LS68 series card reader manual V4 .4

1. Introduction:

The LS68 series card reader contains three parts: high frequency(13.56 MHz), low frequency(125KHz), and ultra-high frequency(915MHz). The high-frequency reading card section supports ISO14443A, ISO1443B and ISO15693 protocols. Support non-contact Mifare one S50, Mifare one S70 card, FM1208 CPU card supporting ISO14443A protocol standard, SRI512 card supporting ISO14443B protocol standard and ISO15693 protocol standard ICODE2 card. The low-frequency reading card partially supports read-only cards EM4100, EM4005, and EM4200. In addition to the above common cards, this card reader can also read and write other cards that are fully compliant with the ISO14443A / B protocol. The UHF reader card partially supports the ISO18000-6C / EPC Class -1 Generation-2 protocol and can read and write HIGS-3 UHF cards.

2. Application:

Widely used in consumption, computer rooms, Internet cafes, libraries, member management, access control, a card system.

3. Features:

Compatibility with international standards: ISO14443A, ISO1443B, ISO15693
Support cards: Mifare One Ultralight, S50, S70, MifareProX, DESFire, FM1208; SRI512; ICODE2; EM4100, EM4102, EM4005, EM4105, EM4200, EM4205, EM4305 and All Compatible Cards

Operating frequency: HF 13.56 MHz; Low frequency 125KHz; UHF 915MHz
communication interface: USB, UART, RS232, RS485
Power supply: 5V
Operating distance: 20-100mm
Operating temperature: -10° C ~ +85 ° C
Storage temperature: -20° C ~+85 ° C

4. Select Table

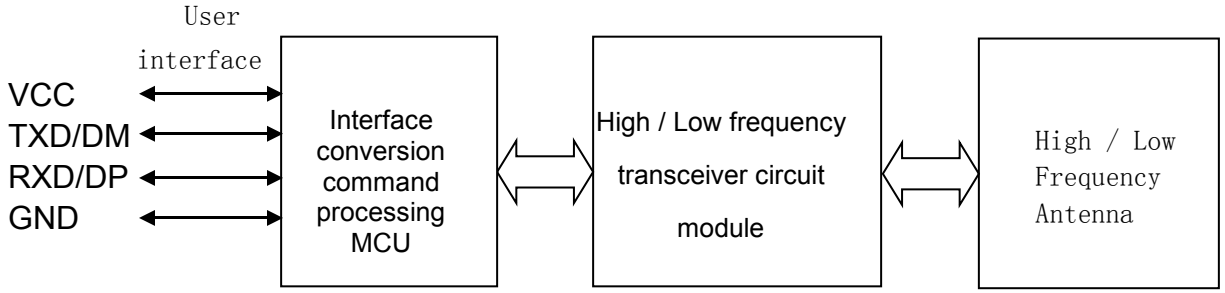
Select Table:

Product Model	Antenna characteristics(HF protocol)	Product Size	remarks
LS6821X	125KHZ	105*70*12 (mm)	The meaning of model X is as follows: A stands for communication interface USB-HID B stands for communication interface USB-CDC C stands for communication interface UART D stands for communication interface RS232 E stands for communication interface RS485 High-frequency related protocols: 13.56 MHZ(A) stands for high frequency ISO14443A; 13.56 MHz(C) represents high-frequency ISO15693; 13.56 MHZ(AB) stands for high frequency ISO14443A And ISO1443B; 13.56 MHZ(ABC) stands for high frequency ISO14443A, ISO1443B and ISO15693; With regard to modules: The module adds an M character after the product suffix X. Such as: LS6826DM. Note that the card reader for the USB-HID interface is not supported Write Card Function
LS6822X	13.56MHZ (A)	105*70*12 (mm)	
LS6824X	13.56MHZ (AB)	105*70*12 (mm)	
LS6826X	13.56MHZ (ABC)	105*70*12 (mm)	
LS6828X	915MHZ	105*70*12 (mm)	
LS6823X	125KHZ+13.56MHZ (A)	105*70*12 (mm)	
LS6825X	125KHZ+13.56MHZ (AB)	105*70*12 (mm)	
LS6827X	125KHZ+13.56MHZ (ABC)	105*70*12 (mm)	
LS682AX	915MHZ+13.56MHZ (A)	105*70*12 (mm)	
LS682CX	915MHZ+13.56MHZ (AB)	105*70*12 (mm)	
LS682EX	915MHZ+13.56MHZ (ABC)	105*70*12 (mm)	
LS682BX	125KHZ+915MHZ+13.56MHZ (A)	105*70*12 (mm)	
LS682DX	125KHZ+915MHZ+13.56MHZ (AB)	105*70*12 (mm)	
LS682FX	125KHZ+915MHZ+13.56MHZ (ABC)	105*70*12 (mm)	
LS6820X	915MHZ+13.56MHZ (C)	105*70*12 (mm)	
LS6829X	13.56MHZ (C)	105*70*12 (mm)	

New and old models comparison table:

Old models of products	New Product Model	Antenna characteristics
LS6828A	LS6821A	125KHZ
LS6828B	LS6821B	125KHZ
LS6828C	LS6822A	13.56MHZ (A)
LS6828D	LS6822B	13.56MHZ (A)
LS6828E	LS6825A	125KHZ+13.56MHZ (AB)
LS6828F	LS6825B	125KHZ+13.56MHZ (AB)
LS6898A	LS6821C	125KHZ
LS6898B	LS6821D	125KHZ
LS6898C	LS6821E	125KHZ
LS6898D	LS6822C	13.56MHZ (A)
LS6898E	LS6822D	13.56MHZ (A)
LS6898F	LS6822E	13.56MHZ (A)
LS6898H	LS6823C	125KHZ+13.56MHZ (A)
LS6898J	LS6823D	125KHZ+13.56MHZ (A)
LS6898K	LS6823E	125KHZ+13.56MHZ (A)

5. System diagram:



6. Interface communication protocol

6.1 Serial bottom format

The serial port communication data string contains the starting bit, the data bit, and the stop bit. The baud rate is the common baud rate. As shown in the following table:

Argument number	describe
Porter rate	2400, 4800, 9600, 19200, 38400, 57600, 115200bit/s
Data bit	8 bits
Start bit	1 bit
Stop Bit	1 bit
Check bit	None

The default settings for serial ports are as follows:

Porter rate	Data bit	Start bit	Stop Bit	Check bit
57600bit/s	8bit	1bit	1bit	None

6.2 Order Format

a. Serial port data transmission(host computer-& GT; Card reader):

Command Head	Keep Words	Address Word	Length word	Command Word	Command Parameters	Verify Words
2	1	1	2	2	N	1

Command Header: Two bytes, fixed to 55 55
Keep word: one byte, fixed at 00
Address Word: One byte, default is 00
Length word: two bytes, large format, calculated from the command word until the last byte command word: two bytes
Command parameter: N bytes, N greater than or equal to 0
Verify word: one byte, all data word by word node or value

b. Serial port data reception(card reader -- & GT; Upper computer):

Command Head	Keep Words	Address Word	Length word	Standard literacy	Data returned	Verify Words
2	1	1	2	1	N	1

Command Header: Two bytes fixed to 55 55
Keep word: one byte, fixed at 00
Address Word: One byte, default is 00
Length word: two bytes, large end format, calculated from the standard, until the last byte can be labeled: one byte, command execution is 00, others are error codes
Data returned: N bytes, N greater than or equal to 0
Verify word: one byte, all data word by word node or value

Note: Identification fields represent only the result of the execution of the link layer. If there is an application data exchange, the result of the application data execution is attached to the end of Return Data. For example, the execution of the COS instruction ultimately depends on the command return value in the Return Data field.

7. Operation Introduction

7.1 Introduction to Operations

After the card reader is turned on, the LED appears as a red Changliang. When the internal initialization is complete, the buzzer rings once,

The LED presents a green flash(USB-HID type is Changliang), and the card reader is in an automatic card search state. When the appropriate card is close to the range of the card, the buzzer calls once, and the card information is returned to the host computer software.

The user can send the "Close Auto Search Card" command to stop the card reader from automatically scanning the card. At this point, the LED presents a green Changliang, and the user must send a suitable command to access the card. If the user sends the "Start Auto Search Card" command, the reader will start the next round of search cards, where the LED appears green(except for the USB-HID type).

Users can send appropriate commands to access the card at any time in any state. Operation cards using serial command (such as query card, conflict prevention, selection card, read block, write block, COS command), you must close the automatic search card. The default address of the reader is 0, so the DEMO software of the satellite host also defaults to access the card with a 0 address

Machine. If the card reader address is changed, enter the Parameter Configuration window and click Get Card Reader Address to match the correct address.

For card readers with different interfaces, it is necessary to open the corresponding upper computer communication software to receive or send data correctly. See the following table for details:

User Interface	Upper Computer Software
USB-HID	Any Text Editor
USB-CDC	Serial debugging software
UART	Serial debugging software
RS232	Serial debugging software
RS485	Serial debugging software

Usb-cdc supports WindowsXP, WindowsVista, windows7, windows8, Android And other common operating systems.

7.2 Automatic card search data format

"Automatic card search" is the default setting of the card reader factory: automatic card search after power, hexadecimal data output. When the reader searches for a suitable card, the data including UID is immediately returned to the host without manual intervention.

Note that the UID seen in the DEMO software monitoring window of the satellite host computer is printed through the underlying API. If the secondary developer wants to obtain the UID raw data, it needs to call the relevant function to achieve it.The "Open Auto Get UID" button in the software demonstrates the calling method.

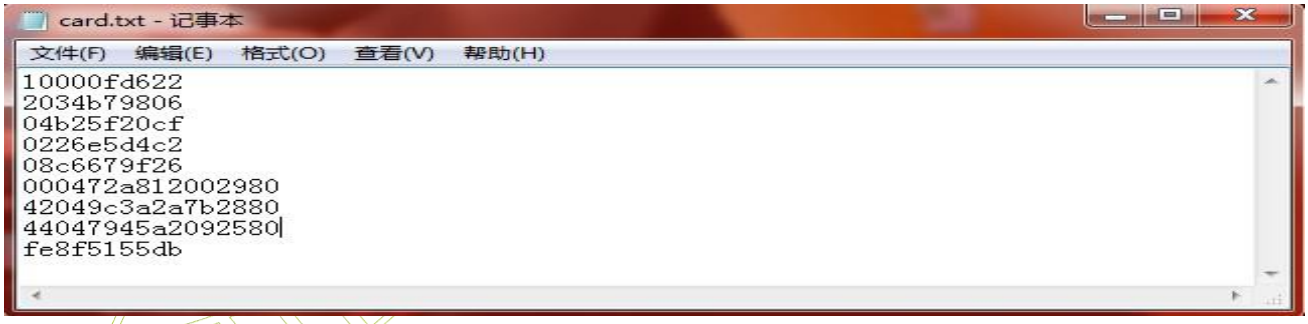
Data output format: card type code + card serial number(UID). All are hexadecimal.

Card type code: one byte. This code is a custom identifier and does not belong to the card internal encoding. Card serial number: 4 to 8 bytes, related to the card type. The serial numbers are all card internal codes.

Card Type	Type Code	Serial number of bytes	instructions
MIFARE_S50	0X04	4	Mifare S50 card
MIFARE_S70	0X02	4	Mifare S70 card
FM_1208	0X08	4	Fudan Microelectronic CPU Card
MIFARE_ULRALIGHT	0X00	7	Mifare Light Card
NTAG203	0XE0	7	NFC Type 2 Tag
NTAG213	0XE3	7	NFC Type 2 Tag
NTAG215	0XE5	7	NFC Type 2 Tag
NTAG216	0XE6	7	NFC Type 2 Tag
MIFARE_PLUS	0X42	7	Mifare PLUS Card
MIFARE_DES	0X44	7	Mifare DES CPU Card
Other ISO 14443A Protocol Cards	0XFE	4~8	Other unusual 14443A agreement cards
Identity card	0X06	8	Second generation ID card
ST_SRI512	0X12	8	ST Company ISO14443-B Protocol Card
NXP_ICODE2	0XE4	8	NXP ISO 15693 protocol card
Higgs-3	0X09	12	Ordinary UHF Card

Note that the card reader can identify the card category based on the antenna features and the known card coding features, and its judgment basis is limited. Therefore, the specific model and read-write characteristics of the card shall be finally confirmed by the user. The main purpose of the card reader is to read and write cards, not to distinguish them. The scope of type code identification is limited, only for reference and prompt.

Screenshot of USB-HID card reader:



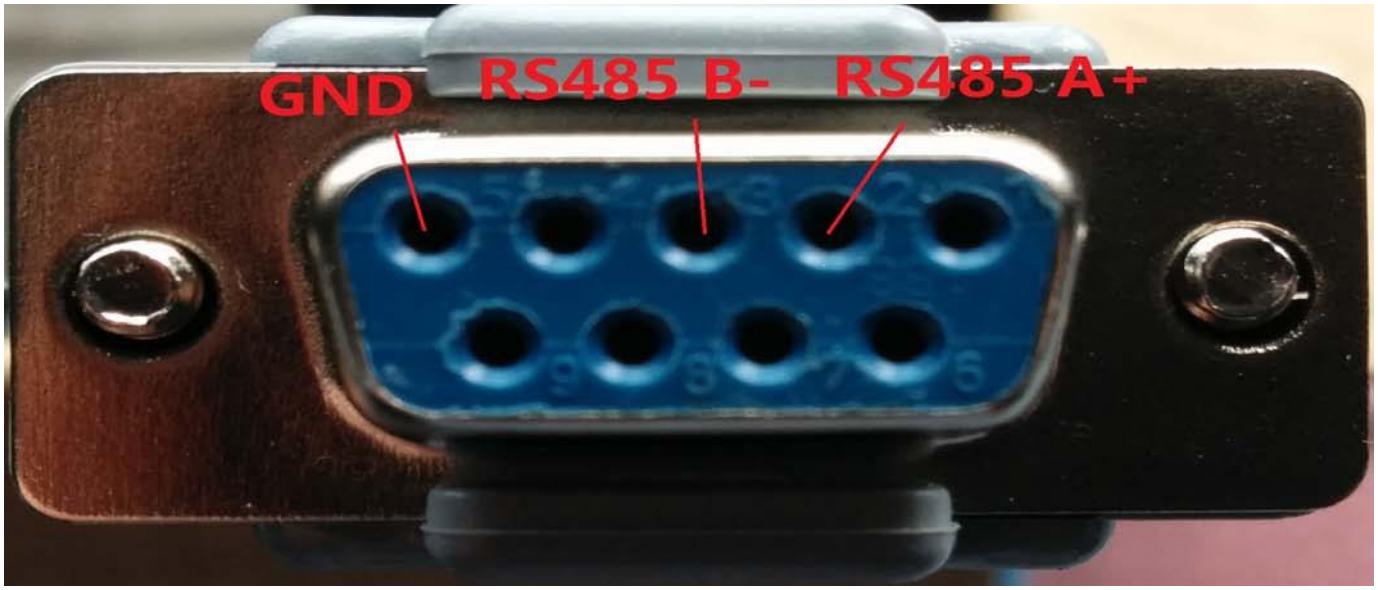
Note that the above figure is the card reading instance of USB-HID interface card reader, which can only read the card but not write it. The default setting is hexadecimal data format output. Customers who need output in decimal format should contact the manufacturer for modification, and it is only limited to the USB-HID interface card reader.

7.3 Introduction to USB Card Reader Usage

1. Connect the card reader to the PC with a USB data cable. If the USB is an HID class, the PC will automatically install the driver; If it is a CDC class, follow the prompt to install the virtual serial driver we provide. The specific installation method is shown in the appendix to this manual. WIN10, Android, and Linux systems do not need to be specifically installed.
2. For USB HID classes, open any editable document; For USB CDC classes, open serial debugging software, serial port configuration: baud rate 9600, data bit 8, stop bit 1, no check bit, hexadecimal receive and send. Unlike USB CDC, UART / RS232/RS485 has a baud rate of 57600.
3. Close the card to the reader and wait for it to read automatically or send commands through the host software. When the command is executed, the buzzer calls(the buzzer takes 50 milliseconds and the user can be configured not to call) and returns the data to the corresponding software.

7.4 Introduction to Transfer Usage of Cascaded Card Reader Interface

The LS68 series reader board connector is unified as USB _ Mini and is generally used to transmit USB signals. However, for electrical features such as UART, RS232, RS485, etc., our card readers still use USB cables to transmit their signals. At the terminal, you can choose to use the adapter to convert the USB-Mini connector into the corresponding serial connector, or connector. We offer USB turn RS232, USB turn RS485 connector(see figure below). As for UART, because there is no recognized connector and it is more common in direct connections, professional connectors are not provided, and only USB cables are used instead.



7.5 Introduction to Direct Connection Usage of Serial Type Card Reader

Experienced users can identify their own wiring based on the signal on the surface of the reader(this situation is consistent with most field applications). The interface signal of the reader is configured at the factory time, and the user only needs to connect the corresponding signal line to the corresponding connector.

For users using the RS232 interface, do the following security measures:

1. Ensure that the ground line of the card reader is connected to the ground line(foot 5) of the RS232 connector.
2. Ensure that the RS-232 connector is grounded in its metal housing.
3. Ensure that the power supply voltage is around 5V, normal conditions are 4.8 V to 5.2 V.

Electrical interface:

As shown in the figure above, the connector is unified as a USB-Mini type, but the meaning of the electrical signal is determined by the model and is not a unified USB signal. The specific distribution is as follows:

User interface	Electrical meaning for each pin of the connector(icon left to right)				
	1	2	3	4	5
USB	+5V	DM	DP	ID	GND
UART	+5V	TXD	RXD	GND	GND

Among them, TXD and RXD represent the port of the upper computer device.

