

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Protocol	Ver.	1.0
		Page	1/55

CRT-310-004 Card Reader Communication Protocol

Contents

1. Communication Specification	3
1.1 Control Logic.....	3
1.1.1 Communication Format	3
1.1.2 Communication Control Method	3
1.1.3 Communication Control Character	3
1.1.4 Command Structure of Communication	3
1.1.5 Control Command Structure	3
1.1.6 Communication Process Descriptions	3
1.1.6.1 Normal Communication Process	3
1.1.6.2 Communication Process for Command Cancelation	3
1.1.6.3 Non-normal Communication Process	3
1.1.6.4 Communication Process for BCC Error.....	3
1.2 Communication Package Format.....	3
1.2.1 Send command communication package format:	3
1.2.2 Returned Format of Communication	3
1.2.2.1 Normal Return	3
1.2.2.2 Non-normal Return	3
2. Communication Protocol	3
2.1 Card Reader Operation Command.....	3
2.1.1 Card Reader Reset	3
2.1.1.2 Read CRT-310 Card Reader's S/N.....	3
2.1.1.3 Card in Control Setup	3
2.2 Card Stop Position Setup	3
2.3 Card Reader Status Information	3
2.4 Sensor Status Checking	3
2.5 Test IC Card Type Automatically.....	3
2.6 Card Move Operation	3
2.7 Contact IC Card Power on/off	3
2.8 Shutter indicator light control operation	3
2.9 Indicator Light on/off Operation.....	3
2.10 Twinkle Indicator Light Operation	3
2.11 Set Baud Rate of Com Port.....	3
2.12 Enable or Disable Using the Communication Port from a Third Party	3
2.13 Read/Write Card Operation Specification	3
2.14 Magnetic Card Specification	3
2.15 Read Appointed Track's Magnetic card Data	3

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	2/55

2.16 According to the Re-appointed Mode Read Appointed Tracks Data	3
2.17 Clear up Magnetic Card Data Command.....	3
1.1.1、 Contact CPU card operation	3
CPU card cold reset	3
CPU card warm reset	3
T=0 CPU card C-APDU command operation	3
T=1 CPU card C-APDU command operation	3
1.1.2、 SIM card operation:	3
SIM card reset.....	3
T=0 SIM card C-APDU command operation	3
T=1 SIM card C-APDU command operation	3
SIM card power off operation.....	3
1.1.3、 SLE4442card operation	3
Card reset.....	3
Read main storage area	3
Read protection bit area	3
Read safty area PSC.....	3
Password verification.....	3
Write main storage area	3
Write protection area data.....	3
Change password	3
Card reset	3
Read storage area data	3
Read protection bit status.....	3
Password verification.....	3
write data(without writing protection bit).....	3
Write data(With writing protection bit)	3
Change password	3
1.1.4、 24CXX series storage card operation:	3
Set up card type	3
Read card	3
write card	3
Write card with parity	3
1.1.5、 AT88SC102 Card Operation	3
Card Reset.....	3
Verify main password:	3
Read Memory	3
Erase memory area as writing memory card.....	3
Write memory area (control area / application area 1 / application area 2)	3
Change Password (Control Area / application area 1 / application area 2).....	3
1.1.6、 AT88S1604 card operaion	3
Card reset.....	3

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	3/55

read card Data	3
Erase card data	3
Write Card Data	3
Card reset	3
Write Card Data	3
1. 1. 7、 AT88SC1608 card operation	3
Card Reset	3
Read Card Data	3
Write Card data	3
Write fuse	3

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	4/55

1. Communication Specification

1.1 Control Logic

1.1.1 Communication Format

Baud Rate (BPS: Bit per second): Automatically adapt to Master controller

(Default Setting: 9600 BPS, 1200/2400/4800/9600/192000/38400/57600/115200 BPS for options)

Communication type: Asynchronous Communication

Transmission type: Half Duplex

Bit detail:

Start bit: 1-bit

Data bit: 8-bit

Parity bit: None

Stop bit: 1-bit

Start bit	D0	D1	D2	D3	D4	D5	D6	D7	Stop bit
-----------	----	----	----	----	----	----	----	----	----------

1.1.2 Communication Control Method

The unit, as a driven part, starts working after received enable command from Master controller

1.1.3 Communication Control Character

STX(0X02)	Start character of TEXT
ETX(0X03)	End character of TEXT
ENQ(0X05)	Enquiry Command (Host -> Reader)
ACK(0X06)	Positive Acknowledge (Reader-Host)
NAK(0X15)	Negative Acknowledge (Reader-Host)
EOT(0X04)	Cancel Communication

1.1.4 Command Structure of Communication

Data Structure of transmitting and receiving

STX(0x02)	Command package	ETX(0x03)	BCC
-----------	-----------------	-----------	-----

BCC (Block Check Character), $BCC = STX \wedge \text{Command Package} \wedge ETX$ ($\wedge$ is exclusive-OR calculation)

Sample: BCC calculation in Reset Command

0x02	0x00	0x02	0x30	0x30	0x03	BCC
------	------	------	------	------	------	-----

$$BCC = 0x02 \wedge 0x00 \wedge 0x02 \wedge 0x30 \wedge 0x30 \wedge 0x03$$

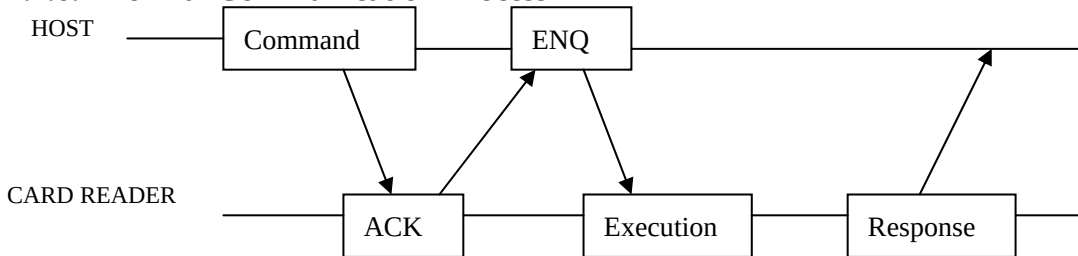
1.1.5 Control Command Structure

A C K	N A K	E N Q	E O T
-------------	-------------	-------------	-------------

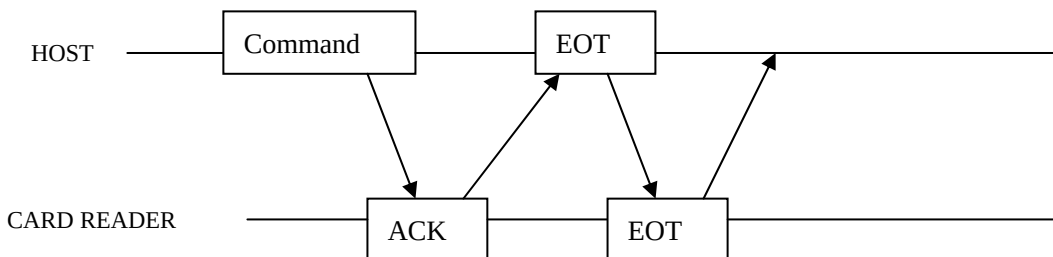
	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	5/55

1.1.6 Communication Process Descriptions

1.1.6.1 Normal Communication Process

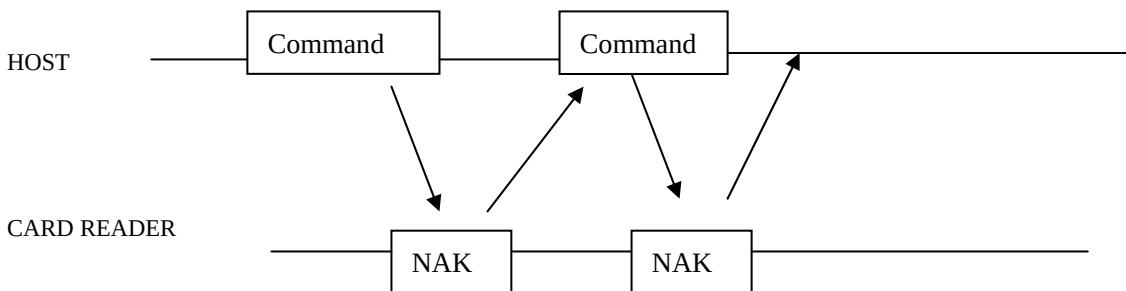


1.1.6.2 Communication Process for Command Cancellation



1.1.6.3 Non-normal Communication Process

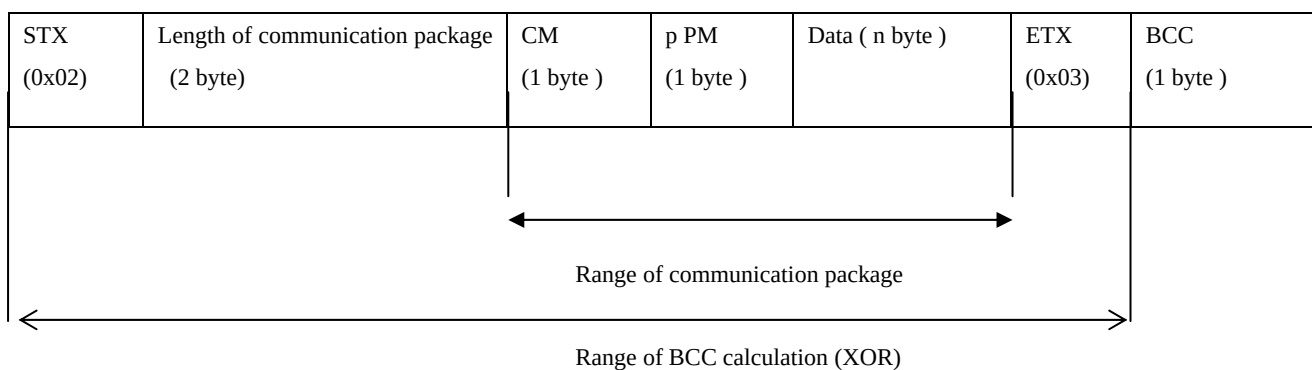
1.1.6.4 Communication Process for BCC Error



	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	6/55

1.2 Communication Package Format

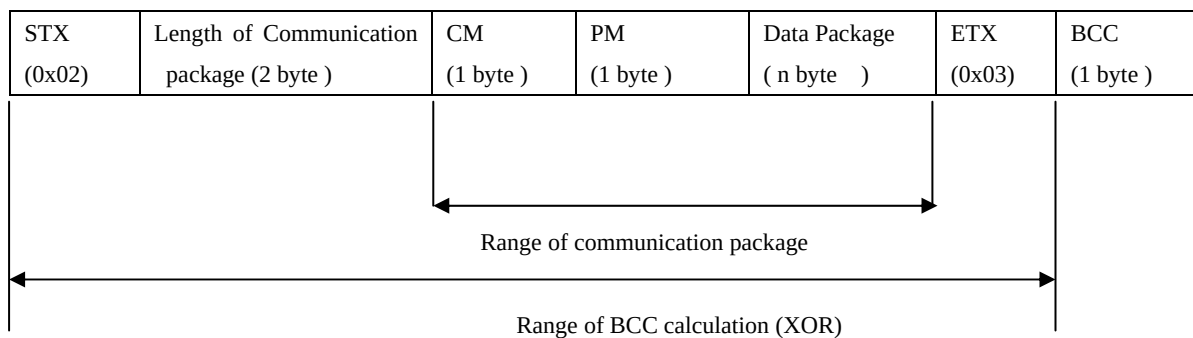
1.2.1 Send command communication package format:



- Data size for communication package: Max=264 byte. Min=0 byte
- Communication package in 2 bytes: High byte first and low byte behind

1.2.2 Returned Format of Communication

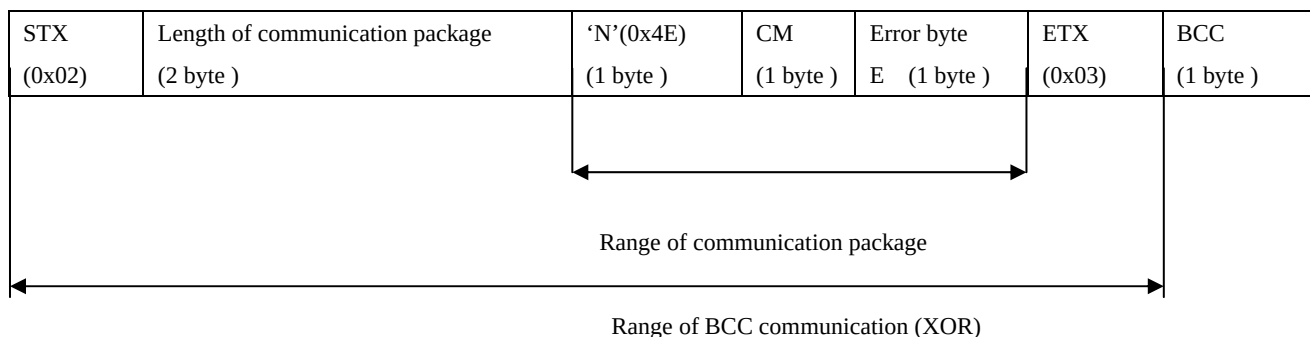
1.2.2.1 Normal Return



- Data size for communication package: Max=264 byte. Min=0 byte
- Return CM, PM code is identical with command corresponding to transmitting command

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	7/55

1.2.2.2 Non-normal Return



The Meaning of error byte:

Error byte E	Descriptions
0x00	CM Error. Command byte CM. Against regulation CM code is included in the command.
0x01	PM Error. Against regulation PM code is included in the command
0x02	Command unable to be executed. Command cannot be executed
0x04	Data Package Error. Part of the communication package is not conformity with the communication protocol
0x05	Input Voltage is not within the range of the voltage. The input voltage lower than 10.8V or higher than 14.5V will bring reader under protection mode.
0x06	Non-standard length of card in the reader. Any case like this happened, the error status will be presented
0x07	Main power down and backup power is off-power, the backup power under working. So other command could not be executed.

