

Software User Manual

HF Reader Testing Demo

(ISO14443A/B,MIFARE DESFire,ISO15693)

(Version 1.1)

FCC statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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1. Introduction

This testing demo is offered for the basic functions available to operate read/write and other functions of the HF series Modules and Reader products designed by CHIKEK, and it supports of UART-TTL, RS232, RS485 and USB(COM) port products.

This demo is programmed basing on C# language and run under WINDOWS system.

Any other specific function not showing in this demo, can be realized by customize if there need, please contact our sales persons for details requesting.

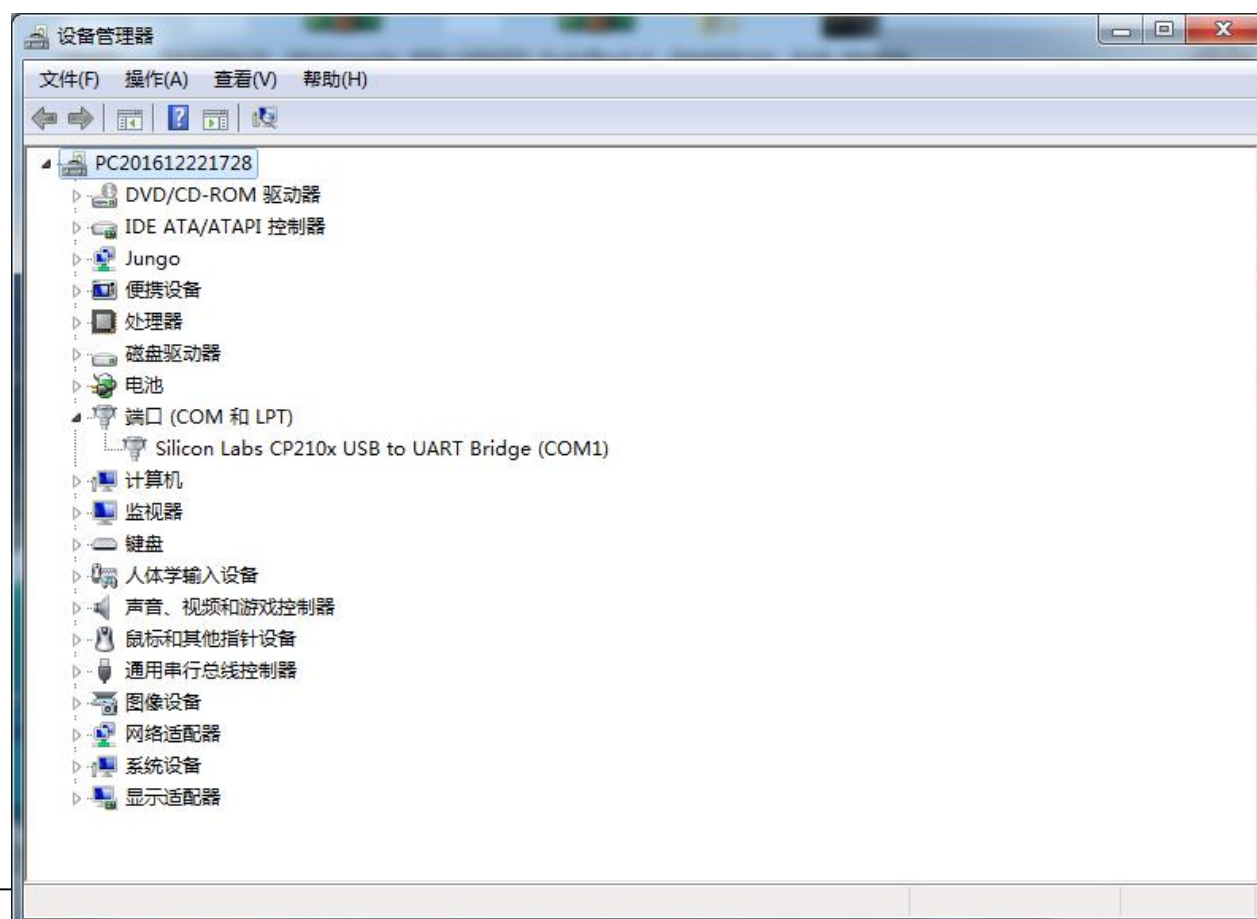
2. Operation Features

2.1 Hardware connection

For Modules series product, please firstly refer to datasheet of the specified Module using for their PIN definition and connect them with correspond mid-ware tool when testing with PC.

