



micro:bit IoT Shield

BMB81TM01A

User Guide

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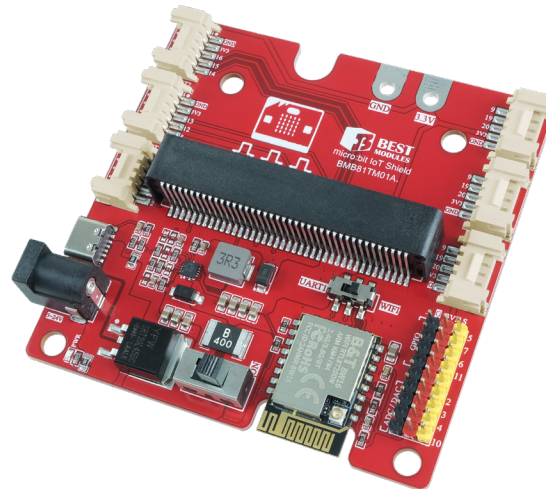
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Introduction

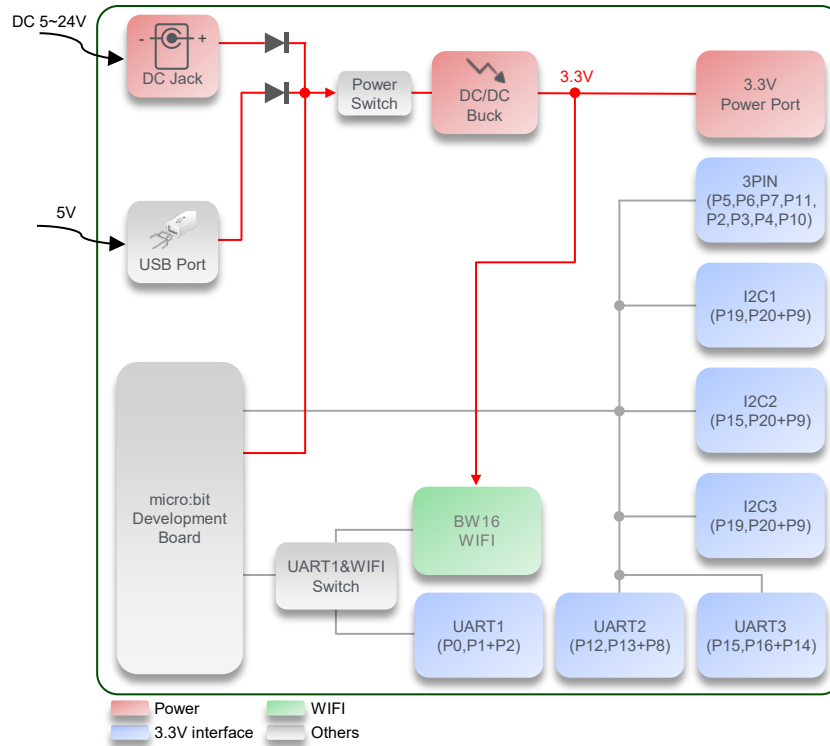
The Best Modules BMB81TM01A is a shield board for micro:bit IoT. It is integrated with on-board WIFI and BLE 5.0. The shield board can be directly plugged in-and-out the micro:bit development board and expands all the development board interface resources into mistake proofing interfaces, enabling quick adaptation to the BMduino series modules. This shield board is applicable to various Internet of Things (IoT) theme teaching scenarios.



