



# **TPAD20 M RFID reader machine**

## **User's manual**

- ◆ Before you use this product, please carefully read this manual, and properly keep it for future reference.
- ◆ As our products continue improving, they may be changed without advanced notice.
- ◆ The contents of this manual have been carefully checked. For any printing error or misunderstanding content, please contact us as soon as possible.

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# 1. Product overview

## 1.1. Introduction

TPAD20 M RFID reader-writer machine is a machine that is specially designed for self-checkout and check-in, book sorter and production lines and has the super anti-interference ability of reading and writing. **The device use anti-metal design, and are not subject to the impact of metal at the bottom and the surrounding metals, even they are installed in the metal environment.** They are mainly used for self-checkout and check-in environment, book sorter, librarian workstation, production lines, etc.

## 1.2. Product features

- Working frequency is 13.56Mhz;
- Support ISO15693, ISO18000-3M1 standard;
- RF power: 0.25 ~ 1.5W (adjustable);
- Anti-metal design, which allows the product to be embedded in metal-surrounding environment without impact on the performance;
- Fast anti-collision processing algorithm; the speed of reading the tag is up to 50pce / sec;
- Reading and writing distance: 15 ~ 41CM; (this distance is related to the card);
- Support noise detection, be able to detect whether the environment has interference;
- Automatically turn off RF during idle hours;
- Integrated design, embedded in reading and writing modules and antennas;
- Communication interface: USB;
- Power supply: 12V DC;

### 1.3. Product parameters

Parameter	Description
Support protocol	ISO15693, ISO18000-3 M1
Working frequency	13.56MHZ
RF power	0.25~1.5W (configurable)
Communication interface	USB
Reading and writing distance	35cm
Range of reading within agreed area	≤6cm
Supply voltage	3.3~12V DC (Support the USB powered mode)
Maximum power consumption	3.5W
Anti-metal design	Yes
Shell material	PCB 和钣金 metal plate
Dimensions	379.5x290x20.7mm

#### ! Tips

- ①Dimensions are approximate. For specific dimension, please refer to the real object;
- ②As our products continue improving, technical parameters may be changed without advanced notice.



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## 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.

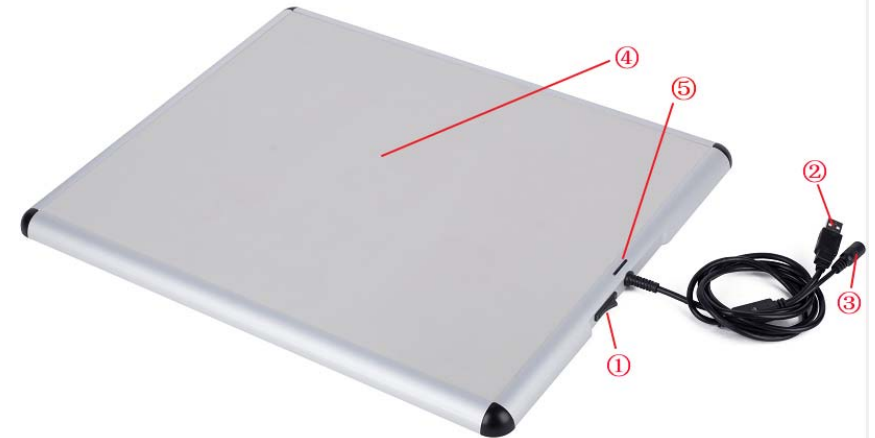
NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can 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.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

