

MCU Config Tool User Manual

V3.6

2023/03/28

Revision History

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1 Overview

This article explains the functions, usage and settings of *MCU Config Tool* for Realtek Bluetooth Audio Chip (8753B /8773B/8763C/8773C Series).

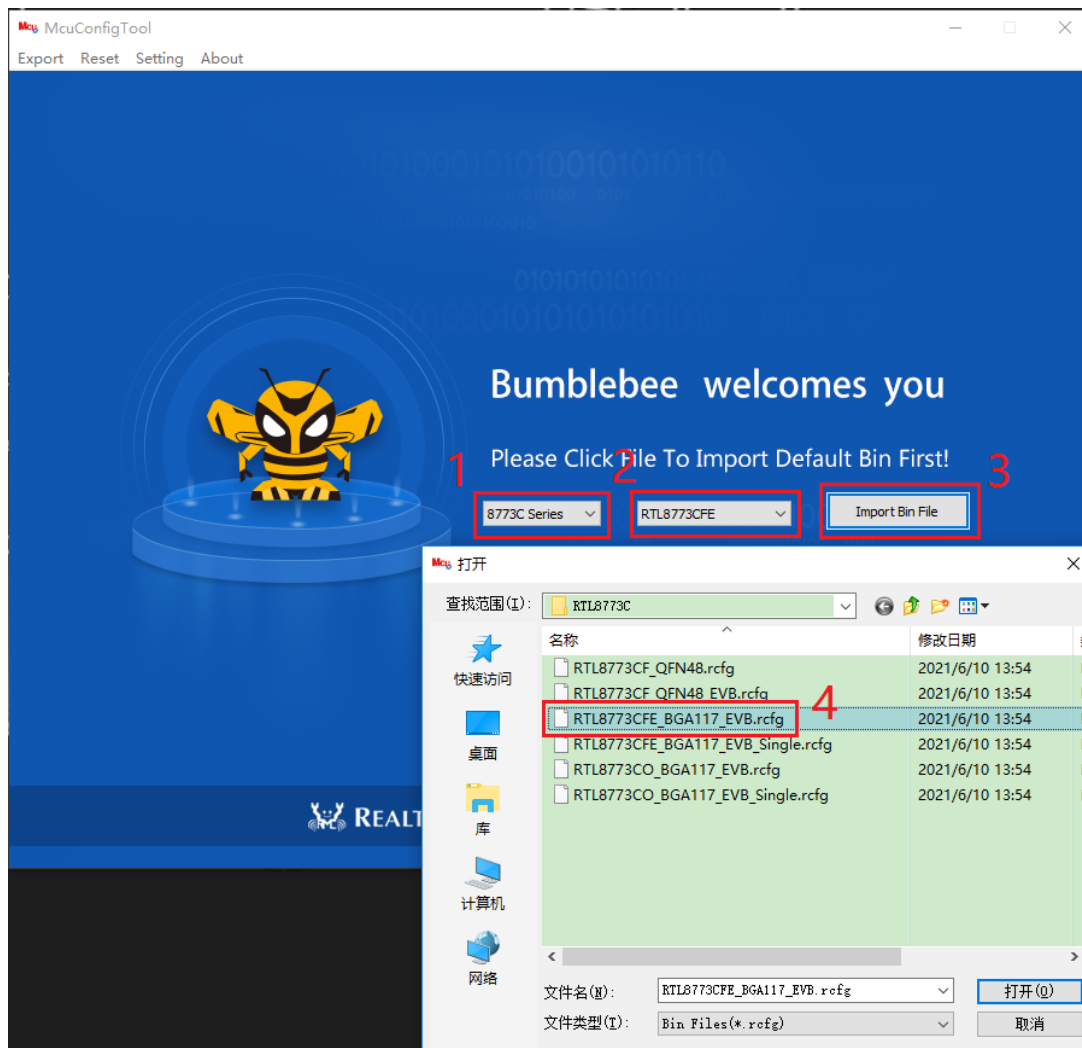
Configurable BT settings and peripheral control are offered by REALTEK Bluetooth MCU. By using *MCU Config Tool* during the development stage, the user can easily configure a number of MCU parameters.

2 Basic usage

MCU Config Tool divides the setting elements into various tabs, such as HW Feature, General, System Configuration, BR/EDR, LE, Audio, Charger, Peripheral, Ringtone, Key, LED, RWS, RF TX, Third Party, and so forth. These configurations will be described in the following sections.

2.1 Import

MCU Config Tool stores settings in *.rcfg files. There are four steps to load a rcfg file:

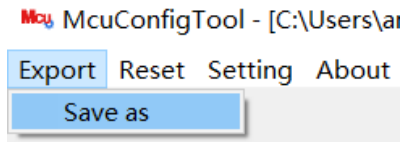


- 1) Select IC series (for example: 8773 C Series)
- 2) Select IC part number from the drop-down list;
- 3) Click "Import Bin File" button;

- 4) Choose the rcfg file. The rcfg file will be loaded if it matches the IC part number chosen in step 2; else, it will be denied.

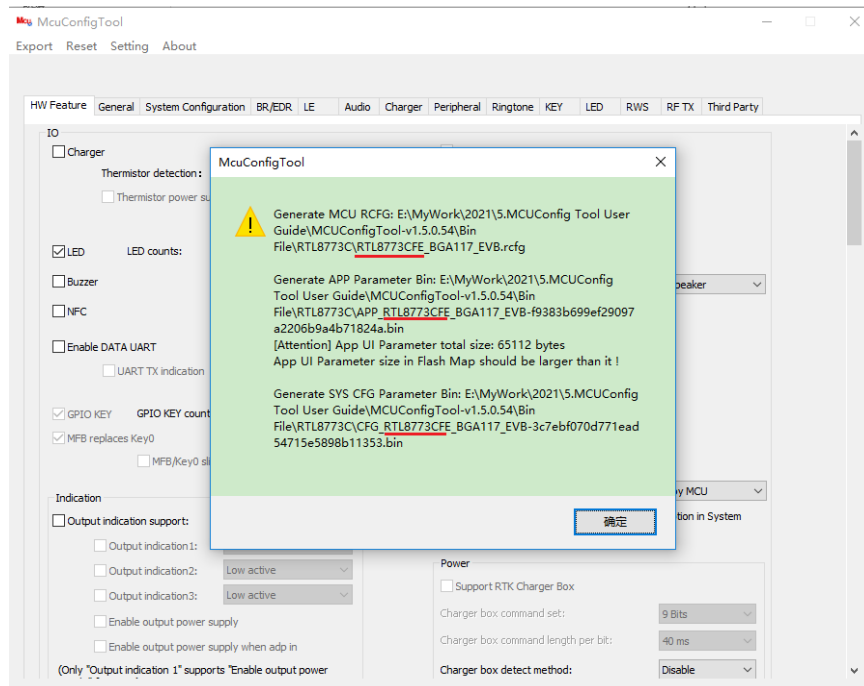
2.2 Export

The user can export this setting by clicking "Export" and then "Save as" after the configuration is finished.



Three files will be produced, and their names and locations will be shown in a pop-up box:

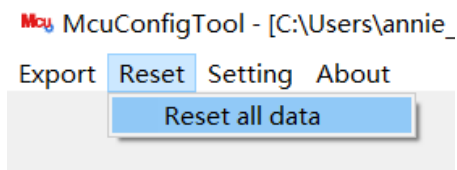
- 1) RCFG file: The rcfg file will keep track of all changes made to the tool's current parameters and can be utilized for the subsequent import. It is advised to include the IC part number in the rcfg name so that other users can identify it.
- 2) APP Parameter bin: This bin needs to be downloaded to the Bluetooth SOC.
- 3) SYS CFG Parameter Bin: This bin needs to be downloaded to the Bluetooth SOC.



2.3 Reset

If you need to import the rcfg file again while configuring, click "Reset" and then "Reset all data" in the

menu bar. Then, return to the main UI and select the desired rcfg file once more.



3 Detail Description

3.1 HW Feature

The tool's first tab, HW Feature, provides a comprehensive overview of hardware switches and PinMux options.

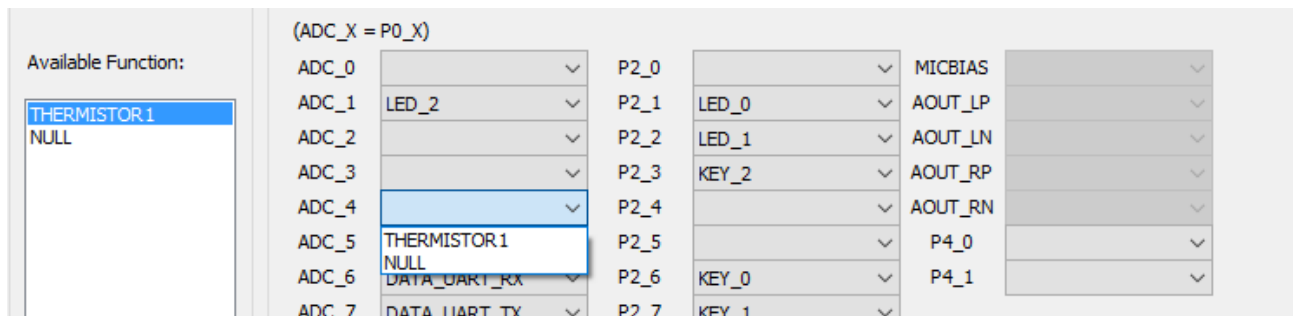
Some functionalities may be disabled or forbidden from configuration depending on the chip series or IC type.

3.1.1 IO

Charger

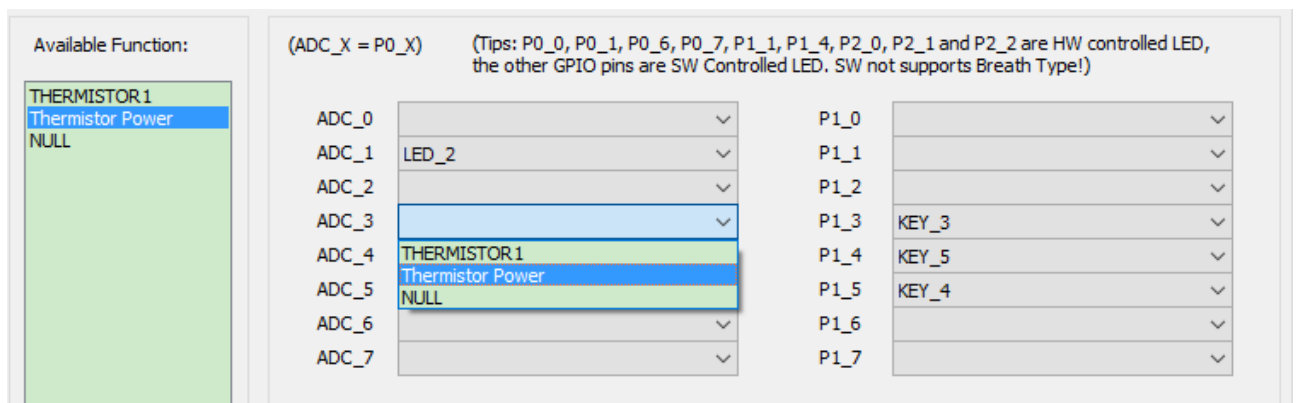
Charger: SoC has an integrated charger and a battery detecting feature. On the majority of mobile phones, you can immediately check the power of the device after connecting to the device.

Thermistor detection: Check the temperature of the battery. “None” is the default selection. An external thermistor is necessary if “One Thermal Detection” is used. Two external thermistors are needed if “Dual Thermal Detection” is chosen.



(ADC_X = P0_X)			
ADC_0		P2_0	MICBIAS
ADC_1	LED_2	P2_1	AOUT_LP
ADC_2		P2_2	AOUT_LN
ADC_3		P2_3	AOUT_RP
ADC_4		P2_4	AOUT_RN
ADC_5	THERMISTOR1	P2_5	P4_0
ADC_6	NULL	P2_6	P4_1
ADC_7	DATA_UART_RX	P2_7	

Thermistor power supply: If this option is checked, the user can configure "Thermistor power" to use a certain pin as the thermistor's power source control.



(ADC_X = P0_X)			
ADC_0		P1_0	
ADC_1	LED_2	P1_1	
ADC_2		P1_2	
ADC_3		P1_3	KEY_3
ADC_4	THERMISTOR1	P1_4	KEY_5
ADC_5	Thermistor Power	P1_5	KEY_4
ADC_6	NULL	P1_6	
ADC_7		P1_7	

(Tips: P0_0, P0_1, P0_6, P0_7, P1_1, P1_4, P2_0, P2_1 and P2_2 are HW controlled LED, the other GPIO pins are SW Controlled LED. SW not supports Breath Type!)

LED

Up to three LEDs can be selected, though this number can be decreased if necessary to meet the product pin distribution. The LED Tab allows you to control each LED's blinking behavior.

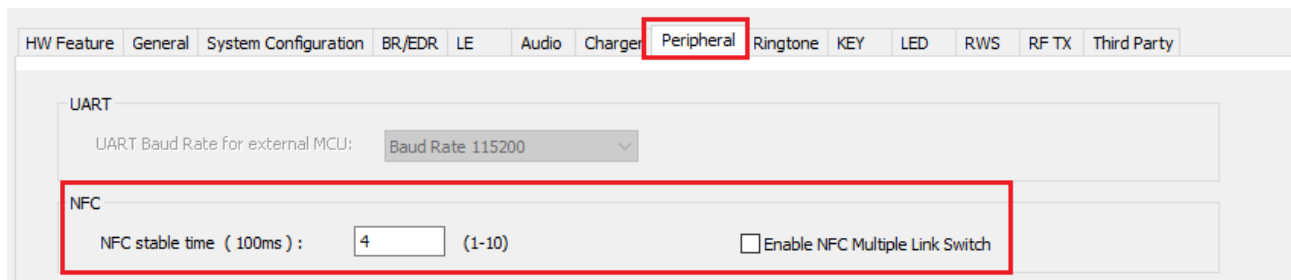


Buzzer

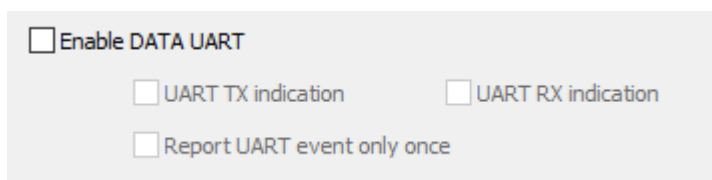
Provides a buzzer function to alert the user.

NFC

The NFC function will be activated if this option is checked, and two NFC options will be offered on the Peripheral page after choosing a Pin for NFC.



DATA UART



UART TX indication: Prior to data transfer, the UART WAKE UP TX of the BT chip should be used to wake up the external MCU. The UART WAKE UP TX will output at a low level when the external MCU is woken up, and the external MCU must be set to wake-up low.

UART RX indication: If the external MCU utilizes its pin to wake up the BT chip prior to data transfer, this option needs to be checked. It indicates that the BT chip can be awakened by the external MCU. The BT chip will be awakened by the UART WAKE UP RX after it receives the low level output of the external MCU after the BT chip has gone to sleep.

Report UART event only once: When this option is selected, when the UART CMD is received, only one corresponding EVENT will be returned; if this option is not selected, it will be determined whether an EVENT ACK has been received. An 800ms timer will be initiated to retry up to three times if EVENT ACK is not received.

Enable One-Wire UART

Enable One-Wire UART: When this option is enabled, it can be used in conjunction with a specific MPPGTool and patch to achieve single line upgrade, as well as in conjunction with an intelligent charging box to achieve two-way communication between the charging box and the headset.

GPIO KEY

Up to 8 GPIO keys are supported.

GPIO key count: Select the number of keys that are supported in accordance with the product pin layout.

- 1) **MFB Replace Key0:** When this option is selected, MFB replaces key0 as a function key, allowing you to use it to perform any key0-assigned operations, including turning devices on and off and performing factory resets.
- 2) **KEY0 SLIDE switch:** Use key0 as an ordinary GPIO to perform the sliding switch, which is to turn the device on and off, when this option is selected.

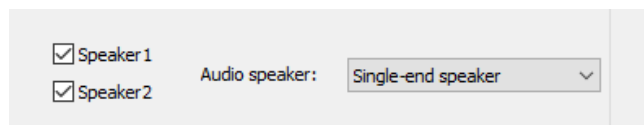
I2S

Enable I2S output conversion: Whether to support I2S output rate conversion.

External analog audio amplifier control: Whether to control the external amplifier.

Speaker

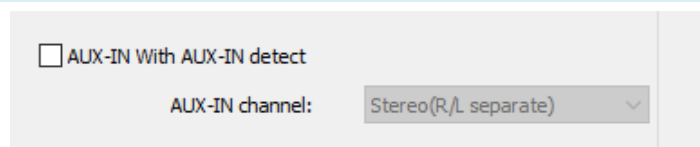
Set the speaker type with this option. Differential mode and Single-end mode are the default configurations.



Speaker configuration UI showing two checked checkboxes for 'Speaker 1' and 'Speaker 2'. To the right, the 'Audio speaker:' dropdown menu is set to 'Single-end speaker'.

A UX-IN with AUX-IN detect

Value	Description
Not checked	There is no support for the aux-in feature in this product.
Checked	This product supports aux-in feature



AUX-IN configuration UI showing an unchecked checkbox for 'AUX-IN With AUX-IN detect'. Below it, the 'AUX-IN channel:' dropdown menu is set to 'Stereo(R/L separate)'.

SPDIF

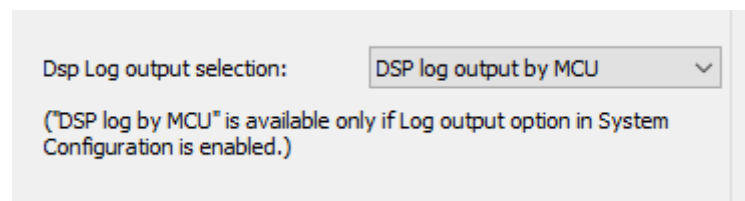
Value	Description
Not checked	There is no support for the SPDIF feature in this product.
Checked	This product uses SPDIF function

IAP

Set whether to support iOS iAP. For specific settings, refer to the SDK Document³

DSP log output selection

Select the DSP debug log's output mode and decide whether to open it.

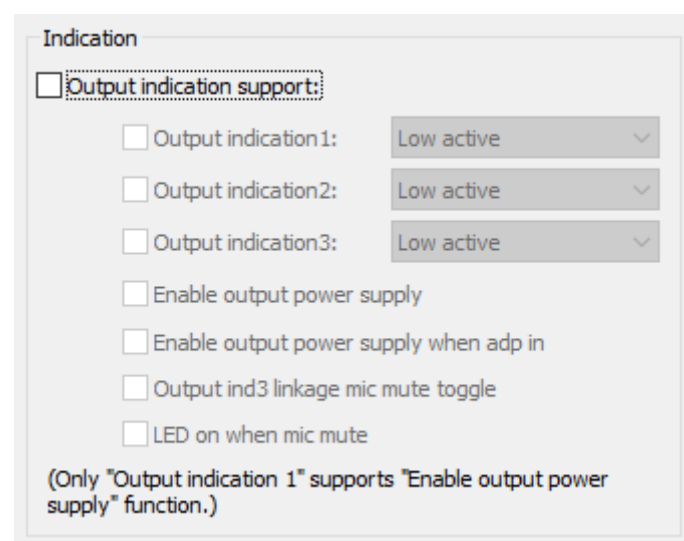


Dsp Log output selection: DSP log output by MCU ▼

(“DSP log by MCU” is available only if Log output option in System Configuration is enabled.)

Value	Description
NO DSP log output	DSP log is not enabled
DSP raw data output by UART	DSP log is output via a special DSP UART pin, which the user must specify in PinMux.
DSP log output by MCU	Along with the MCU log, the DSP log is output (provided that the MCU Log is turned on)

Indication



Indication

☐ **Output indication support:**

☐ Output indication1: Low active ▼

☐ Output indication2: Low active ▼

☐ Output indication3: Low active ▼

☐ Enable output power supply

☐ Enable output power supply when adp in

☐ Output ind3 linkage mic mute toggle

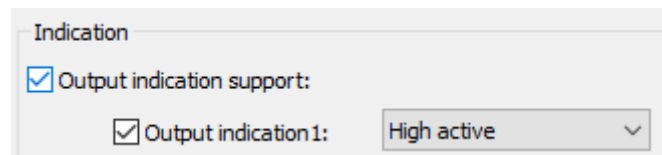
☐ LED on when mic mute

(Only "Output indication 1" supports "Enable output power supply" function.)

Indication function:

Three groups of output indication can be chosen when the **Output Indication support** option has been checked. The corresponding GPIO Pin must be chosen in the PinMux option for each group checked, and the Active Level can be set. The output of the Pin will cycle through the relevant Key operation when the MMI is given. Note: Only **Output indication1** can be used as Power Supply pin.

Enable output power supply: The output of indication1 can be used as a power supply output when the option in the following figure is chosen, and the pin's capacity to drive a load is also boosted from its initial value of 4mA to 16mA.



Enable out put power supply when adaptor in: The output of indication1 will continue to output power while the adaptor is plugged in if this option is checked, even if "**Enable output power supply**" is deactivated.

Output ind3 linkage mic mute toggle:

Note:

1. Requires 8753BAU Dongle
2. This option can only be checked after checking "**Output indication3**"
3. It is linked with the option "**LED on when mic mute**"

If this option is selected, the external LED connected via the GPIO configured in **Output indication3** will be polarity-adjusted depending on whether the headset microphone is muted or not.

No matter if the headset microphone is muted or not, the gpio settings in **Output indication3** will be unaffected if this option is not chosen.

When this option is checked, it can be set as follows with "**LED on when mic mute**":

If the **LED on when mic mute** is checked, when the headset microphone is mute, set the gpio to the active polarity (LED on), and when umute, set the gpio to the inactive polarity (the LED is dark).

If the LED on when mic mute is not checked, when the headset microphone is mute, set the gpio to the inactive polarity (the LED is dark), and when it is umute, set the gpio to the active polarity (the LED is bright).

Power

Power

☐ Support RTK Charger Box

Charger box command set: 9 Bits

Charger box command length per bit: 40 ms

Charger box detect method: Disable

Power on when taken out of charger box: Disable

Power off when put into charger box: Disable

☐ First time engagement only by 5V command set

☐ Enter PCBA shipping mode by battery protect IC

☐ Disallow charging led indication before power off

☐ Power off immediately when close case

☐ Do not auto power off when case not close

☐ Exit airplane when into charger box

☐ Smart charger control

Charger disable threshold(1~100): 30

Charger enable threshold(1~100): 40

- 1) **Support RTK Charger Box:** RTK smart boxes are supported if this option is checked. The smart box can transmit commands through CMD to do things like open and close the cover, pair with devices, perform a factory reset, etc.
- 2) **Charger box command set:** The smart box sends the bit number of the command; it presently supports 9bit and 15bit, with 9bit being the default.
- 3) **Charger box command length per bit:** the time for the corresponding bit in the smart box to send the cmd, the default is 20ms
- 4) Select One-Wire UART mode to receive Charger Box command after checking Enable One-Wire UART in HW Feature. You must synchronize the following settings at this time.

1. Check the Adapter IO support and set the in/out debounce duration on the Charger page.

Adaptor IO support: Yes

ADP IO Low to High Debounce Time 60MS

ADP IO High to Low Debounce Time 60MS

2. On the Peripheral page, configure the UART Baud Rate.

UART

UART Baud Rate for external MCU:

Baud Rate 115200

Console Mode:

Binary Mode

3.Set pinmux: Because VADP IO is required to detect arriving and outgoing boxes in the RTK Smart ChargerBox scenario, the pinmux of One wire UART is now connected to a particular pad.

For 87x3e series ICs, bound to P10_0 pad.

For 87x3d series ICs, bound to P_ UART pad.

For 87x3g series IC, bound to P10_0 pad.

- 5) If the HW Feature Page's Charge option is checked, the charging module will start, and "Adaptor Detect" options will be added to the Charge Box detect method. The standard earbuds are turned off when they are in the box and on when they are taken out. You can also turn the power on and off using the three pins on the charging box. Customers can also make modifications based on their requirements.

Charger box detect method:

Disable

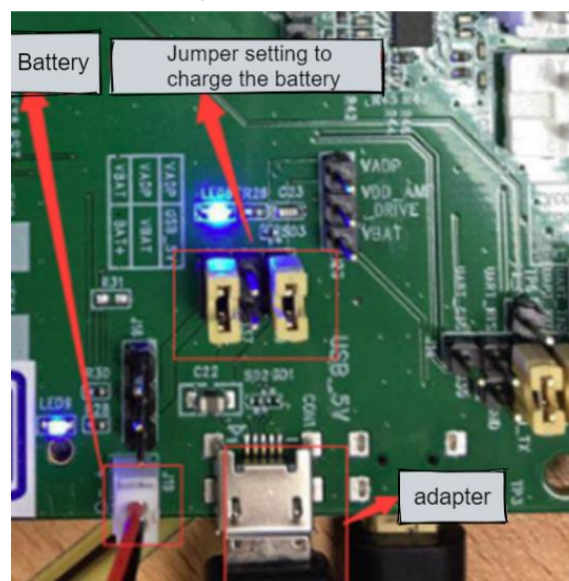
Power on when taken out of charger box:

Adaptor Detect

Power off when put into charger box:

3Pin GPIO

If Adaptor Detect is selected, the Evb wiring is as follows:



If 3Pin is chosen, for example, P0_2, we can control the device's power on or off by connecting or disconnecting this pin from GND.

☐ Enable output power supply when adp in
 (Only "Output indication 1" supports "Enable output power supply" function.)

Charger box command length per bit:

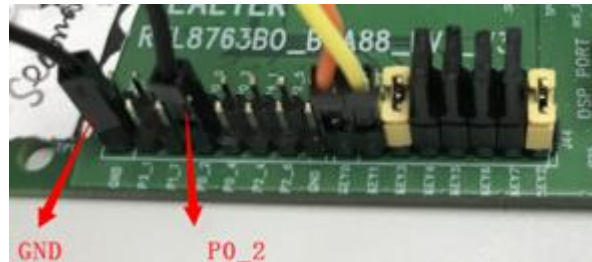
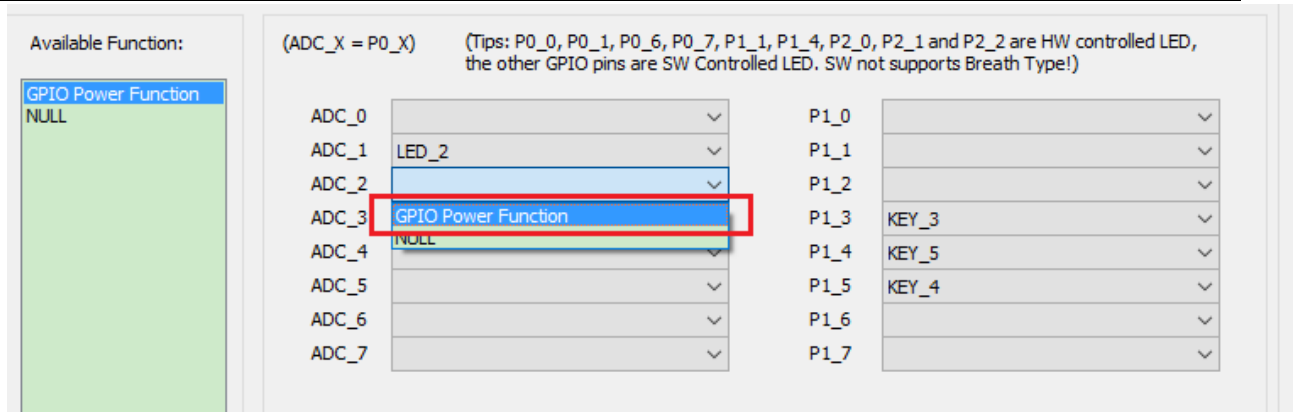
40 ms

Charger box detect method:

3Pin GPIO

Power on when taken out of charger box:

Enable



- 6) **Power on when taken out of charger box:** the headset is turned on when taken out of the charging box
- 7) **Power off when put into charger box:** Power off when put into charger box
- 8) **First time engagement only by 5V command set:** If this option is selected and neither earbud is engaged, the device will wait to perform the first engage action until it receives the 5V command; otherwise, it will enter pairing mode. If this option is unchecked and neither earbud is engaged, the device will perform the first engage action right away.
- 9) **Enter PCBA shipping mode by battery protect IC:** Pull up the PCBA shipping mode pin to isolate the power of the BAT after receiving the corresponding RTK vendor instruction (example: AA XX 02 00 0C 0A, XX: sequence number) or Charger box command (0x08, 0x46).
- 10) **Disallow charging led indication before power off:** If this option is selected when using a smart charging box, the charging LED will not be displayed until the shutdown command is received after entering the box, and it will only be displayed after receiving the shutdown command. If this option is not selected, the earbud will display the charging LED 3 seconds after receiving the command from the charging box.
- 11) **Power off immediately when close case:** If this option is selected, it will turn off after 3 seconds of receiving the command to close the cover; otherwise, it will remain unconnected for 5 seconds after receiving the command, and then turn off after 30 seconds..
- 12) **Do not auto power off when case not close:** The earbud won't switch off after being placed in the case if this option is checked; otherwise, it will do so in 2 minutes.
- 13) **Exit airplane when into charger box:** When this option is selected and the earbud is in airplane mode when it is placed inside the charging box but the lid is not closed or shut halfway, the earbud will automatically switch to normal mode when it is removed from the charging box (this option is only active

when the smart charging box is utilized).

