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# UI Tool User Manual of IS20XX

## Revision History

Date	Revision Content	Version
Jan./08 '2015	Preliminary version	1.0

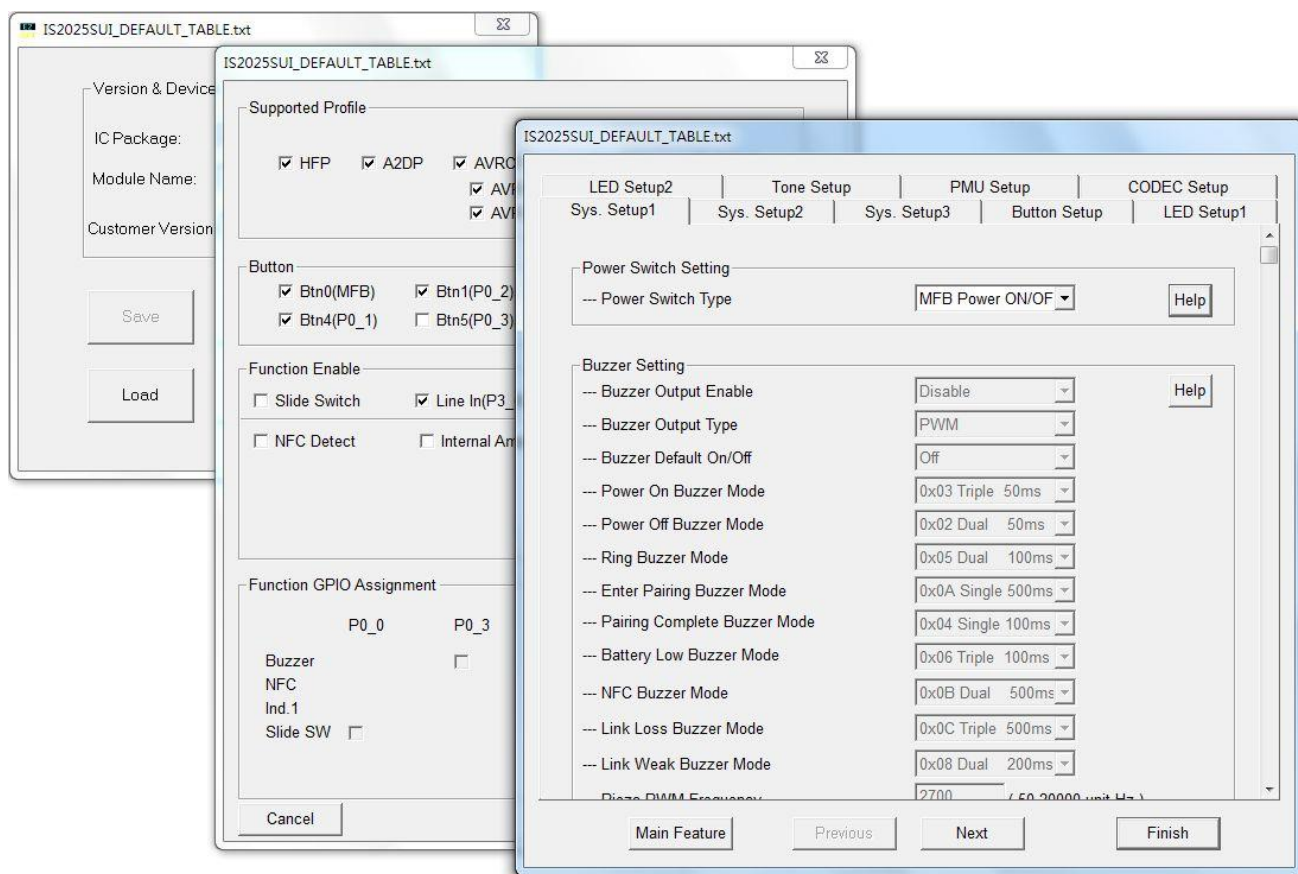
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# 1. INTRODUCTION

This document describes the UI configuration tool which provides a friendly interface to edit parameters of your application. The configuration determines the operations, indications and capability for application. The customers can create their specific function what they want by adjusting the configuration.



## **2. NOMENCLATURE**

### **1) MFB**

MFB (Multiple Function Button) is a specific button that can be used for turning on/off system and define as general purpose functions.

### **2) Pairing Mode**

If system in Pairing Mode, it is discoverable and waiting for remote devices to connect to.

### **3) Multi-Link**

Bluetooth system link 2 different devices.

### **4) PMU**

Power Manager Unit; It is a power control center of whole system.

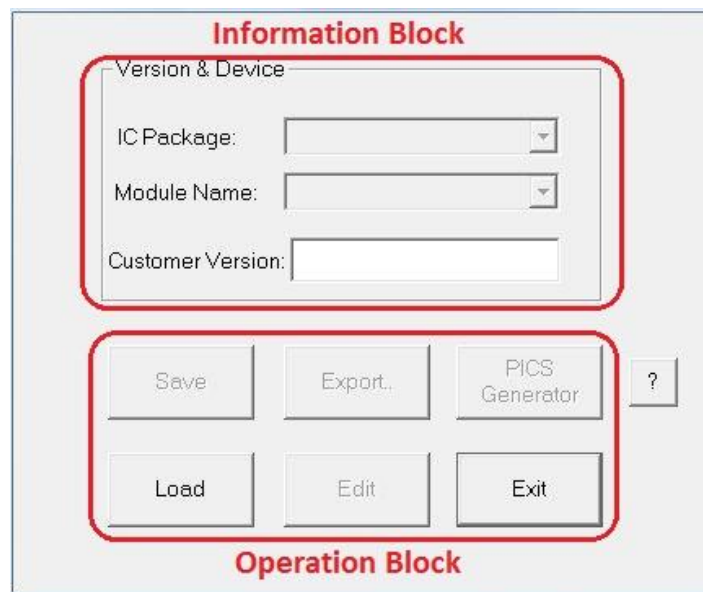
### 3. TOOL OVERVIEW

There are three parts in UI configuration tool; Start Menu, Main Features and Function Settings, will be introduced in the following sections.

#### 3.1 Start Menu Page

After launching this tool, first view you see is Start Menu. It consists of two blocks, information block and operation block as Figure 3.1

Figure 3-1 Start Menu Page



#### 3.1.1 Operation Block

##### 3.1.1.1 Load

Load an UI parameter table. Before doing anything in this tool, loading an UI parameter table is must.

##### 3.1.1.2 Edit

Start to edit parameters. This button is disabled before loading a valid UI parameter table.

##### 3.1.1.3 Save

Save as a UI parameter table.

