CRT-603-CZ7-B Contactless Module

Product Manual

(V1.0.0.2)

Creator (China) TECH Co ., Ltd

Address： 6/F, Block C3, ZHIYUAN iPark, No.1001 XueYuan Road, NanShan District, ShenZhen, GuangDong, China.

TEL：+86-755-26710345

FAX：+86-755-26710105

EMAIL：sale@china-creator.com

Http://www.china-creator.com

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Chapter 1 Introduction

1.1 Product Description

CRT-603-CZ7-B is a USB interface card reader running on Windows including contactless card interface and SAM card interface. The reader complies with PC/SC standard, ISO14443 standard applicable to type A and type B contactless cards and ISO14443-3 standard applicable to MIFARE series contactless cards. It also complies with ISO7816 standard on SAM card.

1.2 Feature

- Support ISO/IEC 14443 A；
- Support ISO/IEC 14443 B；
- Support ISO/IEC 18092；
- Support ISO/IEC 7816；
- Support NXP Mifare；
- Support Sony FeliCa （only public commands）；
- Support NFC P2P (pear to pear; near field communication)；
- Support to operate second generation ID card;
- Automatic search contactless card and perfectly handle multiple card conflict.
- Read/write SAM card which is compliant to ISO7816;
- Firmware online update through USB (supplier IAP tool provided);
- Contactless card interface, antenna and main board separated design;
- EMC、QPBOC certified；

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Technical specification：

Product mode	CRT-603-CZ7-B
Frequency	13.56 MHz
Voltage	DC 5.0V (USB supply power)
Current	Idle current 200mA，work current 220mA， Peak current 250mA
Work distance	>40CM
interface	USB2.0 full speed device； (PC/SC CCID driver)
LED indication	red、green、blue、orange; auto\manual control
buzzer	auto\manual control
Support RFID card type	Mifare Classic 1K(S50) Mifare Classic 4K(S70) Mifare Ultraligth; Type A Type B Felica TOPAZ Support P2P between NFC smart phones with android system Support second generation ID card
SAM operation	2 PSAM, select one of them to work, support ISO/IEC 7816 SAM card
Support operation system	Windows XP、Windows 7、Windows 8
Work condition	-10℃ ~ 60℃, 0 ~ 95 % RH (no condense)；humidity 5 to 95% RH (no condense) Ta <= 60℃；
Storage condition	-40℃ ~ 70℃, 0 ~ 95 % RH (no condense)；humidity 5 to 95% RH (no condense) Ta <= 70℃；

1.3 interface explanation

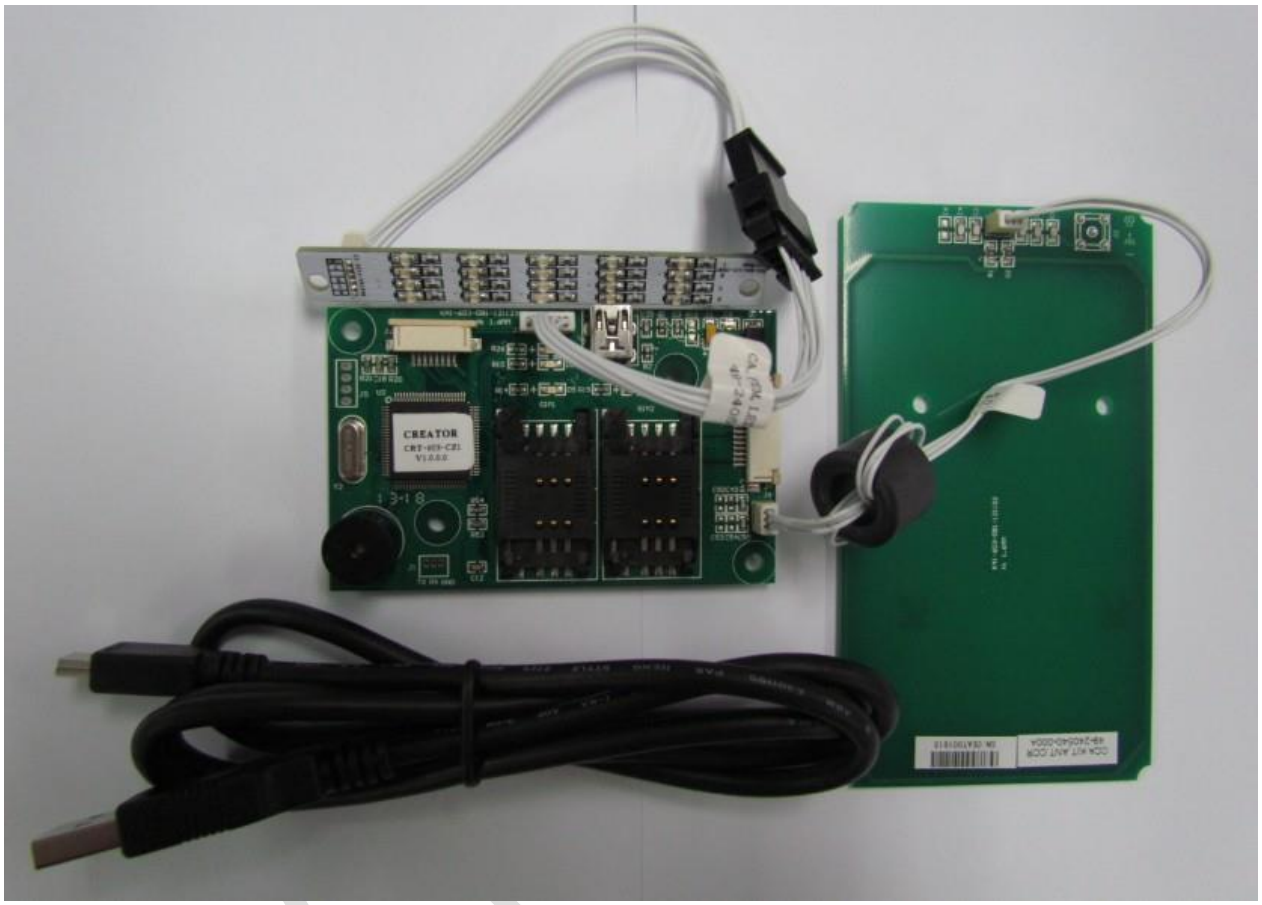
Card reader is connected to the host with a mini USB cable, PIN definition is as following:

PIN	Signal	function
1	VBUS	+5V power supply for module
2	D-	Differential negative signal line
3	D+	Differential positive signal line
4	ID	Interface identification signal, the A type interface is directly connected to the ground, and the B interface is not connected.
5	GND	ground

Reader is ok to use 6PIN interface to connect HOST.

