



MDX-SB01

Technical Specification - Draft

Lissone, september 17th, 2018



Illustrative purpose only



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1 Abstract

This document describes the device “MDX-SB01” from Midatronics. This is a preliminary technical specification for the product.

2 Product Description

The MDX-SB01 is an IoT (Internet of Things) handheld wireless notification button. This battery powered electronic device that can be useful to signal events to a cloud server and then to a person or organization. The wireless transmission uses the Sigfox network.

It is composed by an electronic board with:

- A pushbutton
- RGB led for user feedback
- STM32L0 low power microcontroller from ST Microelectronics - ARM Cortex M0+ 32 bit MCU
- S2-LP sub-1GHz transceiver from ST Microelectronics for Sigfox radio transmission

The button overlay can be customized to suit user’s needs.

The device is powered by 2 AAA non rechargeable Lithium batteries that guarantee years of operation (depending on the number of button pressions/transmissions).

The batteries can be changed by the user when needed (Lithium Micro AAA Energizer L92)

The MDX-SB01 device is a Sigfox RC1 radio class device.

The device is shipped with batteries disabled to conserve energy when the product is stocked.

It is powered on by pressing the button, than remains active. Confirms power on by flashing the red led once.

When pressing the button, the device blue led blinks every 5 seconds.

The device can be powered down from “Button Mode” and “Alert Mode” by pressing the button until the blue led blinks two times. The device confirms power down flashing the blue led 5 times.

The device can be configured to send simple Sigfox messages (BUTTON-MODE) or confirmed messages (ALERT-MODE). The button press sequence to configure the mode of operation is non-trivial to avoid accidental misconfiguration.

The user interacts with the device by pressing the button:

- In BUTTON-MODE one or two button presses (within 2 seconds) send a Sigfox simple message: the device flashes the blue led when the command is accepted,



then flashes the green led on successful transmission, red in case of transmission error

- In ALERT-MODE one or two button presses (within 2 seconds) send a Sigfox confirmed message: the device flashes the blue led when the command is accepted, then flashes the green led on successful transmission. The red led flashes on transmission error.

The device sends an heartbeat message periodically every 24 hours to notify active status and battery voltage.

