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## MODEL NAME INFORMATION

K Y X - 3 X X X X

INTERFACE	FUNCTION	MS / IC	TRACK	OPTION	OPTION II
T: RS-232C L: TTL	3: MOTORIZED MS / IC CARD READER	0: - 1: IC ONLY 2: MS- READ ONLY 3: MS- R/W 5: MS(READ ONLY) + IC 6: MS(R/W)+IC	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 bezel 1: LOW-CO Short bezel 2: HI-CO Short bezel 3: LOW-CO & Shutter 4: HI-CO & Shutter 5: Shutter	R: RF

\*IC CONTACT : 8 PIN

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## 1. OVERVIEW

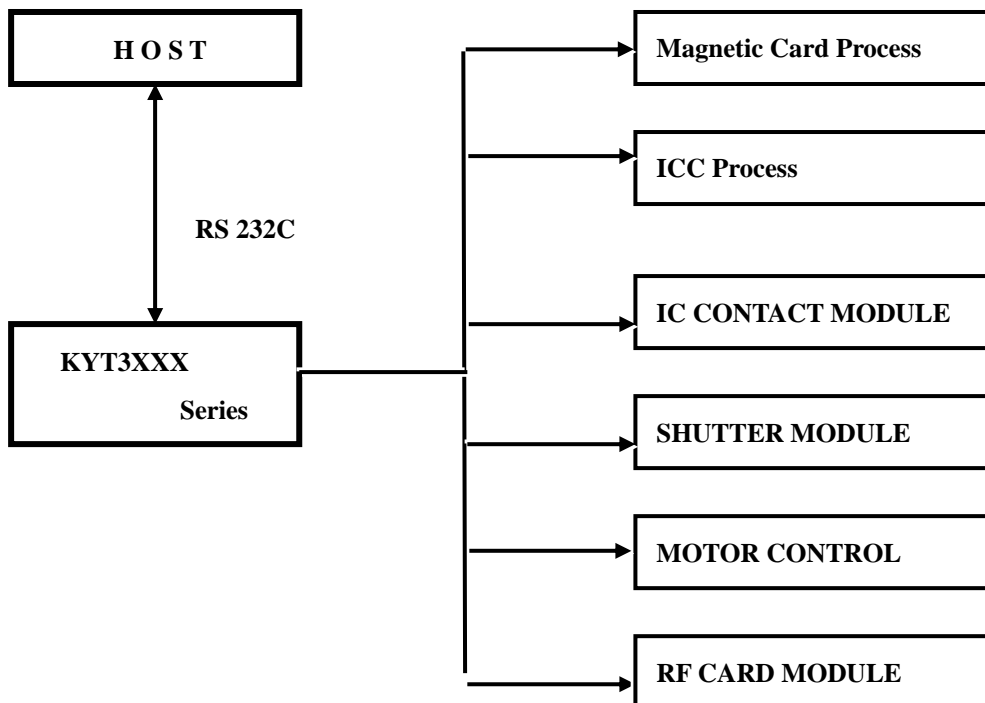
This specification is for the KYT-3XXX Series Motorized Magnetic and or IC Card Reader/Writer. In meeting customer's applications, intended data can be written and read through RS-232C communication.

This model has a function that is a reading writing a IC card confirming to ISO 7816 Part 1 – Part4(T=0, T=1) card, Additionally, this model also can be used for the RF card Conforming to the MIFARE.

KYT-3XXX Series has very compact and robust structure providing high reliability and long life.

KYT-3XXX series is suitable for Banking Terminals, Credit/Debit Card System, Auto ID and Access Control Application.

## 2. System Block Diagram



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### 3. Features

- 3.1 Magnetic Stripe reading Triple tracks.
- 3.2 RS-232C interface with a HOST.
- 3.3 IC Card read and writers.
- 3.4 Support T=0 and T=1 protocol.

### 4. Environmental Requirements

- 4.1 Operating Locus : in door use Only
- 4.2 Operating Temperture and Humidity : 5°C to 50°C(In 0°C to +5°C range, all specifications but 'Warped card' to be satisfied)
- 4.3 Conservation Temperature and humidity : 5% to 80% RH(No Codensation)
- 4.4 Vibration : Amplitude 2mm, 10 to 50Hz X,Y,Z directions for 30min, 2G or less
- 4.5 Shock Resistance : Up to 30, 11msec

### 5. Specifications

- 5.1 Card Standard : ISO7811, ISO7816
- 5.2 Recording

	ISO Track 1	ISO Track 2	ISO Track 3
<b>BPI</b>	210	75	210
<b>Capacity</b>	Max 79	Max 40	Max 107
<b>Reading Methods</b>	F2F		
<b>Length</b>	Variable		
<b>Card thickness</b>	Plastic : 0.76 ( +- ) 0.08mm		

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### 5.3 Power Consumption

#### 5.3.1 Input voltage

Pin No	Remark
1	DC +24V(( +- ) 10%, 1.5A)
2	NC
3	Power Ground

5.3.2 Ripple : Less than 200 mVp-p

5.4 IC Contact Resistance : Less than 0.5Ω

5.5 IC Contact Force : 0.2N ~ 0.6N

5.6 Card Feeding Speed : 350mm/Sec(( +- ) 10%)

5.7 Weight : 1.68KG (Full option)

### ◆ Communication Environment

Asynchronous, Half duplex.

Baud Rate : 9600, 19200, 38400, 57600 BPS (Default : 19200 BPS)

Start Bit : 1Bit

Data Length : 8Bits

Parity : None

Stop Bit : 1Bit

## 6. Magnetic Card Process

KYT3000 Series is able encode data on all three tracks of ISO 1,2 and 3 in one Pass, which makes read/write process time shorter. It is a basic standard option to Read and Write to Low-co card. Optionally Hi-Co Card is read/Write.

### ◆ Power Consumption

Motor Starting or Reversing : Less than 250 mA

Card Feed & Reading : Less than 600 mA

Card Feed & Writing : Less than 600 mA

Steady state : Less than 100 mA

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◆ **Life and Reliability.**

Life of Head : Approximately 500,000 passes  
(One pass is for forward and backward movement)

Error Rate : 3/1000 cycle

◆ **Warped Cards :** This term refers to an evenly warped card having a height from the top of the convex surface to the base of the warped edge.



