Ingeniería Electrónica

SMART IDENT

CARD ISSUING MACHINE

Specifications

User Manual

CHR-1000 Rev. D

Card Issuing Machine for Magnetic, Contact & IC Card

REVISION HISTORY

No	DATE	DESCRIPTION	REV	PAGE	F/W Name
1	2010.10.20.	First Edition	A	43	
2	2010.12.20	Add the SLE4442(5542),SLE4428(5528) function	B	57	
3	2011.04.13	Correct typos in the page5	C	57	
4	2011.08.13	Add the caution of the battery on page 8	D	57	

MODEL NAME INFORMATION

C H R – 1 [X] [X] [X] [X]

INTERFACE	FUNCTION	MS/IC/RF	TRACK	OPTION	CAPACITY		
RS-232C	1: SINGLE STACKER	0: - 1: MS Only 2: MS READ & IC-CONTACT 3: MS & IC Contact 4: MS & IC & RF 5: IC-CONTACT 6: IC & RF 7: MS READ ONLY 8: RF ONLY	0:WITHOUT MAGNETIC 1: ISO 1 TRK 2: ISO 2 TRK 3: ISO 3 TRK 4: ISO 1,2 TRK 5: ISO 1.3 TRK 6: ISO 2,3 TRK 7: ISO 1,2,3 TRK	0: Without bezel 1: Short bezel 2:- 3:- 4:- 5: Shutter	D:0.76T E: 0.84T F: 1.0T	J: 0.76T K: 0.84T L: 1.0T	P: 0.76T Q: 0.84T R: 1.0T
					| 200 PCS	| 300 PCS	| 500 PCS

C O N T E N T S

OVERVIEW

CHR-1000 Series is a set of card issuing machine for the magnetic, IC, and RF card in conjunction with the KHT2100 and KST3000 series. This model can be used for magnetic card conforming to the ISO7816-2 standard and most of the IC cards conforming with the ISO7816-4 T=0. Additionally, this model also can be used for RF card conforming to the MIFARE.

This model simplified the command for magnetic card, minimize the delay time occurs in the communication data processing, and improved the speed due to function to issue the all tracks at a time.

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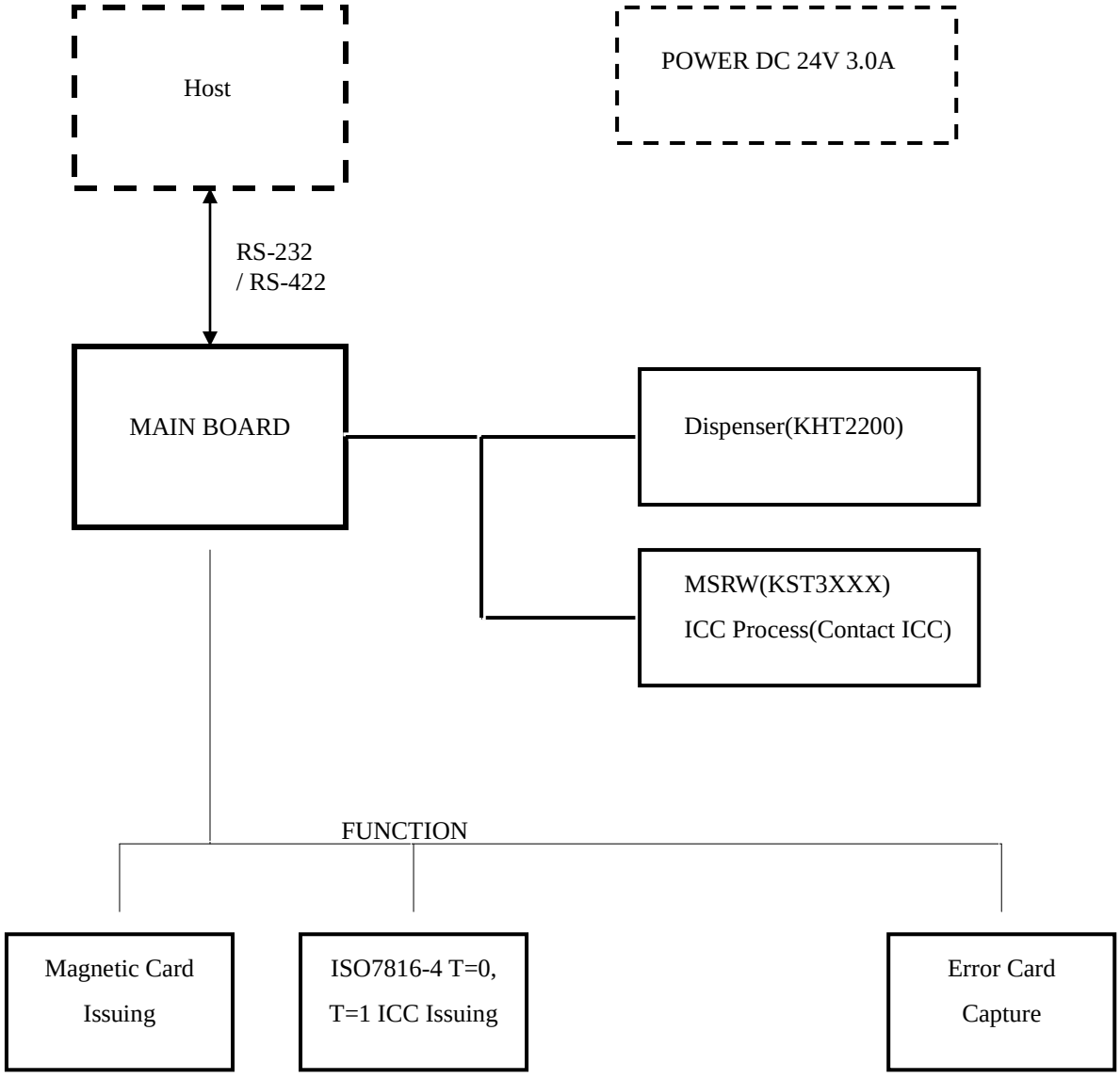
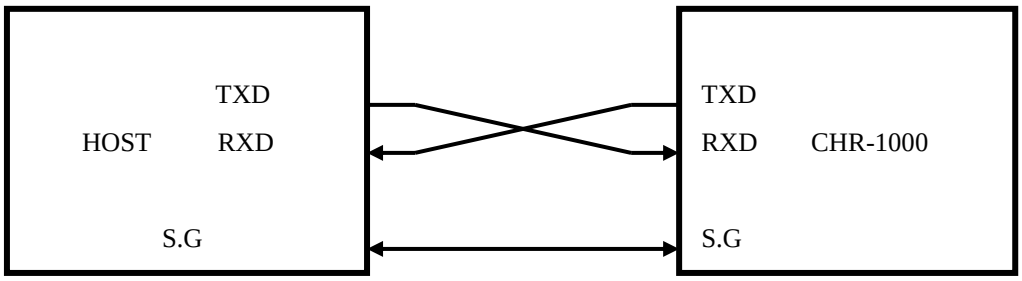
As an automatic issuing machine, this model can be used in issuing most types of credit card and debit card in financial area.

SYSTEM BLOCK DIAGRAM



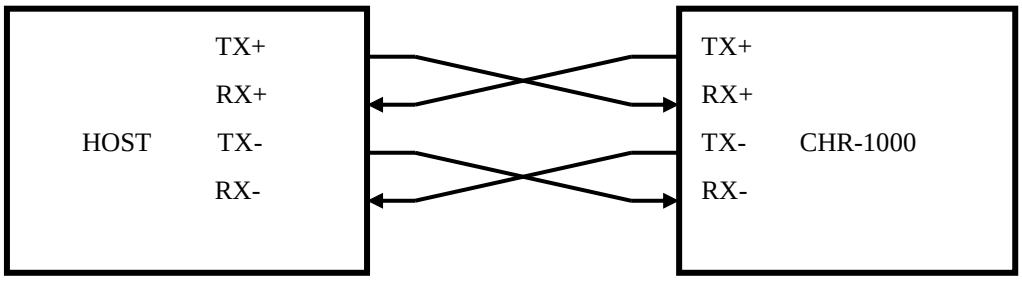
♦ *RS – 232 Connection*



CASE 1) Part Number : D-SUB CONNECTOR(FEMALE)

Pin No	INDEX	Remark
2	RXD	Receive
3	TXD	Transmit
5	S.G	Signal Ground

♦ *RS422 Connection*

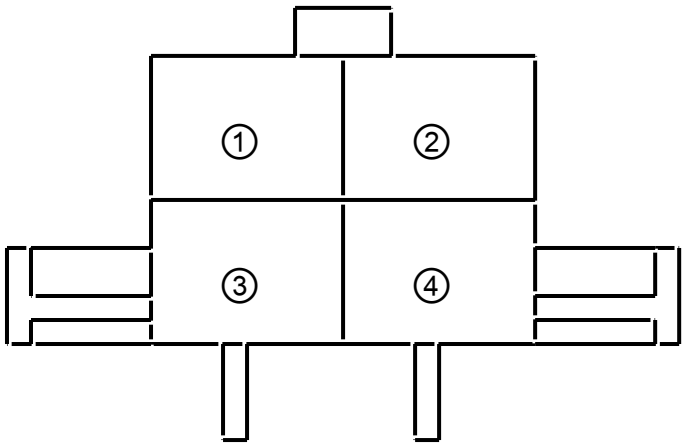


CASE 1) Part Number : D-SUB CONNECTOR(FEMALE)

Pin No	INDEX	Remark
1	TX+-	
4	RX+	
6	TX-	
8	RX-	

♦ *Power Connection*

Front View (male)



Part Number : 5566-04A1 (MOLEX)

<CHR-1000>

Pin No	Signal Name	Direction
1		INPUT
2	DC +24V	
3		
4	GND	

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS

SPECIFICATIONS

♦ *basic functions*

	Spec	Remark
Dimension	Refer from page 20 to page 22	
Input power	DC 24V 3A	

♦ *Environment Requirements*

Operating Locus : in door use Only

Ambient Temperature

Storage : -20 ℃ to 70 ℃(No functional error to be found in 12 hours after returning to normal environment)

Operating : 5 ℃ to 50℃ (In 0℃ to +5℃ range, all specifications but 'Warped card' to be satisfied)

Ambient Relative Humidity

Storage : 0% to 95% RH(No functional error to be found in 12 hours after returning to normal environment)

Operating : 5 % 90% RH(No Condensation)

Vibration

: Amplitude 2mm, 10 to 50 Hz in X, Y, Z directions for 30min, 2G or less

Shock Endurance

: 30G, 11ms

Ecoding Speed : 2.3 ~ 5 Sec/Card

Life Time : More than 500,000card pases(1pass : one forward and backward)

Error Rate : Less than 3/1,000 cycle(Test Card : KYT Standard)

♦ *Controller Environment*

Communication

: RS422 OR RS232C Interface

: Baud Rate – 9600 BPS

19200 BPS

38400BPS (Default)

57600BPS

: 8Data bit, 1 Start bit, None Parity bit, 1 Stop Bit

MAGNETIC CARD PROCESS

♦ *Total processing time*

: Less than 1.2 Sec

♦ *Life and Reliability*

Life of Head : Minimum 1,000,000 passes

(One pass is for forward and backward movement)

Error Rate : 3/1000 cycle

♦ *Reference Standards*

: ISO 7811-1,2,3,4,5 : identification cards – Recording technique

♦ *Recording*

	ISO Track 1	ISO Track 2	ISO Track 3
BPI	210	75	210
Capacity	Max 79	Max 40	Max 107
Reading Methods	F2F		
Length	Variable		
Card thickness	Plastic : 0.76 ±0.08mm		

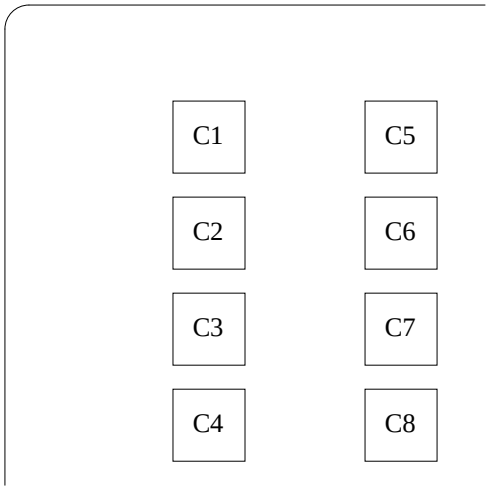
IC CARD PROCESS

This model provides most type of IC card compliant to ISO7816 T=0, T=1.

