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# **CRT Card Communication Protocol**

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# 1. Mifare 1 Card Operation Command

#### 1.1 Seek RF card:

Host sends:

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

#### Reader returns:

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

P= 'Y' (0X59) seek card successfully

P= 'N' (0X4E) fail to seek card

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

P='w' (0X57) card is not at the permitted operation position

# 1.2 Capture S/N of Mifare 1 card

Host sends:

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

#### Reader returns:

0x02	0x00	0x06	0x35	0x31	Operation/status P	4 by	/te	hex Card	13	A L	0x0		BCC
------	------	------	------	------	--------------------	------	-----	----------	----	-----	-----	--	-----

P= 'Y' (0X59) capture card S/N successfull and return the card S/N;

P= 'N' (0X4E) fail to capture card An and return empty S/N (0X00, 0X00, 0X00, 0X00)

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

4 byte Card S/N transmitted by hex, such as 66B272AE"

E.g.: The uploading communication package: 0x02 0x00 0x06 0x35 0x31 0xC6 0xB2 0x72 0xAE

#### 0x03 BCC

### 1.3 Check Password of Sector

Use Key\_A or Key\_B to check the appointed sector

1.3.1. Parity Key\_A:

#### Host sends:

0x02	0x00	0x09	0x35	0x32	Sector No.	6 byte hex Password	0x03	BCC
------	------	------	------	------	------------	---------------------	------	-----

Sector No.=  $0x00 \ 0x1 \ 0x02 \dots 0x0F$ 

#### Reader returns:

0x02   0x00   0x03   0x35   0x32   Sector No.   Operation status byte P   0x03   BCC	35 0x32 Sector No. Operation status byte P 0x03 BCC
--	---

Operation status byte P= 'Y' (0X59) password parity successfully

P= '0' (0X30) fail to seek RF card

P= '3' (0X33) password error

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

P='w' (0X57) card is not at the permitted operation position



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#### 1.3.2. Parity Key\_B

#### Host sends:

0x02	0x00	0x09	0x35	0x39	Sector No.	6 byte hex Password	0x03	BCC
------	------	------	------	------	------------	---------------------	------	-----

Sector No.=  $0x00 \ 0x1 \ 0x02 \dots 0x0F$ 

#### Reader returns:

0x02	0x00	0x03	0x35	0x39	Sector No.	Operation status byte P	0x03	BCC
Operation status byte $P = Y'(0X59)$ password parity successfully								
				P= '(	)'(0X30)	no RF card in		
				P= '3	3'(0X33)	password error		
				P= 'I	E'(0X45)	no card in		
				P="	w'(0X57)	card is not at the permitte	d opera	tion pos

#### 1.4 Read data on sector

#### Host sends:

0x02	0x00	0x04	0x35	0x33	Sector No.	Block	vQ.	0x0	3	B	CC
							$^{\prime}$			$\overline{}$	$\overline{}$

Sector No.=  $0x00 \ 0x1 \ 0x02 \dots 0x0F$ 

Block No.= 0x00 0x01 0x02 0x03

Reader reads data successfully and returns:

C	0x02	0x00	0x15	0x35	0x33	Sector	Block	P=0x59	16 byte hex Data	0x03	BCC
					4	No.	No.		<b>\</b>		

Operation status byte: P= 'Y' (0X50)

Read sector block data specessfully and upload 16 byte data

Reader fails to read sector block data and returns:

0x02	0x00	0x05	0x35	Ī	0x33	1	Sec	tor No.	Bl	∂çk	No.	Operation status byte P	0x03	BCC
------	------	------	------	---	------	---	-----	---------	----	-----	-----	-------------------------	------	-----

Operation status byte

P= '0' (0X30) cannot seek RF (ard

P= '1' (0X31) operated sector No. is wrong (not the sector by password checked)

P= '2' (0X32) S/N of operated card error

P= '3' (0X33) password error

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

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

P='w' (0X57) card is not at the permitted operation position

#### 1.5 Write data on sector

#### Host sends:

0x02	0x00	0x14	0x35	0x34	Sector No.	Block No.	16 byte hex Data	0x03	BCC
------	------	------	------	------	------------	-----------	------------------	------	-----

Sector No.=  $0x00 \ 0x1 \ 0x02 \dots 0x0F$ 



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Block No. = 0x00 0x01 0x02 0x03

Reader writes data successfully and returns:

Operation status byte: P= 'Y' (0X59)

Write sector block data successfully and upload 16 byte data that is written

Reader fails to write sector block data and returns:

0x02	0x00	0x05	0x35	0x33	Sector No.	Block No.	Operation status byte P	0x03	BCC
------	------	------	------	------	------------	-----------	-------------------------	------	-----

Operation status byte

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

P= '1' (0X31) operated sector No. is wrong (not the sector by password checked)

P= '2' (0X32) S/N of operated card error

P= '3' (0X33) password error

P= '4' (0X34) block data written error

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

P='w' (0X57) card is not at the permitted operation position

Note: The third block of each sector is KEYA, storage area, KEYB, and write on this block may lead card locked and useless, please be cautious when operate to this block. To find detail in Philip M1 card specification.

# 1.6 Modify password

This operation can modify password of KEVA only, and change KEYY password to: "0xFF, 0xFF, 0xFF,

Host sends:

0x02	0x00	0x09	0x35	0x35	Sector	No.	byte hex Password	0x03	BCC
------	------	------	------	------	--------	-----	-------------------	------	-----

Sector No.=  $0x00\sqrt{2}$   $0x02 \dots \sqrt{2}$ 

Reader returns:

				-					
0x02	0x00	0x04	0x35	0x35	Seci	tor No.	Operation status byte P	0x03	BCC

Operation status byte

P= 'Y' (0X59) password changed successfully

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

P= '1' (0X31) operated sector No. is wrong (not the sector by password checked)

P= '2' (0X32) S/N of operated card error

P= '3' (0X33) password error

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

P='w' (0X57) card is not at the permitted operation position



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To change operation password of sector (KeyA or KeyB) and the storage area completely, write block 3 data of each sector after checking password successfully.

