

RDM-900S05 UHF RFID Reader

Product specification

(Manual)



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1 Product description

The RDM-900S05 UHF RFID Reader is independently researched and developed by our company and is designed with the industry's highest performance Impinj R2000 chip. Based on the dynamic Q algorithm of Impinj and brand-new data model, we independently invented the latest "adaptive dynamic Q anti-collision algorithm V3.0" and applied this algorithm to all R2000 readers independently developed by our company. Compared with similar readers in the market, the R2000 reader using this algorithm has significantly improved multi-tag reading performance. The more tags, the more obvious the difference. The reader has 8 radio frequency SMA antenna connection ports, which can connect 8 antennas at the same time to realize time-sharing cycle inventory.

The RDM-900S05 UHF RFID Reader can be used in access control channels, smart containers, high-quality consumables cabinets, tool cabinets, clothing channel machines, filing cabinets and other applications that require multi-antenna identification and reading.

2 Product advantages

➤ **The core chip uses the highest-end performance Impinj R2000 chip**

The reader is designed based on the industry's highest-end performance UHF dedicated chip Impinj R2000.

➤ **High-performance multi-tag recognition algorithm**

Based on the dynamic Q algorithm of Impinj and brand-new data model, we independently invented the latest "adaptive dynamic Q anti-collision algorithm V3.0". Compared with similar readers in the market, the R2000 reader using this algorithm has significantly improved multi-tag reading performance. The more tags, the more obvious the difference.

➤ **Few tags optimization algorithm**

An algorithm designed for reading a small number of tags. Ultra-high tag response speed.

➤ **High power output capability**

Choose PA chip with stronger amplifying output ability, the maximum output power of the reader can reach 35dBm. The PA still maintains a linear state when the output is 33dBm. Larger output power can achieve a longer recognition distance, and at the same time, in specific applications, greater output power can activate tags with weaker sensitivity.

➤ **Similar Dual-CPU architecture design**

The R2000 chip is responsible for polling tags, and the CPU is responsible for data management. Polling tags and sending data are parallel and do not occupy each other's time. Greatly improve the overall performance.

➤ **Fast 8-antenna polling function**

High-speed polling 8 antennas. The shortest polling time for each antenna is 50mS. The polling time of each antenna can be configured separately.

➤ **Antenna connection detection function**

The reader integrated antenna physical connection detection circuit can quickly and accurately detect the antenna connection status of the reader port. The antenna connection status of all ports of the reader can be read with one command.

➤ **RF power amplifier PA protection function**

The reader integrates forward and reverse power detection functions. When the RF port of the reader is not connected to the antenna, it can quickly detect the status of the unconnected antenna when the tag is read, so as to protect the PA from being burnt out in the case of open circuit output.

➤ **Onboard temperature sensor**

The onboard high-precision temperature sensor can accurately monitor the

operating temperature of the system in real time.

➤ **Outstanding thermal design**

All the heating devices have a heat-conducting structure. There is a large area of heat sink contact at the bottom of the reader. The thermal coupling interface adopts thermal conductive silicone grease with high thermal conductivity, which is not volatile at high temperature.

➤ **Excellent stability**

24 hours × 365 days work without crashing. The performance is less affected by the outer shell, electromagnetic environment, etc. Wide temperature design, extremely low temperature drift coefficient.

➤ **Excellent consistency**

A model of consistent design. All components of the highest level are selected to ensure the stability and consistency of various parameters.

➤ **Simple and efficient software and hardware interface**

Single power supply, without external tantalum capacitor, the reader can work normally, the peripheral circuit is extremely simple.

3 Product parameter

Table 3-1 Product parameter table

Operating Voltage	DC 3.6V ~5 V
Standby working current	<50mA (EN pin high level enable)
Sleep working current	<100uA (EN pin low level enable)
Operating current	2.1A @ 5V (33 dBm CW Output, 25°C) 1.5A @ 5V (30 dBm CW Output, 25°C) average working current 1.7A @ 5V (33dBm Output, real-time inventory mode, 25°C)
Start Time	<50mS
Operating temperature	- 20 °C ~ +70°C
Storage temperature	- 40 °C ~ +85°C
Working humidity	<95% (+25 °C)
Air interface protocol	EPC global UHF Class 1 Gen 2 / ISO 18000-6C
Working frequency	902MHz~928MHz(USA)、865MHz~868MHz(EU) 860MHz~960MHz(custom working frequency)
Supported work area	US, Canada and other regions following U.S. FCC Europe and other regions following ETSI EN 302 208 with & without LBT regulations Mainland China Japan Korea Malaysia Taiwan
Output power accuracy	+/- 1dB
Output power flatness	+/- 0.2dB
Output RF connector	Female(Reverse) SMA
Receiving sensitivity	<-85dBm
Inventory tag peak speed	> 700 tags/second
Tag RSSI	support
Antenna connection protection	support
Working temperature monitoring	support
Number of antenna ports	8 female SMA
Communication Interface	TTL UART
GPIO	2 GPIO inputs, 2 GPIO outputs (3.3V TTL level)

