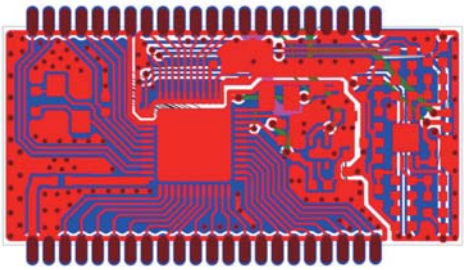
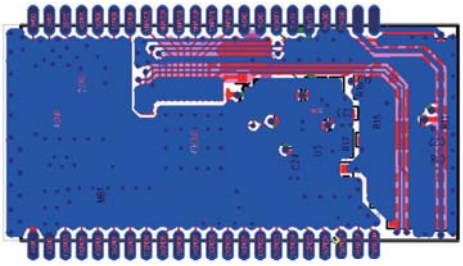
Bluetooth 5.0 MODULE

BTM-2801, BTM 2853 Bluetooth Module





Features

- 32bit RISC processor Core, Up to 240MHz.
- Internal ROM, Internal 203KB RAM for data and program, Internal 2MByte Nor flash.
- Bluetooth Dual Mode support: Simultaneous LE and BR/EDR
- 8-channel ordinary DMA, Support for transmission in burst 8 mode.
- Fully configurable PEQ, Up to 20 segments; Support for echo cancellation and noise reduction.
- Built-in high performance stereo DAC&DAC, Suports three stereo AUX IN sharing three ADCs.

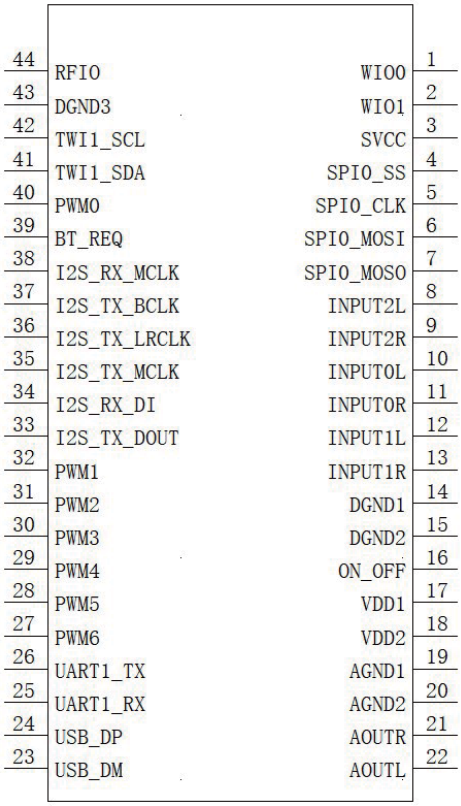
Specification

Module Name	BTM-2801, BTM 2853
Operating Frequency Band	2.4GHz - 2.48GHz Unlicensed ISM band
Bluetooth Specification	V5.3 / V4.2/4.2 LE/4.0/2.1+EDR system
Bluetooth Protocol	A2DP, AVRCP, HFP, SPP, BAS, DIS, FMP, HRP, HRS, HTP, HTS, IAS, LLS
External Interface	UART, SPI, TWI, I2S, IR, SD Card, USB, DMIC
Max Transmitting Power	+8 dBm
Receiving Sensitivity	-93dBm@GFSK (-92dBm@Π/4 DQPSK, -87dBm@8DPSK)
Audio Codec (ADC/DAC)	Sampling rate: Max 48KHz, Typical 44.1KHz, Min 8KHz
Audio SNR (A-Weight)	Input(ADC) >95dB, Output (DAC) >97dB
Audio THD+N (A-Weight)	Input(ADC) <-77dB, Output (DAC) <-77dB
Audio Frequency Response	20Hz - 20KHz, +/-0.5dB
Power Supply	4.5V ~ 5.5V, 50mA(Max)
Dimensions (L x W x H)	29.5mm * 14mm * 2mm
Operating Temperature	-10℃ ~ +70℃
Weight (Net)	TBD
Compliance	Meets BQB certification requirements

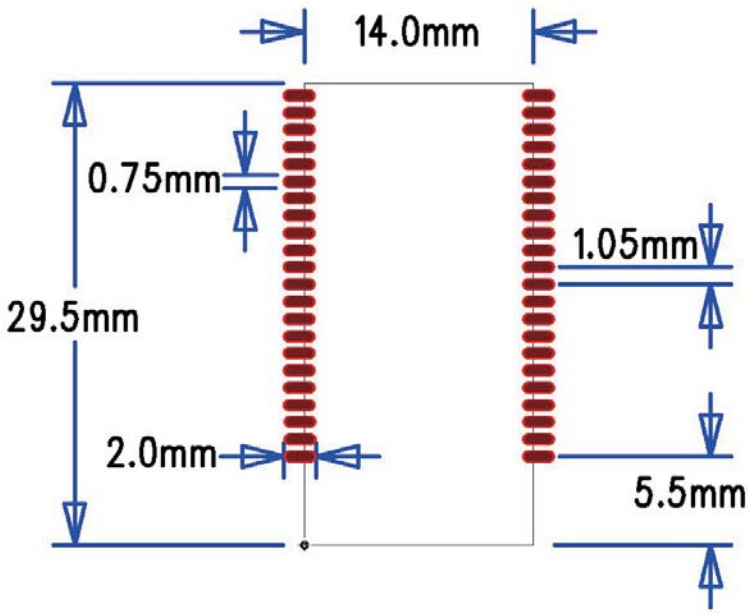
Applications

- Powered Speaker, Guitar Amp, Mixer, Car Audio, Sound Bar, Bluetooth alarm clock, etc.

