HJ-185IMH

Ultra-small Chip (5mm*5.5mm), ultra-low power Bluetooth 5.1 module

Software Manual V1.0

Quick Understanding

HJ-185IMH using chip-level packaging, it's size is 5mm*5.5mm(Built-in antenna inside). It is the smallest Bluetooth module in the same scheme of the industry. The communication distance of the built-in antenna can reach 10~20 meters. The communication distance of the external antenna can reach 40~80 meters.

Module supports master-slave integration, host and slave work at the same time without affecting each other.

HJ-185IMH can work with 1 host and 1 slave at the same time. It can also work with 5 slaves at the same time. Full duplex communication mode is used when HJ-185IMH works with 5 slaves.

When HJ-185IMH works with the host and slave, we can control the connection gap both of the slave and host. Host and slave do not affect each other.

HJ-185IMH can maintain communication connections with long connection gaps over a long period of time, power consumption is less than 10μA. And there are many other modes of work to choose from.

Our company has designed a rich instruction set for this module, many complex parameters can be set. The module can meet the needs of customers to the greatest extent.

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1 Version History

Table 1-1 Revision History

No.	Version Number	Release Time	Reviser	Checker	Description
1	V1.0	20190907	LMY	LJH	First version

2 Appointment

2.1 Byte sequence regulations of protocol stack

Among the instructions for all the functions listed in this document, all bytes are used Big-end. Characters of all instructions are coded in ASCII. All instructions start with '<' and end with '>'. There is no return line break at the end.

All instructions are divided into two parts according to the direction of transmission.

Some of them are sent from MCU to BLE module. They are mainly responsible for setting up and querying, and use uppercase ASCII characters.

The other part is sent to MCU from BLE module, mainly responsible for response and feedback, using lowercase ASCII characters.

For instructions sent from MCU to BLE module, instructions with setting function start with '<ST', instructions with reading function start with '<RD'.

For instructions sent to MCU from BLE module, the BLE module replies to the result of setting instructions execution with instructions which starting with '<st'. The BLE module replies the result of reading instructions execution with instructions which starting with '<rd'.

For example, we set the name of the BLE module to “HongJia”. We need to send instructions, such as “<ST_NAME=HongJia>”. When the module is set up successfully, instructions will be sent to the MCU, such as “<st_name=ok>”. We can send this command to read the module name, such as “<RD_NAME>”. If read successfully, the module will return an instruction, such as “<rd_name=HongJia>”.

2.2 Explanation of nouns

We can use the method of MCU send instructions to BLE module to control the BLE module. At the same time, the BLE module will process and send feedback information to the MCU after receiving the instruction sent from the MCU.

The instructions sent from the MCU to the BLE module constitute an instruction stream. Each instruction that reads or writes to the same attribute constitutes an instruction packet.

The feedback information sent from the BLE module to the MCU constitutes a response stream. Each feedback message which replied to the same instruction packet constitutes a response packet.

About the syntax, functions, and parameters of the instruction and response packets, we give detailed explanations in Chapters 5, 6 and 7 of the HJ-185IMH software documentation.

3 Module working mode description

3.1 Bluetooth working mode

HJ-185IMH built-in high performance protocol stack. It can realize any functions of BLE technology. Our company has expanded the protocol stack. The module can be used as slaves to connect with hosts, or as hosts to connect other slaves.

Moreover, the module can maintain the connection with the host and slave at the same time, and handle the communication tasks with the host and slave at the same time, and the host and slave functions of the module do not affect each other.

This mode of working is similar to the full duplex mode of some kinds of communication interfaces, such as UART. The transceiver and receiver functions run simultaneously without affecting each other.

For example, a mobile phone is connected to HJ-185IMH as a host, and HJ-185IMH can also be connected to other slaves as a host.

HJ-185IMH can work with 1 host and 1 slave at the same time. No need to switch between host and slave. It can realize linkage function or relay function.

If you need it, you can contact our sales department. We can provide a working mode that can accommodate 4 to 6 slaves. For example, modules can be connected by 4 to 6 mobile phones.

If you need a BLE module that can supports multiple host and slave connections, we also have related products, specific product information please consult our sales.

3.2 Data transparent transmission mode and instruction mode

For information sent to HJ-185IMH, firmware programs within the module can identify whether instructions or data are sent. For instructions sent to HJ-185IMH, module enter the instruction mode to process and respond. For the data sent to HJ-185IMH, module enter the data transparent transmission mode and forwards the data.

HJ-185IMH's instruction mode and data transparent transmission mode work at the same time, without affecting each other.

Other manufacturers usually use an IO port or AT instruction to switch, which makes the operation more troublesome. We simplify the process and make the module easier to use.

4 Pin Function Description

4.1 PIN3/P0.14 Host Connection Status Indicator Pin

When the BLE module is successfully connected as the host to the external slave, this pin outputs a high level.

When the BLE module is disconnected from the external slave as the host, this pin outputs a low level.

4.2 PIN4/P0.12 Serial port's TX pin of Bluetooth module

In the transparent transmission mode, this pin is the TX pin of the serial port, which is connected to the RX pin of the MCU.

4.3 PIN5/P0.05 Serial port's RX pin of Bluetooth module

In the transparent transmission mode, this pin is the RX pin of the serial port, which is connected to the TX pin of the MCU.

4.4 PIN6/P0.04 Slave Connection Status Indicator Pin

When this pin's output is high level, the module as slave has been successfully connected by the mobile phone.

When this pin's output is low level, the module as slave has been disconnected by the mobile phone.

4.5 PIN9/P0.01 Serial Port Receiving Function Enabling Pin(Can Be Set,The Default Is Active Low)

When the setting is active low, P0.01=0, serial port receiving function enabled. At this time, the module works at full speed. It can send instructions or transmit data in transparent transmission mode.The current consumption of the module will be up 300~400μA.

When P0.01=1, the serial port receiving function has been disabled. Module working in low power mode. If you broadcast once a second, the current consumption of the module will be less than 15μA.

