Interface Specification

MODEL : VCDM

REV. : 2.7

DATE : 2010. 11. 16

PULOON Technology Inc.

Revision History

Ver.	DATE	Item		Name
		Title	Details	
1.0	2008.03.13.	Released		H. H. SO
1.1	2008.04.30	Rom Version Command	Modify the Rom Version Command frame. (page 22)	H. H. SO
1.2	2009.04.09	Dispense & Test Disepense Command Last Status Command Error Code	Modify the Dispense & Test Dispense Command frame. (page 10-13) Modify the Last Status Command frame. (page 14) Add Error Code (0x1D, 0x60~0x63, 0x80~0x83) (page 24-25)	H. H. SO
1.3	2009.05.18	Status Response Sensor Error Code Command	Modify Status Response (page 9) Modify Sensor Description (page 27) Add Error Code (0x84) (page 24) Add Loader Version Command (page 21) Add FW Version Command (page 22) Add Read Debug Command (page 23)	H. H. SO
1.4	2009.06.09	Error Code Command	Modify Error Code (page 20-21) Add Command Code (page 24) Modify Commnad Code (page 27-29)	H. H. SO
1.5	2009.06.10	Error Code	Modify Error Code(page 28)	H. H. SO
1.6	2009.06.22	Command	Modify Commnad Code (page 25)	H. H. SO
1.61	2009.06.23	Correction of Editiing	Removal of wrong description of EXIT1 (page 13)	H. H. SO
1.7	2009.07.24	Command Error Code	Add Clear/Get/Set Tallies Command Code (page 25) Add Error Code (page 33)	Y.H.KIM
1.80	2009.07.31	Command	Add Get Device Serial Number (page 31)	Y.M.KIM

1.91	2009.08.14	Response	Modify FW Version Response DATA2~DATA3(Year part) (page 25)	Y.M.KIM
		Response	Correct FW Version Response DATA0~DATA1(day, month field) (page 25)	
		Correction of Sensor Description	Correct Sonar Sensor Type DVT Actuator Type and Spelling of “Ultrasonic” (page 39)	
		Correct Error Code	Correct Error Code of Divert, Exit, Reject,and Sonar Sensor error (page 36)	
		Command	Add Get Dispense Serial Command Code (page 34)	
2.0	2009.08.25	Response	Modify Loader Version Response DATA2~DATA3(Year part) (page 23)	Y.M.KIM
		Response	Correct Loader Version Response DATA0~DATA1(day, month field) (page 23)	
		Response	Modify Get Dispense Serial Response (page 33)	
2.1	2009.09.10	Add Error Code	Add Error Code for JAM at Reject Sensor : 0x2F (page 34)	Y.H.KIM
2.2	2009.10.16	Add Error Code	Add Error Code for Note in Exit Sensor at Purge : 0x3F (page 35) Add Error Code : Detect Note in Path Sensor before pick up (page 37)	Y.H.KIM

2.3	2009.10.28	Correct Wrong Description	Correct Define of Parity Bits (page 7) Correct STAT1 to 4 Description (page11) Correct Error of Serial Dispense Number (page 13, 14, 16) Delete Wrong Note Limited (page 15) Correct Description of SENSOR DIAGNOSTICS and it's Response (page 17, 18) Correct Description of General Opacity Range in SET BILL OPACITIES (page 18) Correct Description of Default value in GET BILL OPACITIES (page 19) Correct Description of General Length Range in SET BILL LENGTHS (page 20)	Y.H.KIM
2.4	2010.01.28	Add Command Add Error Code	Add Auto-Calibration Command (page 35) Add Error Code : Failure of Auto-Calibration for Sonar Sensor (page 36)	Y.H.KIM
2.5	2010.09.13	Erase Command Erase Error Code	Erase Dispense2 (p.25) Erase Error Code : Detect note in Cashout	S.W.KIM
2.6	2010.09.28	Add Error Code	Add Error Code 0x26 (p.36) Correct Error Code (p.36)	Y.H.KIM
2.7	2010.11.16	Add Error Code Discription	Add Error Code Discription : Error Code + 0x20 (p.8)	Y.H.KIM

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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.