Communication baud rate	Standard 115200bps (optional 38400bps and 460800bps)
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Precautions::

- When the temperature measured by the working temperature measurement function exceeds 60°C, it is not suitable to work at full load;
- Please connect the heat sink when working continuously at full load;
- The power supply voltage should not exceed 5V, otherwise the internal protection circuit may be damaged;

4 Pin configuration and function description

4.1 1.25mm pitch 15PIN connector pin definition

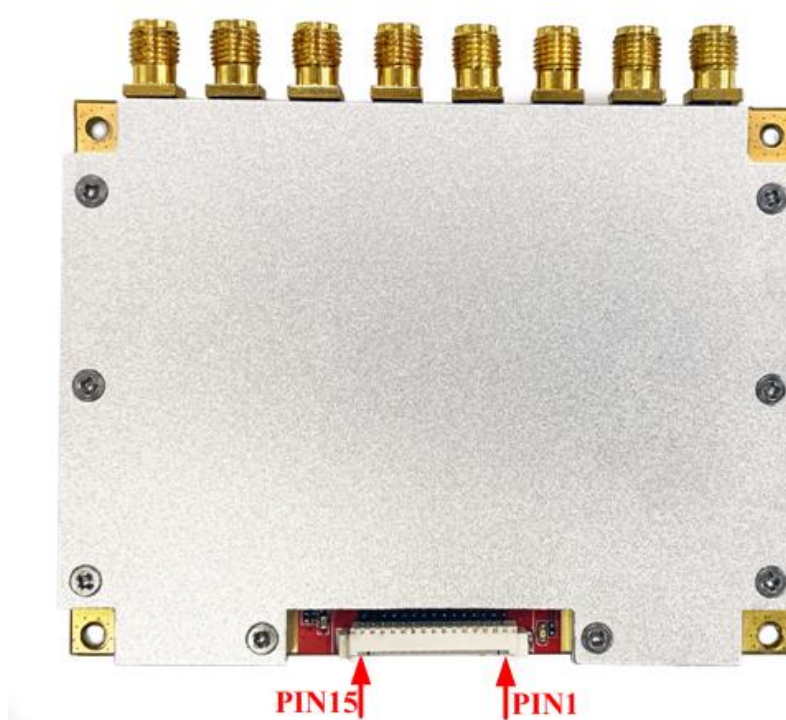


Figure 4-1 1.27mm pitch connector pin definition

Table 4-1 1.27mm pitch connector pin definition

PIN	Definition	Description
1	GND	ground
2	GND	

3	VCC	power supply DC 3.6V~5V
4	VCC	
5	GPIO3	The first 3.3V TTL level GPIO output
6	GPIO4	The second 3.3V TTL level GPIO output
7	GPIO1	The first 3.3V TTL level GPIO input
8	BUZZER	Buzzer control, need external drive (optional internal drive)
9	UART_RXD	UART RXD(TTL serial port data input)
10	UART_TXD	UART TXD(TTL serial port data output)
11	USB_DM	For internal testing only
12	USB_DP	
13	GPIO2	The second 3.3V TTL level GPIO input
14	EN	High level turns on the reader (default internal pull-up is enabled), low level turns off the reader
15	485_DIR	485 data direction control

5 Application information

5.1 Input power supply

It is recommended to use at least two 220uF tantalum capacitors with a withstand voltage of 10V or higher for the VCC port to reduce the traction of the power supply due to the rapid opening and closing of the power amplifier during RF transmission. 0.1uF and 100pF capacitors filter out power ripple noise in different frequency bands respectively.

5.2 Enable pin

EN is enabled, built-in pull-up resistor to VCC, the reader is powered on when high level or floating, and the reader is powered off when low level(low level should be less than 0.3V, high level should be greater than 1.3V and less than VCC).

5.3 GPIO input and output

Input: Logic low<0.56V, minimum 0V; Logic high>1.66V, maximum 3.3V.

Output: Logic low<0.99V, typical 0V; Logic high>2.31V, maximum 3.3V;

IO port maximum output drive current 5mA

5.4 Antenna connection

The output impedance of the antenna port is 50 ohms, and the antenna standing wave ratio is recommended to be less than 1.5. A better antenna standing wave ratio can achieve a better card reading effect.