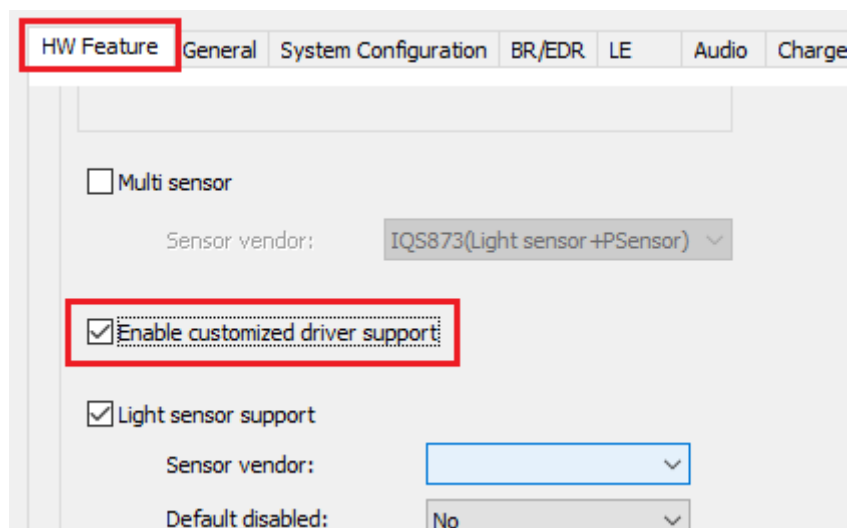
14) **Smart charger control:** When selected, the charging box power command allows the headset to choose whether or not to charge (this option needs to check the smart charging box as well)

- **Charger disable threshold:** When the battery of the charging box alerting the earbud drops below this level, the earbud will stop charging.
- **Charger enable threshold:** When the battery of the charging box that alerts the earbud exceeds this threshold, the earbud will begin charging.

Note: The earbud will enter power down mode in addition to turning off the charging function when the charging box is opened and the 0% command is issued. The charging box can also disable 5v output at this time to conserve energy.

Sensor

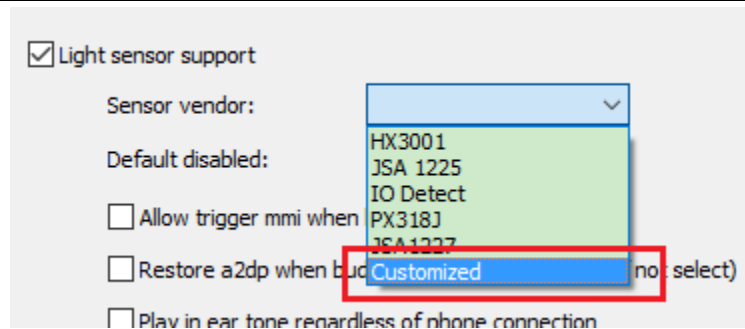
Enable customized driver support: Select the specific Driver support option for this Project. The customized driver is not supported if this option is not checked. The customized driver is supported if this option is checked.



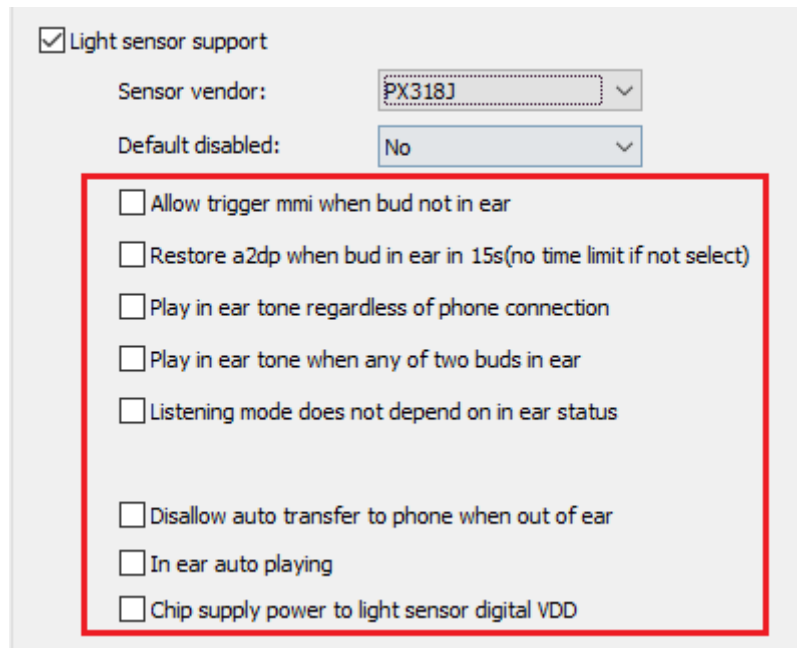
The Vendor sensor selections are expanded by the Light sensor, GSensor, and PSensor once the customized Driver has been chosen. There are some variations in the requirements. Various Sensors are discussed below individually:

Light Sensor

Vendor sensor adds Light sensor "Customized" field



The following UIs are available when the customer chooses "Light sensor support," which is identical to choosing other Light sensors:



There are no IO Pins that need to be configured together.

Example 1: Light sensor support is checked as below:



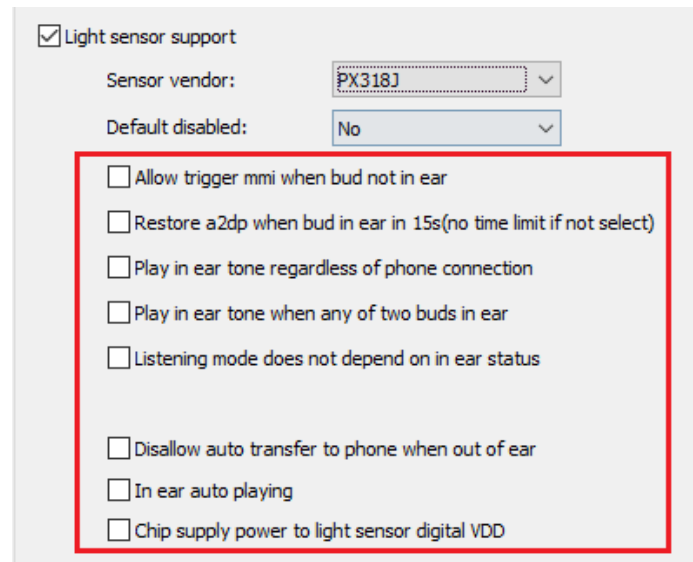
1. The SDK Supports the Sensor, for example PX318J is checked

Expected:

- Ext Image2, which even supports the JSA1227 light sensor, won't be activated
 - Hardware arrangement requires that PX318J and JSA1227 be placed on the same I2C Bus (SCL/SDA share Pin).
2. Ext Image2 supports light sensors (JSA1227) and the customized option in the Sensor Vendor has been checked

Expected:

- Customized external sensor will be used.
- The following options on can be used normally.



Example 2: Light sensor support is not checked and light sensor (JSA1227) is supported on Ext Image2



Expected:

- External Sensor will not be enabled

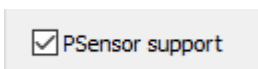
PSensor

checking the P-Sensor checkbox , add the " Customized " option at the Sensor vendor



No need to provide IO interface settings when the Customized option is checked

Example 1: Psenor support is checked



1. Select the Sensor Support (for example IQS773 is checked)

Expected:

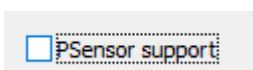
- Ext Image2 has support Psenor will not be enabled

2. If customer checked Customized and Ext Image2 supports P sensor

Expected:

- Will use external Sensor

Example 2: Psenor support is not checked

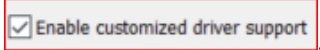


Expected:

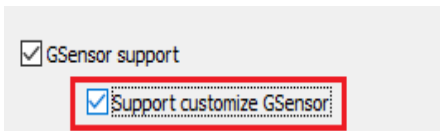
- External Sensor will not be enabled

GSensor

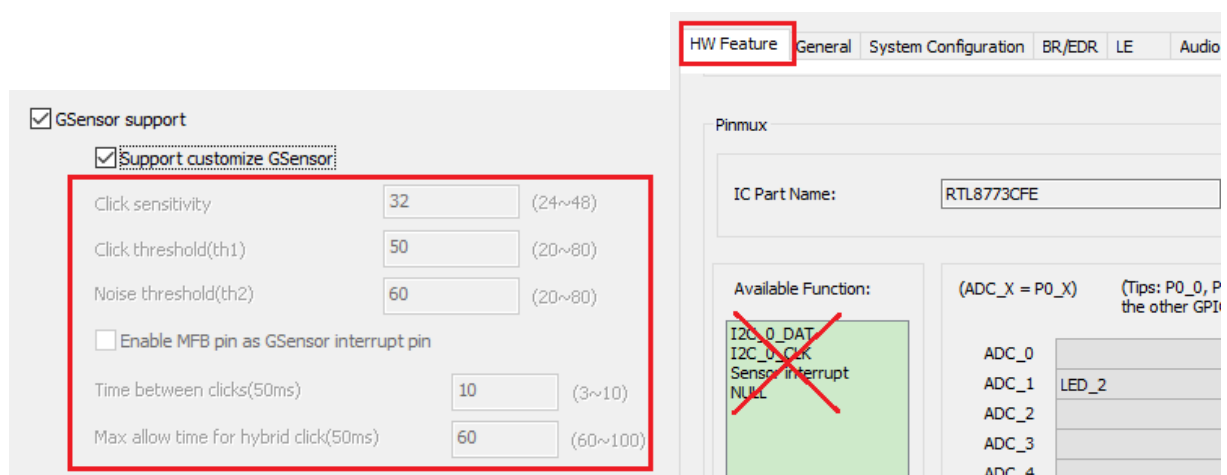
Example 1: Support Customized driver is checked as below,



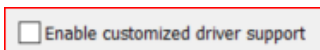
and Then, the G-Sensor would have an option to customize the sensor.



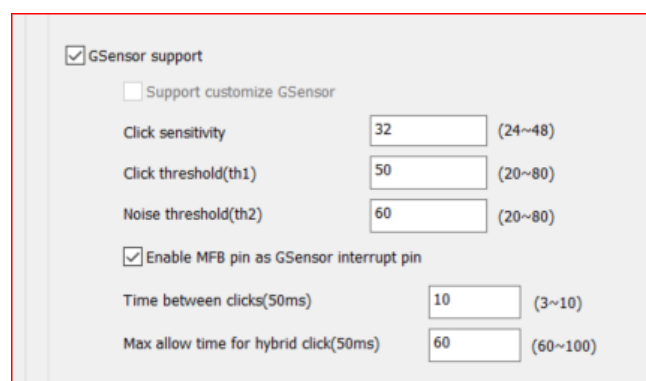
The content of the red box at the bottom left is grayed out and cannot be chosen by the user when the Customize sensor is selected, and Pinmux option is not necessary.



Example 2: Support Customized driver is not checked as below



, but check the option “Enable MFB pin as GSensor interrupt pin” , G-Sensor will then replace MFB interrupt, and they cannot coexist.



Example 3: Support Customized driver is not checked as below

☐ Enable customized driver support

, and the option “Enable MFB pin as GSensor interrupt pin” is not checked, G-Sensor will utilize MFB interrupt, and they can coexist.

☒ **GSensor support**

☐ Support customize GSensor

Click sensitivity
(24~48)

Click threshold(th1)
(20~80)

Noise threshold(th2)
(20~80)

☐ Enable MFB pin as GSensor interrupt pin

Time between clicks(50ms)
(3~10)

Max allow time for hybrid click(50ms)
(60~100)

Wheel support

If this option is checked, it means that volume control via the scroll wheel is supported; if it is not checked, it means that volume control via the scroll wheel is not supported.

4pogo Pin Download

- 1) Only check “**Enable 4pogo pin download**” option:
 - 1) “**Enable DATA UART**” is by default checked, grayed off, and cannot be modified;
 - 2) DATA UART RX and DATA UART TX have fixed configurations of P3 0 and P3, respectively.
- 2) Check “**Enable 4pogo pin download**” option and select “**3Pin GPIO**” in the Charger box detect method drop-down box:
 - 1) “**Enable DATA UART**” is by default checked, grayed off, and cannot be modified;
 - 2) DATA UART RX and DATA UART TX have fixed configurations of P3 0 and P3, respectively.
 - 3) P3 1 can be used as GPIO Power Function, and all other supported and accessible pins (apart from P3 0) can be programmed for this purpose.

☒ **Enable 4pogo pin download**

P3_0	DATA_UART_RX	▼
P3_1	DATA_UART_TX	▼
P3_2		▼
P3_3		▼

MCU HW Reset

As soon as the earbud is inserted into the box after checking this option, the specified pin will start to emit a 10 Hz square wave. The charging box will send the earbud a reset signal to reset the earbud if it is unable to receive the 10Hz square wave.

☐ External MCU hw reset support

External flash support

When this option is not selected, external flash cannot be read, written to, or erased;

When this option is selected, external flash can be read, written to, or erased;

The default setting is not checked.

CAP Touch

Cap Touch Enable: To activate the Cap touch feature, select “Enable”; this choice cannot be changed via OTA.

Channel Type:

This setting will restrict how pinmux is set because Channel 0 correlates to ADC 0, Channel 1 corresponds to ADC 1, and so on.

Channel Type can be set to “Touch detect”, “In ear detect channel 1”, “In ear detect channel 2”.

Touch detect: replace the key0 button.

Light detect pin num: the number of pins for light detection.

In ear detect channel: "Light detect pin num" determines how many detect channels are supported.

SDIO Pinmux

Available SDIO group select options are: disable, group0, group1.

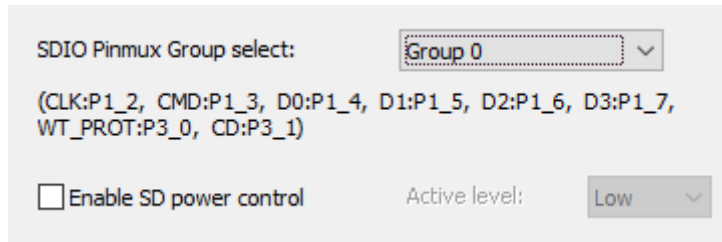
If “disable” is selected, it means that SDIO interface is not enabled;

If "group0" is chosen, which implies using SDIO group0 interface, it will use the SDIO interface pins (group0: CLK: P1_2, CMD: P1_3, D0:P1_4, D1:P1_5 D2:P1_6 D3:P1_7, WT PROT: P3_0, CD: P3_1);

If "group1" is chosen, which implies using SDIO group1 interface, it will use the SDIO interface pins (group1:

CLK: P2_2, CMD: P2_1, D0:P2_4, D1:P2_5 D2:P2_6, D3:P2_7, WT_PROT: P2_0, CD: P2_3);

When Enable SD power control is unchecked, additional SD power is not enabled and no control pin is necessary; however, when it is checked, additional SD power is enabled and a pin must be designated as SD power control usage. You can either set this pin to low or high. When you select low, the SD card is powered when it is at a low level and is not powered when it is at a high level. Conversely, when you select high, the SD card is powered when it is at a high level and is not powered when it is at a low level.



Slide switch 0/1

The toggle switch is supported for function switching if slide switch 0/1 support is checked, in which case you can continue configuring the appropriate High/Low Action; if it is not checked, however, the toggle switch is not necessary.

Mic unmute/mute option for slide switch:

The following slide switch settings are allowed:

High: Mic mute / Low: Mic unmute => When the slide switch pinmux pad is pulled high, mic mute would be enabled; when the pad is pulled low, mic mute would be disabled.

High: Mic unmute / Low: Mic mute => When the slide switch pinmux pad is pulled low, mic mute would be enabled; when the pad is pulled high, mic mute would be disabled

Buck support

Choose the buck driving vcore2 vendor. There are two options: 1.TPS628610, 2.APW7564.

Checking Buck support, choosing the appropriate buck vendor, and choosing the buck vendor in the associated QVL are required if DSP2 is to be supported.

For communication, different ext bucks must be configured with the appropriate pins, hence the corresponding pinmux must be properly set. Example:

I2C 0 DAT, I2C 0 CLK, BUCK PWR EN, and BUCK_PWR_SEL must be configured in TPS628610; on the equivalent EVB, these parameters are set by default to P0_1, P0_0, P5_1, and P5_0 respectively.

P4_0: "Pin P4_0 connected to power of SD Card on RTK EVB and is now configuring to other functions. If configure for RTK EVB, please change pins."

P5_0 except BUCK_PWR_SEL: "Pin P5_0 connected to power select of buck on RTK EVB and is now

configuring to other functions. If configure for RTK EVB, please change pins."

MIC

The SoC's microphone can be set up to fit particular design specifications.

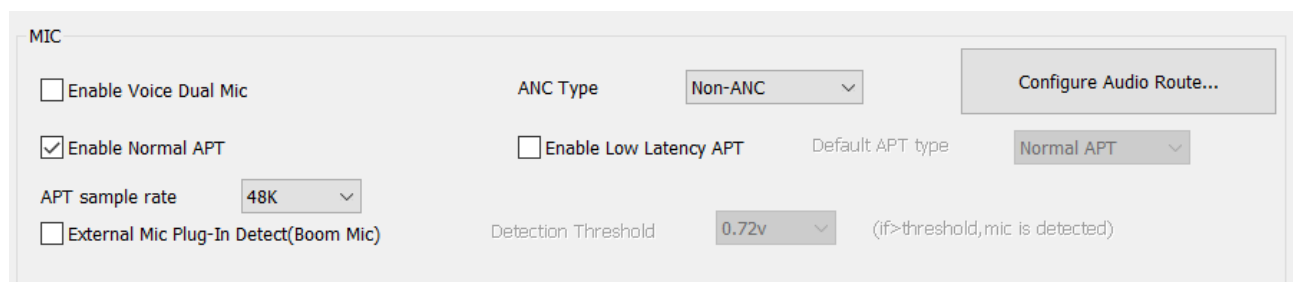
1) Auxiliary Voice Mic options will be shown when "Enable Voice Dual Mic" is enabled. Depending on their needs, users can choose between analog and digital microphones.

2) Users can configure the required microphone in accordance with the ANC situation.

3) Depending on their preferences, users can choose between Low Latency APTs and Normal APTs.

4) APT sample rate: Config the normal APT sample rate. There are two options can be selected: 48KHz and 96KHz.

5) External Mic Plug-in Detect(Boom Mic): When [External Mic Plug-In Detect] is checked, there are two options need to be set. First, select the threshold in the [Detection Threshold] menu. If the threshold is exceeded, the External Boom Mic will be judged as plugged. Second, configure the [Boom_Mic] pinmux. Only the ADC pins can be selected as [Boom_Mic].



3.1.2 Pinmux

Here is a list of all configurable pins and pads. The available pins vary amongst SoCs, and the available pad functions are associated with DSP and peripheral capabilities. The related configuration item and APP variable table is as follows:

HW F eature		
<input checked="" type="checkbox"/> Charger Thermistor detection: <div>None None One thermal detection Dual thermal detection</div>	charger_support	Setting the power supply's functions (can turn on charging and battery detection functions)
<input checked="" type="checkbox"/> LED LED counts: <div>3</div>	led_support led_0_pinmux led_1_pinmux led_2_pinmux	LED settings

<input type="checkbox"/> Buzzer	buzzer_support (same as pwm_support) pwm_pinmux	Buzzer settings
<input checked="" type="checkbox"/> Enable DATA UART	enable_data_uart data_uart_tx_pinmux data_uart_rx_pinmux	Data uart configuration
<input type="checkbox"/> UART TX indication <input type="checkbox"/> UART RX indication	enable_tx_wake_up enable_rx_wake_up tx_wake_up_pinmux rx_wake_up_pinmux	Application scenario example: You can pull high/ low to exit dlps when doing uart communication
<input checked="" type="checkbox"/> GPIO KEY GPIO KEY counts: 6 <input type="checkbox"/> KEY0 (MFB) SLIDE switch	key_gpio_support key_pinmux[8] key_enable_mask enable_slide_switch_de tect	Gpio key settings
<div> <div>Pinmux</div> <div> IC Part Name: RTL8763B0 </div> <div> <div>Available Function:</div> <div> KEY_0 KEY_1 KEY_2 KEY_3 KEY_4 KEY_5 Output indication3 NULL </div> </div> <div> <div>(ADC_X = P0_X)</div> <div> <div> ADC 0 ADC 1 ADC 2 ADC 3 ADC 4 ADC 5 ADC 6 ADC 7 </div> <div> <div>LED 2</div> <div>LED_1</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> <div> <div>P2 0 P2 1 P2 2 P2 3 P2 4 P2 5 P2 6 P2 7</div> <div> <div>MICBIAS</div> <div>LED_0</div> <div>LED_1</div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> <div> <div>P3 0 P3 1 AUXIN R AUXIN L MIC1 P MIC1 N MIC2 P MIC2 N</div> <div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> </div> </div> </div> </div></div>	key_gpio_support key_pinmux[8] key_enable_mask	IO configure
<input type="checkbox"/> External analog audio amplifier control	ext_amp_boost_pinmux	External Amplifier Control Pin
<div> Charger box detect method: Disable Power on when taken out of charge: Adaptor Detect Power off when put into charger box: Disable <input type="checkbox"/> Only enable normal factory reset when in charger box </div>	box_detect_method gpio_box_detect_pinmu x enable_outbox_power_ on	Charging box detection method setting Auto switch settings

	enable_inbox_power_of f	
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3.2 Audio Route

Audio Route is mainly used to configure the SPORT (Serial Port) parameters and the logical IO attributes of the underlying physical data path.

3.2.1 MCLK

MCLK is mainly used to configure the master clock of the external device, e.g. PA, DAC and DSP. When the Codec in SPORTs block is configured for External selection, you need to configure the MCLK related configuration here.

☐ MCLK Enable
 1024KHZ

- 1) **MCLK Enable:** Check this option to indicate enable external MCLK configuration.
- 2) **Sample Rate:** Check MCLK Enable option, and the available sample rate items are 1 024 KHZ, 1 411.2 KHZ, 2 048 KHZ, 2 822.4 KHZ, 3 072 KHZ, 4096 KHZ, 5 644.8 KHZ, 6 144 KHZ, 8 192 KHZ, 1 1289.6 KHZ, 1 2288 KHZ, 1 6384 KHZ, 2 2579.2 KHZ, 2 4576 KHZ, 3 2768 KHZ.

3.2.2 SPORTs

SPORTs		Bridge	Mode	Format	Data Length	Channel Length	Sample Rate
<input checked="" type="checkbox"/> SPORT 0	RX	Internal	TDM4	I2S	24 BIT	32 BIT	Dynamic
Role	Master	TX	Internal	TDM2	I2S	24 BIT	32 BIT
<input checked="" type="checkbox"/> SPORT 1	RX	Internal	TDM4	I2S	24 BIT	32 BIT	Dynamic
Role	Master	TX	Internal	TDM2	I2S	24 BIT	32 BIT
<input type="checkbox"/> SPORT 2	RX	External	TDM2	I2S	16 BIT	24 BIT	Dynamic
Role	Master	TX	External	TDM4	I2S	16 BIT	24 BIT
<input type="checkbox"/> SPORT 3	RX	External	TDM2	I2S	16 BIT	24 BIT	Dynamic
Role	Master	TX	External	TDM4	I2S	16 BIT	24 BIT

- 1) **SPORT 0/1/2/3:** Check this option to indicate that enabling the corresponding SPORT.
- 2) **Codec:** Configure the Codec as Internal routing or External routing. Note that when this option is configured as External, you need to configure the corresponding pinmux in the HW Feature tab.

HW Feature | Audio Route | General | System Configuration | BR/EDR | LE | Audio | Charger | Peripheral | Ringtone | KEY | LED | RWS | RF TX | RHE | Third Party

Pinmux

IC Part Name:

Available Function:

(ADC_X = P0_X) (Tips: P0_0, P0_1, P0_6, P0_7, P1_1, P1_4, P2_0, P2_1 and P2_2 are HW controlled LED, the other GPIO pins are SW Controlled LED. SW not supports Breath Type!)

ADC_0	<input type="text" value="LED_2"/>	P1_0	<input type="text" value="KEY_6"/>
ADC_1	<input type="text" value="LED_2"/>	P1_1	<input type="text" value="KEY_3"/>
ADC_2	<input type="text" value="LED_2"/>	P1_2	<input type="text" value="KEY_5"/>
ADC_3	<input type="text" value="LED_2"/>	P1_3	<input type="text" value="KEY_4"/>
ADC_4	<input type="text" value="LED_2"/>	P1_4	<input type="text" value="KEY_4"/>
ADC_5	<input type="text" value="LED_2"/>	P1_5	<input type="text" value="KEY_4"/>
ADC_6	<input type="text" value="LED_2"/>	P1_6	<input type="text" value="KEY_4"/>
ADC_7	<input type="text" value="LED_2"/>	P1_7	<input type="text" value="KEY_4"/>
P2_0	<input type="text" value="LED_0"/>	P3_0	<input type="text" value="SPORT0_LRC"/>
P2_1	<input type="text" value="LED_0"/>	P3_1	<input type="text" value="SPORT0_BCLK"/>
P2_2	<input type="text" value="LED_1"/>	P3_2	<input type="text" value="SPORT0_DACDAT"/>
P2_3	<input type="text" value="LED_1"/>	P3_3	<input type="text" value="SPORT0_ADCDAT"/>
P2_4	<input type="text" value="KEY_1"/>	P3_4	<input type="text" value="KEY_4"/>
P2_5	<input type="text" value="KEY_2"/>	P3_5	<input type="text" value="KEY_4"/>
P2_6	<input type="text" value="KEY_2"/>	P3_6	<input type="text" value="KEY_4"/>
P2_7	<input type="text" value="KEY_2"/>	P3_7	<input type="text" value="KEY_4"/>

- 3) **Role:** Configure the SPORT role. The optional values are Master and Slave.
- 4) **Bridge:** Configure whether you want to connect the TX/RX direction of SPORT to an external device. If it is set to "External", the SPORT is connected to the external device. If it is set to "Internal", the SPORT is connected to the hardware CODEC inside the IC.
Note: When it is set to "External", you need to configure the corresponding pinmux in the "HW Feature" tab.
- 5) **RX/TX Mode:** Configure the transmission mode in the TX and RX directions of the SPORT. The optional values are TDM 2/4/6/8.
- 6) **RX/ TX Format:** Configure the data format of the TX and RX directions of the SPORT. The optional values are I2S /Left Justified/PCM_A/PCM_B.
- 7) **RX /TX Data Length:** Configure the data length in the TX and RX directions of the SPORT. The optional values are 8/16/20/24/32 BIT.
- 8) **RX /TX Channel Length:** Configure the channel length in the RX and TX directions of the sport. The optional value is 1/6/20/24/32 BIT.
- 9) **RX /TX Sample Rate:** Configure the sample rate in the TX and RX directions of the SPORT. The optional values are 8/16/32/44.1/48/88.2/96/192/12/24/ 11.025/22.05 KHZ. Note that only when Enable I2S output rate convert option in the Audio tab is checked, this configuration can take effect. This linkage configuration will be removed in the future.

