Interface Specification

MODEL   : VCDM

REV.   : 0.4

DATE   : 2008. 05. 27

PULOON Technology Inc.

Revision History

Ver.	DATE	Item		Name
		Title	**Details**	
0.1	2008.03.13.	Released		H. H. SO
0.2	2008.04.30	Rom Version Command	Modify the Rom Version Command frame. (page 22)	H. H. SO
0.3	2008.05.09	1. Change Transmission characteristics.	1. Change Even Parity (page 5)	H. H. SO
		2. Limits of Total Dipense	2. Limits of Total Dipense 20 Notes. (page 10)	
		3. Change to limit Reject note.	3. Change to limit Reject 10 notes. (page 24)	
		4. Add Error Code.	4. Add Error Code (0x60 ~ 0x63) (page 25)	
		5. Change Error Code	5. Change Error Code Meaning (0x50~53) (page 25)	
0.4	2008.05.27	1. Add Error Code(0x1D)	1. Add Serial number Error (0x1D) (page 24)	H. H. SO
		2. Change Dispense CMD and Response Format	2. Change RSV Field in Command and Miss Field in Response. (page 10, 11)	
		3. Change Test Dispense CMD and Response Fomat	3. Change RSV Field in Command and Miss Field in Response. (page 12, 13)	
		4. Change Last_Status Response Format	4. Change Miss Field in Response (page 14)	
		5. Change ACK Delay Time	5. Chagne minimum of ACK Delay Time by 10 msec. (page 5)	
		6. Add EOT Delay Time	6. Add EOT Delay Time (page 5)	

Contents

1. PREFACE

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

2. COMMUNICATION INTEREFACE

VCDM 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 will be tried up to 3 times and, in case all of the trials fail, the message will be canceled and new transmission mode be 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.
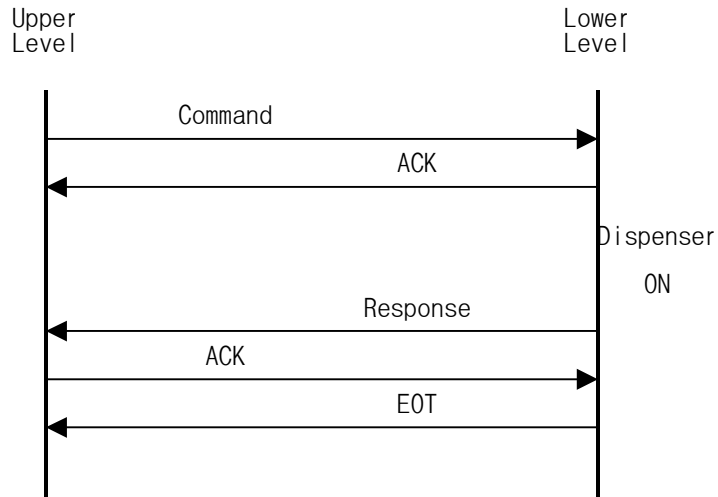
2.2 TRANSMISSION CHARACTERISTICS

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	Even
Stop bits	1 stop bit
Flow Control	None

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	10 ms	50 ms
Delay to send EOT after ACK	10 ms	50 ms
Timeout for waiting for ACK	5000 ms	5050 ms
Delay to send Response after Command	0	90 sec

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.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD		Command Code
PARA		Command PARAmeter (Variable Length)
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		Command Code
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.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD	0x44	Reset 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.

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x44	Reset Command (CMD)
ERROR	0x30	Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.2 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	Communication 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
ERROR		Error Status for Operation
DISP0		Status for Dispenser
DISP1		Status for Dispenser
STAT1		Status of Cassette in Top Pick Position
TYPE1	0x31 ~ 0x34	Type of Cassette in Top Pick Position
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	0x31 ~ 0x34	Type of Cassette in the Second Top Pick Position
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	0x31 ~ 0x34	Type of Cassette in the Third Top Pick Position
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	0x31 ~ 0x34	Type of Cassette in Bottom Pick Position
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

DISP0 Description

bit	Meaning
0	Sensor DIVERT is blocked and Off.
1	Sensor SONAR is blocked and Off.
2	Sensor REJECT is blocked and Off.
3	Sensor EXIT is blocked and Off.
4	REJECT_TRAY exist.
5	Always 0
6	Always 1
7	Always 0

DISP1 Description

bit	Meaning
0	Sensor PATH1 is blocked and Off.
1	Sensor PATH2 is blocked and Off.
2	Sensor PATH2 is blocked and Off.
3	Sensor PATH2 is blocked and Off.

