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RF Card Issuing Machine with Thermal Rewritable Printer

Securetech Peripherals Inc

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REVISION HISTORY

No	DATE	DESCRIPTION	REV	PAGE	F/W Name
1	2008.10. . .	First Edition	A	45	
2	2008.11.26	Mod ifiy TECHNICAL DRAWING (PAGE19)	B	44	
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MODEL NAME INFORMATION

C I P - 1

INTERFACE FUNCTION	MS/IC/RF TRACK	OPTION	CAPACITY		
RS232C 1: SINGLE STACKER 2: Cartridge type Card Dispenser option	0: Printer only	0: without Bezel 1: Short Bezel	A: 0.76T B: 0.84T	C: 0.76T D: 0.84T	E: 0.76T F: 0.84T
	8: Printer with RF		 200 PCS	 300 PCS	 500 PCS

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C O N T E N T S

Overview

System Block Diagram

Specification

Magnetic Card Process

IC Card Process

RF Card Process

Communication Interface

Technical Drawing

Command Detail

Error Detail

Precautions

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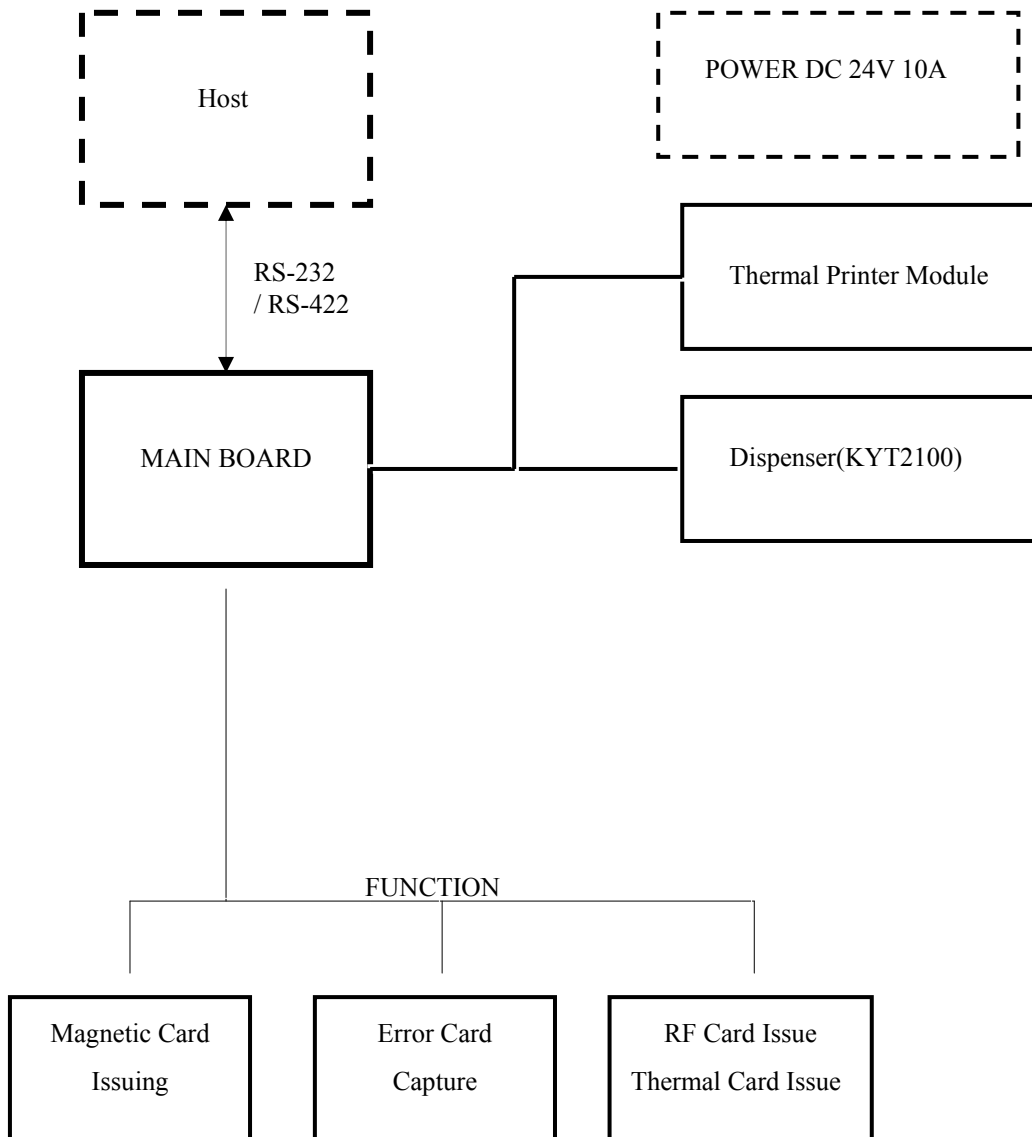
OVERVIEW

CIP-1000 Series is a set of card issuing machine for RF card in conjunction with the KYT2100 series. This model can be used for RF card conforming to the MIFARE.

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

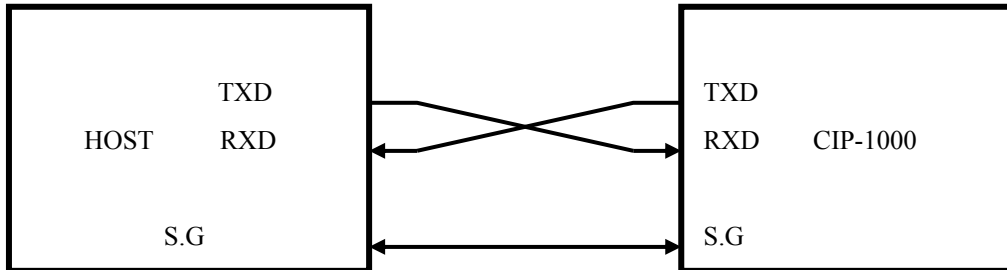
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SYSTEM BLOCK DIAGRAM



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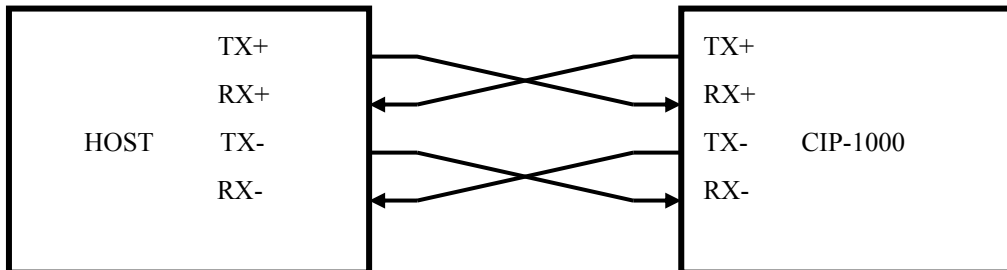
◆ *RS – 232 Connection*



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*



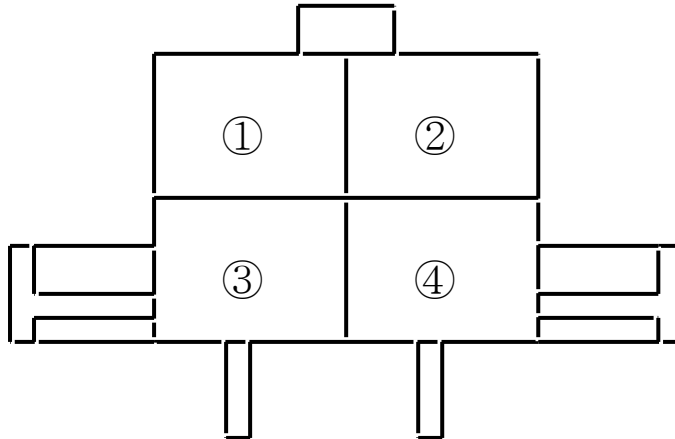
CASE 1) Part Number : D-SUB CONNECTOR(FEMALE)

