PAUMAX OY·AINA WIRELESS INC

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COMMUNICATION PROTOCOL
AINA WIRELESS

SMART BUTTON

Version 0.2

Paumax Oy Y-tunnus: 2395666-2
VAT ID: FI23956662

Nordea Bank (EUR)
FI64 1135 3000 3267 77 NDEAFIHH
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FI15 1777 5200 0001 21 NDEAFIHH

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1. Scope

This document defines wireless device control protocol. The protocol aims to provide secured control link from wireless device to application with high level acknowledgement, minimal latency and minimal radio air time.

2. Features and functionality

Smart button, when BLE communication is enabled in phone and application, operates as a BLE peripheral device and provides custom Characteristics for a phone's application. The application subscribes to receive Notifications from the smart button to enable instant message delivery, such as Push-to-Talk (PTT) keying and writes characteristics in order to control smart button's features, such as double tap activation and led control.

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3. BLE Friendly name, services and characteristics

BLE connection allows two-way communication with compatible phone. Buttons and other state information is available for phone and phone can set certain features on/off as required. Smart button will use a unique generated service identification number.

SERVICE 128b UUID: **127FACE1-CB21-11E5-93D0-0002A5D5C51B**

When scanning LE devices with PC or phone, you see a list of available BLE devices and their friendly names. Friendly name of the smart button starts with **ASB** following by 6-digit unique address, for example **ASB99C2F0**.

3.1. Button mask

This characteristic shows smart button's button press status. It is defined as 8-bit unsigned integer, with following bit definitions:

BUTTON	Bit[0…7]	Hex value
PTT1	0	0x01
EMERG	1	0x02
PTT2	2	0x04
DOWN	3	0x08
UP	4	0x10
LEFT	5	0x20
RIGHT	6	0x40
HEARTBEAT	7	0x80

READ/NOTIFY 16b UUID: **0xBEEF**

Button status bits reflect the current pressed state of the buttons. Displaying the button status will not disable its normal operation regardless what the subscriber will do with the button status information received here. Heartbeat bit will toggle every ~250ms when any button is pressed.

3.2. Led mask

This characteristic allows the control of smart button's leds. It is an 8-bit unsigned integer, with following bit definitions:

LED	Bit[0…7]	Hex value
RED (SOLID ON)	0	0x01
GREEN (SOLID ON)	1	0x02
AMBER (SOLID ON)	2	0x04
RED (SLIDE ON)	3	0x08
GREEN (SLIDE ON)	4	0x10
AMBER (SLIDE ON)	5	0x20
RESERVED 1	6	0x40
RESERVED 2	7	0x80

READ/WRITE/NOTIFY 16b UUID: **0xDEAD**

Led status bits reflect the current state of the leds. Only one led at the time can be turned on, so there is no need to turn led off when changing led color, this is handled by the smart button. Leds can be turned on immediately (Solid on) or led can slide on (ramp up). When turning led off, it will follow the turning on state (Solid on → solid off & slide on → slide off).

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3.3. Config mask

This characteristic allows the control of various smart button's features. It is an 8-bit unsigned integer, with following bit definitions:

FEATURE	Bit[0…7]	Hex value
EXTRA KEYS SEND PTT1	0	0x01
DOUBLE TAPPING	1	0x02
DOUBLE TAPPING SENDS BUTTON	2	0x04
EXTRA KEYS SEND ONLY PTT1	3	0x08
RESERVED 2	4	0x10
RESERVED 3	5	0x20
RESERVED 4	6	0x40
RESERVED 5	7	0x80

READ/WRITE 16b UUID: **0x50DA**

Config status bits reflects the current choices of the features.

EXTRA KEYS SEND PTT1; when this bit is set, every time user presses an extra key (UP, DOWN, LEFT or RIGHT) along with button's actual state bit, also an PTT1 state bit is send (see button mask).This setting is ignored if EXTRA KEYS SEND ONLY PTT1 bit is set.

DOUBLE TAPPING; when this bit is set, double tapping is activated

DOUBLE TAPPING SEND BUTTON; when this bit is set, double tapping sends a defined button state bit (see button mask) for a defined time. To use this feature, also DOUBLE TAPPING has to be set.

EXTRA KEYS SEND ONLY PTT1; when this bit is set, every time user presses an extra key (UP, DOWN, LEFT or RIGHT) ONLY an PTT1 state bit is send (see button mask). If this bit is set, EXTRA KEYS SEND PTT1 (0x01) setting is ignored.

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3.4. Status mask

This characteristic shows the status of smart button. It is an 8-bit unsigned integer, with following bit definitions:

FEATURE	Bit[0…7]	Hex value
DOUBLE TAPPED	0	0x01
RESERVED 1	1	0x02
RESERVED 2	2	0x04
RESERVED 3	3	0x08
RESERVED 4	4	0x10
RESERVED 5	5	0x20
CRITICAL BAT	6	0x40
LOW BATTERY	7	0x80

READ/WRITE 16b UUID: **0x57A7**

DOUBLE TAPPED; this bit is set when double tapping has encountered (and DOUBLE TAPPING SEND BUTTON is not set in config mask). After reading status mask, this bit will be cleared automatically.

CRITICAL BATTERY; this bit is set when battery voltage level drops below 7%.

LOW BATTERY; this bit is set when battery voltage level drops below 40%.

3.5. Accelerometer mask

This characteristic configures double tapping functionality of smart button. It is an array of 8-bit unsigned integers, with following definitions:

FEATURE	Array[0…7]	Possible value
RESERVED (DO NOT CHANGE)	0	-
RESERVED (DO NOT CHANGE)	1	-
RESERVED (DO NOT CHANGE)	2	-
RESERVED (DO NOT CHANGE)	3	-
RESERVED (DO NOT CHANGE)	4	-
RESERVED (DO NOT CHANGE)	5	-
BUTTON	6	0 – 6
PRESS TIME	7	1 – 61

READ/WRITE 16b UUID: **0x8652**

BUTTON: this integer configures a button that double tapping activates (if configured on config mask)

- Value 0 = EMERGENCY BUTTON
- Value 1 = PTT1 BUTTON
- Value 2 = PTT2 BUTTON
- Value 3 = DOWN BUTTON
- Value 4 = UP BUTTON
- Value 5 = LEFT BUTTON
- Value 6 = RIGHT BUTTON

PRESS TIME: this integer configures time in seconds that BUTTON will be “pressed”

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3.6. SW version characteristic

This characteristic will allow to read the smart button's internal SW version (array of 8-bit unsinged integers).

READ 16b UUID: **0xC0FF**

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4. Device FW updates

BLE will enter DFU mode by holding emergency button down when inserting battery to smart button. BLE FW can be updated over the air (OTA) with BLE communication using appropriate software on PC or phone (which supports BLE communication). Please see the Aina FW upgrade guide -document.

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