WBM-5000 SERIES

MOTOR CARD READER

MAGCARD READ ONLY RF/IC CARD READER/WRITER

Version 1.0

CONTENT

1. INTRODUCTION

1.1. BRIEF INTRODUCTION

WBM-5000 series(with RS-232 interface) is a mini motor driven type hybrid card reader that can read the magnetic card compatible with ISO7811/7816 ,and read/write IC card ,RFID card.

CARD Standard：

* Magnetic card：Compatible with ISO7811.
* IC card, Memory card and Atmel series card.
  Encrypt card: SLE（4418/4428/4442）
  CPU card：T=0 and T=1.
* RF card TYPE A.

1.2 MODEL SPECIFICATION

MODEL	MAGNETIC CARD	PROTECTION DOOR + IC CARD MODULE	SAM CARD MODULE	RF CARD MODULE
WBM58	7:Track1&2&3	1: Without protection door and IC card module 6: Without protection door 7: Without IC card module 8: With protection door and IC card module	S0: No S1: One S2: Two S3: Three S4: Four	0: Yes 1: No

MODEL （WBM-5X-XX-X)	DIMENSION	PROTECTION DOOR + IC				SAM	RF
	L*W*H(mm)	Without Protection Door &IC	Without Protection Door	Without IC	With Protection Door &IC	S(n) n stand for SAM Quantity	
WBM587X-SX-0	215*65*61	5871-SX-0	5876-SX-0	5877-SX-0	5878-SX-0	587X-S0-0	No
WBM587X-SX-1		5871-SX-1	5876-SX-1	5877-SX-1	5878-SX-1	587X-S0-1	Yes

1.3. FUNCTIONS

1.3.1. Mechanical design complies with the requirements of industry standard.

1.3.2. Decode triple track magnetic card compatible with ISO standard.

1.3.3. Shutter solenoid with inductive magnetic head and sensor.

(1) Sensor function: Detect the inserted card
(2) Width sensor: Detect the card is available or not
(3) Inductive magnetic head: detect the data of inserted card.

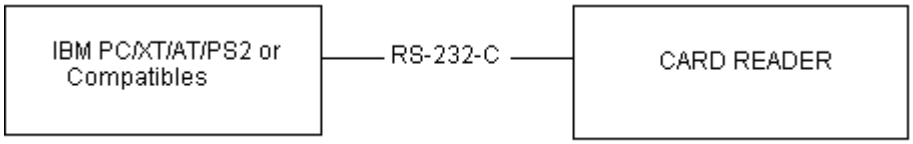
1.3.4. If any cards settle in the reader, it will be ejected automatically when power on.

1.3.5. The communication of IC card can be synchronization and a synchronism.

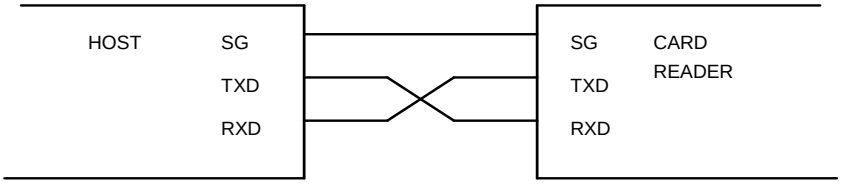
8PCS IC connects with each IC card very good, even the card is not smoothly.

1.3.6. If the card distorted and poor contact, it will be ejected automatically.

2. STRUCTURE



RS-232 connection



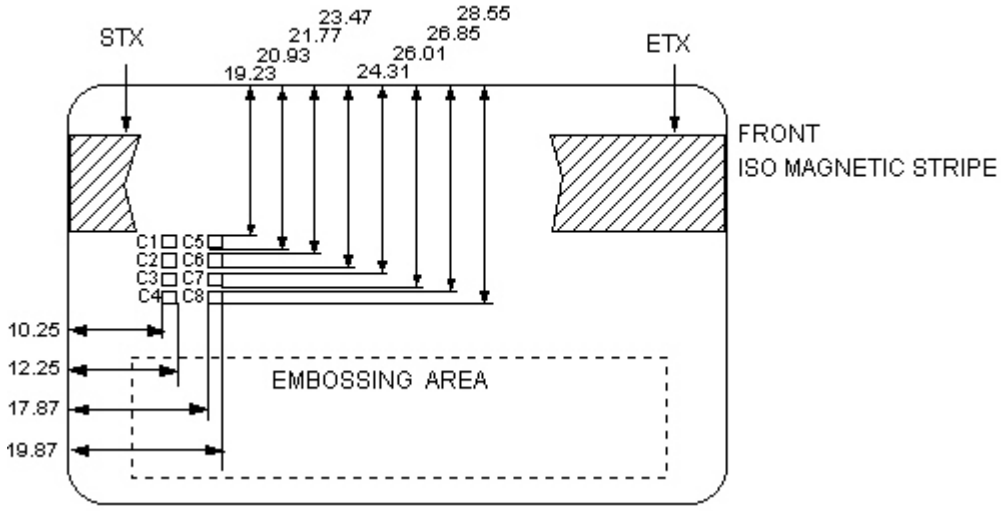
3. SPECIFICARION

3.1. Card standard

3.1.1. Magnetic card

Card standard	ISO 7811		
Track	ISO(1) (IATA)	ISO(2) (ABA)	ISO(3) (MINTS)
Reading	F2F		
Card thickness	Rubber wheel: 0.76 ± 0.08 mm		

3.1.2.IC card connector position and size(IC card: ISO 7816 section 2)



Connector character

C1	Power supply(VCC)	C5	(GND)
C2	Reset(RST)	C6	Unused
C3	CLK)	C7	(I/O)
C4	(RFU)	C8	(RFU)

3.1.3. RF card
None

3.2. Environment requirement

3.2.1. Temperature
(1)Storage: -20°C ~ 70°C
(2)Operating: 5°C ~ 50°C
3.2.2. Relative Humidity
(1)Storage: 0 ~ 95%
(2)Operating: 0 ~ 90%

3.3. Characteristic

3.3.1. Weight: about 1,000g
3.3.2. Power requirement

(1) Voltage	: 12V DC ± 5%
(2) Power consume	: Less than 1A (12V DC, 50msec)
Motor in working	: Less than 400mA (12V DC)
Card insertion	
(3) Baud fluctuation	: Less than 200mVp-p (12V DC) Less than 50mVp-p (5V DC)