Module Pin Definitions



Module Package Information



Pin Configurations (BTM-2801, BTM2853 Module)

PIN NO.	NAME	TYPE	FUNCTION
1	WIO0	Input	Wake up IO0 and LRADC1 input
2	WIO1	Input	Wake up IO1 and LRADC2 input
3	SVCC	Power output	Power Supply for Hosc
4	GPIO5	Bi-directional	SPIO_SS; General Purpose I/O 5
5	GPIO6	Bi-directional	SPIO_CLK; General Purpose I/O 6
6	GPIO8	Bi-directional	SPIO_MOSI; General Purpose I/O 8
7	GPIO9	Bi-directional	SPIO_MOSO; General Purpose I/O 9
8	INPUT2L	Analog input	INPUT2 Left channel input
9	INPUT2R	Analog input	INPUT2 Right channel input
10	INPUT0L	Analog input	INPUT0 Left channel input
11	INPUT0R	Analog input	INPUT0 Right channel input
12	INPUT1L	Analog input	INPUT1 Left channel input
13	INPUT1R	Analog input	INPUT1 Right channel input
14	DGND	Power ground	Ground
15	DGND	Power ground	Ground
16	ONOFF	Input	All-purpose hardware switch
17	VDD	Power input	+5V Voltage input
18	VDD	Power input	+5V Voltage input
19	AGND	Analog ground	Ground for Analog circuit
20	AGND	Analog ground	Ground for Analog circuit
21	AOUTR	Analog output	Right channel output
22	AOUTL	Analog output	Right channel output
23	USB_DM	Bi-directional	USB D-
24	USB_DP	Bi-directional	USB D+
25	GPIO27	Bi-directional	UART1_RX; General Purpose I/O 27
26	GPIO26	Bi-directional	UART1_TX; General Purpose I/O 26
27	GPIO25	Bi-directional	PWM6; General Purpose I/O 25
28	GPIO24	Bi-directional	PWM5; General Purpose I/O 24
29	GPIO23	Bi-directional	PWM4; General Purpose I/O 23
30	GPIO22	Bi-directional	PWM3; General Purpose I/O 22
31	GPIO21	Bi-directional	PWM2; General Purpose I/O 21
32	GPIO20	Bi-directional	PWM1; General Purpose I/O 20
33	GPIO28	Bi-directional	I2S_TX_DOUT; General Purpose I/O 28
34	GPIO17	Bi-directional	I2S_RX_DI; General Purpose I/O 17
35	GPIO16	Bi-directional	I2S_TX_MCLK; General Purpose I/O 16
36	GPIO15	Bi-directional	I2S_TX_LRCLK; General Purpose I/O 15
37	GPIO14	Bi-directional	I2S_TX_BCLK; General Purpose I/O 14
38	GPIO2	Bi-directional	I2S_RX_MCLK; General Purpose I/O 2
39	GPIO1	Bi-directional	BT_REQ; General Purpose I/O 1
40	GPIO0	Bi-directional	PWM0; General Purpose I/O 0
41	GPIO12	Bi-directional	TWI1_SDA; General Purpose I/O 12
42	GPIO13	Bi-directional	TWI1_SCL; General Purpose I/O 13
43	DGND	Power ground	Ground
44	RFIO	RFIO	RFIO

Federal Communication Commission Statement (FCC, U.S.)

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 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.

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.

FCC Caution:

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

FCC Radiation Exposure Statement:

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

IMPORTANT NOTES

Co-location warning:

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the PCB antenna(s) that has been originally tested and certified with this module.

As long as the conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host

equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End product labeling:

The final end product must be labeled in a visible area with the following: “Contains Transmitter Module FCC ID: 2A3BF-BTM2801”.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufactures according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247 & 15.207 & 15.209

2.3 Specific operational use conditions

The module is a Bluetooth module with BR&EDR and BLE 2.4G function.

BR&EDR Specification：

Operation Frequency: 2402~2480MHz
Number of Channel: 79
Modulation: GFSK, π/4-
DQPSK, 8DPSK
Type: PCB Antenna
Gain: 0 dBi

BLE Specification：

Operation Frequency: 2402~2480MHz
Number of Channel: 40
Modulation: GFSK
Type: PCB Antenna
Gain: 0 dBi

The module can be used for mobile or applications with a maximum 0dBi antenna. The host manufacturer installing this module into their product must ensure that the final composit product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operaition. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which

integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn ′ t need a host ′ s printed board microstrip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users ′ body; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization

2.7 Antennas

Antenna Specification are as follows:

Type: PCB Antenna

Gain: 0 dBi

This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a ‘unique ′ antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.)

2.8 Label and compliance information

Host product manufacturers need to provide a physical or e-label stating “Contains Transmitter Module FCC ID: 2A3BF-BTM2801” with their finished product.

2.9 Information on test modes and additional testing requirements

BLE

Operation Frequency: 2402~2480MHz

Number of Channel: 40

Modulation: GFSK

BR&EDR

Operation Frequency: 2402~2480MHz
Number of Channel: 79
Modulation: GFSK, π/4-DQPSK, 8DPSK

Host manufacturer must perfom test of radiated & conducted emission and spurious emission, etc according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.207 & 15.209 and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

IC Caution
Radio Standards Specification RSS-Gen, issue 5
- English:
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development
Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
This device may not cause interference.
This device must accept any interference, including interference that may cause undesired operation of the device.
RF exposure statement:
The equipment complies with IC Radiation exposure limit set forth for uncontrolled environment. This equipment should be installed
and operated with minimum distance 20cm between the radiator and your body.
- French:
Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et
Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:
Cet appareil ne doit pas causer d'interférences.
Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de
l'appareil.
Déclaration d'exposition RF:
L'équipement est conforme à la limite d'exposition aux radiations de la IC établie pour un environnement non contrôlé. Cet équipement
doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.