the surrounding areas.

! NOTE: The user must replace all batteries at the same time and replace only with new batteries of the recommended type. There is a risk of explosion if battery is replaced by an incorrect or non-recommended type.

1. Before opening the battery compartment lid, if moisture or water drops are present, dry Smilio Action's housing with clean soft towel.
2. Open the battery compartment lid using the 4 hex screws and the appropriate hex key.
3. In case of battery replacement, remove batteries. [Figure 1]
4. Respect polarity. [Figure 2]
5. Insert two AA limited power 3.6 V Primary lithium-thionyl chloride (Li-SOCl₂) batteries. [Figure 2]
6. Check that the gasket, which prevents water and dust from entering, is at the right place and untwisted.
7. Close the battery compartment lid using the 4 hex screws and the hex key. [Figure 3]

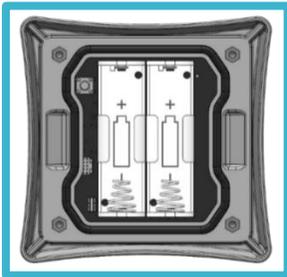


Figure 1

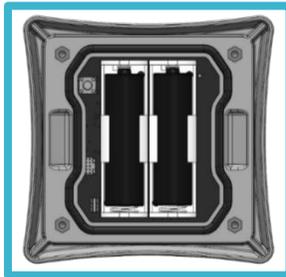


Figure 2

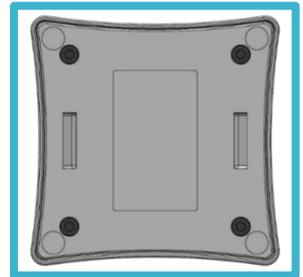


Figure 3

! NOTE: Do not dispose of used batteries in unauthorized places (you should respect the environment by taking the batteries to a suitable collection site). Batteries should not be disposed of in household waste but should be recycled instead.

! NOTE: Do not dispose of batteries in a fire.

9. Boot sequence

Throughout the boot process, the LEDs will blink alternatively green and red.

 **NOTE:** Each time Smilio Action is turned off and turned on (batteries removed and replaced), or if the user pushes the reset button, or if the user makes a manual reset, the boot sequence is executed.

9.1. Sigfox® boot sequence

At the end of the Sigfox® boot sequence, Smilio Action will try to update its configuration via downlink. Therefore, an acknowledged downlink query frame, which starts by “04”, is sent by the device to the Sigfox® backend. Several possible scenarios:

- **Boot with updating settings and restart**
 - Preconditions: a valid downlink payload available on the Sigfox® backend and the downlink payload is different from the stored settings.
 - If the downlink payload is received by the device, and settings are updated, Smilio Action's LEDs light up steadily green for 3 seconds and Smilio Action resets. After the second boot sequence, Smilio Action's LEDs light up steadily red for 3 seconds. The red color doesn't mean that updating and restart have failed, but that the stored settings aren't updated twice in a row.
- **Boot without updating settings**
 - Preconditions: a valid downlink payload available on the Sigfox® backend and the downlink payload is the same as the stored settings.
 - If the downlink payload is received by the device, Smilio Action's LEDs light up steadily green for 3 seconds. The Smilio Action does not restart because the stored payload is the same as downloaded payload.
- **Boot without payload, without valid payload or out of network coverage**
 - Preconditions: an invalid downlink payload available on the Sigfox® backend, no payload available on the Sigfox® backend or “Downlink Mode “at “NONE”, and downlink payload not received by device.
 - No payload is received by device, settings aren't updated, Smilio Action's LEDs light up steadily red for 3 seconds. The Smilio Action does not restart. In this case, the last settings saved in EEPROM flash memory are used.

At the first startup and without downlink, the factory default settings will be used.

	Boot sequence 1		Restart	Boot sequence 2	
	Start	End		Start	End
New valid payload and upadting settings					
Same valid payload no upadting settings			N/A	N/A	N/A
No payload / No valid payload / out of network coverage			N/A	N/A	N/A

LEDs lighting sequence

9.2. Sigfox® Downlink Query

A Sigfox® downlink request is done during:

- Boot Sequence
- Manual Reset
- Hard Reset

To start the “downlink process”, the user has to press one of the five buttons and at the same time activate the magnetic sensor. LEDs blink alternatively green and red throughout the restart process.

For details about the boot and downlink Sigfox® sequence, see paragraph 9.1.

9.3. LoRaWAN™ boot sequence

The Smilio Action's boot sequence in LoRaWAN is similar to the Sigfox® boot sequence. Please refer to the paragraph 9.1.

