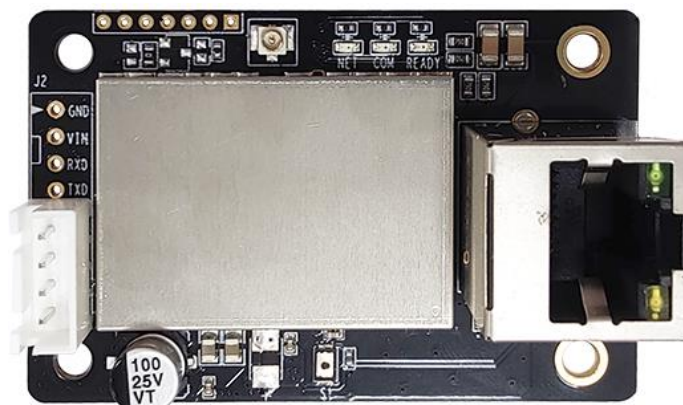


# MW-4E

## Low Power Wi-Fi + BLE + Ethernet Module

### User Manual V1.2



#### Overview of Characteristic

- ✧ **Support Wi-Fi IEEE802.11b/g/n and BLE5.0 Wireless Standards**
- ✧ **Support Ethernet 802.3 protocol.**
- ✧ **Based on RISC SOC, 160MHz CPU, 276KB RAM, 2MB Flash**
- ✧ **Support UART Data Communication with Wi-Fi or BLE or Ethernet**
- ✧ **Support Wi-Fi STA/AP/APSTA Mode**
- ✧ **Support BLE SmartBLELink Config**
- ✧ **Support Wi-Fi AP SmartAPLink and Sniffer SmartLink V8 Config**
- ✧ **Support Wireless and Remote Firmware Upgrade Function**
- ✧ **Support Software SDK for Develop**
- ✧ **Support External 1<sup>st</sup> IPEX Antenna**
- ✧ **Single +5V Power Supply**
- ✧ **Size:**
  - **MW-4E: 57±0.3mm x 37±0.3mm x 11±0.2mm**

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# 1. PRODUCT OVERVIEW

## 1.1. General Description

The MW-4E module is a fully self-contained small form-factor, single stream, 802.11b/g/n Wi-Fi + BLE+Ethernet module, which provide a wireless interface to any equipment with a Serial interface for data transfer. This module integrate MAC, baseband processor, RF transceiver with power amplifier in hardware and all Wi-Fi protocol and configuration functionality and networking stack.

### 1.1.1 Key Application

- Remote equipment monitoring
- Asset tracking and telemetry
- Security
- Industrial sensors and controls
- Home automation
- Medical devices

### 1.1.2 Device Parameters

Table1. MW-4E Module Technical Specifications

Class	Item	Parameters
Wi-Fi Parameters	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.472GHz (CH1~CH13)
	Transmit Power	802.11b: +17dBm $\pm$ 1.5dBm (@11Mbps)
		802.11g: +15dBm $\pm$ 1.5dBm (@54Mbps)
		802.11n: +14dBm $\pm$ 1.5dBm (@HT20, MCS7)
	Receiver Sensitivity	802.11b: -96dBm (@1Mbps)
		802.11b: -89dBm (@11Mbps)
		802.11g: -91dBm (@6Mbps)
		802.11g: -76dBm (@54Mbps)
		802.11n: -91dBm (@MCS0)
		802.11n: -73dBm (@MCS7)
BLE Parameters	Wireless standard	BLE5.0
	Frequency range	2.402GHz-2.480GHz
	Transmit Power	Max 15dBm
	Receiver Sensitivity	-97dBm
Ethernet	Satnad	802.3
Hardware Parameters	Antenna Option	MW-4E: External: 1 <sup>st</sup> IPEX antenna
	Data Interface	RS485/RS232/TTL
	GPIO Driver Ability	Source and Sink Current: 3mA (GND+0.3V or VCC-0.3V)
	Operating Voltage	4.7~6V