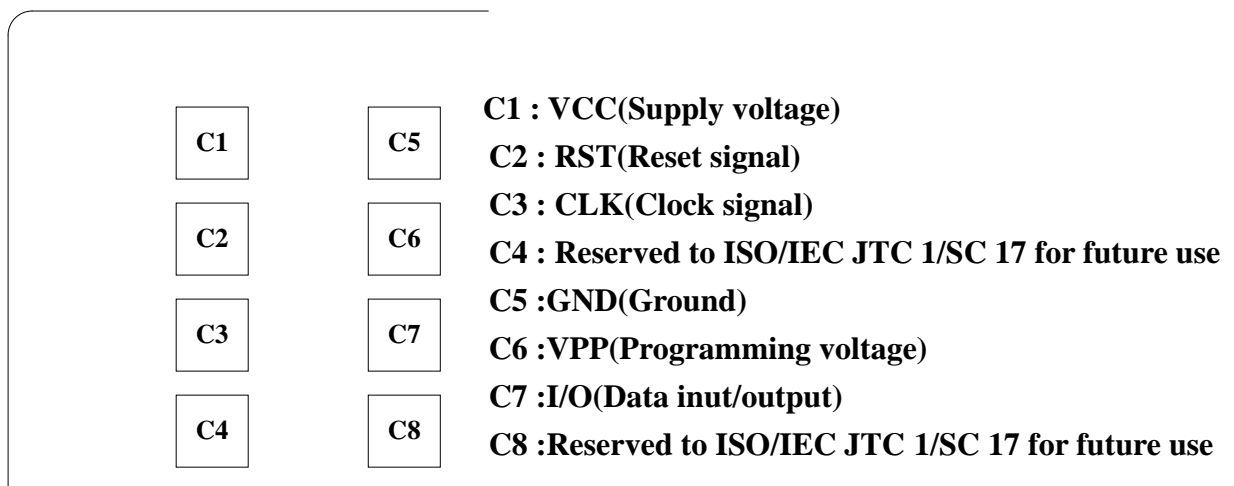
H : 3.00mm Max. for card jamming

## 7. IC Card Process

KYT3XXX accepts most of IC cards supporting ISO7816 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.



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◆ Power Consumption

Motor Starting or Reversing : Less than 250mA  
 Card Feed & Reading /Writing : Less than 700mA  
 Steady state : Less than 100mA

◆ Life and Reliability

IC Contact : Approximately 500,000 Passes.  
 Error Rate : 3/1000 cycle.

## 8. RF Card Process

The RF module supports most of RF cards conforming with the ISO14443-3 Type A(MIFARE Card) with 8 K bit 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

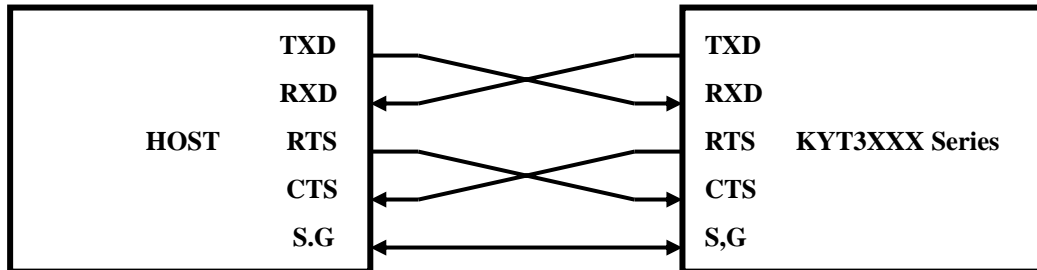
◆ *Operating Frequency*

Operating Frequency : 13.56 MHz  
 Data Transfer Baud : Baud rate 106Kbaud

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## 9. Interface Requirement

### 9.1 RS-232C Interface



CASE 1) Part Number : RED-9S-LNA(HIROSE)

Location Number : P1

Pin No	INDEX	Remark
2	RXD	Receive
3	TXD	Transmit
7	RTS	Request to Send
8	CTS	Clear to Send
5	S.G	Signal Ground

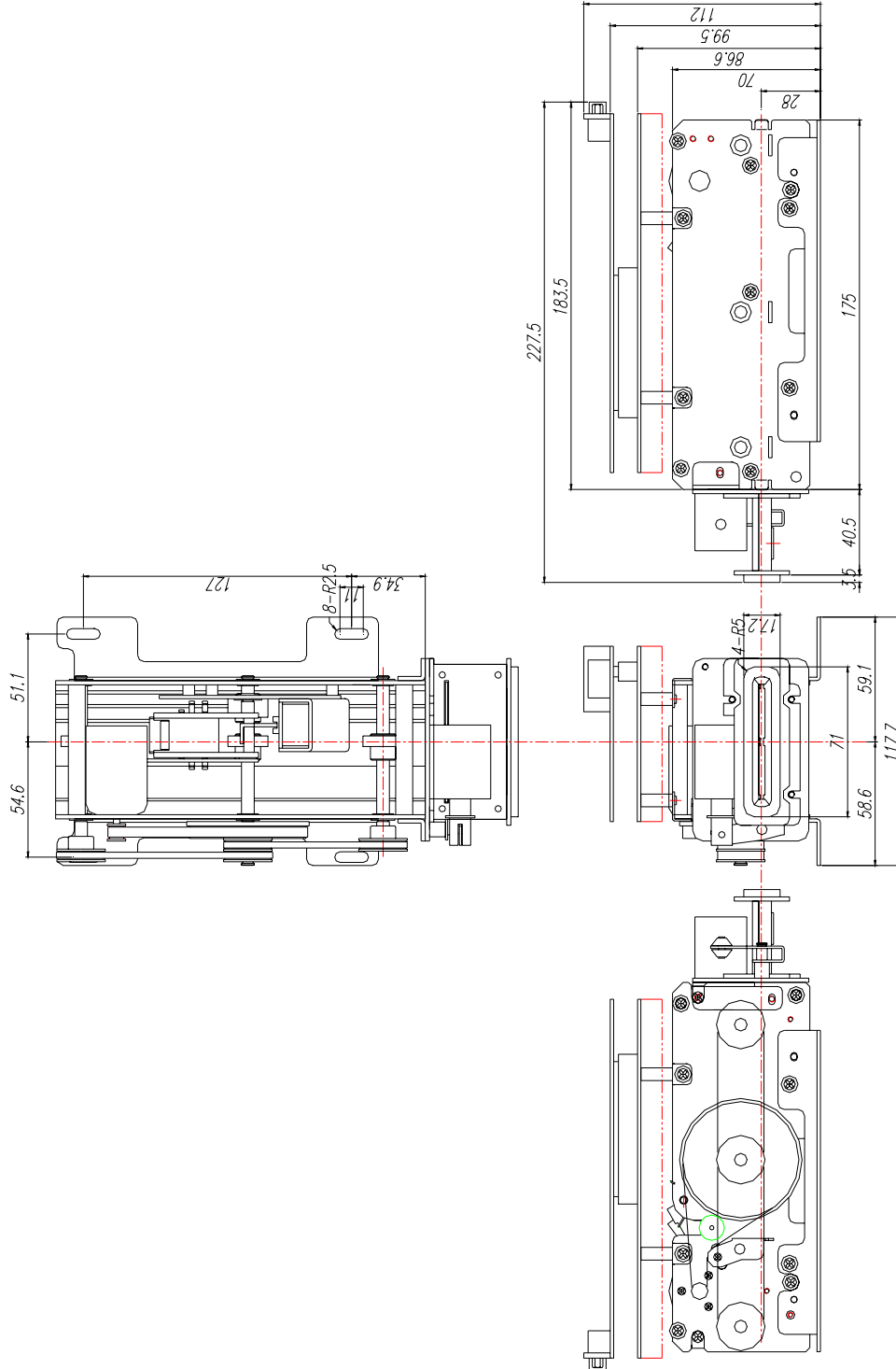
CASE 2) Part Number : 53015-0510(MOLEX)