9.4. LoraWan™ Downlink

The LoRaWAN Downlink process is different from the Sigfox® Downlink Process. For more details, please refer to the LoRaWAN specifications which can be downloaded on the LoRa Alliance website.

If a payload exists in the downlink queue, this payload is pushed from the backend to the Smilio Action after each uplink (the downlink query frame included). The Smilio Action checks if a downlink payload is available after each uplink. If a valid downlink payload is available, and if this payload is different from the settings stored in EEPROM, Smilio updates these settings and restart (see boot sequence paragraph 9.3). After each successful downlink process, the payload is erased from the backend downlink queue. For a new downlink, a new payload must be pushed in the backend's Downlink Queue. For more details, please contact your LoRaWAN provider.

9.4.1. Smilio Action Uplink/Downlink port

Smilio Action use port “2” for uplink and downlink. To create and push a valid downlink payload with your backend, please select port number “2”.

There is no obligation to activate the acknowledgment.

10. Manual Reset

To restart the Smilio Action, without reset of counters, the user has to activate the magnetic sensor and at the same time press one of the five buttons. For more details about the reset sequence, please refer to the paragraph 9.1.

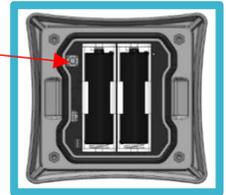
Restart Smilio Action can be useful for:

- Making a new “Join” process. This process is useful if you change the location of the Smilio Action. During the “LoRaWAN Join” process, the radio parameters are exchanged between the backend and the device: Channels, Spreadfactor (SF), etc...
- Making a new join and a downlink process in Sigfox®.
- Restart the Smilio Action without opening the battery lid.

11. Hard-Reset

To make a Hard Reset, press the push button next to the battery’s holders. During the hard-reset process, counters are reset to zero.

Hard Reset
push button



Restart Smilio Action can be useful for:

- Making a new “Join” process. This process is useful if you change the location of the Smilio Action. During the “LoRaWAN Join” process, the radio parameters are exchanged between the backend and the device: Channels, Spreadfactor (SF), etc...
- Making a new join and a downlink process in Sigfox®

12. Buttons configuration



- | | |
|-----|-------------------------------------|
| 1 = | button 1 = AAAA incremental counter |
| 2 = | button 2 = BBBB incremental counter |
| 3 = | button 3 = CCCC incremental counter |
| 4 = | button 4 = DDDD incremental counter |
| 5 = | button 5 = EEEE incremental counter |

13. Data Frames

13.1. « Keep alive » data frame

Each 24 hours, Smilio Action sends automatically a monitoring data frame. This frame contains:

- Battery voltage in idle mode
- Battery voltage in emission (Tx)

The frame format is:

01 XXXX YYYY 64

01 = Keep Alive data frame

XXXX = Battery voltage in idle mode – hexadecimal millivolts value

YYYY = Battery voltage in emission (Tx) – hexadecimal millivolts value

Example of « Keep Alive Frame »:

010c800c8064

01 = data frame type « Keep Alive Frame »

0c80 = Battery voltage in idle mode: 3200mV

0c80 = Battery voltage in emission (Tx): 3200mV

13.2. Normal data frame

Smilio Action will send a data frame:

- After each push (Instantly Send Mode)
- Periodically in (Periodic Send Mode)
- Periodically and after each push (Dual Send Mode)

The frame format is:

02 AAAA BBBB CCCC DDDD EEEE

02 = Normal data frame
AAAA = button 1 incremental counter value
BBBB = button 2 incremental counter value
CCCC = button 3 incremental counter value
DDDD = button 4 incremental counter value
EEEE = button 5 incremental counter value

Example of « Normal Data Frame»:

02 0001 0010 00A0 0023 0010

02 = Normal data frame
0001 = incremental counter 1 hexadecimal value (=1 decimal value)
0010 = incremental counter 2 hexadecimal value (=16 decimal value)
00A0 = incremental counter 3 hexadecimal value (=160 decimal value)
0023 = incremental counter 4 hexadecimal value (=35 decimal value)
0010 = incremental counter 5 hexadecimal value (=16 decimal value)

13.3. Hall effect sensor activation data frame

Whenever the SKIPLY magnetic badge is detected, Smilio Action sends an data frame.

The frame format is:

03 AAAA BBBB CCCC DDDD EEEE

03 = Normal data frame
AAAA = button 1 incremental counter value
BBBB = button 2 incremental counter value
CCCC = button 3 incremental counter value
DDDD = button 4 incremental counter value
EEEE = button 5 incremental counter value

Example of « Normal Data Frame»:

03 0001 0010 00A0 0023 0010

03 = Acknowledge data frame
0001 = incremental counter 1 hexadecimal value (=1 decimal value)
0010 = incremental counter 2 hexadecimal value (=16 decimal value)
00A0 = incremental counter 3 hexadecimal value (=160 decimal value)
0023 = incremental counter 4 hexadecimal value (=35 decimal value)
0010 = incremental counter 5 hexadecimal value (=16 decimal value)

13.4. Special data frame

For special running mode (pulse, code), format and content data frame are described in detail below. Please refers to the relevant paragraphs.

