

WENSHING®

## 902MHz~928MHz Embedded Medium Power Radio Modem

(USB Output/RS232 Output/485 Output/TTL Output)

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### Wireless Modem 500mW 925MHz

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USB Interface  
Model: RD232-H-USB-925M



RS232 Interface  
Model: RD232-H-RD232-925M



USB Interface  
Model: RD232-H-RS485-925M



TTL Interface  
Model: RD232-H-TTL-925M

#### Version History

| Version | Date          | Changes                   |
|---------|---------------|---------------------------|
| V0.01   | July.15, 2010 | 1 <sup>st</sup> . Edition |
| V0.02   | Dec. 31, 2010 | 2 <sup>st</sup> . Edition |
| V0.03   | Jan. 25, 2011 | 3 <sup>st</sup> . Edition |
| V1.0    | May. 9, 2011  | 4 <sup>st</sup> . Edition |
| V1.01   | May.11.2011   | 5 <sup>st</sup> . Edition |

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## **Important Event**

- This product is in general use for the equipment on the premise of the development, design, manufacture. Do not use that require high security purposes, such as machinery or medical, aviation equipment, machinery and transport-related deaths are directly or indirectly related to the system.
- This product should be in this brochure by the instructions of the types and rated voltage power under the current proper use. If violation of this statement by the safety records of the supply operation, I am afraid our company cannot afford any of the responsibility.
- Do not self-decomposition, alteration, repair of the products also will cause fire, electric shock, fault, and dangerous. In addition, their decomposition, alteration, repair the product, failure is not within the scope of warranty.
- The products are not waterproof, so please do not use and touch water. Take off and on also please note. Rain, spray, drinks, steam, sweat may be a failure.
- Use of this product, please be sure to use according to the statement recorded by the use of methods to operate. Please do not violate particular attention to the matter reminded to use.
- Please respect this statement recorded by the note. When consumers in contravention of this statement recorded note of the operation, I am afraid our company could not shoulder any responsibility.
- Products are defective, the Company will be responsible for free to amend the flaws, or to the same flawless product or its equivalent products in exchange. However, the Company does not assume based on the requirements of the flaw and loss responsibility.
- The Company reserves the right to retain without notice to users of the cases, the product of hardware / software (version upgrade) is with the right to edit.

## **Declaration**

This product provides different frequency for user selection to meet different telecommunication regulation and FCC/CE on different countries.

## **Warranty**

The warranty time is within one year from purchased date. The warranty scope are used in normal situation and none vandalism. (Some function harmful out of warranty scope and Vandalism are Un-warranty).

## **Un-warranty Scope Description**

- Because the natural disaster, accident or human factor to cause the bad damage.
- Violate the product instruction manual to cause the damage of the products.
- The improper assemble causes damage.
- The products used the unsanctioned accessory to cause damaged.
- Overstep the allowed used environment to cause the products damaged.

## **Contact Us**

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## Key Feature

- 925MHz
- UHF Band Wireless Data Transceiver
- RF Output Power up to 500mW
- Sensitivity up to -126dBm (2Kbps)
- USB, RS232,RS485,TTL Interface
- Transceiver Data Rate 1.6Kbps~128Kbps

