
Version: V1.1
Date: 2018.12.28

Product: BLE Module

Model: EM-BN832-02

Software:

CUSTOMER	APPROVE	DATE

Company: Shenzhen Equaldo Technology co., Ltd

Address: 05, 13B Floor, Kelu Building-2 Baoshen Road, Nanshan District, Shenzhen, China 518000

Contact:

DESIGN: _____

CHECK: _____

APPROVAL: _____

Version History:

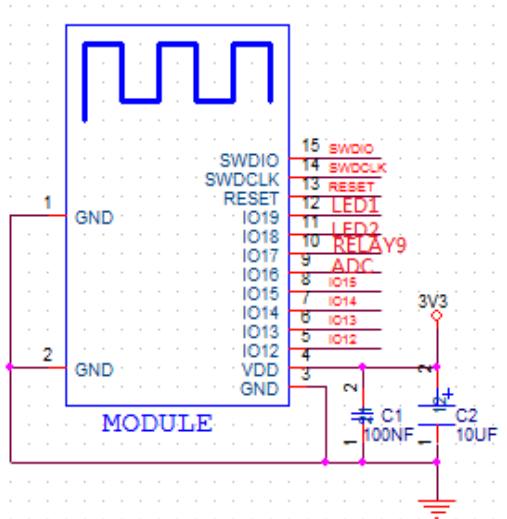
Version	Date	Modification
1.0		First release
1.1	2018.12.28	

1. Feature Summary

- Key features Applications
 - ◆ Internet of Things (IoT)
 - ◆ Home automation
 - ◆ Sensor networks
 - ◆ Building automation
 - ◆ Industrial
 - ◆ Retail
- Personal area networks
 - ◆ Health/fitness sensor and monitor devices
 - ◆ Medical devices
 - ◆ Key fobs and wrist watches
- Interactive entertainment devices
 - ◆ Remote controls
 - ◆ Gaming controllers
- Beacons
- A4WP wireless chargers and devices
- Remote control toys
- Computer peripherals and I/O devices
 - ◆ Mouse
 - ◆ Keyboard
 - ◆ Multi-touch trackpad
 - ◆ Gaming
- 2.4 GHz transceiver
 - ◆ -96 dBm sensitivity in Bluetooth® low energy mode
 - ◆ Supported data rates: 1 Mbps, 2 Mbps Bluetooth® low energy mode
 - ◆ -20 to +4 dBm TX power, configurable in 4 dB steps
 - ◆ On-chip balun (single-ended RF)
 - ◆ 5.3 mA peak current in TX (0 dBm)
 - ◆ 5.4 mA peak current in RX
 - ◆ RSSI (1 dB resolution)
- ARM® Cortex®-M4 32-bit processor with FPU, 64 MHz
 - ◆ 215 EEMBC CoreMark® score running from flash memory
 - ◆ 58 μ A/MHz running from flash memory
 - ◆ 51.6 μ A/MHz running from RAM
 - ◆ Data watchpoint and trace (DWT), embedded trace macrocell (ETM), and instrumentation trace macrocell (ITM)

- ◆ Serial wire debug (SWD)
- ◆ Trace port
- Flexible power management
 - ◆ 1.7 V–3.6 V supply voltage range
 - ◆ Fully automatic LDO and DC/DC regulator system
 - ◆ Fast wake-up using 64 MHz internal oscillator
 - ◆ 0.3 μ A at 3 V in System OFF mode
 - ◆ 0.7 μ A at 3 V in System OFF mode with full 64 kB RAM retention
 - ◆ 1.9 μ A at 3 V in System ON mode, no RAM retention, wake on RTC
- Memory
 - ◆ 512 kB flash/64 kB RAM
 - ◆ 256 kB flash/32 kB RAM

