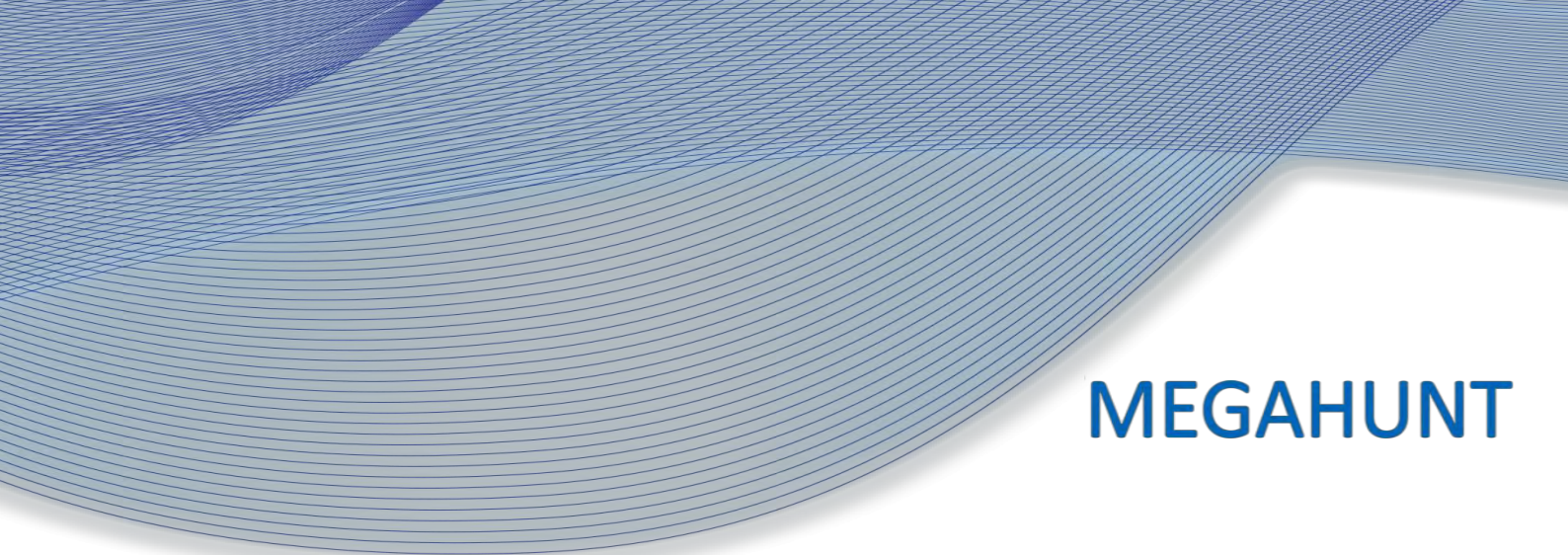




MEGAHUNT

WS8100-M2 BLE5.0

Module Specifications

Transparent transmission BLE5.0 module

Version: 1.6

Date: 2022-26-10



Megahunt Tehnologies Inc.

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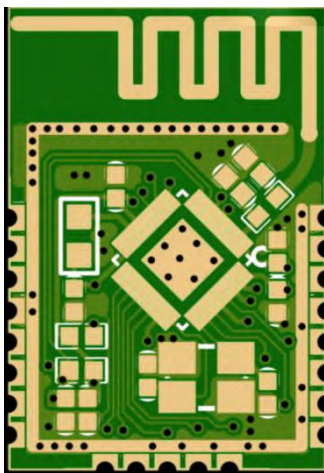
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1 Brief Introduction of the Module

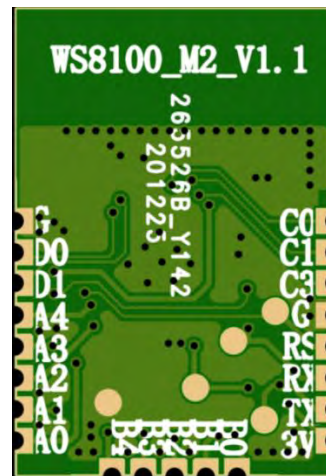
WS8100_M2 is a transparent transmission BLE5.0 module based on WS8100. It has the characteristics of low power consumption, high speed, and long transmission distance as well.

WS8100_M2 can be used for transparent data transmission with AT command. Users can develop their own products based on WS8100_M2 module conveniently. By using the AT commands, the parameters of the module can be checked and configured.

