

# **FC-211SP (V4.1) Micropower Data RF Module**

## **USER MANUAL**



**SHENZHEN FRIENDCOM TECHNOLOGY DEVELOPMENT CO. , LTD**

**Address: 2/F, Multifunction Building, Dongpeng Industrial Park, Wuhao Road,  
North Section of Hi-tech Park, Shenzhen 518057 China**

**Tel: +86-755-86026603 +86-755-29926100**

**Fax: +86-755-86026300**

**E-mail: [faq@friendcom.com](mailto:faq@friendcom.com)**

**Website: <http://www.friendcom.cn>**

## TABLE OF CONTENTS

TABLE OF CONTENTS-----	1
FEATURES-----	2
APPLICATION-----	2
HOW TO USE FC-211SP-----	3
TECHNICAL SPECIFICATION-----	6
FACTORY DEFAULT SETTING AND ACCESSORIES-----	7

## I .Features of FC-211/SP Micropower Data RF Module

### 1. ISM frequency band, requiring on application of frequency point.

Carrier frequency is 433MHz, also capable of providing 868MHz/915MHz carrier frequency.

### 2. High anti-interference and low BER(Bit error Rate)

Based on the FSK modulation mode, the high-efficiency FEC channel encoding technology is used to enhance data's resistance to both burst interference and random interference

### 3. Long transmission distance

Within the range of visibility and the antenna height >2m, the reliable transmission distance >800m(BER= $10^{-6}$ /2400Bps).

### 4.Three interface modes , convenient for setting and use

FC-211SP can provide three transparent interfaces : TTL,/RS232/ RS485 ,but the user should customize only one of the above before purchasing. The interface data rate is 1200/2400/4800/9600Bps optional and its format is 8N1/ 8E1/ 8o1 user-defined.

### 5. Multi-channel

The standard FC-211SP configuration provides 8 channels. If the user needs, it can be extended to more channels, meeting the multiple communication combination mode of the user.

### 6.Large data buffer

FC-211SP can transmit more than 750 bytes long data frames at one time .if the air data rate is greater than the interface rate ,It can transmit more than 200K bytes data frames.

### 7 . Intelligent data control and transparent data transmission.

FC-211SP works in a semi duplex communication mode. The user doesn't need to prepare excessive programs but receive/transmit the data from the interface. FC-211SP will automatically complete the other operations such as transmission/receiving conversion in the air, control,etc.

### 8. Low power consumption

Receiving current is <28mA, transmitting current is <70mA, and sleep current is <3uA.(TTL interface used)

### 9. High reliability, small and light convenient embedding.

Single chip RF integrated circuit and single chip MCU are used for lessened peripheral circuits, high reliability, and low failure rate.

## II . Application of FC-211/SP Micropower Data RF Module

- ◆ FC-211/SP Micropower Data RF Module is suitable for:
- ◆ Wireless data transmission.

- ◆ Wireless meter reading
- ◆ Automatic data collecting system
- ◆ Industrial remote control and remote measurement
- ◆ Building automation, safety and security, powerhouse equipment wireless monitor, entrance control system