Chapter 2 Product outline

2.1 Product component



(Photos are for reference only, the size can be customized.)

The reader has 3 main components:

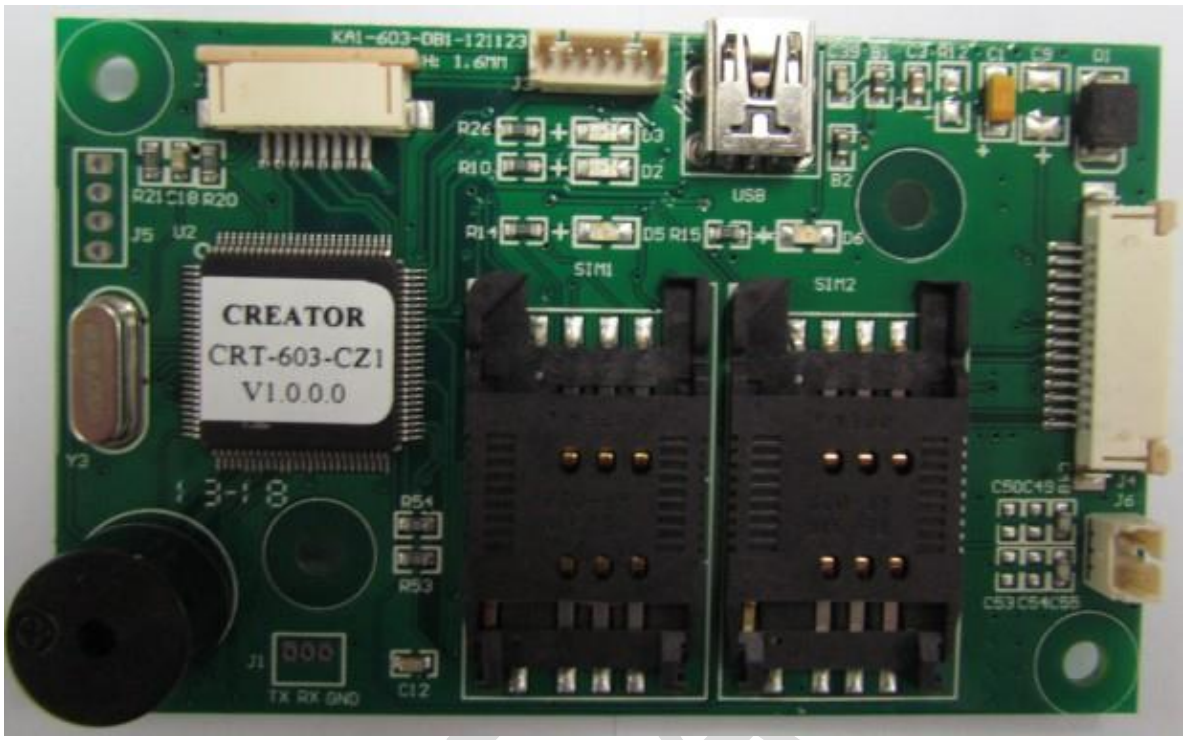
① Main board: including 2 SAM card slots and 1 USB interface, onboard power indicator, USB connection indicator, buzzer

② Antenna board: connected to main board with a 3 pins cable

③ LED board: Red, Green, Blue and Yellow LED lights, the LED board is connected to main board with a 6 pins cable

2.2 Explanation of each component

Main board



Antenna board

LED board

Note: Contactless card interface and SAM card interface are independent with each other. Reader supports operation in parallel.

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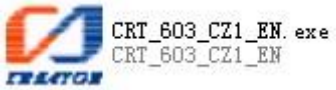
Chapter 3 Operation instruction

3.1 Connection

Set connection with each component by using specified cable, USB to PC, Power LED light on main board and buzzer 'beep', then reader is in work status.

3.2 Run DEMO program



3.3 Driver installation and demo description

It may be required to install driver for first-time usage of the reader. Driver installation instruction can be found in the 'DRIVER' folder in reader's SDK. Please disconnect and connect the read with computer after driver installation is completed.

Click 'Registered CCID' and disconnect and then connect the reader's USB with computer.

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3.4 Contactless Card interface function：

3.4.1 Read RF card

3.4.1.1 The default status is RF mode after power on. It's enable to switch to RF reading status by extended command.

3.4.1.2 RF reader can operate contactless card, auto-detect the card in reader field.

3.4.1.3 when connect the reader, LED lamp and buzzer will act according to the activated card status. (enable to close the buzzer by related command)

If there is no card: green LED light.

If there is a card: yellow LED light, buzzer beep.（the card is activated, the connection is established）

If there are multi cards: red led light.（no card will be activated, conflict）

The card move out after connection: green LED light

Disconnect the reader when the reader is in normal condition, green LED light automatically.

3.4.1.4 When more than one card enter detection area at the same time, cards will conflict with each other, the result caused by conflict is as following:

Card existence	Detection result	ATR reported
One TYPE A card	Detect one TYPE A card and activate the card	TYPE A card ATR
More than one TYPE A card	Detect more than one TYPE A card, not able to activate any card	Special ATR (indicate card conflict)
One TYPE B card	Detect one TYPE B card and activate the card	TYPE B card ATR
More than one TYPE B card	Detect more than one TYPE Bcard, not able to activate any card	Special ATR (indicate card conflict)
One TYPE A and one TYPE B card	Detect more than one card, not able to activate any card	Special ATR (indicate card conflict)
More than one TYPE A and more than one TYPE B card	Detect more than one card, not able to activate any card	Special ATR (indicate card conflict)

3.4.1.4 after the card is activated, always keep such status, no other cards will come to influence it.

3.4.1.5 after activation, operate the card by APDU commands.

3.4.1.5 Contactless card reader also provides buzzer operation, LED operation, card reader restart, get firmware version and jump to IAP mode functions. User can use these functions by extended capabilities command and APDU commands defined by supplier.

3.4.2 Read TOPAZ card

3.4.2.1 switch to RF reading status by extended commands.

3.4.2.2 the LED and Buzzer status are same as RF reading status when doing connection.

3.4.2.3 operate the card by APDU commands after activating.

TOPAZ is operated as memory card, the operation method refer to the read/write commands of contactless memory card.