##### 3.1.1.4 Export

Export the UI settings by the text.

##### 3.1.1.5 PICS Generator

Generate PICS settings upon UI parameters to provide customers a reference in PTS test. PTS (Profile Tuning Suite) test is one of mandatory processes in Bluetooth qualification.

##### 3.1.1.6 Exit

Exit the UI configuration tool.

### **3.1.2 Information Block**

#### **3.1.2.1 IC Package**

Display the IC package.

#### **3.1.2.2 Module Name**

Display the Module name if it has.

### 3.2 Main Features Page

When you start to edit UI parameters, you will see Main Features page as Figure 3.2. This page lists some main features which can be used or had been set up by the UI table we loaded. Now you can choice the feature what you want to use in system. There is one thing need to pay attention. When you mark one feature you need, you can see one IO be marked in “Function GPIO Assignment” area. If all the IOs are occupied, it means no more additional function can be added to system.

Figure 3.2 Main Features

Function	P0_0	P0_3	P0_4	P1_5
Buzzer	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NFC	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ind.1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Slide SW	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 3.2.1 Supported Profiles

Select Bluetooth profiles which you want use on system.

- 1) **HFP(Hands-free Profile)**  
Support voice input/output and some call operations.
- 2) **A2DP(Advanced Audio Distribution Profile)**  
Support audio output.
- 3) **AVRCP(Audio/Video Remote Control Profile)**

Support audio remote control.

**a) AVRCP Controller**

Support controlling the music players of remote devices such as play/pause, forward and rewind. All supported controls can be triggered by buttons of an system upon the settings of button events.

**b) AVRCP Target**

Support volume synchronization with music players of remote devices. When users adjust volume of music on remote devices, remote devices will send controls to systems to synchronize volume.

**4) SPP(Serial Port Profile)**

Support virtual serial port connection.

**5) PBAP(Phone Book Access Profile)**

Support access phone book data from serve equipment.

### 3.2.2 Button

Determine the buttons which be used in system.

**1) Btn0 (MFB)**

Support the MFB key.

**2) Btn1 (P0\_2)**

Support the Btn1 key that occupies P0\_2.

**3) Btn2 (P2\_7)**

Support the Btn2 key that occupies P2\_7.

**4) Btn3 (P0\_5)**

Support the Btn3 key that occupies P0\_5.

**5) Btn4 (P0\_1)**

Support the Btn4 key that occupies P0\_1.

**6) Btn5 (P0\_3)**

Support the Btn5 key that occupies P0\_3.

### 3.2.3 Function Enable

**1) Slide Switch**

This configuration determines that the product is turned on / off by slide switch.

**2) Line-In (P3\_0)**

Support Aux-in detect function when Aux-in jack be plug-in.

**3) Buzzer**

Support buzzer output function.

**4) NFC Detection**

Support NFC (Near Field Communication) function with NFC tag. It can make system make Bluetooth connection automatic when NFC function is triggered.

## 5) Internal Amplifier

Support audio outputs with internal class D amplifier.

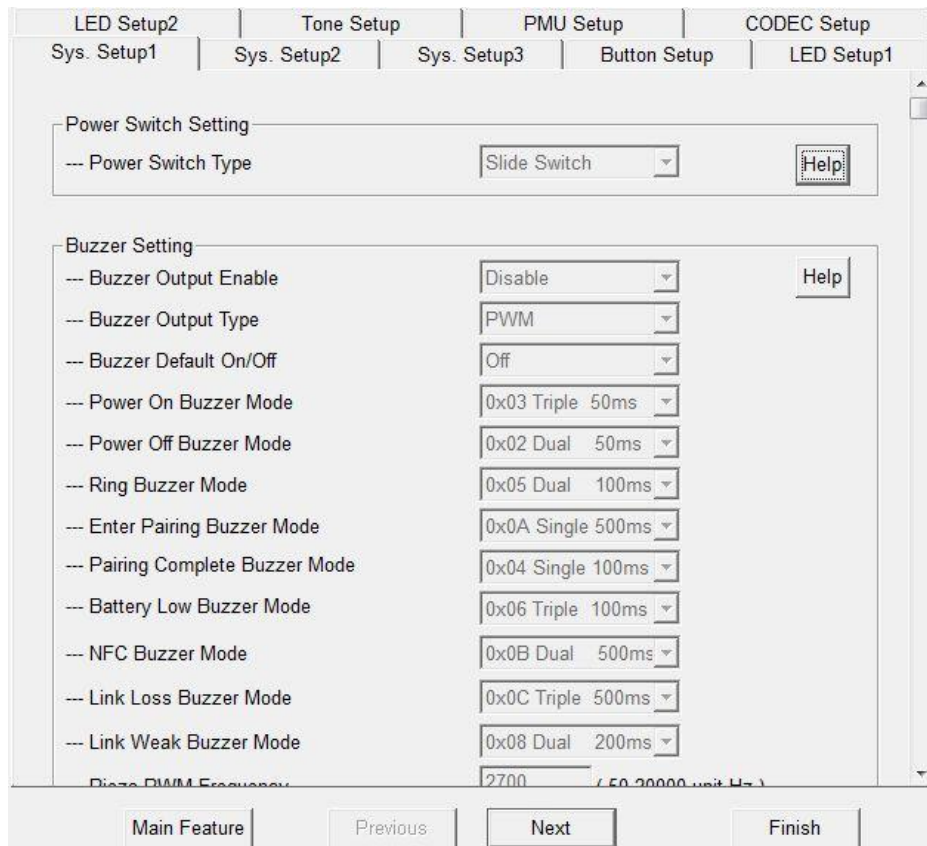
### 3.2.4 Function GPIO Assignment

Some Function can implement by different IO. (e.g. both P0\_4 and P1\_5 can be used as NFC detection) When we turn on one function in "Function Enable" area, system will assign one IO you can use here. If you want to use another one IO which not be assigned any function yet, you can change IO here!

Here is the list which has more than on IO for a function:

- 1) Buzzer: P0\_3 / P1\_5
- 2) NFC: P0\_4 / P1\_5
- 3) Ind.1 (Output Indication 1): P04 / P1\_5
- 4) Slide Switch: P0\_0 / P1\_5

### 3.3 Function Settings Page



Pressing the “Next” button on Main Features will pop up Function Settings page. Function Settings provides more detailed configurations. The settings of Main Features will affect some parameters on Function settings page. Base on the settings of Main Features, some detailed configurations may be fixed or reduce selections. For example, once a profile is disabled in the configuration of supported features, all settings related to this profile will be disabled.