♦ *Processing time* : Less than 1 Sec

♦ *Number and Location of the contacts on IC Card*

: Number and location of the contacts on IC Card is specified in ISO 7816-2 figure 2
Refer to Appendix A.



C1 : VCC(Supply voltage)
C2 : RST(Reset signal)
C3 : CLK(Clock signal)
C4 : Reserved to ISO/IEC JTC 1/SC 17 for future use
C5 :GND(Ground)
C6 :VPP(Programming voltage)
C7 :I/O(Data inut/output)
C8 :Reserved to ISO/IEC JTC 1/SC 17 for future use

♦ *Power Consumption*

Motor Starting or Reversing : Less than 310mA(50mSec)
Card Feed & Reading : Less than 690mA
Card Feed & Writing : Less than 700mA
Steady state : Less than 180mA

♦ *Life and Reliability*

IC Contact : Approximately 1,000,000 passes
Error Rate : 3/1000 cycle

COMMUNICATION INTERFACE

♦ *Communication Method*

Asynchronous, Half duplex.

Baud Rate : 9600 – 57600Bps , Default : 38400Bps

Start Bit : 1Bit

Data Length : 8Bit

Parity : None

Stop Bit : 1Bit

♦ *Communication Protocol Format*

1 Command Frame Format.

SOH	Null	Length	STX	CMD	DATA	ETX	BCC
1BYTE	1BYTE	2BYTE	1BYTE	3BYTE	N-BYTE	1BYTE	1BYTE

2 Positive Response Frame Format

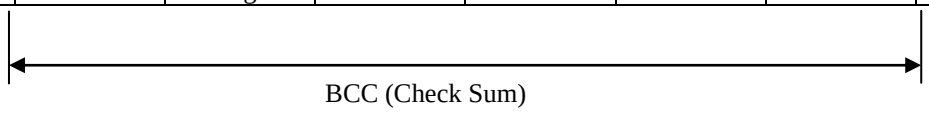
SOH	Null	Length	STX	CMD	GOOD	0x01	DATA	ETX	BCC
1BYTE	1BYTE	2BYTE	1BYTE	3BYTE	1BYTE	1BYTE	N-BYTE	1BYTE	1BYTE

3 Negative Response Frame Format

SOH	Null	Length	STX	CMD	E-Code	0x00	ETX	BCC
1BYTE	1BYTE	2BYTE	1BYTE	3BYTE	2BYTE	1BYTE	1BYTE	1BYTE

4 BCC (Check Sum)

SOH	Null	Length	STX	CMD	DATA	ETX	BCC



Command Frame BCC = Null ^ Length ^ STX ^ CMD ^ DATA ^ ETX.

Positive Response BCC = Null ^ Length ^ STX ^ CMD ^ GOOD ^ 0x01 ^ DATA ^ ETX.

Negative Response BCC = Null ^ Length ^ STX ^ CMD ^ E-Code ^ ETX.

N BYTE : Variable Length

5. Explanatory note of technical words

Name	Detail
Null	Reserved. Always 0x00.
Length	Data Length from the CMD to DATA.
CMD	Instruction Code (3 Bytes)
GOOD	Normal Execution : 0x0000 (2 Bytes)
E-Code	Command Failed: Refer to "Error Code" (2 Bytes)
BCC	Check Sum.

<Length>, <E-Code>

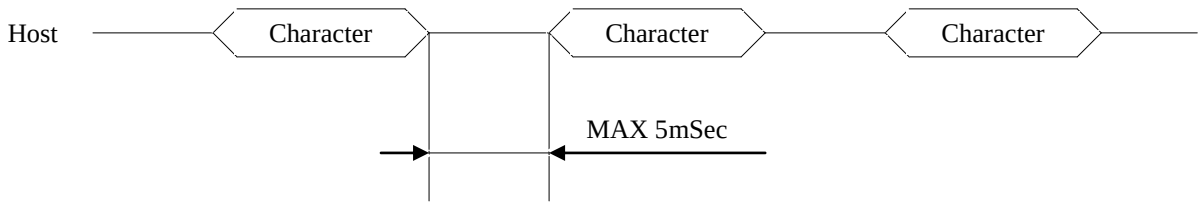
High Byte	Low Byte

6. Control Characters

Name	Hex Value	Detail
SOH	0x01	Start of Header
STX	0x02	Start of Text
ETX	0x03	End of Text
ENQ	0x05	Enquiry
ACK	0x06	Positive Acknowledge
NAK	0x15	Negative Acknowledge
CAN	0x18	Cancel

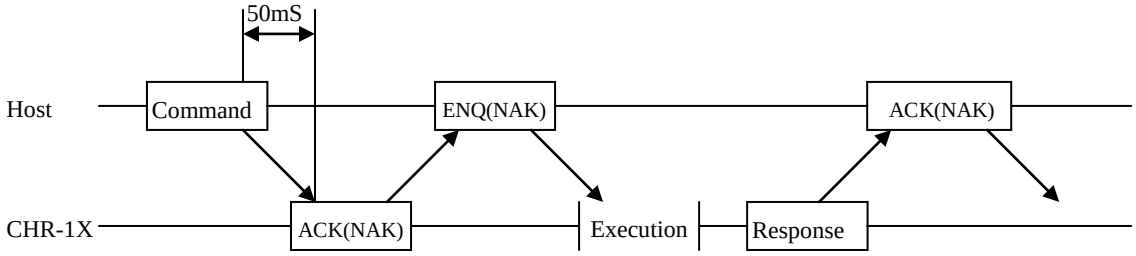
7 COMMUNICATION SEQUENCE / TIMING

7.1 CHARACTER GUIDE TIME

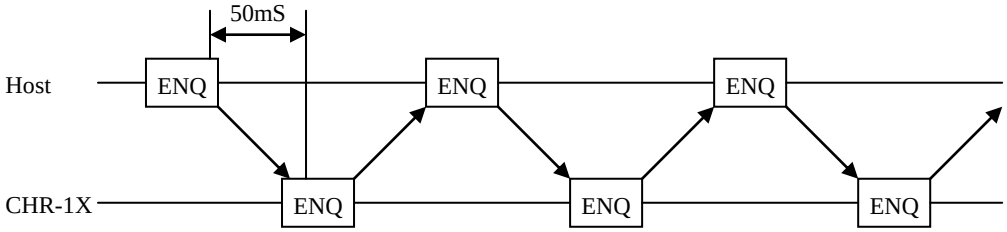


If no consecutive character within 5msec., do time out.

