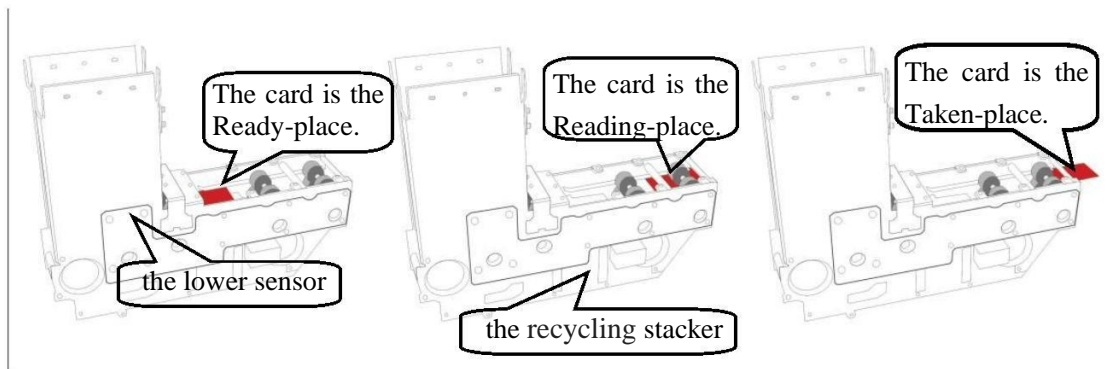


1. Features

- 1) Industrial design, adjust to high temperature and other bad environments;
- 2) Simulated manpower friction card issuers , better adaptability to various deformed cards;
- 3) Watchdog of hardware and embedded operating system to ensure properly running;
- 4) Pre-dispense function accelerate dispensing speed;
- 5) Connectable with the vehicle detector to achieve card issuing and “one car, one card”;
- 6) Automatic buzzer alarm when no cards, fewer cards or failure.
- 7) Provide both RS232 and I/O voltage control interface;
- 8) Automatic buzzer alarm when errors occur, automatic reset after 100 seconds alarm;
- 9) Card recycling capacity of up to more than 40 pcs, and a card full sound alarm function;
- 10) Sliding installation design,it is very easy to installation and removal;
- 11) Use molds to ensure product quality and accuracy.



2. Parameters

- 1) Operating voltage: 24V DC (Max. 2A, Static 0.1A)
- 2) Use condition: Installed in the cabinet
- 3) Card size: Width: $54\pm 0.5\text{mm}$, Length: $85\pm 0.5\text{mm}$,
Thickness: 0.3-2.5mm (adjustable)(0.8mm is default)
- 4) Card material: Paper or Polyester card
- 5) Card capacity: 150pcs (If card thickness is 0.8mm)
- 6) Net weight: About 2.0kg
- 7) Time of issuing: About 0.5s
- 8) Operating temperature: -20°C to 65°C

3. Interface

The card dispenser have 2 interface , one is Input/Output level control interface (CN3,pitch 2.54mm), another is RS232 control interface(CN7).

3.1. I/O level control interface(CN3)

Pin No.	Definiens	Description
1	0V	The negative of the power supply
2	+24 V	The positive of the power supply
3	0 V	Link with Operating Voltage cathode
4	Pay out	Input, Low-Level(min 200ms) effective
5	Reset	Input, Low-Level(min 200mS) effective
6	Ready	Open-collector output, it was actived by a low level control signal. That means there was a card is Ready-place.
7	VD	Input, Low-Level(min 200ms) effective. If the DIP3 is OFF, this signal can be ignored; If the DIP3 is ON, in order to issue a card, this signal and the card signal must be activated.
8	Callback	Input, Low-Level (min 200mS) effective. If there is a card is at the Reading-place or Taken-place, activate this signal can callback the card to the recycling stacker.
9	Out OK	Output Low-Level effective . If DIP2 is OFF, this signal is actived means that the card was carried to the Reading-place or the Taken-place in place ; If DIP2 is ON, this signal is actived means that there is a card was taken away from the Taken-place. After the card is taken away, it will output 500ms pulse signal.
10	Lower	Output Low-Level effective. This signal is actived means that the number of cards is lower than the sensor place.
11	Error	Output, Low-Level effective. It means that the card can't dispense to the Ready-place.
12	Empty Or Full	Output, Low-Level effective. It means that the card dispenser is empty or the the recycling stacker is full.