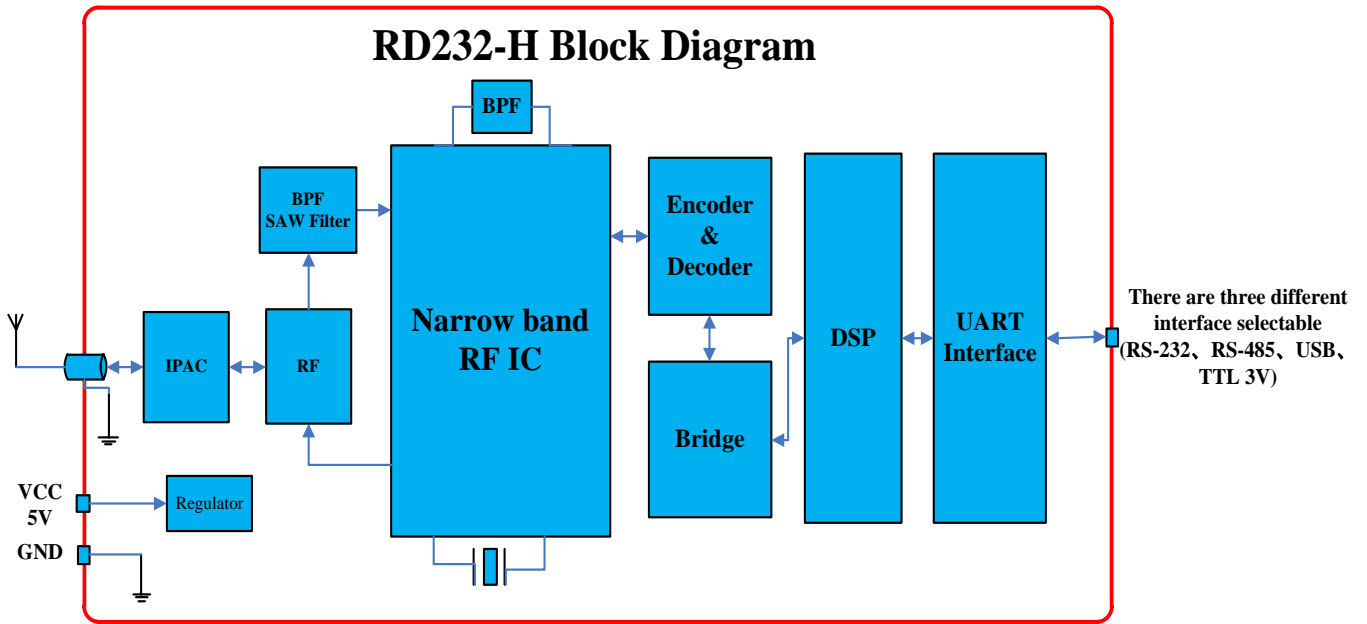
## Application

- Wireless Network
- Multi-Channel Home Automation Standard
- Wireless RS232
- Active RFID Base Station Transceiver