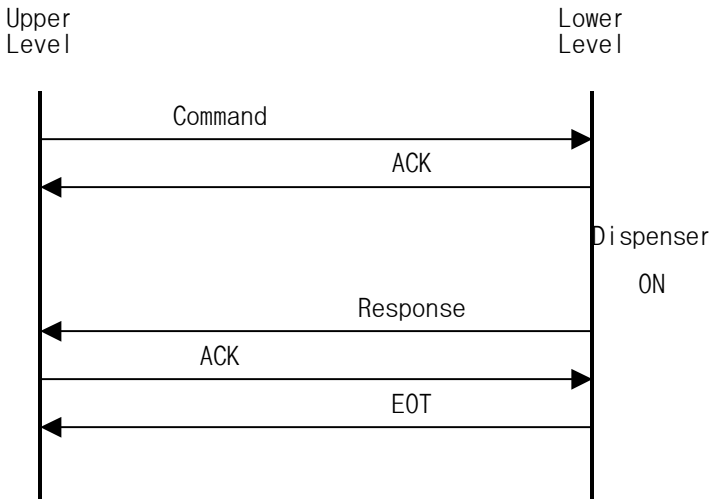
- ACK (0x06): to indicate that message has been accepted.
- NAK (0x15): to indicate that the message has been rejected and that the message should be resent.

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	0	50 ms
Delay to send EOT after ACK	0	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
ERROR		Error Code + 0x20
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		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 PATH3 is blocked and Off.
3	Sensor PATH4 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 position.
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, 0x3D 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 20 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, 0x3D 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
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	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	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, 0x3D 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 average 5 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 Average 5 Picked Bill
LENG.	Value +0x20	LENGTH of the Average 5 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 0x30 and 0x50.

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 0x30)

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

3.10 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 0x92 and 0xD1

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

3.11 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

3.12 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	0x73	GO LOADER 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	0x73	GO LOADER Command Code(CMD)
ERROR	0x20	Error Status for Operation
ETX	0x03	End of Text
BCC		Block Check Character

3.13 LOADER VERSION

The command is used to check Loader version

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD	0x75	LOADER VERSION 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	0x75	LOADER VERSION Command (CMD)
ERROR	0x20	Error Status for Operation
TYPE0	ASCII	Type of Firmware. Default is ‘V’.
TYPE 1	ASCII	Type of Firmware. ‘D’ is the Downloader Firmware. ‘F’ is the Application Firmware.
TYPE 2	ASCII	Default is ‘0’.

TYPE 3	ASCII	Default is '0'.
VER0	0x30 ~0x39	Major Revision 0
VER1	0x30 ~0x39	Major Revision 1
VER2	0x30 ~0x39	Minor Revision 0
VER3	0x30 ~0x39	Minor Revision 1
DATE0	0x21 ~	Day + 0x20
DATE 1	0x21 ~	Month + 0x20
DATE 2	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of (Year-2000) + 0x20
DATE 3	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of (Year-2000) + 0x20
ETX	0x03	End of Text
BCC		Block Check Character

3.14 FW VERSION

The command is used to check F/W version

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD	0x76	FW VERSION 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	0x76	FW VERSION Command Code(CMD)
ERROR	0x20	Error Status for Operation
TYPE0	ASCII	Type of Firmware. Default is 'V'.

TYPE1	ASCII	Type of Firmware. 'D' is the Downloader Firmware. 'F' is the Application Firmware.
TYPE2	ASCII	Default is '0'.
TYPE3	ASCII	Default is '0'.
VER0	0x30 ~0x39	Major Revision 0
VER1	0x30 ~0x39	Major Revision 1
VER2	0x30 ~0x39	Minor Revision 0
VER3	0x30 ~0x39	Minor Revision 1
DATE0	0x21 ~	Day + 0x20
DATE1	0x21 ~	Month + 0x20
DATE2	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of (Year-2000) + 0x20
DATE3	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of (Year-2000) + 0x20
ETX	0x03	End of Text
BCC		Block Check Character