3.4.3 Read Felica function

3.4.3.1 switch to Felica reading status by extended commands.

3.4.3.2 the LED and Buzzer status are same as RF reading status when doing connection.（Felica reading status doesn't support anti-collision function）

3.4.3.3 operate the card by APDU commands after activating.
Read felica block send **01 + block number**
Write felica block send **02 + block number + 16 bytes data**

3.4.4 Read P2P function

3.4.4.1 switch to P2P status by extended commands.
3.4.4.2 the LED and Buzzer status are same as RF reading status when doing connection（doesn't support anti-collision function）
3.4.4.3 operate the card by APDU commands after activating.
3.4.4.4 provide extra express function of sending WEB to mobile phone
Send WEB, please select UIF8 at first, then write S01+ WEB address in text box
For example：S01 http://www.china-creator.com

3.4.5 Read second generation ID card

3.4.5.1 switch to the status of reading second generation ID card by extended commands.
3.4.5.2 the LED and Buzzer status are same as RF reading status when doing connection（doesn't support anti-collision function）
3.4.5.3 gain the information of ID card by special APDU commands after activating.

3.4.6 SAM card reader interface function:

3.4.6.1 User can choose one SAM slot from the 2 SAM slots to read/write SAM card.

3.4.6.2 SAM operation rule：

a) Activate the specified SAM card by use PSAM slot changing command before operate SAM card. Return code 9000 is success, 6300 is failure.
b) Connect the reader after succeed to change slot, if changing is failure, reader gets response RetCode 80100069.
c) Succeed to connect the reader by use APDU command to operate SAM card.
d) Interrupt the working SAM card (taking SAM card out), the slot will power off automatically. Continue to operate SAM card, gets error code RetCode 80100069（The smart card has been removed）. Again insert SAM card, need to re-change to this slot, connect again.

3.4.2.3 'Disconnect Reader' command' will not power off SAM card slot.

RF reader and SAM reader is individual respectively, support parallel operation. Connect reader at first before change reader every time.

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3.5 Utility

3.5.1 Reader operation process

Connect the reader, in PC device manager, it will show two devices: one is RF reader, another is SAM reader.
Use test demo, you may select operation of RF reader or SAM reader.
When operate RF reader, you may change card reading mode according to application purpose:

RF card mode：operate Mifare cards（S50、S70、UL）、Type A、Type B

Felica mode：operate Felica

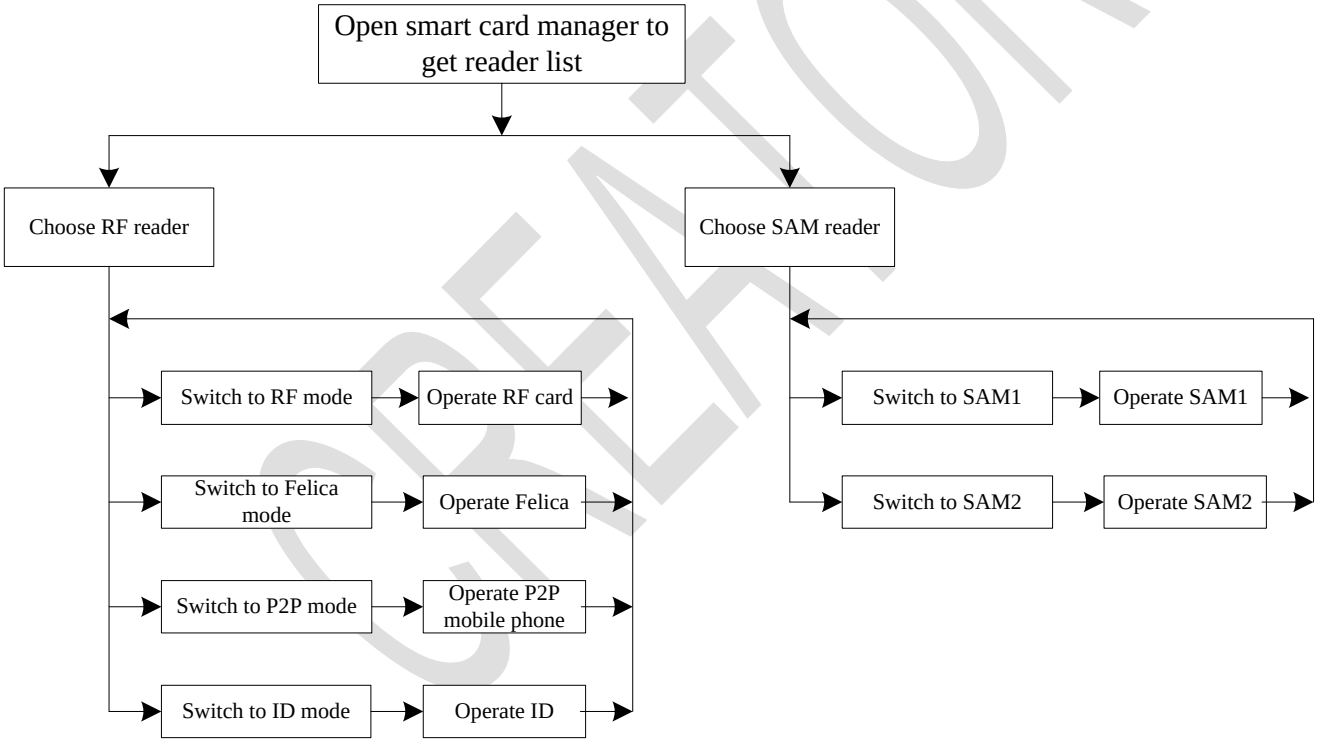
P2P mode：operate P2P device

Second generation ID card：operate second generation ID card

When operate SAM reader, you may change to any of SAM slot.

Change to SAM1 slot, the card in SAM 2 is deactivated.

Change to SAM2 slot, the card in SAM 1 is deactivated.



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3.5.2 RF Card reader operation

1. Choose RF card reader
2. Click ‘Connect Reader’ button
3. Click ‘ScardStatus’ button. Get card status to confirm whether card conflict occurs according to ATR.
4. Click ‘Begin Transaction’ button
5. Send APDU command to operate card (Forcedly send APDU when card conflict occurs, reader will return status code 6A 81)
6. Click ‘End Transaction’ button

In the dotted area, the extended command can be used. After successfully connecting the reader, the APDU command can be used to extend the instruction function.

