RFID READER

13.56MHz Reader/Writer

# SL500

# User Manual

Version 2.6

Dec 2009

StrongLink

# CONTENT

# 1. GENERAL INFORMATION

- RS232 or USB Interface
- 4.5 ~ 5.5VDC Operating
- Windows 32 Operating Systems Compatibility
- 13.56MHz RF Operating Frequency
- ISO14443A ISO1443B ISO15693 Protocols
- 150MA Working Current
- Operating Temperature Range: -20°C ~ +50°C
- Storage Temperature Range: -25°C ~ +60°C
- Dimension: 110 × 81 × 26 mm
- Weight: 100g

# 2. TYPES AND EXPLANATION

SL500 series readers are in accord with ISO14443A, ISO14443B and ISO15693 protocols, and are classified as following sheet

| | SL500L | SL500A | SL500D | SL500F |
|---|---|---|---|---|
| ISO14443A | √ | √ | | √ |
| ISO14443B | | | | √ |
| ISO15693 | | | √ | √ |

NOTICE: The difference between SL500L and SL500A

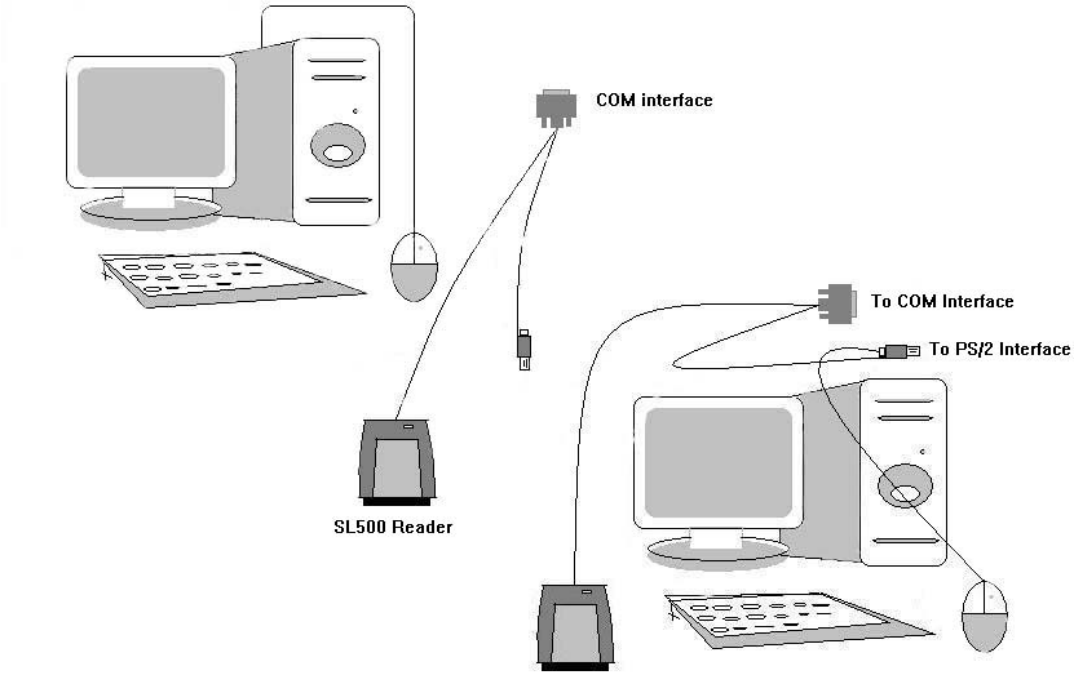
SL500L supported cards: Mifare_1k, Mifare_4k, UltraLight

SL500A supported cards: Mifare_1k, Mifare_4k, UltraLight, Mifare_ProX

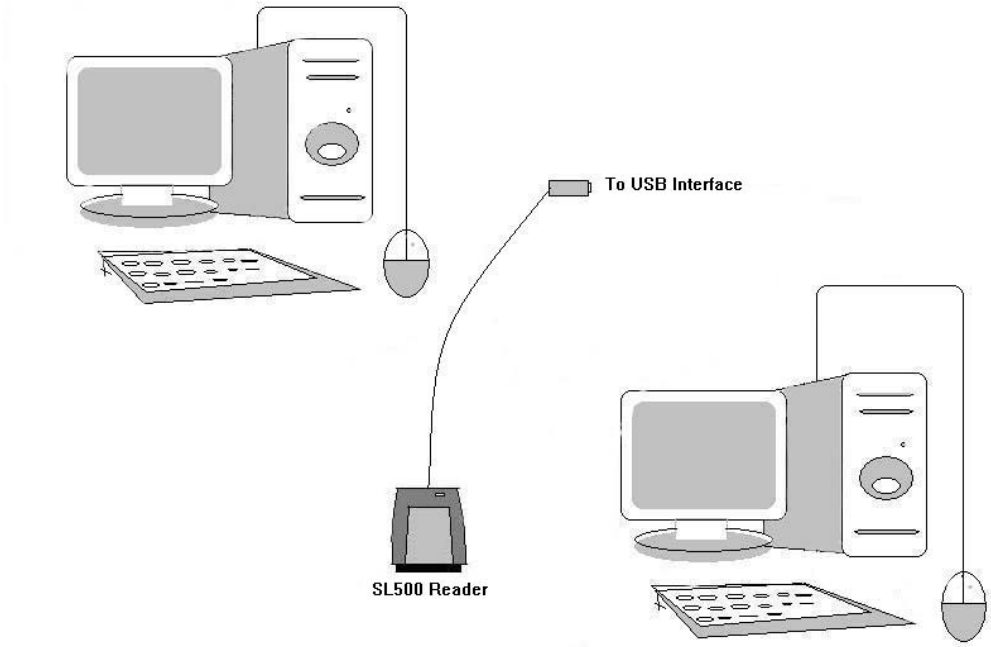
# 3. CONNECTING TO PC

## 3.1 SL500-RS232

The PS/2 port power to Reader

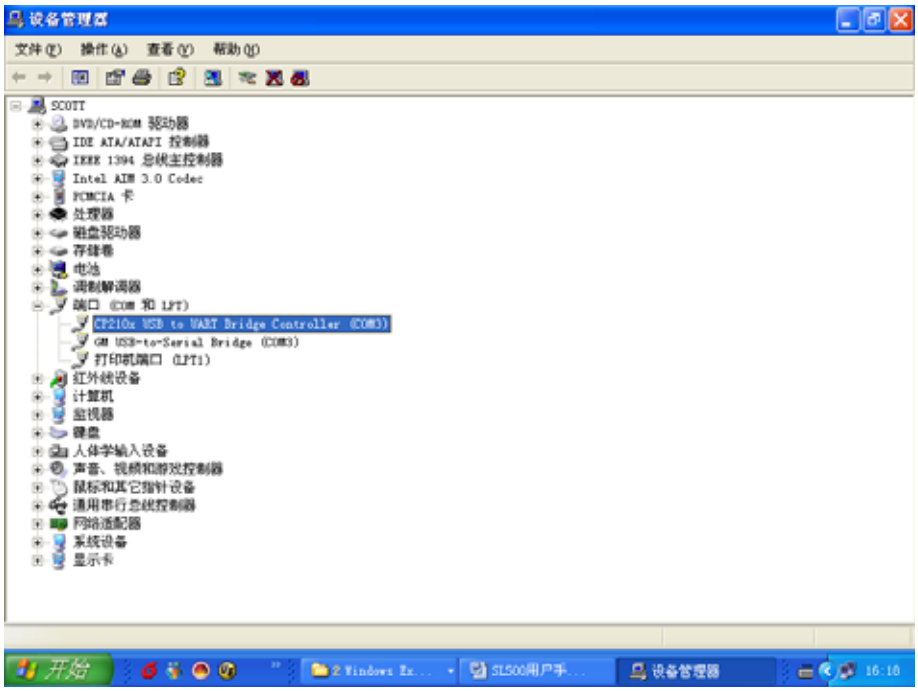


## 3.2 SL500-USB




SL500-USB Reader is USB bridge to COM. Connect SL500 to the USB port of PC, after installing the driver will come out a virtual COM, the operations hereafter are as same as SL500-RS232.

You can find the virtual COM number on the “Device Manager ” as follows:



# 4. SDK

Responding InstDemo.exe to install the DEMO software and the DLL of the reader to PC, and create corresponding logo on the desk.

The default installation directory is C:\RFREADER, including the following content:

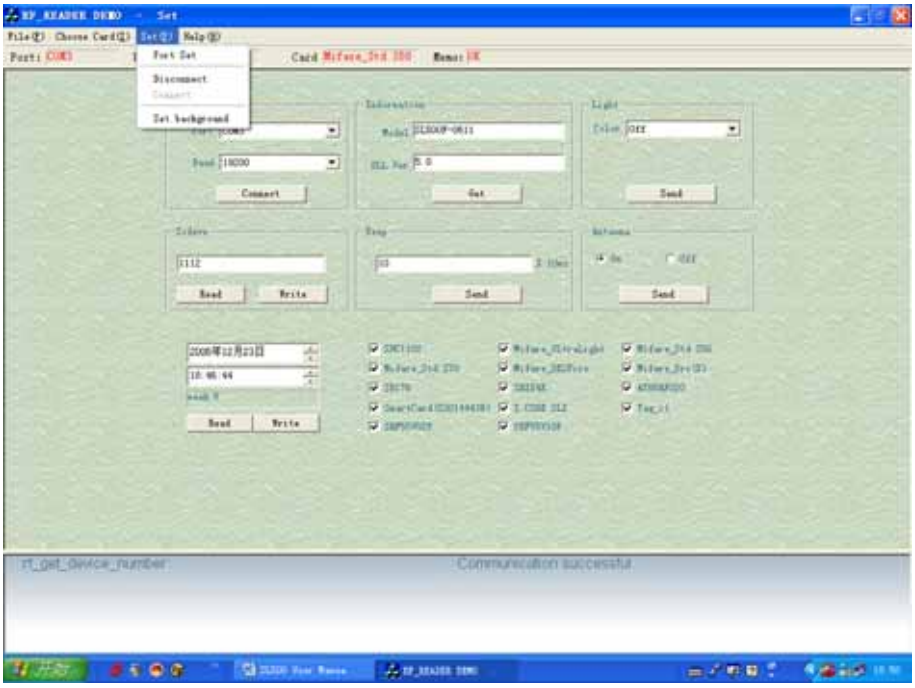
| | |
|---|---|
| C:\RFREADER\Examples | Sample source code |
| C:\RFREADER\UsbDriver | USB interface driver |
| C:\RFREADER\ICTransfer.exe | DEMO software |
| C:\RFREADER\MasterRD.dll | Reader interface library with application |
| C:\RFREADER\MasterCOM.dll | Connect and transfer data with COM device. |
| C:\RFREADER\SL_Paper.dll | DEMO software background library |
| C:\RFREADER\RFHELP.chm | DLL explanations at chm format |
| C:\RFREADER\AppConfig.ini | DEMO software configuration files |

