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KYT-7916

Manual Insertion Type Magnetic Card Read & IC Card Read / Write

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					APl	PROVAL	
RESP. DEPT.	R 8	z D	ORIGINA	ATOR			
	DEPT.	Int'l Sales					
APPROVAL	APPROVAL BY						
&	DEPT.					DOC. CON	APP.
CONFIRMATUON	APPROVED BY						

• REVISION HISTORY

CHECK	DATE	DESCRIPTION	REV.	PAGE
ISSUER	2010.12.6	Software Reset Command	A	20
	2011.03.15	F/W Download Mode Command	В	21
	2016.08.10	FLASH Memory and Unique Code ID Reader Command	С	21

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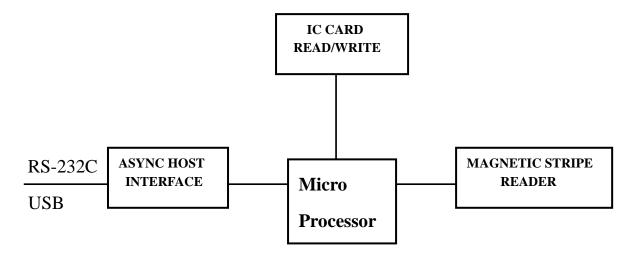
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1. Overview

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

		КУХ	- 7 3 X	X X X		
INTERFACE	FUNCTION	Body	TRACK	OPTION I	BEZEL & EJECT SPEC	OPTION II OPTION III
T : RS-282C 7 L : TTL U : USB	7: MANUAL INSERTION	D: - 3: Standard Bezel	O: - 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	O: WITHOUT IC 1: WITH IC 2: WITH SHUTTER	M: AUTO EJECT & METAL BEZEL P: AUTO EJECT & PLASTICBEZEL	R:RS-232C & P:PROXIMITY WITHOUT RTS.CTS CARD HANDSHAKE (CONTACTLESS)

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: 0~55 ℃, 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

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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: $+5V DC \pm 5\%$

6.7.2 Ripple: Less than 50 mV p-p

6.7.3 Operating: Less than 1500 mA

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

6.9 IC Contact Force : $0.2N \sim 0.6N$

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.

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6.14 Eject Distance: Min. 8mm

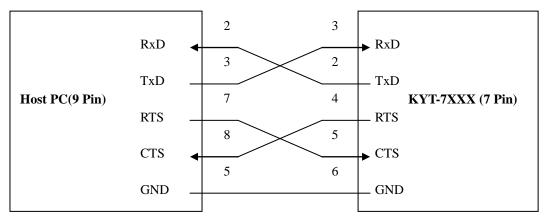
6.15 Banding Card – Long side: Less than 3mm

6.16 Banding Card – Short side: Less than 2mm

7. Interface Requirements.

7.1 RS-232C Interface.

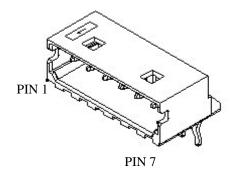
Part Number: D-SUB Standard 9Pin Part Number: 53015-0710(Molex)



⁻ Transmission Distance : Max. 1.5m

7. 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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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.

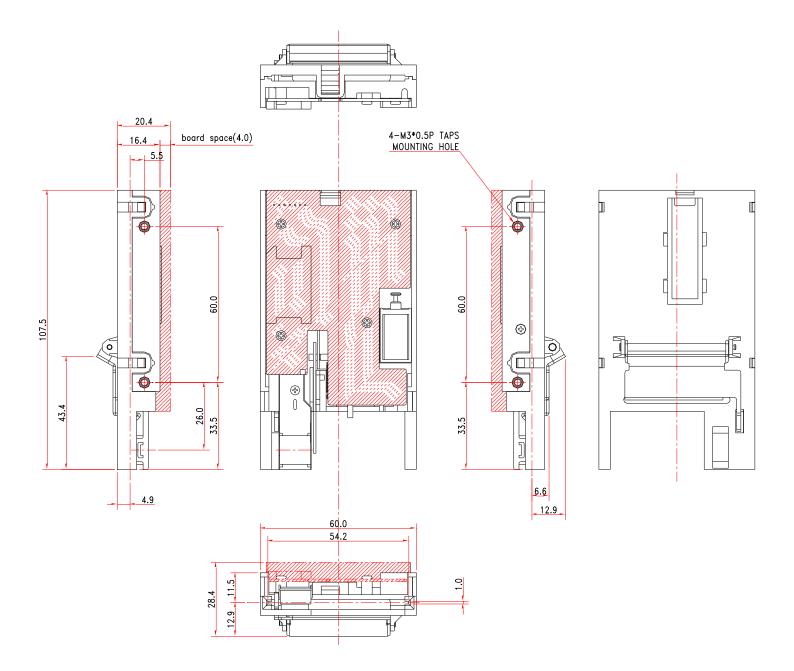
		C1 : VCC(Supply voltage)
C1	C5	C2 : RST(Reset signal)
		C3 : CLK(Clock signal)
C2	C6	C4: Reserved to ISO/IEC JTC 1/SC 17 for future use.
		C5 :GND(Ground)
C3	C7	C6:VPP(Programming voltage)
		C7 :I/O(Data input/output)
C4	C8	C8 :Reserved to ISO/IEC JTC 1/SC 17 for future use.

