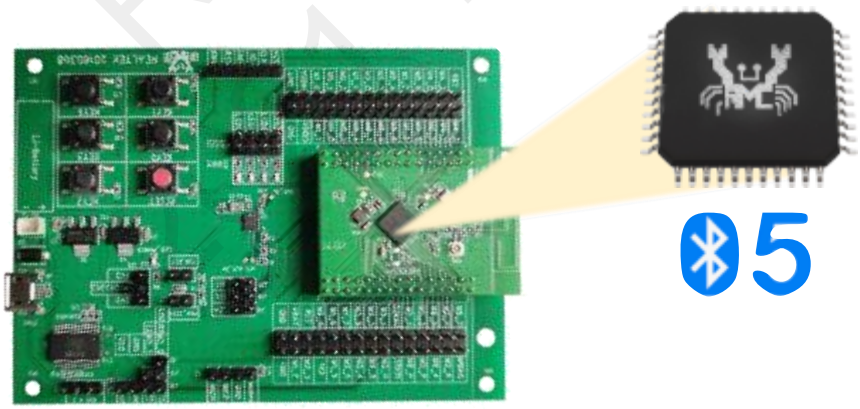
Realtek Bluetooth Solutions

- Bluetooth Products Introduction
- Bluetooth Low Energy (BLE) SoC Solution
- BLE SoC (RTL8762D) Evaluation Board User Manual



Bee Together

•Audio •Entertainment •Health Care •Industry •Smart Home

CONTENT

- **Bluetooth Products Introduction**
  - Bluetooth Dual-mode HCI Transceiver ..... Ⅰ
  - Bluetooth Low Energy (BLE) SoC ..... Ⅱ
  - Bluetooth Audio SoC ..... Ⅲ
- **Bluetooth Low Energy (BLE) SoC Solution**
  - EVB Introduction ..... Ⅳ
  - RTL8762D Evaluation Board User Manual Ⅵ

1 WorkerBEE

BT HCI Transceiver

RTL8761ATT

4.2

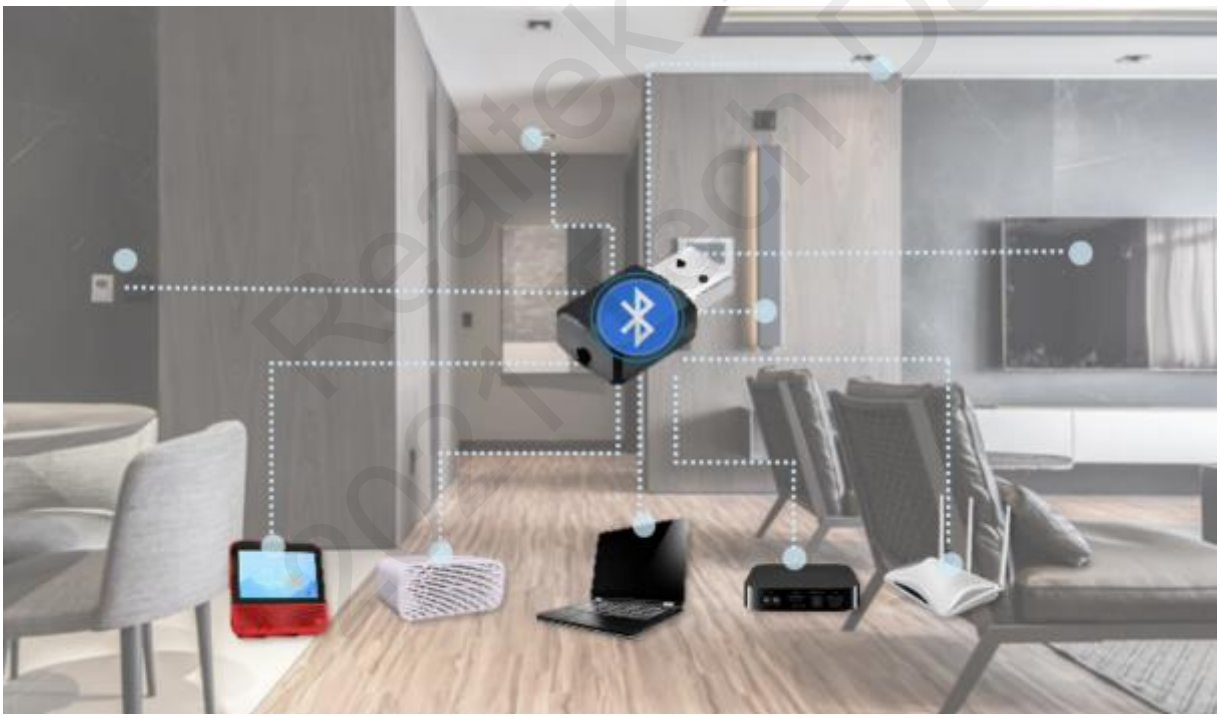
- BT4.2 dual mode SoC
- GATT+SPP profile inside
- AT command with external MCU
- Tx power up to +10dBm
- QFN32 4x4
- **OTT/TV/Camera/Printer**

