ioNODE Series BLE + Wi-Fi Module

MicroMOD-W24

Datasheet

Document Version:

SSTPL/HW/EDDS/W24/1.0

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1. BRIEF DESCRIPTION

MicroMod-W24 is a low-power long-range transceiver module based on ESP32 MCU that supports 2.4 GHz Wi-Fi and Bluetooth® Low Energy (BLE).

This is a powerful, generic WiFi + BLE MCU module that targets a wide variety of applications. Using Wi-Fi allows a large physical range and direct connection to the Internet through a Wi-Fi router, while using Bluetooth allows the user to conveniently connect to the phone or broadcast low energy beacons for its detection. The sleep current of this module is less than 15 µA. So, it is suitable for battery-powered and wearable electronics applications. The module supports a data rate of up to 150 Mbps, and 21 dBm output power at the antenna to ensure the widest physical range.

1.1 Key Features

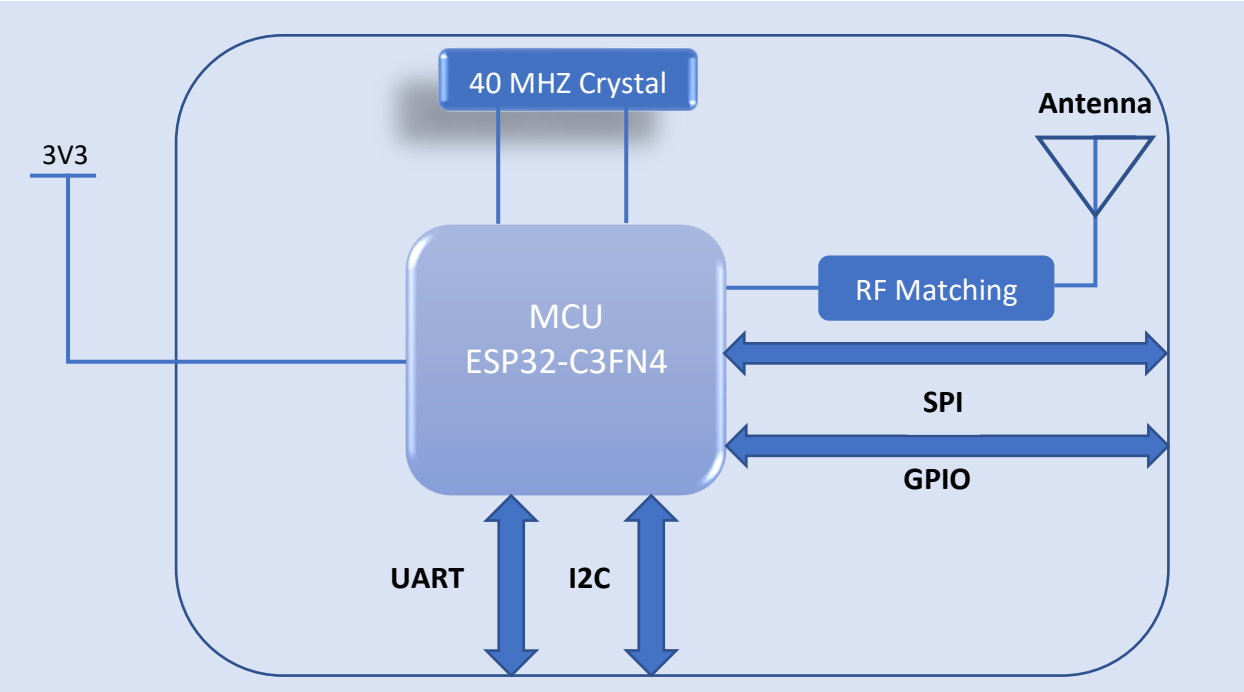
- ✓ Wi-Fi + BT + BLE MCU Module
- ✓ Wi-Fi Protocols: 802.11 b/g/n
- ✓ Integrated SPI Flash of 4 MB
- ✓ Supports Station mode, SoftAP mode, SoftAP + Station mode, and promiscuous mode
- ✓ RF output power up-to +21 dBm.
- ✓ SPI, UART, I2C & I2S Interfaces
- ✓ Wide range of working voltage 3.3V to 3.9 V
- ✓ Operating Current: Avg. 80 mA
- ✓ Wide range of temperatures -40°C to +85°C.