3.3.3. Operation Locus: Indoor use

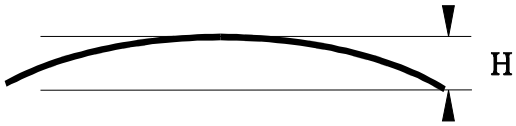
3.4. Operation

3.4.1. Card speed: 470 mm/sec ± 20%
3.4.2. Life of Head: Min. 1,000,000 times (1 time: go forward/backward)
3.4.3. Mechanism section:
Strap: 700,000 cycles

Gear: 700,000 cycles

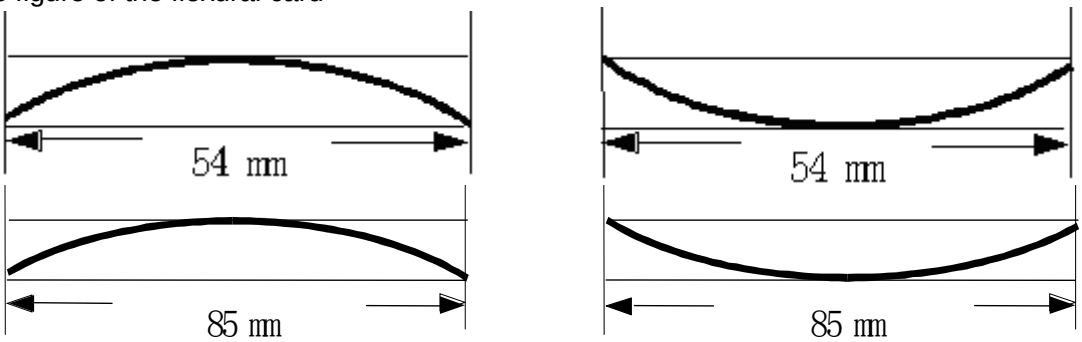
3.5. Flexural card

It means there is camber on the face of the card.



H = 3.0 mm (the maxima acceptable camber when card insertion)
2.0 mm (the maxima acceptable camber when reading)

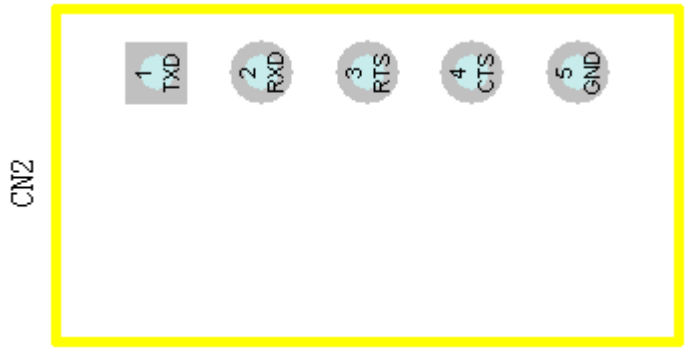
The figure of the flexural card



4. INTERFACE AND SWITCHES

4.1. Interface

4.1.1. RS-232 interface(For example: Interface board, CN2(5PIN),as below：



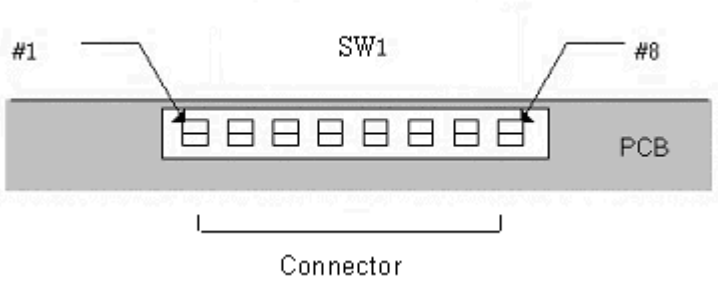
RS-232-C Signal	MSRW CN2	Input/Output	Function
TXD	1	O	Data sending
RXD	2	I	Data receiving
RTS	3	O	sending request
CTS	4	I	Erase
SG	5	GND	Grounding

4.1.2.Plug(For example: interface board , CN1(4PIN),As below：

Pin No.	Signal	Function
1	12V	+12 VDC
2	GND	Grounding
3	GND	Grounding
4	BPC	Backup power

4.2. SWITCHES

4.2.1. Interface board ,Switches ☞ SW1（mounting）



(1) Track:

S/W 1	S/W 2	S/W 3	Track
OFF	OFF	ON	ISO- 1
OFF	ON	OFF	ISO- 2
ON	OFF	OFF	ISO- 3
ON	ON	ON	ISO- 1,2,3
OFF	ON	ON	ISO- 1,2
ON	ON	OFF	ISO- 2,3
OFF	OFF	OFF	Unused

(2) Baud rate : 9600, 19200, 38400, and 57600

SW4	SW5	Baud Rate
OFF	OFF	9600(default)
OFF	ON	19200
ON	OFF	38400

ON	ON	57600

Note: data length:8 bits verify (non),start bit 1,stop bit 1. character : ASCII

(3) Function

SW6	SW7	SW8	Function select
OFF	OFF	OFF	No EMV function(default)
OFF	ON	ON	Have EMV function(Backup)
ON	OFF	OFF	Program download(Backup)

5. COMMUNICATE PROTOCOL

5.1 Communication introduction

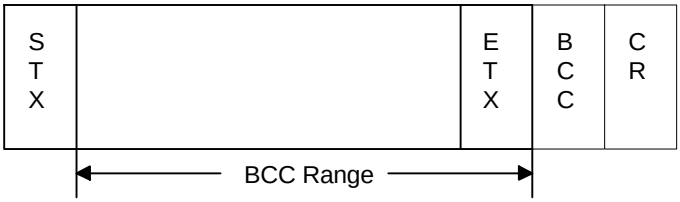
5.1.1. Command/Response: The card reader work as the commands from host, and feedback to the host.

5.1.2. Communication characters

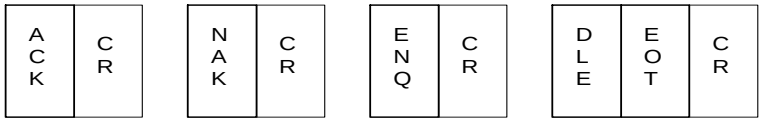
STX (02h)	On the initial of the contents
ETX (03h)	On the end of the contents
ENQ (05h)	Request response
ACK (06h)	Positive response
NAK (15h)	Negative response
DLEEOT(10h0 4h)	Stop the working and reset card reader
CR (0Dh)	Carriage return

5.1.3. Data frames structure

(1) Command/Response



(2) Control Characters



Remark: 1) BCC&CR can set as elide with FM in the initialized command.
2) The distance between characters less than 20 msec.
3) BCC excluded STX, XOR the data before BCC to have the result.