HW Feature	Audio Route	General	System Configuration	BR/EDR	LE	Audio	Charger	Peripheral	Ringtone	KEY	LED	RWS	RF TX	RHE	Third Par
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Codec Output

☒ Enable I2S output rate convert

3.2.3 Audio Logic Device

Audio Logic Device supports the IO attributes configurations for Audio, Voice, Record, Line-in, Ringtone, VP, APT, LLAPT, ANC and VAD data streams.

Audio Playback Category

Audio Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
Audio Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
Audio Primary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Audio Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0

Audio Playback Category supports Audio Primary SPK, Audio Secondary SPK, Audio Primary Reference SPK and Audio Secondary Reference SPK:

1. Audio Primary SPK is used to set the Audio Physical Route path of the primary SPK
2. Audio Secondary SPK is used to set the Audio Physical Route path of the secondary SPK
3. The Audio Primary Reference SPK is used to set the Audio physical AEC loopback path of the main SPK
4. The Audio Secondary Reference SPK is used to set the Audio physical AEC loopback path of the secondary SPK

Note: When the Record Primary Reference MIC and Record Secondary Reference MIC corresponding to the Record Category are also configured, the AEC loopback path between Audio and Record will be opened.

Voice Category

Voice Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
Voice Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
Voice Primary Reference SPK	<input checked="" type="checkbox"/>	No Speaker	DAC 1	SPORT 0	TX Channel 2
Voice Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Voice Primary Reference MIC	<input checked="" type="checkbox"/>	No Mic	ADC 3	SPORT 0	RX Channel 3
Voice Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Prime Voice Mic (Voice Primary MIC)	<input checked="" type="checkbox"/>	Amic1 Differential	ADC 0	SPORT 0	RX Channel 0
Auxiliary Voice Mic (Voice Secondary MIC)	<input type="checkbox"/>	No Mic	ADC 1	SPORT 0	RX Channel 1
Voice Fusion MIC	<input type="checkbox"/>	No Mic	ADC 2	SPORT 0	RX Channel 2
Voice Bone MIC	<input type="checkbox"/>	No Mic	ADC 2	SPORT 0	RX Channel 2

Voice Category supports Voice Primary SPK, Voice Secondary SPK, Voice Primary Reference SPK, Voice Secondary Reference SPK, Voice Primary Reference MIC, Voice Secondary Reference MIC, Voice Primary MIC, Voice Secondary MIC, Voice Fusion MIC and Voice Bone MIC:

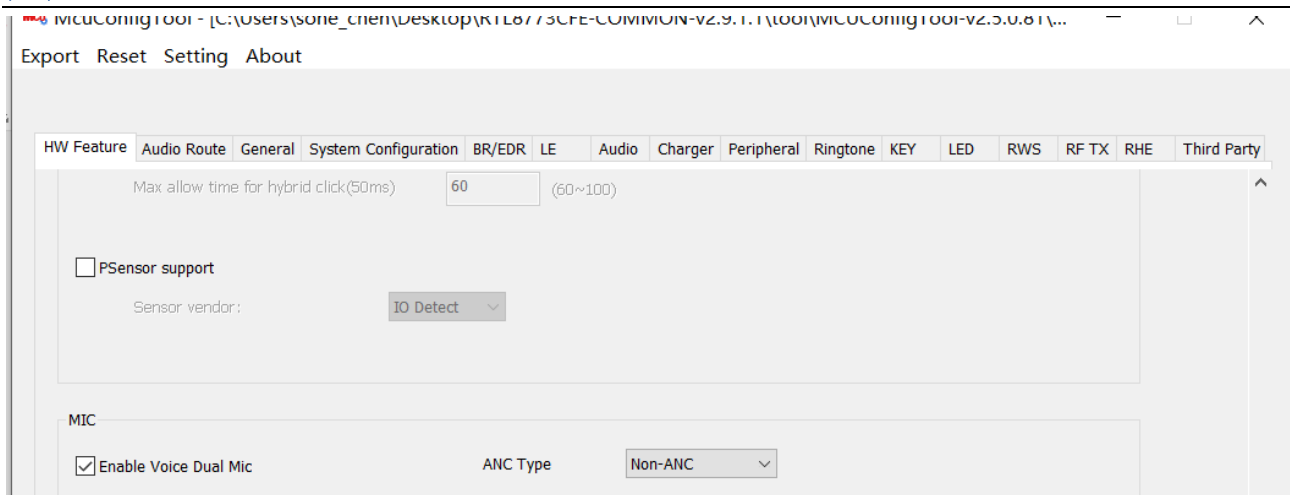
1. The Voice Primary SPK is used to set the voice physical route of the primary SPK.
2. The Voice Secondary SPK is used to set the Voice Physical Route of the secondary SPK
3. Voice Primary Reference SPK is used to set the voice physical AEC loopback path of the primary SPK
4. The Voice Secondary Reference SPK is used to set the Voice physical AEC loopback path of the secondary SPK
5. Voice Primary Reference MIC is used to set the Voice physical AEC loopback path of the primary MIC
6. Voice Secondary Reference MIC is used to set the Voice physical AEC loopback path of the secondary MIC
7. Voice Primary MIC is used to set the voice physical route of the primary MIC
8. Voice Secondary MIC is used to set the Voice physical route of the secondary MIC
9. The Voice Fusion MIC is used to set the Voice physical route of the Fusion MIC。

Fusion Mic boosts the NR effect while using more energy. If "Fusion Mic" is enabled in McuConfigTool, make sure "NR function" is turned on in DspConfigTool.

10. The Voice Bone MIC is used to set the Voice physical route of the Bonse Sensor MIC

Note:

1. Voice Secondary MIC can be configured only when Enable Voice Dual Mic in the HW Feature tab is checked. This linkage configuration will be removed in future versions and will be opened directly on AudioRoute.



- When the Voice Primary Reference SPK and Voice Primary Reference MIC corresponding to the Voice Category, or the Voice Secondary Reference SPK and Voice Secondary Reference MIC are configured, the AEC loopback path will be opened.

Record Category

Record Primary MIC	<input checked="" type="checkbox"/>	Amic1 Differential	ADC 0	SPORT 0	RX Channel 0
Record Secondary MIC	<input type="checkbox"/>	No Mic	ADC 1	SPORT 0	RX Channel 1
Record Primary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Record Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Record Left AUX	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Record Right AUX	<input type="checkbox"/>	No Mic	ADC 1	SPORT 0	RX Channel 1
Record Fusion MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Record Bone MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0

Record Category supports Record Primary MIC, Record Secondary MIC, Record Primary Reference MIC, Record Secondary Reference MIC, Record Left AUX, Record Right AUX, Record Fusion MIC and Record Bone MIC:

- The Record Primary MIC is used to set the Record physical route of the primary MIC
- Record Secondary MIC is used to set the Record physical route of the secondary MIC
- Record Primary Reference MIC is used to set the Record physical AEC loopback path of the primary MIC
- Record Secondary Reference MIC is used to set the Record physical AEC loopback path of the secondary MIC
- Record Left AUX is used to set the Record Physical Route of the AUX IN left channel

6. Record Right AUX to set the Record Physical Route of the AUX IN right channel
7. Record Fusion MIC to set the Record physical route of Fusion MIC
8. Record Bone MIC to set the Record Physical Route of the Bonse Sensor MIC

Note: When the Primary Reference SPK and Secondary Reference SPK corresponding to the Audio Category, Ringtone Category or Voice Prompt Category are also configured, the AEC loopback paths between Audio and Record, Ringtone and Record, or Voice Prompt and Record will be opened.

Line-in Category

Line-in Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
Line-in Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
Line-in Primary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Line-in Primary Reference MIC	<input type="checkbox"/>	No Device	ADC 0	SPORT 0	RX Channel 0
Line-in Left AUX-IN	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Line-in Right AUX-IN	<input type="checkbox"/>	No Mic	ADC 1	SPORT 0	RX Channel 1
Line-in Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Line-in Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0

Line-in Category supports Line-in Primary SPK, Line-in Secondary SPK, Line-in Primary Reference SPK, Line-in Secondary Reference SPK, Line-in Left AUX-IN, Line-in Right AUX-IN, Line-in Primary Reference MIC and Line-in Secondary Reference MIC:

1. The Line-in Primary SPK is used to set the Line-in physical route of the primary SPK.
2. Line-in Secondary SPK is used to set the Line-in physical Route of the secondary SPK
3. The Line-in Primary Reference SPK is used to set the Line-in physical AEC loopback path of the primary SPK
11. The Line-in Secondary Reference SPK is used to set the Line-in physical AEC loopback path of the secondary SPK
12. Line-in Primary Reference MIC is used to set the Line-in physical AEC loopback path of the primary MIC
13. The Line-in Secondary Reference MIC is used to set the Line-in physical AEC loopback path of the secondary MIC
14. Line-in Primary MIC is used to set the Line-in physical route of the primary MIC
15. Line-in Secondary MIC is used to set the Line-in physical route of the secondary MIC

Note: When the Line-in Primary Reference SPK and Line-in Primary Reference MIC corresponding to the Line-

in Category, or the Line-in Secondary Reference SPK and Line-in Secondary Reference MIC are configured, the AEC loopback path will be opened.

Ringtone Category

Ringtone Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
Ringtone Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
Ringtone Primary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Ringtone Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0

Ringtone Category supports Ringtone Primary SPK, Ringtone Secondary SPK, Ringtone Primary Reference SPK and Ringtone Secondary Reference SPK:

1. Ringtone Primary SPK is used to set the Ringtone physical route path of the primary SPK
2. Ringtone Secondary SPK is used to set the Ringtone physical route of the secondary SPK
3. Ringtone Primary Reference SPK is used to set the Ringtone physical AEC loopback path of the primary SPK
4. Ringtone Secondary Reference SPK is used to set the Ringtone physical AEC loopback path of the secondary SPK

Note: When the Record Primary Reference MIC and Record Secondary Reference MIC corresponding to the Record Category are also configured, the AEC loopback paths of Ringtone and Record will be opened.

Voice Prompt Category

Voice Prompt Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
Voice Prompt Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
Voice Prompt Primary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
Voice Prompt Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0

Voice Prompt Category supports Voice Prompt Primary SPK, Voice Prompt Secondary SPK, Voice Prompt Primary Voice Prompt SPK and Voice Prompt Secondary Reference SPK:

1. The Voice Prompt Primary SPK is used to set the Voice Prompt physical route of the primary SPK.
2. The Voice Prompt Secondary SPK is used to set the Voice Prompt physical route of the secondary SPK.
3. Voice Prompt Primary Reference SPK is used to set the Voice Prompt physical AEC loopback path of the primary SPK
4. The Voice Prompt Secondary Reference SPK is used to set the Voice Prompt physical AEC loopback path of

the secondary SPK.

Note: When the Record Primary Reference MIC and Record Secondary Reference MIC corresponding to the Record Category are also configured, the AEC loopback path between Voice Prompt and Record will be opened.

APT Category

APT Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
APT Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
APT Primary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
APT Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
APT Primary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
APT Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Normal APT Mic0 L (APT Primary Left MIC)	<input type="checkbox"/>	No Mic	ADC 2	SPORT 0	RX Channel 1
APT Primary Right MIC	<input type="checkbox"/>	No Mic	ADC 1	SPORT 0	RX Channel 1
APT Secondary Left MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 1
APT Secondary Right MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0

APT Category supports APT Primary SPK, APT Secondary SPK, APT Primary Reference SPK, APT Secondary Reference SPK, APT Primary Reference MIC, APT Secondary Reference MIC, APT Primary Left MIC, APT Primary Right MIC, APT Secondary Left MIC and APT Secondary Right MIC:

1. APT Primary SPK is used to set the APT physical route path of the primary SPK
2. APT Secondary SPK is used to set the APT physical route of the secondary SPK
3. APT Primary Reference SPK is used to set the APT physical AEC loopback path of the primary SPK
4. APT Secondary Reference SPK is used to set the APT physical AEC loopback path of the secondary SPK
5. APT Primary Reference MIC is used to set the APT physical AEC loopback path of the primary MIC
6. APT Secondary Reference MIC is used to set the APT physical AEC loopback path of the secondary MIC
7. APT Primary Left MIC is used to set the APT physical route of the primary left MIC
8. APT Primary Right MIC is used to set the APT physical route of the primary right MIC
9. APT Secondary Left MIC is used to set the APT physical route of the secondary left MIC
10. APT Secondary Right MIC is used to set the APT physical route of the secondary right MIC

Note:

1. APT Primary Left MIC can be configured only when Enable Normal APT in the HW Feature tab is checked.

This linkage configuration will be removed in future versions and will be opened directly on AudioRoute.

Fusion Mic	No Mic	Bone Mic	No Mic
<input type="checkbox"/> Enable Normal APT		<input type="checkbox"/> Enable Low Latency APT	
Tips: LLAPT share 'External Mic L' with ANC !			
Normal APT Mic 0 L	No Mic	Configure Audio Route...	

- When the APT Primary Reference SPK and APT Primary Reference MIC corresponding to the APT Category, or the APT Secondary Reference SPK and APT Secondary Reference MIC are configured, the AEC loopback path will be opened.

LLAPT Category

LL-APT Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
LL-APT Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
LL-APT Primary Reference SPK	<input type="checkbox"/>	No Device	DAC 0	SPORT 0	TX Channel 0
LL-APT Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
LL-APT Primary Reference MIC	<input type="checkbox"/>	No Device	ADC 0	SPORT 0	RX Channel 0
LL-APT Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
LLAPT Mic L (LL-APT Left MIC)	<input type="checkbox"/>	No Mic	ADC 2	SPORT 1	RX Channel 2
LLAPT Mic R (LL-APT Right MIC)	<input type="checkbox"/>	No Mic	ADC 3	SPORT 1	RX Channel 3

LL-APT Category supports LL-APT Primary SPK, LL-APT Secondary SPK, LL-APT Primary Reference SPK, LL-APT Secondary Reference SPK, LL-APT Primary Reference MIC, LL-APT Secondary Reference MIC, LL-APT Left MIC and LL-APT Right MIC:

- LL-APT Primary SPK is used to set the LL-APT physical route of the main SPK
- LL-APT Secondary SPK is used to set the LL-APT physical route of the secondary SPK
- LL-APT Primary Reference SPK is used to set the LL-APT physical AEC loopback path of the primary SPK
- LL-APT Secondary Reference SPK is used to set the LL-APT physical AEC loopback path of the secondary SPK
- LL-APT Primary Reference MIC is used to set the LL-APT physical AEC loopback path of the primary MIC
- LL-APT Secondary Reference MIC is used to set the LL-APT physical AEC loopback path of the secondary MIC
- LL-APT Left MIC is used to set the LL-APT physical route of the left MIC
- LL-APT Right MIC is used to set the LL-APT physical route of the right MIC

Note:

1. LL-APT Left MIC and LL-APT Right MIC can be configured only when Enable Low Latency APT in the HW Feature tab is checked. This linkage configuration will be removed in future versions and will be opened directly on AudioRoute.

MIC

☐ Enable Voice Dual Mic

ANC Type

Non-ANC

Prime Voice Mic

No Mic

External Mic R

No Mic

Internal Mic R

No Mic

Auxiliary Voice Mic

No Mic

External Mic L

No Mic

Internal Mic L

No Mic

☐ Enable Normal APT

Enable Low Latency APT

Normal APT Mic 0 L

No Mic

Configure Audio Route...

2. When the LL-APT Primary Reference SPK and LL-APT Primary Reference MIC corresponding to the LL - APT Category, or the LL-APT Secondary Reference SPK and LL-APT Secondary Reference MIC are configured, the AEC loopback path will be opened.

ANC Category

ANC Primary SPK	<input checked="" type="checkbox"/>	Speaker 1 Differential	DAC 0	SPORT 0	TX Channel 0
ANC Secondary SPK	<input checked="" type="checkbox"/>	Speaker 2 Differential	DAC 0	SPORT 0	TX Channel 1
ANC Primary Reference SPK	<input type="checkbox"/>	No Device	DAC 0	SPORT 0	TX Channel 0
ANC Secondary Reference SPK	<input type="checkbox"/>	No Speaker	DAC 0	SPORT 0	TX Channel 0
ANC Primary Reference MIC	<input type="checkbox"/>	No Device	ADC 0	SPORT 0	RX Channel 0
ANC Secondary Reference MIC	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
External Mic L (ANC FF Left MIC)	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
External Mic R (ANC FF Right MIC)	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Internal Mic L (ANC FB Left MIC)	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0
Internal Mic R (ANC FB Right MIC)	<input type="checkbox"/>	No Mic	ADC 0	SPORT 0	RX Channel 0

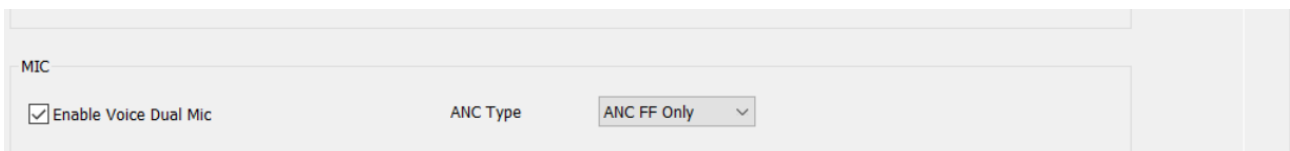
ANC Category supports ANC Primary SPK, ANC Secondary SPK, ANC Primary Reference SPK, ANC Secondary Reference SPK, ANC Primary Reference MIC, ANC Secondary Reference MIC, ANC FF Left MIC,

ANC FF Right MIC, ANC FB Left MIC and ANC FB Right MIC:

1. ANC Primary SPK is used to set the ANC physical route path of the main SPK
2. ANC Secondary SPK is used to set the ANC physical route of the secondary SPK
3. ANC Primary Reference SPK is used to set the ANC physical AEC loopback path of the primary SPK
4. ANC Secondary Reference SPK is used to set the ANC physical AEC loopback path of the secondary SPK
5. ANC Primary Reference MIC is used to set the ANC physical AEC loopback path of the primary MIC
6. ANC Secondary Reference MIC is used to set the ANC physical AEC loopback path of the secondary MIC
7. ANC FF Left MIC is used to set the ANC physical route of the Feedforward left MIC
8. ANC FF Right MIC is used to set the ANC physical route of the Feedforward right MIC
9. ANC FB Left MIC is used to set the ANC physical route of the Feedback left MIC
10. ANC FB Right MIC is used to set the ANC physical route of the Feedback right MIC

Note:

1. When ANC Type in the HW Feature tab is selected as ANC FF Only, ANC FF MIC can be configured; when ANC FB Only is selected, ANC FB MIC can be configured; when ANC Hybrid is selected, ANC FF MIC and ANC FB MIC can be configured at the same time.



2. When the ANC Primary Reference SPK and ANC Primary Reference MIC corresponding to the ANC Category, or the ANC Secondary Reference SPK and ANC Secondary Reference MIC are configured, the AEC loopback path will be opened.

VAD Category



VAD Category supports VAD Reference MIC, VAD Primary MIC and VAD Secondary MIC:

1. VAD Reference MIC is used to set the VAD physical AEC loopback path of the MIC
2. VAD Primary MIC is used to set the VAD physical route of the primary MIC
3. VAD Secondary MIC is used to set the VAD physical route of the secondary MIC

Note: When the Primary Reference SPK and Secondary Reference SPK corresponding to the Audio Category, Ringtone Category or Voice Prompt Category are also configured, the AEC loopback path between Audio and VAD, Ringtone and VAD, or Voice Prompt and VAD will be opened.

3.2.4 IC variance

AEC Loopback

1. On RTL87X3C, DAC0 can only loopback back to ADC2, and DAC1 can only loopback back to ADC3
2. On RTL87X3G, DAC0 can only loopback back to ADC2, and DAC1 can only loopback back to ADC3
3. On RTL87X3E, DAC0 can loopback back to ADC_n ($n = 0, 2, 4$), and DAC1 can loopback back to ADC_m ($m = 1, 3, 5$)
4. On RTL87X3D DAC0 can loopback back to ADC_n ($n = 0, 2, 4$), DAC1 can loopback back to ADC_m ($m = 1, 3, 5$)

3.3 General

3.3.1 Device Name

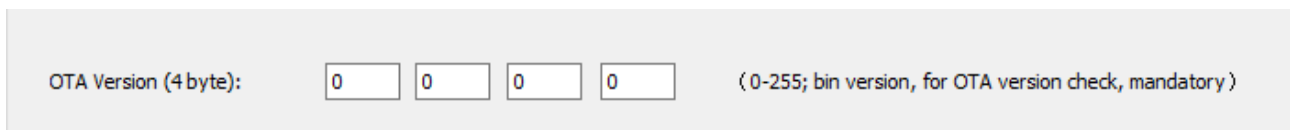
- 1) **Device Name:** The name shown on the user's Bluetooth device, including both the LE name and the legacy name. The device name has a maximum length of 40 bytes and is encoded in UTF-8.



- 2) **LE name sync to legacy name:** If this option is checked, the BLE name and the legacy name are consistent. After the user sets the legacy name in the mcu cfg tool, the mcu cfg tool will automatically import the legacy name to the BLE name. If this option is not checked, BLE and legacy can set different names. By default, both BLE and BREDR use public address. Theoretically, BLE and BREDR are the same device, and the same device is set with different names. The device names on the setting interface of some Android phones will jump between BLE name and legacy name. If you need to use this option, you need to modify the BLE to random address

- 3) **OTA Version:** Setting the OTA Version for the exported App parameter bin is advised.

OTA will do version comparison and app parameter bin verification. The MPPG Tool, Pack Tool, and OTA Tool all display the version number. OTA Version defaults to 0.0.0.0 if not explicitly set.



3.3.2 Class of device

Select the Major Service class and Major CoD, Minor CoD for the device.

When selecting Major CoD as “Audio /Video” , it is recommended to continue to select the Minor CoD type.

Define specific 3 8-byte CoDs by setting the primary CoD to Others CoD.

Class of Device

Major Service Class

☐ Information
☐ Telephony
☒ Audio
☐ Object Transfer
☐ Capturing

☒ Rendering
☐ Networking
☐ Positioning
☐ Limited Discoverable Mode
☐ LE Audio

Class of Device(CoD) Major

Audio/Video

Class of Device(CoD) Minor

Headphones

3.3.3 Power On / Off

Power On/Off

☐ Disable key to power on off
☐ Disallow power off by MFB button

☐ Short Press Power On

Long press power on timer (100 ms):

25

(10-50)

☐ Short Press Power Off

Long press power off timer (100 ms):

30

(10-100)

☒ Pairing timer (100ms) :

60

(10-100; More than Long press power on timer)

- 1) **Disable key to power on off:** If this option is selected and the system has not been factory reset, pressing and holding MFB for 1 second will turn it on, and pressing and holding for 3 seconds will put it right into pairing mode.
- 2) **Disallow power off by MFB button:** If this option is checked, long-press MFB button is not allowed to shut down, if this option is not checked, long-press MFB button is allowed to shut down
- 3) **Short Press Power On:** Short press the power button to turn on.
- 4) **Long press power on timer (unit 100ms):** Power on timer when MFB/KEY0 is long pressed. The recommended range is 15 to 50.
- 5) **Short Press Power OFF:** Short press the power button to turn off.
- 6) **Long press power off timer (unit 100ms):** Power on timer when MFB/KEY0 is long pressed. The recommended range is 10 ~ 100.
- 7) **Pairing timer (100ms):** Press MFB/KEY0 for a long time to boot into traditional BT pairing mode. The recommended range is 10 ~ 100. This value should be greater than Power on timer.

Auto power off while phone connected and anc apt off timer(s):

0

(0~65535, 0 means disable)

- 8) **Auto power off while phone is connected and anc apt off timer(s):**

If the value is not 0, when the mobile phone is connected, and music/call/ANC on/APT is off, the auto

power off timer can be activated;

If the value is 0, the function would be disabled, the phone will not auto power off when connected.

☒ Enable auto power off
 Auto power off timer (s) : (0-65535, 0 means disable power off function)

☐ Enable auto power off when listening mode is not off

☐ Disallow auto power off when airplane mode

- 9) **Enable auto power off:** When no device is connected, automatically power off the device. The timer duration can be set in Auto power off timer (s).
- 10) **Enable auto power off when listening mode is not off:** If this option is checked, the system will automatically shut down when the phone is turned on, regardless of the listening mode. If it is not checked, automatic shutdown will not be performed when the listening mode is not all off.
- 11) **Disallow auto power off when airplane mode:** Check this option, it will not automatically shut down in airplane mode
- 12) **Discoverable in standby mode:** The ability to be discovered in standby mode.

Value	Description
Disable	User can 't discover BT chip
Enable	BT chips can be inquired

- 13) **Allow power on function when charging:** Set whether to allow power on when charging.
- 14) **Enable align default volume from bud to phone:** After checking this option, connecting to a phone that supports absolute volume will synchronize the preset volume of the headset to the phone.
- 15) **Enable align default volume from bud to phone when first connect:** If this option is checked, when the headset and a phone that supports absolute volume are connected for the first time, the preset volume of the headset will be synchronized to the device. If this option is not checked, the headphone volume will be determined according to the volume sent by the mobile phone
- 16) **Enable double click power off under DUT test mode:** If this option is checked, in DUT test mode, you can double click the MFB key to shut down (usually with [Tab: General, Group: Power on/off] check 'Disable MFB key to power' on off' or 'Disallow power off by MFB button', in the case where power off by MFB key is not possible)
- 17) **Enable 5 mins auto power off under DUT test mode:** When this option is checked, it will automatically shut down after 5 minutes in DUT test mode; if this option is not checked, it will not shut down automatically after 5 minutes in DUT test mode
- 18) **Reset EQ index when power on:** Check this option, the EQ index will be set back to the default value when the device is turned on; if this option is not checked, the EQ before the last shutdown will be used when the device is turned on
- 19) **Enter shipping mode if bud is not in box when power off:** If this option is checked, the earbud will enter the shipping mode when the earbud is turned off outside the box; if this option is not checked, the

earphone will enter the power off when the earphone is turned off outside the box down mode

3.3.4 Factory reset

- 1) **Only enable normal factory reset when in charger box:** If this option is checked, only the Normal Factory Reset operation is supported inside the box; if not checked, the Normal Factory Reset operation is allowed outside the box Factory Reset
- 2) **Enable not reset device name when Normal Factory Reset/Phone Record Reset:** When this option is checked, the device name will not be reset when normal factory reset or phone record reset is performed; when this option is not checked, normal factory reset or phone record reset is performed When record reset, the device name will be reset to the name set in the MCU Config Tool
- 4) **Enable factory reset without limit:**
If checked, factory reset can be performed under any conditions; if not checked, factory reset can only be performed under specific conditions.
The conditions for factory reset are:
 - Only enable normal factory reset when in charge box is not checked, the power-on state + rws is not connected + bud is outside the box + pairing mode state;
 - Only enable normal factory reset when in charge box is not checked, it is in shutdown state, long press to do factory reset;
 - Only enable normal factory reset when in charge box is checked, the bud is located in the box;
 - After the Support RTK Charge Box is checked, the factory reset cmd of the charging box is received;
 - `MMI_RESET_TO_UNINITIAL_STATE_BY_SPP`, `MMI_DEV_FACTORY_RESET_BY_SPP`, `MMI_DEV_PHONE_RECORD_RESET_BY_SPP` can do factory reset directly when receiving these three mmi cm;
 - After Enable factory reset without limit is checked, factory reset can be done under any condition
- 5) **Phone Record Reset timer (100ms):** After setting this timer, in device off state, long press MFB/KEY0 to reach the timer setting time, it will do phone record reset (clear the pairing record with the phone, keep the rws record)
- 6) **Normal Factory reset timer (100ms):** After setting this timer, in the device off state, long press MFB/KEY0 to reach the timer setting time, it will do Normal Factory reset (clear all records)
- 7) **Auto power on and enter pairing mode before factory reset:** Check this option, if the factory reset has not been performed, the headset will automatically turn on and enter the pairing mode.
- 8) **Auto power on after factory reset:** In the power off state, long press to trigger factory reset and then automatically power on

3.3.5 Linkback and Pairing

- 1) **Linkback when power on:** The BT chip enters the link back state when the system is powered on.

