

LD-01Pro multi-machine communication protocol

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LD-01Pro Card Dispenser

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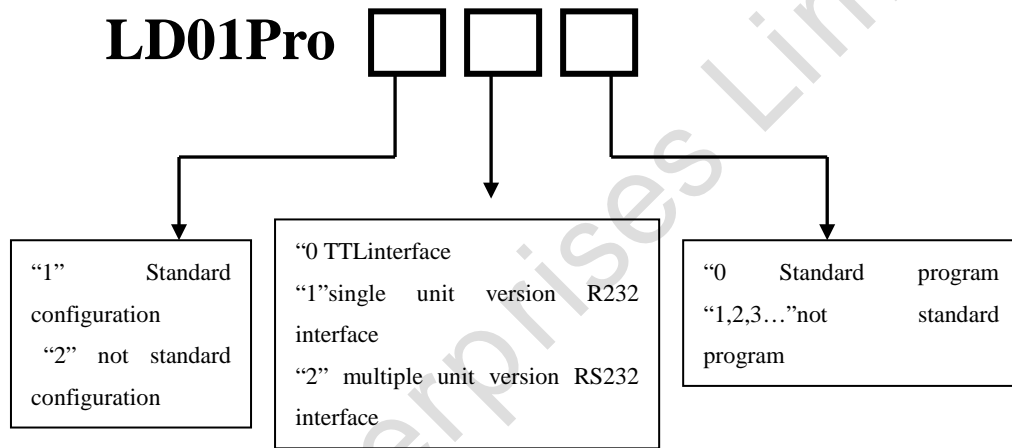
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I Brief introduction

This product adopts industrial design, good resistance to abrasion and corrosion, fit for high or low temperature and dusty environments. Simulation manpower friction card issuing makes most deformed card recognized. Active stacker installation space can let you manage cards more effective. Six shifts card space adjustment is our patented technology used for issuing cards with different thickness, and CNC precision ensures absolute unanimity of card space.

This model card dispenser integrates RS232 and TTL interface, which can use separately and simultaneously. Model number is as below:



2、 Technical data

Subject	Content
Operation power	24VDC(Max current 2A, static current 0.1A)
Operation temperature	-20 °C to 85 °C
Operation humidity	30-90% (RH)
Interface	RS232
Card stay position	Multiple card stay position control
Operation condition	Install in the cabinet
Card size	Width: 54 ± 0.5 mm Length : 85 ± 0.5 mm Thickness: 0.2 – 2.0mm adjustable Card material: Paper card or polyester card
N.W	2.0Kg (Include card holder)
Stacker capacity	190pcs standard cards based on the thickness of 0.76 mm

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Few card Alert	7~50 pcs (Preset 15pcs of 0.76mm thick cards)		
Install dimension	Refer to product structure drawing		

3. Main features and functions

- 1) Card empty and pre-empty detect function and sound alarm .
- 2) Capturing card through a special card retrieving box.
- 3) Preventing dispensing double card simultaneously: Up gear and down gear swirl in different direction, and friction dispensing card can avoid dispensing double card at the same time, even suitable to some distorted cards.
- 4) Can issue all cards in the stacker in normal condition. Most distorted cards can be issued by using card holder.
- 5) Especially suitable for issuing thin paper cards, and card dispenser can also be set according to customers' requirement.
- 6) Card thickness adjustment is convenient, precise and easy to operate.
- 7) RS232 control interface. may make multiple machine communication.
- 8) Pre-dispensing function accelerates the speed and ensures the continuous card issuing.

4、 Interface and its drawing

4. 1 Power interface

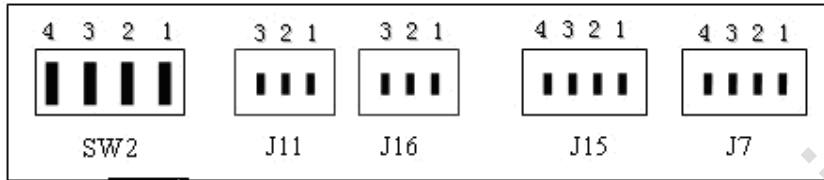
POWER-ZIP (J15、 J17)		
PIN-NO	Input	Requirements
1、 4 pin	VCC	DC24V current above 1.5A
2、 3 pin (Left)	GND	Connect to ground