5.1.4. The distance between dates

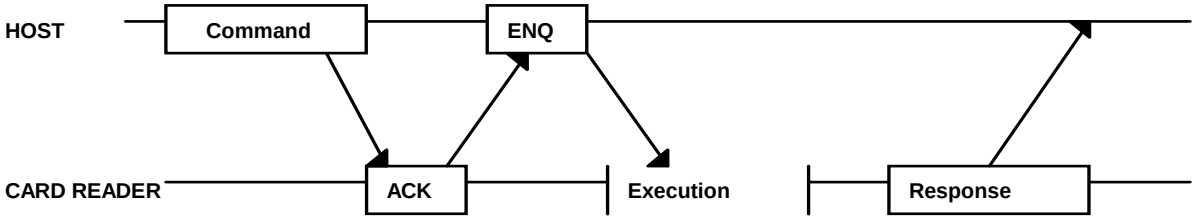
If more than 20msec in receiving, it will be recognized as finished receive a date.

5.1.5. Cancel command

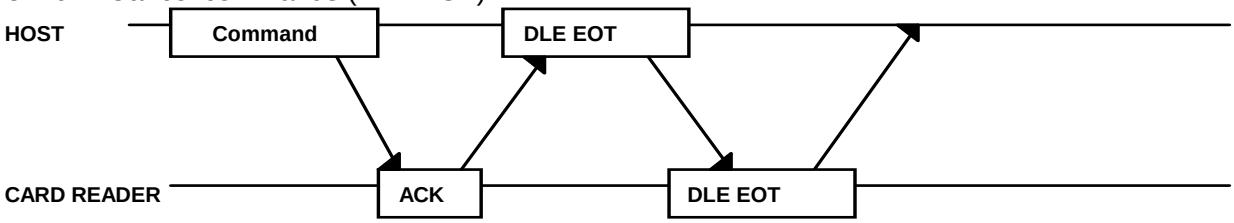
When received ‘DLE EOT (10h 04h) 'in anytime ,card reader will terminate the operation ,send ‘DLE EOT’ to host and wait for the next command. If “DLE EOT’ be received in sending the response, the card reader will finish the sending and back to the waiting status.
If ‘DLE EOT’ be received when enter card or re-enter and re-back, the card reader will reject the card.