8. User Command Table

function	Command Word	Description of functions
Card Reader Function Selection / Configuration		
Start Auto Search Card	01 01	After this command is started, the card reader will continuously search for the card and automatically return the UID after the card is successfully searched
Get Card Information	01 02	Read the type and serial number of the card recorded during the last automatic card search
Close Auto Search Card	01 03	When the card is close to the reader, there is no automatic return of data after closing the automatic card search
Turn on the buzzer.	01 04	Turn on the buzzer so it can ring
Shut off the buzzer.	01 05	Turn off the buzzer so it won't ring
Shut down all antennas	01 06	Close all antennas(then automatically open if there is a read and write card operation)
Read the card chip EEPROM	01 07	Read the contents of the address specified by EEPROM inside the reader chip
Write card chip EEPROM	01 08	Write data to the address specified by EEPROM, safe range: 0030-007F
Manual card search	01 09	Execute this command once, the card reader only completes the card search once, and the result is immediately returned
Configure Card Reader Port Rate	BD 01	This command is only valid for UART / RS232/RS485 user interface
		This command is used for online configuration. Parameters are lost after power is lost
Get card reader serial number	0A 01	Gets the card reader's serial number, which is a 4-byte hexadecimal number
ISO 14443A card initialization		
14443A Inquiry Card	02 01	ISO14443A card command, parameter 26 for standard request and 52 for wake up request
14443A Conflict prevention	02 02	ISO14443A card conflict prevention command(multiple cards respond to conflict at the same time)
14443A Card Selection	02 03	ISO14443A card selection command(card reader automatic selection card, user can not intervene)
14443A Composite Search Card	02 04	ISO 14443A card query card, conflict prevention, card selection completed in one step, only return the serial number
14443A card dormancy	02 05	Sleep ISO14443A cards

M1 card command(in this document, M1 card represents S50 and S70 cards) Relative addressing(default): fan area code + relative block number; Absolute addressing: Absolute block number		
M1 Key Verification	03 01	The key must be verified and the card store can be read and written only after success
M1 Reading block	03 02	Read the contents of a block address, 16 bytes per block
M1 writing block	03 03	Write data to a block address, 16 bytes per block
M1 wallet initialization	03 04	Initialize a block as a wallet function
M1 Read wallet balance	03 05	Read wallet current balance(must ensure addressed block has wallet function)
M1 wallet increase/impairment	03 06	Replenishment / consumption of wallet(must ensure addressed block has wallet function)
M1 Composite read/writing block	03 07	Complete key validation and read/write block in one step
M0 or NTAG card command		
NTAG21X key verification	04 01	Authentication is required only for writing operations on the encrypted page. Only applicable to NTAG21X.
Get chip version number	04 02	This instruction is only applicable to NTAG21X.
Reading counter	04 03	This instruction is only applicable to NTAG21X.
Read Signature	04 04	This instruction is only applicable to NTAG21X.
Page Data	04 05	This instruction applies to M0 and NTAG cards.
Page Data	04 06	This instruction applies to M0 and NTAG cards.
NTAG21X key setting	04 07	This instruction is used to encrypt the NTAG21X tag card. Non-standard instructions.
FM1208 CPU Card Command		
FMCOS activation	07 01	Bring CPU Card Status Machine into COS command state
FMCOS is out of action	07 02	Deactivate CPU Card Status Machine from COS command state
FMCOS command	07 03	Execute COS command(specific protocol requires reference to the relevant CPU card user manual)
FM External Authentication Composite Instruction	07 04	You only need to enter the key and key identification. All other processes are done by the card reader.
ISO 14443B standard protocol command		
14443B Enquiry Card	08 01	Standard ISO 14443B protocol query card command
14443B Conflict prevention	08 02	Standard ISO 14443B conflict prevention command
14443B Select Card	08 03	Standard ISO 14443B Protocol Card Selection Command
14443B Get UID	08 04	ISO1443B gets the UID command. The content of the command varies depending on the specific card.
14443B Composite Search Card	08 05	ISO1443B composite card search command, query card, conflict prevention, card selection completed in one step

14443B dormant	08 06	Standard ISO1443B protocol dormant command
14443B is out of action	08 07	ISO1443B Stop Order. The content of the order varies depending on the specific card
Find Identity Card	08 08	Obtain ID card internal serial number
ISO1443B SRI512 card command		
SRI Inquiry Card	08 0A	SRI512 dedicated query card command
SRI Conflict Prevention 0	08 0B	SRI512 dedicated conflict prevention command
SRI Conflict Prevention N	08 0C	SRI512 dedicated conflict prevention command
SRI Select Card	08 0E	SRI512 Special Card Selection Command
SRI gets UID	08 0F	SRI512 Access UID command exclusively
SRI Reading Block	08 10	SRI512 dedicated read block command
SRI Write Block	08 11	SRI512 dedicated block command
SRI reset	08 12	SRI512 dedicated reset command
SRI dormancy	08 13	SRI512 dedicated dormant command
ISO15693 ICODE2 card command		
ICODE2 List	06 01	ICODE2 List Command
ICODE2 Silence	06 02	ICODE2 Silent Command
ICODE2 card selection	06 03	ICODE2 Card Selection Command
ICODE2 reset	06 04	ICODE2 reset command
ICODE2 Reading Block	06 05	ICODE2 read block command
ICODE2 Write Block	06 06	ICODE2 Write Block Command
ICODE2 Lock Block	06 07	ICODE2 Lock Command
ICODE2 writes AFI	06 08	ICODE2 writes AFI commands
ICODE2 Lock AFI	06 09	ICODE2 Lock AFI command
ICODE2 Write DSFID	06 0A	ICODE2 Write DSID command
ICODE2 Lock DSFID	06 0B	ICODE2 lock DSFID command
ICODE2 Access to System Information	06 0C	ICODE2 Access System Information Command
ICODE2 Get a secure state	06 0D	ICODE2 gets security status information commands for multiple blocks
Low frequency card command		
Read low frequency card serial number	09 01	Read the serial number of the low frequency card, including EM4X00, EM4X05
Read low frequency card block number	09 02	Only EM4X05 can be read
UHF Card Command		
Get EPC	05 03	Get EPC, ID encoding is longer, up to 32 bytes
Reading storage area	05 04	There are four storage areas in the storage body, selected by parameters
Write Storage	05 05	There are four storage areas in the storage body, selected by parameters
Damage Label	05 06	Make the label unusable, be careful!
Lock Storage	05 07	Locks the specified storage area and can not access it until the password is verified
Pass Password	05 08	Pass access password to the locked storage area

9. Examples of orders

9.1 Equipment related orders

Start Auto Search Card	
sending	55 55 00 00 00 03 01 01 03
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7-8 bytes: 9 bytes:	Command Head: 55 55 Keep Words: 00 Address Word: 00 Length word: 00 03 Command Word: 01 01 Verify Words: 03
receive	55 55 00 00 00 02 00 02
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7 bytes: 8 bytes:	Command Head: 55 55 Keep Words: 00 Address Word: 00 Length Word: 00 02 Standard literacy: 00 for Success Verify Words: 02

Get Card Information	
sending	55 55 00 00 00 03 01 02 00
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7-8 bytes: 9 bytes:	Command Head: 55 55 Keep Words: 00 Address Word: 00 Length Word: 00 03 Command Word: 01 02 Verify Words: 00
receive	55 55 00 00 00 07 00 08 C6 67 9F 26 17
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7 bytes: 8 bytes: 9-12 bytes: 13 bytes:	Command Head: 55 55 Keep Words: 00 Address Word: 00 Length Word: 00 07 Standard literacy: 00 为成功 Card type: 04 is S50 card, 02 is S70 card, 08 is a CPU card, 06 is ID card Card serial number: C6 67 9F 26 Verify words: 17

Close Auto Search Card	
Sending	55 55 00 00 00 03 01 03 01

1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 01 03
9 bytes:	Verify words: 01
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes :	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Verify words: 02

Turn on the buzzer	
Sending	55 55 00 00 00 03 01 04 06
1-2 bytes:	COmmand Head: 55 55
3 bytes:	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 01 04
9 bytes:	Verify words: 06
receive	55 55 00 00 00 02 00 02
1-2 bytes:	COmmand Head: 55 55
3 bytes:	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Verify words: 02

Shut off the buzzer	
Sending	55 55 00 00 00 03 01 05 07
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 01 05
9 bytes:	Verify words: 07
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Words: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success

8 bytes	Verify words：02

Shut down all antennas	
Sending	55 55 00 00 00 04 01 06 00 03
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7-8 bytes: 9 bytes: 10 bytes:	Command Head：55 55 Keep Word：00 Address Word：00 Length Word：00 04 Command Word：01 06 Keep Word：00 Verify words：03
receive	55 55 00 00 00 02 00 02
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7 bytes: 8 bytes:	Command Head：55 55 Keep Word：00 Address Word：00 Length Word：00 02 Standard literacy：00 for Success Verify words：02

Read the card chip EEPROM, address range: 0000-007F	
Sending	55 55 00 00 00 06 01 07 00 30 20 10
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7-8 bytes: 9-10 bytes: 11 bytes: 12 bytes:	Command Head：55 55 Keep Word：00 Address Word：00 Length Word：00 06 Command Word：01 07 The byte address of EEPROM inside the card reader RF chip: 0030, large end Length of data to read: 20 Verify words：10
receive	55 55 00 00 00 22 00 00 58 3F 3F 19 13 3F 3B 00 73 08 AD FF 1E 41 00 00 06 03 63 63 00 00 00 00 08 07 06 0A 02 00 00 06
1-2 bytes: 3 bytes: 4 bytes: 5-6 bytes: 7 bytes: 8-39 bytes: 40 bytes:	Command Head：55 55 Keep Word：00 Address Word：00 Length Word：00 22 Standard literacy：00 for Success Data returned：0058 3F 3F 19 13 3F 3B 00 73 08 AD FF 1E 41 00 00 06 03 63 63 00 00 00 00 08 07 06 0A 02 00 00 Verify words：06

Write card chip EEPROM, safe address range: 0030-007F. Access to other addresses can cause system anomalies	
Sending	55 55 00 00 00 26 01 08 00 30 20 00 58 3F 3F 19 13 3F 3B 00 73 08 AD FF 1E 41 00 00 06 03 63 63 00 00 00 00 08 07 06 0A 02 00 00 1B
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 26 7-8 bytes: Command Word: 01 08 9-10 bytes: The byte address of EEPROM inside the card reader RF chip: 0030, large end 11 bytes: 20 Length of data to write: 20 12-43 bytes: Data to write to EEPROM: 00 58 3F 3F 19 13 3F 3B 00 73 08 AD FF 1E 41 00 00 06 03 63 63 00 00 00 00 08 07 06 0A 02 00 00 44 bytes: Verify words: 1B	

receive	55 55 00 00 00 02 00 02
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Verify words: 02	

Manual card search	
Sending	55 55 00 00 00 03 01 09 0B
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 03 7-8 bytes: Command Word: 01 09 9 bytes: Verify words: 0B	
receive	55 55 00 00 00 07 00 04 B2 5F 20 CF 01
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 07 7 bytes: Standard literacy: 00 for Success 8 bytes: card type: 04 is S50 card, 02 is S70 card, 08 is CPU card, 06 is ID card 9-12 bytes: The serial number of the card: B2 5F 20 CF 13 bytes: Verify words: 01	

Get card reader serial number	
Sending	55 55 00 00 00 03 0A 01 08
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 0A 01
9 bytes:	Verify words: 08
receive	55 55 00 00 00 06 00 D1 37 3F 55 8A
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 06
7 bytes:	Standard literacy: 00 for Success
8-11 bytes:	Card Reader Serial Number: D1 37 3F 55
12 bytes :	Verify words: 8A

Configure Card Reader Port Rate	
Sending	55 55 00 00 00 04 BD 01 06 BE
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 04
7-8 bytes:	Command Word: BD 01
9 bytes:	Porter rate code: 06（57600bit/s）。其它：1（2400bit/s），2(4800 bit/s)，3(9600 bit/s)，4(19200 bit/s)，5(38400 bit/s)，6(57600 bit/s)，7(115200bit/s)。
10 bytes:	Verify words: BE
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Verify words: 02

9.2 basic command of iso14443a protocol card

14443a inquiry card	
Sending	55 55 00 00 00 04 02 01 52 55
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7-8 bytes: Command Word: 02 01 9 bytes: 52 for awakening inquiry cards; 26 is the standard query card, but can not access the card into dormant state 10 bytes: Verify words: 55	
receive	55 55 00 00 00 04 00 08 00 0C
1-2bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7 bytes: Standard literacy: 00 for Success 8-9 bytes: ATQA: 04 00 is S50 card, 02 00 is S70 card, small-end format. For details of the ATQA format, see ISO14443-3 Section 6.4.2. 10 bytes: Check word: 0C	

14443A Conflict prevention	
Sending	55 55 00 00 00 04 02 02 93 97
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7-8 bytes: Command Word: 02 02 9 bytes: Series Level: 93 10 bytes: Verify words: 97 Note: When the conflict prevention command is first sent, the tandem level is 93. If the received UID begins with 88, you need to send the conflict prevention command and the card selection command again after the card selection command. The tandem level must be changed to 95 in advance. By analogy. There are three levels in the series: 93, 95, 97. See section 6.4.3.2 of ISO 14443-3 for details.	
receive	55 55 00 00 00 06 00 B2 5F 20 CF 04

1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 06 7 bytes: Standard literacy: 00 for Success 8-11 bytes: The serial number of the card: B2 5F 20 CF 12 bytes: Verify Words: 04 Note: If the serial number begins with 88, the actual serial number is three bytes after 88. The remainder of the serial number is obtained in the next conflict prevention. There are three types of bytes in the serial number: 4 bytes, 7 bytes, or 10 bytes

14443A Card Selection	
Sending	55 55 00 00 00 04 02 03 93 96
1-2bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7-8 bytes: Command Word: 02 03 9 bytes: Series Level: 93, Must be consistent with the level of concatenation in the Conflict Prevention command 10 bytes: Verify Words: 96	
receive	55 55 00 00 00 03 00 08 0B
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 03 7 bytes: Standard literacy: 00 for Success 8 bytes: SAK :08, if the 6th bit of this byte is 1, it supports the ISO14443-4 protocol. For details of the SAK format, see ISO 14443-3 Section 6.4.3.4 9 bytes: Verify Words: 0B	

14443a composite card searching	
Sending	55 55 00 00 00 03 02 04 05
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 02 04
9-bytes:	Verify Words: 05
receive	55 55 00 00 00 06 00 B2 5F 20 CF 04
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 06
7 bytes:	Standard literacy: 00 for Success
8-11 bytes:	Card serial number: B2 5F 20 CF
12 bytes:	Verify Words: 04

14443A sleep	
Sending	55 55 00 00 00 03 02 05 04
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 02 05
9 bytes:	Verify Words: 04
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Verify Words: 02

9.3 S50 / S70 card related commands

M1 Key Verification	
Sending	55 55 00 00 00 0D 03 01 00 02 01 60 FF FF FF FF FF FF 6C
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 0D
7-8 bytes:	Command Word: 03 01
9 bytes:	Address Selection: 00, Relative addressing; 01, Absolute addressing
10 bytes:	Sector Address: 02, This byte is 00 when absolute addressing

11 bytes:	Relative Block Address: 01, This byte is an absolute block address when absolutely addressing
12 bytes:	Key Type: 60 is type A and 61 is type B
13-18bytes:	encryption key: FF FF FF FF FF FF
19 bytes:	Verify Words: 6C
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Verify Words: 02

M1 read block	
Sending	55 55 00 00 00 06 03 02 00 02 01 04
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 06
7-8 bytes:	Command Word: 03 02
9 bytes:	Address Selection: 00, Relative addressing; 01, Absolute addressing
10 bytes:	Sector Address: 02, This byte is 00 when absolute addressing
11 bytes:	Relative Block Address: 01, This byte is an absolute block address when absolutely addressing
12 bytes:	Verify Words: 04
receive	55 55 00 00 00 12 00 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 14
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Length Word: 00
5-6 bytes:	Length Word: 00 12
7 bytes:	Standard literacy: 00 for Success
8-23 bytes:	Block data returned : 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46
24 bytes:	Verify Words: 14
M1 write block	
Sending	55 55 00 00 00 16 03 03 00 02 01 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 13
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 16
7-8 bytes:	Command Word: 03 03
9 bytes:	Address Selection: 00, Relative addressing; 01, Absolute addressing
10 bytes:	sector address: 02, This byte is 00 for absolute addressing
11 bytes:	Relative Block Address: 01, This byte is an absolute block address when addressing absolutely
12-27bytes:	Block data to be written: 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46
28 bytes:	Verify Words: 13

receive	55 55 00 00 00 02 00 02
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Verify Words: 02	

M1 wallet initialization	
Sending	55 55 00 00 00 0A 03 04 00 02 02 64 00 00 00 69
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0A 7-8 bytes: Command word: 03 04 9 bytes: Address Selection: 00, Relative addressing; 01, Absolute addressing 10 bytes: sector address: 02, This byte is 00 for absolute addressing 11 bytes: Relative Block Address: 02, This byte is an absolute block address when addressing absolutely 12-15 bytes: initialize value: 64 00 00 00, Small end 16 bytes: Verify Words: 69	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Verify Words: 02	

M1 Wallet	
Sending	55 55 00 00 00 06 03 05 00 02 02 00
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 06 7-8 bytes: Command word: 03 05 9 bytes: Address Selection: 00, Relative addressing; 01, Absolute addressing 10 bytes: sector address: 02, This byte is 00 in absolute addressing 11 bytes: Relative Block Address: 02, This byte is an absolute block address when addressing absolutely 12 bytes: Verify Words: 00	
receive	55 55 00 00 00 06 00 64 00 00 00 62

1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 06 7 bytes: Standard literacy: 00 for Success 8-11 bytes: Returned wallet balance: 64 00 00 00, Small end 12 bytes: Verify Words: 62

M1 wallet recharge (value added)	
Sending	55 55 00 00 00 0B 03 06 01 00 02 02 64 00 00 00 6B
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0B 7-8 bytes: Command Word: 03 06 9 bytes: Operation Mark: 01 (increment) 10 bytes: Address Selection: 00, Relative addressing; 01, Absolute addressing 11 bytes: sector address: 02, This byte is 00 for absolute addressing 12 bytes: Relative Block Address: 02, This byte is an absolute block address when addressing absolutely 13-16 bytes: Value to be added: 64 00 00 00, Small end 17 bytes: Verify Words: 6B	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Verify Words: 02	

M1 wallet deduction (impairment)	
Sending	55 55 00 00 00 0B 03 06 02 00 02 02 0A 00 00 00 06
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0B 7-8 bytes: Command Word: 03 06 9 bytes: Operation Mark: 02(Impairment) 10 bytes: Address Selection: 00, Relative addressing; 01, Absolute Addressing 11 bytes: sector address: 02, This byte is 00 for absolute addressing 12 bytes: Relative Block Address: 02, This byte is an absolute block address when addressing absolutely 13-16 bytes: Value to subtract: 0A 00 00 00, Small end 17 bytes: Verify Words: 06	
receive	55 55 00 00 00 02 00 02

1-2 bytes: Command Head: 55 55
3 bytes: Keep Word: 00
4 bytes: Address Word: 00
5-6 bytes: Length Word: 00 02
7 bytes: Standard literacy: 00 for Success
8 bytes: Validation word: 02

M1 Composite block	
Sending	55 55 00 00 00 1E 03 07 01 00 02 01 60 FF FF FF FF FF FF 00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF 78
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 1E 7-8 bytes: Command Word: 03 07 9 bytes: Operation Mark: 01 (Write block) 10 bytes: Address Selection: 00, Relative addressing; 01, Absolute Addressing 11 bytes: sector address: 02, This byte is 00 for absolute addressing 12 bytes: Relative Block Address: 01, This byte is an absolute block address when addressing absolutely 13 bytes: Key type: 60 is type A, 61 is type B 14-19 bytes: secret key: FF FF FF FF FF FF 20-35 bytes: Written block data: 00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF 36 bytes: Verification word: 78	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command Head: 55 55 3 bytes : Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Validation word: 02	

M1 composite reading block	
Sending	55 55 00 00 00 0E 03 07 00 00 02 01 60 FF FF FF FF FF FF 4E
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0E 7-8 bytes: Command Word: 03 07 9 bytes: Operation Mark: 00 (Read block) 10 bytes: Address Selection: 00, Relative addressing; 01, Absolute Addressing 11 bytes: sector address: 02, This byte is 00 in absolute addressing 12 bytes: Relative Block Address: 01, When absolute addressing, this byte is absolute block address 13 bytes: Key type: 60 为 A 型，61 为 B 型 14-19 bytes: secret key: FF FF FF FF FF FF	

20 bytes： Check words：4E	
receive	55 55 00 00 00 12 00 00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF 12
1-2 bytes： Command Head：55 55	
3 bytes： Keep Word：00	
4 bytes： Address Word：00	
5-6 bytes： Length Word：00 02	
7 bytes： Standard literacy：00 for Success	
8-23 bytes ： Readout Block Address：00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF	
24 bytes： Check words：12	

9.4 M0/NTAG Card Related Commands

NTAG21X Key Verification	
Sengding	55 55 00 00 00 07 04 01 FF FF FF 02 FF
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 07 7-8 bytes: Command Word: 04 01 9-12 bytes: secret key: FF FF FF FF 13 bytes: Check words: 02	
receive	55 55 00 00 00 04 00 FF FF 04
1-2bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word:00
5-6 bytes:	Length Word: 00 04
7 bytes:	Standard literacy: 00 for success
8-9 bytes:	Authenticated Return Word: FFFF 为 PACK
10 bytes:	Value validation: 04

M0 or NTAG read page data	
Sengding	55 55 00 00 00 04 04 05 20 25
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7-8 bytes: Command Word: 04 05 9 bytes: Page Address: 20, For NTAG213, the maximum page address is 2C 10 bytes: Check words: 25	
receive	55 55 00 00 00 12 00 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 14
1-2 bytes: Command Head: 55 55 3 bytes: Keep words: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 12 7 bytes: Standard literacy: 00 for success 8-23 bytes: Page data returned (4 pages): 30 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 24 bytes: Check words: 14	

M0 or NTAG Page Writing Data	
Sengding	55 55 00 00 00 08 04 06 20 04 00 00 FF D1

1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 08
7-8 bytes:	Command Word: 04 06
9 bytes:	Page Address: 20
10-13 bytes:	Block data to be written: 04 00 00 FF
14 bytes:	Check words: D1
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for success
8 bytes:	Check Words: 02

NTAG21X Key Settings	
Sending	55 55 00 00 00 0C 04 07 FF FF FF FF FF FF FF FF FF F0
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 0C
7-8 bytes:	Command Word: 04 07
9-12 bytes:	Old password: FF FF FF FF
13-16 bytes:	Block data to be written: FF FF FF FF
17 bytes:	Encryption Range: FF。FF refers to encrypting FF pages and all previous pages
18 bytes:	Check Words: F0
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command Word: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 02
7 bytes:	Standard literacy: 00 for success
8 bytes:	Check Words: 02

Get NTAG21X chip version number	
Sending	55 55 00 00 00 03 04 02 05
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 03
7-8 bytes:	Command Word: 04 02
9 bytes:	Check Words: 05

receive	55 55 00 00 00 0A 00 00 04 04 02 01 00 0F 03 05
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0A 7 bytes: Standard literacy: 00 for success 8-15 bytes: Return version number: 00 04 04 02 01 00 0F 03 16 bytes: Check Words: 05	
NTAG21X	read signature
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 03 7-8 bytes: Command Word: 04 04 9 bytes: Check Words: 03	

receive	55 55 00 00 00 22 00 A9 07 8F 00 6E AC BC 8E 9A 1B D6 57 32 D8 55 25 3D 87 DE CB 5D 7A 89 D7 FB C0 B0 68 A0 40 00 00 97
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 22
7 bytes:	Standard literacy: 00 for success
8-39bytes:	Signature returned: A9 07 8F 00 6E AC BC 8E 9A 1B D6 57 32 D8 55 25 3D 87 DE CB 5D 7A 89 D7 FB C0 B0 68 A0 40 00 00
40 bytes:	Check Words: 97

9.5 Fudan CPU Card Related Commands

FMCOS activation	
Sengding	55 55 00 00 00 04 07 01 52 50
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 04
7-8 bytes:	Command Word: 07 01
9 bytes:	Card Searching Method: 52
10 bytes:	Check Words: 50
receive	55 55 00 00 00 12 00 10 78 80 90 02 20 90 00 00 00 00 00 C6 67 9F 26 C0
1-2 bytes:	Command Head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length Word: 00 12
7 bytes:	Standard literacy: 00 for success
8 bytes:	Length of ATS returned by CPU card (TL): 10
9 bytes:	Format byte (T0): 78
10-12 bytes:	Interface bytes (TA (1), TB (1), TC (1)): 80 90 02
13-23 bytes:	History byte: 20 90 00 00 00 00 00 C6 67 9F 26
24 bytes:	Check words: C0
Note: For the structure of ATS and the meaning of each byte, please refer to the relevant CPU card operation manual.	