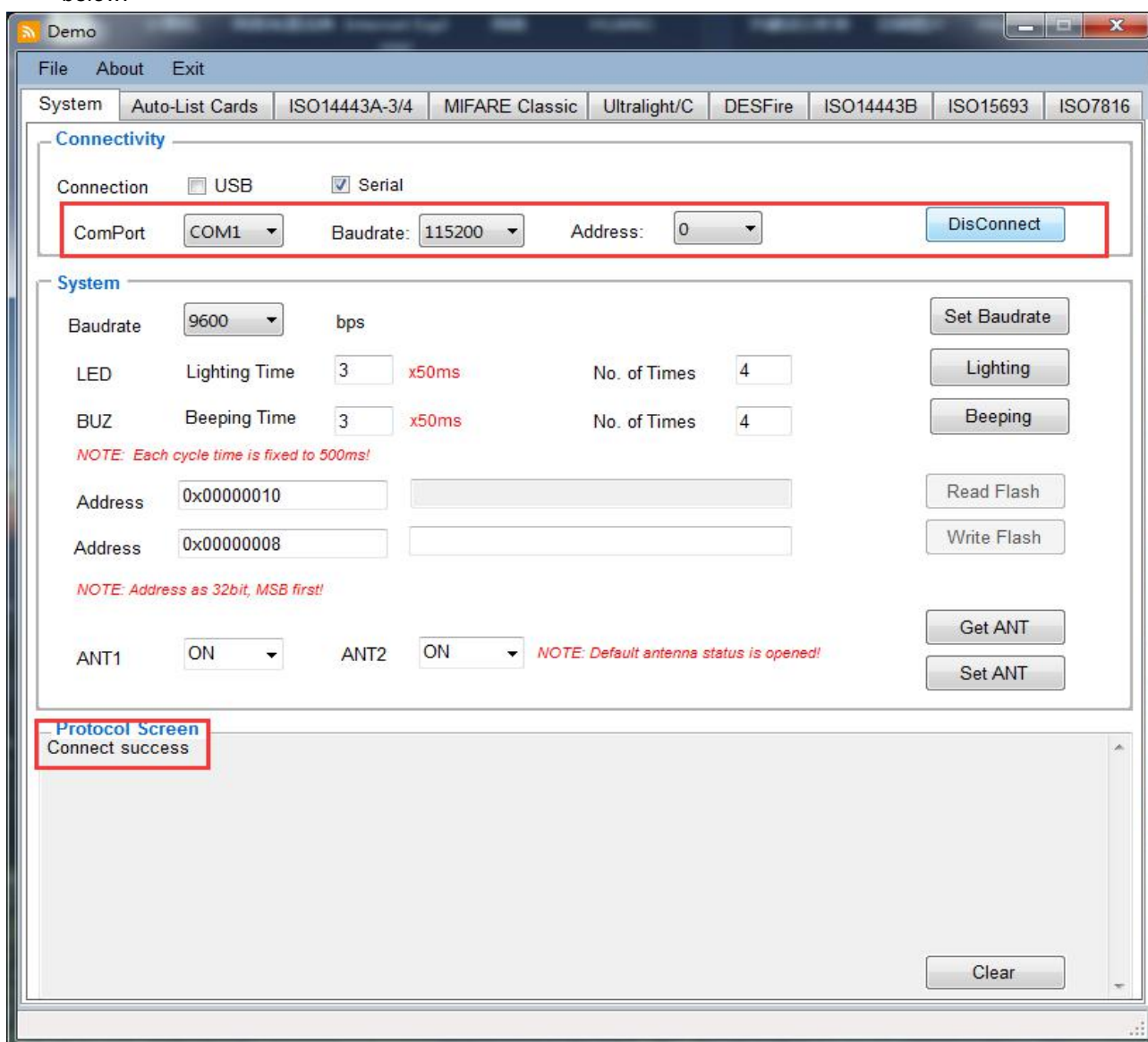
For Reader product with USB COM port, just plug USB connector to the PC side.