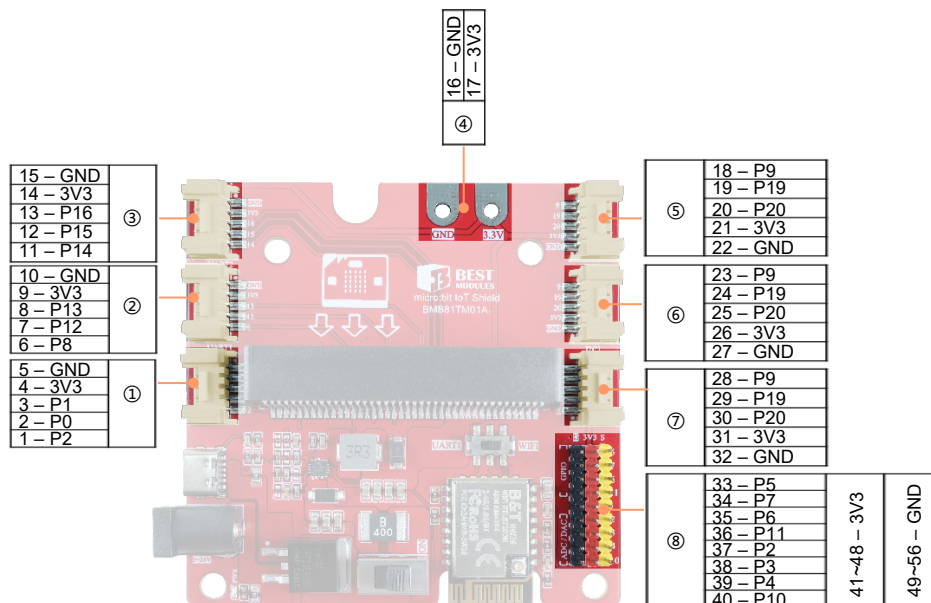
Features

- Operating voltage: 5V~24V
- Operating current: 60mA @ 5V
- On-board BW16 (WIFI & BLE 5.0)
- Power supply output:
 - ◆ 3.3V total output current: 1.5A (max.)
- Communication interfaces:
 - ◆ I²C interface×3
 - ◆ UART interface×3
 - ◆ 3PIN interface×8
- Board size: 82.0mm×82.0mm×15.0mm

Block Diagram



Pin Description



① UART1 interface (P0, P1+P2) pin:

Pin	Function	Description
1	INT	Digital pin P2
2	TX	Digital pin P0 / UART1 interface TX pin
3	RX	Digital pin P1 / UART1 interface RX pin
4	3V3	Positive power supply, 3.3V
5	GND	Negative power supply, ground

② UART2 interface (P12, P13+P8) pin:

Pin	Function	Description
6	INT	Digital pin P8
7	TX	Digital pin P12 / UART2 interface TX pin
8	RX	Digital pin P13 / UART2 interface RX pin
9	3V3	Positive power supply, 3.3V
10	GND	Negative power supply, ground

③ UART3 interface (P15, P16+P14) pin:

Pin	Function	Description
11	INT	Digital pin P14
12	TX	Digital pin P15 / UART3 interface TX pin
13	RX	Digital pin P16 / UART3 interface RX pin
14	3V3	Positive power supply, 3.3V
15	GND	Negative power supply, ground

④ 3.3V external power supply interface pin:

Pin	Function	Description
16	GND	Negative power supply, ground
17	3.3V	Positive power supply, 3.3V

⑤⑥⑦ I²C interface pin:

Pin	Function	Description
18&23&28	INT	Digital pin P9
19&24&29	SCL	Digital pin P19 / I ² C interface SCL pin
20&25&30	SDA	Digital pin P20 / I ² C interface SDA pin
21&26&31	3.3V	Positive power supply, 3.3V
22&27&32	GND	Negative power supply, ground

⑧ 3PIN×8 interface pin:

Pin	Function	Description
33	P5	Digital pin P5
34	P7	Digital pin P7
35	P6	Digital pin P6
36	P11	Digital pin P11
37	P2	Digital pin P2
38	P3	Digital pin P3
39	P4	Digital pin P4
40	P10	Digital pin P10
41~48	3.3V	Positive power supply, 3.3V
49~56	GND	Negative power supply, ground

Note: The micro:bit development board pin functions are described below.

