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# **KYT-7XXX**

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

**3<sup>rd</sup> Floor, A-Dong,**

**Twins Town-Bldg, 703-2.**

**Gojan-Dong, AnSan-City,**

**Kyung Ki-Do, Korea**

**Tel : 82 - 31 - 485 - 9480**

**Fax : 82 - 31 - 485 - 9488**

**E-mail : sales@kytronics.co.kr**

**http://www. kytronics.co.kr**



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## **C O N T E N T S**

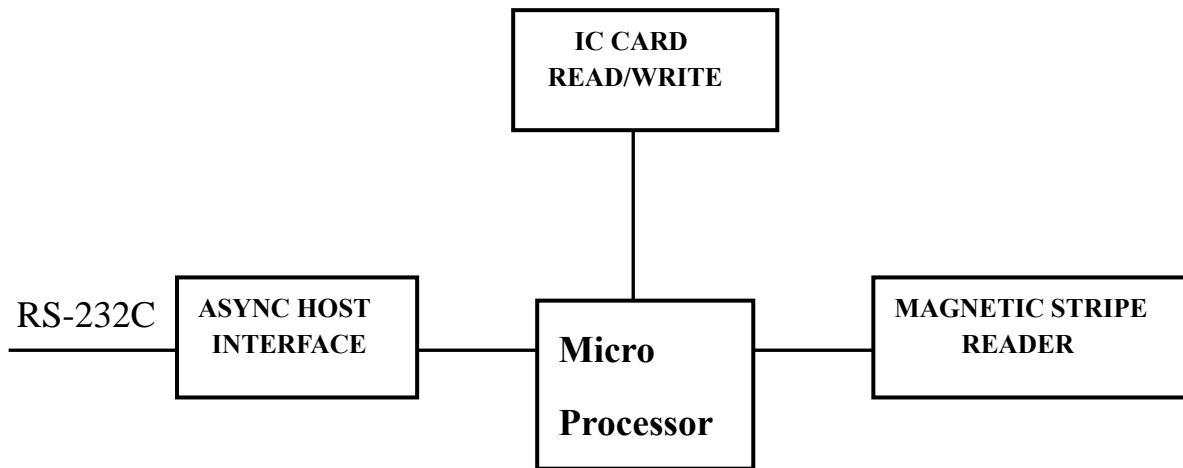
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## 1. Overview

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



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### 3. Configuration Table

K Y X - 7 3 X X X X

INTERFACE	FUNCTION	BODY	TRACK	OPTION	BEZEL & EJECT SPEC	OPTION II
T: RS-232C L: TTL	7: MANUAL INSERTION MS/IC CARD READER	0: - 3: STANDARD BASE	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+SHUTTER 4: IC+SAM 5: IC+SAM+ SHUTTER 6: WITH SAM 7: SAM+SHUTTER	M: AUTO EJECT & METAL BEZEL P: AUTO EJECT & PLASTIC BEZEL 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 & RTS,CTS 제외

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## 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.

## 5. Environmental Requirements

- 5.1 Operating Temperature and Humidity : 0~40℃, 0~95% RH
- 5.2 Conservation Temperature and Humidity : -20~70℃, 0~95% RH
- 5.3 Vibration : Amplitude 2mm, 10~40 Hz 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

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## 6.7 Power Consumption

6.7.1 Input voltage : +5V DC  $\pm 5\%$

6.7.2 Ripple : Less than 50 mV p-p

6.7.3 Operating : Less than 80 mA

6.8 IC Contact Resistance : Less than 0.5  $\Omega$

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. 50,000 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