	Operating Current	Peak (1ms for every 100ms): <350mA Average (STA, No data): 40mA Average (STA, Continuous TX): 60mA Average (AP): 70mA Standby: 310uA (Reset Pin set to low)
	Operating Temp.	-40°C - 85°C
	Storage Temp.	-40°C - 125°C
	Humidity	<85%
	MSL	Level 3
	Dimensions and Size	MW-4E: 57±0.3mm x 37±0.3mm x 11±0.2mm
<b>Software Parameters</b>	Network Type	STA/AP/APSTA
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK/WPA3-SAE
	Encryption	WEP64/WEP128/TKIP/AES
	Update Firmware	Local Wireless, Remote OTA
	Customization	Support SDK for application develop
	Network Protocol	IPv4, TCP/UDP/HTTP/TLS 1.2
	User Configuration	AT+instruction set. SmartBLELink BLE Config SmartAPLink AP Config SmartLink Config

## 1.2. Hardware Introduction

MW-4E Wi-Fi module appearance is as following.

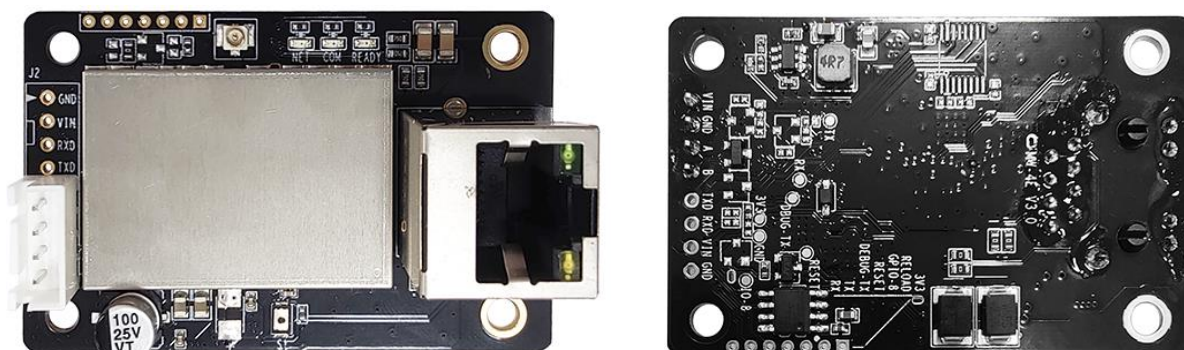


Figure 1. MW-4E Appearance

## 1.2.1. MW-4E Pins Definition

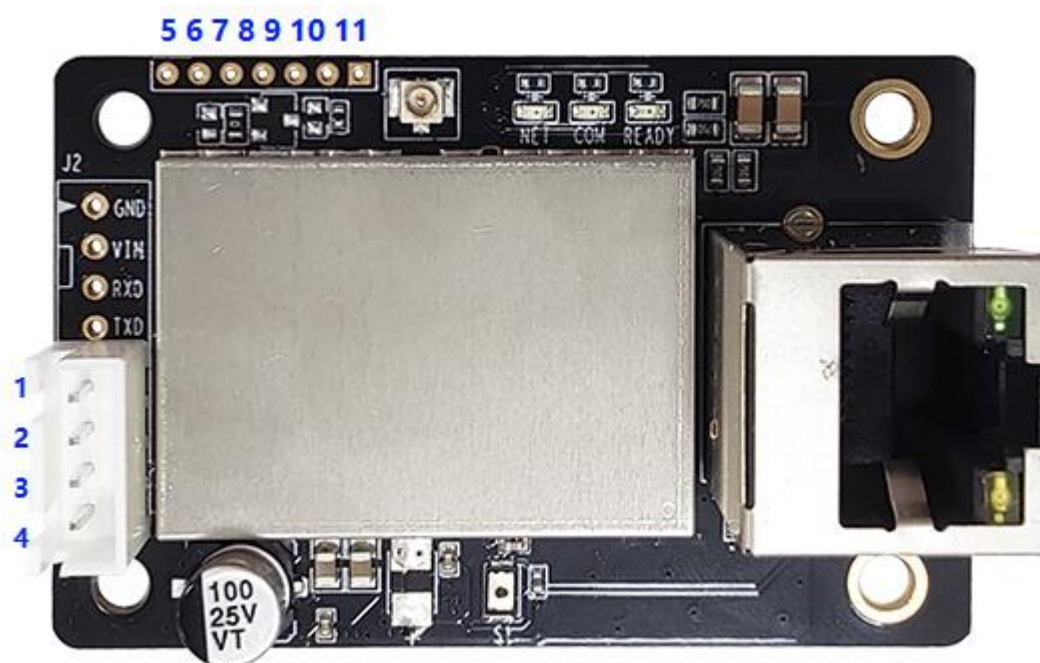


Figure 2. MW-4E Pins Map

Table2. MW-4E Pins Definition

Pin	Description	Net Name	Signal Type	Comments
1				
2	UART1_RX	DEBUG_UART1_RX	I	3.3V TTL UART1 Debug Input GPIO11, SPI, PWM1 function
3	UART0_RTS	GPIO12	O	used as RTS when enable flow control GPIO12, SPI, PWM2, ADC function
4	UART0_CTS	GPIO14	I	used as CTS when enable flow control GPIO14, SPI, DAC, ADC function
5				
6				
7				
8		NC		
9		NC		
10				
11	Module Boot Up Indicator	nReady	O	"0" – Boot-up OK; "1" – Boot-up Fail; GPIO4, PWM4
12				
13	Wi-Fi Status	nLink	O	"0" – Wi-Fi connect to router "1" – Wi-Fi unconncted;

Pin	Description	Net Name	Signal Type	Comments