Note: Abnormal returned data package appears. It is a returned message from the Host when the sending communication package, command byte or command parameter and Reader is in abnormal condition.

1. Error byte E=0x00 It means the command byte of communication package from Host is an undefined command byte in communication protocol. It is illegal command.
2. Error byte E=0x01 It means the command parameter of communication package from Host is an undefined command byte in communication protocol. It is illegal command. When it happens, please check the command byte defined range of communication. Especially when operating the IC card, the value range of command parameter (Operation address, operation length) could not overrun the defined operation address space range of IC card. Otherwise, the Reader returns Error.
3. Error byte E=0x02 It means the Host does not support the function and it could not accept the communication package form Host. It could not be executed and Reader returns error. Please check your Reader model when it happens. For example, when you send communication package of Reading Magnetic card, but the Reader without this function, then it returns that command could not be executed. When you send operation communication package to Reader, but it is without the function of operating

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	8/55

RF card, then it returns that command could not be executed as well. Please notice the specification of the reason why command could not be executed in the communication protocol.

4. Error byte E=0x04 It means the data package of communication package from Host is not accordance with communication protocol. There are mistakes of the format of data package, and it could not be executed, then returns error .This error always happens during the CPU card C-APDU operation when it check the data package whether is right or not.
5. Error byte E=0x05 it means the input voltage runs out of operation voltage range (Rated voltage: 10.5V-14.5V, 12V is suggested). Reader is under protection status, and it could not execute Command, enter card in and move card. Only communication operation will be responded.
6. Error byte E=0x06 It means abnormal length card in the Reader and it is not an ISO standard card (Long card, short card and damaged card). Receive communication package from Host, then Reader returns error and indicate to clear the abnormal card.
7. Error byte E=0x07 it means the power supply has two methods: Main power supply and backup power supply. When the main power supply is off-power, backup power supply will run. After receiving communication package from Host, Reader returns error.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	9/55

2. Communication Protocol

2.1 Card Reader Operation Command

Card reader operation command list

Command	Command byte CM	Command Parameter	Descriptions
Card stop position setup	0x2E	PM	The card stop position setup after card enters into the card reader and read the data from magnetic card.
Card in control	0x2F	PM 1,PM 2	Enable or Disable card in from front side or rear side
Reset	0x30	0x30	Reset card reader, return the software version
		0x31	Reset card reader, eject it to the front side if there is a card in, return the software version
		0x32	Reset card reader, eject it to the rear side if there is a card in, return the software version
Card reader S/N	0x30	0x3A	Read the S/N from the card reader
		0x3B	Write the S/N to the card reader
Check status	0x31	0x2F	Check status of each sensor
		0x30	Check status of reader(e.g. Whether card in or not)
Test IC card type	0x31	0x31	Check IC Card type automatically
Move card operation	0x32	0x2E	Enter card stopped at the position with holding card or position inside reader into the card reader
		0x2F	Move the card stopped at the position with holding card or position inside reader to the IC card operation position. And then card read/write IC card.
		0x30	Eject card from front side without holding
		0x31	Eject card from front side and hold it
		0x32	Eject card from rear side and hold it
		0x33	Eject card from rear side without holding
IC card 0x30 IC card power on power on/off	0x33	0x30	IC card power on
		0x31	IC card power off
Set comm. Baud rate	0x34	0x30	UART=1200 BPS
		0x31	UART=2400 BPS
		0x32	UART=4800 BPS
		0x33	UART=9600 BPS
		0x34	UART=19200 BPS
		0x35	UART=38400 BPS
		0x36	UART=57600 BPS
		0x37	UART=115200 BPS

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	10/55

2.1.1 Card Reader Reset

Host send:

0x02	0x00	0x02	0x30	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x30 Reset card reader, return the software version

PM =0x31 Reset card reader, return the software version, eject it to the front side without holding

PM =0x32 Reset card reader, return the software version, eject it to the rear side without holding

Reader return:

0x02	0x00	0x0F	0x30	PM	Card reader version SV	0x03	BCC
------	------	------	------	----	------------------------	------	-----

Card reader version: CRT310 card reader SV="CRT 310 V4.0 "

2.1.1.2 Read CRT-310 Card Reader's S/N

Host send:

0x02	0x00	0x02	0x30	0x3A	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeeded returns: Operation status byte P='Y'(0x59)

0x02	Length of communication package 2 byte	0x30	0x3A	Operation status byte P	S/N data package	0x03	BCC
------	---	------	------	----------------------------	---------------------	------	-----

Reader operation failed: Operation status byte P='N'(0x4E)

0x02	0x00	0x03	0x30	0x3A	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

2.1.1.3 Card in Control Setup

Host sends:

0x02	0x00	0x03	0x2F	PM 1	PM 2	0x03	BCC
------	------	------	------	------	------	------	-----

PM 1=0x31 Prohibit card in from front side

PM 1=0x32

Allow card in by Magnetic card mode (both magnetic signal and switch should be valid, the allow card in).

Only allow card in from front shutter

PM 1=0x33

Allow card in by switch mode Allow Magnetic card, IC card, Mifare 1 card and dual interface card in from front shutter

PM 1=0x34

Allow card in by Magnetic signal mode It is especially suitable for the thin paper magnetic card

PM 2=0x30 Allow card in from rear side

PM 2=0x31 Prohibit card in from rear side

Reader return:

0x02	0x00	0x04	0x2F	PM 1	PM 2	Card reader status byte S	0x03	BCC
------	------	------	------	------	------	---------------------------	------	-----

S='N'(0x4E) success

S='Y'(0x59) failure

After the reader executes power on or reset command, the default card in mode is allowing card in by switch mode and allow card in from rear side.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	11/55

Note: To the reader without electric shutter, it only could response card in by switch mode. It is not allowed card in by magnetic card mode and in magnetic signal mode or the Reader will return “Command could not be executed”.

2.2 Card Stop Position Setup

After card reader executes power on or reset, the default stop position is stopping inside the reader

Host sends:

0x02	0x00	0x02	0x2E	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x30 Card in and stop in the front side without holding the card.

PM =0x31 Card in and stop in the front side with holding the card.

PM =0x32

Card in and stop inside the front side, but IC card contact does not connect with card, and RF (Mifare one) card is ready to be read/written.

PM =0x33

Card in and stop inside the front side, and IC card contact connects with card, IC card and RF (Mifare one) card is ready to be read/written.

PM =0x34 Card in and stop in the rear side with holding the card.

PM =0x35 Card in and stop in the rear side without holding the card.

Reader Return:

0x02	0x00	0x03	0x2E	PM	Card reader status byte S	0x03	BCC
------	------	------	------	----	---------------------------	------	-----

S='N'(0x4E) failure

S='Y'(0x59) success

Note: When we execute setting stop card at IC card operating position after card in on the Reader without IC Card module, the

Reader will return “Command could not be executed”. The operation of setting stop card at IC card operating position will be invalid.

2.3 Card Reader Status Information

Host sends:

0x02	0x00	0x02	0x31	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader return

0x02	0x00	0x05	0x31	0x30	Card reader status S1	Card reader status S2	Card reader status S3	0x03	BCC
------	------	------	------	------	-----------------------	-----------------------	-----------------------	------	-----

S1=0X46 with long card in the card reader. (The card is longer than the standard card)

S1=0X47 with short card in the card reader. (The card is shorter than the standard card)

S1=0X48 Card stops at the front side position without holding card.(In other words, card is ejected from the front side)

S1=0X49 Card stops at the front side position with holding card.

S1=0X4A Card stops inside the card reader.

S1=0X4B Card stops inside the card reader, and contact connects with IC card.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	12/55

S1=0X4C Card stops at the rear side position with holding card.

S1=0X4D Card stops at the rear side position without holding card. (In other words, card is ejected from the rear side and captured).

S1=0x4E No card in the reader.

S2=0X49 Allow card in by magnetic card mode and only allow magnetic card in by opening the shutter.

S2=0X4A Allow card in by switch mode. Allow magnetic card, IC card, M1 RF card and dual interface card in.

S2=0X4B Allow card in by magnetic signal mode. Allow thin paper magnetic card in.

S2=0x4E Prohibit card in.

S3=0X4A Allow card in from rear side. Allow magnetic card, IC card, M1 RF card and dual interface card in.

S3=0x4E Prohibit card in from rear side.

2.4 Sensor Status Checking

Host sends:

Reader checks the sensor status automatically (6pcs infrared sensors status, shutter status, switch sensor status).

0x02	0x00	0x02	0x31	0x2E	0x03	BCC
------	------	------	------	------	------	-----

Reader return:

0x02	0x00	0x0A	0x31	0x2E	PSS0	PSS1	PSS2	PSS3	PSS4	PSS5	CTSW	KSW	0x03	BCC
------	------	------	------	------	------	------	------	------	------	------	------	-----	------	-----

PSS0—PSS5:

Infrared sensor status:

PSS(0...5)=0X30 no card on the sensor position

PSS(0...5)=0X31 with card on the sensor position

CTSW: Shutter status

CTSW=0X30 shutter is close

CTSW=0X31 shutter is open

KSW: Switch sensor status

KSW=0X30 switch doesn't get the signal of card going through shutter.;

KSW=0X31 switch gets the signal of card going through shutter.

2.5 Test IC Card Type Automatically

Host sends:

Reader auto testing the card type, and return the card type

0x02	0x00	0x02	0x31	0x31	0x03	BCC
------	------	------	------	------	------	-----

Reader return:

0x02	0x00	0x04	0x31	0x31	Card type byte S1	Card type byte S2	0x03	BCC
------	------	------	------	------	-------------------	-------------------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	13/55

Card type byte S1, S2:

Card type byte S1	Card type byte S2	Card type instruction
'N'	'0'	No card inside
	'1'	Unknown card type
	'2'	Card is not in the right position where it can be operated.
'0'	'0'	Contactless RFID card (S50)
	'1'	Contactless S70 card
	'2'	Contactless UL card
	'4'	ISO14443 TYPEA CPU card
	'5'	ISO14443 TYPEB CPU card
	'9'	Contactless RFID card but unknown type
'1'	'0'	T=0 contact CPU card
	'1'	T=1 contact CPU card
'2'	'0'	24C01card
	'1'	24C02 card
	'2'	24C04 card
	'3'	24C08 card
	'4'	24C16 card
	'5'	24C32 card
	'6'	24C64 card
	'7'	24C128 card
	'8'	24C256 card
'3'	'0'	SL4442 card
	'1'	SL4428 card
'4'	'0'	AT88S102 card
	'1'	AT88S1604 card
	'2'	AT45D041 card
	'3'	AT88SC1608 card

Note: Auto testing the type of card, only supports testing the card type of Mifare one RF card and contact IC card, but not dual interface card. For contact card, the testing result is only for reference because the testing result may be not correct if the card is not clean.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	14/55

2.6 Card Move Operation

Move the card which is stopped in the position with holding card or position inside the reader to a new position and wait for operation.

Host sends:

0x02	0x00	0x02	0x32	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x2E Move card inside the reader, then do RF(M1) R/W.

PM =0x2F Move card inside the reader, contact connect with IC card then do IC card R/W.

PM =0x30 Move card to the front side without holding the card on the position.

PM =0x31 Move card to the front side with holding the card on the position.

PM =0x32 Move card to the rear side with holding the card on the position.

PM =0x33 Move card to the rear side without holding the card on the position.

PM =0x34 Eject the abnormal card out of the reader from the rear side, for short card, shall use the standard card to support to eject it out of the reader (This command is used to clean the card inside.)

Reader return:

0x02	0x00	0x03	0x32	PM	Operation status byte P	0x03	BCC
------	------	------	------	----	-------------------------	------	-----

P='Y'(0x59) success

P='N'(0x4E) failure

P='E'(0x45) no card in reader

P='W'(0x57) card is not in the right position where it can be operated.

Note:

1. When the card is not on the position with holding card or position inside the reader, if we execute the command such as eject card or card in, it will return "card is not in the right position where it can be operated"

2.7 Contact IC Card Power on/off

Host sends:

0x02	0x00	0x02	0x33	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x30 IC card power on

PM =0x31 IC card power off

Reader return:

0x02	0x00	0x03	0x33	PM	Operation status byte P	0x03	BCC
------	------	------	------	----	-------------------------	------	-----

Operation status byte

P='Y'(0x59) Success

P='N'(0x4E) Failure

P='E'(0x45) No card in reader

P='W'(0x57) card is not in the right position where it can be operated.

Note:

1. When the card is not on the position with holding card or position inside the reader, if we execute the command such as eject card or card in, it will return "card is not in the right position where it can be operated"

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	15/55

2. When the card is not on the position with holding card or position inside the reader, if we execute the command “IC card power on/off”, it will return “Command could not be executed”.