NEW

RTL8761B

5

- BT5 dual mode/HCI Transceiver
- UART/USB I/F
- **mSBC/eSCO/PLC supported**
- **Tx Power up to +10dBm**
- Rx sensitivity -94.5dBm (2Mbps EDR); -98 dBm (BLE)
- QNF32 4x4



Smart Home/IoT/VoIP Application

2 HoneyBEE BLE SoC

NEW

5.2 RTL8762E

- **BLE5.2**
- Cortex M0+ 40MHz, 1MB Flash, 104KB SRAM
- **Capacitive touch sensor**
- **RF TX 4.75mA (0dBm), RX 3.5mA**
- QFN32/40/48
- **ES: 2021/Q2, MP: 2021/Q4**

5.1 RTL8762D

- **BT5.1**
- **Cortex-M4F 90MHz, 192KB SRAM for sensor fusion**
- SPIC(XiP) for flash, max 32MB (45MHz)
- SPIC(XiP) for PSRAM, max 8MB (45MHz)
- **SPIC for AMOLED (45MHz)**
- **I8080 for TFT/AMOLED (20MHz)**
- **SPI for TFT (45MHz)**
- **Supports AMOLED 454x454**
- Ultra low power consumption

Find More

5 RTL8762C

- BT5/Cortex M4F 40MHz; 160KB RAM
- Voice ADC for voice search; IR transceiver
- Tx Power up to +7.5dBm
- Low Power; ADCx8; EQ Bandx5
- I2C/SPI/UART/I2S/PWMx8
- 240x240 I8080 I/F supports
- Support Scatternet/Routing based on BT SIG
- **Support BLE HomeKit / Amazon BLE Mesh / Amazon Gadget**

3 BumbleBEE Pro

BT Audio SoC

RTL8753C

BT 5

- BT5 dual mode supported
- Cortex-RealM300 80MHz+DSP 120Mhz+ stereo codecs
- Tx Power +10dBm
- High-res audio codec integrated
- **Google Fast Pairing**
- **RWS v1.1: low dual-ear latency for talking**
- **Opus encoder for AI headset/speaker**
- Low power consumption <7mA (A2DP)
- Ultra small package QFN4x6,TFBGA 4.5x6
- Suited for high C/P products

RTL8773B

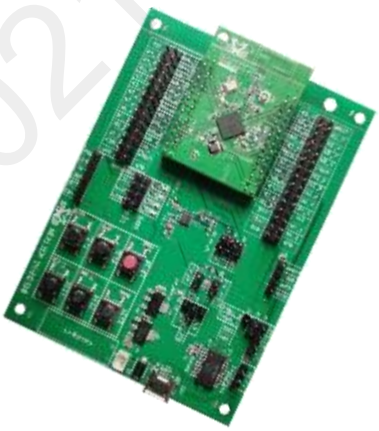
BT 5

Find More

- BT5 dual mode supported
- Tx Power +10dBm
- High-res audio codec integrated
- USB Audio/Charger/2xMic/AEC/NR
- **Google Fast Pairing**
- **Low power hybrid ANC**
- **Opus encoder for AI headset/speaker**
- **RWS v2.0**
  - **Role swap function**
  - **Low dual-ear latency for phone-talk**
- Low power consumption < 6mA (A2DP)
- Ultra small package QFN4.5x6.5,TFBGA 4.5x6

