

AINA PTT SMART BUTTON: COMMUNICATION PROTOCOL

v. 2.0 - PUBLIC

1. SCOPE

This document defines AINA's PTT Smart Button control protocol. The protocol aims to provide secured control link from PTT Smart Button to application with high level acknowledgement, minimal latency and minimal radio air time.



2. FEATURES AND FUNCTIONALITY

PTT 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 PTT Smart Button to enable instant message delivery, such as Push-to-Talk (PTT) keying and writes characteristics in order to control PTT Smart Button's features, such as double tap activation and led control.

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. PTT Smart Button will use a unique generated service identification number.

SERVICE 128-bit 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 PTT Smart Button starts with **ASB** following by 6-digit unique address, for example **ASB99C2F0**.

3.1. BUTTON MASK

This characteristic shows PTT 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 16-bit 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 PTT 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 16-bit 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 PTT 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).

3.3. CONFIG MASK

This characteristic allows the control of various PTT 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
RESERVED 1	1	0x02
RESERVED 2	2	0x04
EXTRA KEYS SEND ONLY PTT1	3	0x08
RESERVED 3	4	0x10
RESERVED 4	5	0x20
RESERVED 5	6	0x40
RESERVED 6	7	0x80

READ/WRITE 16-bit 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.

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.

3.4. COMMON MASK

This characteristic contains the common statuses and configurations of PTT Smart Button. It is an 8-bit unsigned integer, with following bit definitions:

FEATURE	Bit[0...7]	Hex value
KEEP ALIVE	0	0x01
RESERVED 1	1	0x02
SEND EMERGENCY AFTER LINK LOSS	2	0x04
RESERVED (DO NOT CHANGE)	3	0x08
RESERVED (DO NOT CHANGE)	4	0x10
RESERVED (DO NOT CHANGE)	5	0x20
CRITICAL BAT	6	0x40
LOW BATTERY	7	0x80

READ/WRITE/NOTIFY 16-bit UUID: **0x57A7**

KEEP ALIVE; this bit is toggled on every 2,5 second to get application notified that we are connected.

SEND EMERGENCY AFTER LINK LOSS; when this bit is set, send emergency after link loss is activated. Emergency is sent if emergency button is pressed during link loss.

CRITICAL BATTERY; this bit is set when battery voltage level drops below 1.8 V (7%).

LOW BATTERY; this bit is set when battery voltage level drops below 2.2 V (40%).

3.5. ACCELEROMETER MASK

This characteristic shows the statuses of PTT Smart Button. It is an array of 8-bit unsigned integers, with following definitions:

FEATURE	Array[0...7]	Possible value
DOUBLE TAPPED	0	0 – 1
DOUBLE TAPPING	1	0 – 1
DOUBLE TAPPING SEND BUTTON	2	0 – 1
RESERVED 1	3	0 – 255
RESERVED 2	4	0 – 255
RESERVED 3	5	0 – 255
BUTTON	6	0 – 6

PRESS TIME	7	1 – 61
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READ/WRITE/NOTIFY 16-bit UUID: **0x8652**

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.

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.

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”.

3.6. SW VERSION CHARACTERISTIC

This characteristic will allow to read the PTT Smart Button’s internal SW version (array of 8-bit unsigned integers).

READ 16-bit UUID: **0xC0FF**



4. DEVICE FW UPDATES

BLE will enter DFU mode by holding emergency button down when inserting battery to PTT 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.