# 5. DEMO

This software run on Win32 system, and need 1024 x 768 dpi at least

## 5.1 Online

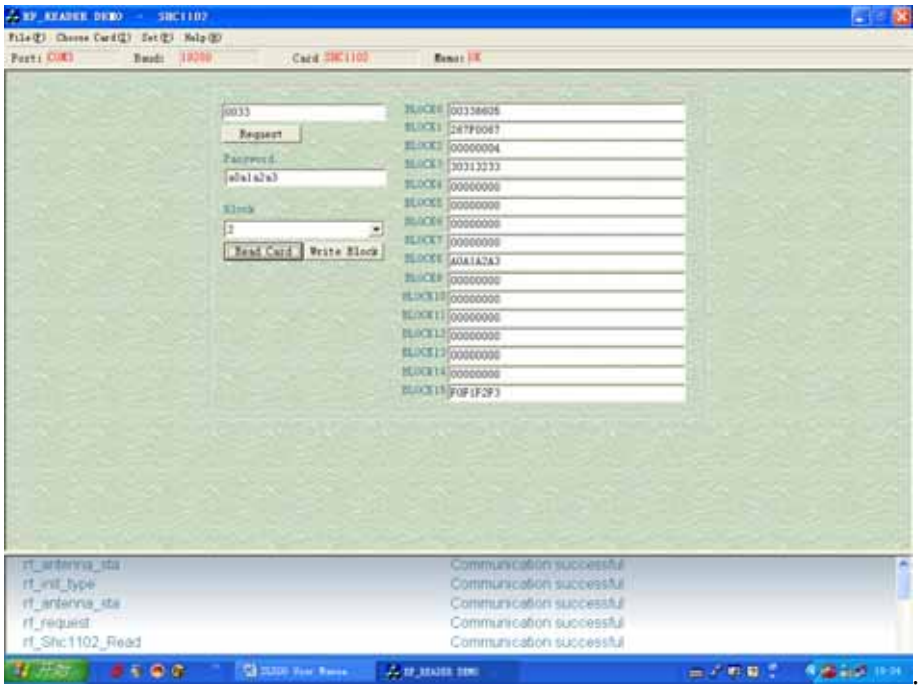
Choose the correct COM number, click [Connect] button to connect the Reader to PC. Click [Read] the product information button, you can check the specific type of the Reader and the supported cards.



## 5.2 SHC1102

Click [Request] button to obtain the card serial number.

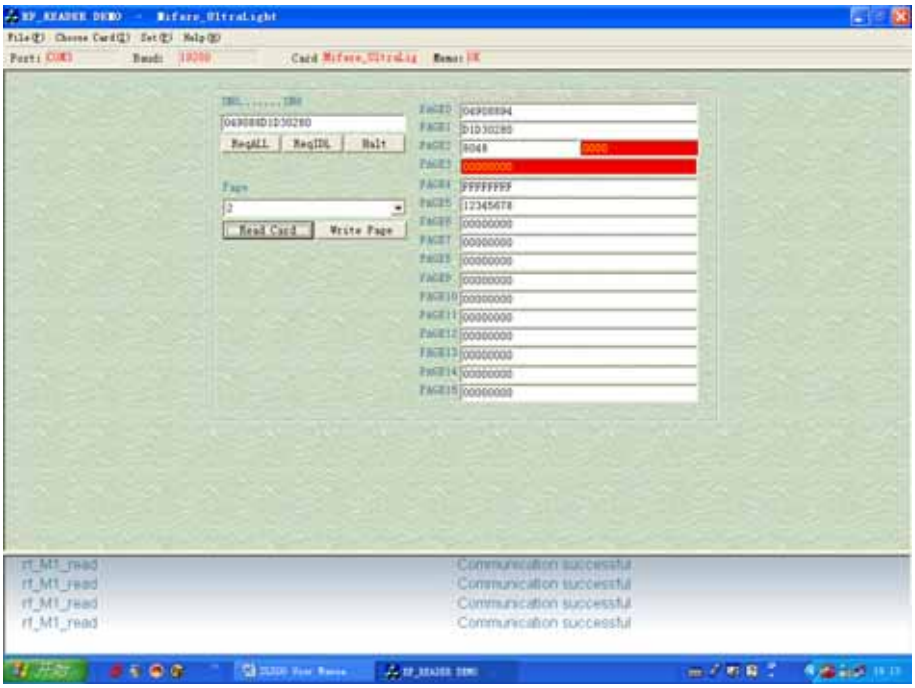
Input the correct key to read/write the card



## 5.3 UltraLight

Click the [Request] button to obtain the card **S**erial **N**umber.

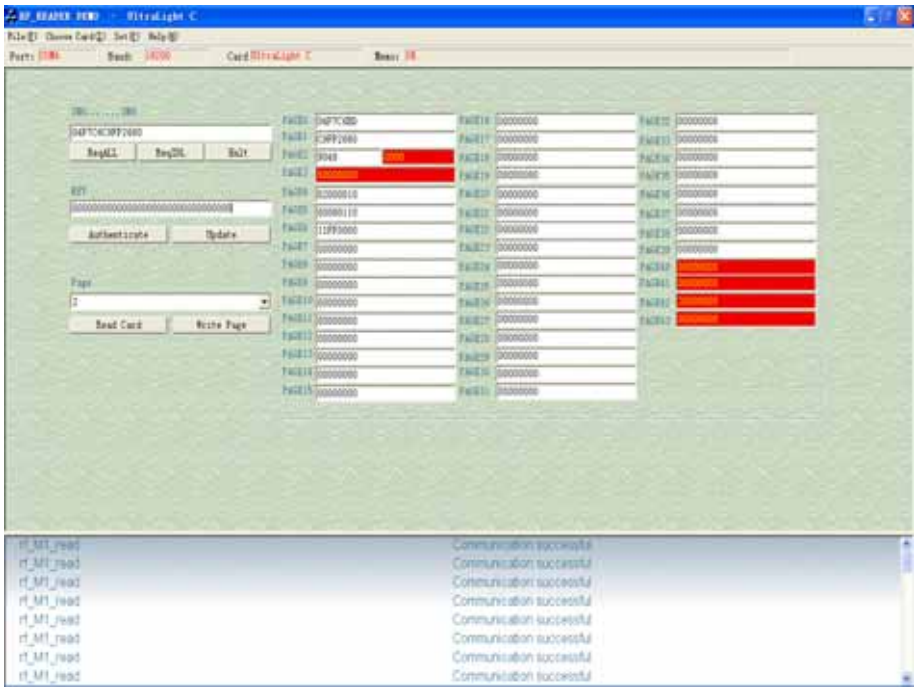
Choose the corresponding address to read/write the card.



## 5.4 UltraLight C

Click the [Request] button to obtain the card **S**erial **N**umber.

Choose the corresponding address to read/write the card



## 5.5 Mifare_1k (STD S50)

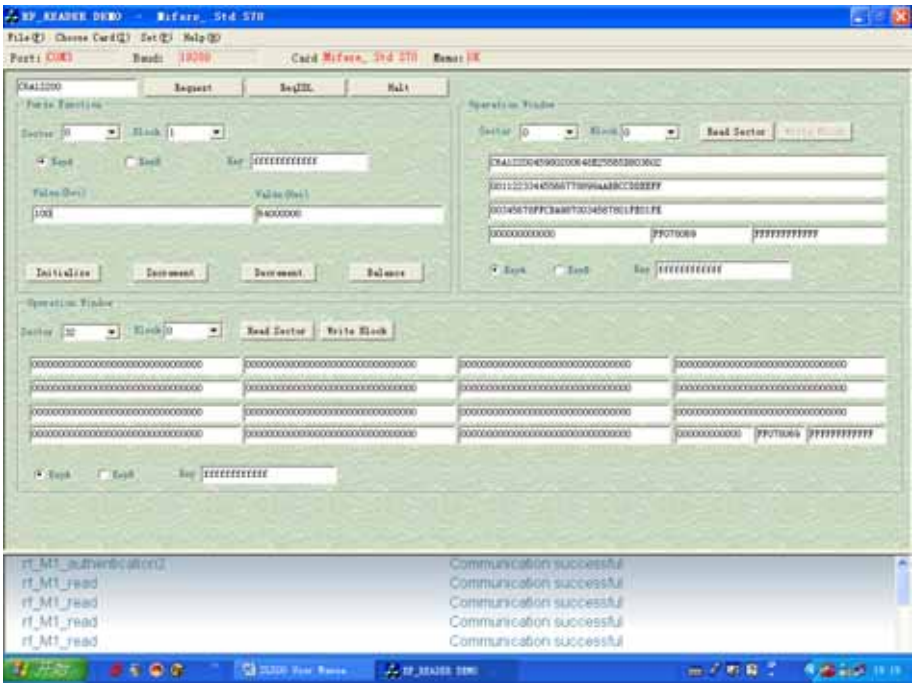
Click the [Request] button to obtain the card serial number.

