Description This module is limited to OEM Installation only.

The MS47SF1 smart module is a SMD package module basis of CC2541 chip, it is a smart module with cost-effective, low power, true system-on-chip (SoC) for Bluetooth low energy applications. It enables robust BLE master or salve nodes to be built with very low total bill of material costs.

The MS47SF1 smart module combines an excellent RF transceiver with an industry-standard enhanced 8051 MCU, in-system programmable 256KB flash memory, 8KB RAM, and many powerful supporting features and peripherals. It is suitable for systems where very low power consumption is required. Very low-power sleep modes are available. Short transmission times between operating modes further enable low power consumption.

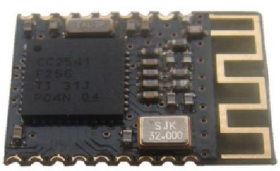
Features

- Bluetooth low energy technology compatible
- Excellent link budget (up to 97dB)
- Enable long range applications
- Accurate digital RSSI
- Compatible with CE and FCC regulation
- High performance and low power 8051 core MCU
- Battery monitor and temperature sensor
- Samples application and profiles
- Full speed USB interface
- AES security coprocessor

Application

- 2.4GHz Bluetooth low energy systems
- Mobile phone accessories
- Sports and leisure equipment
- Consumer electronics
- Human interface devices (keyboard, mouse, remote control and etc.)
- USB dongles
- Healthcare and medical

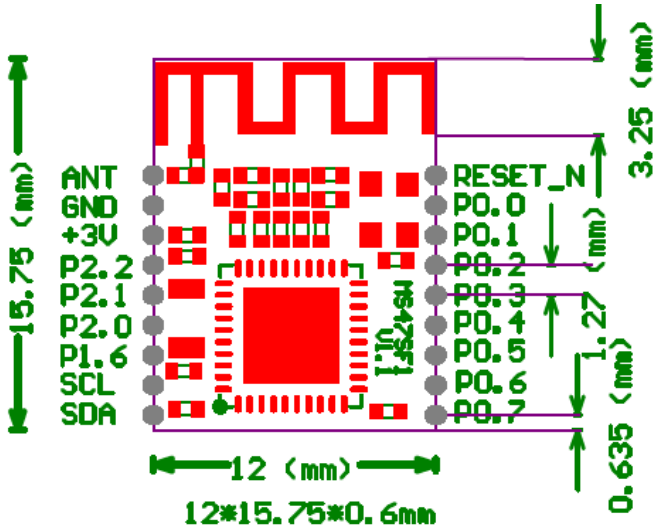
Images



Top view

Bottom view

Mechanical Footprint (Unit: mm)



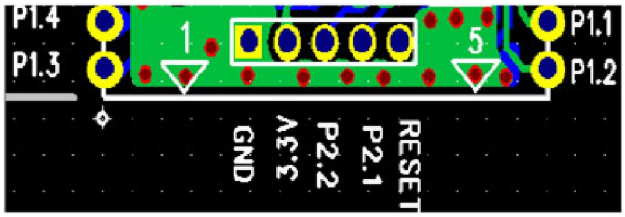
Pin Description

Pin Symbol	Pin Type	Definition
ANT	Null	External antenna
GND	Ground	The ground pin should be connected to the cathode of power supply
3.3V	Power	The 3.3V pin should be connected to the positive of power supply
P2.2	Digital I/O	Port 2.2
P2.1	Digital I/O	Port 2.1
P2.0	Digital I/O	Port 2.0
P1.7	Digital I/O	Port 1.7
P1.6	Digital I/O	Port 1.6
DP	Digital I/O	USB P
DM	Digital I/O	USB N
P1.5	Digital I/O	Port 1.5
P1.4	Digital I/O	Port 1.4
P1.3	Digital I/O	Port 1.3
RESET-N	Digital I/O	Reset, active low
P0.0 – P0.7	Digital I/O	Port 0.0 – Port 0.7
P1.0	Digital I/O	Port 1.0 – 20mA drive capability
P1.1	Digital I/O	Port 1.1 – 20mA drive capability

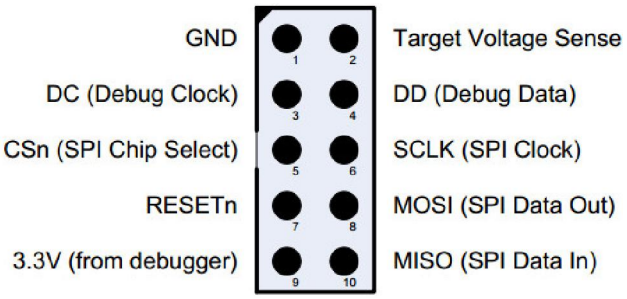
Electronic Parameters

Item	Test Data	Remarks
Operation Voltage	2.0-3.6V	DC
Operation Frequency	2400-2483.5MHz	Programmable
Frequency Error	+/- 20KHz	Null
Modulation	Q-QPSK	Null
Output Power	0 dBm	Programmable
Receiving Sensitivity	-93dBm	High gain mode
Receiving Current	17.9mA	High gain mode
Transmission Current	18.2mA	Transmission power 0dBm
Sleep consumption	0.uA	Power mode 3, connection-less state
Transmission distance	50 meters	BER<0.1%, Open space
Antenna	50ohm	Null
Dimension	12*16*1.7mm	Null