And there is a button “Main Feature” in bottom left corner that can back to Main Features if something need to change. When the editing was done, pressing the “Finish” button in bottom right corner to back to Start Menu. Then you can save the editing as a UI parameter table.

There are so many parameters in Function Settings page you can get more information in the next chapter.

## 4. FUNCTION SETTINGS

### 4.1 System Setup 1

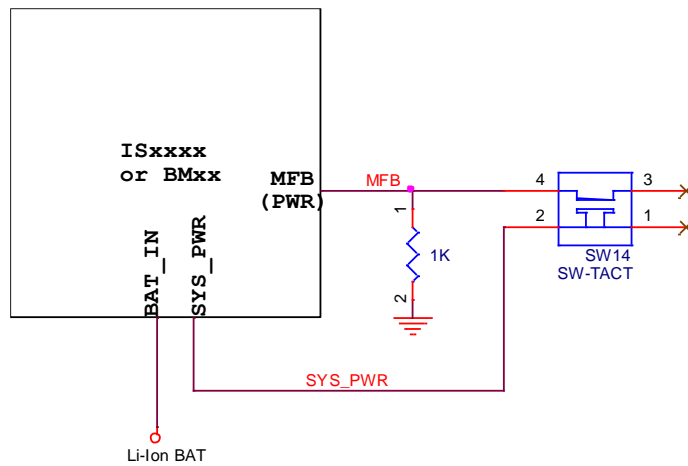
#### 4.1.1 Power Switch Setting

The power switch configuration has three types and determines which pattern is used in system. These three types are listed as below.

##### 1) MFB Power ON/OFF

Turning on and off system depends on the duration of pressing MFB button. The related settings of "Power On" and "Power Off" Duration can be setup in System Setup 3. That is, if users keep pressing MFB key over the configurable time, system will be turned on or turned off. Please refer to [4.3.2 "Button Press Duration"](#) for more information.

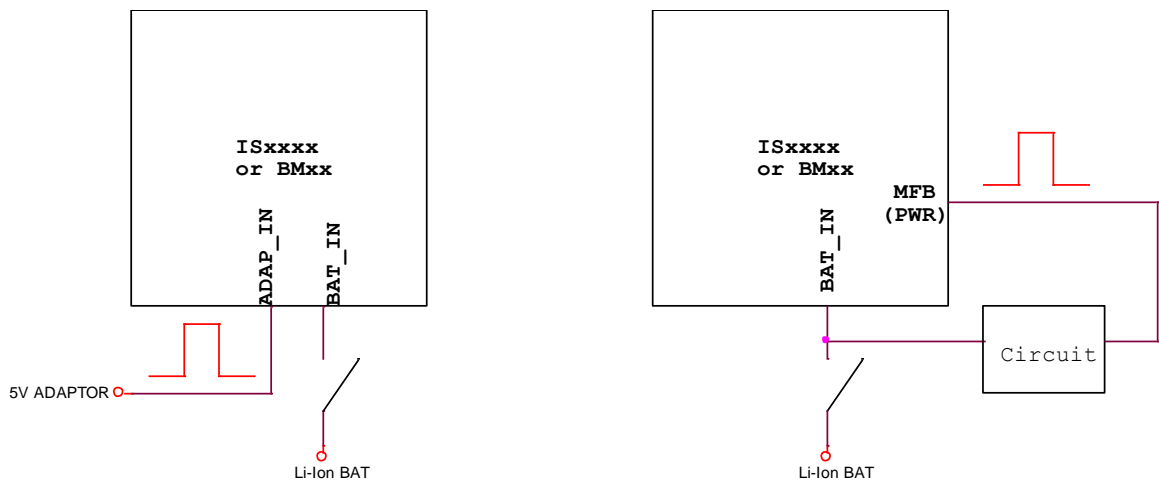
Figure 4.1 MFB Power ON/OFF reference circuit



##### 2) Power On Directly

The system is controlled directly by power source. When system connects to power source such as a battery and a plus to MFB or ADAP\_IN pin, it will turn on system. When remove battery, then it will turn off system directly.

Figure 4.2 Power On Directly reference circuit (Note: CKT is circuit.)





**9) Battery Low Buzzer Mode**

Select a buzzer type for low battery status

**10) NFC Buzzer Mode**

Select a buzzer type for NFC contact

**11) Link Loss Buzzer Mode**

Select a buzzer type for link loss status

**12) Link Weak Buzzer Mode**

Select a buzzer type for bad link quality

**13) Piezo PWM Frequency**

Key in the PWM frequency of buzzer

**4.1.3 Uart Setting**

User can configure the parameter of UART interface in this section.

**1) HCI Uart Function**

HCI UART function Enable/Disable Indicator

The enable setting in MAIN FEATURE

**2) UART Baudrate**

The baud rate setting of HCI UART interface.

**3) CPU Idle Mode**

Disable/Enable BT CPU idle function

**4) Wake Up Delay Time**

Waiting time to start BT UART TX after wakeup MCU

**5) CLIP Name or Number**

CLIP= Calling Line Identification Presentation

"Number Only": Send phone number to MCU only.

"Name Priority": Send name data to MCU is priority

**4.1.4 NFC Setting**

The system offers a convenient way to establish and terminate Bluetooth connection by NFC. To get the benefits, system must have an NFC tag with its Bluetooth address and some related information. The remote devices need to support the NFC feature.

When remote device touch the NFC tag of Bluetooth system, it will get the information of Bluetooth system, and APPs on the remote device will build Bluetooth connection automatically. It reduces much of Bluetooth pairing and connection operation, especially for some persons who aren't similar with that. The related settings are described as below.

**1) NFC Detection Enable**

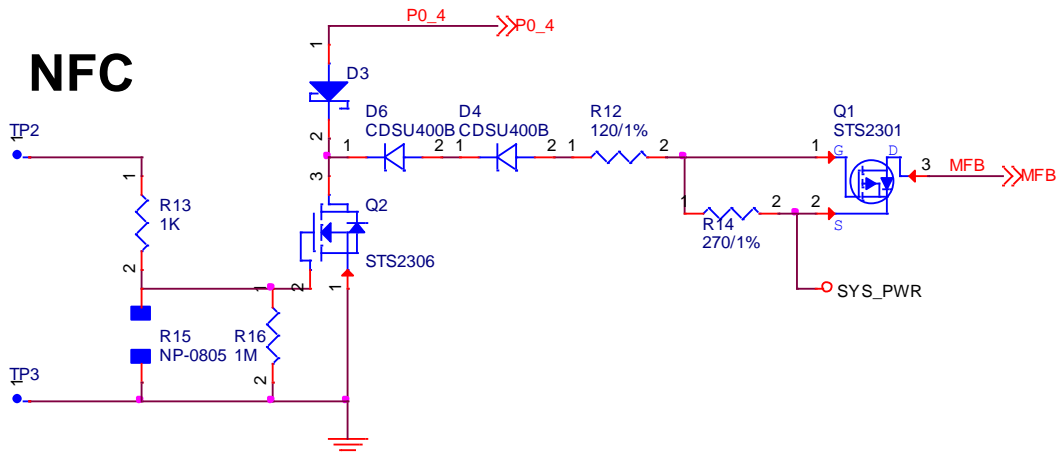
NFC detection function Enable/Disable Indicator.