Input the correct password to read, write, increase or decrease the card.

## 5.6 Mifare_4k (STD S70)

Click the [Request] button to obtain the card serial number.

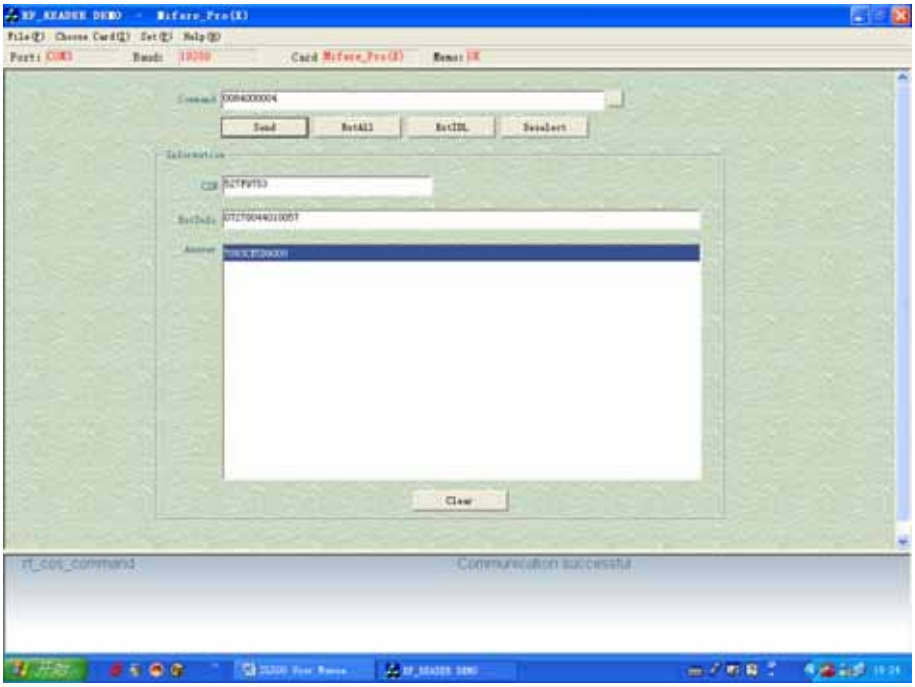
Input the correct password to read, write, increase or decrease the card.



## 5.7 Mifare_ProX

Click [Reset] button to obtain the serial number and the reset information of the card according to ISO14443-4 protocol.

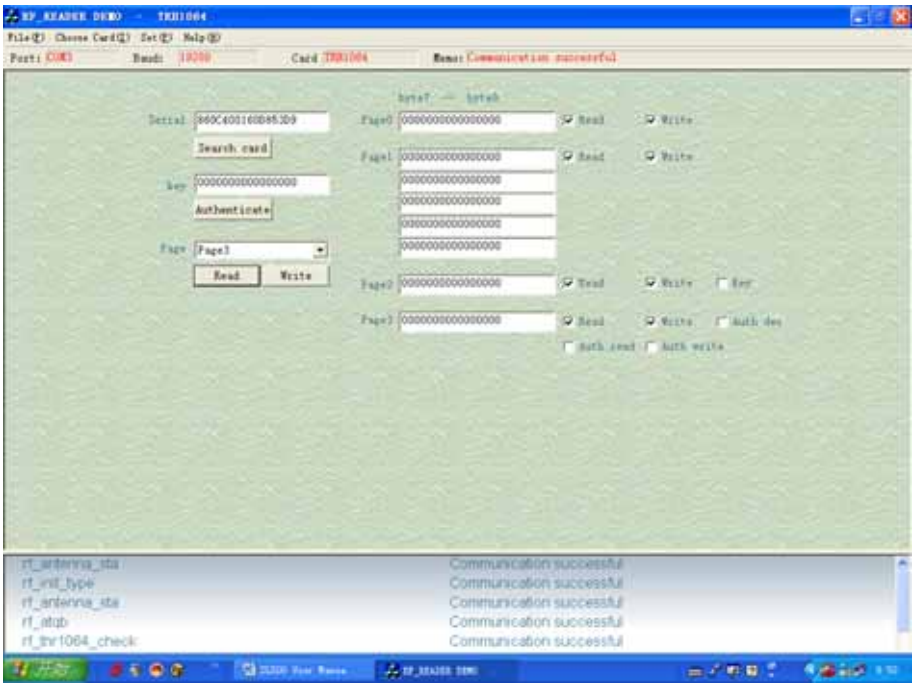
Input the COS command, click [Send] button to commute data to card.



## 5.8 TRH1064

Click [Request] button to obtain the card serial number.

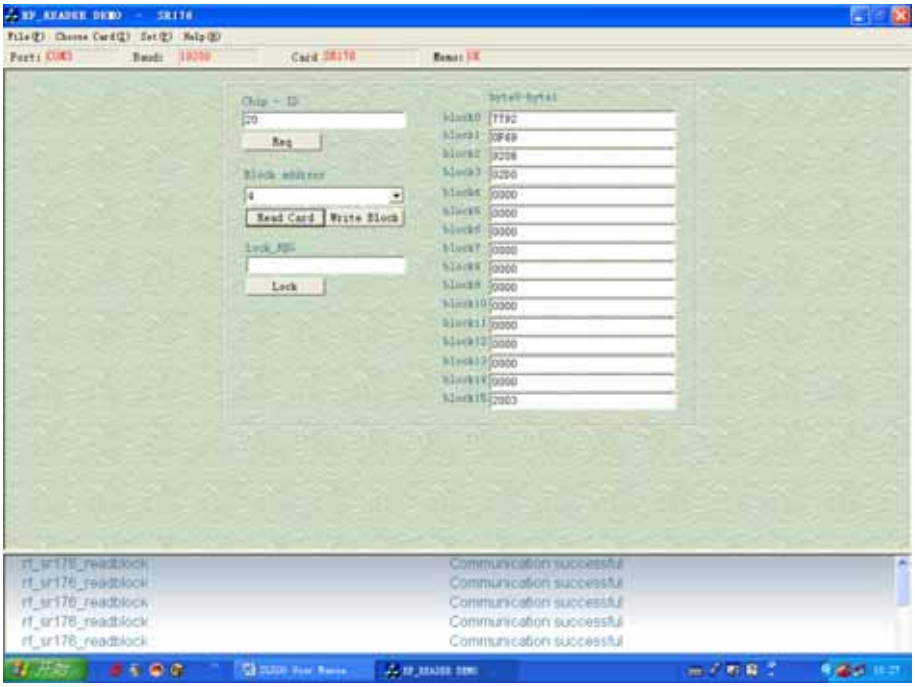
Hereafter can read, write and validate.



## 5.9 SR176

Click [Req] button to obtain the ID number of the card.

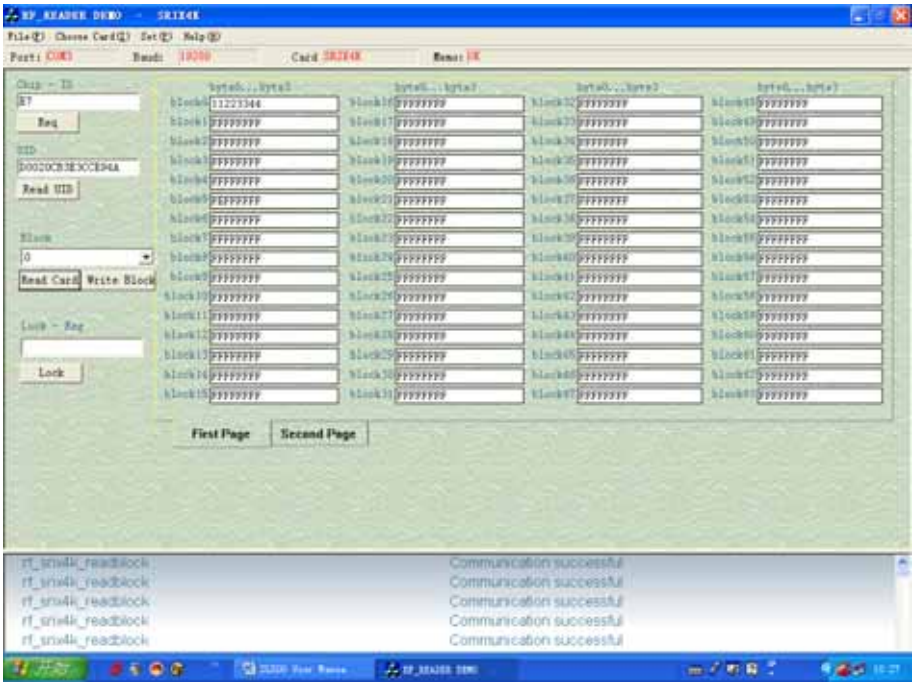
Then you can read, write and lock blocks of the card.



## 5.10 SRIX4K

Click [Req] button to obtain the ID number of the card and click [Read UID] to obtain the UID of the card.

