

# **FC-201/VB Micropower Data/Audio 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-----	3
HOW TO USE FC-201/VB RF MODULE-----	3
TECHNICAL SPECIFICATION-----	7
APPLICATION OF FC-201/VB NETWORKING & PROGARMMING -----	7
DEFAULT SETTING-----	9
DESCRIPTION OF TYPE-----	10

Please read this manual carefully to assure correct operation before using the product.

## I . Features of FC-201/VB RF Module

### 1. Micropower transmission of more than 20mW

### 2. Carrier frequency of 465MHz with clean spectrum and less interference (customization for frequency points in 400-900MHz)

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

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

### 4. Long transmission distance

Within the visible range, the reliable transmission distance is >500m (20mW).

### 5. Transparent data transmission

Transparent data interface is offered to suit any standard or nonstandard user protocol. Any false data generated in the air can be filtrated automatically.

### 6. Multi-channel

The standard FC-201/VB configuration provides 8 channels. If the user needs, frequency points can be customized.

### 7. Data Interface

Providing UART/TTL level, its interface data rate is 1200Bps, even check. (customization for other check modes). The air data rate is 1200bps

### 8. Provide Audio Interface

### 9. Intelligent data control

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

#### **10. Low power consumption and sleep function**

Receiving current is  $\leq 25\text{mA}$ , transmitting current  $\leq 35\text{mA}$  and sleep current is  $\leq 5\text{mA}$ .

#### **11. High reliability, Small and light**

The module is completely sealed with epoxy resin for industrial application.

## **II. Application of FC-201/VB RF module**

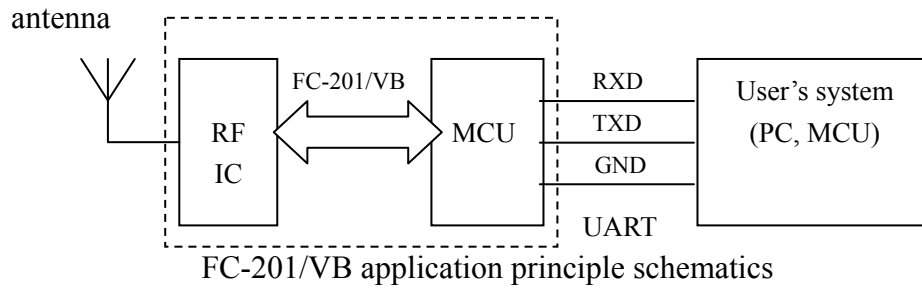
FC-201/VB RF module is suitable for:

- ※ Short distance POS system
- ※ Wireless sensor data collecting
- ※ Wireless meter reading
- ※ Industrial remote control and telemetry
- ※ Automatic data collecting system
- ※ Building automation, safety and security, powerhouse equipment wireless monitor, entrance control system
- ※ Wireless keyboard, mouse

## **III. How to use FC-201/VB RF module**

FC-201/VB RF module provides UART/TTL interface for data application. The module can be embedded into user's PCB as a serial communication component to implement wireless data transmission.

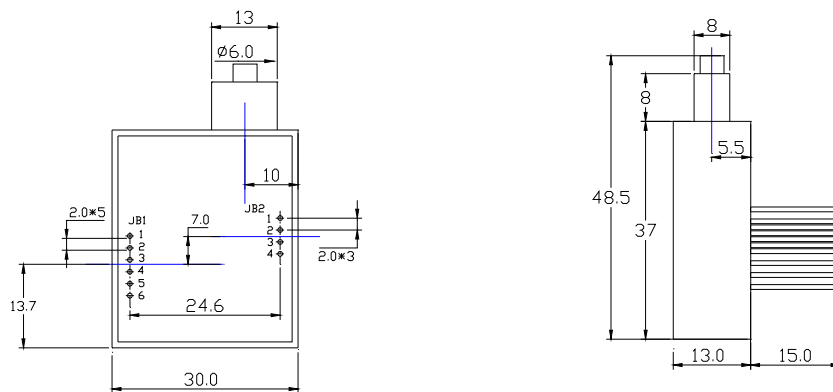
The schematic data application principle of FC-201/VB is shown below:



**Notes: UART interface, TTL level, 1200bps, even check.**

**1. Definition of FC-201/VB connected with terminal**

FC-201/VB can supply one 6-pin connector (JP1), and one 4-pin connector, the definitions as well as connection method with terminals are shown below.



