深圳市当代通信技术有限公司
Shenzhen DDCT Technology Co.,Ltd

User's Manual

Thank you for purchasing our DRF8804A RFID Reader!
Please read this manual before you getting start, and keep it for further reference.
The DRF8804A RFID Reader is a new and innovative four channels RFID Reader that is compatible with IS018000 and EPC Class 1 Gen2 of RFID tags. It solves many problems successfully associated with remote identification, identification of fast moving objects and multi-card identification for The Passive RF tag. This RFID Reader's design includes a Wiegand port, a RS485 port and a RS232 output interface. The many ports included in the DRF8804A provide the user with a wide selection of additional external peripherals. This product exceeds the basic capability recommended by the advanced technology indicators. Additionally, the Reader easily fulfills the environmental standards for low transmitter power. When compared to other RFID reader products, The DRF804A RFID Reader has received top placement in various technology indicators

Supplied Accessories

Microwave Cable (50cm)	x 4
RS232 Cable (1 M)	x 1
User's Manual	x 1
CD	x 1

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Names of Parts

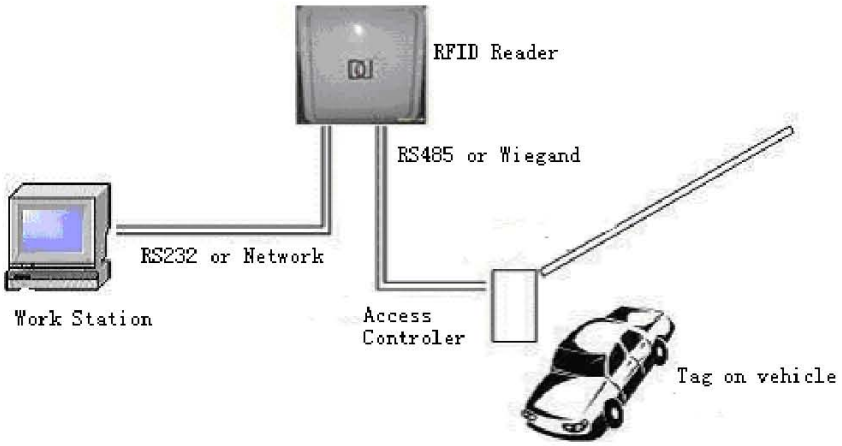
In the figure From left to right are: a Power Adapter, the RFID Reader and an Antenna

Getting Started

1 Installation Procedures

A) Connecting the System's Circuitry

How the DRF8804A RFID Reader is integrated into the system's connection is represented in the figure below:



B) Connecting the RFID Reader to the Antenna

The DRF8804A RFID Reader provides four SMA connectors and is able to connect to four antennae.

As indicated in the figure, the antennae connectors can use a SMA converter in order to connect to high frequency lines. For safety, the antenna must be professional installation because it should Adjust all the antennae following the antenna' data sheet to secure the best position in order to maximize the system's efficiency. And When transmitting under normal use or during debugging of the installation, it is best that no personnel should stay within 20 cm of the antennae for an extended period of time.

Warning

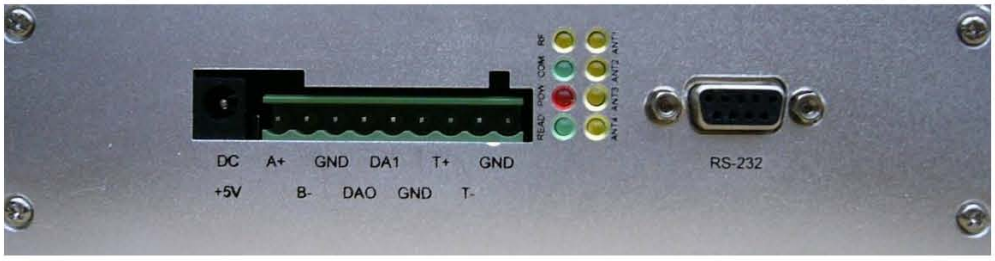
The Antenna must be installated by professional engineer and can not be displace with other!

The antenna must be installated at least 20 cm from all persons!

C) Connecting the RFID Reader, Computer and Power Source

The DRF8804A RFID Reader uses +5V of power. The ports, from left to right, are: a RS485（A+，B-，GND），a Wiegand (DA0,DA1,GND) and a trigger input

（T+，T-，GND）. The indicator lights range from D1 ~ D8. The four indicator lights on the left, listed from top to bottom, are: 1) the radio indicator, 2) the transmission indicator, 3) the power indicator and 4) the RF reading indicator. On the right are four antenna indicator lights, indicating the strength of the four antennae's connections.