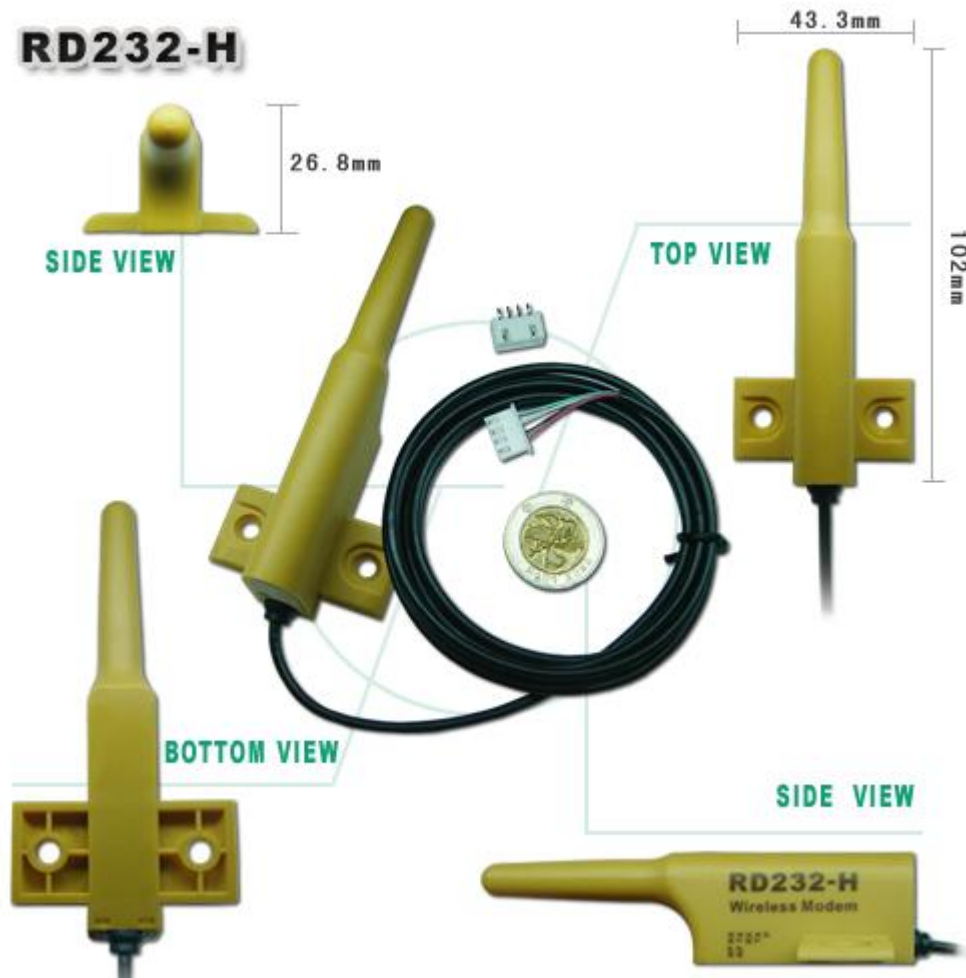
## Characteristic

| Parameter                   | Min | Type | Max   | Unit | Condition |
|-----------------------------|-----|------|-------|------|-----------|
| <b>Operating Condition</b>  |     |      |       |      |           |
| Operating Temperature Range | -10 |      | +70   | °C   |           |
| Operating Supply Voltage    | 4.5 | 5    | 5.5   | V    |           |
| <b>Current Consumption</b>  |     |      |       |      |           |
| RX Mode (TTL 3V)            |     | 34   | 40    | mA   |           |
| TX Mode (TTL 3V)            |     |      | 600   | mA   | Peak      |
| RX Mode (RS485)             |     | 34   | 40    | mA   |           |
| TX Mode (RS485)             |     |      | 600   | mA   | Peak      |
| RX Mode (RS232)             |     | 34   | 40    | mA   |           |
| TX Mode (RS232)             |     |      | 600   | mA   | Peak      |
| RX Mode (USB)               |     | 34   | 40    | mA   |           |
| TX Mode (USB)               |     |      | 600   | mA   | Peak      |
| <b>RF Characteristic</b>    |     |      |       |      |           |
| Frequency Range             | 922 | 925  | 928   | MHz  |           |
| Data Rate                   | 1.6 |      | 128   | Kbps | GFSK      |
| TX Output Power             |     | 27   | 27.5  | dBm  |           |
| RX Sensitivity              |     | -126 | -125  | dBm  |           |
| Modulation                  |     | GFSK |       |      |           |
| <b>Other</b>                |     |      |       |      |           |
| ESD                         |     |      | 2000  | V    |           |
| Interface Data Rate         | 1.2 |      | 115.2 | Kbps |           |