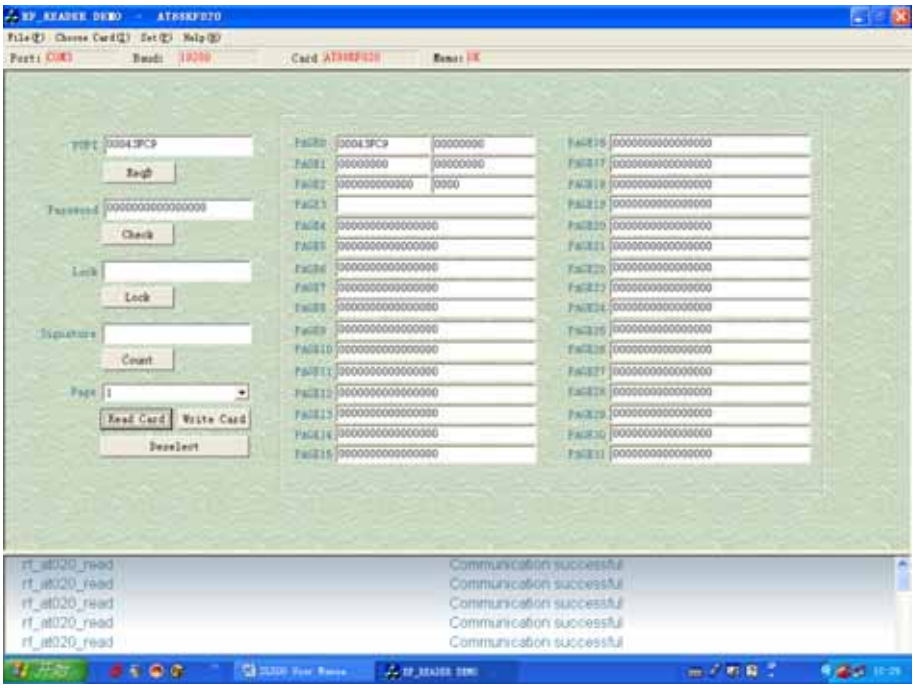
Then you can read, write and lock blocks of the card.




## 5.11 AT88RF020

Click [ReqB] button to obtain the serial number of the card.

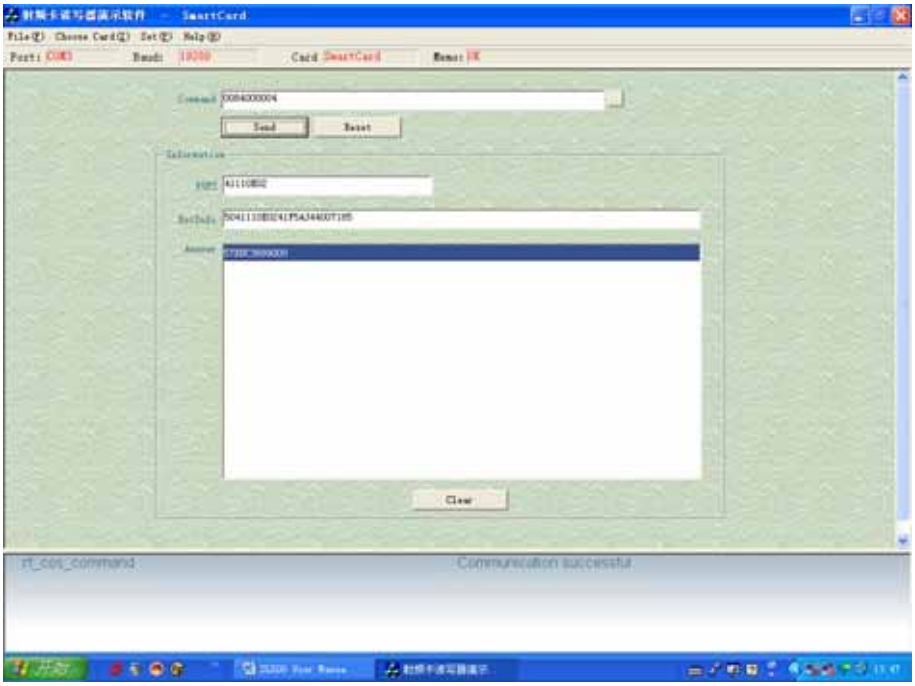
After check password, you can read, write, signature and lock blocks of the card.



## 5.12 ISO14443B-4 Protocol Smart Card

Click [Reset] button to obtain the serial number and the reset information of the card according to ISO14443-4 protocol.

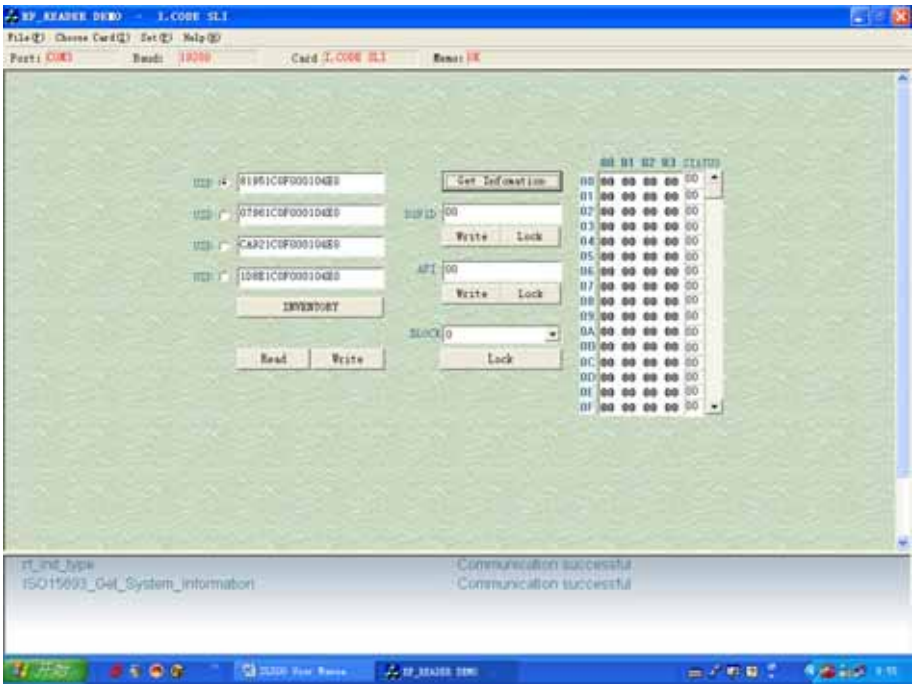
Input the COS command, click [Send] button to commute data to card.



## 5.13 I.CODE SLI

Click [INVENTORY] button to obtain the serial number of the card. You can operate 4 cards at most.

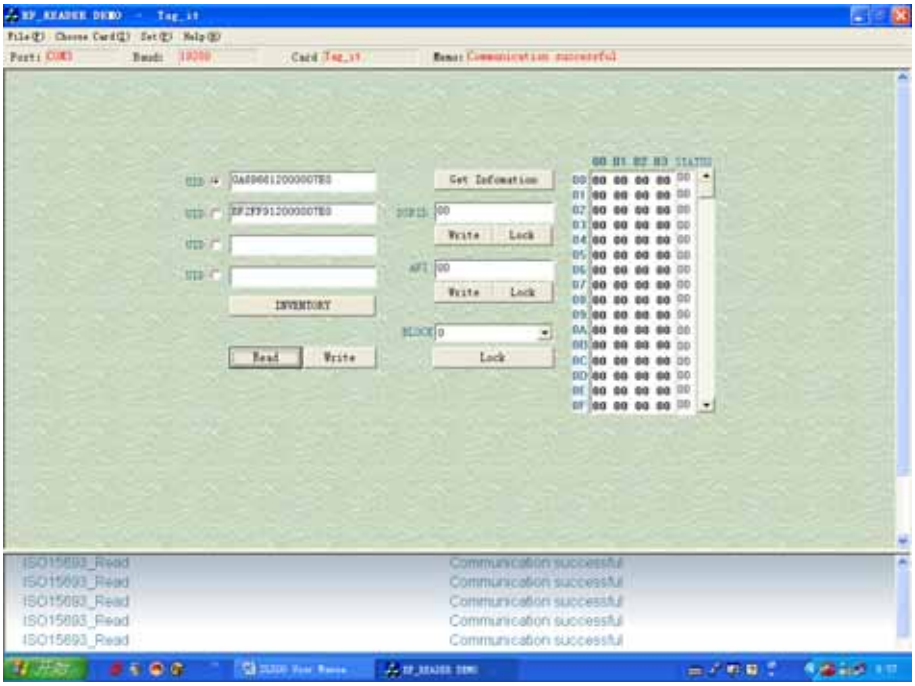
Choose certain card according to the UID to read or write.



## 5.14 Tag_IT

Click [INVENTORY] button to obtain the serial number of the card. You can operate 4 cards at most.

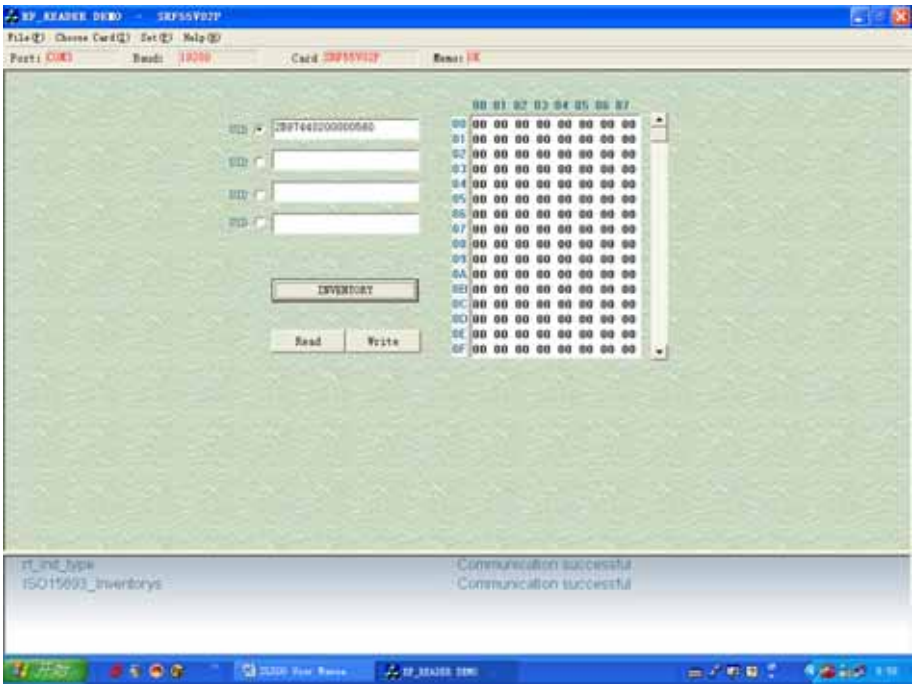
Choose certain card according to the UID to read/write.




