Intelligent Warehousing and Positioning System Based on RFID

Bai Haofan, Wang Shidong, Liu Ke, Chen Zhengyang, Zhang Xingchen, Liu Gege, Liutong LI,Xiaoman XU,Zhenzhen HUANG, Pingchuan ZHANG

School of Information Engineering, Henan Institute of Science and Technology, Henan, CHINA
Corresponding Author: Pingchuan ZHANG

ABSTRACT:

With the rapid development of the current Internet technology and its RFID technology, the management of storage has gradually changed from the original information direction into a direction of intelligent development. The development of the Internet of Things technology is a kind of network that can finally realize some interconnection for some ordinary and specific physical objects and finally link with the Internet. By using RFID technology can constantly make the goods information can be identified quickly processing, the Internet of things can establish the specific connection between goods and the Internet, the storage administrator can timely access to information processing, at the same time, the relevant management center personnel can through the corresponding warehousing staff for the corresponding task instructions, finally realize a kind of goods information processing.

Key words: RFID technology, intelligent storage, the Internet of Things

I. INTRODUCTION

With the development of information technology, the construction and development of intelligent storage at home and abroad has become the main trend in this field. In this paper, the high-frequency ISO15693 international standard is adopted, the radio frequency identification technology and its working principle are analyzed, and the structure and functions of each subsystem are analyzed in detail, including user management, warehousing management, inventory management, detection management, audit management, environmental monitoring management, and warehousing management, so as to provide solutions for intelligent warehouses.

II. EXPERIMENTAL SETUP

2.1 Identification and positioning of articles

In this experiment, the so-called positioning is limited to the information and function of positioning objects, which is different from GPS positioning. High frequency ISO15693 international protocol is an international standard for RFID applications. This standard defines the air interface and data communication specifications of smart tags and readers working at 13.56Mhz. The longest reading distance of tags meeting this standard is up to 2 meters.

This experiment mainly simulates the identification and location of goods, using IC card to represent goods with labels, naming and describing the goods, and writing this electronic information into labels, which is a simulation of adding goods. Special attention should be paid to the reader here, because the reader plays a role in the system: the electronic tag is connected below to supply power; It is connected with the application system and communicates with it.

Experimental template: reader, antenna, electronic tag

2.2 Description and use of some functions

1): uid unique identifier

64-bit unique identifier, which is used to identify the identity number of each tag during the interaction between the reader and the tag in the anti-collision cycle.

2): AFI application identification

AFI indicates the application type locked by the reader-writer, and only the tags that meet the application type are selected.

3): The status of the label

Power off state: the tag is in the Power off state when it does not enter the effective magnetic field area.

Ready status: when activated and selected to indicate that it is not set up, any request will be processed.

Quiet status: it does not process any label inventory commands, and can accept direct addressing commands.

Select status: only respond to the request of selecting identifier setting and the uniqueness of electronic tag ID number.

III. Design and implementation of system scheme

3.1 The preparation of the upper computer

Instruments required: JX508 experimental box, power supply, data cable, PC, RFID card and upper computer. Write the upper computer according to the requirements of the experiment and the design purpose; Use Visual Studio 2019 to write the upper computer.

3.2 Serial port and baud rate configuration

First, open the experimental box for serial connection, then open the Multiplexing.exe software, and set the serial number and baud rate. The baud rate is 115200 by default. If RS232 serial port is used to directly connect the experimental box, the serial number is COM1. If RS232 to USB cable is used, check the virtual serial number in my computer right click-Manage-Device Manager, as shown in Figure 1 below. After this page, initialize the detected items and check whether the serial port can be opened.
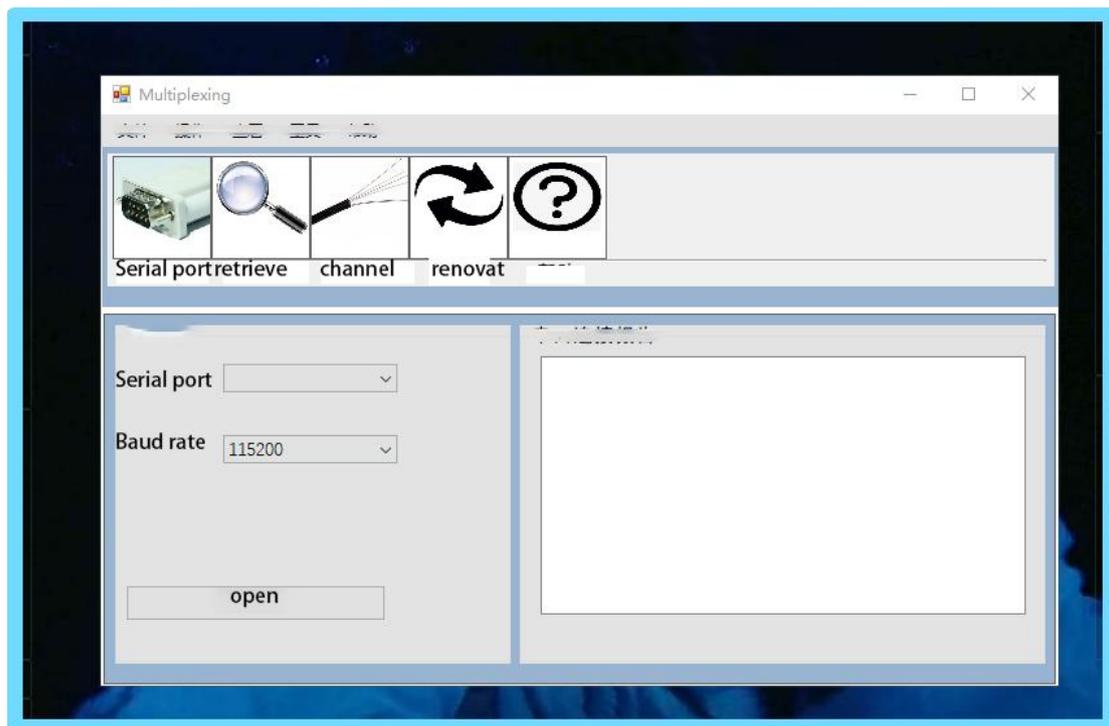