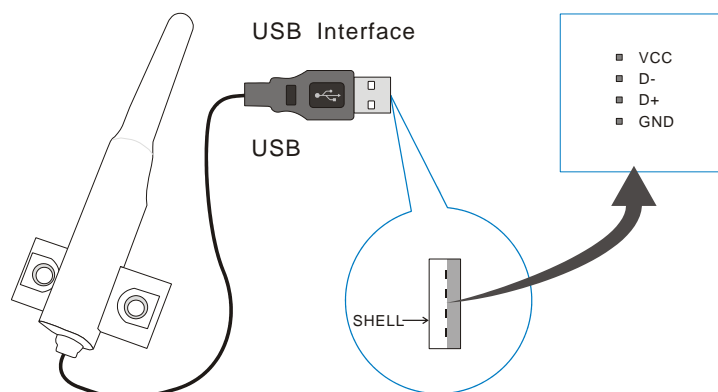
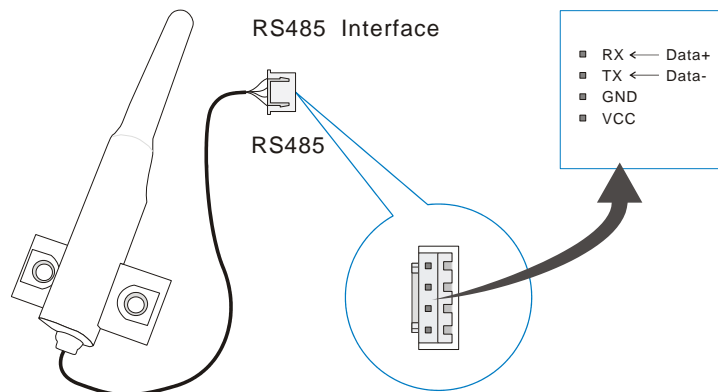
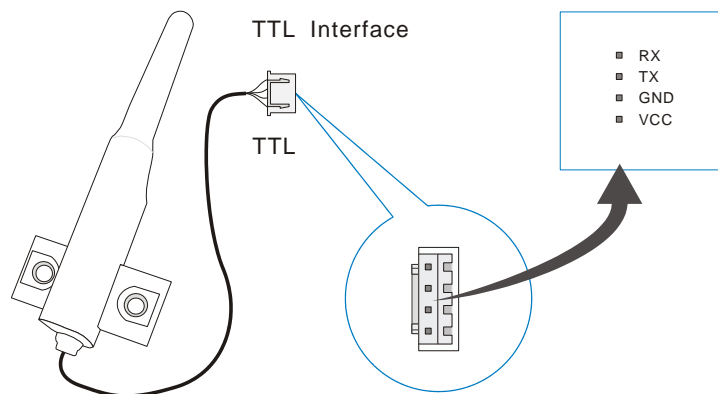
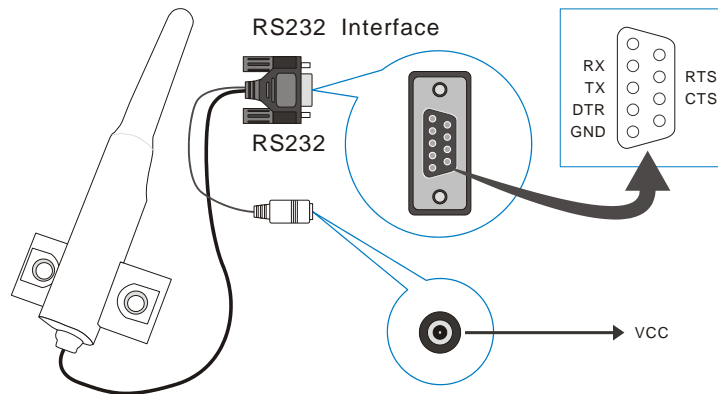
## Block Diagram



## View



## Pin Assignment





beginning rate is 9600bps.

| Value     | 0    | 1    | 2    | 3    | 4     | 5     | 6     | 7      |
|-----------|------|------|------|------|-------|-------|-------|--------|
| Rate(bps) | 1200 | 2400 | 4800 | 9600 | 19.2K | 38.4K | 57.6K | 115.2K |

- ✧ The third~ forth Byte : group (GID) , set up range 0000~FFFF
- ✧ The fifth Byte : instrument ID(SID) , set up range 00~FF
- ✧ The sixth Byte : wrong parameter, fixed as 0x00
- ✧ The seventh Byte : transmit rate, set up range 00~07; Normally, the RF transmit rate must greater than interface speed rate when setting up, it prevent having the wrong information.