5.5 Communication interface(RXD/TXD)

The communication interface RXD and TXD are both 3.3V TTL level, the default baud rate is 115200bps.

6 Product size parameters

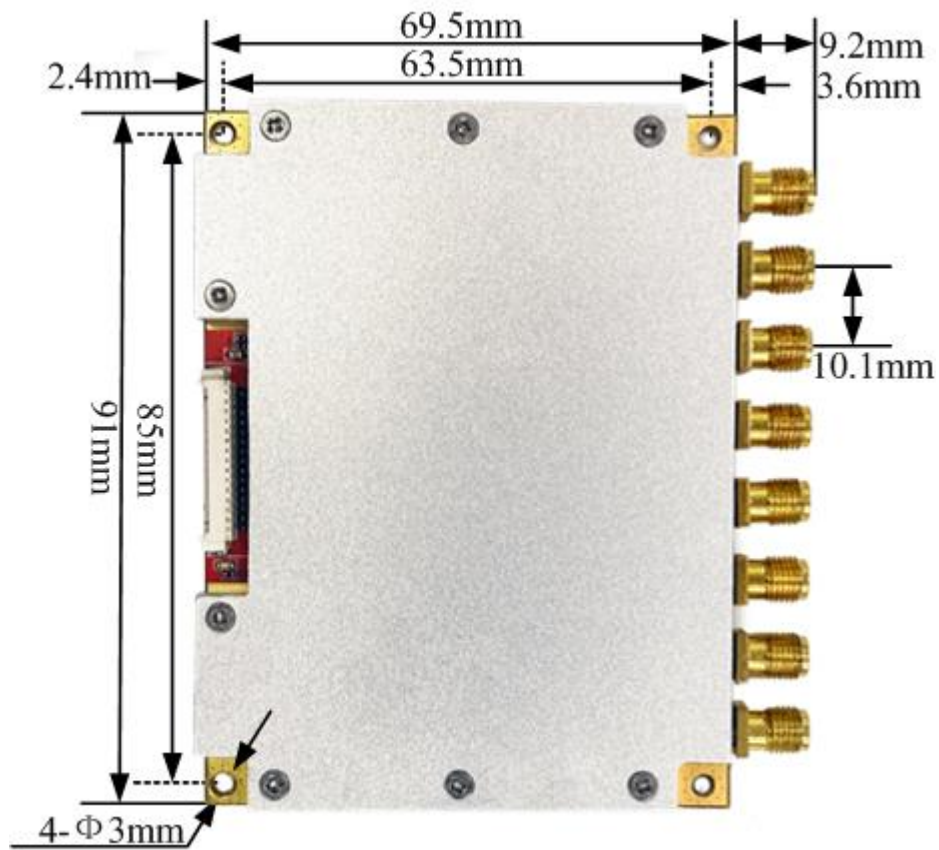


Figure 6-1 Length, width and positioning hole size

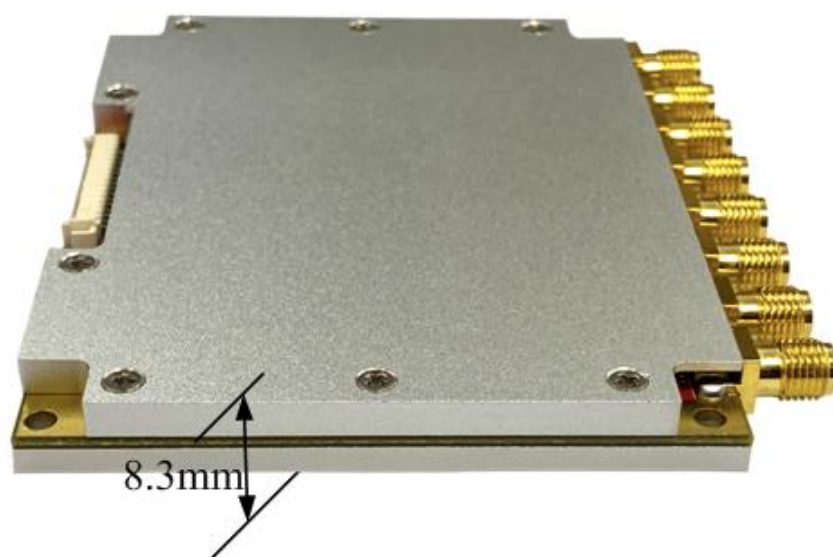


Figure 6-2 PCB, heat sink and shield thickness

FCC Warning

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.