FC-201/VB安装尺寸

Table 1. Definition of JP1

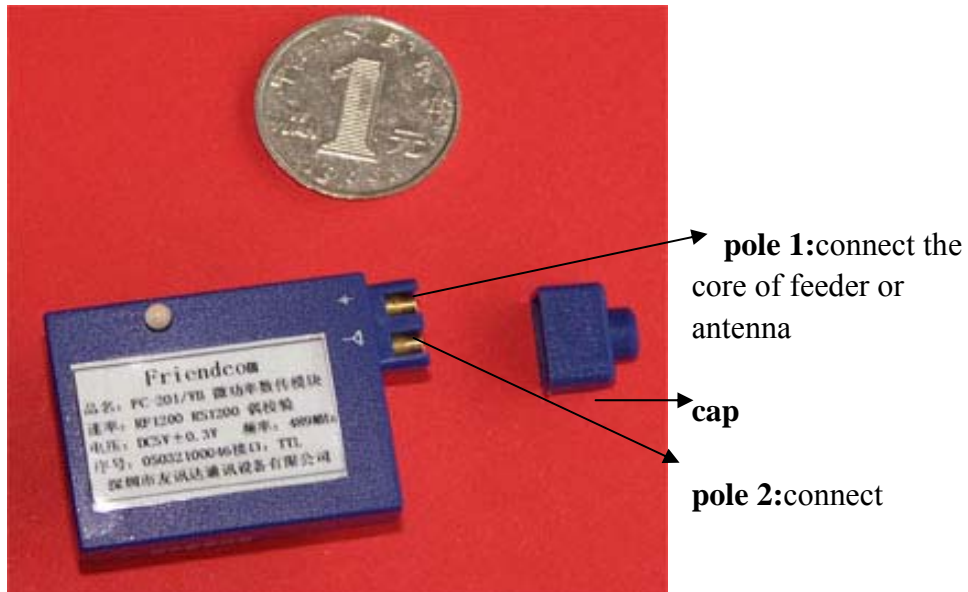
Pin No	Pin Name	Description	level	Connected to the terminal
1	PTT	Keep low level while Tx	L/H	
2	TxD	Data transmit end	TTL	RxD

3	RxD	Data receive end	TTL	TxD
4	GND	Grounding of Power Supply		Grounding of Power Supply
5	+5V	Power Supply DC		+5V DC
6	PWC	NC	NC	NC

Table 2. Definition of JP2

Pin No.	Pin Name	Description	Level	Connected to the terminal
1	GND	Used for fixing PCB	NC	for fixing PCB
2	GND	Used for fixing PCB	NC	for fixing PCB
3	Audio In	<b>50~150mv Audio Input</b>	AC	Audio Out
4	Audio Out	<b>100-200mv Audio Output</b>	AC	Audio In

JP3 antenna port



with the coat of feeder

**Connecting antenna via feeder:**

1. Pull the feeder through the cap.
2. Solder the core of feeder to pole 1.
3. Solder the coat of feeder to pole 2.
4. Put on the cap.

**Direct connection with antenna:**

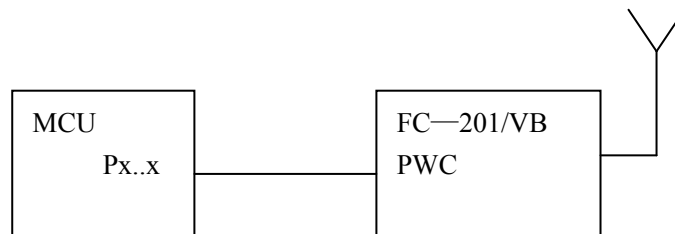
Solder the antenna to pole 1 and put on the cover.