4	Always 0
5	Always 0
6	Always 1
7	Always 0

STAT1 to 4 Description

bit	Meaning
0	Sensor CST_IN is blocked and Off.
1	Sensor CHECK is blocked and Off.
2	Cassette exists in the postion.
3	Cassette is under Near-end Status.
4	Always 0
5	Cassette PickUp is End.
6	Always 1
7	Always 0

3.3 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	Communication 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	The Number of the Dispensed Items during Purge Command
REJECT1	Count +0x20	The Number of the Reject Events during Purge Command
CASSETTE1	0x31 ~0x34	The Type of Cash Cassette Loaded on the 1st High (Top)
EXIT2	0x20	Default value : 0x20
REJECT2	0x20	Default value : 0x20
CASSETTE2	0x31 ~0x34	The Type of Cash Cassette Loaded on the 2nd High
EXIT3	0x20	Default value : 0x20
REJECT3	0x20	Default value : 0x20
CASSETTE3	0x31 ~0x34	The Type of Cash Cassette Loaded on the 3rd High
EXIT4	0x20	Default value : 0x20
REJECT4	0x20	Default value : 0x20
CASSETTE4	0x31 ~0x34	The Type of Cash Cassette Loaded on the 4th High (Bottom)
RSV	0x20	Reserved (9bytes)
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 Type 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 number of the requested notes for dispensing should not be over 20 sheets at maximum.

The SERIAL field is for the sequential count and takes a role of identification of the Dispenser command. If current SERIAL has the same as that of the prior command, 0x1D error will be occurred. In order to avoid the unexpected confusin of Dispense command, the host should

send different number or sequential number every time on SERIAL when it sends Disapnese command to VCDM.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD	0x52	DISPENSE Command
QTY1	0x20~	The number of bills to be dispensed from Top Cassette + 0x20
QTY2	0x20~	The number of bills to be dispensed from the Second Top Cassette + 0x20
QTY3	0x20~	The number of bills to be dispensed from the Third Top Cassette + 0x20
QTY4	0x20~	The number of bills to be dispensed from Bottom Cassette + 0x20
TO1	0x20	Default Status: Fixed as 0x20
TO2	0x20	Default Status: Fixed as 0x20
SERIAL	0x21~ 0x7F	Dispense Serial Number or Identifiaction Number of Dispense Command
ETX	0x03	End of Text
BCC		Block Check Character

Response Format

Name	Code	Description
SOH	0x01	Start of Header
ID	0x30	Communication ID
STX	0x02	Start of Text
RSP	0x52	DISPENSE Command
ERROR		Error Status for Operation
SERIAL	0x21~ 0x7F	Dispense Serial Number or Identifiaction Number of Dispense Command.
EXIT1	Count +0x20	Number of Items Dispensed from the Top Cassette.
REJECT1	Count +0x20	Number of Reject Events from the Top Cassette
CASSETTE1	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 1st High (Reserved.) Default is 0x31
EXIT2	Count +0x20	Number of Items Dispensed from the Second Top Cassette.

REJECT2	Count +0x20	Number of Reject Events from the Second Top Cassette
CASSETTE2	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 2nd High (Reserved.) Default is 0x32
EXIT3	Count +0x20	Number of Items Dispensed from the Third Top Cassette.
REJECT3	Count +0x20	Number of Reject Events from the Third Top Cassette
CASSETTE3	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 3rd High (Reserved.) Default is 0x33
EXIT4	Count +0x20	Number of Items Dispensed from the Bottom Cassette.
REJECT4	Count +0x20	Number of Reject Events from the Bottom Cassette.
CASSETTE4	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 4th High (Reserved.) Default is 0x34
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 50 sheets with Test Dispense Command.