Location Number : CN1

Pin No	INDEX	Remark
1	RTS	Request to Send
2	RXD	Receive
3	TXD	Transmit
4	CTS	Clear to Send
5	GND	Signal Ground

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## 10 . Technical Drawing



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# *Interface*

**Motorized Magnetic and IC Card And RF Card Reader/Writer**

**MODEL : KYT 3XXX**

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## 1. Communication Method

- 1.1. Asynchronous, Half duplex.
- 1.2. Baud Rate : 9600, 19200 38400, 57600BPS(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

SOH	Code	Cm	Pm	STX	DATA	ETX	BCC
-----	------	----	----	-----	------	-----	-----

Ref.) Command Sets List

### 3.2. Response structure

#### 3.2.1. Positive Packet structure

SOH	Code	Cm	Pm	STX	'P'	STATUS	DATA	ETX	BCC
-----	------	----	----	-----	-----	--------	------	-----	-----

#### 3.2.2. Negative Packet structure

SOH	Code	Cm	Pm	STX	'N'	ST1	ST2	ETX	BCC
-----	------	----	----	-----	-----	-----	-----	-----	-----

|----- BCC(XOR) -----|

Ref.) Negative Response Code List

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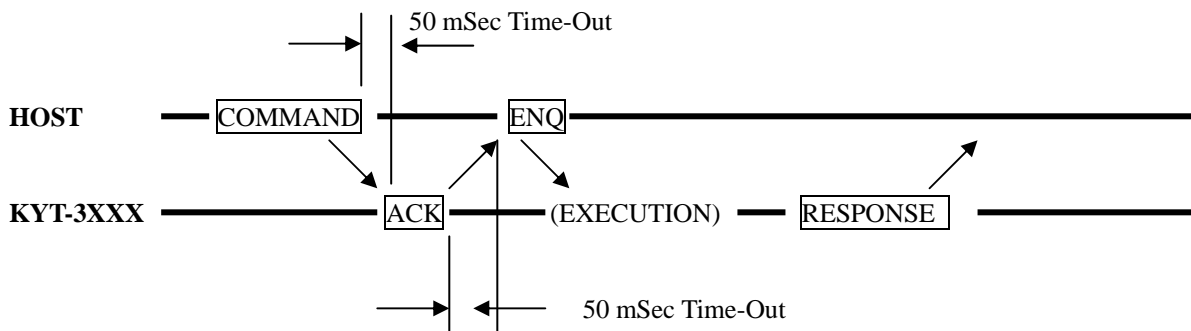
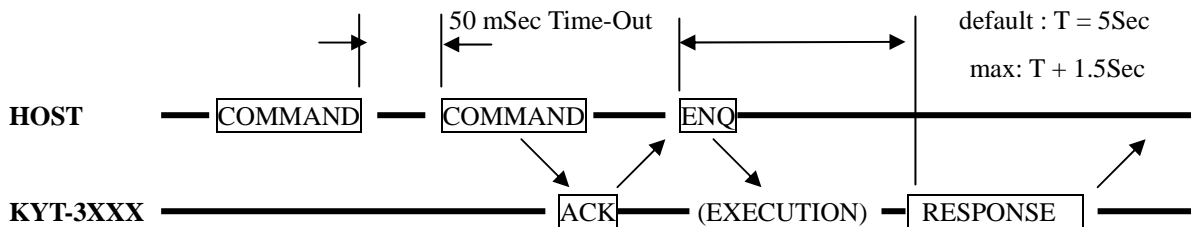
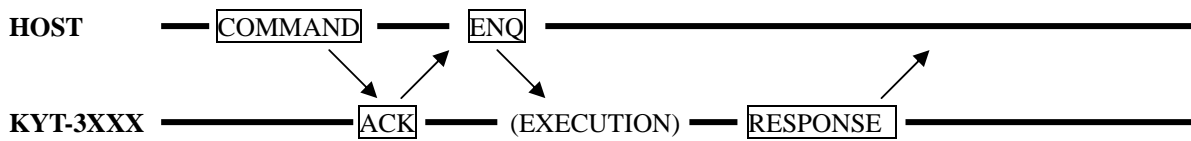
### 3.3.3 STATUS Structure Format

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

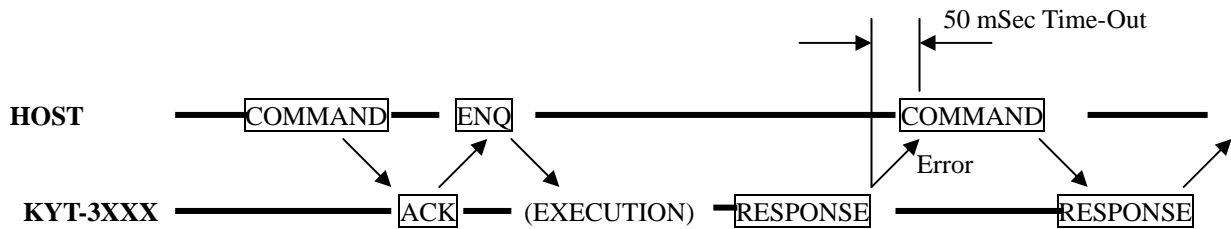
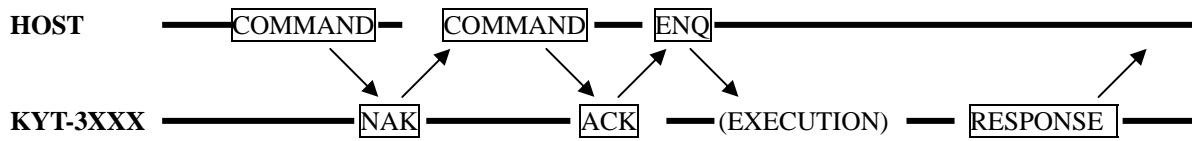
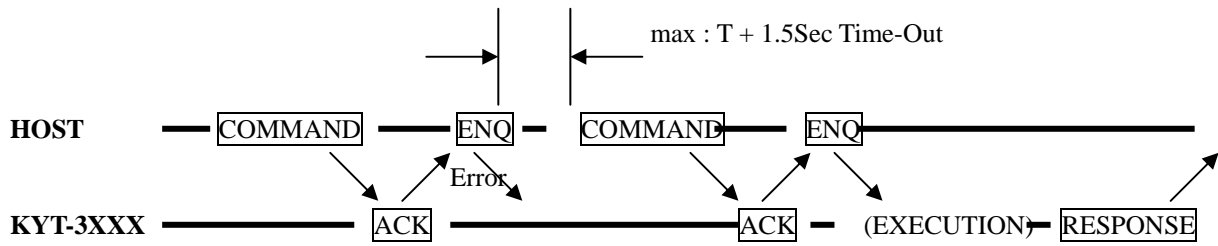
BIT	Description	REMARK
7	If Card Remained inside the unit (Yes: 1, No: 0)	
6	Approval to insert Card (Yes: 1, No: 0)	
5	X	0: Default
4	1 – RTS/CTS Setting Up 0 – RTS/CTS Removal	
3	X	
2	X	
1	X	
0	X	

