PRODUCT SPECIFICATION

BT V5.3 Dual Mode Bluetooth Stereo Audio Module

WB312L

User Manual

Version 1.0

Smart Life Applications SBU
LITE-ON Technology Corporation
4F, 392, Ruey Kuang Road.,
Neihu, Taipei 11492, Taiwan, R.O.C.

CONTENT

1. FEATURES AND SPECIFICATION 3

1.1 DESCRIPTION 3

1.2 BLOCK DIAGRAM 3

1.3 PRODUCT FEATURE 4

1.4 PRODUCT SPECIFICATIONS 5

2. MODULE PINOUT 6

2.1 MODULE PIN ASSIGNMENT 6

3. ELECTRICAL SPECIFICATION 8

3.1 OPERATION CONDITIONS 8

4. MODULE DIMENSION 9

5. WARING STATEMENT 10

1. FEATURES AND SPECIFICATION

1.1 Description

RTL8761BTV is a highly integrated single-chip Bluetooth 5 controller with a UART interface. It combines BT protocol stack(LM,LL and LE), BT Baseband, modem and BT RF in a single chip. RTL8761BTV Bluetooth controller complies with Bluetooth core specification V5 and support dual mode (BR/EDR + Low energy controllers). It is compatible with previous versions including v2.1+LE. For BR/EDR, it allows multiple active links in either slave mode or master mode. For low energy, it supports multiple and allows multiple active links in salve mode. A BR/EDR link and an LE link can be active at the same time.