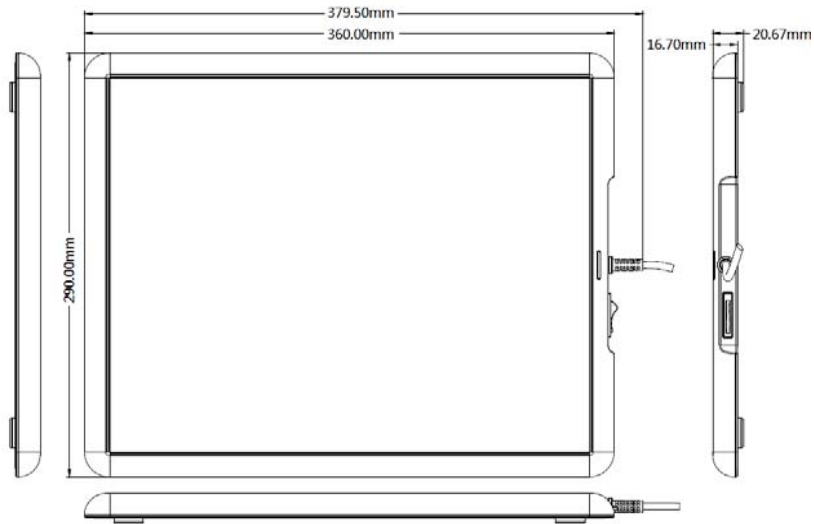
## 2. Product structure

### 2.1. Product appearance



标号 No.	名称 Designation
①	Power switch
②	USB interface
③	Power Interface
④	Sensing area
⑤	LED light

## 2.2. Product dimensions



TPAD20 M

## 2.3. Interface description

## 2.4. Communication interface

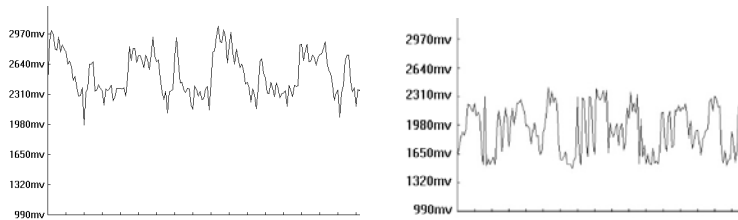
Communication interface of the device adopts the USB interface, as shown below:

### ➤ Call for equipment debugging and technical support

Mobile phone:: 138 0251 4535

Fixed telephone: 020-32039552

The following two waveforms illustrate the existence of electromagnetic interference in the environment:



➤ **Interference source analysis**

(1) Power adapter: laptop power supply, display power supply, LED light power supply, surveillance camera power supply, electric car charger, power supply of other electric equipment.

(2) Card reader with the same frequency band: access card reader, desktop card issuer.

(3) Motor equipment.

➤ **Troubleshooting**

Turn on the Noise Detection function, and switch off the power of the interference source one by one. At the same time, observe changes of the interface waveform, in order to determine the interference source.

## 7. Technical Support

➤ **Download link for development data and testing**

Address 1: [https://git.oschina.net/LiZhenSong/rfidlib\\_SDK](https://git.oschina.net/LiZhenSong/rfidlib_SDK)

Address 2: <http://www.gzandea.com/information>



It can be used directly through the computer USB interface.

## 2.5. Power interface and switch

The device uses the standard DC 2.1 power socket. Each device is not only equipped with a DC 12V / 2A power adapter for connecting devices, but self-equipped with a power switch button, as shown below:

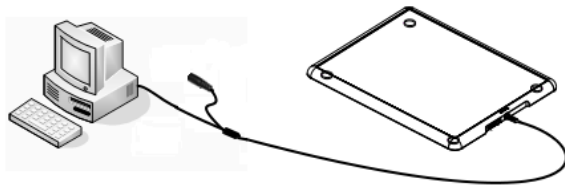


Power switch and interface

## 3. Device connection

### 3.1. Communication connection

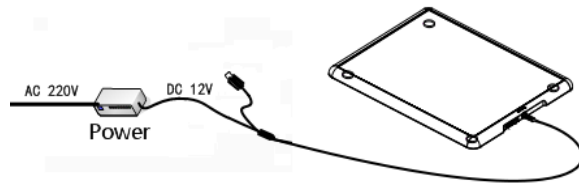
The device connects to PC through the USB communication interface:



Connect via the device's own USB cable

### 3.2. Power connection

Note: The TPAD20 M can be USB powered. However, it may be unstable when the RF power is greater than 0.75W. In such case, the power supply should be connected.