1.2 Applications

- ✓ Smart Metering
- ✓ Smart Home
- ✓ Industrial Automation
- ✓ Health Care
- ✓ Consumer Electronics
- ✓ Smart Agriculture
- ✓ Audio Devices

2. MODULE OVERVIEW

MicroMOD-W24 is a long-range, high-performance, RF module for wireless communication. It Supports Wi-Fi and Bluetooth for data Transmission. It includes all necessary passive components for wireless communication as depicted in the following figure.



3. SPECIFICATIONS

3.1 CPU and Memory

- ✓ 32-bit RISC-V single-core processor, up to 160 MHz
- ✓ CoreMark® score: – 1 core at 160 MHz: 407.22 CoreMark; 2.55 CoreMark/MHz
- ✓ 384 KB ROM
- ✓ 400 KB SRAM (16 KB for cache)
- ✓ Embedded flash: 4MB

3.2 Wi-Fi

- ✓ IEEE 802.11 b/g/n-compliant
- ✓ Supports 20 MHz, 40 MHz bandwidth in 2.4 GHz band
- ✓ 1T1R mode with data rate up to 150 Mbps
- ✓ Wi-Fi Multimedia (WMM)
- ✓ Automatic Beacon monitoring

3.3 Bluetooth

- ✓ Bluetooth LE: Bluetooth 5, Bluetooth mesh
- ✓ High power mode (18 dBm)
- ✓ Speed: 125 Kbps, 500 Kbps, 1 Mbps, 2 Mbps
- ✓ Advertising extensions
- ✓ Multiple advertisement sets
- ✓ Internal co-existence mechanism between Wi-Fi and Bluetooth to share the same antenna

4. ELECTRICAL CHARACTERISTICS

4.1 Maximum Ratings

Condition	Min	Typ.	Max	Unit
Supply Voltage (VDD)	3.3	3.6	3.9	V
Storage Temperature	-40	+25	+85	°C
Operating Temperature	-40	+25	+85	°C
RF Input Power	+8			dBm
ESD (Human Body Model)	2000			V
ESD (Charge Device Model)	500			V
Notes: 1) Unless otherwise noted, all voltages are with respect to GND				

4.2 General Electrical Characteristics

T = 25°C, VDD = 3.5 V (typ.) if nothing else stated					
Parameter	**Condition**	**Min**	**Typ.**	**Max**	**Unit**
Supply Voltage (VDD)		3.3	3.6	3.9	V
Current Consumption System IDLE	RF idle mode, MCU idle mode		<15		µA
Current Consumption RECEIVE	RF receive mode, MCU sleep mode				mA
Current Consumption TRANSMIT	RF transmit mode, MCU Active mode, all MCU units on, max. RF power level				mA
MCU operation frequency		40 MHz & 32.768 KHz			

5. LOW POWER MANAGEMENT

With the use of advanced power-management technologies, this module can switch between different power modes.

- **Active Mode:**

  CPU and chip radio are powered on. The chip can receive, transmit, or listen.

- **Modem-Sleep Mode:** The CPU is operational and the clock speed can be reduced. wi-fi base band, BLE baseband, and radio are disabled, but wi-fi and BLE connection can remain active.