7.2 Command

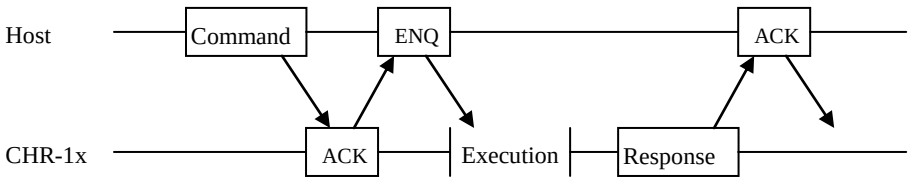


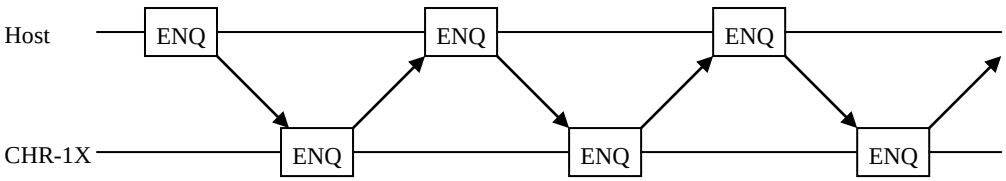
7.3 Inquiry



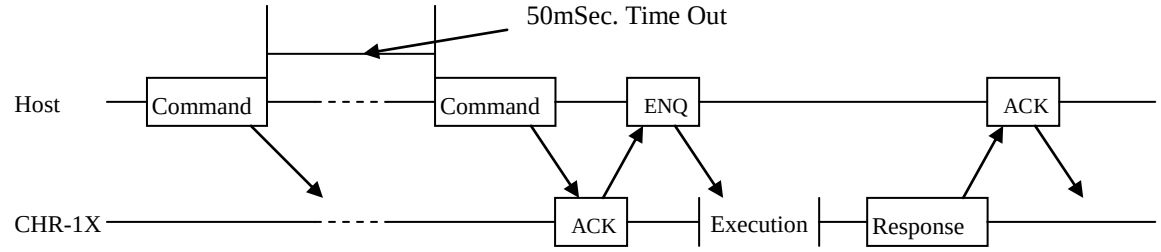
7.4 Sequence

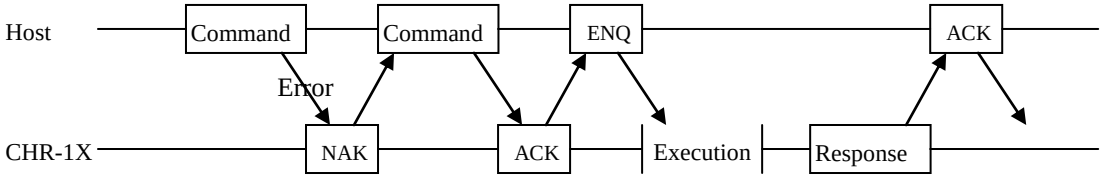
7.3.1 General

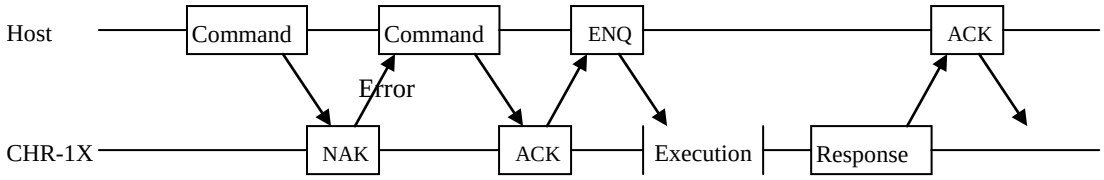


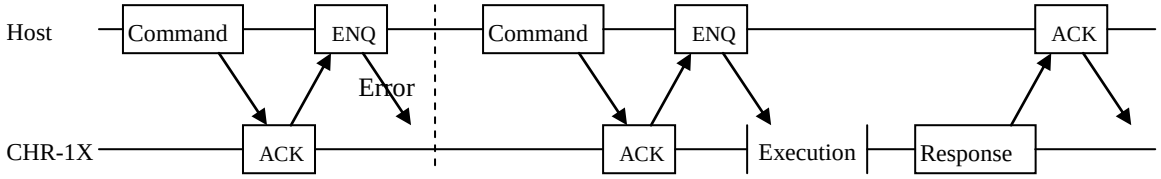


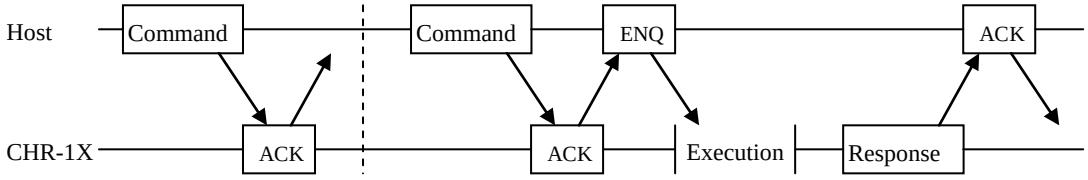
7.3.2 Error1

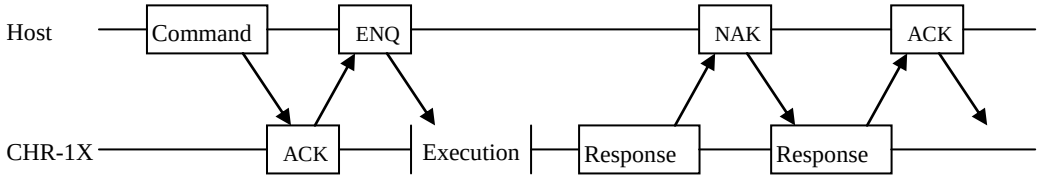

50mSec. Time Out
Host
Command
Command
ENQ
ACK
CHR-1X
ACK
Execution
Response

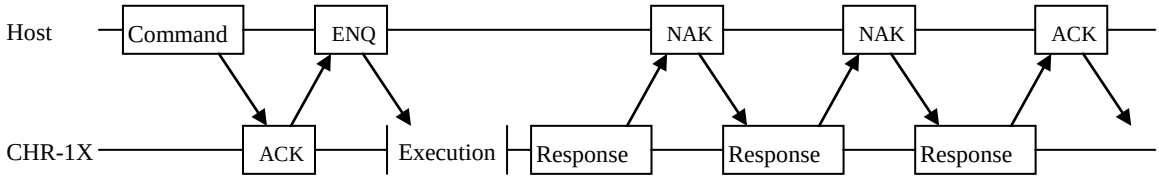

Host
Command
Command
ENQ
ACK
Error
CHR-1X
NAK
ACK
Execution
Response

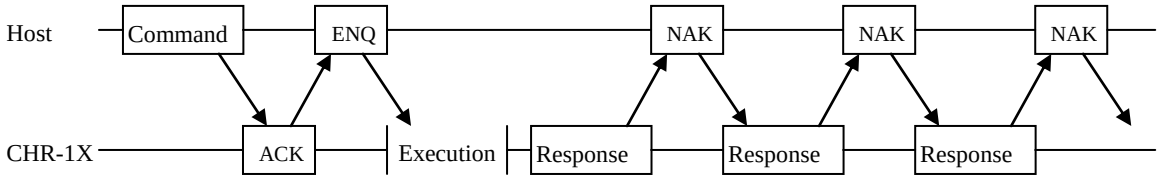

Host
Command
Command
ENQ
ACK
Error
CHR-1X
NAK
ACK
Execution
Response

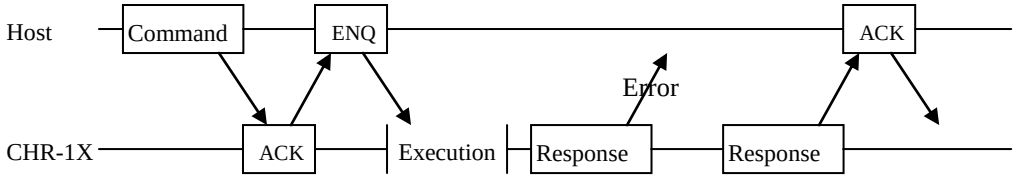

Host
Command
ENQ
Command
ENQ
ACK
Error
CHR-1X
ACK
ACK
Execution
Response

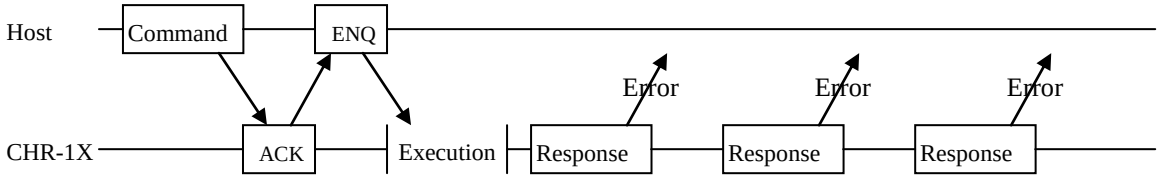

Host
Command
Command
ENQ
ACK
CHR-1X
ACK
ACK
Execution
Response

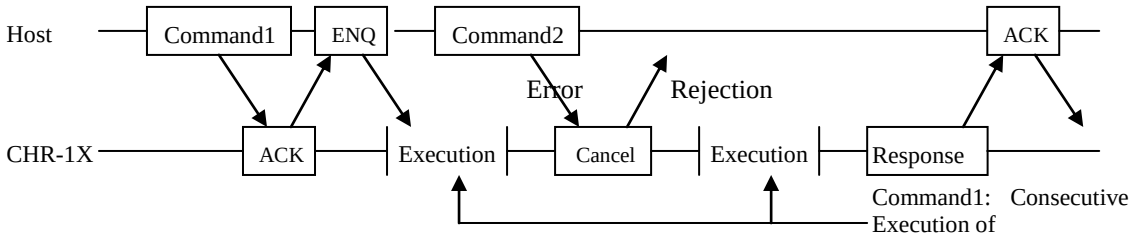

Host
Command
ENQ
NAK
ACK
CHR-1X
ACK
Execution
Response
Response

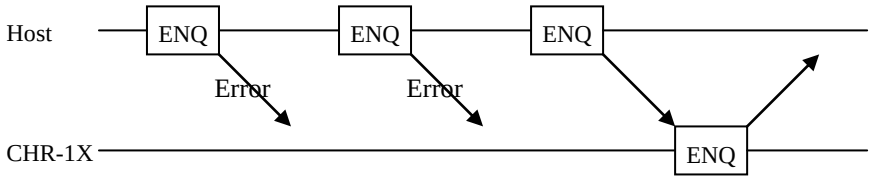

Host
Command
ENQ
NAK
NAK
ACK
CHR-1X
ACK
Execution
Response
Response
Response


Host
Command
ENQ
NAK
NAK
NAK
CHR-1X
ACK
Execution
Response
Response
Response


Host
Command
ENQ
ACK
Error
CHR-1X
ACK
Execution
Response
Response

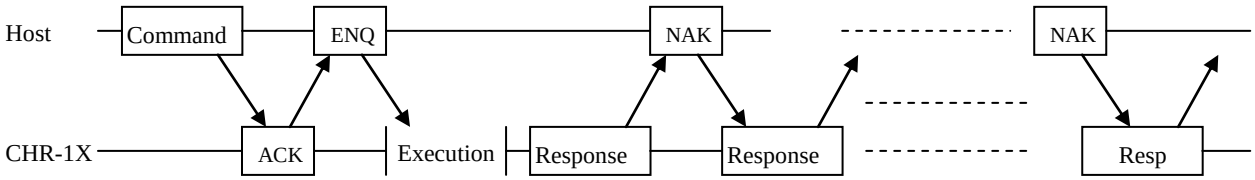

Host
Command
ENQ
Error
Error
Error
CHR-1X
ACK
Execution
Response
Response
Response


Host
Command1
ENQ
Command2
ACK
Error
Rejection
CHR-1X
ACK
Execution
Cancel
Execution
Response
Command1: Consecutive
Execution of

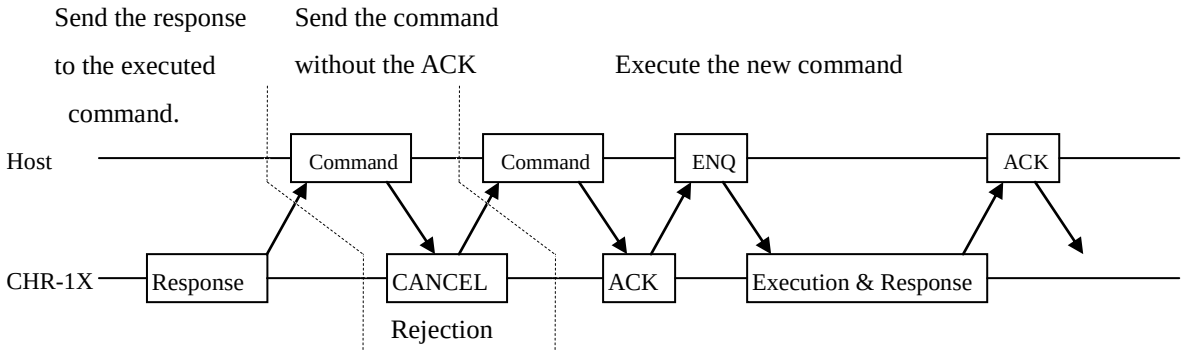

Host
ENQ
ENQ
ENQ
Error
Error
CHR-1X
ENQ

7.3.3 Error2

- When received the NAK packet consecutively.



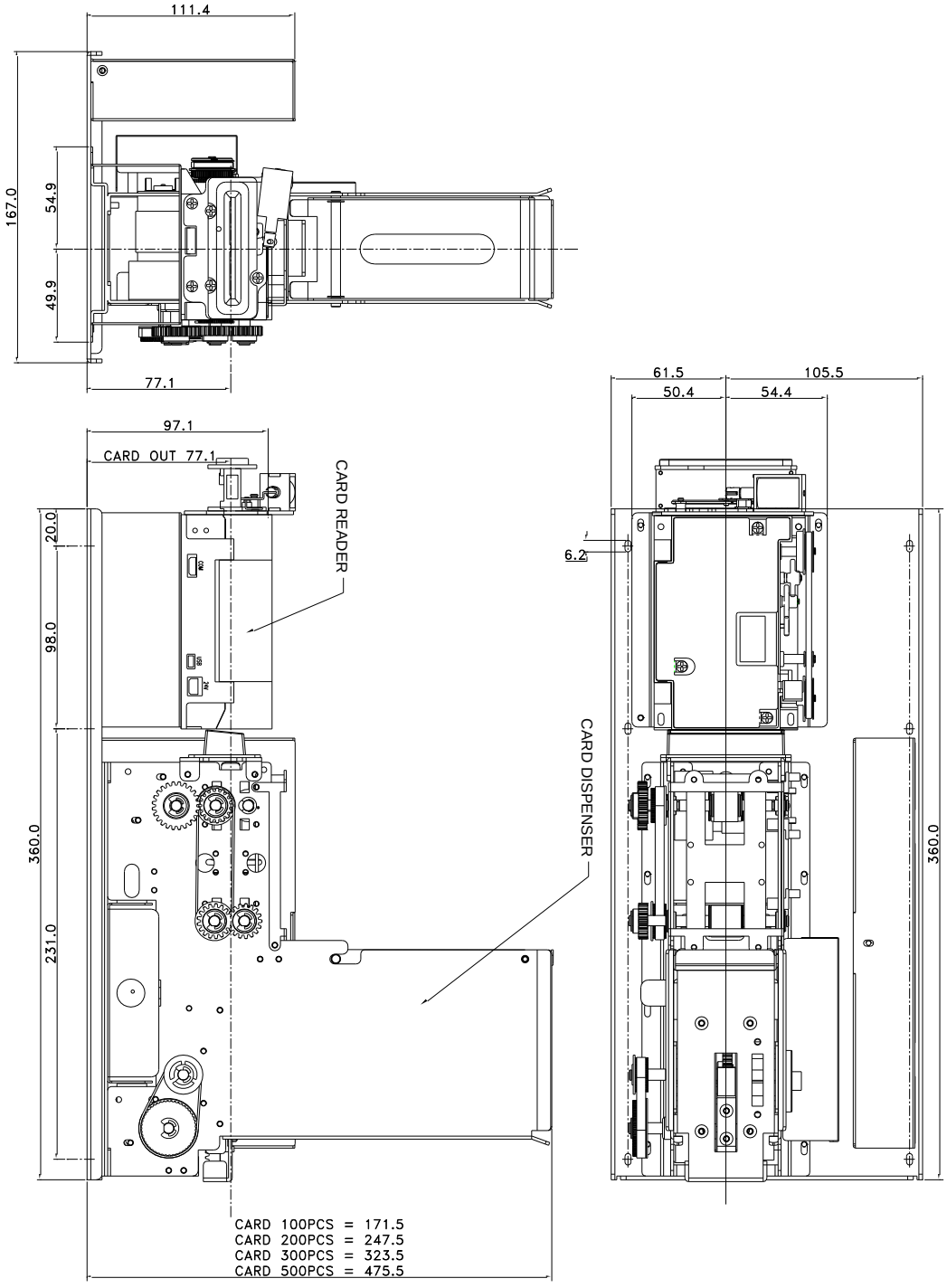
- When the Host sends the command without the ACK packet.