BLE SoC
Development Environment

OS Supported	FreeRTOS, AliOS, Huawei LiteOS, RT-Thread
IDE	Keil MDK-ARM, GCC, IAR
Debug Tool	SEGGER's J-Link
HDK/SDK/MP Tool	All the design materials will release by Realtek's Anchor system directly
EVB Link	Realtek BT Development Board Introduction

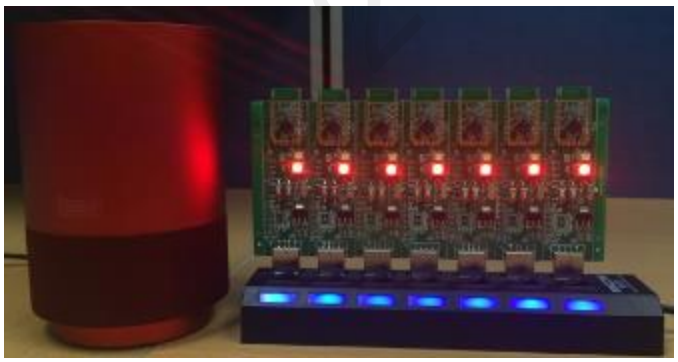


Realtek can Provide Bluetooth SIG Mesh Turnkey Solution

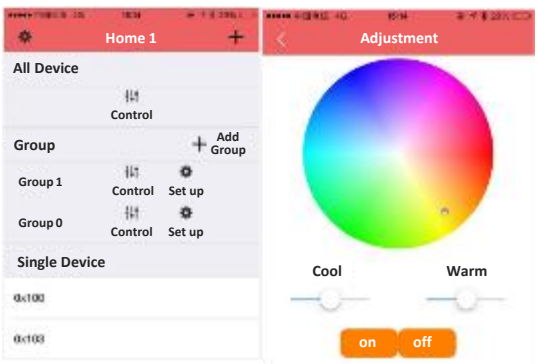
Mesh EVB dongle- RTL8762CMF

- **Where to buy RTL8762CMF Mesh EVB**
- HDK/SDK/MP Tool: all the design materials will release by Realtek's Anchor system directly
- Mesh SDK support SIG Mesh and ALI/MIOT/Baidu/Amazon Mesh
- iOS/Android APP
- Update mesh nodes with new firmware image
- **SIG draft OTA**
  - Background mode
  - Low speed
  - Updating over the mesh network(via adv.)
- **Realtek proprietary OTA**
  - Based GATT connection
  - High speed
  - Update old device automatically
- MIOT OTA
  - Support Mijia App
  - Encoded & More Flash size left for application

SMART HOME SOLUTION INTRODUCTION LINK



Smart speaker with MESH dongle demonstration



APP Interface

RTL8762D (BLE SoC)
Evaluation Board
User Manual

V1.0 2021/01/20

Revision History

Date	Version	Amendment	Author
2021/01/20	V1.0	First Draft	Sillo Yin

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1. RTL8762D Evaluation Board Introduction

1.1 RTL8762D EVB introduction

This document introduces usage of 8762D Bluetooth® Evaluation Board (EVB) Hardware. 8762D EVB provides hardware environment for customer to develop their own application, which includes:

1. Voltage converter.
2. 6-axis motion sensor.
3. 4 LEDs and 6 keys.
4. Button battery and Li-ion battery holder.
5. USB to UART converter (FT232RL).

1.2 Evaluation Board Interface

1.2.1 Interface Description

Distribution of EVB block and interface is shown in Figure 1-1 and Figure 1-2.