4. 2 RS232 interface

RS232-ZIP (J11、 J16)		
PIN-NO	Input	Requirement
1 pin (Right)	TXD	RS232 level
2 pin (Middle)	RXD	RS232 level
3 pin (Left)	GND	Connect to ground

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4. 3 Interface drawing



Note :

Interface Specification

- (1) RS232-ZIP: two same RS 232 communication interface, one is used to connect with extended machine
- (2) SW2: is switch button used to allot address for card dispenser.
- (3) POWER-ZIP two POWER-ZIP , one is used for input and the other is used b for output, which is optional .

5、 RS232 communication

5.1 Communication format

Baud rate (BPS) : 9600 BPS

Communication Type: asynchronous communication

Transmission type: half duplex

5. 2 Data frame structure

Start bit: 1 bit

Data bit: 8 bit

Check bit: None

Stop bit: 1 bit

5.3 Communication control character

S T X : 0X02 start character of data packet

E T X : 0x03 end character of data packet

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A C K : 0x06 active response character of card dispenser

N A K : 0x15 negative response character of card dispenser

E N Q : 0x05 host machine response character

6、 Communication protocol

6.1 Command data packet structure

Data packet structure that host machine sends to card dispenser. (Command data packet, 7 bytes altogether)

S T X	high byte card dispenser address	low byte card dispenser address	High byte command	Low byte command	ETX	BCC
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Note:

(1) BCC is block check character. Calculating method as below

$$BCC = STX \hat{ } \text{high byte card dispenser address} \hat{ } \text{low byte card dispenser address} \hat{ } \text{High byte command} \hat{ } \text{Low byte command} \hat{ } ETX.$$

“^” symbol means

Xor。

(2) Data packet is sent with A S C I I code character.

(3) Command please refer to command sheet

(4) Address effective value only allows to have below data. Data in the table sheet is character type.

“00”	“01”	“02”	“03”	“04”	“05”	“06”	“07”
“08”	“09”	“10”	“11”	“12”	“13”	“14”	“15”

Data packet structure that card dispenser responses to check command from host machine (Response data packet, 11 byte altogether)

S T X	Card dispenser address (2 byte)	‘S’	‘F’	Work status response byte (3~4)	E T X	B C C
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				byte)		

Note:

- (1) Work status response byte
Please refer to work status response data sheet.
- (2) Card dispenser status response byte please refer to card dispenser status response data sheet.

Command sheet

Command name	Code
Dispense card	'DC' (0x44 0x43)
Check(not use)	'RF' (0x52 0x46)
Check	'AP' (0x41 0x50)
Capture card	'CP' (0x43 0x50)
Reset	'RS' (0x52 0x53)
Get version	'GV' (0x47 0x56)
Buffer enable	'BE' (0x42 0x45)
Buffer disable	'BD' (0x42 0x44)
Set baud rate	'CS0' (0x43 0x53 0X30) 1200 'CS1' (0x43 0x53 0X31) 2400 'CS2' (0x43 0x53 0X32) 4800 'CS3' (0x43 0x53 0X33) 9600 'CS4' (0x43 0x53 0X34) 19200 'CS5' (0x43 0x53 0X35) 38400

Note: data in the bracket is relative Hexadecimal value of ASCII character
RF command can only return back 3 byte status. This is in order to be compatible with old version. Check command please use AP command.

Extended command sheet

Command name	Code
Dispense card at sensor 2 position	'FC6' (0x46 0x43 0x36)

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Dispense card at read card position	'FC7' (0x46 0x43 0x37)
Dispense card at hold card position	'FC4' (0x46 0x43 0x34)
Dispense card out of card mouth	'FC0' (0x46 0x43 0x30)