The format as below (see details in PHILIPS M1 card specification):

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6 byte KeyA password					4 byt	e stora	ige are	a	6 byte KeyB password						

# 1.7 Increment Operation

Host sends:

0x02	0x00	0x08	0x35	0x37	Sector No.	Block No.	4 byte hex data	0x03	BCC					
Sec	tor No.=	= 0x00 0x	x1 0x02	0x0l	F									
Blo	ck No.=	=0x000	x01 0x02	2 0x03										
4 b	yte hex	data is th	he increa	sed value	e of appointed	sector block (le	ow byte in front, high b	yte behi	nd).					
Th	ne value	cannot b	e 0; othe	erwise, op	erating will b	e failure.								
Eg	g. The se	ector 5 bl	lock 0 ne	ed to inc	rease to 0x10,	the 4 byte hex	data are: "0x10, 0x00,	0x00,0x	.00"					
Reader returns:														
0x02	0x02 0x00 0x05 0x35 0x37 Sector No. Block No. Operation status byte P 0x03 BCC													
Oper	Operation status byte													
I	P= '0 '((	0X30)	ca	nnot seek	RF card	/								
I	P= '1' ((	OX31)	op	erated see	tor No. is wro	ng (not the sec	tor by password checke	ed)						
I	P= '2' ((	)X32)	S/1	N of open	ated card error	r  // //	<b>∽</b>							
I	P= '3' ((	)X33)	pa	ssword er	Jon	// 5								
I	P= '4' ((	)X34)	(for	mat of bl	ock data error	(not written in	a value format)							
I	P= '5' ((	)X35)	inc	crement o	ver load									
I	P= 'E' (0	0X45)(\	no	card insi	de	$\mathcal{J}$								
I	P= 'Y' (	0X59) \	ope	eration suc	ccessful									
P	='w'(0	X57)	car	d is not	t the permitted	d operation pos	ition							
	)) *													
1.8 Decr	ement	operat	ion	$\smile$										

Host sends:

0x02	0x00	0x08	0x35	0x38	Sector No.	Block No.	4 byte hex data	0x03	BCC
------	------	------	------	------	------------	-----------	-----------------	------	-----

Sector No. =  $0x00 \ 0x1 \ 0x02 \dots 0x0F$ 

Block No. = 0x00 0x01 0x02 0x03

4 byte hex data is the decreased value of appointed sector block (low byte in front, high byte behind).

The value cannot be 0; otherwise, operating will be failure.

#### Reader returns:

0x02	0x00	0x05	0x35	0x38	Sector No.	Block No.	Operation status byte P	0x03	BCC
------	------	------	------	------	------------	-----------	-------------------------	------	-----

Operation status byte



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P= '0' (0X30)	cannot seek RF card
P= '1' (0X31)	operated sector No. is wrong (not the sector by password checked)
P= '2' (0X32)	S/N of operated card error
P= '3' (0X33)	password error
P= '4' (0X34)	format of block data error (not written in a value format)
P = '5' (0X35)	decrement over load
P = 'E'(0X45)	no card inside
P = 'Y' (0X59)	operation success
P='w' (0X57)	card is not at the permitted operation position

#### 1.9 Value initialize

Executed by write block data command, write 16 byte data according to MIFARE value format. The format as below:

0 1	2	3	4	5	6	7	8	Q	//0	11	12	13		>15
Value			/Valu	ie			Vatur				Adr	1,1100	Adr	/Adr

Value: the initializing 4 byte value, low byte of the value in front, high byte behind

/Value: value opposite the initializing 4 byte/value

Adr: the block address of the initializing value. Adr= sector No. X 4 + block No.

/Adr: value opposite of the initializing block address

Eg. The sector 5 block 0 initial value is 10, the 16 byte that a write to sector block are:

"0x0A, 0x00, 0x00, 0x00, 0xF5, 0xFF, 0xFF, 0xQA, 0x00, 0x00, 0x14,0xEB, 0x14, 0xEB"

#### 1.10 Read value

Executed by read sector block data command, for the 16 byte data format, it should be in MIFARE card value data format. If yes, read the value, if not, reading error alert (error data format).

**NOTE**: when processing a value operation, block 3 of each sector cannot save a value data. And notice the address range of the sector when initializing value, increment, decrement, read value.



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# **2. 24CXX Series Card Operation** (24C01, 24C02, 24C04, 24C08, 24C16, 24C32, 24C64)

# 2.1 Card type setting

Host sends:

0x02	0x00	0x03	0x36	0X30	Card type N	0x03	BCC
------	------	------	------	------	-------------	------	-----

N=0x30 Set card as 24C01 128BYTE ADR=0x0000—0x007F

N=0x31 Set card as 24C02 256BYTE ADR=0x0000—0x00FF

N=0x32 Set card as 24C04 512BYTE ADR=0x0000—0x01FF

N=0x33 Set card as 24C08 1K BYTE ADR=0x0000—0x03FF

N=0x34 Set card as 24C16 2K BYTE ADR=0x00000—0x07FF

N=0x35 Set card as 24C32 4K BYTE ADR=0x0000—0x0FFF

N=0x36 Set card as 24C64 8K BYTE ADR=0x0000—0x1FFF

#### Reader returns:

0x02	0x00	0x04	0x36	0X30	Card type N	Operation statu	byte P	0x03	BC	Ç
							\ \	Ι,	\ \	`'

P= 'N' (0X4E) set card unsuccessfully

P= 'Y' (0X59) set card successfully

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

P='w' (0X57) card is not at the permitted operation position

#### 2.2 Read card

Host sends:

0x02	0x00	0x06	0x36	Qx31	1	Card	1	Operation first	Operation	0x03	BCC
						type N		address 2 byte	length: L		

Operation length  $L=0X01\sim0X80$ .  $L=0X01\sim0X80$ .  $L=0X01\sim0X80$ .

Operation first address 2 BYTE: effective address depended on capacity of card.

#### Reader returns:

Read card successfully and return: P = (Y'(0X59))

0x02	Communication	0x36	0x31	Card	Operation	Operation	Operation	Data	0x	BCC
	package Length			type N	status byte	first address	length L	read	03	
	(2 byte)				P	2 byte		n byte		

Communication Package Length= 7 + operation length L

Fail to read card and return:

Fail to read card and return:

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

P= 'N' (0X4E) fail to read card

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

P='w' (0X57) card is not at the permitted operation position



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#### 2.3 Write card

#### 2.3.1 Write without parity

Host sends:

0x02	Communication	0x36	0x32	Card	Operation	Operati	Data	0x03	BCC
	package Length			type N	first address	on	read		
	(2 byte)				2 byte	length L	n byte		

Note: Communication Package Length= 6 + operation length L

Operation length L=0X01 $\sim$ 0X80: 1 byte  $\leq$  L  $\leq$  128 byte

#### Reader returns:

0x02 0x00 0x04 0x36 0x32 Card type N Operation status byte P 0x03 RCC
P= 'Y' (0X59) write card successfully

P= 'N' (0X4E) fail to write card

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

P='w' (0X57) card is not at the permitted operation position

### 2.3.2 Write with parity

Host sends:

0x02	Communication	0x36 0x33 Card	Operation	Operation	Data	0x03	BCC
	package Length	type	first address	_length L	read		
	(2 byte)		2 byte		n byte		

Note: Communication Rackage Length + 6 + operation length L

Operation length L=0 $\times$ 01-0 $\times$ 80: 1 byte  $\leq$  L  $\leq$  128 byte

Reader returns:

Write card successfully with parity and return

0x02	Communication	Qx36	0x33	(Card)	Operation	Operation	Read	0x03	BCC	0x02
	package Length			ype	first	length L	data			
	(2 byte)			N	address 2		written			
					byte		n byte			