The enable setting in MAIN FEATURE table

**2) NFC Function Turn On Time**

It's the judging time of a valid NFC signal. When the remote device touches the NFC tag of Bluetooth system, if NFC signal is stable over this time, it determines that the NFC function is triggered successfully. Else system will ignore the signal as noise.

Figure 4.4 NFC reference circuit, NFC tag connect to TP2, TP3.



For NXP 203F NFC type,  
which build-in rectifier circuit

### 3) NFC Handover

Enable/Disable NFC Handover function

## 4.1.5 Link Quality Setting

User can enable link quality detection in this section.

## 4.2 System Setup 2

### 4.2.1 Name Fragment Segment

Name Fragment is your bluetooth product name that will be shown on a remote device,ex:a phone

### 4.2.2 Security

#### 1) Enable Simple Pairing

Enable: Use simple pairing method when pairing.

Disable: A PIN Code will be required when pairing

#### 2) PIN Code

The PIN code which is four-byte ASCII code for Bluetooth connection verifies.

### 4.2.3 MISC Option

#### 1) Always Re-bundle in Pairing Mode

Always request PIN code in pairing mode if enable.

#### 2) Enable Pairing as Standby Mode

Stay in pairing mode(discoverable mode, no pairing LED indication) when system in standby mode.

#### 3) Enter Pairing Mode When Power On

Enter pairing mode (with Pairing LED Indication) when system power on.

#### 4) **Suspend Stream When SCO Established**

This setting use for multi-link status.

When system builds multi-link with A and B mobile phone and have a A2DP stream with A phone.

When phone B have an incoming call, then

Enable: System send "Suspend" command to phone A before establish SCO link with phone B.

Disable: System don't send "Suspend" command to phone A before establish SCO link with phone B.

#### 5) **Circular Volume Control**

Enable volume control using circular method.

#### 6) **Class of Device**

It is the class of device/service field (CoD).

It is indicated using the 'Format Type field' within the CoD.

The value could be 0x040424(HS) or 0x001F00(Uncategorized)

#### 7) **NR and EC Function on Phone**

NR= Noise Reduction

EC= Echo Cancellation

Ask phone to enable/disable NR & EC function.

#### 8) **Report Battery Status to Smart Phone**

Use Report battery status to mobile phone via AT command.

#### 9) **Link Application**

Single-link: Only one HF link exists.

Multi-link: Two HF links exist.

#### 10) **Auto Answer Incoming Call**

Enable/Disable auto answer an incoming call.

#### 11) **Always Discoverable Setting**

Enable/Disable always discoverable function on Bluetooth system.

If it is enabled, then when BT device is in connectable mode, a host device can find BT device in any case.

#### 12) **Switch Role For Multi-Link**

Enable/Disable Bluetooth system to ask be "Master" in connection for multi-link application.

### 4.2.4 Indication Function

#### 1) **Indicate Pin1 Polarity (P0\_4/P1\_5)**

Set P0\_4 or P1\_5 pin to output High / Low when specific indication need.

#### 2) **Indicate Pin2 Polarity (P0\_3)**

Set P0\_3 pin to output High / Low when specific indication need.

#### 3) **Audio(SBC) Indication**

Indicate when playing music.

#### 4) **Voice(SCO) Indication**

Indicate when SCO link established.

**5) Ring Tone Indication**

Indicate when system has a ring tone.

**6) Incoming Call Indication**

Indicate when Incoming call.

**7) External Amplifier**

For external audio amplifier control when CODEC state changes.

**8) HF Link Indication**

Indicate when HF link established.

**9) A2DP Link Indication**

Indicate when A2DP link established.

**10) Button Event Trigger Indication**

Indicate when button event trigger.

**4.2.5 Factory Default Setting**

**Factory Default Timer**

If system in off mode and power button been pressed over this time, system will clear some EEPROM parameter to default value. (It calls "MASTER RESET", too. This timer must bigger than Enter Pairing Press Duration)

**4.2.6 Mono Device Audio Gateway Information**

**1) Bundle**

System will connect to Audio Gateway if enable this function and key in AG address below

**2) Address**

It is the BT address of specified Audio Gateway.

(default address is 0x333333333333 for AG with ISxxxx chip)

When this address is set in system, it will connects with specified Audio Gateway directly after power on

**4.3 System Setup 3**

**4.3.1 Connection Setting**

**1) Power On Link Back Setting**

Enable/Disable link back function when system power on.

**2) Enable Save Max. Number of Paired Devices**

Setting the maximum number that will be saving into EEPROM.

**3) Search Paired Devices Pattern Setting**

All Devices: Search all devices in paired device list and link back to one of all devices.

Last Device Only: Find the last disconnected device in paired list and link it back.

**4) Power On Link Back Profile(s) Setting**

Last Device: Link back all profile(s) that last disconnected device supported and recorded in the Device

Hands-free Profile: Only link back hands-free profile that last disconnected device supported and recorded in the Device

A2DP Profile: Only link back A2DP profile that last disconnected device supported and recorded in the Device

Notice:

For some mobile phone, even if you set the parameter on your Bluetooth device side, but phone will perhaps establish the others profile(s) that supported by your Bluetooth device and recorded in these phone.

#### **5) Link SPP When Profile Connection Exist**

Disable: system doesn't establish SPP link.

Hands-free Profile: system will establish SPP link when HF profile link exists.

A2DP Profile: system will establish SPP link when A2DP profile link exists.

#### **6) Link Loss Reconnect Timeout**

When HF link loss, it will try to link back until page fail times reached this value.

#### **7) Link HS Timeout**

Headset page fail retry duration.

#### **8) Link A2DP Timeout**

A2DP device page fail retry duration.

#### **9) Pairing Timeout Timer Setting**

System will close pairing mode when time out.

### **4.3.2 Button Press Duration**

#### **1) Power On**

This is the time interval to turn on the power after pressing power button.

#### **2) Power Off**

This is the time interval to turn off the power after pressing power button.

#### **3) Enter Pairing**

The parameter is the time to enter the pairing mode from the power on state.