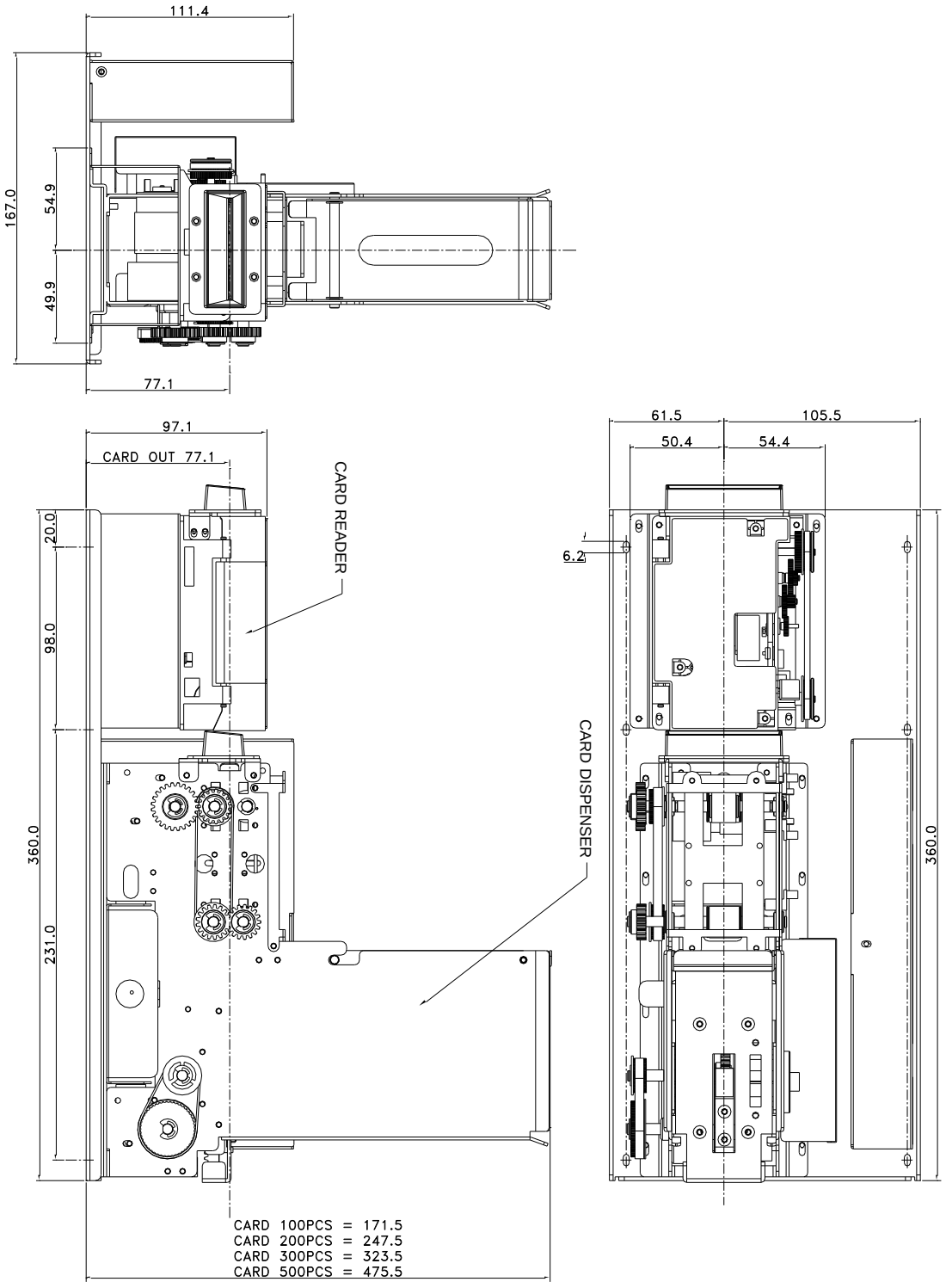
The terminal should ignore the command received before it sends the ACK packet, send the CANCEL packet. The second command will be treated as the ACK packet and executed with no ACK.

TECHNICAL DRAWING

<CHR-1XXX SHUTTER TYPE>



<CHR-1XXX BEZEL TYPE>



COMMAND DETAIL

♦ *Command List*

	Item	Cm0	Cm1	Cm2	Detail	Note
COMMON	STATUS1	'C'	'1'	'1'	Get Model	
		'C'	'1'	'2'	Get Firmware Version	
		'C'	'1'	'3'	Get Stacker	
		'C'	'1'	'6'	Get Card position	
	SETTING1	'C'	'2'	'1'	Set RTC IC	
		'C'	'2'	'3'	Set Capture Time	
		'C'	'2'	'4'	Set Retry Count	
		'C'	'2'	'6'	Set Baud Rate	
	SETTING2	'C'	'4'	'0'	Set User Buzz	
	MOVE	'C'	'3'	'1'	Card Move From Stacker	
		'C'	'3'	'2'	Card Move To …	
		'C'	'3'	'3'	Card Eject	
		'C'	'3'	'4'	Card Capture	
MAGNETIC CARD	READ	'M'	'3'	'1'	Magnetic Card Read	
		'M'	'3'	'5'	Magnetic Card All Track Read	
IC CARD	IC CONTROL	'I'	'2'	'1'	IC Card Reset	
		'I'	'2'	'2'	IC Card Direct Control	
SLE4442 & SLE4428	IC CONTROL	'A'	'0'	'0'	SLE 5542 & 5528 CARD Reset	
		'A'	'0'	'9'	SLE 5542 & 5528 CARD Power Off	
SLE4442	IC CONTROL	'A'	'0'	'1'	SLE 5542 CARD Compare PCS	
		'A'	'0'	'2'	SLE 5542 CARD Modify PCS	
		'A'	'0'	'3'	SLE 5542 CARD Read PCS	
		'A'	'0'	'4'	SLE 5542 CARD Read Memory	
		'A'	'0'	'5'	SLE 5542 CARD Read Protection Area	
		'A'	'0'	'6'	SLE 5542 CARD Write All Memory At Once	
		'A'	'0'	'7'	SLE 5542 CARD Write Memory	
		'A'	'0'	'8'	SLE 5542 CARD Write Protection Area	
SLE4428	IC CONTROL	'B'	'0'	'1'	SLE 5528 CARD Compare PCS	
		'B'	'0'	'2'	SLE 5528 CARD Modify PCS	
		'B'	'0'	'3'	SLE 5528 CARD Read PCS	
		'B'	'0'	'4'	SLE 5528 CARD Read Memory	
		'B'	'0'	'5'	SLE 5528 CARD Read Protection Area	
		'B'	'0'	'6'	SLE 5528 CARD Write All Memory At Once	
		'B'	'0'	'7'	SLE 5528 CARD Write Memory	
		'B'	'0'	'8'	SLE 5528 CARD Write Protection with Compare	
		'B'	'0'	'A'	SLE 5528 CARD Write Memory Data With Protection Area	

♦ *Common*

1 STATUS / SETTING

1.1 "C11" : It is to check out Model number of CHR-1000.

☞ Command Format

SOH	Null	Length	STX	"C11"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"C11"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"C11"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Model No
7Byte (ASCII)

1.2 "C12" : It is to check out Firmware Version of CHR-1000

☞ Command Format

SOH	Null	Length	STX	"C12"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"C12"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"C12"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Firmware Version
5Byte (ASCII)

1.3 “C13” : It is check out status of Stacker of CHR-1000

☞ Command Format

SOH	Null	Length	STX	“C13”	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	“C13”	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C13”	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Stacker	0x00
1Byte (Hex)	1Byte (Hex)

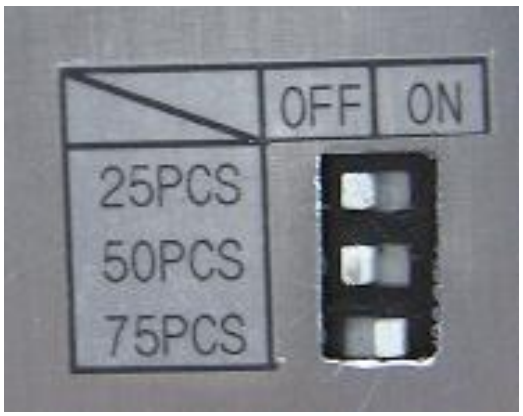
☞ Data Variable

<Stacker>

Code	Status	Note
0x01	Stacker Good	
0x02	Card Warning	Card 500pcs series apply.
0x03	Stacker Empty	

☞ Note

Stacker Status	Detail
‘Stacker Good’	Good.
‘Card Warning’	A few Card in the stacker
‘Stacker Empty’	No cards in the stacker



Set Value	25pcs	50pcs	75pcs
Set to 25pcs cards	ON	OFF	OFF
Set to 50pcs cards	OFF	ON	OFF
Set to 75pcs cards	OFF	OFF	ON

1.4 “C16” : The card is check by existent location.

