Interface Specification

MODEL : LCDM-4000

REV. : 1.31

DATE : 2008. 8. 20

PULOON Technology Inc.

Revision History

Ver.	Date	Content		Manager
		Cause of Revision	Details	
1.01	2005.05.01	Released by Puloon Lab.		H. H. So
1.10	2006.10.30	Corrected Mistake on Desrciption of Manual	Ch. 3.11 Response Format 0X5C → 0X5D Ch. 3.13 Response Format 0X5B → 0X5F	W. H. Park
1.20	2007.09.10	Status Command Description Details Added Device Test Commands Added Error Codes Added	Ch. 3.2 Details Added Ch. 3.14 ~ 3.18 Added Ch. 4 Error Codes Added	H. H. So
1.31	2008.08.20	Error Codes Added	Ch. 4 Error Codes Added (0x29, 0x40, 0x41, 0x42, 0x43)	H. H. So

Contents

1. Preface

The document is related to the communication protocol of LCDM-4000, which is made by Puloon Technology. Communication interface, message protocol and testing program are included.

2. Communication Interface

LCDM-4000 supports the serial interface based on RS-232C with upper level device. The series of the texts, which are transferred to counterpart, are called “Message”. The message from upper level device to cash dispenser will be called “Command” and the message from cash dispenser to upper level will be called “Response”.

2.1 Message Transmission

Cash dispenser is operated by the command from upper level device (host) and sends the response for that. When cash dispenser receives a command, the response should be sent before the next command is received. If a command sends during the processing the response, cash dispenser would not react and respond to the command at all. Also cash dispenser doesn’t give any response before a command is arrived.

When a message (command or response) has been sent, a response is sent to indicate whether the message has been successfully received.

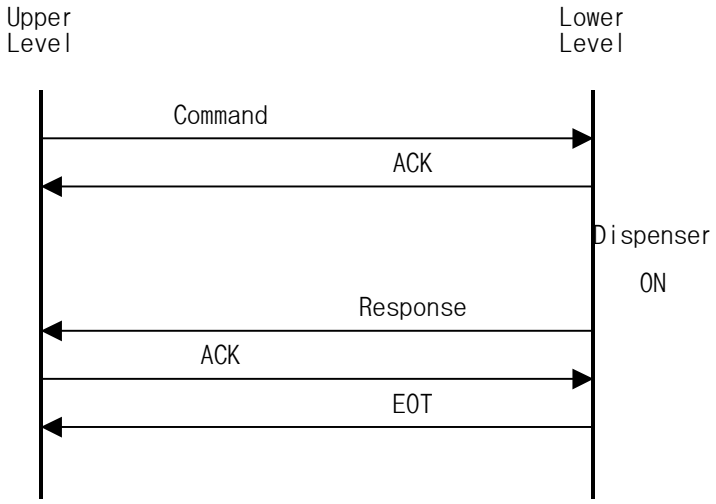
- ✓ ACK (0x06): to indicate that message has been accepted.
- ✓ NAK (0x15): to indicate that the message has been rejected and that the message should be resent.

The re-sending of one message tries 3 times and, in case that all of the trials fail, the previous message is canceled and new transmission mode is ready. All the texts except ACK would be considered as NAK. (Exceptionally. EOT (0x04) is the newly sent character set from upper level and it is recognized as EOT which enables to be ready for new communication transferring mode.)

Every message has Block Check Character (BCC), which shows whether the message is normal or abnormal. Therefore, in case of right BCC, the message is known as normal state (Sending ACK). Otherwise, NAK is sent and notice the failure of message transmission.

The character set of EOT is used in the head and the end of the message. If it is not located on BCC Check, all the transmission order is ignored and new communication mode is set up.

The basic order in message is displayed like below.



2.2 Transmission Characteristics

Transmission method is half duplex mode (HDM). When the dispenser is operated, the message from upper level is ignored. The major transmitted characters are like below.

Transmission Rate	9600 bps
Character Length	8 bits
Parity bits	None
Stop bits	1 stop bit

In case of transmission, physical handshake is not used. Only RXD and TXD defined in RS-232C specification is observed.

2.3 Main Timing

Timing	Min.	Max.
Delay to send ACK after Command	0	50
Timeout for waiting for ACK	500	550
Delay to send Response after Command	0	60sec

3. Message Protocol

Message protocol is dependent on Command and Response of message and has a little difference up to the function with specific format.