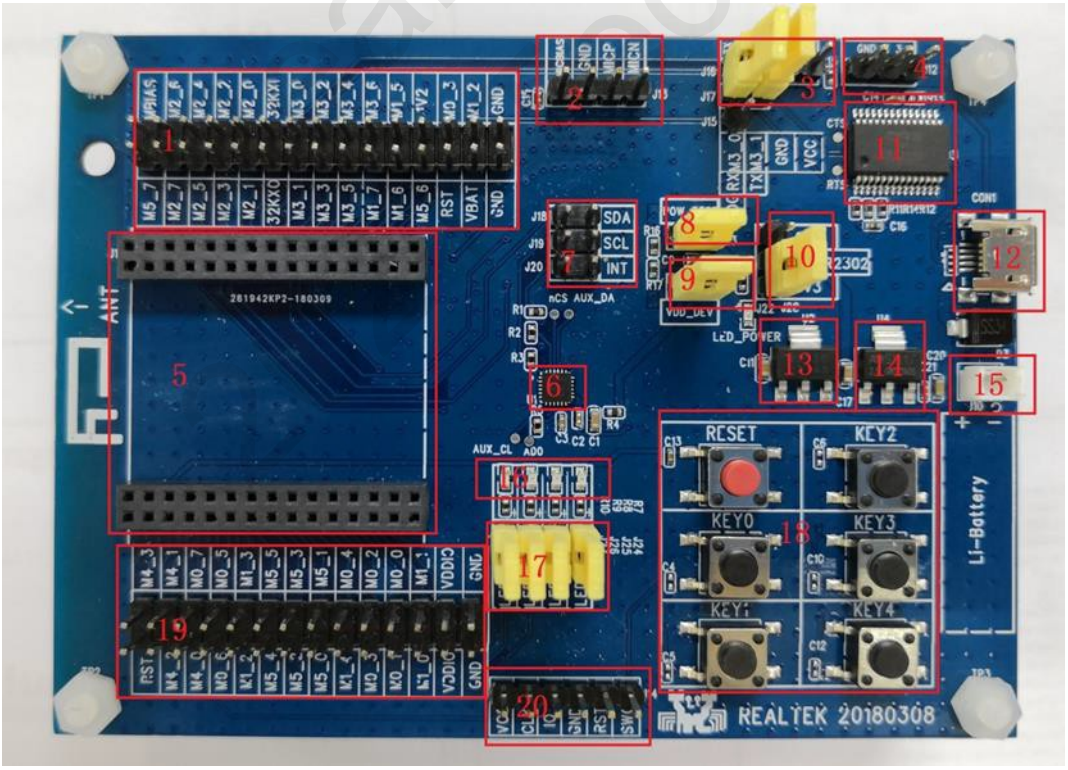

Figure 1-1 EVB Interface Block Diagram

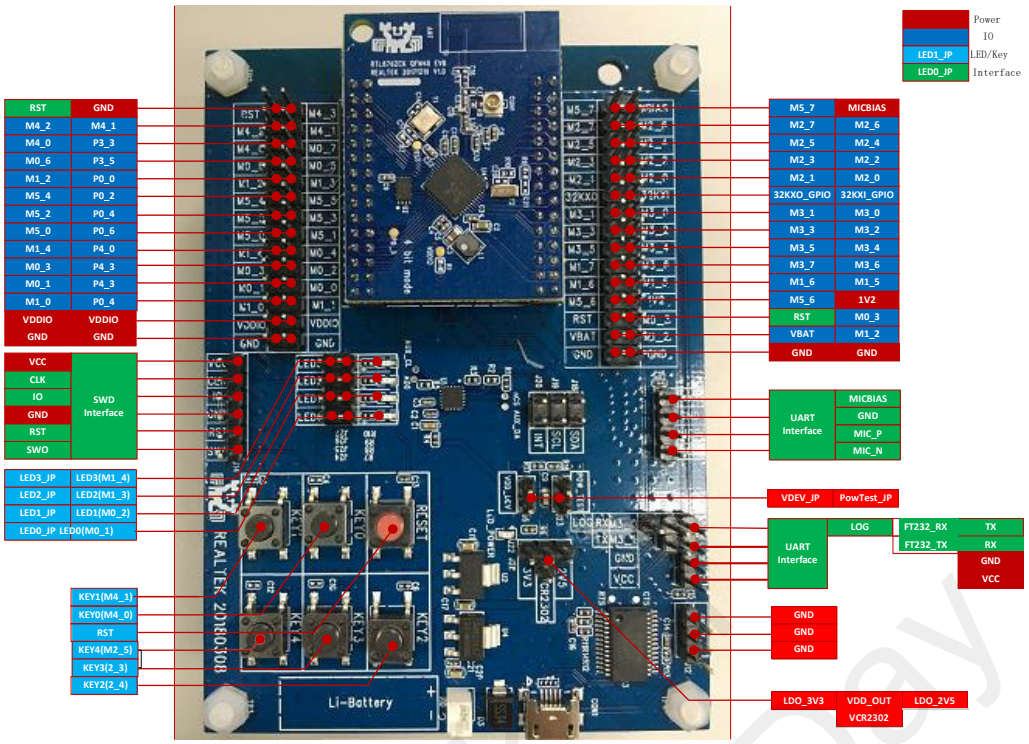

Figure 1-2 EVB Interface Distribution

1.2.2 Main Chip (Module)

Mark 5: Connection socket used to connect daughter board with mother board. Make sure that the orientation of PCB antenna on daughter board is the same as the silkscreen mark of antenna on mother board. Daughter board is shown in Figure 1-3.

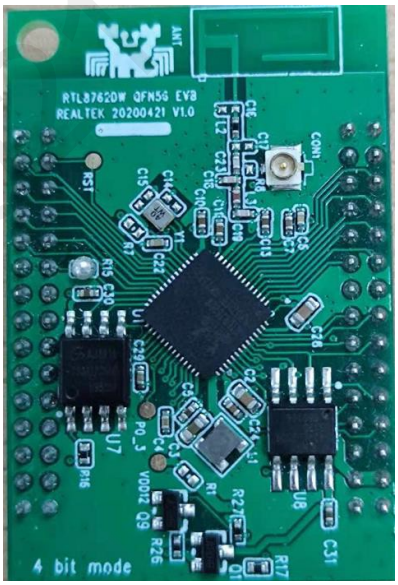

Figure 1-3 Daughter Board

1.2.3 Power supply

1) **Mark 10**: Power supply selection module of motherboard, shown in Figure 1-4.

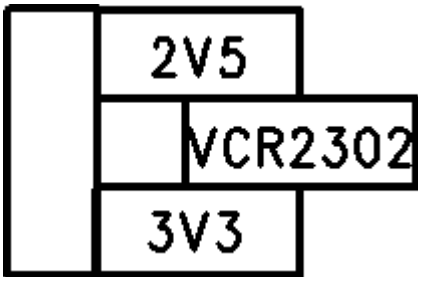

Figure 1-4 Power jumper

a) 3V3：Powered by USB power source on evaluation board, IC voltage 3.3V.

b) VCR2302: Powered by a CR2302 battery (on the rear)

c) 2V5：Powered by USB on evaluation board, IC voltage is 2.5V, generally used while burning eFUSE.

2) **Mark 21**: CR2032 battery holder (at the bottom side of PCB)

3) **Mark 15**: Li-ion battery holder: evaluation board can be powered by Lithium-ion battery.

Note: If EVB is powered by Li-ion battery, jumper cannot be put on mark 10.

4) **Mark 13/14**: AMS1117 3.3V output and AMS1117 2.5V output LDP chip that provide 5V to 3.3V and 5V to 2.5V voltage conversion circuit when EVB is powered by Li-ion battery.

5) **Mark 9**: Power G-sensor and SWD VCC. This jumper must be connected during normal operation.

6) **Mark 8**: Jumper for RTL8762D overall power consumption test. Remove J23 and cascade with an ammeter when performing overall power consumption test.

Note:

a) J23 must be shorted during normal operation.

b) When performing current measurement, LOG printed must be disabled. UART should be left not connected and disconnect SWD with debugger to avoid affecting measurement.

c) Under some special circumstance that current measurement at 3V needs to be performed, replace onboard power supply with external 3V DC power supply.

7) **Mark 12**: Micro USB 5V power supply. It can be connected to either external 5V power supply or USB port of PC.