Note: The figure above indicates the front board of the RFID Reader. From left to right, the figure indicates: the power source interface, data link connector (green), indicator lights, and RS232's DB9 connector.

For Example: The figure above demonstrates how the RFID Reader connects to the main computer using the RS232

2. Functionality

A) Controls for tags

Ⅰ ISO18000-6B Tag:

. Multitag Identify: Searches for all tags within range of the antennae's radiation and reads their 8 bytes UID.

. Multitag read: Searches for all tags within range of the antennae's radiation, then reads their indicated address that begins with 8 bytes of data.

. Writing to a tag: Writes one byte of data to the tag's indicated address.

. Locking a tag: Locks the data of the indicated tag address. The address cannot be over written after it is locked.

. Checking Tag Locks: Checks the status of the locks on the indicated address.

Ⅱ EPC Class1 Tag:

. Multitag Identify: Search for all tags within range of the antennae's radiation and reads their 96-bits EPC.

. Programming the tag: Writes to the tag's 96-bits EPC.

. Erasing a tag: Erases the tag's EPC.

. Locking a Tag: Locks the tag's EPC. The tag's EPC cannot be over written after it is locked.

. Kill.:The tag cannot be reused after it is destroyed. (Note: Some manufacturers produce tags that turn white after Kill. Such tags can be reused.)

Ⅲ EPC GEN2（ISO18000-6C）Tag:

. Multitag Identify: Search for all tags within range of the antennae's radiation and reads their EPC. EPC Gen2's EPC has a maximum 256-bits range. Currently, it supports 96-bits.

Tag Initialization: Defining the tag's EPC range. The usual range is 96-bits.

. Writing to a Tag: Writes to the tag's EPC and can write 16-bits each time.

. Locking a Tag: Locks the tag's EPC. The EPC cannot be over written after it is locked.

. Kill: Destroys the tag. The tag cannot be used after it is destroyed.

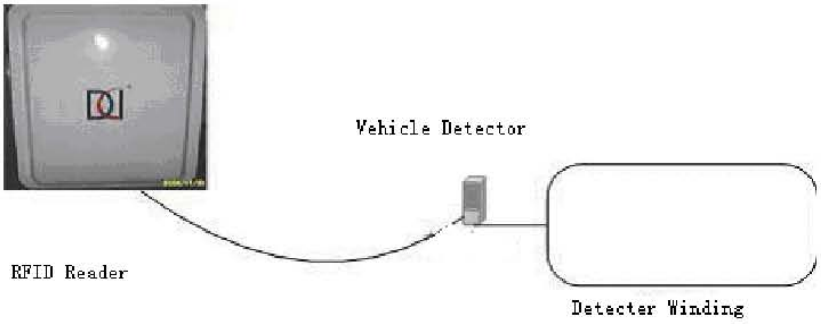
B) Modes of Operation

Ⅰ Client/ Server: Under this mode of operation, The DRF8804A RFID Reader operates under the control of the PC or other kinds of controllers. The RFID Reader can be connected to the controller through RS232, RS485 or through an Ethernet network. This mode of operation can support as well as use the functions of SDK 2.0.

Ⅱ Timing Read: The DRF8804A RFID Reader automatically reads the card after a period of time, which can be configured. After reading the data, the data is sent to the indicated port. Under this mode of operation, the tags can only

function as read-only.

Ⅲ **Trigger Read:** When The DRF8804A RFID Reader senses a low input of power, it will initiate a periodic reading of cards. After a period of time, the RFID Reader will automatically shut down. The figure below is an example of Trigger Read:



C) Ports

Ⅰ RS232：

The DRF8804A RFID Reader includes an RS232 port, which is used to communicate with the main computer, usually a PC. The RS232 port formats data into 8-bits: 1-bit for start, 1-bit for stop, and no bit for verification. The Baud rate can be chosen from 9600, 19200, 38400, 57600 and 115200. The RS232 port supports the RFID Reader's for parameter configuration, demo program and all functions of serial communication SDK 2.0.

Ⅱ RS485：

The DRF8804A RFID Reader provides a RS485 port. Using the RS232-RS485 converter, the RS485 port can connect to a PC's serial port connector. Under this condition, the RS485 port supports the RS232 port's functions. The RS485 port also sends data of the tags. The following are three methods of communication when using the RS485 port to send data of tags:

Active Sending Mode: The RFID Reader sends data immediately after reading the tag.