| Value     | 0    | 1    | 2    | 3     | 4     | 5     | 6     | 7    |
|-----------|------|------|------|-------|-------|-------|-------|------|
| Rate(bps) | 1600 | 3200 | 6400 | 12.8K | 25.6K | 51.2K | 76.8K | 128K |

- ✧ The eighth ~ tenth Byte : working frequency, calculation:  
 $\text{MHz} \times 1000 = \text{KHz}$ , and transfer to 16 Bytes.  
 For example: when it is at 925MHz working frequency ,  
 $925 \times 1000 = 925000 = 0x0E\ 1D\ 48$  fill in 0E in the eighth Byte, fill in 1D in the ninth Byte, fill in 48 in the tenth Byte.  
 When it is at 924.5MHz working frequency,  $924.5 \times 1000 = 924500 = 0x0E\ 1B\ 54$ ;  
 fill in 0E in the eighth Byte, fill in 1B in the ninth Byte, fill in 54 in the tenth Byte.
- ✧ The eleventh Byte :  
 Bit0~Bit2 : shooting rate , set up range 0~7

| Output Power |           |                   |
|--------------|-----------|-------------------|
| dBm          | Set Value | Hex (Bit0 ~ Bit2) |
| 5            | 0         | 000               |
| 12           | 1         | 001               |
| 17           | 2         | 010               |
| 21           | 3         | 011               |
| 24           | 4         | 100               |
| 25           | 5         | 101               |
| 26           | 6         | 110               |
| 27           | 7         | 111               |

Bit3~Bit5 : wrong parameter , fixed as 000

Bit6~Bit7 : instrument working mode , there are four mode:

**0 Mode 1 (long data mode: set up as 00):**

GID of every instrument can receive info at this mode, and it can specifically use on data info that is larger than 127Bytes.

**0 Mode 2 (ID: info mode 1: set up as 01):**

Once GID can transmit to particular SID instrument under this mode, it is one to many; the single info must  $\leq 127$ Bytes.

**0 Transmission:** The first Byte is the SID of the receiver, and from the second byte, it becomes data.

Example: The SID of device A is 55, the SID of device B is 88, and they have the same GID. Under mode 2, device A is going to transmit data 0x1234567890, 5 Bytes in total, to B device, A then sends data 0x881234567890, 6Bytes in total to B, B will receive 0x551234567890, 6Byte in total. The first Byte is the SID of the transmitter.

**0 Mode 3 (ID: info mode 2: set up as 10):**

Once GID can transmit to particular SID instrument under this mode, it is one to many; the single info must  $\leq 127$ Bytes.

Transmission: Data shall be transmitted under the same rule of the thirteen to thirty-two Byte.

Example: The GID of device A = AAAA, SID = 55; the GID of device B = BBBB, SID = 88; the GID of device C = CCCC, SID = 99.

A is going to transmit 0x1234567890 to B, 5 Bytes in total. A then sends 0x04FFBBBB881234567890, 10 Bytes in total, to B, B will receive 0x1234567890, 5 Bytes in total.


A is going to transmit 0x1234567890, 5 Bytes in total, to B via C. A then sends 0x08FFBBBB88FFCCCC991234567890, 14 Bytes in total, C will receive 0x1234567890, 5 Bytes in total, but B will not receive any data.

**0 Mode 4 ( saved ID data mode: set up as 11):**

It can set in advance to save particular GID and SID way, it will transmit it back referring to the track it is saved. It can forward the track up to fourteen times, the single info must  $\leq 127$ Bytes.