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

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◆ *Power Connection*

Front View (male)



Part Number : 5566-04A1 (MOLEX)

<C IP-1000>

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

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SPECIFICATIONS

◆ *basic functions*

	Spec	Remark
Dimension		
Card Issue Speed		When 1line print.
Card Feeding Speed	300mm/Sec	
Character Print/Eraser Speed	40~50mm/s	
Print Area	Length : Left and Right side are 4mm blank Area.	0 ~ 5mm is blank Area
	Width : Left and Right side are 4mm blank Area.	
Card Material	PVC,PET	
Card Thickness	0.76~1.0mm	
Re/Write Type	Thermal Rewritable Film	
The Number of Rewrite	500times	
RFID Type	Mifare/13.56Mhz	
Life of Printer Head	Approximately 30 Km	

◆ *Power Consumption*

Steady state	:	Less than 70mA
Motor Starting or Reversing	:	Less than 1.8A
Character Print	:	Less than 4A
Card Erase	:	Less than 7.0A

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◆ *Environment Requirements*

Operating Locus : in door use Only

Ambient Temperature

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

Operating : 5 °C to 50° C (In 0° C to +5° C 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

Encoding Speed : 2.3 ~ 8 Sec/Card

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

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

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◆ *Controller Environment*

C ommunication

: RS422 OR RS232C Interface

: Baud Rate – 9600 BPS

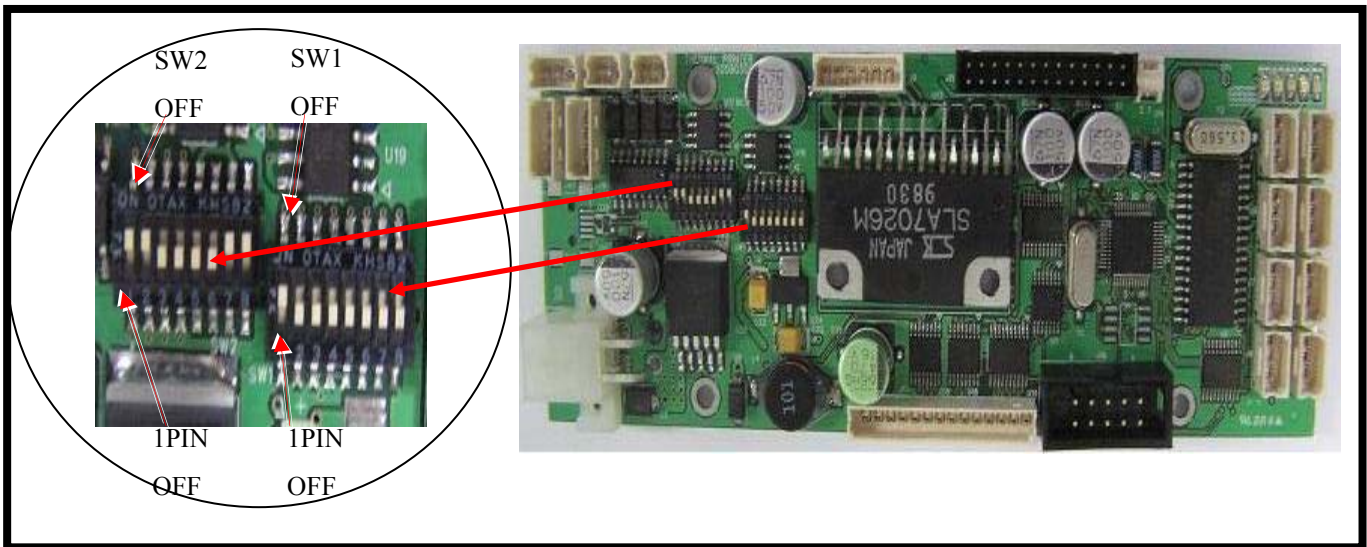
- 19200 BPS
- 38400BPS(Default)
- 57600BPS

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

DIP-Switch Setting

: To provide basic operation and function setting of terminal, DIP(Dual In type Package) switch in the main board has selection of main program and function of communication speed setting .

(ONLY CIP-1800 TYPE)



SW2 SET :Baud Rate Setting

Pin No. 1	Pin No. 2	Baud Rate	Note
OFF O	FF	9600 BPS	
ON O	FF	19200 BPS	
OFF ON		38400 BPS	Default
ON O	N	57600 BPS	

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RF CARD PROCESS

The RF module supports most of RF cards conforming with the ISO14443-3 TypeA(MIFARE Card) with 8 Kbits memory.

◆ *Processing time* : Once Block

Command	Parameter	Time (mSec)		Note
		Type	Max	
Card Read	1 Block	100		Without card moving
Card Write	1 Block	150		Without card moving, With Verify
Card Decrement	1 Block	120		Without card moving
Card Increment	1 Block	120		Without Card moving

◆ *Operating Frequency*

Operating Frequency : 13.56 MHz

Data Transfer Baud : Baud rate 106Kbaud

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COMMUNICATION INTERFACE

◆ *Communication Method*

A synchronous, 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 Nu	ll	Length	STX	CMD	DATA	ETX	BCC
1BYTE 1B	YTE 2B	2BYTE 1B	YTE 1B	3BYTE	N-BYTE	1BYTE 1B	YTE

2 *Positive Response Frame Format*

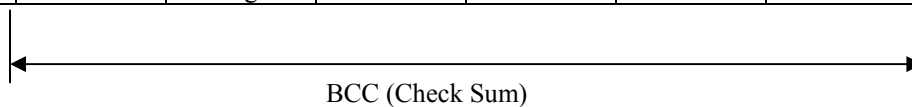
SOH N	ull	Length	STX	CMD	GOOD	0x01	DATA	ETX	BCC
1BYTE 1B	YTE 2B	YTE 1B	YTE 3B	YTE	1BYTE	1BYTE	N-BYTE	BYTE	1BYTE

3 *Negative Response Frame Format*

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

4 *BCC (Check Sum)*

SOH Nu	ll	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

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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>

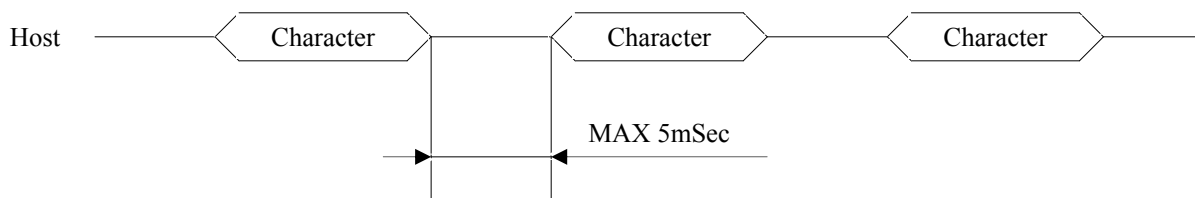
High Byte	Low Byte
-----------	----------

6. Control Characters

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

7 COMMUNICATION SEQUENCE / TIMING

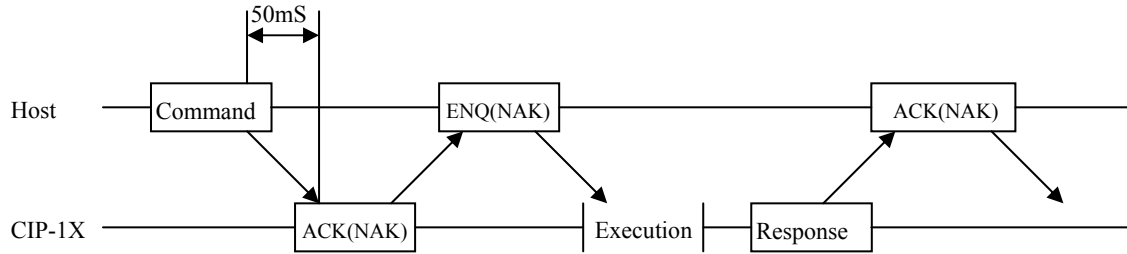
7.1 CHARACTER GUIDE TIME



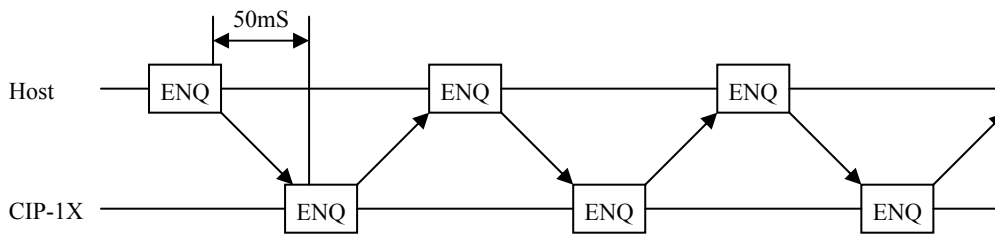
If no consecutive character within 5msec., do time out.