The Command Message is

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD		Status Command
Para		Command Parameter (Variable Length)
ETX	0x03	End of Text
BCC		Block Check Character

The Response is

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP		Status Command
Para		Response Parameter (Variable Length)
ETX	0x03	End of Text
BCC		Block Check Character

BCC can be gotten through exclusive or (XOR) from the start of each message to ETX except BCC.

3.1 RESET

The reset will cause the dispenser reset by software. Therefore, there is no response for this command.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x44	Status Command
ETX	0x03	End of Text
BCC	0x71	Block Check Character

(Cf.) When RESET is transmitted, it would take 2 seconds for dispenser to initialize all status. Therefore, the next command would be sent after the initialization.

3.2 STATUS (Multi-Cassette Status)

This command shows the current sensor status and the configuration of cassette in the top position.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x50	Status Command
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x50	Status Command (CMD)
ERROR		Error Status for Operation
DISP		Status for Dispenser
STAT1		Status of Cassette in Top Pick Position
TYPE1	0x30 or 0x31	Type of Cassette in Top Pick Position - 0x30: Cassette is removed. - 0x31: Cassette exists.
OPAC1	Value +0x20	Thickness Reference Value of Bills in Cassette in Top Pick Position
LENG1	Value +0x20	Length Reference Value of Bills in Cassette in Top Pick Position
STAT2		Status of Cassette in Second Top Pick Position

TYPE2	0x30 or 0x32	Type of Cassette in the Second Top Pick Position - 0x30: Cassette is removed. - 0x32: Cassette exists.
OPAC2	Value +0x20	Thickness Reference Value of Bills in Cassette in the Second Top Pick Position
LENG2	Value +0x20	Length Reference Value of Bills in Cassette in the Second Top Pick Position
STAT3		Status of Cassette in Third Top Pick Position
TYPE3	0x30 or 0x33	Type of Cassette in the Third Top Pick Position - 0x30: Cassette is removed. - 0x33: Cassette exists.
OPAC3	Value +0x20	Thickness Reference Value of Bills in Cassette in the Third Top Pick Position
LENG3	Value +0x20	Length Reference Value of Bills in Cassette in the Third Top Pick Position
STAT4		Status of Cassette in Bottom Pick Position
TYPE4	0x30 or 0x34	Type of Cassette in Bottom Pick Position - 0x30: Cassette is removed. - 0x34: Cassette exists.
OPAC4	Value +0x20	Thickness Reference Value of Bills in Cassette in Bottom Pick Position
LENG4	Value +0x20	Length Reference Value of Bills in Cassette in Bottom Pick Position
ETX	0x03	End of Text
BCC		Block Check Character

DISP Description

Bit	Meaning
0	Sensor DVTL is Blocked and Off.
1	Sensor DVTR is Blocked and Off.
2	Sensor EJT is Blocked and Off.
3	Sensor EXIT is Blocked and Off.
4	Sensor RJT is Blocked and Off.
5	Sensor SOL is Blocked and Off.
6	ALWAYS = 1
7	ALWAYS = 0

STAT1, STAT2, STAT3 and STAT4

Bit	Meaning
0	Sensor CHKL is Blocked and Off.
1	Sensor CHKR is Blocked and Off.
2	BOX is Present.
3	BOX is NEAREND State.
4	ALWAYS = 0
5	ALWAYS = 0
6	ALWAYS = 1
7	ALWAYS = 0

3.3 PURGE (Multi Cassette Purge)

PURGE will cause the dispenser to purge the transport of all bills from four cassettes and to move the bills in the path to the reject tray. This command will not be required for normal operation. However, in case of abnormal termination such as sudden power-off by external cause, the command will be useful to remove the notes. A successful PURGE operation will move any bills in the transport to the reject tray but if the note would be left in the EXIT area, it may be dispensed.

