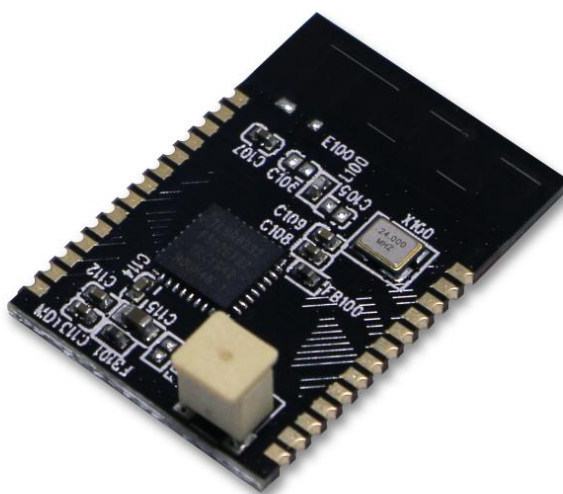


M-B14001 BLE Module

PEI Command Reference Manual

Model No.: M-B14001

Version: V1.03



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Before using this module, please read this document carefully, and pay attention to the following important matters:

M-B14001 BLE module is a compact size, high performance, low-power consumption Bluetooth Module, which is integrated with all RF related devices and has PCB onboard antenna, so excellent RF performance can be obtained without additional antenna configuration.

It uses the two-in-one mode of Transparent Transmission and Beacon, and combines with APP to seamlessly locate indoors, it can be also upgraded over the air. This BLE Module can achieve positioning accuracy of about 0.5m with the help of APP, which can be widely used in various wireless communication fields of the IoT.

Please also note that: this module is an electrostatic sensitive product, make sure operate it on an anti-static workbench during installation and testing. Metal objects and wires should be kept away from the antenna as much as possible. Please also do not use metal case above the BLE module, which will affect the effective use of distance.

File version & update management

Version	Update Date	C/A/M/D	Reviser	Content
V1.01	2020/12/15		Li Ming	1 st release
V1.02	2020/12/28		Li Ming	Add peripheral interface command
V1.03	2021/1/15		Li Ming	Add transparent transmission command

(C - Create, A - Add, M - Modify, D - Delete, R - Release)

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1. AT COMMANDS

1.1 BASIC RULES

The basic rules of the AT Commands are as follows:

The execution command has no operator, and the mobile terminal executes the command and returns the result;

The setup commands are followed by the operator '=', which can be used to save setup parameters for future use, or to perform an operation;

Test commands are followed by the operator '=?', which asks if the mobile device supports the instruction, returns 'OK' if it supports it, and returns the range of the parameter value if it contains a parameter;

Read commands are followed by operator '?', which is used to require the mobile device to return the stored value of the command-related parameters.

1.2 BASIC COMMANDS

1.2.1 AT — Connection Test

Command Format

Execute command: AT

Reply: OK

Demo Code:

```
AT
OK
```

1.2.2 ATE — Command Echo Configuration

Command Format

Execute Command: ATE<Value>

Reading Format: ATE?

Testing Format: ATE=?

Default value: 1, with echoes

Parameter Description

Description	M/C/O	Type	Value	Remark
Value	M	Char	0	Without echo
			1	with echoes

Demo Code:

```

ATE0 // 串口工具不显示打印信息 Serial tools do not display print information
ATE1 // 串口工具显示打印信息 Serial tools display printing information
    
```

1.2.3 AT+VER — Acquire the AT Version

Command Format

Execute Command: AT+VER
Reading Format: N/M
Testing Format: N/M
Default Value: returned result (module version)

Demo Code:

```
AT+VER
+VER:v1.01 // 显示模块版本  Display module version
OK
```

1.2.4 AT+RST — Restart the Module

Command Format

Execute command: AT+RST
Testing Format: N/M
Read & Reply: N/M

Demo Code:

```
AT+RST
OK
```

1.2.5 AT+NAME — Set the Bluetooth Name

Note: The Bluetooth name must be 5 characters or greater, but 29 characters or less

Command Format

Reading Format: AT+NAME?

Testing Format: AT+NAME=?

