KYT-7XXX

Manual Insertion Type
RS-232C Interface Type & USB Interface
Magnetic Card Read &
IC Card Read / Write

3rd Floor, A-Dong,

Twin Town-Bldg, 703-2.

Gojan-Dong, AnSan-City,

Kyung Ki-Do, Korea (zip : 425-960)

Tel : 82 – 31 – 485 – 9480

Fax : 82 - 31 – 485 – 9488

E-mail : sales@kytronics.co.kr

http://www. kytronics.co.kr

APPROVAL		

RESP. DEPT.	R & D		ORIGINATOR			
APPROVAL & CONFIRMATUON	DEPT.	Int'l Sales				
	APPROVAL BY					
	DEPT.				DOC. CON	APP.
	APPROVED BY					

● REVISION HISTORY

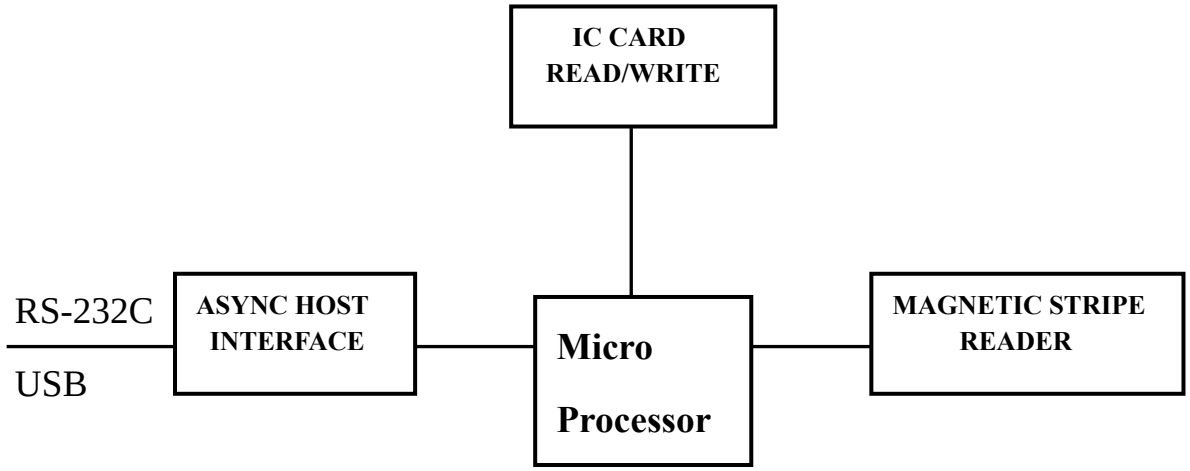
CHECK	DATE	DESCRIPTION	REV.	PAGE
ISSUER	2003. 4. 4.	KYT-73XX Series Specifications ISSUER	A	17
	2003. 8.17.	7.1 RS-232C Interface	B	17
	2005. 4. 1.	Technical Drawing Change	C	18
	2005. 6. 7.	Command Add (PTSS, ICC Deactivation)	D	21
	2006.11.2	Modified the model name information in the SPEC.	E	22
	2007. 1. 9	Operating Temperature and Humidity information are modified	F	22
	2007.2.21	Operating current change the value	G	22
	2007.6.21	RF Function and SAM2 Slot addition.	H	40
	2009.6.25	Led Control command(F50) addition.	I	41
	2009.7.27	Configuration table change	J	40

C O N T E N T S

1. Overview

KYT- 7XXX Series is a set of manual insertion type modules that provide for reading magnetic stripes confirming to ISO 7811. This model has a function that is a reading and writing a IC card confirming to ISO 7816-1,4 (T=0,T=1) card.

2. System Block Diagram



3. Configuration Table

K Y X - 7 3 [X] [X] [X] [X]

INTERFACE	FUNCTION	Body	TRACK	OPTION I	BEZEL & EJECT SPEC	OPTION II	OPTION III
T : RS-232C L : TTL U : USB	7: MANUAL INSERTION MS/IC CARD READER	0 : - 3 : Standard Bezel	0: - 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 IC 1: WITH IC 2: WITH SHUTTER 3: IC+SHUUTER 4: IC + SAM 5: IC + SAM + SHUTTER 6: WITH SAM 7: SAM + SHUTTER	M: AUTO EJECT & METAL BEZEL P: AUTO EJECT & PLASTICBEZEL A: AUTO & MANUAL EJECT + METAL BEZEL B: AUTO & MANUAL EJECT + PLASTIC BEZEL C: MANUAL EJECT & METAL BEZEL D: MANUAL EJECT & PLASTIC BEZEL	R:RS-232C & WITHOUT RTS,CTS HANDSHAKE	P:PROXIMITY CARD (CONTACTLESS)

K Y X - 7 2 [X] [X] [X] [X]

INTERFACE	FUNCTION	BEZEL	TRACK	OPTION I	OPTION II	OPTION III
T : RS-232C L : TTL U : USB	7: MANUAL INSERTION MS/IC CARD READER	0 : - 2 : SLIM BEZEL	0: - 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 IC 1: WITH IC 4: IC + SAM 6: WITH SAM	R : RS-232C & WITHOUT RTS,CTS HANDSHAKE	P:PROXIMITY CARD (CONTACTLESS)

* Bezel selection of KYX-72XX is available plastic only.

4. Features

4.1 Magnetic Stripe reading Triple tracks.

4.2 Customized Front Bezel is available at option.

4.3 RS-232C interface with a HOST.

4.4 IC Card read and writes.

4.5 The IC contact is designed to minimize scratch on the IC card.

4.6 Mag. Head and Chip contacts are located on the opposite side.

4.7 Support T=0 and T=1 protocol.

4.8 **Supports ISO14443 Type-A and Mifare® Card**

5. Environmental Requirements

5.1 Operating Temperature and Humidity : 0~55℃, 0~95% RH

5.2 Conservation Temperature and Humidity : -20~70℃, 0~95% RH

5.3 Vibration : Amplitude 2mm, 10~40 ㎐ in x, y, z direction

6. Specifications

6.1 Card Standard : ISO 7811, ISO 7816

6.2 Mag. Track No : I(IATA), II(ABA), III(MINTS)

6.3 Mag. Reading Method : F2F(FM)

6.4 Mag. Reading Density : 210 BPI(I, III), 75 BPI(II)

6.5 Mag. Reading Capacity : I(IATA) – 79 Characters.

: II(ABA) – 40 Characters

: III(MINTS) – 107 Characters.

6.6 Card Thickness : 0.76 ±0.08 mm

6.7 Power Consumption

6.7.1 Input voltage : +5V DC ±5%

6.7.2 Ripple : Less than 50 ㎷ p-p

6.7.3 Operating : Less than 1500 ㎃

6.8 IC Contact Resistance : Less than 0.5Ω

6.9 IC Contact Force : 0.2N ~ 0.6N

6.10 Operation Locus : Indoors Only

6.11 Magnetic Card Feeding Speed : 15~70 cm/sec

6.12 Life – Cycles.

: HEAD – Min. 500,000 Cycles

: IC CARD CONTACT – Min. 500,000 Cycles

6.13 Weight : Including METAL BEZEL – 169g

Weight can change According to the Customer Version.

6.14 Eject Distance : Min. 8mm

6.15 Banding Card – Long side : Less than 3mm

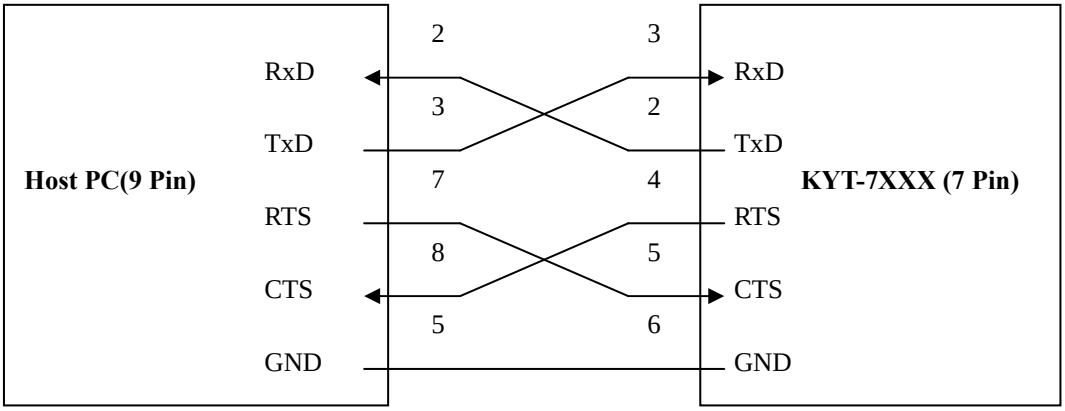
6.16 Banding Card – Short side : Less than 2mm