The total time from power off state to enter pairing mode is "Enter Pairing" time + "Power On" time".

#### **4) Long Button Press**

This is the time for long press button action.

When the pressing time is longer than this parameter, call it "Long Press".

#### **5) Double Click Recognize Period**

This is the time for double click action.

When pressing button twice within this time, it will trigger double click function.

### **4.3.3 Warning Time**

#### **1) No Service Warning Time**

The warning time interval when mobile phone loss mobile signal.

#### **2) Low Battery Warning Time**

The warning time interval when device battery is low.

#### **3) Mute Alarm Time**

The warning time interval when microphone mutes.

#### 4.3.4 Power Save

##### 1) Pairing Timeout Power Off Directly Enable

Shut down system directly if function be enabled and system pairing timeout.

##### 2) Auto Power Off Enable

If enable this function only, then system will be shut down when it is in the following conditions:

- a) No any link is established
- b) Auto Power Off Timer has been timeout
- c) No key is pressed
- d) No adapter plug in
- e) No streaming detect by line-in silence detection. (if silence detect is enabled in DSP tool)

##### 3) A2DP Link Silence

If Enable this one, then system will be shut down automatically when the following conditions happen

- a) Link must be established, and A2DP/AVRCP is only one link
- b) Auto Power Off Timer has been timeout
- c) No key is pressed
- d) No adapter plug in
- e) BT device doesn't receive any audio packet from AG any more

##### 4) Auto Power Off Time

Set the Auto Power Off timer. The minimum value is 1.

### 4.4 Button Setup

#### 4.4.1 Button Option

##### 1) Long Press Repeat Time

Set the long pressing button repeat timer, the unit is 80ms.

When "long pressing event" has happened, the button "Long Press Repeat Mask" is enabled and the button is still pressed, system will generate the relative button event after every the "Long press repeat time" elapses until the button is released.

e.g. if Btn2 (Vol+) "Long Press Repeat Mask" is enabled and press this button over the time, the volume will be continuously increased until releasing the button.

##### 2) Long Press Repeat Mask

Enable the relative button to trigger "long button press repeat event" when it be selected.

##### 3) HS Button Mapping

The button enable indicator of Headset.

It can be enabled in MAIN FEATURE table.

#### 4.4.2 Combine Key Setting

User can set up 4 sets special combined key for specific function.

### 4.4.3 Profile Setting

#### 1) Support HS Profile

This profile let your device can establish a voice channel with your mobile phone.

#### 2) Support HF Profile

This profile let your device support more features than HS.

E.g. calling line identification, three way calling, echo canceling and noise reduction, phone status information, including signal strength, roaming status, battery level, and so on.

#### 3) Support A2DP Profile

Supporting this profile means you can enjoy music by your device connected with an AG that also supports A2DP.

#### 4) Support AVRCP Controller

If support AVRCP controller, it means your BT device could be controller that can remote another device by sending commands.

#### 5) Support AVRCP Target

If support AVRCP target, it means your BT device can receive a command from a remote device.

#### 6) Support SPP Profile

Response SPP profile.

#### 7) Support PBAP Profile

Response Phonebook Access profile, tell the remote host that I can access contact information in remote device by PBAP profile.

#### 8) Auto Register Notification

When A2DP link established, auto register EVENT to ask media player report its status for synch

### 4.4.4 Function Mapping Table

Function Mapping Table

There are eight states; each state has twelve independent button operations and four combine button operation. Each operation can set one function.

When you operate a button, the corresponding function will be triggered.

For example, if you want to trigger voice dial function by short-press MFB, 0x0a must be set in short press Button0(MFB) field in standby state.

Button0 (PWR)

Button1 (P0\_2)

Button2 (P2\_7)

Button3 (P0\_5)

Button4 (P0\_1)

Button5 (P0\_3)

The function description as below:

Function list:

**0x00 None:** No action

**0x02 Force End Call:** End the current active call no matter the voice sound is outputted by the local side and remote side.

**0x04 Answer:** Answer incoming call. Be used in incoming call mode.

**0x05 Reject Call:** Reject incoming call. Be used in incoming call and outgoing call mode.

**0x06 End Call:** End current active call. Be used in call active and multiple calls mode.

**0x07 Toggle Mic Mute:** Toggle the muted status of the microphone of system. If the microphone is muted, it will be un-muted and vice versa.

**0x08 Mic Mute:** Mute microphone. Be used in call active and multiple calls mode.

**0x09 Mic Unmute:** Unmute microphone. Be used in call active and multiple calls mode.

**0x0a Initial Voice Dial:** Initial voices dial function. Be used in standby mode.

**0x0b Cancel Voice Dial:** Cancel voice dial. Be used in voice dial mode.

**0x0c Last Number Redial:** Redial last dial-out number. Be used in standby mode.

**0x0d Call Waiting (Switch to Second Phone):** Hold active call and answer second incoming call or switch to held call. Be used in call active and multiple calls mode.

**0x0e Transfer to Phone:** Voice transfer. Be used in call active and standby mode. If you want to transfer voice between phone and headset operating the same button behavior, this function should be also filled in standby mode. Or you may fill "Initiate Voice Dial" or "Last Number Redial" in standby mode, these two functions also transfer voice to headset.

**0x10 Join Two Calls:** Conference call. Be used in call active and multiple calls mode.

**0x11 Release Waiting Call:** Reject second incoming call or end the held call.

**0x12 Release Active Call and Accept Waiting Call:** End the active call and answer second incoming call.

**0x16 Connect HF Link:** Link back HF link from headset.

**0x17 Disconnect HF Link:** Disconnect HF link from headset.

**0x1a Toggle RX\_NR:**

If RX NR function is ON, then trigger RX NR function OFF.

If RX NR function is OFF, then trigger RX NR function ON.

**0x1d Toggle TX\_NR:**

If TX NR function is ON, then trigger TX NR function OFF.

If TX NR function is OFF, then trigger TX NR function ON.

**0x20 Toggle AEC:**

If AEC function is ON, then trigger AEC function OFF.

If AEC function is OFF, then trigger AEC function ON.

**0x23 Toggle AEC\_RX\_NR:**

If RX NR function is ON, then trigger RX NR function OFF.

If RX NR function is OFF, then trigger RX NR function ON.

If AEC function is ON, then trigger AEC function OFF.

If AEC function is OFF, then trigger AEC function ON.

**0x26 Toggle Active Device:** Change HF primary device.

**0x30 Volume Up:**

If in audio stream state, it will increase one audio gain level.

If in voice state, it will increase one voice gain level.

Otherwise do nothing.

**0x31 Volume Down:**

If in audio stream state, it will decrease one audio gain level.