Pin Function	Pin
GPIO	P0, P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15, P16, P19, P20
ADC/DAC	P0, P1, P2, P3, P4, P10
PWM	P0, P1, P2, P3, P4, P10
I ² C	P19(SCL), P20(SDA)
SPI	P13(SCK), P14(MISO), P15(MOSI)
Button occupied	P5(BUTTON A), P11(BUTTON B)
LED occupied	P4(LED Col1), P7(LED Col2), P3(LED Col3), P6(LED Col4), P10(LED Col5)

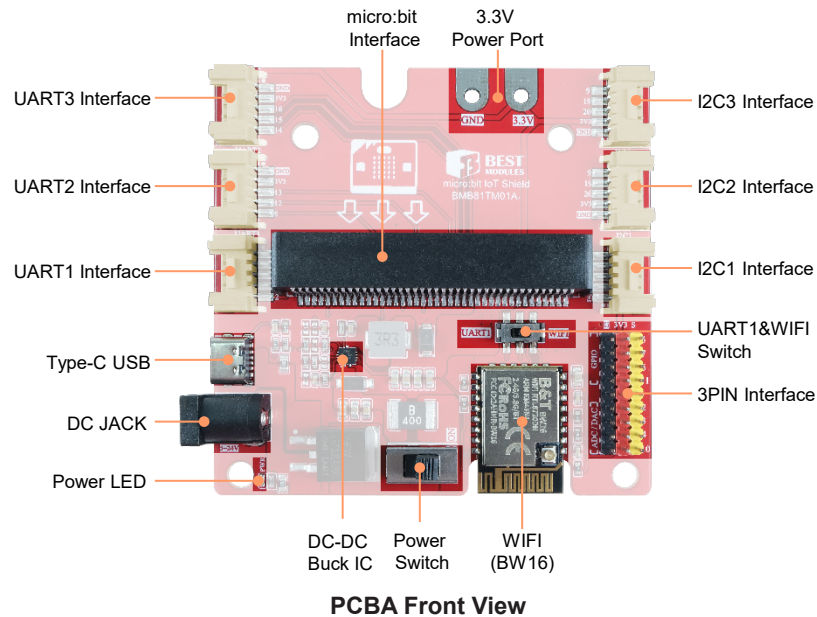
Technical Specifications

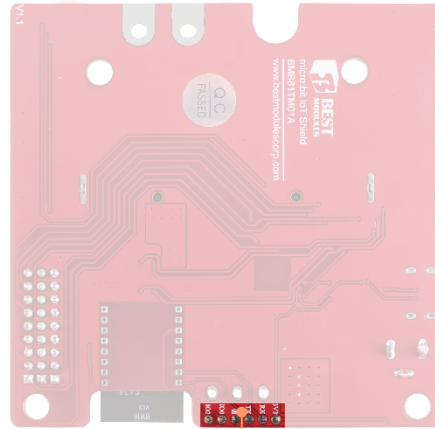
Recommended Operation Conditions

Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Operating Voltage	—	5	—	24	V
I _{DD}	Operating Current	V _{DD} =5V~24V	—	60	—	mA
	3.3V Total Output Current	V _{DD} =5V~24V	—	—	1.5	A

Hardware Overview

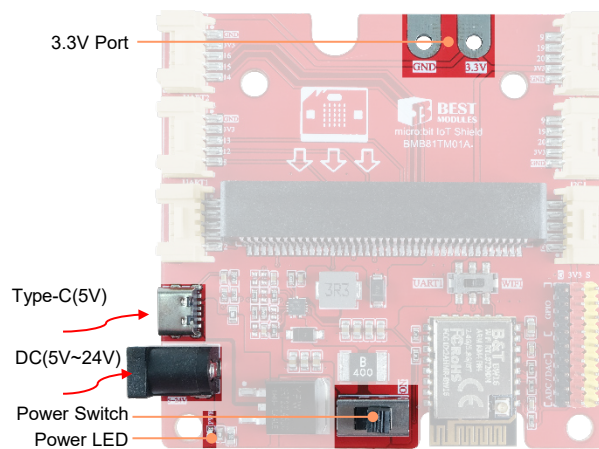




WI-FI(BW16)
Programming interface

PCBA Back View

Power Supply



Choose one of the following power supply methods:

- Provided by the Type-C USB interface input, 5V
- Provided by the DC interface input, 5V~24V

Power Switch is used to control power on/off. The “ON” silk screen side is powered on. Power LED is used to indicate whether the shield board is powered on or not. The shield board provides an alligator clip type 3.3V power interface for customers to use.