☞ Command Format

SOH	Null	Length	STX	“C16”	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	“C16”	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C16”	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

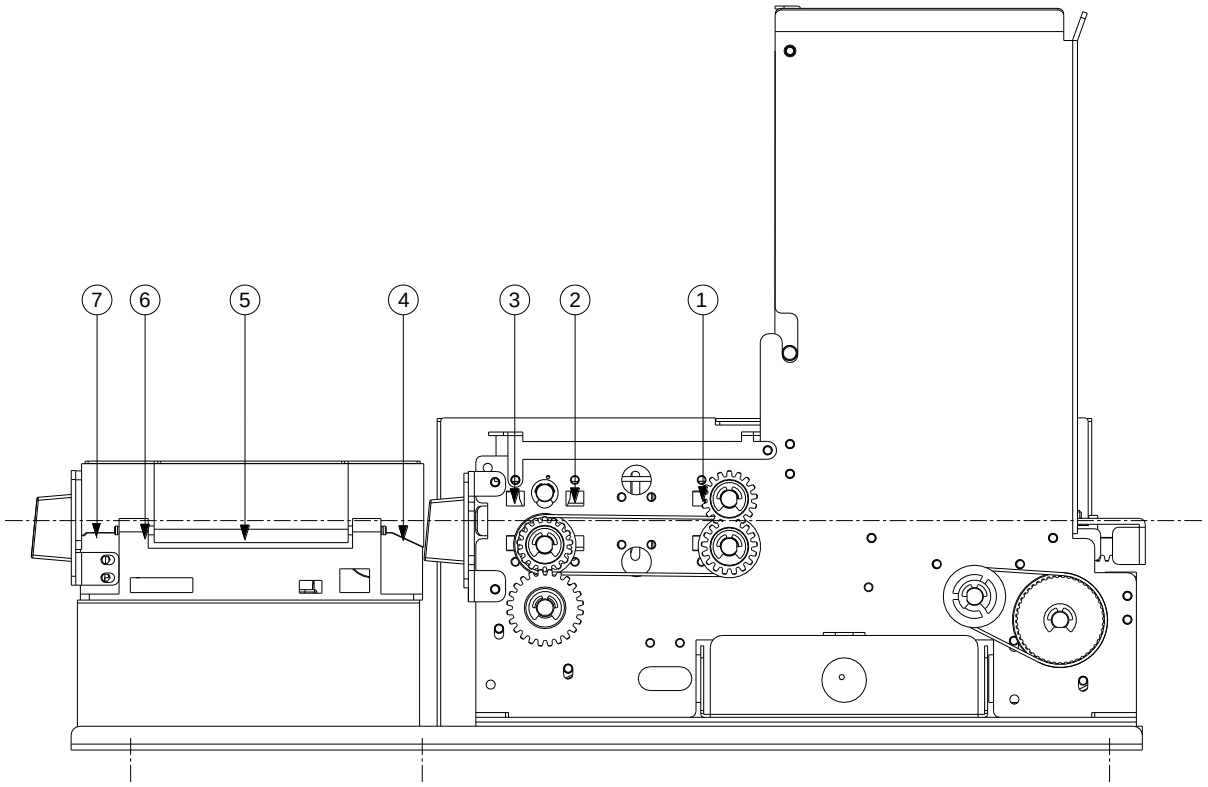
Card Position
1Byte (Hex)

☞ Data Variable

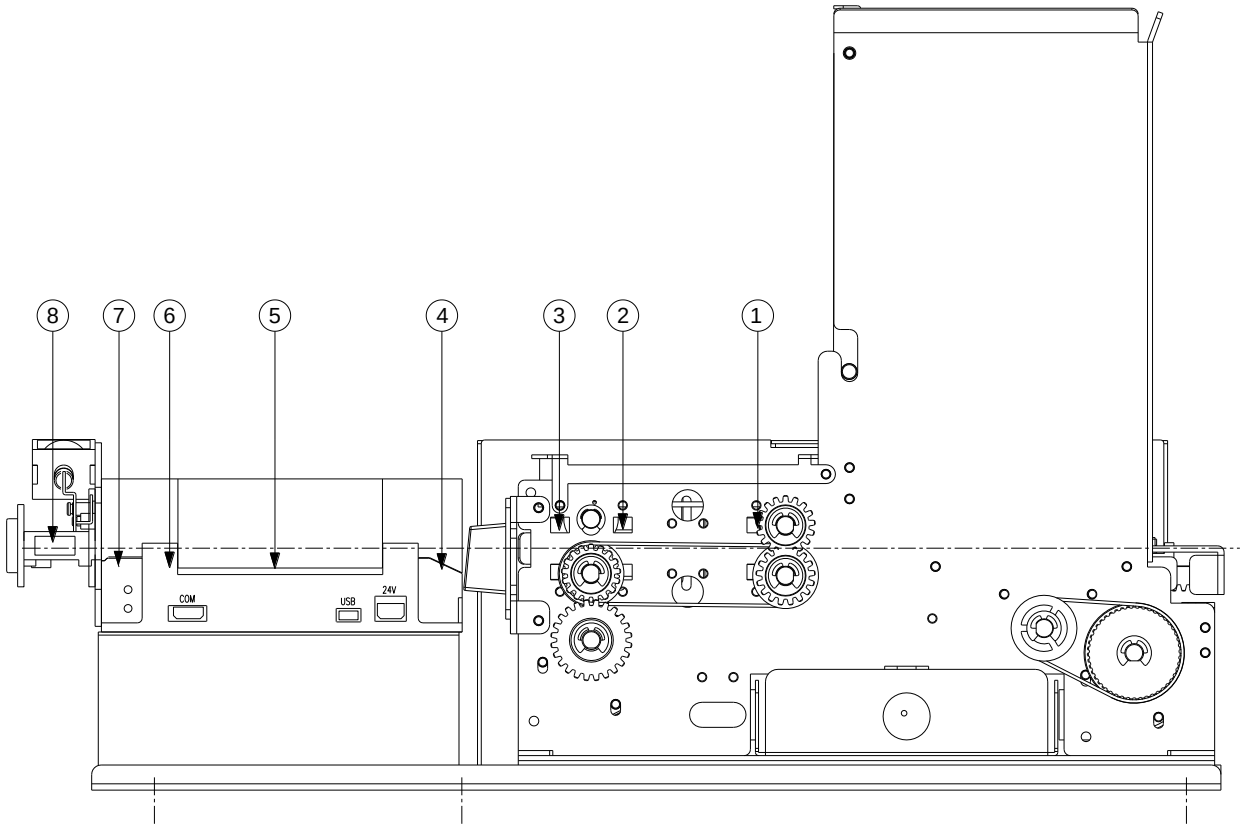
<Card Position>

Code	Sensor	Detail
0x01	SEN1	The card is locate NO.1
0x02	SEN2	The card is locate NO.2
0x04	SEN3	The card is locate NO.3
0x08	SEN4	The card is locate NO.4
0x10	SEN5	The card is locate NO.5
0x20	SEN6	The card is locate NO.6
0x40	SEN7	The card is locate NO.7
0x80	SEN8	The card is locate NO.8

<CHR-1XXX BEZEL TYPE>



<CHR-1XXX SHUTTER TYPE>



2 SETTING

2.1 "C21" : It is to set or to check 'RTC IC'.

☞ Command Format

SOH	Null	Length	STX	"C21"	DATA	ETX	Bcc

☞ Command Data Structure

Fixed	Variable (Mode = Setting Mode)
Mode	Data
1Byte (Hex)	7Byte (BCD)

High-Year	Low-Year	Month	Day	Hour	Minute	Second
0x20	0x00–0x99	0x01–0x12	0x01–0x31	0x00–0x23	0x00–0x59	0x00–0x59
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

☞ Positive Response Format

SOH	Null	Length	STX	"C21"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"C21"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Variable (Mode = Check Mode)						
High-Year	Low-Year	Month	Day	Hour	Minute	Second
0x20	0x00–0x99	0x01–0x12	0x01–0x31	0x00–0x23	0x00–0x59	0x00–0x59
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte
BCD						

☞ Data Variable

<Mode>

Code	Mode	Detail
0x01	'Setting Mode'	Set 'RTC IC'
0x02	'Check Mode'	Check 'RTC IC'

☞ Note

'Day' is changeable due to the value of 'Month'.

2.2 “C23” : It is to set or to check ‘Capture Time’.

☞ Command Format

SOH	Null	Length	STX	“C23”	DATA	ETX	Bcc

☞ Command Data Structure

Fixed	Variable (Mode = Setting Mode)
Mode	Capture Time
1Byte (Hex)	1Byte (Hex)

☞ Positive Response Format

SOH	Null	Length	STX	“C23”	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C23”	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Variable (Mode = Check Mode)
Capture Time
1Byte (Hex)

☞ Data Variable

<Mode>

Code	Mode	Detail
0x01	‘Setting Mode’	Set ‘Capture Time’
0x02	‘Check Mode’	Check ‘Capture Time’

<Capture Time>

Code	Setting	Detail	Note
0x00	NON	‘Capture Time’ not set	
0x01	10Sec	‘Capture Time’ to be set 10 seconds	
0x02	20Sec	‘Capture Time’ to be set 20 seconds	
0x03	30Sec	‘Capture Time’ to be set 30 seconds	Default
0x04	40Sec	‘Capture Time’ to be set 40 seconds	
0x05	50Sec	‘Capture Time’ to be set 50 seconds	
0x06	60Sec	‘Capture Time’ to be set 60 seconds	

☞ Note

if user doesn’t pull out the card from the terminal in ‘Capture Time’ period, it gets back the card automatically.

2.3 “C24” : It is to set or to check ‘Retry Count’.

☞ Command Format

SOH	Null	Length	STX	“C24”	DATA	ETX	Bcc

☞ Command Data Structure

Fixed	Variable (Mode = Setting Mode)
Mode	Retry Count
1Byte (Hex)	1Byte (Hex)

☞ Positive Response Format

SOH	Null	Length	STX	“C24”	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C24”	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Variable (Mode = Check Mode)
Retry Count
1Byte (Hex)

☞ Data Variable

<Mode>

Code	Mode	Detail
0x01	‘Setting Mode’	Set ‘Retry Count’
0x02	‘Check Mode’	Check ‘Retry Count’

<Retry Count>

Code	Setting	Detail	Note
0x00	NON	Do not retry	
0x01	Once	Execute the instruction again.	
0x02	Twice	Retry it twice	
0x03	Three times	Retry it three times	Default

2.4 “C26” : It is to change ‘Baud Rate’.

☞ Command Format

SOH	Null	Length	STX	“C26”	DATA	ETX	Bcc

☞ Command Data Structure

Baud Rate
1Byte (Hex)

☞ Positive Response Format

SOH	Null	Length	STX	“C26”	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C26”	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

☞ Data Variable

<Baud Rate>

Code	Setting	Detail	Note
0x01	9600Bps	Set Baud Rate to be 9600Bps	
0x02	19200Bps	Set Baud Rate to be 19200Bps	
0x03	38400Bps	Set Baud Rate to be 38400Bps	Default
0x04	57600Bps	Set Baud Rate to be 57600Bps	

2.5 “C40” : The BUZZ is operate by internal terminal.

☞ Command Format

SOH	Null	Length	STX	“C40”	DATA	ETX	Bcc

☞ Command Data Structure

Fixed		Variable (Buzz = On)	
Mode	Buzz Count	On Time	Off Time
1Byte (Hex)	1Byte (Hex)	2Byte(Hex)	2Byte(Hex)

☞ Positive Response Format

SOH	Null	Length	STX	“C40”	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C40”	E-Code	0x00	ETX	Bcc

☞ Data Variable

<Mode>

Code	Buzz	Detail
0x01	On	Set Buzz ON
0x02	Off	Set Buzz OFF

<Buzz Count>

Code	Buzz Count	Detail	Note
0x00	Continuous	Buzz continuous occur.	Default
0x01	1	Buzz one time occur.	Note
0x02	2	Buzz two times occur.	Note
---	---	---	---
0x64	100	Buzz hundred times occur.	Note

<On Time/Off Time>

Code	Range	Detail	Note
On Time	100 – 10000	Buzz sound active time	mSec
Off Time	100 – 10000	Buzz sound nonactive time.	mSec

<On Time>, <Off Time>

High Byte	Low Byte

☞ Note

If set ‘Buzz one time occur’, after the terninal is Buzz one time occur, return to ‘Buzz Off’ state.

3 MOVE

3.1 "C31" : It is to take a card from Stacker and to move it to Card Reader / Writer Module.