FMCOS instruction selection home directory	
Sending	55 55 00 00 00 0A 07 03 00 A4 00 00 02 3F 00 97
1-2 bytes: Command Head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0A 7-8 bytes: Command Word: 07 03 9-15 bytes: COS Directive: 00 A4 00 00 02 3F 00 (Refer to the relevant CPU card operation manual for details) 16 bytes: Check words: 97	
receive	55 55 00 00 00 1B 00 6F 15 84 0E 31 50 41 59 2E 53 59 53 2E 44 44 46 30 31 A5 03 88 01 01 90 00 32
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 1B 7 bytes: Standard literacy: 00 for Success 8-30 bytes: File Control Information: 6F 15 84 0E 31 50 41 59 2E 53 59 53 2E 44 44 46 30 31 A5 03 88 01 01 31-32 bytes: Card status value: 90 00 (Success) 33 bytes: Check words: 32 Note: The returned file control information (FCI) conforms to TLV format. For more information, please refer to the relevant CPU card operation manual.	

FMCOS External Authentication Compound Instruction	
Sending	55 55 00 00 00 0D 07 04 08 00 FF FF FF FF FF FF FF FF 06
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 0D 7-8 bytes: Command Word: 07 04 9 bytes: Key length: 08，或 10。08, or 10. The key length is usually 8 bytes or 16 bytes. 10 bytes: Key ID: 00, key ID should be filled in according to the actual situation 11-18 bytes: secret key: FF FF FF FF FF FF FF FF 19 bytes: Check word: 06	
receive	55 55 00 00 00 04 00 90 00 94
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length Word: 00 04 7 bytes: Standard literacy: 00 for Success	

8-9 bytes: Card status value: 90 00 (Success) 10 bytes: Check words: 94

FMCOS deactivation	
Sending	55 55 00 00 00 03 07 02 06
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7-8 bytes: Command word: 07 02 9 bytes: Check words: 06	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Check words: 02	

9.6 ICODE2 card related commands

ICODE2 lists. Note that unlike other protocols, this command is not a prerequisite for other commands. That is, if you know the UID beforehand, you don't need to execute this command, because you only need the UID to execute other commands.	
Sending	55 55 00 00 00 03 06 01 04
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7-8 bytes: Command word: 06 01 9 bytes: Check words: 04	
receive	55 55 00 00 00 0B 00 00 17 66 4A 36 00 01 04 E0 E3
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0B 7 bytes: Standard literacy: 00 为成功。 8 bytes: DSFID:00, Data Storage Format Identifier. For its definition and usage, see Section 4.3 of ISO 15693-3 9-16 bytes: UID: 17 66 4A 36 00 01 04 E0。The format of UID is shown in Section 4.1 of ISO 15693-3. 17 bytes: Check words: E3	

ICODE2 card selection. Note that unlike other protocols, this command is not a prerequisite for manipulating data blocks. If this command is not executed, UID must be added to the parameters to specify which card to operate on when manipulating data blocks with other commands. If this command is executed and other commands are used to manipulate data blocks, the UID is not required in the parameter to indicate that the card has been locked.	
Sending	55 55 00 00 00 0B 06 03 17 66 4A 36 00 01 04 E0 E6
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 0B
7-8 bytes:	Command word：06 03
9-16 bytes:	UID：17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
17 bytes:	Check words：E6
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 02
7 bytes:	Standard literacy：00 for Success
8 bytes:	Check words：02

ICODE2 Getting System Information	
Sending	55 55 00 00 00 0C 06 0C 02 17 66 4A 36 00 01 04 E0 EC
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0C 7-8 bytes: Command word: 06 0C 9 bytes: sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected (that is, even if the "card selection" command is not executed, this command will be executed successfully as long as it has this flag (02) and contains UID). If this byte is "01", it means that UID will not be included in the command sequence, that is, the following 10-17 bytes will not exist. The format of "logo" is shown in Section 7.2.1 Table IV of ISO 15693-3. 10-17 bytes: UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command 18 bytes: Check words: EC	
receive	55 55 00 00 00 10 00 0F 17 66 4A 36 00 01 04 E0 00 00 1B 03 01 EE
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 10 7 bytes: Standard literacy: 00 for Success 8 bytes: Information logo: 0F, See Section 9.3.12 of ISO 15693-3 for the meaning 9-16 bytes: UID: 17 66 4A 36 00 01 04 E0 17-21 bytes: information: 00 00 1B 03 01。See ISO15693-3 and ICODE2 Data Manual for specific meaning 22 bytes: Check words: EE	

ICODE2 read block	
Sending	55 55 00 00 00 0E 06 05 02 17 66 4A 36 00 01 04 E0 00 01 E6
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0E	

7-8 bytes:	Command word: 06 05
9 bytes:	sign: 02。“02”"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	Starting address: 00。The starting address is in blocks and the minimum is 00
19 bytes:	Number of blocks: 01。The number of blocks should not exceed the storage capacity of ICODE2
20 bytes:	Check words: E6
receive	55 55 00 00 00 06 00 00 00 00 00 06
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 06
7 bytes:	Standard literacy: 00 for Success
8-11 bytes:	Readout block data: 00 00 00 00。In ICODE2, a block represents four bytes
12 bytes:	Check words: 06

ICODE2 write block	
Sending	55 55 00 00 00 16 06 06 02 17 66 4A 36 00 01 04 E0 00 01 12 34 56 78 9A BC DE F0 FD
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 16
7-8 bytes:	Command word: 06 06
9 bytes:	sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	Starting address: 00。The starting address is in blocks and the minimum is 00.
19 bytes:	Number of blocks: 01。ICODE2 only supports writing one block at a time
20-27 bytes:	Block data: 12 34 56 78 9A BC DE F0(The card reader actually writes only the first four bytes)
28 bytes:	Check words: FD
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 为成功
8 bytes:	Check words: 02

ICODE2 write AFI

Sending	55 55 00 00 00 0D 06 08 02 17 66 4A 36 00 01 04 E0 00 E9
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 0D
7-8 bytes:	Command word：06 08
9 bytes:	sign：02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID：17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	AFI：00。Here is the new AFI value. For the meaning and naming rules of AFI, see Section 4.2 of ISO 15693-3,It can also be defined by the cardwriter himself
19 bytes:	Validation words：E9

receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 02
7 bytes:	Standard literacy：00 for Success
8 bytes:	Check words：02
ICODE2 Writes DSFID	
Sending	55 55 00 00 00 0D 06 0A 02 17 66 4A 36 00 01 04 E0 00 EB
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 0D
7-8 bytes:	Command word：06 0A
9 bytes:	sign：02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID：17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	DSFID：00。Here is the new DSFID value
19 bytes:	Check words：EB
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 02
7 bytes:	Standard literacy：00 for Success
8 bytes:	Check words：02

ICODE2 Reader Block Security Information	
Sending	55 55 00 00 00 0E 06 0D 02 17 66 4A 36 00 01 04 E0 00 01 EE
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0E 7-8 bytes: Command word: 06 0D 9 bytes: sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not. 10-17 bytes: UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command 18 bytes: Starting address: 00。The starting address is in blocks and the minimum is 00 19 bytes: Number of blocks: 01。The number of blocks should not exceed the storage capacity of ICODE2 20 bytes: Validation words: EE	
receive	55 55 00 00 00 03 00 00 03
1-2 bytes: Command head: 55 55	
3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7 bytes: Standard literacy: 00 for Success 8 bytes: Readout block security status: 00 (unlocked)。01 is locked state, see ISO15693 "Block Safety State" 9 bytes: Check words: 03	

ICODE2 lock block. Note that when this command is executed successfully, the corresponding block data will not be able to be rewritten.	
Sending	55 55 00 00 00 0D 06 07 02 17 66 4A 36 00 01 04 E0 01 E4
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 0D
7-8 bytes:	Command word: 06 07
9 bytes:	sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	Block number: 01。Minimum 00
19 bytes:	Validation words: E4
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

ICODE2 locks AFI. Note that AFI will not be able to overwrite once this command is successfully executed	
Sending	55 55 00 00 00 0C 06 09 02 17 66 4A 36 00 01 04 E0 E9
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 0C
7-8 bytes:	Command word: 06 09
9 bytes:	sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID are available in the "List" command
18 bytes:	Validation words: E9
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

ICODE2 locks DSFID. Note that DSFID will not be able to overwrite once this command is successfully executed

Sending	55 55 00 00 00 0C 06 0B 02 17 66 4A 36 00 01 04 E0 E0
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 0C
7-8 bytes:	Command word: 06 0B
9 bytes:	sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration command
18 bytes:	Validation words: E0
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

ICODE2 is silent. Note that after this command, the "ICODE2 Enumeration" command will temporarily expire for the current card	
Sending	55 55 00 00 00 0B 06 02 17 66 4A 36 00 01 04 E0 E7
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 0B
7-8 bytes:	Command word: 06 02
9-16 bytes:	UID: 17 66 4A 36 00 01 04 E0。UIDs are available in the "List" command
17 bytes:	Validation words: E7
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

ICODE2 reset	
Sending	55 55 00 00 00 0C 06 04 02 17 66 4A 36 00 01 04 E0 E4
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 0C
7-8 bytes:	Command word: 06 04
9 bytes:	sign: 02。"02" means that UID will be included in the command sequence, regardless of whether the card is selected or not.
10-17 bytes:	UID: 17 66 4A 36 00 01 04 E0。UID is available in the Enumeration

command 18 bytes: Validation words: E4	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Standard literacy: 00 for Success 8 bytes: Check words: 02	

9.7 SRI512 Card Related Commands

Read ID serial number	
Sending	55 55 00 00 00 03 08 08 03
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 03
7-8 bytes:	Command word: 08 08
9 bytes:	Check words: 03
receive	55 55 00 00 00 0A 00 11 69 D0 01 B0 E6 9A 31 5E
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8-15 bytes:	ID serial number: 11 69 D0 01 B0 E6 9A 31
14-15 bytes:	Card status value: 9000
16 bytes:	Check words: 5E

SRI512 inquiry card. This command fits only one card around the card reader.	
Sending	55 55 00 00 00 03 08 0A 01
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 03
7-8 bytes:	Command word: 08 0A
9 bytes:	Validation words: 01
receive	55 55 00 00 00 03 00 BE BD
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 03
7 bytes:	Standard literacy: 00 is success. 19 represents conflict, i.e. multiple cards around the card reader
8 bytes:	Label Pseudo ID: BE
9 bytes:	Check words: BD

SRI512 Anti-Conflict 0. This command is first used in post-conflict situations (multiple card responses around the card reader)

Sending	55 55 00 00 00 03 08 0B 00
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 03
7-8 bytes:	Command word：08 0B
9 bytes:	Validation words：00
receive	55 55 00 00 00 03 00 A0 A3
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 03
7 bytes:	Standard literacy：00 为成功00 for Success
8 bytes:	Label Pseudo ID：A0
9 bytes:	Check words：A3

SRI512 Conflict Prevention N. When used in post-conflict situations, this command is placed after "Conflict Prevention 0". N To F	
Sending	55 55 00 00 00 04 08 0C 06 06
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 04
7-8 bytes:	Command word：08 0C
9 bytes:	Time slot：06。Before each command is executed, add the time slot N to 1 until F
10 bytes:	Validation words：06
receive	55 55 00 00 00 03 00 E6 E5
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 03
7 bytes:	Standard literacy：00 for Success
8 bytes:	Label Pseudo ID：E6
9 bytes:	Check words：E5

SRI512 card selection.	
Sending	55 55 00 00 00 04 08 0E E6 E4
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 04
7-8 bytes:	Command word：08 0E
9 bytes:	Label Pseudo ID：E6。Obtain from the results after the anti-conflict command is executed
10 bytes:	Validation words：E4

receive	55 55 00 00 00 03 00 E6 E5
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7 bytes: Standard literacy: 00 for Success 8 bytes: Label Pseudo ID: E6 9 bytes: Check words: E5	
SRI512 obtains the UID.	
Sending	55 55 00 00 00 03 08 0F 04
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7-8 bytes: Command word: 08 0F 9 bytes: Validation words: 04	
receive	55 55 00 00 00 0A 00 8E 81 88 27 47 18 02 D0 27
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0A 7 bytes: Standard literacy: 00 for Success 8-15 bytes: UID: 8E 81 88 27 47 18 02 D0 16 bytes: Check words: 27	
SRI512 Reader Block.	
Sending	55 55 00 00 00 04 08 10 07 1B
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 04 7-8 bytes: Command word: 08 10 9 bytes: Block number: 07。The minimum block number is 00, and for SRI512, the maximum value is 0F. 10 bytes: Validation words: 1B	
receive	55 55 00 00 00 06 00 00 00 00 00 06
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 06 7 bytes: Standard literacy: 00 for Success 8-11 bytes: Block data: 00 00 00 00。In SRI512, a block represents four bytes 12 bytes: Check words: 06	
SRI512 write block.	
Sending	55 55 00 00 00 08 08 11 07 00 00 00 00 16
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00	

5-6 bytes:	Length word: 00 08
7-8 bytes:	Command word: 08 11
9 bytes:	Block number: 07。The minimum block number is 00, and for SRI512, the maximum value is 0F.
10-13bytes:	Block data to be written: 00 00 00 00
14 bytes:	Validation words: 16
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

SRI512 reset	
Sending	55 55 00 00 00 03 08 12 19
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 03
7-8 bytes:	Command word: 08 12
9 bytes:	Validation words: 19
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes:	Standard literacy: 00 for Success
8 bytes:	Check words: 02

SRI512 dormancy	
Sending	55 55 00 00 00 03 08 13 18
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 03
7-8 bytes:	Command word: 08 13
9 bytes:	Validation words: 18
receive	55 55 00 00 00 02 00 02
1-2 bytes:	Command head: 55 55
3 bytes:	Keep Word: 00
4 bytes:	Address Word: 00
5-6 bytes:	Length word: 00 02
7 bytes	Identification:00 for Success
8 bytes:	Check words: 02

9.8 ID Card Related Commands

Read Low Frequency Card Sequence Number	
Sending	55 55 00 00 00 03 09 01 0B
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 03 7-8 bytes: Command word: 09 01 9 bytes: Check words: 0B	
receive	55 55 00 00 00 07 00 20 34 B7 98 06 3A
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 07 7 bytes: Standard literacy: 00 for success 8 bytes: Card type: 20 is EM4X05, which has a user storage block inside the card; 10 is EM4X00, which has no user storage block inside the card and can only read the serial number. 9-12 bytes: Card serial number: 34 B7 98 06 13 bytes: Check words: 3A	

Read the low frequency card number (this command only supports the card reader manufactured before June 2016 for reading cards with user memory blocks inside.For example, EM4205)	
Sending	55 55 00 00 00 04 09 02 06 09
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 04 7-8 bytes: Command word: 09 02 9 bytes: Block number: 06 9 bytes: Check words: 09	
receive	55 55 00 00 00 06 00 5F 80 01 00 D8
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 06 7 bytes: Standard literacy: 00 for success 8-11 bytes: Block data content: 5F 80 01 00 12 bytes: Check words: D8	

9.9 UHF Card Related Commands

UHF single label query (this command applies to only one label in the read range)	
Sending	55 55 00 00 00 04 05 03 51 53
1-2 bytes:	Command head：55 55
3 bytes:	Keep Word：00
4 bytes:	Address Word：00
5-6 bytes:	Length word：00 04
7-8 bytes:	Command word：05 03
9 bytes:	Get EPC instructions (internal code)51
10 bytes：	Check words：53
receive	55 55 00 00 00 12 00 34 00 AA BB 30 16 66 05 02 32 22 90 BB CC EE EE 87
1-2 bytes：	Command head：55 55
3 bytes：	Keep Word：00
4 bytes：	Address Word：00
5-6 bytes：	Length word：00 12
7 bytes：	Standard literacy：00 for success
8-23 bytes：	The EPC returned. "3400" is the PC (protocol control word) segment; "AA BB 3016 66 05 02 32 22 90 BC CC" is the EPC code "EE" is CRC16.
24 bytes：	Check words：87
Note: If there are multiple tags or no tags in the reading range, the module will return the error message of "no card found". Additional instructions are required to find multiple tags	

UHF Reader Memory	
Sending	55 55 00 00 00 08 05 04 52 03 00 00 04 5C
1-2 bytes：	Command head：55 55
3 bytes：	Keep Word：00
4 bytes：	Address Word：00
5-6 bytes：	Length word：00 08
7-8 bytes：	Command word：05 04
9 bytes：	Read Memory Instruction (Internal Code) 52
10 bytes：	Storage area code 03. 03 represents user storage, 02 represents TID storage and 01 represents EPC storage. 00 represents the reserved area. Note: TID represents the product classification information of the electronic label, and EPC represents the identity information of the electronic label. The storage and information of TID and EPC may vary from manufacturer to manufacturer. For details of the storage structure, please refer to the corresponding electronic label data manual.
11-12 bytes：	The first address of the storage to be accessed is 00. The address is in two-byte large-end format. For example, 00 01 equals 01
13 bytes：	The number of words to read is 04. Four words equals eight bytes.
14 bytes：	Validation 5C
Note: UHF tag internal data addressing is in terms of words (one word equals two bytes), and data alignment is also in terms of words. For example, data with address 0001 as the first four words is required to be read out. If converted into	

bytes, 8 bytes of data are actually read from address 02. Note: User Storage Access is limited to access words less than or equal to 20H (20H equals decimal 32)
receive: 55 55 00 00 00 0A 00 30 31 32 33 34 35 36 37 0A
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 0A 7 bytes: Standard literacy: 00 is success. Other error codes: 47 for not finding an electronic tag; 48 for requesting access to data plus addressing offset exceeding storage space limits; 49 for accessed storage area locked and inaccessible (access password needed to be entered successfully); 4A for insufficient power supply of electronic tags; 4B for other errors 8-15 bytes: Return data: 30 31 32 33 34 35 36 37。Note that four words, eight bytes, are read out. 16 bytes: Check words: 0A

UHF Write User Storage.	
Sending	55 55 00 00 00 10 05 05 57 03 00 00 04 88 99 AA BB CC DD EE FF 40
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 10 7-8 bytes: Command word: 05 05 9 bytes: Write Memory Instructions (Internal Code)57 10 bytes: Storage area code 03. 03 represents user storage, 02 represents TID storage and 01 represents EPC storage. 00 represents the reserved area. Note: TID represents the product classification information of the electronic label, and EPC represents the identity information of the electronic label. The storage and information of TID and EPC may vary from manufacturer to manufacturer. For details of the storage structure, please refer to the corresponding electronic label data manual. 11-12 bytes: The first address of the storage to be accessed is 00. The address is in two-byte large-end format. For example, 00 01 equals 01 13 bytes: The number of words to write is 04. Four words equals eight bytes 14-21bytes: What to write 88 99 AA BB CC DD EE FF。 22 bytes: Validation 40 Note: UHF tag internal data addressing is in terms of words (one word equals two bytes), and data alignment is also in terms of words. For example, four-word data is required to be stored at address 0001. If converted into bytes, it is actually from the address. 02 Begins to store 8 bytes of data. Note: User Storage Access is limited to access words less than or equal to 20H (20H equals decimal 32)	
receive	55 55 00 00 00 02 00 02