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7.2 Command

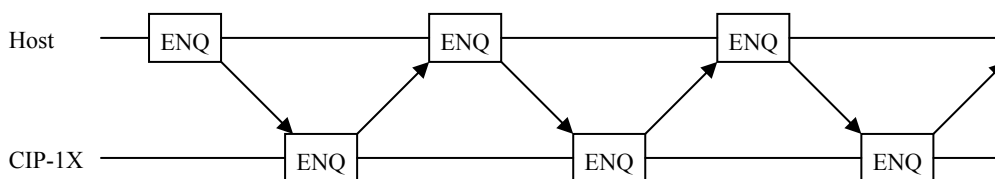
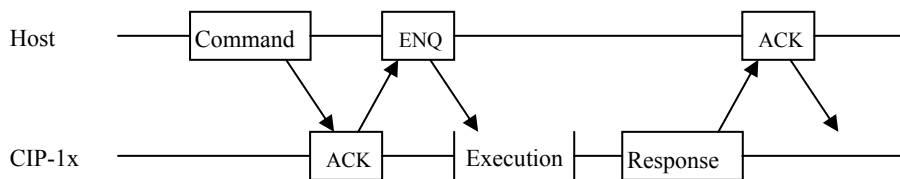


7.3 Inquiry



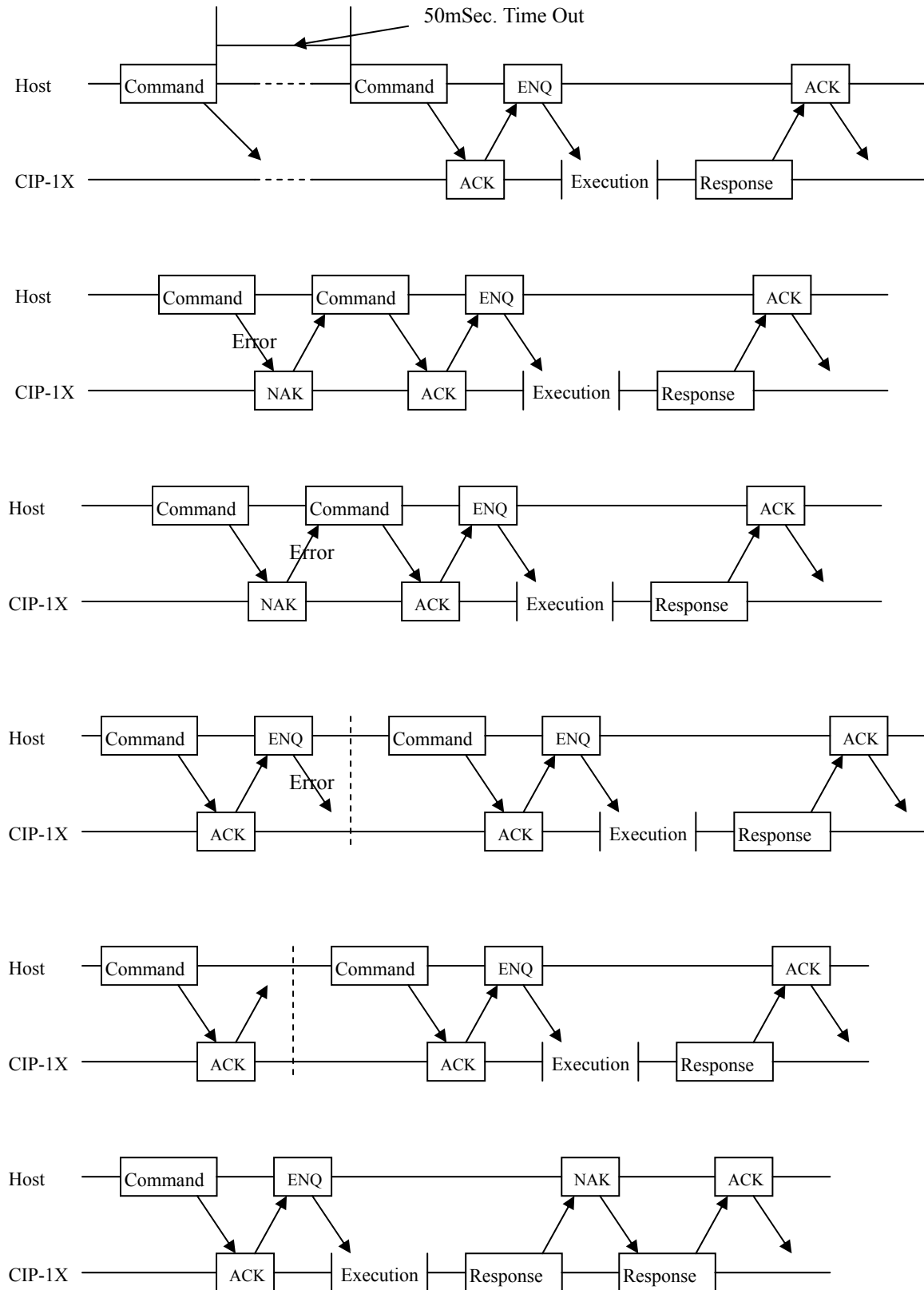
7.4 Sequence

7.3.1 General

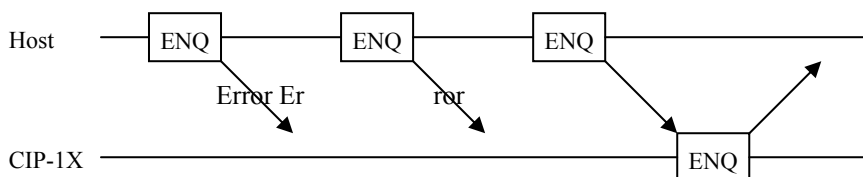
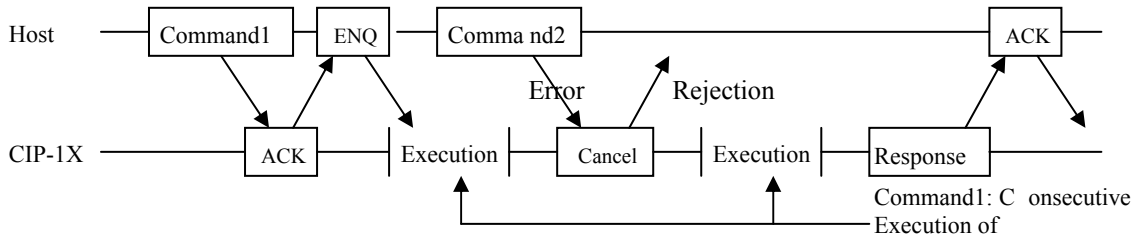
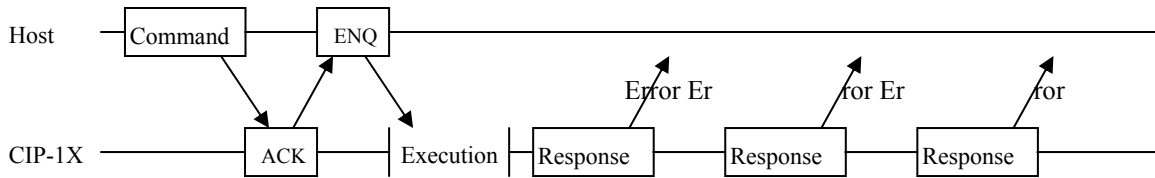
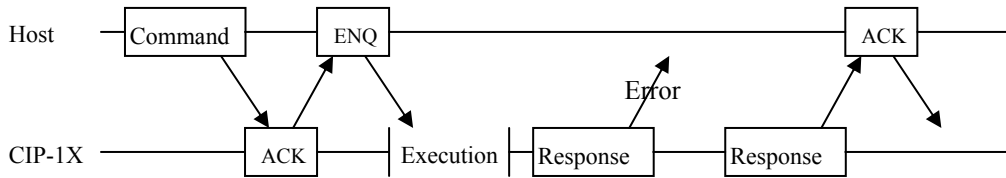
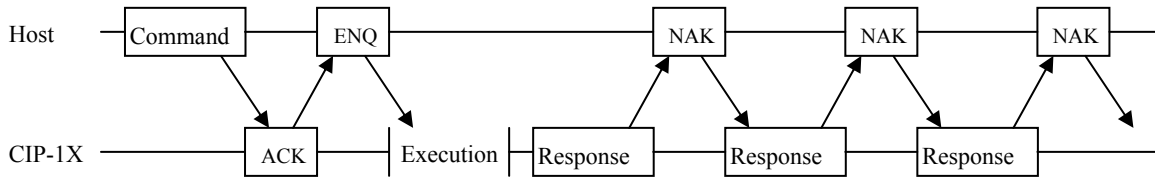
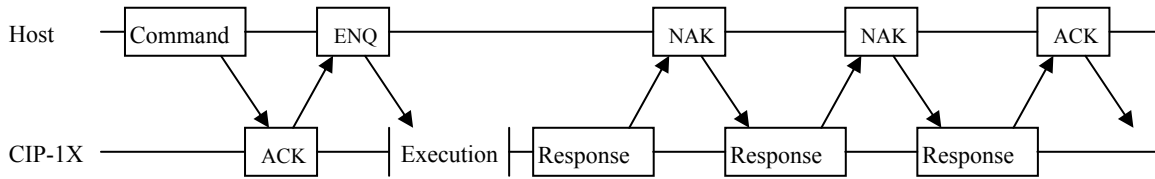


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7.3.2 Error1



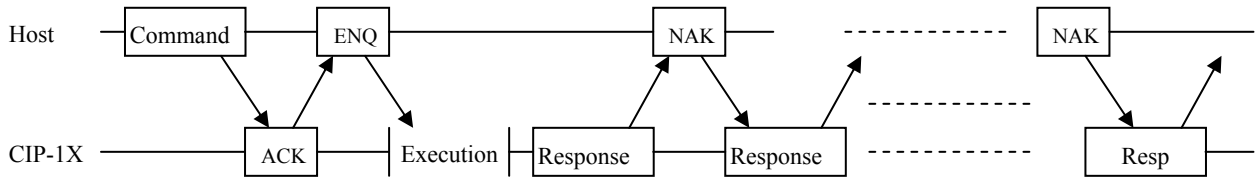
