CTD-400 Card Dispenser Communication Protocol
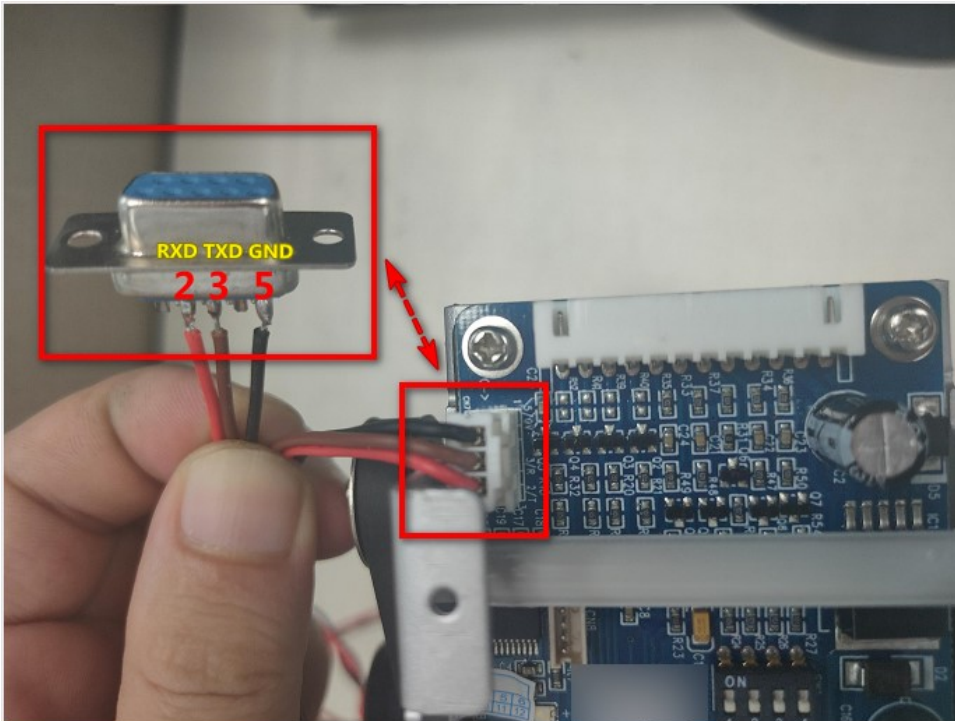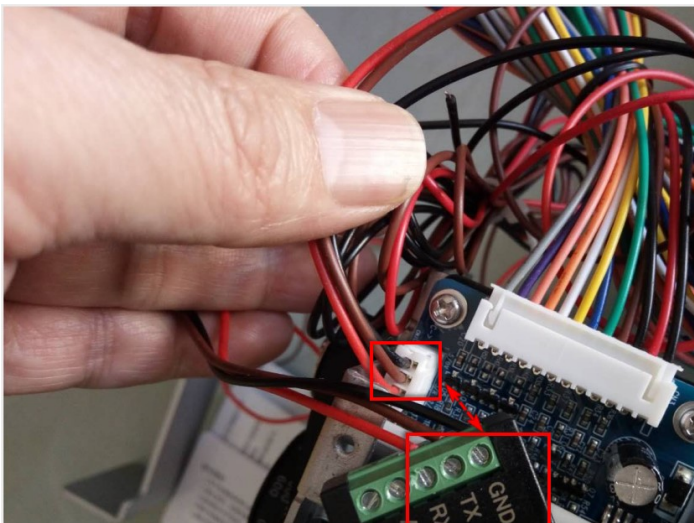
**How the card dispenser communicates with the host computer
& the wiring method is as follows:**

1.**How to connect the card dispenser to DB9 nine-pin female connector**

1.2 **Wiring method of card dispenser (USB to 232 converter)**

二、RS232 communication protocol

The communication between the card dispenser and the host adopts a standard 8-bit asynchronous data transmission format. After the host sends a frame of command first, the card dispenser will return an ACK signal (0x06) or NAK signal (0x15). If an ACK (0x06) signal is received, the host should send another byte of ENQ (0x05) signal, the card dispenser Only then can the received order be executed.