### III. How to use FC-211/SP Micropower Data RF Module

#### 1. Interface sketch map

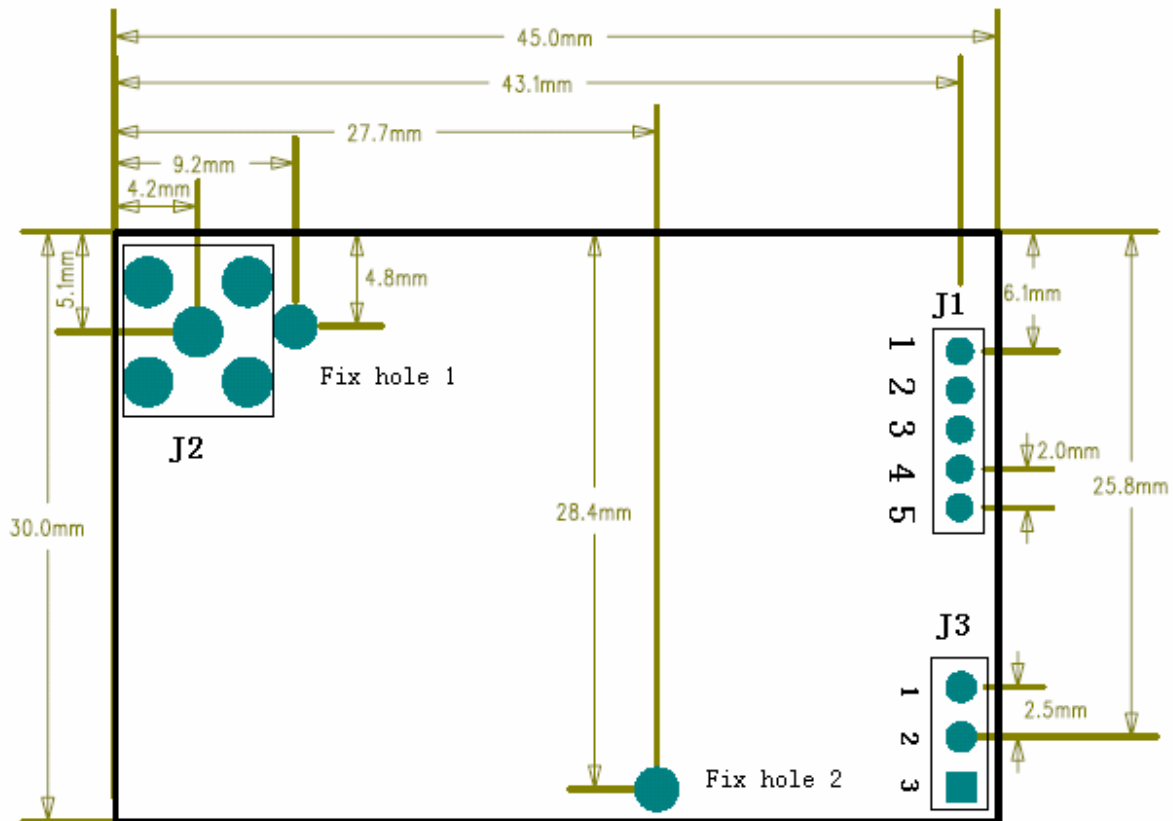


Fig1. FC-211SP Interface sketch map(View from the back of PCB v4.1)

#### 2. Dimension and weight

Size: 45mmX30mmX10mm

Weight: 10g (antenna excluded)

3. Denfinition of FC-211SP interface.

##### J1: User interface

Pin 1:  $5.0 \pm 0.5V$  (3V optional)

Pin 2: GND

Pin 3: RXD: serial data receiving end (RS485 A)

Pin 4: TXD: serial data transmitting end (RS485 B)

Pin 5: IDLE: power-saving mode selection (IDLE mode), hung or Low level takes effect., high level (3.0V ) is for active mode.

**J2: Antenna interface**

**J3: User interface**

Pin1: Green light

Pin 2: Power supply

Pin 3: Red light

**4. Connection with the terminal**

FC-211SP can provide TTL/RS232/RS485 interface. Please select one interface mode while purchasing the product.

Antenna

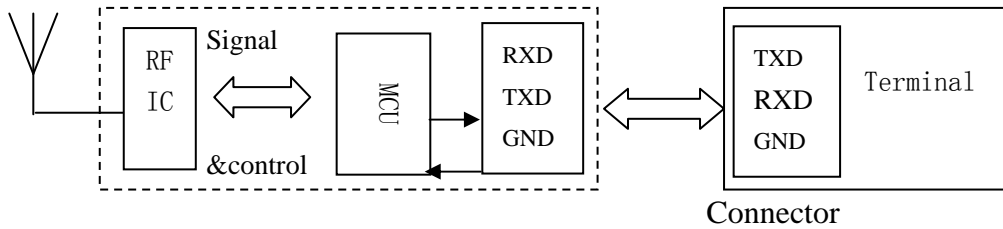


Fig2.FC-211SP application principle map

**5.Setting of channel , interface and data format**

**1).Setting or reading parameters**

User can set or read the serial port data rate, air data rate , channel number and address code .

Parameter setting or reading can be done with software FC211SP.EXE in our delivered CD.

**Command frame format:**

Table 1.

Command frame header	Frame length	Command word	Check sum
----------------------	--------------	--------------	-----------

Command frame header: 55H AAH

Frame length = Command word length +1

Command word: less than 8 bytes

Check sum (2 bytes): Frame length +command data 1+...+command data n

All of the command word expressed in hex.