3. After finishing all of contact IC card operation, use this command to make power off operation.

2.8 Shutter indicator light control operation

2.9 Indicator Light on/off Operation

Host sends:

0x02	0x00	0x02	0x46	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x30 Indicator light on

PM =0x31 Indicator light off

Reader return:

0x02	0x00	0x03	0x46	PM	Operation status byte	0x03	BCC
------	------	------	------	----	-----------------------	------	-----

Operation status byte P='Y'(0x59) success

2.10 Twinkle Indicator Light Operation

Host sends:

0x02	0x00	0x03	0x49	PM 1	PM 2	0x03	BCC
------	------	------	------	------	------	------	-----

PM 1: time value of indicator light on(PM 1= 0x00-0xFF,Time value =0.25S X PM 1)

PM 2: time value of indicator light off(PM 2=0x00-0xFF,Time value=0.25s X PM 2)

Reader return:

0x02	0x00	0x04	0x49	PM 1	PM 2	Operation status byte P	0x03	BCC
------	------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='Y'(0x59) Success

Time cycle of indicator light flashing one time=Time PM 1 + Time PM 2. Minimum twinkle time cycle is 0.5S(PM 1=0x01,PM 2=0x01).

When PM 1=0x00 and PM 2 is any time value,then indicator light is off all the time; when PM 2=0x00 and PM 1=0x01-0xFF,then indicator light is on all the time.

Notice: After Reset power on or reset, the indicator light of shutter will be off. Then execute 8.7.1 Indicator Light On/Off operation, twinkle Indicator Light Operation exits. The indicator light status depends on Indicator Light On/Off operation.

2.11 Set Baud Rate of Com Port

Host sends:

0x02	0x00	0x02	0x34	PM	0x03	BCC
------	------	------	------	----	------	-----

PM =0x30 UART=1200bps

PM =0x31 UART=2400pbs

PM =0x32 UART=4800bps

PM =0x33 UART=9600bps

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	16/55

PM =0x34 UART=19200bps

PM =0x35 UART=38400bps

PM =0x36 UART=57600bps

PM =0x37 UART=115200bps

Reader return:

0x02	0x00	0x03	0x33	PM	Operation status byte P	0x03	BCC
------	------	------	------	----	-------------------------	------	-----

Operation status byte P='Y'(0x59) success

Operation status byte P='N'(0x4E) failure

Note:

1. Host received the successful information return, card reader will reset com port according to new baud rate, and saving in the EEPROM of reader until there is new baud rate changing.
2. After resetting baud rate, host also need to reset com port according to reset baud rate, then communicate.

2.12 Enable or Disable Using the Communication Port from a Third Party

Host sends:

0x02	0x00	0x02	0xFA	PM	0x03	BCC
------	------	------	------	----	------	-----

PM = 0x30 Enable using the communication port from third part

PM = 0x31 Disable using the communication port from third part

Reader return:

0x02	0x00	0x03	0xFA	PM	Operation status byte P	0x03	BCC
------	------	------	------	----	-------------------------	------	-----

Operation status byte P='Y'(0x59) Success

Operation status byte P='N'(0x4E) failure

The communication port from a third party, allows the communication port from a third party combining with the port of CRT310 card reader and use them by time-sharing. After enabling the communication port from a third party, CRT310 will be under monitor and do not return any communication response until the reader receives forbidding the communication operation command from a third party from HOST. Then the HOST can send the communication operation command to operate the equipment from a third party.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	17/55

2.13 Read/Write Card Operation Specification

2.14 Magnetic Card Specification

The initialized reading mode is reading track 1, 2, 3 via ASCII code after card reader power on. When reset the reader, still ASCII mode.

2.15 Read Appointed Track's Magnetic card Data

HOST sends:

0x02	0x00	0x04	0x45	0x30	Card reading mode	Appointed track number	0x03	BCC
------	------	------	------	------	-------------------	------------------------	------	-----

Card reading mode:

0x30 reading card data by ASCII

0x31 reading card data by binary code

Appointed track number:

0x30 do not read any track

0x31 read track 1

0x32 read tracks 2

0x33 read tracks 3

0x34 read track 1, 2

0x35 read track 2, 3

0x36 read 1, 3 tracks

0x37 read all 3 tracks

Reader returns:

0x02	Communication length N byte	0x45	0x30	Card reading mode	Appointed track number	data package n byte of track 1, 2, 3	0x03	BCC
------	-----------------------------	------	------	-------------------	------------------------	--------------------------------------	------	-----

Communication length: N = 4 + 3 tracks data length

Card reading mode:

=0x30 be set to ASCII code reading mode, the upload data is in ASCII coding

=0x31 be set to binary code reading mode, the upload data is in binary coding

Notice: read data in binary code and the format of deferent data is:

Track 1: b0, b1, b2, b3, b4, P

Track 2, 3: b0, b1, b2, b3, P

Data package format of each tracks:

Starting byte + reading status byte + data of tracks

Starting byte: 0x1F

Reading status byte: 0x59 correct data information of track if reading successful

0x4E wrong information if reading error

0x4F cannot read, track data

Error information:

0xE1 error, no STX

0xE2 error, no EXT

0xE3 error, no VRC

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	18/55

0xE4 error, wrong LRC

0xE5 error, blank track

When it is set in ASCII code reading mode, data of each track is uploaded in one byte ASCII code.

E.g., First byte of track 1 0x03 (HEX)

Uploading data package is 0x33 (ASCII)

When it is set in binary code reading mode, data of each track is uploaded in 4 bit per unit in ASCII code.

E.g., First byte of track 1 0x03 (HEX)

Uploading data package is 0x30 0x33

2.16 According to the Re-appointed Mode Read Appointed Tracks Data

It only suits for the Reader with the Magnetic head at the rear side. Move the card again and read the mag card, then upload the magnetic card data. It is suitable for reading magnetic card error when entering at the first time. Executing this command could move the card and read data from magnetic card again.

HOST send:

0x02	0x00	0x04	0x45	0x31	Card reading mode	Appointed track number	0x03	BCC
------	------	------	------	------	-------------------	------------------------	------	-----

Read card mode: 0x30 read data in ASCII code

0x31 read data in binary code

Appointed track code: 0x30 do not read any track

0x31 read track 1

0x32 read tracks 2

0x33 read tracks 3

0x34 read track 1, 2

0x35 read track 2, 3

0x36 read 1, 3 tracks

0x37 read all 3 tracks

Successful operation returns:

0x02	Communication length N byte	0x45	0x31	Card reading mode	Appointed track number	data package n byte of track 1, 2, 3	0x03	BCC
------	-----------------------------	------	------	-------------------	------------------------	--------------------------------------	------	-----

Communication length: N = 4 + 3 tracks data length

Card reading mode: =0x30 be set to ASCII code reading mode, the upload data is in ASCII coding

=0x31 be set to binary code reading mode, the upload data is in binary coding

Notice: read data in binary code and the format of deferent data is:

Track 1: b0, b1, b2, b3, b4, P

Track 2, 3: b0, b1, b2, b3, P

Data package format of each tracks:

Starting byte + reading status byte + data of tracks

Starting byte: 0x1F

Reading status byte: 0x59 correct data information of track if reading successful

0x4E wrong information if reading error

0x4F cannot read, track data

Error information:

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	19/55

0xE1 error, no STX

0xE2 error, no EXT

0xE3 error, no VRC

0xE4 error, wrong LRC

0xE5 error, blank track

When it is set in ASCII code reading mode, data of each track is uploaded in one byte ASCII code.

E.g., First byte of track 1 0x03 (HEX)

Uploading data package is 0x33 (ASCII)

When it is set in binary code reading mode, data of each track is uploaded in 4 bit per unit in ASCII code.

E.g., First byte of track 1 0x03 (HEX)

Uploading data package is 0x30 0x33

Failure operation returns:

0x02	0x00	0x05	0x45	0x31	Card reading mode	Appointed track number	Error status byte P	0x03	BCC
------	------	------	------	------	-------------------	------------------------	---------------------	------	-----

Error status byte P= 'E' (0x45) no card in

P= 'W' (0x57) card is not in the right place where it can be operated

P='N'(0x4E) operation failure

2.17 Clear up Magnetic Card Data Command

Host sends:

0x02	0x00	0x02	0x50	0x30	0x03	0x63
------	------	------	------	------	------	------

Reader return

0x02	0x00	0x03	0x50	0x30	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Card operation status byte

P='Y'(0x59) Success

P='N'(0x4E) Failure

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	20/55

2.18 Mifare One S50/S70 RFID Card Operation

2.19 Seek RFID Card

HOST sends:

0x02	0x00	0x02	0x35	0x30	0x03	BCC
------	------	------	------	------	------	-----

READER return:

0x02	0x00	0x03	0x35	0x30	Operation status P	0x03	BCC
------	------	------	------	------	--------------------	------	-----

Operation status byte

P='Y'(0x59) Seek card successfully

P='N'(0x4E) Seek card unsuccessfully

P='E'(0x45) No card in reader

P='W'(0x57) card is not in the right position where it can be operated.

2.20 Get Mifare1 Card S/N

HOST sends:

0x02	0x00	0x02	0x35	0x31	0x03	BCC
------	------	------	------	------	------	-----

READER operation return:

0x02	0x00	0x07	0x35	0x31	Operation status P	4 byte hex card S/N	0x03	BCC
------	------	------	------	------	--------------------	---------------------	------	-----

Operation status byte

P='Y'(0x59) Get card S/N successfully, and return card S/N.

P='N'(0x4E) Get card S/N unsuccessfully, and return blank S/N(0X00,0X00,0X00,0X00)

P='E'(0x45) No card in reader

Card S/N transmitted by hex:

E.g.: 4byte card S/N "C6B272AE"

E.g.: Uploaded communication package:0x02 0x00 0x06 0x35 0x31 0xC6 0xB2 0x72 0xAE 0x03 BCC

2.21 Verify Key A password:

HOST sends:

0x02	0x00	0x09	0x35	0x32	Sector Number	6 byte hex password	0x03	bcc
------	------	------	------	------	---------------	---------------------	------	-----

READER operation return:

0x02	0x00	0x04	0x35	0x32	Sector Number	Operation status P	0x03	bcc
------	------	------	------	------	---------------	--------------------	------	-----

Operation status byte

P='Y'(0x59) Download password successfully

P='0'(0X30) cannot seek RFID card

P='3'(0X33) Error password

P='E'(0x45) No card in Reader

P='W'(0x57) card is not in the right position where it can be operated.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	21/55

2.22 Verify Key B Password:

HOST sends:

0x02	0x00	0x09	0x35	0x39	Sector Number	6 byte hex password	0x03	bcc
------	------	------	------	------	---------------	---------------------	------	-----

READER return:

0x02	0x00	0x04	0x35	0x39	Sector Number	Operation status byte P	0x03	bcc
------	------	------	------	------	---------------	-------------------------	------	-----

Operation status byte P='Y'(0x59) Download password successfully

P='0'(0x30) cannot seek RFID card

P='3'(0x33) Error password

P='E'(0x45) No card in Reader

P='W'(0x57) card is not in the right position where it can be operated.

Note:

1.Sector Number= 0x00 ~0x28 (S50 card sector number: 0x00 ~0x0F,S70 card sector number : 0x00 ~0x28)

2.Block number= 0x00 ~0x0F (each sector of S50 card have 4 blocks, respective block number: 0x00 0x01 0x02 0x03, from 0 to 31sector of S70 card each sector has 4 block, respective number: 0x00 0x01 0x02 0x03,from 32 to 39 sector each sector has 16 block, respective block number: 0x00~0x0F)

3.If want to read, write , value operation for sector's block data, it must verify sector password successfully, and then proceed.

2.23 Read Sector's Block Data

HOST sends:

0x02	0x00	0x04	0x35	0x33	Sector number	Block number	0x03	BCC
------	------	------	------	------	---------------	--------------	------	-----

When card is S50, sector number= 0x00~0x0F (S50 card has 16 sectors)

When card is S70, sector number = 0x00~0x28 (S70 card has 40 sectors)

Block number= 0x00 0x01 0x02 0x03 (S50 card's block number,S70 card's block number =0x00~0x0F)

READER operation return successfully for reading data block: P='Y' (0x59)

0x02	0x00	0x15	0x35	0x33	Sector number	Block number	Operation status byte P	16 byte hex data	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------------------	------	-----

Read sectors block data successfully, and upload 16byte's reading data.

READER operation return wrongly for reading sector's block:

0x02	0x00	0x05	0x35	0x33	Sector number	Block number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------	-----

Operation status byte

P='0' (0x30) can't seek RF card

P='1' (0x31) operate sector number wrongly (it is not the sector after verifying)

P='2' (0x32) operate card S/N wrongly

P='3' (0x33) verify password wrongly

P='4' (0x34) read data wrongly

P='E' (0x45) no card in reader

P='W' (0x57) Card is not in the right position where it is operated.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	22/55

Note: Sector number= 0x00 ~0x28 (sector number of S50 card: 0x00~0x0F, Sector number of S70card: 0x00~0x28)

Block number= 0x00 ~0x0F (each sector of S50 card have 4 blocks, respective block number: 0x00 0x01 0x02 0x03, from 0 to 31sector of S70 card each sector has 4 block, respective number: 0x00 0x01 0x02 0x03, from 32 to 39 sector each sector has 16 block, respective block number: 0x00~0x0F)

2.24 Write Sector's Block Data

HOST sends:

0x02	0x00	0x14	0x35	0x34	Sector number	Block number	16 byte hex data	0x03	BCC
------	------	------	------	------	---------------	--------------	------------------	------	-----

READER operation return successfully for writing block data:

0x02	0x00	0x15	0x35	0x34	Sector number	Block number	Operation status byte P	16 byte hex data	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------------------	------	-----

Operation status byte: P='Y'(0x59)

Write sector's block data successfully, and upload reading data after 16Byte successfully written into

READER operation return wrongly for writing sector blocks data:

0x02	0x00	0x05	0x35	0x33	Sector number	Block number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------	-----

Operation status byte

P='0'(0X30) can't seek RF card

P='1'(0X31) operate sector number wrongly(it is not the sector after verifying)

P='2'(0X32) operate card S/N wrongly

P='3'(0X33) verify password wrongly

P='4'(0X34) read data wrongly

P='E'(0x45) no card in reader

P='W'(0x57) Card is not in the right position where it is operated.