The SERIAL field is for the sequential count and takes a role of identification of the Dispenser command. If current SERIAL has the same as that of the prior command, 0x1D error will be occurred. In order to avoid the unexpected confusin of Dispense command, the host should send different number or sequential number every time on SERIAL when it sends Disapnese command to VCDM.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD	0x53	TEST DISPENSE Command
QTY1	0x20~	The Number of the Dispensed Banknotes from the 1st High Cash Cassette + 0x20

QTY2	0x20~	The number of bills to be dispensed from the Second Top Cassette + 0x20 (limit 50's Bill)
QTY3	0x20~	The number of bills to be dispensed from the Third Top Cassette + 0x20 (limit 50's Bill)
QTY4	0x20~	The number of bills to be dispensed from Bottom Cassette + 0x20 (limit 50's Bill)
TO1	0x20	Default Status: Fixed as 0x20
TO2	0x20	Default Status: Fixed as 0x20
SERIAL	0x21~ 0x7F	Dispense Serial Number or Identifiaction Number of Dispense 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	0x53	TEST DISPENSE Command
ERROR		Error Status for Operation
SERIAL	0x21~ 0x7F	Dispense Serial Number or Identifiaction Number of Dispense Command.
EXIT1	Count +0x20	Number of Items Dispensed from the Top cassette.
EXIT1	Count +0x20	The Number of the Dispensed Items from Type1 Cash Cassettes
REJECT1	Count +0x20	The Number of Reject Events from Type1 Cash Cassettes
CASSETTE1	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 1st High
EXIT2	Count +0x20	The Number of of the Dispensed Items from the Type2 Cash Cassettes
REJECT2	Count +0x20	The Number of Reject Events from the Type2 Cash Cassettes
CASSETTE2	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 2nd High
EXIT3	Count +0x20	The Number of the Dispensed Items from the Type3 Cash Cassettes
REJECT3	Count +0x20	The Number of Reject Events from the Type3 Cash Cassettes
CASSETTE3	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 3rd High

EXIT4	Count +0x20	The Number of Items Dispensed from the Type4 Cash Cassettes
REJECT4	Count +0x20	The Number of Reject Events from the Type4 Cash Cassettes
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.

The SERIAL field is for the sequential count and takes a role of identification of the Dispenser command. If current SERIAL has the same as that of the prior command, 0x1D error will be occurred. In order to avoid the unexpected confusin of Dispense command, the host should send different number or sequential number every time on SERIAL when it sends Disapnese command to VCDM.

In case the SERIAL is 0x20, the Dispense was perfomed by "SENSOR DIAGNOSTICS" command and if the SERIAL has the value between 0x21 and 0x7F, the Dispense is done by t DISPENSE or TEST DISPENSE command.

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	Last Status Command
LAST CMD		Prior Operation Command Code
ERROR		Error Status for Operation

SERIAL	0x21~ 0x7F	Dispense Serial Number or Identifiaction Number of Dispense Command.
EXIT1	Count +0x20	Number of Items Dispensed from the Top Cassette.
REJECT1	Count +0x20	Number of Reject Events from the Top Cassette
CASSETTE1	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 1st High (Reserved.) Default is 0x31
EXIT2	Count +0x20	Number of Items Dispensed from the Second Top Cassette.
REJECT2	Count +0x20	Number of Reject Events from the Second Top Cassette
CASSETTE2	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 2nd High (Reserved.) Default is 0x32
EXIT3	Count +0x20	Number of Items Dispensed from the Third Top Cassette.
REJECT3	Count +0x20	Number of Reject Events from the Third Top Cassette
CASSETTE3	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 3rd High (Reserved.) Default is 0x33
EXIT4	Count +0x20	Number of Items Dispensed from the Bottom Cassette.
REJECT4	Count +0x20	Number of Reject Events from the Bottom Cassette.
CASSETTE4	0x31 ~0x34	The Type of the Cash Cassette Loaded on the 4th High (Reserved.) Default is 0x34
RSV		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	0x20	Reserved.
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 0xDF. 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. In general, the opacity range is between 0x40 and 0x55.

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
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	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. (Default Value is 0x40)

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
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	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

3.12 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. In general, the bill length range is between 0x60 and 0x85

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
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	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 gets 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
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	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

3.15 Go Loader

The command duplicates and calls Flash Write Loader from RAM area. For the Flash Write, the command should be done with the highest priority.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x72	Load 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	0x72	GOLOADER Command Code(CMD)
ERROR	0x20	Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.16 Program Write

The command writes data on Flash ROM and transmits **128** bytes of sequential starting addresses and data onto the Parameter.