PURGE will perform the repetitive routine of FORWARD/BACKWARD FEED itself and cause the damage of notes. It will not recover errors completely by JAM or already terminated DISP (dispense) command. Therefore, it is recommended to use carefully.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x51	PURGE Command
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x51	PURGE Command (CMD)
ERROR		Error Status for Operation
MISS	0x30	RESERVED
EXIT1	Count +0x20	Number of Items Dispensed from Top Pick Module
REJECT1	Count +0x20	Number of Items Reject Event from Top Pick Module
TYPE1	0x30 ~0x34	Type of Cassette in Top Pick Position - 0x30: Cassette is removed. - 0x31: Cassette exists.
EXIT2	Count +0x20	Number of Items Dispensed from the Second Top Pick Module
REJECT2	Count +0x20	Number of Items Reject Event from the Second Top Pick Module
TYPE2	0x30 ~0x34	Type of Cassette in the Second Top Pick Position - 0x30: Cassette is removed. - 0x32: Cassette exists.
EXIT3	Count +0x20	Number of Items Dispensed from the Third Top Pick Module
REJECT3	Count +0x20	Number of Items Reject Event from the Third Top Pick Module

TYPE3	0x30 ~0x34	Type of Cassette in the Third Top Pick Position - 0x30: Cassette is removed. - 0x33: Cassette exists.
EXIT4	Count +0x20	Number of Items Dispensed from Bottom Pick Module
REJECT4	Count +0x20	Number of Items Reject Event from Bottom Pick Module
TYPE4	0x30 ~0x34	Type of Cassette in Bottom Pick Position - 0x30: Cassette is removed. - 0x34: Cassette exists.
ETX	0x03	End of Text
BCC		Block Check Character

3.4 DISPENSE (Multi-Cassette Dispense)

The command will cause to dispenser the requested number of notes from the requested cassette. It will check thickness and length of notes, which are individually referred to the specified OPACITY and LENGTH, and then decide whether the notes are dispensed or rejected. During the process, other parameters such as the required distance between notes and the skew of notes will give influence on dispensing and rejecting.

The requested dispensing number of notes at maximum should not be over 100 sheets.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x52	DISPENSE Command
QTY1	0x20~	The number of bills to be dispensed from cassette type1 + 0x20
QTY2	0x20~	The number of bills to be dispensed from cassette type2 + 0x20
QTY3	0x20~	The number of bills to be dispensed from cassette type3 + 0x20
QTY4	0x20~	The number of bills to be dispensed from cassette type3 + 0x20
TO1	0x20, 0x1C	If TIMEOUT value is not used, then 0x20. Else if it is used, the value is 0x1C. Default Status: Fixed as 0x20
TO2	0x20, 0x30 ~0x39	If TIMEOUT value is not used, then 0x20. Else if it is used, the value is 0x30~39. Default Status: Fixed as 0x20
RSV	0x20	Reserved (9 bytes)
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x52	DISPENSE Command
ERROR		Error Status for Operation
MISS	0x30	RESERVED
EXIT1	Count +0x20	Number of Items Dispensed from the Top Cassette.
REJECT1	Count +0x20	Number of Reject Events from the Top Pick Module
TYPE1	0x30 ~0x34	The Cassette Type Installed in the Top Pick Module. - 0x30: Cassette is removed. - 0x31: Cassette exists.
EXIT2	Count +0x20	Number of Items Dispensed from the Second Top Cassette.
REJECT2	Count +0x20	Number of Reject Events from the Second Top Pick Module
TYPE2	0x30 ~0x34	The Cassette Type Installed in the Second Top Pick Module. - 0x30: Cassette is removed. - 0x32: Cassette exists.
EXIT3	Count +0x20	Number of Items Dispensed from the Third Top Cassette.
REJECT3	Count +0x20	Number of Reject Events from the Third Top Pick Module
TYPE3	0x30 ~0x34	The Cassette Type Installed in the Third Pick Module. - 0x30: Cassette is removed. - 0x33: Cassette exists.
EXIT4	Count +0x20	Number of Items Dispensed from the Bottom Cassette.
REJECT4	Count +0x20	Number of Reject Events from the Bottom Pick Module
TYPE4	0x30 ~0x34	The Cassette Type Installed in the Bottom Pick Module. - 0x30: Cassette is removed. - 0x34: Cassette exists.
RSV	0x20	Reserved (9bytes)
ETX	0x03	End of Text
BCC		Block Check Character