7. Interface Requirements.

7.1 Standard.

7.1.1 RS-232C Interface.

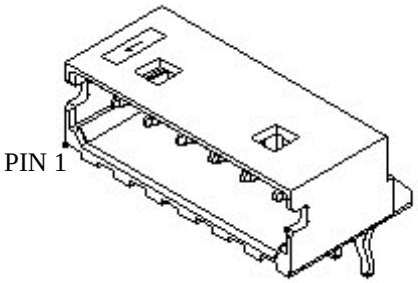
Part Number: D-SUB Standard 9Pin **Part Number : 53015-0710(Molex)**



- Transmission Distance : Max. 1.5m

7.1.2 Pin Assignment.

*** Connector Location Number : J4 - Part Number : 53015-0710(Molex)**

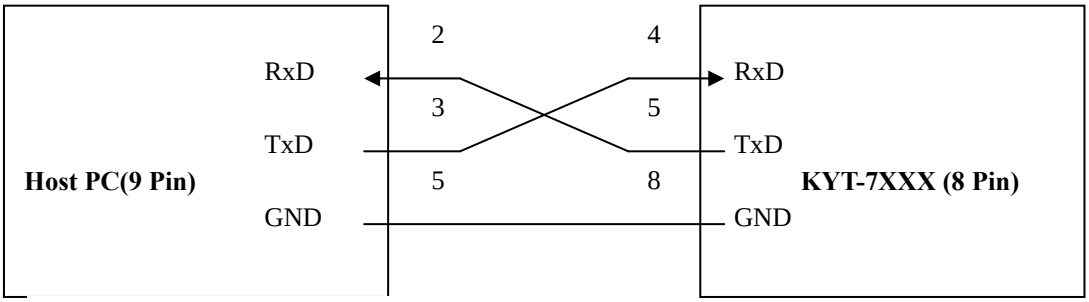


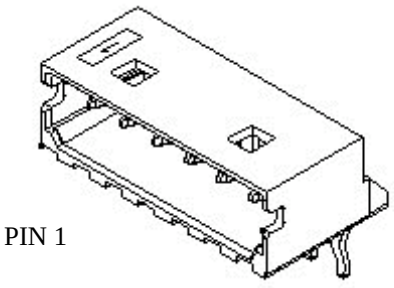
PIN N0	NAME
1	VCC
2	TXD
3	RXD
4	RTS
5	CTS
6	GND
7	GND

7.2 Option.

7.2.1 RS-232C Interface.

Part Number: D-SUB Standard - 9Pin **Part Number : 53015-0710(Molex)**



*** (**  **- Part Number : 53015-0710(Molex)**

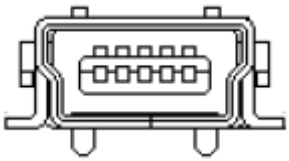
PIN 1

PIN 8

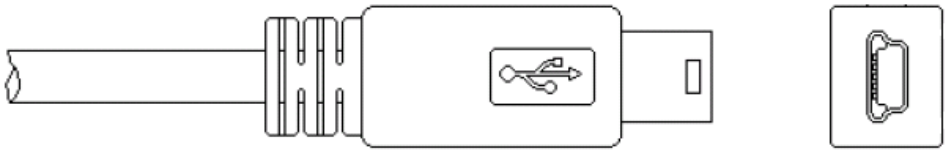
PIN NO	NAME
1	GND
2	-
3	-
4	RXD
5	TXD
6	VCC
7	-
8	GND

7.2 USB Interface.

*** Mini USB : B TYPE CONNECTOR 5PIN**



- Mini USB B & C TYPE CABLE (5PIN)

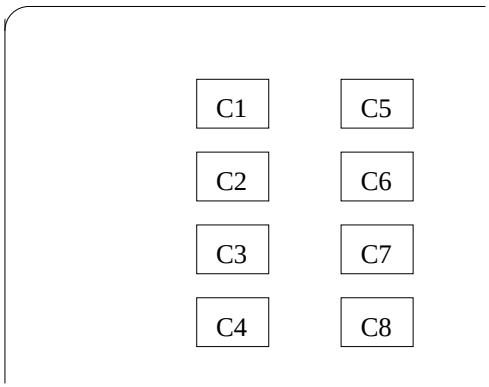


8. IC Card Process

KYT-7XXX accepts most of IC cards supporting IS0 7816 T=0 and T=1.

♦ 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 input/output)
C8 :Reserved to ISO/IEC JTC 1/SC 17 for future use.

