# Instruction Manual for the
OXOBUTTON 2

The Oxobutton 2 is delivered completely ready for use and only a LoRaWAN network is required. The package contains the three relevant keys (OTAA) with which the Oxobutton can be integrated into your preferred LoRaWan network.

The configuration of the device can be achieved via LoRa downlinks.

Structure and configuration

The battery (CR2477) is separated from the device by a thin plastic foil. As soon as you pull it out, the super capacitor is charged and the Oxobutton is starting up after a few seconds.
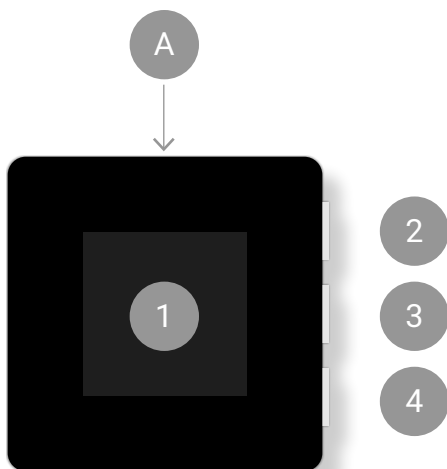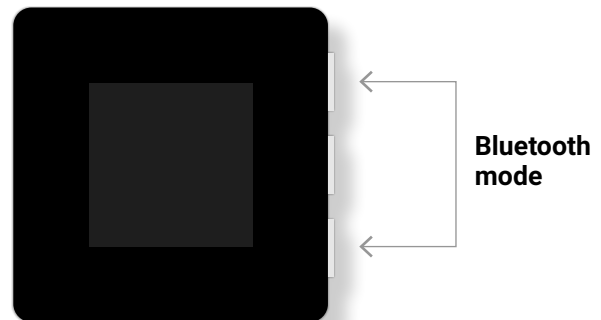

The unit has four buttons.
(1) is located under the glass cover. Clicking on the button triggers a transmission to the correspondingly configured LoRaWan server.

(2)(3)(4) are option buttons that are required for different functions depending on the firmware.

In the original firmware supplied with the unit, the buttons have the following meaning.

Bluetooth mode:

Bluetooth mode

Pressing the two outer buttons (2) and (4) simultaneously activates Bluetooth mode. To make use of this mode, a mobile app is required. The Bluetooth mode is left and the device restarts after 1min or if any button is pressed.

Changing the display:

Toggle mode
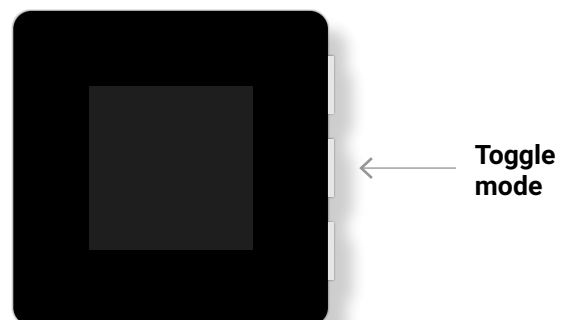
If you press the middle button (3), the display changes from sensor mode to the button mode and vise versa. The mode can be locked, respectively the button can be disabled via a downlink message.

The sensors are located at the top side of the housing (a). In order for the device to function optimally, this side must remain free at all times. The sensors react very sensitively. Covering the slats may alter the behavior of the sensors.

First use

The display can be changed with the button (3). In sensor mode, temperature and humidity are displayed. By default, the values are queried every 60 seconds. The display only updates when the values change by +- 0.5 degrees or 5%RH.

Connection to the LoRaWan server

The package contains the keys for the connection to a LoRaWan server.

DevEUI
745B ████████████

AppEUI
74 █████████████

AppKey
1 ███████████████ 9

These three specifications are to be configured in the LoRaWan server according to the instructions of the respective manufacturer.

Further information:

- Supported Frequencies: 868 MHz
- Adaptive Data Rate (ADR) supported and enabled by default
- LoRaWAN Link Layer(L2) v1.0.3
- LoRaWAN Regional Parameters(RP) v1.0.3

Important:

These keys are essential information. Keep them

in a safe place. Without them, the Oxobutton can

no longer connect to a LoRaWAN server. Replace

Replace battery

The unit uses a very powerful CR2477 with a capacity of around 1000mAh.
These batteries can be purchased from electronics retailers. Be aware that CR2477s are sold with different qualities. To ensure the longest runtime, CR2477s with a charge of >= 1000mAh (1Ah) should be purchased.

The unit can be opened without screws by pressing the round plastic part on the back of the device.
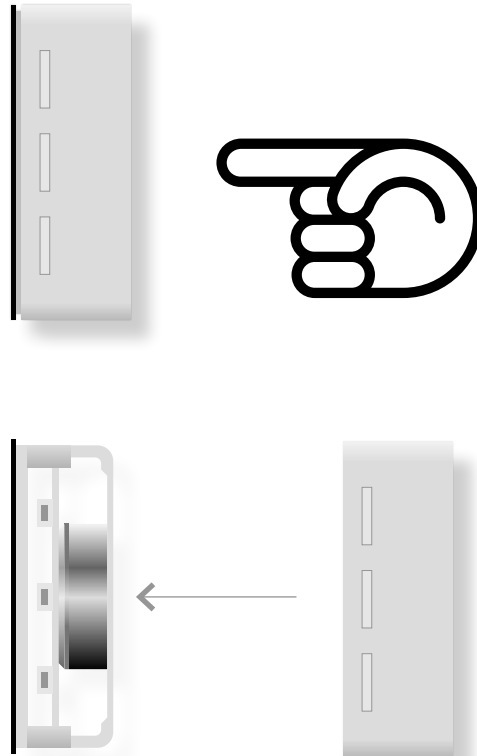
When reassembling the device, make sure that the two plastic parts of the inner part are aligned centrally. The side buttons must be inserted on the housing side with the plastic covers. A gentle press is sufficient, then the inner part snaps back into the outer shell.