Read & Reply: +NAME:<BLUETOOTH NAME>

Setting Format: AT+NAME=<NAME>

Parameter Description

Description	M/C/O	Type	Value
NAME	M	CHAR	ASCII Displayable character

Demo Code:

```
AT+NAME?  
+NAME:iCoin_at  
OK
```

```
AT+NAME=iCoin  
OK
```


1.2.6 AT+MAC — Acquire the MAC Address

Note: Bluetooth address is six bytes, displayed in Hexadecimal, high byte is 0 (must be filled in)

Command Format

Reading Format: AT+MAC?

Testing Format: AT+MAC=?

Read & Reply: +MAC:<MAC IN HEX>

Setting Format: AT+MAC=<MAC IN HEX>

Parameter Description

Description	M/C/O	Type	Value
Mac	M	HEX	[0-9], [A-F]

Demo Code:

```
AT+MAC?
+MAC:A4C138D1AC2A
OK
```

```
AT+MAC= B4C138D1AC2A
OK
```

1.2.7 AT+COMPANY — Set/Read Beacon Company

Information

The manufacturer information is two bytes and displayed in hexadecimal

Command Format

Reading Format: AT+COMPANY?

Testing Format: AT+ COMPANY =?

Read & Reply: + Company ID:<Company ID>

Setting Format: AT+COMPANY =< Company ID >

Parameter Description

Description	M/C/O	Type	Value
Company ID	M	HEX	[0-9], [A-F]

Demo Code:

```

AT+COMPANY?
+Company ID:004c
OK
AT+ COMPANY =0045
OK
    
```

1.2.8 AT+MAJOR — Set/Read Beacon Major

The Beacon Major is two bytes and displayed in hexadecimal

Command Format

Reading Format: AT+MAJOR?

Testing Format: AT+ MAJOR =?

Read & Reply: + Company ID:<MAJOR>

Setting Format: AT+ MAJOR =< MAJOR >

Parameter Description

Description	M/C/O	Type	Value
MAJOR	M	HEX	[0-9], [A-F]

Demo Code:

```
AT+MAJOR?  
+MAJOR:0001  
OK  
AT+MAJOR =0002  
OK
```

1.2.9 AT+MINOR — Set/Read Beacon Minor

The Beacon Minor is two bytes and displayed in hexadecimal

Command Format

Reading Format: AT+MINOR?

Testing Format: AT+ MINOR =?

Read & Reply: + MINOR:< MINOR >

Setting Format: AT+ MINOR =< MINOR >

Parameter Description

Description	M/C/O	Type	Value
MINOR	M	HEX	[0-9], [A-F]

Demo Code:

```

AT+MINOR?
+ MINOR:0102
OK
AT+ MINOR =0104
OK
    
```

1.2.10 AT+UUID — Set/Read Beacon UUID

Beacon UUID is 16 bytes and is displayed in hexadecimal

Command Format

Reading Format: AT+UUID?
 Testing Format: AT+UUID=?
 Read & Reply: + UUID:<UUID >
 Setting Format: AT+UUID=< UUID >

Parameter Description

Description	M/C/O	Type	Remark
UUID	M	HEX	[0-9], [A-F]

Demo Code:

```

AT+UUID?
+UUID:0112233445566778899AABBCCDDEEFF0
OK
AT+UUID=0112233445566778899AABBCCDDEEFFD
OK
    
```

1.2.11 AT+PWR — Set/Read BLE Power

Note: Set/Read module's power level.

Command Format:

Setting Format: AT+PWR=<Power Level>

Reading Format: AT+PWR?

Read & Reply: +PWR:<Power Level>

Parameter Description:

Description	M/C/O	Type	Value	Remark
Power Level	M	Char	0	11.8dB
			1	9.6dB
			2	7.9dB
			3	7 dB
			4	6.3 dB
			5	4.9 dB
			6	3.3 dB
			7	1.6 dB
			8	0 dB

Demo Code:

```

AT+PWR?
+PWR:2 // 当前功率为高功率 Current power is high power
AT+PWR=0
OK
    
```

1.2.12 AT+MODE — Set/Query BLE Mode

Note: Set/check the current operating mode of the terminal

Command Format

Setting Format: AT+MODE=<Mode>

Reading Format: AT+MODE?