Fig. 1 Serial port detection

3.3 Preparation before adding items

Click "Add Assets" in the above figure and jump to the page shown in the right figure 2 below. This page has two options: connecting serial port and adding items.

Serial port: the serial port for identifying articles and reading and writing cards.

Preparation: Open the serial port and set the baud rate to 115200.

(Note: You can't open the positioning serial port first, you should open the button for reading and writing the reader first, otherwise there will be a conflict because there is only one line)
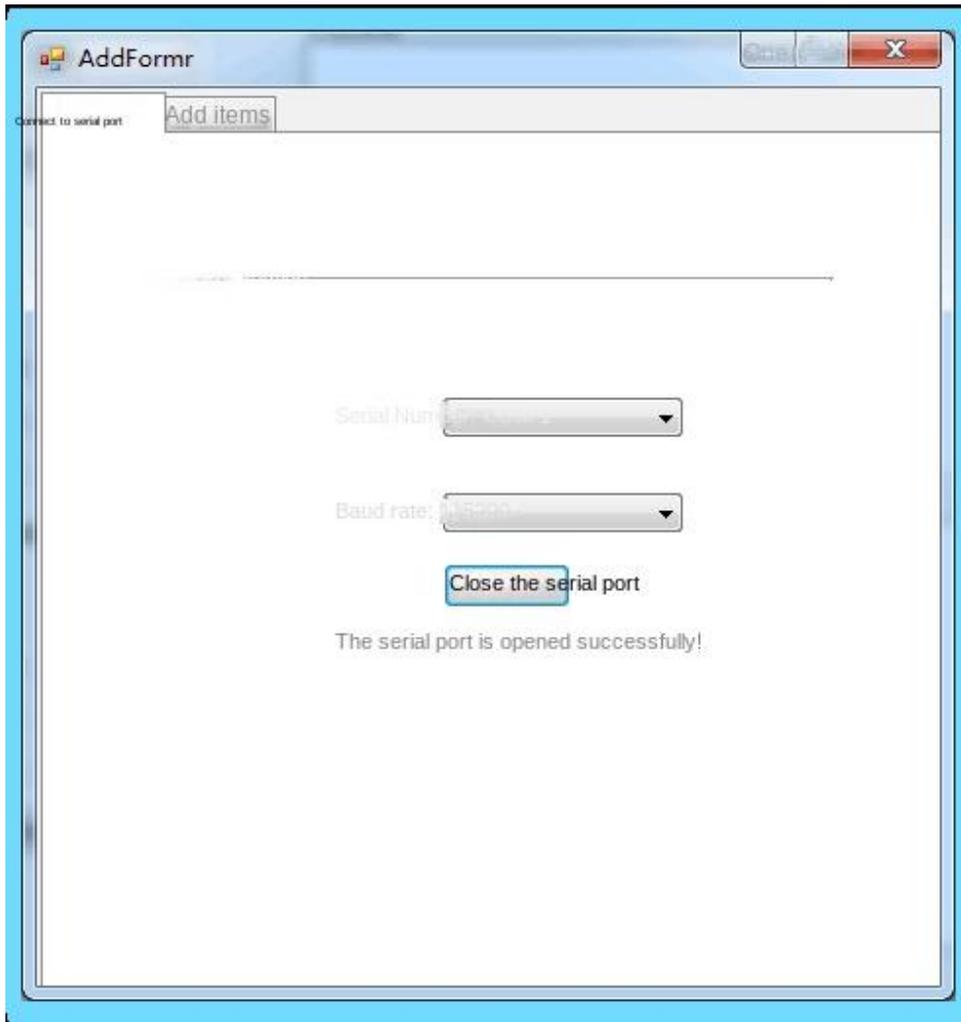
Figure 2 Feature options