3.5 TEST DISPENSE

The command will cause to reject the specified number of notes from the cassette to the reject tray. All the specified notes will move into the reject tray.
The requested dispensing number of notes at maximum should not be over 100 sheets.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x53	TEST DISPENSE Command
QTY1	0x20~	The number of bills to be dispensed from cassette type1 + 0x20
QTY2	0x20~	The number of bills to be dispensed from cassette type2 + 0x20
QTY3	0x20~	The number of bills to be dispensed from cassette type3 + 0x20
QTY4	0x20~	The number of bills to be dispensed from cassette type3 + 0x20
TO1	0x20, 0x1C	If TIMEOUT value is not used, then 0x20. Else if it is used, the value is 0x1C. Default Status: Fixed as 0x20
TO2	0x20, 0x30 ~0x39	If TIMEOUT value is not used, then 0x20. Else if it is used, the value is 0x30~39. Default Status: Fixed as 0x20
RSV	0x20	Reserved (9 bytes)
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x53	TEST DISPENSE Command
ERROR		Error Status for Operation
MISS	0x30	RESERVED
EXIT1	Count +0x20	Number of Items Dispensed from the Top Cassette.
REJECT1	Count +0x20	Number of Reject Events from the Top Pick Module
TYPE1	0x30 ~0x34	The Cassette Type Installed in the Top Pick Module. - 0x30: Cassette is removed. - 0x31: Cassette exists.
EXIT2	Count +0x20	Number of Items Dispensed from the Second Top Cassette.
REJECT2	Count +0x20	Number of Reject Events from the Second Top Pick Module
TYPE2	0x30 ~0x34	The Cassette Type Installed in the Second Top Pick Module. - 0x30: Cassette is removed. - 0x32: Cassette exists.
EXIT3	Count +0x20	Number of Items Dispensed from the Third Top Cassette.
REJECT3	Count +0x20	Number of Reject Events from the Third Top Pick Module

TYPE3	0x30 ~0x34	The Cassette Type Installed in the Third Pick Module. - 0x30: Cassette is removed. - 0x33: Cassette exists.
EXIT4	Count +0x20	Number of Items Dispensed from the Bottom Cassette.
REJECT4	Count +0x20	Number of Reject Events from the Bottom Pick Module
TYPE4	0x30 ~0x34	The Cassette Type Installed in the Bottom Pick Module. - 0x30: Cassette is removed. - 0x34: Cassette exists.
RSV	0x20	Reserved (9bytes)
ETX	0x03	End of Text
BCC		Block Check Character

3.6 LAST STATUS

The command will request to resend the results to the last operation commands such as PURGE, DISPENSE and TEST DISPENSE. Therefore, it is effective only when the prior operation was performed.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x55	Last Status Command
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x55	TEST DISPENSE Command
LAST CMD		Error Status for Operation
ERROR		RESERVED
MISS	0x30	Number of Items Dispensed from the Top Cassette.
EXIT1	Count +0x20	Number of Reject Events from the Top Pick Module
REJECT1	Count +0x20	The Cassette Type Installed in the Top Pick Module. - 0x30: Cassette is removed. - 0x31: Cassette exists.
TYPE1	0x30 ~0x34	Number of Items Dispensed from the Second Top Cassette.

EXIT2	Count +0x20	Number of Reject Events from the Second Top Pick Module
REJECT2	Count +0x20	The Cassette Type Installed in the Second Top Pick Module. - 0x30: Cassette is removed. - 0x32: Cassette exists.
TYPE2	0x30 ~0x34	Number of Items Dispensed from the Third Top Cassette.
EXIT3	Count +0x20	Number of Reject Events from the Third Top Pick Module
REJECT3	Count +0x20	The Cassette Type Installed in the Third Pick Module. - 0x30: Cassette is removed. - 0x33: Cassette exists.
TYPE3	0x30 ~0x34	Number of Items Dispensed from the Bottom Cassette.
EXIT4	Count +0x20	Number of Reject Events from the Bottom Pick Module
REJECT4	Count +0x20	The Cassette Type Installed in the Bottom Pick Module. - 0x30: Cassette is removed. - 0x34: Cassette exists.
TYPE4	0x30 ~0x34	Reserved (9bytes)
ETX	0x03	End of Text
BCC		Block Check Character