If the broadcast is stopped, the current consumption of the module will be less than 2μA.

When the setting is active high, P0.01=1, serial port receiving function enabled;P0.01=0, the serial port receiving function has been disabled.

4.6 PIN10/P0.00 APP Receiving Data Indicator Pin

When the module receives the data sent by the mobile APP or the external device which

connected to the module, the BLE module needs to send data through the TX pin of the module's serial port.

Whether the module is a host or slave, this pin is raised T1 before data is sent out through the TX pin of the module's serial port, and this pin can be lowered only after data is sent out. Also, the pull-down action of this pin is automatic. T1 is a parameter, it can be set 1~255, It's in milliseconds.

Usually this pin keeps a low level to represent idleness. This pin is used as a wake-up sign for long-time connections to low-power devices.

We have set up a function, when the data is sent, it can be delayed for a certain time, and then pull down this pin. This delay time can meet the needs of some applications. Refer to Section 7.10 for information on how to set this delay time.

4.7 PIN14/P0.16 App's Configuration Function Enable Pin

When this pin is input to a high level, module allows APP to send instructions to configure all parameters of the module.

When this pin is input to low level, it is forbidden for APP to configure or read the parameters of the module.

The default input mode for this pin is Pulldown.

Note:

1. When the APP's configuration function is enabled, if the instruction does not exist, then return "<!cmd_no_exist_or_error!>" in "0XFFF3" channel. If the instruction exists and complies with the rules, the result will be returned according to the instruction list.

2. When the APP's configuration function is disabled, no matter what type of instruction is sent to module, the module will be return "<!not_allow_config!>" in "0XFFF3" channel.

4.8 PIN15/P0.18 Transmit Path Selection Pin for Data Received by Serial Port

Assuming that the module has been connected to the slave. When this pin is input at high level, the data received by the module from the serial port is sent to the connected slaves.

When this pin is input at low level or not connected, the data received by the module from the serial port is sent to the host or mobile APP which connected to module.

When the module is not connected to the external slave, no matter what the state of this pin is, the data is sent to the host or mobile APP which connected to the module.

4.9 PIN16/P0.21/nRESET At the host mode, successful flag for writing data to slave/Hardware Reset Pin

The function of this pin can be selected by the instruction in Section 7.14.

At the host mode, successful flag for writing data to slave:

In host mode, if the slave which connected by the module writes data in WRITE_WITH_RSP mode, that's the write with response mode.

What is write with response model? In the processing of sending data packet, we must wait for the confirmation of successful sending, otherwise we will lose the packet.

If the amount of data in communication is not large and the reliability of data writing is high, this mode is recommended. However, this mode wastes at least 2~3 connection gaps when writing data.

In write with response mode, if this pin is at low level, it means that the slave is in idle mode and can continue to write data. When this pin is at high level, it indicates that the data transmission is under way, please wait.

In WRITE_CMD mode, that's the write with no response mode, this pin maintains a low level output state. And in this mode, we don't need to wait for the confirmation of successful sending, the data can be sent directly. At this time, the highest one-way data transmission speed of module to slave is 30KBytes/s.

Hardware Reset Pin:

It is recommended that the reset pin be connected to the IO port of the MCU. Active low. When resetting, the low level should hold at least 10 ms and then be raised.

For some industrial environments or complex electromagnetic environments, we recommend that the hardware reset pin be connected to MCU, and the reset operation must be carried out when the power is on.

4.10 PIN18/P0.20 Slave enters the easy pairing mode control pin

When the pin inputs a high level 1, the slave enters the simple pairing mode, and the HJ-185IMH master can bind the slave; when the pin inputs a low level 0, the slave exits the simple pairing mode.

5 Definition of Instruction Set in Serial Port at Slave Mode

5.1 Set or Read the English Name of Bluetooth

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-1.

Table 5-1 The format of instruction packet which is the function of "Set or Read the English Name of Bluetooth"

Instruction Type	Instruction Format
Write	<ST_NAME=xx..xx>
Read	<RD_NAME>

Note:

1. "xx..xx" is the name of what you need to set, its maximum length is 29 bytes.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-2.

Table 5-2 The format of the response packet which is the feedback of the instruction defined in Section 5.1

Response Type	Response Format
Successful Writing	<st_name=ok>
Successful reading	<rd_name=HJ-185IMH> （such as the name is "HJ-185IMH"）
Failure to read or write	<st_name=error> or <rd_name=error>

5.2 Turn on or off Broadcasting, Query the Status of Broadcasting

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-3.

Table 5-3 The format of instruction packet which is the function of "Turn on or off Broadcasting, Query the Status of Broadcasting"

Instruction Type	Instruction Format
Write	<ST_ADV_ONOFF=X>
Read	<RD_ADV_ONOFF>

Note:

1. When X is 1, BLE module turns on broadcasting. When X is 0, BLE module turn off broadcasting.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-4.

Table 5-4 The format of the response packet which is the feedback of the instruction defined in Section 5.2

Response Type	Response Format
Successful Writing	<st_adv_onoff=ok>
Successful reading	<rd_adv_onoff=x>
Failure to read or write	<st_adv_onoff=error> or <rd_adv_onoff=error>

5.3 Set or Read the Data About Broadcasting

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-5.

Table 5-5 The format of instruction packet which is the function of "Set or Read the Data About Broadcasting"

Instruction Type	Instruction Format
Write	<ST_ADV_DATA=xx..xx>
Read	<RD_ADV_DATA>

Note:

1. xx..xx is the broadcasting data that needs to be set. Its maximum length is 16 bytes, and the number of bytes must be even, and the format must be limited to HEX type. For example, if the broadcast data is set to "0X12 0X13 0X14 0X15 0X16", the instruction "<ST_ADV_DATA=1213141516>" will be sent.

2. The broadcast data can be set to Chinese characters, which following UTF-8 encoding. A Chinese character occupies 3 bytes of HEX data, and up to 5 Chinese characters can be set.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-6.