5.1.6. Natural Operation

5.1.6.1. Commands

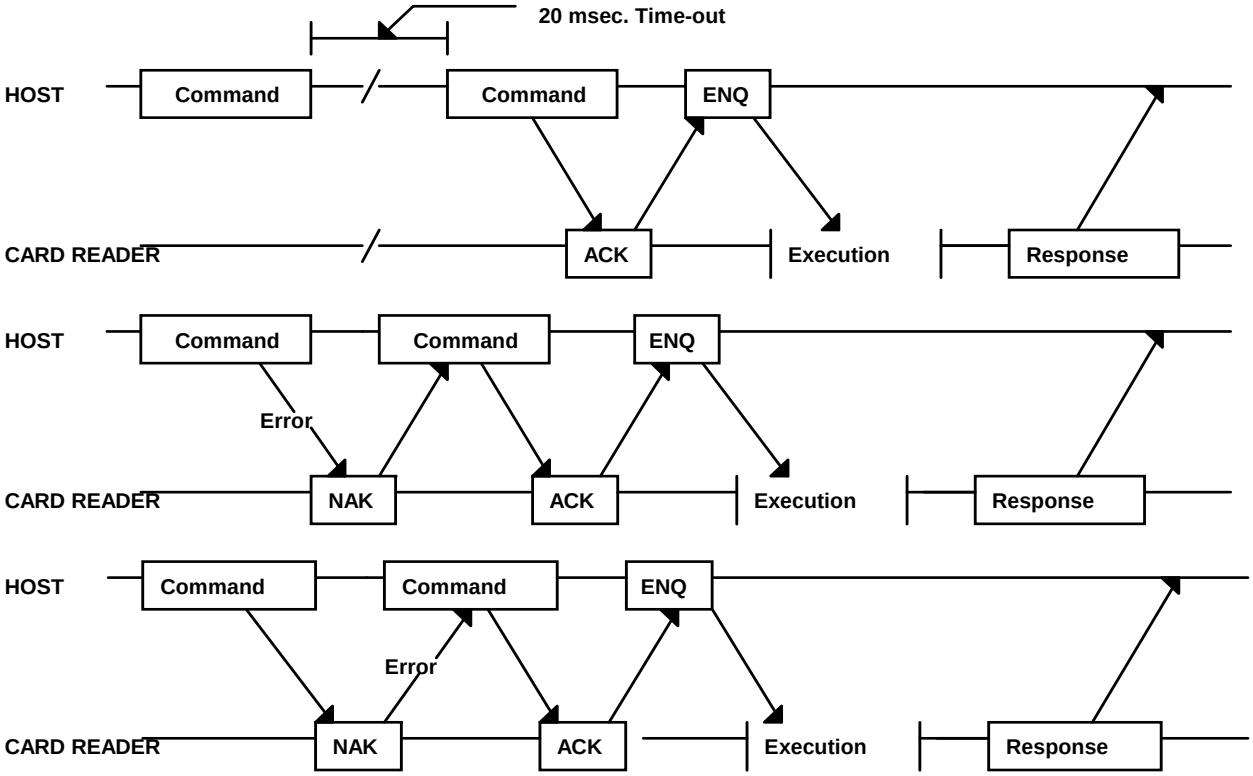


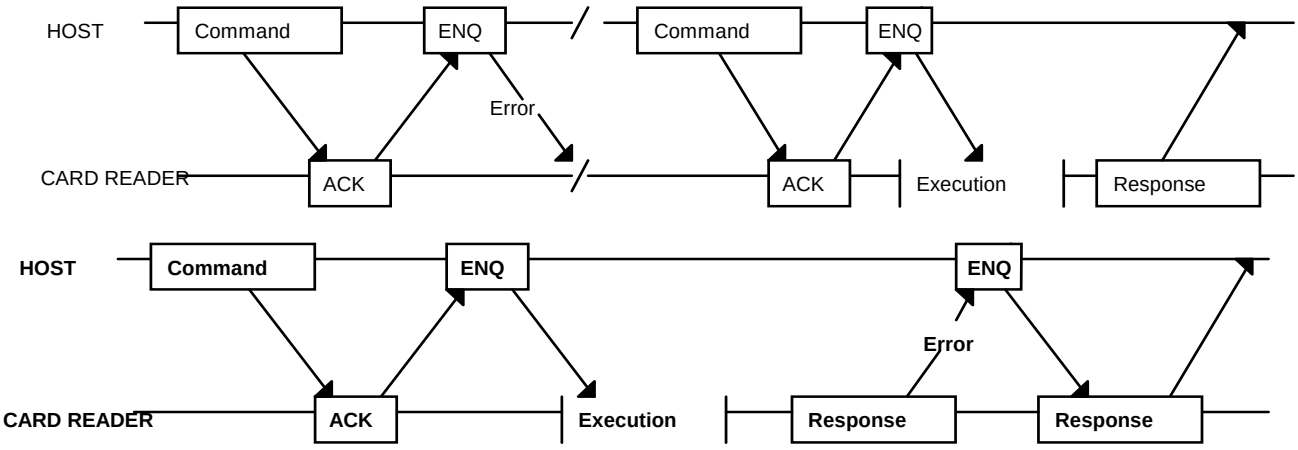
5.1.6.2. Cancel commands (DLE EOT)



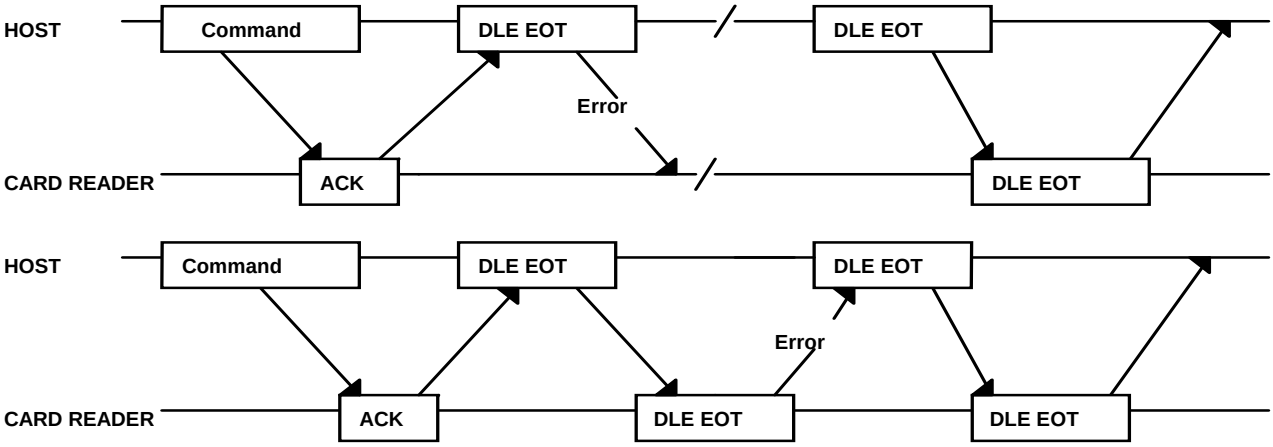
5.1.7. Error operation (Error Communicate)

5.1.7.1. Commands





5.1.7.2. Cancel the commands



5.2 The command format

	Instruction type	Instruction code	Instruction parameter
Content	'C'（43h）	Reference the instruction code form	Optional parameters
Length（character）	1	2	Parameter length（0 ~ 256 byte）

5.3 Command response from host to equipment

Correct response:

	Response type	Response code	Equipment status	Response parameter
Content	'P'（50h）	Reference the instruction code form	Reference the equipment status form	Optional parameters

Length（byte）	1	2	2	Parameter length（0 ~ 256 byte）

Error response:

	Response type	Response code	Equipment status	Error code
Content	‘N’（4Eh）	Reference the instruction code form	Reference the equipment status form	Reference the error code form
Length（byte）	1	2	2	2

5.4 Parameter codes

Command	Instruction code		Description
	CM	PM	
Initialization	30h	30h	Initialize equipment and eject card forward
		31h	Initialize equipment and eject the card backward
		32h	Initialize equipment and keep the card
Inquiry status	31h	30h	To report Is there any card in the reader and the card location
		31h	The exact location of the card
Card enter position	32h	30h	Magcard entrance
		31h	IC card entrance and correspondence
		32h	IC card entrance
		33h	Memory card(SLE 4442&4418) entrance and correspondence
		34h	Can enter the card forward
		35h	Forbid entering the card forward
		36h	Can enter the card backward
		37h	Forbid entering the card backward
Exit card	33h	30h	Exit card forward
		31h	Exit card backward
Card re-entrance	34h	30h	Re-enter the card(Card prepared to read or write)
Read magcard	36h	30h	Move the card ,not read(for the clean)
		31h	Read track 1 and send the data
		32h	Read track 2 and send the data
		33h	Read track 3 and send the data
		35h	Read all the track and send the data
		36h	Cleanup the memory
IC power supply	38h	30h	CPU card power off
		31h	CPU card power on
		32h	SLE 4418 & 4428 & 4442 card power on

		33h	SLE 4418 & 4428 & 4442 card power off
		34h	SAM card power off
		35h	SAM card power on
		36h	AT24 series card power on
		37h	AT24 series card power off
		38h	RF on
IC card commands	39h	30h	Exchange the data with IC card (Remark: select the command directly, and exchange the data with IC card as the selected command.
		31h	Exchange the data with SAM card (Remark: select the command to control the SAM card, and exchange the data with IC card as the selected command.
Get version information	3Ch	30h	Get the version No.
SLE4428/4418 commands	4Ah	31h	Read SLE4418、SLE4428 card and send the data in unprotected way
		32h	Read SLE4418、SLE4428 card and send the data in protected way
		33h	Write SLE4418 card without protect
		34h	Write SLE4418 card with protect
		35h	Full fill the unprotected SLE4418 card with same characters.
		36h	PSC confirm *(only for SLE4428)
		37h	PSC modify *(Only for SLE4428)
		38h	Write SLE4428 card without protect
		39h	Write SLE4428 card with protect
		3Ah	Full fill the unprotected SLE4442 card with same characters
SLE4442 commands	4Bh	31h	Read the Memory and send data
		32h	Read the protected memory and send data
		33h	Write SLE4442 card in unprotected way
		34h	Write SLE4442 card in protected way
		35h	Full fill the unprotected SLE4442 card with the same characters
		36h	PSC verify
		37h	PSC modify
		38h	Read the safe memory
AT24 series commands	4Ch	31h	Read AT24 series card and send the data
		32h	Write AT24 series card and send the data
Mifare card commands	51h	31h	Request answer
		32h	Prevent collide
		33h	select instruction
		34h	Pause the instruction
		35h	To load PSC from FIFO
		36h	To load PSC from EEPROM
		37h	Authentication instruction
		38h	Reading
		39h	Writing
		3Ah	Increment, devalue and memory
		3Bh	Sending