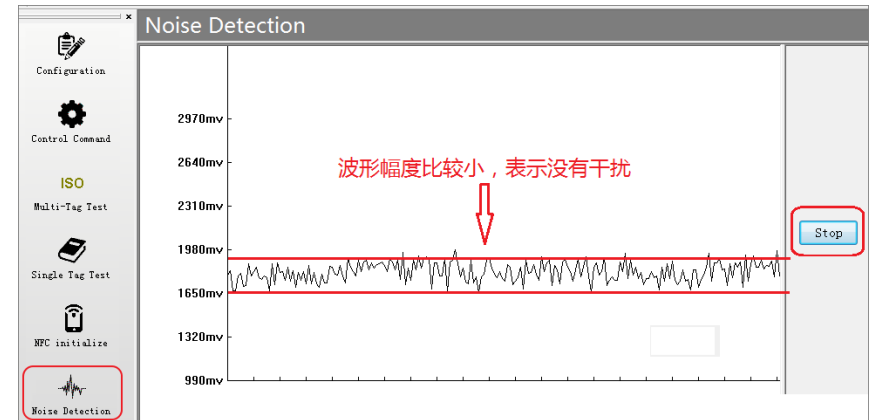
Power connection

### 4. LED instruction

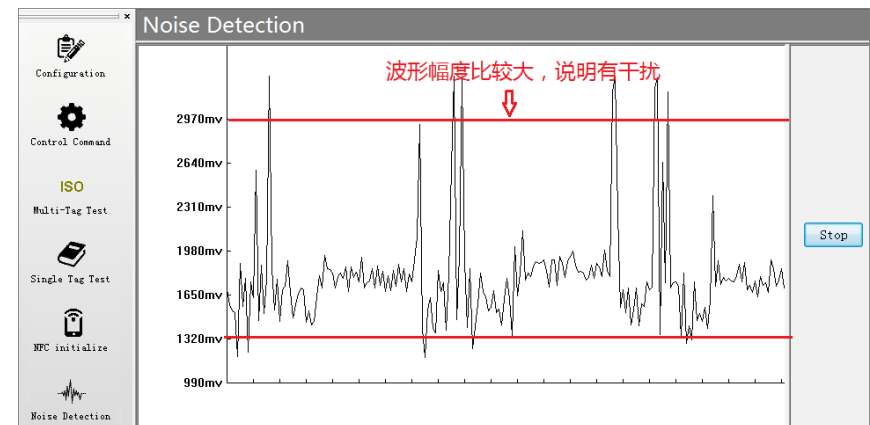


function of the testing software.

Click the "Noise Detection" in the lower left corner to enter the test interface. Then click the "Start" button on the right side for noise detection. See the following multiple screenshots of software:

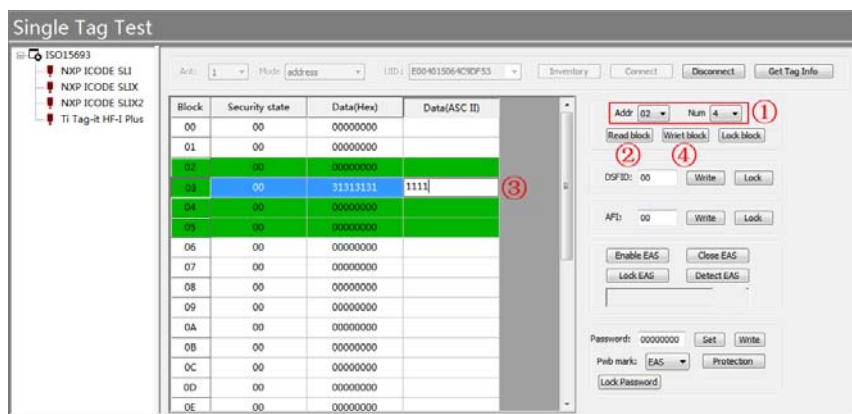


Non-interference reference waveform



Electromagnetic interference reference waveform





**Step:**

- 1, Set the data block of the tag to be operated in the Start drop-down box and the Quantity drop-down box. After setting, the operable data block is displayed in green, indicating that it can be operated;
- 2, Click [Read Data Block] to read the data value of the data block selected in step 1;
3. Write the value in the line (green area) of the data block whose value should be written, and then click [Write Data Block];
- 4, After the operation is completed, click the Disconnect button to disconnect the tag connection.

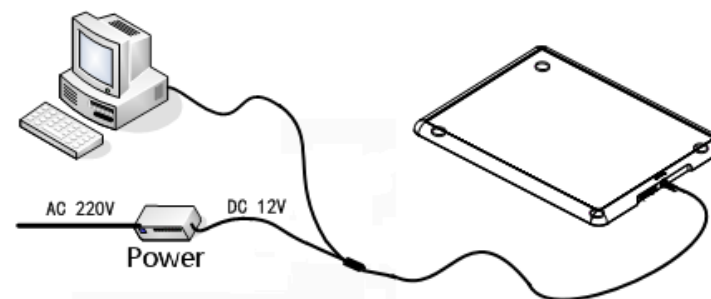
## 6. Troubleshooting of FAQs

When using the TPAD20 M, you may experience problems, such as distance decrease or intermittent reading of a single tag, instability of reading multiple labels, slow reading, or large number changes, etc. When these problems occur, there may be electromagnetic interference in the environment rather than the machine performance issue. Interference source can be judged and investigated by the "noise detection"

Status	Function description
LED 1	The device is powered on normally, when the red light flashes.
LED 2	The device detects an electronic tag or card, when the blue light is on

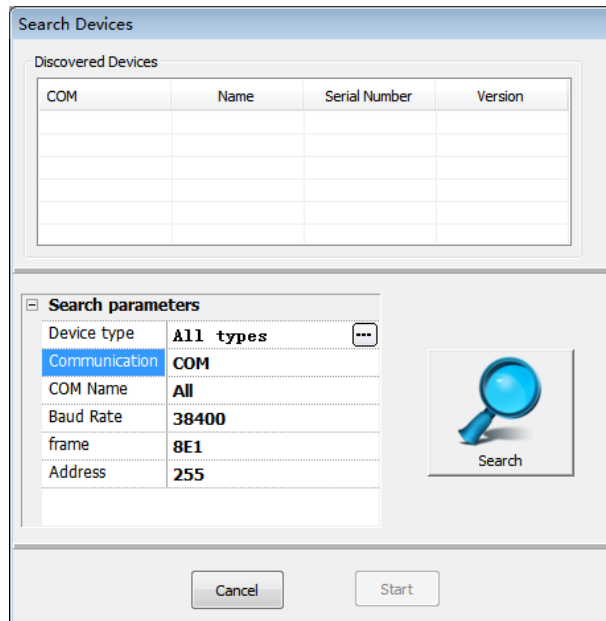
## 5. Instructions for configuration tools

Before testing the device, refer to Section 3 *Device Connection* to connect the device. As shown below, after connecting and turning on the software, the product can be configured and tested:



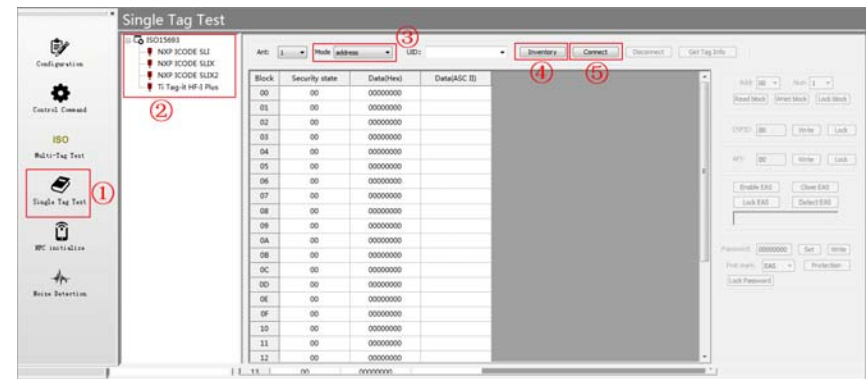
Connection diagram of USB communication

After the device is connected, press the power button. After making sure that the device is normally powered by observing state of the LED, open the testing tool R-Tool folder, and find the file R-Tool in the folder directory. Double-click the file to open the test tool, as shown below:



Select the appropriate communication method according to the actual interface type of the device: Since the communication interface of the device is a USB interface, select "USB Communication" in [Communication Interface] under [Search Parameters].

After the communication interface is set up, click the [Search] button to find the device. After the device is found, the device information will be automatically displayed in the "Discovered Devices" list as follows:



**Note:**

- Step 1: In the software main interface, select the menu "Single Tag Test";
  - Step 2: in the "Single Tag Test" interface, select the type of tag to be operated;
  - Step 3: mode: none address, address.
    - 1, For a single tag, select the "none address" mode.
    - 2, For multiple tags, select the "address" mode.
  - Step 4: Click the "Inventory" button to display the uid list in UID drop-down box.
  - Step 5: 1, For a single tag: click the "Connect" button;
    - 2, For multiple tags: in UID drop-down box, select the tags required to be operated, and then click the "Connect" button;
- After the above steps, you can read and write tags, as shown below:



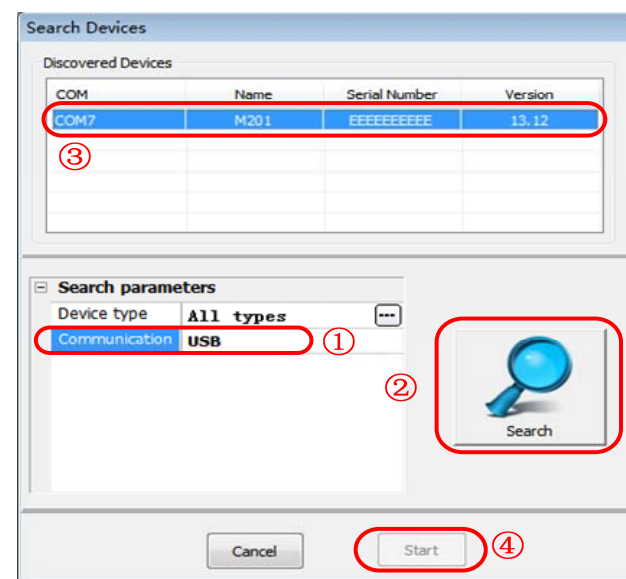
**Note:** Step 1: Select the menu "ISO Multi-Tag Test" in the main interface of the software;

Step 2: Select the "Inventory Operation" in the drop-down list above the "Start" button;

Step 3: Click the "Start" button to carry out the inventory testing.

### 5.2.2. Single-tag operation testing

In the main interface of R-Tool test software, select "Single Tag Test" and carry out procedures as shown in the following figure ①, ②, ③, ④ and ⑤ for tag operation testing:

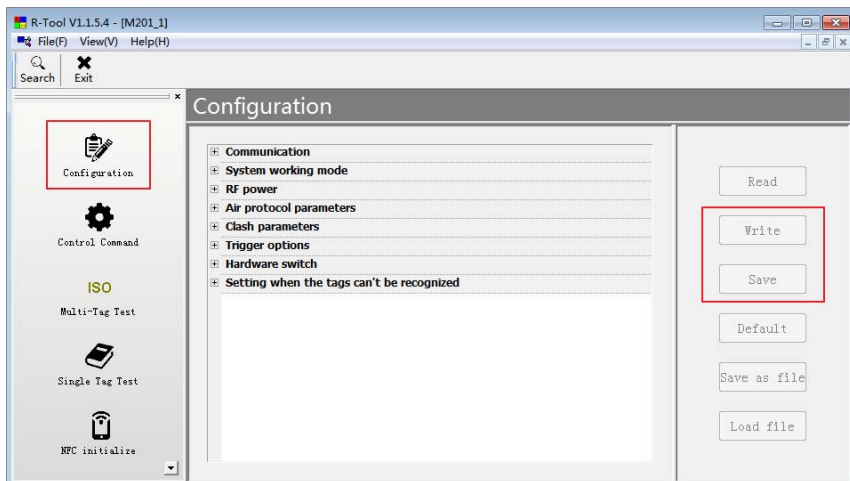


As shown above (Step ④), click the "Start" button to enter the main interface of the test software.

### 5.1. Description of configuration parameters

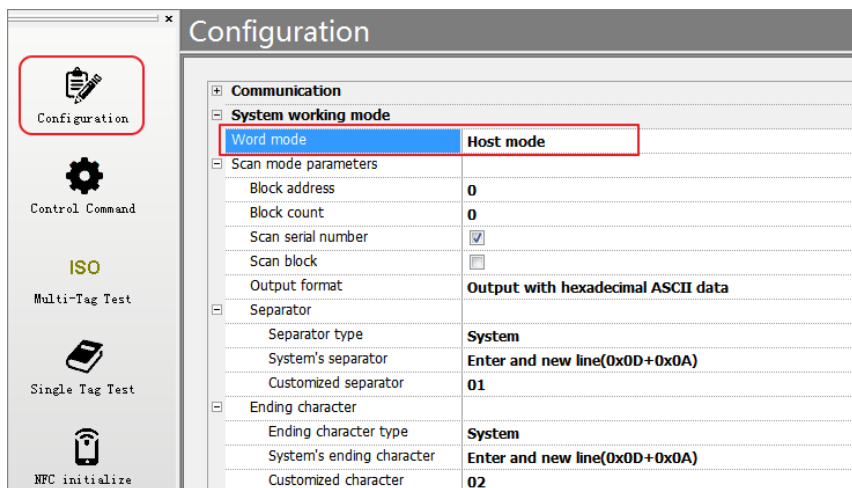
After the software and the device are successful connected, enter the configuration interface and click parameter configuration to configure the interface data, RF parameters, inventory parameters, working mode and other parameters of the device:

**Note: All changed configuration parameters must be saved by clicking [Write] button and then clicking [Save] button. Otherwise, the setting is invalid.**



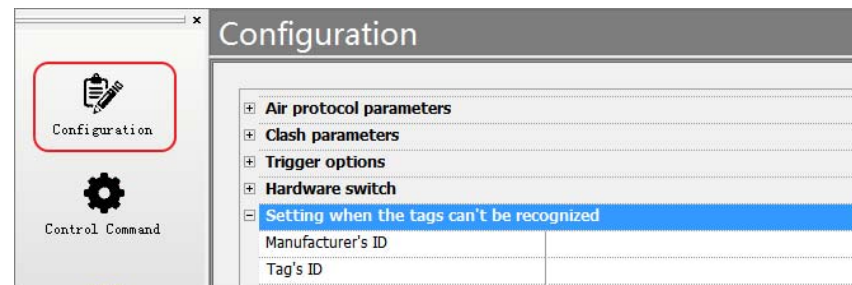
### 5.1.1. Configuration Parameter Description

#### 5.1.1.1. System working mode



counting the tag.

### 5.1.6. Unidentified tag setting



- Manufacturer's ID: Set the vendor code used when the tag type cannot be identified: 1, Tag-it; 2, NXP.
- Tag's ID: Set the tag code used when the tag type cannot be identified.