If in voice state, it will decrease one voice gain level.

Otherwise do nothing.

**0x32 Play:**

1) Line-in removed:

If system has no A2DP link, it will try to establish A2DP connection with a paired remote device. Otherwise it toggles the playing status between play and pause.

2) Line-in plugged:

Toggle muted status of music.

**0x33 Stop:** Stop function.

**0x34 Forward:** Forward function.

**0x35 Backward:** Backward function.

**0x36 Fast Forward:** Fast forward function.

**0x37 Rewind:** Rewind function.

**0x38 EQ Up:** Change the equalizer to next predefined mode if system is playing.

**0x39 EQ Down:** Change the equalizer to previous predefined mode if system is playing.

**0x3a Lock Button:** Lock button (this event can not set on power button).

**0x3b Disconnect AV Link:** Disconnect A2DP link from headset.

**0x3c Effect Toggle:** Enable or disable built-in dynamic range control function for audio.

**0x3d Next Surround Effect:** Change to the next surround effect.

**0x57 Force Speaker Gain Toggle:** To force decrease speaker gain an offset level.

**0x58 Button Indication Toggle:** To output a GPIO to indicate other device when button event triggered.

**0x59 Function0:** Used for combine two button function.

**0x5a Function1:** Used for combine two button function.

**0x5b Function2:** Used for combine two button function.

**0x5c Function3:** Used for combine two button function.

**0x5d Pairing Mode:** Button event to enter pairing mode.

**0x60 Toggle Buzzer:** Buzzer ON/OFF toggle.

**0x61 Mute Buzzer:** Buzzer OFF.

**0x62 Unmute Buzzer:** Buzzer ON.

**0x63 Toggle Tone Set:** Change tone set which have been set up in [4.6.2 "Tone Set"](#).

**0x6a Indicate Battery Status:** Display current battery level by LED.

#### 4.4.5 Combine Function Table

##### Combine Function0 and Combine Function1:

There are five statuses in combine function0 and combine function1. User can set the different function for each status, then user can fill 0x59~0x5a in key function or special key function. These two functions used to determine the action in different link mode.

**No Link:** System has no link.

**Only A2DP:** A2DP linked only.

**Only Mono:** SCO linked only.

**Two Link:** A2DP and SCO linked the same cellphone.

**Two diff Link:** A2DP and SCO linked different cellphones.

(Example:

We set "0x5d Pairing" for No link status, "0x36 Fast Forward" for Only A2DP status and "0x0c Last Number Redial" for Only Mono status in "Combine Function 0". Then we select "0x59 Function 0" function for button 4 in standby mode.

Now, when you turn on the system, you can into pairing mode when short press button 4; you can do the fast forward when system only A2DP link with remote device and short press button 4; you can redial last number when system only SCO link with remote device and short press button 4.)

##### Combine Function2 and Combine Function3:

There are two statuses in combine function2 and combine function3,

User can set the different function for each status, then user can fill 0x5b~0x5c in key function and special key function.

These two function used when music play or not.

**AV Idle:** When the music are not playing.

**AV Play:** When the music are playing

## 4.5 LED Setup

There are two LEDs named LED1 and LED2 in system. They indicate what the current state is to users. The flash pattern of LED for every defined state could be configured. The defined state and related configuration are listed as below.

### 4.5.1 LED Brightness Setting

The brightness setting for LED1 and LED2.

### 4.5.2 LED FLASH Parameters

#### 4.5.2.1 LED Indication Type

- 1) Type0: LED1 and LED2 are always blind.
- 2) Type1: LED1 and LED2 are always bright.

- 3) Type2: LED1 is always bright and LED2 is always blind.
- 4) Type3: LED1 is always blind and LED2 is always bright.
- 5) Type4: LED1 is always blind; LED2 is twinkling.
- 6) Type5: LED1 is twinkling; LED2 is always blind.
- 7) Type6: LED1 is always bright; LED2 is twinkling.
- 8) Type7: LED1 is twinkling; LED2 is always bright.
- 9) Type8: LED1 and LED2 are twinkling simultaneously.
- 10) Type9: LED1 and LED2 are twinkling alternately.

#### **4.5.2.2 LED On Duration**

This is LED on duration for flash.

#### **4.5.2.3 LED Off Duration**

This is LED off duration for flash..

#### **4.5.2.4 LED Count**

This is the number of the flash times for a round

#### **4.5.2.5 LED Interval**

This is the time interval for a round.

Notice that the value of LED Interval must be more than  $(\text{LED On Duration} + \text{LED Off Duration}) * (\text{LED Count})$ .

### **4.5.3 Defined LED State**

This section lists all states that system indicates by LED.

#### **4.5.3.1 Power On LED Indication Setting**

This LED setting is displayed when system is turned on.

#### **4.5.3.2 Power Off LED Indication Setting**

This LED setting is displayed when system is turned off.

#### **4.5.3.3 Pairing LED Indication Setting**

This LED setting is displayed when system is in Pairing Mode.

#### **4.5.3.4 Pairing OK LED Indication Setting**

This LED setting is displayed when system is paired with a remote device successfully.

#### **4.5.3.5 Link LED Indication Setting**

This LED setting is displayed if system has a Bluetooth connection with a remote device.

#### **4.5.3.6 Standby LED Indication Setting**

This LED setting is displayed if system doesn't have any Bluetooth connection.

#### **4.5.3.7 Incoming Call LED Indication Setting**

The LED setting is displayed when system receives an incoming call.

#### **4.5.3.8 Talk LED Indication Setting**

This LED setting is displayed when system has an active call.

#### **4.5.3.9 Audio Stream LED Indication Setting**

This LED setting is displayed if system is playing music.

#### **4.5.3.10 Low Battery LED Indication Setting**

The LED setting is displayed periodically if the battery voltage of system is low. The settings related to battery detection may refer to 4.6 Battery Detection Setting.

#### **4.5.3.11 Link Back LED Indication Setting**

This LED setting is displayed when system is trying to reconnect to a remote device.

#### **4.5.3.12 Multilink LED Indication Setting**

This LED setting is displayed when system build multi-link with devices..

#### **4.5.3.13 Mic Mute LED Flash Setting**

This LED setting is displayed if the microphone of system is muted.

### **4.5.4 Charging LED Setting**

This section describes the LED settings for charging states.

#### **4.5.4.1 Charging LED Indication Setting**

There are two options listed as below to indicate charging state by LED2.

- 1) LED2 is not affected. That is, it has no indicator for charging state.
- 2) LED2 is bright.

#### **4.5.4.2 Charging Complete LED Indication Setting**

The patterns of LEDs for charging complete as below.