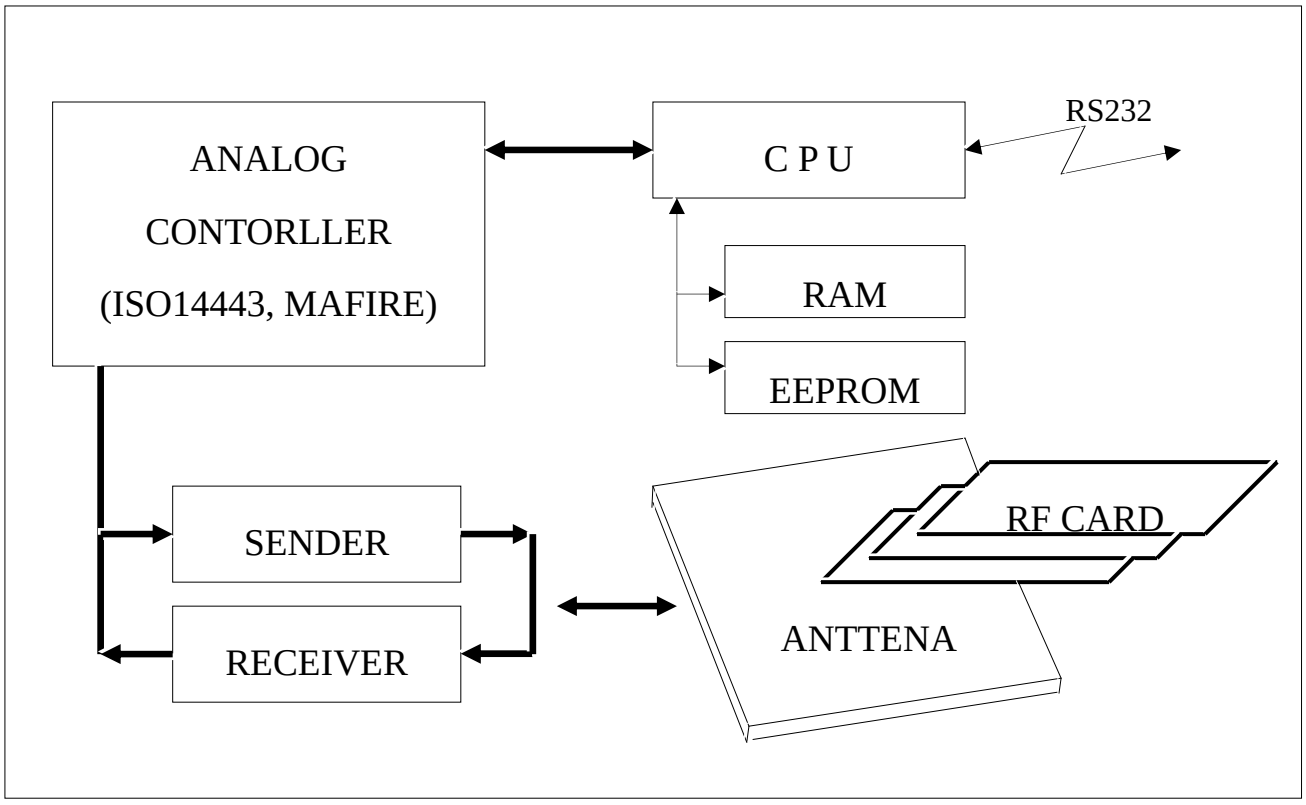
♦ Power Consumption

: Less than 50mA

9. RF Card Process

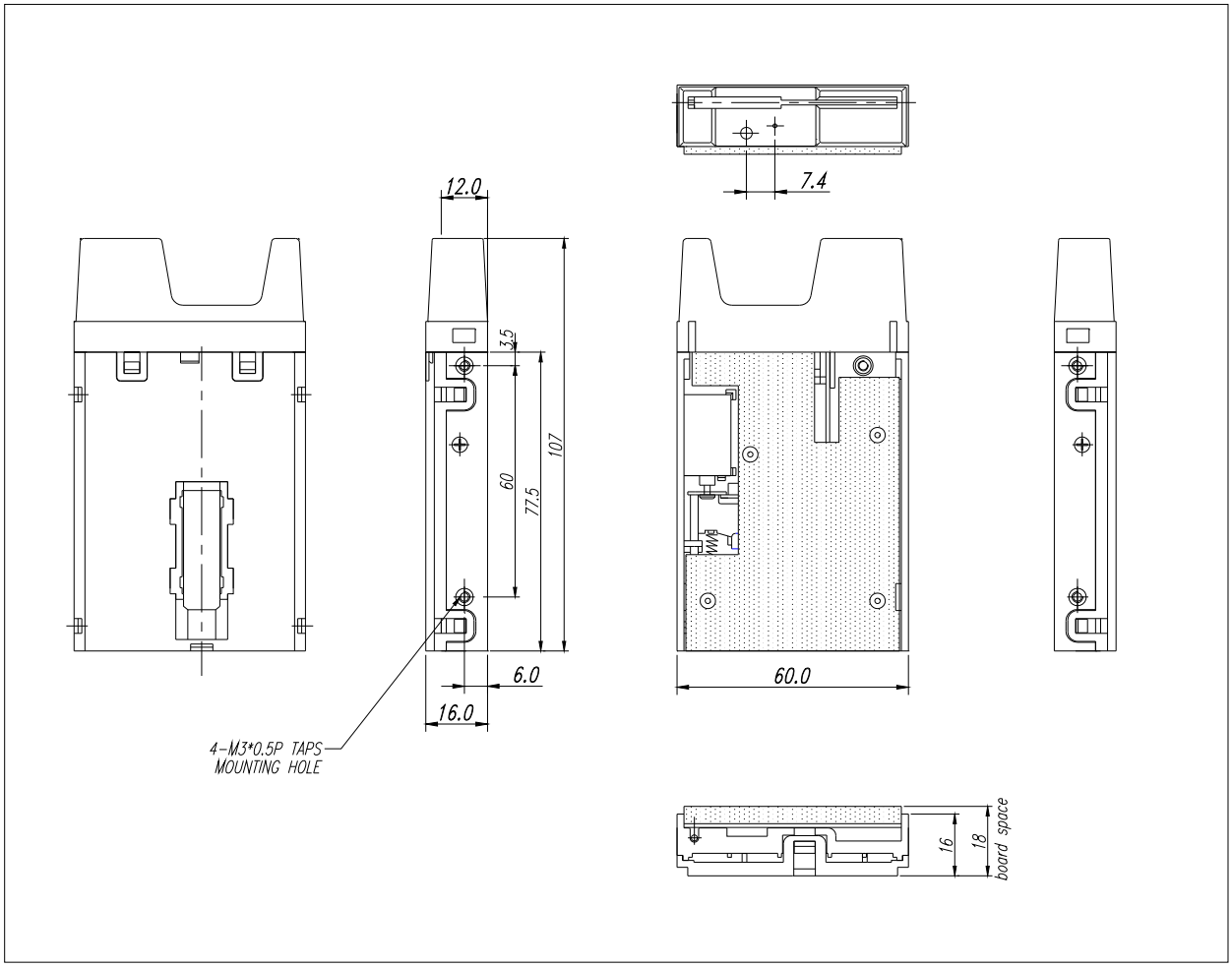
The KYR-7XXX series is a compact read/write dummy terminal and supports ISO 14443 Type-A and Mifare® Contactless Smart Cards.

All the process of KYR-7XXX consists of Execution and Response according to the Commands from Host. And the Response includes Execution Results.