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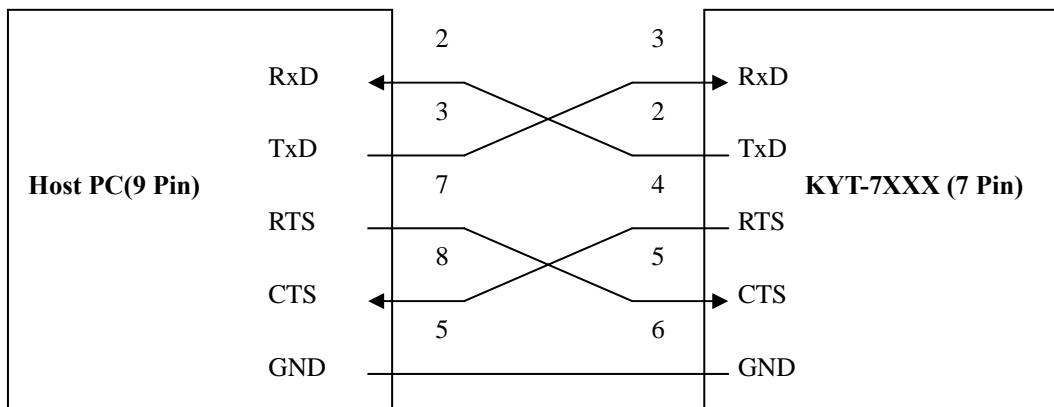
## 7. Interface Requirements.

### 7.1 Standard.

#### 7.1.1 RS-232C Interface.

Part Number: D-SUB Standard 9Pin

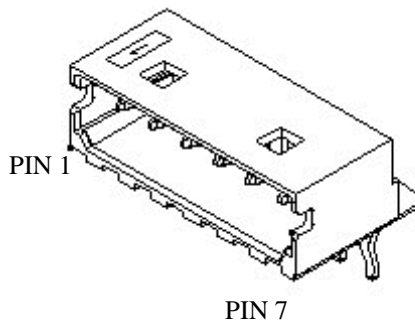
Part Number : 53015-0710(Molex)



- Transmission Distance : Max. 1.5m

#### 7.1.2 Pin Assignment.

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



PIN NO	NAME
1	VCC
2	TXD
3	RXD
4	RTS
5	CTS
6	GND
7	GND



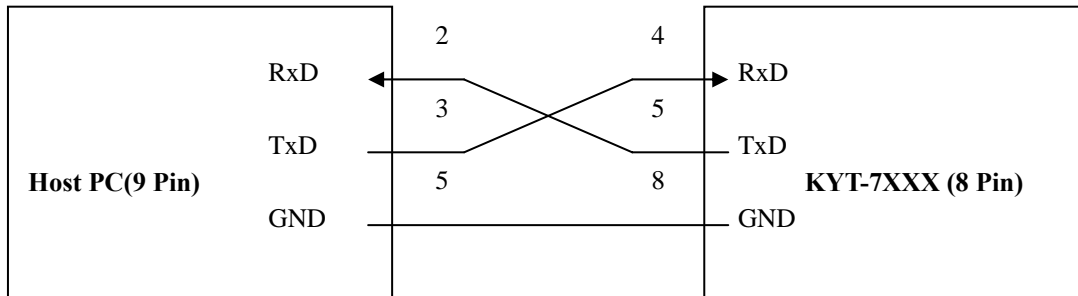
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## 7.2 Option.

### 7.2.1 RS-232C Interface.

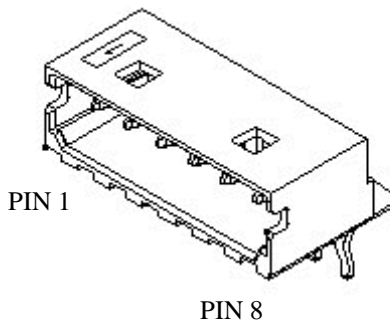
Part Number: D-SUB Standard - 9Pin

Part Number : 53015-0710(Molex)



### 7.2.2 Pin Assignment.

\* Connector Location Number : J2 - Part Number : 53015-0710(Molex)



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

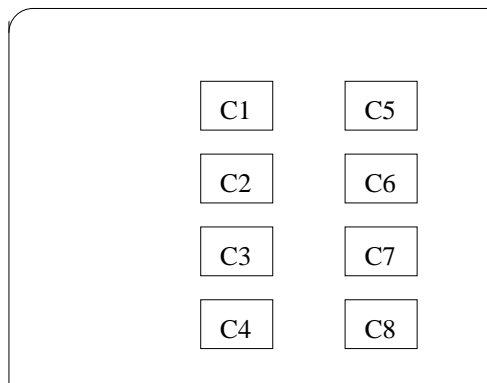
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## 8. IC Card Process

KYT-7XXX accepts most of IC cards supporting ISO 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.

