

BTM20

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Version: **V0.0.0**

1. Features:

Bluetooth 5.4

Supports EDR BLE 1M 2M mode

Integrated AC6328A microprocessor

Power supply voltage range: 3.0V to 3.6V

24MHz crystal oscillator

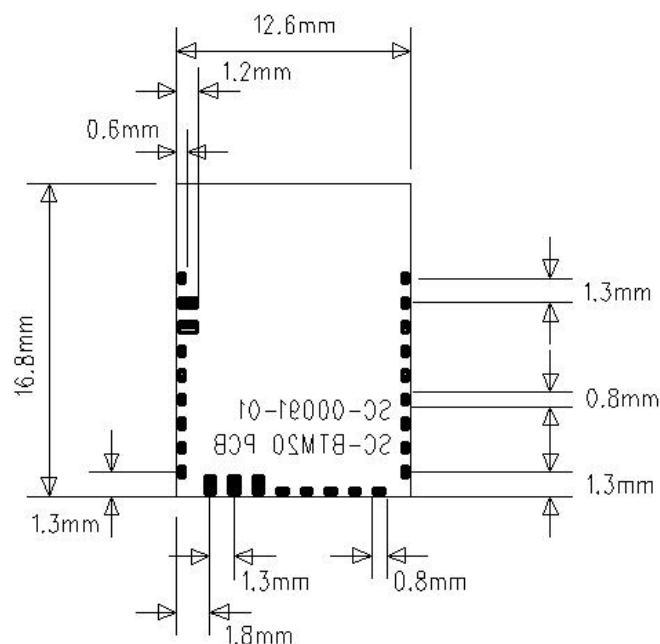
MCU can run with any clock source with internal frequency divider

I2C, UART, USB interface

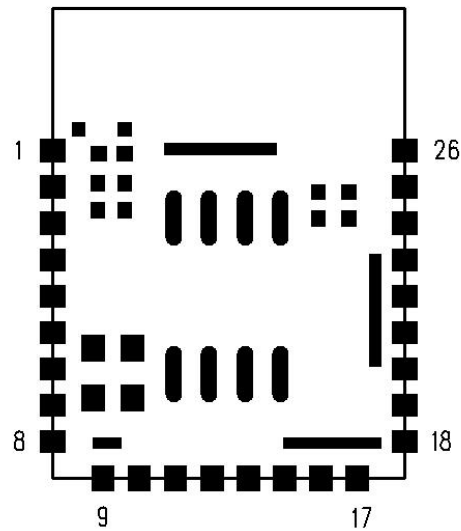
2. Performance parameter

	Min	Typical	Max	Unit
Storage temperature	-40	---	125	°C
Working temperature	-40	---	85	°C
Source power	2.0	3.0	3.6	V
I/O power	1.2	3.3	3.6	V
Frequency range	2402		2480	MHz

3. The size of the module graph(TOP VIEW)



4. Device pin out diagram:



PIN	SYMB	I/O	DESCRIPTION
1	NC	NC	NC
2	GND	GND	GND
3	VCM	P	LDO POWER
4	NC	NC	NC
5	NC	NC	NC
6	NC	NC	NC
7	NC	NC	NC
8	NC	NC	NC
9	GND	GND	GND
10	USBODM	I/O GPIO (PULL DOWN)	USBODM/IICSDAA/UART1RXD
11	USBODP	I/O GPIO (PULL DOWN)	USBODP/IICSCLA/UART1TXD
12	PA0	I/O GPIO (HIGH VOLTAGE)	PA0/CLKOUT1/UART2TXB/UART2RXB/PWM0H
13	NC	NC	NC
14	NC	NC	NC
15	NC	NC	NC
16	NC	NC	NC

17	NC	NC	NC
18	NC	NC	NC
19	NC	NC	NC
20	NC	NC	NC
21	NC	NC	NC
22	PA9	I/O	LongPressReset; ADC8:ADCCchannel8;
23	NC	NC	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC

5. Design notes:

A. Environmental Impact on Bluetooth Signal Propagation

Wireless signals, including Bluetooth, are highly susceptible to environmental interference. Obstructions such as trees, metallic structures, or dense building materials attenuate radio-frequency (RF) signals through absorption, reflection, and diffraction, significantly reducing the effective communication range in real-world deployments.

