

FC-201S Micropower Data Transmission 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

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

TABLE OF CONTENTS

TABLE OF CONENTS-----	1
FEATURES-----	2
APPLICATION FIELD-----	2
HOW TO USE FC-201/S-----	3
POWER SUPPLY-----	3
CONNECTING FC-201/S WITH THE TERMINAL-----	3
SKETCH MAP OF OVERALL SIZE AND STRUCTURE-----	4
DESCRIPTIONG OF FC-201/S INTERFACE-----	4
SETTING OF CHANNEL, INTERFACE AND DATA FORMAT-----	5
DESCRIPTION OF FC-201S I/O FUNCTION-----	6
TECHNICAL SPECIFICATIONS-----	7
APPLICATION OF FC-201/S NETWORKING-----	8
DEFAULT SETTING AND ACCESSORIES-----	9
DESCRIPTION OF TYPE-----	9

I . Features

1. Wireless I/O function

FC-201S can transmit wireless data. It also can implement the collection of input states and controlling of on-off output.

2. ISM frequency band, requiring no applying of frequency point.

Carrier frequency is 433MHz, also capable of working in 315 MHz /868MHz/915MHz carrier frequency.

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

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

4. Excellent transmission performance

Within the visible range and the antenna height >3m, the reliable transmission distance >300m(BER= 10^{-6} /1200Bps).

5. Three interface modes, convenient for setting and use

FC-201S can provide three transparent interfaces: TTL/RS232/ RS485, but user should customize only one of the above while placing an order.

6. Multi-channel

The standard FC-201S configuration provides 8 channels, meeting the multiple communication combination mode of the user.

7. Intelligent data control and transparent data transmission

The user doesn't need to prepare excessive programs but receive/transmit the data from the interface. FC-201S will automatically complete the other operations such as transmission/receiving conversion in the air, control, etc.

8. Low power consumption

Receiving current is <20mA, transmitting current is <70mA, and sleep current is <2mA. (TTL interface used)

9. High reliability, small and light for convenient embedding

Single chip RF integrated circuit and single chip MCU are used for lessened peripheral circuits, high reliability, and low failure rate. The module is sealed with epoxy resin for better protection.

II .Application Field

FC-201S micro power Data RF Module is suitable for:

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

III How to use FC-201S

FC-201S provides three interface modes including standard RS-232, RS-485 and UART/TTL allowing direct connection with computer, user's RS-485 device, monolithic processor and other components for application. The application principle map of FC-201S is shown below:

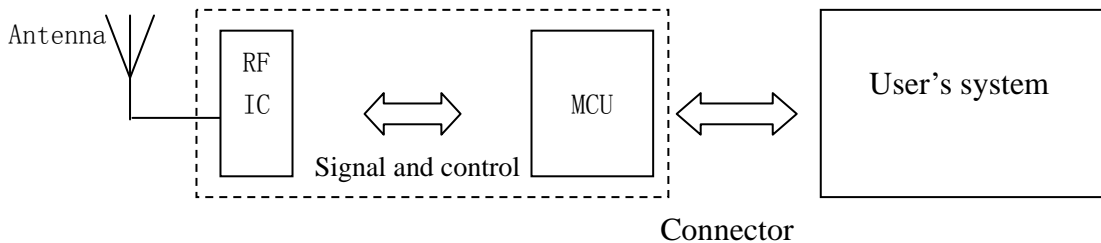


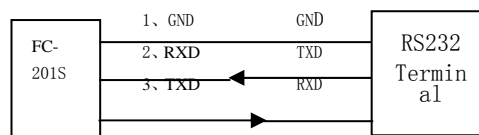
Fig.1. Application principle sketch map of FC-201S

1. Power supply

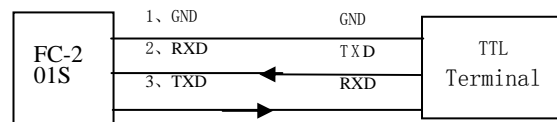
FC-201/S uses DC power supply with voltage of +3V or +5V. It can also share power supply with other equipments. However, the high quality power supply with desirable ripple factor should be selected. In addition, the reliable grounding must be used if there is other device in the system. In case of failure to connect with the earth, it can form its own grounding, but it must be absolutely separated from the municipal electric supply.