1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Standard literacy: 00 for success Other error codes: 47 for not finding an electronic tag; 48 for requesting access to data plus addressing offset exceeding storage space limits; 49 for accessed storage area locked and inaccessible (access password needed to be entered successfully); 4A for insufficient power supply of electronic tags; 4B for other errors 8 bytes: Check words: 02
UHF Damage Label

Sending	55 55 00 00 00 09 05 06 4B FF FF FF FF 00 41

1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 09
7-8 bytes: Command word: 05 06 9 bytes: Damage Label Instruction (Internal Code)4B 10-13 bytes: Inactivation password: FF FF FF FF。The inactivated password is stored in the reserved area 14 bytes: 00 15 bytes: Validation41 Note: Only a non-zero inactivated password can make the Damage Label command effective. Once the command takes effect, the label will be disabled (silent). It can't be used again in response to any instructions. When the label leaves the factory, the inactivated password and the access password are both 0 values (the inactivated password is four bytes 00, and the access password is four bytes 00).

receive	55 55 00 00 00 02 00 02

1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Logo: 00 for success. Other error codes: 47 for not finding an electronic tag; 48 for requesting access to data plus addressing offset exceeding storage space limits; 49 for accessed storage area locked and inaccessible (access password needed to be entered successfully); 4A for insufficient power supply of electronic tags; 4B for other errors. 8 bytes: Check words: 02
UHF Locked Memory

Sending	55 55 00 00 00 08 05 07 4C 00 00 03 FF BA

1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 08 7-8 bytes: Command word: 05 07 9 bytes: Lock instruction (internal code)4C 10-11 bytes: Mask Bit Domain: 00 00。 When the mask bit is 0, it has no effect on the corresponding active bit, and the lock setting remains in the state at that time; when the mask bit is 1, the lock setting of the corresponding active bit is executed. 12-13 bytes: Active Location Domain: 03 FF。When the second active bit of each item is 0, the lock setting is not permanently valid; when the active bit is 1, the lock setting is permanently valid 14 bytes: ValidationBA Note: The so-called "lock setting" refers to the lock value, 0 is not locked, 1 is locked. The mask bits correspond to the active bits one by one. The inactivated password in the reserved area corresponds to two bits, the access password corresponds to two bits, and the other three storage areas correspond to two bits respectively. A total of 10 bits are locked. Therefore, although the 10-11 byte mask bit field and the 12-13 byte active bit field have two bytes, in fact, the high six bits are invalid, and the low ten bits are the valid data. Refer to excerpts for the specific allocation of mask and active bit domains Note: When the access password is 0, you can use the Lock Memory command directly. When the access password is non-zero, the first step is to execute The "Verify Access Password" cannot be used until it is in a secure state.	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Identification: 00 for success。Other error codes: 47 represents that no electronic tag has been found; 48 represents that the amount of data requested and the addressing offset exceeds the storage space limit; 49 represents that the accessed storage area is locked and inaccessible (access password needs to be input to access successfully); 4A represents that the power supply of the electronic tag is insufficient; 4B represents other errors。 8 bytes: Check words: 02	
UHF Authentication Access Password (used to gain access to read, write, and lock storage)	
Sending	55 55 00 00 00 08 05 08 50 FF FF FF FF 55

1-2 bytes: Command head: 55 55 3 bytes : Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 08 7-8 bytes: Command word: 05 08 9 bytes: Verify access password commands (internal code)50 10-13 bytes: Access password to verify: FF FF FF FF 14 bytes: Validation55 Note: This command is for one-time use. That is, after the command is executed, the read/write/lock command can only be executed once. To continue the read/write/lock command, you must execute the Verify Access Password command again. Where the "Authenticate Access Password" command needs to be executed: 1. The access password is non-zero, and the memory to be accessed is not permanently locked. 2. Access password is non-zero. You want to use the Lock Memory command to change the lock settings.	
receive	55 55 00 00 00 02 00 02
1-2 bytes: Command head: 55 55 3 bytes: Keep Word: 00 4 bytes: Address Word: 00 5-6 bytes: Length word: 00 02 7 bytes: Identification: 00 for success。 8 bytes: Check words: 02	

Excerpt (ISO18000-C1-G2 Storage Lock Description Screenshot)

6.3.2.10.3.5 *Lock* (mandatory)

Interrogators and Tags shall implement the *Lock* command shown in Table 6.38 and Figure 6.24. Only Tags in the **secured** state shall execute a *Lock* command. *Lock* allows an Interrogator to:

- Lock individual passwords, thereby preventing or allowing subsequent reads and/or writes of that password,
- Lock individual memory banks, thereby preventing or allowing subsequent writes to that bank, and
- Permalock (make permanently unchangeable) the lock status for a password or memory bank.

Lock contains a 20-bit payload defined as follows:

- The first 10 payload bits are Mask bits. A Tag shall interpret these bit values as follows:
  - Mask = 0: Ignore the associated Action field and retain the current lock setting.
  - Mask = 1: Implement the associated Action field and overwrite the current lock setting.
- The last 10 payload bits are Action bits. A Tag shall interpret these bit values as follows:
  - Action = 0: Deassert lock for the associated memory location.
  - Action = 1: Assert lock or permalock for the associated memory location.

The functionality of the various Action fields is described in Table 6.40.

The payload of a *Lock* command shall always be 20 bits in length.

If an Interrogator issues a *Lock* command whose Mask and Action fields attempt to change the lock status of a nonexistent memory bank or nonexistent password, the Tag shall ignore the entire *Lock* command and instead backscatter an error code (see Annex I).

Permalock bits, once asserted, cannot be deasserted. If a Tag receives a *Lock* whose payload attempts to deassert a previously asserted permalock bit, the Tag shall ignore the *Lock* and backscatter an error code (see Annex I). If a Tag receives a *Lock* whose payload attempts to reassert a previously asserted permalock bit, the Tag shall simply ignore this particular Action field and implement the remainder of the *Lock* payload.

A Tag's lock bits cannot be read directly; they can be inferred by attempting to perform other memory operations.

All Tags shall implement memory locking, and all Tags shall implement the *Lock* command. However, Tags need not support all the Action fields shown in Figure 6.24, depending on whether the password location or memory bank associated with an Action field exists and is lockable and/or unlockable. Specifically, if a Tag receives a *Lock* it cannot execute because one or more of the passwords or memory banks do not exist, or one or more of the Action fields attempt to change a previously permalocked value, or one or more of the passwords or memory banks are either not lockable or not unlockable, the Tag shall ignore the entire *Lock* and instead backscatter an error code (see Annex I). The only exception to this general rule relates to Tags whose only lock functionality is to permanently lock **all** memory (i.e. all memory banks and all passwords) at once; these Tags shall execute a *Lock* whose payload is $FFFFF_h$, and shall backscatter an error code for any payload other than $FFFFF_h$.

A *Lock* shall be prepended with a frame-sync (see 6.3.1.2.8).

After issuing a *Lock* an Interrogator shall transmit CW for the lesser of T_{REPLY} or 20ms, where T_{REPLY} is the time between the Interrogator's *Lock* command and the Tag's backscattered reply. An Interrogator may observe several possible outcomes from a *Lock*, depending on the success or failure of the Tag's memory-write operation:

- **The *Lock* succeeds:** After completing the *Lock* the Tag shall backscatter the reply shown in Table 6.39 and Figure 6.22 comprising a header (a 0-bit), the Tag's handle, and a CRC-16 calculated over the 0-bit and handle. If the Interrogator observes this reply within 20 ms then the *Lock* completed successfully.
- **The Tag encounters an error:** The Tag shall backscatter an error code during the CW period rather than the reply shown in Table 6.39 (see Annex I for error-code definitions and for the reply format).
- **The *Lock* does not succeed:** If the Interrogator does not observe a reply within 20ms then the *Lock* did not complete successfully. The Interrogator may issue a *Req_RN* command (containing the Tag's handle) to verify that the Tag is still in the Interrogator's field, and may reissue the *Lock*.

Upon receiving a valid *Lock* command a Tag shall perform the commanded lock operation. The Tag's reply to a *Lock* shall use the extended preamble shown in Figure 6.11 or Figure 6.15, as appropriate (i.e. a Tag shall reply as if TRext=1 regardless of the TRext value in the *Query* that initiated the round).

Table 6.38 – *Lock* command

	Command	Payload	RN	CRC-16
# of bits	8	20	16	16
description	11000101	Mask and Action Fields	handle	

Table 6.39 – Tag reply to a *Lock* command

	Header	RN	CRC-16
# of bits	1	16	16
description	0	handle	

Masks and Associated Action Fields

	Kill pwd		Access pwd		EPC memory		TID memory		User memory	
	0	1	2	3	4	5	6	7	8	9
Mask	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write
	10	11	12	13	14	15	16	17	18	19
Action	pwd read/ write	perma lock	pwd read/ write	perma lock	pwd write	perma lock	pwd write	perma lock	pwd write	perma lock

Figure 6.24 – *Lock* payload and usage

Table 6.40 – *Lock* Action-field functionality

pwd-write	permalock	Description
0	0	Associated memory bank is writeable from either the **open** or **secured** states.
0	1	Associated memory bank is permanently writeable from either the **open** or **secured** states and may never be locked.
1	0	Associated memory bank is writeable from the **secured** state but not from the **open** state.
1	1	Associated memory bank is not writeable from any state.
pwd-read/write	**permalock**	**Description**
0	0	Associated password location is readable and writeable from either the **open** or **secured** states.
0	1	Associated password location is permanently readable and writeable from either the **open** or **secured** states and may never be locked.
1	0	Associated password location is readable and writeable from the **secured** state but not from the **open** state.
1	1	Associated password location is not readable or writeable from any state.

10.High Frequency Card Operation Flow and Error Handling

<1> Initial state:

After the card reader is powered on, the antenna has been automatically opened and the protocol and baud rate have been fully configured. Except for special reasons

The host computer does not need to execute relevant setting commands, such as error handling and changing baud rate.

<2>Operational specifications:

For S50 and S70 cards, the four steps of "14443A inquiry card", "14443A anti-collision", "14443A card selection", "M1 password verification" must be executed before "M1 card reading", "M1 card writing" and "M1 wallet function operation can be carried out.

For MO and NTAG cards, it is necessary to perform "14443A Composite Card Search" before "MO/NTAG Page Reading Data" or "MO/NTAG Page Writing Data" operation. Note that for NTAG21X card, if the data is encrypted and written, the operation of "NTAG21X key verification" must be performed first.

For FM1208 CPU card, the FMCOS activation command must be executed first, and then the relevant COS instructions must be executed. According to the ISO14443A protocol, "FMCOS Activation" command has completed the three basic operations of "14443A Inquiry Card", "14443A Anti-Conflict" and "14443A Selection Card".

For CPU cards, after a set of COS operation processes are completed, the FMCOS stop command must be executed before other non-COS commands can be executed. If other non-COS commands are executed without "FMCOS deactivation" and then COS commands are executed, for some CPU cards, the internal state will enter an error state and cannot be recovered.

For ICODE2 card, it is necessary to execute the "ICODE2 Enumeration" command to obtain the UID before switching on power or replacing the card during operation. After obtaining the UID, there are two options to operate the card: the first option is to use the UID as a parameter, execute the "ICODE2 card selection" command, and lock a card. Thereafter, the same card is operated, and UID is not required in the command parameters. Second option: Do not execute the "ICODE2 card selection" command, directly operate the card, at this time you must enter UID in the parameters, so that the reader can understand which card to operate.

For SRI512 card, the "SRI512 inquiry card" command must be executed to obtain the "false ID of label" before switching on power or replacing the card during operation. If there is only one card (label) around the reader, it will get the "false ID of label" smoothly. Input the ID as a parameter into the "SRI512 card selection" command and execute it, the corresponding card will be locked. Subsequent commands will be based on the selected card.

<3>Error handling:

For S50 and S70 cards, if the "key verification" command fails, the four steps of "14443A inquiry card", "14443A anti-collision", "14443A card selection", "M1 password verification" need to be re-executed. If other commands fail, it is usually successful to try the command again. If there are repeated errors, you can only move the card away and re-approach the reader. The worst case solution is to re-energize the reader. For FM1208 CPU card, after the command error, it is recommended to try the command again. If not, according to experience, the card has entered an erroneous state, and generally cannot be restored. In this case, the first step is to "close the antenna" and then to execute other commands as needed. If there is still a mistake, it is recommended that the reader be re-energized.

To avoid conflicts, some errors may be caused by multiple cards entering the reader's reading range at the same time. If there is a problem with the conflict prevention mechanism, there will be a problem in this case. Therefore, only one card is allowed around the reader

11. Error code summary

Errors inevitably occur when the card reader interacts with the card. After making a mistake, the reader usually retries twice in order to correct the mistake and reduce the burden of the upper computer's judgment. After two retries, if the card reader is still unable to fix the error, it will report the error code to the host computer (the error code is located in the seventh byte of the return data stream). The meaning of each code can be queried in the following table.

error code	Meaning	Remedial measures
3C	Card reader abnormality	Re-energize the card reader
3D	Card reader does not support this command	Check for errors in bytes 7 and 8
3E	Command parameter error	Check if byte 9 is wrong
3F	Two consecutive activations of COS	CPU cards that have already activated COS are not allowed to be activated again. If you want to activate COS again, you must first deactivate COS (execute the command with the word "07 02")
40	Execution of COS instructions without activation of COS	The command "07 01" must be executed first to activate COS.
41	The card does not support this command	Usually, the card used is not M1 or CPU card. Please change the card.
01	No card around card reader	Try to align the card with the forward reader antenna. The distance between card and reader is 1CM to 3CM is suitable. Too close or too far may cause the card reader to fail to recognize the card.
03	CRC Check Error	Adjust the position of reader and card properly and retry the command.
06	M1 card key authentication error M1	Check if the password is correct or if the data stream entered is misaligned.
08	Coding Error in M1 Card Writing Operation	Adjust the position of reader and card properly and retry the command.
0B	M1 card has not been authenticated by key before read-write operation	It must be authenticated first, then read and write. Each sector corresponds to an authentication, checking whether the sectors used for authentication are consistent with the sectors being read and written.
0C	Bit Counter Error	Adjust the position of reader and card properly and retry the command.

0D	Card Reader Receives Card Data Abnormality	Try to align the card with the forward reader antenna. The distance between card and reader is 1CM to 3CM is suitable. Avoid irrelevant magnetic fields or magnetic materials around.
19	Bit conflict	Use the Conflict Prevention Command to list all cards.
1D	Card reader and card communication timeout	Adjust the position of reader and card properly and retry the command.
3B	Error communication between card reader and card	Adjust the position of reader and card properly and retry the command. Check whether the card is damaged, invalid or mismatched.

12. Examples of programming steps

To accomplish a task, the host computer may send multiple commands to the card reader. After each command is issued, the next command can only be sent after the card reader responds. The seventh byte of data returned by the card reader is 0x00, which indicates that the command has been executed successfully, otherwise it will fail.

12.1 S50/S70 Card Reader

1. Send the "14443A Inquiry Card" command
2. Send "14443A Anti-Conflict" Order
3. Send "14443A card selection" command
4. Send M1 Key Verification Command
5. Send the "M1 Reader" command

12.2 S50/S70 card writing block

1. Send the "14443A Inquiry Card" command
2. Send "14443A Anti-Conflict" Order
3. Send "14443A card selection" command
4. Send M1 Key Verification Command
1. Send "M1 Write Block" command

12.3 S50/S70 Card Initialization Wallet

1. Send the "14443A Inquiry Card" command
2. Send "14443A Anti-Conflict" Order
3. Send "14443A card selection" command
4. Send M1 Key Verification Command
5. Send "M1 wallet initialization" command

12.4 S50/S70 Card Wallet Increase/Decrease

1. Send the "14443A Inquiry Card" command
2. Send "14443A Anti-Conflict" Order
3. Send "14443A card selection" command
4. Send M1 Key Verification Command

5. Send "M1 Wallet Increase/Decrease" Order, Increase Value

Note: It is necessary to operate the S50/S70 card for the first time after power-on. The three steps can be omitted if the same card is operated later

12.5 MO/NTAG Card Read Page Data

1. Send "14443A Compound Card Search" command
2. Send "MO/NTAG Page Reading Data" command

12.6 MO/NTAG Card Page Writing Data

1. Send "14443A Compound Card Search" command
2. Send the "NTAG21X Key Verification" command (only if the operation page has been encrypted)
3. Send "MO/NTAG Page Writing Data" command

12.7 FM1208 CPU Card Operation

1. Send FMCOS Activation Command
2. Send the "Select File" command of "FMCOS Directive" and enter the directory where the file is to be manipulated.
3. Send "Take Random Number" command of "FMCOS Directive"
4. Send "External Authentication" Order of "FMCOS Directive"
5. Send "FMCOS instructions" a series of operation commands to operate.
6. Send FMCOS Stop Command

Note: Step 3 and 4 can be completed in one step by using "FM External Authentication Compound" command. Step 1 and 6 must appear in pairs.

Each CPU card has its own operating manual, which explains each COS instruction in detail.

12.8 ICODE2 Card Reader

1. Send "ICODE2 Enumeration" command
2. Send "ICODE2 Select Card" command
3. Send the "ICODE2 Reader" command

12.9 ICODE2 Card Writing Block

1. Send "ICODE2 Enumeration" command
2. Send "ICODE2 Select Card" command
3. Send "ICODE2 Write Block" command

12.10 SRI512 card reader

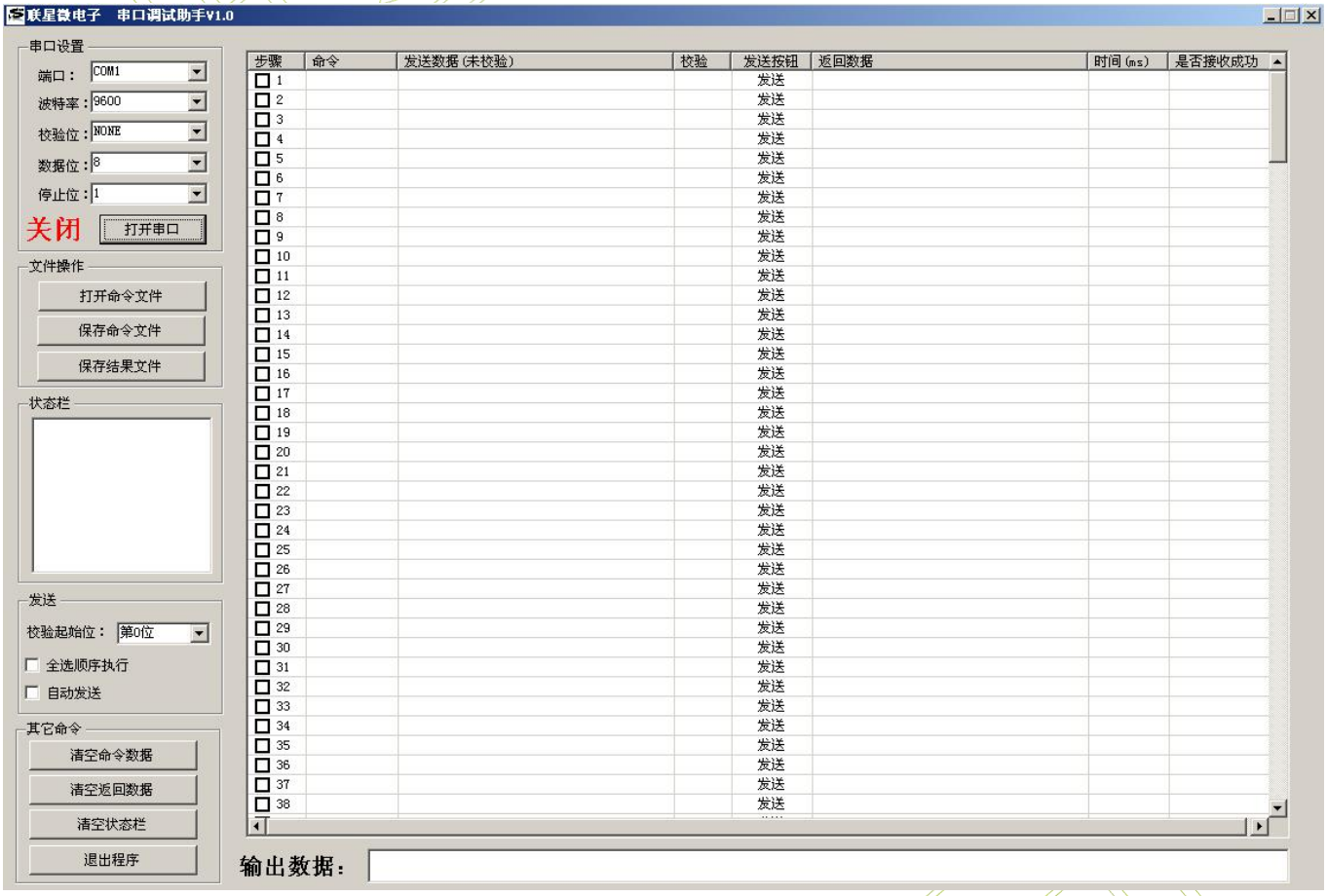
1. Send "SRI512 Inquiry Card" command
2. Send "SRI512 Selection Card" command
3. Send "SRI512 Reader" command

12.11 SRI512 card writing block

1. Send "SRI512 Inquiry Card" command
2. Send "SRI512 Selection Card" command
3. Send "SRI512 Write Block" command

Appendix 1: Instructions for the use of commissioning assistant V1.0

1. Double-click the setup file provided by us. After installation, open the application "Connected Serial Port Assistant" on the desktop. The interface after opening is shown in the following figure.

