

# FST78 RF Data Radio

## User's Manual



### About FST78

FST78, the Middle power wireless Radio, is used as the wireless data transmission and power consumption and good stability and reliability, it has the function of bi-directional data sign transmission, test and control. It is used for Wireless meter reading, such as water meter, electric meter and gas meter, parking meter, intellectual card, electronic weighing apparatus, meter for checking on work attendance, queue wireless meter, building control, shipping company control, alarm system, intelligent equipment, Automatic data collecting system; Industrial remote control and remote test building automation, safety and security, powerhouse equipment wireless monitor, entrance control system, etc.

### FST78 Feature

#### 1. Power and receiving sensitivity

transmission power :5W, ,RX current : < 45mA , TX current:1.5A. high receiving sensitivity: -123dbm.

#### 2. Modulation mode and Frequency

Modulation mode: GFSK, Frequency :430MHz---470MHz.

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

Based on the GFSK modulation mode, it adopts the efficient communication protocol.

The actual bit error rate of  $10^{-5} \sim 10^{-6}$  can be achieved when channel bit error rate is  $10^{-2}$ .

#### 4. Long transmission distance

when the antenna altitude greater than 8m ,Within the range of visibility, the reliable transmission distance is (BER= $10^{-3}$ /1200bps) >20KM  
and (BER= $10^{-3}$ /9600bps) >10KM .

#### 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 (What has been received is exactly what has been transmitted). The charge time for receiving and sending <10ms.

#### 6. Multi-channel and speed

The standard FST78 configuration provides 16 channels. to meet the multiple communication combination mode of the users. It has baud rate to be chosen such as 1200bps、2400bps、4800bps、9600bps、19200bps、38400bps.

The wireless transmission rate is direct ratio with baud rate of interface to meet user's equipment requirement.

#### **7. High speed wireless communication and Large data buffer**

When the speed rate in the air is quicker than interface's, allowing to transmit unlimited length data at one time, when the speed rate is slower or equal the interface's, allowing the transmission of 255 Bytes long data frames at one time for more flexible programming by users.

#### **8. Intelligent data control and the user doesn't need to prepare excessive programs**

Even for semi duplex communication, the user doesn't need to prepare excessive programs, only receiving/transmitting the data from the interface. FST78 will automatically complete the other operations, such as transmission/receiving conversion in the air, control, etc.

#### **9. High reliability, small and light**

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

#### **10. Watchdog monitor**

Watchdog monitors the inner function, so that change the traditional product structure and improve the product reliability.

## **Main technic Parameters**

### **1.Integration Parameters**

Frequency range: 430-470MHZ

Channel interval: 25KHz

Frequency stabilization: +2.5PPM

Modulation mode: GFSK

RF Baud Rate:1200/2400/4800/9600/19200/38400bps

Channel amount : 16

Antenna impedance: 50Ω

Temperature: -20~60℃

Working humidity : 10%~90% relative humidity without condensation

Weight : 200g

Size : 109mm×79mm×30mm (not include antenna and Data interface)

### **2 RX parameters:**

receiving sensitivity: -123dbm

neighbour channel Power: ≥65dB

### **3 TX parameters**

RF Power : 5W

neighbour channel Power : ≥65dB

Change time for receiving and sending : <10ms

### **4 RS-232/RS485 interface**

Baud rate : 1200/2400/4800/9600/19200/38400bps

Data format : 8N1

### **5 Power supply**

9-15V DC, Standard: 12V

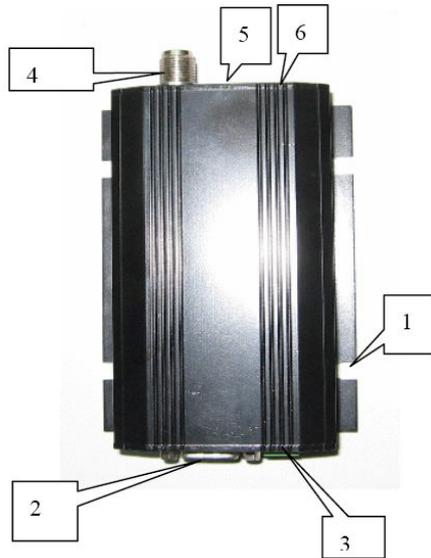
### **6 power consumption**

RX current : ≤45mA

TX current : ≤1.5A

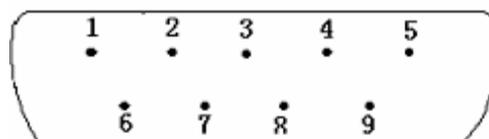
## Interface:

### 1、 FST78 interface:

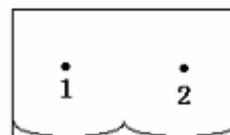


- (1) Install orifice: install and fixation FST78.
- (2) User interface: DB9 male Soker;
- (3) Power Plug: 2 pin, right pin is anode, the left pin is cathode;
- (4) Antenna interface: N type TNC tie-in, female core , screw thread outside, impedance is 50Ω.
- (5) TX/RX indicator light: TX is red, RX is green.
- (6) Power indicator light: green when electrify .