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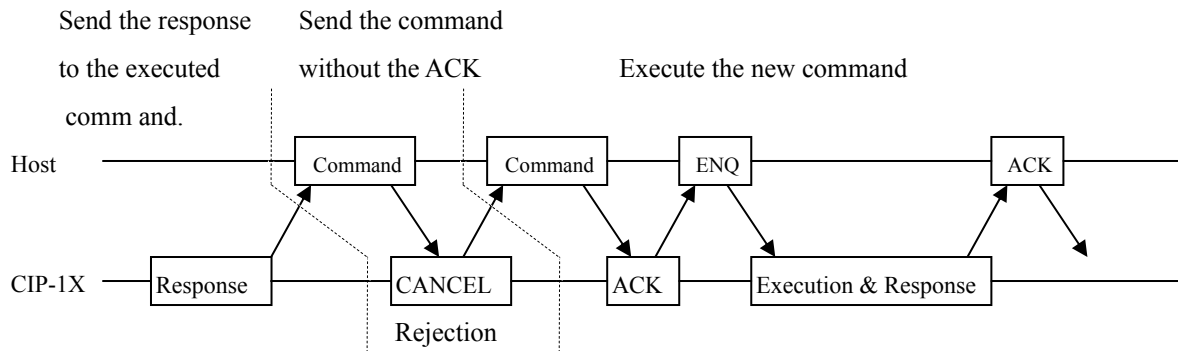
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7.3.3 Error2

- When received the NAK packet consecutively.



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

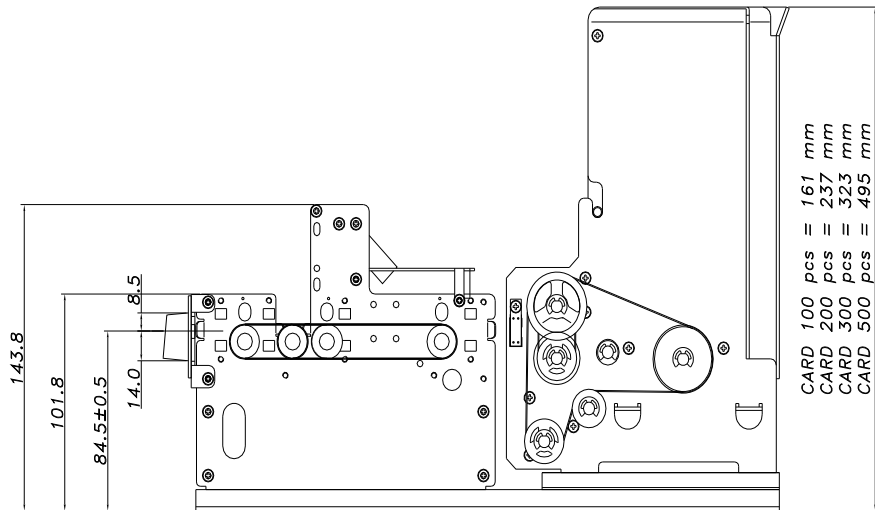
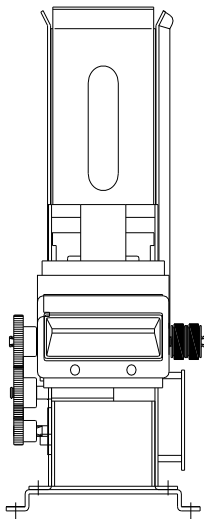
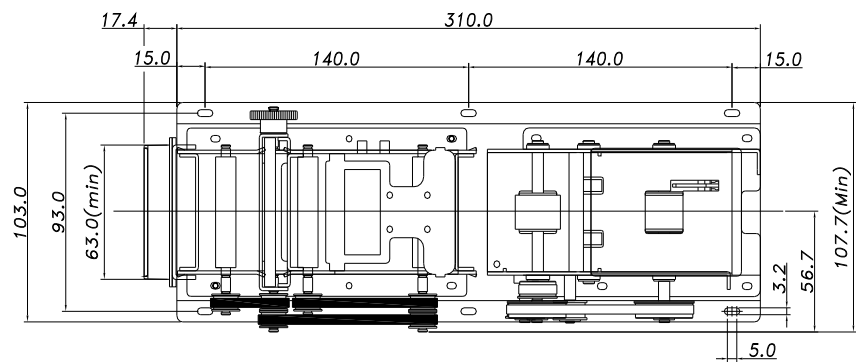


The terminal should ignore the command received before it sends the ACK packet, send the CANCEL packet. The second command will be treated as the ACK packet and executed with no ACK.