8) **Mark 4**: GND jumper.

1.2.4 IO Port

1) **Mark 1**: 2 × 15 IO Jumper

2) **Mark 19**: 2 × 14 IO Jumper

1.2.5 Interface

1) **Mark 2**: MIC Test Jumper for external MIC

2) **Mark 3**: UART /LOG Test Jumper.

   a) Connection of Jumper for HCI UART Test is shown in figure 1-5:

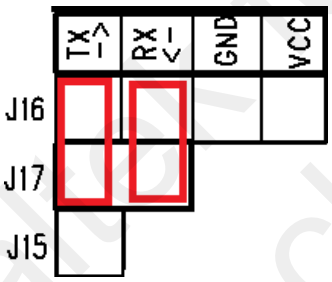

Figure 1-5 Connection of HCI UART Jumper

   b) Connection of Jumper for Log Test:

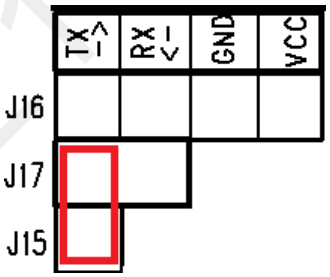

Figure 1-6 Connection of LOG

3) **Mark 6:** G-sensor, which is a 6-axis motion sensor, is powered by VDD_DEV. Thus, J6 need be connected when G-sensor is required.

4) **Mark 7:** I2C interface of 6-axis motion sensor. Connection of Jumper J18, J19 and J20 is shown in figure 1-7. If I2C interface is applied, J18 and J19 should be shorted with jumper. That is to say, connect I2C signal line to M3_2 and M3-3. INT single line can be connected to M2_2 via J20, and can be left not connected if INT function is not configured.

   If SPI interface is applied, R1 need be removed. Connect test point AD0 and nCS to specified IO port with SDO and nCS jump wire respectively, and then short J18 and J19 with jumper.

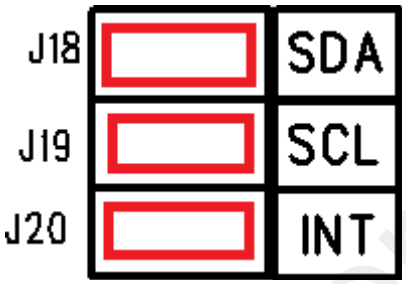

Figure 1-7 G-sensor I2C connection

5) **Mark 12:** Micro USB interface. It can be used as UART communication port when connected to PC.

6) **Mark 20:** SWD interface used for SWD debug.

1.2.6 Others

1) **Mark 16:** 4 independent LED used for development of customized application. Confirm that corresponding jumpers (J24 to J27) are connected properly before develop. Schematic is shown in figure 1-8.

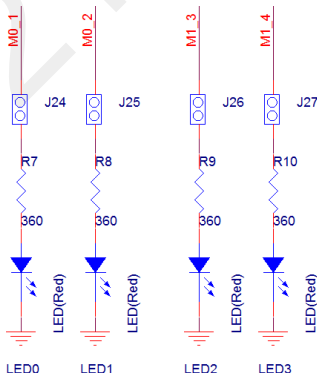

Figure 1-8 Schematic of LED circuit

2) **Mark 17:** 4 LED jumpers. When testing power consumption, LED may be lighted up and affect result of test. Under such circumstance, LED Jumpers should be removed. Default LED configuration is provided in table 1-1. If customers would like to use IOs that not listed in table 1-1 to control LEDs, LEDs can be connected to specified IO port with jump wire.

3) **Mark 18:** RESET key and 5 independent keys, as shown in Figure 1-9.

Note: Debouncing capacitors and internal pull-up resistor make up a filter circuit to reduce ripples when buttons are pressed. However, it can also affect the result of keyboard array scan. Capacitors are not mounted on board by default. User can solder 0.1uF capacitor on pads when necessary.