Note: Sector Number= 0x00~0x28 (sector number of S50 card: 0x00~0x0F, Sector number of S70card: 0x00~0x28)

Block number= 0x00~0x0F (each sector of S50 card have 4 blocks, respective block number: 0x00 0x01 0x02 0x03, from 0 to 31sector of S70 card each sector has 4 block, respective number: 0x00 0x01 0x02 0x03, from 32 to 39 sector each sector has 16 block, respective block number: 0x00~0x0F)

From 0 to 31 sector of S50,S70, each sector 's 0x03 block, from 32 to 40 sector of S70's 0x0F block is KEYA, control word, KEYB's store area, if make writing operation will cause card locked and scrapped, it needs to operate carefully, please refer to Philip card technical documents.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	23/55

2.25 Change Sector Password

Executing the command and only change operation for KEYA's password, correct KEYB password: "0xFF, 0xFF, 0xFF, 0xFF, 0xFF" meanwhile control word is written: "0xFF, 0x07, 0x80, 0x69"(Card Ex-work's default value).

HOST sends:

0x02	0x00	0x09	0x35	0x35	Sector number	6 byte hex password	0x03	bcc
------	------	------	------	------	---------------	---------------------	------	-----

Sector number= 0x00~0x28 (sector's number of S50: 0x00~0x0F, sector number of S70: 0x00 ~0x28)

READER returns:

0x02	0x00	0x04	0x35	0x35	Sector number	Operation status byte P	0x03	bcc
------	------	------	------	------	---------------	-------------------------	------	-----

Operation status byte P='Y' (0x59) change password successfully

P='0'(0X30) can't seek RF card

P='1'(0X31) operate sector number wrongly (it's not the sector after password verification)

P='2'(0X32) operate card S/N wrongly

P='3'(0X33) verify password wrongly

P='E'(0x45) no card in reader

P='W'(0x57) Card is not in the right position where it is operated.

Fully operate password for sector (Key A or Key B)and correct storage control word for sector, after verifying operation password successfully, writing sector's block data command operation for each sector's block3. the format is as below: (refer to philipsM1 card technical documents):

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6 byte Key A password byte						4 byte sector's storage control word				6 byte Key B password byte					

2.26 Initialized Value Operation

To execute with writing sector's block data command, according to MIFARE value data format written into 16byte data, the format is as below:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Value				/Value				Value				Adr	/Adr	Adr	/Adr

Value: initialize 4byte value; please note value's low byte is in the front, high byte is in the back.

/Value: Initialize 4byte value and reverse

Adr: Initialized value's block address:

Adr= sector number X 4 + block number (from 0-15 sector of S50 card, from 0-31 sector of S70 card's block value operation address calculation)

Adr= (sector number- 32) X 16 + 128 + block number (from 32 to 39 sector of S70 card's block value operation address calculation)

/Adr: Initialized value's block address's reverse

The last block of each sector can't be initialized with value operation.

E.g.: making the 5th sector's block 0's initialized value as 10, written into 16byte sector block data:

“ 0x0A, 0x00, 0x00, 0x00, 0x00, 0xFF, 0xFF, 0xFF, 0xFF, 0x0A, 0x00, 0x00, 0x00, 0x14, 0xEB, 0x14, 0xEB “

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	24/55

S70 card's the 39th sector block0's initialized value as 10, written into 16byte sector block data:

“ 0x0A, 0x00, 0x00, 0x00, 0x00, 0xF0, 0xFF,0xFF ,0xFF , 0x0A, 0x00, 0x00, 0x00, 0xF0, 0x0F, 0XF0, 0x0F “

2.27 Read Value Operation

Execute with reading sector's block data command, verifying Mifare card value data format for returning 16byte data format, make reading value for verified mifare card value data format, otherwise, it should report reading value error (data format error)

Note: when making value operation, the 3rd block of 0-31 sector's each sector, the 15th block of S70's 32-39 sector is KEYA, control word, KEYB's storage area, it can 't take value data storage. Value initial, increment, decrement, reading value should note the range of sector's block address operation.

2.28 Increment Operation

HOST sends:

0x02	0x00	0x08	0x35	0x37	Sector number	Block number	4 byte hex data	0x03	BCC
------	------	------	------	------	---------------	--------------	-----------------	------	-----

4 byte hex data is appointed sector's appointed block's value, it needs to add value(low byte is in the front, the high byte is in the back).

E.g.: the 5th sector block 0 needs to add 0x10,sending 4 byte hex data:” 0x10, 0x00, 0x00, 0x00 “

READER returns:

0x02	0x00	0x05	0x35	0x37	Sector number	Block number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------	-----

Operation status byte

P='0'(0X30)	Can't seek RF card
P='1'(0X31)	Operate sector number wrongly(it is not sector after verifying the password)
P='2'(0X32)	operate card S/N wrongly
P='3'(0X33)	password verification error
P='4'(0X34)	block data format error(the block's storage data don't written into value data format)
P='5'(0X35)	increment flow
P='E'(0x45)	No card in reader
P='Y'(0x59)	operate successfully
P='W'(0x57)	Card is not in the right position where it is operated

Sector number= 0x00~0x28 (the sector number of S50 card: 0x00 ~0x0F,The sector number of S70 card: 0x00 ~0x28)

Block number= 0x00 ~0x0E (block number's range of S50 card: 0x00 0x01 0x02,

Block number's range of 0-31 sector of S70 card: 0x00 0x01 0x02,

Block number's range of 32-39 sector: 0x00 ~0x0E)

The last block of each sector cannot do increment and decrement value operation.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	25/55

2.29 Decrement Operation

HOST sends:

0x02	0x00	0x08	0x35	0x38	Sector number	Block number	4 byte hex data	0x03	BCC
------	------	------	------	------	---------------	--------------	-----------------	------	-----

4 byte hex data is appointed sector's appointed block's value, it needs to lower value (low byte is in the front, the high byte is in the back), it is not allowed to be 0 value, otherwise, it fail to operate.

READER returns:

0x02	0x00	0x05	0x35	0x38	Sector number	Block number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	--------------	-------------------------	------	-----

Operation status byte

- P='0'(0X30) can't seek RF card.
- P='1'(0X31) operate sector number wrongly(it is not the sector after verifying password)
- P='2'(0X32) operate card S/N wrongly
- P='3'(0X33) password verification error
- P='4'(0X34) block data format error(the block's storage data can't written into value data format)
- P='5'(0X35) decrement flow
- P='E'(0x45) no card in reader
- P='Y'(0x59) operate successfully
- P='W'(0x57) Card is not in the right position where it is operated.

Sector number= 0x00 ~0x28 (the sector number of S50 card: 0x00 0x01 0x020x0F, the sector number of S70 card: 0x00 0x01 0x020x28)

Block number= 0x00 ~0x0E (block number's range of S50 card: 0x00 0x01 0x02,0-31 sector's block number 's range of S70 card: 0x00 0x01 0x02,32-39 sector block number's range: 0x00 ~0x0E), The last block of each sector cannot do increment and decrement value operation.

2.30 Read Sector's Multi-Block Data

HOST sends:

0x02	0x00	0x05	0x35	0x45	Sector number	Starting block number	Block number N	0x03	BCC
------	------	------	------	------	---------------	-----------------------	----------------	------	-----

When card is S50, sector number = 0x00 0x01 0x020x0F (S50 card has 16 sectors)

When card is S70, sector number = 0x00 0x01 0x020x28 (S70 card has 40 sectors)

Block number= 0x00 0x01 0x020x0F

(each sector of S50 has 4 blocks, respective block number: 0x00 0x01 0x02 0x03,each sector of S70 card 0-31 sector has 4 blocks, respective block number: 0x00 0x01 0x02 0x03,each sector of 32-39 sector has 16 blocks, respective block number: 0x00 0x01 0x02.....0x28)

Block number= 0x01 0x020x0F

(each sector of S50 has 4 blocks, permitted block number: 0x01--0x03,each sector of S70 card 0-31 sector has 4 blocks, permitted block number: 0x01--0x03,each sector of 32-39 sector has 16 blocks, respective block number, permitted block number : 0x00 0x01 0x02.....0x0F)

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	26/55

READER return successfully for reading data block: P='Y' (0x59)

0x02	Communication length L (2 Byte)	0x35	0x45	Sector number	Starting block number	Block number N	Operation status byte P	Block data package (N X 16 byte)	0x03	BCC
------	------------------------------------	------	------	---------------	-----------------------	----------------	-------------------------	-------------------------------------	------	-----

Note: block's data package= block1 data (16 byte) +block 1 data (16 byte) +block N data (16 byte)

READER returns wrongly for reading sector's block operation:

0x02	0x00	0x04	0x35	0x45	Sector number	Block number N	Operation status byte P	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	----------------	-------------------------	-------------------------	------	-----

Operation status byte

P='0'(0x30) can't seek RF card.

P='1'(0x31) operate sector number wrongly(it is not the sector after verifying password)

P='2'(0x32) operate card S/N wrongly

P='3'(0x33) password verification error

P='4'(0x34) read data wrongly

P='E'(0x45) No card in reader

P='W'(0x57) Card is not in the right position where it is operated.

2.31 Write Sector's Multi-block Data

HOST sends:

0x02	Communication length L (2 Byte)	0x35	0x46	Sector number	Starting block number	Block number N	Block data package(N X 16 byte)	0x03	BCC
------	------------------------------------	------	------	---------------	-----------------------	----------------	---------------------------------	------	-----

When card is S50, sector number = 0x00 0x01 0x020x0F (S50 card has 16 sectors)

When card is S70, sector number = 0x00 0x01 0x020x28 (S70 card has 40 sectors)

Block number= 0x00 0x01 0x02 0x03 (S50 card block number,S70 card block number =0x00 0x01 0x020x0F)

Note: when writing sector's multi-block data, the last block of each sector is not allowed to write,

READER returns successfully for reading data block: P='Y' (0x59)

0x02	0x00	0x06	0x35	0x46	Sector number	Starting block number	Block number N	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	-----------------------	----------------	-------------------------	------	-----

Note: block data package = block 1data (16 byte) + block 1 data (16 byte)+block N data(16 byte)

READER fails to return for writing data block:

0x02	Communication package length N	0x35	0x46	Sector number	Starting block number	Block number N	Operation status byte P	0x03	BCC
------	--------------------------------	------	------	---------------	-----------------------	----------------	-------------------------	------	-----

Operation status byte:

P='0'(0x30) can't seek RF card.

P='1'(0x31) operate sector number wrongly(it is not the sector after verifying password)

P='2'(0x32) operate card S/N wrongly

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	27/55

P='3'(0x33) password verification error
P='4'(0x34) write data error
P='E'(0x45) No card in reader
P='W'(0x57) Card is not in the right position where it is operated.

2.32 Mifare one UL (Ultra-Light) Operation

2.33 Seek Card

Host sends:

0x02	0x00	0x02	0x35	0x40	0x03	0x63
------	------	------	------	------	------	------

Reader returns

0x02	0x00	0x03	0x35	0x40	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='Y'(0x59) seek card successfully
P='N'(0x4E) fail to seek card
P='E'(0x45) no card in reader
P='W'(0x57) Card is not in the right position where it is operated.

2.34 Get Card S/N

HOST sends:

0x02	0x00	0x02	0x35	0x42	0x03	BCC
------	------	------	------	------	------	-----

READER operation returns:

0x02	0x00	0x07	0x35	0x42	Operation status P	4 byte hex card S/N	0x03	BCC
------	------	------	------	------	--------------------	---------------------	------	-----

Operation status byte

P='Y'(0x59) get card S/N successfully, and return card S/N.
P='N'(0x4E) fail to get card S/N, and return blank S/N.(7 byte 0X00)
P='E'(0x45) no card in reader
P='W'(0x57) Card is not in the right position where it is operated.

7byte card S/N transmit by hex:

E.g.: UL card S/N: "04B40DC9EF0284"

E.g.: Uploading communication package:0x02 0x00 0x0A 0x35 0x31 0x59 0x04 0XB4 0x0D 0xC9 0xEF 0x02 0x84 0x03 BCC

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	28/55

2.35 Read Card's Sector Data

HOST sends:

0x02	0x00	0x03	0x35	0x43	Sector number	0x03	BCC
------	------	------	------	------	---------------	------	-----

UL card sector number = 0x00—0x0F (UL card totally has 16 sectors, each sector has 4byte data)

READER succeeds to return for reading data block: P='Y'(0X59)

0x02	0x00	0x08	0x35	0x43	Sector number	Operation status byte P	4 byte hex data	0x03	BCC
------	------	------	------	------	---------------	-------------------------	-----------------	------	-----

Succeed to read sector's block data, and uploading 4byte reading data.