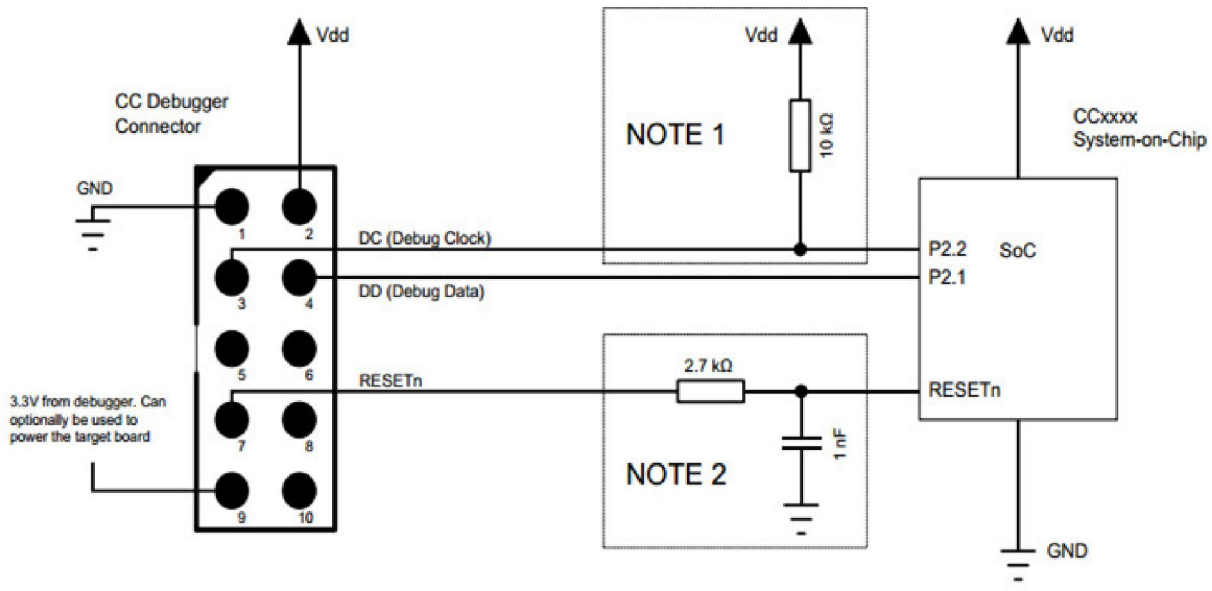
Debugger / UART Interface



MS47SF1 smart module



TI JTAG Definition



Host Information

This module was defined to be used for specific host only. The designated host for this module was:

Model: MS51PX1

Brand Name: MINEW

Manufacturer: Shenzhen Minew Technologies Co.,Ltd.

Address: 5 Floor, H Building, Gangzhilong Science Park, Qinglong Road, Longhua District, Shenzhen City, China

FCC RF Exposure Requirement

1. At least 20cm separation distance between the antenna and the user's body must be maintained at all times. And must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.

2. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 0dBi in the 2.4G band.

3. A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

Please be noticed following information and instructions should be placed in the end-user's operating manual

The Module has been granted as limited modular approval for mobile applications. This Module must be installed in the designated host as specified in this manual.

1. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.
2. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.
3. A label must be affixed to the outside of the end product into which the module is incorporated, with a statement similar to the following: For MS47SF1: This device contains FCC ID: 2ABU6-MS47SF1.
4. The module shall be in non-detachable construction protection into the finished products, so that the end-user has to destroy the module while remove or install it.
5. This module is to be installed only in mobile or fixed applications. According to FCC part 2.1091(b) definition of mobile and fixed devices is:.

Mobile device:

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. In this context, the term ''fixed location'' means that the device is physically secured at one location and is not able to be easily moved to another location.

Portable device:

For purposes of this section, a portable device is defined as a transmitting device designed to be used so that

the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.
6. Separate approval is required for all other operating configurations, including portable configurations with respect to FCC Part 2.1093 and different antenna configurations.
7. A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labelled with an FCC ID: 2ABU6-MS47SF1. The OEM manual must provide clear instructions explaining to the OEM the labelling requirements, options and OEM user manual instructions that are required.
For a host using a this FCC certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: 2ABU6-MS47SF1" or "Contains FCC ID: 2ABU6-MS47SF1" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

8. Host product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. compliance must be demonstrated to regulations for other transmitter components within the host product; to requirements for unintentional radiators (Part 15B). To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. If a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this maydepend on the details of how the module is integrated with the host, we suggest the host device to recertify part 15B to ensure complete compliance with FCC requirement: Part 2 Subpart J Equipment Authorization Procedures , KDB784748 D01 v07, and KDB 997198 about importation of radio frequency devices into the United States.

FCC Certification Requirement:
The end product with an embedded Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

Note: If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

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. Changes or modifications made to this equipment not expressly approved by Shenzhen Minew Technologies Co.,Ltd. may void the FCC authorization to operate this equipment.