Program Write repeats to write on all the Write Area.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x73	Program Write Command
Start Address0	0x30 ~0x3F	The hexadecimal digit of the 1st nibble among the 1st Starting Address byte
Start Address1	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble among the 1st Starting Address byte
Start Address2	0x30 ~0x3F	The hexadecimal digit of the 1st nibble among the 2nd Starting Address byte
Start Address3	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble among the 2nd Starting Address byte
PARA0	0x30 ~0x3F	The hexadecimal digit of the 1st nibble among the transmitted data 0
PARA1	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble among the transmitted data 0
⋮	⋮	⋮
PARA254	0x30 ~0x3F	The hexadecimal digit of the 1st nibble among the transmitted data 127
PARA255	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble among the transmitted data 127
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	0x73	PROGRAM WRITE Command Code(CMD)
ERROR		Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.17 Program Verify

The command verifies the operation of writing on FlashROM. The data of Check Sum are written transmitted on Parameters.

Then, the reset of system is required to complete the downloading of the program.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x74	Verify Command
PARA0	0x30 ~0x3F	The hexadecimal digit of the 1st nibble of the 1st Check Sum byte (The hexadecimal digit from the 1st 4 bits among Check Sum bytes)
PARA1	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble of the 1st Check Sum byte (The hexadecimal digit from the 2nd 4 bits among Check Sum bytes
PARA2	0x30 ~0x3F	The hexadecimal digit of the 1st nibble of the 2nd Check Sum byte (The hexadecimal digit from the 3rd 4 bits among Check Sum bytes
PARA3	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble of the 2nd Check Sum byte (The hexadecimal digit from the 4th 4 bits among Check Sum 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	0x74	Verify Code(CMD)
ERROR		Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.18 ROM Version

The command is used to check version and checksum.

o and or at

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x71	Special Extend Command
PARA0	0x30	Version Check Command (Sub-Command)
PARA1	0x20	Reserved.
PARA2	0x20	Reserved.
PARA3	0x20	Reserved.
ETX	0x03	End of Text
BCC		Block Check Character

e pon e or at

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
RSP	0x71	Special Extend Command
ERROR		Error Status for Operation
SUB	0x30	Version Check Command (Sub-Command)
VER0	ASCII	Type of Firmware. Default is 'V'.
VER1	0x30 ~0x39	Major Revision
VER2	0x30 ~0x39	Minor Revision
VER3	ASCII	Type of Configuration. Default is 'N'.

CHKS0	0x30 ~0x3F	The hexadecimal digit of the 1st nibble of the 1st Check Sum byte (The hexadecimal digit from the 1st 4 bits among Check Sum bytes)
CHKS1	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble of the 1st Check Sum byte (The hexadecimal digit from the 2nd 4 bits among Check Sum bytes
CHKS2	0x30 ~0x3F	The hexadecimal digit of the 1st nibble of the 2nd Check Sum byte (The hexadecimal digit from the 3rd 4 bits among Check Sum bytes
CHKS3	0x30 ~0x3F	The hexadecimal digit of the 2nd nibble of the 2nd Check Sum byte (The hexadecimal digit from the 4th 4 bits among Check Sum bytes
ETX	0x03	End of Text
BCC		Block Check Character

4. ERROR CODES

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

CODE	Description
0x01	Feeding Time-out between CHECK Sensor and SONAR Sensor
0x02	Feeding Time-out between SONAR Sensor and DIVERT Sensor
0x03	Feeding Time-out between DIVERT Sensor and EXIT Sensor
0x04	Feeding Time-out between DIVERT Sensor and REJECT Sensor
0x05	A Note Is Staying at EXT Sensor
0x06	Ejecting the Note Suspected as Rejected
0x07	Abnormal Note Management (Flow Processing Error)
0x08	Abnormal Note Management (Flow Processing Error)
0x09	Rejecting the Note Suspected as Ejected
0x0B	Detecting Notes on the Path Before Start of Pick-up
0x0C	Too Many Pick-up Events During Dispensing from One Cash Cassette (Limits of Total Pickup : 30 Notes Including all the Rejected)
0x0D	Too Many Rejects During Dispensing from One Cash Cassette (Limit: 10 notes)
0x0E	Abnormal Termination During Purge Execution
0x11	Detecting Trouble in Motor or Slit Sensor Before Dispensing
0x12	Not Detecting Reject Tray before Start or for Operation
0x13	Failed to Calibrate Sensors
0x14	More Banknotes than the Requested are Dispensed.
0x15	Dispensing is Not Terminated within 90 Seconds.
0x16	Recogniging Abnormal Command