				Detailed functions see <Notes> GPIO5, PWM5
14		NC		
15	+3.3V Power	VDD	Power	
16	Ground	GND	Power	
17		ANT	Signal	Only -0 and -2 have these two pins Antenna Pad Out. See following for detailed.
18	Ground	GND	Power	

Pin	Description	Net Name	Signal Type	Comments
1		B	IO	RS485 B
2		A	IO	RS485 A
3		GND	Power	
4		VIN	Power	5VDC Input
Debug Pin				
5	UART0	UART0_RX	I	3.3V TTL UART0 Communication Input GPIO7
6	UART0	UART0_TX	O	3.3V TTL UART0 Communication Output GPIO16
7	UART1_TX	DEBUG_UART1_TX	O	3.3V TTL UART1 Debug Output GPIO17, SPI function
8	Module Reset	RESET	I,PU	<b>“Low” effective reset input. There is RC reset circuit internally. No need of external RC reset circuit.</b>
9	GPIO8	GPIO8	IPD	Internal 10K pull-down resistor, Boot select: Low: boot from module flash. High: boot from external UART. <b>This is used for HF factory firmware program, leave it unconnected for user application</b>
10	Multi-Function	nReload	I,PU	Detailed functions see <Notes> GPIO3, PWM3
11		3V3	Power	LDO 3.3VDC

## &lt;Notes&gt;

I — Input; O — Output

PU—Internal Resistor Pull Up; I/O: Digital I/O; Power—Power Supply

UART1 Debug :

1. Is used for debug log or firmware program, baud rate 921600.

**1.2.2. Electrical Characteristics**

Table3. Absolute Maximum Ratings:

Parameter	Condition	Min.	Typ.	Max.	Unit
Maximum soldering temperature	IPC/JEDEC J-STD-020		250	255	°C
ESD (Human Body Model HBM)	TAMB=25°C			2	KV
ESD (CDM)	TAMB=25°C			0.5	KV



### 1.2.3. MW-4E Mechanical Size

MW-4E modules physical size (Unit: mm) as follows:

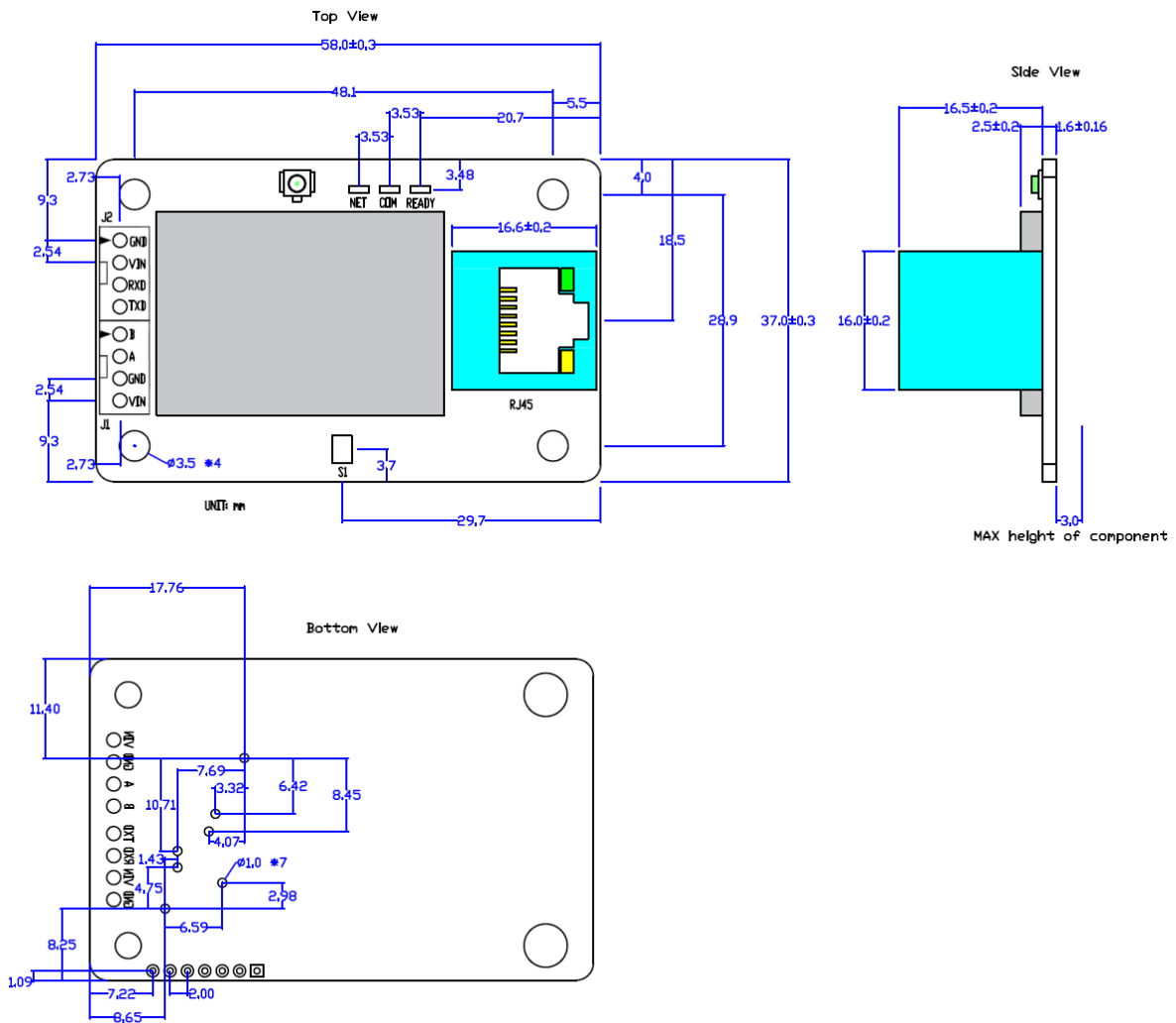


Figure 3. MW-4E Mechanical Dimension

### 1.2.4. External Antenna

MW-4E module supports external antenna(I-PEX) option for user dedicated application.

If user select external antenna,MW-4E Wi-Fi modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards. We can provide external antenna if needed. Contact with our salesman.