Communication Package Length= 7 + operation length L

Fail to write card and return:

#### Reader returns:

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

P= 'N' (0X4E) fail to write card

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

P='w' (0X57) card is not at the permitted operation position



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# 3. Contact CPU Card Operation

#### 3.1 Reset CPU card

Host sends:

Reader operates successfully and returns: T=0 CPU card reset successfully and return operation status byte P= 'Y' (0X59)

0x02	Communication	0x37	0x30	operation	Length of reset	Data reset	0x03	BCC
	package length			status	data package 2	n byte		
	2 byte			byte P	byte			

Communication package length=5+ length of data reset n

Reader operates successfully and returns: T=1 CPU card reset successfully and return operation status

byte P= 'Z'(0X5A)

0x02	Communication	0x37	0x30	operation	Length of reset	Qata reset	0x03	BCC
	package length			status	data package 2	n byte	$\rightarrow$	
	2 byte			byte P	byte			

Communication package length=5+ reset length of data reset n

Reader fails to operate and returns:

0X0	02 0X00	0X03	0X37	0X30.	<b>Operation</b>	n status o		0X03 BCC	
						_/	//		

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

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

P='W' (0X57) card is not at the permitted operation position

3.2 CPU card C-APDU operation: (T=0 CPU operation)

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

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

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

1	,		1	3	,				
0x02	Communication	0x37	0x31	operation	C-APDU	C-APDU	0x03	ВС	C
	package length 2			status byte P	operation return	Operation			
	byte				package length	return package			
					2 byte	n byte			

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

Reader fails to operate and returns:



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

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

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

P='W' (0X57) card is not at the permitted operation position

# 3.3 CPU card C-APDU operation: (T=1 CPU operation)

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

Communication package length=4+ C-APDU package length n (n= 262 by e max)

Reader operates successfully and returns: operation status byte P= 'Y' (0X50)

0x02	Communication	0x37	0x32	operation	C-APDU Q-APDU	0x0	BC
	package length 2			status byte	operation return Operation	3	С
	byte			Р //	package length return package	7	
					2 byte n byte		

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

Reader fails to operate and returns:

0x02	0x00	0x03	0x37	0x31	Operation status	s byte P	0x03	BCC
						<i>'' ' '</i>		

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

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

P='W' (0X57) card is not at the permitted operation position

For the operation of CPU card C-APDU, please select the correspond command of T=0/T=1 according to

CPU reset card type.



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# 4. SIMENS SLE4442 Card Operation

#### 4.1 SLE4442 card reset

Host sends:

0x02 0x	00 0x02	0x38	0X30	0x03	BCC
---------	---------	------	------	------	-----

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

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

Reader fails to operate and returns:

0x02 | 0x00 | 0x03 |0x38 0x30operation status byte P 0x03**BCC** P='N'(0X4E) fail to reset

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

P='W' (0X57) card is not at the permitted operation position

# 4.2 Read 4442 main memory

Host sends:

							\		1	
0x02	0x00	0x04	0x38	0X31	Read first address ADR 1 byte	Read L1	//	0x03	<b>P</b>	/
A]	DR = 00	-FF	-	-					,	

L = 0x01-0x80

Operation length L=0X01 0X80

Main memory of 4442 has 256 bytes; please be cautious about operation address and length within valid range.

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

0x02	Communication	0x38	0x31 0	peration	Read first	Read	Read	0x03	BCC
	length		1)	status	address	length L	data		
	2 byte			byte P	ADR		L byte		

Communication length=5+ read length L

#### Reader fails to operate and returns

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

P= 'N' (0X4E) fail to read card

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

P='W' (0X57) card is not at the permitted operation position



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### 4.3 Read 4442 protection area

Host sends:

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

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

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

Each bit in Protection Memory is corresponding with the protection status of the same address in

Main Memory. The address ranks from low to high.

Protection bit=0x00 Protect bit valid, can not write this byte

Protection bit=0x01 Protect bit invalid, can write the data of this byte

# Reader fails to operate and returns:

0x02	0x00	0x03	0x38	0x32	operation status byte P	/	0xd		BCC
						_	$\overline{}$	$\overline{}$	_

P= 'N' (0X4E) fail to read card

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

P='W' (0X57) card is not at the permitted operation position

#### 4.4 Read 4442 PSC area

Host sends:

0x02	0x00	0x02	0x38	Ł	ØX33	\	0x <b>03</b>	Ţ	sce	
				- 1	,		` '			

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

0x02	0x00	0x07	$\sqrt{0x38}$	0x33	operation	status	Security area data package 4	0x03	BCC	
		}			byte R	<i>&gt;</i>	byte			

First byte in Security Area data package: password error counter

Second byte in Security Area data package: password data 1

Third byte in Security Area data package: password data 2

Fourth byte in Security Area data package: password data 3

Password error counter=0x07 (password error amount is 0), 0x03 (password error amount is 1), 0x01 (password error amount is 2), 0x00 (password error code is 1, card useless)

#### Reader fails to operate and returns:

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

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

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

P='W' (0X57) card is not at the permitted operation position



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### 4.5 Password parity:

Host sends:

0x02	Password data, 3 byte	0x03	BCC
------	-----------------------	------	-----

Reader operates and returns:

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

P= 'Y' (0X59) Password correct

P= 'N' (0X4E) Password error

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

P='W' (0X57) Card is not at the permitted operation position

# 4.6 Write main memory (00H-FFH)

Host sends:

0x02	Communication	0x38	0x35	Write first Write	elength	Write data	0x03 ≯BCC
	length 2 byte			address ADR	1/1	Lbyte	$\rightarrow$

Communication length = 4+ write length L

Operation length  $L = 0x01 \sim 0x80$ , 1 byte  $\leq L \leq 128$  byte

Reader operates and returns:

0	0x02	0x00	0x05	0x38	0x35	operation	status	Write first address	Write	0x03	BCC
				,		byte		ADR	length		
				ζ,				// >>	L		

P= 'Y' (0X59) write successfully

P= 'N' (0X4E) \fail to write

P= 'E' (0X45) pa card in

P='W' (0X57) card is not at the permitted operation position

**4.7 Write protection memory** (ADR: 0x00-0x1f, 32 BYTE with write protection function to proceed with first address, and appoint length to write protection)

#### Host sends:

0x02	Communication	0x38	0x36	A dr	lon	Lan buta verita protection	0x03	BCC	
UXUZ	Communication	0236	0230	Adr	len	Len byte write protection	0.003	ВСС	
	Package length L					Status			

Notes: Adr: first address byte of writing protection Adr: 0x00---0x1F

Len: length of byte of writing protection 0x00 < len < 0x1F

Sbyte: status byte package of unit of writing protection

0x01: write protection in a correspond unit



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0x00: not write protection in a correspond unit