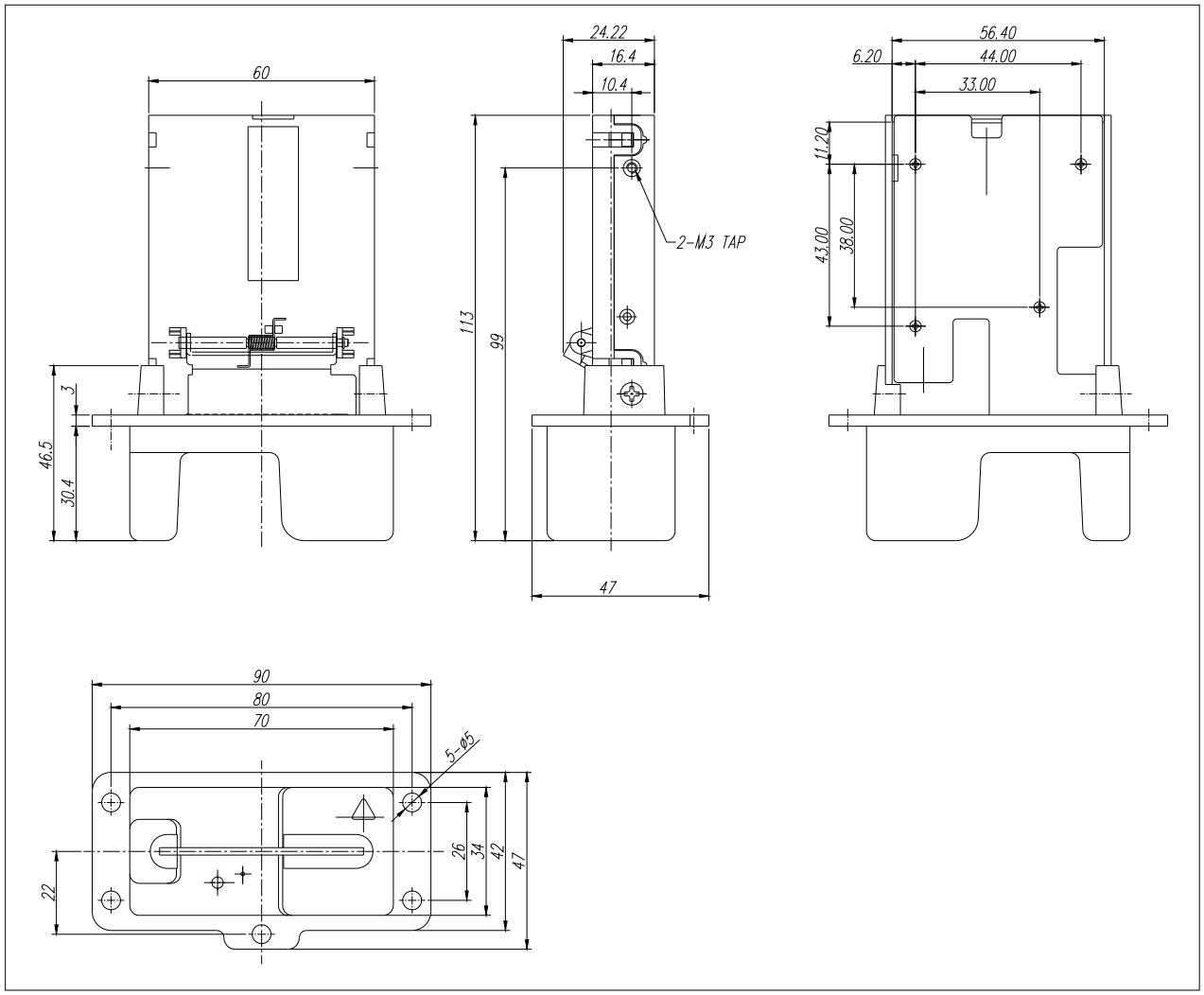
10. Technical Drawing

KYT-72XX DIMENSIONS



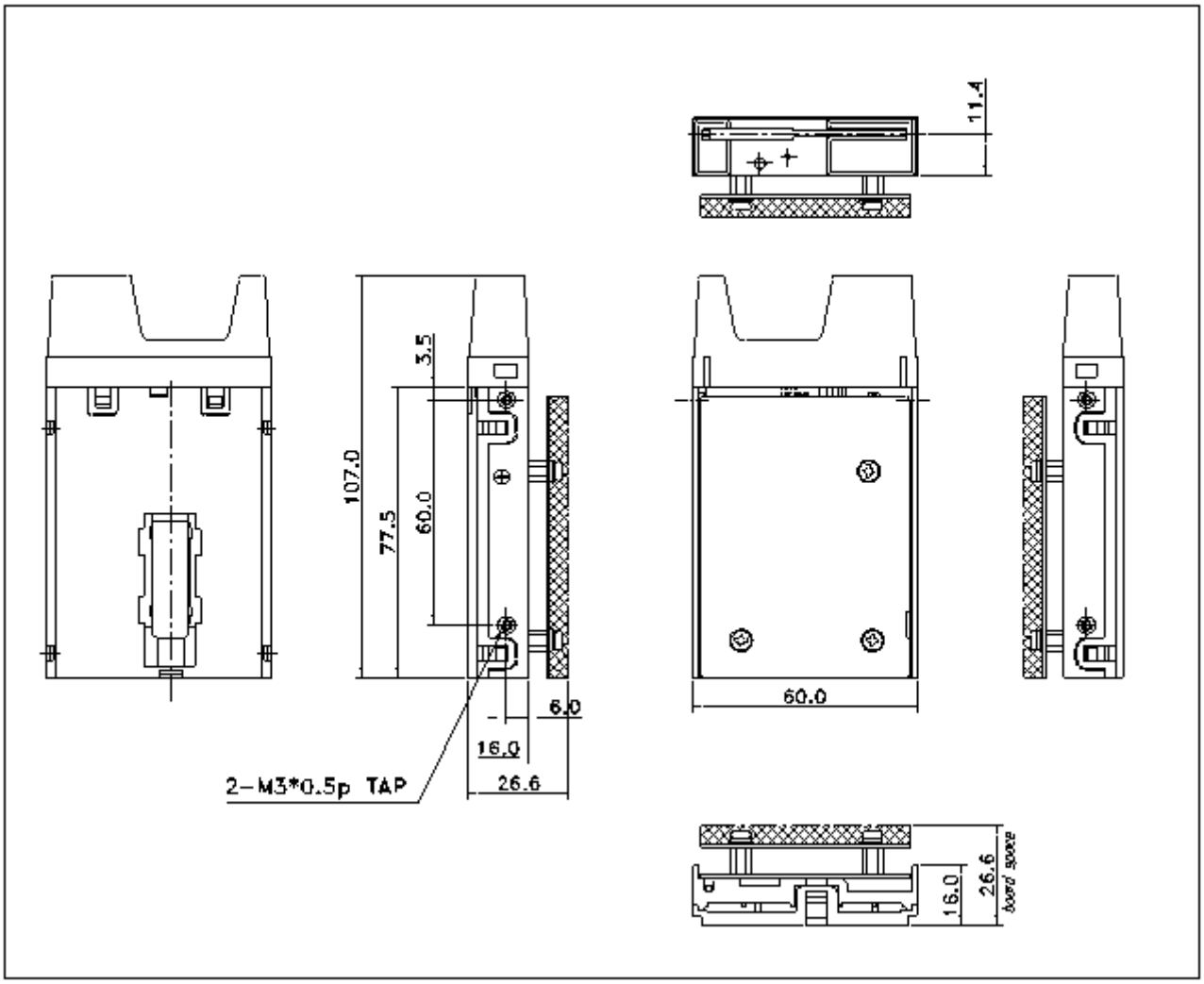
*** Dimensions are subject to be changed according to the customer requirements.**

KYT-73XX DIMENSIONS



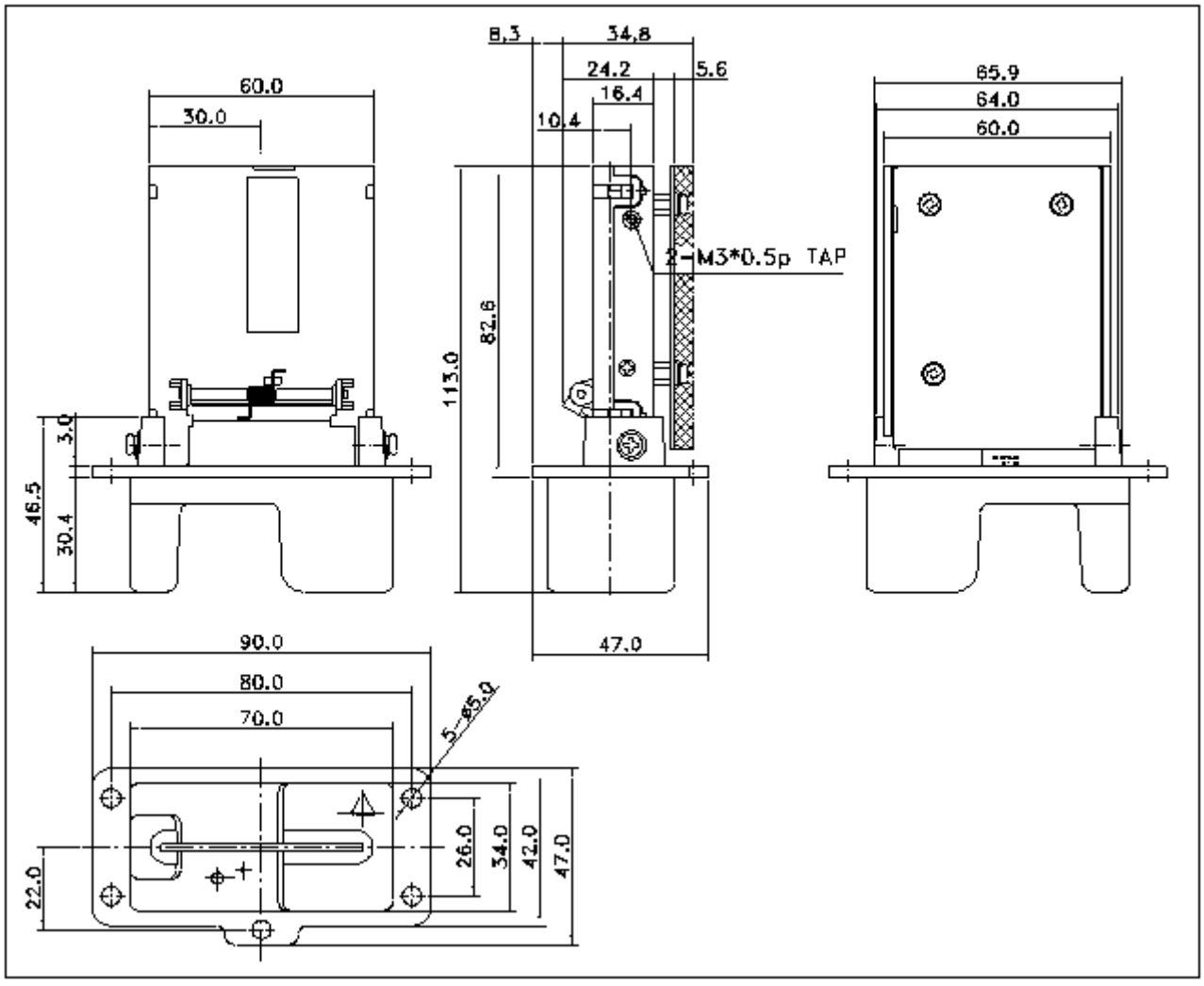
*** Dimensions are subject to be changed according to the customer requirements.**

KYT72XXP, KYU72XXP



*** Dimensions are subject to be changed according to the customer requirements.**

KYT73XXP,KYU73XXP



*** Dimensions are subject to be changed according to the customer requirements.**

Interface

MS Reader & IC Card Reader/Writer

MODEL: KYT- 7XXX Series

1.Communication Method.