14. Config settings & setting frames

14.1. Config settings

	Description	Units	Min value	Max value
dtx	Period between two frames in Periodic Send Mode or Dual Send Mode	minutes	1	1440
tpb	Minimum period between two pushes	seconds	1	60
tpbq	Minimum period between two Skiplly magnetic badge detections	seconds	3	60
csc	<p>Only valid and useable in Periodic Send Mode for energy-saving</p> <ul style="list-style-type: none"> 0 = send a frame (02) at each end of period whatever the counter values. 1 = send a frame (02) at each end of period, only if counter values have changed since the last sent frame. 	NA	0	1
eat	<p>Selection of Send Mode</p> <ul style="list-style-type: none"> 0 = Periodic Send Mode – Frame (02) is sent out automatically every “dtx” minutes. 1 = Instantly Send Mode – Frame (02) is sent out at each push with a delay of “tpb” between two pushes. 2 = Dual send Mode – Frame (02) is sent out at each push with a delay of “tpb” between two pushes, and frame (02) is sent out automatically every “dtx” minutes (backup function). 	N/A	0	2

rnm	Selection of Running Mode	NA	1	9
	<ul style="list-style-type: none"> 1 = a single push permitted among the five buttons during “tpb” delay. During “tpb”, a single push permitted on the same button. 2 = a single push permitted on each button during “tpb”. During “tpb”, a single push permitted on the same button. 3 = During “tpb”, a single push permitted on button 1 and a single push permitted among button 2,3,4,5. During “tpb”, a single push permitted on the same button. 4 = During “tpb”, a single push permitted on button 1 or button 2 during “tpb” and a single push among button 3,4,5. During “tpb”, a single push permitted on the same button. 6 = RNM 2 with acknowledgement. For details please refer to paragraph 18. 7 = RNM 9 CODE with acknowledgment. For details please refer to paragraph 18. 8 = “Pulse” mode. For details please refer to paragraph 18. 9 = “CODE” mode. For details please refer to paragraph 18. 			
Lwf	<p>0xYZ</p> <p>If Y greater than 0, then confirmed payload with a maximum of Y emissions.</p> <p>If Z greater than 0, then non-confirmed payload with Z emissions.</p> <p>If Y and Z equal to 0, then non-confirmed payload with option to modify the number emissions with MAC commands issues from the gateway or access point.</p>	NA	0x00	0xFF
a	duty-cycle (0: disabled, 1: enabled)	NA	0	1
b	LoRaWAN backoff (0: disabled, 1: enabled)	NA	0	1
c	LoRaWAN piggyback (0: disabled, 1: enabled)	NA	0	1
d	LoRaWAN force DR0 at join procedure (0: disabled, 1: enabled)	NA	0	1
e	LoRaWAN ADR bit (0: disabled, 1: enabled)	NA	0	1

14.2. Downlink Query Frame

Each time Smilio Action is turned on, or the user pushes the Reset button, Smilio Action sends a frame with its settings.

The frame format is:

04 UU VVVV WW XX YZ TT

04 = Downlink query frame
UU = "csc" and "eat" hexadecimal values:

0x00	Frame (02) is sent out at each end of period whatever the counter values.
0x10	Frame (02) is sent out at each end of period, only if counter values have changed since the last sent frame.
0x01	Frame (02) is sent out at each push with a delay of "tpb" between two pushes.
0x02	Frame (02) is sent out at each push with a delay of "tpb" between two pushes, and frame (02) is sent out automatically every "dtx" minutes (backup function) whatever the counter values.
0x12	Frame (02) is sent out at each push with a delay of "tpb" between two pushes, and frame (02) is sent out automatically every "dtx" minutes (backup function) only if counter values have changed since the last sent frame.

VVVV = hexadecimal value is to be converted into bit field 'abcdeffffffff' encoded as follows:

- a: duty-cyle (0: disabled, 1: enabled)
- b: LoRaWAN backoff (0: disabled, 1: enabled)
- c: LoRaWAN piggyback (0: disabled, 1: enabled)
- d: LoRaWAN force DR0 at join procedure (0: disabled, 1: enabled)
- e: LoRaWAN ADR bit (0: disabled, 1: enabled)
- ffffffff: dtx expressed in minutes 11 bits value from 0x0001 to 0x05A0.