3.7 SENSOR DIAGNOSTICS

The command will cause to dispense 5 notes from the designated cassette as if “TEST DISPENSE” will do. The notes are moved to reject tray and the measured OPACITY, LENGTH and SOLENOID TIME of the last note is returned.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x58	SENSOR DIAGNOSTICS Command
POS	0x31~ 0x34	The Designated Cassette for Dispensing (0x31: Top, … 0x34: Bottom)
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header

ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x58	SENSOR DIAGNOSTICS Command Code (CMD)
ERROR		Error Status for Operation
OPAC.	Value +0x20	OPACITY of the Last Picked Bill
LENG.	Count +0x20	LENGTH of the Last Picked Bill
DIVERT	Time +0x20	The Solenoid Operation Time for the Diverter Enable (Unit: ms)
REJECT	0x20~	Number of Reject Event
ETX	0x03	End of Text
BCC		Block Check Character

3.8 SET BILL OPACITIES

The command is used to save the reference value in order to detect double notes. Each opacity value can be saved from 0x00 to 0xFF. The value, 0x00 means to maintain current data. When the data is changed, it will be saved in the memory of EEPROM and then efficient for the next transaction. In case of power on/off, the value continues to be used. However, when the electricity trouble causes the saved data damaged (wrong check sum on EEPROM), the criterion is set to initial value again. Therefore, it is recommended for user to check the value of the saved value of OPACITY when it is turned on.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5A	SET BULL OPACITIES Command
OPAC1_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in top cassette
OPAC1_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in top cassette
OPAC2_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in second top cassette
OPAC2_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in second top cassette
OPAC3_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in third top cassette
OPAC3_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in third top cassette
OPAC4_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in bottom cassette

OPAC4_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in bottom cassette
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5A	SET BILL OPACITIES Code (CMD)
ERROR		Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.9 GET BILL OPACITIES

The command will get the OPACITY data from each cassette.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5B	GET BILL OPACITIES Command
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5B	GET BILL OPACITIES Command Code (CMD)
ERROR		Error Status for Operation
OPAC1_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in top cassette
OPAC1_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in top cassette
OPAC2_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in second top cassette
OPAC2_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in second top cassette
OPAC3_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in third top cassette
OPAC3_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in third top cassette

OPAC4_HIGH	0x30~ 0x3F	The high hexadecimal digit for the opacity of bills in bottom cassette
OPAC4_LOW	0x30~ 0x3F	The low hexadecimal digit for the opacity of bills in bottom cassette
ETX	0x03	End of Text
BCC		Block Check Character

3.10 SET BILL DISPENSE ORDER

The command will define the bill dispense order from multi-cassettes. The default order is to pick bills from top cassette first, then second cassette and so on. The invalid assignment of parameter will cause an error and not be saved. When the data is changed, it will be saved in the memory of EEPROM and then efficient for the next transaction. In case of power on/off, the value continues to be used. However, when the electricity trouble causes the saved data damaged (wrong check sum on EEPROM), the criterion is set to initial value again. Therefore, it is recommended for user to check the value of the saved bill dispenser order when it is turned on.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5C	SET BILL DISPENSE ORDER Command
ORDER1	0x31~ 0x34	The cassette location (type) that is first to be picked up
ORDER2	0x31~ 0x34	The cassette location (type) that is second to be picked up
ORDER3	0x31~ 0x34	The cassette location (type) that is third to be picked up
ORDER4	0x31~ 0x34	The cassette location (type) that is last to be picked up
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5C	SET BILL DISPENSE ORDER Command Code (CMD)
ERROR		Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.11 GET BILL DISPENSE ORDER

The command will get the bill dispense order data.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5D	GET BILL DISPENSE ORDER Command
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5D	GET BILL DISPENSE ORDER Command (CMD)
ERROR		Error Status for Operation
ORDER1	0x31~ 0x34	The cassette location (type) that is first to be picked up
ORDER2	0x31~ 0x34	The cassette location (type) that is second to be picked up
ORDER3	0x31~ 0x34	The cassette location (type) that is third to be picked up
ORDER4	0x31~ 0x34	The cassette location (type) that is last to be picked up
ETX	0x03	End of Text
BCC		Block Check Character