3.15 CLEAR TALLIES

This command is used to clear tallies.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD0	0x64	CLEAR TALLIES Command
CMD1		Sub-Command1
CMD2		Sub-Command2
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
RSP0	0x64	CLEAR TALLIES Command Code(CMD)
RSP1		Sub-Command1
RSP2		Sub-Command2
ERROR		Error Status for Operation
DATA0	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of data
DATA 1	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of data
DATA 2	0x20 ~0x2F	The hexadecimal digit of the 3rd nibble of data
DATA 3	0x20 ~0x2F	The hexadecimal digit of the 4th nibble of data
DATA 4	0x20 ~0x2F	The hexadecimal digit of the 5th nibble of data
DATA 5	0x20 ~0x2F	The hexadecimal digit of the 6th nibble of data
DATA 6	0x20 ~0x2F	The hexadecimal digit of the 7th nibble of data
DATA 7	0x20 ~0x2F	The hexadecimal digit of the 8th nibble of data
ETX	0x03	End of Text
BCC		Block Check Character

3.16 GET TALLIES

This command is used to get tallies.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD0	0x65	GET TALLIES Command
CMD1		Sub-Command1
CMD2		Sub-Command2
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
RSP0	0x65	GET TALLIES Command
RSP1		Sub-Command1
RSP2		Sub-Command2
ERROR		Error Status for Operation
DATA0	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of data
DATA 1	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of data
DATA 2	0x20 ~0x2F	The hexadecimal digit of the 3rd nibble of data
DATA 3	0x20 ~0x2F	The hexadecimal digit of the 4th nibble of data
DATA 4	0x20 ~0x2F	The hexadecimal digit of the 5th nibble of data
DATA 5	0x20 ~0x2F	The hexadecimal digit of the 6th nibble of data
DATA 6	0x20 ~0x2F	The hexadecimal digit of the 7th nibble of data
DATA 7	0x20 ~0x2F	The hexadecimal digit of the 8th nibble of data
ETX	0x03	End of Text
BCC		Block Check Character

3.17 SET TALLIES

This command is used to get tallies.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communication ID
STX	0x02	Start of Text
CMD0	0x66	SET TALLIES Command
CMD1		Sub-Command1
CMD2		Sub-Command2
DATA0	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of data

DATA 1	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of data
DATA 2	0x20 ~0x2F	The hexadecimal digit of the 3rd nibble of data
DATA 3	0x20 ~0x2F	The hexadecimal digit of the 4th nibble of data
DATA 4	0x20 ~0x2F	The hexadecimal digit of the 5th nibble of data
DATA 5	0x20 ~0x2F	The hexadecimal digit of the 6th nibble of data
DATA 6	0x20 ~0x2F	The hexadecimal digit of the 7th nibble of data
DATA 7	0x20 ~0x2F	The hexadecimal digit of the 8th nibble of data
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
RSP0	0x66	SET TALLIES Command
RSP1		Sub-Command1
RSP2		Sub-Command2
ERROR		Error Status for Operation
DATA0	0x20 ~0x2F	The hexadecimal digit of the 1st nibble of data
DATA 1	0x20 ~0x2F	The hexadecimal digit of the 2nd nibble of data
DATA 2	0x20 ~0x2F	The hexadecimal digit of the 3rd nibble of data
DATA 3	0x20 ~0x2F	The hexadecimal digit of the 4th nibble of data
DATA 4	0x20 ~0x2F	The hexadecimal digit of the 5th nibble of data
DATA 5	0x20 ~0x2F	The hexadecimal digit of the 6th nibble of data
DATA 6	0x20 ~0x2F	The hexadecimal digit of the 7th nibble of data
DATA 7	0x20 ~0x2F	The hexadecimal digit of the 8th nibble of data
ETX	0x03	End of Text