3.4 Add items

s shown in Figure 3 and Figure 4, open the serial port, click Add Item at the top of the software, and place the cards on the antenna (one card at a time). First read the serial number of the tag, put the IC card on the module of International Standard 15693 for serial number reading, and write the name of the corresponding tag after generating a unique serial number. When reading again, the serial number of the tag and related information of the item will be read, which will be modulated and demodulated and uploaded to the upper computer.
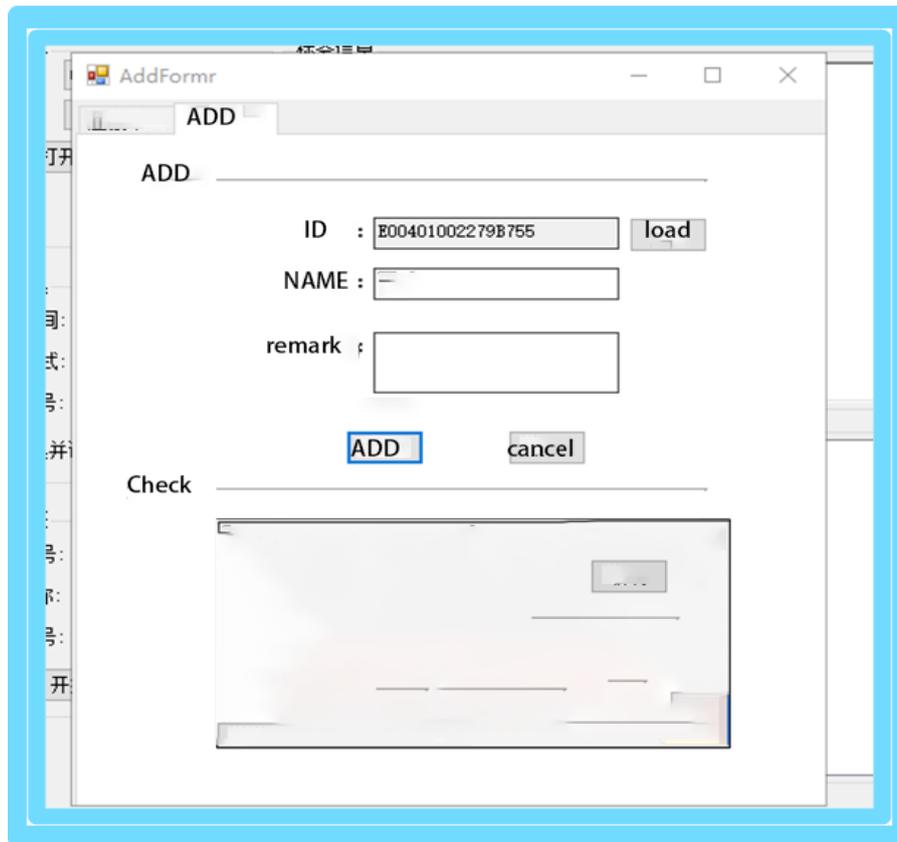
Figure 3 Physical photos

Figure 4 Software interface

IV. RESULTS AND DISCUSSION

Similar to the preparation before adding items, mainly the serial port opening and the baud rate setting. After adding, locate, before positioning, to debug the serial port and port rate, (serial port COM1, Porter, 115200), and then open the serial port, see this window, Figure 7, if there is an error, there is an error prompt. Next, read the letter, Channel switching, the default channel number of the modulating device is 1-4, the channel number of the item search tag is 1-8, and the experimental box can only simulate one channel number。

Read the information written in the card; through the query function on the software, enter the label number of

the product and directly retrieve all the information of the label。

REFRENCES

[1]. Cao Hui. [2017] " RFID Technology in the Internet of Things and the Construction of the Internet of Things " Information and Computer (Theoretical Edition).

[2]. Luo Wei, Zhu Yaqiong. [2015] "Internet of Things Research Based on RFID Technology" Informatization Construction, Vol.204: issue 8, pp.8-9.

[3]. Xu Huijian. [2012] "Design and Implementation of Intelligent Warehouse System Based on RFID Technology of Internet of Things" CNKI; WanFang.

[4]. WU Yunchang. [2001] "Principles and Applications of Analog Integrated Circuits".

[5]. LI Runian. [2009] "Research on Internet of Things Based on RFID Technology" Journal of China Academy of Electronic Sciences, issue 6, pp.594-597.