- 1) LED1 and LED2 display as normal. No special indicator for charging complete.
- 2) LED1 flashes once, and then LED1 and LED2 display as normal.
- 3) LED1 is always bright and LED2 displays as normal.
- 4) LED1 is always blind and LED2 displays as normal.

#### **4.5.4.3 Charging Error LED Indication Setting**

If a fault occurs when charging, the setting determines how to indicate the error..

- 1) Use the same setting with above Charging LED Option.
- 2) LED1 is always blind and LED2 flashes.

#### **4.5.4.4 Extra Charging Complete LED**

Use P2\_4 to control LED for charger status Indication.

(only ON when charger complete)

## **4.6 Tone Setup**

### **4.6.1 Add Voice Prompt Tone / Multi Tone**

The system provides a way to add external tones. If users want to use their own tones, they can add these tones by audio converter that is built in the UI configuration tool. After adding the tones, the corresponding options will be created in the tone settings above. There is one thing need to pay attention, all translated data of external tones is stored in the UI configuration table and will consume the EEPROM space.

There are two kinds of external audios: Voice Prompt and Multi-Tone.

#### **4.6.1.1 Voice Prompt**

The audio format must be “\*.wav” and meets the conditions listed as below. If not, it may pop up a warning message and fails to add the tone.

- 1) The tone length limitation is 3 seconds; for Power On Tone limitation is 4.5 seconds.
- 2) Sampling rate should be 8k.
- 3) Bit rate should be 16bit.
- 4) The type is mono type.
- 5) The size of translated raw data can't over 9K bytes.

#### **4.6.1.2 Multi-tone**

The audio format must be “\*.mid” and comply with the conditions listed as below. If not, it may not play the tone as expectation.

- 1) The tone length limitation is 3 seconds; for Power On Tone limitation is 4.5 seconds.
- 2) The beat clock should be 135.
- 3) The octave range should be 3.
- 4) No multi-chord.
- 5) The smallest musical note is sixteen notes.
- 6) Single sound track.
- 7) The size of translated raw data can't over 256 bytes.

The following introduces how to add and delete external audio tones and related functions.

#### **4.6.1.3 Add Tone**

Click the button of Add Tone to add an external tone. The maximum number of external tones is twenty. If the amount of the external tones reaches this limitation, it won't be allowed to add tones.

#### **4.6.1.4 Delete Tone**

Select a tone in Tones Selection above. Clicking the button of Delete Tone can remove the selected external tone.

#### **4.6.1.5 Current EEPROM Size**

This field displays the needed space of current configuration. The displayed value reflects operation of adding and deleting tones. The EEPROM size on system must be greater than this value to store the configuration.

#### **4.6.2 Tone Setting**

**1) Tone Set1 (English)**

The first tone setting set and use English voice prompt.

**2) Tone Set2 (Chinese)**

The first tone setting set and use Chinese voice prompt.

**3) Tone Set3 (French)**

The first tone setting set and use French voice prompt.

**4) Tone Set4 (Spanish)**

The first tone setting set and use Spanish voice prompt.

**5) Use Tone Set**

Select one tone setting set and voice prompt language as default setting.

**6) Power On Tone**

The tone setting is for turning on system.

**7) Power Off Tone**

The tone setting is for turning off system.

**8) Enter Pairing Tone**

The tone setting is for entering the Pairing Mode.

**9) Pairing Complete Tone**

The tone is generated when system pairs with a remote device successfully in Pairing Mode.

**10) Pairing Not Complete Tone**

The tone is generated when system fails to pair with a remote device in Pairing Mode.

**11) Incoming Call Tone**

The tone is generated when system is receiving an incoming call.

**12) Reject Incoming Call Tone**

The tone is generated when system reject an incoming call.

**13) Call Active Tone**

The tone type is generated when system answers an incoming call.

**14) End Call Tone**

The tone type is for ending the active call.

**15) Charging Initiate Tone**

The tone type is for charger initialize.

**16) Charging Complete Tone**

Tone type for charging is completed.

- 17) **Battery Level 1 Tone**  
Tone type for battery level one.( $\geq 3.5v$ )
- 18) **Battery Level 2 Tone**  
Tone type for battery level two.( $\geq 3.6v$ )
- 19) **Battery Level 3 Tone**  
Tone type for battery level three.( $\geq 3.7v$ )
- 20) **Battery Level 4 Tone**  
Tone type for battery level four.( $\geq 3.8v$ )
- 21) **Battery Level 5 Tone**  
Tone type for battery level five.( $\geq 3.9v$ )
- 22) **Battery Level 6 Tone**  
Tone type for battery level six.( $\geq 4.0v$ )
- 23) **Full Battery Tone**  
Tone type when battery is full.( $\geq 4.1v$ )
- 24) **Max Volume Tone**  
The tone type when volume is maximum level.
- 25) **Min Volume Tone**  
The tone type when volume is minimum level.
- 26) **Low Battery Tone**  
The tone type when battery low.
- 27) **HF Connected Tone**  
The tone type when HF connection exists.
- 28) **Music Mode Ready Tone**  
The tone type when A2DP linked.
- 29) **Link Disconnect Tone**  
The tone type when normal ACL link disconnect.
- 30) **Link Loss Tone**  
The tone type for link lost.
- 31) **Toggle Tone Set Tone**  
Tone type when changing tone set.
- 32) **Voice Dial Tone**  
Tone type when initiate voice dial.
- 33) **Last Number Redial Tone**  
The tone type when system redials the last phone number.
- 34) **Short Press Tone**  
Tone type when short press.
- 35) **Long Press Tone**  
Tone type when long press.

- 36) Double Click Tone**  
Tone type when double click.
- 37) No Service Tone**  
The tone type when system service of mobile phone is not available.
- 38) Mute Tone**  
The tone type when mute function enable.
- 39) Function Alarm Tone**  
Tone type when specific function be triggered.
- 40) Button Lock Tone**  
Tone type when button locked function be triggered (button function: 0x3A).
- 41) Link Quality Warning Tone**  
The tone type when system out of range.
- 42) Connected Second Profile Tone**  
Select the tone type for the second profile connected.
- 43) RSSI Weak Threshold**  
"RSSI Weak Threshold" will be compared with the average of real RSSI data, the average of real RSSI was calculated by  $(2^{\text{Average\_RSSI\_Counter}})$  times RSSI data.
- 44) Fixed Ring Tone Volume**  
Fix volume of ring tone.
- 45) Ring Tone Volume**  
Gain level (0~15) of fixed ring tone volume.
- 46) Button Press Alarm**  
Always alarm ring tone when any button triggered.
- 47) MFB Long Press Force Alarm**  
Always alarm ring tone when MFB triggered.
- 48) Incoming Call Repetition**  
Enable the repeated tone setting for receiving incoming call.
- 49) Phone Number Prompt**  
Enable prompt incoming call phone number.
- 50) Use 2nd Connected Tone**  
Disable: Use dedicated profile connected tone setting.  
Enable: Use connected\_tone2 as 2nd connected profile indication tone.
- 51) Battery Status Prompt When Button Triggered**  
Enable/Disable battery status prompt when triggered by MMI event.
- 52) Battery Status Prompt When Power On**  
Enable/Disable battery Status Prompt When Power On.