Read & Reply: +MODE:<Mode>

Parameter Description

Description	M/C/O	Type	Value	Remark
<i>Mode</i>	<i>M</i>	<i>Char</i>	<i>0</i>	MASTER
			<i>1</i>	Beacon/Slave
			<i>2</i>	Beacon

Demo Code:

```

AT+MODE?
+MODE:2
AT+MODE=0
OK
    
```

Note: Master device is not currently supported

1.2.13 AT+ADV — Set/Query Broadcast Data

Note: Set/read BLE broadcast data, 31 bytes, HEX display. Must be filled in BLE ADV format.

Command Format

Setting Format: AT+ADV=<ADV>

Reading Format: AT+ADV?

Read & Reply: +ADV:<ADV>

Parameter Description

Description	M/C/O	Type	Value	Remark
ADV	M	HEX	[0-9], [A-F]	Must meet BLE ADV standards

Demo Code:

```
AT+ADV?
+ADV:0409525354
AT+ADV=050952532455
OK
```


1.2.14 AT+INTVAL — Set/Read the ADV Transmitting Interval

Note: Set the BLE ADV transmission interval

Command Format

Setting Format: AT+INTVAL=< INTVAL Level>

Reading Format: AT+ INTVAL?

Read & Reply: + INTVAL:< INTVAL Level>

Parameter Description

Description	M/C/O	Type	Value	Remark
INTVAL Level	M	Char	0	50ms
			1	100ms
			2	200ms
			3	300ms
			4	400ms
			5	500ms
			6	1s

Demo Code:

```
AT+INTVAL?
+INTVAL:2
AT+INTVAL =1
OK
```

1.2.15 +CME — Command Error

Note: this command is used to notify peripherals of command errors.

Command Format

Receiving Format: +CMR :<Result Code>

Parameter Description

Description	M/C/O	Type	Value	Remark
Result Code	M	Char	0	Command not supported
			1	Parameter error
			3	Parameter value out of range

1.3 PERIPHERAL INTERFACE COMMAND

1.3.1 AT+GPIO — GPIO Control

Control module GPIO interface, including GPIO direction, input or output, and read input level or configure output level.

Command Format

Setting Format: AT+GPIO=<NO.>, <DIR>[,<value>]

Reading Format: N/M

Read & Reply: +GPIO: <NO.>, <DIR>,<value>

Parameter Description

Description	M/C/O	Type	Value	Remark
NO.	M	Char	0	GPIO Module No, [0,F]
DIR	M	CHAR	0	1 Input, 2 Output
Value	C	char	0	0 Low Level, 1 High Level

Demo Code:

```

AT+GPIO=0, 1 //读取 Read
+GPIO:0, 1, 0
OK
AT+GPIO=0, 2, 1 //设置 Setting
+GPIO:0, 2, 1
OK
    
```

1.3.2 AT+PWM — PWM Configuration

Note: configure the PWM output signal

Command Format

Setting Format: AT+PWM=<No>,<OPS>[,<CLK>,<DutyClk>]

Reading Format: N/M

Read & Reply: +PWM: <No>,<OPS>[,<CLK>,<DutyClk>]

Parameter Description

Description	M/C/O	Type	Value	Remark
NO	M	Char	0	0 - choose PWM0; 1 - choose PWM1
OPS	M	Char	0	0 - stop; 1 - enable
CLK	C	Char	Number	Hexadecimal, PWM frequency
DutyClk	C	Char	Number	Hexadecimal, PWM Duty cycle frequency

Demo Code:

```

AT+PWM=0, 1, 8000, 16000 //使能 enable
+ PWM:0, 1, 8000, 16000
OK
AT+PWM=0, 0 //停止 stop
OK
    
```

1.3.3 AT+I2C — I2C Operation

Note: Operate an I2C device connected to the module.