- **light-Sleep Mode:**

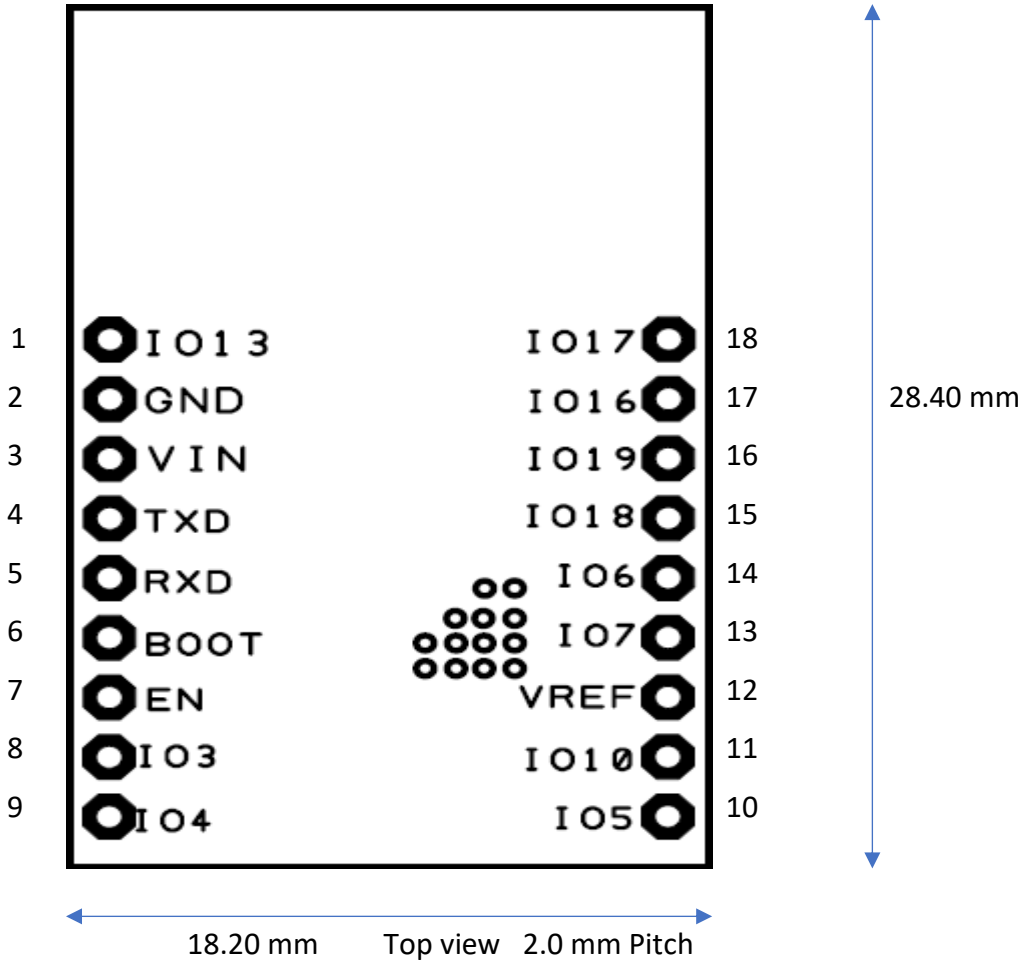
  The CPU is paused. Any wake-up events (mac, host, RTC timer, or external interrupts) Will wake up the chip. Wi-fi and BLE connection can remain active.

- **Deep-Sleep Mode:**

  CPU and most peripherals are powered down. Only the RTC memory is powered on. Wi-fi connection data are stored in the RTC memory

6. MODULE PACKAGE

6.1 Module Dimensions



6.2 PINOUT DESCRIPTION

PIN	PIN Name	PIN Type	Primary Function	5 V Tolerance	Alternate Function
1	IO13	I/O/T	SPIWP		
2	GND	Supply	Supply Ground		
3	VIN	Input Supply	3 to 3.7V DC Input		Input DC Supply
4	TXD	I/O/T	U0TXD		
5	RXD	I/O/T	U0RXD		
6	BOOT	Supply	Bootloader	No	
7	EN	I			
8	IO3	I/O/T	GPI03, ADC1_CH3		
9	IO4	I/O/T	GPIO4, ADC1_CH4, FSPIHD, MTMS		
10	IO5	I/O/T	GPIO5, ADC2_CH0, FSPIWP, MTDI		
11	IO10	I/O/T	GPIO10, FSPICS0		
12	VREF	Supply Output (Vin - 0.3 V)	Digital Supply Output for reference, max 50 mA	No	N/A
13	IO7	I/O/T	GPIO7, FSPID, MTDO		
14	IO6	I/O/T	GPIO6, FSPICLK, MTCK		
15	IO18	I/O/T	GPIO18, USB_D-		
16	IO19	I/O/T	GPIO19, USB_D+		
17	IO16	I/O/T	GPIO16, SPID		
18	IO17	I/O/T	GPIO17, SPIQ		

7. IMPORTANT NOTICE

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7.3 Document Revision History

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