Up- and downlinks

The Oxobutton can be extensively configured: By default, a click on button 1 triggers a confirmed uplink and whenever a delta of +- 0.5 degrees or 5%RH is reached, an unconfirmed uplink is sent. In addition, periodic unconfirmed uplinks can be configured. It is also possible to define thresholds that result in immediate unconfirmed uplinks when a threshold is exceeded or fallen below.

There are three different message categories:
– Event messages of the button
– Configuration of the device
– Configuration of the sensors

Event messages of the button

UPLINK: uplink event message

0	1	2	3	4	5	6	7	8	9	10	11
39	00	05	01	01	FF	09	60	0F	A0	FF	00

The event message of the Oxobutton 2 is always 12 bytes long.
Each message starts with a message signature: 0x39

Bytes	Value
0	0x39
1-2	Uplink reason, bit-coded: bit0 = button 1 bit1 = button 2 bit2 = button 3 bit3 = button 4 bit4 = isHeartbeat bit7 = isPeriodicSensorUplink bit8 = isSensorTriggerTemp bit9 = isSensorTriggerHumi bit10 = isSensorTriggerALS
3	AppMode: 0 = sensor display 1 = generic bell image 2 = fire alarm image 3 = service request image 4 = medical incident image 5 = technical alert image
4	Accepts downlinks? 0 = no 1 = yes
5	Battery level in %: 0-100
6-7	Temperature (*100): 2451 means 24.51 °C. To get the real (float) value, you have to divide it by 100.
8-9	Humidity (*100): 4875 means 48.75%RH. To get the real (float) value, you have to divide it by 100.
10-11	Ambient light value 0 = no light 65535 = max light emission

Configuration of the device

If a downlink with signature 0xBA and no data is sent to the device, the unit sends its current configuration as an uplink with the signature 0x3A. A new device configuration can be sent as a downlink with the signature 0xBB. The structure of the two device configuration messages is identical – with the exception of the initial signature.

DOWNLINK: request device configuration

0
BA

UPLINK: uplink device configuration

0	1	2	3	4	5	6	7	8	9
3A	00	01	01	00	18	00	01	00	3C

DOWNLINK: set device configuration

0	1	2	3	4	5	6	7	8	9
BB	00	01	01	00	18	00	01	00	3C

Bytes	Value
0	0x3A or 0xBB
1	AppMode: 0 = sensor display 1 = generic bell image 2 = fire alarm image 3 = service request image 4 = medical incident image 5 = technical alert image
2	ModeLock: 0 = not locked 1 = locked Determines whether the middle button for switching between sensor display and button is activated.
3	Piezo enable: 0 = off 1 = on Switches the piezo signal tone on or off.
4-5	Heartbeat interval in hours (default: 12h)
6-7	Sensor sampling interval in minutes (default: 1 minute)
8-9	Periodic uplink counter: This counter determines after how many sensor sampling intervals an uplink is triggered, regardless of hysteresis or threshold values. 0 = switched off Example: If the sensor sampling interval is set to one minute and the periodic uplink counter value is 30, an uplink will be sent approximately every 30 minutes, regardless of whether a sensor value has changed or not.

Configuration of the sensors

The current configuration of a sensor can be requested via the following downlink message. To get the sensor configuration of all three sensors, three separate downlinks must be sent.

DOWNLINK: request sensor configuration

0	1
BC	00
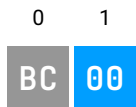
Bytes	Value
0	0xBC
1	Sensor type: 0 = temperature 1 = humidity 2 = ambient light (ALS)

Offsets, hysteresis and up to six threshold values can be specified for each sensor. The currently configured data is sent to the server as an uplink with the signature 0x3C and can be sent to the device with 0xBD in the same structure.

UPLINK: uplink sensor configuration

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
3C	00	00	00	00	32	02	00	0C	00	18	00	00	00	00	00	00	00	00

DOWNLINK: set sensor configuration

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
BD	00	00	00	00	32	02	00	0C	00	18	00	00	00	00	00	00	00	00

Bytes	Value
0	0x3C or 0xBD
1	Sensor type: 0 = temperature 1 = humidity 2 = ambient light (ALS)
2-3	Offset
4-5	Hysteresis: The hysteresis determines after which sensor value delta the display is updated and an unconfirmed uplink is sent. The default value is 0.5 °C and 5 %RH. The values must be multiplied by 100, i.e. 0.5 °C = 500 (0x01F4).
6	Number of following threshold values (0-6)
7-8	First threshold value as integer (*100). I.e. 24.51 °C must be transmitted as 2451 (0x0993).
9-10	Second threshold
11-12	Third threshold
13-14	Fourth threshold
15-16	Fifth threshold
17-18	Sixth threshold

Support and service

We offer comprehensive services for this product. Our experienced software and hardware team offers support in the evaluation, construction and operation of LoRaWAN-based networks.

This product can also be adapted to individual projects. For example, if you need additional images or special functionalities (RFID, NFC, QR codes, other sensors), please contact us. The firmware on the devices can be replaced with project-specific versions using a mobile app. The device housing offers space for individual extensions.

Feel free to contact us. We will be happy to advise you without obligation.

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