B. Enclosure Considerations for Bluetooth Modules

Since Bluetooth modules are typically integrated into existing systems and housed within enclosures, metallic casings pose a critical challenge due to their RF-shielding effect.

Recommendation: Avoid placing the Bluetooth module inside fully metallic enclosures. If unavoidable, use non-conductive materials (e.g., ABS plastic with ≤ 3 dB/m loss at 2.4 GHz) or implement antenna feed-throughs with dielectric spacers.

C. PCB Layout Guidelines for Antenna Integration

For Bluetooth modules with onboard PCB antennas, metallic interference must be minimized:

Prohibition: Do not route ground planes, power traces, or signal lines beneath the antenna area.

Optimization: If feasible, remove copper fills from the antenna's reference layer (e.g., Layer 2 in a 4-layer board) to create a keep-out zone (≥ 2 mm clearance).

D. Clearance Requirements for Nearby Components

To mitigate coupling effects, maintain ≥ 15 mm separation between the antenna and: Metallic objects (e.g., batteries, screws, heat sinks)

Electrically conductive components (e.g., LCD panels, speaker magnets)

High-current traces (e.g., battery charging paths)

E. Power Distribution and Grounding Strategy

Star-Topology Power Routing: Use dedicated, low-impedance power traces from the regulator to the Bluetooth module, with high-frequency decoupling (e.g., 100 nF + 10 μ F) placed within 2 mm of the power pins.

Ground Isolation:

Isolate the Bluetooth (BT) ground domain from analog (e.g., op-amps, audio amps) and digital (MCU) grounds using split-plane techniques or guard rings with $\geq$ 5 mm clearance.

Connect isolated grounds at a single star point near the power entry to prevent ground loops.

Prohibit routing noisy ground returns (e.g., DC/DC converters, Class-D amplifiers) beneath the BT module.

F. Critical Trace Routing Near Antenna

Avoid routing control signals, power lines, audio traces, or microphone lines within 10 mm of the antenna to minimize:

Passive intermodulation (PIM) from non-linear loads (e.g., speaker drivers).

Common-mode current injection from digital switching noise.

6, FCC Warning

List of applicable FCC rules

FCC Part 15.247

Label and compliance information

FCC ID label on the final system must be labeled with “Contains FCC ID: 2BNRF-BTM20” or “Contains transmitter module FCC ID: 2BNRF-BTM20”.

Information on test modes and additional testing requirements

Contact SUNTEK ELECTRONICS CO., LTD. will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

Additional testing, Part 15 Subpart B disclaimer

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier’s Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, SUNTEK ELECTRONICS CO., LTD. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

FCC Warning

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.

NOTE 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions

to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

Caution:

Use the Product in the environment with the temperature Between -40°C and 85°C ; Otherwise, it may damage your product. Products can only be used below 2000m altitude

For the following equipment:

Product Name: BT Module

Brand Name: /

Model No. : BTM20

SUNTEK ELECTRONICS CO., LTD.

E-mail: Fenggong@zs-suntek.com

hereby declares that this [Name: BT Module, Model: BTM20] is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.



This product is intended for sale and application in a business environment.

RED Article 10 2

-This product can be used across EU member states

RED Article 10 10

-The product is class 1 product, No restrictions

The RF distance between body and product is 5mm

Frequency Range:

Bluetooth Version:	Bluetooth V5.4
Frequency Range:	2402MHz-2480MHz
Max. RF Output Power:	1Mbps: 0.10dBm (EIRP) 2Mbps: 0.12dBm (EIRP)