## 4. Communication Protocol Sequence & Timing

( T : Time Setting Value(Refer to “C90” ) )



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- Exception : If Card "STAND-BY" Time is designated as longer than 5 Sec., designate time + 5 Sec

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## 5. Command Sets List

	Code	Cm	Pm	Description	Note	
Initialize	43h	30h	30h	Initialize after forward direction Card discharge		
	43h	30h	31h	Initialize after reverse direction Card discharge		
	43h	30h	32h	Initialize after transfer to "STAND-BY" mode		
Request	43h	31h	30h	Read present Card location		
	43h	31h	31h	Read F/W Version of unit		
Card Control	43h	32h	30h	Approve to insert Card	Card Insertion Approval setting	
	43h	32h	31h	Prohibit to insert Card		
Moving	43h	33h	30h	Card Forward Direction Discharge		
	43h	33h	31h	Card Reverse Direction Discharge (Capture)		
	43h	33h	32h	Transfer to "STAND-BY" mode		
	43h	33h	33h	Card movement(FRONT ->REAR)		
	43h	33h	34h	Card ejection to the front		
	43h	33h	35h	Card Entry(M/S No Check)		
	43h	33h	36h	Card Entry After M/S Check		Pre_Head
	43h	33h	41h	IC Card Accept & Contact		IC Control
M/S Read	43h	34h	30h	1 Track Data Reading		
	43h	34h	31h	2 Track Data Reading		
	43h	34h	32h	3 Track Data Reading		
	43h	34h	33h	1,2,3 All Track Data Reading		
	43h	34h	35h	1 Track Reading after Card Insertion STAND-BY		
	43h	34h	36h	2 Track Reading after Card Insertion STAND-BY		
	43h	34h	37h	3 Track Reading after Card Insertion STAND-BY		
	43h	34h	38h	1,2,3 All Track Reading after Card Insertion STAND-BY		
M/S Write	43h	35h	30h	1 Track Data Writing		
	43h	35h	31h	2 Track Data Writing		
	43h	35h	32h	3 Track Data Writing		
	43h	35h	35h	1 Track Writing after Card Insertion STAND-BY		
	43h	35h	36h	2 Track Writing after Card Insertion STAND-BY		
	43h	35h	37h	3 Track Writing after Card Insertion STAND-BY		
IC Card Control	43h	36h	35h	IC Direct Control	IC Contact Option	
	43h	36h	38h	IC Card Reset		
RF Card Control	52h	31h	30h	Identify the sector and block set at terminal.		
	52h	31h	31h	Identify whether if the antenna detect the card.		
	52h	31h	32h	Change the sector and block set at terminal.		
	52h	31h	33h	authentication key Read ( KeyA or KeyB).		
	52h	31h	34h	Get the RF Card's serial.		
	52h	31h	35h	Select the authentication key: KeyA or KeyB.		
	52h	32h	30h	RF Card Data(balance or character) Read.		
	52h	32h	31h	RF Card Data (balance) Read.		
	52h	32h	32h	RF Card Data (balance) Write.		
	52h	32h	33h	RF Card Data (balance or character) Write.		
	52h	32h	34h	Increment the balance of card to the specified amount.		
	52h	32h	35h	Decrement the balance of card to the specified amount..		

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	Code	Cm	Pm	Description	Note
	52h	32h	41h	RF Card Data(balance or character) Read.	
	52h	32h	42h	RF Card Data (balance) Read.	
	52h	32h	43h	RF Card Data (balance) Write.	
	52h	32h	44h	RF Card Data (balance or character) Write.	
	52h	32h	45h	Increment the balance of card to the specified amount.	
	52h	32h	46h	Decrement the balance of card to the specified amount..	
	52h	33h	30h	RF Card Key Change(Access Condition Data Exclude).	
	52h	33h	31h	RF Card Key Change(Access Condition Data inclusion).	
	52h	33h	32h	Module Key Change.	
	52h	34h	30h	Power On (The carrier wave emitted in antenna.)	
	52h	34h	31h	Power Off(The carrier wave not emitted in antenna.)	
Retry Set	43h	37h	30h	Retry 0	
	43h	37h	31h	Retry 1	
	43h	37h	32h	Retry 2	
	43h	37h	33h	Retry 3	
	43h	37h	34h	Retry 4	
Cleaning	43h	38h	30h	Head Cleaning	
Buzzer Control	43h	38h	31h	Good Buzzer On	
	43h	38h	32h	Error Buzzer On	
Setting	43h	39h	30h	Card Wait Time Set	
	43h	39h	31h	Series(RTS,CTS) Setting	
	43h	39h	32h	Series(RTS,CTS) Cancellation	
	43h	39h	33h	Baud Rate Setting	

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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'	Fail Card	
4	'0'	'4'	Card JAM Error	
5	'0'	'5'	Data Fail	
6	'0'	'6'	Time Out	
7	'0'	'7'	Write Error	
8	'0'	'8'	Blank Error	
9	'0'	'9'	Pre_Amble Error	
10	'1'	'0'	Parity Error	
11	'1'	'1'	Post_Amble Error	
12	'1'	'2'	LRC Error	
13	'1'	'4'	IC Card Contact Error	
14	'1'	'5'	IC Card Control Error	
15	'1'	'6'	IC Read Error	
16	'1'	'7'	IC Write Error	
17	'1'	'8'	Not Define	
18	'1'	'9'	RF POWER On Error	
19	'2'	'0'	RF Card Authentic Error	
20	'2'	'1'	RF Card Select Error	
21	'2'	'2'	RF Card Anticllsion Error	
22	'2'	'3'	RF Card Read Error	
23	'2'	'4'	RF Card Write Error	
24	'2'	'5'	RF Card Inc Error	
25	'2'	'6'	RF Card Dec Error	
26	'2'	'7'	RF Card Value Error	
27	'2'	'8'	Sector or Block Error	
28	'2'	'9'	RC500 Init Error	

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## 7. Command Detail

### 7.1 Initialize

7.1.1 “C00” : If Card Remained inside the unit, Initialize after forward direction

Card discharge

Command Packet

SOH	'C'	'0'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'0'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'0'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

7.1.2 “C01” : If Card Remained inside the unit, initialize after reverse direction

Card discharge (Capture)

Command Packet

SOH	'C'	'0'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'0'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'0'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

7.1.3 “C02” : If Card Remained inside the unit , Initialize after transfer to  
“STAND-BY” mode

Command Packet

SOH	'C'	'0'	'2'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'0'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'0'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.2 Request

### 7.2.1 “C10” : Read exact Card location

Command Packet

SOH	'C'	'1'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'1'	'0'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

X	X	X	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
---	---	---	-------	-------	-------	-------	-------

BIT

- 4 : Sensor 5(Front Sw : Shutter Model )
- 3 : Sensor 4
- 2 : Sensor 3
- 1 : Sensor 2
- 0 : Sensor 1

Refer To DRAWING

Negative Response Packet

SOH	'C'	'1'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.2.1 “C11” : F/W Version Read

Command Packet

SOH	'C'	'1'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'1'	'1'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

'V'	X1	'.'	X2	X3
-----	----	-----	----	----

Ex) “V1.00”

Negative Response Packet

SOH	'C'	'1'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.3 Card Control

#### 7.3.1 “C20” : Approval Card Insertion into the unit.

When this command is sent to card reader , card reader takes a card into its body after the card is detected by sensors. And all following processes are executed according to commands .