## 5.15 SRF55V02P

Click [INVENTORY] button to obtain the serial number of the card. You can operate 4 cards at most.

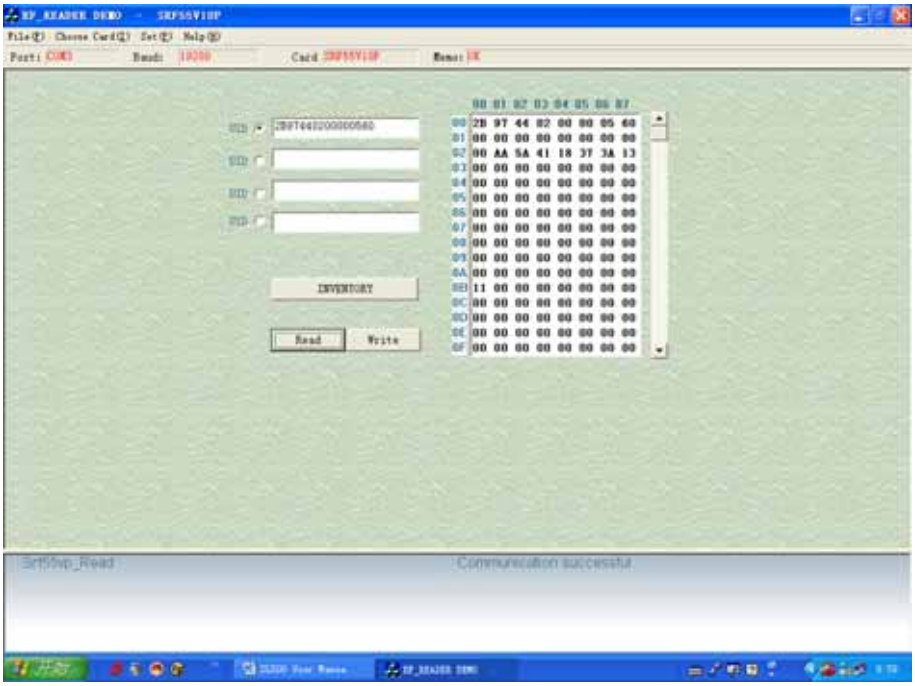
Choose certain card according to the UID to read/write.



## 5.16 SRF55V10P

Click [INVENTORY] button to obtain the serial number of the card. You can operate 4 cards at most.

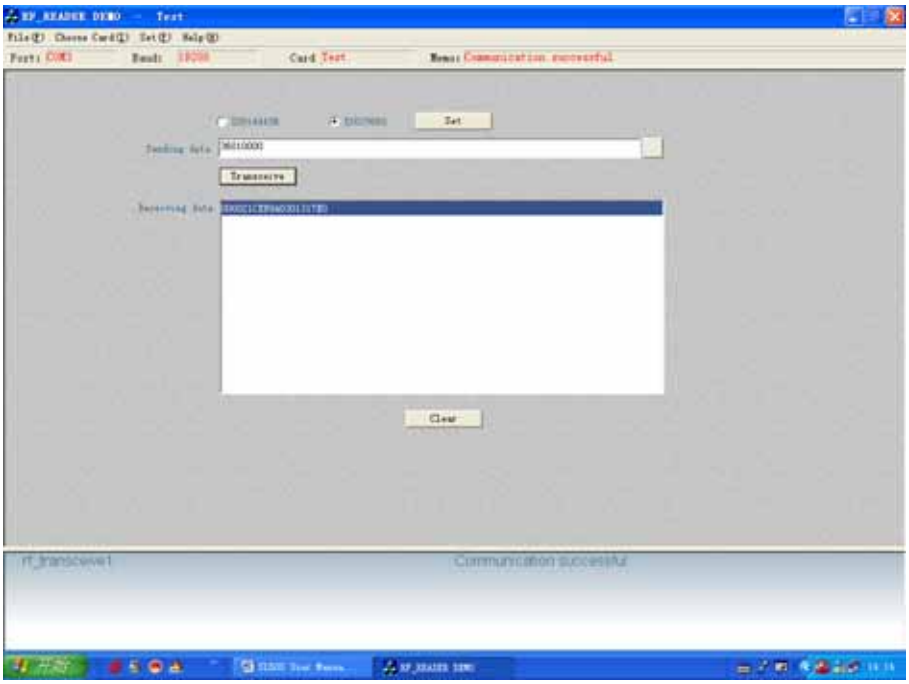
Choose certain card according to the UID to read/write.




## 5.17 Pass_Through

In this windows, input parameters according to ISO14443B and ISO15693 protocol, click [Transceive] button to get response data from tag

CRC bytes is auto managed by reader, it will not be contained in the stream



# 6. DLL INFORMATION

All types of readers have system function and encrypt function.
Whether readers support other functions depends on their specific types.

## 6.1 SYSTEM FUNCTION

### 6.1.1 INT WINAPI LIB_VER

Function: Get DLL Version

Prototype: int WINAPI lib_ver (unsigned int *pVer)

Parameter: pVer: [OUT] DLL version

Return: return 0 if successful

### 6.1.2 INT WINAPI RF_INIT_COM

Function: Connect

Prototype: int WINAPI rf_init_com (int port, long baud)

Parameter: port: [IN] serial port number

baud: [IN] communication baud rate, 4800 ~ 115200 bps

Return 0 on success

### 6.1.3 INT WINAPI RF_CLOSEPORT

Function: Disconnect

Prototyp: int WINAPI rf_ClosePort(void)

Return 0 on success

### 6.1.4 INT WINAPI RF_GET_MODEL

Function: Get Device Type

Prototype: int WINAPI rf_get_model (unsigned short icdev,
unsigned char *pVersion,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID

pVersion: [OUT] response information

pLen: [OUT] length of response information

Return 0 on success

### 6.1.5 INT WINAPI RF_INIT_DEVICE_NUMBER

Function: Designate Device ID

Prototype: int WINAPI rf_init_device_number (unsigned short icdev)

Parameter: icdev: [IN] Device ID

Return 0 on success

### 6.1.6 INT WINAPI RF_GET_DEVICE_NUMBER

Function: Read Device ID

Prototype: int WINAPI rf_get_device_number (unsigned short *pIcdev)

Parameter: pIcdev: [OUT] response Device ID

Return 0 on success

### 6.1.7 INT WINAPI RF_INIT_TYPE

Function: Set Reader contactless working mode

Prototype: int WINAPI rf_init_type(unsigned short icdev, unsigned char type)

Parameter: icdev: [IN] Device ID

type: [IN] reader working mode

Return 0 on success

Explanation: this function is not effective to the readers only support single protocol.

type = 'A': set SL500 into ISO14443A mode

type = 'B': set ISO14443B mode

type = 'r': set AT88RF020 card mode

type = '1': set ISO15693 mode

### 6.1.8 INT WINAPI RF_ANTENNA_STA

Function: Manage RF Transmittal

Prototype: int WINAPI rf_antenna_sta (unsigned short icdev, unsigned char model)

Parameter: icdev: [IN] Device ID

model: [IN] transmittal state

Return 0 on success

Explanation:model = 0: turn off RF transmittal

model = 1: turn on RF transmittal

### 6.1.9 INT WINAPI RF_LIGHT

Function: Manage LED

Prototype: int WINAPI rf_light (unsigned short icdev, unsigned char color)

Parameter: icdev: [IN] Device ID

color: [IN] 0 = off

1 = red

2 = green

3 = yellow

Return 0 on success

### 6.1.10 INT WINAPI RF_BEEP

Function: beep

Prototype: int WINAPI rf_beep (unsigned short icdev, unsigned char msec)

Parameter: icdev: [IN] Device ID

msec: [IN] beep time, unit 10 MSEL

Return 0 on success

## 6.2 DES FUNCTION

### 6.2.1 INT WINAPI DES_ENCRYPT

Function: DES_Encrypt

Prototype: int WINAPI des_encrypt ( unsigned char *pSzOut,
unsigned char *pSzIn,
unsigned int inlen,
unsigned char *pKey,
unsigned int keylen)

| Parameter: | | | |
|---|---|---|---|
| | pSzOut: | [OUT] | ciphertext, bytes length equal to plaintext |
| | pSzIn: | [IN] | plaintext |
| | inlen: | [IN] | length of plaintext, integer times of 8 bytes |
| | pKey: | [IN] | encrypt key |
| | keylen: | [IN] | length of key, 8 bytes for single DES, 16 bytes for triple DES |

Return 0 on success

### 6.2.2 INT WINAPI DES_DECRYPT

Function: DES_Decrypt

Prototype: int WINAPI des_decrypt ( unsigned char *pSzOut,
unsigned char *pSzIn,
unsigned int inlen,
unsigned char *pKey,
unsigned int keylen)

| Parameter: | | | |
|---|---|---|---|
| | pSzOut: | [OUT] | plaintext, bytes length equal to ciphertext |
| | pSzIn: | [IN] | ciphertext |
| | inlen: | [IN] | length of ciphertext, integer times of 8 bytes |
| | pKey: | [IN] | encrypt key |
| | keylen: | [IN] | length of key, 8 bytes for single DES, 16 bytes for triple DES |

Return 0 on success

## 6.3 ISO14443A FUNCTION

### 6.3.1 UltraLight

#### 6.3.1.1 INT WINAPI RF_REQUEST

Function: ReqA

Prototype: int WINAPI rf_request ( unsigned short icdev,
unsigned char model,
unsigned short *pTagType)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | model: | [IN] | REQ MODE |
| | pTagType: | [OUT] | response data, chip type code |

Return 0 on success

Annotation: mode = 0x26: REQ_STD
mode = 0x52: REQ_ALL

### 6.3.1.2 INT WINAPI RF_UL_SELECT

Function: Select UltraLight

Prototype: int WINAPI int rf_ul_select (unsigned short icdev,
unsigned char *pSnr,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
pSnr: [OUT] response data, card unique serial number
pLen: [OUT] length of response data

Return 0 on success

### 6.3.1.3 INT WINAPI RF_M1_READ

Function: MifareOne read

Prototype: int WINAPI rf_M1_read ( unsigned short icdev,
unsigned char block,
unsigned char *pData,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
pData: [OUT] response data from card
pLen: [OUT] length of response data

Return 0 on success

Annotation: this function is also applicable for UltraLight card. Every page of UltraLight card has 4 bytes. After calling this function, return data of 4 consecutive pages.

