# LittleSwan WB01 Wi-Fi Module Instruction Manual



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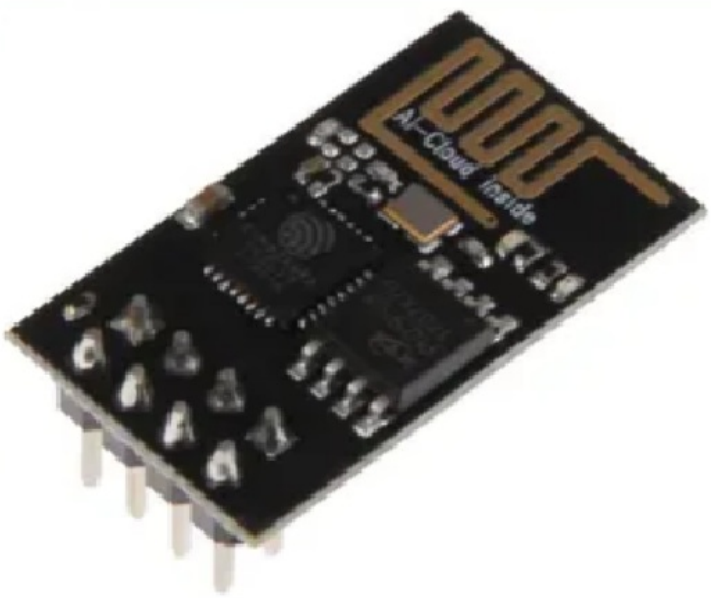
## LittleSwan WB01 Wi-Fi Module Instruction




Overview

WB01 is a fully functional, highly integrated and low-power dedicated Wi-Fi + BLE module for the IoT. It supports IEEE802.11 b/g/n protocol, also embedded with IPv4, TCP, UDP, DNS, HTTP and other complete network protocols, makes the terminal more reliable, convenient and easy to use in the application of the IoT. Wb01 core chip adopts hola con wb01 single-chip scheme, and the chip is highly integrated with CPU PMU RAM T/R SW LNA PA and other main parts, thus greatly reducing the power consumption of the whole machine. The chip is a 24-bit MCU with a maximum running speed of 160MHz and a built-in 352kb ram, which can make the chip support a multi-cloud connection. The module provides a complete serial interface function to communicate with the device, and can connect the device through the serial port to cloud and mobile client.

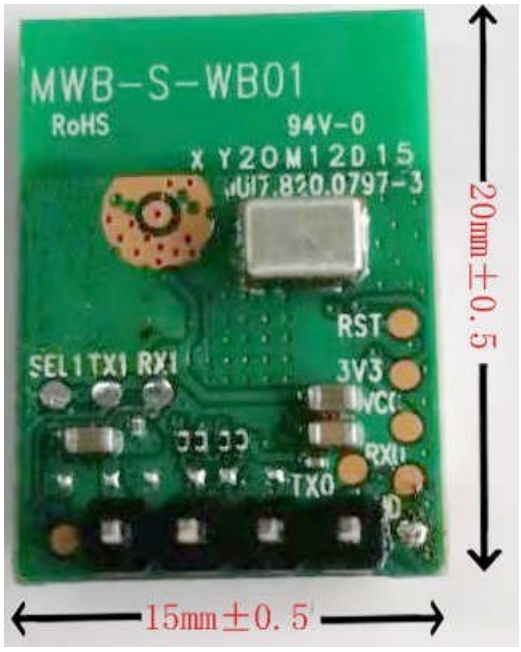
**Features**

- Support IEEE 802.11b/g/n protocol
- support 20MHz and 40MHz in the 2.4GHz band
- Bluetooth BLE 4.2
- Low power consumption moni tor ing mode
- Suppor t encryption protocols: WAPI , WPA, WPA2
- Support IPv4, TCP, UDP, DNS, HTTP and other networks protocols

### Top view

**Front**


**Back**




## RF characteristics

**Tx & Rx characteristics**

Support IEEE 802.11a/b/g/n standard; In terms of transmitting power, receiving sensitivity, EVM, distribution and other parameters, seek more stringent standards than IEEE specifications.
For specifications, please refer to the attached table below.