Table 5-6 The format of the response packet which is the feedback of the instruction defined in Section 5.3

Response Type	Response Format
Successful Writing	<st_adv_data=ok>
Successful reading	<rd_adv_data=xx..xx>
Failure to read or write	<st_adv_data=error> or <rd_adv_data=error>

Note:

1. We can read the broadcast data by reading "xx..xx" in the feedback message, broadcast data are HEX format, two characters constitute a HEX data, pay attention to conversion.

5.4 Set or Read the Broadcast Gap

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-7.

Table 5-7 The format of instruction packet which is the function of "Set or Read the Broadcast Gap"

Instruction Type	Instruction Format
Write	<ST_ADV_GAP=xx..xx>
Read	<RD_ADV_GAP>

Note:

1. xx..xx is the broadcast gap that needs to be set. Its range is 20 to 10000, corresponding to 20ms~10000ms.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-8.

Table 5-8 The format of the response packet which is the feedback of the instruction defined in Section 5.4

Response Type	Response Format

Successful Writing	<st_adv_gap=ok>
Successful reading	<rd_adv_gap=xx..xx>
Failure to read or write	<st_adv_gap=error> or <rd_adv_gap=error>

5.5 In slave mode, active disconnect the connection or query connection status

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-9.

Table 5-9 The format of instruction packet which is the function of "In slave mode, active disconnect the connection or query connection status"

Instruction Type	Instruction Format
Write	<ST_CLIENT_LINK=0>
Read	<RD_CLIENT_LINK>

Note:

1. About the instruction of "<ST_CLIENT_LINK=0>", this instruction will disconnect the connection in slave mode after execution.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-10.

Table 5-10 The format of the response packet which is the feedback of the instruction defined in Section 5.5

Response Type	Response Format
Successful Writing	<st_client_link=ok>
Successful reading	<rd_client_link=x0-x11,max_len>
Connection doesn't exist	<st_client_link=no_exist>
Failure to read or write	<st_client_link=error> or <rd_client_link=error>

Note:

1. After execution, the slave immediately disconnects from the host.
2. "x0-x11" is the MAC address of the host connected by the module. "max_len" is the maximum number of bytes per packet sent or received by the host which connected by the module.
3. General the Bluetooth protocol stipulates that the packet size is 20 bytes, and our module is extended to the maximum 160 bytes. The actual size of this parameter depends on the phone model and Bluetooth module performance.

5.6 Set or read the minimum connection gap of the slave

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-11.

Table 5-11 The format of instruction packet which is the function of "Set or read the minimum connection gap of the slave"

Instruction Type	Instruction Format
Write	<ST_CON_MIN_GAP=xx..xx>
Read	<RD_CON_MIN_GAP>

Note:

1. xx..xx is the smallest connection gap, set in the range of 75~40000, corresponding to 7.5ms~4000ms. We expand the time value (in milliseconds) by 10 times and write it into the instruction as a parameter.

2. The maximum connection gap must be greater than or equal to the minimum connection gap, otherwise an error will be reported.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-12.

Table 5-12 The format of the response packet which is the feedback of the instruction defined in Section 5.6

Response Type	Response Format
Successful Writing	<st_con_min_gap=ok>
Successful reading	<rd_con_min_gap=xx..xx,yy..yy>
Failure to read or write	<st_con_min_gap=error>

5.7 Set or read the maximum connection gap of slave

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-13.

Table 5-13 The format of instruction packet which is the function of "Set or read the maximum connection gap of slave"

Instruction Type	Instruction Format
Write	<ST_CON_MAX_GAP=yy..yy>
Read	<RD_CON_MAX_GAP>

Note:

1. yy..yy is the maximum connection gap, set in the range of 75~40000, corresponding to 7.5ms~4000ms. We expand the time value (in milliseconds) by 10 times and write it into the instruction as a parameter.

2. The maximum connection gap must be greater than or equal to the minimum connection gap, otherwise an error will be reported.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-14.

Table 5-14 The format of the response packet which is the feedback of the instruction defined in Section 5.7

Response Type	Response Format
Successful Writing	<st_con_max_gap=ok>
Successful reading	<rd_con_max_gap=xx..xx,yy..yy>
Failure to read or write	<st_con_max_gap=error>

5.8 Set or read the timeout of the slave connection timeout

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-15.

Table 5-15 The format of instruction packet which is the function of "Set or read the

timeout of the slave connection timeout”

Instruction Type	Instruction Format
Write	<ST_CON_TIMEOUT=xx..xx>
Read	<RD_CON_TIMEOUT>

Note:

1. xx..xx is the maximum length of timeout, set in the range of 500~8000, corresponding to 500ms~8000ms.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-16.

Table 5-16 The format of the response packet which is the feedback of the instruction defined in Section 5.8

Response Type	Response Format
Successful Writing	<st_con_timeout=ok>
Successful reading	<rd_con_timeout=xx..xx>
Failure to read or write	<st_con_timeout=error>

5.9 Set or Read the Chinese Name of Bluetooth

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-17.

Table 5-17 The format of instruction packet which is the function of “Set or Read the Chinese Name of Bluetooth”

Instruction Type	Instruction Format
Write	<ST_CH_NAME=xx..xx>
Read	<RD_CH_NAME>

Note:

1. “xx..xx” is the data of the Chinese name that needs to be set. Chinese characters follow UTF-8 encoding, A Chinese character occupies 3 bytes of HEX data. Up to 8 Chinese characters can be set.
2. For example, the HEX data corresponding to the Chinese name "宏佳电子" is "e5ae8fe4bdb3e794b5e5ad90". We can set it by sending “<ST_CH_NAME=e5ae8fe4bdb3e794b5e5ad90>”.
3. You can access the website "https://tool.lu/hexstr/" to query the encoding of UTF-8 in HEX format corresponding to Chinese characters encoded by UTF-8.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-18.