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TECHNICAL DRAWING

<CIP-18xx>



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COMMAND DETAIL

◆ *Command List*

	Item	Cm0	Cm1	Cm2	Detail	Note
COMMON	STATUS1	'C'	' '	'1'	Get Model	
		'C'	' '	'2'	Get Firmware Version	
		'C'	' '	'3'	Get Stacker	
		'C'	'1'	'6'	Get Card position	
	SETTING1	'C'	'2'	'4'	Set Retry Count	Check*
	MOVE	'C'	'3'	'1'	Card Move From Stacker	
		'C'	'3'	'2'	Card Move To ...	
		'C'	'3'	'3'	Card Eject	Forward
		'C'	'3'	'4'	Card Capture	Backward
		'C'	'3'	'6'	Card Drop	Forward
		'M'	'3'	'3'	Magnetic Card Write	Verify**
		'M'	'3'	'4'	Magnetic Card Write From Stacker	Verify**
	CLEANING	'M'	'3'	'5'	Magnetic Card All Track Read	
RF CARD MIFARE 1K	RF CARD READ / WRITE	'R'	'3'	'1'	RF Card Read in Block Range	
		'R'	'3'	'2'	RF Card Write in Block Range	Verify**
		'R'	'3'	'6'	RF Card Read in Sector Range	
		'R'	'3'	'7'	RF Card Write in Sector Range	
	BALANCE	'R'	'4'	'1'	Balance Increment	
		'R'	'4'	'2'	Balance Decrement	
	SECRET KEY CHANGE	'R'	'5'	'1'	Change 'Secret Key' to other Key	
		'R'	'5'	'2'	Change 'Secret Key' to all the same Key value	
		'R'	'5'	'3'	Select 'Secret Key Index'	
		'R'	'5'	'4'	Change 'RF Card Secret Key' to other Key	
		'R'	'5'	'5'	Key Set and Change 'Secret Key' to other Key	
		'R'	'5'	'6'	Key Set and Change 'Secret Key' to all the same Key value	
	RF DETECT	'R'	'6'	'1'	Check RF card in antenna area	
	PRINTER	CARD PRINT	'P'	'1'	'0'	Card Print.
'P'			'1'	'1'	Stand By & Card Print.	
CARD ERASE		'P'	'2'	'0'	Card Erase.	

* Command Check possible with setting the terminal.

** After command execution, verify execution automatically.

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◆ *Common*

1 STATUS / SETTING

1.1 “C11” : It is to check out Model number of CIP-1000.

☞ Command Format

SOH N	ull	Length	STX	“C11”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C11”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

☞ Negative Response Format

SOH N	ull	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 CIP-1000

☞ Command Format

SOH N	ull	Length	STX	“C12”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C12”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

☞ Negative Response Format

SOH N	ull	Length	STX	“C12”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

☞ Response Data Structure

Firmware Version
5Byte (ASCII)

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

☞ Command Format

SOH N	ull	Length	STX	“C13”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C13”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

☞ Negative Response Format

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

☞ Response Data Structure

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

☞ Data Variable

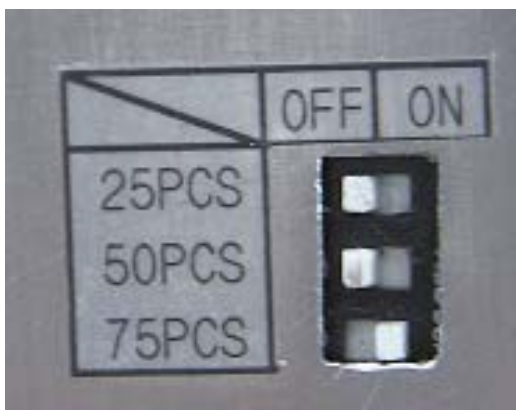
<Stacker>

Code	Status	Note
0x01 S	tacker Good	
0x02 Car	d Warning	Card 500pcs series apply.
0x03 S	tacker Empty	

☞ Note

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

-Warning Sensor Setting (Only Card 500 pcs series apply).



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

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

Command Format

SOH N	ull	Length	STX	“C16”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

Positive Response Format

SOH N	ull	Length	STX	“C16”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

Negative Response Format

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

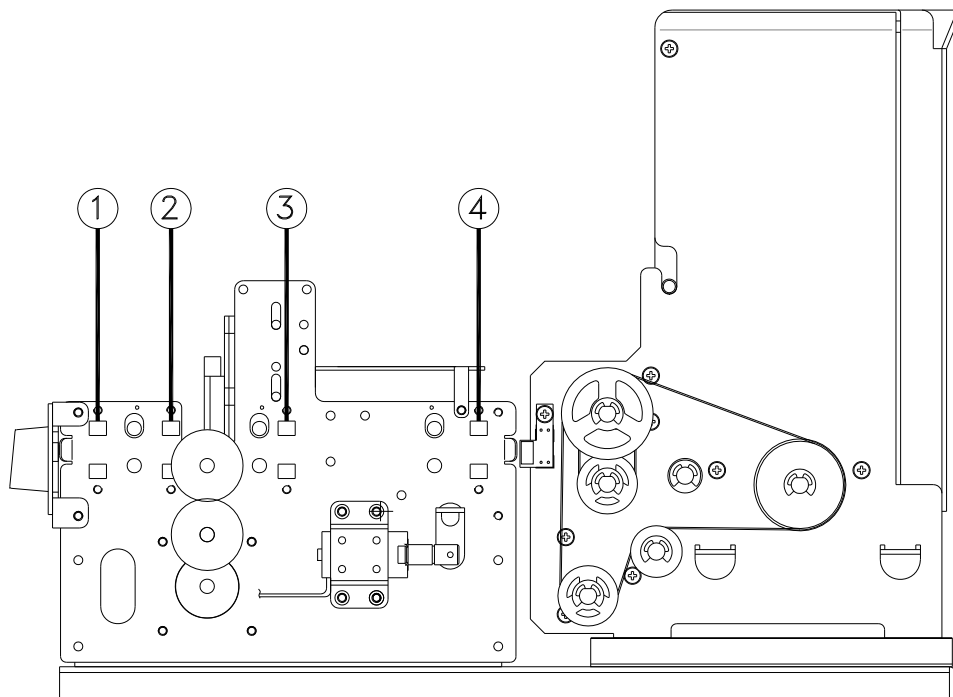
Response Data Structure

Card Position
1Byte (Hex)

Data Variable

<Card Position>

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



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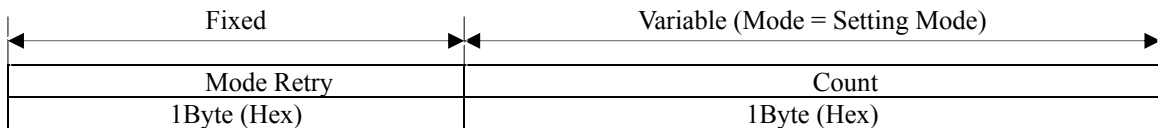
2 SETTING

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

Command Format

SOH N	ull	Length	STX	“C24”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure



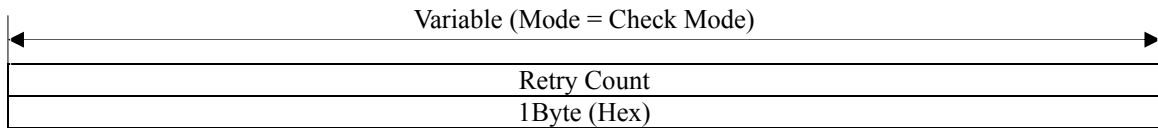
Positive Response Format

SOH N	ull	Length	STX	“C24”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

Negative Response Format

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

Response Data Structure



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 N	ON	Do not retry	
0x01	Once	Execute the instruction again.	
0x02	Twice	Retry it twice	
0x03	Three times	Retry it three times	Default

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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 N	ull	Length	STX	“C31”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

☞ Command Data Structure

0x00 Mo	dule
1Byte (Hex)	1Byte (Hex)

☞ Positive Response Format

SOH N	ull	Length	STX	“C31”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

☞ Negative Response Format

SOH N	ull	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
0x03	RF	Card transport to RF Module
0x04	FEEDER	Card transport to FEEDER Module
0x05	PRINTER	Card transport to Printer Module.