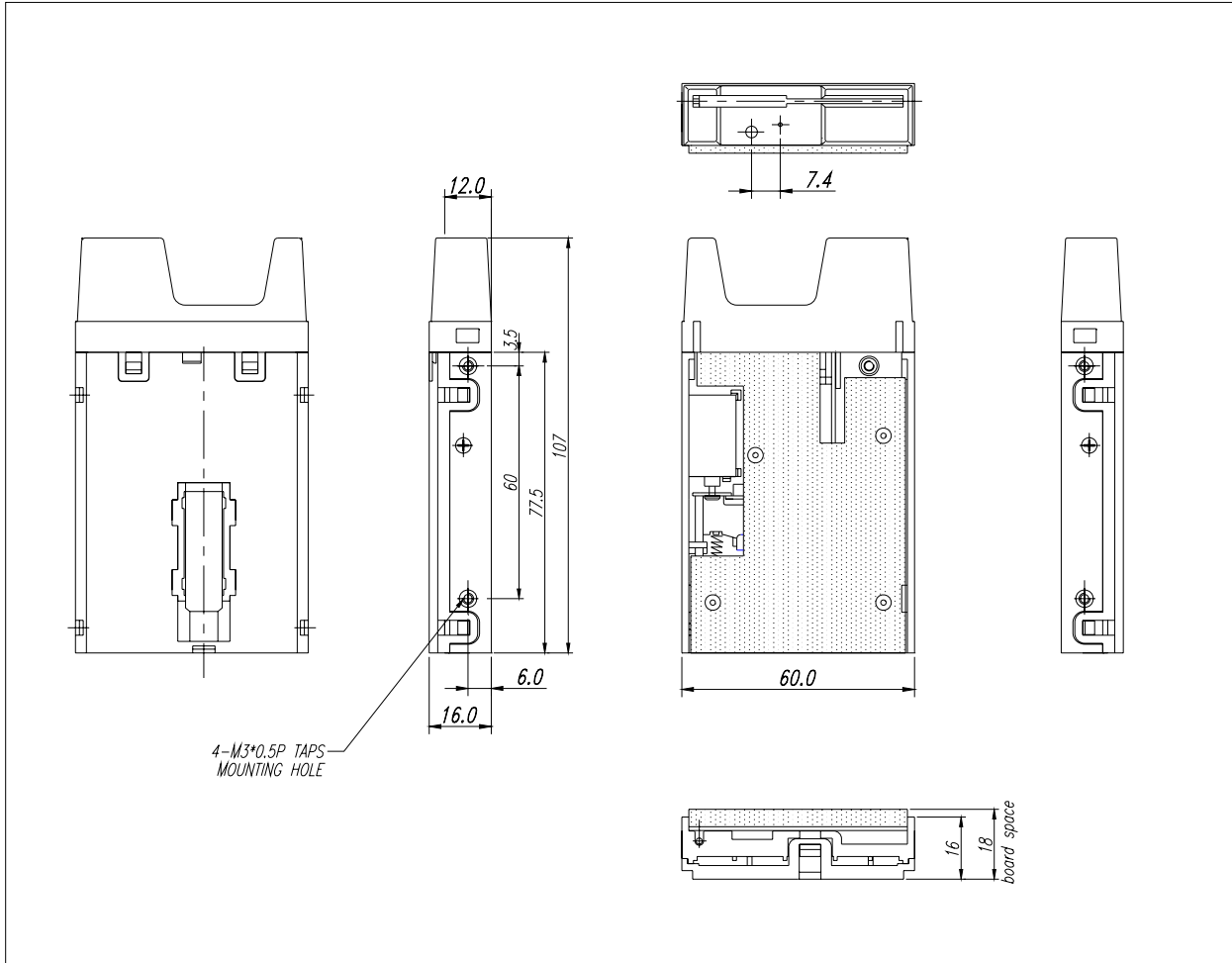
### ◆ Power Consumption

: Less than 50mA

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## 10. Technical Drawing

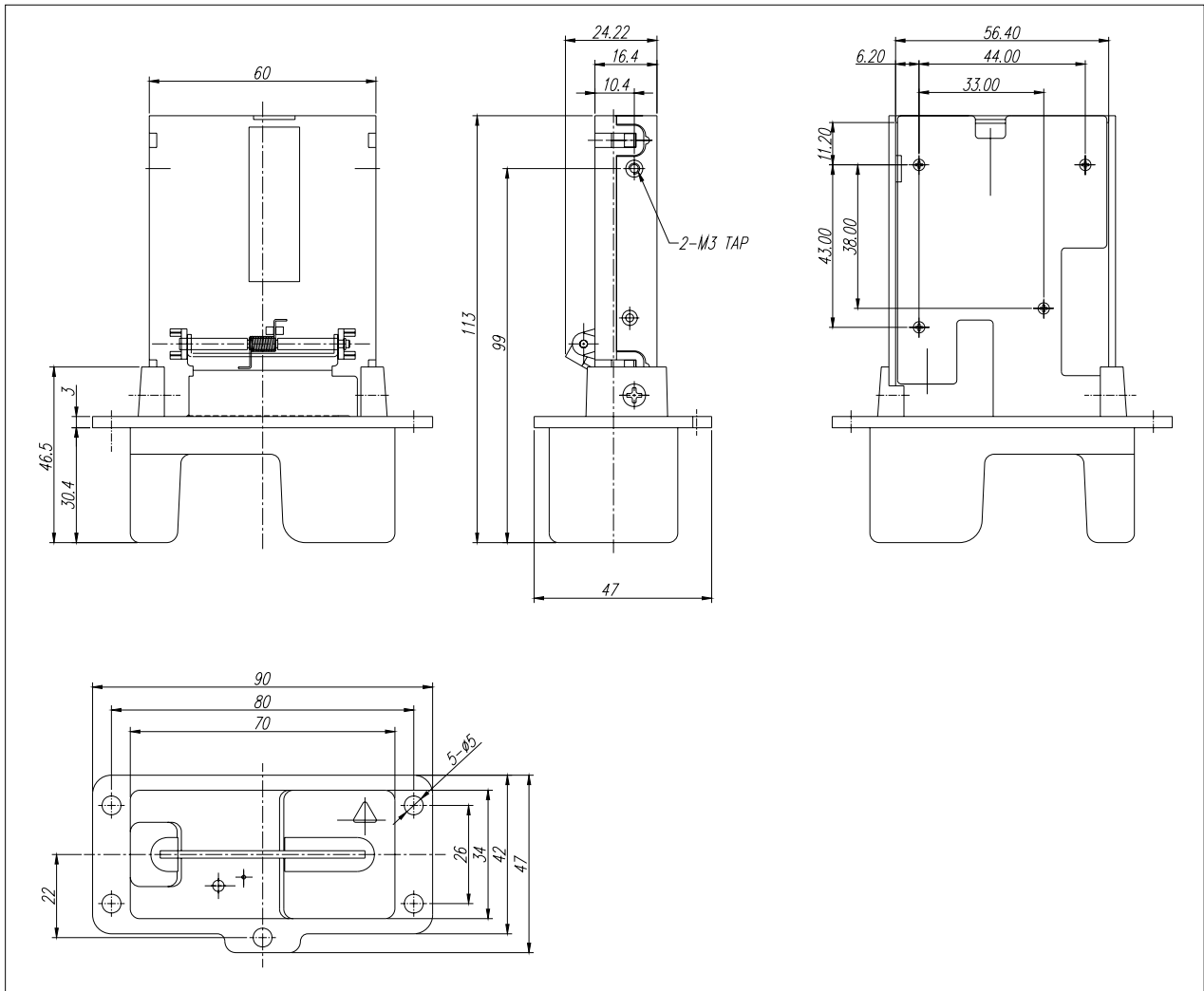
KYT-72XX DIMENSIONS



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

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### KYT-73XX DIMENSIONS



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

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# *Interface*

**MS Reader & IC Card Reader/Writer**

**MODEL: KYT- 7XXX Series**

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## 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