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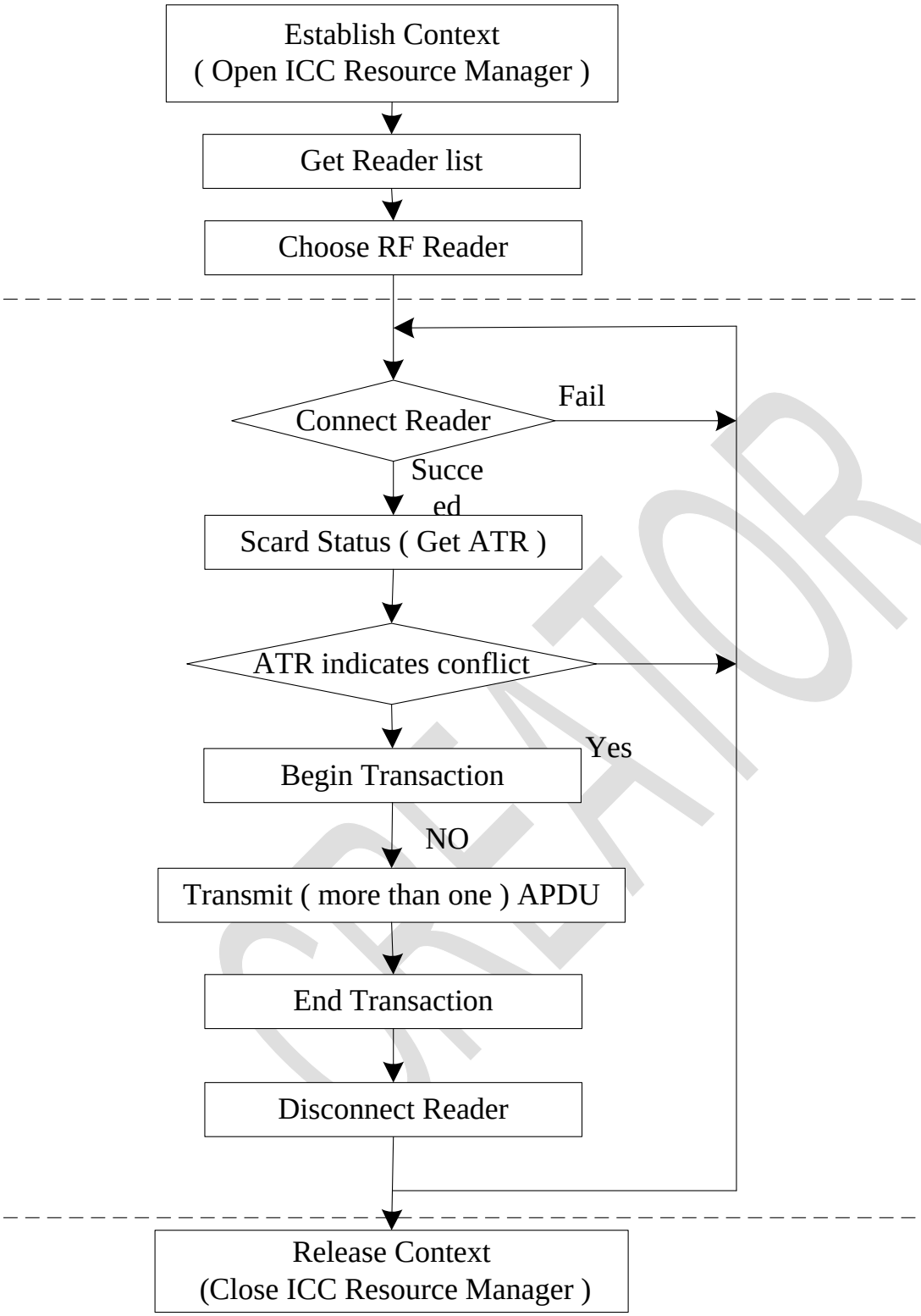

RF Reader operation flow chart

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3.5.3 SAM card reader operation

1. Choose SAM card reader
2. Click ‘Check SAM Slot Status’ button - check which SAM card slot has a SAM card already inserted
3. Click ‘Chang Card Slot’ button - choose card slot
   (Return ‘9000’ indicates card activation is successful; Return ‘6300’ indicates failure.)
4. Click ‘Connect Reader’ button
5. Click ‘Begin Transaction’ button
6. Send APDU command
7. Click ‘End Transaction’ button

In dotted area, the extended commands can be used.

If ‘Change Card Slot’ command is not implemented or this command fails, reader will return error code ‘80100069’ upon ‘Connect Reader’ command is sent. (The smart card has been removed).

If a SAM card being operated is removed, SAM card slot will be powered off automatically and reader will return error code ‘80100069’（The smart card has been removed）if any command is sent.

To operate a SAM card this is inserted to this card slot again, it is required to send ‘Change Card Slot’ command to choose this card slot first and send ‘Connect Reader’ command again.