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

☞ Command Format

SOH N	ull	Length	STX	“C32”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

☞ Command Data Structure

Module
1Byte (Hex)

☞ Positive Response Format

SOH N	ull	Length	STX	“C32”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

☞ Negative Response Format

SOH N	ull	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
0x03	RF	Card transport to RF Module
0x04	FEEDER	Card transport to FEEDER Module
0x05	PRINTER	Card transport to Printer Module.

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

☞ Command Format

SOH N	ull	Length	STX	“C33”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C33”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

☞ Negative Response Format

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

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

☞ Command Format

SOH N	ull	Length	STX	“C34”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C34”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

☞ Negative Response Format

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

3.5 “C36” : Dispense the card to front and drop it out of the unit.

☞ Command Format

SOH N	ull	Length	STX	“C36”	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

☞ Positive Response Format

SOH N	ull	Length	STX	“C36”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

☞ Negative Response Format

SOH N	ull	Length	STX	“C36”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

☞ Note

The CIP-1xxx model with bezel or shutter can not use “C36” command.

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◆ RF CARD

This section describes the commands that can use at the 'RF CARD'.

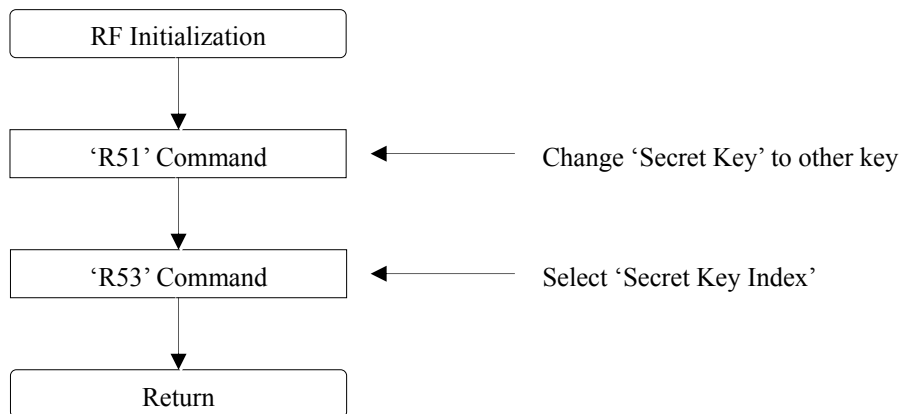
The RF Module of his model supports only the MIFARE card.

The applicable models of the KYT5000 Series are the KYT540, KYT560, KYT570, the available commands are as follows.

Item	Cm0	Cm1	Cm2	Detail	Note
RF CARD READ / WRITE	'R'	'3'	'1'	RF Card Read in Block Range	
	'R'	'3'	'2'	RF Card Write in Block Range	Verify
	'R'	'3'	'6'	RF Card Read in Sector Range	
	'R'	'3'	'7'	RF Card Write in Sector Range	
BALANCE	'R'	'4'	'1'	Balance Increment	
	'R'	'4'	'2'	Balance Decrement	
SECRET KEY CHANGE	'R'	'5'	'1'	Change 'Secret Key' to other Key	
	'R'	'5'	'2'	Change 'Secret Key' to all the same Key value	
	'R'	'5'	'3'	Select 'Secret Key Index'	
	'R'	'5'	'4'	Change 'RF Card Secret Key' to other Key	
	'R'	'5'	'5'	Key Set and Change 'Secret Key' to other Key	
	'R'	'5'	'6'	Key Set and Change 'Secret Key' to all the same Key value	
RF DETECT	'R'	'6'	'1'	Check RF card in antenna area	

To use the RF card, you need to initialize at first.

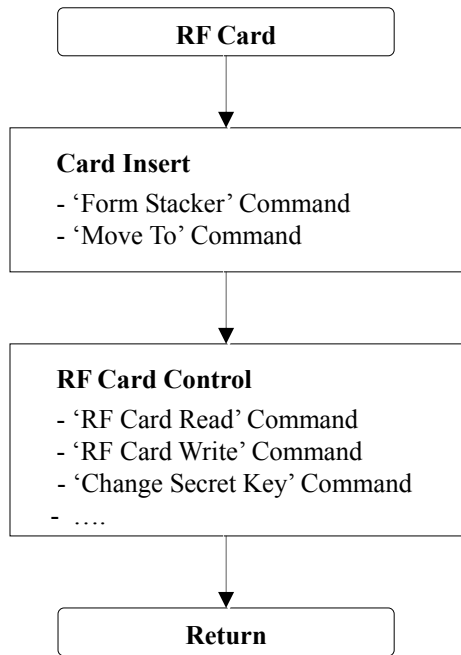
- Setting and updating of the secret key and secret key index.



RF Module Initialization

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Basic Operating Procedure of the RF card:



RF Card Basic Operating Procedures

Memory Architecture(map) of the RF card: 8Kbyte

Sector	Block	Size	Detail	Note
Sector 0	Block 0	16Byte	RF Card Information	Can't use
	Block 1	16Byte		
	Block 2	16Byte		
	Block 3	16Byte	'Sector Key'	
Sector 1	Block 0	16Byte	User Available Memory	
	Block 1	16Byte		
	Block 2	16Byte		
	Block 3	16Byte	'Sector Key'	
Sector 2	Block 0	16Byte	User Available Memory	
	Block 1	16Byte		
	Block 2	16Byte		
	Block 3	16Byte	'Sector Key'	
---	---	--	---	---
Sector 15	Block 0	16Byte	User Available Memory	
	Block 1	16Byte		
	Block 2	16Byte		
	Block 3	16Byte	'Sector Key'	

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1 RF CARD READ / WRITE

1.1 "R31" : Read RF card data & Secret Key in block range

Command Format

SOH N	ull	Length	STX	"R31"	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector B	lock
0x00 – 0x0f	0x00 – 0x03
1Byte (Hex)	1Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	"R31"	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"R31"	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Response Data Structure

Sector Block	Read Data
1Byte (Hex)	16 Byte (Hex)

D0 D1	D2	---	D14	D15
1Byte 1B	yte 1B	yte	1Byte 1B	yte

1.2 "R32" : Write RF card data in block range

Command Format

SOH N	ull	Length	STX	"R32"	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector Blo	ck	Write Data
0x00 – 0x0f	0x00 – 0x02	0x00 – 0xff
1Byte (Hex)	1Byte (Hex)	16Byte (Hex)

D0 D1	D2	---	D14	D15
1Byte 1B	yte 1B	yte	1Byte 1B	yte

Positive Response Format

SOH N	ull	Length	STX	"R32"	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"R32"	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

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1.3 “R36” : Read RF card data in sector range

Command Format

SOH N	ull	Length	STX	“R36”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector
0x00 – 0x0f
1Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R36”	GOOD	0x01	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R36”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Response Data Structure

Sector	0x00	Read Data (0)	0x01 Read	Data (1) 0x02	Read	Data (2)
1Byte(Hex)	1Byte(Hex)	16Byte (Hex)	1Byte (Hex)	16Byte (Hex)	1Byte (Hex)	16Byte (Hex)

D0 D1	D2	---	D14	D15
1Byte 1B	yte 1B	yte	1Byte 1B	yte

1.4 “R37” : Write RF card data in sector range (except Sector 0)

Command Format

SOH N	ull	Length	STX	“R37”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector W	rite Data
0x01 – 0x0f	0x00 – 0xff
1Byte (Hex)	51Byte (Hex)

0x00 Read	Data (0) 0	x01 Read	Data (1)	0x02 Read	Data (2)
1Byte (Hex)	16Byte (Hex)	1Byte (Hex)	16Byte (Hex)	1Byte (Hex)	16Byte (Hex)

D0 D1	D2	---	D14	D15
1Byte 1B	yte 1B	yte	1Byte 1B	yte

Positive Response Format

SOH N	ull	Length	STX	“R37”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R37”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

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2 BALANCE

2.1 “R41” : Increment the balance of card to the specified amount.