READER return wrongly after reading sector's block operation:

0x02	0x00	0x04	0x35	0x43	Sector number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	-------------------------	------	-----

Operation status byte

P='0'(0x30) can't seek UL card

P='N'(0x4E) fail to read card

P='E'(0x45) No card in reader

P='W'(0x57) Card is not in the right position where it is operated.

2.36 Write Card's Sector Data

HOST sends:

0x02	0x00	0x07	0x35	0x44	Sector number	4 byte data	0x03	BCC
------	------	------	------	------	---------------	-------------	------	-----

UL card sector number = 0x00—0x0F (UL card totally has 16sectors, each sector has 4byte data)

READER succeed to return for writing data block: P='Y'(0X59)

0x02	0x00	0x04	0x35	0x44	Sector number	Operation status byte P	4 byte data	0x03	BCC
------	------	------	------	------	---------------	-------------------------	-------------	------	-----

Succeed to write sector's block data, and uploading 4byte written into successfully reading data.

READER returns wrongly for reading sector block operation:

0x02	0x00	0x04	0x35	0x44	Sector number	Operation status byte P	0x03	BCC
------	------	------	------	------	---------------	-------------------------	------	-----

Operation status byte

P='0'(0x30) can't seek UL card

P='N'(0x4E) fail to read card

P='E'(0x45) No card in reader

P='W'(0x57) Card is not in the right position where it is operated.

2.37 Contactless ISO14443 CPU Card Operation

2.38 TYPE A Card Seeks Card Polling Operation

HOST sends:

0x02	0x00	0x02	0x35	0x60	0x03	BCC
------	------	------	------	------	------	-----

Reader return successfully: P='Y' (0X59) seek card successfully

0x02	Communication package length 2 byte	0x35	0x60	Operation status byte P	ATR data package	0x03	BC C
------	-------------------------------------	------	------	-------------------------	------------------	------	------

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	29/55

Reader fails to return:

0x02	0x00	0x02	0x35	0x60	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='N'(0x4E) fail to seek card

P='E'(0x45) No card in reader

2.39 TYPE B Card Seek Card Polling Operation

HOST sends:

0x02	0x00	0x02	0x35	0x61	0x03	BCC
------	------	------	------	------	------	-----

Reader operation returns successfully: P='Y'(0x59) seek card successfully

0x02	Communication package length 2 byte	0x35	0x61	Operation status byte P	ATR data package	0x03	BCC
------	-------------------------------------	------	------	-------------------------	------------------	------	-----

Reader operation fails to return:

0x02	0x00	0x02	0x35	0x61	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='N'(0x4E) fail to seek card

P='E'(0x45) No card in reader

2.40 C-APDU Command Operation

HOST sends:

0x02	Communication package length 2 byte	0x35	0x65	C-APDU package length 2 byte	C-APDU package n byte	0x03	BCC
------	-------------------------------------	------	------	------------------------------	-----------------------	------	-----

Communication package length =4+ C-APDU package length n (n=4--263byte)

Reader operation succeed to return: Operation status byte P='Y'(0x59)

0x02	Communication package length 2 byte	0x35	0x65	Operation status byte P	C-APDU operation return package length 2 byte	C-APDU operation return package n byte	0x03	BCC
------	-------------------------------------	------	------	-------------------------	---	--	------	-----

Communication package length=5+ C-APDU return package length n (n=4--263byte)

Reader operation fails to return:

0x02	0x00	0x04	0x35	0x65	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P='N' (0x4E) fail to operate

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	30/55

2.41 DESELECT Command Operation

HOST Send:

0x02	0x00	0x02	0x35	0x68	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: P='Y'(0X59)power off successfully

0x02	0x00	0x03	0x35	0x68	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Reader operation fails to return:

0x02	0x00	0x03	0x35	0x68	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='N' (0X4E) fail to power off

P='E' (0X45) no card in reader

2.42 TYPE A Card Get Card S/N

HOST sends:

0x02	0x00	0x02	0x35	0x69	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: P='Y'(0X59) successful operation

0x02	0x00	0x03	0x35	0x69	Operation status byte P	4byte or 7byte card S/N	0x03	BCC
------	------	------	------	------	-------------------------	-------------------------	------	-----

Reader operation fails to return:

0x02	0x00	0x03	0x35	0x69	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte

P='N'(0X4E) fail to operate

P='E'(0X45) No card in reader

1.1.1、Contact CPU card operation

CPU card cold reset

HOST sends:

0x02	0x00	0x02	0x37	0X30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: T=0 CPU card reset successfully and return operation status byte

P= 'Y' (0x59)

0x02	Communication package length 2 byte	0x37	0x30	Operation status byte P	Reset data package length 2 byte	Reset data n byte	0x03	BCC
------	-------------------------------------	------	------	-------------------------	----------------------------------	-------------------	------	-----

Communication package length=5+ reset data length n

Reader operation succeed to return: T=1 CPU card reset successfully and return operation status byte

P= 'Z' (0X5A)

0x02	Communication package	0x37	0x30	Operation	Reset data package	Reset data	0x03	BCC
------	-----------------------	------	------	-----------	--------------------	------------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	31/55

	length 2 byte			status byte P	length 2 byte	n byte		
--	---------------	--	--	---------------	---------------	--------	--	--

Communication package length =5+ Reset data length n

Reader operation fail to return:

0x02	0x00	0x03	0x37	0x30	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to reset

P= 'E' (0x45) no card in reader

P= 'W' (0x57) Card is not in the allowed position.

CPU card warm reset

HOST sends:

0x02	0x00	0x02	0x37	0x2F	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: T=0 CPU card reset successfully and return operation status byte P= 'Y' (0x59)

0x02	Communication package length 2 byte	0x37	0x2F	Operation status byte P	Reset data package length 2 byte	Reset data n byte	0x03	BCC
------	-------------------------------------	------	------	-------------------------	----------------------------------	-------------------	------	-----

Communication package length =5+ Reset data length n

Reader operation succeed to return: T=1 CPU card reset successfully and return operation status byte P= 'Z' (0x5A)

0x02	Communication package length 2 byte	0x37	0x2F	Operation status byte P	Reset data package length 2 byte	Reset data n byte	0x03	BCC
------	-------------------------------------	------	------	-------------------------	----------------------------------	-------------------	------	-----

Communication package length =5+ Reset data length n

Reader operation fail to return:

0x02	0x00	0x03	0x37	0x2F	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to reset

P= 'E' (0x45) no card in reader

P= 'W' (0x57) Card is not in the allowed position.

T=0 CPU card C-APDU command operation

HOST sends:

0x02	Communication package length 2 byte	0x37	0x31	C-APDU package length 2 byte	C-APDU package n byte	0x03	BCC
------	-------------------------------------	------	------	------------------------------	-----------------------	------	-----

Communication package length =4+ C-APDU package length n (n Max value:262byte)

Reader operation succeed to return: operation status byte P= 'Y' (0x59)

0x02	Communication package length byte	0x37	0x31	Operation status byte P	C-APDU operation return package length 2 byte	C-APDU operation return package n byte	0x03	BCC
------	-----------------------------------	------	------	-------------------------	---	--	------	-----

Communication package length =5+ C-APDU return package length n (n Max value:257byte)

Reader operation fail to return:

0x02	0x00	0x03	0x37	0x31	operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

operation status byte P= 'N' (0x4E) fail to operate

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	32/55

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

When operate C-APDU, it should choose T=0, T=1 C-APDU command operation according to CPU card reset return
T=0, T=1.

T=1 CPU card C-APDU command operation

HOST sends:

0x02	Communication package length 2 byte	0x37	0x32	C-APDU package length 2 byte	C-APDU package n byte	0x03	BCC
------	--	------	------	---------------------------------	--------------------------	------	-----

Communication package length=4+ C-APDU package length n (n max value: 262byte)

Reader operation succeed to return: operation status byte P= 'Y' (0x59)

0x02	Communication package length 2 byte	0x37	0x32	Operation status byte P	C-APDU operation return package length 2 byte	C-APDU operation return package n byte	0x03	BCC
------	---	------	------	----------------------------	---	--	------	-----

Communication package length=5+ C-APDU return package length n (n max value 257byte)

Reader operation fail to return:

0x02	0x00	0x03	0x37	0x32	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to operation

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position

When operate C-APDU, it should choose T=0, T=1 C-APDU command operation according to CPU card reset return
T=0, T=1.

Receive link C-APDU p[ackage:(when return C-APDU package's data length is over 256,

1.1.2、SIM card operation:

Only suitable for SIM card module

SIM card reset

(reset for 1.8V ,3.0V ,5.0V SIM card)

HOST sends:

0x02	0x00	0x03	0x3D	PM	SIM card number	0x03	BCC
------	------	------	------	----	--------------------	------	-----

PM = 0x2E making reset operation for work voltage 1.8V SIM card

PM = 0x2F making reset operation for work voltage 3.0V SIM card

PM = 0x30 making reset operation for work voltage 5.0V SIM card

Reader operation succeed to return: T=0 SIM card successful reset, and return operation status byte P='Y'(0x59)

0x02	Communication package length 2 byte	0x3D	PM	SIM card number	Operation status byte P	Reset data package length 2 byte	Reset data n byte	0x03	BCC
------	---	------	----	-----------------------	-------------------------------	--	----------------------	------	-----

Communication package length=6+ reset data length n

Reader operation succeed to return: T=1 SIM card successful reset, and return operation status byte P='Z'(0x5A)

	SPECIFICATION				Model No.	CRT-310-004Card Reader			
					Date	2011/11/24			
	Communication Specification				Ver.	1.0			
					Page	33/55			

0x02	Communication package length 2 byte	0x3D	PM	SIMcard number	Operation status byte P	Reset data package length 2 byte	Reset data n byte	0x03	BCC
------	--	------	----	----------------	----------------------------	-------------------------------------	----------------------	------	-----

Communication package length =6+ Reset data length n

SIM card number =0x30 Operate SIM card 1

=0x31 Operate SIM card 2

=0x32 Operate SIM card 3

=0x33 Operate SIM card 4

=0x34 Operate SIM card 5

=0x35 Operate SIM card 6

=0x36 Operate SIM card 7

=0x37 Operate SIM card 8

Reader operation fail to return:

0x02	0x00	0x04	0x3D	0x30	SIM card number	Operation status byte P	0x03	BCC
------	------	------	------	------	-----------------	-------------------------	------	-----

Operation status byte P='N'(0x4E) fail to reset

Note:1、For SIM card operation, only after reset successfully and then operate C-APDU package .

2、when using SIM card, please check the work voltage, otherwise it 's possible to destroy the SIM card.

T=0 SIM card C-APDU command operation

HOST sends:

0x02	Communication package length 2 byte	0x3D	0x31	SIM card number	C-APDU Package length 2 byte	C-APDU Package n byte	0x03	BCC
------	--	------	------	-----------------	---------------------------------	--------------------------	------	-----

Communication package length=5+ C-APDU package length n (n=4—263byte)

Reader operation succeed to return: operation status byte P='Y'(0x59)

0x02	Communication package length 2 byte	0x3D	0x31	SIM card number	Operation status byte P	C-APDU operation return package length 2 byte	C-APDU operation return package n byte	0x03	BCC
------	--	------	------	-----------------	----------------------------	---	---	------	-----

Communication package length=6+ C-APDU return package length n (n=4--263byte)

T=1 SIM card C-APDU command operation

HOST sends:

0x02	Communication package length 2 byte	0x3D	0x32	SIMcard number	C-APDU package length 2 byte	C-APDU package n byte	0x03	BCC
------	--	------	------	----------------	---------------------------------	--------------------------	------	-----

Communication package length =5+ C-APDU package length n (n=4--263byte)

Reader operation succeed to return: Operation status byte P='Y'(0x59)

0x02	Communication package length 2 byte	0x3D	0x32	SIM card number	Operation status byte P	C-APDU operation return package length 2 byte	C-APDU operation return package n byte	0x03	BCC
------	--	------	------	-----------------	----------------------------	---	---	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	34/55

Communication package length =6+ C-APDU return package length n (n=4—263byte)

Reader operation fail to return:

0x02	0x00	0x04	0x3D	0x32	SIM 卡座号	Operation status byte P	0x03	BCC
------	------	------	------	------	---------	-------------------------	------	-----

Operation status byte P='N'(0x4E) fail to operate

SIM card power off operation

Host sends:

0x02	0x00	0x02	0x4A	0x31	0x03	BCC
------	------	------	------	------	------	-----

PM =0x31 SIM card power off

Reader return:

0x02	0x00	0x03	0x4A	PM	Operation status byte P	0x03	BCC
------	------	------	------	----	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) fail to operate

P= 'N' (0x4E) fail to operate

Note: 1、SIM card power on operation is finished by SIM card reset operation

2、There is no SIM card type executing SIM card power off/on command, the reader will return “command can't be executed” information.

1.1.3、SLE4442card operation

Card reset

HOST sends:

0x02	0x00	0x02	0x38	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: Operation status byte P= 'Y' (0x59)

0x02	0x00	0x07	0x38	0x30	Operation status byte P	Reset data package 4 byte	0x03	BCC
------	------	------	------	------	-------------------------	---------------------------	------	-----

Reader operation fail to return:

0x02	0x00	0x03	0x38	0x30	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to reset

P= 'E' (0x45) no card in reader

P= 'W' (0x57) Card is not in the allowed position.