1.1. Asynchronous, Half duplex.
1.2. Baud Rate: 9600, 19200 38400 (Default: 19200 BPS)
1.3. Start Bit: 1Bit
1.4. Data Length: 8Bits
1.5. Parity: None
1.6. Stop Bit: 1Bit

2. Control Characters.

NANE	Hex Value	Description
SOH	01	Start of Header
STX	02	Start of Text
ETX	03	End of Text
EOT	04	End of Transmission
ENQ	05	Enquiry
ACK	06	Positive Acknowledge
NAK	15	Negative Acknowledge
CAN	18	Cancel

`

3. Frame Format.

3.1. Command structure

STX	Len_H	Len_L	CMD	DATA	ETX	BCC

Ref.) Command Sets List

3.2. Response structure

3.2.1. Positive Packet structure

STX	Len_H	Len_L	‘P’	STAT	DATA	ETX	BCC

3.2.2. Negative Packet structure

STX	Len_H	Len_L	‘N’	ST1	ST2	ETX	BCC

BCC (XOR)

Ref.) Negative Response Code (ST1, ST2) List

3.3. Data Length range of Len_H and Len_L.

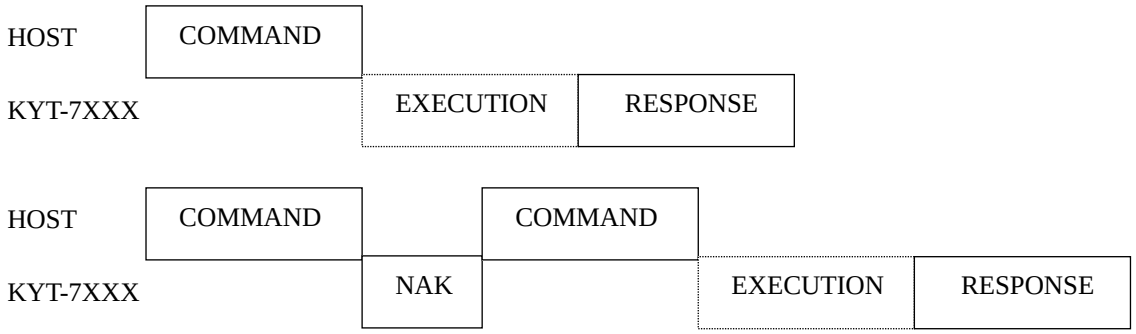
3.3.1 Command structure : Data Length from CMD to DATA.
3.3.2 Positive Packet structure : Data Length form ‘P” to Data.
3.3.3 Negative Packet structure : Data Length form ‘N’ to ST2.

3.4. STAT Structure Format

BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

BIT	Description		REMARK
	1	0	
7	Rear Detect ON	None Detect at Rear Sensor	
6	Front Detect ON	None Detect at Front Sensor	
5	IC Reset ON	No ICC Reset	If Card is got out of Rear Sensor area by artificial means, terminal is deactivated.
4	Is M/S Data	None M/S Data	
3	M/S Forward Read ON	M/S Backward Read ON	
2	X	X	
1	Is SAM2	None SAM2	
0	Is SAM1	None SAM1	

4. Communication Protocol Sequence.



Cf) The point of the time when SLAVE transmit “NAK”.

1. When BCC is incorrect. (BCC: Last byte of Each COMMAND).
2. When SLAVE can’t receive each byte of COMMAND within 20 ms.

5. Command Sets List.

Index	CMD	Description	Note
Request	‘S’ (53H)	Status Request	
	‘V’(56H)	Read F/W Version of unit	
IC Card Control	‘R’(52H)	ICC Reset	ICC Control Command
	‘P’(50H)	PTSS(PPSS) Application	
	‘I’ (49H)	ICC Direct Control	
	‘D’(44H)	ICC Deactivation.	
RF Card	‘F’(46H)	RF Card Control	Cf) Page 27
Setting	‘B’(42H)	Baud rate change	
Select	‘L’(4CH)	IC Card Select	
MS Read	‘M’(4DH)	Magnetic data read command	
Eject	‘E’(45H)	Card Eject	

6. Negative Response Code List.

NO	ST1	ST2	Description	NOTE
1	'0'	'1'	Command Not Define	
2	'0'	'2'	No Card	
3	'0'	'3'	Card Fail	
4	'0'	'4'	Card Jam	
5	'0'	'5'	Data Fail	
6	'0'	'6'	Time Out	
7	'0'	'8'	M/S Blank Error	Magnetic Data Interpreter Error
8	'0'	'9'	M/S Preamble Error	
9	'1'	'0'	M/S Parity Error	
10	'1'	'1'	M/S Post amble Error	
11	'1'	'2'	M/S LRC Error	
12	'1'	'4'	IC Card Contact Error	
13	'1'	'5'	IC Card Control Error	
14	'1'	'6'	Command Cancel	
15	'1'	'8'	EEPROM Error	
16	'2'	'0'	Not Detected at the Antenna.	
17	'2'	'1'	MIFARE Card Error (On Authentication)	
18	'2'	'2'	MIFARE Card Error (Not Selected RF Card)	
19	'2'	'3'	MIFARE Card Read Error	
20	'2'	'4'	MIFARE Card Write Error.	
21	'2'	'5'	MIFARE Card Increment(Decrement) Error	
22	'2'	'6'	Read Data Format Error(Character - Error)	
23	'2'	'7'	RF Initial Error	
25	'2'	'8'	The Carrier wave not emitted in antenna	
24	'2'	'9'	RF Card Contact Error	
30	'3'	'0'	Block Error	

7. Command Detail.

7.1 Request

7.1.1 'S' (53H): Status Request.

Command Packet

STX	00H	01H	'S'	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.1.2 'V' (56H): F/W Version Read.

Command Packet

STX	00H	01H	'V'	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	' P '	STAT	DATA	ETX	BCC

DATA Structure

'V'	X1	'.'	X2

Ex) "V1.00"

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.2 IC Card Control.

7.2.1'R' (52H): Command for sending Reset Signal Contacted IC Card and for receiving ATR from IC Card.

Command Packet

STX	00H	01H	'R'	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

DATA of above Positive Response Packet is a string of characters as many as a designated number of Byte read from a designated address in Command Packet.

The DATA Format is as below.

ICC ATR
(Length – 2) Byte

EX)

3B	6B	00	00	80	31	90	63	53	46	01	83	03	90	00

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.2.2 ‘P’(50H) : PTSS(PPSS) Application.

: ISO 7816 Standard prescribe that PTSS can execute only once directly after ‘R’ Command execution. And “Set Clock Rate Factor Register” Command can execute every time needed. But This Command set up communication speed of IFM, And so baud rate must be set up before this command execute

Command Packet

STX	Len_H	Len_L	‘P’	TA1	ETX	BCC

TA1 (1BYTE)								REMARK
7	6	5	4	3	2	1	0	
0	1			1 ~ 3				PTSS operating between Terminal and ICC according to ISO7816.
1								Set Clock Rate Factor Register (ICC interface Device – Chip)

<Low Nibble of 2’st Byte>

BIT6 ~ BIT 0	Decryption
0x11	9600bps
0x12	19200bps
0x13	38400bps

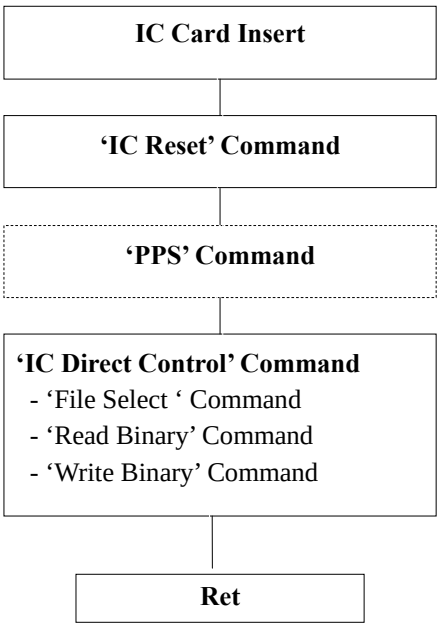
Positive Response Packet

STX	Len_H	Len_L	‘P’	STAT	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	‘N’	ST1	ST2	ETX	BCC

< PTSS operation method >



Can use ‘PPS’ command in case of IC card support to PTS.

7.2.3 'I' (49H): ICC Direct Control

This is a command for operation under ISO 7816. Accordingly, user can handle all IC cards Conforming to ISO 7816 – 4 and T = 0, T= 1.

Command Packet

STX	Len_H	Len_L	'I'	DATA	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

- Note: Add to Data block of above Command Packet Command Packet specified in ISO 7816-4 APDU.

Basic format of Packet of APDU

CLA	INS	P1	P2	Lc	Data	Le
1Byte	1 Byte	1 Byte	1 Byte	1 Byte	Lc Byte	1 Byte
Fixed					Variable	

CLA	Class of instruction	Fixed
INS	Instruction code	
P1	Instruction parameter 1.	
P2	Instruction parameter 2	
Lc	Number of byte present in command data field	
Data	String of data bytes sent in command (= Lc)	Variable
Le	Maximum number of data byte expected in data field of response	

P.S) Lc is 0 if there is no "Data".

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 details, refer to IS 7816-4.

7.2.4 'D' (44H) : ICC Deactivation.

Command Packet

STX	00H	01H	'D'	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.3 Setting

7.3.1 'B' (42H): Baud Rate Setting

Set up the baud rate of the Terminal (After then, you must set up baud rate of the host to the same value of the terminal)

Command Packet

STX	00H	02H	'B'	DATA	ETX	BCC

DATA:

'0' – 9600 BPS

'1' – 19200 BPS (Default)

'2' – 38400 BPS

Positive Response Packet

STX	00H	02H	'P'	STAT	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.3.2 'L' (4CH): IC Card Select Command.