WW = "tpb" hexadecimal value (expressed in seconds): from 0x01 to 0x3C

XX = "rnm" hexadecimal value: from 0x01 to 0x09

YZ = "Lwf" hexadecimal value: from 0x00 to 0xFF

TT = "tpbq" hexadecimal value (expressed in seconds): from 0x01 to 0x3C

14.3. Downlink Result Frame

After sending a Downlink Query Frame, Smilio Action is waiting for a Downlink Result Frame with new settings from the backend.

The frame format is:

05 UU VVVV WW XX YZ TT

05 = Downlink query frame
UU = "csc" and "eat" hexadecimal values:

0x00	Frame (02) is sent out at each end of period whatever the counter values.
0x10	Frame (02) is sent out at each end of period, only if counter values have changed since the last sent frame.
0x01	Frame (02) is sent out at each push with a delay of "tpb" between two pushes.
0x02	Frame (02) is sent out at each push with a delay of "tpb" between two pushes, and frame (02) is sent out automatically every "dtx" minutes (backup function) whatever the counter values.
0x12	Frame (02) is sent out at each push with a delay of "tpb" between two pushes, and frame (02) is sent out automatically every "dtx" minutes (backup function) only if counter values have changed since the last sent frame.

VVVV = hexadecimal value is to be converted into bit field 'abcdeffffffff' encoded as follows:

- a: duty-cyle (0: disabled, 1: enabled)
- b: LoRaWAN backoff (0: disabled, 1: enabled)
- c: LoRaWAN piggyback (0: disabled, 1: enabled)
- d: LoRaWAN force DR0 at join procedure (0: disabled, 1: enabled)
- e: LoRaWAN ADR bit (0: disabled, 1: enabled)
- ffffffff: dtx expressed in minutes 11 bits value from 0x0001 to 0x05A0.

WW = "tpb" hexadecimal value (expressed in seconds): from 0x01 to 0x3C

XX = "rnm" hexadecimal value: from 0x01 to 0x09

YZ = "Lwf" hexadecimal value: from 0x00 to 0xFF

TT = "tpbc" hexadecimal value (expressed in seconds): from 0x01 to 0x3C

14.4. Online Downlink Frame configurator

To help you to generate a valid downlink frame, you can use our online configurator. Please visit our website at:

<https://skipllyfrance.github.io/configurator.html>



15. Default settings

Below, the list of default values for parameters described in the previous paragraph:

- dtx = 15
- tpb = 3
- tpbq = 3
- csc: 1
- rnm = 2
- eat: 1
- Lwf: 0x00
- duty-cycle: 1

LoRaWan

- backoff: 0
- piggyback: 0
- force DR0 at join procedure: 0
- ADR bit: 0

16. Settings and use cases

To help you to set your device depending your use case, you will find hereunder a few standard configurations. All acronyms are defined in this user manual. We recommend that you read it carefully before changing the default confirmation of your Smilio Action. Should you need any further information, do not hesitate to contact our support department: support@skiplly.org. You can use our online configurator to generate the different downlink frame. Please refer to the paragraph 14.4.

16.1. Smilio Action Cancellation / Validation

- RNM 1 = a single push permitted among all buttons and on the same button during "TPB"
- TPB = 5 seconds
- EAT = 1 (immediate sending)
- DOWNLINK PAYLOAD = 0501800105010005

16.2. Smilio Action Multiservices

- RNM 2 = a single push permitted on each button during "TPB"
- TPB = 5 seconds
- EAT = 0 (periodic sending)
- CSC = 1 (periodic sending only in case of counter change)
- DTX = 10 (periodic sending: every 10 minutes)
- DOWNLINK PAYLOAD = 0510800A05020005

16.3. Smilio Action 3 Smileys

- Periodic sending every 15 minutes
 - RNM 1 = a single push permitted among all buttons and on the same button during "TPB"
 - TPB = 5 seconds
 - EAT = 0 (periodic sending)
 - CSC = 1 (periodic sending only in case of counter change)
 - DTX = 15 (periodic sending: every 15 minutes)
 - DOWNLINK PAYLOAD = 0510800F05010005
- Periodic sending every 30 minutes
 - RNM 1 = a single push permitted among all buttons and on the same button during "TPB"
 - TPB = 5 seconds
 - EAT = 0 (periodic sending)
 - CSC = 1 (periodic sending only in case of counter change)
 - DTX = 30 (periodic sending: every 30 minutes)
 - DOWNLINK PAYLOAD = 0510801E05010005

17. Settings description

17.1. Duty Cycle

The duty cycle of radio devices is often regulated by government. If this is the case, the duty cycle is commonly set to 1%, but make sure to check the regulations of your local government. In Europe, duty cycles are regulated by section 7.2.3 of the ETSI EN300.220 standard. For more details about the Duty Cycle, please refer to the ETSI EN300.220 standard.