Table 5-18 The format of the response packet which is the feedback of the instruction defined in Section 5.9

Response Type	Response Format
Successful Writing	<st_ch_name=ok>
Successful reading	<rd_ch_name=xx..xx>
Failure to read or write	<st_ch_name=error> or <rd_ch_name=error>

Note:

1. “xx..xx” is the data in HEX.

5.10 Set or Read the Connection Password of Bluetooth Slave

The function of the slave's connection password is to secure the connection of the Bluetooth.

When any mobile APP or host connects to the BLE module, they must send the password in the "configble channel (0XFFF3)" within the timeout time. The default timeout time is 10s. Detailed settings are described in Section 5.11.

For example, set the password to "123456", then send "123456". If the validation is successful, the module will return "<SECRET_CONFIRM>", and if it fails, the connection will be disconnected immediately. Also, the connection will be disconnected when the timeout is over.

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-19.

Table 5-19 The format of instruction packet which is the function of "Set or Read the Connection Password of Bluetooth Slave"

Instruction Type	Instruction Format
Write	<ST_SECRET=xx..xx>
Clear	<ST_CLEAR_SECRET=1>
Read	<RD_SECRET>

Note:

1. "xx..xx" is the password that needs to be set, and its maximum length is 8 bytes.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-20.

Table 5-20 The format of the response packet which is the feedback of the instruction defined in Section 5.10

Response Type	Response Format
Set password successfully	<st_secret=ok>
Clear password successfully	<st_clear_secret=ok>
Successful reading	<rd_secret=xx..xx>
No password set	<rd_secret=null>

Note:

1. When the password is empty, there is no password authentication process when connecting.

5.11 Set or Read the Timeout Time of the Module when at Password Authentication in Slave Mode

If the module sets the connection authentication password, when the module as a slave connected to the mobile APP or other host, the module starts timing. If the authentication has not been successful within the timeout period, the module automatically disconnects.

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 5-21.

Table 5-21 The format of instruction packet which is the function of "Set or Read the Timeout Time of the Module when at Password Authentication in Slave Mode"

Instruction Type	Instruction Format
Write	<ST_SECRET_TIMEOUT=xx..xx>

Read	<RD_SECRET_TIMEOUT>

Note:

1. “xx..xx” is the value that needs to be set, and its value represents how many seconds the timeout time is. Its range from 1~255, corresponding to 1s~255s.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 5-22.

Table 5-22 The format of the response packet which is the feedback of the instruction defined in Section 5.11

Response Type	Response Format
Successful Writing	<st_secret_timeout=ok>
Successful reading	<rd_secret_timeout=xx..xx>
Failure to read	<st_secret_timeout=error>

6 Definition of Instruction Set in Serial Port at Host Mode

6.1 In host mode, disconnect the connection or query connection status

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-1.

Table 6-1 The format of instruction packet which is the function of "In host mode, disconnect the connection or query connection status"

Instruction Type	Instruction Format
Write	<ST_CENTER_LINK=0>
Read	<RD_CENTER_LINK>

Note:

1. About the instruction of "<ST_CENTER_LINK=0>", this is an instruction, its function is disconnect the connected slave in the host mode. Setting to 0 means disconnected.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-2.

Table 6-2 The format of the response packet which is the feedback of the instruction defined in Section 6.1

Response Type	Response Format
Successful Writing	<st_center_link=ok>
Successful reading	<rd_center_link=xxxxxxxxxxxx,max_len>
Connection doesn't exist	<st_center_link=no_exist>
Failure to read or write	<st_center_link=error> or <rd_center_link=error>

Note:

1. "xxxxxxxxxxxx" fixed to 12 bytes of MAC address, returned in large-end mode.
2. "max_len" is the maximum number of bytes per packet sent or received by the slave connected by the module.
3. General the Bluetooth protocol stipulates that the packet size is 20 bytes, and our module is extended to the maximum 160 bytes. The actual size of this parameter depends on the phone model and Bluetooth module performance.

6.2 About the host, turn on or off the scanning function or query the status of the scanning function

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-3.

Table 6-3 The format of instruction packet which is the function of "About the host, turn on or off the scanning function or query the status of the scanning function"

Instruction Type	Instruction Format
Write	<ST_SCAN_ONOFF=x>
Read	<RD_SCAN_ONOFF>

Note:

1. This instruction can control whether the scanning function of the module as the host is turned on. When x=1, host scanning function enabled. When x=0, host scanning function disabled.

2. When the scanning function of the host is disabled, even if the host has bound the corresponding slave, the bound slave will not automatically connect to the host. The module as host must enable the scanning function before binding connections can be made to slaves.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-4.

Table 6-4 The format of the response packet which is the feedback of the instruction defined in Section 6.2

Response Type	Response Format
Successful Writing	<st_scan_onoff=ok>
Successful reading	<rd_scan_onoff=x>
Failure to read or write	<st_scan_onoff=error> or <rd_scan_onoff=error>

Note:

1. When the module's scanning function is disabled, module will always turn off the active scanning function. At this time, the power consumption of the module is the lowest. Even if the host has already bound the slave device, when the host booting will not automatically connect the previously bound slave.

2. When the scanning function of the host is turned on, the overall power consumption of the module will reach about 4mA.

6.3 Set up the write mode of sending data to slave in host mode

In the host mode, there are two ways for the host to write data to the slave. One is the write with response model, the other is the write with no response model. Detailed description refers to Section 4.9.

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-5.

Table 6-5 The format of instruction packet which is the function of "Set up the write mode of sending data to slave in host mode"

Instruction Type	Instruction Format
Write	<ST_WR_RSP=x>
Read	<RD_WR_RSP>

Note:

1. When x=1, the host writes data to slave in write with response mode, similar to TCP mode.

2. When x=0, the host writes data to slave in write with no response mode, writing data in this mode is very fast. It is similar to UDP mode.

3. Effective immediately after setting up.

4. When the host enters the write with response mode, the PIN11/P0.04 pin will output corresponding to the read and write status to indicate whether the data sending is busy.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-6.