3.2. RS232 Control Interface (CN7)

Pins	Signal Definiens	Signal Description
1	GND	Ground,0V
2	RXD	RS232 serial receive pin
3	TXD	RS232 serial transmit pin

3.3 Operating instructions

3.3.1 Reset and Callback the card

When the card dispenser reset, buzzer sounds "Doo, Doo" . If a card is jammed, the card will be automatically call back to the recycling stacker, then the card dispenser drived out a card into the ready status(It is called Pre-dispense operate). The following case will cause the card dispenser to reset:

- a) The card dispenser is power on;
- b) The card dispenser received Reset command;
- c) The card dispenser is error status or jammed status over 100 seconds.

The callback function is good to prevent lost and reduce losses of the property.

If there is a card at the Reading-place or Taken-place, In the following cases, the card dispenser can callback the card to the recycling stacker.

- a) The card dispenser is reset;
- b) The card dispenser received the callback command.

3.3.2 The Fault and solutions

The fault occur in the following situation:

- ① When Pre-dispense fail (buzzer ring "Doo-, Doo-, Doo-" for three short acoustic);
- ② When cards jammed (buzzer ring "Doo-, Doo-"for two short acoustic);

If pre-dispense operate is failed, and the failed status was kept over 100 seconds,the card dispenser will be reseted; If a card is jammed, when the card was taken away, the jammed signal will be disappear;

3.3.3 Dispense mode setting

The card dispenser has two dispense modes: Pre-reading dispense and direct dispense. It will be set by the DIP1 of the DIP switch CN9.

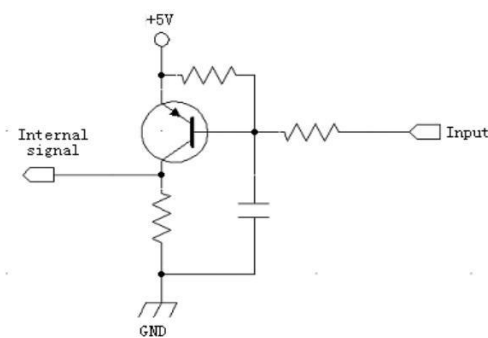
1) **Pre-reading dispense mode**

If the DIP1 is set to “ON”, when get a payout signal,the card will be carried into the Reading-place from the Ready-place; When get another payout signal again, the card will be carried into the Taken-place from the Reading-place.

2) **Direct dispense mode**

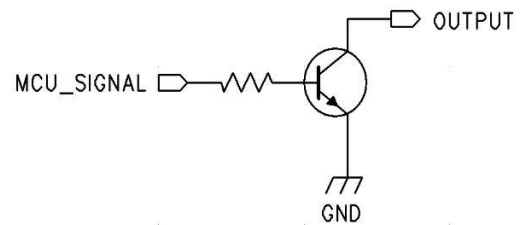
If the DIP1 is set to “OFF”, DIP2 = OFF, when get a payout signal,the card will be carried into the Taken-place from the Ready-place.

3.4 **Input and Output Circuit**



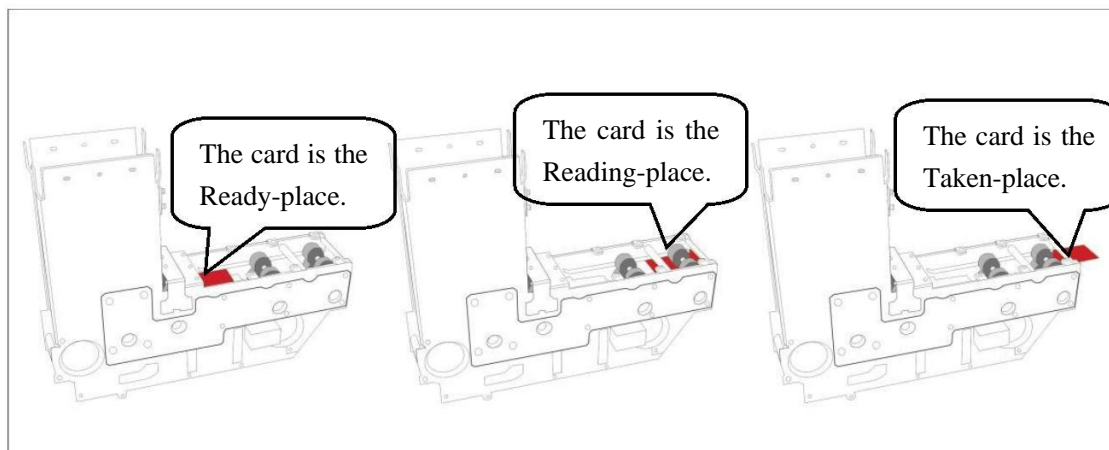
Input Circuit

All input signal is TTL. The max input voltage is 5V and input level to be 200ms minimum.