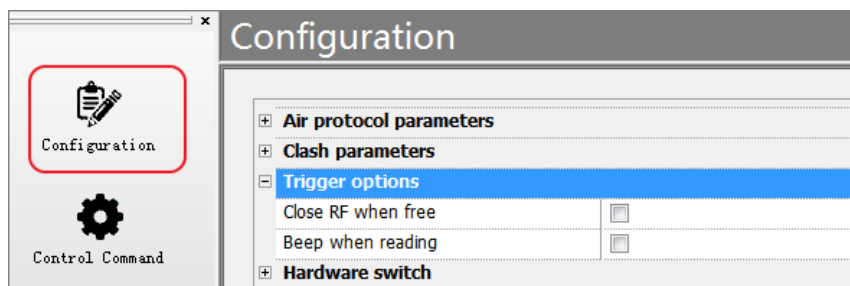
**Note: The above configuration is a common configuration. For other configuration information, consult our technical staff for configuration.**

## 5.2. Equipment testing

### 5.2.1. Tag inventory testing

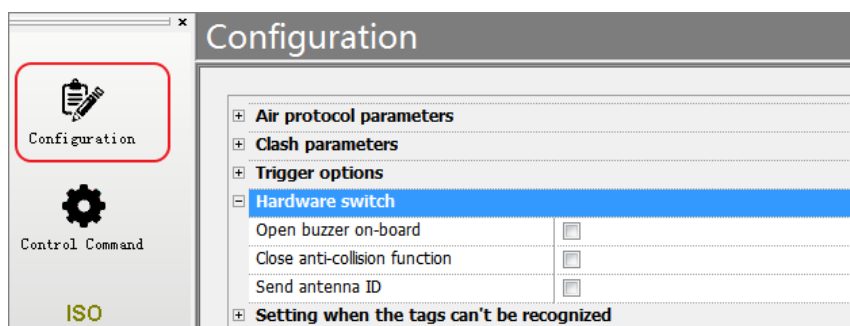
After entering the main interface of R-Tool test software, select "ISO Multi-Tag Test" and carry out the procedure as shown in the following figure ①, ② and ③ for tag inventory test:

### 5.1.4. Trigger options



- Close RF when free: In the host control mode, the machine will automatically turn off the radio frequency when it does not receive the command of card reading or opening the RF
- Read buzzer: When the buzzer on the board is on, tick the Read Buzzer to turn on the read buzzer. At this time, the buzzer will buzz when reading the tag.

### 5.1.5. Hardware switch



- Open buzzer on-board: Whether to turn on the buzzer on the board.
- Close anti-collision function: turn off the anti-collision function.
- Send antenna ID: Whether to upload the antenna interface number when

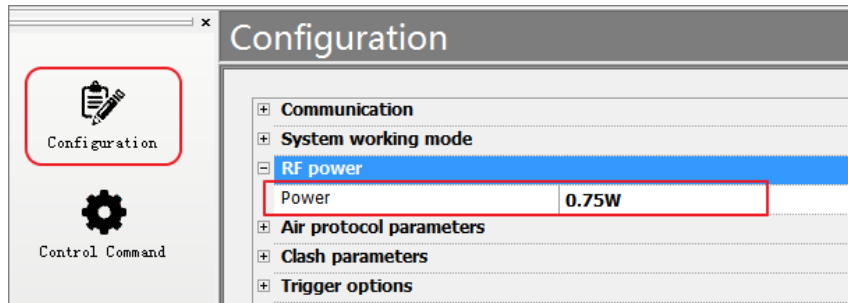
Working mode of the system can be divided into host mode and scan mode:

- Host mode: Controlled by the host software.
- Scan mode: take the initiative to scan and send the scanned data to the host.