Command Packet

SOH	'C'	'2'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'2'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'2'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

#### 7.3.2 “C21” : Prohibit Card Insertion into the unit

This is a command to disable above command “C20” .

Command Packet

SOH	'C'	'2'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'2'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'2'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.4 Card Moving

#### 7.4.1 “C30” : If Card Remained inside the unit, forward direction Card Discharge(EJECT)

Command Packet

SOH	'C'	'3'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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**7.4.2 “C31”** : If Card Remained inside the unit, reverse direction Card Discharge(CAPTURE)

Command Packet

SOH	'C'	'3'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.4.3 “C32”** : If Card Remained inside the unit, transfer to “READ STAND-BY” mode

Command Packet

SOH	'C'	'3'	'2'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.4.4 “C33”** : If Card Remained inside the unit, transfer to “WRITE STAND-BY” mode ( Function “C32” identical )

Command Packet

SOH	'C'	'3'	'3'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'3'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'3'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.4.5 “C34”** : Card ejection to the front if card is inside MSRW.

Command Packet

SOH	'C'	'3'	'4'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'4'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'4'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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**7.4.6 “C35”** : After receiving this command, Card Reader stands by for insertion of a card for defined time duration. After checking the insertion of a card, Card Reader takes in the card.

Command Packet

SOH	'C'	'3'	'5'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'5'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'5'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.4.7 “C36”** : After receiving this command, Card Reader stands by for insertion of a card defined time duration. Realizing the card insertion, Card Reader takes in the card after checking if data (i.e, bits) is written on magnetic stripe(Pre\_Head setting)

Command Packet

SOH	'C'	'3'	'6'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'6'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'6'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.4.8 “C3A”** : Card Reader considers the checked card IC card if Card Reader receives this command After making contact with IC card ,Card Reader stands by for IC card control command.

Command Packet

SOH	'C'	'3'	'A'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'3'	'A'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'3'	'A'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.5 Magnetic Data Read

### 7.5.1 “C40” : If Card Remained inside the unit , Track Data Read

Command Packet

SOH	'C'	'4'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'0'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 76 Byte ASCII String

Negative Response Packet

SOH	'C'	'4'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.5.2 “C41” : If Card Remained inside the unit, 2 Track Data Read

Command Packet

SOH	'C'	'4'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'1'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 37 Byte ASCII String

Negative Response Packet

SOH	'C'	'4'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.5.3 “C42” : If Card Remained inside the unit, 3 Track Data Read

Command Packet

SOH	'C'	'4'	'2'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'2'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 104 Byte ISCII String

Negative Response Packet

SOH	'C'	'4'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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**7.5.4 “C43”** : If Card Remained inside the unit, ALL Track(1, 2, 3 Track) Data Read

Command Packet

SOH	'C'	'4'	'3'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'3'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

1 Track Data	00h	2 Track Data	00h	3 Track Data
--------------	-----	--------------	-----	--------------

Return Negative Code in case of Read Error

(Ref. : Negative Response Code List)

Negative Response Packet

SOH	'C'	'4'	'3'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.5.5 “C45”** : If No Card Remained inside the unit, STAND-BY for specified time and Read 1 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'4'	'5'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'5'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 76 Byte ASCII String

Negative Response Packet

SOH	'C'	'4'	'5'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.5.6 “C46”** : If No Card Remained inside the unit, STAND-BY for specified time and Read 2 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'4'	'6'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'6'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 37 Byte ASCII String

Negative Response Packet

SOH	'C'	'4'	'6'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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**7.5.7 “C47”** : If No Card Remained inside the unit, STAND-BY for specified time and Read 3 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'4'	'7'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'7'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA : 1 – 104 Byte ASCII String

Negative Response Packet

SOH	'C'	'4'	'7'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

**7.5.8 “C48”** : If No Card Remained inside the unit, STAND-BY for specified time and Read 1,2,3 all TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'4'	'8'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'4'	'8'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

1 Track Data	00h	2 Track Data	00h	3 Track Data
--------------	-----	--------------	-----	--------------

Return Negative Code in case of Read Error

(Ref. : Negative Response Code List)

Negative Response Packet

SOH	'C'	'4'	'8'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

## 7.6 Magnetic Data Write

**7.6.1 “C50”** : If Card Remained inside the unit, 1 Track Data Write

Command Packet

SOH	'C'	'5'	'0'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 76 Byte ASCII(ALPHA\_NEMERIC) String

Positive Response Packet

SOH	'C'	'5'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.6.2 “C51” : If Card Remained inside the unit, 2 Track Data Write

Command Packet

SOH	'C'	'5'	'1'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 37 Byte ASCII(NUMERIC Only) String

Positive Response Packet

SOH	'C'	'5'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.6.3 “C52” : If Card Remained inside the unit, 3 Track Data Write

Command Packet

SOH	'C'	'5'	'2'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 104 Byte ASCII(NUMERIC) String

Positive Response Packet

SOH	'C'	'5'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.6.5 “C55” : If No Card Remained inside the unit, STAND-BY for specified time and Write 1 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'5'	'5'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 76 Byte ASCII(ALPHA\_NEMERIC) String

Positive Response Packet

SOH	'C'	'5'	'5'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'5'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.6.6 “C56” : If No Card Remained inside the unit, STAND-BY for specified time and Write 2 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'5'	'6'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 37 Byte ASCII(NUMERIC Only) String

Positive Response Packet

SOH	'C'	'5'	'6'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'6'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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7.6.7 “C57” : If No Card Remained inside the unit, STAND-BY for specified time and Write 3 TRACK Data if Card is inserted.

Command Packet

SOH	'C'	'5'	'7'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : 1 – 104 Byte ASCII(NUMERIC) String

Positive Response Packet

SOH	'C'	'5'	'7'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'5'	'7'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.7 IC Card Control

### 7.7.1 “C65” : ICC Direct Control

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

#### Command Packet

SOH	'C'	'6'	'5'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

#### Positive Response Packet

SOH	'C'	'6'	'5'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

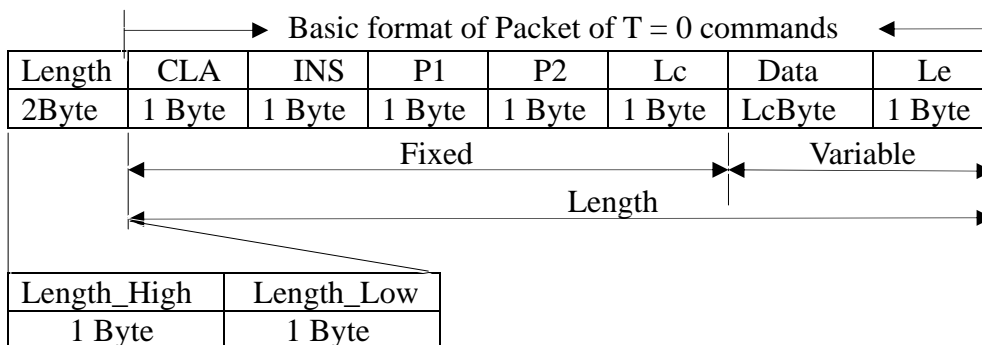
#### DATA Structure

Length_High	Length_Low	RESULT
2BYTE Length		Length

#### Negative Response Packet

SOH	'C'	'6'	'5'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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



CLA	Class	
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 is composed of followings ;

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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 ISO 7816-4 .