1.1 Demo Board Physical Pictures

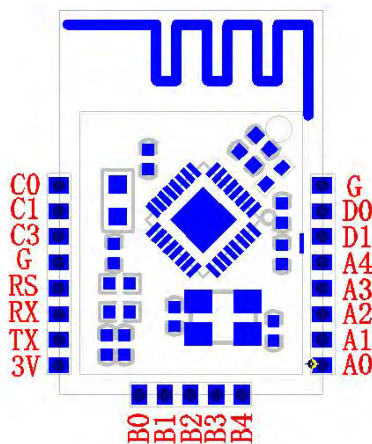


Top layer

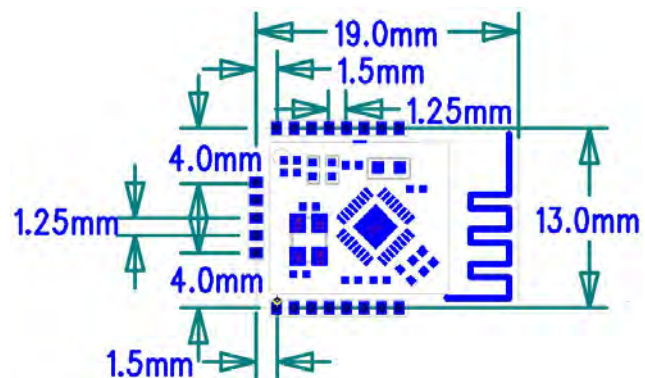


Rear

1.2 Module Pin Footprint



PIN Footprint



Module Dimensions

1.3 Dimension

Outline Dimension: 19×13×1.0(Unit:mm)

Note: All dimensions are ± 0.005 in [0.12mm] unless otherwise specified.

1.4 Performance Parameter

- **Microcontroller**

- 32-Bit RISC Core
- 16MHz / 32MHz crystal Clock
- 512KB/1MB Flash
- 40KB SRAM for Cache
- Operating temperature: -20°C ~ +85°C

- **Low Power Consumption**

- Wide Supply Voltage Range: 1.8 to 3.6V
- On-chip internal DC-DC Converter
- MCU Active Mode: 1.4mA @ 16MHz
- MCU Low Power Mode:
 - 0.6uA (IO wake up)
 - 1.0uA (32KHz on、8K RAM on)
 - 1.1uA (32KHz on、24K RAM on)
- RX: 8.5mA
- TX: 9.5mA@+0dbm
16mA@+7dbm

- **RF Characteristics**

- 2.4GHz RF transceiver, compatible with the Bluetooth Low Energy(BLE) 5.0 specification
- -97dBm Receiver Sensitivity
- -20dBm~+7dBm Programmable output power
- Single-Ended RF Interface
- Frequency Range: 2402MHz~2480MHz
- Modulation method: GFSK

1.5 Low Power Mode

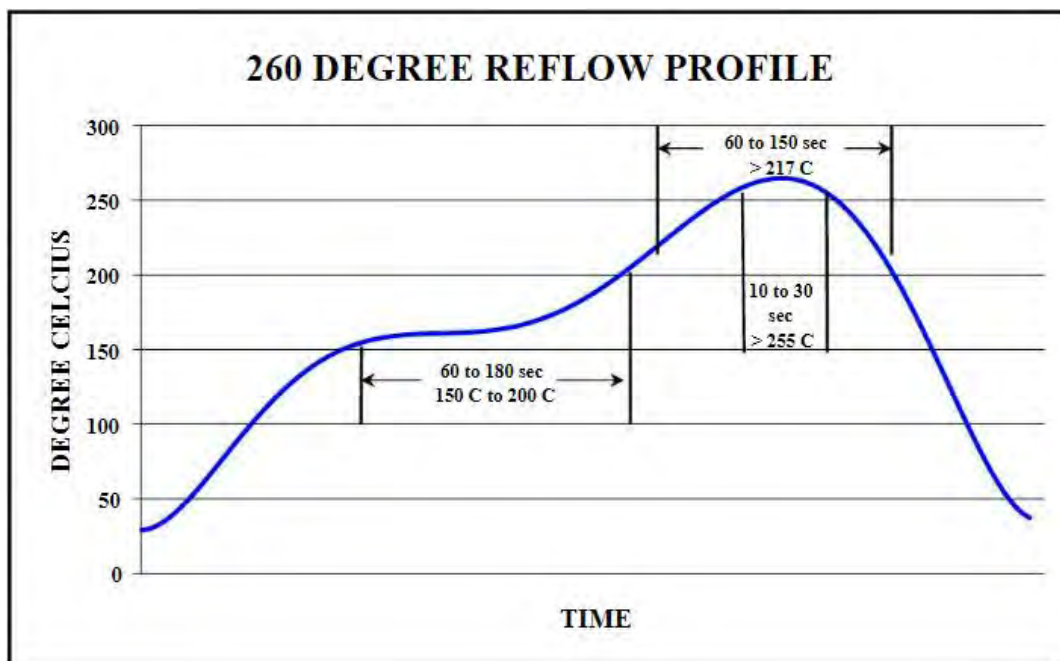
Power Domain	Peri	RAM	AON	FLASH
Deep Sleep+	Off	Off	On	On
Sleep(HOSC Off)	On	On	On	On