Table 6-6 The format of the response packet which is the feedback of the instruction defined in Section 6.3

Response Type	Response Format
Successful Writing	<st_wr_rsp=ok>
Successful reading	<rd_wr_rsp=x>
Failure to write	<st_wr_rsp=error>

6.4 In host mode, accept or reject the slave connection parameters request

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-7.

Table 6-7 The format of instruction packet which is the function of "In host mode, accept or reject the slave connection parameters request"

Instruction Type	Instruction Format
Write	<ST_EN_CLIENT_UPDATE=x>
Read	<RD_EN_CLIENT_UPDATE>

Note:

1. When x=1, the host accepts the connection parameters request which sending from the slave. When x=0, the host reject the connection parameters request which sending from the slave.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-8.

Table 6-8 The format of the response packet which is the feedback of the instruction defined in Section 6.4

Response Type	Response Format
Successful Writing	<st_en_client_update=ok>
Successful reading	<rd_en_client_update=x>
Failure to read or write	<st_en_client_update=error> or <rd_en_client_update=error>

Note:

1. When the host accepts the parameters request from the external slave, the host connection gap and the time of timeout which set in the host mode will be invalid, and the host will connect and communicate to the slave with the connection parameters reported from the slave. If the connection parameters of slave are very small, the power consumption of module will increase.
2. When the host rejects the parameters request from the external slave, the host will take the parameters set by itself as the criterion. In this way, regardless of the slave parameters, everything is subject to the host. At this time, we can accurately control the power consumption of the system without affecting by the slave parameters.

6.5 Set or read the minimum connection gap of the host

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-9.

Table 6-9 The format of instruction packet which is the function of "Set or read the minimum connection gap of the host"

Instruction Type	Instruction Format
Write	<ST_CENTER_CON_MIN_GAP=xx..xx>
Read	<RD_CENTER_CON_MIN_GAP>

Note:

1. xx..xx is the smallest connection gap, set in the range of 75~40000, corresponding to 7.5ms~4000ms. We expand the time value (in milliseconds) by 10 times and write it into the instruction as a parameter.

2. The maximum connection gap must be greater than or equal to the minimum connection gap, otherwise an error will be reported.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-10.

Table 6-10 The format of the response packet which is the feedback of the instruction defined in Section 6.5

Response Type	Response Format
Successful Writing	<st_center_con_min_gap=ok>
Successful reading	<rd_center_con_min_gap=xx..xx,yy..yy>
Failure to read or write	<st_center_con_min_gap=error>

6.6 Set or read the maximum connection gap of host

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-11.

Table 6-11 The format of instruction packet which is the function of "Set or read the maximum connection gap of host"

Instruction Type	Instruction Format
Write	<ST_CENTER_CON_MAX_GAP=yy..yy>
Read	<RD_CENTER_CON_MAX_GAP>

Note:

1. yy..yy is the maximum connection gap, set in the range of 75~40000, corresponding to 7.5ms~4000ms. We expand the time value (in milliseconds) by 10 times and write it into the instruction as a parameter.

2. The maximum connection gap must be greater than or equal to the minimum connection gap, otherwise an error will be reported.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-12.

Table 6-12 The format of the response packet which is the feedback of the instruction defined in Section 6.6

Response Type	Response Format
Successful Writing	<st_center_con_max_gap=ok>
Successful reading	<rd_center_con_max_gap=xx..xx,yy..yy>
Failure to read or write	<st_center_con_max_gap=error>

6.7 Set or read the timeout of the host connection timeout

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-13.

Table 6-13 The format of instruction packet which is the function of "Set or read the

timeout of the host connection timeout”

Instruction Type	Instruction Format
Write	<ST_CENTER_CON_TIMEOUT=xx..xx>
Read	<RD_CENTER_CON_TIMEOUT>

Note:

1. xx..xx set in the range of 500~8000, corresponding to 500ms~8000ms.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-14.

Table 6-14 The format of the response packet which is the feedback of the instruction defined in Section 6.7

Response Type	Response Format
Successful Writing	<st_center_con_timeout=ok>
Successful reading	<rd_center_con_timeout=xx..xx>
Failure to read or write	<st_center_con_timeout=error>

6.8 Binding the MAC address of the slave that needs to be connected

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-15.

Table 6-15 The format of instruction packet which is the function of “Binding the MAC address of the slave that needs to be connected”

Instruction Type	Instruction Format
Write	<ST_BOND_CLIENT_MAC=xxxxxxxxxxxx>
Read	<RD_BOND_CLIENT_MAC>

Note:

1. “xxxxxxxxxxxx” is the MAC address of the bound slave.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-16.

Table 6-16 The format of the response packet which is the feedback of the instruction defined in Section 6.8

Response Type	Response Format
Successful Writing	<st_bond_client_mac=xxxxxxxxxxxx>
Successful reading	<rd_bond_client_mac=xxxxxxxxxxxx>
Failure to read or write	<st_bond_client_mac=error>

Note:

1. After setting up, the module will automatically turn on the scanning function. In other words, the module will automatically set "<ST_SCAN_ONOFF=1>". And then start searching for the MAC address that needs to be bound until the connection is successful.
2. When this function is turned on, the power consumption of the module will reach about 4mA when the module is not connected to the slave.
3. When the module is successfully connected to the slave, the power consumption of the module will be greatly reduced. If the connection gap is large enough, for example, the connection gap of the host is 1s, the power consumption of the module can reach 16μA.

6.9 Cancel the MAC address of the slave that needs to be bound and connected

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-17.

Table 6-17 The format of instruction packet which is the function of "Cancel the MAC address of the slave that needs to be bound and connected"

Instruction Type	Instruction Format
Write	<ST_BOND_CLIENT_MAC=0>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-18.