♦ Power Consumption

: Less than 50mA

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9. Technical Drawing



^{*} 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: 1Bit1.4. Data Length: 8Bits1.5. Parity: None1.6. 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
-----------------	----------	-----	-----

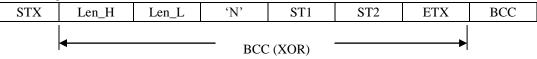
Ref.) Command Sets List

3.2. Response structure

3.2.1. Positive Packet structure

		1					1
STX	Len_H	Len_L	'P'	STAT	DATA	ETX	BCC

3.2.2. Negative Packet structure



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

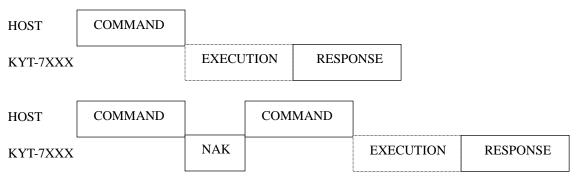
- 3.3. Data Length range of Len_H and Len_L.
 - 3.3.1 Command structure: Data Length from CMD to DATA.
 - 3.3.2 Positive Packet structure: Data Length form 'P" to Data.
 - 3.3.3 Negative Packet structure : Data Length form 'N' to ST2.

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3.4. STAT Structure Format

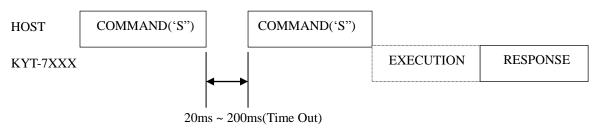
BIT	Description		REMARK
DII	1	0	
7	Rear Detect ON	None Detect at Rear Sensor	
6	Front Detect ON	None Detect at Front Sensor	
5	IC Reset ON	No ICC Reset	If Card is got out of Rear Sensor area by artificial means, terminal is deactivated.
4	Is M/S Data	None M/S Data	
3	M/S Forward Read ON	M/S Backward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

★ Command('S') Only.



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5. Command Sets List.

Index	CMD	Description	Note
Request	'S' (53H)	Status Request	
	'V'(56H)	Read F/W Version of unit	
IC Card	'R'(52H)	ICC Reset	
Control	'P'(50H)	PTSS(PPSS) Application	ICC Control
	'I' (49H)	ICC Direct Control	Command
	'D'(44H)	ICC Deactivation.	
	'W'(57H)	Software Reset	
	'Q'(51H)	F/W Download Mode	
LED	'F'(46H)	LED Control Command	
Setting	'B'(42H)	Baud rate change	
Select	'L'(4CH)	IC Card Select	
MS Read	'M'(4DH)	Magnetic data read command	
	'C'(43H)	Magnetic data Clear Command	
Eject	'E'(45H)	Card Eject	
Internal	'X'(58H)	Flash Memory write(8 BYTE)	
Flash	'Y'(59H)	Flash Memory read(8 BYTE)	
memory	'0'(30H)	Unique Code ID read(12BYTE)	

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	
8	'0'	'9'	M/S Preamble Error	Magnetic Dete
9	'1'	'0'	M/S Parity Error	Magnetic Data
10	'1'	'1'	M/S Post amble Error	Interpreter 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	

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7. Command Detail.