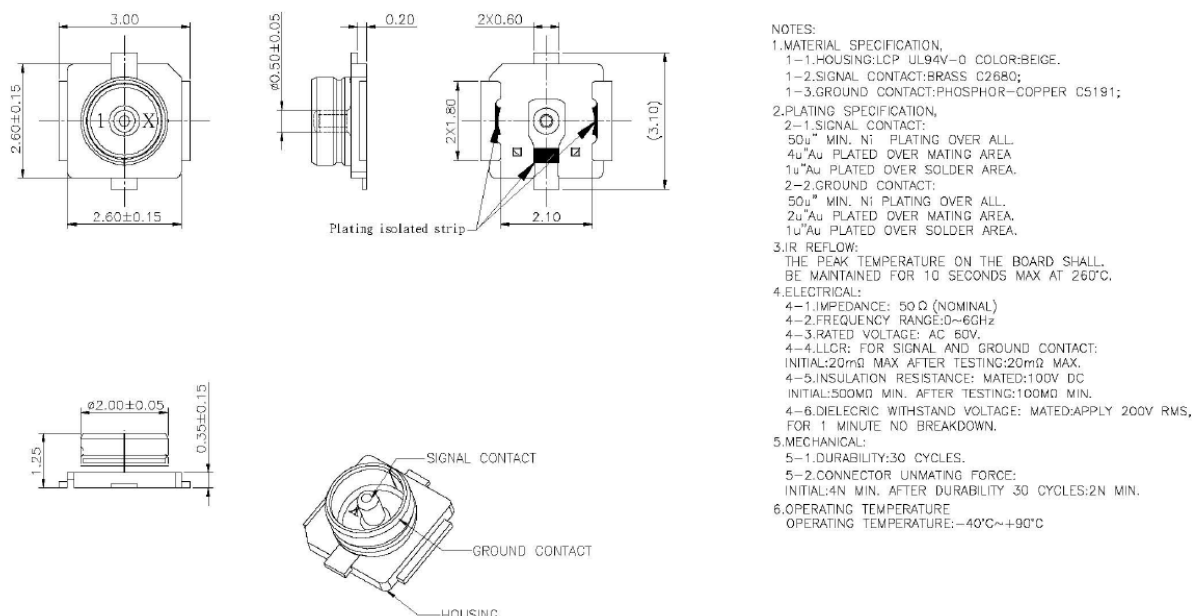


Figure 4. 1<sup>st</sup> IPEX Connector

The antenna parameters required as follows:

Table4. External Antenna Parameters

Item	Parameters
Frequency range	2.4~2.5GHz
Impedance	50 Ohm
VSWR	2 (Max)
Return Loss	-10dB (Max)
Connector Type	I-PEX or populate directly

#### Notes:

**nReset-** Module hardware reset signal. Input. Logics “0” effective.

There is pull-up resistor internal and no external pull-up required. If need reset, set low at least 10ms and then set high.

**nLink-** Module WIFI connection status indication. Output.

**(This pin is recommend to connect to LED, indicate status when the module in wireless upgrade mode)**

When module connects to AP (AP associated), this pin will output “0”. This signal used to judge if module already at WiFi connection status. There is pull-up resistor internal and no external pull-up required. If nLink function not required, can leave this pin open.

**nReady-** Module boot up ready signal. Output. Logics “0” effective.

The module will output “0” after normal boot up. This signal used to judge if module finish boot up and ready for application or working at normal mode. If nReady function not required, can leave this pin open.

**nReload-** Module restore to factory default configuration. Input. Logics “0” effective.

**(This pin is recommend to connect to button, is used to enter wireless upgrade mode)**

User can de-assert nReload signal “0” more than 4s through button or MCU pin, then release, module will restore to factory default configuration and re-start boot up process.. If nReload function not required, can leave this pin open.

**UART0\_TXD/RXD-** UART port data transmit and receive signal.

## FCC Caution

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.

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.

To maintain compliance with FCC’s RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

**Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID 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 FCC ID: 2A4FR-MW-4E"

**Manual Information to the End User**

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 manufacturers according to KDB 996369 D03  
OEM Manual v01**