☞ Command Format

SOH	Null	Length	STX	"C31"	DATA	ETX	Bcc

☞ Command Data Structure

0x00	Module
1Byte (Hex)	1Byte (Hex)

☞ Positive Response Format

SOH	Null	Length	STX	"C31"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"C31"	E-Code	0x00	ETX	Bcc

☞ Data Variable

<Module>

Code	Setting	Detail
0x01	MSRW	Card transport to MSRW Module
0x02	IC	Card transport to IC Module

3.2 "C32" : It is take card to Card Reader / Writer Module

☞ Command Format

SOH	Null	Length	STX	"C32"	DATA	ETX	Bcc

☞ Command Data Structure

Module
1Byte (Hex)

☞ Positive Response Format

SOH	Null	Length	STX	"C32"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"C32"	E-Code	0x00	ETX	Bcc

☞ Data Variable

<Module>

Code	Setting	Detail
0x01	MSRW	Card transport to MSRW Module
0x02	IC	Card transport to IC Module

3.3 “C33” : It is to dispense out card to the front.

☞ Command Format

SOH	Null	Length	STX	“C33”	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	“C33”	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C33”	E-Code	0x00	ETX	Bcc

3.4 “C34” : It takes card to Bin Box (Capture)

☞ Command Format

SOH	Null	Length	STX	“C34”	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	“C34”	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	“C34”	E-Code	0x00	ETX	Bcc

♦ *MAGNETIC CARD*

This section describes the commands that can use at the magnetic card.

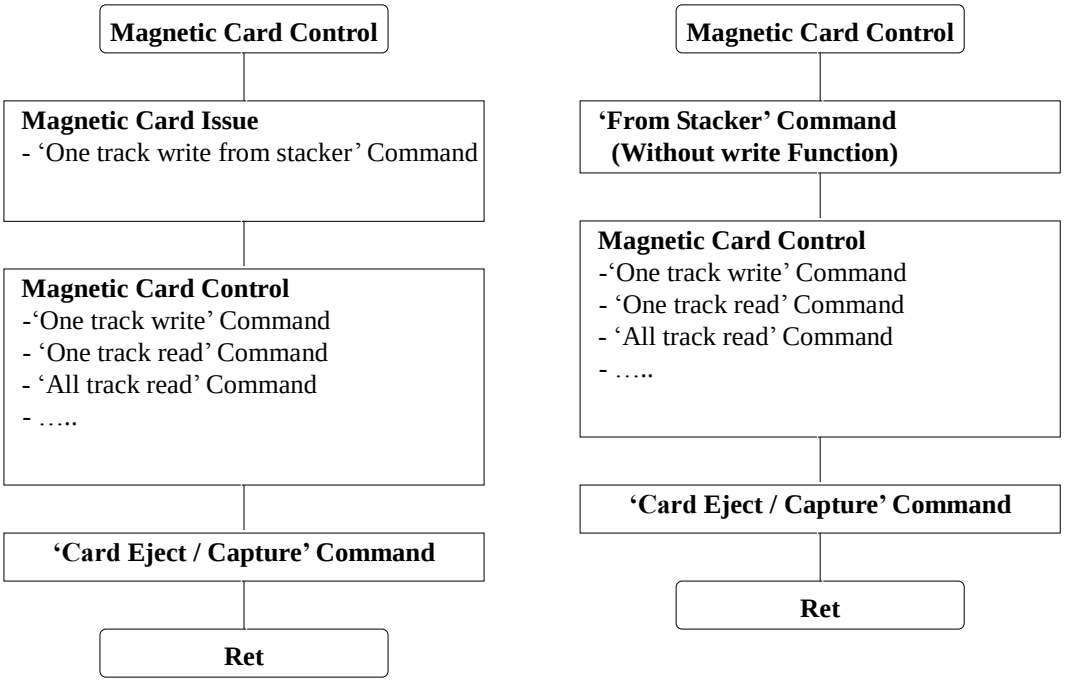
The data to be written in every track should be conform to the ISO7816-2 standard, the available character is as follows. For more information about Magnetic card, refer to the ISO7816-2 standard.

Track	Available Character Set	Maximum characters	비 고
Track #1	Character, Numbers	76	Except for the special character
Track #2	Numbers	37	
Track #3	Number	104	

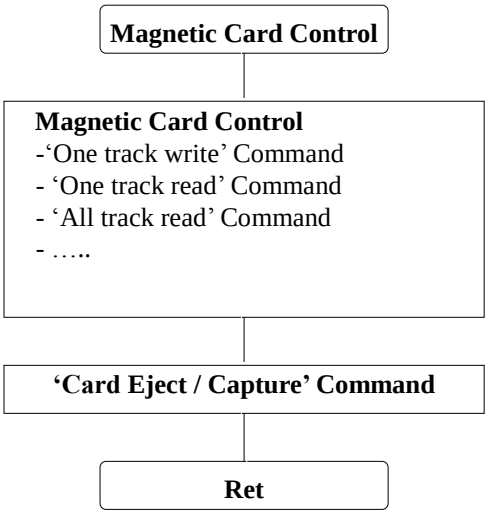
The CHR-1000 provides two features for speedy processing. The first is to provide the command combined with ‘FromStacker’ and ‘Magnetic Write’ command. This feature enables to write on card in the dispenser stacker at a command.

The second is to lessen the processing time for the ‘magnetic read’ command repeated after latching the data read from card. To latch data occurs at a point of time when verify in the magnetic write command and execute the magnetic read command. However, the latched data is erased when the card is off from the terminal.

Basic Magnetic Card Operations:



Magnetic Card Operations in the stacker



Magnetic Card Operations in the terminal

1 MAGNETIC READ

1.1 "M31" : It is to read data on track chosen.

☞ Command Format

SOH	Null	Length	STX	"M31"	DATA	ETX	Bcc

☞ Command Data Structure

Track (1Byte)

☞ Positive Response Format

SOH	Null	Length	STX	"M31"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"M31"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Read Data (ASCII Code)

☞ Data Variable

<Track>

Code	Setting	Detail
0x01	Track 1	Read data on Track 1
0x02	Track 2	Read data on Track 2
0x03	Track 3	Read data on Track 3

☞ Note

If the 'Magnetic Read' command is executed normally, the read data is latched.

1.4 "M35" : It is to read data from all three tracks.

☞ Command Format

SOH	Null	Length	STX	"M35"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"M35"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"M35"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

0x00	Track1 Data	0x00	Track2 Data	0x00	Track3 Data
1Byte(Hex)	(ASCII)	1Byte(Hex)	(ASCII)	1Byte(Hex)	(ASCII)

☞ Note

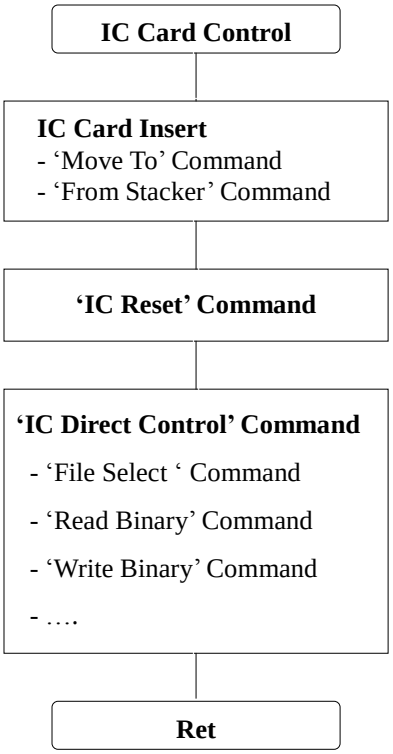
If the 'Magnetic Read' command is executed normally, the read data is latched.

♦ *IC CARD*

This section describes the commands that can use at the IC card

The IC card should conform to the ISO7816-4 T=0/T=1, these cards is available.

Basic Operating Procedure for the IC card and Memory Card:



1 IC CONTROL

1.1 "I21" : Reset the IC card and receive the ATR from card.

☞ Command Format

SOH	Null	Length	STX	"I21"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"I21"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"I21"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	ATR (Answer To Request)
2Byte		N Byte

Length

☞ Example

SAMSUNG SCOS ATR

15 Byte	0x3B	0x6B	0x00	0x00	0x80	0x31	0x80	0x63
	0x53	0x46	0x01	0x83	0x03	0x90	0x00	

1.2 "I22" : Control the card conforming to the ISO 7816 T=0 / T=1, ISO 7816 – 4 standard directly.

☞ Command Format

SOH	Null	Length	STX	"I22"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	IC Command & IC Data
2Byte		N Byte

Length

☞ Positive Response Format

SOH	Null	Length	STX	"I22"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

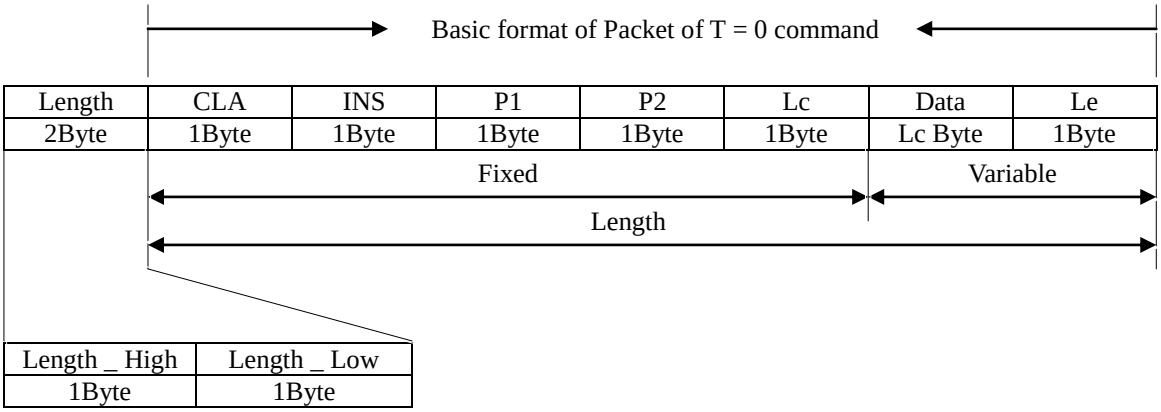
SOH	Null	Length	STX	"I22"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	IC Data (or Result)
2Byte		N Byte

Length

☞ IC Command & IC Data Structure



CLA	Class	Note
INS	Instruction	
P1	Offset(High Value)	
P2	Offset(Low Value)	
Lc	A number of data to transfer	Max Value : 255
Data	Data to Transfer	
Le	A number of data to receive	

☞ Format of T = 0 Command

Command	INS Code (Hex Value)
Read Binary Command	B0
Write Binary Command	D0
Update Binary Command	D6
Erase Binary Command	0E
Read Record(s) Command	B2
Write Record Command	D2
Append Record Command	E2
Update Record Command	DC
Get Data Command	CA
Put Data Command	DA
Select File Command	A4
Verify Command	20
Internal Authenticate Command	88
External Authenticate Command	82
Get Challenge Command	84
Manage Channel Command	70

For more information, refer to the ISO 7816 – 4 standard.