### 7.7.2 “C68” : Command for sending Reset Signal Contacted IC Card and for receiving ATR from IC Card.

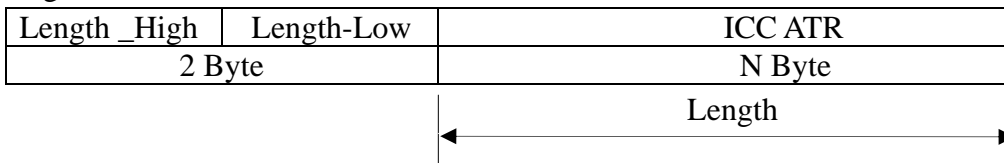
Command Packet

SOH	'C'	'6'	'8'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'6'	'8'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA of above Positive Response Packet is ATR data received from IC card after Reset signal is sent to IC card . The format of DATA is as follows ;



EX)

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

Negative Response Packet

SOH	'C'	'6'	'8'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.8 RF Card Control

### 7.8.1 “R10” : Identify the sector and block set at terminal.

Command Packet

SOH	'R'	'1'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'R'	'1'	'0'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	RESULT
2BYTE Length		Length

Negative Response Packet

SOH	'R'	'1'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.2 “R11” : Identify whether if the antenna detect the card.

Command Packet

SOH	'R'	'1'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'R'	'1'	'1'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	RESULT
2BYTE Length		Length

Result Structure.

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

Negative Response Packet

SOH	'R'	'1'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.3 “R12” : Change the sector and block set at terminal.

Command Packet

SOH	'R'	'1'	'2'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Sector&Block
2BYTE Length		Length

Result Structure.

BYTE	
1 Byte	Sector
2 Byte	Block

Positive Response Packet

SOH	'R'	'1'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'R'	'1'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.4 “R13” : authentication key Read ( KeyA or KeyB).

Command Packet

SOH	'R'	'1'	'3'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'R'	'1'	'3'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	RESULT
2BYTE Length		Length

Result Structure.

Result	
0x00	Secret key A
0x01	Secret key B

Negative Response Packet

SOH	'R'	'1'	'3'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.5 “R14” : Get the RF Card’s serial.

Command Packet

SOH	‘R’	‘1’	‘4’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘R’	‘1’	‘3’	STX	‘P’	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	RESULT
4BYTE Length		Length

Result Structure.

LSB		MSB
-----	--	-----

Negative Response Packet

SOH	‘R’	‘1’	‘4’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.6 “R15” : Select the authentication key: KeyA or KeyB.

Command Packet

SOH	‘R’	‘1’	‘5’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key Data
1BYTE Length		Length
Secret key Data		
0x00	Secret key A	
0x01	Secret key B	

Positive Response Packet

SOH	‘R’	‘1’	‘5’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘1’	‘5’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.6 “R20” : RF Card Data(balance or character) Read.

Command Packet

SOH	'R'	'2'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'R'	'2'	'0'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	Read Data
16BYTE Length		Length

Read Data Structure.

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

Negative Response Packet

SOH	'R'	'2'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.7 “R21” : RF Card Data (balance) Read.

Command Packet

SOH	'R'	'2'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'R'	'2'	'1'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	Read Data
4BYTE Length		Length

Result Structure.

D0	D1	D2	D3
1Byte	1Byte	1Byte	1Byte

Negative Response Packet

SOH	'R'	'2'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.8 “R22” : RF Card Data (balance) Write.

Command Packet

SOH	‘R’	‘2’	‘2’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Write Data
4BYTE Length		Length

Write Data Structure : 0x00000000 ~ 0xffffffff

D0	D1	D2	D3
1Byte	1Byte	1Byte	1Byte

Ex) DATA(balance) : ‘1000’

D0	D1	D2	D3
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	‘R’	‘2’	‘2’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘2’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.9 “R23” : RF Card Data (balance or character) Write.

Command Packet

SOH	‘R’	‘2’	‘3’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Read Data
16BYTE Length		Length

Data Structure.

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

Ex) DATA(character) : ‘KYTRONICS’

D0	D1	D2	D3	D4	---	D12	D13	D14	D15
0x4b	0x59	0x54	0x52	0x4f	---	0x00	0x00	0x00	0x00

Positive Response Packet

SOH	‘R’	‘2’	‘3’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘3’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.10 “R24” : Increment the balance of card to the specified amount.

Command Packet

SOH	‘R’	‘2’	‘4’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Increment Data
4BYTE Length		Length

Increment Data Structure : 0x00000000 ~ 0xffffffff

D0	D1	D2	D3
1Byte	1Byte	1Byte	1Byte

Ex) DATA(balance) : ‘1000’

D0	D1	D2	D3
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	‘R’	‘2’	‘4’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘4’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.11 “R25” : Decrement the balance of card to the specified amount..

Command Packet

SOH	‘R’	‘2’	‘5’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Decrement Data
16BYTE Length		Length

Decrement Data Structure : 0x00000000 ~ 0xffffffff

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

Ex) DATA(balance) : ‘1000’

D0	D1	D2	D3
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	‘R’	‘2’	‘5’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘5’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.12 “R2A” : RF Card Data(balance or character) Read.

Command Packet

SOH	'R'	'2'	'A'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
9BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

Positive Response Packet

SOH	'R'	'2'	'A'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

DATA Structure

Length_High	Length_Low	Read Data
16BYTE Length		Length

Read Data Structure.

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

Negative Response Packet

SOH	'R'	'2'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.13 “R2B” : RF Card Data (balance) Read.

Command Packet

SOH	'R'	'2'	'B'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
9BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

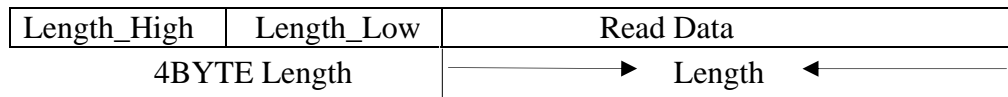
V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

Positive Response Packet

SOH	'R'	'2'	'B'	STX	'P'	STATUS	DATA	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	------	-----	-----

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DATA Structure



Result Structure.

D0	D1	D2	D3
1Byte	1Byte	1Byte	1Byte

Negative Response Packet

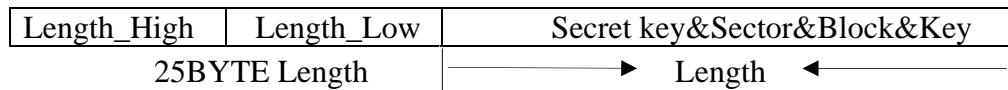
SOH	'R'	'2'	'B'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

7.8.14 "R2C" : RF Card Data (balance) Write.