Slide Switch

P0 and P1 can be selected to connect to the WIFI module or to the UART1 interface by switching the slide switch.

Slide Switch	
To WIFI Module Side	To UART1 Side
Switch to the WIFI module RX pin	Switch to the UART1 interface P0
Switch to the WIFI module TX pin	Switch to the UART1 interface P1

On-board WIFI Module

The shield board is integrated with on-board BW16 WIFI module. The BW16 is a dual-band Wi-Fi + Bluetooth SoC module developed based on the RTL8720DN. The BW16 supports dual-band (2.4GHz or 5GHz) WLAN and Bluetooth 5.0 with low power consumption. It integrates an ARM V8 (compatible with Cortex-M4F) high-performance MCU, an ARM V8M (compatible with Cortex-M0) low-power consumption MCU, WLAN (802.11 a/b/g/n), MAC, Bluetooth baseband and RF baseband. Additionally, it provides a configurable GPIO port for different peripheral device control. The BW16 also integrates internal memory, which supports simple application development and can implement the complete Wi-Fi and BLE 5.0 protocol functions.

- Supports 802.11a/b/g/n 1×1, 2.4GHz or 5GHz
- Supports HT20/HT40 modes
- Supports low-power beacon detecting mode, low-power receiving mode and low-power suspend mode
- Integrated AES / DES / SHA hardware engines
- Supports TrustZone-M and secure boot
- Supports SWD debug port access protection and prohibition mode
- Supports BLE 5.0
- Supports high-power mode for Bluetooth (7dBm, sharing the same power amplifier with Wi-Fi)
- Wi-Fi and BLE share the same antenna
- Supports STA/AP/STA+AP operating modes
- Supports the Simple Config APP on both Android and iOS for one-click network configuration
- Supports Android and iOS Simple Config APP one-click network
- Supports serial port local upgrade and remote firmware over-the-air (FOTA) upgrade

Refer to the BW16 Datasheet for details.

Switch the slide switch to the “WIFI” side before using WIFI function.

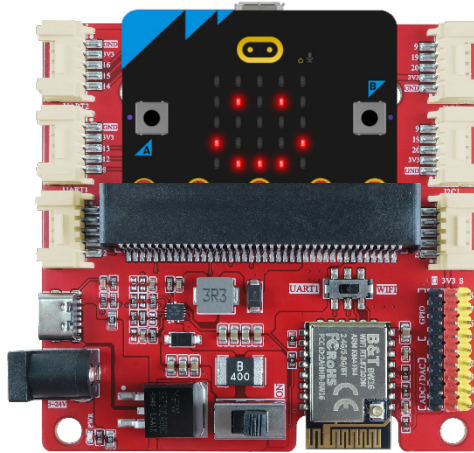
Communication Interface

The shield board has three UART interfaces, three I²C interfaces, and eight 3PIN interfaces. Refer to the “Pin Description” section for details.

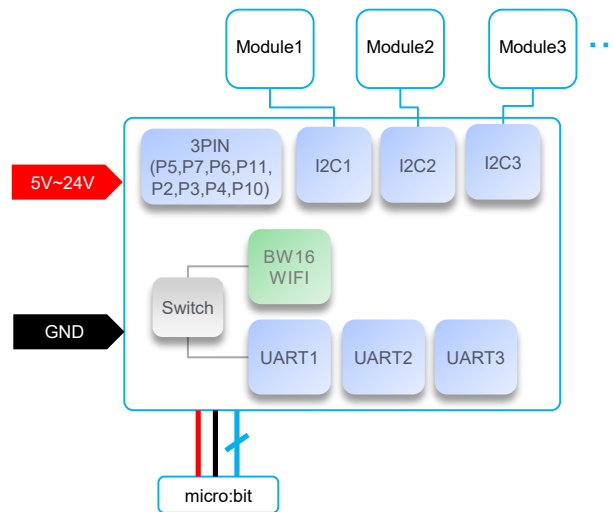
Communication Interface Name	Communication Logical Level	Pin
UART1	3.3V	P2, P0, P1, 3V3, GND
UART2	3.3V	P8, P12, P13, 3V3, GND
UART3	3.3V	P14, P15, P16, 3V3, GND
I ² C1	3.3V	P9, P19, P20, 3V3, GND
I ² C2	3.3V	
I ² C3	3.3V	
3PIN	3.3V	P5, P7, P6, P11, P2, P3, P4, P10

