**User Manual**

Version V1.0

# Radio Station RS05B
## For Wireless Data Transmission

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# 1  Introduction

Radio Station RS05B is an external receipt and transmission high-power radio modem, waterproof to IP67, durable structure, which can apply to all outdoor weather conditions.

It has 4 pieces of LED, 1 piece of nixie tube and 3 pieces of push-button, for user's convenience of booting, channel switching, power rating, and low voltage alarming and indicating the current operation channel.

This user manual outlines the functional and operational description of this product.



Figure 1 Outlook of Radio Station RS05B

## 2　Interface

### 2.1　Serial data line interface
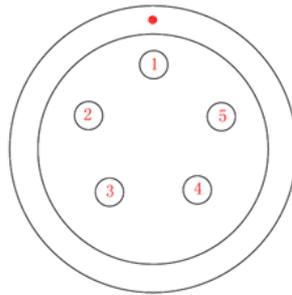


Figure 2 Outlook of interface type

Interface type: asynchronous serial communication standard of RS232
The pin definitions of interface are shown in Table 1.

Table 1 Pin definition of interface type

| Pin Number | Definition |
| --- | --- |
| Pin 1 | Power, 9-16V DC |
| Pin 2 | Power grounding, Power GND |
| Pin 3 | Serial data receiver, RXD |
| Pin 4 | Serial signal grounding |
| Pin 5 | Serial data transmission, TXD |

### 2.2　RF interface

Radio Station RS05B RF interface is TNC female connector of 50Ω.

## 3　Function and operating instruction

### 3.1　Booting

Press the button of ON/OFF to boot. LED indicator of ON is green, which means the voltage is normal, and the machine can work normally; if LED indicator of ON is red

flash, which means the voltage is too low, please turn on the low voltage protection; if LED indicator of ON is red, which means the voltage is too high, please turn on the overvoltage protection.

## 3.2　Low power switching

Pressing the button of PWR for switching between high power and low power. If you choose high power, LED indicator of PWR will turn red; if you choose low power, LED indicator of PWR will turn green.
Default value: high power.

## 3.3　Transmitting channel switching

Pressing the button of CHANL, 8 channels of "1-8" will be switched within each other, keep pressing for fast forward, digital tube display the current channel number.

## 3.4　Channel display

Operation Mode: Display the channel number of "1-8" transmitting rate.

## 3.5　Low voltage indicator

While transmitting data, TX/RX LED indicator of ON will be red flash.
While receiving data, TX/RX LED indicator show green.

## 3.6　Low voltage and overvoltage indicator

When the voltage lower than 10V, radio modem will turn on protection, LED indicator of ON will be red flash; voltage back up to 10.2V, LED indicator show green, radio modem will return to normal work.
When voltage higher than 16V, the radio modem will turn on protection, LED indicator of ON turn red; voltage back down to 15.8V, LED indicator will show green, radio modem will return to work normal.

### 3.7  Low voltage and overvoltage indicator

The relay mode can be selected by the configuration tool, which is currently only supported by TRANSEOT, TRIMTALK, and TRIMMK3 protocols.

1) Select TRANSEOT and turn on the relay function. If the destination address is 255, the current radio forwarding wireless data, and spit in the local data through the serial port. If the destination address is not 255, only when the destination address of the pending data is in line with the target address of the current configuration, the data is forwarded to the destination; otherwise it will only be spit at the local data through the serial port.

2) If choose the TRIMTALK and TRIMMK3 protocol, as long as the current radio received data, then immediately forwarded, no destination address limits, while the local data through the serial port.

## 4  Radio model setting

### 4.1  Open ports

Open the configured software,  choose the corresponding port and baud rate defaulted as 115200, and click the port  .

Figure 3 Interface of configuration tool

## 4.2    Make radio modem enter the configuration mode

Connecting the power line and serial port line, which confirmed to be connected correctly, repower, press the button of "ON/OFF" for booting, LED indicator of ON show green. Within 3 seconds, click the button [Connect] to make the radio modem enter configuration mode, reading and saving the information of configured radio modem (shown as the figure below), button of "load" failure and turn gray. Digital tube of radio modem show "C", radio modem will enter the configuration mode.
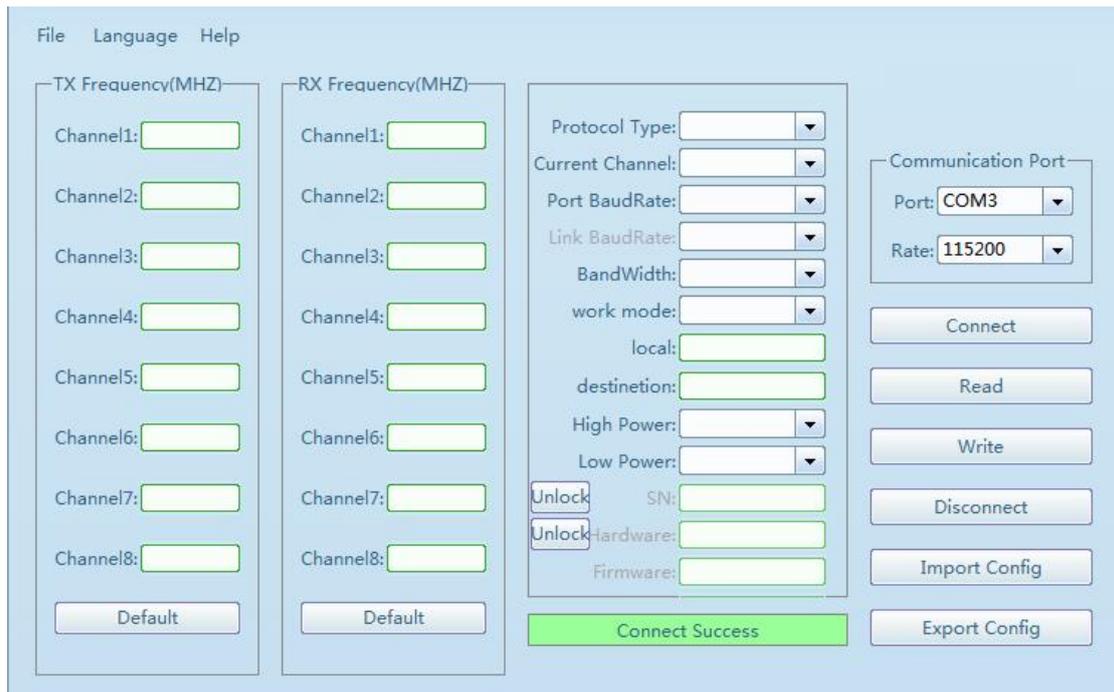
Figure 4 Interface of successful connection