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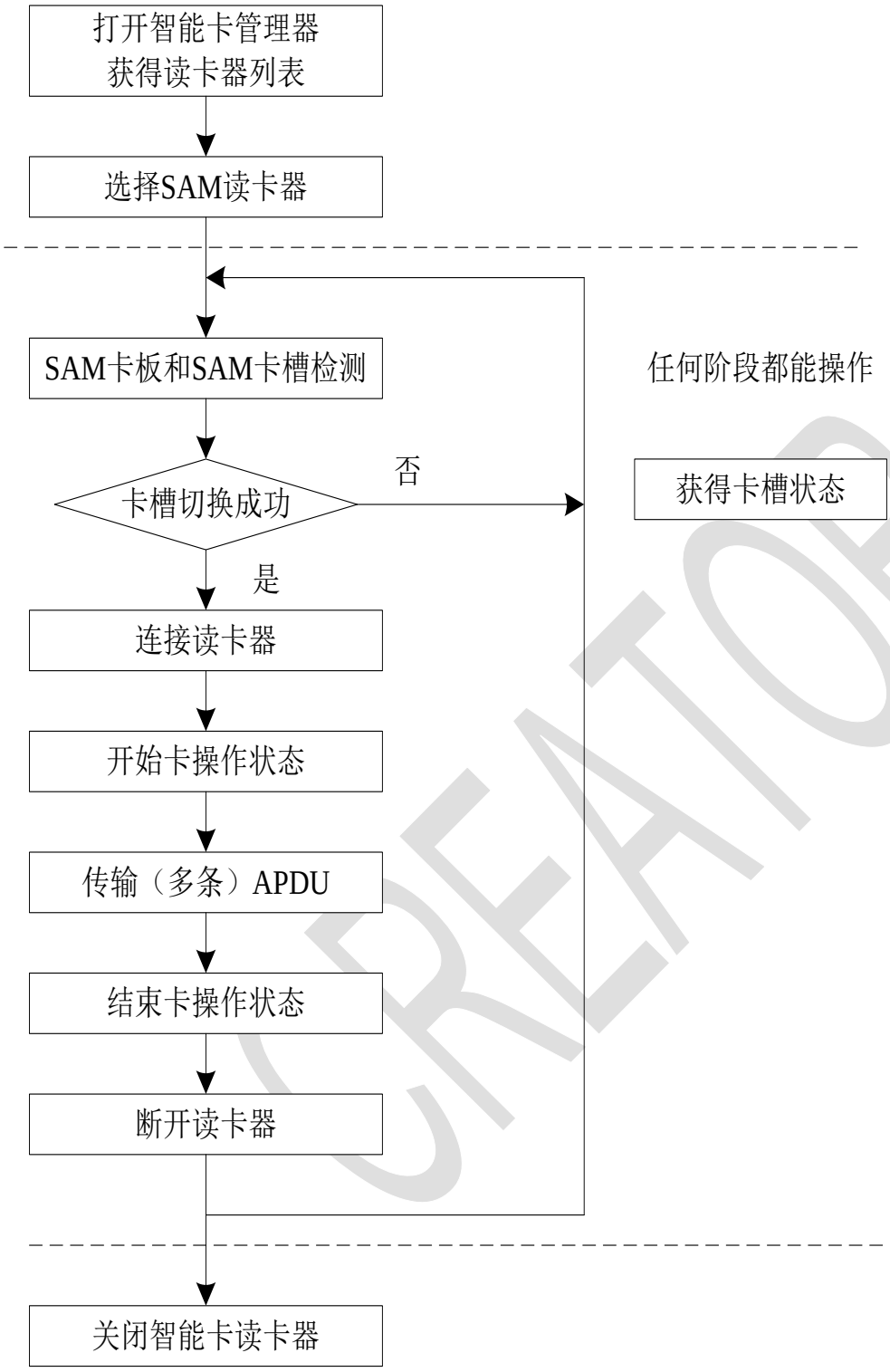

SAM读卡器操作流程

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Chapter 4 The card operation commands

Contactless CPU card APDU commands

Contactless memory card (S50 S70 card) simulation APDU commands

SAM card APDU commands

APDU is also used to control buzzer, reboot, get firmware version, switch to IAP mode. Detail is in chapter 6.

4.1 Get UID or ATS of the contactless card

Command format:

Command	Class	INS	P1	P2	Le
Get Data	0xFF	0xCA	XX	0x00	XX

P1 = 0 UID is returned.
P1 = 1 all historical bytes from the ATS of a ISO 14443 A card without CRC are returned.
Le = 0x00, this means: Return full length of the data (e.g. for ISO14443A single 4 bytes, double 7 bytes, triple 10 bytes, for ISO14443B 4 bytes PUPI, for 15693 8 bytes UID).

Return format

Data Out
Data + SW1 SW2

Example:

A. Get UID APDU:

Command:

Command	Class	INS	P1	P2	Le
Get Data	FF	CA	00	00	00

Return:

Response	Data Out				
Result	UID (LSB)	……	UID (MSB)	SW1	SW2

B. Get ATS APDU:

Command:

Command	Class	INS	P1	P2	Le
Get Data	FF	CA	01	00	00

Return:

Response	Data Out		
Result	ATS	SW1	SW2

ATS without CRC

SW1 SW2 STATUS CODE:

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
	62	82	End of data reached before Le bytes (Le is greater than data length).
Fail	67	00	Wrong length
	68	00	Class byte is not correct

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	6A	81	Function not supported.
	6B	00	Wrong parameter P1-P2
	6C	XX	Wrong length (wrong number Le; 'XX' encodes the exact number) if Le is less than the available UID length)

4.1.1 ATR format of Contactless Card

4.1.1.1 ATR format of TYPE A and TYPE B

Detail is in PCSC protocol the third chapter 3.1.3.2.3 ATR section

Byte	Value	Designation	Description
0	3B	Initial Header	
1	8n	T0	Higher nibble 8 means no TA1, TB1, TC1 only TD1 is following. Lower nibble n is the number of historical bytes (HistByte 0 to HistByte n-1)
2	80	TD1	Higher nibble 8 means no TA2, TB2, TC2 only TD2 is following. Lower nibble 0 means T = 0
3	01	TD2	Higher nibble 0 means no TA3, TB3, TC3, TD3 following Lower nibble 1 means T = 1
4 to 3+n	XX XX XX	T1 … .. Tk	Historical bytes: ISO14443A: The historical bytes from ATS response. Refer to the ISO14443-4 specification. ISO14443B: Byte1-4---- Application Data from ATQB Byte5-7---- Protocol Info Byte from ATQB Byte 8 ----Higher nibble = MBLI from ATTRIB command Lower nibble (RFU) = 0
4+n	XX	TCK	Exclusive-OR of bytes T0 to Tk

example：A TYPE A card ATR: 3B 8F 80 01 78 80 90 02 20 90 00 3F 38 70 04 B6 49 70 67 4F。

A TYPE B card ATR: 3B 8C 80 01 50 20 02 22 52 55 55 55 55 00 81 C1 4F。

Note: When ISO14443A historical bytes T1-Tk greater than 15 bytes, the reader only reported to the last 15 historical bytes of data

4.1.1.2 ATR of Contactless Memory Card

Detail is in PCSC protocol the third chapter 3.1.3.2.3 ATR section

Byte	Value	Designation	Description
0	3B	Initial	
1	8n	T0	Higher nibble 8 means: no TA1, TB1, TC1 only TD1 is following. Lower nibble n is the number of historical bytes (HistByte 0 to HistByte n-1)
2	80	TD1	Higher nibble 8 means: no TA2, TB2, TC2 only TD2 is following. Lower nibble 0 means T = 0
3	01	TD2	Higher nibble 0 means no TA3, TB3, TC3, TD3 following. Lower nibble 1 means T = 1
4 To 3+N	80	T1	Category indicator byte, 80 means A status indicator may be present in an optional COMPACT-TLV data object
	4F	Tk	Application identifier Presence Indicator
	0C		Length
	RID		Registered Application Provider Identifier (RID) # A0 00 00 03 06
	SS		Byte for standard
	C0..C1		Bytes for card name
	00 00 00 00	RFU	RFU # 00 00 00 00
4+N	UU	TCK	Exclusive-oring of all the bytes T0 to Tk

C0 C1 is 0001 suggest the card is S50 card, 00 02 suggest S70 card,

For example:

S50 card ATR: 3B 8F 80 01 80 4F 0C A0 00 00 03 06 03 00 01 00 00 00 00 6A

S70 card ATR: 3B 8F 80 01 80 4F 0C A0 00 00 03 06 03 00 02 00 00 00 00 69

Note: The naming method for other types of cards can be found in supplementary file in PC/SC section 3.