### 6.3.1.4 INT WINAPI RF_UL_WRITE

Function: UltraLight Write

Prototype: int WINAPI int rf_ul_write ( unsigned short icdev,
unsigned char page,
unsigned char *pData)

Parameter: icdev: [IN] Device ID
page: [IN] UltraLight card page address , 0 ~ 0x0F
pData: [IN] written data, 4 bytes

Return 0 on success

### 6.3.1.5 INT WINAPI INT RF_UC_AUTHENTICATION

Function: Authenticate Key for Ultralight C

Prototype:
```
int WINAPI rf_UC_authentication(unsigned short icdev,
                                unsigned char *pKey))
```

Parameter: icdev: [IN] Communication device identifier
pKey: [IN] Key, 16 bytes

Return 0 on success

#### 6.3.1.6 INT WINAPI RF_UC_CHANGEKEY

Function: Update key of Ultralight C

Prototype: int WINAPI rf_UC_changekey(unsigned short icdev, unsigned char *pKey)

Parameter: icdev: [IN] Communication device identifier

pKey: [IN] Key, 16 bytes

Return 0 on success

#### 6.3.1.7 INT WINAPI RF_HALT

Function: TYPE_A card HALT

Prototype: int WINAPI rf_halt (unsigned short icdev)

Parameter: icdev: [IN] Communication device identifier

Return 0 on success

### 6.3.2 Mifare Class

#### 6.3.2.1 INT WINAPI RF_REQUEST

Function: ReqA

Prototype: int WINAPI rf_request ( unsigned short icdev,
unsigned char model,
unsigned short *pTagType)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | model: | [IN] | REQ MODE |
| | pTagType: | [OUT] | response data, chip type code |

Return 0 on success

Annotation: mode = 0x26: REQ_STD
mode = 0x52: REQ_ALL

#### 6.3.2.2 INT WINAPI RF_ANTICOLL

Function: Mifare card Anticollision

Prototype: int WINAPI rf_anticoll ( unsigned short icdev,
unsigned char bcnt,
unsigned char *pSnr,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | bcnt: | [IN] | must be 4 |
| | pSnr: | [OUT] | response data from card, unique serial number |
| | pLen: | [OUT] | length of response data |

Return: return 0 if successful

#### 6.3.2.3 INT WINAPI RF_SELECT

Function: Mifare card Selectting

Prototype: int WINAPI rf_select (unsigned short icdev,
unsigned char *pSnr,
unsigned char snrLen,
unsigned char *pSize)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pSnr: | [IN] | card unique serial number |
| | snrLen: | [IN] | length of pSnr |
| | pSize: | [OUT] | response data from card, capacity code |

Return 0 on success

Annotation: card will be on active estate after received this command, only one TYPE_A card on active estate at the same influence range at same time.

### 6.3.2.4 INT WINAPI RF_M1_AUTHENTICATION2

Function: Mifare_Std Authentify

Prototype: int WINAPI rf_M1_authentication2 ( unsigned short icdev,
unsigned char model,
unsigned char block,
unsigned char *pKey)

Parameter: icdev: [IN] Device ID
model: [IN] key validate mode
block: [IN] block absolute address
pKey: [IN] 6 bytes password

Return 0 on success

Annotation: model = 0x60: use KeyA
model = 0x61: use KeyB

### 6.3.2.5 INT WINAPI RF_M1_READ

Function: MifareOne Read

Prototype: int WINAPI rf_M1_read ( unsigned short icdev,
unsigned char block,
unsigned char *pData,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
pData: [OUT] response data from card
pLen: [OUT] length of response data

Return 0 on success

### 6.3.2.6 INT WINAPI RF_M1_WRITE

Function: Mifare_Std Write

Prototype: int WINAPI rf_M1_write (unsigned short icdev,
unsigned char block,
unsigned char *pData)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
pData: [IN] written data, 16 bytes

Return 0 on success

### 6.3.2.7 INT WINAPI RF_M1_INITVAL

Function: Mifare_Std card Initialize Value

Prototype: int WINAPI rf_M1_initval ( unsigned short icdev,
unsigned char block,
long value)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
pValue: [IN] initialize purse value at HEX format, low byte in former

Return 0 on success

### 6.3.2.8 INT WINAPI RF_M1_READVAL

Function: Mifare_Std Read Value

Prototype: int WINAPI rf_M1_readval ( unsigned short icdev,
unsigned char block,
long *pValue)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
pValue: [OUT] response value at HEX format, low byte in former

Return 0 on success

### 6.3.2.9 INT WINAPI RF_M1_INCREMENT

Function: Mifare purse increment

Prototype: int WINAPI rf_M1_increment (unsigned short icdev,
unsigned char block,
long value)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
value: [IN] increase value at HEX format, low byte in former

Return 0 on success

### 6.3.2.10 INT WINAPI RF_M1_DECREMENT

Function: Mifare purse decrement

Prototype: int WINAPI rf_M1_decrement (unsigned short icdev,
unsigned char block,
long value)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address
value: [IN] decrease value at HEX format, low byte in former

Return 0 on success

### 6.3.2.11 INT WINAPI RF_M1_RESTORE

Function: Mifare_Std Restore

Prototype: int WINAPI rf_M1_restore (unsigned short icdev, unsigned char block)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address

Return 0 on success

### 6.3.2.12 INT WINAPI RF_M1_TRANSFER

Function: Mifare_Std Transfer

Prototype: int WINAPI rf_M1_transfer (unsigned short icdev, unsigned char block)

Parameter: icdev: [IN] Device ID
block: [IN] block absolute address

Return 0 on success

Annotation: this function only be transferred after increment, decrement and restore command

#### 6.3.2.13 INT WINAPI RF_HALT

Function: Mifare Halt

Prototype: int WINAPI rf_halt (unsigned short icdev)

Parameter: icdev: [IN] Device ID

Return 0 on success

Annotation: card will exit active estate after received this command

### 6.3.3 Mifare_DESFire

#### 6.3.3.1 INT WINAPI RF_DESFIRE_RST

Function: DESFire Reset

Prototype: int WINAPI rf_DESFire_rst (unsigned short icdev,
unsigned char model,
unsigned char *pData,
unsigned char *pMsgLg)

Parameter: icdev: [IN] Device ID
model: [IN] ReqA mode
pData: [OUT] response data from card
pMsgLg: [OUT] length of response data

Return 0 on success

Annotation: mode = 0x26: REQ_STD
mode = 0x52: REQ_ALL
pData = 7 bytes CSN + n bytes RATS according to ISO14443-4 protocol

#### 6.3.3.2 INT WINAPI RF_COS_COMMAND

Function: DESFire data commutting

Prototype: int WINAPI rf_cos_command ( unsigned short icdev,
unsigned char *pCommand,
unsigned char cmdLen,
unsigned char *pData,
unsigned char *pMsgLg)

Parameter: icdev: [IN] Device ID
pCommand: [IN] COS command
cmdLen: [IN] length of COS command
pData: [OUT] response data from card
pMsgLg: [OUT] length of response data

Return 0 on success

### 6.3.4 Mifare_ProX

#### 6.3.4.1 INT WINAPI RF_TYPE_RST

Function: Request ISO14443A-4 card and reset

Prototype: int WINAPI rf_typea_rst ( unsigned short icdev,
unsigned char model,
unsigned char *pData,
unsigned char *pMsgLg)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | request mode |
| pData: | [OUT] | response data from card |
| pMsgLg: | [OUT] | length of response data |

Return 0 on success

Annotation: mode = 0x26: REQ_STD
mode = 0x52: REQ_ALL
pData: 4bytes CSN + RATS according to ISO14443A

#### 6.3.4.2 INT WINAPI RF_ COS_COMMAND

Prototype: int WINAPI rf_cos_command ( unsigned short icdev,
unsigned char *pCommand,
unsigned char cmdLen,
unsigned char *pData,
unsigned char *pMsgLg)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| pCommand: | [IN] | COS command |
| cmdLen: | [IN] | length of COS command |
| pData: | [OUT] | response data from card, including SW1& SW2 |
| pMsgLg: | [OUT] | length of response data |

Return 0 on success

#### 6.3.4.3 INT WINAPI RF_CL_DESELECT

Prototype: int WINAPI rf_cl_deselect (unsigned short icdev)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |

Return 0 on success

### 6.3.5 SHC1102

#### 6.3.5.1 INT WINAPI RF_REQUEST

Function: ReqA

Prototype: int WINAPI rf_request ( unsigned short icdev,
unsigned char model,
unsigned short *pTagType)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | REQ MODE |
| pTagType: | [OUT] | response data from card, chip type code |

Return 0 on success

Annotation: mode = 0x26: REQ_STD
mode = 0x52: REQ_ALL

### 6.3.5.2 INT WINAPI RF_ SHC1102_AUTH

Function: SHC1102 card Authentify

Prototype: int WINAPI rf_Shc1102_Auth (unsigned short icdev, unsigned char *pPassword)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| pPassword: | [IN] | 4 bytes password |

Return 0 on success

### 6.3.5.3 INT WINAPI RF_ SHC1102_READ

Function: SHC1102 card read

Prototype: int WINAPI rf_Shc1102_Read (unsigned short icdev,
unsigned char block,
unsigned char *pData,
unsigned char *pLen)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| block: | [IN] | SHC1102 card block address, 0x00 ~ 0x0F |
| pData: | [OUT] | response data from card |
| pLen: | [OUT] | length of response data |