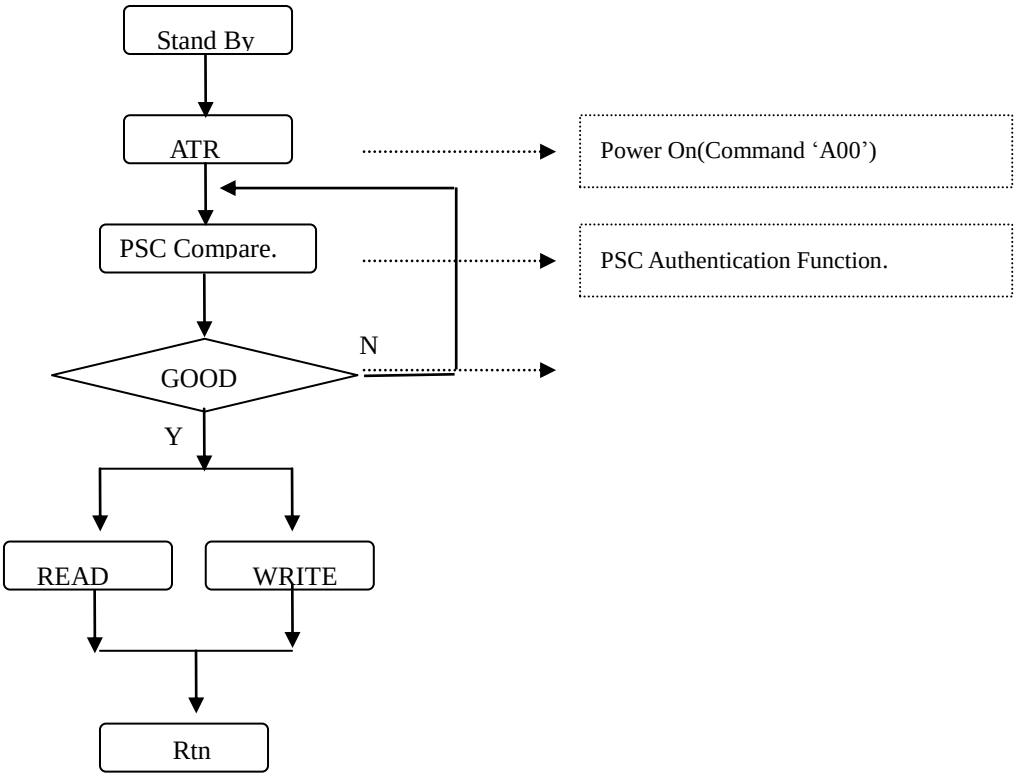
☞ Frame Command for SAMSUNG SCOS 3.0

Command	INS Code (Hex Value)
Put Key	EA
Create File	E0
Block	1E
UnBlock	18
Create Session	8A
Set Life Cycle	E8
Forbidden AC	1C
Initialize IEP	50
Load / Cancel IEP	52
Purchase /Unload / Complete IEP	54
Update Parameter	56
Read Balance	5C

2. Memory Card(SLE 5542)

The Command is for communication with the IC card(SLE 5542) and it is available after executing ATR command(A00). To read or write data on an IC card in hexa value, the start address is necessary which is available for 00h ~ FFh As "len is the length of data to read or write from start address , start address data length" should not be more than FFh.

EXECUTION PROCEDURES



* Memory Map.

Address (decimal)	Main Memory	Protection Memory	Security Memory (only SLE 4442)
255	Data Byte 255 (D7 … D0)		
:	:		
32	Data Byte 32 (D7 … D0)		
31	Data Byte 31 (D7 … D0)	Protection Bit 31 (D31)	
:	:	:	
3	Data Byte 3 (D7 … D0)	Protection Bit 3 (D3)	Reference Data Byte 3 (D7 … D0)
2	Data Byte 2 (D7 … D0)	Protection Bit 2 (D2)	Reference Data Byte 2 (D7 … D0)
1	Data Byte 1 (D7 … D0)	Protection Bit 1 (D1)	Reference Data Byte 1 (D7 … D0)
0	Data Byte 0 (D7 … D0)	Protection Bit 0 (D0)	Error Counter (0,0,0,0,0,D2,D1,D0)

2.1. 'A00': Command for sending Reset Signal Contacted IC Card and for receiving ATR from IC Card(SLE5542).

☞ Command Format

SOH	Null	Length	STX	"A00"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"A00"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A00"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	ATR (Answer To Request)
2Byte		4 Byte
		Length

☞ Example

EX) SLE5542.

0x00	0x04	0xA2	0x13	0x10	0x91

EX) SLE5528.

0x00	0x04	0x92	0x23	0x10	0x91

2.2.'A09': Power OFF.

☞ Command Format

SOH	Null	Length	STX	"A09"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"A09"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A09"	E-Code	0x00	ETX	Bcc

2.2.'A01': PSC Compare.

- This command should be done before writing data if the input PSC code is different from the original PSC Code, the value at 00h of security memory will be down counted in bit and if the value of 00h be come '0' after 3 time of input the IC card will not be valid any move.

  Therefore error count should be checked when this command is performed.

☞ Command Format

SOH	Null	Length	STX	"A01"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	PCS1(1BYTE), PCS1(2BYTE), PCS3(1BYTE),
2Byte		3 Byte

Length

☞ Positive Response Format

SOH	Null	Length	STX	"A01"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A01"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Error Count	PCS1(1BYTE), PCS1(2BYTE), PCS3(1BYTE),
2Byte		1Byte	3Byte

Length

*Error Count.

0x07: Compare Good , 0x06: Wrong One Time, 0x04: Wrong Two Time, 0x00: Locked the Card.

2.3.'A02': PSC Modify.

This is command to modify PSC after executing PSC Compare command.

PSC Compare must be executed after PSC modification is done.

☞ Command Format

SOH	Null	Length	STX	"A02"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	PCS1(1BYTE), PCS1(2BYTE), PCS3(1BYTE),
2Byte		3 Byte

Length

☞ Positive Response Format

SOH	Null	Length	STX	"A02"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A02"	E-Code	0x00	ETX	Bcc

2.4.'A03': PSC Read.

This is the command to read security memory where PSC error and PSC are existed.

☞ Command Format

SOH	Null	Length	STX	"A03"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"A03"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A03"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Error Count	PCS1(1BYTE), PCS1(2BYTE), PCS3(1BYTE),
2Byte		1Byte	3Byte

Length

*Error Count.

0x07: Compare Good , 0x06: Wrong One Time, 0x04: Wrong Two Time, 0x00: Locked the Card.

2.5.'A04': Read Memory.

This command is to read main memory data.

☞ Command Format

SOH	Null	Length	STX	"A04"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address(0x00~0xFF)	Data Length (0x00~0xFF)
2Byte		1(Byte, Hex)	1(Byte, Hex)

Length

Ex) When Read the Memory area Address 0x20 to 0xFF, Input the Address :0x20, Input the Data Length : 0xE0

☞ Positive Response Format

SOH	Null	Length	STX	"A04"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A04"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Memory Data
2Byte		1~255 (Byte, Hex)

Length

2.6.'A05': Read The Protection Bit.

This command is to read Protection memory data.

☞ Command Format

SOH	Null	Length	STX	"A05"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"A05"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A05"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Protection Bit(0x00~0x1F)
2Byte		4 (Byte, Hex)

Length

2.7.'A06': Full write same character to the Memory without protect.

This command is to write memory data **From 0x0020 to 0x0FF.**

***This command spend a time about 3seconds.**

☞ Command Format

SOH	Null	Length	STX	"A06"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	DATA To Write
2Byte		1 (byte, Hex)

Length

☞ Positive Response Format

SOH	Null	Length	STX	"A06"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A06"	E-Code	0x00	ETX	Bcc

2.7.'A07': Write to the Memory.

This command is to write memory data.

***This command spend a time maximum about 3seconds.**

☞ Command Format

SOH	Null	Length	STX	"A07"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address (0x00~0xFF)	Data Length (0x00~0xFF)	Data (0x00~0xFF)
2Byte		1(Byte, Hex)	1(Byte, Hex)	1~ 255(Byte, Hex)

Length

Ex) When Write the Memory area Address 0x20 to 0xFF, Input the Address :0x20, Input the Data Length : 0xE0, Input the Data 224Byte continuously.

☞ Positive Response Format

SOH	Null	Length	STX	"A07"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"A07"	E-Code	0x00	ETX	Bcc

2.6.'A08': Write The Protection Bit.

This command is to write with protection to prevent over-writing.

This command can write on the area where the new data and exist data are same among protected Memories.

☞ Command Format

SOH	Null	Length	STX	"A08"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address (0x00~0x1F)	Data Length (0x00~0x20)	Data (0x00~0x20)
2Byte		1(Byte, Hex)	1(Byte, Hex)	1~ 32(Byte, Hex)

Length

Ex) When Write the Protection Memory area Address 0x00 to 0x01, Input the Address :0x00, Input the Data Length : 0x02, Input the Protection Data 2Byte continuously.

☞ Positive Response Format

SOH	Null	Length	STX	"A08"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

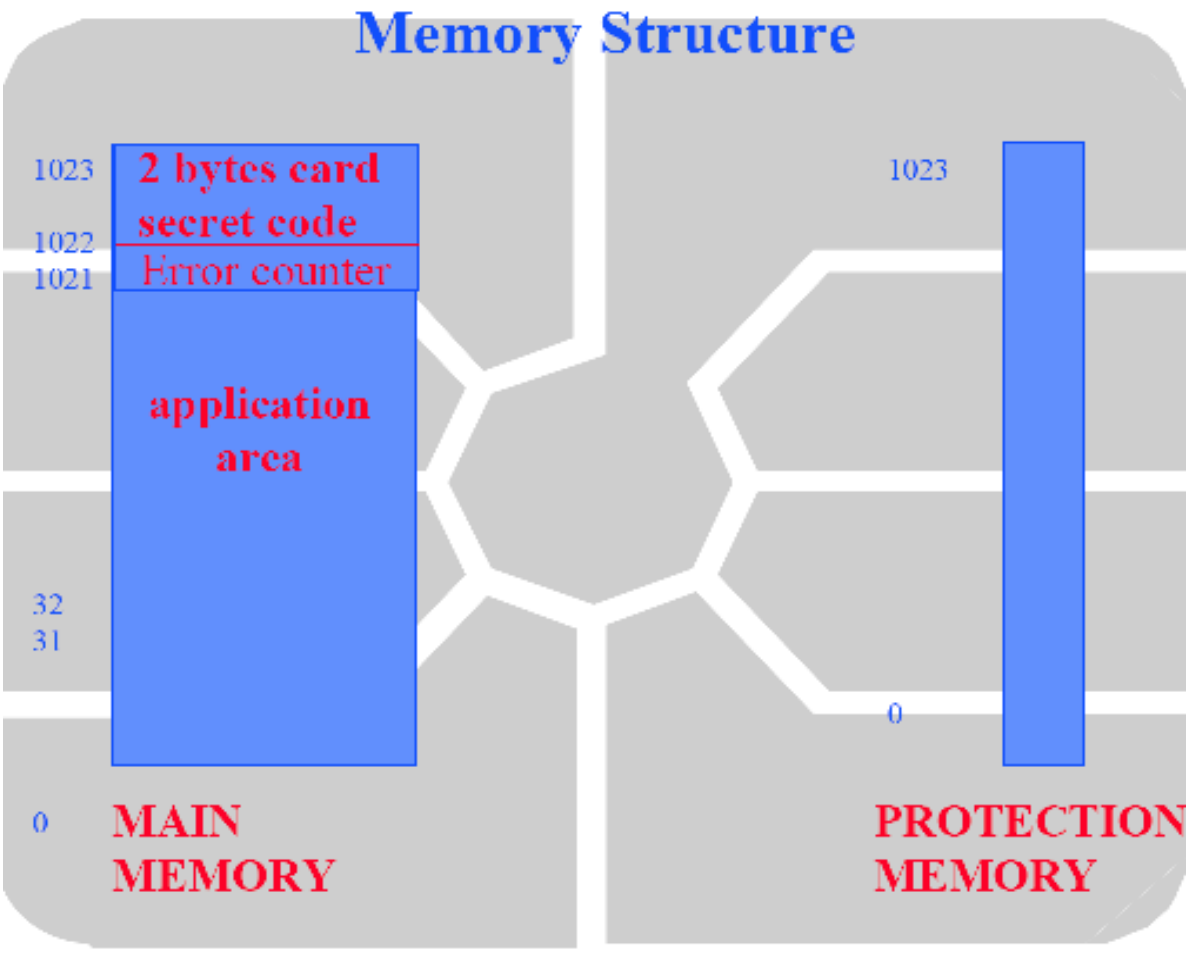
SOH	Null	Length	STX	"A08"	E-Code	0x00	ETX	Bcc

3. Memory Card(SLE 5528)

The chip contains an EEPROM organized 1024 x 8 bit offering the possibility of programmable write protection for each byte. Reading of the whole memory is always possible. The memory can be written and erased byte by byte. Input data and the contents of the adressed byte are compared so that only bits are written which were not written before. Erasing is only possible byte-wise, even if only one bit is to be erased, but bits may be written individually. Each byte can be write/eraseprotected individually by setting a protect bit (EEPROM → ROM). The protect bit is only one time programmable and cannot be erased.