Passive Sending Mode: The RFID Reader does not immediately send data after reading a tag. Instead, the Reader waits for the main computer's command to fetch the data.

Responsive sending Mode: After reading a tag, the RFID Reader would repeatedly send data to the tag every 10 seconds until it receives a response from the main computer.

The following table indicates the format of the data sent by the RFID Reader's RS485:

Header	ID	Address	Antenna	Tag Data	Check Sum
0x90	0x5B	1 byte	1 byte	8 byte	1 byte

The following lists the format in which the main computer fetches data commands:

Header	ID	Module	Address	Command Code	Footer
0x90	0x5B	1byte	1byte	0x83	0x0D

The main computer receives data responses in the following format:

Header	ID	Module	Address	Command Code	Footer
0x90	0x5B	1byte	1byte	0x82	0x0D

Ⅲ Wiegand port

The DRF8804A RFID Reader provides a Weigand port. The user can choose to use the Wiegand 26 communication protocol or the Wiegand 34 communication protocol. These two protocols format data in the following manner：

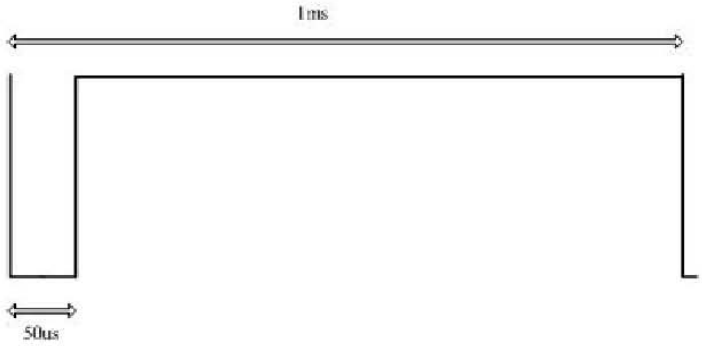
The following chart is Wiegand 26 format, P0 are the Even Check Sum of the first 12-bits and P1 are the Odd Check Sum of the last 12-bits.

P0	First 12-bits	last 12-bits	P1

The following chart is Wiegand 34 format, P0 are the Even Check Sum of the first 16-bits and P1 are the Odd Check Sum of the last 16-bits.

P0	First 16-bits	Last16-bits	P1

The Wiegand port is made up of three lines, one for negative pulse "0", one for "1" and another is the ground wire. The following figure demonstrates the format of every 1-bit. The user may set up the Wiegand port's data format according to the needs of the controller. Wiegand signal is as the following figure:



In order to enhance reliability in its data-communications, the RFID Reader provides various data-sending functions. Once a tag has been read, the Wiegand port will send data to the tag multiple times over a period of time. Number of times sent can be from 1 to 3. The configuration software can set the interval between each time of sending.

D) Tag ID Buffer and Pre-compare

Ⅰ Tag ID Buffer

In order to eliminate inconsistency between the Reader's high speed reading and its limited speed in communication , as well as to provide reliable data sending , The DRF8804A RFID Reader determines the setting for the ID Buffer .The ID Buffer, at its maximum, can hold 600 of ISO18000-6's UID data. As the RS485 sends the data, the RFID Reader send the data of tag in the ID buffer basing on FIFO (first in first out) sequence ,when it receive the main computer's command. Without the The ID Buffer, the RFID reader will be send the data it read most recently first.

Ⅱ Pre-compare

Pre-compare is for the purpose of reducing redundancy in The DRF8804A RFID Reader's data sending. With this function, even if the RFID Reader reads a tag more than once, it will only send one set of data. Pre-compare will choose the most efficient allocation of time in its data sending. If reading of the tag next exceeds beyond the effective period of time, the RFID Reader will not proceed to Pre-compare. The user can also choose this function in accordance with his or her needs.

E) RFID Reader network

All of the RFID Readers in the DRF series is able to support network.

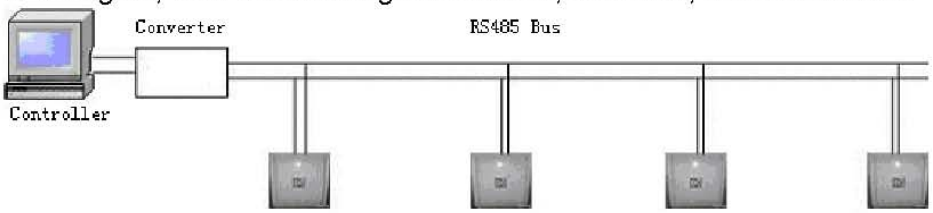
Ⅰ RS485 network

The DRF8804A RFID Reader RS485 network is composed of a main controller and a number of RFID Readers that are connected to the RS485 bus. The RS485 bus is made up of two difference signal lines. Every RFID Reader can be enacted on the single address code. Through the address code, the controller can differentiate and control all the RFID Readers.