Return 0 on success

### 6.3.5.4 INT WINAPI RF_ SHC1102_WRITE

Function: SHC1102 card write

Prototype: int WINAPI rf_Shc1102_Write (unsigned short icdev,
unsigned char block,
unsigned char *pData)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| block: | [IN] | SHC1102 card block address, 0x00 ~ 0x0F |
| pData: | [IN] | written data, 16 bytes |

Return 0 on success

## 6.4 ISO14443B FUNCTION

### 6.4.1 THR1064

#### 6.4.1.1 INT WINAPI RF_TYPEB_RST

Function: REQ THR1064 card

Prototype: int WINAPI rf_atqb (unsigned short icdev,
unsigned char model,
unsigned char *pData,
unsigned char *pMsgLg)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | model: | [IN] | REQ MODE 0=REQB, 1=WUPB |
| | pData: | [OUT] | response data from card, 8 bytes SN + 4 bytes corresponding data |
| | pMsgLg: | [OUT] | length of response data |

Return 0 on success

#### 6.4.1.2 INT WINAPI RF_ THR1064_READ

Function: THR1064 card read

Prototype: int WINAPI rf_thr1064_read(unsigned short icdev,
unsigned char page,
unsigned char *pData,
unsigned char *pMsgLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | page: | [IN] | page address, 0 ~3 |
| | pData: | [OUT] | response data from card |
| | pMsgLen: | [OUT] | length of response data |

Return 0 on success

#### 6.4.1.3 INT WINAPI RF_ THR1064_WRITE

Function: THR1064 card write

Prototype: int WINAPI rf_thr1064_write (unsigned short icdev,
unsigned char page,
unsigned char *pData,
unsigned char *pMsgLen);

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | page: | [IN] | page address, 0 ~3 |
| | pData: | [IN] | written data |
| | pMsgLen: | [OUT] | length of written data |

Return 0 on success

#### 6.4.1.4 INT WINAPI RF_ THR1064_CHECK

Function: THR1064 card Authentify

Prototype: int WINAPI rf_thr1064_check (unsigned short icdev, unsigned char *pKey)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |

pKey: [IN] 8 bytes pass word

Return 0 on success

### 6.4.2 AT88RF020

#### 6.4.2.1 INT WINAPI RF_ TYPEB_RST

Function: REQ ISO14443B protocol card and set SLOT

Prototype: int WINAPI rf_atqb(unsigned short icdev,
unsigned char model,
unsigned char *pData,
unsigned char *pMsgLg)

Parameter: icdev: [IN] Device ID
model: [IN] REQ MODE 0 = REQB, 1 = WUPB
pData: [OUT] response data from card
pMsgLg: [OUT] length of response data

Return 0 on success

#### 6.4.2.2 INT WINAPI RF_ AT020_CHECK

Function: AT88RF020 card Authentify

Prototype: int WINAPI rf_at020_check (unsigned short icdev, unsigned char *pKey)

Parameter: icdev: [IN] Device ID
pKey: [IN] 8 bytes pass word

Return 0 on success

#### 6.4.2.3 INT WINAPI RF_ AT020_COUNT

Function: AT88RF020 card count

Prototype: int WINAPI rf_at020_count(unsigned short icdev, unsigned char *pData)

Parameter: icdev: [IN] Device ID
pData: [IN] signature, 6 bytes

Return 0 on success

#### 6.4.2.4 INT WINAPI RF_ AT020_READ

Function: AT88RF020 read

Prototype: int WINAPI rf_at020_read (unsigned short icdev,
unsigned char page,
unsigned char *pData,
unsigned char *pMsgLen)

Parameter: icdev: [IN] Device ID
page: [IN] page address, 0 ~ 31
pData: [OUT] response data from card
pMsgLen: [OUT] length of response data

Return 0 on success

#### 6.4.2.5 INT WINAPI RF_ AT020_WRITE

Function: AT88RF020 write

Prototype: int WINAPI rf_at020_write ( unsigned short icdev,
unsigned char page,
unsigned char *pData)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | page: | [IN] | page address, 0 ~ 31 |
| | pData: | [IN] | written data, 8 bytes |

Return 0 on success

#### 6.4.2.6 INT WINAPI RF_ AT020_LOCK

Function: AT88RF020 LOCK

Prototype: int WINAPI rf_at020_lock (unsigned short icdev, unsigned char *pData)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pData: | [IN] | 4 bytes data |

Return 0 on success

#### 6.4.2.7 INT WINAPI RF_ AT020_DESELECT

Function: AT88RF020 card Deselect

Prototype: int WINAPI rf_at020_deselect (unsigned short icdev)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |

Return 0 on success

### 6.4.3 SR176SRIX4K

#### 6.4.3.1 INT WINAPI RF_ST_SELECT

Function: ST card (SR176/SRIX4K) Lock

Prototype: int WINAPI rf_st_select (unsigned short icdev, unsigned char *pChip_ID)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pChip_ID: | [IN] | response data from card, 1 byte ID code |

Return 0 on success

#### 6.4.3.2 INT WINAPI INT_RF_SR176_READBLOCK

Function: SR176 Read

Prototype: int WINAPI int rf_sr176_readblock ( unsigned short icdev,
unsigned char block,
unsigned char *pData,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | block: | [IN] | block address |
| | pData: | [OUT] | response data from card |
| | pLen: | [OUT] | length of response data |

Return 0 on success

### 6.4.3.3 INT WINAPI INT_RF_SR176_WRITEBLOCK

Function: SR176 Write

Prototype: int WINAPI int rf_sr176_writeblock (unsigned short icdev,
unsigned char block,
unsigned char *pData)

Parameter: icdev: [IN] Device ID
block: [IN] block address
pData: [IN] written data, 2 bytes

Return 0 on success

### 6.4.3.4 INT WINAPI INT_RF_SR176_PROTECTBLOCK

Function: SR176 Lock

Prototype: int WINAPI int rf_sr176_protectblock (unsigned short icdev, unsigned char lockreg)

Parameter: icdev: [IN] Device ID
lockreg: [IN] LOCKREG

Return 0 on success

Annotation: SR17 6has 16 blocks, every lockreg controls 2 blocks

| lockreg | BLOCK | bit_setting | |
|---|---|---|---|
| b7 | 14 & 15 | 0:Write Enable | 1:Block set as ROM |
| b6 | 12 & 13 | 0:Write Enable | 1:Block set as ROM |
| b5 | 10 & 11 | 0:Write Enable | 1:Block set as ROM |
| b4 | 8 & 9 | 0:Write Enable | 1:Block set as ROM |
| b3 | 6 & 7 | 0:Write Enable | 1:Block set as ROM |
| b2 | 4 & 5 | 0:Write Enable | 1:Block set as ROM |
| b1 | 2 & 3 | 0:Write Enable | 1:Block set as ROM |
| b0 | 0 & 1 | 0:Write Enable | 1:Block set as ROM |

### 6.4.3.5 INT WINAPI INT_RF_SRIX4K_ GETUID

Function: SRIX4K Get UID

Prototype: int WINAPI int rf_srix4k_getuid ( unsigned short icdev,
unsigned char *pUid,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
pUid: [OUT] response data from card, UID
pLen: [OUT] length of response data

Return 0 on success

### 6.4.3.6 INT WINAPI INT_RF_SRIX4K_ READBLOCK

Function: SRIX4K Read

Prototype: int WINAPI int rf_srix4k_readblock (unsigned short icdev,
unsigned char block,
unsigned char *pData,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
block: [IN] block address
pData: [OUT] response data from card
pLen: [OUT] length of response data
Return 0 on success

### 6.4.3.7 INT WINAPI INT_RF_SRIX4K_ WRITEBLOCK

Function: SRIX4K Write
Prototype: int WINAPI int rf_srix4k_writeblock(unsigned short icdev,
unsigned char block,
unsigned char *pData)
Parameter: icdev: [IN] Device ID
block: [IN] block address
pData: [IN] written data, 4bytes
Return 0 on success

### 6.4.3.8 INT WINAPI INT_RF_SRIX4K_ PROTECTBLOCK

Function: SRIX4K Lock
Prototype: int WINAPI int rf_srix4k_protectblock(unsigned short icdev, unsigned char lockreg)
Parameter: icdev: [IN] Device ID
Lockreg: [IN] LOCKREG
Return 0 on success
Annotation: 7~15 blocks of SRIX4K card can be written protect

| lockreg | BLOCK | bit_setting | |
|---|---|---|---|
| b7 | 15 | 1:Write Enable | 0:Block set as ROM |
| b6 | 14 | 1:Write Enable | 0:Block set as ROM |
| b5 | 13 | 1:Write Enable | 0:Block set as ROM |
| b4 | 12 | 1:Write Enable | 0:Block set as ROM |
| b3 | 11 | 1:Write Enable | 0:Block set as ROM |
| b2 | 10 | 1:Write Enable | 0:Block set as ROM |
| b1 | 9 | 1:Write Enable | 0:Block set as ROM |
| b0 | 7 & 8 | 1:Write Enable | 0:Block set as ROM |

### 6.4.3.9 INT WINAPI RF_ST_COMPLETION

Function: ST Desactived
Prototype: int WINAPI rf_st_completion (unsigned short icdev)
Parameter: icdev: [IN] Device ID
Return 0 on success

### 6.4.4 TYPE_B SmartCard

#### 6.4.4.1 INT WINAPI RF_ TYPEB_RST

Function: Req ISO14443B-4 protocol Smart card and Reset

Prototype: int WINAPI rf_atqb ( unsigned short icdev,
unsigned char model,
unsigned char *pData,
unsigned char *pMsgLg)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | model: | [IN] | REQ MODE 0 = REQB, 1 = WUPB |
| | pData: | [OUT] | response data from card |
| | pMsgLg: | [OUT] | length of response data |