**Figure 1: Wi-Fi 2.4GHz Band RF Specifications**

| **WiFi RX Characteristics** | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Frequency range** | | 2412 | | 2484 | MHz |
| **Sensitivity** | HT40, MCS7 | | -69 | | dBm |
| | HT20, MCS7 | | -71 | | dBm |
| | 54 Mbps OFDM | | -74 | | dBm |
| | 6 Mbps OFDM | | -92 | | dBm |
| | 11 Mbps DSSS | | -90 | | dBm |
| | 2 Mbps DSSS | | -92 | | dBm |
| Adjacent channel rejection ratio | HT40, MCS7 | | 20 | | dB |
| | HT20, MCS7 | | 25 | | dB |
| | 54 Mbps OFDM | | 26 | | dB |
| | 11 Mbps DSSS | | 40 | | dB |
| **WiFi TX Characteristics** | Condition | Min. | Typ. | Max. | Unit |
| **Frequency range** | | 2412 | | 2484 | MHz |
| **Transmission power (EVM meet s<br><br>the standard requirements)** | HT40, MCS7 | | 13 | | dBm |
| | HT20, MCS7 | | 14 | | dBm |
| | 54 Mbps OFDM | | 15 | | dBm |
| | 11 Mbps DSSS | | 17 | | dBm |

**Figure 3: BLE RF Specifications**

| **BLE RX Characteristic** | **Condition** | **Min.** | **Typ.** | **Max.** | **Unit** |
|---|---|---|---|---|---|
| **Frequency range** | | 2402 | – | 2480 | MHz |
| **Data rate** | | | 1 | | Mbps |
| **Sensitivity** | | | -85 | | dBm |
| Max RF input signal in | | -10 | | | dBm |
| Mutual loss | | | | -23 | dBm |
| Common channel rejection ratio C/I | | | 10 | | dB |
| **Adjacent channel rejection ratio** | +1MHz | | 0 | | dB |
| | -1MHz | | 0 | | dB |
| | +2MHz | | -20 | | dB |
| | -2MHz | | -27 | | dB |
| | +3MHz | | -25 | | dB |
| | -3MHz | | -36 | | dB |
| **Out of band blocking** | 30MHz~2000MHz | -10 | | | dB |
| | 2000MHz~2400MHz | -20 | | | dB |
| | 2500MHz~3000MHz | -10 | | | dB |
| | 3000MHz~12.5GHz | -10 | | | dB |
| **BLE TX Characteristic** | **Condition** | **Min.** | **Typ.** | **Max.** | **Unit** |
| **Frequency range** | | 2402 | | 2480 | MHz |
| **Data rate** | | | 1 | | Mbps |
| **Tx power** | | -20 | 5 | 20 | dBm |
| 20dB band BW | | | 1 | | MHz |
| Frequency offset | | -150 | | 150 | KHz |
| Max Drift | | -50 | | 50 | KHz |
| **Drift rate** | | | 80 | 400 | Hz/us |
| △f1avg | | **225** | **244** | **275** | KHz |
| △f2max | | 185 | 195 | | KHz |
| △f1avg/△f2avg | | 0.8 | 0.85 | | |
| Adjacent channel transmission power 2)Frequency Drift | **2MHz Offset** | | -45 | -20 | dBm |
| | **>=3MHz Offset** | | -47 | -30 | dBm |

**Module antenna characteristics**

The antenna passive performance of Wi-Fi + BLE module shall meet the following requirements (since the passive performance can only be used as a reference, the antenna performance test is mainly based on the active throughput test):

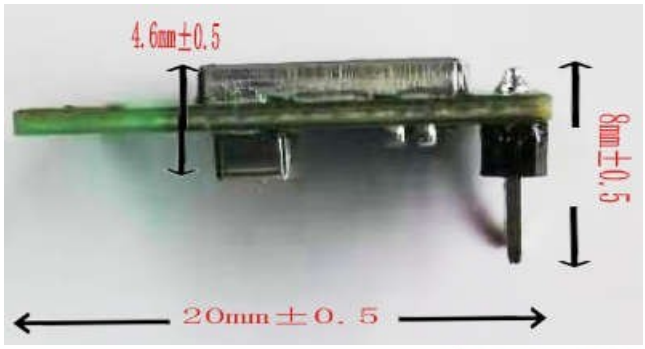
**Figure 4** Module antenna characteristics

| | |
|---|---|
| Parameters | 2400MHz-2484MHz at 2.4G band |
| Return loss | <-10dB |
| Efficiency | >40% |