BCC		Block Check Character

- Sub-Command List

CMD1	CMD2	Description
0x20	0x20	# Power Ups
0x21 (# Operate Function)	0x20	# Dispense Operation
	0x21	# Purge Operation
	0x22	# Test Dispense Operation
	0x23	# Zigzag Operation
0x22 (# Each Motor Start)	0x20	# BLDC Motor Start
	0x21	# STEP1 Motor Start
	0x22	# STEP2 Motor Start
	0x23	# STEP3 Motor Start
	0x24	# STEP4 Motor Start
0x23	0x20	# Total Motor Failure
0x24 (# Each Motor Failure)	0x20	# BLDC Motor Failure
	0x21	# STEP1 Motor Failure
	0x22	# STEP2 Motor Failure
	0x23	# STEP3 Motor Failure
	0x24	# STEP4 Motor Failure
0x25 (# Jams with Each Cassette)	0x20	# Jams with Cassette1
	0x21	# Jams with Cassette2
	0x22	# Jams with Cassette3
	0x23	# Jams with Cassette4
0x26	0x20	# Total Jams
0x27 (# Jams at Location)	0x20	# Jams at Cassette1
	0x21	# Jams at Cassette2
	0x22	# Jams at Cassette3
	0x23	# Jams at Cassette4
	0x24	# Jams at Check
	0x25	# Jams at Sonar
	0x26	# Jams at Diverter to Exit
	0x27	# Jams at Diverter to Reject
	0x28	# Jams at Exit
	0x29	# Jams at Reject
0x28 (# Jam Recovery)	0x20	# Used Jam Recovery
	0x21	# Successful Jam Recovery
0x29	0x20	# Total Pick Failures
0x2A (# Each Pick Failures)	0x20	# Pick Failure on Cassette1
	0x21	# Pick Failure on Cassette2
	0x22	# Pick Failure on Cassette3
	0x23	# Pick Failure on Cassette4

0x2B	0x20	# Total Notes Dispensed
0x2C (# Each Notes Dispensed)	0x20	# Notes Dispensed on Cassette1
	0x21	# Notes Dispensed on Cassette2
	0x22	# Notes Dispensed on Cassette3
	0x23	# Notes Dispensed on Cassette4
0x2D	0x20	# Total Notes Rejected
0x2E (# Each Notes Rejected)	0x20	# Notes Rejected on Cassette1
	0x21	# Notes Rejected on Cassette2
	0x22	# Notes Rejected on Cassette3
	0x23	# Notes Rejected on Cassette4
0x2F (# Cause of Notes Rejected)	0x20	# Notes Rejected by Length
	0x21	# Notes Rejected by Distance
	0x22	# Notes Rejected by Opacity
	0x23	# Notes Rejected by Bad Note
0x30	0x20	# Communication Failures
0x31 (# Removed Cassette)	0x20	# Removed Cassette1
	0x21	# Removed Cassette2
	0x22	# Removed Cassette3
	0x23	# Removed Cassette4
0x32	0x20	# F/W Update
0x33 (# Extracted Tallies)	0x20	# Extracted Tallies of # Power Ups
	0x21	# Extracted Tallies of # Operate Function
	0x22	# Extracted Tallies of # Each Motor Start
	0x23	# Extracted Tallies of # Total Motor Failure
	0x24	# Extracted Tallies of # Each Motor Failure
	0x25	# Extracted Tallies of # Jams with Each Cassette
	0x26	# Extracted Tallies of # Total Jams
	0x27	# Extracted Tallies of # Jams at Location
	0x28	# Extracted Tallies of # Jam Recovery
	0x29	# Extracted Tallies of # Total Pick Failures
	0x2A	# Extracted Tallies of # Each Pick Failures
	0x2B	# Extracted Tallies of # Total Notes Dispensed
	0x2C	# Extracted Tallies of # Each Notes Dispensed
	0x2D	# Extracted Tallies of # Total Notes Rejected
	0x2E	# Extracted Tallies of # Each Notes Rejected
	0x2F	# Extracted Tallies of # Cause of Notes Rejected
	0x30	# Extracted Tallies of # Communication Failures
	0x31	# Extracted Tallies of # Removed Cassette
	0x32	# Extracted Tallies of # F/W Update
	0x33	# Extracted Tallies of # Extracted Tallies
	0x34	# Extracted Tallies of # Clear Tallies
0x34 (# Clear Tallies)	0x20	# Clear Tallies of # Power Ups
	0x21	# Clear Tallies of # Operate Function