Communication package length L=4+len

Modify write protection memory: address range 00H-31H only. And once written the protection bit can not be erased. When it is in operation we should confirm the ranks of Adr and len, it can write protection for every unit byte

Rea	der	operate	es and re	eturns:								
0x	02	0x00	0x03	0x38	0x36	operation st	atus byte P	0x03	BCC			
F	)= '`	Y' (0X5	59) wr	ite succ	essfully	7						
F	e ']	N' (0X4	IE) fai	l to wri	te							
P	= 'I	E' (0X4	5) no	card in								
P	P='W' (0X57) card is not at the permitted operation position											
E.,	E.g., Write protection of 0x10 0x11 0x12											
Host s	Host sends											
0x02	0x02 0x00 0x07 0x38 0x36 0x10 0x03 0x01 0x01 0x01 0x03 BCC											
4.8 N	Iod	ify pa	ssword	l	·	(						
Hos	st se	nds:				^		\				
0x	02	0x00	0x05	0x38	0x37	Password da	ata 3 byte	0x03	всс	>		
Reade	r op	erates a	and retu	rns:	4				$\rightarrow$			
0x	02	0x00	0x03	0x38	<b>833</b>	operation st	atus byte P	$\left\langle 0 \times 03 \right\rangle$	BCC			
	P=	'Y'(0	X59) <sub>1</sub>	passwoi	dchang	ged successfu	lly	$\nearrow$	,			
	P=	'N'(0	X4E) (	failto	hange	password		•				
	P= E'(0X45) (no card in											
	P=	'W'(0	X57)	card is	not at t	he permitted	operation po	sition				



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# 5. SL4428 Card Operation

#### 5.1 Reset

Host sends:

0x02	0x00	0x02	0x39	0X30	0x03	BCC
------	------	------	------	------	------	-----

Reader operates successfully and returns: operation status byte P= 'Y' (0X59)

0x02	0x00	0x07	0x39	0x30	operation status byte P	Reset data package 4 byte	0x03	BCC
0.10_	0.100	0110 /	0.10	01120	operation status of the	Treser data parinage . ejte	01102	200

Reader fails to operate and returns:

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

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

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

P='W' (0X57) card is not at the permitted operation position

# 5.2 Read 4428 main memory (without protection bit)

Host sends:

0x02	0x00	0x05	0x39	0X31	I	Read first address	R	ead length	L 1 byte	) <sub>0x03</sub>	BCC
					,	ADR 2 byte					

ADR=0000-03FF

L = 0x01 - 0x80

Operation length L=0X01 $\sim$ 0X80, 1 byte  $\leq$  L  $\leq$  128 byte

Main memory of 4428 has 1K byte: please cautious about operation address and length within valid range.

Reader operates successfully and returns: operation status byte P = Y'(0X59)

0x02	Communication 0x39	0x31 operati	Read first	Read	Read	0x03	BCC
	length 2 byte	on>	address	length	data		
		status	2 byte	L 1bye	L byte		
		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					

Communication length=6+ read length L

Reader fails to operate and returns:

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

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

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

P='W' (0X57) card is not at the permitted operation position

#### 5.3 Read 4428 protection bit

#### Model No. CRT-284/286/287/288/310/386 **SPECIFICATION** 2005/10/1 Date Ver. 3.0 **CRT Card** Page 16/35 CREATOR **Communication Protocol** 0x020x000x050x39 0X32 Read first address Read length 0x03**BCC** ADR 2 byte L 1 byte ADR=0000-03FF L = 0x01 - 0x80Operation length L=0X01 $\sim$ 0X80, 1 byte $\leq$ L $\leq$ 128 byte Main memory of 44 has 1K byte; please cautious about operation address and length within valid range. Each bit in Protection Memory is corresponding with the protection status of same address in Main Memory. The address ranks from low to high. Protection bit=0x00 Protect bit valid, can not change the data of this byte Protection bit=0x01 Protect bit invalid, can change the data of this byter Reader operates successfully and returns: operation status byte P= TOX59 0x02Communication 0x39 0x32 Read Protection Qx03 BCC operation Read first length 2 byte status byte bit data L ength P byk add\2 byte byte Communication length=6+ read length L Reader fails to operate and returns: Read length L 0x020x000x06 0x39 0x32Read first 0x03BCC operation 2 byte status by 1 bye P = 'N' (0X4E)fail to read P = 'E' (0X45)no card in P='W'(0X57) card is not at the permitted operation position 5.4 Password parity Host sends: 0x020x000x04 0x39Password data 2 byte 0x03**BCC** Reader operates and returns 0x02 0x030x39 0x33 Operation status byte P 0x03**BCC** 0x00

# 5.5 Write data (without protection bit)

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

P= 'Y' (0X59) password correct P= 'N' (0X4E) password error

P='W' (0X57) card is not at the permitted operation position



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0x02	Communication length	0x39	0x34	write first add	write length	write data	0x03	BCC
	2 byte			ADR 2byte	L 1 byte	L byte		

Communication length = 5+ write length L

Range of address=0x0000—0x03FF;

Operation length L=0X01 $\sim$ 0X80, 1 byte  $\leq$  L  $\leq$  128 byte

Note: Last three byte (0x03FD, 0x03FE, 0x03FF) is the error counter of 4428 card; please do not operate these bytes for it is easy making card useless.

#### Reader returns:

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

P= 'Y' (0X59) write successfully

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

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

P='W' (0X57) card is not at the permitted operation position

# **5.6** Write data (with protection bit)

0x02	Communication length	0x39 0x3	3	write first add	write length	write data	0x03	BCC
	2 byte			ADR 2byte	L) byte	L byte		

Communication length = 5+ write length Is

Range of address=0x0000 0x03FF;

Operation length L=0 $\times$ 0\,\(\times\_0\

Note: Last three byte (0x03FD, 0x03FE, 0x03FE) is the error counter of 4428 card, password parity 1, password parity 2 please do not operate these bytes for it is easy making card useless. Meantime, it can't be modified once write protection bit.