1.2 Block Diagram

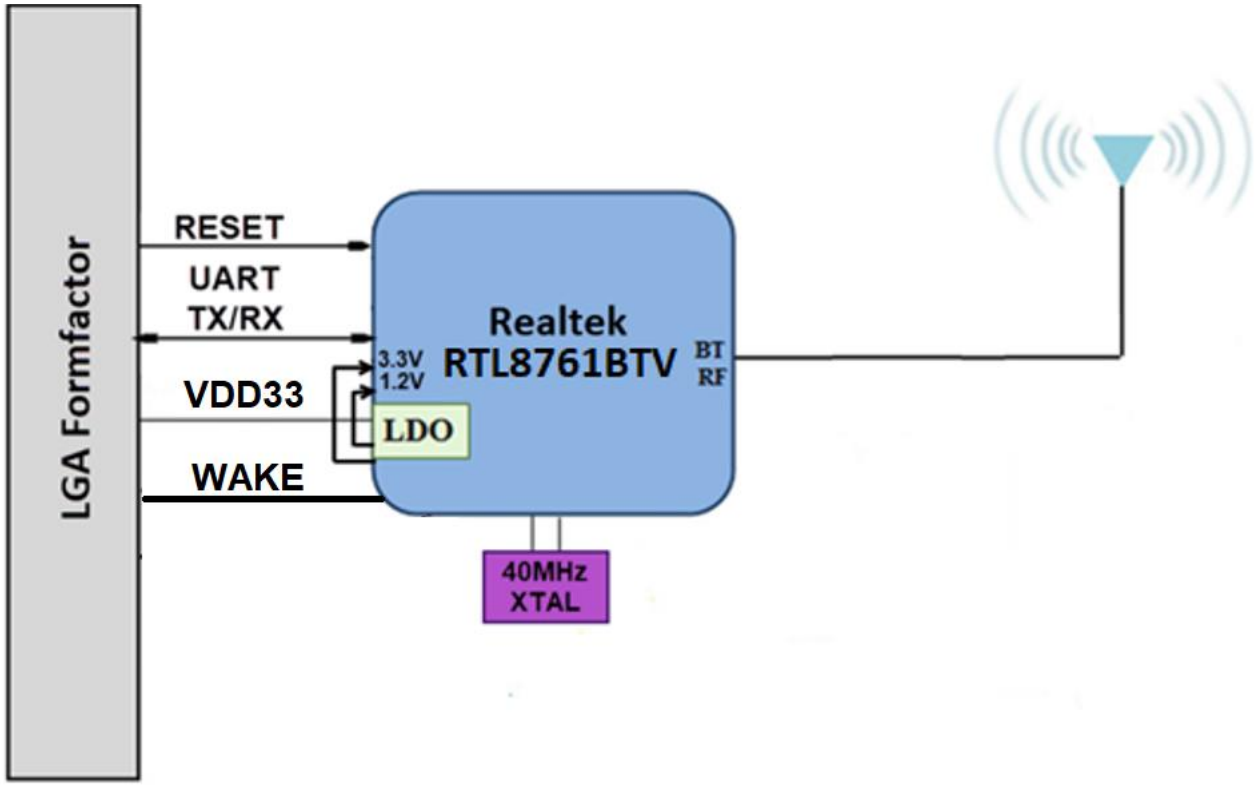


Figure 1-1 RTL8761BTV module block diagram

1.3 Product Feature

- Bluetooth core specification 5 compliant
  - Bluetooth classic (BDR/EDR)
  - Bluetooth low energy (BLE-1M)
  - Complies with HS-UART with configurable baud rate for Bluetooth
  - Compatible with Bluetooth v2.1
  - HS-UART interface for Bluetooth data transmission compliant H5 specification
  - Integrated MCU to execute Bluetooth protocol stack
  - Support all packet types in basic rate and enhanced data rate
  - Supports Secure Simple Pairing
  - Supports multiple low energy states
  - Fast AGC control to improve receiving dynamic range
  - Supports Power control

- Peripheral
  - Configurable LED pin

1.4 PRODUCT SPECIFICATIONS

MAIN CHIPSET

Realtek RTL8761BTV

FUNCTIONAL SPECIFICATIONS

<table>
<tr><th colspan="2">BT Function</th></tr>
<tr><td>Standard</td><td>Bluetooth V5.3</td></tr>
<tr><td>Bus Interface</td><td>UART
(The default baud rate configuration is115200 while using Realtek BTAPP tool for RF testing)</td></tr>
<tr><td>Data Rate</td><td>1 Mbps, 2Mbps and Up to 3Mbps</td></tr>
<tr><td>Modulation Scheme</td><td>GFSK, π/4-DQPSK and 8-DPSK</td></tr>
<tr><td>Frequency Range</td><td>2.402~2.480 GHz</td></tr>
<tr><td>Channel Number</td><td>BER/EDR: 0-78
BLE: 0-39</td></tr>
<tr><td>Transmit Output Power</td><td>BR/EDR: Typical 5dBm
BLE 1M: Typical 5dBm
(Tolerance: +/- 3dBm)</td></tr>
<tr><td>Receiver Sensitivity</td><td>< 0.1% BR Typical: -90 dBm
< 0.1% EDR Typical: -88 dBm
BLE 1M (PER <30.8%) Typical: -92dBm</td></tr>
<tr><td>Operating Voltage</td><td>Power input: 3.3V +/- 10%</td></tr>
<tr><td>Power Consumption</td><td>
<table>
<tr><th>Mode</th><th>TX
(Uint: mA, Max)</th><th>RX
(Uint: mA, Max</th></tr>
<tr><td>BR</td><td>58</td><td>30</td></tr>
<tr><td>EDR</td><td>58</td><td>30</td></tr>
<tr><td>BLE</td><td>41</td><td>28</td></tr>
</table>
Note: measured under continue Tx/Rx
</td></tr>
<tr><td>Antenna Type</td><td>On board chip Antenna</td></tr>
</table>