1.6 PIN Assignments and Functionality Details

No.	Definition	IO	Wire Printing	Type	Description
1	PC0	PC0	C0	I/O	Undefined, used for secondary development
2	PC1	PC1	C1	I/O	Undefined, used for secondary development
3	PC0	PC0	C3	I/O	Undefined, used for secondary development
4	GND	GND	G	P	Ground
5	RST	RST	RS	I	Reset pin, after the reset, the control IO should be set as a floating input to reduce power consumption. 0: Reset 1: Normal operation
6	UART_RX	PD2	RX	I	Data receiver of serial port RX
7	UART_TX	PD3	TX	O	Data transmitter of serial port TX
8	VCC	V33	3V	P	Module positive power supply, range: 1.8V-3.6V, typical 3.3V
9	CONN_STAT0	PB1	B1	O	B1 B0 are BIT1 BIT0 respectively 00: stop broadcasting 01: broadcasting 10: complete the connection 11: disconnected
10	CONN_STAT1	PB0	B0	O	
11	DEBUG_TX	PB3	B3	I	Undefined, low level/DEBUG_UART_TX
12	DEBUG_RX	PB2	B2	I	Undefined, low level/DEBUG_UART_RX
13	WAKE_UP	PB4	B4	I	1: module wake up 0: module standby, disconnect the Bluetooth connection, standby current 0.8uA [Remarks for extremely low power consumption: after outputting a high level for 2 seconds, set IO to input pull-down, otherwise it will increase power consumption. This operation has a detection signal: after it takes effect PD1 is high level]
14	STANDBY	PA0	A0	I	1: Enter standby. 0: Working mode. [Remarks for extremely low power consumption: After outputting a high level for 2 seconds, set IO to input pull-down, otherwise it will increase power consumption. This operation has a detection signal: PD1 is low level after it takes effect]
15	MODE_CTRL	PA1	A1	I	Module signal input, serial port mode switching 1: Serial port is in instruction mode 0: Serial port is in transparent transmission mode

16	UART_EN	PA2	A2	I	1: The serial port is ready to receive data 0: The serial port is idle, reducing power consumption
17	BT_EN	PA3	A3	I	Module signal input, module Bluetooth enable 0: The module starts broadcasting until a device is connected to it 1: Turn off Bluetooth, if connected, disconnect and turn off broadcasting
18	PA4	PA4	A4	I/O	Undefined, used for secondary development
19	PD1	PD1	D1	I/O	Undefined, used for secondary development
20	PD0	PD0	D0	I/O	Undefined, used for secondary development
21	GND	GND	G	P	Ground

1.7 Processing Requirements



Caution:

If temperature ramps exceed the reflow temperature profile above, module and component damage may occur due to thermal shock. Avoid overheating. Please follow the recommended reflow profile for the module .

2 Software Instruction Set

2.1 Instruction Format

In the instruction mode, users can query or set the module parameters through the serial port. The query instruction is sent to the module in the format of "AT+XXXX\CR\LF". The setting instruction is sent to the module in the format of "AT+XXXX:xxxx\CR\LF". The meaning of \CR\LF is "\r\n", the corresponding hexadecimal is (0x0D, 0x0A).

For example:

Send the query mode instruction

Asc: AT+ROLE\r\n

Hexadecimal: 41 54 2B 56 45 52 53 0D 0A

Serial transmission parameters are as follows:

Default Baud Rate:115200bps; 8 data bits; 1 stop bit; No parity.

2.2 Query Instruction Table

Description	Instruction	Respond	Parameter Note
Query master-slave mode	AT+ROLE\r\n	ROLE:SLAVE\r\n	
Query firmware version	AT+VERS\r\n	VX.X\r\n	
Query Bluetooth MAC address	AT+GADD\r\n	ADDR:XXXX\r\n	
Query device name	AT+GNAM\r\n	NAME:XXXX\r\n	
Query connection interval	AT+GCONA\r\n	CON:XXXX\r\n	Unit: 0.625ms
Query the maximum connection interval	AT+GCONX\r\n	CONMAX:XXXX\r\n	Unit: 0.625ms
Query the minimum connection interval	AT+GCONN\r\n	CONMIN:XXXX\r\n	Unit: 0.625ms
Query latency	AT+LATY+\r\n	LATY:XXXX+\r\n	
Query transmit power	AT+GPWR\r\n	PWR:XXXX\r\n	
Query the serial port baud rate	AT+GURT\r\n	UART:XXXX\r\n	
Get Bluetooth status	AT+GSTA\r\n	ADVERTISING_ON	broadcast on
Query the paired password	AT+GPWD\r\n	Pair code:XXXX	
Query the broadcast interval	AT+GADVA\r\n	ADV:XXXX\r\n	Unit: 1.25ms
Query the maximum broadcast interval	AT+GADVX\r\n	ADVMAX:XXXX\r\n	Unit: 1.25ms
Query the minimum broadcast interval	AT+GADVNI\r\n	ADVMIN:XXXX\r\n	Unit: 1.25ms
Query broadcast packet content	AT+GAVD\r\n	AVD:XXXXXX\r\n	