### 2、 FST78 Interface define:



Data interface



Power integerface

### 1) User interface:

FST78 have one interface of TTL/RS232/RS485, user can choose one

Item no	PIN	Description Level Connected to the terminal	User terminal	Remarks
1	null			
2	TXD/A	Serial data transmitting end	RXD/ A (RS-485)	
3	RXD/B	Serial data receiving end	TXD/ B (RS-485)	
5	GND	Ground	DGND/AGND	
4,6,7,8,9	Null			

Item no	PIN	Description Level Connected to the terminal	User terminal	Remarks
1	GND	Ground		
2	+12V	+12V DC	9-15V DC	Standard: 12V

Remarks: To avoid to connect the interface reversely and can not communicate, please check and assure the voltage of 3 and 4 pin is existing by using multimeter. If there is one pin that has the voltage, another has not voltage, which means the interface is connected reversely, pls. Change the connection wires between pin 3 and 4.

### 2) power supply

FST78 power supply is 9-15V DC, Representative value is +12V DC, the current greater than 3A。 It can also share power supply with other equipment, 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 equipment. 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.

## FST78 parameters setting

FST78 have one interface of TTL、RS232、RS485, You must specify the interface when you buy. FST78 main parameters: COM baud rate and verify, RF baud rate, Channel and frequency。 You can change these parameters by our RF Module soft. When RF baud rate is faster than COM baud rate, One frame Can transmit limitless data. When RF baud rate is not faster than COM baud rate , One frame Can transmit 255 bytes most. You can set the rate according your need.

Two FST78 communication must have condition as follow:

1. Their channels(i.e. frequency) is same.
2. Their RF rates is same.
3. RF Module Com baud rate and verify is agree with its equipment or PC that it connects with.

Channel and Frequency	
Channel	1
Frequency	430.2000MHZ
Read (1)	Write (2)
RF Baud Rate	
Baud Rate	9600
Read (3)	Write (4)
COM Parameters	
Baud Rate	9600
Verify	NONE
Read (5)	Write (6)

**1)parameters default value:**

Channel : 1  
 Interface speed rate : 9600BPS  
 Interface verify : none  
 Speed rate in air : 9600BPS

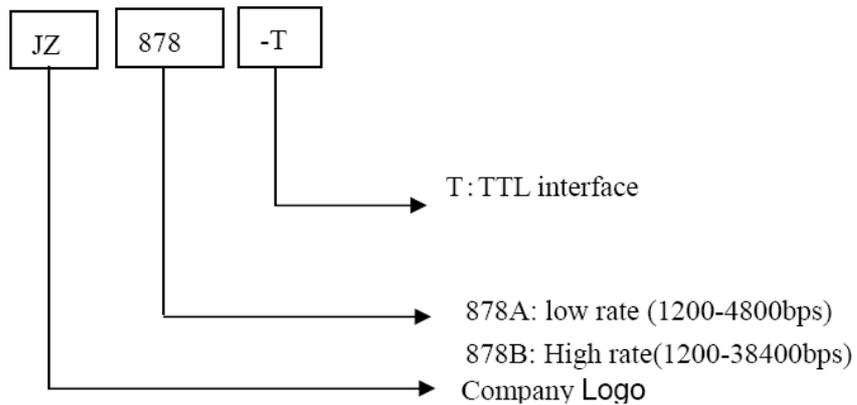
**2)Channel and frequency list**

Channel	Frequency	Channel	Frequency
1	430.2000MHZ	9	458.5250MHZ
2	431.4288MHZ	10	459.1250MHZ
3	431.7360MHZ	11	459.5250MHZ
4	430.5072MHZ	12	460.1250MHZ
5	434.6940MHZ	13	460.5250MHZ
6	434.2332MHZ	14	461.1250MHZ
7	433.1580MHZ	15	461.5250MHZ
8	433.9260MHZ	16	462.1250MHZ

**Technical specification of FST78**

Modulation mode: GFSK  
 Working frequency: 430-470MHZ  
 Transmission power: 5W  
 Receiving sensitivity: -123dBm  
 Transmitting current: <1.5A  
 Receiving current: <45mA  
 Channel speed rate: 1200/2400/4800/9600/19200/38400Bit/s,User can Choose one  
 Interface speed rate: 1200/2400/4800/9600/19200/38400Bit/s ,User can Choose one  
 Change time for receiving and sending: <10ms  
 Interface data format: 8E1/8N1/8O1  
 Power supply: 9-15V DC  
 Working temperature: -20°C~65°C  
 Working humidity: 10%~90% relative humidity without condensation  
 Dimension: 109mm×79mm×30mm (not include antenna and Data interface)  
 Attachable Communication with Model: FST72/FST78

## Model and name



NO.	Trouble	Trouble causes and solve ways
1	No shine of Indicator light	<ul style="list-style-type: none"> <li>a、 Power Line(+12V) badness touch .</li> <li>b、 Power(+12V) is bad.</li> <li>c、 Power line(+12V) meet in reverse, or diode of polarity protect is bad.</li> </ul>
2	No transmit or No receive	<ul style="list-style-type: none"> <li>a、 Radio is badness touch with PC/terminal.</li> <li>b、 Radio with TTL/RS232/RS485 not match terminal.</li> <li>c、 RX frequency and TX frequency is not same.</li> </ul>
3	Bit error rate High	<ul style="list-style-type: none"> <li>a、 antenna not match, or touch bad;</li> <li>b、 RF baud rate is not right.</li> <li>c、 Power supply ripple is too great.</li> </ul>
4	Indicator light twinkling	<ul style="list-style-type: none"> <li>a、 Electromagnetism disturb in circumstance.</li> <li>b、 Same frequency disturb in the circumstance.</li> </ul>