	0x22	# Clear Tallies of # Each Motor Start
	0x23	# Clear Tallies of # Total Motor Failure
	0x24	# Clear Tallies of # Each Motor Failure
	0x25	# Clear Tallies of # Jams with Each Cassette
	0x26	# Clear Tallies of # Total Jams
	0x27	# Clear Tallies of # Jams at Location
	0x28	# Clear Tallies of # Jam Recovery
	0x29	# Clear Tallies of # Total Pick Failures
	0x2A	# Clear Tallies of # Each Pick Failures
	0x2B	# Clear Tallies of # Total Notes Dispensed
	0x2C	# Clear Tallies of # Each Notes Dispensed
	0x2D	# Clear Tallies of # Total Notes Rejected
	0x2E	# Clear Tallies of # Each Notes Rejected
	0x2F	# Clear Tallies of # Cause of Notes Rejected
	0x30	# Clear Tallies of # Communication Failures
	0x31	# Clear Tallies of # Removed Cassette
	0x32	# Clear Tallies of # F/W Update
	0x33	# Clear Tallies of # Extracted Tallies
	0x34	# Clear Tallies of # Clear Tallies
0xFF	Don't Care	Clear All Tallies (Use Clear Tallies Only)

3.18 GET DEVICE SERIAL NUMBER

The command will get the Device Serial Number data

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x63	GET DEVICE SERIAL NUMBER 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	0x63	GET DEVICE SERIAL NUMBER Command(CMD)
ERROR		Error Status for Operation

DATA0	0x30~ 0x5A	The 1’th ascii code for Device Serial Number
DATA1	0x30~ 0x5A	The 2’nd ascii code for Device Serial Number
DATA2	0x2D	Delimiter
DATA	0x30~ 0x5A	The 3’rd ascii code for Device Serial Number
DATA4	0x30~ 0x5A	The 4’th ascii code for Device Serial Number
DATA5	0x30~ 0x5A	The 5’th ascii code for Device Serial Number
DATA6	0x30~ 0x5A	The 6’th ascii code for Device Serial Number
DATA7	0x2D	Delimiter
DATA8	0x30~ 0x5A	The 7’th ascii code for Device Serial Number
DATA9	0x30~ 0x5A	The 8’th ascii code for Device Serial Number
DATA10	0x30~ 0x5A	The 9’th ascii code for Device Serial Number
DATA11	0x30~ 0x5A	The 10’th ascii code for Device Serial Number
ETX	0x03	End of Text
BCC		Block Check Character

3.19 GET SERIAL DATA OF DISPENSE COMMAND

The command will get the SERIAL Data of DISPENSE command to distinguish each command. It is effective for all kinds of DISPENSE commands of VCDM, i.e, a) DISPENSE(0x52), b) TEST DISPENSE(0x53) and c) DISPENSE_2(0x54).

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x67	GET SERIAL DATA OF DISPENSE COMMAND Command Code
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	0x67	GET SERIAL DATA OF DISPENSE COMMAND Command Code(CMD)
ERROR		Error Status for Operation
SERIAL	0x21~ 0x7F	The Value that will be valid for next Dispense Command without 0x3D(Dispense Serial Number Error) is Dispense Serial Number or Identifiaction Number
ETX	0x03	End of Text
BCC		Block Check Character

3.20 AUTO-CALIBRATION FOR SONAR SENSOR

The command will automatically calibrate the untrasonic sensor through normalization of response signal level to standard media.

Command Format

Name	Code	Description
EOT	0x04	Start of Transmission
ID	0x30	Communications ID
STX	0x02	Start of Text
CMD	0x57	Auto-Calibration for Sonar Sensor Command Code
POS	0x31~ 0x34	The Designated Cassette for Auto-Calibration (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	0x57	Auto-Calibration for Sonar Sensor Command Code (CMD)
ERROR		Error Status for Operation
AMP	Value +0x20	Amplicate Parameter for Received Sonar Signal

NOISE	Value +0x20	Noise Value of Amplicated Sonar Signal
RSV	0x20	Reserved
REJECT	0x20~	Number of Reject Event
ETX	0x03	End of Text
BCC		Block Check Character