Command Format

SOH N	ull	Length	STX	“R41”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector B	lock	Index Value
0x00 – 0x0f	0x00 – 0x02	0x00000000 – 0xffffffff
1Byte (Hex)	1Byte (Hex)	4Byte (Hex)

V0 V1		V2 V3	
0x00-0xff 0	x00-0xff	0x00-0xff 0	x00-0xff
1Byte(Hex, LSB)	1Byte(Hex)	1Byte(Hex)	1Byte(Hex, MSB)

Positive Response Format

SOH N	ull	Length	STX	“R41”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R41”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

The balance should be written in the Electronic Purse format in the card.

2.1 “R42” : Decrement the balance of card to the specified amount..

Command Format

SOH N	ull	Length	STX	“R42”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector B	lock	Index Value
0x00 – 0x0f	0x00 – 0x02	0x00000000 – 0xffffffff
1Byte (Hex)	1Byte (Hex)	4Byte (Hex)

V0 V1		V2 V3	
0x00-0xff 0	x00-0xff	0x00-0xff 0	x00-0xff
1Byte(Hex, LSB)	1Byte(Hex)	1Byte(Hex)	1Byte(Hex, MSB)

Positive Response Format

SOH N	ull	Length	STX	“R42”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R42”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

The balance should be written in the Electronic Purse format in the card.

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3 SECRET KEY

3.1 “R51” : Change ‘Secret Key’ to a new key

Command Format

SOH N	ull	Length	STX	“R51”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector KE	Y A	KEY B
0x00 – 0x0f	0x00 – 0xff	0x00 – 0xff
1Byte (Hex)	6Byte (Hex)	6Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R51”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R51”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

KYT-5000 Series ‘Secret Key’ Default – Key Set 0

KEY A : FFFFFFFF

KEY B : FFFFFFFF

3.2 “R52” : Change ‘Secret Key’ to all the same key value

Command Format

SOH N	ull	Length	STX	“R52”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

KEY A	KEY B
0x00 – 0xff	0x00 – 0xff
6Byte (Hex)	6Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R52”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R52”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

KYT-5000 Series ‘Secret Key’ Default – Key Set 0

KEY A : FFFFFFFF

KEY B : FFFFFFFF

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3.3 “R53” : Select ‘Secret Key Index’

Command Format

SOH N	ull	Length	STX	“R53”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Index
0x01 – 0x02
1Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R53”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R53”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Data Variable

<Index>

Code	Setting	Detail
0x01	KEY A	Select ‘Secret Key A’
0x02	KEY B	Select ‘Secret Key B’

Note

KYT-5000 Series ‘Secret Key Index’ Default

‘Secret Key Index ‘ : KEY A

3.4 “R54” : Change RF card ‘Secret Key’ to other key

Command Format

SOH N	ull	Length	STX	“R54”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Sector KE	Y A	Access	KEY B
0x00 – 0x0f	0x00 – 0xff	0x00 – 0xff	0x00 – 0xff
1Byte (Hex)	6Byte (Hex)	4Byte (Hex)	6Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R54”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R54”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Warning

If you use this command incorrectly, it couldn’t be authenticated from the card.

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3.5 “R55” : Change ‘Secret Key’ to a new key from Key Set Number.

Command Format

SOH N	ull	Length	STX	“R55”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Key Set	Sector	KEY A	KEY B
0x00 – 0x02	0x00 – 0x0f	0x00 – 0xff	0x00 – 0xff
1 Byte(Hex)	1Byte (Hex)	6Byte (Hex)	6Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R55”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R55”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

Key Set <Index>

Code	Detail
0x00 K	ey Set 0
0x01 K	ey Set 1
0x02 K	ey Set 2

3.6 “R56” : Change ‘Secret Key’ to all the same key value from Key Set Number.

Command Format

SOH N	ull	Length	STX	“R56”	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

Key Set	KEY A	KEY B
0x00 – 0x02	0x00 – 0xff	0x00 – 0xff
1 Byte(Hex)	6Byte (Hex)	6Byte (Hex)

Positive Response Format

SOH N	ull	Length	STX	“R56”	GOOD	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	“R56”	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Note

Key Set <Index>

Code	Detail
0x00 K	ey Set 0
0x01 K	ey Set 1
0x02 K	ey Set 2

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4 RF DETECT

4.1 "R61" : RF card detect in antenna area

Command Format

SOH N	ull	Length	STX	"R61"	ETX	Bcc
-------	-----	--------	-----	-------	-----	-----

Positive Response Format

SOH N	ull	Length	STX	"R61"	GOOD	DATA	0x01	ETX	Bcc
-------	-----	--------	-----	-------	------	------	------	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"R61"	E-Code	0x00	ETX	Bcc
-------	-----	--------	-----	-------	--------	------	-----	-----

Response Data Structure

Serial Number
Hex Code
4Byte

Note

If the RF card is detected, this command send the serial number to host. But, it doesn't authenticate the Secret Key of the RF card.

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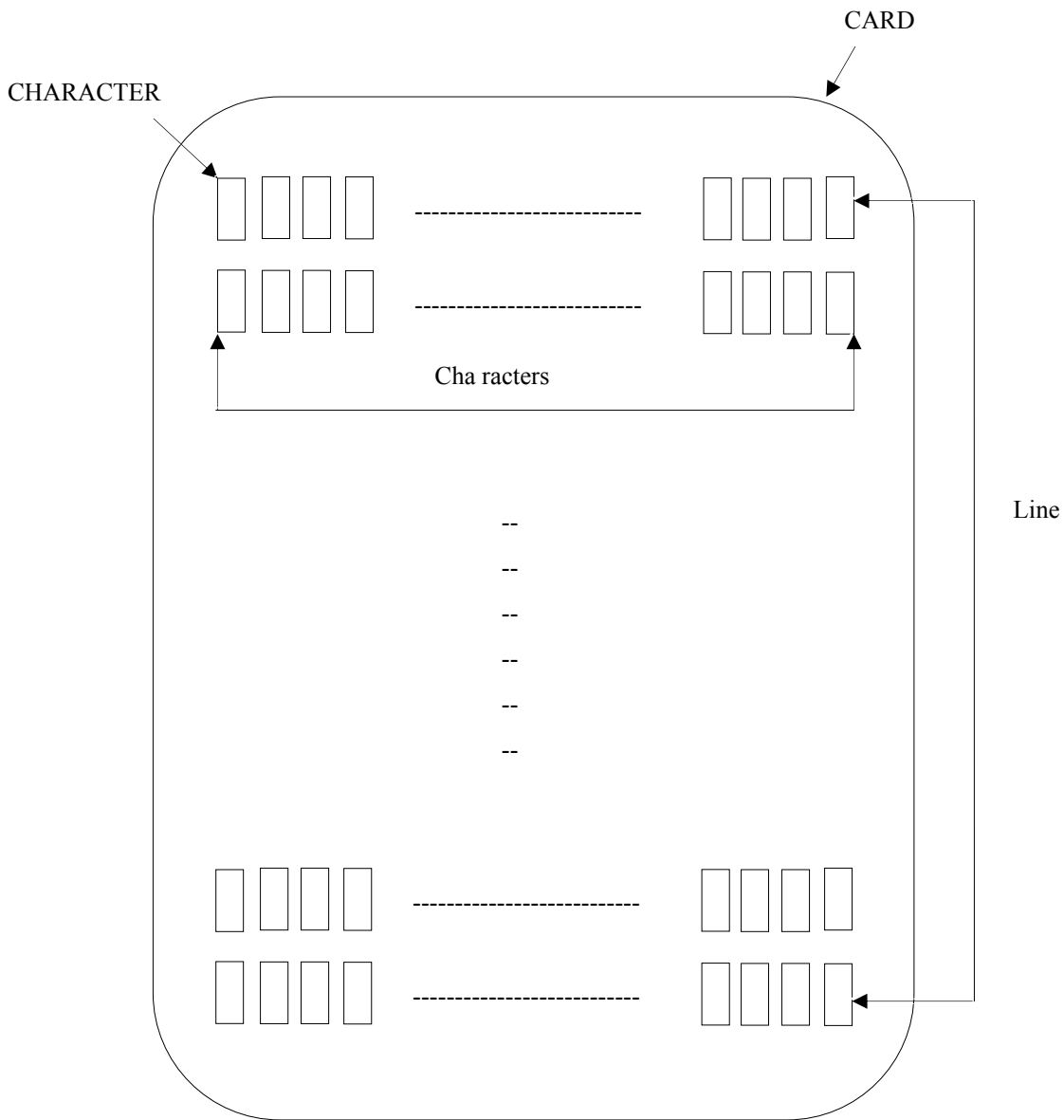
◆ *THERMAL PRINT*

This section describes the commands that can use at the thermal print.