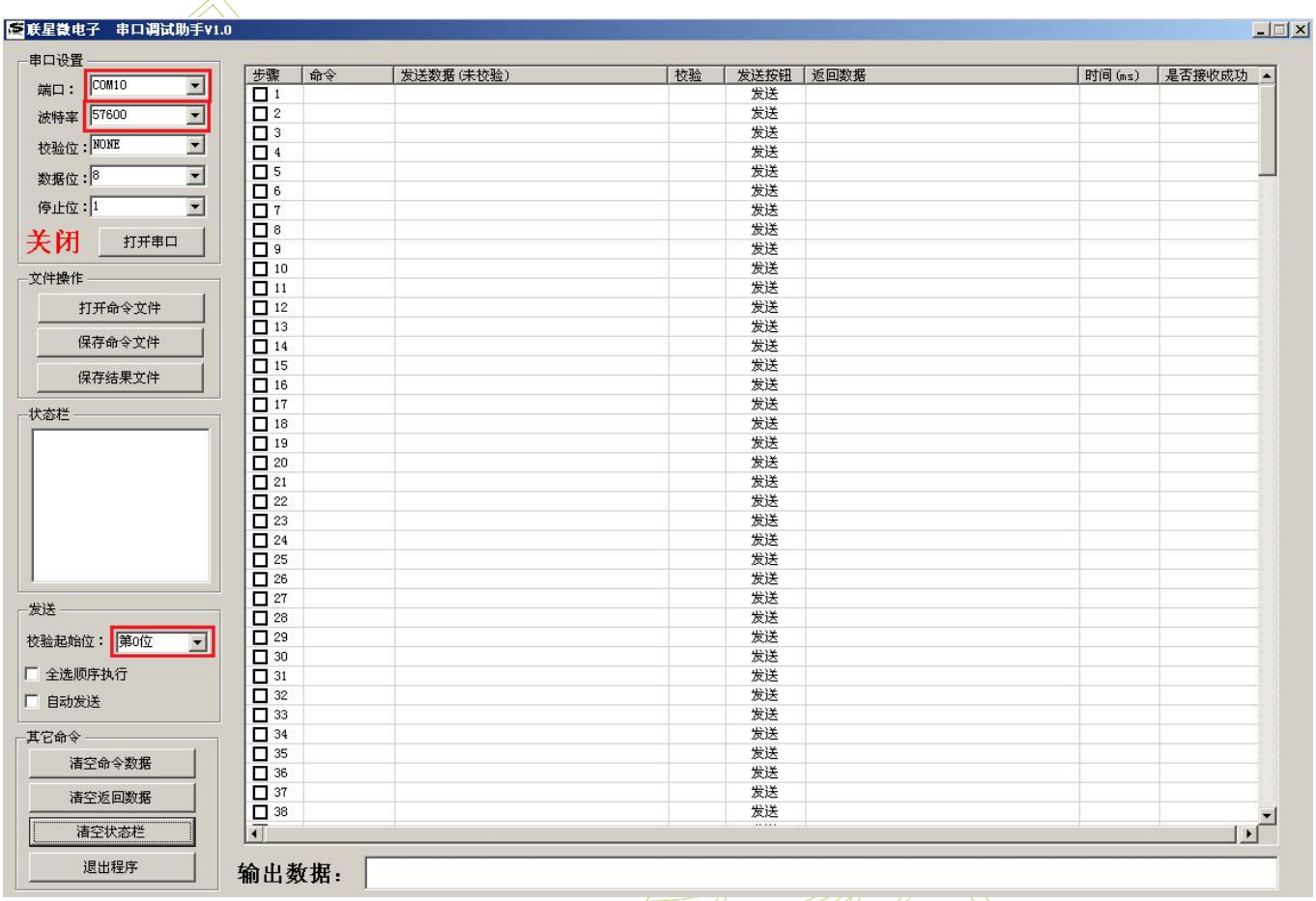


2. Basic configuration. As shown in the following figure, the three red boxes must be configured separately: port COMXX, baud rate 57600, and check starting position 0.

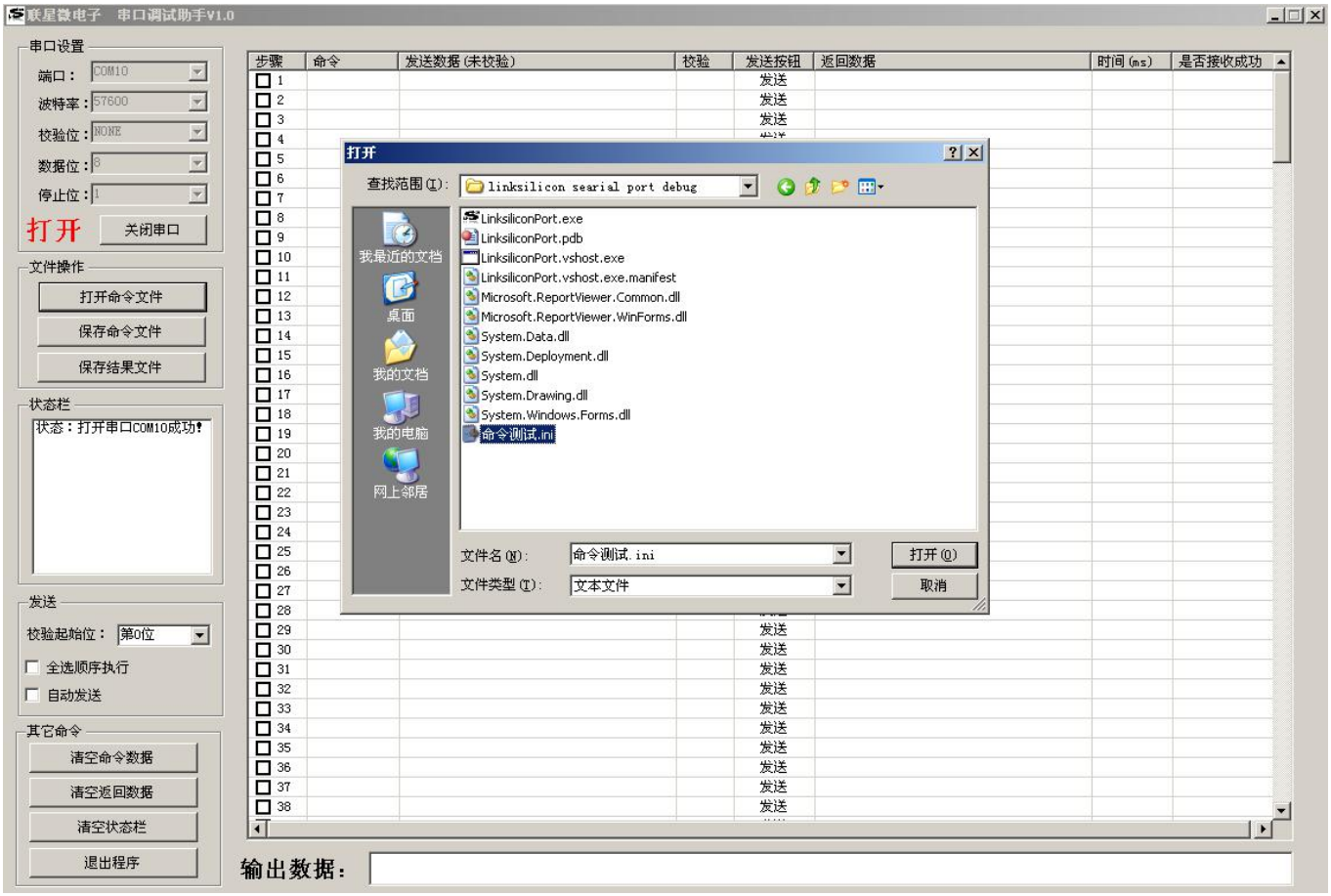
The baud rate configuration is 57600 because the baud rate of the reader is 57600 bits/s after it is initialized on power. The check start bit is configured as "bit 0" to indicate that the check begins with the first byte, and the check method is byte-by-byte XOR. When a command is sent, the check code is added to the end of the data stream. The

calculation of the check code and the addition of the check code are automatically completed by the program, and users need not interfere.

Note that the port must be set to the port number currently in use, and the port number can be viewed through the Device Manager. Finally, click "Open Serial Port".



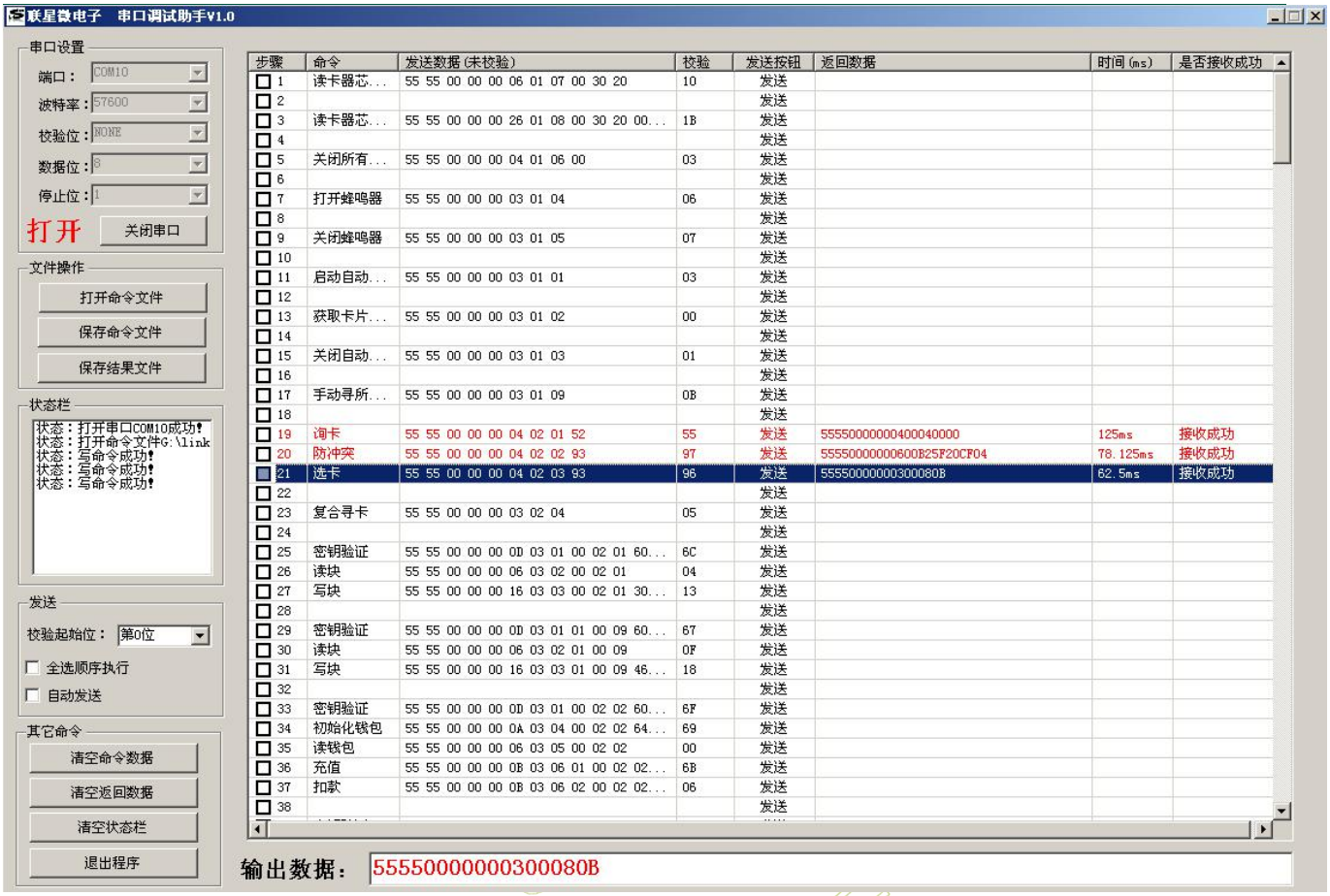
3. Call out debugging files. Click "Open Command File", pop up the dialog box, and select the debug file (extension ini). As shown in the figure below.



The interface after opening the debug file is shown in the following figure. Click Send to execute the command. The data returned from the card reader is displayed in the "Return Data" column and also in the "Output Data" column below the interface for replication. Users can also add new command lines or create new debugging files themselves. When inputting data, the data format must be organized according to the protocol mentioned in Chapter 6. The 5th and 6th bytes are data length bytes, which need to be calculated by users themselves.

Click "Clear Return Data" to clear all data in the "Return Data" column. Click on the Clear Status Bar to clear all the prompts in the Clear Status Bar.

Click "Save Command File" to save the current debug file or save it as another name.



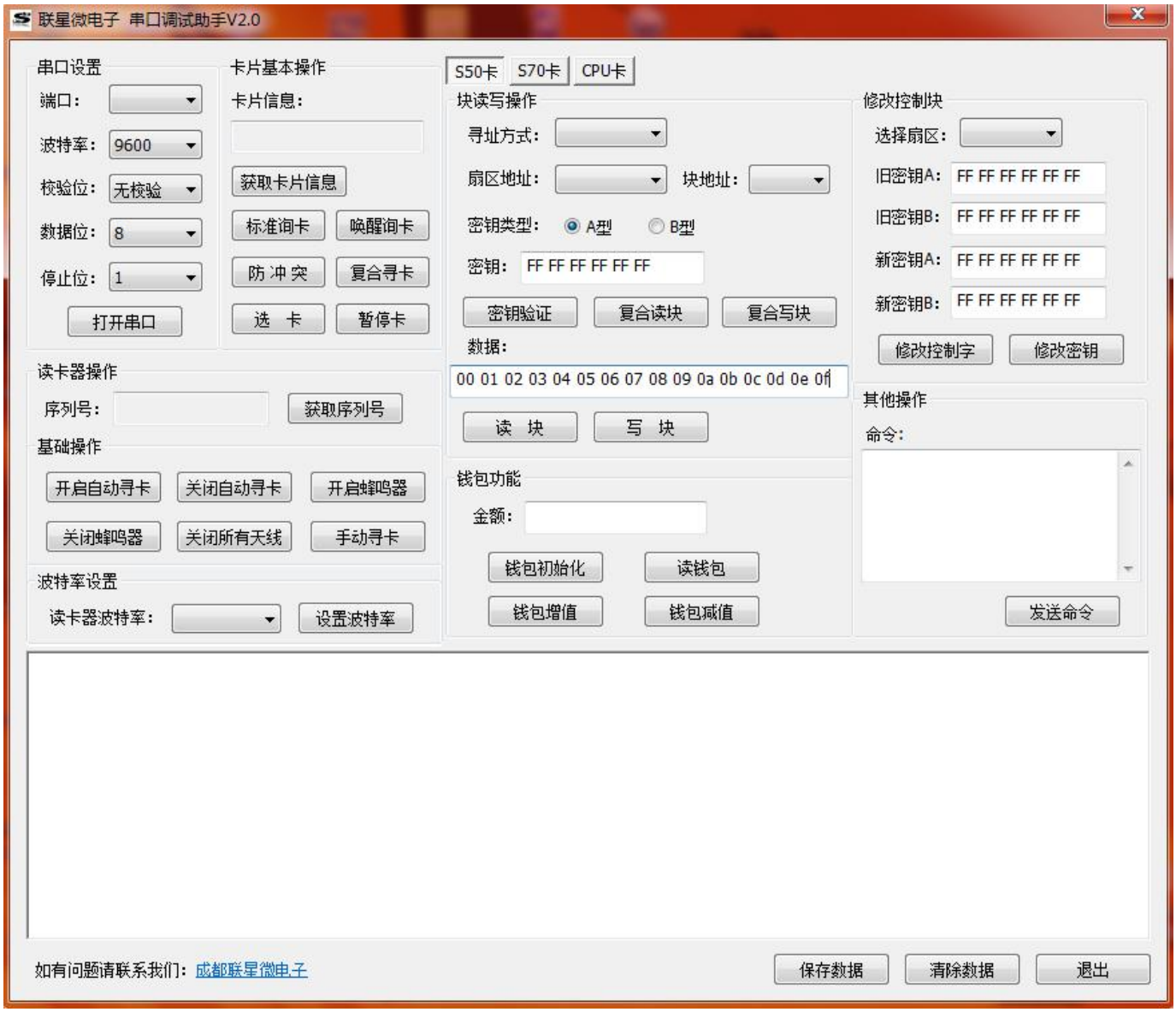
Be careful:

"Joint Star Serial Port Assistant" is a special RFID read-write DEMO software, which is based on Command + response, and is only suitable for RFID read-write test. Therefore, users who only need the card reader to automatically acquire the card UID should select a universal serial debugging assistant for testing.

Appendix 2: Instructions for the Use of Debugging Assistant V2.0

The debugging assistant V2.0 adopts graphical operation method, and the instructions used in the operation will be recorded completely.

When using this version of software in operating systems above WIN7, it must be operated as an administrator.



Ports in the Serial Port Settings column are used to select port numbers, which can be viewed in Device Manager.

"Baud Rate" is suitable for UART, RS232, RS485 card reader. The baud rate is set to 57600. Other parameters need not be set. If the baud rate of the card reader has been changed halfway, the baud rate in this column should also be

changed the same way. After setting the parameters, click the "Open Serial Port" button.

The serial number in the "Reader Operation" column is used to display the serial number of the reader.

The Basic Operations column is used to manage some basic parameters of the card reader. Note: Open the software, open the serial port, first click "Close the automatic card search" to operate the card.

The "Card Basic Operation" column is suitable for S50, S70 and CPU cards. The order of operation is "wake-up card", "wake-up card", "wake-up card", "wake-up card", "wake-up card", "wake-up card", "wake-up card" and "wake-up card".

"Conflict Prevention", "Card Selection". This three-step operation is necessary after the reader is powered on, or after replacing the card halfway, in order to lock the card. These three steps can be simply replaced by the "composite card search" button and completed in one step.

"S50", "S70", "CPU" buttons are used to select the current card to operate. To manipulate any card, click the corresponding button. If you don't know what card to use, you can click on "Open Auto Search Card" and "Get Card Information", and you can see the type of card in the "Card Information" column. Note that if you want to continue to operate the card after turning on the auto-search card, please click "Close the auto-search card".

The "Block Read and Write Operation" column is suitable for S50 and S70 cards. Before operating in this column, you must first click the "Compound Card Search" button in the "Card Basic Operations" column, then the "Key Verification", then the "Reader Block" or the "Compound Card Search" button.

Write Block. The two steps of "key verification + read block" operation can be replaced by "compound read block". The two steps of "key verification + write block" can be replaced by "compound write block". The Addressing Mode drop-down menu is used to select how to locate the operation blocks in the card. There are two kinds of addressing: relative addressing and absolute addressing. Relative addressing refers to the addressing mode of sector address + block address, while absolute addressing refers to the direct location of block address. Key Type is used to select the encryption type of the block to be operated on currently. In the Key input box, you enter 6 bytes of keys (the key of a white card is 6 FFs). Before clicking on "Key Verification", "Addressing Mode", "Sector Address", "Block Address", "Key Type", "Sector Address", "Sector Address", "Block Address", "Key Type","

The five parameters of "key" should be set up. For the concepts of sector, block number, and key, please refer to S50 or

S70 card data manual.