Note: data in the bracket is relative Hexadecimal value of ASCII character

Machine status sheet

Hexadecimal	Binary	Status
0x38 0x30 0x30 0x30	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Keep
0x34 0x30 0x30 0x30	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Command cannot execute
0x32 0x30 0x30 0x30	0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Preparing card fails
0x31 0x30 0x30 0x30	0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Preparing card
0x30 0x38 0x30 0x30	0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Dispensing card
0x30 0x34 0x30 0x30	0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0	Capturing card
0x30 0x32 0x30 0x30	0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0	Dispense card error
0x30 0x31 0x30 0x30	0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0	Capture card error
0x30 0x30 0x38 0x30	0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0	No captured card
0x30 0x30 0x34 0x30	0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0	Card overlapped
0x30 0x30 0x32 0x30	0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0	Card jammed
0x30 0x30 0x31 0x30	0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0	Card pre-empty
0x30 0x30 0x30 0x38	0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0	Card empty
0x30 0x30 0x30 0x34	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0	Card at sensor 3 position
0x30 0x30 0x30 0x32	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0	Card at sensor 2 position
0x30 0x30 0x30 0x31	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1	Card at sensor 1 position

Note: (1) Sensor 3 is card mouth position sensor, sensor 2 is read card position sensor, sensor 1 is pre-dispensing card sensor.

(2) Each position in status sheet is related to one status. If several statuses exist at the same time, then they can be stacked.

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e.g, card stay at sensor 1 and sensor 2 two position, then the last byte of returned status is
 $0x30 + 0x03 = 0x33$.

6.2 Communication process

- (1) If card dispenser receives data packet from host machine, it will make data check. If correct, it will return back positive response ACK, but card dispenser will not execute command at this time until wait ENQ from main controller again, and will revise status register.
- (2) After main machine receives ACK, it will send ENQ again and send check command continuously to get status of card dispenser. If receives negative response NAK, it means that there are error when card dispenser receives data. If main machine need to be connected again, command packet must be resent. If resending command packet many times, error still occurs. It is suggested that main machine should alert user to check communication line.
- (3) Card dispenser is completely passive equipment, so it will not send any data to host machine unless it receives command from host machine.

6.3 Host machine and card dispenser communication procedure

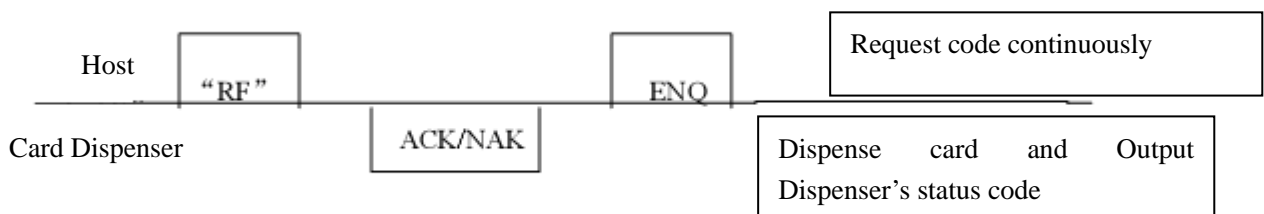
- (1) Dispense card command packet and procedure drawing

STX	Card dispenser address (2 byte)	‘D’ (0x44)	‘C’ (0x43)	ETX	BCC
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Dispense card data packet

Note:

- STX: 0x02 start character
- Card dispenser address: ADDR_H + ADDR_L
- Character D: 0x44 High byte dispense card command
- Character C: 0x4C Low byte dispense card command
- ETX: 0x03 End character
- BCC: 0xxx block check between STX and ETX



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Procedure figure

(2) Host machine check command packet and procedure figure

STX	Card dispenser address (2 byte)	‘R’ (0x52)	‘F’ (0x46)	ETX	BCC
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Note:

STX: 0x02 start character

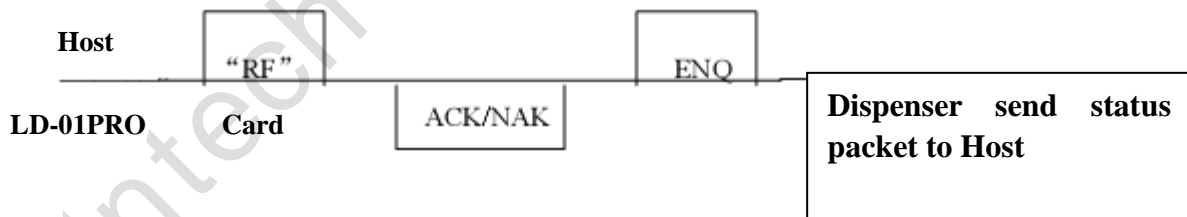
Card dispenser address: ADDR_H + ADDR_L

Character R : 0x52 High byte check command

Character F : 0x46 Low byte check command

ETX : 0x03 end character

BCC : 0xXX block check between STX and ETX



Procedure figure

(3) Card dispenser return back RF or AP command packet

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S T X	Card dispenser address (2 byte)	‘S’	‘F’	Status code (RF command 3byte) Status code (AP command 4 byte)	E T X	B C C