2. MODULE PINOUT

2.1 Module Pin Assignment

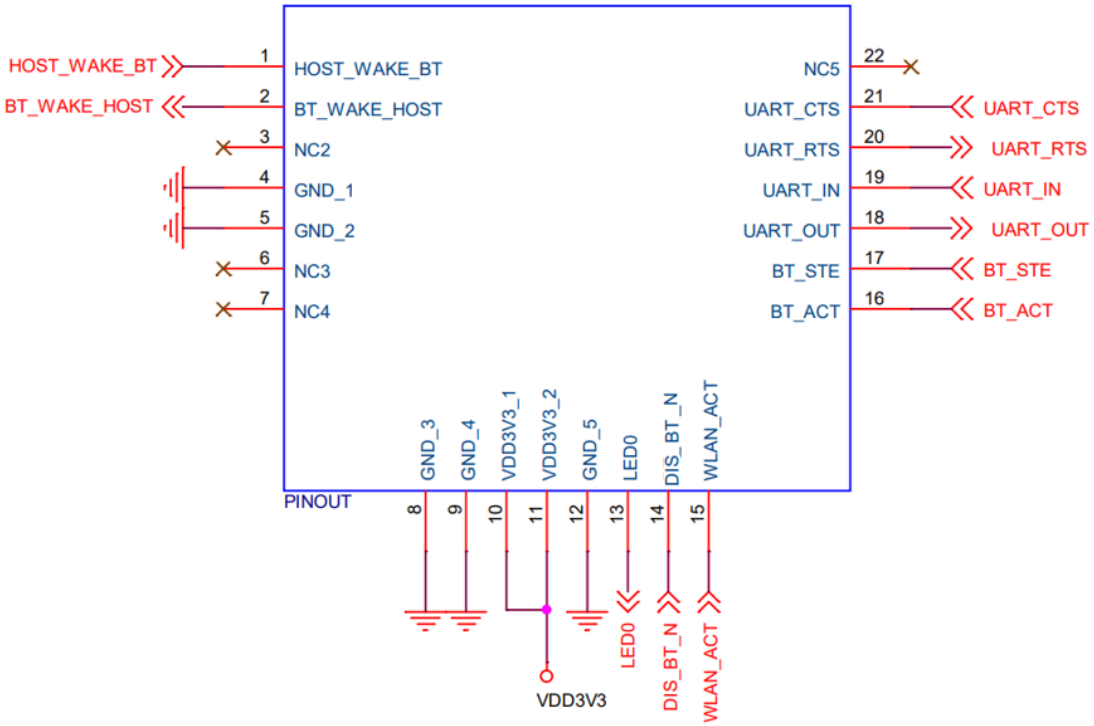


Figure 2-1 WB312L module pinout

Table 2-1 Pad Type Definition

Pad Type	Definition
I	Input
O	Output
PI	Power Input
G	Ground

Table 2-2 Module pinout definition

Pin.	Module Pin Define	RTL8761BTV I/O Pin Name	Description	I/O
1	HOST_WAKE_BT	GPIOA[13]	Wake up BT via host The status of Host is provided to RTL8761BTV while the system entering suspend or shut down mode.	I
2	BT_WAKE_HOST	GPIOA[14]	BT wakeup Host function. The default state is low and will be driving high when the wakeup signal generated.	O
3	NC		Not connected	

4	GND		Ground	G
5	GND		Ground	G
6	NC		Not connected	
7	NC		Not connected	
8	GND		Ground	G
9	GND		Ground	G
10	VDD33	REG_IN	3.3V power input	PI
11	VDD33	REG_IN	3.3V power input	PI
12	GND		Ground	G
13	LED[0]	GPIOA[23]	LED function pin Also, a FW debug log pin	O
14	DIS_BT_N	GPIOA[11]	Bluetooth hardware reset pin, module internally connect a 10 kΩ resistor pull high to VIO_SB and reserve a 0.1uF capacitor to GND. Also, this pin could be connected to the host for hardware reset function.	I
15	WLAN_ACT	GPIOA[10]	Reserved interface for RTK, it could be used as GPIO, add a 10 kΩ resistor pull low to GND.	I
16	BT_ACT	GPIOA[9]	Power on latch pin (SPS_LDO_SEL) If SPS mode is selected, then connecting a 10kΩ resistor pull low to GND. If LDO mode is selected, then connecting a 10kΩ resistor pull high to VDDIO33.	I
17	BT_STE	GPIOA[8]	BT test mode selection Need to connect 10 kΩ resistor pull low to GND when 3.3V attach While VDD3V3 is applied, BT_STE and BT_ACT power on latch pin levels should be stable within 2ms BT_ACT is internally pulled high in module, BT_STE has to connect 10K ohm to GND in main board side	I
18	UART_OUT	GPIOA[6]	UART transmit data Connect to HOST UART_IN with series 0 Ω resistors	O
19	UART_IN	GPIOA[7]	UART receive data Connect to HOST UART_OUT with series 0 Ω resistors	I
20	UART_RTS	GPIOA[5]	UART request to send Connect to HOST UART_CTS with series 0 Ω resistor	O
21	UART_CTS	GPIOA[4]	UART clear to send Connect to HOST UART_RTS with series 0 Ω resistor Shunt 10kohm pull low to GND if without hardware flow control function	I
22	NC		Not connected	