2. Connecting FC-201S with the terminal

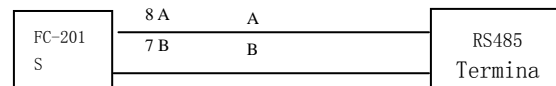
a. FC-201S connected with terminal via RS232.



b. FC-201S connected with terminal via TTL.



c. FC-201S connected with terminal via RS485



3. Sketch map of Overall size and structure, fig. 3 (back), fig. 4 (front)

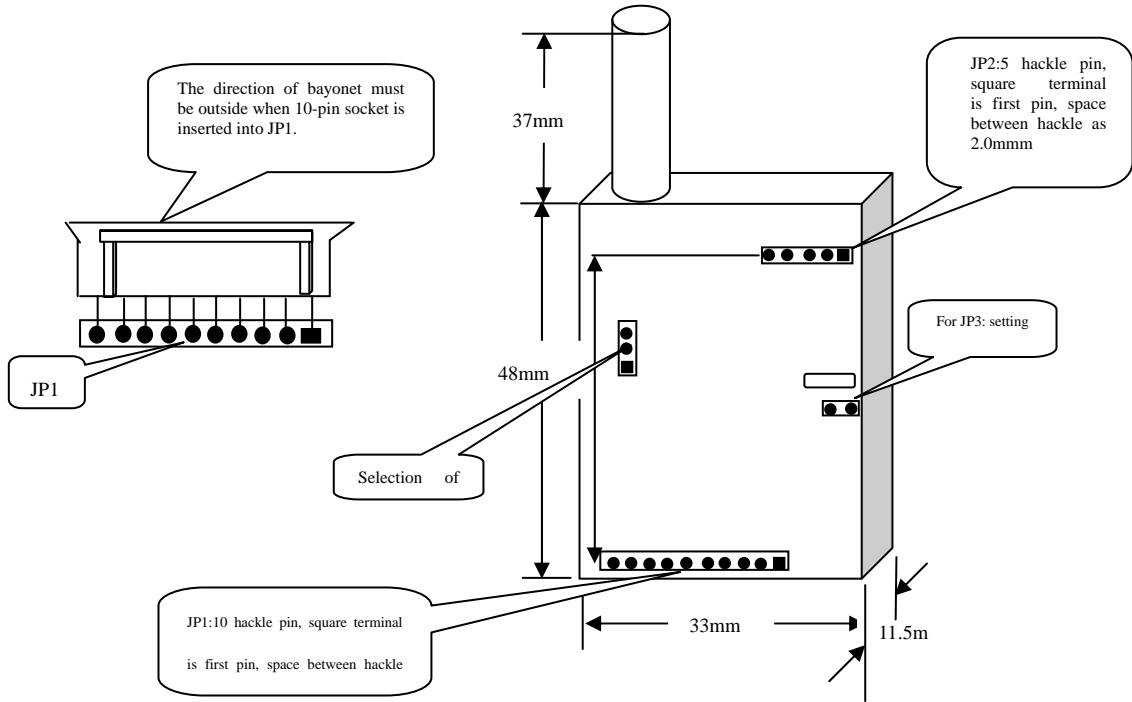


Fig. 3. Sketch map of FC-201S (back)

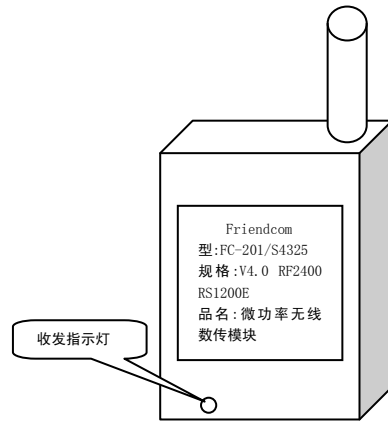


Fig.4 Sketch map of FC-201S (front)

4. Definition of FC-201S interface

(1) FC-201S provides one 10-pin connector (JP1) and one 5-pin connector (JP2). The definitions are shown below.

Table 1: Definition of JP1 pins and connection method:

Pin No.	FC-201S	Description	Level	Connected to the terminal	Remarks
1	GND	Power supply grounding		Power supply grounding	* O1 and O2 is OC output.
2	RXD	RS-232/TTL receiving data end		TXD	(User should select pull-up)

3	TXD	RS-232/TTL transmitting data end		RXD	resistance based on application).
4	CTS	data flow control signal			
5	O1	Output control signal	TTL		
6	O2	Output control signal	TTL		
7	B	RS-485 B			
8	A	RS-485 A			
9	VCC	Power supply DC	+3V or +5V		
10	GND	Signal grounding		Signal grounding	

Table2: Definitions of JP2 connector

Pin No.	FC-201S	Level	Remark
1	I 1: input of test signal	TTL level L/H	H : high level L : low level
2	I 2: input of test signal	TTL level L/H	
3	I 3: input of test signal	TTL level L/H	
4	I 4: input of test signal	TTL level L/H	
5	GND: grounding		

5. Setting of channel, interface and data format

1)、Setting and reading of 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 FC201S.EXE in our delivered CD.

Command frame format:

Table 3

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 denoted in hex.

Table 4.

Command type	Frame	Frame	Command	Check	Remarks
--------------	-------	-------	---------	-------	---------

	header	length	word	sum	
Channel No. setting	55 AA	06	07 XX 00 00 00		XX : 01-04
Air data rate setting	55 AA	04	20 05 XX		XX= 00: 2400; 20: 1200; 30: 4800; 40: 9600; 80: 19200
Address code setting	55 AA	04	32 XX XX		XXXX: 4 bytes BCD (0000-9999)
Serial port 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

Before using FC-201S, the user can make simple configuration based on its own needs to determine the channel, interface mode and data format.