When RF card conflicts with each other, returned ATR:
3B 8F 80 01 80 4F 0C A0 00 00 03 06 03 00 01 E0 00 00 01 8B

4.1.1.3 Felica card ATR format

3B 8F 80 01 80 4F 0C A0 00 00 03 06 11 00 3B 00 00 00 00 42

4.1.1.4 TOPAZ card ATR format

3B 8F 80 01 80 4F 0C A0 00 00 03 06 11 00 30 00 00 00 00 49

4.1.1.5 The Second generation ID card ATR format

The second generation ID card ATR is similar as ATR of TYPEB card.

4.1.1.6 SAM card ATR format

SAM card ATR is the original data for SAM card activated.

4.2 Memory Card Functionality Support

Contactless memory card use simulation APDU commands to operate, ATR is the same way.

4.2.1 Load Key (Password)

The 'Load key' command will just load (write) the keys(Mifare key) in the IFD designated memory. 32 groups password can be saved into the IFD volatile memory and 1 group password can be saved into the IFD non-volatile memory

Command format:

Command	**Class**	**INS**	**P1**	**P2**	**Lc**	**Data In**
Load Keys	0xFF	0x82	Key Structure	Key number	Key Length	Key

Response format:

Data Out
SW1 SW2

1. P1 format:

Bit	**Value**	Description
7	**0**	**0**: Card Key; **1** Reader Key
6	**0**	**0**: Plain Transmission, **1**: Secured Transmission
5	1	**1**: Keys are loaded into the IFD non-volatile memory.
4		0:Key type is KEY_A1:Key type is KEY_B ，（for non-volatile memory.）
0~3	0000	If **b6** is **set**, it is the Reader Key number that has been used for the encryption, else it is ignored by the IFD. The maximum of 16-reader keys is possible. Typically an IFD uses two reader keys only.

2. P2 format

indicating Key number, range: 0x00~0x1F

when bit5 of P1 is 1, the password will be saved into the IFD volatile memory. P2 indicates password group No, the value is 0~0x1FH.

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	82	Card key not supported
		83	Reader key not supported
		85	Secured transmission not supported
		88	Key type not known
		89	Key length is not correct

Example:

Load Key FFFFFFFFFFFF into RAM, APDU command:FF 82 00 00 06 FF FF FF FF FF FF.

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4.2.2 Authenticate Key(Password)

The application provides the number of the key used for the authentication. The specific key must be already in the reader. So Load Key (password) into RF reader before Authenticate sector Key of S50, S70

Command format：

Command	**Class**	**INS**	**P1**	**P2**	**Lc**	**Data In**	**Le**
Authenticate	0xFF	0x86	0x00	0x00	5	See table	-

Data In table

Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**
Version 0x01	0x00	Block Number	Key type	Key Nr

Response format：

Data Out
SW1 SW2

note：

1. Version: This is used in the future to differentiate different version of this command, it is 0x01
2. Block Number: The sector NO. of the specific sector that need PIN verification
3. Key type:The type of the key. for Mifare one S50/S70 ,KEY_A (0x60) or KEY_B (0x61)
4. Key Nr.: The card key number, which will be used for this authentication

SW1 SW2 STATUS CODE：

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	65	81	Memory failure, addressed by P1-P2 is does not exist
	67	00	Wrong length
	68	00	Class byte is not correct
	69	82	Security status not satisfied.
		83	Authentication cannot be done
		84	key not useable
		86	Key type not known
		88	Key number not valid
	6A	81	Function not supported.
		82	Addressed block or byte does not exist.

Example:

Use group 0 Key under type KEY A mode to Authenticate 2th section’s Key: F 86 00 00 05 01 00 02 60 00

4.2.3 Read Block Data

Command Format ：

Command	Class	INS	P1	P2	Le
Read Blocks data	FF	B0	00	Block Number	Number of Bytes to Read

Note : Le: specify that you want to return the number of bytes. When Le=00, return of all the data.

Response format：

Data Out
Data （0~16 byte）+ SW1 SW2

SW1 SW2 STATUS CODE：

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
	62	81	Part of returned data may be corrupted.
		82	End of file reached before reading expected number of bytes
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	81	Command incompatible.
		82	Security status not satisfied.
		86	Command not allowed.
	6A	81	Function not supported.
		82	End of data reached before Le bytes (Le is greater than data length).
	6B	00	Wrong parameter P1-P2
	6C	XX	Wrong length (wrong number Le; ‘XX’ is the exact number).

Example:

Read 16 bytes data of 2nd sector: FF B0 00 02 10

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4.2.4 Write block data (update block command)

Command format：

Command	Class	INS	P1	P2	Lc	Data In
Update Blocks data	FF	D6	00	Block Number	Number of Bytes to Update	Block Data 4 Bytes for MIFARE Ultralight or 16 Bytes for MIFARE 1K/4K

Response format：

Data Out
SW1 SW2

W1 SW2 STATUS CODE：

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
	62	81	Part of returned data may be corrupted.
		82	End of file reached before reading expected number of bytes
Fail	63	00	Command execution failed
	65	81	Memory failure (unsuccessful storing).
	67	00	Wrong length
	68	00	Class byte is not correct
	69	81	Command incompatible.
		82	Security status not satisfied.
		86	Command not allowed.
	6A	81	Function not supported.
	6A	82	File not found / Addressed block or byte does not exist.
	6B	00	Wrong parameter P1-P2

Example:

Write 16 byte data in 2nd sector, APDU command,

FF D6 00 02 10 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

Chapter 5 Extended Command (Extended Capabilities)

Extended Function of card reader module is controlled by that of PC/SC protocol. Please refer to 6.1.8 for 《 Interoperability Specification for ICCs and Personal Computer Systems Part 9. IFDs with Extended Capabilities》 and《 Specification for Integrated Circuit(s) Cards Interface Devices》 for the description of PC/SC extended commands.