Return 0 on success

#### 6.4.4.2 INT WINAPI RF_ COS_COMMAND

Prototype: int WINAPI rf_cos_command (unsigned short icdev,
unsigned char *pCommand,
unsigned char cmdLen,
unsigned char *pData,
unsigned char *pMsgLg)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pCommand: | [IN] | cos command |
| | cmdLen: | [IN] | length of cos comman |
| | pData: | [OUT] | response data from card, including SW1, SW2 |
| | pMsgLg: | [OUT] | length of response data |

Return 0 on success

#### 6.4.4.3 INT WINAPI RF_ CL_DESELECT

Function: ISO14443B card Deselect

Prototype: int WINAPI rf_cl_deselect (unsigned short icdev)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |

Return 0 on success

## 6.5 ISO15693 FUNCTION

### 6.5.1 INT WINAPI ISO15693_INVENTORY

Function: ISO15693_Inventory (single card)

Prototype: int WINAPI ISO15693_Inventory ( unsigned short icdev,
unsigned char *pData,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pData: | [OUT] | response data from tag, 1 byte DSFID + 8 bytes UID |
| | pLen: | [OUT] | length of response data |

Return 0 on success

### 6.5.2 INT WINAPI ISO15693_INVENTORYS

Function: ISO15693_Inventory (several cards)

Prototype: int WINAPI ISO15693_Inventorys (unsigned short icdev,
unsigned char *pData,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pData: | [OUT] | response data from tag, every 9 bytes is a team, the structure of every team is:<br>1byte DSFID + 8 bytes UID |
| | pLen: | [OUT] | length of response data |

Return 0 on success

### 6.5.3 INT WINAPI ISO15693_GET_SYSTEM_INFORMATION

Function: ISO15693_Get_System_Information

Prototype: int WINAPI ISO15693_Get_System_Information(unsigned short icdev,
unsigned char model,
unsigned char *pUID,
unsigned char *pData,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |
| | pUID: | [IN] | 8 bytes UID |
| | pData: | [OUT] | response data from tag |
| | pLen: | [OUT] | length of response data |

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
Clear Option_flag = 0

### 6.5.4 INT WINAPI ISO15693_SELECT

Function: ISO15693_Select

Prototype: int WINAPI ISO15693_Select (unsigned short icdev, unsigned char *pUID)

Parameter: icdev: [IN] Device ID
pUID: [IN] 8 bytes UID

Return 0 on success

### 6.5.5 INT WINAPI ISO15693_RESET_TO_READY

Function: ISO15693_Reset_To_Ready

Prototype: int WINAPI ISO15693_Reset_To_Ready (unsigned short icdev,
unsigned char model,
unsigned char *pUID)

Parameter: icdev: [IN] Device ID
model: [IN] bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag
pUID: [IN] 8 bytes UID

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
Clear Option_flag = 0

### 6.5.6 INT WINAPI ISO15693_STAY_QUIET

Function: ISO15693_Stay_Quiet

Prototype: int WINAPI ISO15693_Stay_Quiet (unsigned short icdev, unsigned char *pUID)

Parameter: icdev: [IN] Device ID
pUID: [IN] 8 bytes UID

Return 0 on success

### 6.5.7 INT WINAPI ISO15693_GET_BLOCK_SECURITY

Function: ISO15693_Get_Block_Security

Prototype: int WINAPI ISO15693_Get_Block_Security ( unsigned short icdev,
unsigned char model,
unsigned char *pUID,
unsigned char block,
unsigned char number,
unsigned char *pData,
unsigned char *pLen)

Parameter: icdev: [IN] Device ID
model: [IN] bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag
pUID: [IN] 8 bytes UID
block: [IN] block address
number: [IN] the number of block to be read, < 0x40
pData: [OUT] response data from tag
pLen: [OUT] length of response data

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
Clear Option_flag = 0

### 6.5.8 INT WINAPI ISO15693_READ

Function: ISO15693_Read

Prototype:
```
int WINAPI ISO15693_Read ( unsigned short   icdev,
                           unsigned char    model,
                           unsigned char    *pUID,
                           unsigned char    block,
                           unsigned char    number,
                           unsigned char    *pData,
                           unsigned char    *pLen);
```

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |
| pUID: | [IN] | 8 bytes UID |
| block: | [IN] | block address |
| number: | [IN] | the number of block to be read, < 0x40 |
| pData: | [OUT] | response data from tag |
| pLen: | [OUT] | length of response data |

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
Clear Option_flag = 0

### 6.5.9 INT WINAPI ISO15693_WRITE

Function: ISO15693_Write

Prototype:
```
int WINAPI ISO15693_Write ( unsigned short   icdev,
                            unsigned char    model,
                            unsigned char    *pUID,
                            unsigned char    block,
                            unsigned char    *pData)
```

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |
| pUID: | [IN] | 8 bytes UID |
| block: | [IN] | block address |
| pData: | [IN] | written data, 4 bytes |

Return 0 on success

Explanation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command

If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

### 6.5.10 INT WINAPI ISO15693_LOCK_BLOCK

Function: ISO15693_Lock_Block

Prototype: int WINAPI ISO15693_Lock_Block (unsigned short icdev,
unsigned char model,
unsigned char *pUID,
unsigned char block)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |
| pUID: | [IN] | 8 bytes UID |
| block: | [IN] | block address |

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

### 6.5.11 INT WINAPI ISO15693_WRITE_AFI

Function: ISO15693_Write_AFI

Prototype: int WINAPI ISO15693_Write_AFI (unsigned short icdev,
unsigned char model,
unsigned char *pUID,
unsigned char AFI)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |
| pUID: | [IN] | 8 bytes UID |
| AFI: | [IN] | AFI to be written |

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

### 6.5.12 INT WINAPI ISO15693_LOCK_AFI

Function: ISO15693_Lock_AFI

Prototype: int WINAPI ISO15693_Lock_AFI ( unsigned short icdev,
unsigned char model,
unsigned char *pUID)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| model: | [IN] | bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag |

pUID: [IN] 8 bytes UID

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

### 6.5.13 INT WINAPI ISO15693_WRITE_DSFID

Function: ISO15693_Write_DSFID

Prototype: int WINAPI ISO15693_Write_DSFID (unsigned short icdev,
unsigned char model,
unsigned char *UID,
unsigned char DSFID)

Parameter: icdev: [IN] Device ID
model: [IN] bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag
pUID: [IN] 8 bytes UID
DSFID: [IN] DSFID to be written

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

### 6.5.14 INT WINAPI ISO15693_LOCK_DSFID

Function: ISO15693_Lock_DSFID

Prototype: int WINAPI ISO15693_Lock_DSFID ( unsigned short icdev,
unsigned char model,
unsigned char *pUID)

Parameter: icdev: [IN] Device ID
model: [IN] bit0=Select_flag, bit1=Addres_flag, bit2=Option_flag
pUID: [IN] 8 bytes UID

Return 0 on success

Annotation: If set Select_flag, only the cards on Selected state respond this command
If set Address_flag, only the cards that the UID are congruous will respond this command
If write TI card, set Option_flag,
If write I.CODE SLI card, clear Option_flag

## 6.6 Function of Infineon Electric Tag

### 6.6.1 INT WINAPI SRF55VP_READ

Function: SRF55XXP Read a PAGE

Prototype: int WINAPI Srf55vp_Read ( unsigned short icdev,
unsigned char *pUID,
unsigned char page,
unsigned char *pData,
unsigned char *pLen)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| pUID: | [IN] | 8 bytes UID |
| page: | [IN] | address |
| pData: | [OUT] | response data from tag |
| pLen: | [OUT] | length of response data |

Return 0 on success

### 6.6.2 INT WINAPI SRF55VP_WRITEBYTE

Function: SRF55XXP Write 1BYTE

Prototype: int WINAPI Srf55vp_WriteByte ( unsigned short icdev,
unsigned char *pUID,
unsigned char page,
unsigned char byteaddr,
unsigned char data)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| pUID: | [IN] | 8 bytes UID |
| page: | [IN] | address |
| byteaddr: | [IN] | write the bytes to excursion address of the PAGE, 0 ~ 8 |
| data: | [IN] | written data |

Return 0 on success

### 6.6.3 INT WINAPI SRF55VP_WRITE

Function: SRF55XXP Write a page

Prototype: int WINAPI Srf55vp_Write ( unsigned short icdev,
unsigned char *pUID,
unsigned char page,
unsigned char *pData)

Parameter:

| | | |
|---|---|---|
| icdev: | [IN] | Device ID |
| pUID: | [IN] | 8 bytes UID |
| page: | [IN] | address |
| pData: | [IN] | written data, 8 bytes |

Return 0 on success

### 6.6.4 INT WINAPI SRF55VP_WRITE_REREAD

Function: SRF55XXP write PAGE and Return to the real data of this PAGE

Prototype: int WINAPI Srf55vp_Write_Reread(unsigned short icdev,
unsigned char *pUID,
unsigned char page,
unsigned char *pWdata,
unsigned char *pRdata,
unsigned char *pLen)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Device ID |
| | pUID: | [IN] | 8 bytes UID |
| | page: | [IN] | address |
| | pWdata: | [IN] | written data, 8bytes |
| | pWdata: | [OUT] | response data from tag |
| | pLen: | [OUT] | length of response data |

Return 0 on success

## 6.7 PASS THROUGH FUNCTION

### 6.7.1 INT WIN API RF_TRANSCEIVE1

Function: Send parameteres to Tag and receive response data

Prototype: int WINAPI rf_transceive1(unsigned short icdev,
unsigned char *pTxData,
unsigned char sendLen,
unsigned char *pRxData,
unsigned char *pMsgLg)

| Parameter: | | | |
|---|---|---|---|
| | icdev: | [IN] | Communication device identifier |
| | pTxData: | [IN] | parameter sent to tag, without CRC bytes<br>CRC bytes is auto managed by reader |
| | sendLen: | [IN] | length of parameter |
| | pRxData: | [OUT] | response data from tag |
| | pMsgLg: | [OUT] | length of response data |

Return 0 on success