Value	Description
Not checked	Enter Legacy BT pairing mode when power on
Checked	Try to linkback last connected devices based on Linkback scenario

- 2) **Linkback scenario:** BT chip link back to the desired devices.

Value	Description
Linkback HF and A2DP	Last device has either HFP or A2DP connected
Linkback HF	Last device must have HFP connected
Linkback A2DP	Last device must have A2DP connected
Linkback SPP	Last device must have SPP connected
Linkback HID	Last device must have HID connected

- 3) **Linkback timeout (s):** The time that the BT chip will try to connect back to the device.

- 4) **Linkback fail enter pairing:** Behavior after Linkback times out.

Value	Description
Disable	Enter system standby mode
Enable	Enter Legacy BT pairing mode

- 5) **Enable pairing timeout (s):** The time the BT chip stays in Legacy BT pairing mode. The recommended range is 10 ~ 600.

Value	Description
Not checked	Always in Legacy BT pairing
Checked	Refer to pairing timeout value

- 6) **Power off when pairing timeout:** When Legacy BT pairing times out and no link is connected, the BT chip shuts down.

Value	Description
Not checked	Enter standby mode after pairing timeout
Checked	Power off after pairing timeout

- 7) **When link lost linkback timeout (s):** The connection time out after the connection is disconnected abnormally.
- 8) **Non -discoverable when linkback:** When this option is checked, the headset in the linkback cannot be searched by the mobile phone; when this option is not checked, the headset in the linkback can still be searched by the mobile phone
- 9) **Maximum trail linkback source count:** When the link back fails, try to link back to several mobile phones at most

10) **Always enter pairing mode scenario:** No connection will be severed after selecting this option, regardless of the number of mobile phone connections currently active, and pairing mode will always be entered without delay until a new mobile phone is connected and the maximum number of mobile phones has been. The oldest mobile phone connection, will be cut off. Under typical conditions, it is not advised to choose.

11) **Normal disconnect enter pairing mode:**

Single link scenario: When this option is checked, it will enter pairing mode after disconnecting from the phone normally; if this option is not checked, it will enter standby mode after disconnecting from the phone normally.

Multi-link scene: When this option is checked, connect two mobile phones, one normal disconnect, will enter pairing mode (It needs to be in the pairing mode under call idle); if you do not check this option, connect two mobile phones, one normal disconnect, will not enter the pairing mode, in the single link connected state.

12) **Linkback to gaming/conference dongle first:**

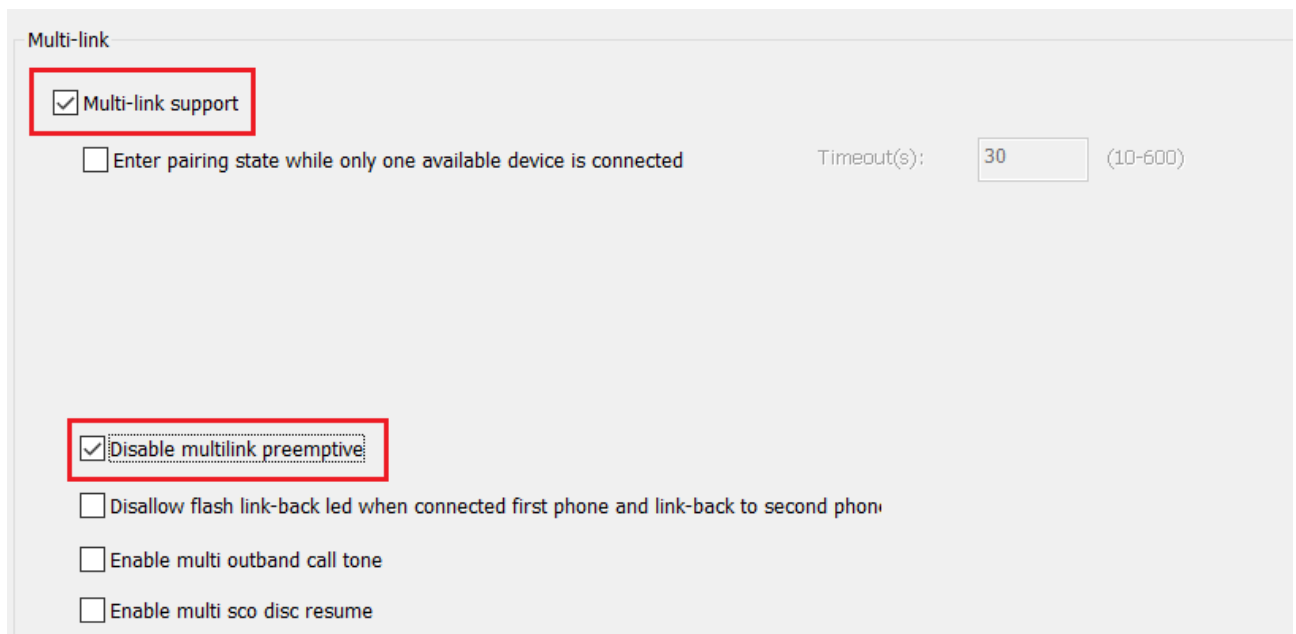
Checked: Earbud would linkback to gaming/conference dongle first when earbud power on.

Unchecked: Earbud would linkback to devices according to corresponding record priority when earbud power on.

3.3.6 Multi-link support

Multi-link support: supports multi-link

Disable multilink preemptive: You can set whether A2DP preempts is allowed when the earbud is connected to two phones and playing audio,

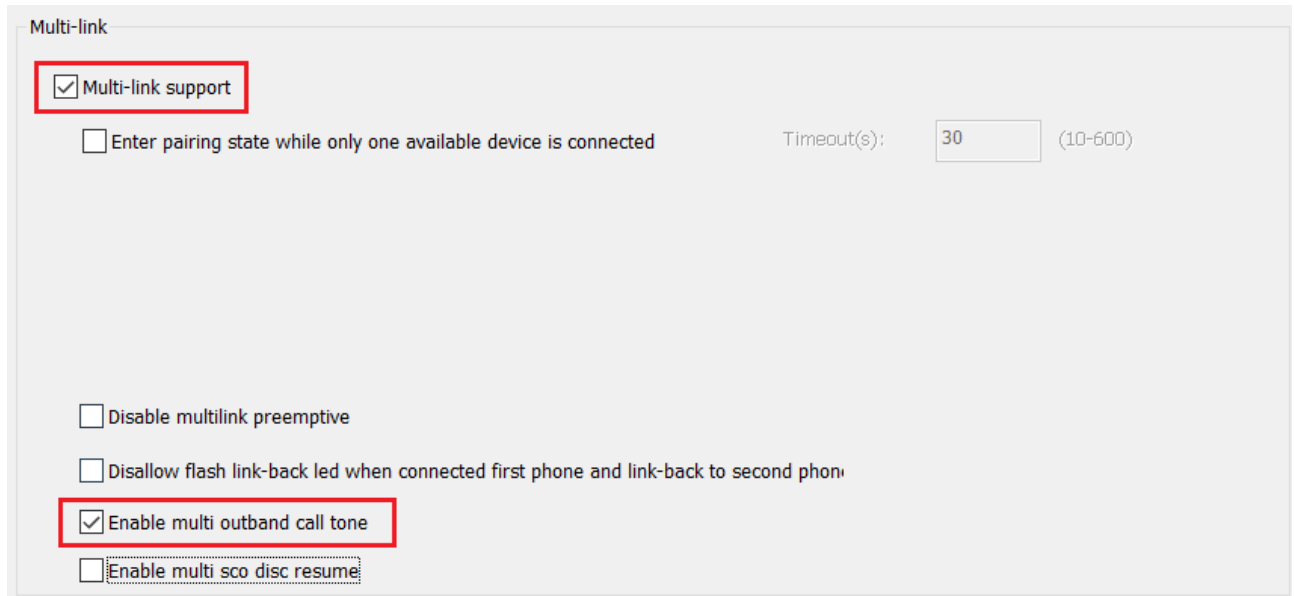


Disallow flash link-back led when connected first phone and link-back to second phone: After checking this option, if multi-link is supported and a mobile phone is connected, the link-back LED will not flash when linking back to the second phone. If it's not checked, the link-back LED will flash when linking back to the second

phone.

Enable multi outband call tone: The earbud is connected to two phones, and when the first phone is engaged in a SCO call, this setting determines whether the second call's ringtone will be audible. When the second SCO call comes in, you can hear the outband ringtone if it is checked.

Note: If this option is checked, only outband ringtones will be audible even though the second mobile phone might enable inband ringtones.



Enable multi sco disc resume: Two sources are connected to the headset. You can choose whether the music behavior will resume after the call stops.

For example:

Step 1. Click on the SRC_A media player to play music, and the headphones output the audio of SRC_A

Step 2. SRC_B triggers the call, and the headset triggers the pause of the SRC_A audio

Step 3. When SRC_B ends the call, the headset will trigger SRC_A to play audio

Note:

1. It won't initiate the end call to resume the music if the music is paused from the source side.
2. This will be categorized as a source device issue if the mobile phone does not actually carry out the resume command from the bud.

Multi-link

☒ Multi-link support

☐ Enter pairing state while only one available device is connected

Timeout(s):

30

(10-600)

☐ Disable multilink preemptive

☐ Disallow flash link-back led when connected first phone and link-back to second phone

☐ Enable multi outband call tone

☒ Enable multi sco disc resume

3.3.7 DLPS

Enable DLPS: Turn on low power mode.

3.3.8 Dongle

Enable dongle dual mode: The functionality for switching between dual modes (BT mode and dongle mode) is provided if this option is checked. The term "dongle mode" describes the situation in which the headset activates the BLE broadcast while deactivating the inquiry scan, allowing it to only be found and connected to by the dongle.

Enable 2.4G/BT audio source switch: User should setup a switch key (0x98, 2.4G/BT Audio Source Switch) in key-mmi page. User could switch source to BT device or Dongle via switch key to play media streaming when earbuds connect BT device and Dongle.

Enable dongle multi-pairing (2.4G & BT): This can switch BT or 2.4G pairing when multilink is enabled.

- 2.4G Pairing: for pairing new dongle.

- BT Pairing: for pairing new phone.

3.3.9 Monitor

Monitor heap and timer timeout(s): If the value is not 0, the usage of ram/timer can be watched regularly according to the set value; if the value is 0, the function is unavailable.

3.4 System configuration

The System configuration tab contains the Bluetooth stack, profiles, OTA and platform configuration, etc.

3.4.1 Bluetooth stack

- 1) **BD Address:** The Bluetooth address of the device. The bluetooth address setting is only available when “Export BD Address to System Config bin” is checked and then address will be in the exported System Config bin.

☒ Export BD Address to System Config bin

BD Address :

aa

22

56

77

22

11

- 2) **Mode:** The operation mode of the Bluetooth stack in the BT chip.

Value	Description
HCI Mode	Only controller is workable in BT chip
SOC Mode	All functions of Bluetooth are workable

- 3) **BR/EDR link number:** The maximum simultaneous number of BR/EDR links. If you select the maximum of three devices for Multi-link support, the first device will be disconnected in order to make room for the third device. If not, one of the initial two connected devices must be disconnected before the third device can be connected.
- 4) **L2CAP channel number:** The maximum number of L2CAP channels that can be created simultaneously. Valid numbers are 0~24.
- 5) **BR/EDR bond device number:** The number of BR/EDR devices that will store bond information in flash. This number shall not be less than the BR/EDR link number and shall be less than or equal to 8.
- 6) **LE only mode:** Whether the LE-only functionality can be used by the BT chip. This setting needs to be disabled if audio functionality is desired.

Value	Description
Disable	BT chip will work as a dual mode device
Enable	BT chip will work as LE only device

- 7) **Support LE Isochronous:** If this option is configured to disable, the LE Audio related ram will not be allocated when booting
- 8) **LE CIG number:** This value determines the maximum number of CIGs that can exist at the same time
- 9) **LE CIS number:** This value determines the maximum number of CISs that can exist at the same time
- 10) **LE BIG number:** This value determines the maximum number of BIGs that can exist at the same time
- 11) **LE BIS number:** This value determines the maximum number of BISs that can exist at the same time
- 12) **LE link number:** The maximum number of LE links that can be established simultaneously.

- 13) **LE master link number:** This value determines the maximum number of le master links that can exist at the same time
- 14) **LE slave link number:** This value determines the maximum number of le slave links that can exist at the same time
- 15) **CCCD count:** The maximum number of CCCDs that can be stored in flash
- 16) **CCCD per link count:** Set the number of CCCDs supported by each BLE link, ranging from 0 to 50
- 17) **LE privacy mode**

Value	Description
Device privacy	device is in device privacy mode
Network privacy	device is in network privacy mode

- 18) **CCCD not check**

Value	Description
Disable	Before notifying or indicating data, server will check CCCD value.
Enable	Server notify or indicate data without check CCCD value.

- 19) **LE bond device number:** the quantity of LE devices that will be saved in flash. This number cannot be less than the LE link number or more than 4.
- 20) **Support LE PA:** If the value of Support LE PA is disabled, the LE PA related ram will not be allocated when booting

3.4.2 Clock configuration

For system 32K related settings, please refer to the following descriptions for the details of the fields (the setting interface of different Chip Series or IC models is different):

- 1) **AON 32K CLK SRC:** 32k clock source of AON FSM. Optional external 32k XTAL, internal RCOSC SDM, external GPIO IN. Different SoCs may have different options available.
- 2) **RTC 32K CLK SRC:** 32k clock source of User RTC. Optional external 32k XTAL, internal RCOSC SDM, external GPIO IN. Different SoCs may have different options available.
- 3) **BTMAC 32K CLK SRC:** 32k clock source of BTMAAC. Selectable internal RCOSC SDM, external GPIO IN, external 32k XTAL
- 4) **SysTick 32K CLK SRC:** The 32k clock source of SysTick. Selectable internal RCOSC SDM, external GPIO IN, external 32k XTAL
- 5) **BTMAC, SysTick 32K CLK SRC:** 32k clock source of BTMAC/SysTick. Choice of external 32k XTAL or internal RCOSC SDM
- 6) **GPIO OUT CLK SRC:** 32k clock source of GPIO out. Selectable internal RCOSC SDM, external GPIO IN, external 32k XTAL
- 7) **EXT32K Frequency:** The frequency of the external 32k clock source. 32.768KHz or 32k Hz selectable

- 8) **EXT32 K GPIO Frequency:** The frequency of the external 32k GPIO clock source. 32.768KHz or 32k Hz selectable
- 9) **EXT32 K XTAL Frequency:** The frequency of the external 32k XTAL clock source. 32.768KHz or 32k Hz selectable
- 10) **Enable P2_1 GPIO 32K Input:** Indicates whether to pour 32K from P2_1 to SOC. When AON, BTMAC, RTC clock source is selected to 1 (external 32K XTAL), it means to apply GPIO IN 32k; when AON, BTMAC, RTC clock source is selected to 0 (external 32K XTAL), it means to apply external 32K XTAL
- 11) **RTC 32K OUT PIN:** 32k GPIO output pin selection. Can choose Disable, P1_2, P2_0
- 12) **GPIO 32K OUT PIN:** 32k GPIO output pin selection. Can choose Disable, ADC_7, 32K_XO, P3_4, P4_1, P6_1
- 13) **GPIO IN PIN:** 32k GPIO input pin selection

3.4.3 OTA

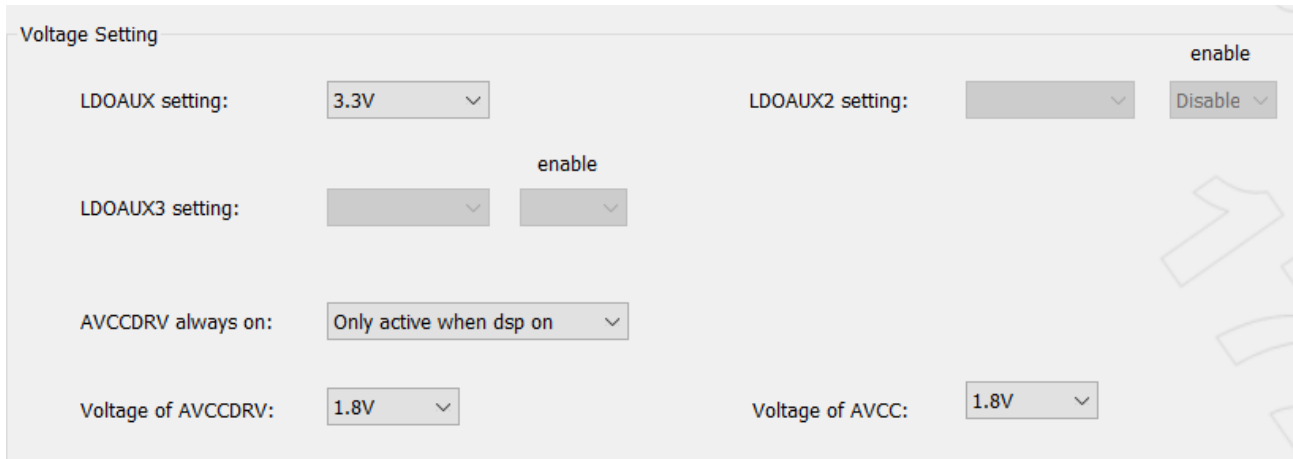
- 1) **Data decryption:** Indicates whether the image received from the remote controller is encrypted. The default setting is Disable.

Value	Description
Disable	The new image is plaintext data and does not need decryption
Enable	The new image is encrypted data and need decryption

- 2) **AES type:** If AES encryption is enabled, this option defines the key length. The default selection is AES 256.

Value	Description
AES128	Use 128 bit AES key
AES256	Use 256 bit AES key

3.4.4 Voltage Setting



Voltage Setting

LDOAUX setting: 3.3V

LDOAUX2 setting: Disable

LDOAUX3 setting: enable

AVCCDRV always on: Only active when dsp on

Voltage of AVCCDRV: 1.8V

Voltage of AVCC: 1.8V

LDOAUXx setting: Used to set the voltage. If you need to have different voltage settings according to different power modes, the voltage setting fields of different power modes will be displayed as shown in the figure above. For example: the fields of active/dlps mode and power down mode in LDOAUX setting

Whether LDOAUXx is enabled according to IO. If it is set to “Enable”, it will open LDO_AUX2 to the specified voltage (1.8V or 3.3V). If there is no such field, it means that this LDO cannot be closed.

AVCCDRV always on: Used to set whether AVCCDRV needs to be always on, or only open when there is an audio behavior.

Voltage of AVCCDRV/ AVCC: AVCC_DRV/AVCC voltage setting, which can be set to 1.8V/1.8V or 2.1V/2.0V according to the usage of peripherals

3.4.5 Platform Configuration

- 1) **Log output:** Whether to output logs to the Log UART. The default selection is on.

Value	Description
Disable	Log printing is disabled
Enable	Log printing is enabled

- 2) **Log_output pinmux:** configure the pin for log output.
- 3) **UART HW flow ctrl:** The default log uart hardware flow control is disabled. To enable log uart hardware flow control, you must select the available log uart cts pinmux, connect the log uart cts pinmux to the FT232 log uart RTS pin, and set the Flow Control in the log setting of the Debug Analyzer to RequestToSend.
- 4) **Enable SWD:** Open the SWD debug interface.
- 5) **Reset_When Hardfault:** When the platform Hardfault appears, the platform will automatically restart.
- 6) **Watchdog Configuration:**

If [WDG Enable in ROM] is Disable, the watchdog will not take effect, and all other related configuration value are invalid.

If [WDG Enable in ROM] is Enable, the value of [Watchdog Timeout(s)] is the timeout period which unit is second.

The value of [WDG Auto feed in ROM] indicates when to feed the WDG:

- a) None: Never feed WDG in ROM
- b) CS: Feed when task context switch
- c) Idle: Feed in idle task
- d) CS&Idle: Feed both in idle task and when task context switch

The value of [Watchdog mode] indicates the working mode when watchdog timeout:

- a) Interrupt mode: Trigger watchdog timeout interrupt
- b) Reset mode: Reset chip

3.4.6 Memory Configuration

- 1) **Enable RAM Always On:** Allow RAM to stay power on all the time.

3.4.7 OEM Header Setting

Flash map layout information. The layout can be adjusted via the “Import flash map.ini “button.

OEM Header Setting

Note: Below Flash layout is retrived from rcfg.

Tool will export what is shown on UI to bin !

Import flash map.ini ...

OTA Bank0 address	0x	<input type="text" value="806000"/>	OTA Bank0 size	0x	<input type="text" value="fa000"/>
OTA Bank1 address	0x	<input type="text" value="900000"/>	OTA Bank1 size	0x	<input type="text" value="fa000"/>
FTL address	0x	<input type="text" value="9fa000"/>	FTL size	0x	<input type="text" value="5000"/>
OTA Temp address	0x	<input type="text" value="0"/>	OTA Temp size	0x	<input type="text" value="0"/>
Reserved Section1 address	0x	<input type="text" value="0"/>	Reserved Section1 size	0x	<input type="text" value="0"/>
Reserved Section2 address	0x	<input type="text" value="0"/>	Reserved Section2 size	0x	<input type="text" value="0"/>
Hardfault Record Begin	0x	<input type="text" value="9ff000"/>	Hardfault Record Size	0x	<input type="text" value="1000"/>

3.4.8 Configuration item and APP variable correspondence table

Genral

Legacy Name (Max. 40 Bytes) <input type="text" value="BBPRO RWS BREDR"/> LE Name (Max. 40 Bytes) <input type="text" value="BBPRO RWS LE"/>	device_name_legacy_default device_name_le_default	device_name settings
Class of Device Class of Device(CoD) Major <input type="text" value="Audio/Video"/> Class of Device(CoD) Minor <input type="text" value="Headphones"/>	class_of_device	
<input type="checkbox"/> Disable key to power on off <input type="checkbox"/> Short Press Power On Long press power on timer (100 ms): <input type="text" value="25"/> <input type="checkbox"/> Short Press Power Off Long press power off timer (100 ms): <input type="text" value="30"/> <input checked="" type="checkbox"/> Pairing timer (100ms) : <input type="text" value="50"/>	key_power_on_interval key_power_off_interval key_enter_pairing_interval	the time required to press the button to switch the machine and enter the pairing mode
<input checked="" type="checkbox"/> Normal Factory reset timer(100ms) : <input type="text" value="200"/>	key_factory_reset_interval	Set the time required for the button to be pressed until the factory reset is performed
<input checked="" type="checkbox"/> Enable auto power off Auto power off timer (s) : <input type="text" value="180"/>	timer_auto_power_off	Auto power off setting
Allow power on function when charging <input type="text" value="Allow"/>	enable_adaptor_disallow_power_on	Set whether to power on while charging
Link back and Pairing <input checked="" type="checkbox"/> Linkback when power on Linkback scenario : <input type="text" value="Linkback HF and A2DP"/> Linkback timeout (s) : <input type="text" value="60"/> (5-600) Linkback fail enter pairing : <input type="text" value="Enable"/>	enable_power_on_linkback timer_linkback_timeout enable_power_on_linkback_fail_enter_pairing	Linkback settings _
<input checked="" type="checkbox"/> Enable Pairing timeout (s) : <input type="text" value="60"/> <input type="checkbox"/> Power off when pairing timeout	timer_pairing_timeout	

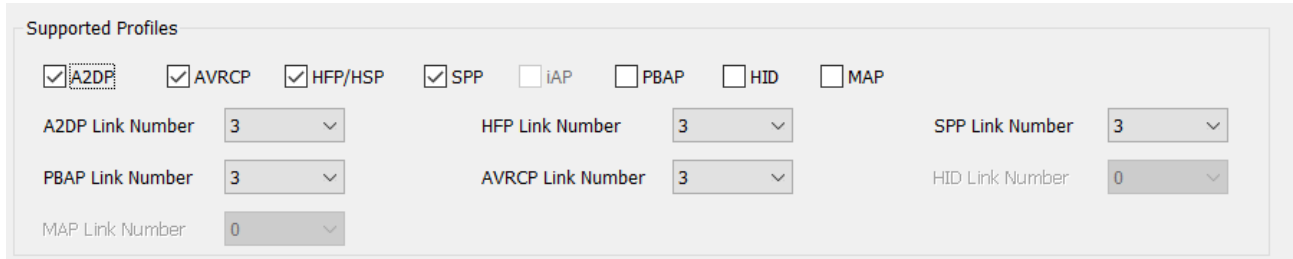
<div>Multi-link</div> <div> <input type="checkbox"/> Multi-link support </div> <div> Attention: If RWS enabled, multi-link no </div> <div> Multilink max linkback device number : <input type="text" value="2"/> (1-3) </div> <div> Multilink disconnect linkback scenario : <input type="text" value="Linkback all profiles"/> </div> <div> Multilink always discoverable : <input type="text" value="Disable"/> </div> <div> <input type="checkbox"/> Enable linkback one device when multilink </div> <div> <input type="checkbox"/> Enable multilink preemptive </div>	<div>enable_multi_link</div> <div>max_legacy_multilink_devices</div> <div>enable_multilink_preemptive</div>	<div>Multilink settings _</div> <div>whether to allow preemption when playing music under M ultilink</div>
<div>DLPS</div> <div> <input checked="" type="checkbox"/> Enable DLPS </div>	<div>enable_dlps</div>	

3.5 BR/EDR

BR/EDR tab contains the configurations for BR/EDR or Classic Bluetooth applications.

3.5.1 Supported Profiles

BR/EDR Profiles are listed here.



The 'Supported Profiles' window shows a list of Bluetooth profiles with checkboxes and corresponding link number dropdown menus. The profiles and their current settings are:

Profile	Link Number
<input checked="" type="checkbox"/> A2DP	3
<input checked="" type="checkbox"/> AVRCP	3
<input checked="" type="checkbox"/> HFP/HSP	3
<input checked="" type="checkbox"/> SPP	3
<input type="checkbox"/> iAP	-
<input type="checkbox"/> PBAP	3
<input type="checkbox"/> HID	0
<input type="checkbox"/> MAP	0

You can choose the profiles to be supported: A2DP, AVRCP, HFP/HSP, SPP, iAP, PBAP, HID, MAP; iAP needs to be checked in the HW feature tab.

