※※※CAUTION※※※

changes of modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment。

XCRF-502C Reader User manual

Table of Contents

1 Introduction

Thank you for using XCRF-502C reader made in Shenzhen Invengo Information Technology Co. Ltd. The reader can offer stability and reliability, while strictly following the ISO-18000-6B recommendation..

Front panel and rear panel layout

XCRF-502C reader layout as below: figure 2－1:

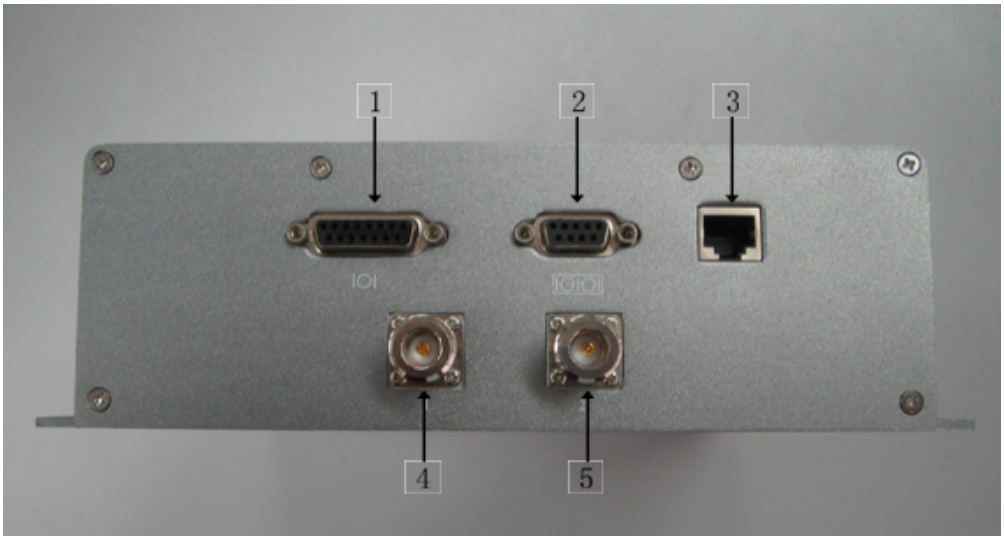

figure 2－1　XCRF-502C reader front panel layout

1－I/O port, have four input ports and four output ports with　photoelectricity isolation showed on DB15 connector;

2－RS-232 serial port, a physical interface between a computer and reader. The pin no, signal name and direction list as below. And the pin number is same as the number showed on DB9 connector.

pin	signal	direction
2	RXD	input
3	TXD	output
5	Ground	ground

3－Network Interface between a computer and reader. Plug one end of the cable into the RJ45 jack on the back of your PC. Plug the other end into RJ45 port on the reader. Device provides 10M Ethernet interfaces.

4－antenna port1;

5－antenna port2;

Note: Every antenna port must connect with an antenna or 50 ohm load before the reader power up. otherwise the reader will be damaged.

XCRF-502C reader rear panel figure 2－2:

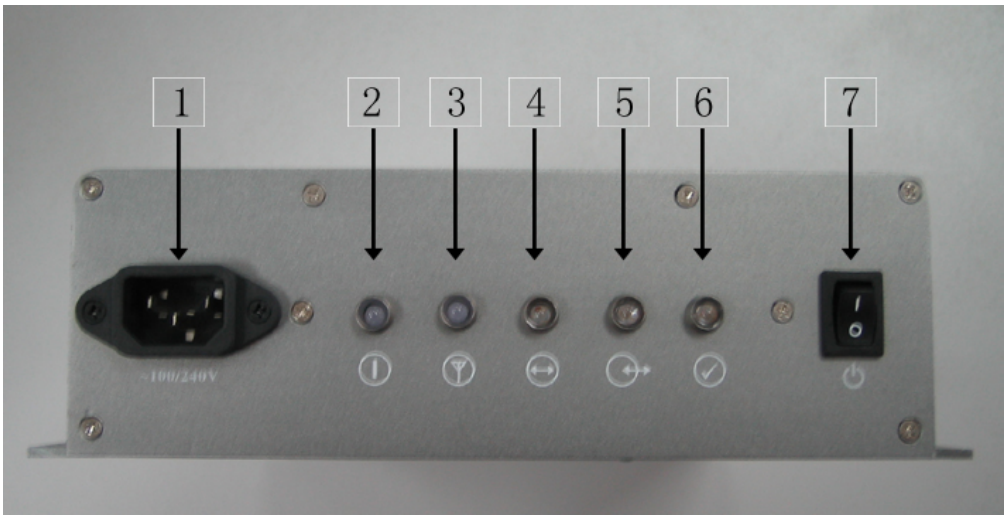

figure 2－2　XCRF-502C reader rear panel figure 2－2

1－AC INLET;