Host: Command   ENQ
Card Dispenser: ACK/NAK   <Execute command or reply command frame>

2.1 Data transfer format

Code: NRZ   Baud rate: 9600   Duplex: Half-duplex
Data bit: 8 bit   Check bit: None   Stop bit: 1 bit

2.2 Host command frame format

Command frame format: <STX> C1 C2 <ETX> <BCC>
<STX>: 02 (HEX), start of command frame
C1 C2 ：Operation command, two-byte ASCII code
<ETX> ： 03（HEX），End of command frame
<BCC>： <STX>$\oplus$C1$\oplus$ C2$\oplus$<ETX>， Command block XOR check code ($\oplus$ is XOR operator)

2.3 Host operation command

The host sends the following commands to the card dispenser and performs related operations.

Host command	Code(HEX)	description	Reply command
Dispense Card	44H, 43H	When the card dispenser is in the ready state, after receiving this command, the card is sent from the pre-issuing position or the card reading position to the card taking position	＿＿
Recycle（CaPture）	43H, 50H	When the card is in the pre-reading card position or the card taking position, execute this command	＿＿
Check status（Request Flag)	52H, 46H	Return the current status of the card dispenser, and only return one status each time according to the priority (see 3.5.5 Response Command of the dispenser).	'S'，'F'
Reset（reSeT）	53H, 54H	Perform reset operation immediately	＿＿
Single-step dispense card 1（DH）	44H, 48H	Single-step dispensing card 1, the card is sent from the pre-issuing position to the card reading position Only valid when DIP1＝ON	＿＿

Single-step dispense card 2（ES）	45H, 53H	Single-step dispensing card 2, the card is sent from the card reading position to the card taking position	——
Fully dispense card （FU）	46H, 55H	The card is sent directly to the card dispenser from the pre-issuing card position or the card reading position	——
Query flag （Poll　Bit flag）	50H, 42H	Query the working status flag bit of the card dispenser, and return the status of 12 flag bits at the same time each time. (For details, please refer to 3.5.6 Issuing Machine Status Flag)	'P','B'
Clear flag （Poll　Clear flag）	50H, 43H	Clear the card removed sign and the card recycled sign of the card dispenser.	'P','C'
Get product version number (Get Version)	47H, 56H	Return the 3-byte version number	'G','V'

2.4 Host operation command code example

The following command code examples are all given in hexadecimal (indicated by the prefix 0x) code