- 1) **A2DP Link Number:** The maximum number of A2DP links that can be established simultaneously.
- 2) **HFP Link Number:** The maximum number of HFP links that can be established simultaneously.
- 3) **SPP Link Number:** The maximum number of SPP links that can be established simultaneously.
- 4) **PBAP Link Number:** The maximum number of PBAP links that can be established simultaneously.
- 5) **AVRCP Link Number:** The maximum number of AVRCP links that can be established at the same time.
- 6) **HID Link Number:** The maximum number of HID links that can be established at the same time.
- 7) **MAP Link Number:** The maximum number of MAP links that can be established at the same time.

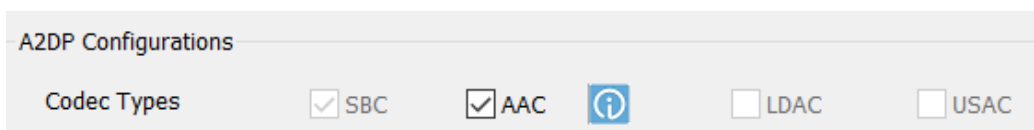
Note:

When BT chip and Android phone are paired, you need to check the SPP, PBAP and Enable RTK vendor command to implement the voice broadcast of the incoming call.

If Android phone wants to perform SPP OTA upgrade on the device to be tested, it is also necessary to check SPP. If you need to perform GATT OTA upgrade, you need to remove the check of SPP.

3.5.2 A2DP Configurations

Select the A2DP codec to support: SBC, AAC, LDAC (part number supported), USAC (supporting for this codec is Optional.)



The 'A2DP Configurations' window shows a 'Codec Types' section with checkboxes for SBC, AAC, LDAC, and USAC. The AAC checkbox is currently selected.

1) SBC codec

SBC Codec

Sampling Frequency

☒ 16kHz
☒ 32kHz
☒ 44.1kHz
☒ 48kHz

Channel Mode

☒ Mono
☒ Dual Channel
☒ Stereo
☒ Joint Stereo

Block Length

☒ 4
☒ 8
☒ 12
☒ 16

Subbands

☒ 4
☒ 8

Min Bitpool (2~max bitpool)

Allocation Method

☒ SNR
☒ Loudness

Max Bitpool (min bitpool~250)

- a) **Sampling Frequency:** SBC encoding supported sampling rate
- b) **Channel Mode:** Channel modes supported by SBC encoding, mono, bi-channel, stereo and joint stereo
- c) **Block Length:** The block length supported by SBC encoding
- d) **Subbands:** The number of subbands supported by SBC encoding
- e) **Allocation Method:** The allocation method supported by SBC encoding
- f) **Min Bitpool:** The minimum value of the SBC to be negotiated with the remote device.
- g) **Max Bitpool:** The maximum bitpool value of SBC to be negotiated with the remote device.

2) AAC codec

AAC Codec

Object Type

☒ MPEG 2 AAC LC
☐ MPEG 4 AAC LC
☐ MPEG 4 AAC LTP
☐ MPEG 4 AAC SCALABLE

☐ MPEG 4 HE AAC
☐ MPEG 4 HE AACV2
☐ MPEG 4 AAC ELDV2
☐ MPEG D DRC

Sampling Frequency

☐ 8kHz

☐ 11.025kHz

☐ 12kHz

☐ 16kHz

☐ 22.05kHz

☐ 24kHz

☐ 32kHz

☒ 44.1kHz

☒ 48kHz

☐ 64kHz

☐ 88.2kHz

☐ 96kHz

Channel Number

☒ 1
☒ 2

Bit rate: (0~8388607)

☒ VBR supported

- a) **Object Type:** encoding specifications supported by AAC encoding
- b) **Sampling Frequency:** sampling rate supported by AAC encoding
- c) **Channel Number:** The number of channels supported by AAC encoding
- d) **Bit rate:** AAC encoding bit rate

3) LDAC codec

LDAC Codec

Sampling Frequency

☐ 44.1kHz
 ☐ 48kHz
 ☐ 88.2kHz
 ☐ 96kHz
 ☐ 176.4kHz
 ☐ 192kHz

Channel Mode

☐ Mono
 ☐ Dual channel
 ☐ Stereo

- a) **Sampling Frequency:** The sampling rate supported by LDAC encoding.
- b) **Channel Mode:** The channel mode supported by LDAC encoding.

3.5.3 AVRCP Configurations

Enable AV forward backward only when playing: When this option is checked, you can switch songs only when listening to songs; when this option is not checked, you can also switch songs when you connect the phone to stand still.

Features: If the headset supports absolute volume, the controller should select category 1, and the target should select category 2; if it does not support absolute volume, only the controller should select category 1.

3.5.4 HFP Configurations

- 1) **Answer incoming call automatically:** Whether the incoming call is answered automatically. The incoming call can be answered directly without the headset operating MFB/KEY0. By default, this function is turned off.

Value	Description
Disable	Incoming call must be answered via user action
Enable	Incoming call is automatically answered

- 2) **Auto answer call timer (s):** When Answer incoming call automatically is selected as enable, when there is an incoming call, it will automatically answer the timer according to the time set by Auto answer call timer, and the interval of automatic answering is set by Auto answer call timer time
- 3) **Enable last num redial always by:**

By first phone: In the multilink scenario, press the button to call back the last phone in the call record of the first connected device in the headset

By last phone: In the multilink scenario, press the button to call back the last phone call in the call record of the last connected device to the headset
- 4) **Periodic time of incoming call ringtone (s):** This timer sets the periodic interval of incoming call ringtone. For non-inband ringtone, use RTK the time period for the language broadcast.
- 5) **Enable No Service Warning:** No service warning, can be turned on, no service will be reminded.

- 6) **Warning interval (s):** When HFP No Service, set the periodic interval of Warning Tone
- 7) **Enable report lower battery volume of two buds:** If this option is checked, when reporting the power of the headset to the mobile phone, the minimum value of the left and right ear power will be taken and reported to the mobile phone.
- 8) **Enable power off only when call idle:** Enable power off only when call idle: Power off only when no call activity
- 9) **Fixed inband ringtone tone gain:** When this field is configured and gain level is set, the inband ringtone for incoming/outgoing calls is a fixed gain level (does not change with the volume adjustment on the phone)
- 10) **Mic mute alarm timer (s):** Set the microphone mute alarm timer setting, the setting range is 3-20s.
- 11) **HFP Bluetooth Retrieve Supported Features:** Use the default

3.5.5 SPP Configurations

- 1) **Enable RTK vendor command:** Whether to process RTK vendor commands in the SPP path. Vendor commands for RTK definitions.

Value	Description
Disable	SPP not handle RTK vendor command
Enable	RTK vendor command is processed in SPP

- 2) **Enable SPP capture dsp data:** If this option is checked, the Tool is allowed (eg DSP Config Tool) Get DSP data through SPP

3.5.6 Vendor UUID

- 1) **Enable specific service UUID:** Whether to allow vendor - specific services UUID

3.5.7 Bluetooth Stack

Used to reply to BR/EDR pin code request evt

- 1) **Pin code size setting:** Set the length of the BR/EDR pin code array
- 2) **Pin code:** The specific value to be replied, the type is uint8

3.5.8 Configuration item and APP variable correspondence table

BR/EDR

<div>Profiles Support</div> <div> <input checked="" type="checkbox"/> A2DP <input checked="" type="checkbox"/> AVRCP <input checked="" type="checkbox"/> HFP/HSP <input type="checkbox"/> SPP <input type="checkbox"/> IAP <input type="checkbox"/> PBAP </div>	supported_profile_mask	Supported profile settings
<div>Profile Setting _ HFP</div> <div> Answer incoming call automatically : Disable ▾ Answer incoming call automatically when HFP connected : Disable ▾ </div>	enable_auto_answer_incoming_call enable_auto_answer_when_hfp_connected	
<div>Profile Setting _ SPP</div> <div> <input checked="" type="checkbox"/> Enable RTK vendor command <input type="checkbox"/> Enable specific SPP uuid: Specific SPP service uuid 00000000000000000000000000000000 </div>	enable_embedded_cmd	SPP vendor command related settings

3.6 LE

LE settings for dual mode applications are listed in this Tab.

3.6.1 Profile Setting_LE

- 1) **Enable RTK App advertising:** If this option is checked, RTK custom APP broadcasting can be triggered. If the duration is set to be permanent, the broadcasting will be automatically turned on when power on. ios only) BLE connection can be made with the headset through broadcast; if this option is not checked, this function will be disabled

Timeout(s): The duration of the BLE broadcast on the headset end, the default is 180s, 0 means permanent

Enable power on advertising with timeout: If this option is checked, there will be a timeout broadcast when the system is turned on, and the broadcast time is the time set by Timeout. Note: To use this function, you need to check “Enable RTK App advertising” first, and then check Enable power on advertising with timeout, and Timeout cannot be set to 0, you must give a non-zero value

- 2) **Enable RTK fast pair advertising:** When this option is checked, the headset will start a 30s RTK pop-up broadcast in the following scenarios: 1. Power on, 2. The status of the headset in and out of the box changes. Note that when the phone is turned on, both ears will broadcast. When the two ears are paired, only the main ear will broadcast. The corresponding pop-up window will pop up after searching for the headset broadcast on the mobile phone; when this option is not checked, the headset will not start the RTK pop-up window broadcast.

Company ID: The default is 0x005d, representing the REALTEK company

UUID: can be set to different values according to user needs to distinguish different products

Company ID and UUID are transmitted in the broadcast for mobile APP detection.

- 3) **Enable RTK vendor command:** Whether to process RTK vendor commands in the LE path. If this option is not checked, LE broadcasts will not be sent.

Value	Description
Disable	LE not handle RTK vendor command
Enable	RTK vendor command is processed in LE

3.6.2 Configuration item and APP variable correspondence table

LE		
<div> <div>Profile Setting _ LE</div> <div> <div> <div>Timer advertising (s) :</div> <div>180</div> <div>(10-300)</div> </div> <div> <div>Timer iBeacon (s)</div> <div>0</div> </div> </div> <div> <input checked="" type="checkbox"/> Enable RTK vendor command </div> </div>	timer_advertising timer_ibeacon enable_embedded_cmd	BLE commom advertising and ibeacon settings Ble vendor command settings

3.7 Audio

BT chip supports Audio product functions. The configurations are listed in this tab.

3.7.1 External amplifier

The main switch is in tab HW Feature.



- 1) **Enable amplifier high active:** Control polarity of external amplifier.

Value	Description
Not checked	External amplifier pad polarity is low active
Checked	External amplifier pad polarity is high active

- 2) **AMP pre-On Guard Time (100ms):** Protection time before external amplifier is switched on. This time is used for waiting internal codec configured into stable state.
- 3) **AMP post-On Guard Time (100ms):** Protection time after external amplifier is switched on. This time is used for waiting external amplifier power on into stable state.
- 4) **AMP Off Guard Time (100ms):** Protection time after external amplifier is switched off. This time is used for waiting external amplifier power off into stable state.

3.7.2 AUX-IN

Enable AUX-IN priority over A2DP: If this option is checked, the priority of Line-in is higher than that of A2DP; if it is not checked, the priority of A2DP is higher than that of Line-in.

3.7.3 Circular Volume Control

Enable one key to control circular volume up: If this option is checked, the volume is allowed to be switched circularly. When the volume is adjusted to maximum level, it will switch back to level 0 and then level up.

3.7.4 Listening Mode

- 1) **Listening mode cycle:** User can choose the listening mode cycle switching patterns listed below:
 - i. ALL off -> ANC on -> APT on
 - ii. ALL off -> APT on -> ANC on
 - iii. APT on < -> ANC on
 - iv. ALL off < -> ANC on

v. All off -> ANC on -> APT on -> ANC + APT on

- 2) **Disallow apply listening mode status before bud connected:** After checking this option, any ANC/APT operation will only be recorded but not actually worked and keep both ANC and APT turned off until buds are connected. When both ear buds are connected, it will automatically switch to the correct listening state. If this option is not checked, this function will not be enabled.
- 3) **Disallow apply listening mode status before phone connected:** After checking this option, any ANC/APT operation will only be recorded but not actually worked and keep both ANC and APT turned off until phone is connected. When mobile phone is connected, it will automatically switch to the correct listening state. If this option is not checked, this function will not be enabled.
- 4) **Listening mode status when power on:** Configure whether to automatically turn on ANC or APT when power on. There are below options:
 - i. Follow the last listening state when power off
 - ii. APT on
 - iii. ANC on
 - iv. Keep all off
 - v. ANC+APT on
- 5) **Time delay to open/close ANC/LLAPT (second):** When the listening mode is switched, delay the time to open/close ANC/LLAPT (take the union of these setting time). For example: If close APT delay 3sec and open ANC delay 1sec are configured, this state transition will be delayed by 4sec when APT on -> ANC on
- 6) **Disallow trigger listening mode again within (second):** If the value is not 0, after triggering MMI LISTENING MODE CYCLE (0xD1), the same MMI will not be executed within a certain time, and the next trigger will be allowed after the time expires; if the value is 0, then without this restriction
- 7) **Listening mode when enter airplane mode:** Select the default listening mode when entering airplane mode, this function supports the following options:
 - i. ANC on
 - ii. APT on
 - iii. ALL off
 - iv. Remain the currently switched listening mode
 - v. ANC + APT on
- 8) **Disallow ANC/APT off when airplane mode:** When the option is checked, earbud is not allowed to turn off both ANC and APT during airplane mode. "All off" listening mode state is not allowed to be applied.
- 9) **Enable direct APT on/off:**

Checking this option will change the behavior of MMI AV Toggle audio pass through (0x65):

 - i. APT on: switch listening mode state to APT on.
 - ii. APT off: return to the listening mode state before the state is switch to APT on.

If this option is not checked, the behavior of MMI AV Toggle audio pass through (0x65):

- i. APT on: switch listening mode state to APT on.
- ii. APT off: switch listening mode state to All off.

3.7.5 DMIC Clock

DMIC 1/2/3: When digital microphone is chosen in Audio Route, set the clock rate of DMIC 1/2/3, which can be configured as 312.5KHz/625KHz/1.25MHz/2.5MHz/5MHz clock rate

3.7.6 Gaming Mode

Latency level: This field determines the latency value in gaming mode. Latency determines the timeliness of audio output. The smaller the level, the smaller the latency and the more timely the audio output. The difference between each level is 20ms latency

Disallow listening mode on when gaming mode: If this option is checked, the listening mode will remain in the all off state after the gaming mode is enabled. If it is not checked, the listening mode can still be switched freely after the gaming mode is enabled

Enable enter gaming mode after power on: automatically enter gaming mode after power on

3.7.7 Normal Mode

Latency: This value determines the audio latency in normal mode, ranges from 180 to 280(ms), and the default value is 280. The larger this value is, the better the anti-interference ability, but occupies more memory. The smaller this value is, the less the anti-interference ability, but occupies less memory. This value can be adjusted according to memory requirements.

3.7.8 RAMP Gain Control

When the Notification mixing setting in the [Ringtone] tab is enabled, in the audio scene, if a notification comes in, the audio volume will be lowered to highlight the notification effect. You can control how much to suppress the effect by adjusting the suppress gain

3.7.9 Audio PLC

Maximum packet lost compensation count: The value can be 1~7. This value determines the maximum compensation count of the system when packet loss occurs. The larger the value is, the easier it is to have abnormal sounds generated by the supplementary package; the smaller the value, the easier it is to have sound break when the environment is disturbed

3.7.10 ANC/ LLAPT Status

ANC function when SCO: Enable or disable ANC under SCO. If disable is selected, when listening mode state is ANC on, the state will be switched to All off and cannot to be switched to ANC on when SCO is established.

LLAPT function when SCO: Enable or disable LLAPT under SCO. If disable is selected, when listening mode state is LLAPT on, the state will be switched to All off and cannot to be switched to LLAPT on when SCO is established.

3.7.11 Dual Audio Effect

Effect switch mode: Select the switching pattern of dual audio, there are two patterns to choose from

- i. Bypass cycle: Default bypass sound (No effect) is included in the switching cycle, and No effect can be configured as default effect
- ii. No bypass cycle: The default bypass sound effects (No effect) is not included in the switching cycle

Default effect: Select the initial effect of dual audio

Default effect Save: If this option is not checked, the sound effect selected each time the headset is turned on is the default effect. If this option is checked, the sound effect selected by the headset is the last effect selected before the last shutdown

Gaming effect align default: If this option is not checked, the sound effect selected when the headset enters gaming mode is the gaming mode effect. If this option is checked, the sound effect selected when the headset enters gaming mode is the default effect

Gaming mode effect: Specifies the sound effect configured when the headset enters gaming mode

3.7.12 Local Playback

Enable local playback: If this option is not checked, the local playback function is not supported; If this option is checked, the local playback function is supported, and the SDIO pinmux also needs to be configured in the HW Feature tab.

3.7.13 Voltage/Current

MICBIAS voltage: Adjust the MICBIAS output voltage according to the specifications of the MIC, it can be configured as 1.44V/1.62V/1.8V, and the default is 1.44V

MICBIAS LDO Ctrl: If the value is Enable, the external LDO provides the MICBIAS voltage, and the external LDO is switched through the configured GPIO which is set via MICBIAS_GPIO in HW Feature tab. On the RTL8773D EVB, MICBIAS_GPIO is set to P2_3 by default,

P2_0		▼
P2_1	LED_0	▼
P2_2	LED_1	▼
P2_3	MICBIAS_GPIO	▼
P2_4	KEY_1	▼
P2_5	KEY_2	▼
P2_6		▼
P2_7		▼

If the value is Disable, it is the internal MICBIAS output, and the MICBIAS voltage setting is valid, as follows:

Voltage/Current

MICBIAS voltage

1.44V
1.44V
1.62V
1.8V

MICBIAS LDO Ctr

Notice: When MICBIAS LDO Ctrl is enabled, because MICBIAS has higher requirements on driving current, it is recommended not to use other pins in the same group as MICBIAS_GPIO (for example, all belong to VDDIO1) to avoid mutual influence

3.7.14 User EQ

The number of the SPK EQ saved to flash: After the user adjusts the SPK EQ, the number of groups allowed to be saved in flash

The number of the MIC EQ saved to flash: After the user adjusts the MIC EQ, the number of groups allowed to be saved in flash

Notice: 2M flash IC can save up to 6 groups totally. Non-2M flash IC, SPK and MIC can each save up to 10 groups.

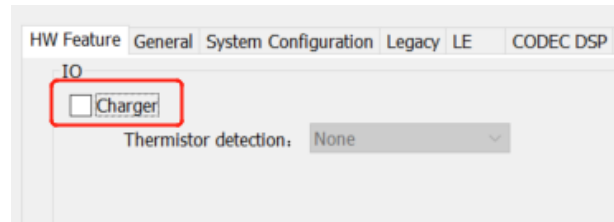
3.7.15 RTP Voice (Gaming Dongle)

Sampling rate: This option is used to set the sampling frequency used by RTP Voice (upstream voice) when paired with Gaming dongle. The default option is 16K, and it can be set to 32K.

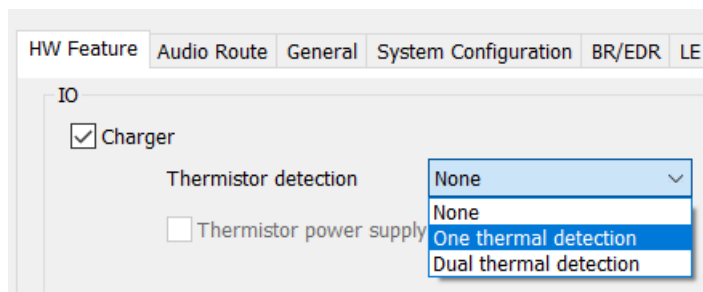
3.8 Charger

3.8.1 Charger

The "Charger" check box on the HW Feature page needs to be selected in order to enable the charger.



- 1) **Charger auto enable:** To decide the device will go into charger mode automatically or not when adapter in, the default is "YES", please do not modify it unless you have already contacted with the FAE and fully understand how to enable the charger with "NO" setting.
- 2) **Set Charger config to APP config:** If the check box is set, all the charger configuration parameters will be added to the APP config bin. And the charger firmware will apply the params in the APP config bin instead of the SYS config bin. So that the charger parameters could be updated through OTA.
- 3) **Pre-Charge Timeout(min):** Battery pre-charge mode time out parameter, the range is 1-65535min
- 4) **Fast-charger state timeout(min):** Battery fast charge mode (CC+CV mode) time out parameter, the range is 3-65535min
- 5) **Charge current of pre-charge state(mA):** Pre-charge mode current setting
- 6) **Charge current of Fast-charge state(mA):** charge mode (CC mode) current setting
- 7) **Re-Charge Voltage(mV):** Re-charge mode voltage threshold
- 8) **Voltage limit of battery(mV):** The CV mode target
- 9) **Charge finish current(mA):** Charge finish, charge current setting in CV mode
- 10) **Charger thermal protection:** Battery temperature protection in fast charge mode, there are four state according to the ADC valued read. The thermistor detection must be selected in HW feature page.



- i) **Warn Region Voltage of Battery High Temperature (mV):** Charger current will drop to (I/X2) once this ADC voltage is read. "I" is the charger current before high temperature is reached. X2 is defined in item19.

- ii) **Warn Region Voltage of Battery Low Temperature (mV):** Charger current will drop to (I/X3) once this ADC voltage is read. “I” is the charger current before low temperature is reached. X3 is defined in item20.
 - iii) **Error Region Voltage of Battery High Temperature (mV):** Charger current stop once this ADC voltage is read.
 - iv) **Error Region Voltage of Battery Low Temperature (mV):** Charger current stop once this ADC voltage is read.
- 11) **Battery detection support** is enabled when the check box is checked.
- a) **Battery warning percent:** Battery low warning level, with the LED or tone setting to send warning to user.
 - b) **Timer low battery warning tone (s):** If the battery level is below battery warning percentage, there is warning tone setting to remind the user. The config range is 1 to 255 (second or minutes according to the unit setting)
 - c) **Warning tone time unit:** Set warning tone interval unit as second or minute
 - d) **Timer low battery warning LED (s):** If the battery level is below battery warning percentage, there is warning LED setting to remind the user. The config range is 1 to 255seconds.
 - e) **Low battery warning count:** Battery low warning tone counts, if the parameter is 0, the warning continue until power off.
 - f) **Battery capacity (mAh):** Fill in the battery capacity in the device. The range is 20~65535mAh
- 12) **Reference Battery Voltage (mV):** To define the reference voltage for 0% to 90% to show battery remains for the smartphone display, low battery warning and power off. Please get the ten levels according to the battery discharge curve with constant loading and divide into ten levels.
- 13) **Effective Resistance of Battery (mOhm):** The reference battery effective resistance including battery internal resistance, PCB trace and battery wire. It is used to compensate the IR voltage drop due to the additional effective resistance.
- 14) **Disable Charger after charging finish 1 min(Allow low power mode):**
- **Yes:** The device will go into power down mode 1min after charger finish (CV mode reach charger finish current), the charger will restart only when adapter out and adapter in again.
 - **No:** The device will stop charging after charger finish but will not go into power down mode, under this condition if the battery drops due to loading and reach **Re-Charge Voltag**, the charger will restart.
- Note: the adapter 5V behavior in charge box
- If the 5V will not drop even when charger finish, please set “Disable Charger after charging finish 1 min(Allow low power mode)” as “Yes” so the system could go into power down mode to save the current consumption.
 - If the 5V will drop after charger finish, the headset will judge it as out of box and power on, connect

to smart phone. To avoid this wrong state, please add a 3rd pin as box detect (0= in box) or smart charger box command

- 15) **Rapid charge support:** If Enable, the CC mode charger current will follow the fast charge current setting (defined as 2C) and slow to to (2C/X1, X1 define in item 19) when VBAT reach 4V. e.g, if battery capacity is 50mA, please set 100mA for rapid charge application.

Note: If customer modify the charger behavior or use external charger IC, please set rapid charge as disable.

- 16) **Report battery status every 10% level drop:** If selected, there is a warnig tone or VP when each 10% battery voltage drops.
- 17) **Disallow battery report once power on(Except power on in low battery state):** If selected, there is no battery VP when power on unless the battery is in low battery state; If not selected, there is battery voltage VP when power on.
- 18) **Enable battery report once phone connected:** If selected, there is battery voltage VP when connect to the smart phone.
- 19) **Rapid charge current divisor:** Set the parameter “X1” when enable rapid charge, the charge current will drop to (2C/X1, 2C is fast charge current setting) when battery voltage reach 4V.
- 20) **High temp warning current divisor:** Set the parameter “X2” when the thermal ADC reading reach high temperature threshold.
- 21) **Low temp warning current divisor:** Set the parameter “X3” when the thermal ADC reading reach low temperature threshold.

3.8.2 Adapter

Low to High Detection Threshold: Adapter in voltage threshold

High to Low Detection Threshold: Adapter out voltage threshold

Low to High Debounce Time (ms): When adapter in, it will be recognized as adapter in state after voltage level high than the threshod and keep more than this timer.

High to Low Debounce Time (ms): When adapter out, it will be recognized as adapter out state after voltage level lower than the threshod and keep more than this timer.

Adaptor IO support: If Yes, 1-wire uart function re-use adapter pin is enabled.

ADP IO Low to High Debounce Time (ms): Adapter IO low to high, and keep high for a certain time, the system will judge as leave 1-wire mode, if “0ms”, default debounce time is 10ms

ADP IO High to Low Debounce Time (ms): Adapter IO high to low, and keep low for a certain time, the system will judge as enter 1-wire mode, if “0ms”, default debounce time is 10ms

3.8.3 Configuration item and APP variable correspondence table

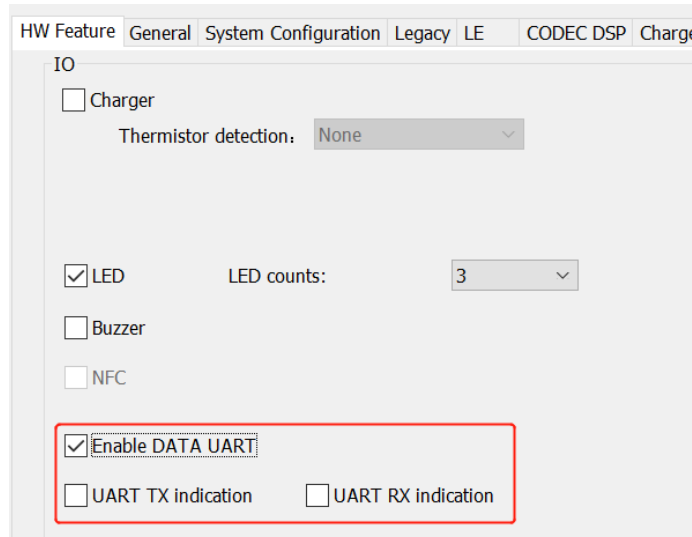
Charger		
<input type="checkbox"/> Battery detection support Battery warning percent: 20% Timer low battery warning tone (s): 10 (1-255) Timer low battery warning LED (s): 10	discharger_support battery_warning_percent timer_low_bat_warning timer_low_bat_led	Low battery alarm settings

3.9 Peripheral

The parameters for MCU peripherals can be configured using the Peripheral tab.

3.9.1 UART

The main switch is in HW Feature tab



UART Baud Rate for external MCU: UART baud rate can be set from 9600 to 6000000

Console Mode: There are two formats for setting:

- String mode: Commands in any format can be entered, suitable for applications such as BQB verification
- Binary mode: User-defined format commands can be entered, such as RTK vendor command

3.9.2 NFC

NFC stable time (100ms): NFC detection time, the unit is 100ms, and the setting range is 100ms - 1s. During this time, if the presence of NFC is always detectable, the NFC event is executed.

Enable NFC Multiple Link Switch: If this option is checked, it is allowed to switch phone connections through NFC. For example: when mobile phone A is connected to the headset, mobile phone B touches the headset through NFC, and after connecting with mobile phone B, disconnects the connection of mobile phone A

3.9.3 Buzzer Mode

In addition to the ringtone, the BT chip also provides user indication of the buzzer function.