2－Power Indicator, green-colour light, green light indicates that the reader power on;

3－Power Amplifier Indicator, red-colour light, Red light indicates the reader is transmitting Radio frequency power from RF port;

4－Link Indicator ,green light, green light indicates that the Reader has linked with Computer from Ethernet network port;

5－Communication, blue light, ,blue lighting indicates that the reader is communicating with computer ;

6－Receive light, green lighting indicates that the reader is communicating with the tag;

7－power switch;

2 Performance Parameter

2.1 General Features

- Operating temperature:－10℃～＋60℃（14℉～＋140℉）
- Storage temperature:－20℃～＋70℃（－4℉～＋158℉）
- Operating humidity:20％～95％
- Power supply voltage:AC:100V～240V/200mA
- Size:29.5 x 23.0 x 7.0cm（11.6 x 9.0 x 2.8inches）
- Weight: about:3.0Kg（6.61lb）

2.2 Key feature

- Protocol:ISO-180006B
- Tag data rates:40kbps
- Number of antenna:up to 2 , electronically switched
- Antenna port isolation:≧22dB
- Transmitter type:On/Off Keying
- Usable channels:51
- Occupied frequency bandwidth:＜400KHz

2.3 Technical specification

- Frequency of operating:902MHz ~928MHz
- Output power:1.0Watt（+30dBm）
- Frequency stability:≦±5ppm
- Operating mode: fixed-frequency /frequency hopping selective availability.maximal optional frequency number is 51pcs, frequency interval is 500KHz.
- Maximal reading distance up to 3.5~4.5m (11.48~14.75feet)（EIRP=36dBm,related to tags.）
- Write distance:Distances up to70％ of the read distance under the same condition.
- Multi-tag reading rate:≧60 pcs/second（it’s related to protocol）

3 Design fundamentals

3.1 Device compose

As figure 4－1 and 4－2,XCRF-502C reader has 5 parts:RF unit, baseband unit,power unit、data interface unit、case unit.