## Package

### PCB

**PCB thickness** 1.0mm
**Module thickness(with shield):** 8mm±0.5mm proofing paint and glue spraying 75 120 um





## Peripherals


**Figure 2.1 Peripherals**

| No. | Mark | **Wi-Fi** peripherals |
|---|---|---|
| 1 | V | VCC power |
| 2 | R | RXD recieving |
| 3 | T | TXD transmitting |
| 4 | GND | GND ground |

**Wiring instructions:**
RXD and TXD pins of Wi-Fi Bluetooth module are respectively connected to TXD and RDX pins of the communication terminal and VCC of the module
Grounded at 5V / 3.3V level, GND grounded. After the module is powered on, it is received through RDX terminal and sent through TXD terminal.

## Labels

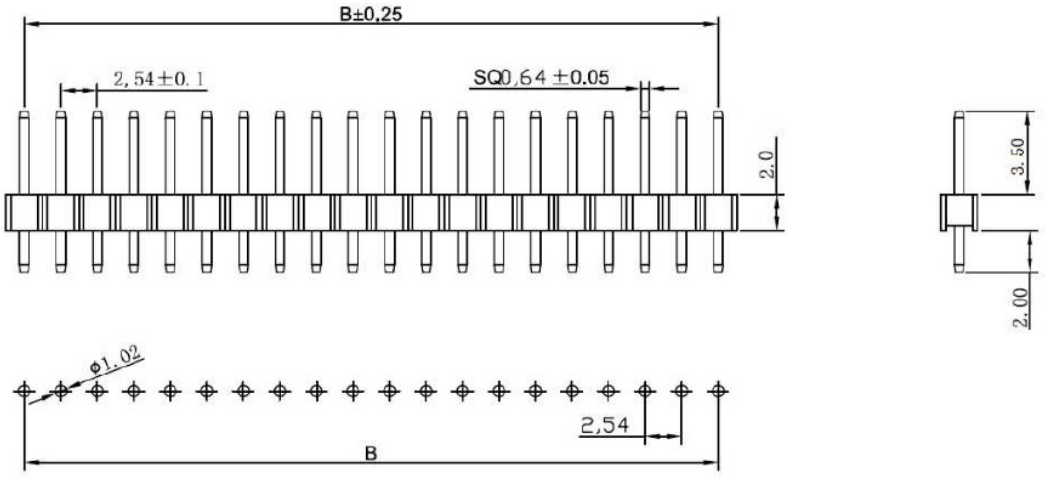

**Printing requirements**
Lable dimension: 13.5*9.5mm lable should be white Song typeface; The dimension of QR code is 4.8 * 4.8mm.
QR code content:

| QR code content: | | |
|---|---|---|
| **Field** | **Length** | **remarks** |
| MAC address | 12 | |
| | | If “X” is not enough, use “X” to make up |
| production informa tion | | Processing plant code (2 digits) + operation number (8 digits) + producti on |
| | | date (6 digits) + small version of software |
| S/N | | This number (6) |
| | 26 | “02BPF4FM041706080000010000” |
| Software version n umber | 12 | The firmware issued by the division shall prevail |
| Power | 4 | 5.0V |
| Current | 9 | DC 5V/0.5A |

**Note:** Production information (26 digits):02 XXXXXXXX 170608 000003 0000

The first and second place: represents the production plant The 3rd to 10th digits: the operation number of the production plant Figures 11-16: production date, for example, June 8, 2017 is marked as 170608, and figures 17-22: undetermined Numbers 23-26: enterprise code. Midea’s internal business division is “0000”. Non Midea’s enterprise code is based on the software code.
Software version (12 digits): xxxxxxxxxxxxx
Power supply (4 bits): module working voltage and current (5 bits): 500mA
Other marks: according to the actual needs, write as many as you need; Cmiit ID: write according to the actual situation;
Code: 17310900003061;
Digital segments are separated by “,” and “;