4. ERROR CODES

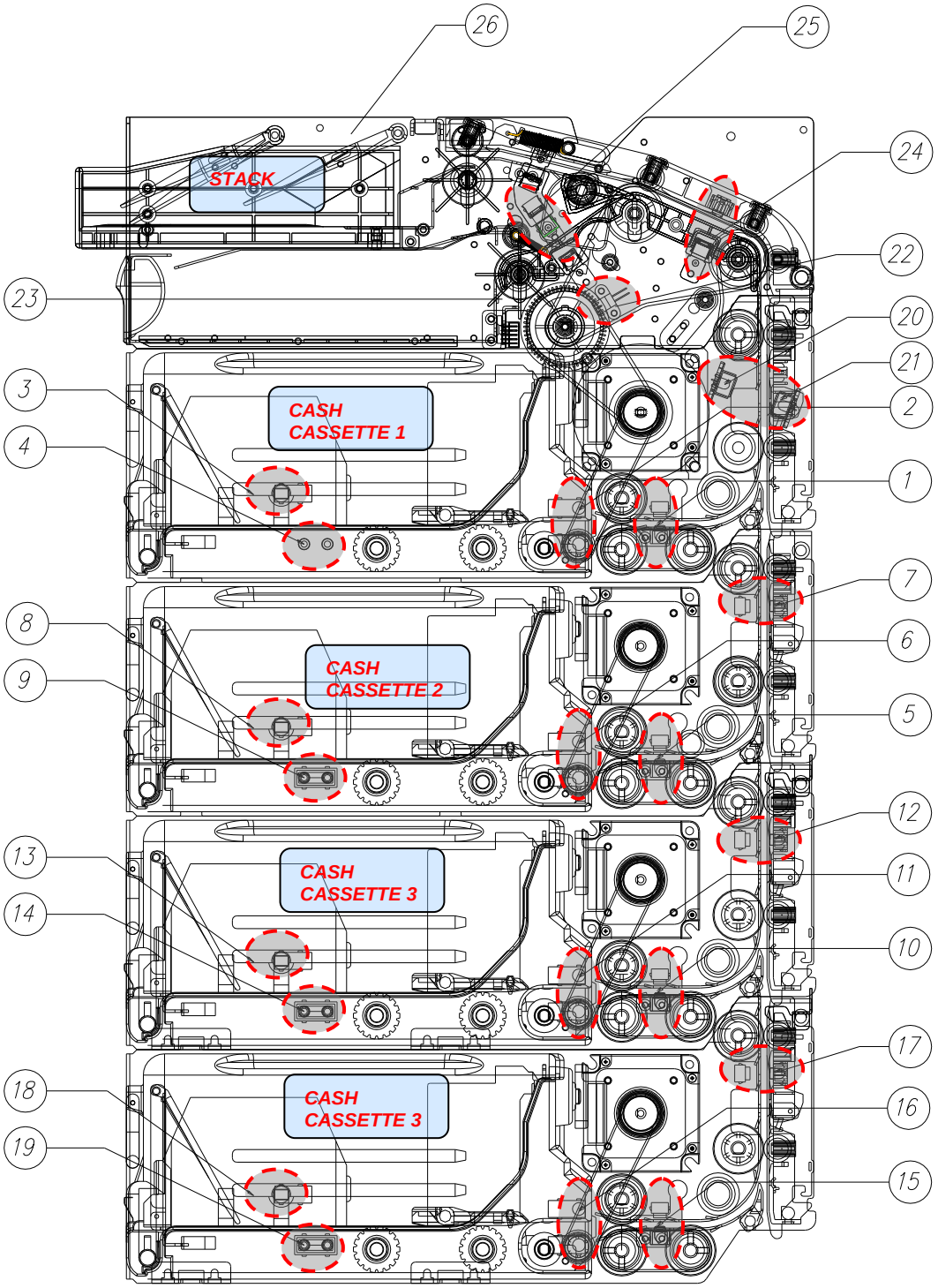
4.1 ERROR CODES

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 : 50 Notes Including all the Rejected)
0x0D	Too Many Rejects During Dispensing from One Cash Cassette (Limit: 20 notes)
0x0E	Abnormal Termination During Purge Execution
0x0F	A Note Is Staying at REJECT Sensor
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	Error in Dispense Serial Number or Identifiaction Number of Dispense Command (in case of the same value of Serial)
0x1E	ACK message was not return from host after dispenser transmit