All the memory, except

for the PSC, can always be read. The memory can be written or erased only after PSC verification. The error counter can always be written. After eight successive incorrect entries the error counter will block any subsequent attempt at PSC verification and hence any possibility to write and erase.



3.1.'B01': PSC Compare.

- This command should be done before writing data if the input PSC code is different from the original PSC Code, the value at 00h of security memory will be down counted in bit and if the value of 00h be come '0' after 7 time of input the IC card will not be valid any move.

  Therefore error count should be checked when this command is performed.

☞ Command Format

SOH	Null	Length	STX	"B01"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	PCS1(1BYTE), PCS1(2BYTE)
2Byte		2 Byte

Length

☞ Positive Response Format

SOH	Null	Length	STX	"B01"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B01"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Error Count	PCS1(1BYTE), PCS1(2BYTE)
2Byte		1Byte	2Byte

Length

*Error Count.

0xFF: Compare Good , 0x3F: Wrong 1 Time, 0x1F: Wrong 2 Time, 0x0F: Wrong 3 Time,

0x07: Wrong 4 Time, 0x03: Wrong 5 Time, 0x01: Wrong 6 Time, 0x00: Locked the Card.

3.2.'B02': PSC Modify.

This is command to modify PSC after executing PSC Compare command.

PSC Compare must be executed after PSC modification is done.

☞ Command Format

SOH	Null	Length	STX	"B02"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	PCS1(1BYTE), PCS1(2BYTE)
2Byte		2 Byte

Length

☞ Positive Response Format

SOH	Null	Length	STX	"B02"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B02"	E-Code	0x00	ETX	Bcc

3.3.'B03': PSC Read.

This is the command to read security memory where PSC error and PSC are existed.

☞ Command Format

SOH	Null	Length	STX	"B03"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"B03"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B03"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Error Count	PCS1(1BYTE), PCS1(2BYTE)
2Byte		1Byte	2Byte

Length

*Error Count.

0xFF: Compare Good , 0x3F: Wrong 1 Time, 0x1F: Wrong 2 Time, 0x0F: Wrong 3 Time,

0x07: Wrong 4 Time, 0x03: Wrong 5 Time, 0x01: Wrong 6 Time, 0x00: Locked the Card.

3.4.'B04': Read Memory.

This command is to read main memory.

***As the unit buffer size is 255byte, the unit can read Maximum 255 byte memory data At a Time.**

☞ Command Format

SOH	Null	Length	STX	"B04"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address(0x0000~0x03FF)		Data Length (0x00~0xFF)
2Byte		Length _ High (1Byte)	Length _ Low (1Byte)	1(Byte, Hex)

Length

Ex) When Read the Memory area Address 0x0020 to 0x00FF, Input the Address :0x0020, Input the Data Length : 0xE0

☞ Positive Response Format

SOH	Null	Length	STX	"B04"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B04"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Memory Data
2Byte		1~255 (Byte, Hex)

Length

3.5.'B05': Read The Protection Bit.

This command is to read Protection memory data.

☞ Command Format

SOH	Null	Length	STX	"B05"	ETX	Bcc

☞ Positive Response Format

SOH	Null	Length	STX	"B05"	GOOD	0x01	DATA	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B05"	E-Code	0x00	ETX	Bcc

☞ Response Data Structure

Length _ High	Length _ Low	Protection Bit(0x00~0x1023)
2Byte		128 (Byte, Hex)

Length

3.6.'B06': Full write same character to the Memory without protect.

This command is to write memory data **From 0x0020 to 0x03FC.**

***This command spend a time about 5seconds.**

☞ Command Format

SOH	Null	Length	STX	"B06"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	DATA To Write
2Byte		1 (byte, Hex)

Length

☞ Positive Response Format

SOH	Null	Length	STX	"B06"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B06"	E-Code	0x00	ETX	Bcc

3.7.'B07': Write to the Memory.

This command is to write memory data.

***This command spend a time maximum about 5seconds.**

***As the unit buffer size is 255byte, the unit can write Maximum 255 byte memory data At a Time.**

☞ Command Format

SOH	Null	Length	STX	"B07"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address (0x0000~0x03FF)		Data Length (0x00~0xFF)	Data (0x00~0xFF)
2Byte		Length _ High (1Byte)	Length _ Low (1Byte)	1(Byte, Hex)	1~ 255 (Byte, Hex)

Length

Ex) When Write the Memory area Address 0x0020 to 0x00FF, Input the Address :0x0020, Input the Data Length : 0xE0, Input the Data 224Byte continuously.

☞ Positive Response Format

SOH	Null	Length	STX	"B07"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B07"	E-Code	0x00	ETX	Bcc

3.8.'B08': Write The Protection Bit With data Comparison.

This command is to write with protection to prevent over-writing.

This command can write on the area where the new data and exist data are same among protected Memories.

***This command spend a time maximum about 5seconds.**

***As the unit buffer size is 255byte, the unit can write Maximum 255 byte Protection data At a Time.**

☞ Command Format

SOH	Null	Length	STX	"B08"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address (0x0000~0x03FF)		Data Length (0x00~0xFF)	Data (0x00~0xFF)
2Byte		Length _ High (1Byte)	Length _ Low (1Byte)	1(Byte, Hex)	1~ 255 (Byte, Hex)

Length

Ex) When Write the Protection Memory area Address 0x0020 to 0x0021, Input the Address :0x0020, Input the Data Length : 0x02, Input the Protection Data 2Byte continuously.

☞ Positive Response Format

SOH	Null	Length	STX	"B08"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B08"	E-Code	0x00	ETX	Bcc

3.9.'B0A': Write Memory Data With Protection Bit.

This command is to write with protection to prevent over-writing.

This command can write on the area where the new data and exist data are same among protected Memories.

***This command spend a time maximum about 5seconds.**

***As the unit buffer size is 255byte, the unit can write Maximum 255 byte Protection data At a Time.**

☞ Command Format

SOH	Null	Length	STX	"B0A"	DATA	ETX	Bcc

☞ Command Data Structure

Length _ High	Length _ Low	Address (0x0000~0x03FF)		Data Length (0x00~0xFF)	Data (0x00~0xFF)
2Byte		Length _ High (1Byte)	Length _ Low (1Byte)	1(Byte, Hex)	1~ 255 (Byte, Hex)
		Length			

Ex) When Write the Protection Memory area Address 0x0020 to 0x0021, Input the Address :0x0020, Input the Data Length : 0x02, Input the Protection Data 2Byte continuously.

☞ Positive Response Format

SOH	Null	Length	STX	"B0A"	GOOD	0x01	ETX	Bcc

☞ Negative Response Format

SOH	Null	Length	STX	"B0A"	E-Code	0x00	ETX	Bcc

ERROR DETAIL

<GOOD>

Code : 0x0000

Description: Normal Execution

Procedures: None

<NOT_DEFINE_COMMAND>

Code : 0x2001

Description : Using the command that does not defined in this model.

Action : Use the valid command in this model.

<NOT_USE_COMMAND>

Code : 0x2002

Description : Not available command in this model.

Action : Use the valid command in this model.

<COMM_FRAME_ERROR>

Code : 0x2003

Description : Sending the command that has the invalid communication frame.

Action : Check the data format and the corresponding module specification.

<CARD_JAM>

Code : 0x2004

Description : When the card is jammed.

Action : Remove the jammed card.

<NO_CARD>

Code : 0x2005

Description : No cards.

Action : Insert the card.

<CARD_PRESENT>

Code : 0x2006

Description : When the card exists already in the terminal.

Action : Eject the card.

<BUSY>

Code : 0x2007

Description : When the terminal is running or busy.

Action : Wait until the previous operation is completed.

<RTC_ERROR>

Code : 0x2008

Description : When the RTC time is incorrect by internal terminal or incorrect input data.

Action : RTC time resetting

<TWO_MORE>

Code : 0x2009

Description : When more than two cards exit in the terminal simultaneously.

Action : Remove the Card .

<CARD_ERROR>

Code : 0x200B

Description : When the using card error, commonly occur in MSRW.

Action : Exchange the Card

<DISPENSER_ERROR>

Code : 0x2100

Desctiption : Not Applicable Dispenser.

Action : Reset the terminal and exchange the dispenser..

<DISPENSER_COMM_ERROR>

Code : 0x2101

Description : Dispenser communication error

Action : Check the communication line and reset the terminal.

<ALL_EMPTY>

Code : 0x2104

Description : No cards at stacker.

Action : Load the card in the stacker.

<MSRW_ERROR>

Code : 0x2200

Description : The MS Reader/Writer that cannot use in this model.

Action : Change the MS Reader/Writer.

<MSRW_COMM_ERROR>

Code : 0x2201

Description : The MS Reader/Writer communication error.

Action : Check the communication line and reset the terminal.

<MSRW_WRITE_ERROR>

Code : 0x2202

Description : Error when the MS Reader/Writer is writing on the card.

Action : Clean the header and check the card.

<MSRW_READ_ERROR>

Code : 0x2203

Description : Error when the MS Reader/Writer is reading on the card.

Action : Clean the header and check the card.

<IC_CONTACT_ERROR>

Code : 0x2204

Description : Error while the terminal contacts the IC card.

Action : Be sure that the current card is an IC card.

<IC_CONTROL_ERROR>

Code : 0x2205

Description : Error while the terminal executes the IC card command.

Action : Check if the command is able to use in the contacted card.

<MS BLANK ERROR >

Code : 0x2209

Description : No data on the magnetic card

Action : Write data on the magnetic card.

< SLE4442 PSC MODIFY ERROR >

Code : 0x2220

Description : Error when the PSC is Modifying on the card.

Action : Ccheck the PSC DATA and the Card.

< SLE4442 PSC READ ERROR >

Code : 0x2221

Description : Error when the PSC is reading on the card.

Action : Check the PSC DATA and the Card.

< SLE4442 MEMORY READ ERROR >

Code : 0x2222

Description : Error when the Memory of the Memory card is reading on the card.

Action : Check the Card.

< SLE4442 PSC COMAPRE ERROR >

Code : 0x2223

Description : Error when the Memory Compare on the card.

Action : Check the PSC DATA and the Card.

<SLE4428 PSC MODIFY ERROR >

Code : 0x2226

Description : Error when the PSC is Modifying on the card.

Action : Ccheck the PSC DATA and the Card.

< SLE4428 PSC READ ERROR >

Code : 0x2227

Description : Error when the PSC is reading on the card.

Action : Check the PSC DATA and the Card.

< SLE4428 MEMORY READ ERROR >

Code : 0x2228

Description : Error when the Memory of the Memory card is reading on the card.

Action : Check the Card.

< SLE4428 PSC COMAPRE ERROR >

Code : 0x2229

Description : Error when the Memory Compare on the card.

Action : Check the PSC DATA and the Card.

<FLASH_ERROR>

Code : 0x2400

Description : Unavailable FLASH memory ic.

Action : Change the main control board