Read main storage area

HOST sends:

0x02	0x00	0x04	0x38	0x31	Read the first address ADR 1 byte	Read length L 1 byte	0x03	BCC
------	------	------	------	------	-----------------------------------	----------------------	------	-----

ADR=0x00—0xFF

L =0x01—0x80

Operation length L=0x01—0x80 ,Min length; 1 BYTE,max length: 128 BYTE

4442' s main storage area has only 256 byte, when using , it should note operation address and length which should be in the permitted range.

Reader operation succeed to return: Operation status byte P= 'Y' (0x59)

0x02	Communication	0x38	0x31	Operation	Read the first	Read	Read data	0x03	BCC
------	---------------	------	------	-----------	----------------	------	-----------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	35/55

	length 2 byte			status byte P	address ADR	length L	L byte		
--	---------------	--	--	---------------	-------------	----------	--------	--	--

Communication length =5+ Read length L

Reader operation fail to return:

0x02	0x00	0x05	0x38	0x31	Operation status byte P	Read the first address ADR	Read length L	0x03	BCC
------	------	------	------	------	-------------------------	----------------------------	---------------	------	-----

P= 'N' (0x4E) fail to read

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Read protection bit area

HOST sends:

0x02	0x00	0x02	0x38	0x32	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: Operation status byte P= 'Y' (0x59)

0x02	0x00	0x23	0x38	0x32	Operation status byte P	32 byte protection bit status byte	0x03	BCC
------	------	------	------	------	-------------------------	------------------------------------	------	-----

The each byte of protection bit status byte should be corresspense to one main storage area' s each unit' s writing protection status, address is from low to high.

Protection bit status byte =0x00 means that byte writing protection is vali, it cannot write this unit.

Protection bit status byte =0x01 means that the byte writing protection is not valid, it may write the unit.

Reading protection bit area fully read out 4442 card 32 byte protection bit status at one time.

Reader operation fail to return:

0x02	0x00	0x03	0x38	0x32	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to read

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Read safty area PSC

HOST sends:

0x02	0x00	0x02	0x38	0x33	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: Operation status byte P= 'Y' (0x59)

0x02	0x00	0x07	0x38	0x33	Operation status byte P	Safty area data package 4 byte	0x03	BCC
------	------	------	------	------	-------------------------	--------------------------------	------	-----

Safty area data package the first byte: password counts data wrongly

Safty area data package the second byte: Password data 1

Safty area data package the third byte: Password data 2

Safty area data package the fourth byte: Password data 3

Password error counter =0X07(password verification error:0),0X06(Error data: 1),0X04(Error data: 2),0X00(Error code data: 1,card have scrapped)

Reader operation fail to return:

0x02	0x00	0x03	0x38	0x33	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to read

P= 'E' (0x45) No card in reader

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	36/55

P= 'W' (0x57) Card is not in the allowed possition.

Password verification

HOST sends:

0x02	0x00	0x05	0x38	0x34	Password data 3 byte	0x03	BCC
------	------	------	------	------	----------------------	------	-----

Reader operation return:

0x02	0x00	0x03	0x38	0x34	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) password verification correct

P= 'N' (0x4E) password verification error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed possition.

Write main storage area

HOST sends:

0x02	Communication package length 2 byte	0x38	0x35	Write the first address ADR(1byte)	Write the length L	Write data L byte	0x03	BCC
------	-------------------------------------	------	------	------------------------------------	--------------------	-------------------	------	-----

Communication length= 4+ write length L

Address range ADR =0x00-0xFF

Operation length L=0x01-0x80 ,Min length: 1 Byte,Max length: 128 Byte.

Reader operation returns:

0x02	0x00	0x05	0x38	0x35	Operation status byte P	Write the first address ADR	Write the length L	0x03	BCC
------	------	------	------	------	-------------------------	-----------------------------	--------------------	------	-----

Operation status byte P= 'Y' (0x59) succeed to write

P= 'N' (0x4E) writing error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed possition.

Write protection area data

(ADR:0x00-0x1f is totally 32 BYTE which has writing protection bit function unitand make oppointedstartingaddress, oppointed length' s writing protection.)

HOST sends:

0x02	Communication length L	0x38	0x36	Adr	len	Len bytes writing protection data Sbyte	0x03	BCC
------	------------------------	------	------	-----	-----	---	------	-----

Instruction: communication package length L= 4 + len

Adr : the first address for writing protection byte ADR:0x00-0x1F

Len : Length for writing protection byte 0x01-0x20

Sbyte : data for writing protection

Note: 1、Data for writing protetion:it is the data for writing protection. When the writing protectiondatais the same as the original storage unit' s data, executing writing protection can be successfu, the writing protection data is diferent with original data, it will fail to operate writing protection bit.

2、change writing protection area:only change for 00H-31H storage unit,once writing protection is valid, it will be valid for ever, and can' t be cancelled.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	37/55

3、it should confirm Adr when operation, len is in the specified range. Writing protection for single byte.

Reader operation returns:

0x02	0x00	0x03	0x38	0x36	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) succeed to write

P= 'N' (0x4E) writing error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Change password

HOST sends:

0x02	0x00	0x05	0x38	0x37	Password data 3 byte	0x03	BCC
------	------	------	------	------	----------------------	------	-----

Reader operation returns:

0x02	0x00	0x03	0x38	0x37	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) succeed to change password

P= 'N' (0x4E) fail to change password

P= 'E' (0x45) No card in reader

P='W'(0x57) card is not in the allowed position.

SLE4428 card operation

Card reset

HOST sends:

0x02	0x00	0x02	0x39	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation succeed to return: operation status byte P= 'Y' (0x59)

0x02	0x00	0x07	0x39	0x30	operation status byte P	Reset data package 4 byte	0x03	BCC
------	------	------	------	------	-------------------------	---------------------------	------	-----

Reader operation fail to return:

0x02	0x00	0x03	0x39	0x30	operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

operation status byte P= 'N' (0x4E) fail to reset

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Read storage area data

HOST sends:

0x02	0x00	0x05	0x39	0x31	Read the first address ADR 2 byte	Read length L 1 byte	0x03	BCC
------	------	------	------	------	-----------------------------------	----------------------	------	-----

ADR=0000-03FF

L =0x01-0x80

Operation length L=0x01-0x80 ,Min length: 1 BYTE,Max length: 128 BYTE

4428 storage area has only 1K byte when using please note operation address and length which should be within the permitted range.

Reader operation succeed to return: operation status byte P= 'Y' (0x59)

0x02	Communication length	0x39	0x31	Operation status	Read the first	Read length L 1byte	Read data L byte	0x03	BCC
------	----------------------	------	------	------------------	----------------	---------------------	------------------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	38/55

	2 byte			byte P	address 2byte				
--	--------	--	--	--------	------------------	--	--	--	--

Communication length =6+ read length L

Reader operation fail to return:

0x02	0x00	0x06	0x39	0x31	Operation status byte P	Read the first address 2byte	Read length L 1byte	0x03	BCC
------	------	------	------	------	----------------------------	---------------------------------	------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to read

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Read protection bit status

HOST sends:

0x02	0x00	0x05	0x39	0x32	Read the first address ADR 2 byte	Read length L 1 byte	0x03	BCC
------	------	------	------	------	-----------------------------------	----------------------	------	-----

ADR=0000-03FF

L =0x01-0x80

Operation length L=0x01-0x80 ,Min length: 1 BYTE,Max length: 128 BYTE

4428 storage area only has 1K byte when using please note operation address and length which should be within the permitted range.

Each byte of protection bit status byte corresponds to writing protection status of one storage area' s each unit address is in the sequence of low to high.

Protection bit status byte=0x00 means that this byte' s writing protection is valid, it can' t write this byte

Protection bit status byte =0x01 means that this byte' s writing protection is not valid, it can write this byte

Reader operation succeed to return: operation status byte P= 'Y' (0x59)

0x02	Communication length 2 byte	0x39	0x32	Operation status byte P	Read the first address 2byte	Read length L 1byte	Protection bit data L byte	0x03	BCC
------	-----------------------------------	------	------	-------------------------------	---------------------------------------	---------------------------	----------------------------------	------	-----

Communication length=6+ read length L

Reader operation fail to return:

0x02	0x00	0x06	0x39	0x32	Operation status byte P	Read the first address 2byte	Read the length L 1byte	0x03	BCC
------	------	------	------	------	----------------------------	---------------------------------	----------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to read

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

Password verification

HOST sends:

0x02	0x00	0x04	0x39	0x33	Password data 2 byte	0x03	BCC
------	------	------	------	------	----------------------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	39/55

Reader operation return:

0x02	0x00	0x03	0x39	0x33	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) Password verification correctness

P= 'N' (0x4E) password verification error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed position.

write data(without writing protection bit)

HOST sends:

0x02	Communication length 2 byte	0x39	0x34	Write the first address ADR 2byte	Write the length L 1byte	Write data L byte	0x03	BCC
------	--------------------------------	------	------	--------------------------------------	-----------------------------	----------------------	------	-----

Communication Length= 5+ write length L

Address range=0x0000—0x03FF;

Operation length L=0x01—0x80 ,Min length: 1 BYTE,Max length:128 BYTE

Note:4428 card' s last three storage bit unit(0x03FD, 0x03FE, 0x03FF) is password error' s counter, When write data, Be careful in the operation in order to prevent card scrapped.

Reader operation returns:

0x02	0x00	0x06	0x39	0x34	Operation status byte P	Write the first address ADR 2byte	Write length L 1byte	0x03	BCC
------	------	------	------	------	----------------------------	--------------------------------------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) writing successful

P= 'N' (0x4E) writing error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Not in the allowed operation position

Write data(With writing protection bit)

HOST sends:

0x02	Communication length 2 byte	0x39	0x35	Write the first address ADR 2byte	Write length L 1byte	Write data L byte	0x03	BCC
------	--------------------------------	------	------	--------------------------------------	-------------------------	----------------------	------	-----

Communication length= 5+ write length L

The range of address=0x0000—0x03FF (any of each card of the whole card can make writing protection)

Operation length L=0x01—0x80 ,Min length: 1 BYTE,Max length: 128 BYTE

Writing data L byte : It is the data for writing protection.

Note: 1、Once the storage unit is written by writing protection bit writing data, which can' t make writing operation.

2、SLE4428 card' s last three storage unit (0x03FD, 0x03FE, 0x03FF)is respectively password error counter, password byte 1, password 2, When write data, Be careful in the operation in order to prevent card scrapped, once this three units with writing protection bit, it can' t make writing operation.

Reader operation returns:

0x02	0x00	0x06	0x39	0x35	Operation status byte P	Write the first address ADR 2byte	Write length L 1byte	0x03	BCC
------	------	------	------	------	----------------------------	--------------------------------------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) writing successful

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	40/55

P= 'N' (0x4E) writing error

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Not in the allowed operation position

Change password

HOST sends:

0x02	0x00	0x06	0x39	0x36	Original password data 2 byte	New password data 2 byte	0x03	BCC
------	------	------	------	------	-------------------------------	--------------------------	------	-----

Reader operation returns:

0x02	0x00	0x03	0x39	0x36	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status byte P= 'Y' (0x59) Password modification successful

P= 'N' (0x4E) Password modification failure

P= 'E' (0x45) No card in the reader

P='W'(0x57) Not in the allowed operation position

1.1.4、24CXX series storage card operation:

Can operate 24C01、24C02、24C04、24C08、24C16、24C32、24C64、24C128、24C256

Set up card type

HOST sends:

0x02	0x00	0x03	0x36	0x30	Card type N	0x03	BCC
------	------	------	------	------	-------------	------	-----

N=0x30 setup card is 24C01 128BYTE ADR=0x0000—0x007F

N=0x31 setup card is 24C02 256BYTE ADR=0x0000—0x00FF

N=0x32 setup card is 24C04 512BYTE ADR=0x0000—0x01FF

N=0x33 setup card is 24C08 1K BYTE ADR=0x0000—0x03FF

N=0x34 setup card is 24C16 2K BYTE ADR=0x0000—0x07FF

N=0x35 setup card is 24C32 4K BYTE ADR=0x0000—0x0FFF

N=0x36 setup card is 24C64 8K BYTE ADR=0x0000—0x1FFF

N=0x37 setup card is 24C128 16K BYTE ADR=0x0000—0x3FFF

N=0x38 setup card is 24C256 32K BYTE ADR=0x0000—0x7FFF

Reader returns:

0x02	0x00	0x04	0x36	0x30	Card type N	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) card setup unsuccessful

P= 'Y' (0x59) card setup failure

P= 'E' (0x45) no card in reader

P= 'W' (0x57) Card is not in the allowed operation position

Read card

HOST sends:

0x02	0x00	0x06	0x36	0x31	Card type N	Operate the first address 2byte	Operation length L	0x03	BCC
------	------	------	------	------	-------------	---------------------------------	--------------------	------	-----

Operation length L=0x01—0x80 ,Min Length: 1 BYTE,Max length: 128 BYTE

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	41/55

Operate the first address 2BYTE:Valid addressis decided by the capacity of card.