The data to be written ASCII code , the available character is as follows.

* Selection of Font Size describe to page 8.

Available Character Set	Font Size	Width Max Character	Length Max Line
ASCII CODE 0x21(!) to 0x7E(~)	48 x 24	22 Character	18 Line



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◆ *PRINT EXAMPLE*

␣ (ASCII CODE 0x20) : 1 character fills blank.

␣ (ASCII CODE 0x0D): Next Line moving.

Ex1)

INPUT DATA : A~Z

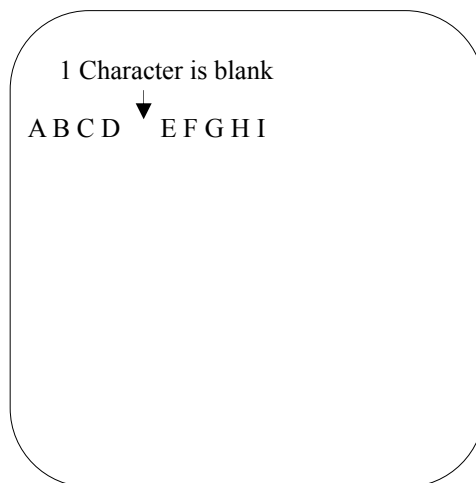
CARD OUTPUT:



Ex2)

INPUT DATA: ABCD ␣ EFGHI

CARD OUTPUT:

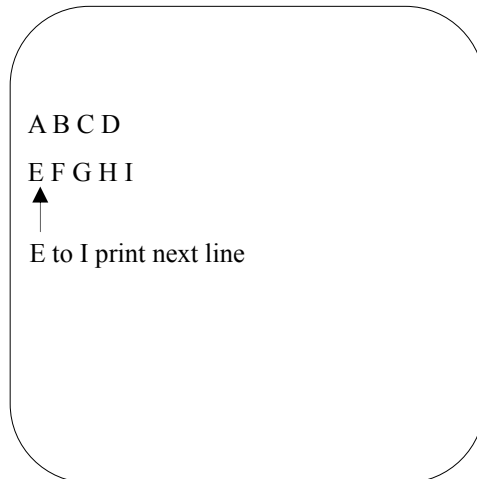


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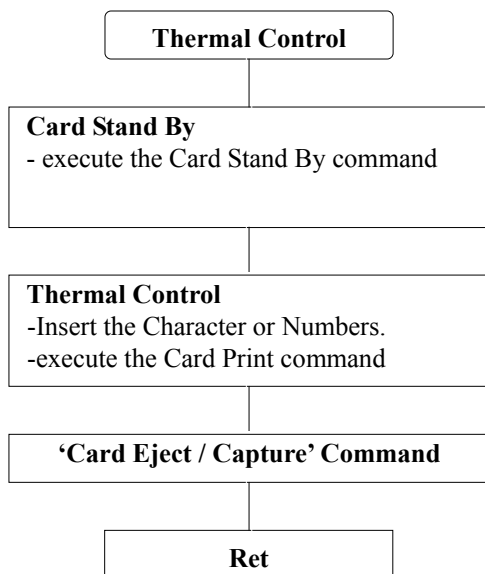
Ex3)

INPUT DATA: ABCD ↵ EFGHI

CARD OUTPUT:



Basic Thermal Print Operations:



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1. THERMAL PRINTER

1.1 "P10" : Start printing.

Command Format

SOH N	ull	Length	STX	"P10"	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

ASCII CODE 0x21(!) to 0x7E(~) (200Byte Max)

Positive Response Format

SOH N	ull	Length	STX	"P10"	GOOD	'1'	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"P10"	E-Code	'0'	ETX	Bcc
-------	-----	--------	-----	-------	--------	-----	-----	-----

Note

⌘ (ASCII CODE 0x20) : 1character fills blank.

␣ (ASCII CODE 0x0D): Next Line moving.

1.2 "P11" : Move card to Stand-by position, and start printing.

Command Format

SOH N	ull	Length	STX	"P11"	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

ASCII CODE 0x21(!) to 0x7E(~) (200Byte Max)

Positive Response Format

SOH N	ull	Length	STX	"P11"	GOOD	'1'	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"P11"	E-Code	'0'	ETX	Bcc
-------	-----	--------	-----	-------	--------	-----	-----	-----

Note

⌘ (ASCII CODE 0x20) : 1character fills blank.

␣ (ASCII CODE 0x0D): Next Line moving.

1.3 "P20" : Erase printed card.

Command Format

SOH N	ull	Length	STX	"P20"	DATA	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----

Command Data Structure

0x00(1byte)

Positive Response Format

SOH N	ull	Length	STX	"P20"	GOOD	'1'	ETX	Bcc
-------	-----	--------	-----	-------	------	-----	-----	-----

Negative Response Format

SOH N	ull	Length	STX	"P20"	E-Code	'0'	ETX	Bcc
-------	-----	--------	-----	-------	--------	-----	-----	-----

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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.

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<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

Description : 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.

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<ALL_EMPTY>

Code : 0x2104

Description : No cards at stacker.

Action : Load the card in the stacker.

<RF_ERROR>

Code : 0x2300

Description : Unavailable RF module.

Action : Change the RF MODULE

<RF_COMM_ERROR>

Code : 0x2301

Description : Communication error at the RF Module.

Action : Check the connection socket

<RF_AUTHEN_ERROR>

Code : 0x2302

Description : Authentication Error at the RF Module.

Action : Change the 'SECRET KEY'

<RF_WRITE_ERROR>

Code : 0x2303

Description : Error while the terminal writes at the RF Card.

Action : Be sure that the card exists in the detection range.

<RF_READ_ERROR >

Code : 0x2304

Description : Error while the terminal reads at the RF Card.

Action: Be sure that the card exists in the detection range.

<RF_DETECT_ERROR>

Error Code : 0x2305

Description : No RF Card.

Action : Insert the RF Card into the terminal.

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<RF_VALUE_ERROR>

Code : 0x2306

Description : Error while the value increases(or decreases) at the RF Card.

Action: Be sure that the card exists in the detection range.

<FLASH_ERROR>

Code : 0x2400

Description : Unavailable FLASH memory ic.

Action : Change the main control board

<PRINT_ERROR>

Code : 0x2600

Description : Unavailable PRINTER module.

Action : Change the PRINTER MODULE

<ERASE_ERROR>

Code : 0x2601

Description : Unavailable PRINTER module.

Action : Change the PRINTER MODULE

<SOLENOID_ERROR>

Code : 0x2602

Description : SOLENOID OPEN AND CLOSE ERROR.

Action : Change the SENSOR or SOLENOID.

<THERMAL_TEMPERATURE_ERROR>

Code : 0x2603

Description : Unavailable PRINTER module.

Action : Need the REST

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Precautions

1. Check the communication line

1) Communication Port, Baud, Parity, and Data Bit, etc.

1. Check if the card exists in stacker. Otherwise, it may not issue the card.