Then please check the COM port if be recognized in PC successfully, the way to check it is: Open Computer Manager--Device Manager--COM and LPT, as below :



2.2 Software connection

Firstly double click the DEMO EXE file to open demo software, and enter into connection interface as below:



Notes for Connectivity parameters:

Port number: Refer to Device Manager--COM&LPT, which on listing
 Baudrate: Default as 115200bps, available from 9600bps ~ 115200bps;
 Address: Not important

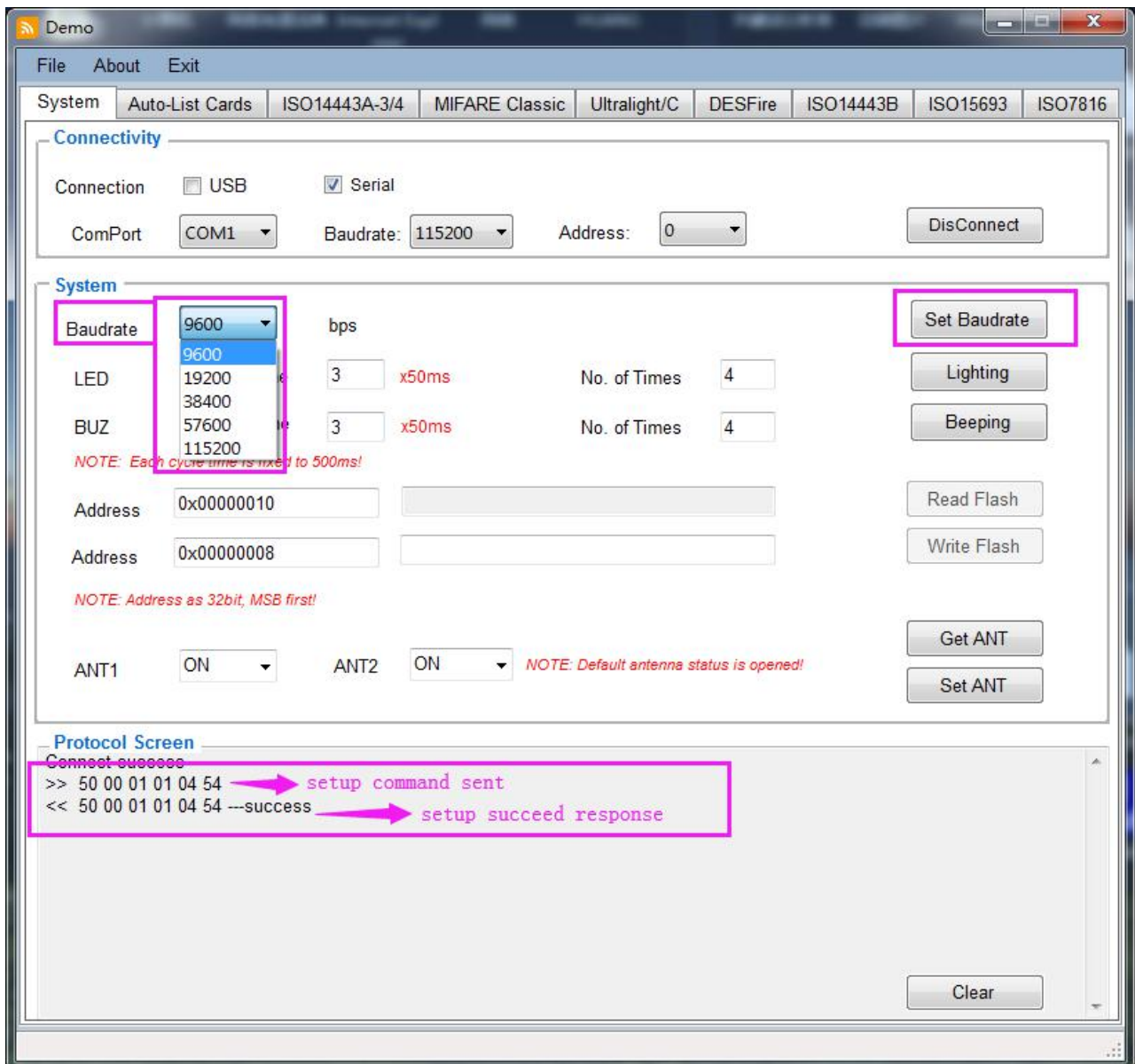
Make sure above parameters in right, then click Connect button to enter functions interface, and according response will be shown on "Protocol Screen" box.