Smilio Action can self-manage the radio emissions according to the authorized duty cycle. By default, and to respect the European recommendations, the Duty Cycle is activated in Smilio Action. User can choose to activate or deactivate the Duty Cycle. Despite this, we do not recommend deactivating the duty cycle.

17.2. ADR (Adaptative Data Rate) - Useable only with LoRaWAN

Adaptive Data Rate (ADR) is a mechanism for optimizing data rates, airtime and energy consumption in the LoRaWAN network. If ADR is enabled, the LoRaWAN networks are able to manage the Smilio Action's data rate. ADR should be enabled whenever an end device has sufficiently stable RF conditions. This means that it can generally be enabled for static devices. If radio conditions are unstable (mobile end devices for example), ADR should be disabled.

17.1. Force DR0 at join procedure - Useable only with LoRaWAN

If « Force DR0 » parameter is enabled, Smilio Action force the data rate to the most robust during the join procedure (DR0=SF12BW125). In difficult environments such as a low SNR, a low signal area, or if DR0 is enabled, the join procedure will be shorter and more efficient.

If ADR is disabled, Smilio Action stays with the same data rate: (DR0=SF12BW125).

17.2. Backoff parameters - Useable only with LoRaWAN

Only valid for LoRaWAN acknowledged mode and for a current datarate greater than the DR0 (DR0 = SF12BW125) like SF7, SF8, etc.

The Smilio Action sends the N requested transmissions with the current datarate. If no acknowledge received and backoff enabled, the Smilio Action decreases the current datarate, that means increases the SF, and retries 2 transmissions. If no acknowledge is received, Smilio Action decreases again the current datarate and retries 2 new transmissions. And so on, until the Smilio Action receives the acknowledge or has reached the SF12BW125.

17.3. Piggyback - Useable only with LoRaWAN

If Piggyback is disabled, the Smilio Action responds to MAC commands from the network. Therefore, the transmitted frame contains only the response to the MAC command (port 0).

When the Piggyback is enabled and the response to the MAC command is in the MAC header (≤ 15 bytes), the Smilio Action keeps the answer in his memory and will add it to the MAC header when the Smilio Action transmits its next payload.

The purpose is to save the radio resources by transmitting only one frame instead of two.

18. Running Mode description

18.1. Running Mode 6

This running mode is the same as the running mode 2 with one significant difference, the uplink payload is an acknowledged payload. For details about running mode 2, please refer to paragraph 14.1.

With this running mode, user can send button's states with acknowledgement to confirm or not, that the payload is well received by the network server.

To use this running mode 6, we recommend setting parameter eat = 1 for (Instantly Send Mode). After expiration of "TPB", the Smilio Action flash alternatively red/green until the acknowledge is received. Two cases:

- Acknowledgement is received by Smilio Action = LEDs lights fix green.
- Acknowledgement isn't received by Smilio Action (after timeout of 60 seconds) = LEDs lights red fix.

Until the acknowledgment is received, or until the timeout is ended, the keyboard is disabled. User have to wait to use keyboard.

Note: After the time out of 60 second, if LEDs lights red fix, it isn't a proof that the payload didn't received by the network server. In some cases, the uplink payload may have been received by the network server, but the acknowledgment was not received by Smilio Action.

The frame format is:

02 AAAA BBBB CCCC DDDD EEEE

02 = Running Mode 6 data frame
AAAA = button 1 incremental counter value – max = 0001
BBBB = button 2 incremental counter value – max = 0001
CCCC = button 3 incremental counter value – max = 0001
DDDD = button 4 incremental counter value – max = 0001
EEEE = button 5 incremental counter value – max = 0001

Example of « Running Mode 6 Data Frame»:

02 0001 0000 0001 0000 0001

02 = Mode PULSE data frame
0001 = incremental counter 1 hexadecimal value (=1 decimal value) – button 1 pushed
0000 = incremental counter 2 hexadecimal value (=1 decimal value) – button 2 not pushed
0001 = incremental counter 3 hexadecimal value (=1 decimal value) – button 3 pushed
0000 = incremental counter 4 hexadecimal value (=1 decimal value) – button 4 not pushed
0001 = incremental counter 5 hexadecimal value (=1 decimal value) – button 5 pushed

18.2. Running Mode 7

This running mode is the same as the running mode 9 CODE with one significant difference, the uplink payload is an acknowledged payload. For details about running mode 9 CODE, please refer to paragraph 18.4.