2)、Channel and Frequency

Table 5. Corresponding frequency of 1~8 channels

Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency	Channel No.	Frequency
1	428.0028M HZ	2	429.0012 MHZ	3	433.3020M HZ	4	433.9164M HZ
5	434.5308M HZ	6	430.0764 MHZ	7	431.4588M HZ	8	432.8412M HZ

6. Description of FC-201S I/O function.

FC-201S appends I/O function which makes it quite easy to test or control remote signal. For example, we want to control a remote device, the master station only input 'Identification [code @OUT1L/H'\(capital](#) letter) from computer, then execute 'send' and command can be sent from

master station. Slave station will promptly send back ‘Identification code@ACK’ for acknowledgement if it receives the command. ‘Identification code@ACK’ will be displayed on master computer. At the same time JP1 pin5 and pin6 output L/H level to control user’s device(fig.6) we can test the device’s working condition by JP2 pin1-4(I1-I4) of slave station. (H/L TTL level input)。Master station can read the status of I1-I4 with ‘Identification code@PORTR’ (fig.6), slave station will promptly send back Identification code@PORTX’ to inform master station of the status of the controlled device. (LSB(D0-D3) of X in “PORTX” indicates input status of I1-I4 respectively) (Notes: the above “L” indicates low level, “H” indicates high level; module indicates FC-201S)。

I/O function working process:

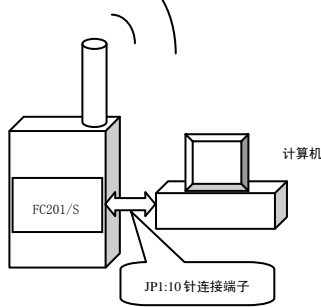


Fig.5. Master

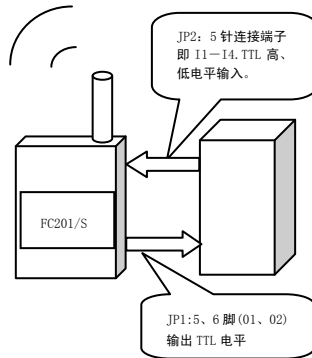


Fig.6. Slave

Table 6 I/O function command format:

Command type	Input/output command format	Return command format	备注
O1 output control	Identification code@OUT1L/H	Identification code@ACK	1.L/H optional。2、All command ends with </cr></n> 3、Identification code indicates ID in Table 4 (0000-9999)。4、L indicates low level , H indicates high level . 5、LSB(D0-D3) of X in “PORTX” indicates input status of I1-I4 respectively
O2 output control	Identification code@OUT2L/H	Identification code@ACK	
I1-I4 input Status reading	Identification code@PORTR	Identification code@PORTX	

IV. Technical Specifications

Table 7: Technical specifications

No.	Specifications	Parameters	Remark
1	Modulation mode	MSK	
2	Carrier frequency	428.00~434.5308MHz	
3	RF power	≤20mW	
4	Receive sensitivity	-105dBm	
5	Transmitting current	≤70mA	
6	Receiving current	≤20mA	
7	Interface data rate	1200/2400/4800/9600/19200/Bps	Optional
8	Interface data format	8E1/8N1/801	User-defined
	Air data rate	1200/2400/4800/9600/19200/Bps	Optional
9	Power supply	+3V or +5V	DC
10	Temperature	-25℃~+60℃	
11	Humidity	10%~90% RH , non condensing	
12	Size	48mm×33mm×12mm	

V. Application of FC-201S networking.

The communication channel of FC-201S is semi duplex, which is most suitable for the communication mode of point to multi-point. Under this mode, one master station must be set, and all of the rest are slave stations. A unique address is given to each station. The coordination of communication is controlled by master station that uses data frames containing address code to transmit data or command. Slave station will receive all of the data and command and compare the received address code with local address code. If they are different, the data will be deserted without any response. If those address codes are the same, it means the data is sent to the local. Slave station will make different responses according to the transmitted data or command and send back the data of response. All these jobs must be performed by upper protocol, and it is assured that there is only one transmitter-receiver in the state of transmission in the communication network at any moment so as to avoid the cross-interference.

FC-201S can also be used for point-to-point communication with easier operation. For the programming of serial port, all you have to do is to remember that its communication mode is semi duplex while always observing the time sequence of come-and-go for receiving and transmitting.

VI. Factory default setting and accessories

Table6: Factory default setting

Channel No.	1
Interface data rate	9600bps
Air data rate	9600bps
check	None

Accessories:

Manual	1
10-pin JP1	1

VII. Description of type

Note: Please indicate the model while ordering