2.3 System command

2.3.1 Set Baudrate

This function is to set according baudrate to be used in specific application. The available value is as listing and just select the right one to be set, as following show.

And in the Box of Protocol Screen, there will be showing according setup command and right succeed response.



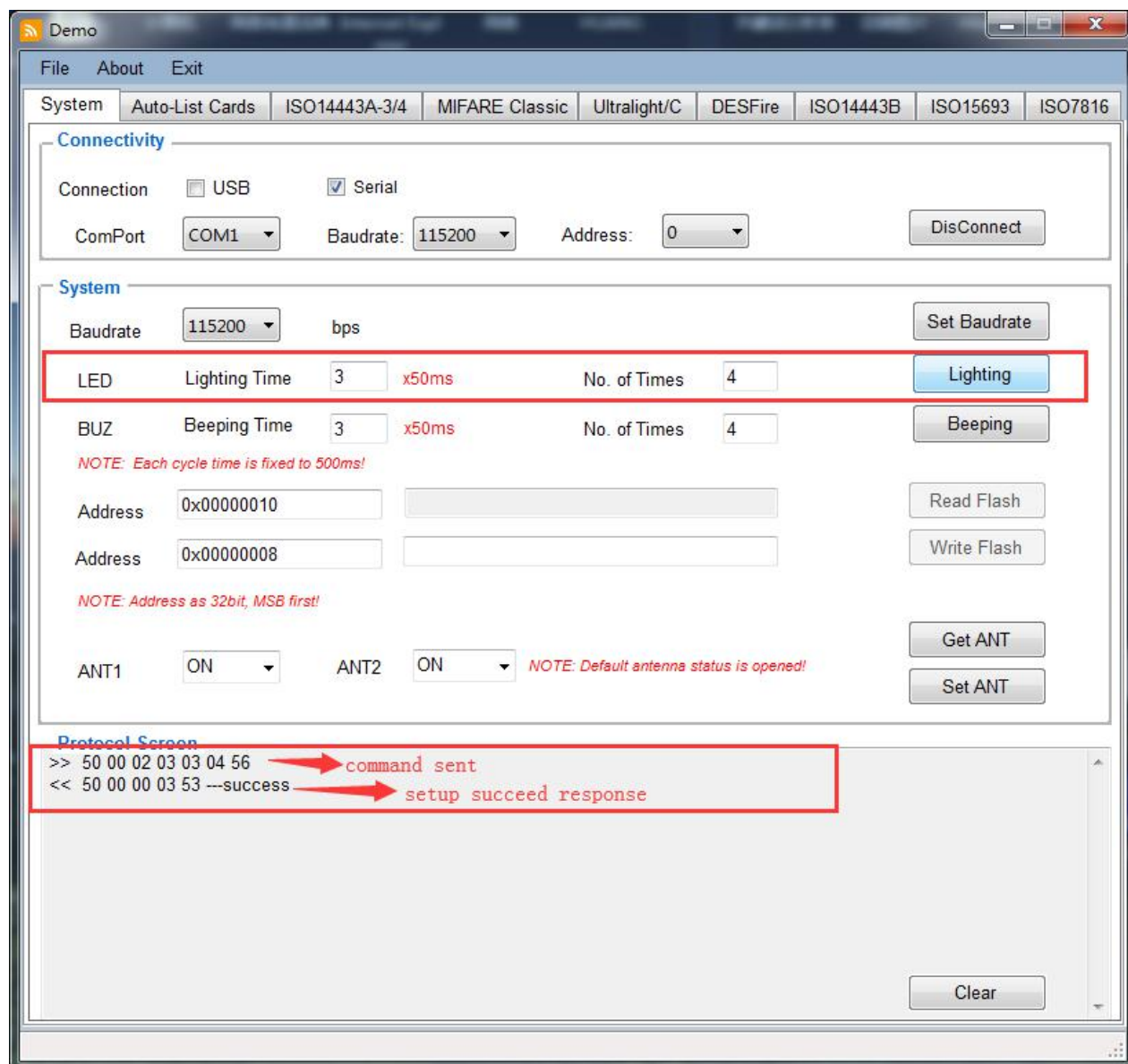
2.3.2 Set LED

This function is to set according LED's working way to be used in specific application. The available value including:

Lighting time: time length to be light, and the unit as 50ms

No. Of Times: time cycle, which means how many times to be light during whole length

And in the Box of Protocol Screen, there will be showing according setup command and right succeed response.