It's Default to Select IC Card when Power on.

When Received command of 'I' Card Reader controls card.

To control SIM Card in SAM Slot, user should perform command of 'I' after this command is conducted.

Command Packet

STX	00H	02H	'L'	DATA	ETX	BCC

Data: '0' Selection of Inserted Card.

'1' Selection of SAM1 Slot.

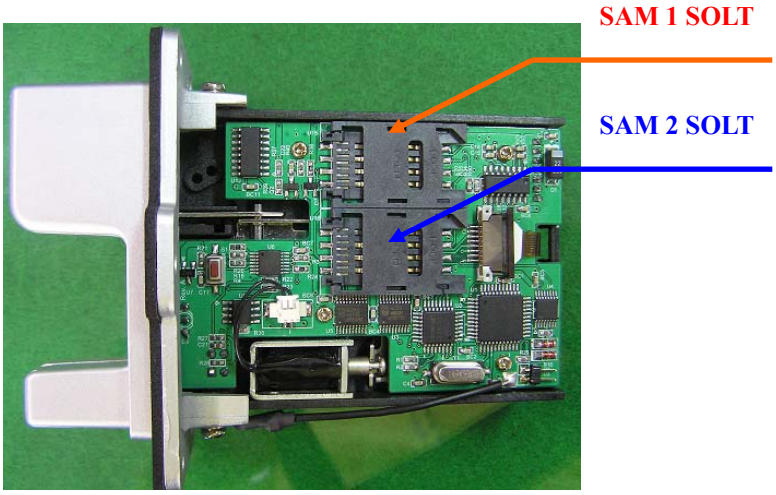
'2' Selection of SAM2 Slot.(option)

Positive Response Packet

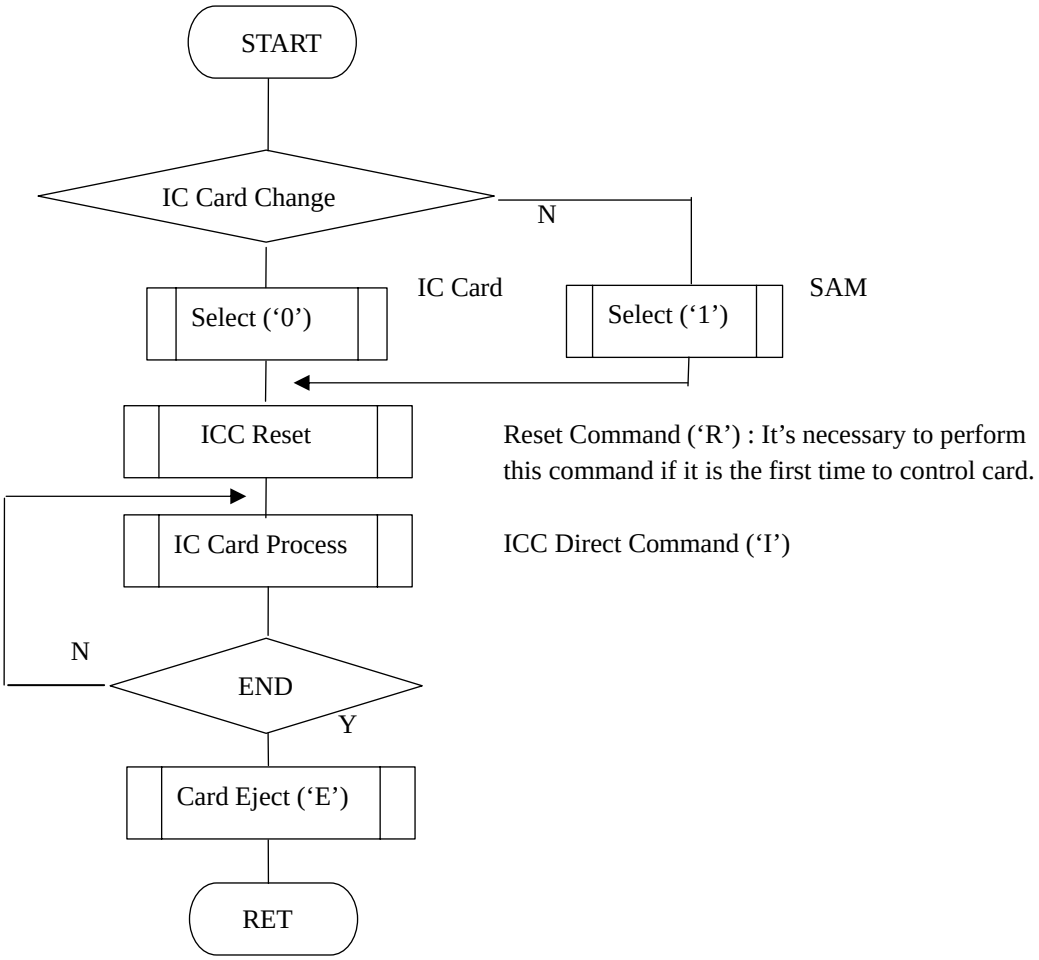
STX	Len_H	Len_L	'P'	STAT	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC



IC Card Processing Flow (Example)



7.4 M/S Data Reading.

7.4.1 'M'(4DH) : A Command to read Magnetic Data.

Command Packet

STX	00H	01H	'M'	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

DATA :

Track 1 data	00h	Track 2 data	00H	Track 3 data

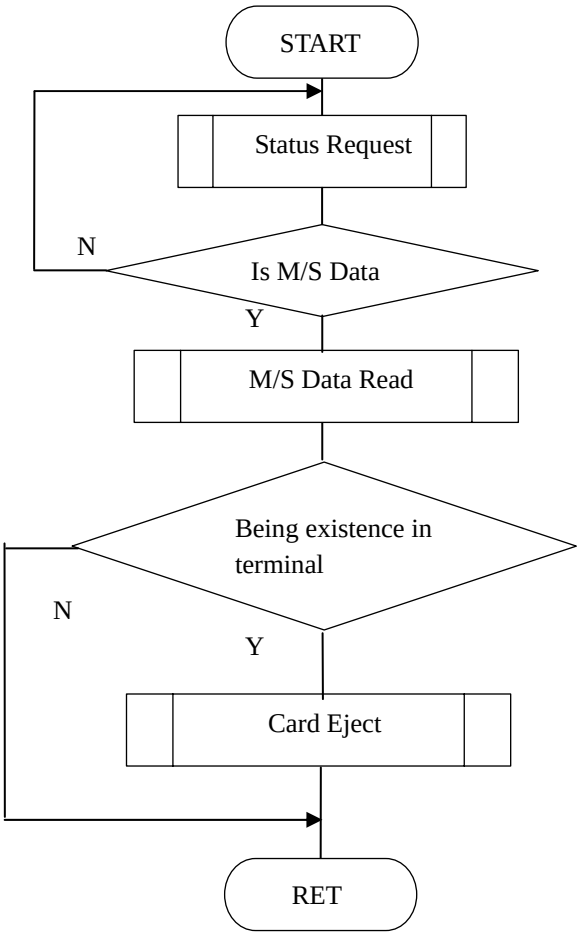
Cf) "00h" byte added to classify each track, And transmit 3 Byte('N',ST1, ST2) every track if Error occur while reading data.

(Page 13 "6. Negative Response Code List").

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

Magnetic Card Processing Flow (Example)



Command : 'S' (53H)
Cf) Page 15.

If bit 4 is set('1')
Cf) Page 14. 3.4. STAT Structure Format

Command : 'M' (4DH)
Cf) Page 14. 3.4. STAT Structure Format

If bit 7& bit6 is set('1')
Cf) Page 14. 3.4. STAT Structure Format

Command : 'E' (45H)
Cf) Page21. 7.5 Eject

7.5 Eject.

7.5.1 ‘E’(45H) : A Command to eject a card.

If this Command would be executed while a IC Card being in operation inside reader, IC Card is De-Activated and then ejected.