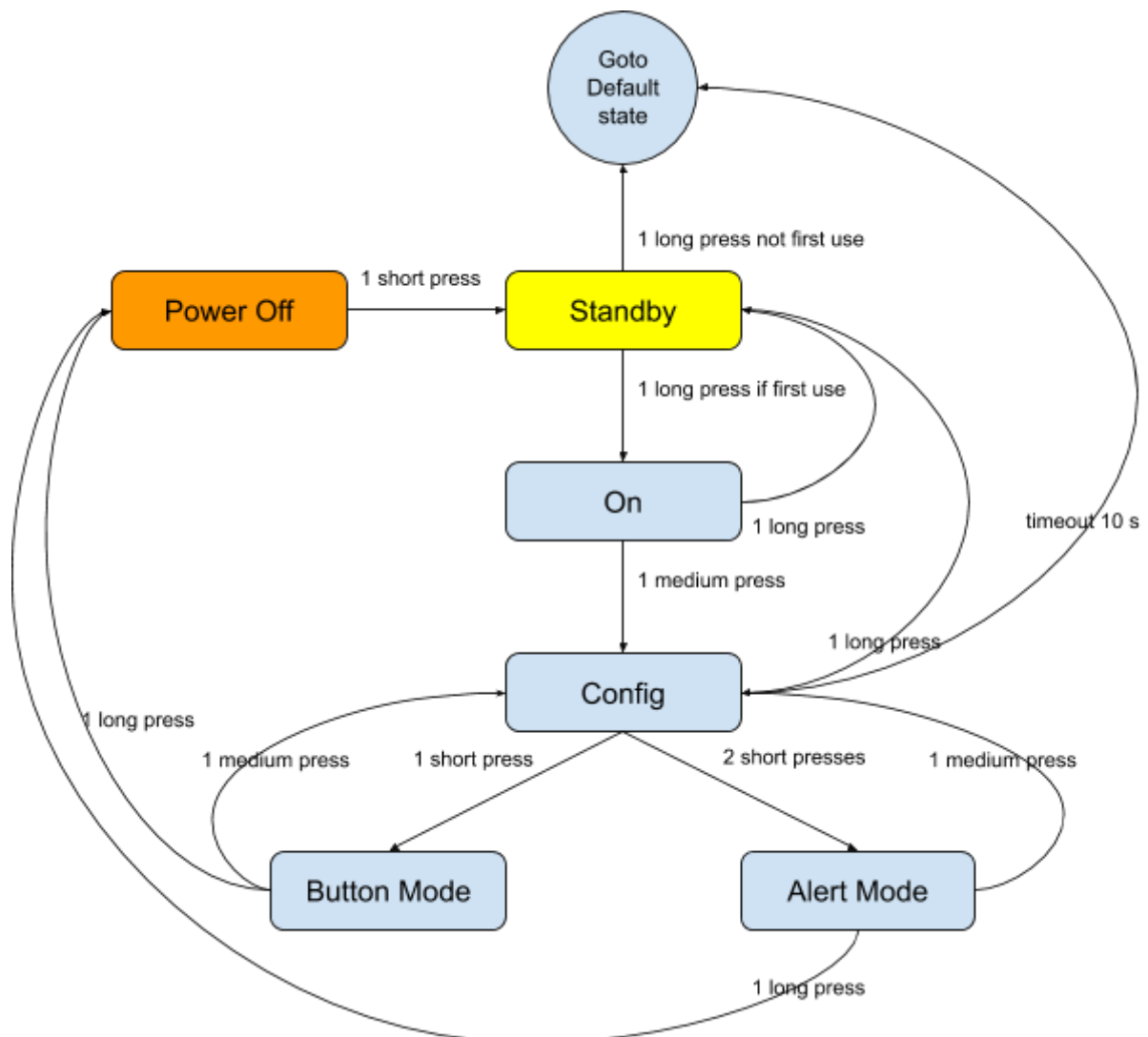
4 Operational Modes

The device is shipped with batteries disabled to conserve energy when the product is stocked.

It is powered on by pressing the button, then remains active. Confirms power on by flashing the red led once and goes in Standby status.

When pressing the button, the device blue led blinks every 5 seconds.

- **Short press:** the button is pressed one or two times within 2 seconds
- **Medium press:** keep the button pressed until the blue led blinks one time
- **Long press:** keep the button pressed until the blue led blinks two times





From "Standby" 1 long press moves into the Button/Alert Mode if already configured. The blue led blinks once if in Button Mode, twice if in Alert Mode.

From "Standby" 1 long press moves into the "Config" status if not already configured.

From "Config" status 1 short press within 10 seconds moves into "Button Mode"

From "Config" status 2 short presses within 10 seconds moves into "Alert Mode"

After 10 seconds, if no mode has been selected, the device moves from "Config" status to the default status if configured, to "Standby" otherwise.