	response.
0x1F	Detect Notes in Exit Sensor at Purge
0x20	Divert Sensor is Always On
0x21	Exit Sensor is Always On.
0x22	Reject Sensor is Always On.
0x23	Sonar Sensor is Always On.
0x24	Failure of Auto-Calibration for Sonar Sensor
0x26	Back- Feeding Time-out at DIVERT Sensor
0x28	Divert Sensor is Always Off.
0x29	Exit Sensor is Always Off
0x2A	Reject Sensor is Always Off.
0x2B	Sonar 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)
0x80	Detect Note in Cassette 1 Check Sensor
0x81	Detect Note in Cassette 2 Check Sensor or Path 2
0x82	Detect Note in Cassette 3 Check Sensor or Path 3
0x83	Detect Note in Cassette 4 Check Sensor or Path 4
0x89	Detect Note in Sonar Sensor before pick up
0x8A	Detect Note in Diverter Sensor before pick up
0x8B	Detect Note in Exit Sensor before pick up
0x8C	Detect Note in Reject Sensor before pick up

4.2 SENSOR LAYOUT



4.3 SENSOR DESCRIPTION

NO	NAME	DESCRIPTION	TYPE
1	CHK 1 SENSOR	Sensor to detect the length of the banknote picked from Top Cassette and to measure distance between bankotes	Optical
2	CST_IN 1 SENSOR	Sensor to check banknote on the path of Top Cassette	Optical
3	NEAREND 1 SENSOR	Sensor to check the remaining banknote on the path of Top Cassette	Optical
4	CST 1 SENSOR	Sensor to detect existence of Top Cassette	Optical
5	CHK 2 SENSOR	Sensor to detect the length of the banknote picked from the 2nd Cassette from Top and to measure distance between bankotes	Optical
6	CST_IN 2 SENSOR	Sensor to check banknote on the path of the 2nd Cassette from Top	Optical
7	PATH 2 SENSOR	Sensor to check banknote on the Path 2	Optical
8	NEAREND 2 SENSOR	Sensor to check the remaining banknote on the path of the 2nd Cassette from Top	Optical
9	CST 2 SENSOR	Sensor to detect existence of the 2nd Cassette from Top	Optical
10	CHK 3 SENSOR	Sensor to detect the length of the banknote picked from the 3rd Cassette from Top and to measure distance between bankotes	Optical
11	CST_IN 3 SENSOR	Sensor to check banknote on the path of the 3rd Cassette from Top	Optical
12	PATH 3 SENSOR	Sensor to check banknote on the Path 3	Optical
13	NEAREND 3 SENSOR	Sensor to check the remaining banknote on the path of the 3rd Cassette from Top	Optical
14	CST 3 SENSOR	Sensor to detect existence of the 3rd Cassette from Top	Optical
15	CHK 4 SENSOR	Sensor to detect the length of the banknote picked from the Bottom Cassette and to measure distance between bankotes	Optical
16	CST_IN 4 SENSOR	Sensor to check banknote on the path of the Bottom Cassette	Optical
17	PATH 4 SENSOR	Sensor to check banknote on the Path 4	Optical
18	NEAREND 4 SENSOR	Sensor to check the remaining banknote on the path of the Bottom Cassette	Optical
19	CST 4 SENSOR	Sensor to detect existence of the Bottom Cassette	Optical
20	SONAR_IN SENSOR	Sensor to detect start of sampling of Ultransonic Sensor	Optical
21	SONAR SENSOR	Ultransonic Sensor for doubled notes	Ultransonic
22	WHEEL SENSOR	Wheel Count Sensor	Interrupt
23	RJT_TRAY SENSOR	Sensor to check existence of Reject Tray	Limit S/W
24	DVT SENSOR	Swing Selector Control Sensor for Diverter Operation	Optical
25	RJT SENSOR	Sensor to detect rejected banknotes	Optical

26	EXIT SENSOR	Sensor to detect banknotes on Exit	Optical