2. Typical Application

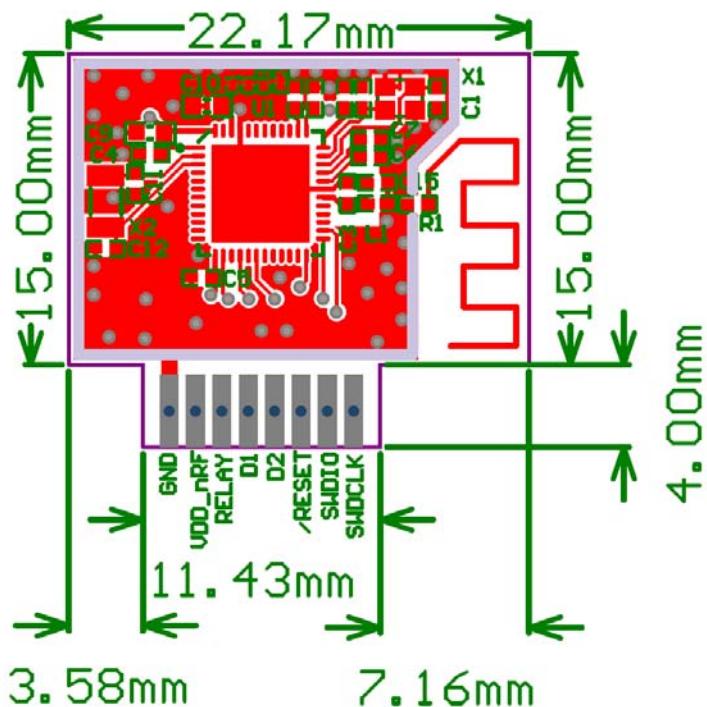


3. Design Description

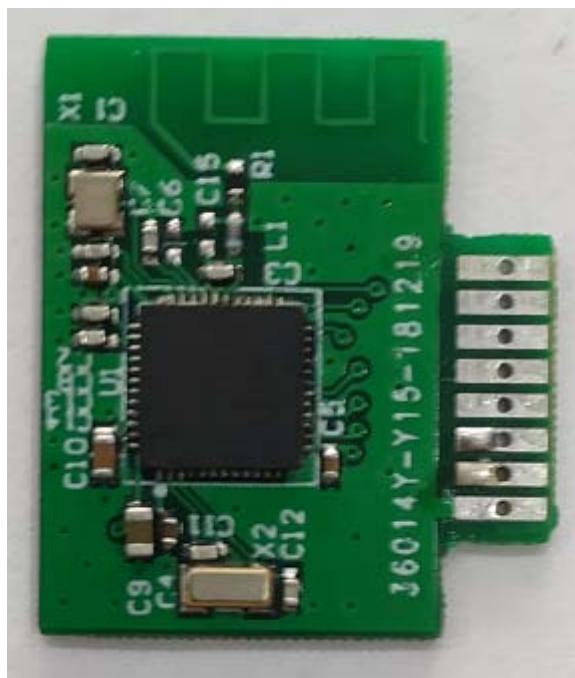
- Customized module and APP according to customer's requirements
- Support voice recognition
- Power Consumption: <3.3V@200uA
- Filter capacitors C1 and C2 need to close with VDD (3.3V) pin of module as soon as possible
- SWDIO and SWDCLK are used for software updated.
- Console Configuration;
 - ◆ Baud Rate: 1200 to 921600
 - ◆ Data bits: 8 bits
 - ◆ With/without check bit and flow control

- Support I2C
- Support Mesh Network Function
- Support connected without router
- Support 8/10/12 bit ADC, input voltage range from 0 to 3.5V.
- The reset signal of this module input from reset pin. Active low with internal pull-up resistor. If not used, this pin could be floating.
- The pin LED2 indicates the status of Relay. Logic “0” will light the external LED.
- The pin LED1 indicates the status of the BLE module. Logic “0” will light the external LED.
- Reset input could connect to reset button with active low. When short pressing this button, relay will work.
- RELAY signal controls the relay. It could output 5mA(Typical).(Attention: please pay attention to the difference between the IO driving capacity and drive current required by relay.)
- Other unused pins could be floating.
- The default install method is direct insertion. It is suggested that the antenna should be isolated with other metal parts at least 15mm, to get the best performance of the BLE module.
- Support shut down the the sense temperature over 40°C.
- Operation temperature:- 40 to 85°C.
- Support timing/random switch function.

4. Module Size and PIN Definition



5. Module Object



Integration instructions for host product manufacturers 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 BLE function.

Operation Frequency: 2402-2480MHz

Number of Channel: 40

Modulation: GFSK

Type: PCB Antenna

Gain: 0 dBi Max.

The module can be used for mobile or portable 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. The module is a Single module and complies with the requirement of FCC Part 15.212.

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 5mm 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 FCC ID: **2ATMK-EMBN83202**" with their finished product.

2.9 Information on test modes and additional testing requirements

Operation Frequency: 2402-2480MHz

Number of Channel: 40

Modulation: GFSK

Host manufacturer must perform 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 circuitry), 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.

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.

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 external 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: 2ATMK-EMBN83202](#)".

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.