Command Packet

STX	00H	01H	‘E’	ETX	BCC

Positive Response Packet

STX	Len_H	Len_L	‘P’	STAT	ETX	BCC

Negative Response Packet

STX	Len_H	Len_L	‘N’	ST1	ST2	ETX	BCC

7.6 RF Command.

	Function	Cm0	Cm1	Cm2	Explanation
Mifare	Sector/Block Get	‘F’	0x30	0x30	Sector/Block Get
	etection.		0x30	0x31	Card Detection.
	Sector & Block Setting		0x30	0x32	Sector & Block Setting
	Serial Number		0x30	0x33	Get the MIFARE Card Serial Number
	Read		0x31	0x30	MIFARE Card Read
	Write		0x31	0x31	MIFARE Card Balance Write.
			0x31	0x32	MIFARE Card Character Write
	Increment		0x31	0x33	MIFARE Card Increment.
	Decrement		0x31	0x34	MIFARE Card Decrement.
	Read		0x31	0x35	MIFARE Card Read Balance
	Module Key		0x32	0x30	Module Key Value Change
	Card Key		0x32	0x31	Card Secret Key Change.
	Key Set		0x32	0x32	Authentication Key set
	Card Key Change		0x32	0x33	Card Secret Key Change to other Key
			0x32	0x34	Key Value Change(without access code)
	Power On		0x33	0x30	The carrier wave emitted in antenna.
	Power Off		0x33	0x31	The carrier wave not emitted in antenna.
	Read		0x40	0x30	MIFARE Card Read.(Sector, Block, key)
	Write		0x40	0x31	MIFARE Card Balance Write. (Sector, Block, key)
			0x40	0x32	MIFARE Card Character Write(Sector, Block, key)
	Increment		0x40	0x33	MIFARE Card Increment. (Sector, Block, key)
	Decrement		0x40	0x34	MIFARE Card Decrement. (Sector, Block, key)
	Read		0x40	0x35	MIFARE Card Read Balance.(Sector, Block, key)

7.6.1. Sector/Block Get

: Identify the sector and block set at terminal.

Command Packet

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x30]	Command[0x30]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response DATA Structure

Sector(1Byte , Hex)	Block(1Byte , Hex)

7.6.2. Card Detection.

: Identify whether if the antenna detect the card.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x30]	Command[0x31]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response Data Structure

Status Mode (1Byte, Hex)

<Status Mode>

Value	Detail
0x01	Card Detection
0x00	Card Non-Detection(= No Card)

7.6.3. Sector & Block Setting

: Change the sector and block set at terminal.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x30]	Command[0x32]

Sector(1Byte , Hex)	Block(1Byte , Hex)

Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x03.

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.4. Serial Value

: Get the RF Card's serial number(UID).

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x30]	Command[0x35]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response Data Structure

Serial Value(4Byte, Hex)

Note: The RF Card's serial consists of 4 Bytes..

7.6.5. Read Block

: Read the data structure (16 Bytes) of the RF Card

Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x03.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x30]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response DATA Structure

DATA(16Byte, Hex)

7.6.6. Balance Write.

: Write the data at the specified block in the RF Card.

Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x03.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x31]

DATA(4Byte, Hex)

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.7. Character Write.

: Write the data string at the specified block in the RF Card.

Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x03.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x32]

DATA(16Byte, Hex)

Cf)DATA : "1234567890123456"

MSB LSB

0x31 0x32 0x33 ……. 0x35 0x36

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.8. Increment.

: Increase the RF Card's Balance as much as a given data value.

Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x02.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x33]

☞ Command DATA Structure

DATA(4Byte, Hex)

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.9. Decrement

: Decrease the RF Card's Balance as much as a given data value.
Note: Sector Range: 0x00 ~ 0x0f, Block Range: 0x00 ~ 0x02.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x34]

☞ Command DATA Structure

DATA(4Byte, Hex)

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.10. Read Balance

: Read the RF Card's Balance.

Note: Sector Range: 0x00~ 0x0f, Block Range: 0x01 ~ 0x02.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x31]	Command[0x35]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response DATA Structure

DATA(4Byte, Hex)

7.6.11. Module Key Value Change

: Change the RF Card Key Value required for authentication.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x32]	Command[0x30]

Sector	Key 1	KEY A	KEY B	Key 2	KEY A	KEY B	Key 3	KEY A	KEY B

Sector	Key1	KEY A	KEY B
Sector(1Byte, Hex)	Key(1Byte, Hex)	DATA (6Byte, Hex)	DATA (6Byte,Hex)

Sector : 0x00 ~ 0x0f, All Sector : 0xff

* Key Name

Key Location	Value
Key 1	0x01
Key 2	0x02
Key 3	0x03

KEYA, KEYB : Authentication Key data.

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.12. Card Secret Key Change.

: Change the RF Card Key Value.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x32]	Command[0x31]

☞ Command DATA Structure

Sector(1Byte, Hex)	KEYA(6Byte, Hex)	KEYB(6Byte,Hex)

Sector(0x00 ~ 0x0f)

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

7.6.13. Authentication Key.

: Select the authentication key(KeyA, KeyB).

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x32]	Command[0x32]

Key Select(1Byte, Hex)

<Key Select>

7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0

1) High(4bit)	Detail
0001	Key Sel 1
0010	Key Sel 2
0011	Key Sel 3

Low(4bit)	Detail
0000	Key A
0001	Key B

1) In case of Authentication failure for the RF Card, select to authenticate with different Key.

Key Sel 1 : Authenticate with the first Key saved in EEPROM.

Key Sel 2 : Authenticate from the first , second Key saved in EEPROM until authenticated.

Key Sel 3 : Authenticate from the first , second and third Key saved in EEPROM until authenticated.

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.16. Card Secret Key Change to other Key

: Change the RF Card Key Value.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x32]	Command[0x33]

Sector(1Byte, Hex)	KEYA(6Byte, Hex)	Access(4Byte, Hex)	KEYB(6Byte,Hex)

Sector(0x00 ~ 0x0f)

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.1.17. Key Value Change

: Change the RF Card Key Value required for authentication.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x32]	Command[0x34]

Sector : 0x00 ~ 0x0f

Key(1Byte, Hex)	Sector(1Byte, Hex)	DATA (6Byte, Hex)	DATA (6Byte,Hex)

* Key Name

Key Location	Value
Key 0	0x01
Key 1	0x02
Key 2	0x03

* Sector(1Byte, Hex) : 0x00 ~ 0x0F

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.18. Power On.

: The carrier wave emitted in antenna.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x33]	Command[0x30]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.19. Power Off

: The carrier wave not emitted in antenna.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x33]	Command[0x31]

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.20. Read Block.

: Read the data structure (16 Bytes) of the RF Card

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x30]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response DATA Structure

DATA(16Byte, Hex)

6.5.21. Balance Write.

: Write the data at the specified block in the RF Card.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x31]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)
Balance Data (4Byte, Hex)			

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.22. Character Write.

: Write the data string at the specified block in the RF Card.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x32]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)

DATA(16Byte, Hex)

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

Cf) DATA : "1234567890123456"

MSB LSB

0x31 0x32 0x33 ……. 0x35 0x36

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.23. Increment.

: Increase the RF Card's Balance as much as a given data value.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x33]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)
Balance Data (4Byte, Hex)			

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.24. Decrement

: Decrease the RF Card's Balance as much as a given data value.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x34]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)
Balance Data (4Byte, Hex)			

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

6.5.25. Read Balance

: Read the RF Card's Balance.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x34]	Command[0x35]

KEY Type	Sector (1Byte , Hex)	Block (1Byte , Hex)	Secret Key(6Byte, Hex)

KEY Type : KEYA(0x00), KEYB(0x01) , Sector : 0x00 ~ 0x0f, Block : 0x00 ~ 0x03, Secret Key(6byte).