3. Electrical Specification

3.1 Operation Conditions

Table 3-1 Recommended Operation Conditions

Symbol	Rating	Min	Typ	Max	Units
VDD33	Switch mode regulator sense input and digital core power input	3.0	3.3	3.63	V
VIO_UART	IO supply voltage(3.3V)	3.0	3.3	3.63	V
T_A	Ambient operating temperature	-40	25	85	^{0}C
T_{AH}	Ambient operating humidity	20	40	70	%
T_S	Storage temperature	-55	25	90	^{0}C
T_H	Storage humidity	20	50	85	%

Table 3-2 DC Characteristics

Symbol	Parameter	Min	Typ	Max	Units
V_{IL}	Input Low Voltage (VIO_UART=3.3V)	-	0	0.9	V
V_{IH}	Input High Voltage (VIO_UART =3.3V)	2	3.3	3.6	V
V_{OL}	Output Low Voltage (VIO_UART =3.3V)	0	-	0.33	V
V_{OH}	Output High Voltage (VIO_UART =3.3V)	2.97	-	3.3	V

Table 3-3 Electrostatic discharge (ESD) Ratings

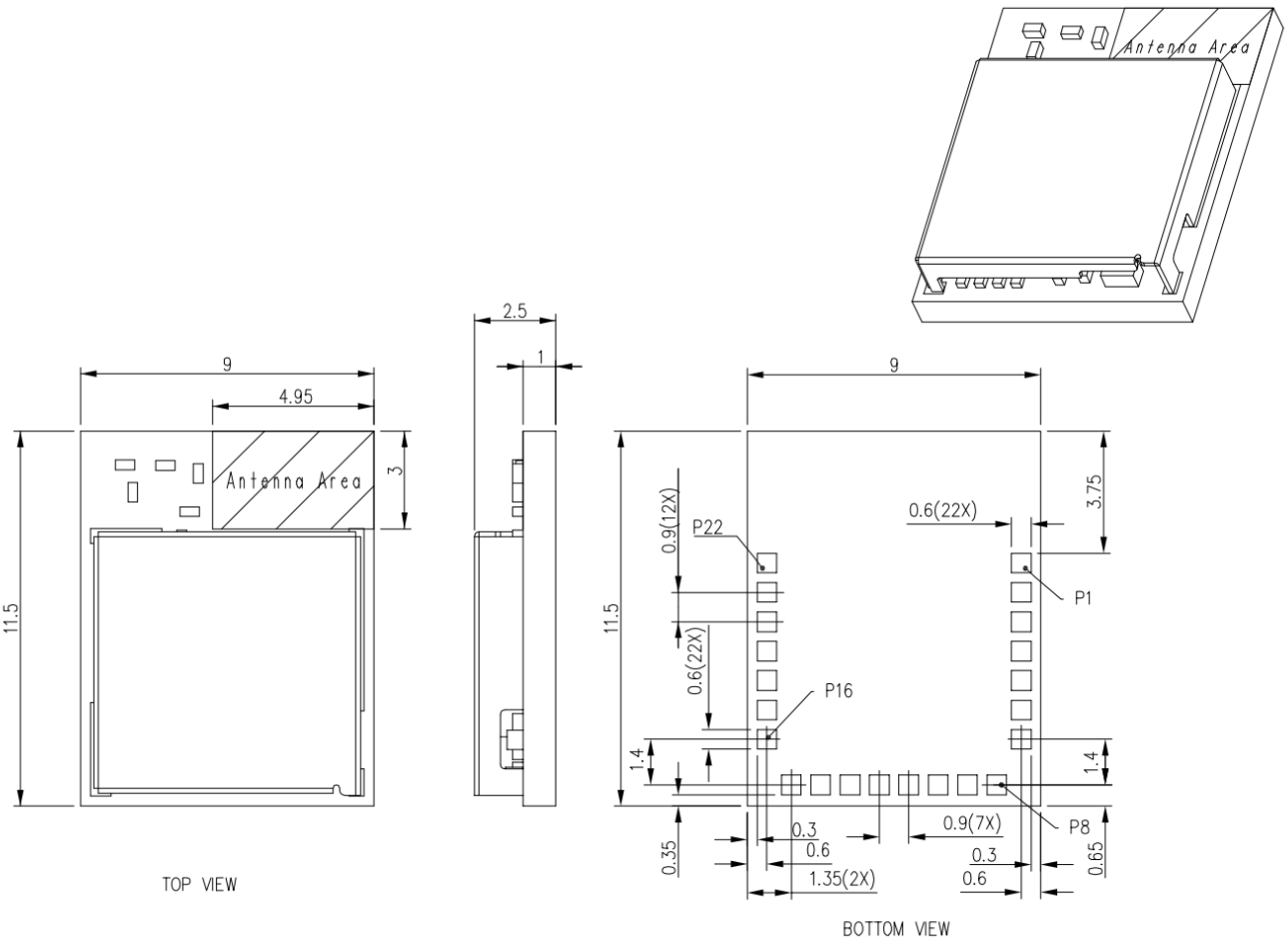
ESD Mode	Standard	Pin name	Typ	Max	Units
Human body model (HBM)	JESD22-A114	All pins	-3500	3500	V
Charged device model (CDM)	JESD22-C101	All pins exclude RF pins	-500	500	V
		RF pins	-250	250	V