Reader succeeds to return: P= 'Y' (0x59)

0x02	Communication package Length (2 byte)	0x36	0x31	Card type N	Operation status byte P	Operation 2byte	Operation length L	Read card data n byte	0x03	BCC
------	---------------------------------------	------	------	-------------	-------------------------	-----------------	--------------------	-----------------------	------	-----

Communication package length Length= 7 + Operation length L

Reader fail to return:

0x02	0x00	0x04	0x36	0x31	Card type N	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) Fail to read card

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed operation position.

write card

9.2.3.1 write card without parity

HOST sends:

0x02	Communication package Length(2 byte)	0x36	0x32	Card type N	Operation the first address 2byte	Operation length L	Write card data n byte	0x03	BCC
------	--------------------------------------	------	------	-------------	-----------------------------------	--------------------	------------------------	------	-----

Communication package length Length= 6 + operation length L

Operation length L=0X01—0X80, Min length: 1 BYTE, Max length: 128 BYTE

Reader returns:

0x02	0x00	0x04	0x36	0x32	Card type N	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation sttatus byte P= 'Y' (0x59) Writing card successful

P= 'N' (0x4E) writing card failure

P= 'E' (0x45) No card in reader

P= 'W' (0x57) Card is not in the allowed operation position

Write card with parity

HOST sends:

0x02	Communication package Length(2 byte)	0x36	0x33	Card type N	Operate the first address 2byte	Operation length L	Write card data n byte	0x03	BCC
------	--------------------------------------	------	------	-------------	---------------------------------	--------------------	------------------------	------	-----

Note:Communication package Length= 6 + operation length L

Operation length L=0X01—0X80 , Min length: 1 BYTE, Max length: 128 BYTE

Reader succeed to write card and return with parity:

0x02	Communication package Length (2 byte)	0x36	0x33	Card type N	Operaion status byte P	Operation the first address 2byte	Operation length L	Read outwriting card data n byte	0x03	BCC
------	---------------------------------------	------	------	-------------	------------------------	-----------------------------------	--------------------	----------------------------------	------	-----

Communication package Length= 7 + operation length L

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	42/55

Reader fail to write card with parity:

0x02	0x00	0x04	0x36	0x33	Card type N	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P= 'N' (0x4E) fail to write card

P= 'E' (0x45) No card in reader

P='W'(0x57) Card is not in the allowed operation position.

1.1.5、AT88SC102 Card Operation

Card Reset

HOST sends:

0x02	0x00	0x02	0x3A	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation returns:

0x02	0x00	0x03	0x3A	0x30	Operation status byteP	0x03	BCC
------	------	------	------	------	------------------------	------	-----

Operation status byte P='Y'(0x59) Reset successful

P='N'(0x4E) Reset Failure

P='E'(0x45) No card in the reader

P='W'(0x57) Not in the allowed operation position.

Verify main password:

Main password (2byte),Erase password 1(6byte),Erase password 2 (4byte)

HOST sends:

0x02	0x00	0x04	0x3A	0X31	Password data package 2 byte	0x03	BCC
------	------	------	------	------	------------------------------	------	-----

Reader operation return:

0x02	0x00	0x04	0x3A	0x31	Password area number	Operation status byte P	0x03	BCC
------	------	------	------	------	----------------------	-------------------------	------	-----

Operation status byte P='Y'(0x59) Password verification successful

P='N'(0x4E) Password verification failure

P='E'(0x45) No card in reader

P='F'(0X46) Card scraped (Exceeding the number of error key verification)

P= 'W' (0x57) Not in the allowed operation position.

Security Mode1: Data could be read out via verifying main password.

Security Mode2: Except password data, others could be read out via verifying main password.

Read Memory

There is application block1, application block2 and control block

HOST sends:

0x02	0x00	0x05	0x3A	0x32	Block No	adr 1 byte	Read application area len 1 byte	0x03	BCC
------	------	------	------	------	----------	------------	----------------------------------	------	-----

Notes:Block number=0x30 control area (the unit is control area except application area 1, application area 2)

=0x31 Application area 1 (64 byte the range of address 0x16-0x55)

=0x32 Application area 2 (64 byte the range of address 0x5C-0x9B)

Reader operation succeed to return: operation status byte P='Y'(0x59)

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	43/55

0x02	Communication length L 2 byte	0x3A	0x32	Block No	Operation status byte P	Read application area adr 1 byte	Read application area len 1 byte	Read data Len byte	0x03	BCC
------	-------------------------------	------	------	----------	-------------------------	----------------------------------	----------------------------------	--------------------	------	-----

Communication length L=5+ read application area len

Reader operation fail to return:

0x02	0x00	0x04	0x3A	0x31	Area number	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P='N'(0x4E) fail to read

P='E'(0x45) No card in reader

P='W' (0x57) Card is not in the allowed operation position.

Erase memory area as writing memory card

Before writing the data, it must execute erasing operation, then it can be written

1.1.5.1、 Erasing operation area under safe mode 1

HOST sends:

0x02	0x00	0x05	0x3A	0x33	Area number B	Erase the first address in storage area ard 1 byte	Erase the length in storage area len 1 byte	0x03	BCC
------	------	------	------	------	---------------	--	---	------	-----

Area number B= 0x30 erase control area under safe mode1

B= 0x31 erase application area 1 under safe mode 1

B= 0x32 erase application area 2 under safe mode 1

Reader operation return:

0x02	0x00	0x04	0x3A	0x33	Area number	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P='Y'(0x59) erase successful

P='N'(0x4E) erase failure

P='E'(0x45) no card in reader

P='W'(0x57) no card in the allowed operation position

1.1.5.1、 Erasing application area 1 under safe mode 2

HOST sends:

0x02	0x00	0x09	0x3A	0x33	0x33	Erase password data package 6 byte	0x03	BCC
------	------	------	------	------	------	------------------------------------	------	-----

Reader operation return:

0x02	0x00	0x04	0x3A	0x33	Area number	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte P='Y'(0x59) erase successful

P='N'(0x4E) erase failure

P='E'(0x45) no card in reader

P='W'(0x57) no card in the allowed operation position

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	44/55

1.1.5.1、 Erasing application area 2 under safe mode 2

HOST sends:

0x02	0x00	0x08	0x3A	0x33	0x34	EC2	Erase password data package 6 byte	0x03	BCC
------	------	------	------	------	------	-----	------------------------------------	------	-----

Erase fuse status operation byte EC2 = 0x30 Erase the fuse is not blown application area two erasure.

= 0x31 Erase the fuse has blown application area two erasure

Reader operation return:

0x02	0x00	0x04	0x3A	0x33	Area number	Operation status byte P	0x03	BCC
------	------	------	------	------	-------------	-------------------------	------	-----

Operation status byte

P='Y'(0x59) succeed to erase

P='N'(0x4E) fail to erase

P='E'(0x45) No card in reader

P='F'(0x46) Area 2 that have been abandoned, can no longer be read only rewritable

P= 'W' (0x57) card is not in the allowed operation position. (EC2 fuse is not blown exceed the allowable erase cycles (128) can not be erased after the card is scrapped)

Notess: In Safe Mode 2 erasing application 1,2 areas which are respectively input operation 1, 2 area' s password, after the password verification is successful, in this application area it will erase the entire area.

Write memory area (control area / application area 1 / application area 2)

HOST send:

0x02	Com length	0x3	0x34	Area	Write memory	Write memory area	Write data Len	0x03	BCC
	L 2 byte	A		No	area adr 1 byte	len 1 byte	byte		

Com Len L=5+write data len

Reader operation return:

0x02	0x00	0x04	0x3A	0x34	Area NO	Operation status word P	0x03	BCC
------	------	------	------	------	---------	-------------------------	------	-----

Operation status word

P='Y'(0x59) Succeed to write card

P='N'(0x4E) fail to write card

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

Notes:1、 In Safe Mode 1 as long as the master password authentication can be erased after writing all units. Control area unit writes some data which can not be free, to prevent changes to the password storage unit, resulting in password authentication password failed to be rewritten and caused Card scrapped.

2、 In Safe Mode 2 can only be erased written application area, all of the control unit will not erase the writing area. Application area only verify that the master password is successfully re-validation erase the password only after successfully writing.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	45/55

Change Password (Control Area / application area 1 / application area 2)

HOST send:

0x02	Com Len L	2 byte	0x3A	0x35	Area NO	New password data Len	byte	0x03	BCC
------	-----------	--------	------	------	---------	-----------------------	------	------	-----

Com Len L=3+new password data len

Area No =0x30 change control area password password data is 2 byte

=0x31 change application 1 password password data is 6 byte

=0x32 change application area 2 password password data is 4 byte

Reader operation return:

0x02	0x00	0x04	0x3A	0x35	Area NO	Operation status word	0x03	BCC
						P		

Operation status word

P='Y'(0x59) succeed to change password

P='N'(0x4E) fail to change password

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

Note:Change password only in safe mode 1, verify that the master password to modify, enter safe mode 2 can not be modified after all passwords can only be verified.

• Personalize operation, so that the card into the Security Level Mode 2

HOST send:

0x02	0x00	0x03	0x3A	0x36	Operation modeF	0x03	BCC
------	------	------	------	------	-----------------	------	-----

Operation mode F=0x30 The card into the security level simulation mode 2, for testing,

F=0x31 Enter the security level of the analog mode 2 cards to a safe level mode 1.

F=0x32 Card completely into the security level mode 2, once the card operation into safe mode 2, Will not be restored to a safe mode 1.

Reader operation return:

0x02	0x00	0x04	0x3A	0x36	Operation modeF	Operation status word P	0x03	BCC
------	------	------	------	------	-----------------	-------------------------	------	-----

Operation status word P='Y'(0x59) Succeed to Personalized operation

P='N'(0x4E) fail to Personalized operation

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

Safe Mode two before must set an application area, two passwords, application area a first byte (0x16)

Application area two first byte (0x5C) can not be easily modified to control these areas and write unit enabled.

After entering safe mode 2 write these applications areas, card erase operation is a block erase these applications areas, attention should be Written new data should be preceded by reading out stored to prevent data loss. Areas

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	46/55

affected by these applications simultaneously fuse counter control. The fuse counter effectively the write 128 times can not be written. Voidable after the maximum number of writes for the efficient operation of the card number (100,000).

• **Second District erase counter operation word EC2 and set to an invalid operation.**

HOST send

0x02	0x00	0x02	0x3A	0x37	0x03	BCC
------	------	------	------	------	------	-----

Reader operation retur

0x02	0x00	0x03	0x3A	0x37	Operation status word P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status word P='Y'(0x59) succeed to operate

P='N'(0x4E) fail to operate

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

Note: Make card application in safe mode 2 is not restricted zone two will have to erase the number entering personal perform this operation before the operation.

Otherwise, the card setting mode 2, the card default application area two times in mode 2 Erase limited effective (only erase 128). To cancel the application and then erase the Second District is not limited, you can not cancel the two zones erase limited number (128). Also set the card in mode 2 is not limited endurance after flash can not be set to Restricted. While users have saved on EC2 operating state, the card application in mode 2 application area two o'clock to erase (erase verify application area two passwords) should pay attention to the corresponding parameters.

1.1.6、AT88S1604 card operaion

Card reset

HOST send

0x02	0x00	0x02	0x3B	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operaion return

0x02	0x00	0x03	0x3B	0x30	Operation status word P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

Operation status word P='Y'(0x59) succeed to reset

P='N'(0x4E) fail to reset

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

• **Verify Password**

HOST send

0x02	0x00	0x05	0x3B	0x31	Password area No	Password data	0x03	BCC
					1 byte	2 byte		

Reader operation return

0x02	0x00	0x04	0x3B	0x31	Passwors area No	Operation status wor	0x03	BCC
						P		

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	47/55

Operation status word P='Y'(0x59) succeed to verify password

P='N'(0x4E) fail to verify password

P='F'(0x46) Card application blocks have been abandoned or scrapped

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

the password code: = 0x30 Verify Master Password

= 0x31 password validation applied an area

= 0x32 erase the password validation applied an area

= 0x33 password authentication applications II

= 0x34 erase the password validation applied two zones

= 0x35 password validation applied three zones

= 0x36 erase the password validation applied three zones

= 0x37 password authentication applications in four districts

= 0x38 erase the password validation applied in four districts

read card Data

HOST send

0x02	0x00	0x06	0x3B	0x32	Area No	Operation addr	Operation Len	0x03	BCC
					1 byte	2 byte	1 byte		

Reader successful operation return :P='Y' (0x59)

0x02	Com	0x3B	0x32	Area	Operation status word	Operation	Operation	data	0x03	BCC
	Len			NO	P	add	Len	n		
	L					2 byte	1 byte	byte		
	2 byte									

Com Len :L= 7 + n byte

Reader operation unsuccessful return:

0x02	0x00	0x07	0x3B	0x32	Area No	Operation status word	Operation addr	Operation Len	0x03	BCC
						P	2 byte	1 byte		

Operation status word P='N' fail to read card

P='E' No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

The range of operation addr :0x000—0x7FF

The range of operation Len:0x01—0x80

Area No:= 0x30 one area (0x020 - 0x21A)

= 0x31 two zones (0x21B - 0x420)

= 0x32 three zones (0x421 - 0x621)

= 0x33 four zones (0x622 - 0x7F5)

= 0x34 other areas (except one, two, three, areas outside the region)

Erase card data

HOST send

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	48/55

0x02	0x00	0x06	0x3B	0x33	Area No	Operation addr	Operation Len	0x03	BCC
					1 byte	2 byte	1 byte		

Reader operation return

0x02	0x00	0x04	0x3B	0x33	Area NO	Operation status word	0x03	BCC
						P		

Operation status wordP='Y' (0x59) succeed to erase

P='N' (0x4E) fail to erase

P='E' (0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

the range of operation addr:0x000—0x7FF

the range of operation len: 0x01—0x80

Write Card Data

HOST send:

0x02	Com len	0x3B	0x34	Area NO	Operation addr	Operation len	Write data	0x03	BCC
	L 2 byte			1 byte	2 byte	1 byte	n byte		

Com len L = 6 + n byte

Reader operation return:

0x02	0x00	0x04	0x3B	0x34	Area NO	Operation status word	0x03	BCC
						P		

Operation status wordP='Y' (0x59) succeed to write data

P='N' (0x4E) fail to write data

P='E' (0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

the range of operation addr:0x000—0x7FF

the range of operation len: 0x01—0x80

area No: = 0x30 one area (0x020 - 0x21A)

= 0x31 two zones (0x21B - 0x420)

= 0x32 three zones (0x421 - 0x621)

= 0x33 four zones (0x622 - 0x7F5)

= 0x34 other areas (except one, two, three, areas outside the region)

• Mode 1 Change Password

HOST send:

0x02	0x00	0x05	0x3B	0x35	Password type Model No	Password data	0x03	BCC
					1 byte	2 byte		

Reader operation return:

0x02	0x00	0x04	0x3B	0x35	Password area NO	Operation status word	0x03	BCC
						P		

Operation status word P='Y'(0x59) succeed to change password

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	49/55

P='N'(0x4E) fail to change password

P='E'(0x45) No card in reader

P= 'W' (0x57) card is not in the allowed operation position.