-----	-------	-------	-----	-----	-----	-----	-----



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.

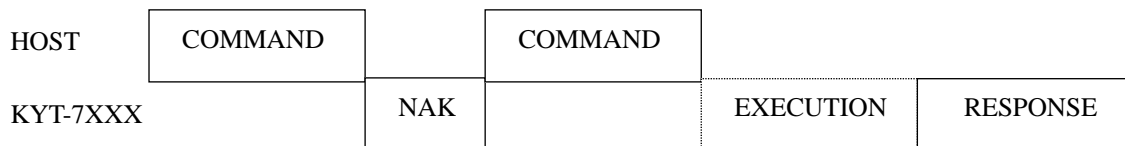
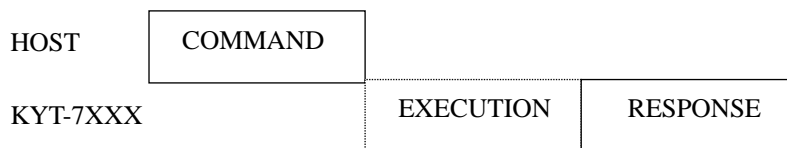
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### 3.4. STAT Structure Format

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		
1	X		
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.	
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	

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## 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	

## 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
-----	-------	-------	-----	-----	-----	-----	-----



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## 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	1			1 ~ 3				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

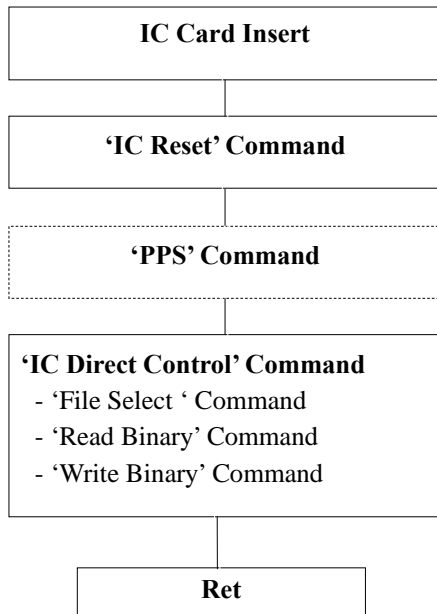
STX	Len_H	Len_L	'P'	STAT	ETX	BCC
-----	-------	-------	-----	------	-----	-----

Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC
-----	-------	-------	-----	-----	-----	-----	-----

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< 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
-----	-------	-------	-----	------	-----	-----