Table 6-18 The format of the response packet which is the feedback of the instruction defined in Section 6.9

Response Type	Response Format
Successful Writing	<st_bond_client_mac=ok>
Failure to read or write	<st_own_mac=error>

Note:

1. After unbinding, the module will close the scan in host mode. In other words, the module automatically sets "<ST_SCAN_ONOFF=0>". And the module as host will no longer automatically search and connect the bound slaves.

6.10 Turn on or off the ability to scan peripheral Bluetooth devices

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-19.

Table 6-19 The format of instruction packet which is the function of "Turn on or off the ability to scan peripheral Bluetooth devices"

Instruction Type	Instruction Format
Write	<ST_SCAN_DEVICE_ON=x>
Read	<RD_SCAN_DEVICE_ON>

Note:

1. When x=1, it means that the module enables the function of scanning peripheral devices.
2. When x=0, the module disabled the function of scanning peripheral devices.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-20.

Table 6-20 The format of the response packet which is the feedback of the instruction defined in Section 6.10

Response Type	Response Format
Successful Writing	<st_scan_device_on=ok>
Successful reading	<rd_scan_device_on=x>
Failure to read or write	<st_scan_device_on=error> or <rd_scan_device_on=error>
Overtime after scanning	<st_scan_device_on=timeout>

Note:

1. When the instruction of "<st_scan_device_on=timeout>" send to the MCU, the scanning cycle of 20s is over and the scanning is over.

2. When the module has been enable the function of scanning the peripheral devices, the Bluetooth module will continue to scan peripheral devices for 20 seconds.

3. The format of the scanned data is shown in Table 6-21.

Table 6-21 The format of the scanned data

Top	Data Identification Header	MAC address	Broadcast data	RSSI Value	End

4. For example, the scanned data are as follows.

Send→◇<ST_SCAN_DEVICE_ON=1>□
Receive←◆<st_scan_device_on=ok>
Receive←◆<ADV_DATA=784128c58150,1eff060001092002be6a5637d9a17d346b8227a05fdc6c0d6364e08f019a2e,-47>
Receive←◆<ADV_DATA=5ba86175d80c,02011a0aff4c001005031ca38ffc,-60>
Receive←◆<ADV_DATA=5ba86175d80c,02011a0aff4c001005031ca38ffc,-55>
Receive←◆<ADV_DATA=a4da32d1f375,0201061aff4c00021574278bdab64445208f0c720eaf0599350120d81ac5,-81>
Receive←◆<ADV_DATA=64c62c5bc7d6,02011a0aff4c001005031c2adca5,-51>
Receive←◆<st_scan_device_on=timeout>

6.11 Send the Data to the "configble channel" of the Slave in Host Mode

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 6-22.

Table 6-22 The format of instruction packet which is the function of "Send the Data to the "configble channel" of the Slave in Host Mode"

Instruction Type	Instruction Format
Send Data	<SEND_CONFIG_DATA=xx..xx>

Note:

1. "xx..xx" is the data that needs to send. If a data packet contains only this instruction, the maximum length of "xx..xx" is 138 bytes.

2. This instruction can be used in the following two situations. A. After the function of the APP configuration module is enabled, use this instruction to send the parameters needed to configure the slave. B. The slave has configured the connection password, and the mobile APP or the host uses this instruction to send the password.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 6-23.

Table 6-23 The format of the response packet which is the feedback of the instruction defined in Section 6.11

Response Type	Response Format
Validation fails or is disconnected	<send_config_data=error>
Sending instruction	Reply to the corresponding information according to the instructions you

successful	send. Detailed rules reference instruction list.
Connection Password Validation Successful	<SECRET_CONFIRM>

7 The Description of Common Instruction Sets for Host and Slave

7.1 Getting Software Version

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-1.

Table 7-1 The format of instruction packet which is the function of "Getting Software Version"

Instruction Type	Instruction Format
Read	<RD_SOFT_VERSION>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-2.

Table 7-2 The format of the response packet which is the feedback of the instruction defined in Section 7.1

Response Type	Response Format
Successful reading	<rd_soft_version=xxx>
Failure to read	<rd_soft_version=error>

Note:

1. When the version is v1.0, then BLE module return "<rd_soft_version=v1.0>".

7.2 Set or read the transmit power of the module

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-3.

Table 7-3 The format of instruction packet which is the function of "Set or read the transmit power of the module"

Instruction Type	Instruction Format
Write	<ST_TX_POWER=xx..xx>
Read	<RD_TX_POWER>

Note:

1. There are 9 power levels that can be set, they are -40dBm, -20dBm, -16dBm, -12dBm, -8dBm, -4dBm, 0dBm, +3dBm and +4dBm.
2. For example, when set the transmission power to +4dbm, the MCU can send this instruction "< ST_TX_POWER=+4>".

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-4.

Table 7-4 The format of the response packet which is the feedback of the instruction defined in Section 7.2

Response Type	Response Format
Successful Writing	<st_tx_power=ok>
Successful reading	<rd_tx_power=xx..xx>
Failure to write	<st_tx_power=error>

7.3 Bluetooth Reset Instruction

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-5.

Table 7-5 The format of instruction packet which is the function of "Bluetooth Reset Instruction"

Instruction Type	Instruction Format
Write	<ST_RESET_BLE>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-6.

Table 7-6 The format of the response packet which is the feedback of the instruction defined in Section 7.3

Response Type	Response Format
Successful Writing	<st_reset_ble=ok>
Failure to write	<st_reset_ble=error>

Note:

1. After the MCU received the writing successful message, the BLE module will be reset after about 500 ms.

7.4 Set or Read the Baud Rate of Serial Port

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-7.

Table 7-7 The format of instruction packet which is the function of "Set or Read the Baud Rate of Serial Port"

Instruction Type	Instruction Format
Write	<ST_BAUD=xx..xx>
Read	<RD_BAUD>

Note:

1. Settable baud rate up to 921600bps. For example, set the baud rate to 19200bps, then send "<ST_BAUD=19200>".
2. Settable baud rate are 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, 230400bps, 460800bps, 921600bps.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-8.