The currently supported buzzer function is to work in the switching cycle, repeating 1 to 3 times. Buzzer duration varies from 50ms to 3s.

should be checked on Buzzer in the tab->HW Feature interface.

- 1) **Power on:** turn on
- 2) **Power off:** shutdown
- 3) **Pairing complete:** Pairing complete
- 4) **Incoming call:** incoming call
- 5) **Alarm:** Alarm.
- 6) **Link loss:** Link loss.

3.9.4 USB

When [Enable USB] is checked, the [USB speed] must be selected.

When [USB Audio] is checked, it can perform playing/recording functions. When [HID] is checked, it can control the player behaviors like the volume, play/pause status.

3.9.5 Light Sensor

Light Sensor 's internal parameter setting interface, if you need to modify it, please contact the sensor supplier to assist in debugging.

Light Sensor

JSA 1225

Integration time(0~31):
Waiting time(0~31):
Interrupt Persistence:
PS Gain:
PS Pulse(0~255):

PX318J

Wait time(0~255):
Mean(0~3):
Output precise(1~3):
Pulse duration(0~42):
Pulse time(0~5):

JSA 1227

Integration time(0~15):
Waiting time(0~31):
Interrupt Persistence:
PS Gain:
PS Pulse(0~15):

IO Detect

IO sensor detect:
In ear debounce time(100ms, 1~10):
Out ear debounce time(100ms, 1~10):

SC7A20

Z (unit:-10)
Z Max(0~51): (unit: 10)

3.9.6 PSensor

PSensor internal parameter setting interface, if you need to modify it, please contact the sensor supplier to assist in debugging.

PSensor

Release

0

(0~15)

IQS773

Sampling rate(0~255):

16

Ultra low power rate(0~255):

16

Interrupt persistence(0~255):

255

Sensor sensitivity ATI target(0~63):

15

Sensor sensitivity ATI base(0~3):

1

Sensor trigger level(0~255):

13

Force touch bias current(0~3):

2

Force touch halt timeout(0~255):

40

Charge freq(0~3):

2

Prox threshold(0~255):

12

☐ Hall-effect

Sensor sensitivity(0~255):

35

Sensor trigger level(0~255):

25

IQS873

ULP report rate(0~255):

8

Touch timeout(0~255):

32

Wear detect

Sensor sensitivity base(0~3):

1

Sensor sensitivity ATI target(0~63):

15

Sensor trigger level(0~255):

16

Force touch

Sensor sensitivity base(0~3):

1

Sensor sensitivity ATI target(0~63):

15

Sensor trigger level(0~255):

8

☐ Hall-effect

Sensor sensitivity base(0~3):

3

Sensor sensitivity ATI target(0~63):

15

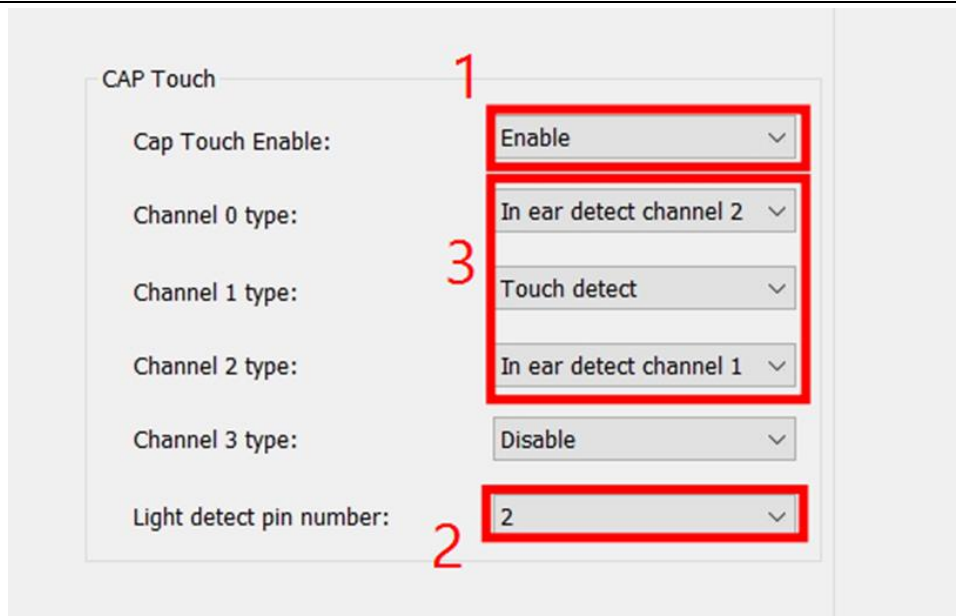
Sensor trigger level(0~255):

36

3.9.7 CAP Touch

Cap touch realizes capacitive touch detection by sampling ADC data. The current value sampled by ADC is compared with the ambient level (baseline) when there is no touch. If the difference between the two values is greater than the threshold set by the channel, the touch is triggered.

The pins used by Cap touch are ADC 0~3. Before setting cap touch, please make sure that the functions of these pins are idle. The function setting can be set to touch or light sensor detection. If set to touch, it will replace key 0. Light detection can choose to use one channel or two channel to determine the in-ear or out-ear.

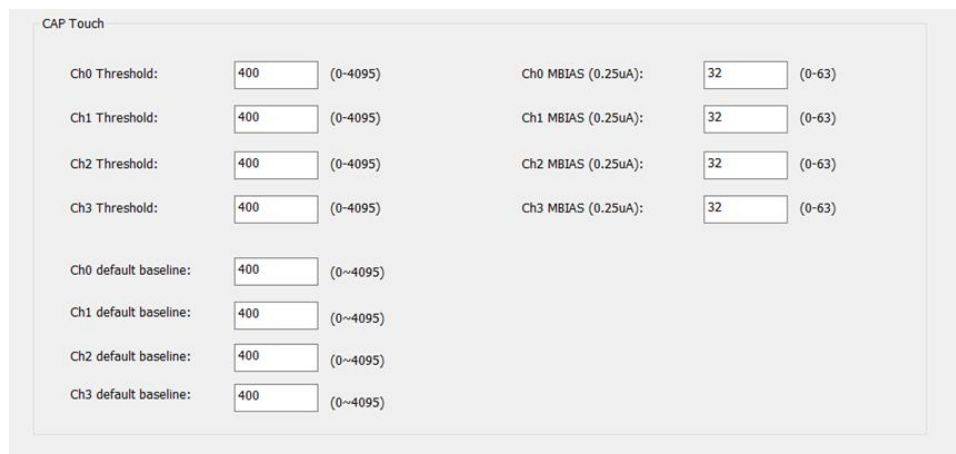


Cap Touch can adjust Threshold, MBIAS, and default baseline individually for each channel

Chx Threshold: The threshold used to judge the touch, the smaller the setting, the easier it is to trigger, but the anti-interference ability will also be poor

Chx default baseline: Set the ADC reference value of the environment when the channel has no touch

Chx MBIAS: This parameter determines the sensitivity of the sensor. The higher the value, the higher the sensitivity of the sensor, but the power consumption will also increase



3.9.8 Configuration item and APP variable correspondence table

Peripheral		
UART	data_uart_baud_rate	Uart communication baud rate configuration
UART Baud Rate for external MCU: Baud Rate 115200		

<div>USB</div> <div><input type="checkbox"/> USB audio support</div>	usb_audio_support	USB audio support
--	-------------------	-------------------

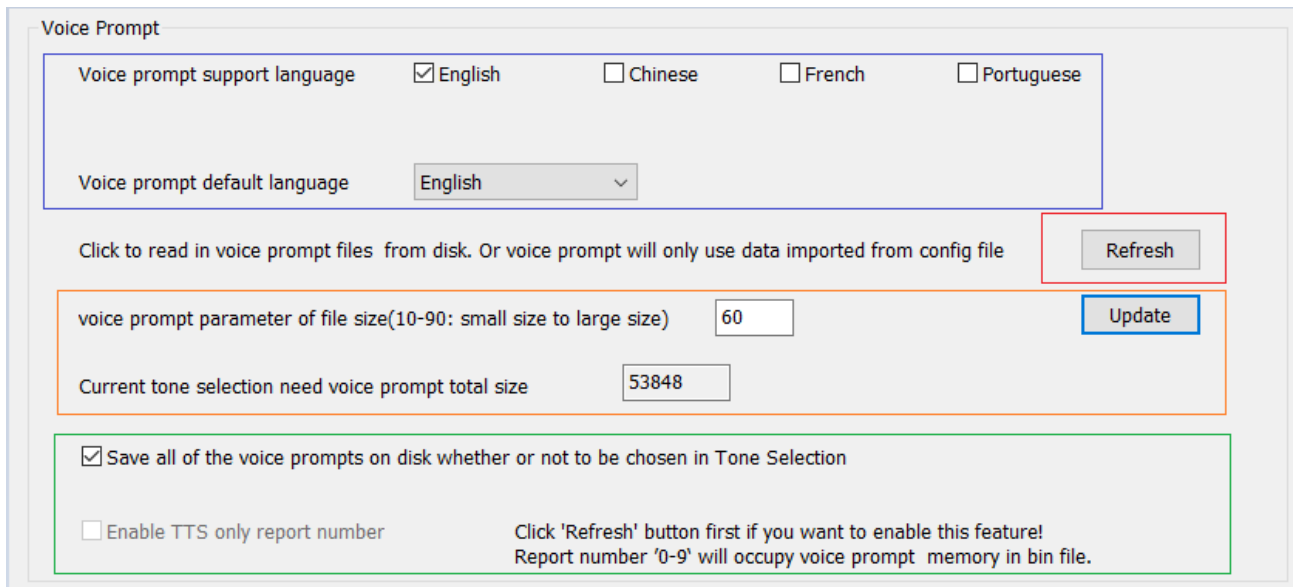
3.10 Ringtone

Ringtone tab provides ringtone and voice prompt configuration. Here, users can personalize ringtones and import voice prompts.

3.10.1 Notification mixing Setting

- 1) **Notification mixing setting:** If the value is enable, the notification will be played in the audio scene, and the two will be mixed; if the value is disabled, the notification will be played in the audio scene, and the notification will be played separately. After the notification is played, the audio will resume playing.

3.10.2 Voice prompt



- 1) **Voice prompt support language:** Supports built-in voice prompts in up to 4 languages. The user chooses which languages this product supports.
- 2) **Voice prompt default language:** The user selects a language as the default prompt language.

3.10.3 Update Voice Prompt

To update the Voice Prompts that the tool identified, follow the instructions below.

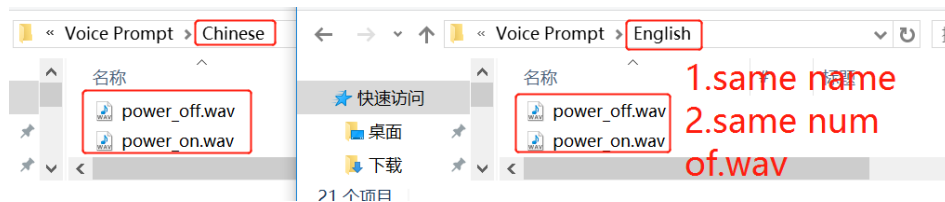
- 1) Choose the voice prompt supported languages according your needs (Voice prompt support language)
- 2) Update the wav file in the folder ". \Voice Prompt ".

Wav files must meet the following requirements:

- i. Mono or Stereo audio
- ii. Following sampling rates are allowed: 8KHz, 16KHz, 44.1KHz, 48KHz.

File name is written as *.wav. Be aware that if multiple languages are selected, the wav files in the respective language folder must have the same name. Tool won't recognize files with inconsistent file names in the language folder when multi-language is chosen.

For instance, suppose SOC use both English and Chinese voice prompt. If you want to update “power_on.wav” and “power_off.wav”, put them in the folders as shown.



3) Click the **"Refresh"** button to trigger the tool search and obtain the wav files on the hard drive.

4) Click the **"Update"** button to check the required size of the Voice prompt exporting to Bin. Please make ensure the generated Voice Prompt's overall size does not exceed the SOC Flash layout's maximum allowed size.

The wav files will be converted to voice prompt in AAC format. By adjusting the **"voice prompt parameter of file size"** parameter, whose valid range is 10–90, you can customize the VP sound quality. Larger parameter values will result in better VP sound quality, but more flash space will be needed.

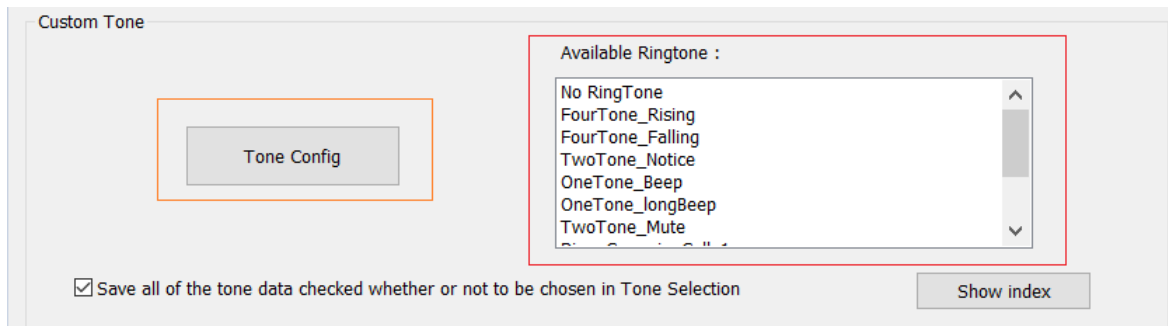
The voice prompt file name and content will be recorded after the configuration is finished and the rcfg file is exported. The VP information can be used if rcfg is imported the next time.

3.10.4 Voice Prompt export logic

Which Voice Prompts are exported to Bin is described in this section.

- 1) If option **"Save all of the voice prompts on disk whether or not to be choose in Tone Selection"** is chosen:
All VP files that Tool presently recognizes will be imported into Bin.
- 2) If option **"Save all of the voice prompts on disk whether or not to be choose in Tone Selection"** is not chosen:
Only the voice prompt chosen by the tone scenario in "Tone Selection" is collected by the tool. In other words, it won't be written to Bin if the VP identified by Tool is not selected in "Tone Selection."
- 3) If **"Enable TTS only report number"** is checked, some VPs will automatically be exported to Bin for TTS function (Tool recognizes the VP names as "0", "1", "2", "3", "4", "5", "6", "7", "8", "9").

3.10.5 Configure Ringtone



"Available Ringtones" lists the ringtones that can be chosen for export to bin file. Click the "Tone Config" button to modify the "Available Ringtone."

Tool offers 45 non-editable Ringtones. Ringtone customization is also supported.

- 1) When a ringtone is selected, it will appear in the list of "Available Ringtones".
- 2) Click the " Play " button to hear the Ringtone effect.
- 3) Click the " Value " button to examine Ringtone data.

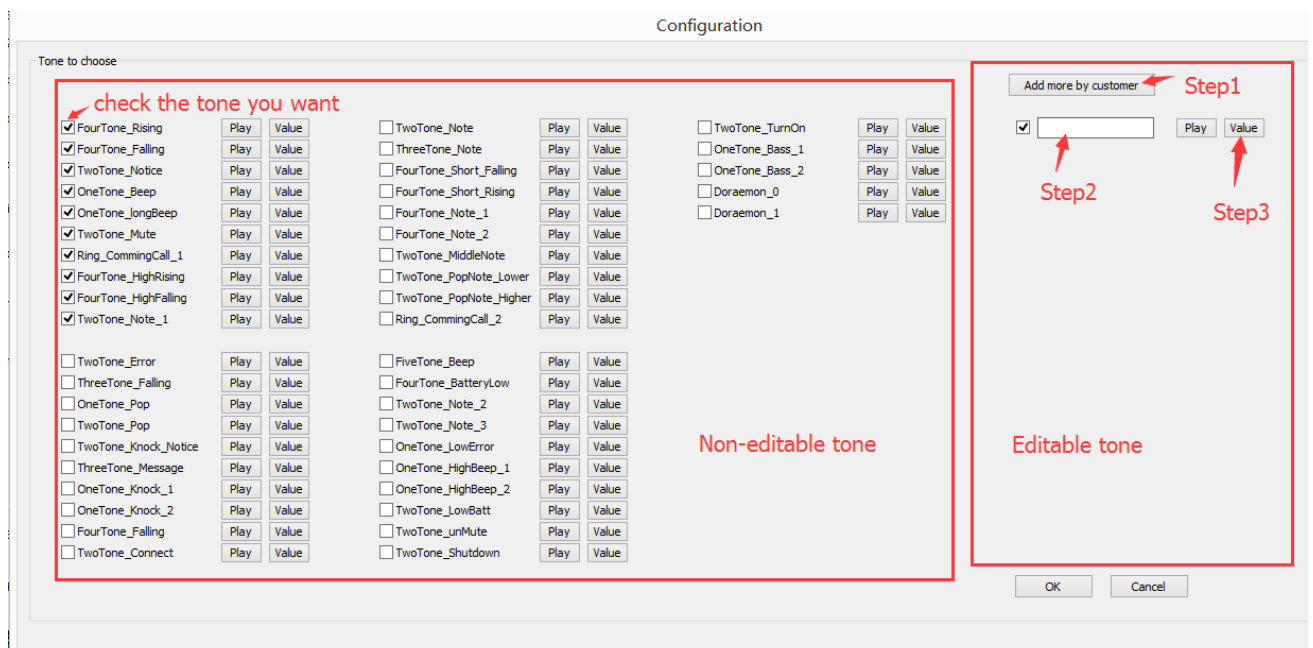
Add a customized Ringtone:

Step1: Click button " Add more by customer " to add a new ringtone.

Step2: Give the custome ringtone a name in the editbox. Make sure this name is different from the existing "non-editable Ringtone" name.

Step3: Click the "Value" button to fill in the tone data, then save it. Click the "Play" button to hear the Ringtone effect.

Note: Select the checkbox to display this custom Ringtone in " Available Ringtones " list.



3.10.6 Ringtone export logic

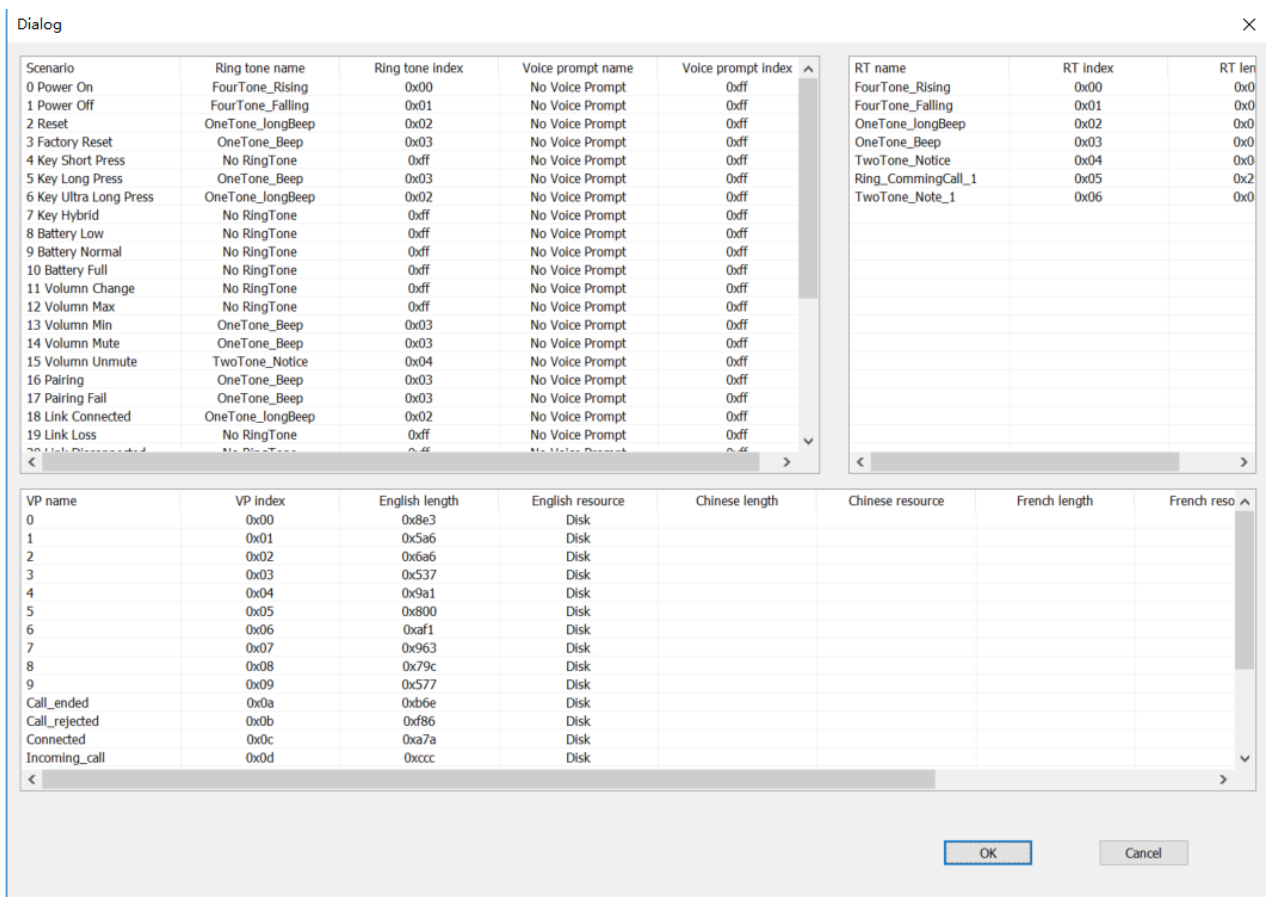
This section describes which ringtones are exported to Bin.

- 1) If the option **"Save all of the tone data checked whether or not to be chosen in Tone Selection"** is chosen:
All ringtones in "Available Ringtone" will be exported to Bin.
- 2) If the option **"Save all of the tone data checked whether or not to be chosen in Tone Selection"** is not chosen:
The tool only collects the ringtones selected by the tone scenario in "Tone Selection". In other words, if the ringtone in "Available Ringtone" is not chosen in "Tone Selection", it will not be written to Bin.

3.10.7 View Ringtone /Voice Prompt index and length

Click "Show index" button to view following information of Ringtone and VP:

- 1) The Ringtone/VP index in the exported Bin.
- 2) The data size of Ringtone/VP.



The screenshot shows a 'Dialog' window with two main sections. The top section displays a table of Ringtone (RT) information, and the bottom section displays a table of Voice Prompt (VP) information.

Scenario	Ring tone name	Ring tone index	Voice prompt name	Voice prompt index
0 Power On	FourTone_Rising	0x00	No Voice Prompt	0xff
1 Power Off	FourTone_Falling	0x01	No Voice Prompt	0xff
2 Reset	OneTone_longBeep	0x02	No Voice Prompt	0xff
3 Factory Reset	OneTone_Beep	0x03	No Voice Prompt	0xff
4 Key Short Press	No RingTone	0xff	No Voice Prompt	0xff
5 Key Long Press	OneTone_Beep	0x03	No Voice Prompt	0xff
6 Key Ultra Long Press	OneTone_longBeep	0x02	No Voice Prompt	0xff
7 Key Hybrid	No RingTone	0xff	No Voice Prompt	0xff
8 Battery Low	No RingTone	0xff	No Voice Prompt	0xff
9 Battery Normal	No RingTone	0xff	No Voice Prompt	0xff
10 Battery Full	No RingTone	0xff	No Voice Prompt	0xff
11 Volumn Change	No RingTone	0xff	No Voice Prompt	0xff
12 Volumn Max	No RingTone	0xff	No Voice Prompt	0xff
13 Volumn Min	OneTone_Beep	0x03	No Voice Prompt	0xff
14 Volumn Mute	OneTone_Beep	0x03	No Voice Prompt	0xff
15 Volumn Unmute	TwoTone_Notice	0x04	No Voice Prompt	0xff
16 Pairing	OneTone_Beep	0x03	No Voice Prompt	0xff
17 Pairing Fail	OneTone_Beep	0x03	No Voice Prompt	0xff
18 Link Connected	OneTone_longBeep	0x02	No Voice Prompt	0xff
19 Link Loss	No RingTone	0xff	No Voice Prompt	0xff
20 Link Disconnected	No RingTone	0xff	No Voice Prompt	0xff






RT name	RT index	RT len
FourTone_Rising	0x00	0x0
FourTone_Falling	0x01	0x0
OneTone_longBeep	0x02	0x0
OneTone_Beep	0x03	0x0
TwoTone_Notice	0x04	0x0
Ring_CommingCall_1	0x05	0x2
TwoTone_Note_1	0x06	0x0

VP name	VP Index	English length	English resource	Chinese length	Chinese resource	French length	French reso
0	0x00	0x8e3	Disk				
1	0x01	0x5a6	Disk				
2	0x02	0x6a6	Disk				
3	0x03	0x537	Disk				
4	0x04	0x9a1	Disk				
5	0x05	0x800	Disk				
6	0x06	0xaf1	Disk				
7	0x07	0x963	Disk				
8	0x08	0x79c	Disk				
9	0x09	0x577	Disk				
Call_ended	0x0a	0xb6e	Disk				
Call_rejected	0x0b	0xf86	Disk				
Connected	0x0c	0xa7a	Disk				
Incoming_call	0x0d	0xcc	Disk				

3.10.8 Tone Selection

“Tool Selection” lists various notification scenarios of SOC. You can set each scenario to using "Ringtone

Prompt" or "Voice Prompt", and the effect can be heard instantly by clicking the speaker icon.

	Category	Tone	
Power on tone	Voice Prompt ▾	power_on ▾	
Power off tone	Voice Prompt ▾	power_off ▾	
Factory reset tone	Multi Tone ▾	OneTone_Beep ▾	
Pairing tone	Voice Prompt ▾	Pairing_mode ▾	
Pairing time out tone	Multi Tone ▾	No RingTone ▾	

If you need to modify the optional Ringtone and Voice Prompt, please refer to 3.10.3 and 3.10.5.