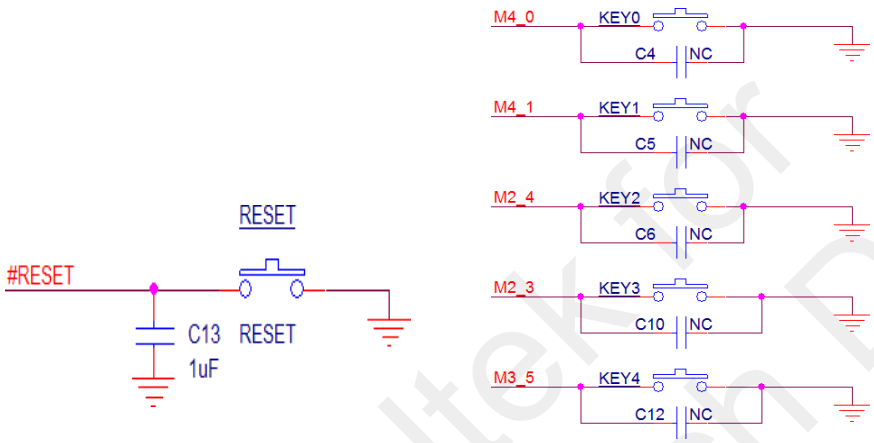

Figure 1-9 Schematic of Keys

4) **Mark 11:** FT232 chip.

1.2.7 Pin Allocation on Motherboard of Evaluation Board

When edges of daughter board are flush with the white lines and PCB antenna on daughter board is aligned with silkscreen mark on motherboard, the pins on daughter board are properly inserted; otherwise it is necessary to be cautious about improper connection.

Pin allocation of motherboard is listed as follows:

Table 1.1 IO Pin Allocation on Motherboard & Daughterboard

RTL8762 DW	RTL8762 DK	RTL8752 DJF RTL8762 DJF	RTL8762 DDF	RTL8762 DGF	RTL8762 DKF	EVB FunctIOn	EVB socket
P0_0	P0_0	P0_0	P0_0	P0_0	P0_0		M0_0
P0_1	P0_1	P0_1	P0_1	P0_1	P0_1	LED0	M0_1
P0_2	P0_2	P0_2	P0_2	P0_2	P0_2	LED1	M0_2
P0_3	P0_3	P0_3	P0_3	P0_3	P0_3	LOG	M0_3
P0_4	P0_4	P0_4	P0_4	P0_4	P0_4		M0_4
P0_5	P0_5	P0_5	P0_5	P0_5	P0_5		M0_5
P0_6	P0_6	P0_6	P0_6	P0_6	P0_6		M0_6
P0_7	P0_7	P0_7	P0_7	P0_7	P0_7		M0_7
P1_0	P1_0	P1_0	P1_0	P1_0	P1_0	SWDIO	M1_0
P1_1	P1_1	P1_1	P1_1	P1_1	P1_1	SWDCLK	M1_1
P1_2	P1_2	P1_2	P1_2	P1_2	P1_2		M1_2
P1_3	P1_3	P1_3	P1_3	P1_3	P1_3	LED2	M1_3
P1_4	P1_4	P1_4	P1_4	P1_4	P1_4	LED3	M1_4
P1_5	P1_5	P1_5	P1_5	P1_5	P1_5		M1_5
P1_6	P1_6	P1_6	P1_6	P1_6	P1_6		M1_6
P1_7	P1_7	P1_7	P1_7	P1_7	P1_7		M1_7
MICBIAS	MICBIAS	MICBIAS	MICBIAS	MICBIAS	MICBIAS	MIC_BIAS	M_MICBIAS
32k_XI	32k_XI	32k_XI	32k_XI	32k_XI	32k_XI		M_32k_XI
32k_XO	32k_XO	32k_XO	32k_XO	32k_XO	32k_XO		M_32k_XO