7.1 Request

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

Command Packet

Communa i uc	nec										
STX	00H		011	Η		'S'	ETX			BCC	
Positive Response Packet											
STX	Len_H	I	en_L	'I	o'	STAT		ETX		BCC	
Negative Resp	onse Packet										
STX	Len_H	I	en_L	ʻN	,	ST1	S	Т2	ET	X	BCC

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

Command Packet

Comman	minand Packet												
ST	X	00H		011	Н		'V'		ETX			BCC	
Positive Response Packet													
STX	X .	Len_H		P'	S	ГАТ	D.	ATA	J	ETX		BCC	
DATA Structure													
'V'	X1	.,	X2										
Ex) "V	1.00"												
Negative	Negative Response Packet												
STX	X.	Len_H	Lei	ı_L	'N'		ST	1	ST2	2	E	ГΧ	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

Command 1	acket							
STX	00)H	01H	'R'	E	ГХ	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.

The Billitt office is us ociow.	
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
-----------------	-----	-----	-----	-----	-----

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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

CTV	Lon H	I on I	'D'	ТА 1	ETV	PCC
SIA	Len_H	Len_L	r	IAI	EIA	BCC

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

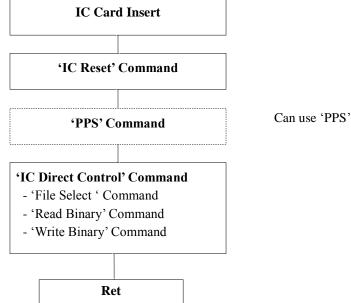
<Low Nibble of 2'st Byte>

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								BCC

< PTSS operation method >



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

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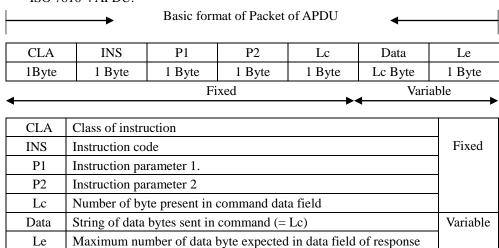
7.2.3 'I' (49H): ICC Direct Control

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	']	' DATA		'I' DATA		ETX		BCC
Positive Res	Positive Response Packet										
STX	Len_H	Len_L	6	P'	STA	Т	DATA	ETX		BCC	
Negative Re	Negative Response Packet										
STX	Len_H	Len_L	']	N'	ST	1	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".

Command	INS Code (Hex Value)				
Read Binary Command	В0				
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.

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

Command Packet

STX	00)H	01H	'D'	'D' ETY		BCC			
Positive Response Packet										
STX	Len_H	Len_L	'P'	STAT	ETX	BCC	STX			
Negative R	Negative Response Packet									
STX	Len_H	Len_L	'N'	ST1	ST2	ETX	BCC			

7.2.5 'W' (57H): Software Reset Command

Command Packet

STX	00)H	01H 'W'		E	ГΧ	BCC	
Positive Response Packet								
STX	Len_H	Len_L 'P' STAT ETX BCC ST						

The following order after Response receiving transmits in 1.5Sec after and it becomes.

7.2.6 'Q (57H): F/W Download Change Mode.

Command Packet

STX	00)H	01H	'Q'	Е	TX	X BCC		
Positive Response Packet									
STX	Len_H	Len_L	'P'	STAT	ETX	BCC	STX		

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

_	Command 1 acket									
	STX	00H	02H	'B'	DATA	ETX	BCC			

DATA:

'0' - 9600 BPS

'1' - 19200 BPS (Default)

'2'-38400 BPS

Positive Response Packet

STX	00H	02H	02H 'P' STAT ETX						BCC
Negative Response Packet									
STX Len_H Len_L 'N' ST1 ST2 ETX BCC									

The terminal initially operating time is necessary

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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

Data: '0' Selection of Inserted Card.

'1' Selection of SAM1 Slot.

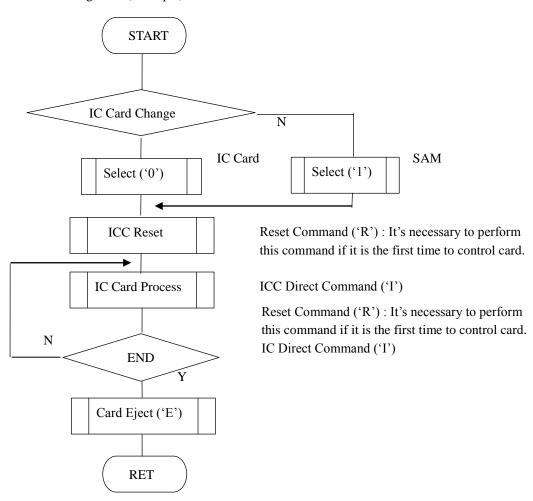
Positive Response Packet

_							
Ī	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	STX 00H			01H 'M		ETX		X	BCC	
Positive Response Packet										
STX	Len_H	Len_	L	'P'	STAT	DAT	A	ETX		BCC
DATA:										
Track	00h	Track 2 data			00H	00H Track 3 d		lata		

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

7.4.2 'C'(43H) " Magnetic data Clear.