**2. Power supply**

FC-201/VB uses DC power supply with voltage of  $+5.0 \pm 20\%V$ . The working voltage can be reduced down to 3.6V based on the user's needs. It can also share power supply with other equipments. However, the high quality power supply with desirable ripple factor should be selected. If possible, 7805 chip or other voltage-stabilizing unit should be used for separate power supply. In addition, reliable grounding must be ensured if there are other devices 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.

**Note:**

The on/off of FC-201/VB's power supply is directly controlled by PWC in low power consumption mode. The schematic circuit is shown below:



Px.x = H            FC-201/VB   Power on  
 Px.x = L            FC-201/VB   Power down

If PWC is unnecessary for user, It should be declared while placing an order. And PWC will be connected to high to avoid uncertain status before delivery.

#### IV. Technical specifications of FC-201/VB

1	Modulation mode	MSK
2	Carrier frequency (channel1-8)	465.150/465.250/465.350/465.450/465.550/465.650/465.750/465.850
3	RF power	20mW
4	Receiving sensitivity	-116dBm
5	Transmit current	≤35mA
6	Receive current	≤25mA
7	Sleeping current	≤10mA
8	Interface	UART /TTL
9	Interface Data rate and Format	1200bps,8,E,1
10	Air data rate	1200bps
11	Power supply	+5.0V±20%
12	Temperature	-25°C~70°C
13	Humidity	90+5% RH, non-condensing
14	Dimension	48.5mm×30mm×13mm
15	Weight	30g

#### V. Application of FC-201/VB networking and programming

The communication channel of FC-201/VB is semi duplex, which is most suitable for the communication mode of point to multi-point as well as

point to point. The modules can communicate with each other if the below rules are followed.

1. within the transmission range of the module
2. Interface mode is consistent with the user'.
3. Its communication mode is just like bus-mode semi duplex 485.
4. In the mode of point to multi-point, 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 to transmit data or command. Slave station will receive all of the data and command then compare the received address with local address. If they are different, the data will be deserted without any response. If those addresses 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 then 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 to avoid the cross-interference.

FC-201/VB can 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.

The indicator light will flash at the moment of power-on, and will be off in standby state. The indicator light will turn green while receiving and turn red while transmitting.

Please check the interface, level and power supply and communication range if the module is out of work.

FC-201/VB always switches to channel 1 after power-on. The following commands can be used to switch the channels.

Switching to channel 1: 55, AA, 06, 07, 01, 00, 00, 00, 00, 0e

Switching to channel 2: 55, AA, 06, 07, 02, 00, 00, 00, 00, 0f

Switching to channel 3: 55, AA, 06, 07, 03, 00, 00, 00, 00, 10

Switching to channel 4: 55, AA, 06, 07, 04, 00, 00, 00, 00, 11

Switching to channel 5: 55, AA, 06, 07, 05, 00, 00, 00, 00, 12

Switching to channel 6: 55, AA, 06, 07, 06, 00, 00, 00, 00, 13

Switching to channel 7: 55, AA, 06, 07, 07, 00, 00, 00, 00, 14

Switching to channel 8: 55, AA, 06, 07, 08, 00, 00, 00, 00, 15

Note: All the command word is converted into hex.

#### VI. Default setting

Default Setting		Accessories		
Interface data rate	1200bps	Manual	One	Standard
Air data rate	1200bps	5×2mm port	One	Standard
Check	Even	External antenna		Optional

**VII. Description of type**

FC-201 model	VB Micro power	XX	XXX Carrier frequency: for example 465MHz
-----------------	----------------------	----	---

TR: transceiver