- ✧ The twelfth Byte: wrong parameter, it fixed as 0x00.
- ✧ The thirteenth ~ the thirty-two Byte : the pre saved track, it only works under mode 4 (saved ID data mode).
- ✧ The thirteenth Byte: It shows how much information in the fourteenth Byte ~thirty-two Byte.
- ✧ The fourteenth Byte ~ thirty-two Byte road formation:
  - ◆ **Example 1: 04 FF 12 34 55 11 22 33 44 ~ 00**  
 You can know there is four Bytes effective information as FF 12 34 55 from the thirteen Byte.  
 FF 12 34 55 means GID=1234 、SID=55, this instrument will forward information to GID=1234 、SID=55 once UR instrument after receiving it.
  - ◆ **Example 2: 05 FF 12 34 55 11 22 33 44 ~ 00**  
 You can know there is five byte effective information as FF 12 34 55 11 from the thirteen Byte.  
 FF 12 34 55 11 means, GID=1234 、SID=55 及 11 , this instrument will forward information to GID=1234 、SID=11 instrument after this instrument transmit information automatically to GID=1234 、SID=55 when receiving it through UR.
  - ◆ **Example 3: 06 FF 12 34 55 11 22 33 44 ~ 00**  
 You can know there is six Bytes effective information as FF 12 34 55 11 22 from the thirteenth Byte.  
 FF 12 34 55 11 22 means GID=1234 、SID=55 、11 and 22.  
 It will forward information to GID=1234 、SID=11 instrument and GID=1234 、SID=22 after this instrument transmit information automatically to GID=1234 、SID=55 after receiving it through UR.
  - ◆ **Example 4: 08 FF 12 34 55 FF 45 67 88 44 ~ 00**  
 You can know there is eight Bytes effective information as FF 12 34 55 FF 45 67 88.  
 FF 12 34 55 FF 45 67 88 means GID=1234 、SID=55 and GID=4567 、SID=88. This instrument will forward information to GID=4567 、SID=88 instrument once this instrument transmit information automatically to GID=1234 、SID=55 when receiving it through UR.

## **CE Caution Note (European Union)**

Symbol of  it accords with EMC regulation (89/336 / EEC) to represent this device, and the low-voltage regulation of European Union (73/23/EEC). It represents to follow the following standard regulations of European Union (The bracket is a reciprocal international standard reciprocal international standard and regulation).

- EN 60950/A11: 1997/(IEC 60950/A4: 1996),The ones that includes information science and technology of apparatus of e-commerce safe.
- EN 55024: 1998 (IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, 1000-4-8, 1000-4-11) - ' scientific and technological apparatus of information - The characteristic of interfere avoided - Restrain and test method '
- Chapter 2 -Static release (ESD) Demand
- Chapter 3 -Radiate the static field demand
- Chapter 4 -The electron is transmitted / produced and washed (EFT) fast Demand.
- Chapter 5 -surge demand
- Chapter 6 -Resistance demand caused in field of wireless frequency.
- Chapter 8 -Magnetic field demand of electric frequency.
- Chapter 11 –Shortly cut off the demand of making a variation with the voltage transiently under the voltage.

EN 55022:1998/(CISPR 22:1997) ,Class B, ' “To assess information scientific and technological apparatus wireless restriction and way of interfering with the characteristic.”

## **FCC Consistent Declaration (U.S.A. Only)**

Attention: FCC rule regulation, modified and changed must allowed by WENSHING Electronics company, otherwise that would make you operate this apparatus invalid. This apparatus adopted test, according to chapter 15 that FCC regulation, accord with Class B digital restrictions of device. These limits are designed to provide reasonable protection, avoid to having harmful interference at home's environment.

This device may have radiated wireless frequency energy. If don't allow the instruction manual, then may will interfere wireless communication. However, there is no any way to guarantee, it will not be interfered in particular installed. If this device really causes harmful interference, (It could be confirmed by turning on or off this device.) Advise you to try to use the following ways modifying the interference situation.

- Relocation receiving antenna or altering its direction.
- Increase the distance between device and receiver.
- Please connect this device to the outlet in the circuit different from the receiver.
- The following manuals is published by Federal Communications Commission, they must be helpful to all users.
- How to Identify and Resolve Radio-TV Interference Problems. (This manual can be obtained by relevant departments of publication of the U.S. government.)
- Government Printing Office, Washington D.C., 20402. Stock No. 004-00398-5