3.12 SET BILL LENGTHS

The command is used to save the reference value in order to detect double notes. Each length value can be saved from 0x00 to 0xFF. The value, 0x00 means to maintain current data. When the data is changed, it will be saved in the memory of EEPROM and then efficient for the next transaction. In case of power on/off, the value continues to be used. However, when the electricity trouble causes the saved data damaged (wrong check sum on EEPROM), the criterion is set to initial value again. Therefore, it is recommended for user to check the value of the saved value of LENGTH when it is turned on.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission

ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5E	SET BILL LENGTHS Command
LENG1_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in top cassette
LENG1_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in top cassette
LENG2_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in second top cassette
LENG2_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in second top cassette
LENG3_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in third top cassette
LENG3_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in third top cassette
LENG4_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in bottom cassette
LENG4_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in bottom cassette
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5E	SET BILL LENGTHS Command Code (CMD)
ERROR		Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.13 GET BILL LENGTHS

The command will get to saved length data for each cassette.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x5F	GET BILL LENGTHS Command
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x5F	GET BILL LENGTHS Command Code (CMD)
ERROR		Error Status for Operation
LENG1_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in top cassette
LENG1_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in top cassette
LENG2_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in second top cassette
LENG2_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in second top cassette
LENG3_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in third top cassette
LENG3_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in third top cassette
LENG4_HIGH	0x30~ 0x3F	The high hexadecimal digit for the length of bills in bottom cassette
LENG4_LOW	0x30~ 0x3F	The low hexadecimal digit for the length of bills in bottom cassette
ETX	0x03	End of Text
BCC		Block Check Character

3.14 ROM VERSION

The command is to check the program version and check sum of EEPROM through sending version check on parameter.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
CMD	0x71	Other Supplementary Command
PARA0	0x30	ROM VERSION Command(Sub-Command)
PARA1	0x20	Reserved.
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
RSP	0x71	Other Supplementary Command
ERROR		Error Status for Operation
SUB	0x30	ROM VERSION Command(Sub-Command)
VER0	0x30 ~0x39	High digit of major number in version
VER1	0x30 ~0x39	Low digit of major number in version
VER2	0x30 ~0x39	High digit of minor number in version
VER3	0x30 ~0x39	Low digit of minor number in version
CHKS0	ASCII	The high hexadecimal digit of the upper byte for the Check Sum
CHKS1	ASCII	The low hexadecimal digit of the upper byte for the Check Sum
CHKS2	ASCII	The high hexadecimal digit of the lower byte for the Check Sum
CHKS3	ASCII	The low hexadecimal digit of the lower byte for the Check Sum
ETX	0x03	End of Text
BCC		Block Chc-

3.15 SOLENOID TEST

The command is to test solenoid operation for testing and to hold for one second.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
CMD	0x71	Other Supplementary Command
PARA0	0x20	SOLENOID TEST Command
PARA1	0x20	Reserved.
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.

ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
RSP	0x71	Other Supplementary Command
ERROR		Error Status for Operation
SUB	0x20	SOLENOID TEST Command
PARA0	0x30	Reserved.
PARA1	0x30	Reserved.
PARA2	0x30	Reserved.
PARA3	0x30	Reserved.
PARA4	0x30	Reserved.
PARA5	0x30	Reserved.
PARA6	0x30	Reserved.
PARA7	0x30	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

3.16 CLUTCH TEST

The command is to check the clutch device for each level and make it stuck for one second.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
CMD	0x71	Other Supplementary Command
PARA0	0x21	CLUTCH TEST Command
PARA1	0x20 ~0x23	Value for Testing on Each Level Top Level : 0x20 The 2nd Level : 0x21 The 3rd Level : 0x22 Bottom : 0x23
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.
ETX	0x03	End of Text

BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
RSP	0x71	Other Supplementary Command
ERROR		Error Status for Operation
SUB	0x21	CLUTCH TEST Command
PARA0	0x30	Reserved.
PARA1	0x30	Reserved.
PARA2	0x30	Reserved.
PARA3	0x30	Reserved.
PARA4	0x30	Reserved.
PARA5	0x30	Reserved.
PARA6	0x30	Reserved.
PARA7	0x30	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

3.17 BLDC MOTOR SPEED TEST

The command is to show BLDC Motor Speed through the number of the slits for 10 seconds.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
CMD	0x71	Other Supplementary Command
PARA0	0x22	BLDC MOTOR SPEED TEST Command
PARA1	0x20	Reserved.
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.
ETX	0x03	End of Text

BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
RSP	0x71	Other Supplementary Command
ERROR		Error Status for Operation
SUB	0x22	Sub-Command
PARA0	ASCII	The high hexadecimal digit of the upper byte for the Slit Count
PARA1	ASCII	The low hexadecimal digit of the upper byte for the Slit Count
PARA2	ASCII	The high hexadecimal digit of the lower byte for the Slit Count
PARA3	ASCII	The low hexadecimal digit of the lower byte for the Slit Count
PARA4	0x30	Reserved.
PARA5	0x30	Reserved.
PARA6	0x30	Reserved.
PARA7	0x30	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

3.18 RVDT TEST

The command is to check the value of RVDT(Rotary Variable Differential Transformer) and to measure min/max value during unloading rotation of Motor.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
CMD	0x71	Other Supplementary Command
PARA0	0x23	RVDT Test Command

PARA1	0x20 ~0x23	Value for Testing on Each Level Top Level : 0x20 The 2nd Level : 0x21 The 3rd Level : 0x22 Bottom : 0x23
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Text Start
RSP	0x71	Other Supplementary Command
ERROR		Error Status for Operation
SUB		Sub-Command
PARA0	ASCII	The high hexadecimal digit of Max. Differential Value of RVDT
PARA1	ASCII	The low hexadecimal digit of Max. Differential Value of RVDT
PARA2	ASCII	The high hexadecimal digit of Min. Differential Value of RVDT
PARA3	ASCII	The low hexadecimal digit of Min. Differential Value of RVDT
PARA4	ASCII	The high hexadecimal digit of Max. Value of RVDT
PARA5	ASCII	The low hexadecimal digit of Max. Value of RVDT
PARA6	ASCII	The high hexadecimal digit of Min. Value of RVDT
PARA7	ASCII	The low hexadecimal digit of Min. Value of RVDT
ETX	0x03	End of Text
BCC		Block Check Character

4. Error Codes

The error code in response can be calculated by the below code value adding to 0x20.

Code	Description
0x01	Bill Pick Up Error
0x02	Jam on the path between CHK Sensor and DVT Sensor
0x03	Jam on the path between DVT Sensor and EJT Sensor
0x04	Jam on the path between EJT Sensor and EXIT Sensor
0x05	A note Staying in EXIT Sensor
0x06	Ejecting the note suspected as rejected
0x07	Abnormal note management (Flow Processing Error Inside)
0x08	Abnormal note management (Flow Processing Error Inside)
0x09	Abnormal note management (Flow Processing Error Inside)
0x0A	Abnormal note management (Flow Processing Error Inside)
0x0B	Detecting notes on the path before start of pick-up
0x0C	Dispensing too many notes for one transaction (Default limit: 100 notes including the rejected)
0x0D	Rejecting too many notes for one transaction (Default limit: 10 notes)
0x0E	Abnormal termination during purge operation
0x20	Detecting sensor trouble or abnormal material before start
0x21	Detecting sensor trouble or abnormal material before start
0x22	Detecting trouble of solenoid operation before dispense
0x23	Detecting trouble in motor or slit sensor before dispense
0x24	Detecting no cassette requested to dispense bills
0x25	Detecting NEAREND status in the cassette requested to dispense (When NEAREND detection mode is turned on)
0x26	Detecting no reject tray before start or for operation
0x29	The number of the dispensed is more than that of the requested.
0x30	Recognizing abnormal command
0x31	Recognizing abnormal parameter on the command
0x32	Not to Operate VERIFY Command after Downloading and Reset
0x33	Program area writing Failure
0x34	Verify Failure
0x35	EEPROM Write Failure
0x36	Check Sum Error on Writing EEPROM
0x40	During dispensing from the 2nd, 3rd or Bottom Cassette, the banknote coming from the Top Cassette is detected.
0x41	During dispensing from the 1st, 3rd or Bottom Cassette, the banknote coming from the 2nd Cassette is detected.

0x42	During dispensing from the 1st, 2nd or Bottom Cassette, the banknote coming from the 3rd Cassette is detected.
0x43	During dispensing from the 1st, 2nd or 3rd Cassette, the banknote coming from the 4th Cassette is detected.