3.10.9 Other Setting

- ☐ RWS connected show channel VP (If not check, SNK will show role VP)
- ☐ Repeat DUT test tone
- ☐ Play volume Max/Min tone when adjust volume from phone
- ☐ Always play HF incoming tone when incoming call
- ☐ Only primary bud play device connected tone
- ☐ Only play volume Max/Min tone once when adjust volume via long press repeat
- ☐ Disallow sync play vol changed tone when vol adjust
- ☐ Only play key tone on trigger bud side

- 1) **RWS connected show channel VP (If not check, SNK will show role VP):** After checking this option, the original RWS speaker1/2 role tone will be changed to show RWS connected left/right channel, and after rws is connected, the ringtone will be changed to play the ringtone of the corresponding channel
- 2) **Repeat DUT test tone:** After checking this option, EVB will play the DUT tone every 5s after entering DUT mode.
- 3) **Play volume Max/Min tone when adjust volume from phone:** After checking this option, for mobile phones that support absolute volume and adjust the volume from the mobile phone. When the volume reaches the maximum and minimum values, the prompt tone of the maximum and minimum volume will also be played; Uncheck this option, adjust the volume from the phone to the maximum and minimum, it will not play the maximum and minimum volume prompts
- 4) **Always play HF incoming tone when incoming call:** After checking this option, HFP inband tone will not be played when incoming call, but incoming call tone configured by MCUConfig Tool will be played

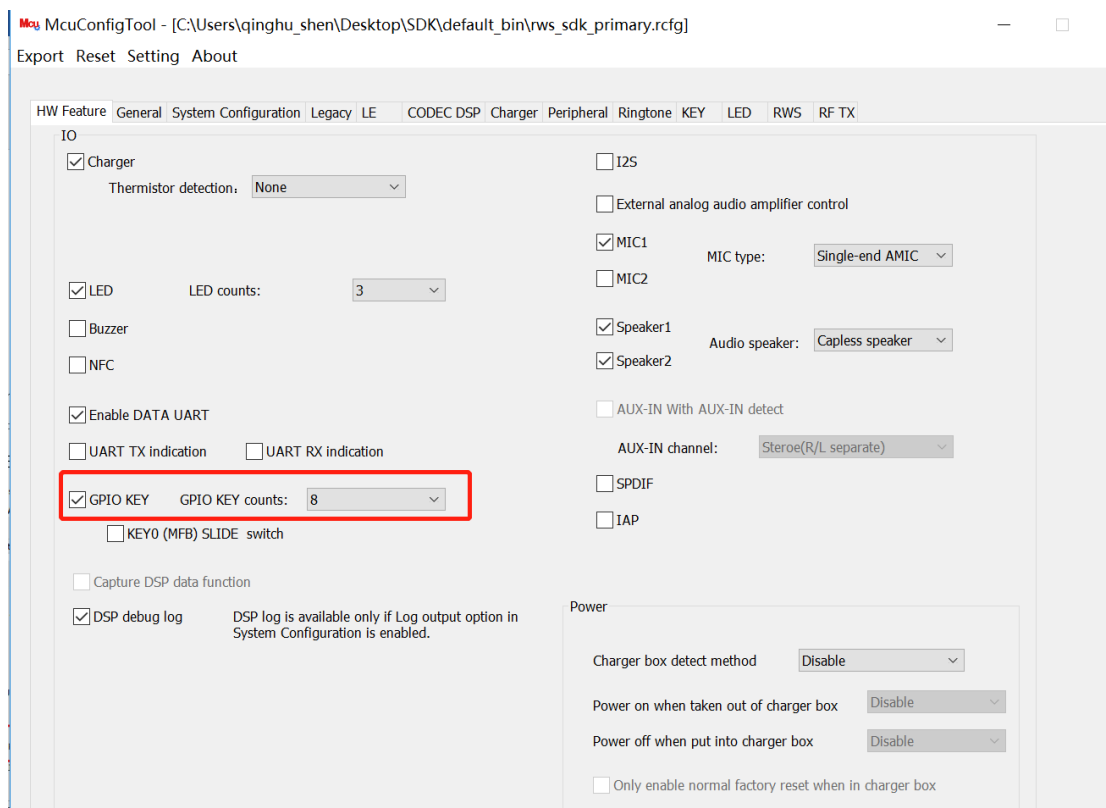
- 5) **Only primary bud play device connected tone:** After checking this option, when connected to the phone, only the primary bud will play the connected tone. If this option is not checked, both the primary and secondary buds will play the connected tone.
- 6) **Only play volume Max/Min tone once when adjust volume via long press repeat:** When this option is checked, the volume Max/Min tone triggered by long press repeat will only be played once; when this option is not checked, it will be triggered by long press repeat. And the volume Max/Min tone will play continuously.
- 7) **Disallow sync play vol changed tone when vol adjust:** If the option is checked, press the button to adjust the volume, and the tone will be played on the pressed bud.
- 8) **Only play key tone on trigger bud side:** Default the press key tone is played with both buds. If you only want to play on pressed bud, you can check this option

3.11 Key

8 GPIO keys are available. Although each of the 8 keys' button action can be changed and set up individually, users typically only need to setup 6 keys on the EVB.

Also included are 8 hybrid keys. The key behavior is assigned here. Each hybrid key can be categorized as a multi-click key or a combination key. The amount of keys used in HW Feature can be altered by the user. Also available is the KEY0 (MFB) SLIDE switch option, which employs a slide switch as a power switch.

The major switch for Key is located on the "HW Feature" tab. After selecting the n as the supported key number, there are only n keys available on the "KEY" tab.



Configure the IO interface of the button:

Pinmux

IC Part Name:

Available Function:

NULL

(ADC_X = P0_X)

(Tips: P0_0, P0_1, P0_6, P0_7, P1_1, P1_4, P2_0, P2_1 and P2_2 are HW controlled LED, the other GPIO pins are SW Controlled LED. SW not supports Breath Type!)

ADC_0

ADC_1

LED_2

ADC_2

ADC_3

ADC_4

ADC_5

ADC_6

ADC_7

P1_0

P1_1

P1_2

P1_3

KEY_3

P1_4

KEY_5

P1_5

KEY_4

P1_6

P1_7

P2_0

P2_1

LED_0

P2_2

LED_1

P2_3

P2_4

KEY_1

P2_5

KEY_2

P2_6

P2_7

P3_0

P3_1

P3_2

P3_3

P3_4

P3_5

P3_6

P3_7

3.11.1 Key Setting

- 1) **Key x active:** This function is to set the trigger button to high level or low level, the default evb is set to low level; but it can be set to high level to trigger the key according to the design.
- 2) **Disable key in DUT test mode:** If this option is not checked, the key is valid in DUT test mode; if this option is checked, the key is invalid.
- 3) **Key0/MFB Press trigger:** The function that is activated by holding down the key 0 for a long time. When the long pressing duration is reached, the function defined by key 0 will be activated if this option is checked. In order to prevent the shutdown procedure if the long pressing time is not properly managed.
- 4) **Disable key function timer (s):** Indicates that the key function will be disabled after a few seconds after entering the charing box. If it is set to 0, it will be disabled immediately.
- 5) **Long Press timer (unit 100ms):** the duration of pressing the button.
- 6) **Long Press Repeat support:** The function of long press repeat (the specific performance is equivalent to the function of fast forward and rewind by pressing the key all the time).
- 7) **Long press repeat timer (100ms):** The time interval for long press to trigger long press MMI repeatedly.
- 8) **Key0-Key7 repeat:** Whether these options are checked can be customized. If the customer has requirements, they can select the corresponding key according to the requirements.

3.11.2 Key Ring indication

- 1) **Key Short Press Tone:** The Short Press of keys 0 through 7 can be customized to your needs to determine whether a prompt tone reminder sounds when you short press a key.
- 2) **Key Long Press Tone:** The Short Press of keys 0 through 7 can be customized to your needs to determine whether a prompt tone reminder sounds when you long press a key.

3.11.3 Hybrid key setting

Tool allows to configure 8 groups of hybrid keys.

- 1) **Multi-click support:** The function of this option is to support the setting of multiple keys. For example, in the BT chip, some products have limited pins, but there are many key functions. Users can set the key to be pressed twice or three times according to their needs. The function works. If you check this option, you need to set the interval time of Multi-click (ie Multi -click detect timer). It has a linkage relationship with the Hybrid Key behavior in the Multi-click detect timer and the Hybrid Key Mapping module. If this function is not turned on, the Hybrid Key Mapping part will only have long press and short press, and there will be no Hybrid function from 2 Clicks to 7 Clicks.

Hybrid Key Setting

☒ Multi-click support

Multi-click detect timer (100ms): (1-10)

☐ Ultra long press support

☐ Execute long press action when timeout
☐ Execute ultra long press action when timeout
☐ Ultra long press repeat Support

Ultra long press detect timer (100ms): (10-255)

Ultra long press repeat timer (100ms): (3-50)

☐ Hall switch support

Hall switch stable timer (100ms): 5 (1-10)

☐ Enable combination key to power on/off

☐ Click and press support

Press detect timer(100ms): (10-100)

Click number

Hybrid Key0 5 (1-7)

Hybrid Key1 5 (1-7)

Hybrid Key2 5 (1-7)

Hybrid Key3 5 (1-7)

Hybrid Key Mapping

Select Key index

☒ Hybrid Key 0
☒ Key0/MFB
☒ Key1
☐ Key2
☐ Key3
☐ Key4
☐ Key5
☐ Key6
☐ Key7

☐ Hybrid Key 1
☐ Key0/MFB
☐ Key1
☐ Key2
☐ Key3
☐ Key4
☐ Key5
☐ Key6
☐ Key7

☐ Hybrid Key 2
☐ Key0/MFB
☐ Key1
☐ Key2
☐ Key3
☐ Key4
☐ Key5
☐ Key6
☐ Key7

☐ Hybrid Key 3
☐ Key0/MFB
☐ Key1
☐ Key2
☐ Key3
☐ Key4
☐ Key5
☐ Key6
☐ Key7

Hybrid Key Behavior

Long Press

Short Press

Long Press

2 Clicks

3 Clicks

4 Clicks

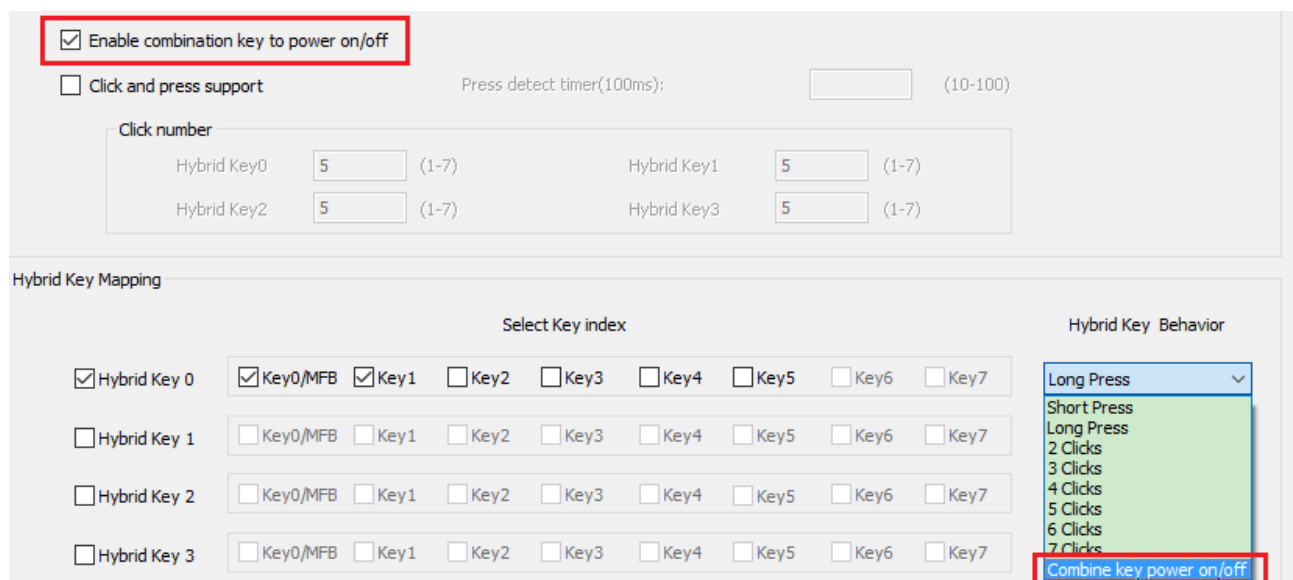
5 Clicks

6 Clicks

7 Clicks

- 2) **Ultra long press support:** supports ultra-long key mode (that is, longer than long press The press button lasts for a long time)

- 3) **Ultra long press detect timer (100ms):** the time required to trigger the ultra long press detect timer
- 4) **Execute long press action when timeout:** If checked, it will be carried out immediately following the long-press timer. It will do two actions if it is continuously pressed for an extremely long period of time. By default, you must release the button after the long-press time has expired (while using a long-press time press ringtone) in order to carry out the intended action.
- 5) **Execute ultra long press action when timeout:** If this option is checked, the MMI action will be carried out following the ultra long press timeout; if it is not checked, the MMI action will be carried out following the ultra long press timeout and the key release.
- 6) **Ultra long press repeat support:** Once this option has been selected and the Ultra long press has been initiated, you can repeatedly initiate the action by pushing and holding down this button.
- 7) **Ultra long press repeat timer (100ms):** After triggering Ultra long press, the time required to trigger Ultra long press repeatedly.
- 8) **Hall switch support / Hall switch stable timer (100ms):** The purpose of the timer setting option is to make sure that the corresponding MMI action will be executed after the hall switch is stably triggered. If this option is checked, configure the hybrid key behavior on the corresponding hybrid key mapping page to hall switch high or hall switch low, and then set the corresponding MMI behavior on the key MMI page.
- 9) **Enable combination key to power on/off:** As a result of this option, the user can specify a combination key as the function of the power on/off key, which adds another combination key MMI. When this box is checked, the function "Combine power on/off" will only be available once in the "Hybrid Key Mapping" module's "Hybrid Key Behavior" drop-down box. Key0 serves as a standard push button for earbud product users, while Key 1 serves as the touch button. Because of structural issues, whenever a user presses key 1, key 0 will also be pressed.



The screenshot shows the MCU Config Tool interface. At the top, the option **Enable combination key to power on/off** is checked and highlighted with a red box. Below it, there are fields for **Click and press support** (unchecked), **Press detect timer(100ms):** (empty), and **Click number** (5). The **Hybrid Key Mapping** section is visible below, showing a table of key mappings. The **Hybrid Key Behavior** dropdown menu is open, showing options like **Long Press**, **Short Press**, **Long Press**, **2 Clicks**, **3 Clicks**, **4 Clicks**, **5 Clicks**, **6 Clicks**, **7 Clicks**, and **Combine key power on/off**, which is highlighted with a red box.

- 10) **Click and press support:** After selecting this option, MMI can be activated by pressing 1–7 times followed by a long press. This feature can only be configured via Hybrid Key 0-3.

- 11) **Press detect timer (100ms)**: the long press time setting in the “Click and press support”; if it is shorter than this duration, MMI will not be triggered.
- 12) **Click number** (Hybrid Key0-3): Set the number of clicks the Hybrid Key 0~3 has to make in order to activate MMI using click and press.

3.11.4 Hybrid key mapping

This module handles combination key configuration. To fit their needs, users can change the parameters. You can create up to 8 different groups of combination keys. Each combination key group can select the optimal number of keys depending on the quantity of keys available and their needs. Typically, a combination key can be assigned using two keys. The behavior drop-down box, which is connected to the parameter settings in the "Hybrid Key Setting," offers the option selection for the Hybrid Key behavior.

3.11.5 Hybrid Key Press Indication

According to their requirements, users can alter the sound that plays when they need to press the combination key.

3.11.6 RWS Key Mapping

The headset can trigger different MMIs depending on whether one or two ears are being used by customizing the RWS Key.

When using only one ear, the Key MMI configuration will be used; when using both ears, the MMI specified by the RWS Key will be executed, and the Key MMI configuration will only be used when the RWS Key does not have any associated configuration.

Only Key0/MFB is supported by this function at the moment. To use this feature, the RWS key must have the same key trigger settings as the Key MMI, including Click, LongPress, and Hybrid. For example: Key0/MFB configuration for hybrid key mapping also requires two clicks for RWS key configuration.

RWS Key Mapping

<input type="checkbox"/> RWS Key0	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key1	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key2	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key3	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key4	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key5	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key6	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>
<input type="checkbox"/> RWS Key7	<div>Call Idle ▾</div>	<div>Short Press ▾</div>	<div>No define (0x00) ▾</div>

3.11.7 Key MMI

This module is a function module for setting KEY, the action of the pressed key will be mapped to RTK MMI, including click, long press and combination keys can be customized in different scenarios.

- 1) Call idle: idle state (that is, not in a call state)
 - a) AV Speaker mute (silent mode): It can only be set in this state. When the music is playing, press the key corresponding to this MMI, and the music will be muted. The music mute will be released if you press the AV Speaker Un mute button once more.
 - b) AV Speaker Un mute: See above.
 - c) Audio Effect Next/ previous: It is the setting of DSP and can only be set in this state
- 2) Voice Dial: Voice assistant.

Generally speaking, only need to set key 0 in this scenario click For HF Initiate voice dial or set long press is HF Cancel voice dial (that is, cancel the voice assistant function). Additionally, users can modify the other keys' functionalities based on their own requirements. Every mobile phone, nevertheless, behaves differently. In most cases, calling up the assistant is successful. When canceling, there will be some exceptions, but the SoC needs to confirm that the message has been sent.

- 3) Incoming call: Incoming call scenario

In this scenario, you can set the basic functions of answering and rejecting incoming calls. For example, set key 0 click to HF Answer (to answer an incoming call), long press set to HF Reject Call (rejecting incoming calls); Other crucial features, including volume adjustment, can be customized to demands.

- 4) Outgoing call: Outgoing call scenario

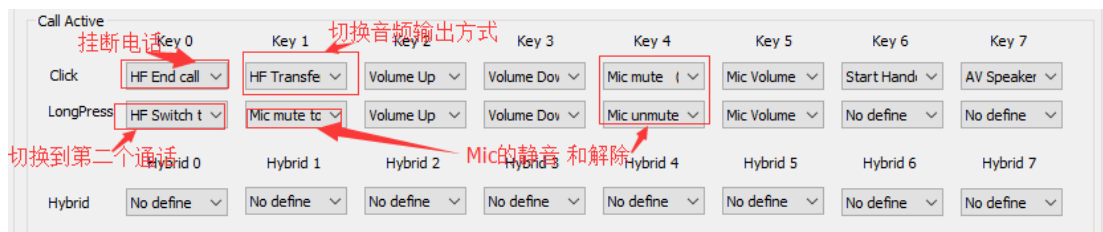
In this case, we can typically set the call to be terminated before the remote picks up. For example, set key 0 click Long Press to HF End outgoing call (hang up the outgoing call); other key functions can be customized

according to your needs, such as volume adjustment.

5) Call Active: Scenarios during a call

In this scenario, we generally need to set the operation after the call is connected. For example, hang up the phone, switch the output mode of the phone, adjust the volume of the call, and transfer the second call and other functions.

For example, the following settings:



If users have other needs, they can customize the settings.

If Mic Mute is set, and this key is operated during a call, the local mute is muted, and the remote end cannot hear the sound of the local headset. If you click Mic Unmute, it will return to normal. Mic Toggle is equivalent to Mic Mute / Umute.

- 6) Call Active with Call Waiting: During a three-party call, one is on the call and the other is waiting (this scenario can only be used for a single legacy connection). In this scenario, we usually set to hang up the current call and transfer to the second incoming call, so that the current two incoming calls are added to the call. For example, set key 0 click to HF End call (hang up the current call), key0 Long Press is set to HF Switch to second call (transfer a second call). Volume adjustment can generally be set at key 2 /key 3.
- 7) Call Active with Call Hold: During a three-party call, one is on the call and the other is on hold (this scenario can only be used for a single legacy connection) The only difference between this scenario and the Call Active with Call Waiting scenario is that in the former, the recipient of the second incoming call did not respond to the caller of the first incoming call(that is, the other party was in a waiting state); in the second scenario, “HF Switch to second Call” was applied in the first scenario., the user can add both calls to answer, but the second call is on hold. Key setting is the same as Call Active with Call Waiting, but key 1 click can be set to “HF Join two calls” (both incoming calls make a call).
- 8) Multi-link Call Active with Call Waiting: This scenario is for Multi-link In the scenario, its meaning is the same as Call Active with Call Waiting / Hold.
- 9) Multi-link Call Active with Call Hold: This scenario is for Multi-link In the scenario, its meaning is the same as Call Active with Call Waiting / Hold.

3.11.8 Correspondence table between configuration items and APP variables

Key		
<div> <div>Key Setting</div> <div> <div>Key 0 active: Active low</div> <div>Key 1 active: Active low</div> <div>Key 2 active: Active low</div> <div>Key 3 active: Active low</div> <div>Key 4 active: Active low</div> <div>Key 5 active: Active low</div> <div>Key 6 active: Active low</div> <div>Key 7 active: Active low</div> </div> </div>	key_high_active_mask	Button press high / low effective setting, matching with hardware circuit
<div> <div><input type="checkbox"/> Key0/MFB Press trigger</div> </div>	key0_tigger_long_press_option	Whether to execute the action corresponding to the long press during the long press of key0
<div> <div>Long press timer (100ms) :</div> <div>8</div> </div>	key_long_press_interval	Button long press function settings
<div> <div>Long Press Repeat</div> <div> <div><input checked="" type="checkbox"/> Long Press Repeat support</div> <div>Long press repeat timer (100ms)</div> <div> <div><input type="checkbox"/> Key 0 Repeat</div> <div><input type="checkbox"/> Key 1 Repeat</div> <div><input checked="" type="checkbox"/> Key 2 Repeat</div> <div><input checked="" type="checkbox"/> Key 4 Repeat</div> <div><input checked="" type="checkbox"/> Key 5 Repeat</div> <div><input type="checkbox"/> Key 6 Repeat</div> </div> </div> </div>	key_long_press_repeat_interval key_long_press_repeat_mask	Press and hold the button to set the repeat function,
<div> <div>Key Short Press tone</div> <div> <div><input checked="" type="checkbox"/> Key 0 Ring</div> <div><input type="checkbox"/> Key 1 Ring</div> <div><input type="checkbox"/> Key 2 Ring</div> <div><input type="checkbox"/> Key 4 Ring</div> <div><input type="checkbox"/> Key 5 Ring</div> <div><input type="checkbox"/> Key 6 Ring</div> </div> </div>	key_short_press_tone_mask	Short press tone to set
<div> <div>Key Long Press tone</div> <div> <div><input checked="" type="checkbox"/> Key 0 Ring</div> <div><input type="checkbox"/> Key 1 Ring</div> <div><input type="checkbox"/> Key 2 Ring</div> <div><input type="checkbox"/> Key 4 Ring</div> <div><input type="checkbox"/> Key 5 Ring</div> <div><input type="checkbox"/> Key 6 Ring</div> </div> </div>	key_long_press_tone_mask	Long press tone to set
<div> <div>Hybrid Key Setting</div> <div> <div><input type="checkbox"/> Multi-click support</div> <div>Multi-click detect timer (100ms):</div> <div><input type="checkbox"/> Ultra long press support</div> <div>Ultra long press detect timer (100ms):</div> <div><input type="checkbox"/> Execute long press action when timeout</div> <div><input type="checkbox"/> Hall switch support</div> <div>Hall switch stable timer (100ms):</div> <div><input type="checkbox"/> Enable combination key to power on/off</div> </div> </div>	key_multi_click_interval key_trigger_ultra_long_press key_ultra_long_press_interval enable_combinekey_power_onoff	Multi-tap settings Long press settings action option of whether to execute the response immediately when the super long press time expires hall switch settings Combination key switch function settings
<div> <div>Hybrid Key Mapping</div> <div> <div><input checked="" type="checkbox"/> Hybrid Key 0</div> <div><input checked="" type="checkbox"/> Key0</div> <div><input checked="" type="checkbox"/> Key1</div> </div> </div>	hybrid_key_mapping[8][2]	[Key Index][Hybrid Key click type]
<div> <div>Hybrid Key Press Indication</div> <div><input checked="" type="checkbox"/> Hybrid 0 Ring</div> </div>	hybrid_key_press_tone_mask	Hybrid key tone setting

Key MMI

Key pressed action is mapped to RTK vendor MMI.
The MMI mapping is based on HFP scenario when the key is pressed

Call Idle

	Key 0	Key 1	Key 2
Click	HF Initiate ▾	AV Play/Pau ▾	Volume Up ▾
LongPress	HF Last num ▾	AV Stop ▾	Volume Up ▾
	Hybrid 0	Hybrid 1	Hybrid 2
Hybrid	Legacy Ente ▾	RWS Pairin ▾	LE Enter ad ▾

key_table[2][9][8]

hybrid_key_table[9][8]

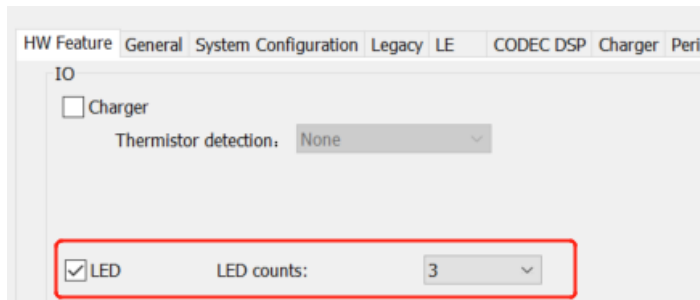
key_table [short/long press]
[condition][KEY0~7]

hybrid_key_table[condition][
hybrid_key0 ~ 7]

3.12 LED

BT SOC supports 3 leds: LED 0, LED1, and LED2.

Generally, it is necessary to set whether to use LEDs and the number of LEDs to be used in Tab “HW Feature”.



Detailed configuration of LEDs can then be performed at Tab “LED “. If n LEDs are configured on the “HW Feature” Tab, there are also n LEDs on the “LED” Tab that can be configured in detail.

3.12.1 LED Setting

1) LED active

The LED can be set to a high or low level using this function. Our EVB LED's default setting is high; depending on the user's design, it can be changed to a low level to activate the LED.

- a) LED0 active: LED0 high potential or low potential.
 - b) LED1 active: LED1 high potential or low potential.
 - c) LED2 active: LED2 high potential or low potential.
- 2) **Enable repeat gaming mode LED:** If this option is checked, LED Mode (non-repeat): Enter/Exit Gaming Mode will change to LED Mode (repeat): Gaming Mode. Gaming mode LED will change to repeat mode, that is, after entering gaming mode, the LED will always flash according to the setting, after exit gaming mode, the LED will stop flashing; if this option is not checked, the Gaming mode LED is non-repeat mode, that is, the enter or exit gaming mode will flash the LED at the moment.
 - 3) **LED behavior is only applied to LED0 in normal mode, only LED1 is applied to in low battery mode and charging mode:** a specific UI needs to be set before using this option ([UI][HW Feature][LED counts]: 2 ; [UI][LED][LED Mode]: LED1 mode setting should be the same as LED0), under this premise, when this option is checked, only LED0 will flash in normal mode, and only LED1 will flash in low power and charging status.
 - 4) **Enable connected LED over role LED:** If this option is not checked, the priority of RWS role LED is higher than that of Connected_single_link LED. After the RWS connection between the two ears and the mobile phone is established, the connect single link LED will return to the rws role LED after a short flash; After rws is connected, it will continue to flash connect single link LED.

3.12.2 LED Specify Function

- 1) **LED 0/1/2:** This option is used to specify a one-to-one correspondence between a certain LED and a certain mode, that is, to designate a certain LED to display a certain mode. Currently, a certain LED can be designated to display ANC on, AUX IN/APT/LLAPT mode. When a certain LED is selected to display a certain mode, the LED cannot be set in other LED modes. At the same time, if a certain mode is set to be displayed exclusively by a certain LED, it cannot be configured in this mode to other LEDs.
- 2) **RWS Creation LED timer(s):** This option is used to set the minimum blink time of the RWS creation LED. If the value is 0, it means the item is invalid. If the value is not 0, if the binaural engagement time is less than the set time, the “RWS Creation LED” will not stop automatically after the binaural engagement is completed, and it must continue until the minimum blinking time expires before jumping to the next mode; If the bud engagement time exceeds the set time, the “RWS Creation LED” will normally adjust to the next mode after the binaural engagement ends.

3.12.3 LED scenes and settings

BT SOC defines several LED usage scenarios. Different Chip Series or IC models may have different LED application scenarios and Repeat modes.

LED scenes may be in “Repeat mode” or “Non-repeat” mode. The LED scenes in Repeat mode will flash the LED repeatedly using the configured parameters; in the “Non-repeat” mode, the LED scenes will flash only once according to the configured parameters.