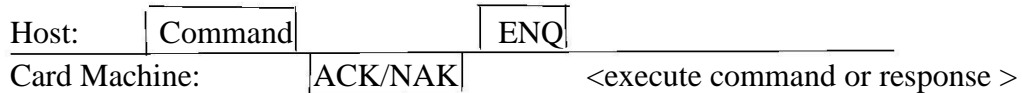
Output Circuit

All output signal is open-collector output and the maximum output is 30V/100mA. Output signal keep 200ms at least.



3.5 Protocol of the RS232

This protocol is asynchronous data transfer. After the host send one frame command, the card dispenser machine will return back ACK (0x06) or NAK (0x15). If get ACK(0x06) signal, the host will send 1 byte ENQ (0x05). And then the dispenser execute the command after the "ENG" signal is received.



3.5.1 RS232 Format

Code: NRZ Baud rate: 9600 Duplex: semi duplex
 Data bit: 8bits Parity bit: no Stop bit: 1

3.5.2 Command

3.5.2.1 Command frame format

<STX> [C1] [C2] <ETX> <BCC>
 <STX> : 02 (HEX) ,start byte
 [C1] [C2] : Command code (two bytes of ASCII)
 <ETX> : 03 (HEX) , end byte
 <BCC> : Exclusive or check code (1 byte), calculated by this expressions:

$$\langle \text{STX} \rangle \oplus [C1] \oplus [C2] \oplus \langle \text{ETX} \rangle, \text{ (} \oplus \text{ is Xor operator)}$$

3.5.2.2 Commands content

The host computer sends the following command to the card dispenser for expected operates.

Command	C1,C2	Description	Response(R1,R2)
Dispense Card (DC)	44H,43H	If a card is Ready-place or Reading-place, the card will be driven (issued) to the taken-place by this command.	-----
Callback (CP)	43H,50H	If a card is reading-place or Taken-place, the card will be called back to the recycle bin.	-----
Request working state (RF)	52H,46H	Get the current status of the card dispenser (See the section 3.5.5.2 for detailed information)	'S' 'F' , 3 bytes status ASCII code
Reset (ST)	53H,54H	Reset the card dispenser.	-----
Single step 1 (DH)	44H,48H	If a card is Ready-Site , the card will be driven (issued) to the Reading-place for reading the card.(DIP1 must be set to"ON")	-----
Single step 2	45H,53H	The card is driven(issued) to the taken-place.	-----

(ES)			
Throw the card (FU)	46H,55H	The card is driven(issued) to the taken-place,and then is thrown out of the card dispenser.	-----
Poll bit flags (PB)	50H, 42H	Poll the bit flags of the card dispenser, you can get 12 bit flags (Include the bit flag of the card is taken away or called-back) by this command.	'P' 'B' + 12 Bit Flags
Clear Bit flag (PC)	50H, 43H	Clear the bit flag of the card is taken and clear the bit flag of the card is called-back.	'P' 'C' + 12 Bit Flags
Get Version (GV)	47H, 56H	Get the version of the card dispenser	'G' 'V'+ 3 bytes code

3.5.2.3 Command Examples

The following codes are command examples in hex (indicated by prefix 0x):