Table 2. Command frame format:

Command type	Frame header	Frame length	Command word	Check sum	Remarks
Channel No.	55 AA	06	07 XX 00 00 00		XX: 01-08
Air data rate setting	55 AA	04	20 05 XX		XX=00: 2400; 20: 1200; 30: 4800; 40: 9600
Power-saving mode setting	55 AA	04	58 00 XX		XX= 00: mode 1 22: mode 2
Power-saving mode reading	55 AA	04	59 00 00		Return: 59 00 XX
Address code setting	55 AA	04	32 XX XX		XXXX: 4 bytes BCD (0000-9999)
Interface data rate setting	55 AA	03	28 XY		X=0: no check; X=2: odd check; X=3: even check; Y=0: 9600; Y=1: 4800; Y=2: 2400; Y=3: 1200; Y=4: 600; Y=6: 19200
Channel reading	55 AA	03	24 00		Return : 24 XX
Air data rate reading	55 AA	03	23 00		Return: 23 XX
Address code reading	55 AA	04	26 00 00		Return: 26 XX XX
Correct setting response	55 AA	02	20	00 22	
Wrong setting response	55 AA	02	21	00 23	

**2). Channel and Frequency**

Table3. Corresponding frequency of 1~8 channels

Channel No.	Frequency	Channel No.	Frequency
1	432.8000MHZ	2	432.9000MHZ
3	433.0000MHZ	4	433.1000MHZ
5	433.2000MHZ	6	433.3000MHZ
7	433.4000MHZ	8	433.5000MHZ

**5.Low power consumption(sleep)function of FC-211SP**

**The module keeps active (receiving /transmitting) when Pin IDLE(Pin 5 of J1) is high. It will enter into sleep mode if pin IDLE keeps hung or low while its receiving /transmitting stops for 5s.**

(1). In sleep mode one, CPU stops working ,but the periphery receiving circuit of the module alternates between work(standby reception status) and sleep status. The ratio of work/sleep time is 1/200. It can be waked up by the following two cases:

A. If pin IDLE jumps high or the module receives any data from the interface, the module will wake up, then it will send wakening command to wake up other sleeping modules. The module can receive/transmit data from/to air after an interval of 1s, but just after 20ms its interface can handle data. The consumption current is less than 3  $\mu$  A(special requirement for hardware) if the reliable transmission distance is required up to 350m, and the consumption current is less than 5mA. If the reliable transmission distance is required up to 800m.

B. The module can be waked up by wakening command from air, and it can receive/transmit data promptly after being waked up.

(2). In sleep mode two, All the peripheral circuit is powered down and CPU is out of work with the least consumption of less than 1.5 $\mu$ A.If the interface has any data(00 is optimal) or IDLE keeps high,the module will exit from this mode but will not receive the first byte of data correctly. A low pulse should be send to wake up CPU on pin RXD. After at least 10ms for CPU startup, the correct transmission is ensured.

**Note: Pin IDLE connects to high level in default case. Low power consumption mode is disable. The function should be declared if user needs.**

**IV. Technical specification of FC-211SP**

Table 4. Technical specification

1	Modulation mode	FSK	
2	Carrier frequency	428.00~433.50MHZ	
3	RF power	$\leq 30$ mW	
4	Receiving sensitivity	-116dBm	
5	Sleep current	<3 $\mu$ A/TTL , <0.3mA/RS485 , <3mA/RS232	
6	Transmitting current	<70mA/TTL , <70mA/RS485 , <75mA/RS232	

7	Receiving current	<27mA/TTL , <27mA/RS485 , <30mA/RS232	
8	Channel data rate	1200/2400/4800/9600Bps	Set by user
9	Interface data rate	1200/2400/4800/9600BBps	Set by user
10	Interface data format	8E1/8N1/8O1	Set by user
11	Power supply	DC 5±0.5V	
12	Temperature	-25℃ ~ 60℃	
13	Working humidity	10% ~ 90% RH, non-condensing	
14	Dimension	45mm × 30mm × 10mm	

#### V. Factory default setting and Accessories.

##### Factory default setting

Channel No.	1
Interface data rate	9600bps
Air data rate	9600bps
Check	no check

##### Accessories

User's manual	1 pcs
5-core port	1
433MHz/SMA antenna	optional
CD	1