Note :

STX : 0x02 start character

Card dispenser address : ADDR_H + ADDR_L

Character S : 0x53 High byte check command

Character F : 0x46 Low byte check command

3-4 byte status code : refer to machine status code sheet

ETX : 0x03 end character

BCC: 0xXX block check between STX and ETX

(4) Extended control command packet (Dispense card at read card position)

STX	Card dispenser address (2 byte)	‘F’ (0x46)	‘C’ (0x43)	Specify position of card to be dispensed	ETX	BCC
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Procedure : same as dispense card command

7、Card thickness adjustment

7.1 Principle of adjustment

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Adopts patented technology six shift card thickness adjustment. Six shift cam wheel on the stacker machine can adjust card space through distance difference between each face and center point.

7.2 Adjust method

Rotate the card space adjustment button according to the indication on the six shift cam wheel.

7.3 Six shifts explanation

According to card dispensing principle, card space should be larger than thickness of one card and smaller than that of two cards. E.g. Card thickness is X, card space is Y, then $X < Y < 2X$.

Card space	Card thickness
0.3mm	Above 0.15mm below 0.25mm
0.5mm	Above 0.25mm below 0.4mm
0.7mm	Above 0.4mm below 0.65mm
1.2mm	Above 0.65mm below 1.0mm
1.5mm	Above 1.0mm below 1.3mm
2.2mm	Above 1.3mm below 2.0mm

8、 Maintenance and caution

8.1 Daily maintenance

After card dispenser uses long period or dispenses a certain quantities of card, some part will have great abrasion through long time operation. Then it is necessary to maintain card dispenser. The procedure is as below:

- 1) Check if parts of card dispenser are loose or abnormal. If so, please fasten or repair

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immediately.

- 2) Check if the belts are loose. If so, please adjust the position of wheel.
- 3) Use cleaning card or soft cloth dipped with alcohol to clean up wheels at the bottom of card cabinet.
- 4) Pick out cards with greasy surface and distorted cards. Use soft cloth dipped with alcohol to clean cards with greasy surface. If distorted cards cannot be repaired, you need to change cards.

8.2 Caution for safe use

- 1) When opening host machine or cabinet to repair, power connected with card dispenser must be shut off to avoid damage machine.
- 2) Be careful of the difference of power positive and negative in the first power-on.
- 3) Notice the jumping line explanation in the first use. Wrong jumping line may cause machine unable to work or uncertain status.
- 4) Forbid hot-plugging connecting socket in the port. Hot-plugging is easy to damage control circuit.
- 5) Keep card dispenser clean, no oil. Greasy binder may damage the performance of card dispenser greatly.
- 6) There is a red hand-operated soft reset button at the rear down position of card dispenser body side. Field operator can adjust by hand when there is error or abnormal condition in the field operation. In normal condition please do not use it.
- 7) Resetting button can be used to sort cards in stacker and reclaim cards hand-operated.
- 8) Resetting button has overtime protection. Hold and press the button motor will stop operating automatically to protect motor.

9、Warranty

- 1) Our products have one year free warranty. Warranty period starts from the date that users receive products.

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2) Repairing method is that users send products to our factory.

3) After the warranty period, our company will still provide after sale service. In case it is involved with replace parts, our company will charge a certain material cost. But for the below condition even in the warranty our company will charge a certain repairing fee in repairing.

- a) Damage or trouble caused by human error after purchase;
- b) Damage or trouble caused by operation of unprofessional technician;
- c) Damage or trouble caused by unstable outer power or voltage;
- d) Trouble and damage caused by force majeure such as earthquake etc.