LED scene is as follows:

LED Scenes	Description
Link Back	When the system starts up or triggers the connection back MMI, the BT chip tries to connect back to the last connected device
Standby	The BT chip is in standby, waiting for a connection.
Pairable	BT chip is in a pairable state.
Connected Single Link	A single device connection.
Connected Multi-Link	Multiple device connections.
Incoming Call	incoming call
Talking	calling
Mic Mute	Mute the microphone
Audio Playing	BT SOC is playing music
AUX IN /APT/ LLAPT	Auxiliary Input / Audio Pass Through/ Low Latency A PT
RWS Creation	BT SOC is creating RWS link

Outgoing call	outgoing call
First engagement LED	After the first engagement LED light is configured in the MCU tool LED module, the LED will flash according to this MODE when the two ears are engaged for the first time.
ANC On	Headphones enable ANC function
RWS Speaker 1	After the binaural engagement is completed, the main ear LED flashes according to this MODE, indicating that the headset is the main ear
RWS Speaker 2	After the binaural engagement is completed, the secondary ear LED flashes according to this mode, indicating that the headset is the secondary ear
Charging	Battery charge status.
Charging Complete	The battery is fully charged
Charging Error	An error occurred while charging
DUT Test Mode	Test mode, connect with instrument 8852, test parameters such as earphone RF
Enter/Exit Gaming Mode	Trigger to switch normal/gaming mode state
Power On	Start BT chip
Power Off	BT chip shuts down
Pairing Complete	Pairing is complete. The BT chip is successfully connected to the BT device.
Factory Reset	Factory reset, clear flash
Low Battery	low battery
Volume Adjust	Trigger volume adjustment
Volume Max/Min	Volume adjustment reaches maximum or minimum

The following settings can be made for each scene:

LED Mode(repeat): Standby

LED 0

LED 1

LED 2

Demo

Type

On-Off

Keep On

Keep Off

On Duration (1-200; unit: 10ms)

50

0

0

Off Duration (1-200; unit: 10ms)

200

0

0

Blink Count (1-4)

1

0

0

Blink Interval (0-100; unit: 100ms)

30

0

0

1) Type

Value	Description
Keep Off	LED stays off all the time
Keep On	LED stays on all the time
On-Off	LED flashes in sequence
Off-On	LEDs flash in sequence from dim to bright
Breath	LED breathing light status, gradually turn off

Bypass

Bypass Mode or Bypass Mode

- 2) On Duration (unit 10ms): The time the LED is on. Recommended range is 1 ~ 200
- 3) Off Duration (unit 10ms): The time the LED is dimmed. Recommended range is 1 ~ 200
- 4) Blink Count: The available settings for the number of LED blinks are 1 ~ 4.
- 5) Blink Interval (unit 100ms): The time interval for LED blinking. The recommended range is 1 ~ 100.

3.12.4 Configuration item and APP variable correspondence table

led		
<div> <div>Led</div> <div> <div>LED0 active :</div> <div> High active High active Low active </div> </div> </div>	enable_led0_low_active enable_led1_low_active enable_led2_low_active	LED high/low level active, consistent with hardware design

3.13 RWS

If the SOC supports the RWS function, the function configuration can be performed in this Tab.

3.13.1 RWS

- 1) **RWS pairing ID (Hex):** During binaural engagement, the headset will use this ID to determine the matching of the left and right ears. If the ID does not match, the subsequent engage action will not be performed
- 2) **When RWS link loss link back timeout (5s):** If the value is 0, after RWS link loss, the automatic shutdown process is performed according to the Auto power off timer (s); if the value is not 0, then RWS link loss After that, according to the set time, if the time is up, if there is no connection, it will turn off
- 3) **Bud role:** RWS role configuration.
- 4) **Bud side:** configure the earphone as left/right earphone
- 5) **Couple Speaker Channel:** Audio channel for both ears
- 6) **Single/Solo Speaker Channel:** Audio channel for single ear

Note: Different IC models have different options

Value	Description
Speaker out L/R	By default, Stereo left outputs left channel and Stereo right outputs right channel
Speaker out L/L	Both Stereo left and right output left channel
Speaker out R/R	Both Stereo left and right output right channel
Speaker out (L+R)/2 (all channels)	Both Stereo left and right output (left channel/2) + (right channel/2)
Speaker out R/L (swap channels)	In swap, Stereo left outputs right channel and Stereo rights output left channel

- 7) **RWS enable circular volume up when in solo mode:** If this option is checked, it is only valid when the RWS is used in a single ear. When the two ears are connected, it can be set that the L ear has the vol+ button, and the other R ear has the vol- button. The headphones in RWS mode, one is Vol+ and the other is Vol-, and the function is normal.
 - If only the R headset is in use, because it only has Vol-, pressing Vol- will increase the volume. After the volume is up to the maximum, it will be increased to the minimum volume, but it will not report Volume Min VP.
 - If only L earphones are in use, only Vol+, press Vol+, volume will be +, volume up to the maximum

and then increase to the minimum volume but will not report Volume Min VP, the loop volume is always operating vol+, so only volume max VP will be reported

- 8) **RWS disallow sync power off:** Indicates whether the binaural buttons are turned off synchronously. When this option is checked, the binaural unsynchronized keys are turned off; when this option is not checked, the binaural sync keys are turned off
- 9) **Disallow sync power off under voltage 0%:** Indicates whether the voltage of one ear is 0 to shut down, and whether the other ear is shut down synchronously. When this option is checked, binaural asynchronous low-voltage shutdown, when this option is not checked, binaural synchronous low-voltage shutdown
- 10) **RWS enable seamless join:** When this option is checked, in the scenario where the main ear alone plays music/calls, the secondary ear will try to seamlessly join the music/phone stream of the main ear when the secondary ear is connected to the main ear, and the main ear stream will not be interrupted; When this option is checked, the secondary ear will not try to join seamlessly when connecting to the main ear, and the main ear stream will be interrupted once and then played in sync with the secondary ear. When seamless join is selected, the delay of the secondary audio stream will be slightly longer than that of non-seamless join
- 11) **First engagement timeout (5s):** The timeout time (unit is 5sec) when the first engagement is performed. During this time, the broadcast sent by the ear that also wants to form a team for the first time will be searched
- 12) **First engagement required rssi:** When setting up a pair of earphones for the first time, the valid BLE adv rssi must be at least greater than this value to ensure that two close earphones are formed into a team

3.13.2 Configuration item and APP variable correspondence table

RWS			
RWS pairing / linkback timeout (s):	<input type="text"/>	(5-200)	bud_role
When RWS link loss linkback timeout (5s) :	<input type="text"/>	(1-255)	
RWS Primary Speaker Channel:	Speaker out L/L	▼	
RWS Secondary Speaker Channel:	Speaker out R/R	▼	
RWS role:	Primary	▼	
			The default role set at the factory is set to single for single-ear products , and primary/secondary for paired-ear products.

3.14 RF TX

3.14.1 RF TX Power

☐ Export RF TX power to System Config Bin

Max Tx power of legacy :	1M (BR):	<input type="text" value="0x3C"/>	2M (EDR):	<input type="text" value="0x43"/>	3M (EDR) :	<input type="text" value="0x43"/>
Tx power of LE :	1M / LR	<input type="text" value="0x3C"/>	2M (LE):	<input type="text" value="0x3C"/>		
Tx Power of LE 1M 2402MHz :		<input type="text" value="0x3C"/>	Tx Power of LE 2M 2402MHz :		<input type="text" value="0x3C"/>	
Tx Power of LE 1M 2480MHz :		<input type="text" value="0x3C"/>	Tx Power of LE 2M 2480MHz :		<input type="text" value="0x3C"/>	

These RF parameters will be exported to the new generated System Config Bin only if “**Export RF TX Power to System Config Bin**” is enabled. Otherwise, it will not export to bin file.

- 1) **Max Tx power of legacy:** Legacy BDR/EDR TX power setting
- 2) **Tx power of LE:** LE TX power setting
- 3) **Tx Power of LE 1M/2M 2402MHz/2480MHz:** individually fine tune 2402Hz (CH0) and 2480MHz (CH39) TX power setting for certification purpose, this is specially for band edge test item requirement.

3.14.2 RF TX Config

☒ Export RF TX config to System Config Bin

Flatness 2402-2423MHz (dBm) :	<input type="text" value="0"/>	Flatness 2424-2445MHz (dBm) :	<input type="text" value="0"/>
Flatness 2446-2463MHz (dBm) :	<input type="text" value="0"/>	Flatness 2464-2480MHz (dBm) :	<input type="text" value="0"/>
Adaptivity (LBT) Enable :	<input type="text" value="Disable"/>	Adaptivity (LBT) Antenna Gain : (dBi)	<input type="text" value="0"/>
BR/EDR Level Number of Power Control :	<input type="text" value="4"/>		
Default BR/EDR Tx Power Level :	<input type="text" value="0 (Max)"/>		

These RF parameters will be exported to the new generated System Config Bin only if “**Export RF TX Config to System Config Bin**” is enabled. Otherwise, it will not export to bin file.

- 1) **Flatness 2402-2423MHz/2424-2445MHz/2446-2463MHz/2464-2480MHz(dBm):** The RF channels are divided into low/mid1/mid2/high groups through the 79 channels, due to the PCB thickness, impedance control and component variance, the RF TX performance may be varied among different groups, this parameter is use to do compensation in the four groups to keep better flatness for the BT channels.
- 2) **Adaptivity (LBT) Enable:** Enable Adaptivity for CE Directive

- 3) **Adaptivity (LBT) Antenna Gain:** Fill in the antenna peak gain for adaptivity parameter
- 4) **BR/EDR Level Number of Power Control:** define the TX power control level, 3 (0,1,2) or 4 (0,1,2,3), 0 is the the max level defined in RF TX Config above. The default TX power level is 0 and could be config by Default BR/EDR Tx Power Level
- 5) **Default BR/EDR Tx Power Level:** 0(MAX)~4(MIN)。

3.14.3 Frequency Offset

☒ Export Frequency Offset to System Config Bin

Frequency Offset:

0x3f ▼

Low Power Mode Frequency Offset:

0x00 ▼

These RF parameters will be exported to the new generated System Config Bin only if “**Export Frequency Offset to System Config Bin**” is enabled. Otherwise, it will not export to bin file.

- 1) **Frequency offset:** Tune the IC internal compensation capacitor value (XI/XO), the tunable range is 0x00~0x7f, with 0.3pF change per step. The default 0x3F
- 2) **Low Power Mode Frequency offset:** Tune the IC internal compensation capacitor value (XI/XO) in DLPS mode, this wrong parameter will cause disconnect issue.

3.14.4 Other setting

- 1) **Bud to phone sco tx power control:** The default TX power level when SCO link established. You may set this value to a different level to decrease power consumption during a phone call, and increase the call time. Default level is 0, which means not reduce TX power when phone call. -1 means reduce one level; -2 means reduce two levels.

Note that after SCO link established, the TX power level maybe changed according to the smart phone requirement.

- 2) **External PA:** Set Enable for using external PA, otherwise for using internal PA.

3.15 RHE

If the SOC supports hearing assistance, you can configure related functions in the "RHE (Real Hearing Enhancement)" tab.

- 1) **APT auto off while playing music:** If this option is checked, APT will automatically turn off when the music starts to play while the APT is turned on, and after the music ends, the APT will automatically return to the on state. If it is not checked, the APT status will not be affected by the music playback state
- 2) **RWS disallow sync audio pass through volume:**

If this option is not checked:

When RWS is paired, MMI APT volume up (0x92) and MMI APT volume down (0x93) are triggered in one bud, and the other bud is executed synchronously.

If the two buds have been individually adjusted to different volumes when RWS is disconnected, the secondary bud will sync to the APT volume of the primary bud after RWS is paired.

If this option is checked:

When RWS is paired, MMI APT volume up (0x92) and MMI APT volume down (0x93) are only executed on the trigger side

The two buds' APT volumes are saved separately and will not be synchronized after RWS is paired

- 3) **RWS disallow sync LLAPT brightness:** If this option is not checked, the LLAPT brightness level of both buds are always synchronized when it is adjusted by key MMI or Audio connect APP. If this option is checked, the LLAPT brightness level adjustment only works on a single bud and will not be synchronized
- 4) **RWS separate adjust apt eq by audio connect:** If this option is checked, the APT EQ in each bud is adjusted independently. If this option is not checked, the APT EQ adjustment will be synchronized on both buds.
- 5) **Still linkback if first engage fail (For Single earbud sale):**

If the RWS buds has not done the first engage process, the behavior when the first engage fails is based on this option:

 - a) **Checked:** If there is a pairing record, ear bud will try to connect to the mobile phone when the first engage fails. If there is no pairing record, ear bud will enter pairing mode when the first engage fails.
 - b) **Unchecked:** Forced to enter pairing mode when first engage fails
- 6) **Airplane mode when power on:** By checking this option, ear bud enters the airplane mode directly after power on. If this option is not checked, ear bud goes to the normal boot process after power on
- 7) **Enable one key to control APT circular volume up:** If this option is checked, the APT volume can be adjusted circularly (ex. 13>14>15>0>1>2>3 or 3>2>1>0>15>14>13)
- 8) **Time delay to open APT when power on:** 0~31 (seconds) can be filled in this option. If the default listening mode is APT on when power on, it will delay the configured time before turning on APT. If 0 is configured, APT will be turned on immediately

3.16 RHA

- 1) **Enable RHA:** When the option is checked, HA module would be enabled. It can receive HA params from APP/tool, load HA params if dsp config contain HA program. When the earbud contains HA params, it would apply HA params when APT on. If the option is checked, please make sure Normal APT, APT ref mic, APT ref spk, APT pri mic is enabled. If the option is not checked, then HA module would not be enabled.
- 2) **Time delay to open APT when in ear(s):** When the column is set to 1~60, earbuds would delay correspond value in seconds to open APT when in ear. If the column is set to zero, earbud would not delay to open APT when in ear.

3.17 LE Audio

If the SOC supports LE Audio, you can configure related functions in the " LE Audio " Tab.

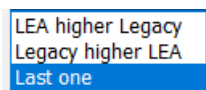
1) Feature Check

- a) **CIS:** Check this option to support LE Connected Isochronous Stream
- b) **BIS:** Check this item to support LE Broadcast Isochronous Stream
- c) **Legacy:** Check this option to support classic Bluetooth

At least one of above must be checked

2) LEA Link Back and Pairing

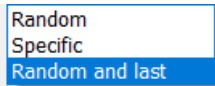
- a) **Profile:** MCP (Media Control Profile) /CCP (Call Control Profile)/ CSIS (Coordinated Set Identification Service)
- b) **LEA Pairing Timer:** LEA enters pairing mode, the overdue time is set, the range is 10~600 seconds
- c) **LEA Link Back Timer:** LEA link back mode, setting the overdue time, the range is 5~600 seconds
- d) **Active Priority of Connected Device:** When several devices are connected, the priority of button behavior will be determined according to the priority. There are the following options:



- e) **Power-off When LEA Timeout:** When the LEA pairing mode expires and the current is idle, power off directly
- f) **When LEA link Loss Line Back Timeout:** LEA link loss and then retrying time setting
- g) **Disconnect Enter LEA Pairing Mode:** The Master require disconnection, and then device will enter LEA Pairing Mode.

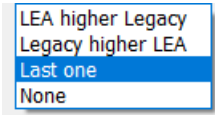
3) Broadcast Configure

- a) **Broadcast Role:** Scan Delegator is controlled by Scan assistant to initiate ADV; Broadcast Sink actively searches for PA to enable scan
- b) **BIS Number and Default bond This Number:** Broadcast Receiver expects to synchronize channel. "BIS Number" is available if "Default bond This Number" is selected.
- c) **Broadcast Sink Policy:**
Random is the surrounding random PA
Specific is to find a specific PA
Random and Last is the surrounding random PA by last one slaved in flash.



- d) **SCAN Time:**
- i. the role is Scan Delegator; it indicates the overdue time for initiating ADV
 - ii. When the role is Broadcast Sink, it means that scan is enabled to actively search for the PA overdue time.

- e) **Active Priority if connected, after BIS stop:** There are following options,



Button priority after BIS is stopped, setting LEA device is active.

- f) **BIS loss, resync timer:** When pa loss, the headphone side actively resync time setting
- g) **Power off when BIS timeout:** When the BIS expires after triggering, and the current is idle, power off directly

4) MMI/Others Setting

- a) **Enbl ADV MMI:** Allow LEA ADV to be triggered by MMI
- b) **Enbl BIS Switch MMI:** Allows to switch BIS triggered by MMI Channel or Subgroup
- c) **Unicast sink Policy:**
 - i. LEA auto, when pairing with legacy, enter LEA pairing together
 - ii. LEA MMI is actively triggered by mmi
- d) **Group ID:** Provide 4-byte customer management SIRQ key. SIRQ key is combined by Group ID and Primary BT address, Secondary BT address.

5) Audio Setting

- a) **Upstreaming Algorithm:**

Voice Algorithm: RCV 5.0 defined by DSP side. Just Primary MIC is available.

Audio Algorithm: real talk profile defined by DSP side. MIC are both available in earbud side.

There are following options,



- b) **Upstreaming Mode:** Two earbuds create cis upstreaming.
- c) **Broadcast Presentation Delay:**

If the value is not 0, DSP start to decode according to reference clock and the "Presentation Delay".

If the value is 0, the Presentation Delay is 40ms.
- d) **Enter Gaming mode after power on:** earbud require low latency parameter to master.
- e) **Unicast Presentation Delay:**

CIS start to decode offset time(100us):

If the value is not 0, DSP start to decode according to reference clock and the "Presentation Delay".

If the value is 0, the Presentation Delay is 40ms.
- f) **RTK Gaming:** choice RTK gaming default parameter.

- g) **Call end resume media:** If media is playing, and then call incoming or dial out. After call is end, earbud or headset will resume media.

- h) Audio capability support:

According SIG Spec, we suggest setting as illustrated below. And master will select audio capability for Conversation and Media.

Conversion

Upstreaming Sample Rate

☒ 16K
☐ 24K
☒ 32K

Downstreaming Sample Rate

☒ 16K
☒ 32K
☒ 48K

Media

Downstreaming Sample Rate

☐ 44.1K
☒ 48K
☐ 88K
☐ 96K
☐ 176K
☐ 192K
☐ 384K

3.18 Third Party

3.18.1 GFPS (Google Fast Pair)

1) **Transport**

- a) **LE:** must be checked, otherwise the GFPS advertising will not be advertised, and there will be no GFPS function, which is equivalent to the enable/disable GFPS function.
- b) **RFCOMM:** It needs to be checked when passing the certification test. In actual application, it is decided by whether the customer needs functions like "Find me" or "Retroactive with account key" or "report the battery function through RFCOMM". More strictly speaking, as long as the customer wants to use the function of GFPS Extensions, RFCOMM should be checked. If device supports only initial pairing and subsequent pairing, there is no need to check it.

2) **Module ID / Anti-spoofing public key/ Anti-spoofing private key (Hex)**

The registered model id, public key and private key must be filled in.

Thoes parameters shall not be all zero.

Customers need to register these parameters by themselves.

The registration address is <https://developers.google.com/nearby/devices/>

3) **Battery info enable:** If this option is checked, the battery reporting function will be enabled, the battery information will be included in the GFPS advertising data, and the mobile phone will display the battery level of the headset by scanning the GFPS advertising data.

- a) **Battery show ui:** Display battery information on the mobile phone interface, checked by default
- b) **Battery remain time enable:** Currently this function is not supported, no need to check
- c) **Left ear / Right ear/ Case battery support:** The left ear, right ear and battery box battery information is reported. If Battery info enable is checked, left ear battery support, Right ear battery support, and Case battery support must be checked.

4) **Enable TX power data in adv:** Mobile phone refers the TX power data to measure the distance between mobile phone and device. If the distance exceeds, the GFPS notification window will not pop up. It must be filled in. If the TX power data is already filled when register model id in Google nearby device console page, this value will be ignored by mobile phone. So we recommend not to set tx power when registering model id.

5) **Discoverable/Not Discoverable advertising interval (0.625 ms/per unit):** GFPS advertising interval setting, must be filled in.

Discoverable advertising interval:

The default value is 32, if this value is set too large, it may affect the efficiency of the initial pairing.

Not Discoverable advertising interval:

The default value is 100, if want to minimize the power consumption in device idle, you can set the maxmium

value to 400, however, it may affect the efficiency of the subsequent pairing.

Account Key number: The maximum number of GFPS account key set which device could store in the FTL, which must be filled in.

3.18.2 Profile Setting

- 1) **Advertising Interval(ms)**: AMA, XiaoAi, XiaoWei broadcast interval
- 2) **AMA**:
 - a) **AMA ID (14 bytes)**: The AMA serial number of the product, which needs to be applied to Amazon
 - b) **Transport**: Select the AMA transmission method. RFCOMM is used to connect with Android devices; IAP and BLE are used to connect with IOS. Which one to use needs to be set in BLE broadcast. Generally speaking, IAP has higher priority.
 - c) **Enable MCU ringtone(earcon)**: Decide whether to use the ringtone that comes with the MCU, or let Alexa play the prompt tone automatically. If this option box is checked, the ringtone of the MCU will be used
- 3) **XiaoAi**:
 - a) **VID (0000~FFFF)**: used to fill the manufacturer SIG data in the broadcast response data (2 bytes)
 - b) **PID (0000~FFFF)**: used to fill the product ID data in the broadcast response data (2 bytes)
 - c) **Major / Minor ID (00~FF)**: Two fields of adv data in Xiaoi Broadcast, which need to be obtained from Xiaomi by the manufacturer, both occupy 1 byte
 - d) **Transport**: This field check box (LE / RFCOMM) indicates whether LE communication / RFCOMM communication is supported between the headset and the Xiaoi mobile app
 - e) **Adv timeout (s)**: If the Support RTK Charger Box is checked, except for the switch box, when the Adv timeout value is 0, the broadcast time is 180s, and when the Adv timeout value is greater than 0, the value is the broadcast time; if it is not checked Support RTK Charger Box, when the Adv timeout value is 0, it means broadcasting all the time, Adv When the timeout value is greater than 0, the value is the broadcast time
- 4) **XiaoWei**: Check this option to support Tencent Xiaowei function
 - a) **Transport**: Indicates the supported transmission channel, check LE and IAP for communication with ios mobile phone, check RFCOMM for communication with android mobile phone
 - b) **Adv timeout(s)**: Indicates the broadcast timeout time, if set to 0, it means that the broadcast will always advertising.
 - c) **Product ID**: Customers need to register on Tencent's official website by themselves
 - d) **Model name (Max 64 Bytes)**: Set the device name displayed on the mobile phone
- 5) **Tuya**: If Tuya is checked, Tuya related functions will be enabled, otherwise it will not be enabled.
 - a) **Adv timeout(s)**: After checking tuya, you can set the value of Adv timeout(s), the range is 0~600s, if you

fill in 0, it will continue to broadcast.

3.18.3 Swift Pair

Swift Pair:

If checking this option, swift pair function is enabled. When headset is in pairing mode, it will automatically do BLE advertising.

When headset is close by, Windows will show a notification to the user. You need to check the “Show notifications to connect using Swift Pair box” in advance on Windows OS Setting. Once end user confirms, the device can be paired.

☒ Show notifications to connect using Swift Pair

When selected, you can connect to supported Bluetooth devices quickly when they're close by and in pairing mode.



4 Appendix

- 1) The system config bin file contains the configuration for the "System Configuration," "Charger," and "RF TX" tabs. However, some of the fields on the Charger tab are kept in the app configuration bin, as seen in the following figure:

V Feature	Audio Route	General	System Configuration	BR/EDR	LE	Audio	Charger	Peripheral	Ringtone	KEY	LED	RWS	RF TX	RHE										
<p>Pre-Charge Timeout(min): <input type="text" value="30"/> (1-65535)</p> <p>Fast-Charge State Timeout(min) : <input type="text" value="90"/> (3-65535) Re-charge Voltage (mV): <input type="text" value="4000"/> (3680-4310)</p> <p>Charge Current of Pre-Charge State (mA): <input type="text" value="20"/> (5-50) Voltage Limit of Battery (mV): <input type="text" value="4200"/> (4000-4400)</p> <p>Charge Current of Fast-Charge State (mA): <input type="text" value="50"/> (20-400) Charge Finish Current (mA): <input type="text" value="20"/> (5-50)</p> <p>Charger thermal protection:</p> <p>Warn Region Voltage of Battery High Temperature (mV): <input type="text" value="42"/> (0-900)</p> <p>Warn Region Voltage of Battery Low Temperature (mV): <input type="text" value="150"/> (0-900)</p> <p>Error Region Voltage of Battery High Temperature (mV): <input type="text" value="19"/> (0-900)</p> <p>Error Region Voltage of Battery Low Temperature (mV): <input type="text" value="361"/> (0-900)</p> <div style="border: 2px solid red; padding: 5px;"> <p><input checked="" type="checkbox"/> Battery detection support</p> <p>Battery warning percent: <input type="text" value="20%"/></p> <p>Timer low battery warning tone (s): <input type="text" value="10"/> (1-255) Timer low battery warning LED (s): <input type="text" value="10"/> (1-255)</p> <p>Warning tone time unit: <input type="text" value="Second"/> Low battery warning count: <input type="text" value="0"/> (0-255)</p> </div>																								
<p>Reference Battery Voltage (mV) (2800-4400)</p> <table border="0"> <tr> <td>0%: <input type="text" value="3000"/></td> <td>10%: <input type="text" value="3558"/></td> <td>20%: <input type="text" value="3696"/></td> <td>30%: <input type="text" value="3739"/></td> <td>40%: <input type="text" value="3770"/></td> </tr> <tr> <td>50%: <input type="text" value="3809"/></td> <td>60%: <input type="text" value="3856"/></td> <td>70%: <input type="text" value="3916"/></td> <td>80%: <input type="text" value="3989"/></td> <td>90%: <input type="text" value="4068"/></td> </tr> </table> <p>Effective Resistance of Battery (mOhm): <input type="text" value="400"/> (0-65535)</p> <p>Disable Charger after charging finish 1 min(Allow low power mode) <input type="text" value="Disable"/> Enable: For charge box keep 5V after charging finish Disable: For charge box drop 5V after charging finish</p> <p>Rapid charge support: <input type="text" value="Disable"/></p> <div style="border: 2px solid red; padding: 5px;"> <p><input type="checkbox"/> Report battery status every 10% level drop</p> <p><input type="checkbox"/> Disallow battery report once power on(Except power on in low battery state) <input type="checkbox"/> Enable battery report once phone connected</p> <p><input type="checkbox"/> Charger control by MCU</p> </div> <p>Rapid charge current divisor: <input type="text" value="1/2"/></p> <p>High temp warning current divisor: <input type="text" value="1/2"/> Low temp warning current divisor: <input type="text" value="1/2"/></p>															0%: <input type="text" value="3000"/>	10%: <input type="text" value="3558"/>	20%: <input type="text" value="3696"/>	30%: <input type="text" value="3739"/>	40%: <input type="text" value="3770"/>	50%: <input type="text" value="3809"/>	60%: <input type="text" value="3856"/>	70%: <input type="text" value="3916"/>	80%: <input type="text" value="3989"/>	90%: <input type="text" value="4068"/>
0%: <input type="text" value="3000"/>	10%: <input type="text" value="3558"/>	20%: <input type="text" value="3696"/>	30%: <input type="text" value="3739"/>	40%: <input type="text" value="3770"/>																				
50%: <input type="text" value="3809"/>	60%: <input type="text" value="3856"/>	70%: <input type="text" value="3916"/>	80%: <input type="text" value="3989"/>	90%: <input type="text" value="4068"/>																				

2) Configuration in the Audio Route tab have an impact on the framework block. These setting is stored in the app config bin file

3) RingTone/Voice Prompt and LED information are stored in separate blocks in the app config bin file. In some IC part number, RingTone/VP may be saved in a separate VP bin file.

5 References

- 1) Bluetooth Class of device definition
- 2) <https://www.bluetooth.com/specifications/assigned-numbers/baseband>
- 3) Realtek Bluetooth chip SDK document
- 4) Bluetooth SIG, Specification of the Bluetooth System, Profiles, Advanced Audio Distribution Profile version 1.3 .1
- 5) https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=303201
- 6) RTL8763BO_BGA88_EVB_V1.1_190628.pdf