P2_0	P2_0	P2_0	P2_0	P2_0	P2_0		M2_0
P2_1	P2_1	P2_1	P2_1	P2_1	P2_1		M2_1
P2_2	P2_2	P2_2	P2_2	P2_2	P2_2	ICM20618_INT/CUT	M2_2
P2_3	P2_3	P2_3	P2_3	P2_3	P2_3	KEY3	M2_3
P2_4	P2_4	P2_4	P2_4	P2_4	P2_4	KEY2	M2_4
P2_5	P2_5	P2_5	P2_5	P2_5	P2_5		M2_5
P2_6	P2_6	P2_6	P2_6	P2_6	P2_6	MIC_N	M2_6
P2_7	P2_7	P2_7	P2_7	P2_7	P2_7	MIC_P	M2_7
P3_0	P3_0	P3_0	P3_0	P3_0	P3_0	UART_TX	M3_0
P3_1	P3_1	P3_1	P3_1	P3_1	P3_1	UART_RX	M3_1
P3_2	P3_2	P3_2	P3_2	P3_2	P3_2	ICM20618_I2C_SCL	M3_2
P3_3	P3_3	P3_3	P3_3	P3_3	P3_3	ICM20618_I2C_SDA	M3_3
P3_4	P3_4	P3_4	P3_4	P3_4	P3_4		M3_4
P3_5	P3_5	P3_5	P3_5	P3_5	P3_5	KEY4	M3_5
P3_6	P3_6	P3_6	P3_6	P3_6	P3_6		M3_6
P4_0	P4_0	P4_0	P4_0	P4_0	P4_0	SPI0_CLK / KEY0/SWO	M4_0
P4_1	P4_1	P4_1	P4_1	P4_1	P4_1	SPI0_MISO / KEY1	M4_1
P4_2	P4_2	P4_2	P4_2	P4_2	P4_2	SPI0_MOSI	M4_2
P4_3	P4_3	P4_3	P4_3	P4_3	P4_3	SPI0_CS_N	M4_3
P5_0	P5_0	P5_0	P5_0	P5_0	P5_0	P5_0	M5_0

2. Development Board Operation Instructions

2.1 Acquiring Log with Onboard USB to UART Converter

P0_3 is default log output pin. UART conversion chip on board can transmit log to PC after J15 and J17.1 are connected.

Connection of Jumper for Log Test is shown in Figure 2-1.

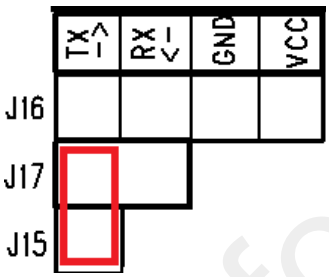

Figure 2-1 LOG out connection

2.2 Current test

The following current test points are reserved on evaluation board:

- VDD_DEV is peripheral power supply of EVB.
- VDD_BAT powers VBAT and HVD on EVB.
- VDD_IO powers VDD_IO on RTL8762D chips (some of packages have no independent VDD_IO Pin)

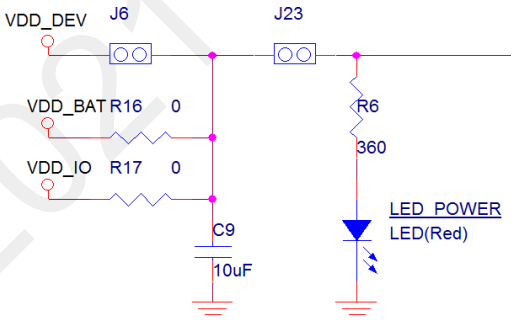

Figure 2-2 Schematic of Power jumpers on EVB

J23 shall be disconnected when testing power consumption.

Notes:

- Log output in the SDK shall be disabled during current measurement to avoid additional power consumption.

- When measuring current under the condition of maintaining voltage at 3.0V, external DC power source powers chips instead of onboard power supply.
- When measuring power consumption, disconnect UART and SWD with debugger to avoid additional impacts from debug device.

2.3 6-axis Motion Sensor

6-axis motion sensor is powered by VDD_DEV, so J6 needs to be connected before using G-sensor.

If I2C interface is applied, J18 and J19 should be shorted with jumper. That is to say, connect I2C signal line to M3_2 and M3-3. INT single line can be connected to M2_2 via J20, and can be left not connected if INT function is not configured.

If SPI interface is applied, R1 need be removed. Connect test point AD0 and nCS to specified IO port with SDO and nCS jump wire respectively, and then short J18 and J19 with jumper.