Note: When developing, the prefix 0x does not need to be entered
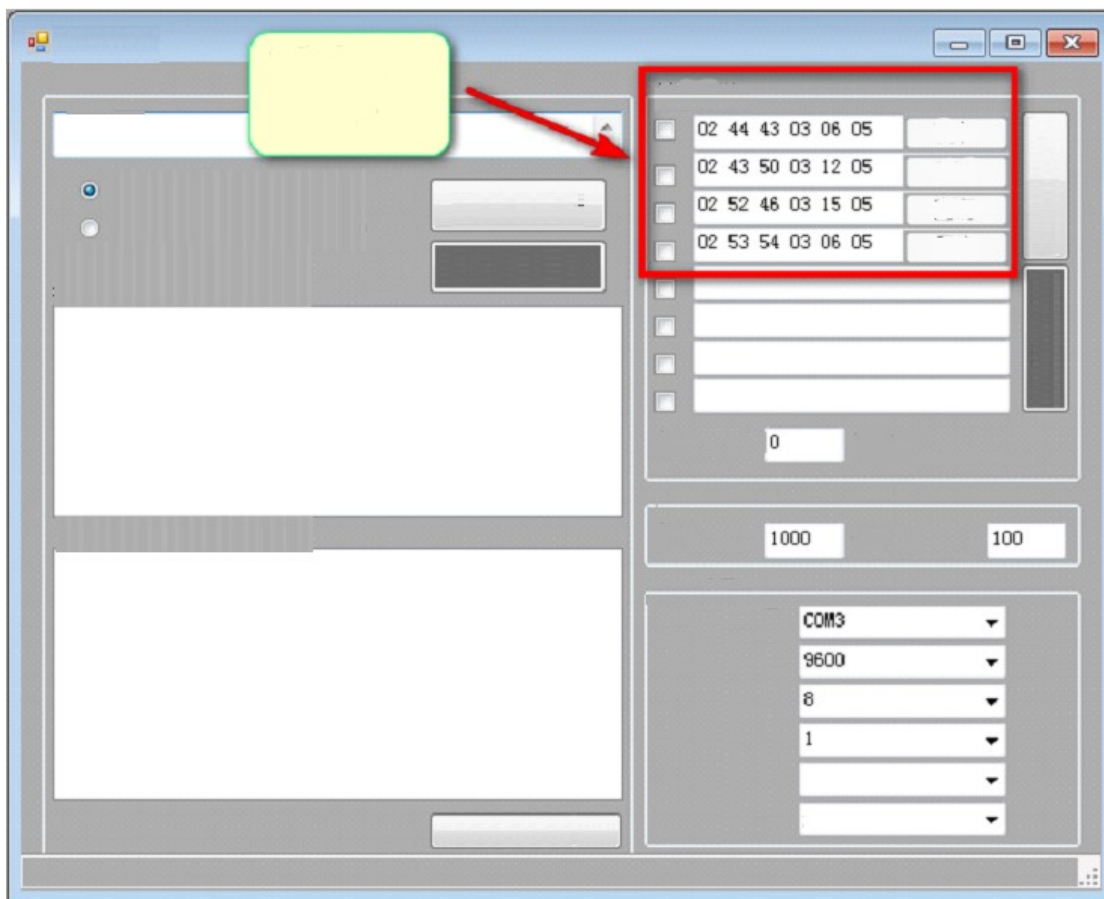
Dispensing command code：0x02,0x44,0x43,0x03,0x06,0x05

Recovery command code：0x02,0x43,0x50,0x03,0x12,0x05

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

Single-step dispense card 1 code:0x02,0x44,0x48,0x03,0x0D,0x05

Single-step dispense card 2 code：0x02, 0x45, 0x53, 0x03, 0x17, 0x05

Fully dispense card code：0x02,0x46,0x55,0x03,0x12,0x05

Query work status command code：0x02,0x52,0x46,0x03,0x15,0x05

Query work flag command code：0x02,0x50,0x42,0x03,0x13,0x05

The command code for clearing the flags of the cards that have been taken out and the cards that have been recycled: 0x02,0x50,0x43,0x03,0x12,0x05

Get product version number command code：0x02,0x47,0x56,0x03,0x10,0x05

When the user host sends a frame of command, the card dispenser will return an ACK signal (0x06) or NAK signal (0x15). If an ACK (0x06) signal is received, the host should send anot her byte of ENQ (0x05) signal, the card issuer Only then can the received order be executed.

2.5 **Card dispenser response command**

The response command frame format of the card dispenser is： <STX> R1 R2   D1 D2 D3 <ETX> <BCC>

<STX> : 0 2 (HEX) , Start byte of command frame (hexadecimal code)

R1 ： The first byte of the card dispenser response command (ASCII code)

R2 ： The second byte of the card dispenser response command (ASCII code)

D1 D2 D3 : 3 bytes, the response data information of the card dispenser (ASCII code)

<ETX> : 0 3 (HEX) , Command frame end byte (hexadecimal code)

<BCC> : The one-byte XOR check code is calculated according to the following expression:

$$<STX> \oplus R1 \oplus R2 \oplus D1 \oplus D2 \oplus D3 \oplus <ETX>$$

Note: $\oplus$ is the exclusive OR operator.