Command Packet

SOH	'R'	'2'	'C'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure



Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5
V9	V10	V11	V12					
B0	B1	B2	B3					
Balance Data								

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

DATA(balance) : '1000'

B0	B1	B2	B3
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	'R'	'2'	'3'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'R'	'2'	'3'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.15 “R2D” : RF Card Data (balance or character) Write.

Command Packet

SOH	‘R’	‘2’	‘D’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
25BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8	
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5	
V9	V10	V11	V12	V13	---	V21	V22	V23	V24
D0	D1	D2	D3	D4	---	D12	D13	D14	D15
Balance or Character Data									

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

DATA(Character) : ‘KYTRONICS’

Ex) DATA(character) : ‘KYTRONICS’

V9	V10	V11	V12	V13	---	V21	V22	V23	V24
0x4b	0x59	0x54	0x52	0x4f	---	0x00	0x00	0x00	0x00

Positive Response Packet

SOH	‘R’	‘2’	‘D’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘D’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.16 “R2E” : Increment the balance of card to the specified amount.

Command Packet

SOH	‘R’	‘2’	‘E’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
13BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5
V9	V10	V11	V12					
B0	B1	B2	B3					
Balance Data								

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

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DATA(balance) : '1000'

V9	V10	V11	V12
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	'R'	'2'	'E'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'R'	'2'	'E'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.17 "R2F" : Decrement the balance of card to the specified amount..

Command Packet

SOH	'R'	'2'	'F'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
13BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Secret key	Sector	Block	Key 0	Key 1	Key 2	Key 3	Key 4	Key 5
V9	V10	V11	V12					
B0	B1	B2	B3					
Balance Data								

Ex) Secret : Key A, Sector : 0, Block : 0, Key Value : 0xff,0xff,0xff,0xff,0xff,0xff

V0	V1	V2	V3	V4	V5	V6	V7	V8
0x00	0x00	0x00	0xff	0xff	0xff	0xff	0xff	0xff

DATA(balance) : '1000'

V9	V10	V11	V12
0xe8	0x03	0x00	0x00

Positive Response Packet

SOH	'R'	'2'	'F'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'R'	'2'	'F'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.18 “R30” : RF Card Key Change(Access Condition Data Exclude).

Command Packet

SOH	‘R’	‘3’	‘0’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
13BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6
Sector	Key A0	Key A1	KeyA 2	KeyA 3	Key A4	KeyA 5
Secret key A						
V7	V8	V9	V10	V11	V12	
KeyB0	KeyB1	KeyB2	KeyB3	KeyB4	KeyB5	
Secret key B						

Positive Response Packet

SOH	‘R’	‘3’	‘0’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘3’	‘0’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.19 “R31” : RF Card Key Change(Access Condition Data inclusion).

Command Packet

SOH	‘R’	‘3’	‘1’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector
17BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6	V7	V8
Sector	KeyA0	KeyA1	KeyA2	KeyA3	KeyA 4	KeyA 5	Acc0	Acc1
Secret key A							Access	
V9	V10	V11	V12	V13	V14	V15	V16	
Acc3	Acc4	KeyB0	KeyB1	KeyB2	KeyB3	KetB4	Keyb5	
Condition		Secret key B						

Positive Response Packet

SOH	‘R’	‘3’	‘1’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘3’	‘1’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.8.20 “R32” : Module Key Change.

Command Packet

SOH	‘R’	‘3’	‘2’	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA Structure

Length_High	Length_Low	Secret key&Sector&Block&Key
13BYTE Length		Length

Ex) Secret key&Sector&Block&Key Structure

V0	V1	V2	V3	V4	V5	V6
Sector	Key A0	Key A1	KeyA 2	KeyA 3	Key A4	KeyA 5
Secret key A						
V7	V8	V9	V10	V11	V12	
KeyB0	KeyB1	KeyB2	KeyB3	KeyB4	KeyB5	
Secret key B						

Positive Response Packet

SOH	‘R’	‘3’	‘2’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘3’	‘2’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.21 “R40” : Power On (The carrier wave emitted in antenna.)

Command Packet

SOH	‘R’	‘4’	‘0’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘R’	‘2’	‘F’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘2’	‘F’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.8.22 “R41” : Power Off(The carrier wave not emitted in antenna.)

Command Packet

SOH	‘R’	‘4’	‘1’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘R’	‘4’	‘1’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘R’	‘4’	‘1’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.9 Retry Setting

### 7.9.1 “C70” : No RETRY in case of Data Error

Command Packet

SOH	'C'	'7'	'0'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'7'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'7'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.9.2 “C71” : Set Read RETRY 1 time in case of Data Error

Command Packet

SOH	'C'	'7'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'7'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'7'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.9.3 “C72” : Set Read RETRY 2 time in case of Data Error

Command Packet

SOH	'C'	'7'	'2'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'7'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'7'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.9.4 “C73” : Set Read RETRY 3 time in case of Data Error

Command Packet

SOH	'C'	'7'	'3'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'7'	'3'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'7'	'3'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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### 7.9.5 “C74” : Set Read RETRY 4 time in case of Data Error

Command Packet

SOH	‘C’	‘7’	‘4’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘C’	‘7’	‘4’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘C’	‘7’	‘4’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

## 7.10 Head Cleaning

7.10.1 “C80” : Head Cleaning If No Card Remained inside the unit, STAND-BY for specified time and reciprocate 5 times and eject Cleaning Card if Card is inserted.

Command Packet

SOH	‘C’	‘8’	‘0’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘C’	‘8’	‘0’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘C’	‘8’	‘0’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.10.2 “C81” : Command for activating Buzzer once.

Example) To indicate that a command runs “Good” .

Command Packet

SOH	‘C’	‘8’	‘1’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘C’	‘8’	‘1’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘C’	‘8’	‘1’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.10.3 “C82” : Command for activating Buzzer twice

Example) To indicate that a command runs “In Error”.

Command Packet

SOH	‘C’	‘8’	‘2’	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	‘C’	‘8’	‘2’	STX	‘P’	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	‘C’	‘8’	‘2’	STX	‘N’	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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## 7.11 Setting

### 7.11.1 “C90” : Card Wait Time Set

Command Packet

SOH	'C'	'9'	'0'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA : Card STAND-BY time to be inserted (sec : “1” – “9”)

Positive Response Packet

SOH	'C'	'9'	'0'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'9'	'0'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.11.2 “C91” : Series(RTS,CTS) Set.

Command Packet

SOH	'C'	'9'	'1'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'9'	'1'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'9'	'1'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.11.3 “C92” : Series(RTS,CTS) Cancellation.