#### Reader returns:

0x	:02	0x00	0x06	0x39	0x35	Operation	Write first add	Write length	0x03	BCC
					//	status byte	ADR 2 byte	L 1 byte		
						P				

P= 'Y' (0X59) write successfully

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

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

P='W' (0X57) card is not at the permitted operation position

#### 5.7 Modify password

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

®
CREATOR

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					_
					1
		1	1 .		ı
		hvte	l hyte		ı
		by to	Dyte		1

# Reader returns:

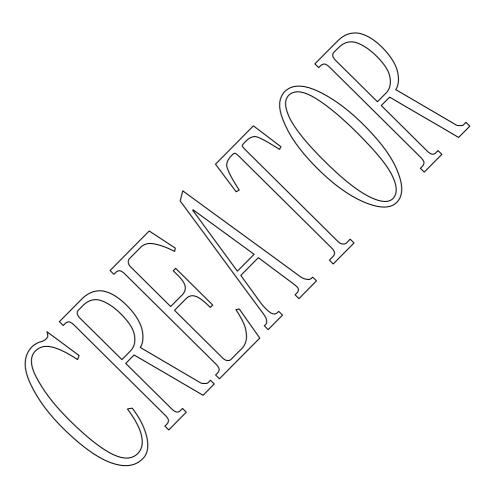
0x02	0x00 0x03	0x39	0x36	Operation status byte P	0x03	BCC
------	-----------	------	------	-------------------------	------	-----

P= 'Y' (0X59) password changed successfully

P= 'N' (0X4E) fail to change password

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

P='W' (0X57) card is not at the permitted operation position





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# 6. AT88SC102 Operation

#### 6.1 Reset:

Host sends:

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

Reader returns:

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

Operation status bit P= 'Y' (0X59) reset successfully

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

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

P='W' (0X57) card is not at the permitted operation position

# 6.2 Main password modify

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

Host sends:

0x02	0x00	0x04	0x3A	0X31	Password data packa	age 2	byte	e (	)x0:	3\B	C

Reader returns:

0x02	0x00	0x04	0x3A	0x31 /	Pas	sword cod	Xe )	Operation	n statt	s byte P	0x03	BCC
------	------	------	------	--------	-----	-----------	------	-----------	---------	----------	------	-----

Operation status byte P= 'Y' (0X59) passwor

P= 'Y' (0X\$9) password parity successful P= 'N' (0X\$E) password parity failure

P==E(0X45) 1

no card in reader

F'(0X46) card useless after password parity failure overrun the

permission times, card invalidate)

P='W' (0X57) card is not at the permitted operation position

Under safety grade 1 mode, all units can be read after the main password parity.

Under safety grade 2 mode, units except password memory unit, can be read after the main password parity.

#### 6.3 Read memory zone (application zone 1, application zone 2, control zone)

Host sends:

0x02	0x00	0x05	0x3A	0x32	Zone	Read application first	Read application	0x03	BCC
					code	address adr 1 byte	length len 1 byte		

Note: zone code=0x30 control zone (control zone= units except application zone 1, 2)

=0x31 application zone 1 (64 byte address range 0x16-0x55)

=0x32 application zone 2 (64 byte address range 0x5C-0x9B)

Reader operation successful returns: operation status byte P= 'Y' (0X59)

	® SPECIFICATION					-	Model No.	CRT-2			7/288/31	0/386		
		31					Date		2	2005/1				
				CRT		_	Ver.			3.0				
CR	EATOR	C	omi	nunicat	ion Protoco	<u> </u>	Page			20/3	5			_
0 0	Communication	0	0	Zone	Operation		Read	F	Read		Read da	ta (	В	
X	length L	X	X	code	status	app	olication first	applica		zone	Len byt			
0	2 byte	3	3		byte P		address		ength			0		
2		Α	2	<u> </u>			adr 1 byte	len	1 byt	e		3		
	unication length operation failur				cation zone l	length	len							
0x02	T T	0x3.			Zone code	Оре	eration status b	oyte P	0:	x03	BCC			
P= '	N' (0X4E) fa	il to	reac	 		•								
	` /			reader										
	,				244 1	, •	•,•							
P=,	W' (0X57) ca	ard 19	s not	at the p	ermitted ope	eration	position							
<b>6.4</b> Eras	se memory zo	ne (	pre	pare to	write data	a)				\				
6.4.1 Era	se application <b>a</b>	zone	und	ler safet	y mode 1					)				
Host se					•				$\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{\mathbf{$		_			
		02	<u> </u>	0x33	Zono	Енопо		hand	7,,,,	7		0**	ВС	C
0x02	0x00   0x05	0x3	A	UX33			memory zone		//	//	ory zone	0x	ВС	
					code B	ad	dress adr 1 by	te	leng	th he	n ≯byte	03		
Zo	ne code								,	// `	~			
	B= 0x30 erase control zone under satety mode 1													
	B=0x31 er	ase a	appli	ication z	one 1 under	<b>hafety</b>	mode 1							
	B=0x32 er	ase a	appli	ication z	one I under	safety	mode 2	$\rightarrow$						
Reader re	eturns:			$\langle \langle \rangle$				<b>,</b>						
0x02	0x00 0x05	0x3	3A/	0x33\	Zone co	rde	Operation sta	tus byte	P	0x0	)3 BCC			
Opera	ation status byte	P≟	X.	(0X59)	successfi	ul				1	l			
•			\	(0X4E)	11 //									
	((	D-	7	(0X45)	^ \	n raod	// or							
	('	\		` '\	no card in	$\sim$								
	`	/Ψ=	: W	(0X57)	card is no	ot at th	ne permitted of	peration	positi	on				
				·	\\ \\ \\									
6.4.2 Era	se memory zon	e 1 u	ınde	r safety	mode 2									
Host se	Host sends:													
0x02	0x00 0x09	0x3	A	0x33	0x33 Eras	se pass	sword data pac	kage 6 t	byte	0x03	BCC			
Reader	returns:													
0x02	0x00 0x05	0x3	3A	0x33	Zone co	de	Operation sta	tus byte	P	0x03	BCC			
Opera	ation status byte	P=	'Y'	(0X59)	successfi	ul					_			
		P=	'N'	(0X4E)	failure									
		P=	έ'Ε'	(0X45)	no card in	n read	er							
				,				neration	nogiti	or				
	P='W' (0X57) card is not at the permitted operation position													

6.4.3 Erase application zone 2 under safety mode 2



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#### Host sends:

0x02	0x00	0x08	0x3A	0x33	0x34	EC2	Erase password data package 4 byte	0x03	BCC
------	------	------	------	------	------	-----	------------------------------------	------	-----

Erase fuse status operation byte EC2 = 0x30 Erase unfused application zone 2

= 0x31 Erase fused application zone 2

#### Reader returns:

	0x02	0x00	0x05	0x3A	0x33	Zone code	Operation status P	0x03	BCC
	Operation status $P= Y'(0X59)$ successful								
			P=	'N' (0X	4E) fa	ailure			
P= 'E' (0X45) no card in reader									
P= 'F' (0X46) the zone 2 useless, can read only.									
	P='W' (0X57) card is not at the permitted operation position								

(EC2 fuse unfused overrun the permission erase times (128 times) can not erase data any longer)

#### 6.4.4 Write memory zone (application zone 1, application zone 2, control zone)

Host sends:

0x0	Communication	0x3	0x3	Zone	Write memory	Write memory	Write data	0x03	BCC
2	length L	A	4	code	zone address	zone length	length		
	2 byte			^	adr I byte	len1 byte	Len byte		

Communication length L=5+ Write data length len

Reader returns:

0x02	0x00	0x06	0x3A	0x34	Z	one	C06	k	1	Ope	rati	on stat	us F	)	0x03	BCC
D= ''	V' (0X5	, (O)	rite ker	Cucce	-A-1	N	//	\		,	//	$\rangle\rangle$				

P= 'Y' (0X59) write card success

P = 'N' (0X4E)

vitte cardi tartitre

P = 'E'(0X45)

d card in reader

P='W'(0X57)

card is not at the permitted operation position

Under safety mode 1, all units can erase and write as long as main password checked. To prevent modifying password memory unit and result in card useless, some data cannot write in control zone unit liberty.