		3Ch	Store the PSC to EEPROM

5.5 Error codes form

Error codes		Description
E1	E0	
30h	30h	Command incorrect
30h	31h	Parameter incorrect
30h	32h	Command can't be perform
30h	34h	Command data error
30h	35h	Time error when card entrance
30h	36h	Card error(Abnormal)

5.6 Equipment status

codes		Description
ST1	ST0	
30h	30h	No card in the reader and doorway of the reader
30h	31h	Card in front of doorway
30h	32h	Card in the reader

6. COMMANDS

6.1 Initialization (CM = 30h)

Initialize after power on, then receive the command from the host, perform and feedback the result. The initialization command be used to set the exact parameter and the default setting.

Command

'C'	30h	PM

Correct response

'P'	30h	PM	ST1	ST0

Error response

'N'	30h	PM	E1	E0

Parameter introduction

PM：Define how to exit the card in the reader

30h	Exit card forward
31h	Enter card backward
32h	Keep the card in the reader

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.2 Status request (CM = 31h)

This command be used to detect is there any card in the reader and the card location.
Reader always send two bytes (ST1 &ST0), sometimes it will send one or two special bytes as the setting of the parameter.

6.2.1 Notify is there any card in the reader and the location

Command

'C'	31h	30h

Correct response

'P'	31h	30h	ST1	ST0

Error response

'N'	31h	30h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error code form

6.2.2 Inform the exact card location

Command

'C'	31h	31h

Correct response

'P'	31h	31h	ST1	ST0	SE1	SE0

Error response

'N'	31h	31h	E1	E0

Parameter introduction

SE1、SE0 ：

	8	7	6	5	4	3	2	1
SE1	0	1	0	0	B3	B2	B1	B0
SE0	0	1	0	0	B7	B6	B5	B4

No.	Signification	Description	
b0	PH1	1: Have card	0: No card
b1	PH2	1: Have card	0: No card
b2	PH3	1: Have card	0: No card
b3	PH4	1: Have card	0: No card
b4	SW1	1: Valve open	0: Valve close(with valve model)
b5	SW2	1: Have card	0: No card(with valve model)
b6	PH5	1: Have card	0: No card
b7	PH6	1: IC connector release	0: IC card seat press down

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error code form

6.3 Card entrance setting (CM = 32h)

Permit magcard and IC card entrance, and whether can be enter from backward as the setting of PM.

Command

'C'	32h	PM

Correct response

'P'	32h	PM	ST1	ST0

Error response

'N'	32	PM	E1	E0

Parameter instruction

PM ： Define the card entrance

30h	Magcard enter
31h	IC card enter
32h	Forbid entering card forward
33h	Allow entering card backward
34h	Forbid enter card backward

ST1、ST0 ： Reference equipment status form

E1、E0 ： Reference the error code form

6.4 Exit card (CM = 33h)

Can set the card exit forward or backward as PM setting .When exit forward ,half of the card will out of the reader and the other part will keep in the reader .

Command

'C'	33h	PM

Correct response

'P'	33h	PM	ST1	ST0

Error response

'N'	33h	PM	E1	E0

Parameter instruction

PM ： Define the card exit direction

30h	Exit card forward
31h	Exit card backward

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.5 Read magcard (CM = 36h)

Read the magcard and send the data to the host, STX, ETX and LRC are excluded in the data frames. If read error, the host will get the error codes from the reader. If error in reading single track, card reader will send the error codes to the host .If error in reading all the tracks, the error codes will be included in the correct response data frames and sent to host.

Command

‘C’	36h	PM

Correct response (single track or all tracks)

‘P’	36h	PM	ST1	ST0	DATA1	00	DATA2	00	DATA3

Error response

‘N’	36h	PM	E1	E0

Parameter instruction

PM ： Define the track

30h	Only move the card (for clean)
31h	Read ISO 1
32h	Read ISO 2
33h	Read ISO 3
35h	Read triple track
36h	Cleanup the memory

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

Error codes in reading

Codes	Description
E1h	Pre-amble(Initial data) Error
E2h	Post-amble (Ending data) Error
E3h	LRC Error
E4h	Parity error
E5h	Blank magcard

6.6 IC card power supply (CM = 38h)

It adapts to build IC card power management and have reset response as PM.

6.6.1

Command

‘C’	38h	PM

Correct response

‘P’	38h	PM	ST1	ST0	DATA*

When PM=31h,32h ,there will be some dates in HEX, Each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

‘N’	38h	PM	E1	E0

Parameter instruction

PM ： Define IC card power supply (Power on)/(Power off)

30h	CPU card power off
31h	CPU card power on
32h	SLE 4418 & 4428 & 4442 card power on
33h	SLE 4418 & 4428 & 4442 power off
36h	AT24 series card power on
37h	AT24 series card power off

ST1、ST0 ： Reference equipment status form

E1、E0 ： Reference error codes form

6.6.2 SAM card power on

Command

'C'	38h	PM	SAM_ID

Correct response

'P'	38h	PM	ST1	ST0	DATA*

Data in HEX, each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

'N'	38h	PM	E1	E0

Parameter instruction

PM ： Define SAM card power on/power off

34h	SAM card power off
35h	SAM card power on

SAM_ID ： select SAM card

31h	SAM connector 1
32h	SAM connector 2
33h	SAM connector 3
34h	SAM connector 4

Maximum will be 16 connectors

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.6.3 Contactless IC card power supply

Command

'C'	38h	38h	ON/OFF

Correct response

'P'	38h	38h	ST1	ST0

Error response

'N'	38h	38h	E1	E0

Parameter instruction

ON/OFF：Define the contactless IC card power supply (Power on/power off)

30h	Contactless IC card power off
31h	Contactless IC card power on

ST1、ST0 ： Reference equipment status form

E1、E0 ： Reference error codes form

6.7 IC card commands (CM = 39h)

It can control the exact communication with IC card and SAM card through the IC card defined commands.