0x17	Recognizing Abnormal Parameters on the Command
0x18	Downdoad Sequecne is incorrect.
0x19	Failure of Write
0x1A	Not to Give Verify command on Reset after Downloading Program
0x1B	Failure of Writing EEPROM
0x1C	Mismatches Checksum of EEPROM on Writing EEPROM
0x1D	Erro in Dispense Serial Number or Identifiaction Number of Dispense Command (in case of the same value of Serial)
0x20	Sonar Sensor is Always On.
0x21	Divert Sensor is Always On.
0x22	Exit Sensor is Always On.
0x23	Reject Sensor is Always On.
0x28	Sonar Sensor is Always Off.
0x29	Divert Sensor is Always Off.
0x2A	Exit Sensor is Always Off.
0x2B	Reject Sensor is Always Off.
0x30	Path1 Sensor is Always On.
0x31	Check1 Sensor is Always On.
0x32	CST_IN1 Sensor is Always On.
0x33	Path2 Sensor is Always On.
0x34	Check2 Sensor is Always On.
0x35	CST_IN2 Sensor is Always On.
0x36	Path3 Sensor is Always On.
0x37	Check3 Sensor is Always On.
0x38	CST_IN3 Sensor is Always On.
0x39	Path4 Sensor is Always On.
0x3A	Check4 Sensor is Always On.
0x3B	CST_IN4 Sensor is Always On.
0x40	Path1 Sensor is Always Off.
0x41	Check1 Sensor is Always Off.
0x42	CST_IN1 Sensor is Always Off.
0x43	Path2 Sensor is Always Off.
0x44	Check2 Sensor is Always Off.
0x45	CST_IN2 Sensor is Always Off.
0x46	Path3 Sensor is Always Off.
0x47	Check3 Sensor is Always Off.
0x48	CST_IN3 Sensor is Always Off.
0x49	Path4 Sensor is Always Off.
0x4A	Check4 Sensor is Always Off.
0x4B	CST_IN4 Sensor is Always Off.
0x50	Banknote Pick Up Error in the Cassette1 on NEAREND State
0x51	Banknote Pick Up Error in the Cassette2 on NEAREND State
0x52	Banknote Pick Up Error in the Cassette3 on NEAREND State

0x53	Banknote Pick Up Error in the Cassette4 on NEAREND State
0x54	Jamming or sensor failure in the Cash Cassette1
0x55	Jamming or sensor failure in the Cash Cassette2
0x56	Jamming or sensor failure in the Cash Cassette3
0x57	Jamming or sensor failure in the Cash Cassette4
0x58	Not Detecting Cash Cassette1 before Start or for Operation
0x59	Not Detecting Cash Cassette2 before Start or for Operation
0x5A	Not Detecting Cash Cassette3 before Start or for Operation
0x5B	Not Detecting Cash Cassette4 before Start or for Operation
0x5C	Cash Cassette1 is Near-End (In Case of Near End Detection Mode)
0x5D	Cash-Cassette2 is Near-End (In Case of Near End Detection Mode)
0x5E	Cash-Cassette3 is Near-End (In Case of Near End Detection Mode)
0x5F	Cash-Cassette4 is Near-End (In Case of Near End Detection Mode)
0x60	Pick-up Error in Cassette1 (Banknotes exist in Cash Cassette1)
0x61	Pick-up Error in Cassette2 (Banknotes exist in Cash Cassette2)
0x62	Pick-up Error in Cassette3 (Banknotes exist in Cash Cassette3)
0x63	Pick-up Error in Cassette4 (Banknotes exist in Cash Cassette4)