## Pin drawing




## Technical requirements

- Rated current: 3A
- Withstand voltage value: AC 500V
- Operating temperature: – 40 ℃ ~ + 105 ℃
- Insulating material: Black PA6T
- Material: Brass
- Plating: g / F plated over nickel

### Power consumption

| State | Average current in 2min mA | Peak current mA | Max current in 2min mA | Min current in 2m in mA |
|---|---|---|---|---|
| **Idle** | 20 | 50 | 50 | 25 |
| **STA** | 15 | 80 | 80 | 13 |
| **AP** | 30 | 150 | 150 | 50 |

**Note:** the module power consumption is the measured value of samples taken from the laboratory. In practical application, it will vary with the use environment and scene. This data is for reference only;

### Electrical characteristics

Power parameters: (ripple controlled within 100mV)

| Symbol | parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| VDD | Power | 3.1 | 5 | 5.25 | V |

DC Electrical Characteristics for Digital I/Os

| Symbol | parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| VIH | High Level Input Voltage | 4.5 | 5 | 5.5 | V |
| VIL | Low Level Input Voltage | -0.3 | – | 0.3 | V |
| VOH | High Level Output Voltage | 4.75 | 5.0 | 5.25 | V |
| VOL | Low Level Output Voltage | 0 | – | 0.4 | V |

### Standards and certification

Wi-Fi + BLE module must comply with ROHS environmental assessment certification

## Precautions for use

The Wi-Fi + ble module exposed in the air (the core board inside the module or the whole composed of the core board and the substrate) shall at least meet the service environmental conditions of ordinary consumer electronic products, including but not limited to:

- Operating temperature: – 10 ~ 75 ℃
- Storage temperature: – 20 ~ 85 ℃
- Working humidity: 0 ~ 95% RH
- Storage humidity: 0 ~ 98% RH
  Withstand the thermal shock of – 20 / + 85 ℃ every 2h, and there is no abnormal function or performance degradation and no significant tin crack under the impact of at least 20 cycles.
  When working for a long time, the temperature rise of circuit elements shall meet the requirements of their own specifications.
  Simulating the transportation process and home application scenarios, the module shall withstand a certain degree of mechanical impact and drop.
  Through certain protective measures, the Wi-Fi + ble module can have higher environmental adaptability.
  Design of Wi-Fi + ble module The margin in performance, size and process required for the implementation of protective measures shall be reserved.

## 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.
   Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
   The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device.

**FCC Radiation Exposure Statement**
This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.
If the FCC 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. This exterior label can use wording such as the following:
"Contains Transmitter Module FCC ID: 2A5BD-WB01 Or Contains FCC ID: 2A5BD-WB01"
When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. 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.
    2. This device must accept any interference received, including interference that may cause undesired

operation.

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

   The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

   Any company of the host device which installs this modular with Single modular approval should perform the test of radiated emissions and spurious emission according to FCC part 15C : 15.247 and 15.209 requirements, Only if the test result complies with FCC part 15C : 15.247 and 15.209 requirements, then the host can be sold legally.

## IC Statement

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

**Radiation Exposure Statement**

This modular complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the ISED 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. This exterior label can use wording such as the following:

"Contains Transmitter Module IC: 28527-WB01 Or Contains IC: 28527-WB01"

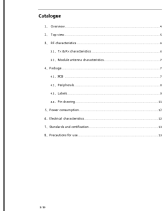
When the module is installed inside another device, the user manual of the host must contain the below warning statements;

1. This device complies with Industry Canada's license-exempt RSS. Operation is subject to the following two conditions:
   1. This device may not cause interference; and
   2. This device must accept any interference, including interference that may cause undesired operation of the device.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

   The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

   Any company of the host device which installs this modular with Single modular approval should perform the test of radiated emission and spurious emission according to RSS-247 requirement, Only if the test result complies with RSS-247 requirement then the host can be sold legally.

## Documents / Resources



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