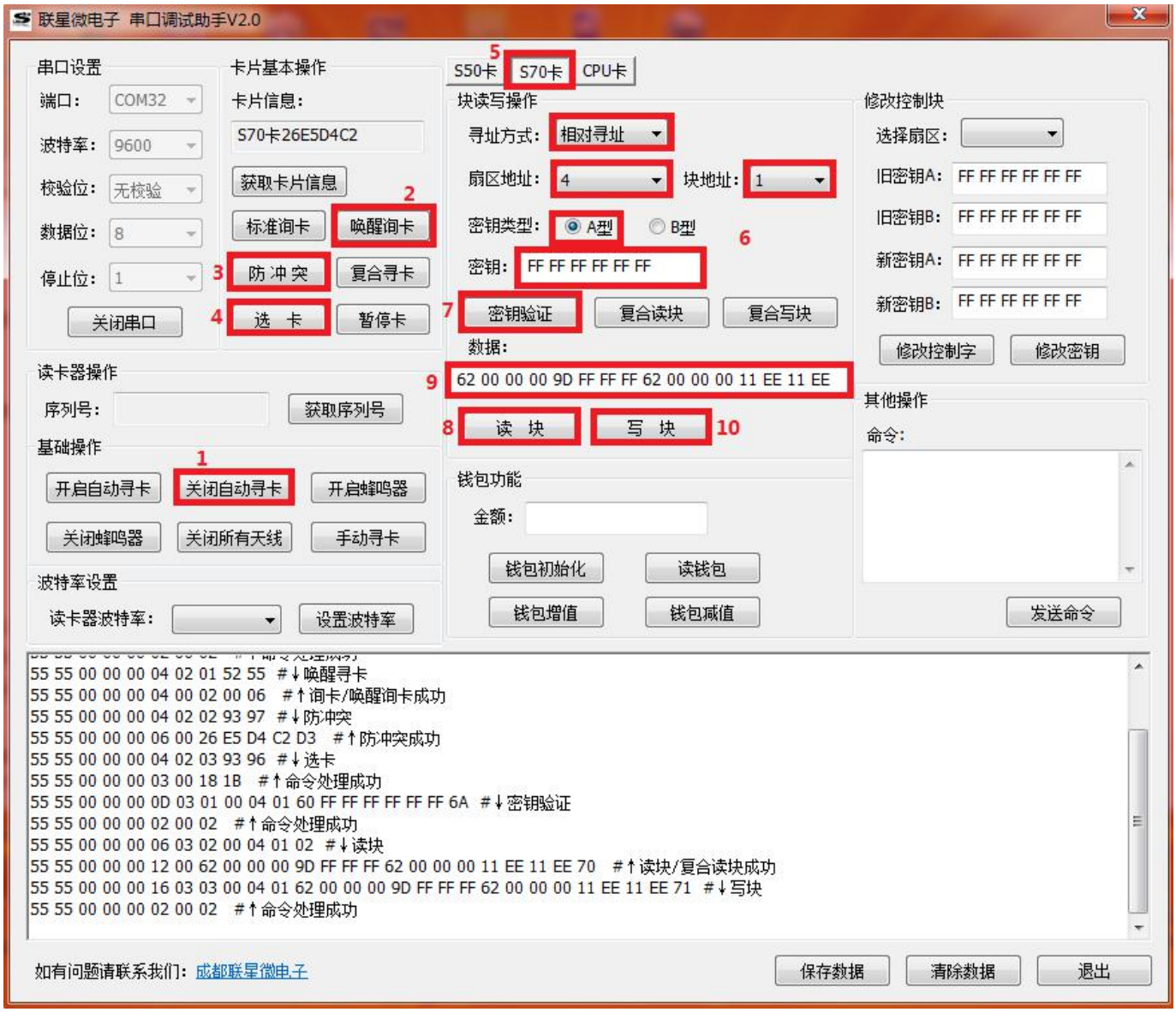
"Wallet function" is suitable for S50 and S70 cards. Wallet operations are also essentially block operations, and the first three

blocks of each sector can be used as wallets (except the first block of the first sector). In the "amount" input box, fill in the value to be filled (decimal), click the "wallet initialization" button, and the corresponding block will immediately become a wallet.

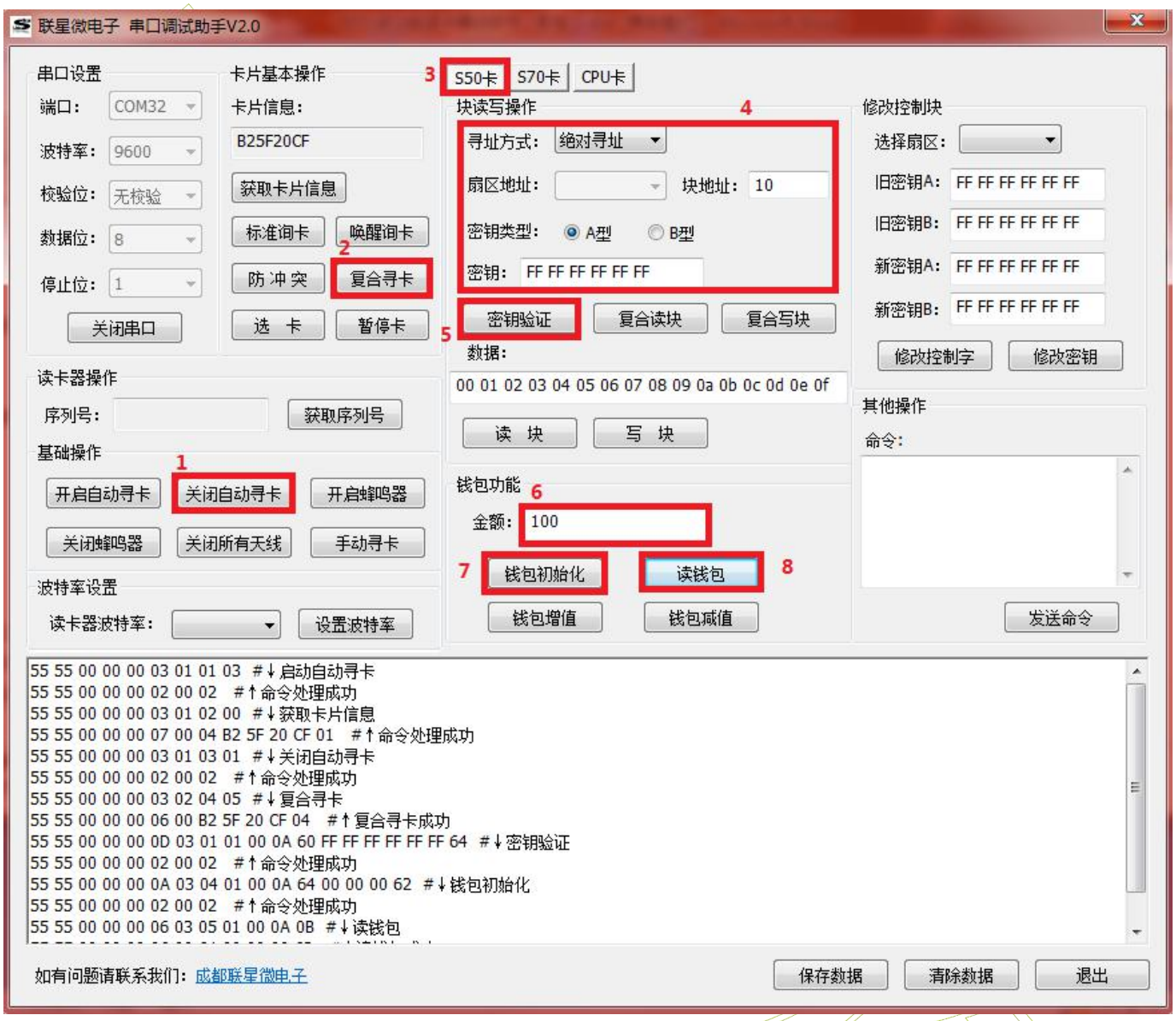
The "Modify Control Block" column is suitable for S50 and S70 cards. This column belongs to advanced application. For the item of "modifying control word", the operator must be fully familiar with S50 or S70 card storage structure and privilege management methods in order to operate on it. Otherwise, it may lead to lock cards, card abnormalities and so on. The "Modified Key" item is used to modify sector keys. Each sector can be set separately, and the key is six hexadecimal data. Keys are not readable, and the system will not store them specially. You must be careful to modify the keys.

"Other Operations" is a high-level application. Operators must be familiar with the communication protocol between the card reader and the host computer in order to operate.

Read and write S70 card operation legend:

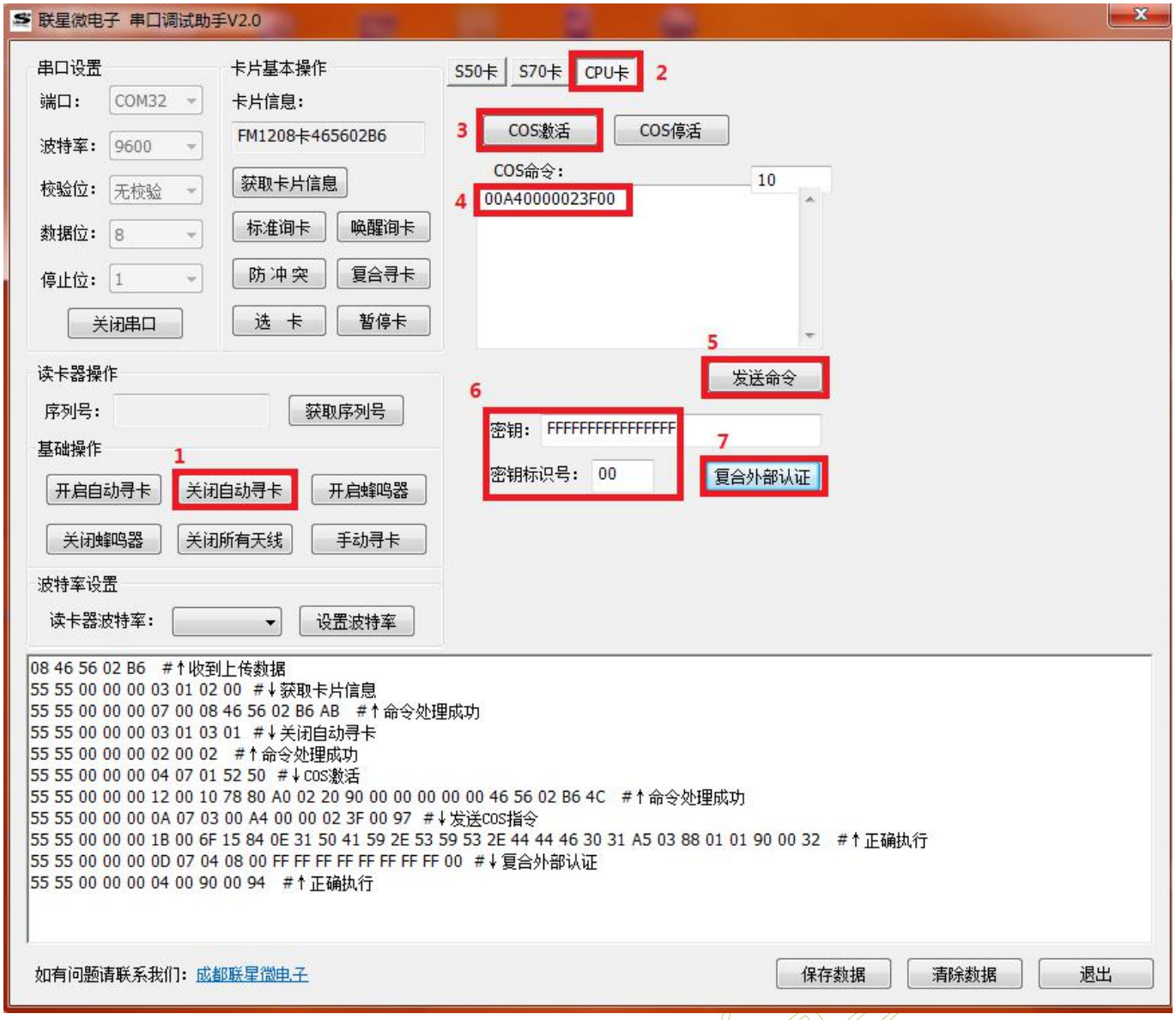


S50 Card Wallet Operation Legend:



The value added and the value impaired of the wallet are entered in the "amount" input box.

Fudan CPU card operation legend:



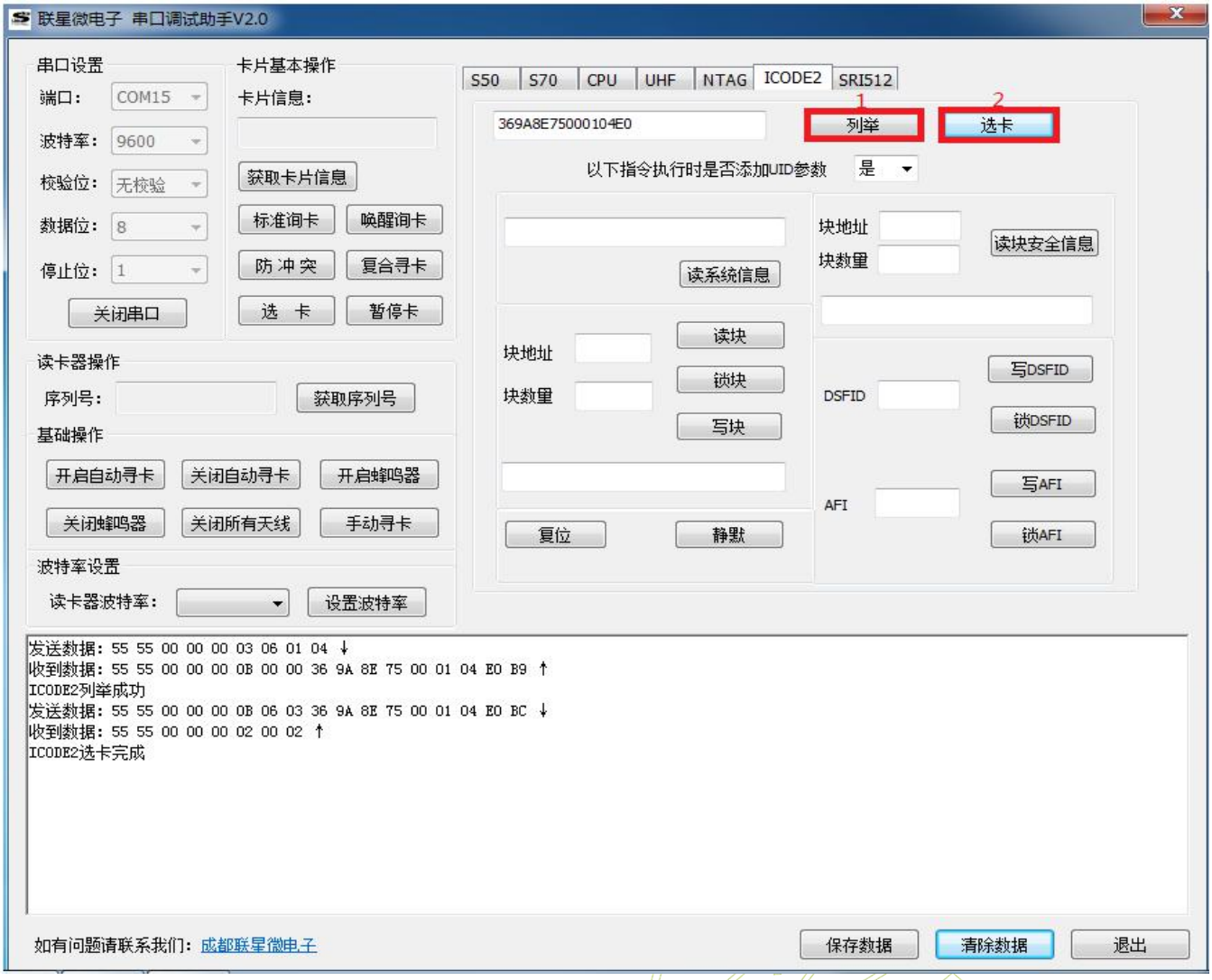
In step 4 above, you enter the MF file command. Enter the COS command and click Send Command

Step 6 and 7 are the external authentication process of CPU cards, listed separately as commands. It is more complicated to input instructions to authenticate in COS instructions. This software intentionally reduces the complexity of authentication. It only needs to input keys and key identifiers to complete authentication.

For the specific usage of COS instructions, please refer to the corresponding CPU card COS instruction operation manual.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

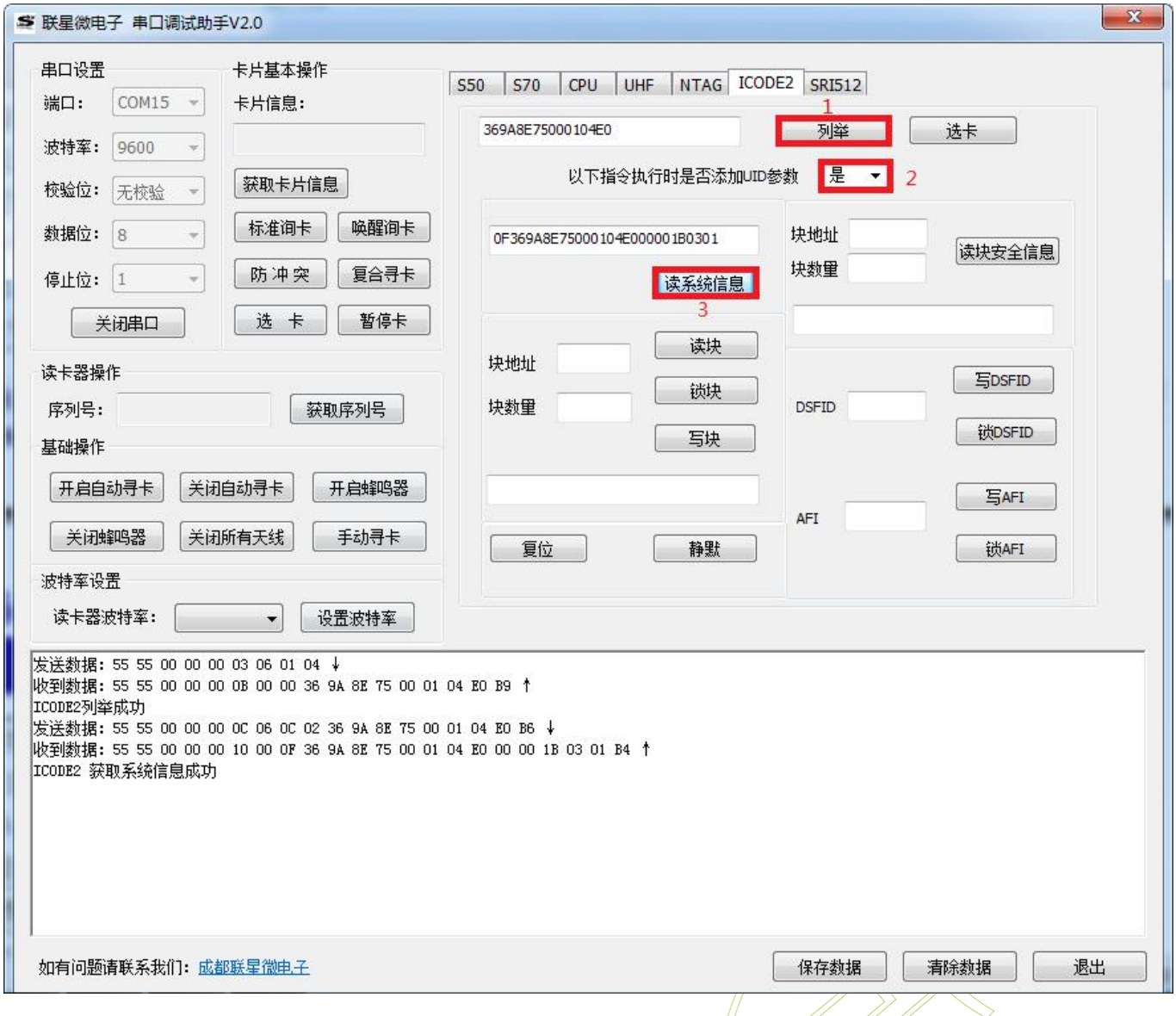
ICODE2 card operation Illustration 1 (enumeration, card selection):



The "enumeration" instruction of ICODE2 is the card-seeking instruction. The "card selection" instruction does not have to be operated, but after the card selection, other instructions do not need to add UID parameters. Select "No" in "Whether to add UID parameters when the following instructions are executed". When you do not execute the "Select Card" instruction, but to execute other instructions, you must select "Yes" in the drop-down box "Whether to add UID parameters when the following instructions are executed" and enter UID in the text box on the left of the Enumeration button.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