Command Packet

SOH	'C'	'9'	'2'	STX	ETX	BCC
-----	-----	-----	-----	-----	-----	-----

Positive Response Packet

SOH	'C'	'9'	'2'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

Negative Response Packet

SOH	'C'	'9'	'2'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

### 7.11.4 “C95” : Baud Rate Setting

Command Packet

SOH	'C'	'9'	'5'	STX	DATA	ETX	BCC
-----	-----	-----	-----	-----	------	-----	-----

DATA :

'0' – 9600 BPS

'1' – 19200 BPS(Default)

'2' – 38400 BPS

'3' – 57600 BPS

Positive Response Packet

SOH	'C'	'9'	'5'	STX	'P'	STATUS	ETX	BCC
-----	-----	-----	-----	-----	-----	--------	-----	-----

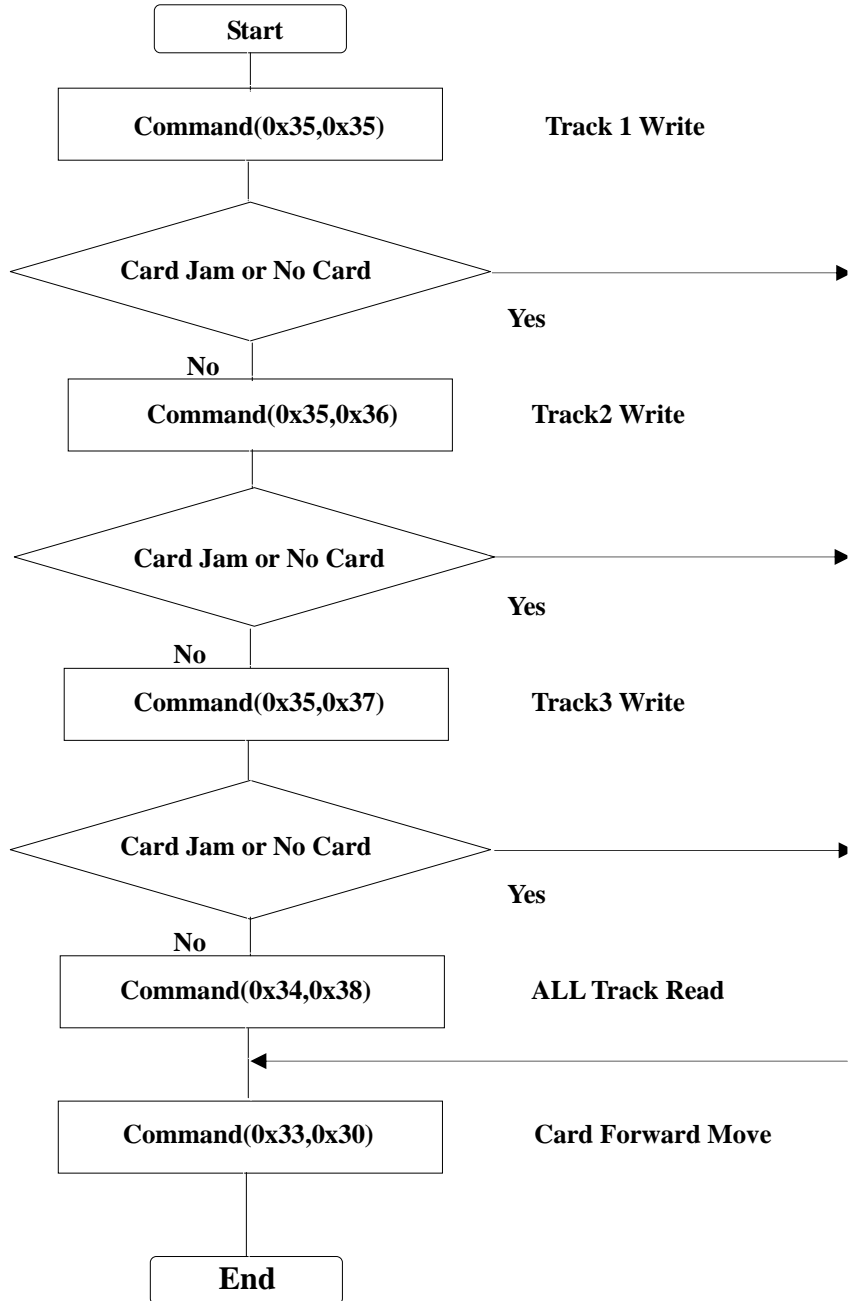
Negative Response Packet

SOH	'C'	'9'	'5'	STX	'N'	ST1	ST2	ETX	BCC
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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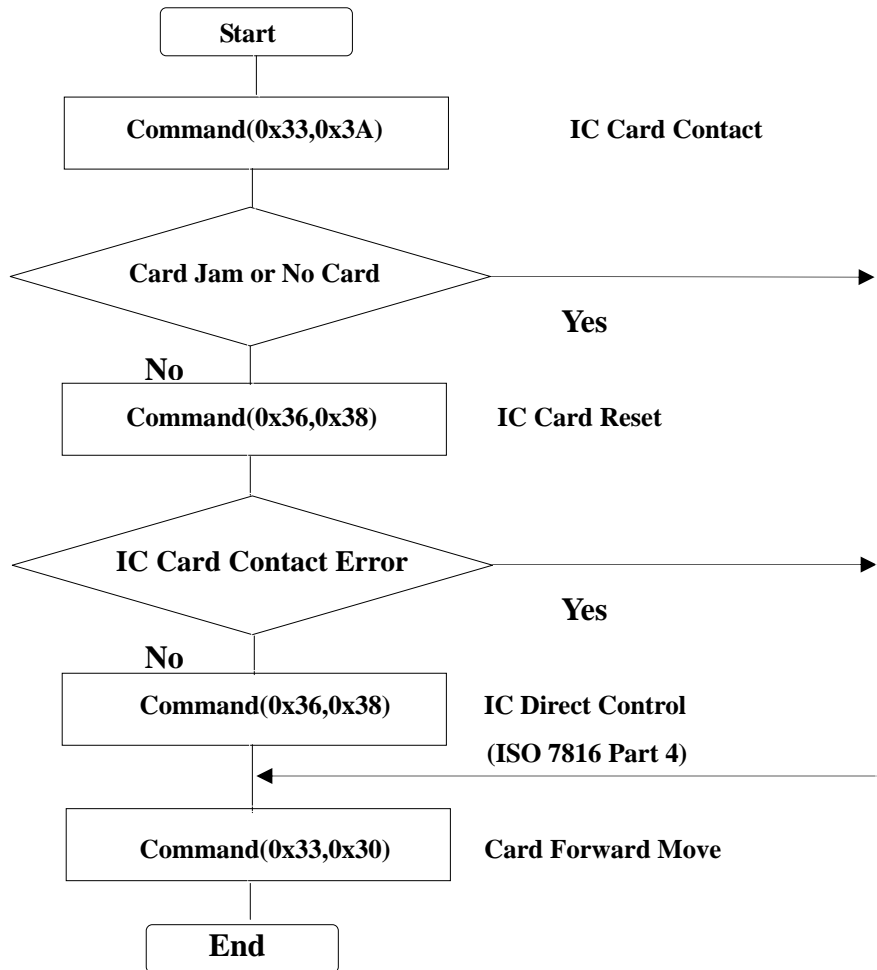
<Flow Chart>

1. Magnetic Card.



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## 2. IC Card.



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### 3. RF Card(Read).

