UM019180

RHF0M0E5 User Manual

V1.2

Document information

Info	Content
Keywords	*RisingHF, User Manual, Instruction*
Abstract	RHF0M0x5 module user manual to help users quickly use the module

Content

1 Preface

RHF0M0E5 is a low-cost, ultra-low power, ultra-small size LoRaWAN® module designed by Rui Xing Heng Fang Network (Shenzhen) Co., Ltd. The module uses ST system on chip STM32WLE5JC, intergrated high-performance LoRa® SX126X IP and ultra-low power Consumption of MCU. The target application of this module is wireless sensor networks and other Internet of Things devices, especially battery-powered low power consumption and long-distance occasions.

2 Hardware Description

2.1 Pin definition

28 pin SMT package for module:

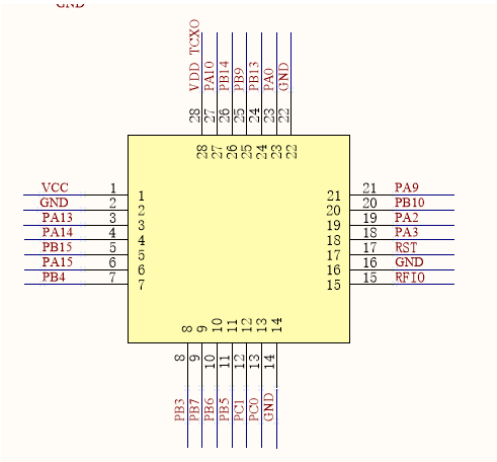

Figure 2-1 RHF0M0E5 Pin arrangement

2.2 Pin details

PB0 is used for TCXO power supply and should not be used normally.

Number	Name	Type	Description
1	VCC	-	Supply voltage for the module
2	GND	-	Ground
3	PA13	I	SWDIO of SWIM for program download
4	PA14	I/O	SWCLK of SWIM for program download
5	PB15	I/O	SCL of I2C2 from MCU
6	PA15	I/O	SDA of I2C2 from MCU
7	PB4	I/O	MCU GPIO
8	PB3	I/O	MCU GPIO
9	PB7	I/O	UART1_RX from MCU
10	PB6	I/O	UART1_TX from MCU
11	PB5	I/O	MCU GPIO

12	PC1	I/O	MCU GPIO；LPUART1_TX from MCU
13	PC0	I/O	MCU GPIO；LPUART1_RX from MCU
14	GND	-	Ground
15	RFIO	I/O	RF input/output
16	GND	-	Ground
17	RST	I/O	Reset trigger input for MCU
18	PA3	I/O	MCU GPIO；USART2_RX from MCU
19	PA2	I/O	MCU GPIO；USART2_TX from MCU
20	PB10	I/O	MCU GPIO
21	PA9	I/O	MCU GPIO
22	GND	-	Ground
23	PA0	I/O	MCU GPIO
24	PB13	I/O	SPI2_SCK from MCU; Boot pin(Active low)
25	PB9	I/O	SPI2_NSS from MCU
26	PB14	I/O	SPI2_MISO from MCU
27	PA10	I/O	SPI2_MOSI from MCU
28	PB0	I/O	Unavailable；Suspended treatment

3 quick start

MCU communicates with module through serial port. The default parameter is "9600, 8, N, 1" (9600 baud rate, 8-bit data, no parity, 1-bit stop bit).

The following is the key information entered in the manufacturing, which can be modified by at command, but cannot be read by at command.

AppKey：2B7E151628AED2A6ABF7158809CF4F3C
AppSKey：2B7E151628AED2A6ABF7158809CF4F3C
NwkSKey：2B7E151628AED2A6ABF7158809CF4F3C

3.1 ABP mode

Use the AT+ID command to query the module ID information and register the ID information to the server ABP mode device. Follow these steps to configure the node so that it can communicate with the server.

3.1.1 ID query

Format：

AT+ID

Return：

+ID: DevAddr, 00:DF:E0:2E

+ID: DevEui, 20:4F:37:50:32:36:50:08
+ID: AppEui, 52:69:73:69:6E:67:48:46

3.1.2 Configure band

Set the band of the node according to the working frequency of the gateway.(EU868、US915、US915、HYBRID、CN779 、EU433、AU915、AU915OLD、CN470、AS923、KR920、IN865 、RU864、CN470PREQUEL、STE920)

Format：

AT+DR=CN470

Return：

+DR: CN470

3.1.3 Configure channels

Set the channel of the node according to the type of gateway subnet

Format：

AT+CH=NUM,0-7

Return：

+CH: NUM, 0-7

Query whether the channel of the module matches the gateway through the AT+CH command

Format：

AT+CH

Return：

+CH: 8; 0,470300000,DR0,DR5; 1,470500000,DR0,DR5; 2,470700000,DR0,DR5; 3,470900000,DR0,DR5; 4,471100000,DR0,DR5; 5,471300000,DR0,DR5; 6,471500000,DR0,DR5; 7,471700000,DR0,DR5;

3.1.4 Configure mode

Format：

AT+MODE=ABP

Return：

+MODE: LWABP

3.1.5 Configure class

Format：

AT+CLASS=A

Return：

+CLASS: A

3.1.6 Communication

Format：

AT+MSG=123

Return：

+MSG: Start

+MSG: Done

3.2 OTAA mode

Use the AT+ID command to query the module ID information and register the ID information to the server OTAA mode device. Follow these steps to configure the node so that it can communicate with the server.