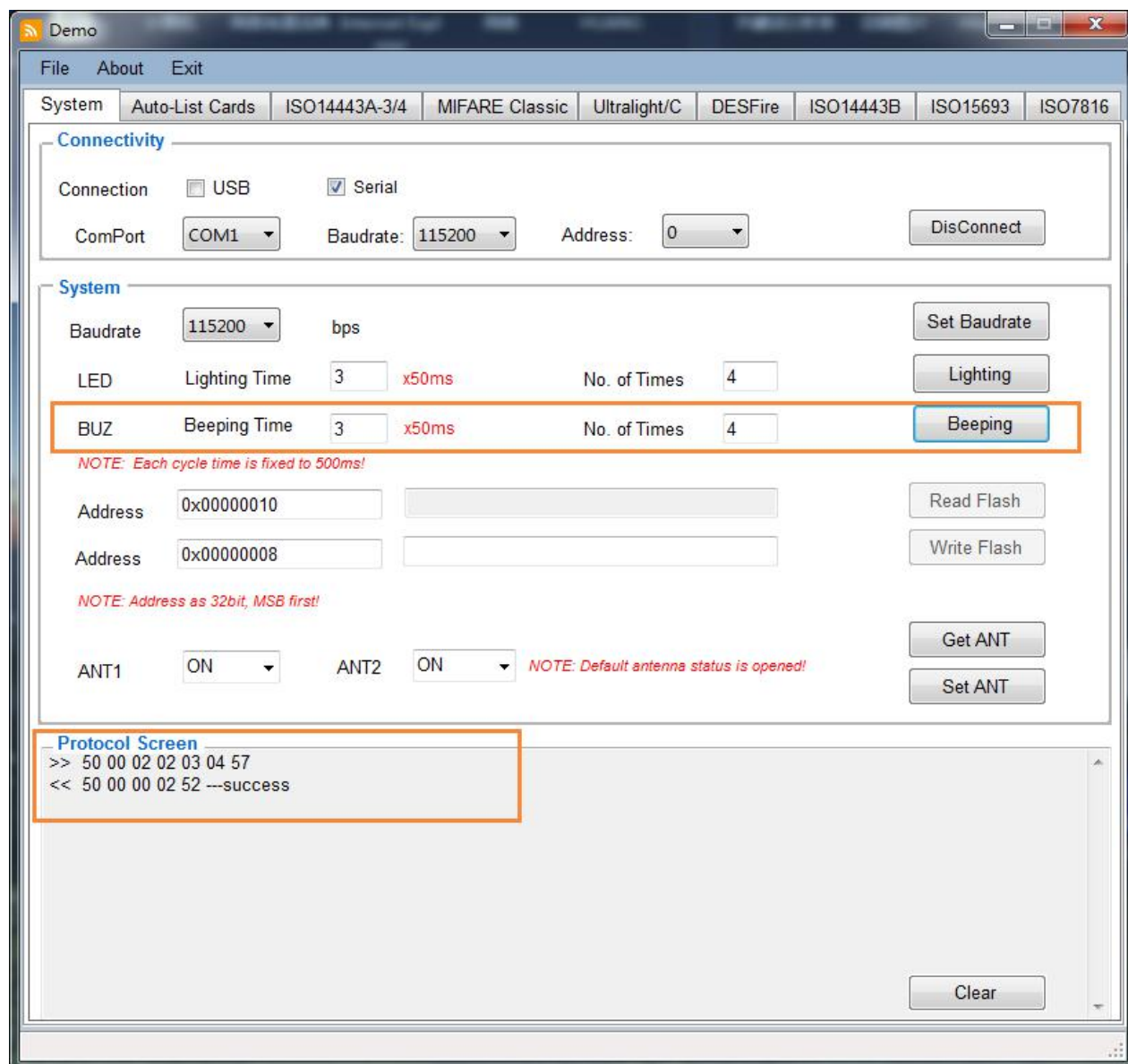
2.3.3 Set BUZ

This function is to set according buzzer's working way to be used in specific application. The available value including:

Beeping time: time length to be beeping, and the unit as 50ms

No. Of Times: time cycle, which means how many times to be beeping during whole length

And in the Box of Protocol Screen, there will be showing according setup command and right succeed response.