6.7.1 Communicate with IC card

Command

'C'	39h	30h	DATA*

Data in HEX, each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	39h	30h	ST1	ST0	DATA*

Data in HEX, each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

'N'	39h	30h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.7.2 Communicate with SAM card

Command

'C'	39h	31h	SAM_ID	DATA*

Data in HEX, each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	39h	31h	ST1	ST0	DATA*

Data in HEX, each byte will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

'N'	39h	31h	E1	E0

Parameter instruction

SAM_ID ： Select SAM card

31h	SAM connector 1
32h	SAM connector 2
33h	SAM connector 3
34h	SAM connector 4

Maximum will be 16 connectors

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.8 Get the version information (CM = 3Ch)

Command

'C'	3Ch	30h

Correct response

'P'	3Ch	30h	ST1	ST0

Error response

'N'	3Ch	30h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.9 SLE4428/4418 direct commands（CM = 4Ah）

It is the function to build the communication with SLE4418/SLE4428 card .it will be perform after IC card power on. The functions are similar, the difference will be SLE4418 needn't PSC to read/write IC card, but SLE4428 must need PSC to read/write. The data will be in HEX.

* SA : Original address (Length:3 byte；Range: 000h ~ 3FFh)
* LEN : Data length (Length:3 byte；Range : SA + LEN <= 3FFh)

Data in Hex with 2 bytes means each byte will be sent with 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

6.9.1 Read IC card with unprotected way（PM = 31h）

It will provide the data in Hex with 2 bytes to read from the original address. The maximum length will be 256 bytes once reading.

Command

'C'	4Ah	31h	SA	LEN

Correct response

'P'	4Ah	31h	ST1	ST0	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

'N'	4Ah	31h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status from

E1、E0 ： Reference the error codes form

6.9.2 Read the IC card in protected way (PM = 32h)

It will read the data with 3 bytes. (1 byte to check the protect exist or not and data with 2 bytes in Hex)The Maximum length will be 256 bytes once reading.

Command

'C'	4Ah	32h	SA	LEN

Correct response

'P'	4Ah	32h	ST1	ST0	DATA*

Data length = 3 * LEN byte

Data

1 byte	2 bytes

Data (For example: 46h、31h = F1)

Protect bit 2AH (*): Protected
20H(Enter): Unprotected

Error response

'N'	4Ah	32h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.9.3 Write the IC card in unprotected way (PM = 33h, 38h)

Card reader will write the data from host in HEX from IC card initial address until finished the data length restriction, the maximum length will be 256 bytes.

Means work SLE4418,PM=38h means work SLE4428.

Command

'C'	4Ah	33h/38h	SA	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	4Ah	33h/38h	ST1	ST0

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h)

Error response

'N'	4Ah	33h/38h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.9.4 Write IC card with protected (PM = 34h, 39h)

Card reader will write the data from host in HEX from initial address of the protected IC card until finished the data length restriction, the maximum length will be 256 bytes. But the finished address can't be modified.

Command

'C'	4Ah	34h/39h	SA	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	4Ah	34h/39h	ST1	ST0

Error response

‘N’	4Ah	34h/39h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.9.5 Full fill the unprotected IC card with the same character. (PM = 35h, 3Ah)

Full fill the address from the initial of the unprotected zone with the same characters of 2 bytes in HEX.

PM = 35h Means work SLE4418 card, PM=3Ah means work SLE4428 card.

Command

‘C’	4Ah	35h/3Ah	SA	LEN	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

Correct response

‘P’	4Ah	35h/3Ah	ST1	ST0

Error response

‘N’	4Ah	35h/3Ah	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.9.6 Check PSC code (PM = 36h): Only for SLE4428

Before writing the data, if the input PSC code have discrepancy, this command will be performed and store the error data (8 bytes) in the 3FDh of the IC card .If input PSC code unsuccessfully, the IC card will be locked and can’t be used. So please check the PSC code before performing this command.

Error arithmometer (address:3FDh) will return the nonzero data to zero every PSC verify error .And the IC card will be blocked if 8 times verify error continuous, error arithmometer will reset to FFh automatically .

Command:

‘C’	4Ah	36h	PSC1	PSC0

PSC in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

Correct response

‘P’	4Ah	36h	ST1	ST0	ECNT

Return data：error arithmometer（address：3FDh）

ECNT code in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

Error response

‘N’	4Ah	36h	E1	E0

Parameter instruction

ST1、ST0 ： Reference equipment status form

E1、E0 ： Reference the error codes form

6.9.7 Modify PSC code (PM = 37h): Only for SLE4428

Check the PCS code before this command.

Command

‘C’	4Ah	37h	PSC1	PSC0

PSC in HEX , each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	4Ah	37h	ST1	ST0

Error response

'N'	4Ah	37h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10 SLE4442 direct command（CM = 4Bh）

It is the function to build the communication with SLE4442 card; it should work after IC power on. To get the PCS code authorization before writing SLE4442 card. Then read/write data in HEX.

* SA : Initial address (Length 2 bytes；Value range: 00h ~ FFh)
* LEN : Data length (Length 2 bytes；Value range : SA + LEN <= FFh)
  Data in HEX with 2 bytes means data will be sent as 4 bit in ASCII.(For example 7Bh can be sent as 37h and 42h)

6.10.1 Read the data in memory (PM = 31h)

Read the protected data with 2 byte in HEX (20h~FFh)

Command:

'C'	4Bh	31h

Correct response

'P'	4Bh	31h	ST1	ST0	DATA*

Data length：2 * 233 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h)

Error response

'N'	4Bh	31h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.2 Read the protected memory zone (PM = 32h)

Read the protected memory zone with data in HEX of 3 bytes.

Command

'C'	4Bh	32h

Correct response

'P'	4Bh	32h	ST1	ST0	DATA*

Data length：3 * 32 byte

Data

1 byte	2 bytes

Data (For example：46h、31h = F1)

Protected 2AH (*)： protected
20H (enter) :unprotected

Error response

'N'	4Bh	32h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.3 Write without protect (PM = 33h)

It provides the write function from 00h to FFh in unprotected memory zone.