The RFID Reader's RS485 port supports the functions of the SDK 2.0 provided by our company, as well as some of the RS485's specialized protocols such as the Syris protocol (See 3.2.3 port).

The DRF Reader's RS485 port is in accordance with the electric criterion of RS485 bus. The following indicates the RFID Reader's 485 network within the RS485 bus.

In the figure, from the left to right: Controller, converter, RS845 main line



3. Operation Configuration of the RFID Reader

Our company provides a DrfSetup.exe program for the configuration of RFID Reader's operational parameter. The following demonstrates the interface of the parameter configuration program:

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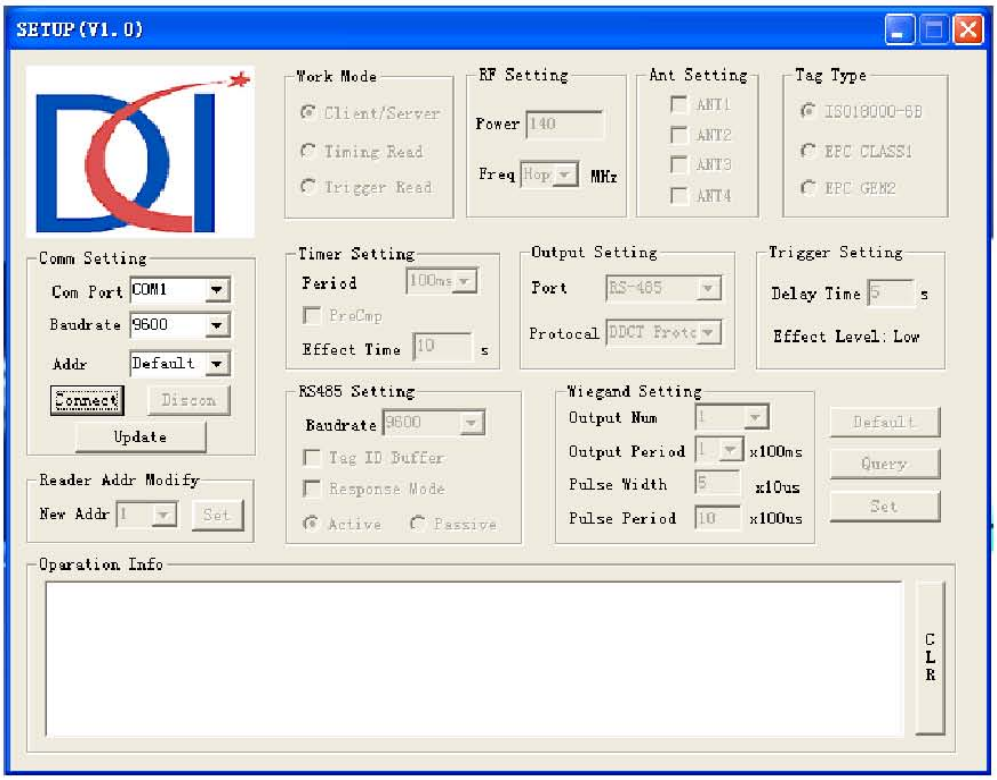
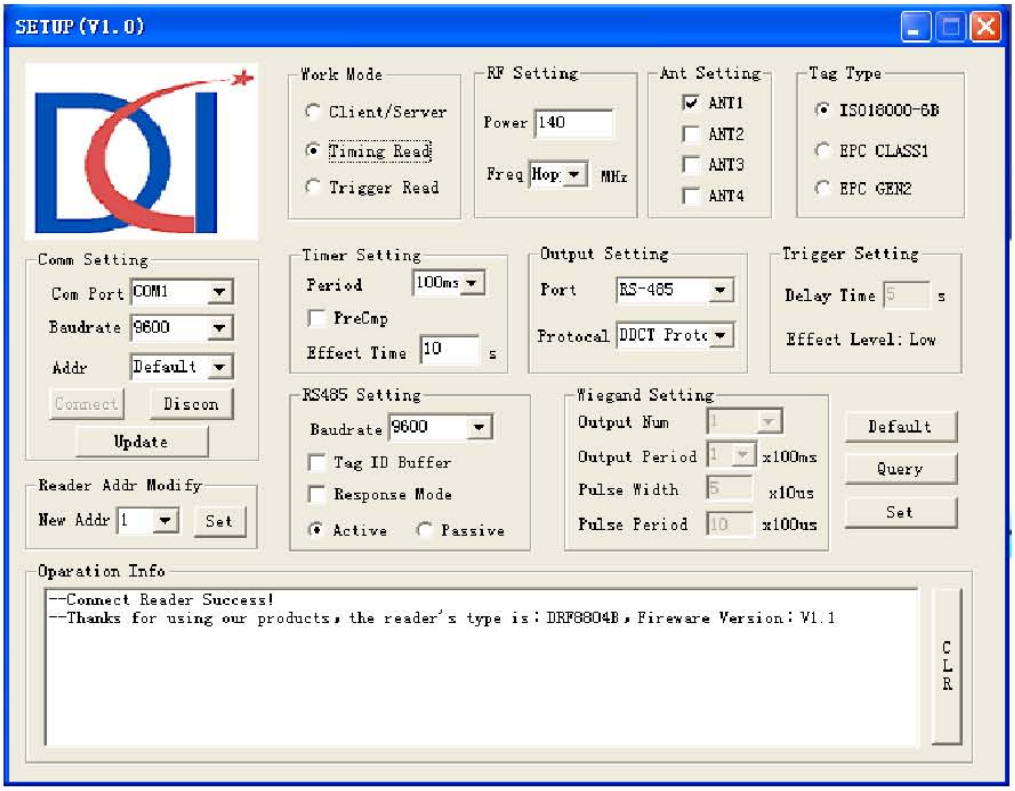