Among: password type model NO:

= 0x30 modify the master password

= 0x31 modify the application an area code

= 0x32 modify the application an area erase the password

= 0x33 modify the application code II

= 0x34 erase the password to modify applications II

= 0x35 modify the application three zones password

= 0x36 Third District erase the password to modify applications

= 0x37 modify the application in four districts password

= 0x38 erase the password to modify applications in four districts

Modify the password can only be modified in safe mode 1, mode 2 only verify safety can not modify any code.

- Personalized operation (card into safe mode 2)

HOST send:

0x02	0x00	0x03	0x3B	0x36	Operation NO	0x03	BCC
------	------	------	------	------	--------------	------	-----

Operation Number = 0x30 soft personalization operation (analog operation personalize the card into safe mode 2, for testing)

= 0x31 Exit soft personalize the

= 0x32 totally personalized action can not be restored

Reader operation return:

0x02	0x00	0x04	0x3B	0x36	Operation No	Operation status word	0x03	BCC
						P		

Operation status word P = 'Y' (0x59) operation is successful

P = 'N' (0x4E) operation fails

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operation position.

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	50/55

AT45D041 Card operation

Page 2048, page 264 byte, only support 264 byte page write mode

Card reset

HOST send:

0x02	0x00	0x02	0x3C	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation return:

0x02	0x00	0x03	0x3C	0x30	操作状态字 P	0x03	BCC
------	------	------	------	------	---------	------	-----

Operation status word P = 'Y' (0x59) Reset successful

P = 'N' (0x4E) Reset unsuccessful

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operaton position.

• Read card data

HOST send:

0x02	0x00	0x04	0x3C	0x31	Page addr 2 byte	0x03	BCC
------	------	------	------	------	---------------------	------	-----

Reader operation successful return :P='Y'(0x59) succeed to read card

0x02	0x01	0x0D	0x3C	0x31	Operation status word P	Page addr 2 byte	264 byte card data	0x03	BCC
------	------	------	------	------	----------------------------	---------------------	--------------------	------	-----

Reader operation unsuccessful return:

0x02	0x00	0x05	0x3C	0x31	Operation status word P	Page addr 2 byte	0x03	BCC
------	------	------	------	------	----------------------------	---------------------	------	-----

Operation status word P = 'N' (0x4E) card reader fails

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operaton position.

Page address: 0x0000-0x07FF

Write Card Data

HOST send:

0x02	0x01	0x0C	0x3C	0x31	Page ADDR 2 byte	264 byte card data	0x03	BCC
------	------	------	------	------	---------------------	--------------------	------	-----

Reader operation return

0x02	0x00	0x05	0x3C	0x31	Operation status word P	Page addr 2 byte	0x03	BCC
------	------	------	------	------	----------------------------	---------------------	------	-----

Operation status word P = 'Y' (0x59) write cards successfully

P = 'N' (0x4E) card write failure

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operator position

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	51/55

1. 1. 7、AT88SC1608 card operation

Card Reset

HOST send:

0x02	0x00	0x02	0x3E	0x30	0x03	BCC
------	------	------	------	------	------	-----

Reader operation return:

0x02	0x00	0x03	0x3E	0x30	Operation status word P	0x03	BCC
------	------	------	------	------	----------------------------	------	-----

Operation status word P = 'Y' (0x59) Reset success

P = 'N' (0x4E) Reset unsuccessful

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operator position.

• Verify Password

HOST send:

0x02	0x00	0x06	0x3E	0x31	Password area NO	Password data 3 byte	0x03	BCC
------	------	------	------	------	------------------	-------------------------	------	-----

Reader operation return:

0x02	0x00	0x04	0x3B	0x31	Password area NO	Operation status word P	0x03	BCC
------	------	------	------	------	------------------	-------------------------	------	-----

Operation status word P = 'Y' (0x59) Verify Password successful

P = 'N' (0x4E) authentication password failed

P = 'F' (0x46) card application blocks have been abandoned or scrapped

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card is not in a position to allow operation

Which type of password No.: = 0x30 Verify application a zone read password

= 0x31 read password authentication applications II

= 0x32 read password validation applied three zones

= 0x33 read password authentication applications in four districts

= 0x34 read password validation applied five zones

= 0x35 read password validation applied six districts

= 0x36 read password authentication application seven districts

= 0x37 read password validation applied eight districts

= 0x38 write password validation applied a zone

= 0x39 write password authentication applications II

= 0x3A password authentication application to write three districts

= 0x3B password authentication applications written in four districts

= 0x3C password authentication application to write five districts

= 0x3D password authentication application to write six districts

= 0x3E verify applications written seven districts Password / Verify Master Password

= 0x3F password authentication application to write eight districts

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	52/55

Each area code only allows verification eight times, eight times after checking paraphasia card lock, to show that card this block area can not read or write.

Read Card Data

HOST send:

0x02	0x00	0x06	0x3E	0x32	Area N 1 byte	Operate initial addr 1 byte	Operation len 1 byte	0x03	BCC
------	------	------	------	------	------------------	--------------------------------	-------------------------	------	-----

Reader operation successful return :P='Y' (0x59)

0x02	Com len L 2 byte	0x3E	0x32	Area No 1 byte	Operation status word P	Operate initial addr 1 byte	Operation len 1 byte	data n byte	0x03	BCC
------	---------------------	------	------	-------------------	----------------------------	--------------------------------	----------------------------	----------------	------	-----

Com len :L= 7 + n byte

Reader operaion unsuccessful return:

0x02	0x00	0x06	0x3E	0x32	Area NO 1 byte	Operation status word P	Operate initial addr 1 byte	Operation len 1 byte	0x03	BCC
------	------	------	------	------	-------------------	----------------------------	--------------------------------	-------------------------	------	-----

Operation status word P = 'E' (0x45) reader fails

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operator position.

Operation Address range:

Application Area: 0x00 ---- 0xFF

Set Area: 0x00 ---- 0x80

Operating length range: 0x01 ---- 0x80

Area Code: = 0x30 apply a zone (len = 0x01-0x80)

= 0x31 Applications II (len = 0x01-0x80)

= 0x32 applied three zones (len = 0x01-0x80)

= 0x33 Applied four zones (len = 0x01-0x80)

= 0x34 Applied five zones (len = 0x01-0x80)

= 0x35 Application six zones (len = 0x01-0x80)

= 0x36 Applied seven districts (len = 0x01-0x80)

= 0x37 Applied eight districts (len = 0x01-0x80)

= 0x38 setting area (len = 0x01-0x80)

To read the Application section, please read the password is correct, check the area to be read, or read data is invalid,only the password set zone data area (0x40 --- 0x7F) is password protected and can only verify correct read correctly.

Write Card data

HOST send:

0x02	Com len 2 byte	0x3E	0x33	Area NO 1 byte	Operation initial addr 1 byte	operation len1 byte	data n byte	0x03	BCC
------	-------------------	------	------	-------------------	----------------------------------	------------------------	----------------	------	-----

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	53/55

Reader operation return:

0x02	0x00	0x06	0x3E	0x33	Area NO	Operation status word P	Operation initial addr 1 byte	operation 1 byte	0x03	BCC
------	------	------	------	------	---------	-------------------------	-------------------------------	------------------	------	-----

P = 'Y' (0x59) write card success

P = 'E' (0x45) write card fails

P = 'E' (0x45) Card No card

P = 'W' (0x57) card does not allow the operator position.

Operation Address range:

Application Area: 0x00 ---- 0xFF

Set Area: 0x00 ---- 0x80

Area Code: = 0x30 apply a zone (len = 0x01-0x80)

= 0x31 Applications II (len = 0x01-0x80)

= 0x32 applied three zones (len = 0x01-0x80)

= 0x33 Applied four zones (len = 0x01-0x80)

= 0x34 Applied five zones (len = 0x01-0x80)

= 0x35 Application six zones (len = 0x01-0x80)

= 0x36 Applied seven districts (len = 0x01-0x80)

= 0x37 Applied eight districts (len = 0x01-0x80)

= 0x38 setting area (len = 0x01-0x80)

To write to the Application section, please read the password is correct, check the area to be written, or write invalid data, set the area code, manufacturers curing information card providers curing information, access control area, the certification area the key areas subject to relevant conditions in order to write, only to meet a write operation to write. Please refer to the relevant information when using details.

• Read Fuse

HOST send:

0x02	0x00	0x06	0x3E	0x34	0x03	BCC
------	------	------	------	------	------	-----

Reader operation successful return :P='Y' (0x59)

0x02	0x00	0x06	0x3E	0x34	Operation status word P	Fuse status word FAB	Fuse status word CMA	Fuse status word PER	0x03	BCC
------	------	------	------	------	-------------------------	----------------------	----------------------	----------------------	------	-----

Reader operation unsuccessful return:

0x02	0x00	0x06	0x3E	0x34	Operation status word P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

P = 'N' (0x4E) Read Fuse failure

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operator position.

Fuse status word FAB: FAB = 0X30 has blown, FAB = 0X31 fuse end

Fuse status word CMA: CMA = 0X30 has blown, CMA = 0X31 fuse end

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	54/55

Fuse status word PER: PER = 0X30 has blown, PER = 0X31 fuse end

FAB is the ATMEL chip factory fuse signs.

CMA card to card factory fuse factory mark.PER of publishers fuse in the application of the system before the start of the fuse personalized logo.

Write fuse

(Write down a blown fuse is a by PER,◇ CMA ◇FAB the fuse blows can not be recovered)

HOST send:

0x02	0x00	0x03	0x3E	0x35	0x03	BCC
------	------	------	------	------	------	-----

Reader operation return:

0x02	0x00	0x03	0x3E	0x35	Operation status word P	0x03	BCC
------	------	------	------	------	----------------------------	------	-----

P = 'Y' (0x59) Write Fuse successful

P = 'N' (0x4E) to write fuse fails, the card all the fuse has blown

P = 'E' (0x45) Card No card

P = 'W' (0x57) card does not allow the operator position.

• Initialization certification area

HOST send:

0x02	0x00	0x0A	0x3E	0x36	8 byte Random Number Q0、Q1、Q2、Q3、Q4、Q5、Q6、Q7	0x03	BCC
------	------	------	------	------	--	------	-----

Reader operation return:

0x02	0x00	0x03	0x3E	0x36	Operation status word P	0x03	BCC
------	------	------	------	------	----------------------------	------	-----

P = 'Y' (0x59) successfully initialized

P = 'N' (0x4E) failed to initialize the card has been initialized.

P = 'E' (0x45) Card No card

P = 'W' (0x57) card does not allow the operator position.

Initialization is to first read the card authentication area in the Nc, Ci, from the F1 or F2 algorithm to calculate the Gc = F1 (Ks, Nc) to obtain a random number Q0 ~ Q7, into AT88SC1608 card, complete the authentication area initialized.

• Calibration certification area

HOST sen

0x02	0x00	0x0A	0x3E	0x37	8 byte Random Number Q0、Q1、Q2、Q3、Q4、Q5、Q6、Q7	0x03	BCC
------	------	------	------	------	--	------	-----

Reader operation return:

0x02	0x00	0x03	0x3E	0x37	Operation status word P	0x03	BCC
------	------	------	------	------	-------------------------	------	-----

P = 'Y' (0x59) proved to be successful

P = 'N' (0x4E) verification failed

P = 'E' (0x45) No card in reader

P = 'W' (0x57) card does not allow the operator position.

Calibration certification area is the certified area during initialization operation, press F2 algorithm to complete Q1 = F2

	SPECIFICATION	Model No.	CRT-310-004Card Reader
		Date	2011/11/24
	Communication Specification	Ver.	1.0
		Page	55/55

(Gc, Ci, Q0), respectively, generated Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7 into AT88SC1608 card accomplished by card check certification area, this verification.

Note: Nc: identification code, usually used as a unique identification card - card number. Personalized previously defined.Ci: ciphertext, personalized write a random number prior to certification card use, each certification will be automatically overwritten.Gc: keys, 64 seeds of confidentiality by Nc F1 formula derived through the personal front, write cards Medium. After personalization inaccessible authentication formula F2 as the card parameters. (Detailed usage see Authentication Protocol)