2.6 "Query status command RF"answer

The response command characters R1 and R2 are "S" and "F". Every three data codes represent a working state, and the response is returned according to the priority in the following table. The state with the lower priority number is returned first.

Priority	Hexadecimal code	Status Description
1	0x32, 0x30, 0x30	Dispense Card error（Error)
2	0x30, 0x32, 0x30	Dispense card blocked
3	0x31, 0x30, 0x30	The recycle bin of card dispenser is full of cards
4	0x38, 0x30, 0x30	The card dispenser is issuing the card
5	0x34, 0x30, 0x30	The card dispenser is recycling the card
6	0x30, 0x30, 0x34	The card has been issued to the card pickup location, waiting for the card to be picked up
7	0x30, 0x30, 0x32	The card has been issued to the card reading position and is waiting for processing
8	0x30, 0x30, 0x38	Issuing warehouse card empty
9	0x30, 0x31, 0x30	Card issuing warehouse is small
10	0x30, 0x30, 0x30	The card dispenser is ready
11	0x30, 0x30, 0x31	Pre-issued card is not ready

2.7 **"Query flag command PB"answer**

The response command characters R1 and R2 are "P" and "B". The upper nibble of "D1, D2, D3" is fixed to "3", and each bit in the lower nibble represents a different work flag bit.

D1&(~0x31)：Bit 0 of D1 indicates that the card dispenser's recycling bin is full;

D1&(~0x32):Bit1 of D1 indicates that the card dispenser fails to issue the card   normally;

D1&(~0x34)：Bit 2 of D1 indicates that the card dispenser is recycling the card;

D1&(~0x38):Bit3 of D1 indicates that the card dispenser is transmitting the card

D2&(~0x31)：Bit 0 of D2 indicates that the card holder of the card dispenser has a small amount of cards;

D2&(~0x32):Bit1 of D2 indicates that the card sending channel of the card dispenser is blocked;

D2&(~0x34)：D2&(~0x34): bit2 of D2 indicates that the card has been recycled into the recycling bin;

D2&(~0x38)：Bit3 of D2 indicates that the card has been taken away

D3&(~0x31)：Bit 0 of D3 indicates that the card is ready;

D3&(~0x32)：Bit1 of D3 indicates that there is a card in the card reading position;

D3&(~0x34)：Bit 2 of D3 indicates that there is a card in the card pickup position；

D3&(~0x38)：Bit3 of D3 indicates that the card dispenser is empty or not.

2. 8 **"Clear flag command PC" answer**

The response command characters R1 and R2 are "P" and "C", "D1, D2, D3" are to clear the status after the card has been recovered and the card has been removed, the meaning of the flag bit and the "query flag bit command PB" response D1, Each Bit in D2 and D3 has the same meaning.

2. 9 **"Read the software version number of the card dispenser "GV" answer**

The response command character R1 R2 is "G" and "V". For example, the content of "D1, D2, D3" is "0x33, 0x31,0x35", which means that the version number of the card dispenser software is Ver3.15.

3.0 Serial port control card out process

When the host computer sends the working status query command (SF) to the card output machine, if it receives the return status "0x30,0x30,0x34" (the card has been sent to the card removal position) or "0x30,0x30,0x32" (the card has been issued) When it reaches the card reading position), when it returns to other states when inquiring again, it can be judged that the card has been taken away.

DIP switch settings

DIP1 (payout)	ON	Pre-reading dispense card
	OFF	Direct dispense card
DIP2 (OutOK)	ON	Card in place output
	OFF	Take the card signal output
DIP3 (VD)（Enable signal）	ON	Disable the "one car, one card" function
	OFF	Turn on the "one car, one card" function
DIP4	ON	Do not recycle after timeout, and turn off the buzzer
	OFF	Allow timeout recovery and turn on the buzzer

ON

OFF