A) Serial Port Setting

Serial port setting includes serial port selection, baud rate setting and RFID Reader address selection. The RFID Reader address lists from 1 to 240. Only by selecting the correct address will the RFID Reader establish communication. The 'Default' selection can be used to establish communication with any RFID Reader. By clicking on connect, a connection will be established between the PC and the RFID Reader.

The following Figure indicates the interface after connection has been established:

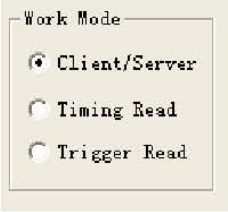


Note: Input the product model number and the firmware code into the operation information column.

B) Modify the RFID Reader address

If the RFID Reader address needs to be changed, select the correct address in the 'Reader addr Modify' drop-down menu as the following Figure. Clicking 'set' will modify the RFID Reader address. The new RFID Reader address will become effective after the RFID Reader has been reset.

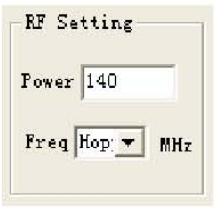
C) Selecting working modes



Through the selections indicated in the figure above, the user can configure the RFID Reader's work mode. When the Client/server mode is selected, the RFID reader can set its RF setting and its antennae setting for all four antenna connections. After selecting the Client/server mode, other selections turn grey and hence cannot be selected. When the Timing Read or the Trigger Read is selected, the RFID Reader can set its RF setting, tag type, timer setting and Output setting. Under the Trigger mode, the RFID Reader can also set the trigger setting. More details will be explained in the following.

D) RF setting

The user can set the RFID Reader's RF power and frequency according to the user's needs. The maximum parameter for the RF power is 150. The RFID Reader will use RF power at 0.25W, The RF frequency is in the range of 902.5MHz to 927.0MHz with FHSS.



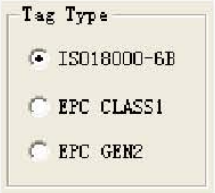
(Warning: To his or her best ability, the user should use the minimum amount of RF power that the installation will allow. When using the maximum RF power, any installation personnel or the user should not stay within 35°in front of and within 1 meter of the antennae for an extended period time.)

E) Antennae setting

The antennae can be selected using the DRF8804A RFID Reader. In order to start using an antenna, check its corresponding check box as the following figure .

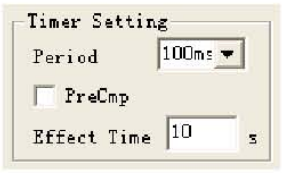
F) Tag type setting

Setting the tag type is necessary when the RFID Reader is set at Timing Read or Trigger Read .Under iming Read or Trigger Read, the DRF series RFID Reader can be set to automatic sorting with the following tag types: ISO18000-6B，EPC Class1 and EPC GEN2.