Extended commands for RF card reader are different from those for SAM card reader, please make a difference when usage. Send unknown extended commands to card reader, it would return status code 6B 00

All extended commands use '68 92' as Information Header, command format is as follows:

Class	INS	P1	P2	Le	Data1	Data2	…
68	92	XX	XX	XX	XX	XX	XX

All extended commands can be sent by special APDU commands:
Extended command: 11 22 33 44 55, APDU is: FF 69 44 42 05 11 22 33 44 55。
FF 69 44 42 is designated value.
LEN is the length of extended command, the LEN in this APDU command is 05.
11 22 33 44 55 is the actual extended commands.

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5.1 Get Firmware Version

Get firmware version number of Reader

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Lc**
Get FIREWARE Version	68	92	00	04	00

Response format

Data Out
Data1 Data2 … + SW1 SW2

Parameter description
Data1 Data2 …firmware number，format：C603_CZ7_B_YMD. Bellow shows example of firmware version number： C603_CZ7_B_150608

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:
Get firmware version of Reader, 68 92 00 04 00

CREATOR

5.2 Contactless card reset

This command is used to reset contactless card. First close the field strength, and then re activate the RF card. (only the RF reader is valid)

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Reset Card	68	92	00	09	03	00	00	00

Respond format

Data Out
SW1 SW2

SW1 SW2 status

	SW1	**SW 2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Note：
For example, reset contactless card:68 92 02 09 03 00 00 00

CREATOR

5.3 Choose SAM Card Slot

This command is for switching SAM slot and activates any of the cards among the 2 of the SAM slots. Return code refers to the activating results.

Command format:

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Change slot	68	92	01	00	03	Slot number	00	00

Response format:

Data Out
SW1 SW2

Parameter Description
Slot number:

Value	**Description**
01	Switch to SAM1 slot
02	Switch to SAM2 slot

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Card activation successful
Fail	63	00	Card activation failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:
Choose SAM Card Slot, 68 92 01 00 03 01 00 00

CREATOR

5.4 RF mode switch

The instruction is used to switch the work mode of the RF card reader, selectable of RF mode, Felica mode, P2P mode.
Default is RF mode after power on machine.（only RF reader valid）

Mode	Function
RF mode	Read Mifare, TYPEA, TYPEB
Felica mode	Read Felica
P2P mode	Send label information, web information to mobile phone

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Change mode	68	92	01	01	03	RFreader_mode	00	00

Response format

Data Out
SW1 SW2

Parameter explanation
RF reader_mode format

Value	**Description**
01	Switch to RF mode
02	Switch to Felica mode
03	Switch to P2P mode

SW1 SW2 status

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

note：
for example：switch to P2P mode，68 92 01 01 03 03 00 00

CREATOR

5.5 Get RF mode

This command is used for RF mode inquiring（only RF reader valid）

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Lc**
Get Led Status	68	92	01	11	01

Response format

Data Out
Data1 + SW1 SW2

Response data explanation

Data1 refer to RF reader_mode

SW1 SW2 status

	SW 1	**SW 2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

note:
for example：get present RF mode：68 92 01 11 01

CREATOR

5.6 LED Control

The LED control rules are as follows:

LED indicator status (Note: Reader can only handle ISO14443 TYPE A card conflict. Detection TYPE A card is given priority.)

1. When reader is standby: Green LED is on.

2. After Connect Reader command is sent:
A single card is activated, yellow LED is on. If buzzer has been enabled, user can start operate card after buzzer gives a short beep.
If more than one card presented when reader is in standby status, red LED is on. If buzzer has been enabled, buzzer will gives a long beep. Reader will return 6A 81 error code with any further command operation.

3. When operating card:
Yellow LED will be on when operating single card and its status will not changed by new cards which are presented in the detection area
When a activation card which is being operating is removed, green LED is on. Reader returns to standby status.
When card conflict occurs, red LED is on. Red LED will be close and green LED is on when surplus cards are removed or all cards are removed. Reader returns to standby status

4. When send Disconnect Reader command:
After deactivation card operation is completed, green LED is on. Card reader returns to standby status.
Send Disconnect Reader command, red LED will be on when more than one card collision occurs, red LED will be off and green LED is on when surplus cards are removed or all cards are removed. Reader returns to standby status.

When card conflict occurs，return ATR:
3B 8F 80 01 80 4F 0C A0 00 00 03 06 03 00 01 E0 00 00 01 8B

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5.6.1 Set LED Working Mode

Set LED current working mode to CCR automation mode or HOST control mode.

Command format:

Command	Class	INS	P1	P2	Le	Data1	Data2	Data3
Set Led Mode	68	92	02	00	03	mode	00	00

Parameter Description
Data = 0 CCR automation mode.
Data = 1 HOST control mode.

Return format:

Data Out
SW1 SW2

SW1 SW2 STATUS CODE:

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Note:

When LED is working in CCR Controls mode control, LED control rules are in accordance with Section 5.2
When LED is working in HOSt control mode, HOST controls LED on/off.
The current working mode status value is stored in non-volatile memory; it is still effective after restart

Example:
Set to HOST control mode, 68 92 02 00 03 01 00 00

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5.6.2 Get LED Working Mode

Get LED of reader Current working mode

Command format:

Command	**Class**	**INS**	**P1**	**P2**	**Lc**
Get Led Mode	68	92	02	01	01

Return format:

Data Out
Data SW1 SW2

Return data description:

Data = 0 CCR automation mode.
Data = 1 HOST control mode.

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:
Get LED of reader Current working mode: 68 92 02 01 01

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5.6.3 HOST Set LED Status

HOST controls the LED on/off/flash when LED is only working in HOST control mode.

Command format:

Command	Class	INS	P1	P2	Le	Data1	Data2	Data3
Set Led Status	68	92	02	02	03	Control	Circle1	Circle2

Return format:

Data Out
SW1 SW2

Parameter Description

Control:

Bit	Description
7	0:Yellow light not flash 1:Yellow light flash
6	0:Blue light not flash 1: Blue light flash
5	0:Green light not flash 1: Green light flash
4	0:Red light not flash 1: Red light flash
3	0:Yellow light off 1:Yellow light on
2	0: Blue light off 1: Blue light on
1	0: Green light off 1: Green light on
0	0: Red light off 1: Red light on

Bit 0 to Bit 7 means one byte, highest is Bit7 and lowest is Bit 0 (Hereinafter the same).