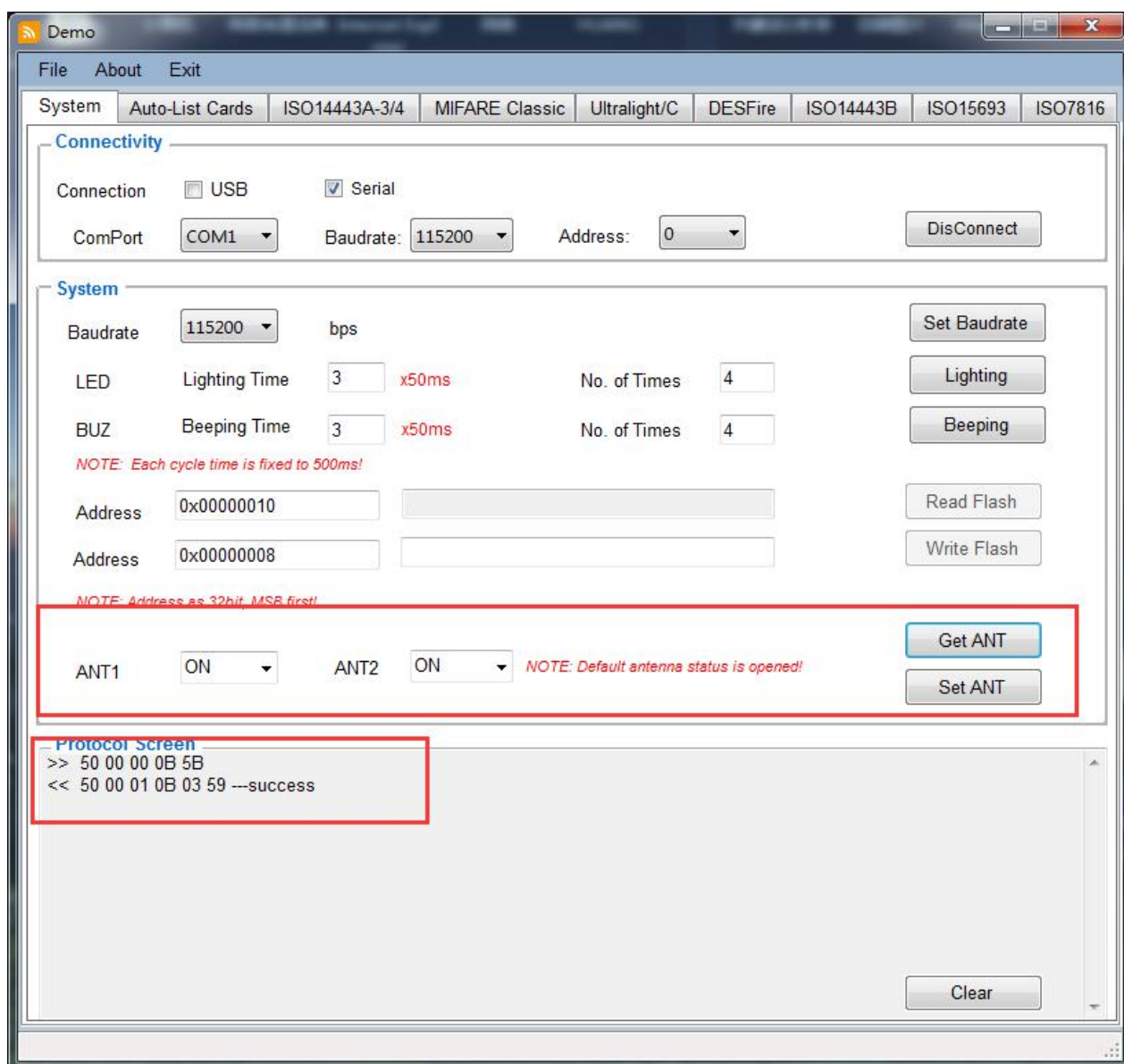


2.3.4 Set ANT

This function is to set which antenna to be ON or OFF when there are two antennas.