Table 7-8 The format of the response packet which is the feedback of the instruction defined in Section 7.4

Response Type	Response Format
Successful Writing	<st_baud=ok>
Successful reading	<rd_baud=xx..xx>
Failure to write	<st_baud=error>

7.5 Query the MAC Address of the BLE Module of this unit

The direction of instruction stream is MCU to BLE module. The format of instruction packet

is shown in Table 7-9.

Table 7-9 The format of instruction packet which is the function of "Query the MAC Address of the BLE Module of this unit"

Instruction Type	Instruction Format
Read	<RD_BLE_MAC>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-10.

Table 7-10 The format of the response packet which is the feedback of the instruction defined in Section 7.5

Response Type	Response Format
Successful reading	<rd_ble_mac=xxxxxxxxxxxx>
Failure to read	<rd_ble_mac=error>

Note:

1. "xxxxxxxxxxxx" fixed to 12 bytes of MAC address, returned in large-end mode.

7.6 Set or Read the value of T1

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-11.

Table 7-11 The format of instruction packet which is the function of "Set or Read the value of T1"

Instruction Type	Instruction Format
Write	<ST_T1=x>
Read	<RD_T1>

Note:

1. 'x' is the value to be set for T1. Its range is 1~255, corresponding to 1ms~255ms.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-12.

Table 7-12 The format of the response packet which is the feedback of the instruction defined in Section 7.6

Response Type	Response Format
Successful Writing	<st_t1=ok>
Successful reading	<rd_t1=x>
Failure to write	<st_t1=error>

Note:

1. The definition of T1 is given in Section 4.6 of this document.

7.7 Set the user-defined MAC address

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-13.

Table 7-13 The format of instruction packet which is the function of "Set the user-defined MAC address"

Instruction Type	Instruction Format
Write	<ST_OWN_MAC=xxxxxxxxxxxx>

Note:

1. Where “xxxxxxxxxxxx” is the MAC address to be set.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-14.

Table 7-14 The format of the response packet which is the feedback of the instruction defined in Section 7.7

Response Type	Response Format
Successful Writing	<st_own_mac=ok>
Failure to write	<st_own_mac=error>

Note:

1. After setting up, the module will restart automatically, and then broadcast with the new user-defined MAC address.

7.8 Cancel the User-defined MAC Address of this unit

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-15.

Table 7-15 The format of instruction packet which is the function of “Cancel the User-defined MAC Address of this unit”

Instruction Type	Instruction Format
Write	<ST_OWN_MAC=0>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-16.

Table 7-16 The format of the response packet which is the feedback of the instruction defined in Section 7.8

Response Type	Response Format
Successful Writing	<st_own_mac=ok>
Failure to write	<st_own_mac=error>

Note:

1. When the user-defined MAC address is cancelled, the module will return to the default MAC address.

7.9 Enable or Disable the Even Parity of Serial Port, Query the Status of the Even Parity

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-17.

Table 7-17 The format of instruction packet which is the function of “Enable or Disable the Even Parity of Serial Port, Query the Status of the Even Parity”

Instruction Type	Instruction Format
Write	<ST_UART_EVEN=x>
Read	<RD_UART_EVEN>

Note:

1. When x=1, the module enables the function of even parity of serial port.
2. When x=0, the module disabled the function of even parity of serial port.
3. Effective immediately after setting up.
4. The format of serial port sending data in even parity mode is nine bits, the first eight bits are data bits, and the last one is check bits.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-18.

Table 7-18 The format of the response packet which is the feedback of the instruction defined in Section 7.9

Response Type	Response Format
Successful Writing	<st_uart_even=ok>
Successful reading	<rd_uart_even=x>
Failure to write	<st_uart_even=error>

Note:

1. When x=1, the function of even parity has been enabled. When x=0, the function of even parity has been disabled.

7.10 Set or read the delay time for pull down PIN10/P.00

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-19.

Table 7-19 The format of instruction packet which is the function of "Set or read the delay time for pull down PIN10/P.00"

Instruction Type	Instruction Format
Write	<ST_AD_WAIT=x>
Read	<RD_AD_WAIT>

Note:

1. 'x' is the value to be set. Its range is 1~255, corresponding to 1ms~255ms. The default value is ten milliseconds

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-20.

Table 7-20 The format of the response packet which is the feedback of the instruction defined in Section 7.10

Response Type	Response Format
Successful Writing	<st_ad_wait=ok>
Successful reading	<rd_ad_wait=x>
Failure to write	<st_ad_wait=error>

7.11 Enable or disable the internal input pull-up resistance of BLE-RX pin

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-21.

Table 7-21 The format of instruction packet which is the function of "Enable or disable the internal input pull-up resistance of BLE-RX pin"

Instruction Type	Instruction Format
Write	<ST_UART_PULL=x>
Read	<RD_UART_PULL>

Note:

1. When x=1, then enable the internal input pull-up resistance of the BLE-RX pin.
2. When x=0, then disable the internal input pull-up resistance of the BLE-RX pin.
3. Effective immediately after setting up.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-22.

Table 7-22 The format of the response packet which is the feedback of the instruction defined in Section 7.11

Response Type	Response Format
Successful Writing	<st_uart_pull=ok>
Successful reading	<rd_uart_pull=x>
Failure to write	<st_uart_pull=error>

Note:

1. When x=1, then enable the internal input pull-up resistance of the BLE-RX pin.
2. When x=0, then disable the internal input pull-up resistance of the BLE-RX pin.

7.12 Restore the module to factory settings

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-23.

Table 7-23 The format of instruction packet which is the function of "Restore the module to factory settings"

Instruction Type	Instruction Format
Write	<ST_FACTORY=1>

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-24.

Table 7-24 The format of the response packet which is the feedback of the instruction defined in Section 7.12

Response Type	Response Format
Successful Writing	<st_factory=ok>
Failure to write	<st_factory=error>

7.13 Set the function of P0.01 Serial Port Enable Pin

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-25.