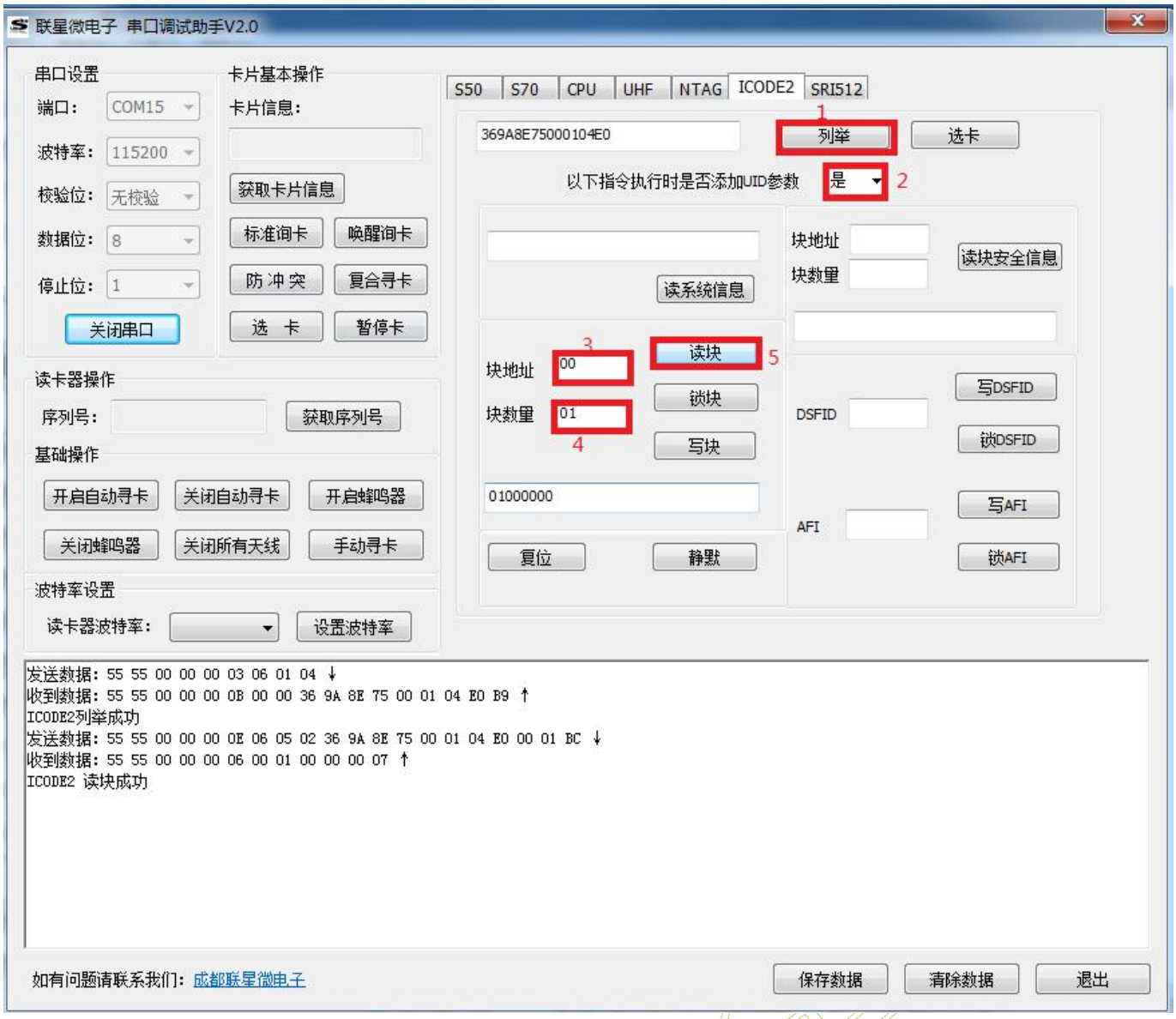
ICODE2 card operation legend II (reading system information)



After the instruction of "read system information" is executed, the parameters such as card UID, AFI, DSFID will be returned. Please refer to the relevant instructions in Chapter 9 for details.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

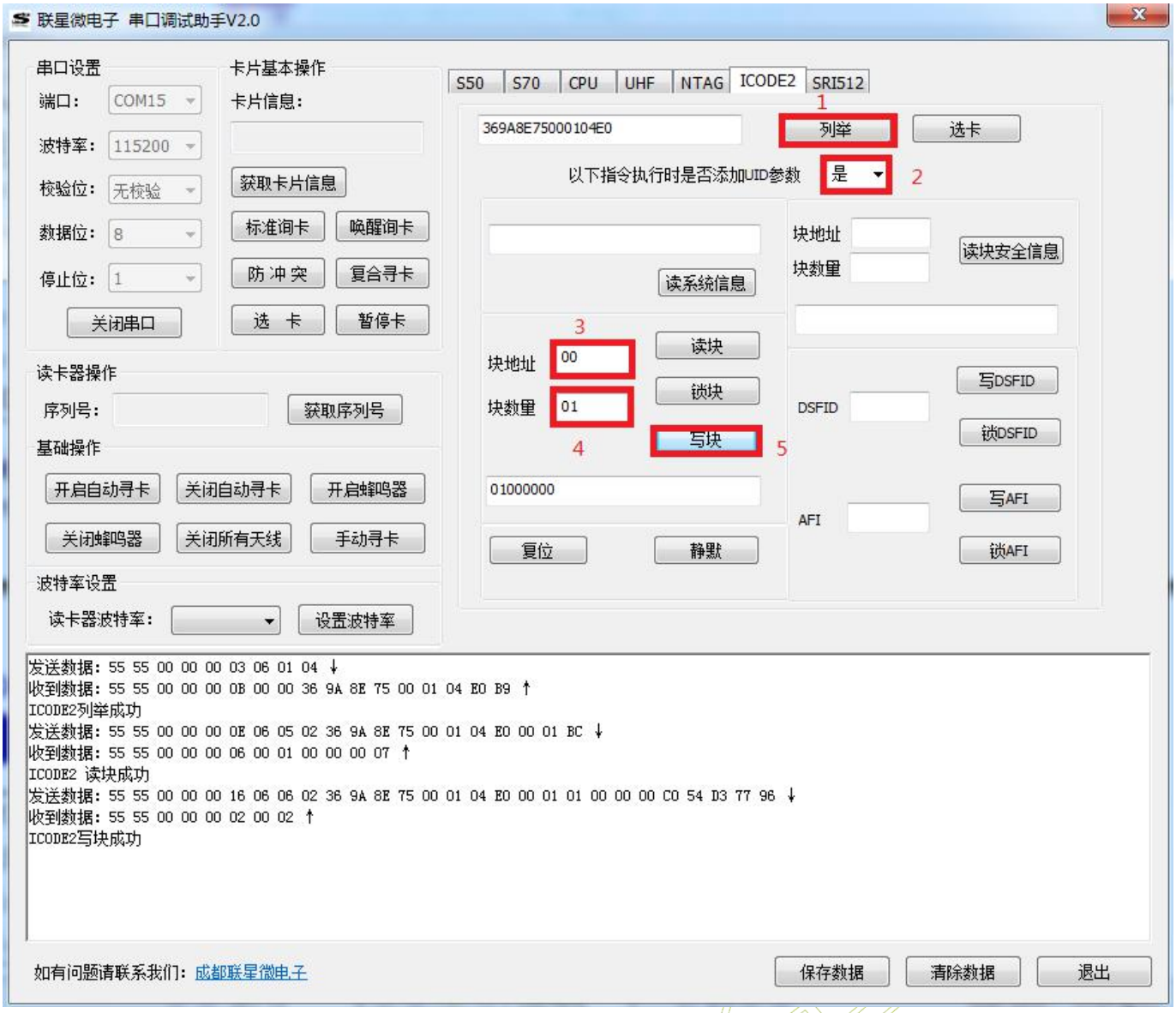
ICODE2 card operation legend 3 (reading block)：



Fill in decimal data in Block Address and Number of Blocks. "Block Address" is the first address, and "Block Number" should not exceed 15. "Block Address"+Block Number"shall not exceed the memory boundary of ICODE2 card.

Note that in order to issue command operation cards, you must first turn off the automatic search card. "Lock block" operation is irreversible, once a block is locked, the block will only read, not write.

ICODE2 card operation legend 4 (writing block)：



The "write block" instruction can only write one block at a time, four bytes. Four bytes of hexadecimal data must be entered in the edit box.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

ICODE2 card operation legend 5 (write AFI):

The "Write AFI" instruction can only write one byte. Hexadecimal data must be entered in the AFI edit box. "Lock AFI" operation is irreversible, once locked, AFI will only read, not write.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

ICODE2 card operation legend 6 (writing DSFID):

"Write DSFID" instruction can only write one byte, "DSFID" edit box must enter hexadecimal data. "Lock DSFID" operation is irreversible, once locked, DSFID will only read, not write.

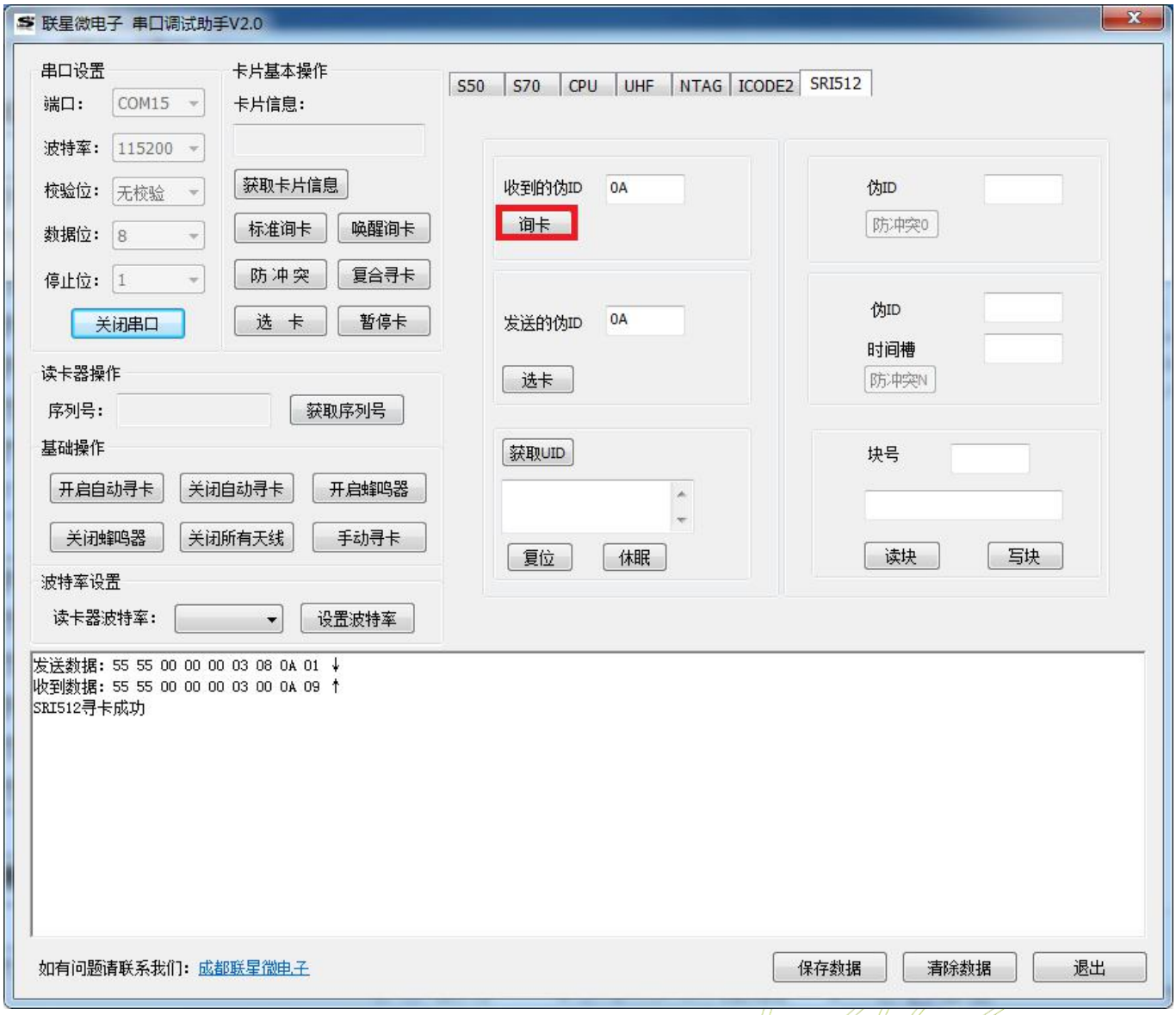
Note that in order to issue command operation cards, you must first turn off the automatic search card.

ICODE2 card operation legend 7 (read block security information):

"Read Block Security Information" is similar to the "Read Block" instruction. Enter the first block address in Block Address and the number of blocks to read in Block Number. The text box below will display block security information identifiers, one block corresponding to a byte.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

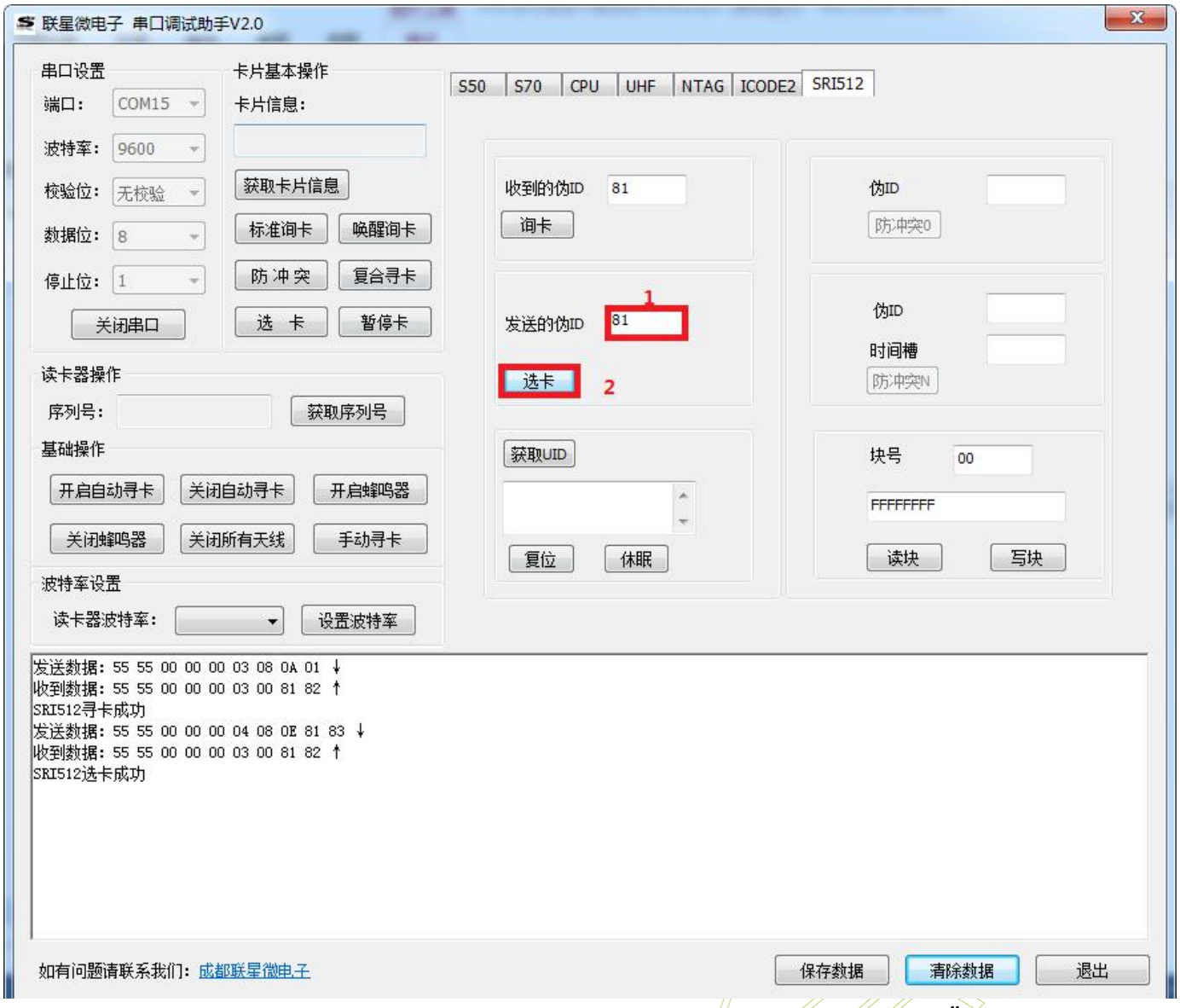
SRI512 card operation legend 1 (inquiry card):



After the "inquiry card" instruction, the card reader will return the pseudo ID as a parameter of the card selection.

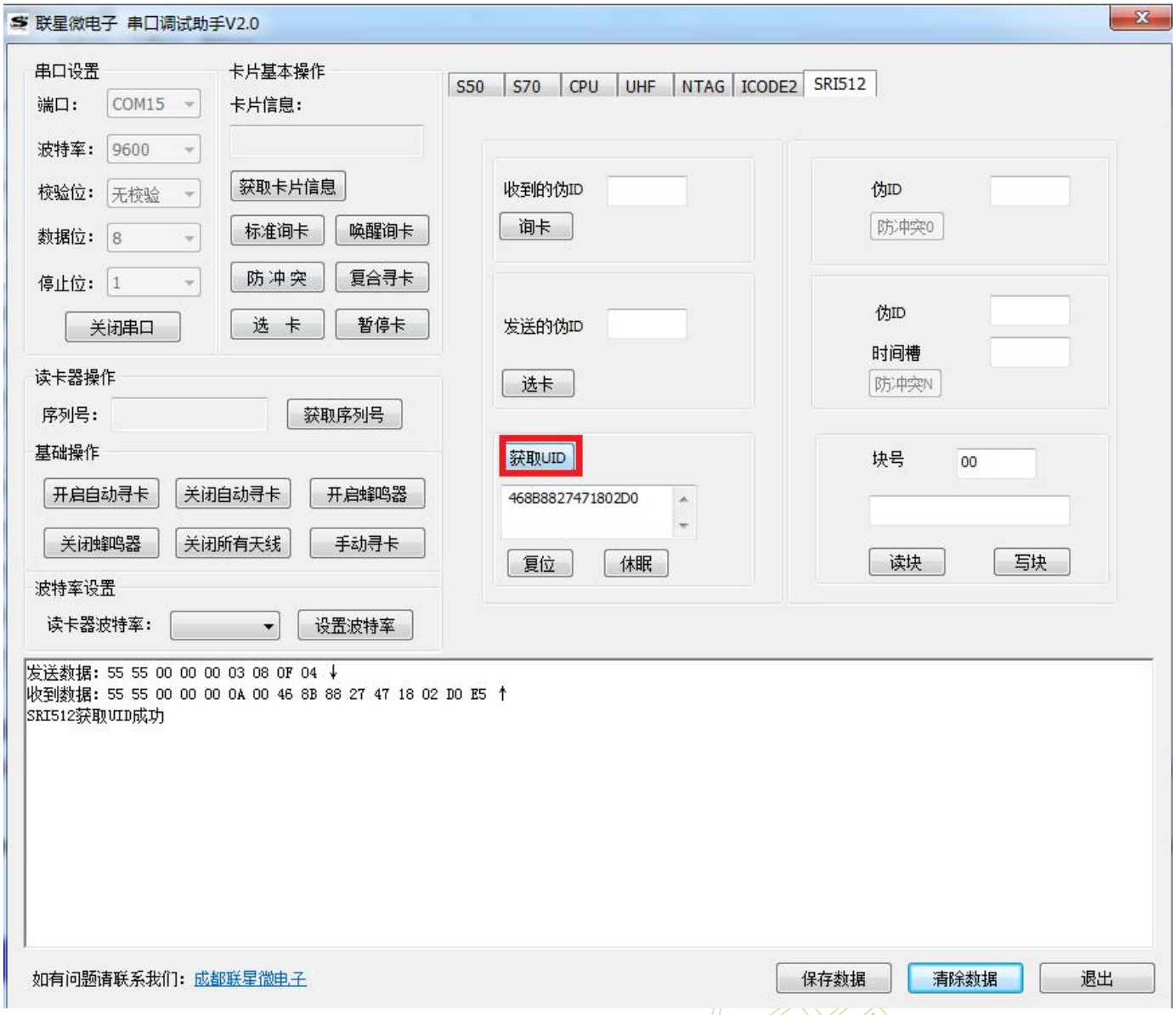
Note that in order to issue command operation cards, you must first turn off the automatic search card.