With this running mode, user can send an identification code with acknowledgement to confirm or not, that the payload (=code) is well received by the network server. After expiration of "TPB", the Smilio Action flash alternatively red/green until the acknowledge is received. Two cases:

- Acknowledgement from network server is received by Smilio Action = LEDs lights fix green.
- Acknowledgement from network server isn't received by Smilio Action (after timeout of 60 seconds) = LEDs lights red fix.

Until the acknowledgment is received, or until the timeout is ended, the keyboard is disabled. User have to wait if he needs to dial a new code.

Note: After the time out of 60 second, if LEDs lights red fix, it isn't a proof that the payload didn't received by the network server. In some cases, the uplink payload may have been received by the network server, but the acknowledgment was not received by Smilio Action.

18.3. Running Mode 8: PULSE

This running mode is the same as the running mode 2 with one significant difference: counters are reset to zero after the data frame is sent.

With this running mode, user can send button's states without maintaining counter's records.

Smilio sends a data frame:

- After lapse "dtx" for Periodic Send Mode: eat = 0
- After lapse "tpb" for Instantly Send Mode: eat = 1
- After lapse "tpb" and "dtx" for Dual send Mode: eat = 2

The frame format is:

40 AAAA BBBB CCCC DDDD EEEE

40 = Mode PULSE data frame

AAAA = button 1 incremental counter value – max = 0001

BBBB = button 2 incremental counter value – max = 0001

CCCC = button 3 incremental counter value – max = 0001

DDDD = button 4 incremental counter value – max = 0001

EEEE = button 5 incremental counter value – max = 0001

Example of « PULSE Data Frame»:

40 0001 0000 0001 0000 0001

40 = Mode PULSE data frame

0001 = incremental counter 1 hexadecimal value (=1 decimal value) – button 1 pushed

0000 = incremental counter 2 hexadecimal value (=1 decimal value) – button 2 not pushed

0001 = incremental counter 3 hexadecimal value (=1 decimal value) – button 3 pushed

0000 = incremental counter 4 hexadecimal value (=1 decimal value) – button 4 not pushed

0001 = incremental counter 5 hexadecimal value (=1 decimal value) – button 5 pushed

18.4. Running Mode 9: CODE

In this section acknowledgement means activation of the Hall effect sensor with a magnetic badge.

The purposes, among others, of this running mode is:

- to allow an individual to be identified (with his personal code)
- to allow the proof of presence
- to enter and transmit a code
- to enter and transmit an acknowledged code
- to detect the use of the magnetic badge

In this mode the buttons 1,2,3,4 and 5 don't increment their respective counters, but allow to create the user code by shift to the left at each push (maximum 6 digits, if there are more digits only the first 6 digits are stored). Under normal conditions, as soon as the first push is detected, a countdown is started. The value in seconds of this countdown is equal to "TPB". The user enters his identification code (maximum 6 digits). If the user doesn't activate the magnetic sensor before the end of the countdown, the code isn't acknowledged, otherwise the code is acknowledged. At the of the countdown equal to "TPB" LEDs lights green fix to inform user that it is possible to compose a new code.

For an acknowledged code, the header of the uplink payload starts with "3".

For an unacknowledged code, the header of the uplink payload starts with "1".

To address an issue of duty cycle, this running mode embeds a buffer containing up to 4 uplink payloads. If all duty cycle is completely consumed and more than 4 codes are entered before the duty cycle becomes available again, the oldest codes are lost.

18.4.1. Code Data Frame format

The uplink payload contains the last two codes entered. The uplink payload is formatted as follows:

XaXb TT YYYY BBBBBB AAAAAA

Xa: Acknowledgement flag for the first code A (1 => unacknowledged, 3 => acknowledged)

Xb: Acknowledgement flag for the previous code B (1 => unacknowledged, 3 => acknowledged)

YYYY: hexadecimal value. Time in minutes since the last transmitted code.

TT: hexadecimal value. Time in minutes between the end of the entering code (= end of "TPB" countdown) and the transmission of the uplink payload (duty cycle management). Maximum FF or 255 minutes. In most cases, the duty cycle management does not exceed 3 minutes.

BBBBBB: Second last code entered and sent

AAAAAA: Last code entered and sent

After each sent frame, the YYYY and TT counters are reset in anticipation of the next code entry and frame sending.