Under safety mode 2, can only erase and write application zone units after main password checked, all control zone units cannot be erased and written. Application zone can be written only after main password checked and erase password checked successfully.

# 6.4.5 Modify password: (control zone password, application zone 1 password, application zone 2 password)

Host sends:

0x02	Communication	length	0x3A	0x35	Zone	New password length	0x03	BCC
	L 2 byte				code	Len byte		

Communication length L=3+ New password length len



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Zone code=0x30 modify control zone password,

password data:2 byte

=0x31 modify application zone 1 password,

password data:6 byte

=0x32 modify application zone 2 password

password data: 4 byte

#### Reader returns:

0x02	0x00	0x04	0x3A	0x35	Zone code	Operation status P	0x03	BCC
------	------	------	------	------	-----------	--------------------	------	-----

P= 'Y' (0X59) modify password successful

P= 'N' (0X4E) modify password failure

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

P='W' (0X57) card is not at the permitted operation position

Only under the safety mode 1 and checked main password then the password can be modified.

After entered safety mode 2, password can only be checked not be modified

#### 6.4.6 Personalized operation, enable card enter safety mode 2

#### HOST SENDS:

					/_			
0x02	0x00	0x03	0x3A	0x36	Operation mode	0x03	BCC	
Or	eration	mode	F=0x30	enabl	e card enter safety mode	2, for test,		$\bigwedge$
			F = 0x31	enabl	e the simulation enter sa	ifetx mode 2	and sard re	erurn to

=0x31 enable the simulation enter safety mode 2, and eard return to safety mode 1.

F=0x32 enable eard enter safety mode 2 completely it cannot return card to

mode

in case operated the card in safety mode 2.

#### Reader returns:

0x02 $0x00$ $0x0$	04 0x32 0x36 Operation mode F Operation status P 0x03 BCC	
P= 'Y' (0X59)	personalized operation successful	
P= 'N' (0X4E)	personalized operation failure	
P = 'E'(0X45)	no card in reader	

P='W' (0X57) card is not at the permitted operation position

Before enter safety mode 2 Make sure of the password of application zone 1, 2 have been set. The  $1^{st}$  byte of application zone 1: (0x16) and the  $1^{st}$  byte of application zone 2: (0x5C). They are the authorization of control these units. Do not modify them.

If you want to write data in this zone after enter safety mode 2, notice that the whole block of application zone will be erased, so make sure to save the data before new data written in.

Simultaneity, these application zones are under control of the fuse counter. If the fuse counter works, it will be written less then 128 times. And if the fuse counter doesn't works, the write times will be the max card write operation times (100,000 times)

### 6.4.7 The zone 2 erase counter operation byte EC2, Set to be invalidate operation



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

#### Reader returns:

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

P= 'Y' (0X59) successful

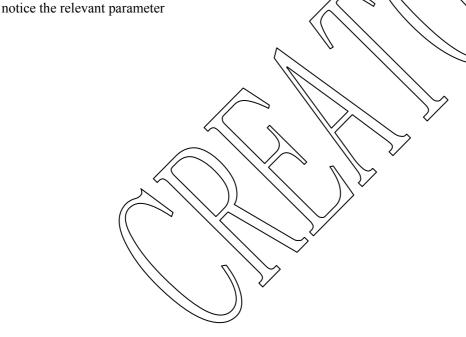
P= 'N' (0X4E) failure

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

P='W' (0X57) Card is not at the permitted operation position

Executing this operation before entering the personalized operation is unlimited the erase times of card application zone 2 under safety mode 2. Otherwise, after complete the setting of mode 2, the card application zone 2 defaults erase times limit is effective under safety mode 2 (128 times). There's no way to cancel the 128 erase times limit, if the erase limit in the zone 2 canceled. Also, when the setting is no limited under mode 2, it can not change to limited mode.

At the same time, user should save the EC2 operation status; 'cause applications under mode 2, when the card erase and write application zone 2 (the erase password parity of application zone 2) should





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# 7. AT88S1604 Card Operation

#### **7.1 Reset**

Host sends:

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

Reader returns:

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

Operation status byte P= Y'(0X59) successful

P= 'N' (0X4E) failure

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

P='W' (0X57) card is not at the permitted operation position

# 7.2 Parity password:

Host sends:

UXU2	UXUU	UXUS	0X3B	0X31	Password type code 1 b	yte Password data 2 by	$\downarrow e \rightarrow 0x$	03 BC	
Reader	returns	:					<i>✓</i>		
0x02	0x00	0x04	0x3B	0x31	Password zone code	Operation status byte?	0x03	BCC	

Operation status byte P= Y'(0X59)

P= 'Y' (0X59) successful

P= 'N' (0X4E) failure

P= 'F' (0X46) care unused or application block unused

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

 $P \notin W(0X5)$  card is not at the permitted operation position

Password type code; 0x30 main password parity

= 0x31 application zone 1 password parity

 $\neq 0$ x32 application zone 1 erase password parity

=0x33 application zone 2 password parity

= 0x34 application zone 2 erase password parity

= 0x35 application zone 3 password parity

= 0x36 application zone 3 erase password parity

= 0x37 application zone 4 password parity

= 0x38 application zone 4 erase password parity

#### 7.3 Read data:

0x02	0x00	0x06	0x3B	0x32	Zone code	Operation	Operation	0x03	BCC
					1 byte	address 2 byte	length 1 byte		



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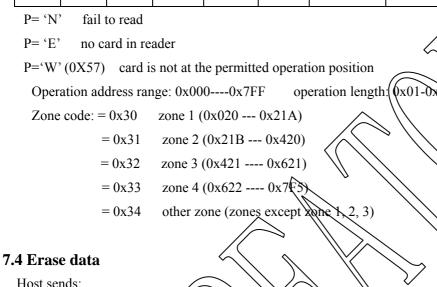
Reader operation successful returns: P= Y'(0x59)

0x02	Communication	0x3B	0x32	Zone	Operation	Operation	Operation	data	0x03	BCC
	length L			code	status P	address	length	n byte		
	2 byte					2 byte	1 byte			

Communication length: L=7 + n byte

Reader operation failure returns:

0x02	0x00	0x07	0x3B	0x32	Zone	Operation	Operation	Operation	0x03	BCC
					code	status byte	address	length		
						P	2 byte	1 byte		