Installation Method

Plug the micro:bit development board into the shield board with LED side facing up.

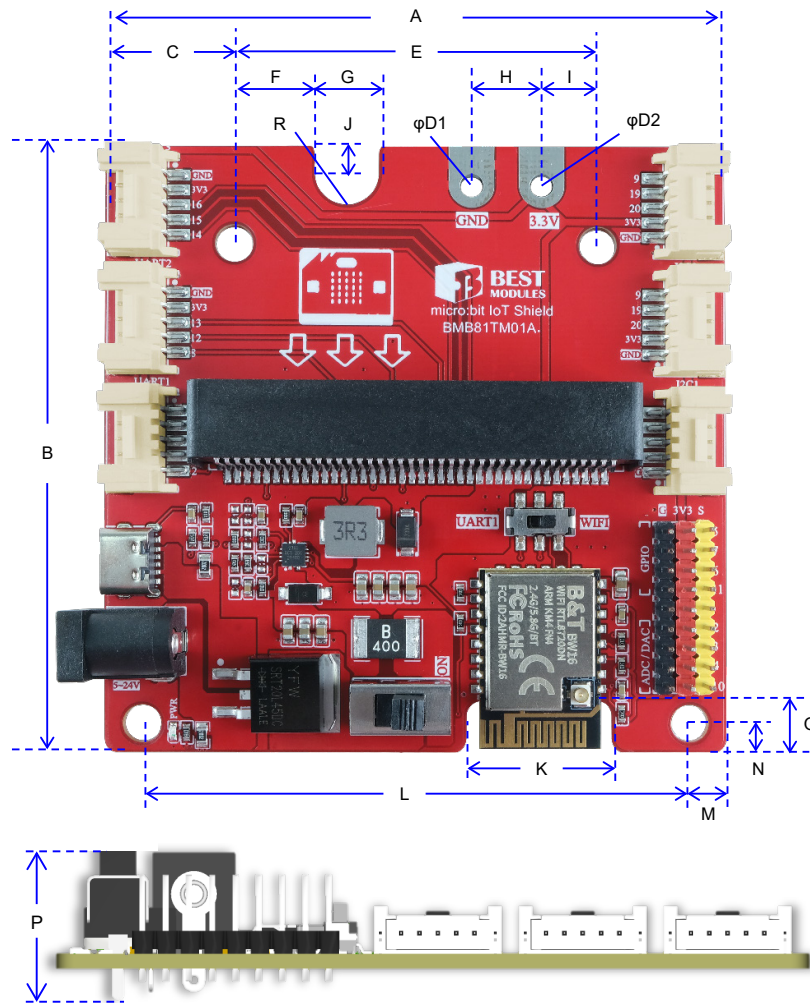


Application Circuit



Connection Diagram

Dimensions



Dimension Information

Symbol	Unit	mm	inch
A (Board Length)		82.0	3.228
B (Board Width)		82.0	3.228
C		17.0	0.669
φD1		3.0	0.118
φD2		4.8	0.189
E		48.0	1.890
F		10.7	0.421
G		8.3	0.327
H		9.3	0.366
I		7.4	0.291
J		4.5	0.177
K		19.0	0.748
L		72.0	2.835

Symbol \ Unit	mm	inch
M	5.0	0.197
N	4.0	0.157
O	7.0	0.276
P	15.0	0.591
R	2.4	0.094

Dimension List

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