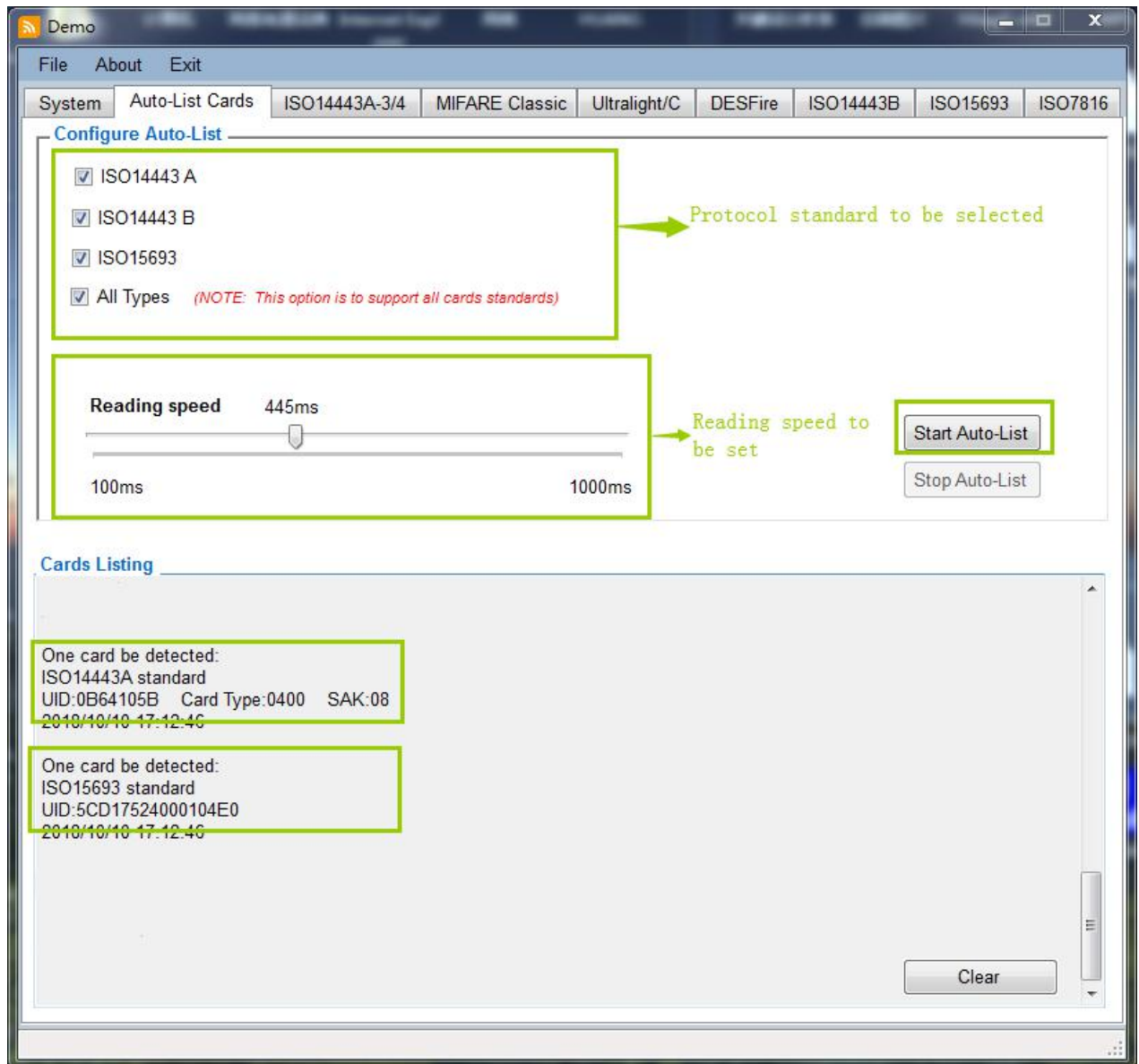
(Note: The antenna's default status is opened, and please refer to detail commands to do setup based on the Communication Protocol document for different product, or contact our technician for support)

And in the Box of Protocol Screen, there will be showing according setup command and right succeed response.