Dispense Card: 0x02,0x44,0x43,0x03,0x06,0x05

Callback : 0x02,0x43,0x50,0x03,0x12,0x05

Request working state : 0x02,0x52,0x46,0x03,0x15,0x05

Reset : 0x02,0x53,0x54,0x03,0x06,0x05

Single step 1: 0x02,0x44,0x48,0x03,0x0D,0x05

Single step 2: 0x02,0x45,0x53,0x03,0x17,0x05

Throw the card: 0x02,0x46,0x55,0x03,0x12,0x05

Poll bit flag: 0x02,0x50,0x42,0x03,0x13,0x05

Clear Bit flag: 0x02,0x50,0x43,0x03,0x12,0x05

Get Version: 0x02,0x47,0x56,0x03,0x10,0x05

3.5.3 Response

3.5.3.1 response frame format

< STX > $\boxed{R1}$ $\boxed{R2}$ $\boxed{D1}$ $\boxed{D2}$ $\boxed{D3}$ < ETX > < BCC >

<STX>: 02 (HEX), start byte

$\boxed{R1}$: Response first byte

$\boxed{R2}$: Response second byte

$\boxed{D1}$ $\boxed{D2}$ $\boxed{D3}$: the response data, 3 bytes ASCII code.

<ETX>: 03 (HEX), end byte

<BCC>: Exclusive or check code (1 byte), calculated by this expressions:

$\langle \text{STX} \rangle \oplus \boxed{R1} \oplus \boxed{R2} \oplus \boxed{D1} \oplus \boxed{D2} \oplus \boxed{D3} \oplus \langle \text{ETX} \rangle$, (\oplus is Xor operator)

3.5.5.2 Response Content

The card dispense response the host computer command.

Command (C1 C2)	Response (R1 R2)	Response Data(D1,D2,D3)	Description
'R' 'F'	'S' 'F'	1: 0x32,0x30,0x30 (Dispense failure) 2: 0x30,0x32,0x30 (Jammed) 3: 0x31,0x30,0x30 (Recycle bin is full) 4: 0x38,0x30,0x30 (Dispensing) 5: 0x34,0x30,0x30 (Calling back) 6: 0x30,0x30,0x34 (Card is take-site) 7: 0x30,0x30,0x32 (Card is read-site) 8: 0x30,0x30,0x38 (Hopper is empty) 9: 0x30,0x31,0x30 (Hopper is lower) 10: 0x30,0x30,0x30 (Card dispenser is ready) 11: 0x30,0x30,0x31 (Card dispenser is not ready)	Get the current status of the card dispenser. The digit 1 to 11 indicate the Priority order of the card dispenser status.
'P' 'B'	'P' 'B'	D1,D2,D3 is 3 bytes ASCII code, high 4 bits of the all bytes is digit 3, low 4 bits indicate 4 flag status. D1>bit0: 1 flagged Recycle bin is full; D1>bit1: 1 flagged Dispense failure; D1>bit2: 1 flagged Calling back; D1>bit3: 1 flagged Dispensing ; D2>bit0: 1 flagged Hopper is lower; D2>bit1: 1 flagged Jammed;	Get the 12 bit flags of the card dispenser.
'P' 'C'	'P' 'C'	D2>bit2: 1 flagged Called back; D2>bit3: 1 flagged Card is taken away; D3>bit0: 1 flagged Card dispenser is ready ; D3>bit1: 1 flagged Card is reading-place; D3>bit2: 1 flagged Card is taking-place; D3>bit3: 1 flagged Hopper is empty.	Clear the 2 bits: D2>bit2, D2>bit3. Clear the flag that the card have been taken away; Clear the flag that the card have been called back.
'G' 'V'	'G' 'V'	D1,D2,D3 is 3 bytes ASCII code. Example, the code "0x33,0x31,0x35" means the version is 3.15	Get the card dispenser version.

3.5.5.3 How to control the card dispenser to get a card?

In an application project, if you want to get a card from the card dispenser, you must follow the process:

1. Use the command "PB" to ask the card dispenser's Bit Flags. If the card dispenser is ready(D3>bit0 is "1"), then you can use the dispense command ("DH" , "ES" , "DC" , or "FU") to dispense a card.

2. After then , Use the command "PB" to ask the card dispenser's Bit Flags. If the card is taken away (D2>bit3 is "1"), you must use the command "PC" to clear this bit flag.

4. Operating status

No.	Status	Buzzer
1	reset	“Doo-,Doo”
2	Number of card is lower	“Doo”
3	There is a card jammed	“Doo-,Doo”
4	Error	“Doo-,Doo-,Doo”
5	FULL	“Doo-,Doo,Doo-,Doo-”
6	Empty	“Doo-,Doo-,Doo-,Doo-,Doo-”