2.3 Setting Instruction Table

Description	Instruction	Respond	Parameter Declaration
Set serial port baud rate	AT+UART+Para\r\n	OK\r\n	Enter one of the numbers 2400, 4800, 9600, 19200, 38400, 57600, 115200 Default: 115200
Set the device name	AT+SNAM+Para\r\n	OK\r\n	Enter a string name, up to 20 Bytes Default: WS8100_BLE5.0
Module reset	AT+REST\r\n	OK\r\n	Bluetooth module restart
Module parameter reset	AT+PDEF\r\n	OK\r\n	Bluetooth module parameter reset
Set the connection interval [The maximum and minimum values are the same]	AT+SCONA+Para\r\n	OK\r\n	Input 6~3200 (unit : 1.25ms) Default: 64
Set the maximum connection interval	AT+SCONX+Para\r\n	OK\r\n	Input 6~3200 (unit : 1.25ms) Default: 64
Set the minimum connection interval	AT+SCONN+Para\r\n	OK\r\n	Input 6~3200 (unit : 1.25ms) Default: 64
Set transmit power	AT+SPWR+Para\r\n	OK\r\n	Input -20, -15, -10, -5~4, 7 Default: 0
Disconnect the Bluetooth	AT+CONB\r\n	OK\r\n	
Turn on broadcast	AT+ADVL\r\n	ADVERTISING_ ON\r\n	
Turn off broadcast	AT+ADVB\r\n	ADVERTISING_ OFF\r\n	
Set broadcast interval[The Maximum and minimum values are the same]	AT+SADVA+Para\r\n	OK\r\n	Input 20~6399 (unit : 0.625ms) Default: 160
Set the maximum broadcast interval	AT+SADVX+Para\r\n	OK\r\n	Input 20~6399 (unit : 0.625ms) Default: 160
Set the minimum broadcast interval	AT+SADVN+Para\r\n	OK\r\n	Input 20~6399 (unit : 0.625ms) Default: 160

Set broadcast packet	AT+SAVD+Para\r\n	OK\r\n	Up to 31 Bytes
Set Bluetooth latency	AT+LATY+Para\r\n	OK\r\n	Set the default value of latency to 0

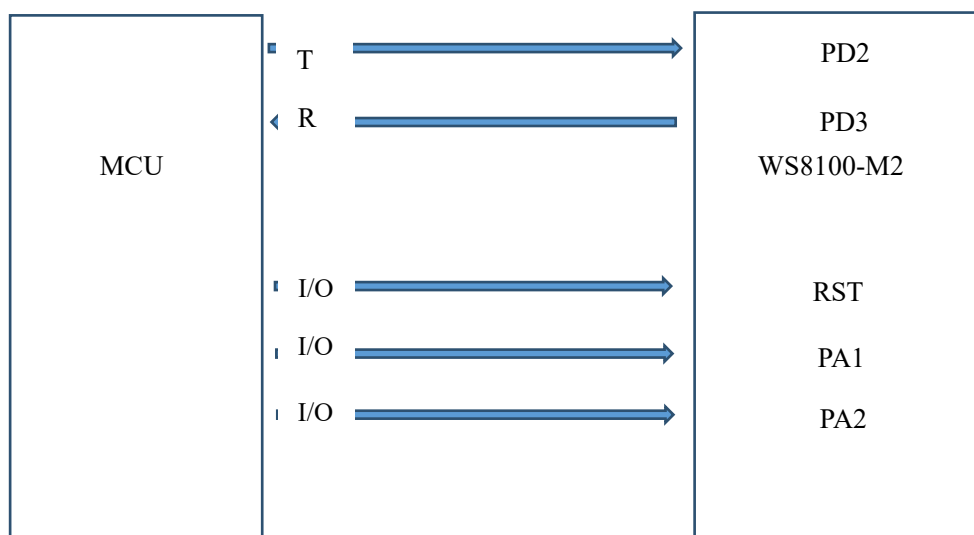
Note:

Setting latency can reduce power consumption but data is delayed!

Latency can be turned on while there is no data transmission, and turned off while data transmission.

3 Module Application

3.1 MCU and WS8100-M2 module connection diagram

**Instructions for use:**

PA1 command data switching

PA2 serial port enable

PD2 Rx

PD3 TX

VCC

GND

RST low pulse [lasting 100ms] reset

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