Among them, when choosing the working mode as the scan mode, configure the parameters of the scan mode:

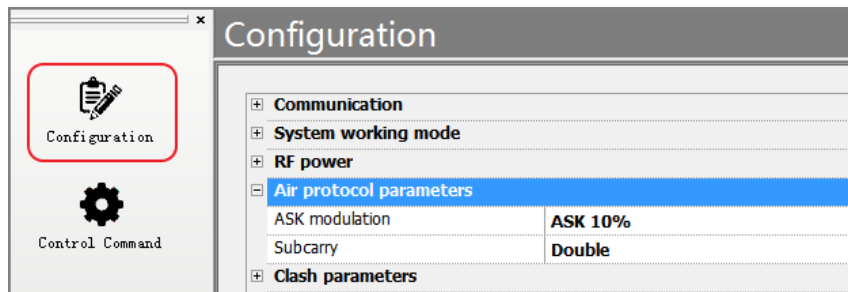
Data block start address		Set the start address of the data block to be scanned.
Number of blocks scanned		Set the number of blocks to be scanned
Scan the serial number of the tag		Set whether to scan the serial number of the tag.
Scan data block		Set whether to scan the tag's data block
Scan results output format	Output in original value	The hexadecimal characters scanned are output in hexadecimal format
	Output in ASCII code after being converted into hexadecimal character	The hexadecimal characters scanned are output in ASCII character string format
Separator	Separator type	1. Use the system separator 2. Use user-defined separators
	System's separator	Carriage return& line feed 0x0D + 0x0A, line feed 0x0A, carriage return 0x0D, TAB 0x07, semicolon 0x3B, comma 0x2C, space 0x20.
	Customized separator	Set a custom separator value, which falls within 0x00-0xFF
Ending character	Ending character type	1. Use the System's ending character 2. Use the Customized character
	System's ending character	Carriage return& line feed 0x0D + 0x0A, line feed 0x0A, carriage return 0x0D, TAB 0x07, semicolon 0x3B, comma 0x2C, space 0x20.
	Customized character	Set a custom terminator value, which falls within 0x00-0xFF

### 5.1.1.2.RF power



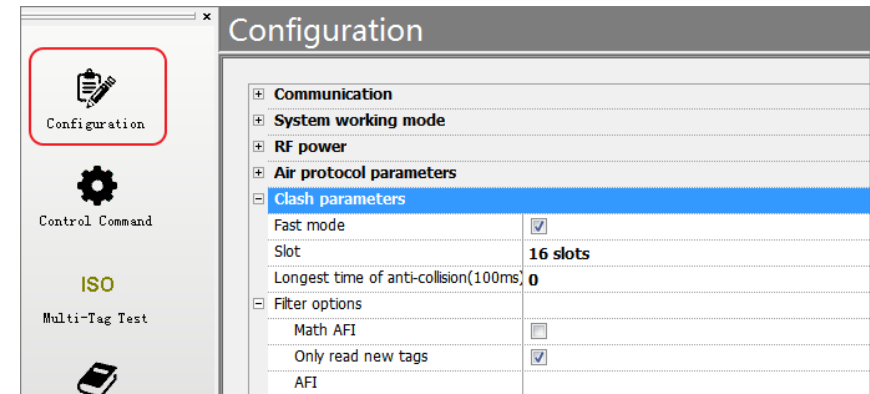
- ◆ RF power: RF power can be configured according to need: 0.25 ~ 1.5W(adjustable).

### 5.1.2. Air protocol parameters



- ◆ ASK modulation depth: Set the modulation depth: 1. OOK 100% 2. ASK 10%
- ◆ Subcarrier: It can be set as double subcarrier and single subcarrier

### 5.1.3. Anti-collision parameters



- Anti-collision parameter configuration instructions:

Fast Mode	Check to open the fast mode <b>Note: this function is available to V1.1.4.13 and above of R-TOOL configuration software</b>
Slot	Set the reader slot: 1 slot, 16 slots
Longest time of anti-collision (100ms)	The largest inventory time. When counting the tags, if the number of tags is too large and has not been read at this time, the tags that have already been read are returned.

- Filter options configuration description:

Match AFI	Set the filtering tag that enables AFI matching.
Only read new tags	When the tag does not leave the antenna sensing area, read it only once
AFI	Set the value required for AFI matching