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

☞ Response DATA Structure

DATA(4Byte, Hex)

6.5.26 LED On/Off.

☞ Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC

☞ Command DATA Structure

Command[0x35]	Command[0x30]

LED [1BYTE]

. 0x30 : REEN_LED ON . 0x31 : RED_LED ON . 0x32 : ORANGE_LED ON

. 0x33 : ALL OFF

☞ Positive Response Packet

STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

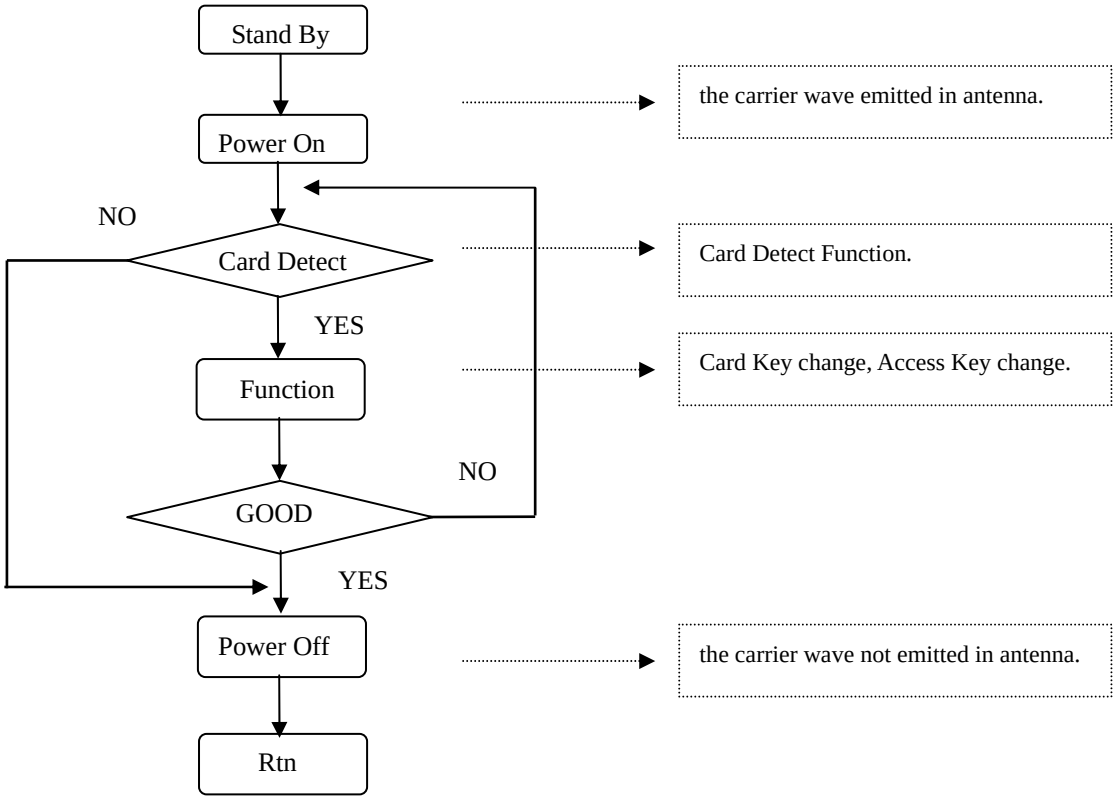
☞ Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC

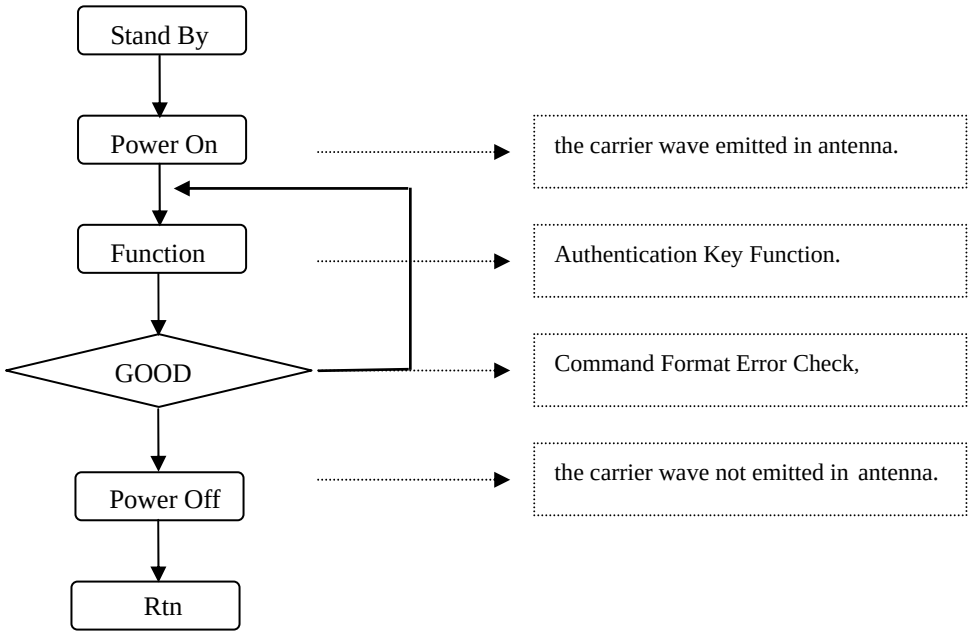
EXECUTION PROCEDURES

This is a flowchart that describes how to operate the read, write, increment and decrement command after detecting the card. However, it is possible to read, write, increase and decrease without detecting a card.

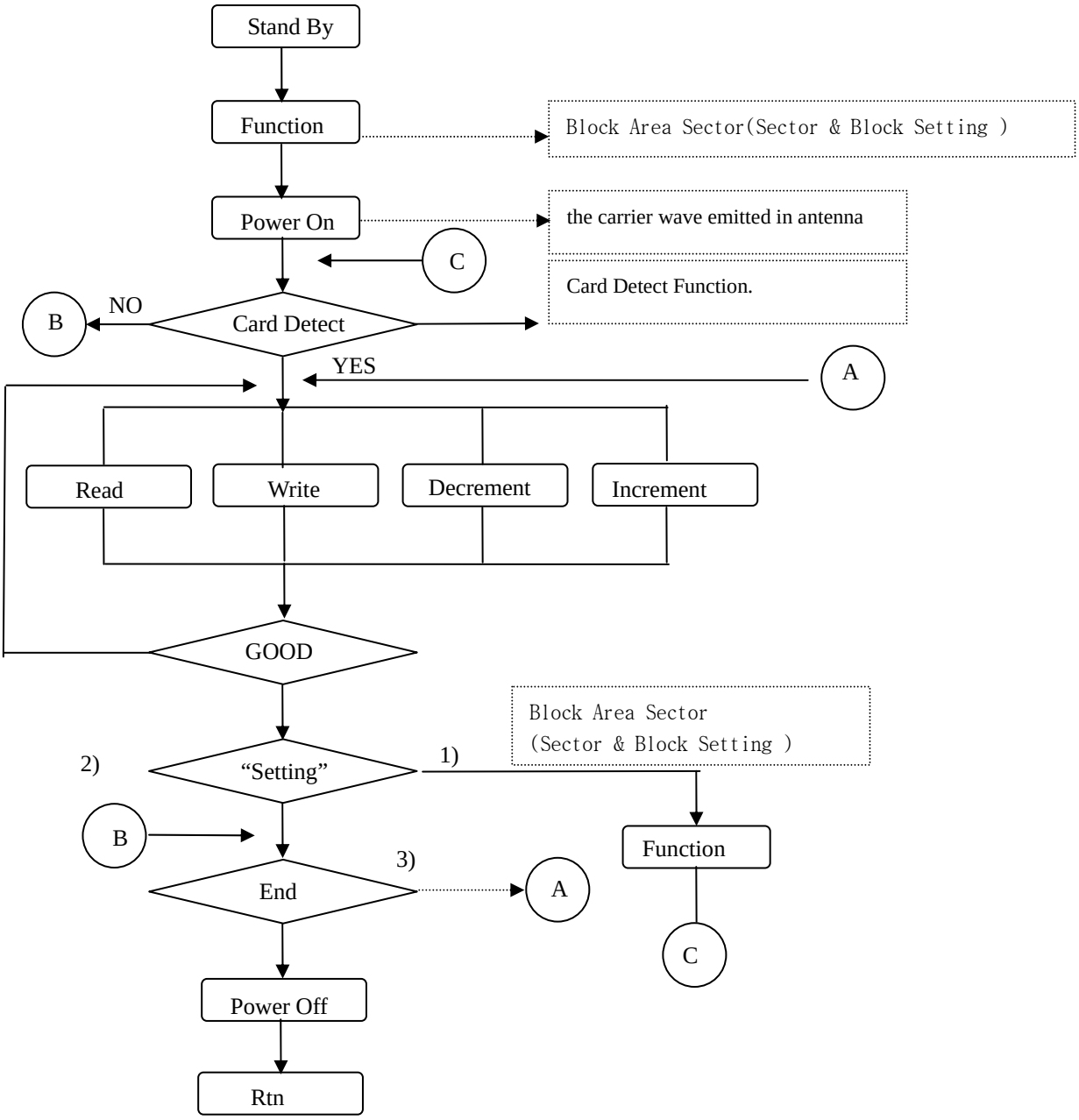
1. Card Key change, Access Key change Function.



2. Authentication Key Function.



3. Read/Write, Increment/Decrement, Balance Write/ Balance Read



1 : "Setting" is for new Sector or Block, not previous Sector or Block

2 : Confirm all the process for present card is completed.

3 : the carrier wave not emitted in antenna