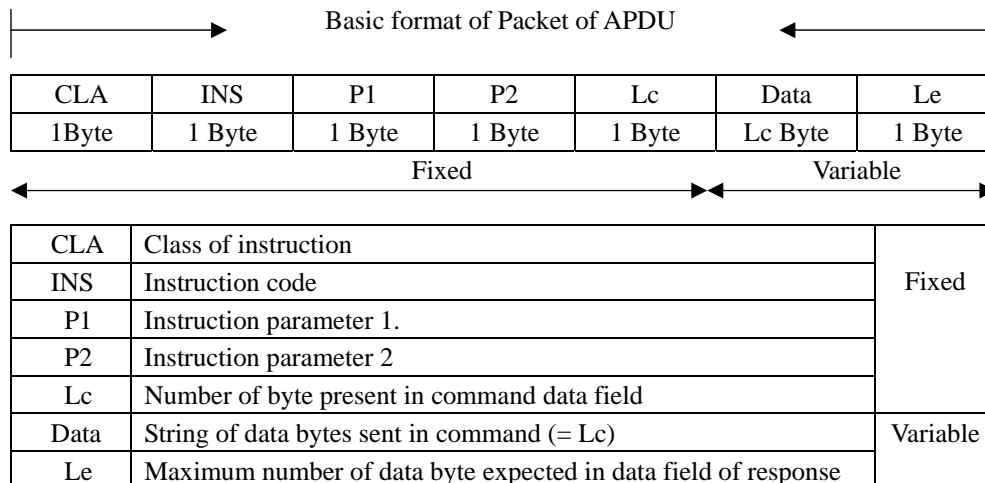
#### Positive Response Packet

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.



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

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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
-----	-------	-------	-----	-----	-----	-----	-----

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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 SAM Slot.

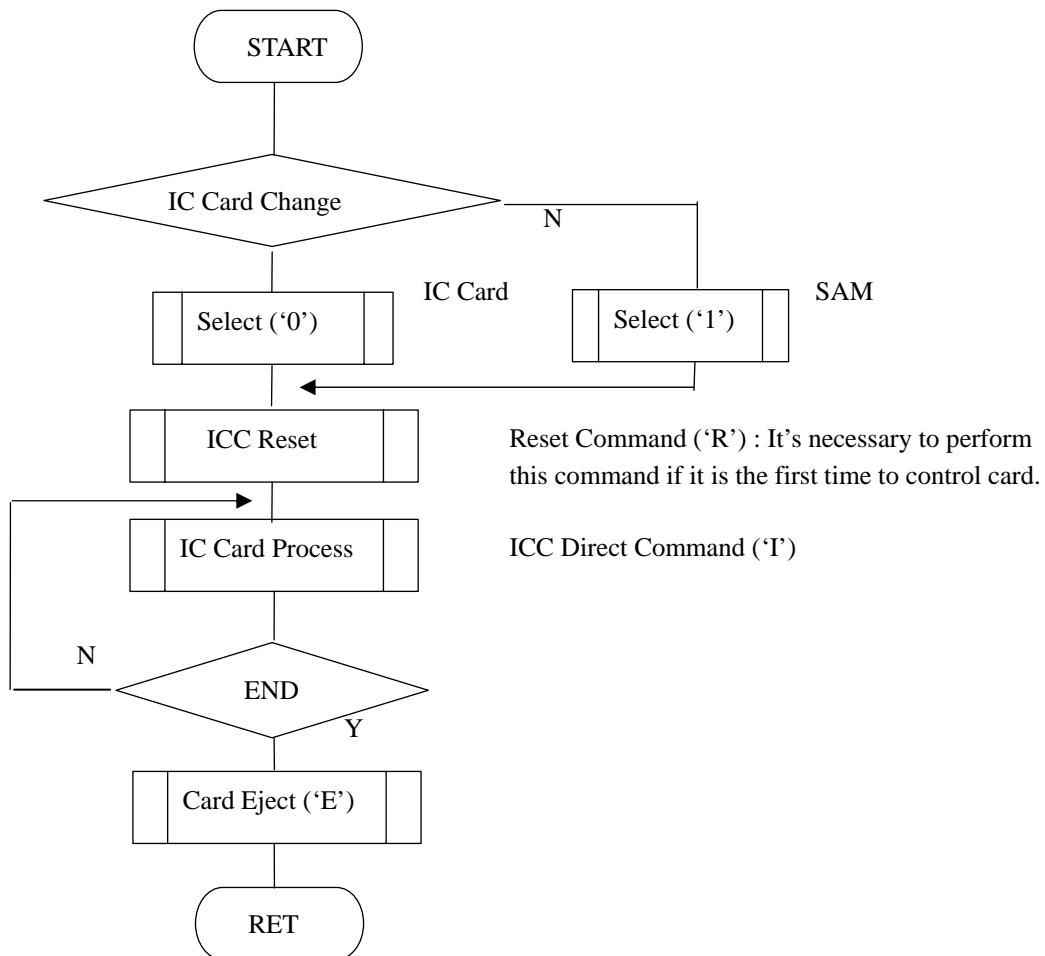
Positive Response Packet

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)