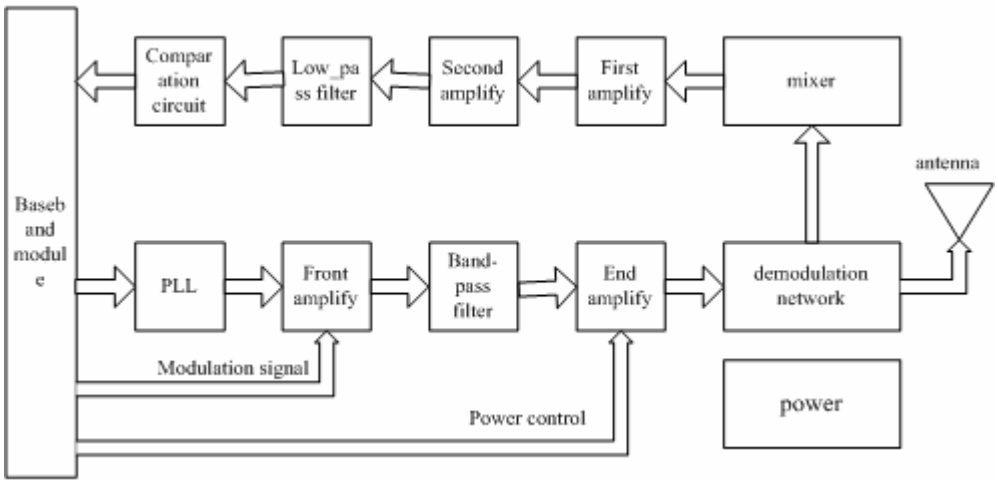

figure 4－1　reader RF unit fundamental block diagram

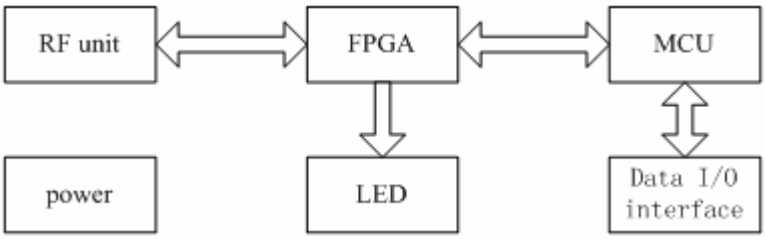

figure 4－2　reader baseband unit fundamental block diagram

3.1.1 RF unit:

→The RF unit receive baseband signal and modulate carrier,then amplify the modulated carrier signals and transmit the signals by selected antenna.

→The unit receive the back scatter signal from the RFID tag.After demodulating , amplifying ,comparing the signals ,the unit transmit the signals up to baseband unit.

→The unit adjust output power and frequency of the antenna interface under the control of the baseband unit.

3.1.2 Baseband unit:

→The unit receive data & command from PC via RS-232 interface,or send data & results to PC ;

→The unit transmit control signals of tags to RF unit;

→The unit accept tag signals from RF unit, modulate signals and checkout;

→The unit can modify or query configure information of reader under the control of PC command ;

3.1.3 Power unit:

→converts incoming alternating current (AC) to direct current (DC),out DC power supply for the integrated equipment.

3.1.4 Data interface unit:

→Standard connector to connect the COM port ,network and power interface with the rear panel of the integrated equipment ;

3.1.5 Case unit:

→The reader case is made of molded-in Aluminum.

3.2 Fundamental working principle

The complete RFID system is consist of XCRF-502C reader, antenna, tags, and pc.

The baseband send the command to RF unit under the control of PC.RF unit send signals to tags according to the tag type. When the tag is activated, it sends out its number as well as other information .

The tags' response signals was amplified and shaped by the received-data circuit. Then the signals was send to baseband unit. The baseband will decode the received signal and then sends to PC via the communication interface of the baseband unit.

The transmitting part of the RF unit will take the function of carrier generation, carrier modulation, amplification and emission. The receiving part of the RF unit will take the function of demodulation, amplify , compare etc.

The FPGA part of baseband will take the code/decode function to tag data.

MCU will take the function of communication with PC.

4 Usage and operation

4.1 Reader connection

There are 2 antenna port on the XCRF-502C reader .The output port of antenna interface is N plug.

4.2 Reader usage and operation

Connect the device as stated above, and the reader will work under the control of PC command. Our company provide API function and reader demo software .User can use the software to test the reader. Please read user manual of the reader demo software to get the information about test procedure and test method.

5 Usual failure analysis and exclusion

- When the reader is power on the signal lamp is not lighted:

→power fault: check if the input alternating current power is normal. The alternating current voltage should between 100V～240V;

→If the other signal lamp is light, there is MCU or FPGA fault in the device. Once you meet this problem, you can only contact with Invengon company to repair the device;

- Can't read tag data:

→Please check if the serial port or the network cable is connect to the reader correctly. If the cable is not joint firmly, reader can not get command from PC.

→If the power amplifier signal lamp is light ,user need to check if the antenna N connector is screw down, or if the tag is fault. But if the power amplifier is not light, maybe the FPGA or MCU is fault. User should contact Invengo company to repair the device;

6 Other notice

6.1 Production warranty

The warranty: period of our products is 2 years from delivery . If a defective is

found due to material processibility qualified problems of the product , we will perform warranty commitment. Invengo company will decide whether repaire or replace the fault product with certain qualified problem.

If a problem occurred is because the user's operation environment is not accord with the product Specifications, or a problem occurred due to installation reasons, we will not perform warranty commitment. we may charge the maintenance costs.

6.2 Safety note

When reader is working (emitting microwave),person who install or operate the device should be 30cm away from antenna to meet the FCC safety standards requirement about maximal tolerant radiation human body can take.

The item should be carry out when user install or operate the reader.

Not undertake item:

Any RF device, include this reader , maybe disturb the medical device without correct protection. If you face this problem , you should listen to the counsel of medical device manufactory . This reader may disturb other device when working .

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