Host Selies.			3 //			
0x02 0x00	0x06  0x3B	0x33 Zone code	Operation	Operation	0x03	BCC
		1 byte	address	length		
			2 byte	1 byte		
Reader returns:						
	\ \ \	$\alpha \wedge \alpha$				

	• • • • • • • • • • • • • • • • • • • •	//						
0x02	0x00	0x04	Qx3B	0433		Operation	0x03	BCC
				))	code	status byte P		

P = 'Y' (0x59)successful

P = 'N' (0x4E)failure

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

P='W'(0X57)card is not at the permitted operation position

Operation address range: 0x000----0x7FF operation length: 0x01-0x80

#### 7.5 Write data:



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0x02	Communication	0x3B	0x34	Zone	Operation	Operation	Write data	0x03	BCC	
	length L			code	address	length	length			
	2 byte			1 byte	2 byte	1 byte	n byte			

Communication length L = 6 + n byte

#### Reader returns:

0x02	0x00	0x04	0x3B	0x34	Zone code	Operation status byte P	0x03	BCC		
	P= 'Y	' (0x59)	) succ	essful						
P= 'N' (0x4E) failure										
P= 'E' (0x45) no card in reader										
P='W' (0X57) card is not at the permitted operation position										
Operation address range: 0x0000x7FF operation length: 0x01-0x80										

Zone code: = 0x30 zone 1 (0x020 --- 0x21A)

= 0x31 zone 2 (0x21B --- 0x420)

= 0x32 zone 3 (0x421 ---- 0x621)

= 0x33 zone 4 (0x622 - - 0x7F5)

= 0x34 other zone (zones except zone (2, 3))

# 7.6 Modify password under mode 1:

Host sends:

Host se	ends:				_	\\ >		\/				
0x02	0x00	0x05	0x3B	0x35	Password	type code 1	byte	-Rassword data 2 b	yte	0x0	3	BCC
Reader	returns	:										
0x02	0x00	0x04	0x3B	Qx35	Password	zone code	Opera	tion status byte P	0x	03	BCC	,
Opera	Operation status byte P Y' (0X59) successful											
	P= 'N' (0X4E) failure											
	R= 'E' (0X45) no card in reader											
	P = W'(0X57) card is not at the permitted operation position											

Password type code: = 0x30 main password parity

= 0x31 application zone 1 password parity

= 0x32 application zone 1 erase password parity

= 0x33 application zone 2 password parity

= 0x34 application zone 2 erase password parity

= 0x35 application zone 3 password parity

= 0x36 application zone 3 erase password parity

= 0x37 application zone 4 password parity

= 0x38 application zone 4 erase password parity

Can only modify password under safety mode 1, under safety mode 2 can only parity password ,cannot modify the password.



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# 7.7 Personalized operation (Under safety mode 2)

#### Host sends:

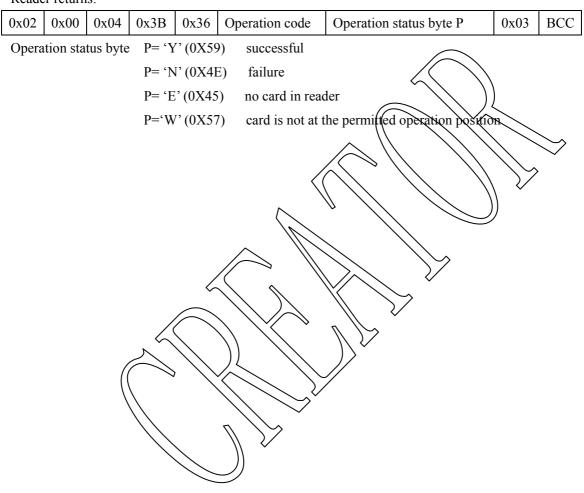
02 0x00 0x03 0x3B	0x36	Operation code	0x03	BCC	
-------------------	------	----------------	------	-----	--

Operation code = 0x30 simulate personalize operation (for test)

= 0x31 quit personalize operation

= 0x32 personalized operation completely, cannot return

#### Reader returns:





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# 8. AT45D041 Card Operation (2048 pages storage, each: 264 byte)

#### 8.1 Reset

Host sends:

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

Reader returns:

02 0x00 0x03 0x3C 0x	Operation status byte P	0x03 BCC
----------------------	-------------------------	----------

Operation status byte P= Y'(0X59) successful

P= 'N' (0X4E) failure

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

P='W' (0X57) card is not at the permitted operation position

# **8.2 Read data:** only support page read (264 byte)

 $0x02 \quad 0x00 \quad 0x04 \quad 0x3C \quad 0x31 \quad Page address 2 byte$ 

Host sends

01102	01100	0710 1	0/15 C	0715 1	r age address 2 9		1260			
Reader	operati	on succe	essful ret	turns: P=	"Y" (0X59) rs	ad card succ	essful	, // ¿		
0x02	0x01	0x0D	0x3C	0x31	Operation statu	s Page add	kress	264 byte	0x03	BCC

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0x31	Operation status	Page address	264 byte	0x03	BCC
		byte P	2 byte	card data		

Reader operation failure return:

0x02	0x00	0x05	0x3C	0x31	Operation status byte	P	Rage address 2 byte	0x03	BCC
------	------	------	------	------	-----------------------	---	---------------------	------	-----

Operation status byte P = 'N' (0)

P= 'N' (0)(4E) read card failure

P = E(0X45) and card in reader

eard is not at the permitted operation position

Page address: 0x0000---\0x07FF

# **8.3 Write data:** only support page write (264 byte)

Host sends:

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

Reader returns:

Operation status byte P= 'Y' (0X59) write card successful

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

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

P='W' (0X57) card is not at the permitted operation position



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# 9. SIM Card Operation (for SIM card operation)

#### 9.1 Reset SIM card:

Host sends:

0x02 0x00 0x03 0x3D	0X30	SIM card No.	0x03	BCC
---------------------	------	--------------	------	-----

Reader operation successful returns: T=0 SIM card reset successfully and return operation status

byte P = 'Y' (0X59)

0x02	Communication	0x3D	0x30	SIM	operation	Reset data	Reset	0x0	BCC
	length 2 byte			card	status	package	data	3	
				No.	byte P	length 2 byte	n byte		

Data package length=6+ reset data length n

Reader operation successful returns: T=1 SIM card reset successfully and return operation status byte P=

'Z' (0X5A)

0x02	Communication	0x3D	0x30	SIM	operation Reset data Reset 0x0 BCC
	length 2 byte			card	status package data 3
				No.	byteP length2 byte n byte

Data package length=6+ reset data length n

SIM card connector No.=0x30 operation STM and 1

> operation SIM cord 2 =0x31

operation SIM card =0x32

=0x33operation SIM eard 4

operation SIM card operation SIM card 6 0x35

operation SIM card 7

operation SIM card 8

Reader operation failure returns

0x02	0x00	0x03	0x3D	0x30		operation status byte P	0x03	BCC	
------	------	------	------	------	--	-------------------------	------	-----	--