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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
--------------	-----	--------------	-----	--------------

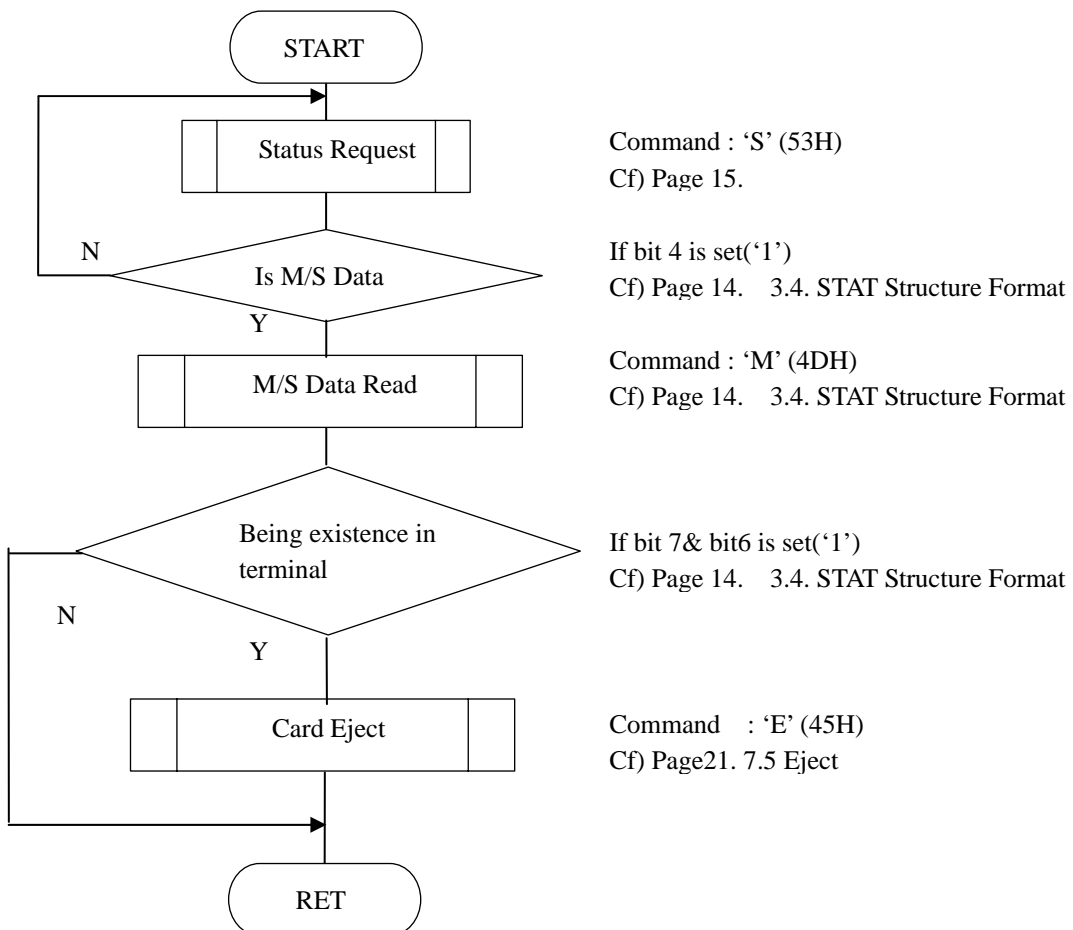
Cf) "00h" byte added to classify each track, And transmit 3 Byte('N',ST1, ST2) every track if Error occur while reading data.

(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)



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7.5 Eject.

7.5.1 'E' (25H) : 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
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Negative Response Packet

STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC
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