SRI512 card operation legend II (card selection):



Before reading and writing SRI512 and acquiring UID, the "card selection" instruction must be executed first. Note that in order to issue command operation cards, you must first turn off the automatic search card.

SRI512 card operation legend 3 (obtaining UID)：



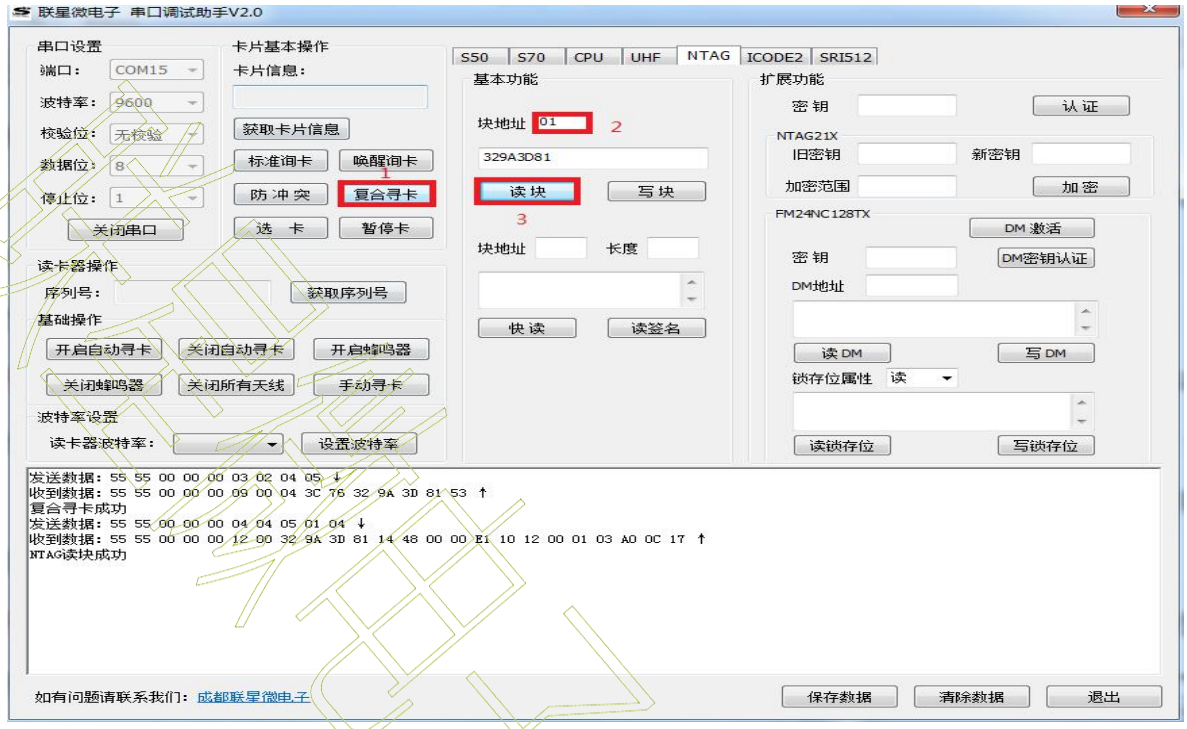
Note that in order to issue command operation cards, you must first turn off the automatic search card.

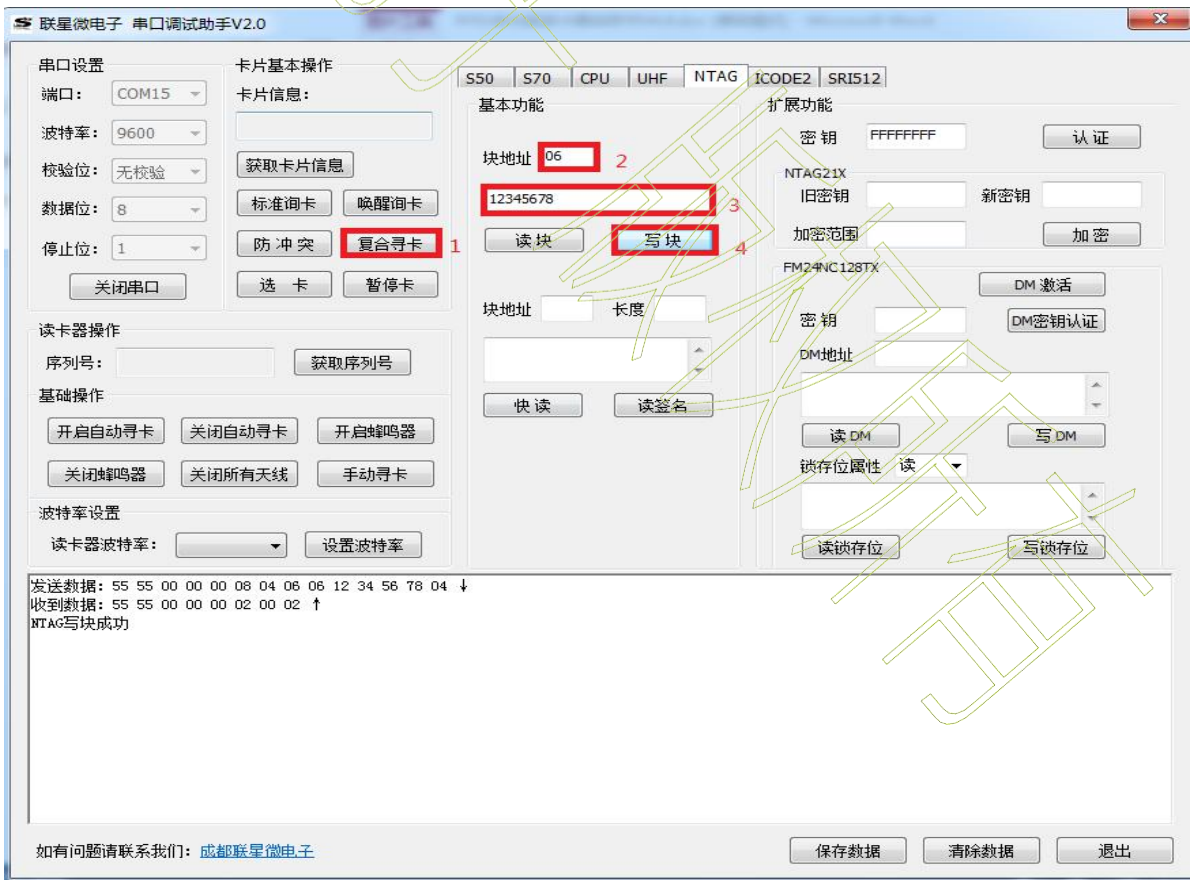
Legend IV of SRI512 Card Operation (Read and Write Block)：

The decimal data is filled in the common parameter "block number" of "read block" and "write block" instructions.

The text box contains data written or received in 4 bytes, in hexadecimal format.

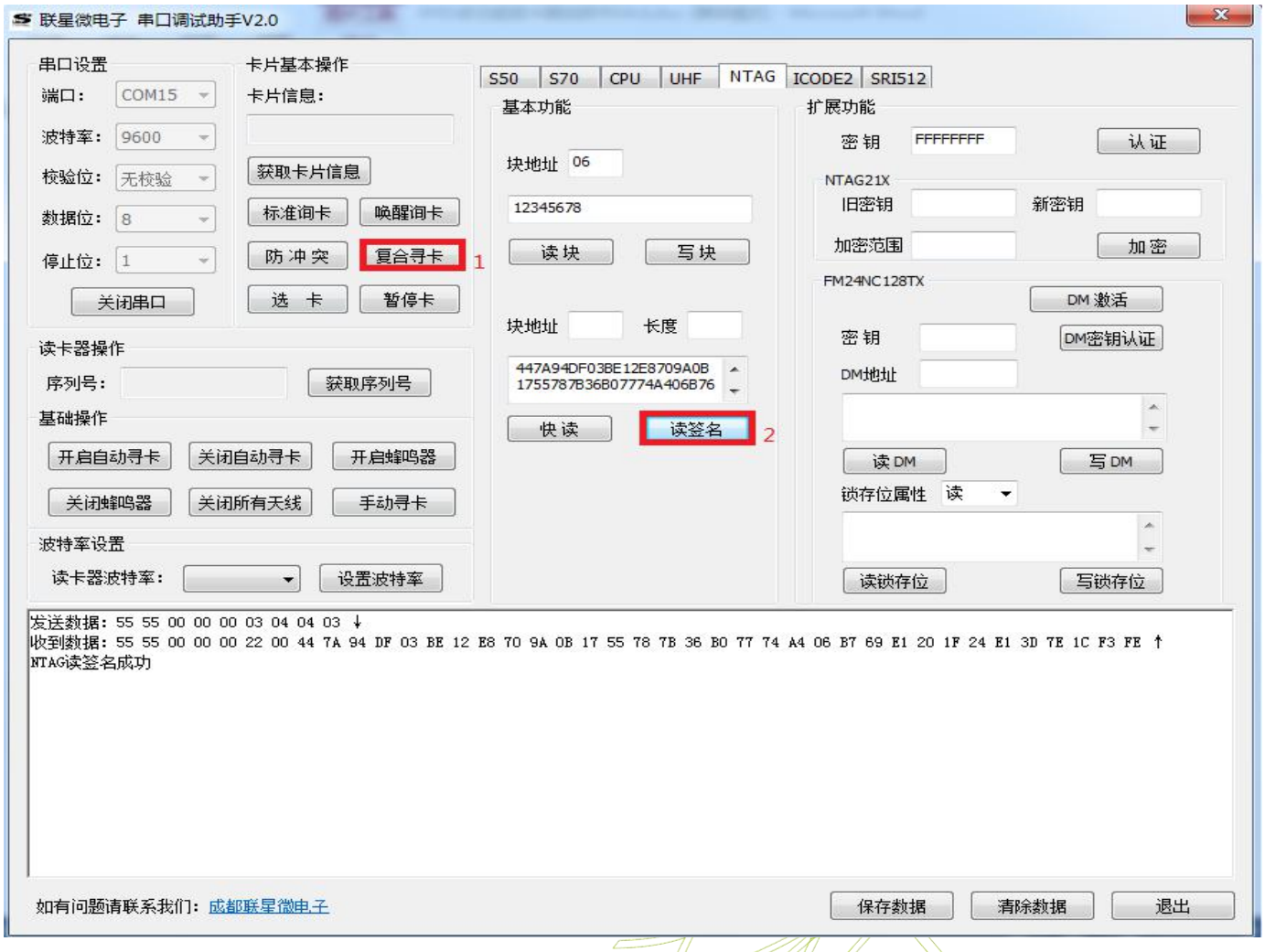
Legend 1 of NTAG Card Operation (Read and Write Block):





The decimal data is filled in the common parameter "block number" of "read block" and "write block" instructions. The text box contains data written or received in 4 bytes, in hexadecimal format.

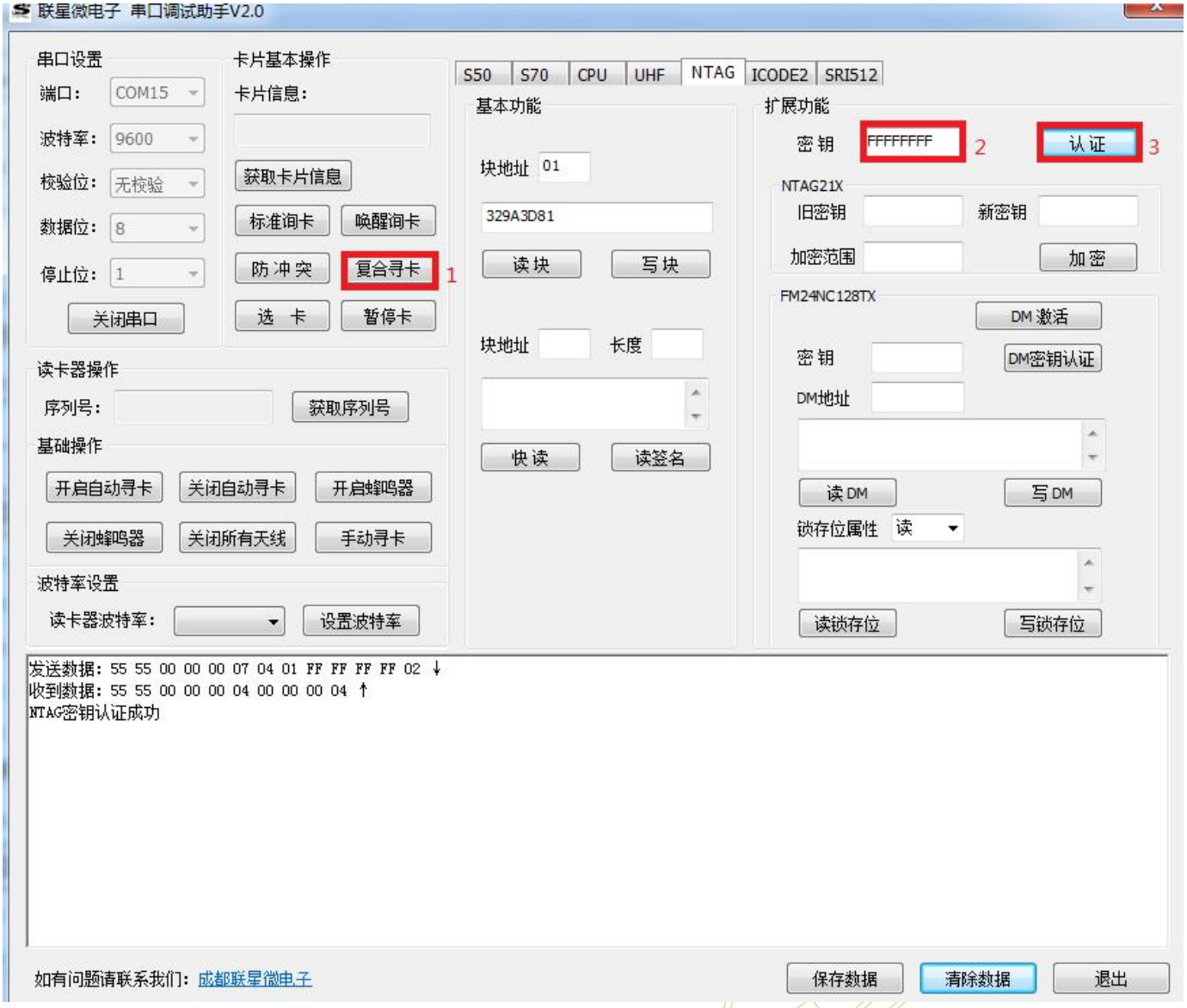
NTAG card operation legend II (read signature)：



The read signature operation is only for NTAG21X series, and no parameters are required.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

Legend 3 of NTAG Card Operation (Key Authentication and Settings):



Whether authenticated or set, the key is 4 bytes of hexadecimal data. Only encrypted blocks require authentication.

Note: The key data should be kept by the user. The reader will not retain the private key. If authentication is required, the user must fill in the key himself, and the key cannot be fetched from the system.

Note that in order to issue command operation cards, you must first turn off the automatic search card.

UHF (UHF) Card Operation Legend I (Inventory):

Inventory instructions are used to obtain card EPC, including protocol control words (the first two bytes) and CRC16 check words (the latter 2 bytes).

Note that the auto-search card must be turned off before sending instructions. The following is not repeated.

UHF (UHF) Card Operation Legend I (Read-Write Memory):

1. Select the storage area to access.

2. Enter the first address in decimal format. The upper limit of module design is 16384, but it should be based on the actual card.

3. Enter the length of the word to be accessed, in words, one word equals 2 bytes. Decimal format.

4. When you click "Read Storage", the read data is displayed in the text box below. When you click Write Storage, write the data in the text box below to the card.

The text box must be entered with hexadecimal data.

Other operation instructions of UHF (UHF) card:

Locked Memory is used to restrict access to storage. "Mask bit" and "active bit" input 2 bytes of hexadecimal data, the specific format refers to the relevant instructions in Chapter 9. Password Validation and Destruction Card require input of 4 bytes of hexadecimal data.

Legend of parameter configuration:

The "Parameter Configuration" window is used to configure some default parameters of the card reader, which is permanently valid after configuration.

1. "Turn off/turn on the auto-search card" is used to set whether to turn off the auto-search card function of the card reader.
2. "Turn off/turn on the buzzer" is used to set whether or not to turn off the buzzer of the card reader.
3. "Read UID without prefix/add prefix" is used to set whether the prefix is removed from the UID packet returned by the automatic reader card.
4. "UID Inverse/Sequential Output" is used to set whether the UID returned by the automatic reader card is output in reverse order.
5. "Setting device baud rate" is used to set the baud rate of card reader. This function only applies to UART, RS232 and RS485.
The card reader of the interface is valid.
6. "Setting device address" is used to set the address of card reader. When multiple card readers are applied to the same system at the same time, it helps to distinguish and avoid conflicts.

7. "Get device address" is used to get the address of the current card reader. When using this command, there must be only one card reader in the system

Appendix 3: Installing USB-CDC Driver under Windows XP

1. When the USB device first accesses the PC, the system prompts to find the new hardware, and pops up the following dialog box to ask whether to search online. Please click "No, no for the time being" and "Next step".

2. The system asks where to find the installation file. Please click "Install from list or specified location" and "Next step".

3. Please click the "Browse" button to find the driver folder we provide you (32-bit system please select "X86", 64-bit system please select "64"), click "Next".

4. The system checks the compatibility of the software. Please select "Still Continue".

5. The driver was installed successfully. In Device Manager, you can find an additional serial port. Please pay attention to the serial password. When you open the serial debugging software, you must select this serial password.

Appendix 4: Installing USB-CDC Driver under Windows 7

1. The first time a USB device is inserted into a computer with a WIN7 system, the system will automatically find a driver for installation. When the driver is not found, there is only a brief hint.

2. When you insert the device for the second time, the system may not have any prompts. The best way to verify that the driver has been installed successfully is to call out the Device Manager for inspection. As shown in the figure below, the device marked with yellow background exclamation marks indicates that the device driver has not been installed correctly.

3. Right-click on the device and select "Update Driver Software"

4. Pop up the dialog box and select "Browse the computer to find the driver software"

5. Click the "Browse" button to find the driver we provide (32-bit system please select "X86", 64-bit system please choose "64". As shown in the figure below, click Next

6. Verify the security of Windows system and select "Install this driver software all the time"

7. Next, the pop-up window shows that the installed device is a serial device with a serial number of 42, or COM42.

8. In Device Manager, the exclamation mark next to the device disappears, indicating that the driver has been successfully installed.

Appendix 5: Installing USB-CDC Driver under Windows 8

Windows 8 has a stricter checking mechanism for device drivers. Therefore, before installing the driver, the following tasks need to be done:

1. Hover the mouse over the upper right corner or the lower right corner of the screen. The right side of the screen will change as shown in the following figure. Click Settings.
2. Click "Change Computer Settings".
3. Click "General", find the "Advanced Start" item in the right column, and click "Restart immediately".
4. When the computer restarts, the following interface will appear. As shown in the figure, click "Troubleshooting".
5. Select Start Settings.
6. Click "Restart".
7. When the "Start Settings" interface appears, find and press the function key "F7" in the keyboard.
8. When the system is restarted, the reader will be connected to the USB interface of the PC. Open Device Manager, right-click LS6828, and select Update Driver Software as shown in the figure below.

The next operation is the same as installing driver under Windows 7 system.

9. Select "Browse the computer to find driver software".
10. Click "Browse" to point to the directory where the driver (INF file) is located. Users of 64-bit system choose the folder "64", and users of 32-bit system choose the folder "x86".
11. Next, the system verifies the security of the driver. As shown in the following figure, select "Always install this driver software".
12. Driver installation is completed.

Appendix VI: Using USB-CDC Card Reader under Android

If you want to use USB-CDC card reader under Android system, the hardware and software need to meet the following conditions:

1. The hardware platform of Android system must support USB-OTG function.

2. Android system supports USB debugging function. Open USB Debugging by Settings - > Developer Options. Some platforms may need "root".

3. Install the application. Simple universal serial port software such as "Android USB Serial Monitor" can be used after setting baud rate and display mode correctly, but only data can be received. Our company also has special software for professional testing only. This document does not introduce the method of use.

4. Select high-quality USB data line, the length of the line is as short as possible, the total length is best below 1.5 meters. You can use USB first.

Mouse or USB keyboard for testing.