Circle1:

Bit	Description
7-4	Yellow light flash cycle
3-0	Blue light flash cycle

Circle2:

Bit	Description
7-4	Green light flash cycle
3-0	Read light flash cycle

Flash cycle:

value	Description
0x0	Remain
0x1	0.25 Second
0x2	0.5 Second
0x3	0.75 Second
0x4	1 Second
0x5	1.25 Second
0x6	1.5 Second

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0x7	1.75 Second
0x8	2 Second
0x9	2.25 Second
0xA	2.5 Second
0xB	2.75 Second
0xC	3 Second
0xD	3.5 Second
0xE	4 Second
0xF	5 Second

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Note:

1. Only in Host Controls mode, when the LED Lighting state bit and the LED flash bit state bit of are effective，flashing cycle is effective. Otherwise the blinking cycle is ignored.
2. When CCR automation mode,run this command will return status code 6300.
3. The current LED on/off/flash status value is stored in non-volatile memory, it is still effective after restart

Example:

Red light flash with 0.25second cycle: 68 92 02 02 03 11 00 01

CREATOR

5.6.4 Get LED status

Inquire the status of each of the LED

Command format:

Command	Class	INS	P1	P2	Lc
Get Led status	68	92	02	03	03

Return format:

Data Out
control circle1 circle2 + SW1 SW2

Return data description

Control, circle1, circle2, please refer to section 2.2.6

SW1 SW2 STATUS CODE:

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:

Get LED status: 68 92 02 03 03

CREATOR

5.7 Enable/Disable Buzzer Beep

Enable/disable buzzer beep, and then settings are stored into non-volatile memory

Command format:

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Beep Enable/Disable	68	92	03	00	03	mode	00	00

Return format:

Data Out
SW1 SW2

Parameter Description

Mode = 0 means disable buzzer, and buzzer will not beep when card is activated with connecting reader after disable buzzer.

Mode = 1 means enable buzzer, and buzzer will beep automatically when card is activated with connecting reader after enable buzzer.
Buzzer beeps shortly for single card activation, and longer for multi cards collision.

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:
Enable buzzer, 68 92 03 00 03 01 00 00

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5.8 Control Buzzer Beep

Dynamic control buzzer beeps.

Command format:

Command	Class	INS	P1	P2	Le	Data1	Data2	Data3
Beep Control	68	92	03	01	03	Beep time	00	00

Parameter Description
Beep Time: one unit is 100ms,

Return format:

Data Out
SW1 SW2

SW1 SW2 STATUS CODE:

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Example:
Buzzer beeps for a second, 68 92 03 01 03 0A 00 00

CREATOR

5.9 Switch on/off RF field

This command is used for RF field on / off. Default is on after power on. （only RF reader valid）

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Beep Control	68	92	10	00	03	RFField	00	00

Response format

Data Out
SW1 SW2

Parameter explanation
RF Field format

value	**Description**
0	Switch on RF field
1	Switch off RF field

SW1 SW2 status code

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

For example：switch off RF field，68 92 10 00 03 01 00 00

CREATOR

5.10 Inquire RF Field Status

This command is used for RF field status inquiring.（only RF reader valid）

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Lc**
Get Led Status	68	92	10	04	01

Response command

Data Out
Data1 + SW1 SW2

Response data explanation

Data1 refer to 'switch on/off' RF Field definition

SW1 SW2 status code

	SW 1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

note:
for example：get RF field status：68 92 10 04 01

CREATOR

5.11 Set TYPEB function

This command is used to control if ban to read Type B card. Save when deactivate.（only RF reader valid）

Command format

Command	Class	INS	P1	P2	Le	Data1	Data2	Data3
Beep Control	68	92	10	02	03	TYPEBactive	00	00

Response command

Data Out
SW1 SW2

Parameter explanation
TYPEB active format

value	Description
0	Allow to activate TYPEB
1	Ban to activate TYPEB

SW1 SW2 status code

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

For example：ban to activate TYPEB reading function，68 92 10 02 03 01 00 00

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5.12 Inquire TYPEB Reading Function

This command is used for if ban to read TYPEB card.（only RF reader valid）

Command format

Command	**Class**	**INS**	**P1**	**P2**	**Lc**
Get Led Status	68	92	10	03	01

Response format

Data Out
Data1 + SW1 SW2

Response data explanation

Data1 refer to 'set TYPEB function' TYPEB active definition

SW1 SW2 status code

	SW1	**SW 2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

note:
for example：get if ban to read TYPEB card： 68 92 10 03 01

CREATOR

5.13 Restart Reader

Restart the module by this command（only for contactless reader）

Command format:

Command	Class	INS	P1	P2	Le	Data1	Data2	Data3
Restart Reader	68	92	80	FF	03	4B	30	00

Return format

Data Out
SW1 SW2

SW1 SW2 STATUS CODE:

	SW1	SW2	Meaning
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Note:
After data return, module will restart automatically. Restart success after noises alarm.

Example: Restart Reader, 68 92 80 FF 03 4B 30 00

The corresponding command used of APDU channel transmission as follows

Command	Class	INS	P1	P2	Le	Data
Restart Reader	FF	69	44	42	8	68 92 80 FF 03 4B 30 00

Return format as above

Data Out
SW1 SW2

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5.14 IAP download

Enter IAP Mode by this command（only for contactless reader）

Command format:

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data1**	**Data2**	**Data3**
Enter IAP Mode	68	92	80	FF	03	4B	31	00

Return format

Data Out
SW1 SW2

SW1 SW2 STATUS CODE:

	SW1	**SW2**	**Meaning**
Success	90	00	Command execution successfully
Fail	63	00	Command execution failed
	67	00	Wrong length
	68	00	Class byte is not correct
	69	00	Wrong data parameter
	6A	81	Function not supported
	6B	00	Wrong parameter P1-P2

Note:
This command is executed, the reader will automatically restart. And then enter IAP Download process.

Example: Enter IAP mode, 68 92 80 FF 03 4B 31 00

The corresponding command used of APDU channel transmission as follows

Command	**Class**	**INS**	**P1**	**P2**	**Le**	**Data**
Enter IAP Mode	FF	69	44	42	8	68 92 80 FF 03 4B 31 00

Return format as above

Data Out
SW1 SW2

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