Command Format

Setting Format: AT+I2C=<dev>,<OPS>,<reg_addr>,<Len>[,<Data>]

Reading Format:

Read & Reply: +I2C:<dev>,<OPS>,<Len>,<Data>

Parameter Description

Description	M/C/O	Type	Value	Remark
dev	M	Char	0	Device address, two hexadecimal characters
OPS	M	Char		0-Read, 1 Write
reg_addr	M	Char		I2C Device address, which supports only one byte address
Len	M	Char		Number of read and write data
Data	C	Array		Hexadecimal data

Demo Code:

```
AT+I2C=76,1,06,1,00 //写数据 Write the data
+I2C:76,1,06,1,00
OK
```

```
AT+I2C=76,1,06,1 //读数据 Read the data
+I2C:76,1,06,1,00
OK
```

1.3.4 AT+ADC — ADC Operation

Operate the module ADC to make sure there are external links

Command Format

Setting Format: AT+ADC=<No>

Reading Format: N/M

Read & Reply: AT+ADC:<No>,<Value>

Parameter Description

Description	M/C/O	Type	Value	Remark
No	M	Char	0	ADC No. 0, 1
Value	M	Short		Hexadecimal

Demo Code:

```
AT+ADC=0
+INTVAL:0,0189
OK
```

1.3.5 AT+SPI —SPI Operation

Operates on devices connected through the module SPI interface

Command Format

Setting Format: AT+SPI=<WLEN>,<wdata>,<RLEN>

Reading Format: N/M

Read & Reply: +SPI:<WLEN>,<wdata>,<RLEN>,<RData>

Parameter Description

Description	M/C/O	Type	Value	Remark
WLen	M	Char	0	Write data length
Wdata	M	Data		Hexadecimal, write data
Rlen	M	Char		Read data length
RData	M	Data		Hexadecimal, Read data

Demo Code:

```
AT+SPI=1,bc,2
+SPI:1,bc,2,aeaf
OK
```

1.3.6 AT+Sleep — Sleep Mode Configuration

Note: set up sleep mode, it enters sleep mode after 500ms

Command Format

Setting Format: AT+Sleep=<sleep_mode>

Reading Format: N/M

Read & Reply: +sleep:<sleep_mode>

Parameter Description

Description	M/C/O	Type	Value	Remark
sleep_mode	M	Char	0	0- Sleep, need to specify IO port to wake it up

Demo Code:

```
AT+Sleep=0
+Sleep:0
OK
```


1.4 TRANSPARENT TRANSMISSION COMMAND

1.4.1 +bleconnect — Connection Configuration

A BLE connection has been entered. This message indicates that a BLE connection has been established successfully.

Command Format

Setting Format: N/M

Reading Format: N/M

Read & Reply: +bleconnect:<indicate>

Parameter Description

Description	M/C/O	Type	Value	Remark
indicate	M			1 connected, 0 disconnected

Demo Code:

```
+INTVAL:a454c28bf1f2
```

1.4.2 AT+bledata —BLE Data Transmission

This command has two situations:

1. If master is connected, the data from this command will be transmitted to the master;
2. If there is no master been connected, it will be sent by broadcast;

Command Format

Setting Format: AT+bledata=<len>,<data>

Reading Format:

Read & Reply: +bledata:<path>,<len>,<data>

Parameter Description

Description	M/C/O	Type	Value	Remark
LEN	M			Data length, maximum 255
path	M			Data transmission mode, 0 broadcast, 1 BLE connection
data	M			Data

Demo Code:

AT+bledata=6,457836984525 // 对 master 发送 6 个字节 Send 6 bytes to the master
OK

+bledata=1,ef //接收到 master 发来的数据 Receive the data from the master

1.4.3 AT+bledatam —Transmission Mode Configuration

Set BLE transfer mode into transparent transmission mode, or AT data transmission mode

The transparent transmission data will be sent in below two ways:

1. If master is connected, the data from this command will be transmitted to the master
2. If there is no master been connected, it will be sent by broadcast;

Command Format

Setting Format: AT+bledatam=< mode>

Reading Format: N/M

Read & Reply: N/M

Parameter Description

Description	M/C/O	Type	Value	Remark
mode	M		1	Enter transparent transmission mode

Demo Code:

```
AT+bledatam=1
```

1.4.4 +++ Exit Transparent Transmission Mode

Command Format

Setting Format: +++

Reading Format: N/M

Read & Reply: N/M

Demo Code:

```
+++ //连续三个+++退出当前数传模式，进入 at 模式  
(3 consecutive +++ exit the current data transparent transmission mode, enter the AT mode)
```

```
OK
```

2. Contact us

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