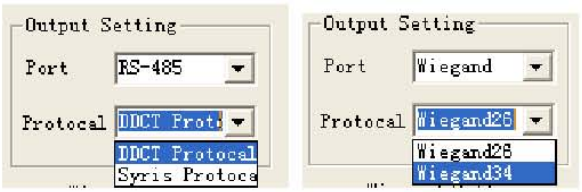
G) Timer setting

This column of setting includes the setting of the period at which the DRF8804A RFID Reader reads the tags (such as the interval between each reading) and the Pre-compare setting. The interval between each reading can be set between 10ms to 1000ms. The user can select the Pre-compare function as well as set the effective time at which Pre-compare is in effect. Set at "0" when it is not necessary to set the effective time at which Pre-compare is in effect.



H) Output setting

This column is the setting for the ports and communication protocols when using the RS485, the user can select between the Syris protocol or DDCT's communication protocol. When using the Wiegand port, the user can choose to use the Wiegand26 or the Wiegand 34 protocol.

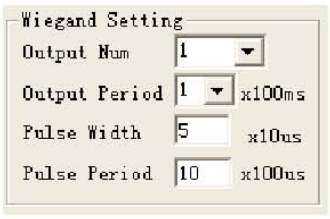


I RS485 setting

This column is the setting for the RS485's parameter. Its content includes: RS485's speed, the Tag ID Buffer, Active Sending Mode, Passive sending mode and Response sending mode.

II Wiegand setting

This column is the setting for the Wiegand port's parameter. The setting includes: the number of times Wiegand transmits, the length of the interval between each transmission as well as the format of the signal. The format of Wiegand signals requires the setting of Wiegand's pulse width and Pulse period .After selecting these functions, click set. The RFID Reader must be reset in order for the new parameter setting to be in effect. The user can click reset data in order to reset the RFID Reader.



Tips for ensuring effective usage

1. Adjust all the antennae to secure the best position in order to maximize the system's efficiency.
2. When placing the tags, take care to not accidentally stick the tags together.

Safety Instructions

1. Never attempt to service the RFID Reader by yourself at anytime.

2. When transmitting under normal use or during debugging of the installation, it is best that no personnel should stay within 65°in front of and within 20 cm of the antennae for an extended period of time.
3. Unplug the RFID Reader from the DC power adapter before cleaning it. Use only a damp cloth for cleaning the exterior surfaces of the RFID Reader.
4. Do not place the RFID Reader on any unstable cart, stand, bracket or table. The RFID Reader may fall, causing damage to the Reader.
5. Never insert objects of any kind into the RFID Reader. The objects may short out parts causing damage to the Reader and user.
6 Remove the power adaptor if the transmitter is stored for long periods of time.
7 If liquid leaks into the RFID Reader, do not turn it on. The interior of the transmitter must be completely dry or it will be damaged when power is applied.

Trouble Shooting

1. **Problem**: When using the demo software after connecting the RFID Reader, a display appears, indicating, 'successfully opened the serial ports, and failed to set the baud rate'.
Solution: The source of this problem is usually in the RS232 bus. Please check if the RS232 bus connection between the RFID Reader and the PC is operating normally. Also, check if the RFID Reader is connected to its power.
2. **Problem**: After connecting the Wiegand port to the controller, the RFID Reader is not receiving any data or is receiving scrambled data.
Solution: The Wiegand port has three wires, two signal wires and one ground wire. Please ensure that the Wiegand's ground wire connection and the controller's ground wire connection are normal.

Technical Parameter

Radio Frequency	ISM 902-928MHz
Working Mode	FHSS
Channel Space	500KHz
Radio Power	+15dBm to +24 dBm （P-P ）
Antenna Gain	12dBi
Antenna Horizontal 3dB Beamwidth	65°

Antenna Vertical 3dB Beamwidth	34°
Antenna Polarization	Vertical
Antenna Front-Back Ratio	>25dB
Antenna VSWR	< 1.4
Antenna Impedance	50Ω
Modulation Mode	ASK
Bit rate	150K bps
interface	RS-232 RS-485 Wiegand 26 bits\34bits
Working Distance	≤8M
Power	220V / 5V 4A
Working Temperature	-20℃~+50℃
Store Temperature	-35℃~+85℃

FCC Statement (FCC ID: UWBDRF8804A)

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receivers connected.

-- Consult the dealer or an experienced radio/TV technician for help.

NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.