## **4.7 PMU (Power Manager Unit) Setup**

### **4.7.1 Battery Detection Setting**

It supports the feature of battery detection on system. There are three stages of voltage decided by the settings of Low Battery Warning Level and Battery Shut Down Level. If the battery voltage of system is higher than the value of Low Battery Warning Level, it is at normal battery state. Else it is at low battery state and it may have some warnings by tones or LEDs upon settings to remind users to charge battery. And once the battery voltage is lower than the voltage of Battery Shut Down Level, system starts the scheme of battery protection and shuts down automatically.

#### **4.7.1.1 Battery Detection Enable**

Enable or disable battery detection.

#### **4.7.1.2 Low Battery Warning Level**

The setting is the threshold of low battery state. (Range: 3.0v~4.2v)

#### **4.7.1.3 Battery Shut Down Level**

The setting is the threshold of battery protection and should be lower than the voltage of Low Battery Warning Level. (Range: 3.0v~4.2v)

### **4.7.2 Charging Setting**

The system supports charging function. In general, there are several stages in charging cycle and it has different ways to charge in each stage. When charging, system detects the voltage of battery to decide which stage is it in. The charging flexibility system supported lists as below.

#### **4.7.2.1 Charging Enable**

Enable or disable the charging function.

#### **4.7.2.2 Advance Charger Enable**

This setting determines whether charging continues for an additional 30 minutes when charging current diminishes to the minimum current as condition of charging complete.

#### **4.7.2.3 Re-Charging As Charge Complete**

Enable or disable the recharging function. When system stops charging due to charging complete for a while, the voltage of battery may fall slowly. If the voltage less than 4.1V and this function is enabled, system charges battery again to keep it full.

#### **4.7.2.4 Charging Current**

The setting is the charging current of Constant Current state.

#### **4.7.2.5 Constant Voltage Charging Complete Current Percent**

In Constant Voltage state, if charging current diminishes to the percentage of battery capacity system judges charging

completes.

#### **4.7.2.6 Constant Current Protect Time**

The charging protection timer when system in Constant Current state. If system stays in Constant Current state over the time, it raises an error.

#### **4.7.2.7 Constant Voltage Protect Time**

The charging protection timer when system in Constant Voltage state. If system stays in Constant Voltage state over the time, it raises an error.

#### **4.7.2.8 Disallow SHS Active When Charger On**

Determine whether system can be normal operation in charging state.

## **4.8 CODEC Setup**

### **4.8.1 CODEC Function**

This section describes the settings related to CODEC. The hardware circuit should be considered when configuring these settings to get good performance.

#### **4.8.1.1 Speaker Output**

Set the audio analog output type as Capless or Single End; it upon the hardware circuit on system.

#### **4.8.1.2 Filter Type For Stereo Audio Quality**

Select different filter type for different stereo audio quality.

Filter Type 1: Clear.

Filter Type 2: Warm for Vocal.

Filter Type 3: Filter 2 extended to 17KHz.

#### **4.8.1.3 Enable LR Sound Channel Swap**

Swap the left channel and right channel or not.

#### **4.8.1.4 Enable LR Sound Mix**

Enable or disable to mix the left channel with the right channel to a single channel.

#### **4.8.1.5 DAC Bias For Audio Quality**

Select different DAC BIAS for audio quality.

#### **4.8.1.6 DSP CODEC Always On Enable**

System never turns off codec and DSP if this function be enabled.

#### **4.8.1.7 Close CODEC Time**

When DSP in SBC decode state, and FW do not receive any stream data, it will close CODEC after this time.

#### **4.8.1.8 SDM Order**

SDM= Sigma Delta Modulator.

The higher SDM order been used, it will get lower in-band noise and higher out-band noise.

The quantization noise slope of 2nd SDM is 20dB; for 3rd SDM is 40dB.

#### **4.8.1.9 Dual Microphone**

Dual Microphone is enabled for echo cancellation.

### **4.8.2 Line-in Setting**

The system Supports optional line-in audio input by an Aux-in wire. The related parameters listed as below should be configured if this function is enabled.

#### **4.8.2.1 Stereo Line In Loop Back**

Enable or disable indication of line-in function. This setting is determined in Main Features page. The related hardware circuit is necessary to support this function.

#### **4.8.2.2 Line In Priority**

This setting determines the priority of audio sources. There are two audio sources that one is from an A2DP link and another one is from line-in input. If these two signal input simultaneously, system will output the one as high priority upon this setting. For example, if it has two sources at the same time and set line-in high priority, audio outputs will come from line-in. And system changes the audio source to A2DP when the line-in is unplugged.

#### **4.8.2.3 Line-in Mute/Unmute**

This setting determines whether the line-in audio can be muted. If it is enabled, the muted status is controlled by the button events with Play function described in Button Setup.

#### **4.8.2.4 Line-in Silence Detection**

This setting determines the silence detection with line-in. If it is enabled, the silence detection function will be activated to detect the swing in line-in path. It can use for saving power.

#### **4.8.2.5 Line-in Path**

Select the path of Line-in data through: Digital Path or Analog Path.

For digital path, it means signal can be process by DSP.

For Analog path, it means bypass to output directly.

#### **4.8.2.6 Line-in Indicate Led Ctrl (P2\_4)**

Enable LED indicator for Line In status by P2\_4.

### **4.8.3 External Amplifier Control Setting**

The system audio outputs connect with the external amplifier. To avoid outputting the unexpected noise when the CODEC is

turning on or off, it needs to fine tune the timing of CODEC and external amplifier.

#### 4.8.3.1 Off External Amplifier When BT Codec Mute

This setting determines if turning the external amplifier off or not when the CODEC has no data to process.

#### 4.8.3.2 Off External Amplifier T0

This setting determines the timer to turn the external amplifier off when the CODEC has no data to process.

#### 4.8.3.3 Off External Amplifier T1

The timer to enable the external amplifier after the CODEC is activated.

#### 4.8.3.4 Off External Amplifier T2

The waiting timer to output sounds after the external amplifier is enabled.