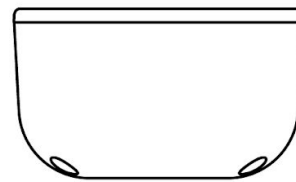
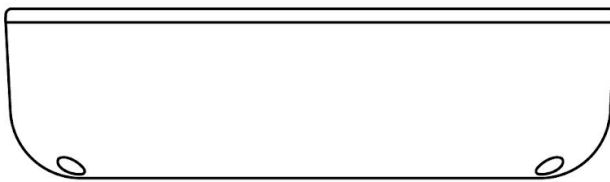
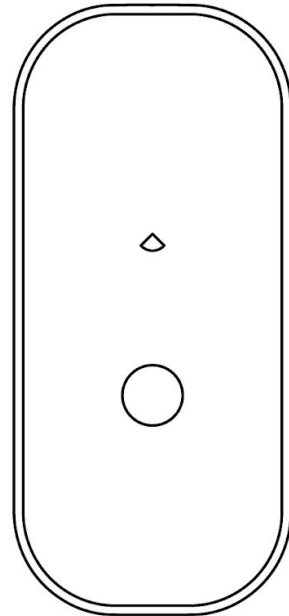
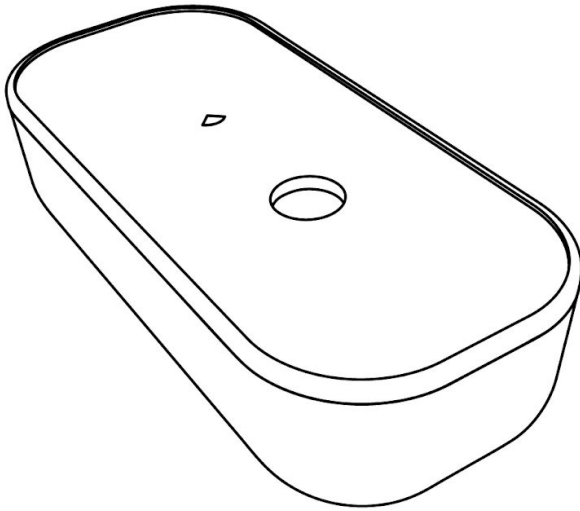
After the selection of the mode from "Config" status the Blue Led will blink (1 or 2 times) accordingly to the selected Mode.

When in "Button Mode" or "Alert Mode" one or two short button presses send messages. The device responds blinking the blue led once or twice, than blinks green after a short period if the message transmission was successful, red if there has been a transmission error.

When in "Button Mode" or "Alert Mode" one long button press powers the device off. The blue led blinks 5 times to confirm shutdown.



5 Product Dimensions



Scale 1:1



Units: mm



6 Sigfox Messages

All the messages sent by the Button have the same structure.

The first field of the 12-bytes message, the 'Message Type', identifies the content of the payload.

The meaning of the different fields of the payload is strictly related to each Message Type.

Generic Message Data Structure

MSG Type <1-byte>	Counter <2-bytes>	Spare <1-byte>	Status <1-byte>	Spare <7-bytes>
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Len is expressed in byte units. Total Len of the message is 9 bytes

Name	Len	Description
MSG Type	1	0x01 : BUTTON-MODE Single Click Notification 0x02 : BUTTON-MODE Double Click Notification 0x03 : ALERT-MODE Single Click Notification 0x04 : ALERT-MODE Double Click Notification 0x07 : HEARTBEAT Notification
Counter	2	The counter notifies the following information for each Message type: <ul style="list-style-type: none"> • Button Mode Single Click Message: <i>the Number of total Single clicks</i> • Button Mode Double Click Message: <i>the Number of total Double clicks</i> • Alarm Mode Single Click Message: <i>the Number of total Single clicks</i> • Alarm Mode Double Click Message: <i>the Number of total Double clicks</i> • Periodic Heartbeat Message: <i>The number of actual SIGFOX Messages sent so far.</i>
Not Used	1	Defaults to zero, reserved for future expansion
Status	1	This field contains a bitmask of status information 0x01 : Battery Low
Not Used	4	Reserved



7 Product Use Cases

“MDX-SB01” from Midatronics can be used for:

- Automatic online purchases, similar to the Amazon Dash Button but uses Sigfox infrastructure so it can be used without personal infrastructure (WiFi AP), outdoor, in movement or in a wide/dispersed area
- Notify product necessity or refilling,
- Notify alerts, alarms, emergency situations including accidents, sudden illness, need for assistance of any kind.
- Push-to-call customer service
- Push-on-receive delivery service feedback
- Push-to-notify need for a package pickup
- Remotely switch on/off a network connected devices (light, household appliances, heating system)
- Express customer satisfaction in public offices

The availability of one or two button presses messages allows to discriminate urgency, or customer satisfaction