3.2.1 ID query

Format：

AT+ID

Return：

+ID: DevAddr, 00:DF:E0:2E
+ID: DevEui, 20:4F:37:50:32:36:50:08
+ID: AppEui, 52:69:73:69:6E:67:48:46

3.2.2 Configure band

Set the band of the node according to the working frequency of the gateway.(EU868、US915、US915、HYBRID、CN779 、EU433、AU915、AU915OLD、CN470、AS923、KR920、IN865 、RU864、CN470PREQUEL、STE920)

Format：

AT+DR=CN470

Return：

+DR: CN470

3.2.3 Configure channels

Set the channel of the node according to the type of gateway sub band

Format：

AT+CH=NUM,0-7

Return：

+CH: NUM, 0-7

Query whether the channel of the module matches the gateway through the AT+CH command

Format：

AT+CH

Return：

+CH: 8; 0,470300000,DR0,DR5; 1,470500000,DR0,DR5; 2,470700000,DR0,DR5; 3,470900000,DR0,DR5; 4,471100000,DR0,DR5; 5,471300000,DR0,DR5; 6,471500000,DR0,DR5; 7,471700000,DR0,DR5;

3.2.4 Configure mode

Format：

AT+MODE=OTAA

Return：

+MODE: LWOTAA

3.2.5 Configure class

Format：

AT+CLASS=A

Return：

+CLASS: A

3.2.6 Join

Use the at + join command to join the network. Start the network access process when the module is not connected to the network

Format：

AT+JOIN

Return：

+JOIN: Start
+JOIN: NORMAL
+JOIN: Network joined
+JOIN: NetID 000000 DevAddr 01:09:BD:8C
+JOIN: Done

Use the at + join command to join the network. Return to network status when the module is connected to the network

Format：

AT+JOIN

Return：

+JOIN: Joined already

Use the AT+JOIN=FORCE command to force joining the network.

Format：

AT+JOIN=FORCE

Return：

JOIN: Start
+JOIN: FORCE
+JOIN: Network joined
+JOIN: NetID 000000 DevAddr 01:09:BD:8C
+JOIN: Done

3.3 TEST mode

Test mode is used to evaluate the performance of the module, which helps the user to find the module problems

Use AT+MODE=TEST configuration module to enter test mode

Format：

AT+MODE=TEST

Return：

+MODE: TEST

Use AT+TEST=RFCFG to configure parameters in module test mode

AT+TEST=RFCFG,[FREQUENCY],[SF],[BANDWIDTH],[TX PR],[RX PR],[TX POWER],[CRC],[IQ],[NET]

Format：

AT+TEST=RFCFG,470,7,125,8,8,14,OFF,OFF,OFF

Return：

+TEST: RFCFG F:470000000, SF7, BW125K, TXPR:8, RXPR:8, POW:14dBm, CRC:OFF, IQ:OFF, NET:OFF

3.3.1 test noise floor

Parameter 470 is the test frequency (MHz) and parameter 25 is the number of samples.
The return parameters - 98, - 98, - 98 are the average value, the maximum value and the minimum value, respectively.

Format：

AT+TEST=RSSI,470,25

Return：

+TEST: RSSI, -98, -98, -98

3.3.2 test TXCW

Format：

AT+TEST=TXCW

Return：

+TEST: TXCW

3.3.1 test CLORA

Format：

AT+TEST=TXCLORA

Return：

+TEST: TXCLORA

3.3.2 test send LORA packet

Format：

AT+TEST=TXLRPKT,112233

Return：

+TEST: TXLRPKT "112233"
+TEST: TX DONE

3.3.3 test receive LORA packet

Format：

AT+TEST=RXLRPKT

Return：

+TEST: RXLRPKT

Display message when LORA packet is received

Return：

+TEST: LEN:3, RSSI:-11, SNR:12

+TEST: RX "AB04BA"

4 FAQ

Q：Why does not the baud rate change take effect immediately after setting

A：Restart the module to take effect after baud rate setting

Q：Why there is no response when entering DFU mode

A：In DFU mode, the baud rate of the serial port is 115200. Check whether the baud rate of the serial port tool is correct. RHF0M0x5 module does not need to be restarted

Q:：Node sending data completed, but the server did not receive data

A：

1、Check whether gateway and node devices are registered to the server

2、Check whether the working band of the node and the gateway matches, and whether the working channels matches

3、Check whether the working mode and working type of the node are consistent with the device information registered by the server

4、Check whether the node supports the set working frequency band

5、Check whether the antenna of each node and gateway is correct

Revision

V1.2 2020-09-25

+ Update STM32WLE5JC description

V1.1 2020-05-08

+ Initial creation

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