Command:

'C'	4Bh	33h	SA	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h)

Correct response

'P'	4Bh	33h	ST1	ST0

Error response

'N'	4Bh	33h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.4 Write with protect (PM = 34h)

Card reader will write the data from host in HEX from initial address of IC card until finished the data length restriction, but the finished address can't be re-write.

Command

'C'	4Bh	34h	SA	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h),data length +SA,<=20h.

Correct response

'P'	4Bh	34h	ST1	ST0

Error response

'N'	4Bh	34h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.5 Full fill the unprotected IC card with the same character. (PM = 35h)

It provides the function of full fill unprotected zone with same character.

Command

'C'	4Bh	35h	SA	LEN	DATA*

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Data length + SA <= 100h 。

Correct response

'P'	4Bh	35h	ST1	ST0

Error response

'N'	4Bh	35h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.6 Verify PSC code (PM = 36h)

Before writing the data, if the input PSC code have discrepancy, this command will be performed and store the error data in 00h of the IC card .If input PSC code unsuccessfully, the IC card will be locked and can't be used. So please check the PSC code before performing this command. Error arithmometer (address:00h) will return the nonzero data to zero every PSC verify error .And the IC card will be blocked if 3 times verify error continuous, error arithmometer will reset to 07h automatically .

Command:

'C'	4Bh	36h	PSC2	PSC1	PSC0

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h.

Correct response

'P'	4Bh	36h	ST1	ST0	ECNT

Returned data： Error arithmometer（Address：3FDh）

ECNT PSC arithmometer in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Error response:

'N'	4Bh	36h	E1	E0

Parameter instruction

ST1、ST0 : Reference the equipment status form

E1、E0 : Reference the error codes form

6.10.7 PSC modify (PM = 37h)

Check PSC code before performing this command.

Command:

'C'	4Bh	37h	PSC2	PSC1	PSC0

PSC in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h

Correct response

'P'	4Bh	37h	ST1	ST0

Error Response

'N'	4Bh	37h	E1	E0

Parameter instruction:

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.10.8 Read the protected memory zone (PM = 38h)

This command to store the PSC and read the error times in the protected memory zone.

Command:

'C'	4Bh	38h

PSC in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Correct response:

'P'	4Bh	38h	ST1	ST0	ECNT	PSC2	PSC1	PSC0

Returned data： Error arithmometer（Address：3FDh）

CNT、PSC in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Error Response:

'N'	4Bh	38h	E1	E0

Parameter Instruction:

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.11 AT24 series card direct commands（CM = 4Ch）

AT24 series card is common EEPROM memory card, Can be read/write directly.

*ID : AT24 series card

ID No.	Card
0x31	AT24C01
0x32	AT24C02
0x33	AT24C04
0x34	AT24C08
0x35	AT24C16
0x36	AT24C32
0x37	AT24C64
0x38	AT24C128
0x39	AT24C256
0x41	AT24C512
0x42	AT24C1024

* SA : Start Address (length: 4 bytes； Bound : 0000h ~ 0FFFh)

* LEN : Data Length (Length: 2 bytes；Bound : SA + LEN <= 0FFFh)

2 bytes in HEX: data will be sent as 4 bit in ASCII. (For example 7Bh can be sent as 37h and 42h

6.11.1 Read Memory card (PM = 31h)

Command:

'C'	4Ch	31h	ID	SA	LEN

Correct Response:

'P'	4Ch	31h	ST1	ST0	DATA*

Data in HEX each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Error Response

'N'	4Ch	31h	E1	E0

Parameter Instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.11.2 Write Memory card (PM = 32h)

Command:

'C'	4Ch	32h	ID	SA	LEN	DATA*

Data in HEX each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Correct Response:

'P'	4Ch	32h	ST1	ST0

Error Response

'N'	4Ch	32h	E1	E0

Parameter Instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12 Mifare card commands （CM = 51h）

Mifare card is the contactless IC card from PHILIPS, This machine can read/write the card compatible with ISO 14444 A and Mifare standard.

6.12.1 Ask for Response (PM = 31h)

Command:

'C'	51h	31h	CMP

Data Length：2 * 1 byte

Data in HEX each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command Parameter (CMP):

Parameter	Instruction
0x52h	search the cards
0x26h	Search the cards not in IDLE status

Correct response

'P'	51h	31h	ST1	ST0	DATA*

Data Length：2 * 2 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h

Error response:

'N'	51h	31h	E1	E0

Parameter Instruction:

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.2 Prevent collide dictate (PM = 32h)

Command:

'C'	51h	32h	CMP

Data Length：2 * 1 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command Parameter (CMP)

Parameter	Instruction
0x93h	Class One Card Parameter
0x95h	Class Two Card Parameter
0x97h	Class Three Card Parameter

Correct response

'P'	51h	32h	ST1	ST0	DATA*

Data Length：2 * 4 byte

Data in HEX each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Error response

'N'	51h	32h	E1	E0

Parameter Instruction

ST1、ST0 ：Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.3 Choose dictate (PM = 33h)

Command

'C'	51h	33h	CMP

Data Length：2 * 5 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h

Command line Parameter（CMP)："search card (1byte） + Card No.（4 byte）"

Search card parameter	Instruction
0x93h	Class One Card Parameter
0x95h	Class Two Card Parameter
0x97h	Class Three Card Parameter

Correct response

'P'	51h	33h	ST1	ST0	DATA*

Data length：2 * 4 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h

Error response

'N'	51h	33h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.4 Pause dictate (PM = 34h)

Command

‘C’	51h	34h

Correct response

‘P’	51h	34h	ST1	ST0

Error response

‘N’	51h	34h	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.5 Upload PSC dictate from FIFO (PM = 35h)

Command

‘C’	51h	35h	CMP

Data length：2 * 6 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII. (For example 7Bh can be sent as 37h and 42h

Correct response

‘P’	51h	35h	ST1	ST0

Error Response

‘N’	51h	35h	E1	E0

Parameter Instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.6 Upload PSC from EEPROM (PM = 36h)

Command

‘C’	51h	36h	CMP

Data length：2 * 2 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）：“PSC mode（1byte） + PSC No.（1byte）”

Command line parameter	Instruction
PSC mode	= 0x60 Key A = 0x61 Key B
PSC NO.	0~15

Correct Response

'P'	51h	36h	ST1	ST0

Error Response

'N'	51h	36h	E1	E0

Parameter Instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.7 Authentication dictate(PM = 37h)

Command

'C'	51h	37h	CMP

Data Length：2 * 6 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）："Verify mode（1byte） + Block No.（1byte） + Card No.（4bytes）"

Command lines parameter	Instruction
Verify mode	= 0x60 Key A = 0x61 Key B
Block No.	0 ~ 63
Card No.	The read card No.