Thus, the first byte can take the following values:

- First start:
 - 10: one code without acknowledgement (= activation of Hall effect sensor)
 - 30: one code with acknowledgement (= activation of Hall effect sensor)
- Steady state:
 - 11: two codes; first without acknowledgement, second without acknowledgement
 - 13: two codes; first without acknowledgement, second with acknowledgement
 - 31: two codes; first with acknowledgement, second without acknowledgement
 - 33: two codes; first with acknowledgement, second with acknowledgement

Example of « CODE Data Frame»:

Just after first start, or after hard reset, if user enters the code 132445 and activates Hall effect sensor before the end of “TPB” countdown, the following data frame is sent:

30 TT YYYY 000000 132445

A new (second) code is entered without activation of the Hall effect sensor. The following data frame is sent:

13 TT YYYY 123445 003333

User activates the Hall effect sensor, no code is entered. The following data frame is sent:

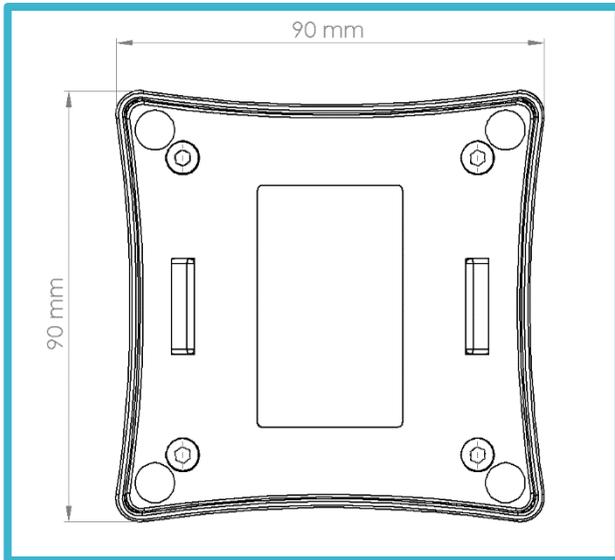
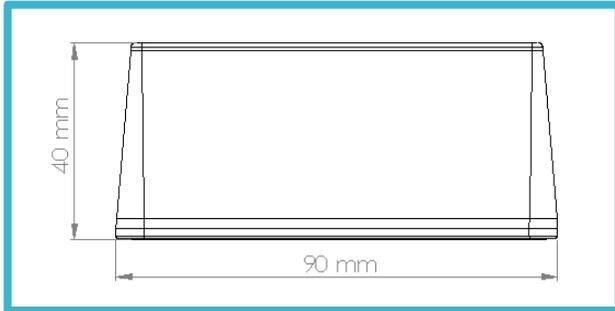
31 TT YYYY 003333 FFFFFFFF

User enters the code 112233 and activates the Hall effect sensor before the end of “TPB” countdown. The following data frame is sent:

33 TT YYYY FFFFFFFF 112233

And so on...

19. Dimensions



Weight (without batteries)	130 grs
Plastics	ABS (Acrylonitrile-Butadiene-Styrene Copolymer) Flammability: HB (IEC 60695-11-10; ANSI/UL 94)
Gasket	Thermoplastic Vulcanizate (TPE family) Flammability: HB (IEC 60695-11-10; ANSI/UL 94)
Keypad	POLIBOND Polyester film. UL flame class VTM-2 PET X140 / X190. HB UL94 Ink GREENGUARD Gold Certification

20. Safety recommendations

- Do not let Smilio Action in direct sunlight for prolonged periods of time. Keep Smilio Action in a shaded area. Keep Smilio Action away from extreme temperatures. Operating temperature range is -10°C to 45°C.
- Make sure Smilio Action is perfectly dry before storage. Store Smilio Action in a clean dry area.
- Do not disassemble this product: this would void warranty. There are no user-serviceable parts inside Smilio Action.
- For long-term storage, remove all batteries.
- Open and/or tamper with Smilio Action will void your warranty.
- Batteries replacement must be done in a dry indoor environment.
- Batteries replacement must be done by a qualified technician.
- Use only batteries SAFT LS14500 LiSOCl₂ 3.6V.
- There is a risk of explosion if battery is replaced by incorrect type.

21. Symbols

	Caution risk of danger or Attention
	Follows operating instructions. See user manual supplied with this equipment
	Direct current
	The crossed-out wheeled-bin symbol on your product, battery, literature, or packaging reminds you that all electrical and electronic products, batteries, and accumulators must be taken to separate collection at the end of their working life. This requirement applies in the European Union. Do not dispose of these products as unsorted municipal waste.
	CE marking is a certification mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives. CE marking certified that Smilio Action meets the minimum requirements of European directives 2014/35/UE and RED 2014/53/EU

22. Declaration of Conformity

CE symbol confirms that the product conforms to the applicable European directives 2014/35/UE and RED 2014/53/EU.