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

#### 9.2 T=0 SIM card C-APDU command operation:

0x02	Communication	0x3D	0x31	SIM card	C-APDU	C-APDU	0x03	BCC
	package length			No.	package length	package		
	2 byte				2 byte	n byte		

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

operation status byte P= Y'(0X59)Reader operation successful returns:

0x02 Com	munication	0x3D	0x31	SIM	operation	C-APDU	C-APDU	0	В
----------	------------	------	------	-----	-----------	--------	--------	---	---

	(R)
	-
CREATOR	

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package length	card	status	operation	operation	X	С
2 byte	No.	byte P	returns package	returns package	0	С
			length 2 byte	n byte	3	

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

# 9.3 T=1 SIM card C-APDU command operation:

0x02	Communication	0x3D	0x32	SIM card	C-APDU	C-APDU	0x03	BCC
	package length			No.	package length	package		
	2 byte				2 byte	n byte		

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

Reader operation successful returns: operation status

operation status byte P = Y'(0X5)

0x02	Communication	0x3D	0x32	SIM	operation C-A	PDU	CAPDU	0	В
	package length			card	status oper	hation	operation	X	С
	2 byte			No.	byte retur	rns package	returns paekage	0	C
					leng	th 2 byte	n byte	3	

Communication package length =6+ C-APDU operation returns package length in =4--263byte)

Reader operation failure returns:

0x02 0x00 0x04 0x3D 0x32 SIM card No. operation status byte P 0x03 BCC

P= 'N' (0X4E) failure



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# 10. Magnetic Card Operation

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

#### 10.1 According to the appointed mode read appointed tracks data

Host sends:

	0x02	0x00	0x04	0x45	0x30	Read card mode	Appointed track	0x03	BCC				
R	ead card	l mode:	02	x30	ASCII	code read data					•	•	
			0	x31	binary	code read data							
A	ppointe	d track	code:	0x30	do not	read any track							
			0	x31	read tra	ack 1	~ ~ ~		))				
			0	x32	read tra	acks 2							
			0	x33	read tra	acks 3		///		_	$\searrow$	$\searrow$	$\searrow$
			0	x34	read tra	ack 1, 2			///	ク	<i>&gt;</i>	^	^
			0	x35	read tra	ack 2, 3			\\			,	,
			0	x36	read 1,	3 tracks	"		))				
			0	x37	read al	1 3 tracks							
I	Reader r	eturns:						$\nearrow$					
	0x02	Comn	nunicati	on 0x	45 Øx	30 Card reading	Appointed	data pa	ckage n		0x03	0x03	0x03 I
		lengt	th n byte	e		mode	track No.	byte of t	rack 1, 2	,	,	,	,

0x02	Communication	0x45	0x30	Card readin	Appointed	data package n	0x03	BCC
	length n byte			mode	track Nø.	byte of track 1, 2,		
						3		

Communication length N = 4 + 3 tracks data length

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

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

Notice: The format of binary code read data is?

Track 1: b0, b1, b2, b3, b

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

0x4Fcan not read, track data is 0xE0

Error information:

0xE1 error, no STX



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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.

Eg, 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.

Eg, First byte of track 1 0x03 (HEX)
Uploading data package is 0x30 0x33

# 10.2. According to the appointed mode read appointed tracks data again. (Only for CRT-310-X2XX)

Host sends:

-							// \ \		11 1
	0x02	0x00	0x04	0x45	0x31	Read card	Appointed	0x03	BCC.
						mode	track		

Read card mode: 0x30 ASCII code read data

0x31 binary code read data

Appointed track code: 0x30 do not read any track

0x31 read track

0x32 \tangle read tracks 2

)x33 read tracks 3 )x34 read track 1,

x35 read track 2,3

0x36 read track 1, 3

0x37 read track), 2, 3

#### Reader returns:

on length N 1 reading track byte of tr	rack 1,	
byte mode 2, 3		

Communication length: N = 4 + 3 tracks data length

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: The format of binary code read data is:

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



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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 can not read, track data is 0xE0

Error information:

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.

Eg, 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.

Eg, First byte of track 1

0xQ3 (HEX)

Uploading data package is 0x30 0x3

Fail operation returns

0x02	0x00	0.05	0x45 0x31 Reading	Appoint	Error	0x03	BCC
			card	the track	status		
			mold		byte P		

Error status byte

P = 'N' (0X4E)

read card failure

P = 'E' (0X45)

no card in reader

P='W'(0X57)

card is not at the permitted operation position

# 10.3 CRT284 Card Read Command Setting (only fit for CRT284)

#### Host sends

0x02	0x00	0x06	0x46	0x30	Reading	Uploading	Appointed	0X31	0X03	BCC
					card mode	control	track NO			

Reading card mode: 0x30

reading card data in ASCII code

0x31

reading card data in binary code

Uploading control: 0x30

20 amahla ta u

enable to upload the mag card data (if using this way to, it suggests not use



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the reading card command to read data of mag card)

0x31: prohibit to upload the mag card data (if you set it to this mode, you can use

magnetic card reading command to get the data of mag card)

Track 1: b0, b1, b2, b3, b4, P Track 2, 3: b0, b1, b2, b3, P

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 track 1, 3

0x37 read track 1, 2, 3

#### Reader return:

0x02	0x00	0x07	0x46	0x30	Reading Uploading	Appointed	9X3T }	0x03	BCC
					card control	track NQ			
					prode		>		

S=0X59 Set successful

S=0X4E Set failed

Note: Hold the card for a second after fully insert the card, and then pull out.

#### Command of clearing data from reader (For CRT-284)

Host sends

0x02	0x00	0x02	 0x47	١	0x30	0X03	BCC
		_	 <u> </u>		/		

### Reader return:

S= 'Y' 0X59 Set successful

S= 'N' 0X4E Set failed

# 10.4 CRT287 Card Read Command Setting (only fit for CRT287)

#### Host sends

0x02	0x00	0x05	0x46	0x30	Reading	Uploading	Appointed	0X03	BCC
					card mode	control	track NO		

Reading card mode: 0x30 reading card data in ASCII code



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0x31 reading card data in binary code

Uploading control: 0x30 enable to upload the mag card data (if using this way to, it suggests not use

the reading card command to read data of mag card)

0x31: prohibit to upload the mag card data (if you set it to this mode, you can use

magnetic card reading command to get the data of mag card)

Track 1: b0, b1, b2, b3, b4, P Track 2, 3: b0, b1, b2, b3, P

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 track 1, 3

0x37 read track 1, 2, 3

#### Reader return:

0x02	0x00	0x06	0x46	0x30 Reading	Uploading	Appointed	S	0x03	BCC
				card	control	track NO			
				mode		<b>V</b>			

Note: Communication process please refer to the description of \$5.00 of << CRT card reader communication

protocol (V3)>>