Correct response

'P'	51h	37h	ST1	ST0

Error Response

'N'	51h	37h	E1	E0

Parameter Instruction

ST1、ST0 ：Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.8 Reading dictate (PM = 38h)

Command

'C'	51h	38h	CMP

Data length：2 * 2 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）："Block No.（1byte） + the block be read （1byte）"

command line parameter	Instruction
Block No.	0 ~ 63
the block be read	1 ~ 4

Correct response:

'P'	51h	38h	ST1	ST0	DATA*

Data length：2 * 16 * Block No. (Byte)

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Error response

'N'	51h	38h	E1	E0

Parameter instruction

ST1、ST0 ：Reference the equipment status form

E1、E0 ：Reference the error codes form

6.12.9 Writing dictate (PM = 39h)

Command

'C'	51h	39h	CMP

Data length：2 * 5 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）义：" Block No.（1byte） + The wrote block（1byte） + data in blocks（16 byte*block No.）"

Correct response

Command line parameter	Instruction
Block No.	0 ~ 63
The wrote block	1 ~ 4
Data	

'P'	51h	39h	ST1	ST0

Error response

'N'	51h	39h	E1	E0

Parameter Instruction

ST1、ST0 ：Reference the equipment status form

E1、E0 ：Reference the error codes form

6.12.10 Increment、devalue、Memory dictate (PM = 3ah)

Command

'C'	51h	3ah	CMP

Data length：2 * 6 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command Line parameter（CMP）："Value mode（1byte） + Block No.（1byte） + Value（4 byte）"

Command line parameter	Instruction
Value Mode	= 0xC0 devalue (DecValue)

	= 0xC1 Increment (IncValue) = 0xC2 (Restore)
Block No.	0 ~ 63
Value	

Correct response

'P'	51h	3ah	ST1	ST0

Error response

'N'	51h	3ah	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.11 Transmit dictate (PM = 3bh)

Command

'C'	51h	3bh	CMP

Data length：2 * 1 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）："Block No.（1byte）"

Command line parameter	Instruction
Block No.	0 ~ 63

Correct response

'P'	51h	3bh	ST1	ST0

Error response

'N'	51h	3bh	E1	E0

Parameter instruction

ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

6.12.12 The dictate that store PSC to EEPROM (PM = 3ch)

Command

'C'	51h	3ch	CMP

Data length：2 * 8 byte

Data in HEX, each byte will be sent as 4 bit data in ASCII.(For example 7Bh can be sent as 37h and 42h

Command line parameter（CMP）："PSC mode（1byte） + PSC（1byte） + PSC（6 byte）"

Command line parameter	Instruction
PSC mode	= 0x60 KeyA = 0x61 KeyB
PSC NO.	0 ~ 15
PSC	

Correct response

'P'	51h	3ch	ST1	ST0

Error response

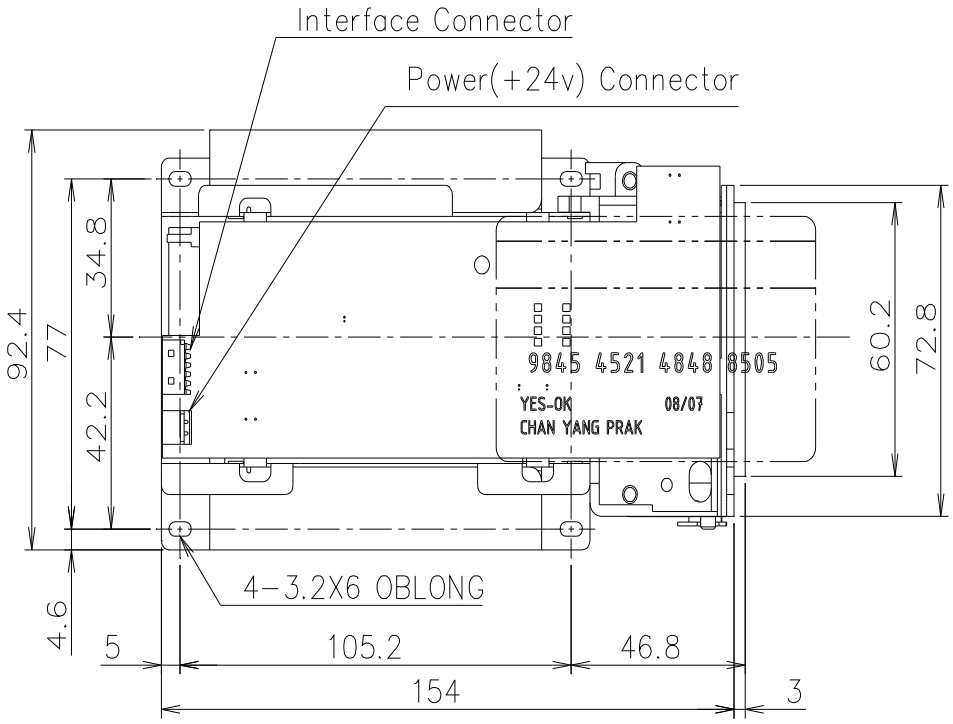
'N'	51h	3ch	E1	E0

Parameter Instruction

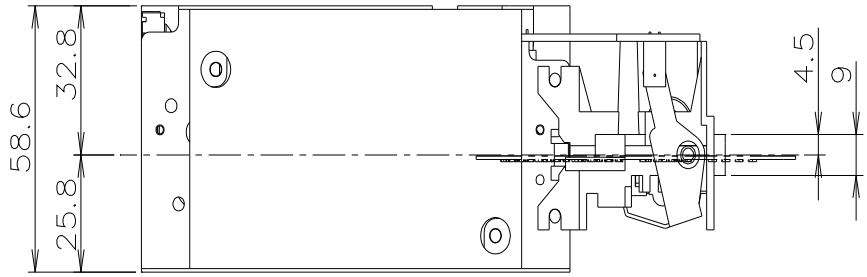
ST1、ST0 ： Reference the equipment status form

E1、E0 ： Reference the error codes form

7. ENGINEERING VIEW



Top View



Side View