Smilio Action complies with these European Standards and Directives:

- Electromagnetic Compatibility (EMC) ETSI EN 301 489-3:2017 v2.1.1 and ETSI EN 301 489-1: 2017 V2.2.0
- Radio spectrum Matters (ERM); Short Range Devices (SRD) ETSI EN 300 220-2 v3.1.1 & ETSI EN 300 220-1 v3.1.1
- Product Safety Directive EN 60950-1 :2006 + A1:2009 + A2:2013 + A11:2009 + A12:2011
- ERC 70-03 Recommendation: Relating to the use of Short Range Device (SRD)

23. Certificates

23.1. Sigfox® Ready certificate RC1

QF_385

Sigfox Ready™ Certificate

P_0056_99E6_01

Congratulations SKIPLY, the following product is now Sigfox Ready™ certified:



END-PRODUCT COMMERCIAL NAME: Smilio Action
END-PRODUCT MODEL NAME: Smilio Action
RADIO CONFIGURATION: RC1
COMMUNICATION MODE: Uplink and downlink
TEST REPORT: R410-18-101252-1A Ed.0
END-PRODUCT UPLINK RADIATION CLASS: 0u
CERTIFICATION DATE: 2018-04-17
SIGFOX VERIFIED CERTIFICATE: M_0016_628C_01
SIGFOX REFERENCE: CORP-10638

This certificate is valid for this product only. Any change to the certified product is to be reported to Sigfox as it may lead to a renewal of the Sigfox Ready™ certification.
The Sigfox Ready™ logo must be used in respect of Sigfox branding guidelines.



Sigfox Head Office:
425 rue Jean Rostand, 31670 Labège, FRANCE
www.sigfox.com

Rev1.0

23.2. Sigfox® Ready certificate RC2

QF_628

Sigfox Ready™ Certificate

P_0056_112F_01

Congratulations SKIPLY, the following product is now Sigfox Ready™ certified:



DEVICE COMMERCIAL NAME:	Smilio Action
DEVICE MODEL NAME:	Smilio Action Device RC2
RADIO CONFIGURATION:	RC2
TEST REPORT:	R412-19-101625-1A Ed.0
DEVICE UPLINK RADIATION CLASS:	1u
CERTIFICATION DATE:	28/05//2019
SIGFOX CREDENTIALS M NUMBER:	M_0016_FECE_01
SIGFOX REFERENCE:	BUIL-531
SIGFOX FEATURES:	
DOWNLINK	✓
PAYLOAD ENCRYPTED	✗
MONARCH	✗

This certificate is valid for this product only. Any change to the certified product is to be reported to Sigfox as it may lead to a renewal of the Sigfox Ready™ certification.
The Sigfox Ready™ logo must be used in respect of Sigfox branding guidelines.



Sigfox Head Office:
425 rue Jean Rostand, 31670 Labège, FRANCE
www.sigfox.com

Rev1.0

23.3. Sigfox® Ready certificate RC3

QF_629

Sigfox Ready™ Certificate

P_0056_0593_01

Congratulations SKIPLY, the following product is now Sigfox Ready™ certified:



DEVICE COMMERCIAL NAME:	Smilio Action
DEVICE MODEL NAME:	Smilio Action Device RC3
RADIO CONFIGURATION:	RC3
TEST REPORT:	R412-19-101802-1A Ed.0
DEVICE UPLINK RADIATION CLASS:	0u
CERTIFICATION DATE:	28/05//2019
SIGFOX CREDENTIALS M NUMBER:	M_0016_AE11_01
SIGFOX REFERENCE:	BUIL-532
SIGFOX FEATURES:	
DOWNLINK	✓
PAYLOAD ENCRYPTED	✗
MONARCH	✗

This certificate is valid for this product only. Any change to the certified product is to be reported to Sigfox as it may lead to a renewal of the Sigfox Ready™ certification.
The Sigfox Ready™ logo must be used in respect of Sigfox branding guidelines.



Sigfox Head Office:
425 rue Jean Rostand, 31670 Labège, FRANCE
www.sigfox.com

Rev1.0

23.4. IP 65 Certification



R-ADE-PNN-18-300405-1 A (00)

DEGREE OF PROTECTION TEST REPORT IP65

According to the standard:
NF EN 60529 (2000)

Equipment under tests :
2 Satisfaction terminals SIGFOX

Company :
SKIPLY

DISTRIBUTION: Mr SIEBERT

(Company: SKIPLY)

Number of pages: 18
(Included 1 appendix)

Ed.	Date (MM/DD/YYYY)	Modified Pages	Written by		Technical Verification & Quality Approval	
			Name	Visa	Name	Visa
00	07/04/2018	Creation	C. THOLIER Climatic responsible C.T.		M. GIBERT Laboratory manager 	

The reproduction of this test report is allowed only in its full version, it contains the number of pages referenced above. The present document results from tests on a specimen, a test tube or a sample of product. It doesn't prejudge of the compliance of all the products to the tested sample.