Table 7-25 The format of instruction packet which is the function of "Set the function of P0.01 Serial Port Enable Pin"

Instruction Type	Instruction Format

Write	<ST_WAKEUP_HIGH=x>
Read	<RD_WAKEUP_HIGH>

Note:

1. If you need to set the functions of P0.01 pins to be active high, set x to 1.
2. If you need to set the functions of P0.01 pins to be active low, set x to 0.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-26.

Table 7-26 The format of the response packet which is the feedback of the instruction defined in Section 7.13

Response Type	Response Format
Successful Writing	<st_wakeup_high=ok>
Successful reading	<rd_wakeup_high=x>
Failure to read	<rd_wakeup_high=error>

Note:

1. When x=1, the functions of P0.01 pins is high to enable serial port reception.
2. When x=0, the functions of P0.01 pins is low to enable serial port reception.

7.14 Select the function of P0.21/nRESET pin

The direction of instruction stream is MCU to BLE module. The format of instruction packet is shown in Table 7-27.

Table 7-27 The format of instruction packet which is the function of "Set the function of P0.01 Serial Port Enable Pin"

Instruction Type	Instruction Format
Write	<ST_WAKEUP_HIGH=x>
Read	<RD_WAKEUP_HIGH>

Note:

1. If you need to set the functions of P0.01 pins to be active high, set x to 1.
2. If you need to set the functions of P0.01 pins to be active low, set x to 0.

The direction of response stream is BLE module to MCU. The format of response packet is shown in Table 7-28.

Table 7-28 The format of the response packet which is the feedback of the instruction defined in Section 7.14

Response Type	Response Format
Successful Writing	<st_wakeup_high=ok>
Successful reading	<rd_wakeup_high=x>
Failure to read	<rd_wakeup_high=error>

Note:

1. When x=1, the functions of P0.01 pins is high to enable serial port reception.
2. When x=0, the functions of P0.01 pins is low to enable serial port reception.

8 EASY-BOND Mode

In addition to confirming the slave's MAC address by scanning, and then use the function of binding slave's instructions to binding slave, we also provide an EASY-BOND mode, which can control the host to bind several peripheral Bluetooth devices quickly and easily.

8.1 The steps of the slave

First, the slave need to enter the EASY-BOND mode.
Step 1: Pull down the pin of P0.01/XL2, enable and open the serial port.
Step 2: Pull up the pin of P0.20. At this time, the slave enters the EASY-BOND mode.

8.2 The steps of the host

Step 1: Pull down the pin of P0.01/XL2, enable and open the serial port. The host sends the instruction which is “<ST_ENTER_EASY_BOND=1>”. Return “<st_enter_easy_bond=ok>” after successful execution.

Step 2: The timeout time of the host enters the EASY-BOND mode is 20s. If the host does not find the slave that requests binding within 20 seconds, it will return “<st_enter_easy_bond=timeout>”. If the binding succeeds during this period, it will returns “<st_enter_easy_bond=success>”.

Step 3: Once the binding is successful, the host will connect the bound slave immediately, and will automatically connect every time when the power is on.

Step 4: If you need to query whether the host is currently in EASY-BOND mode, send “<RD_ENTER_EASY_BOND>” to read, and the module will return “<rd_enter_easy_bond=x>”. The x=1 indicates that the host is in EASY-BOND mode, and the x=0 indicates that it is not in EASY-BOND mode.

9 Description of Data Receive and Send

1. Regardless of the module as host or slave, we send and receive data in the transparent transmission mode.

2. The path of Bluetooth module sending data can be selected. If the host and slave are connected to the module at the same time, then we can choose the data transmission path using PIN15/P0.18 pin, and we can choose whether to send to APP or connected slave. If the Bluetooth module is not connected to any device as the host, the PIN15/P0.18 pin's level will be ignored and the data will always be sent to the mobile APP.

3. Whether the data sent from the mobile APP or the connected slave of module, we send all the data through the serial port of the BLE module. If the slave connected of module and the mobile APP communicates with each other, please forward the data through the MCU.

10 Description of all parameters of mobile APP configuration module

In order to facilitate the user to configure the parameters of the module, we allow APP to read or write all the parameters of the module. But for security, we need PIN14/P0.16 pin for physical control. Only when the user's external MCU pulls up the PIN14/P0.16 pin, can APP be allowed to configure.

Step 1: First, keep the BLE module connected and the “notification” function of the “0XFFF3” channel is turned on.

Step 2: Pull up the PIN14/P0.16 pin.

Step 3: Then you can send instructions and read parameters through the “0XFFF3” channel.

Note:

1. When the APP’s configuration function is enabled, if the instruction does not exist, then return “<!cmd_no_exist_or_error!>” in “0XFFF3” channel. If the instruction exists and complies with the rules, the result will be returned according to the instruction list.

2. When the APP’s configuration function is disabled, no matter what type of instruction is sent to module, the module will be return “<!not_allow_config!>” in “0XFFF3” channel.

11 Bluetooth module default parameters

●UART RX pin pull-up enabling
- Default serial port parameters:115200bps, N 8 1 even check disabled
- Default transmit power: +0dBm

●Module normal broadcasting enabling
- Default broadcasting gap of slave: 500ms
- Default minimum connection gap for slave: 20ms
- Default maximum connection gap for slave: 40ms
- Default connection timeout time of slave: 5s

●Module host scan function disabled
- Default scan gap for Host: 6.25ms
- Default minimum connection gap for Host: 10ms
- Default maximum connection gap for the host: 20ms
- Default connection timeout time for host: 6s
- The default mode host writes data to slave in write_no_rsp mode

●The default mode for host to write data to slaves is “write_no_rsp”
- Host rejects the requests from the slave that get connection parameters
- The host does not bind any slave devices

●The number of hosts that a module as a slave can be connected to: one
●The number of slaves that a module as a host can connect to: one

● The default value of T1 is 2ms.
● The waiting time after data transmission is 10 ms.