## 4.3 Configuring the parameter radio modem

### 4.3.1 Configuring the customized rate

There are two groups of defaulted rate value (transmitting and receiving frequency) click "default " and set all the frequencies in the corresponding column.

### 4.3.2 Configuring the serial baud rate

Serial baud rate optional 9600, 19200, 38400, 57600, 115200 bps. (Note: if you want to reconnect radio modem after modifying the baud rate of serial port, you have to
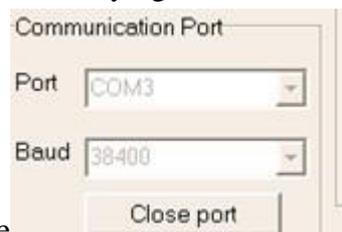


modify the serial baud rate here                          .

### 4.3.3  Configuring the current channel ch1-ch8

You can choose one channel as the current communication channel in the 1-8 channel,

click button [Write] . Configuring Radio Parameters.



Figure 5 Interface of channel configuration

Noted: Before Configuring Radio Parameters, click "Read" button
[Read] . First read all the configuration parameters of the machine,
and then make the appropriate parameter modification.

### 4.4    Finish to exit the configuration mode
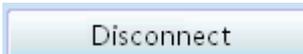
Click the button [Disconnect] to exit configuration mode, the digital tube
of radio modem will show the current channel number.

## 5   Software upgrading

Table 2 Fault description and solution

| Fault description | Cause analysis | Solution |
|---|---|---|
| Cannot boot | Power cable connection is not reliable or positive and negative reversed | Correctly connect power cable |
| Unable to enter configuration mode | Serial port configuration is not correct, improper operation | Correctly configured serial baud rate and related parameters, click the "Connect" button Boot within 3 seconds |
| Unable to transmit and receive data | Frequency, protocol, air baud rate, the baud rate and other parameters configured incorrectly | Correctly configured transmitter and receiver parameters and serial port parameters |

# 6 Technical specifications

Table 3 Technical specifications

| Total Performance Specifications | | |
|---|---|---|
| **Name** | **Specifications** | |
| Frequency range | 410~470MHz | |
| Operating mode | half-duplex | |
| Channel spacing | 25KHz or 12.5KHz | |
| Operating voltage | 12V | |
| Power consumption (typical value) | High power transmitter (35W) | ≤110W @ DC 12V |
| | Low power transmitter (5W) | ≤25W @ DC 12V |
| | Standby | ≤1.5W @ DC 12V |
| Frequency stability | ≤±1.0ppm | |
| Dimension | 186×140×73mm | |
| Operating temperature | -30℃~+60℃ | |
| Storage temperature | -55℃~+85℃ | |
| Antenna interface | TNC-Female | |
| Antenna interface impedance | 50ohm | |
| Data power interface | LEMO, HGG.1B.305 | |
| **Transmitter Performance Specifications** | | |
| **Name** | **Specifications** | |
| RF output power | High power（35W） | 45.5±0.5dBm@DC12V |
| | Low power（5W） | 37.5±1dBm@DC12V |
| RF power stability | ±1dB | |
| Adjacent channel power restrain | >50dB | |
| **Receiver Performance Specifications** | | |
| **Name** | **Specifications** | |
| Sensitivity | >-114dBm@BER 10-3, 9600bps | |

| | |
|---|---|
| Adjacent channel selectivity | >50dB@25KHz |
| **Modem** | |
| **Name** | **Specifications** |
| Air rate | 9600bps, 19200bps |
| Modulation | GMSK |

# 7 Antenna installation warning

Any antenna only can be installed and maintained by professional technician. Please make sure that the radio station is closed when you maintain or work nearby the antenna.

In general, radio will be connected to a directional (high-gain) antenna, and fixed to the edge or top of a building or top of tower. According to the application and antenna gain, total hybrid power may exceed 90W (ERP). Under normal circumstance, only the professional technicians can close to the antenna area, anyone can't touch the antenna or close to 2.3m in diameter range of the antenna.

Table 4 Antenna gain vs. safe distance recommended

| | Antenna gain | | |
|---|---|---|---|
| | 0–5 dBi | 5–10 dBi | 10–16.5 dBi |
| The minimum safe distance | 0.6m | 1.06m | 2.3m |

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