Command Packet

STX	00	Н	011	Η	,C,			ETX		BCC
Positive Res	ponse Pack	et								
STX	Len_H	L	en_L	ʻI	ρ'	ST	ΆΤ	ETX		BCC
Negative Response Packet										
STX	Len_H	Len_L		N'	ST	1	ST2	ETX		BCC

7.5 LED On/Off.

Command Format

STX	Len_H	Len_L	'F'	DATA	ETX	BCC				
Command DATA Structure										
	Command[()x35]		Command[0x30]						

LED [1BYTE]
. 0x30 : REEN_LED ON . 0x31 : RED_LED ON . 0x32 : ORANGE_LED ON

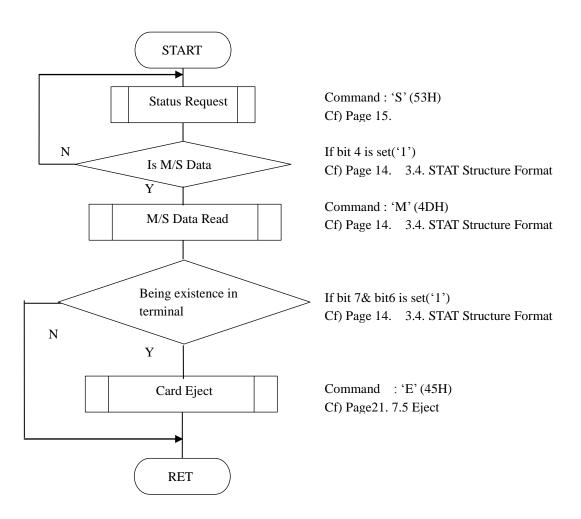
. 0x33 : ALL OFF

Positive Response Packet

STX	Len_H	Len_	en_L 'P' STAT				ETX		ВС	CC	
Negative Response Packet											
STX	Len_H	Len_L	ʻl	N'	ST	1	ST2		ETX	В	CC

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Magnetic Card Processing Flow (Example)



7.6 Eject.

7.6.1 '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	00)H	011	Н		'E'		ETX		BCC
Positive Res	ponse Pack	et								
STX	Len_H	I	en_L	'I	· ·	ST	ΉT	ETX		BCC
Negative Response Packet										
STX	Len_H	Len_	L '	N'	ST	1	ST2	ETX		BCC

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7.7 FLASH Memory.

7.7.1 'X'(58H): FLASH Memory Write(8BYTE).

Command Packet

STX	00H	09H	'X'	DATA	ETX	BCC
-----	-----	-----	-----	------	-----	-----

DATA: 8 BYTE(fixed) Cf) 16080010(8 BYTE)

DATA: 0x31 0x36 0x30 0x38 0x30 0x30 0x31 0x30

Positive Response Packet

•	1 oblive response i deket											
Ī	STX	00H	']	'P' STAT				ETX	BCC			
ľ	Negative Response Packet											
	STX	Len_H	Len_L	6	N'	ST	1	ST2		ETX	BCC	1

7.7.2 'Y'(59H): FLASH Memory Read(8BYTE).

Command Packet

STX	001	H	01H	'Y'	Е	ETX	BCC			
Positive Response Packet										
STX Len_H Len_L		' P '	STAT	DATA	ETX	BCC				

DATA VALUE: 16080010

21111 (11202 (10000010											
31H	36H	30H	38H	30I	H 30H		31H	30H			
Negative Response Packet											
STX	Ι	en H	Len 1	,	'N'		ST1	ST2		ETX	BCC

7.7.3 '0'(30H): Unique Code ID Read(12BYTE).

Command Packet

	991111111111111111111111111111111111111	1100										
	STX	001	H	01H	'0'		Е	CTX	BCC			
I	Positive Response Packet											
	STX	Len_H	Len_L	' P '	STAT	D	ATA	ETX		BCC		

DATA LENGTH: 12BYTE