Table 3-4 MSL rating

MSL	Out of bag floor life	Comments
4	72 hours	30^{0C} / 60%RH

Noted: Due to the timing from SMT to pakcing will take around 96hr, so customer has to mount this module onto main board within 72hr

4. MODULE DIMENSION



Unit: mm

DIM \ DEG	A	B	V C	D	ANGLE	
0-4.99	±0.03	±0.05	±0.10	±0.15	0°-30°	±0.1°
5-9.99	±0.05	±0.10	±0.15	±0.20	31°-60°	±0.3°
10-49.99	±0.10	±0.15	±0.20	±0.25	61°-90°	±0.5°
50-99.99	±0.15	±0.20	±0.25	±0.30		
□100	±0.15%	±0.20%	±0.25%	±0.30%	RADIUS	±10%

Tolerance: C

Figure 4-1 WB312L module dimension

5. WARING STATEMENT

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and a human body.

-for Module

If the identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module, Contains FCC ID: 2AM73-0002

Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the multi-transmitter procedures.

The host integrator must follow the integration instructions provided in this document and ensure that the composite-system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or evaluation to the rules, including the transmitter operation and should refer to guidance in KDB 996369.

ISED Statement

This device contains licence-exempt transmitter(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) this device may not cause interference,

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and a human body.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et un corps humain.

-for Module

If the identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module, Contains IC: 22826-0002

Si le numéro d'identification n'est pas visible lorsque le module est installé à l'intérieur d'un autre appareil, alors l'extérieur de l'appareil dans lequel le module est installé doit également afficher une étiquette faisant référence au module fourni, Contient IC : : 22826-0002

EU Statement

- The frequency and maximum transmitted power in EU are listed as belows,

2402~2480 MHz: 7.23dBm for Bluetooth, 6.13dBm for Bluetooth LE

- Declaration of Conformity

This device complies with Directive 2014/53/EU, issued by the Commission of the European Community.

Safety	EN 62368-1: 2014+A11:2017
EMC	EN 301 489-1 V2.2.3
	EN 301 489-17 V3.2.4
Radio	EN 300 328 V2.2.2
SAR	EN 50663: 2017
	EN 62479: 2010

NCC Statement

「取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。」

此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示本產品內含發射器模組 CCXXxxLPyyyZzW

Certification ID

USA FCC	FCC ID: 2AM73-0002
Canada IC	IC: 22826-0002
Taiwan NCC	CCXXxxLPyyyZzW
Japan TELEC	R XXXXXXXX