2.4 Auto-List Card

This TAB is available to do Read all cards under 13.56MHz frequency automatically, and the function can be configured Protocol standard and Reading speed as following shown, the cards information will be listing on Card Listing box:



2.5 ISO14443A-3/4

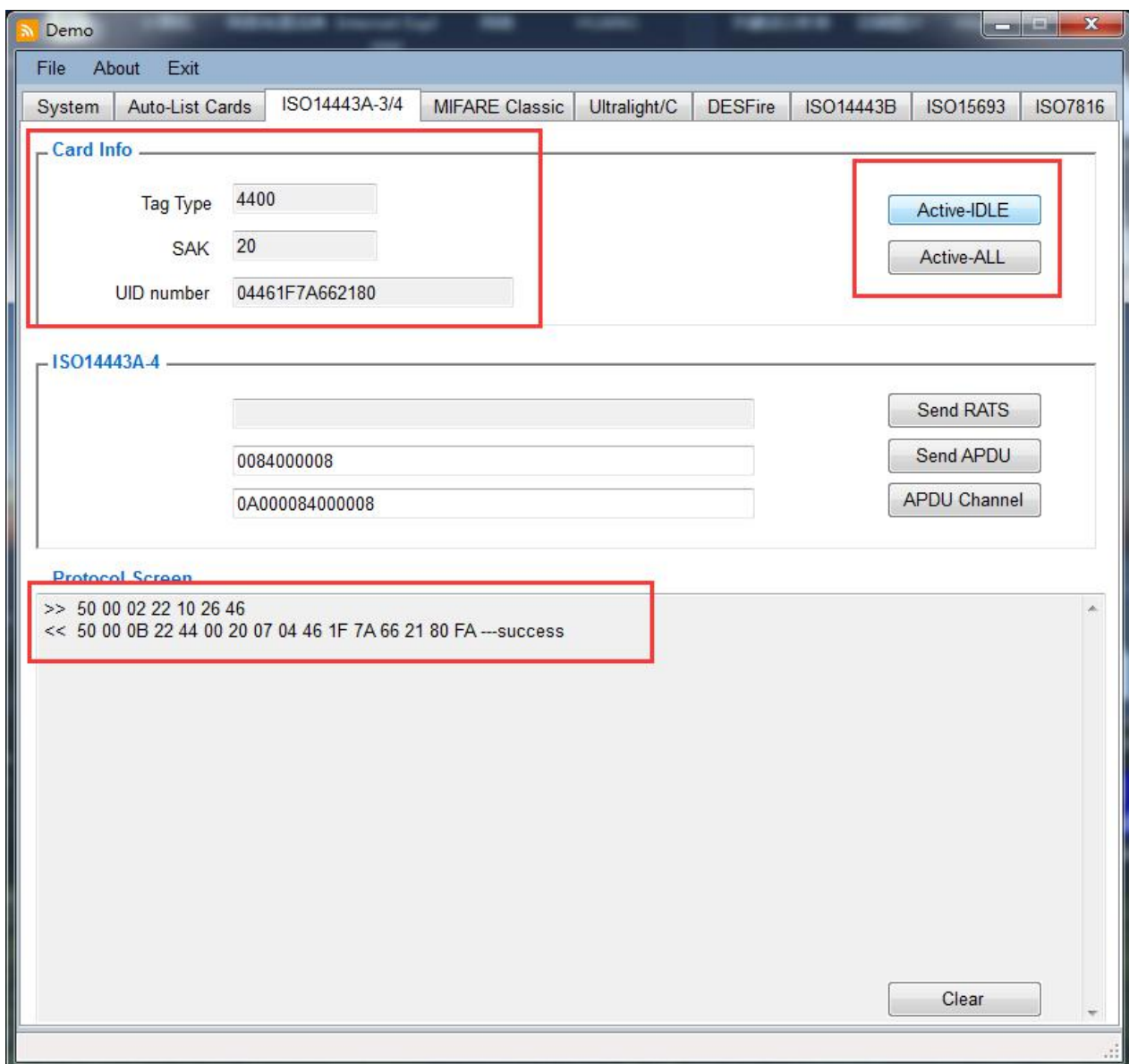
The interface is to enable ISO14443A-3 standard cards to enter into ISO14443A-4 standard and as a contactless CPU card.

2.5.1 Request card

The optional button including as below:

Active-IDLE: to request the cards not dormant

Active-ALL: Request cards including dormant cards

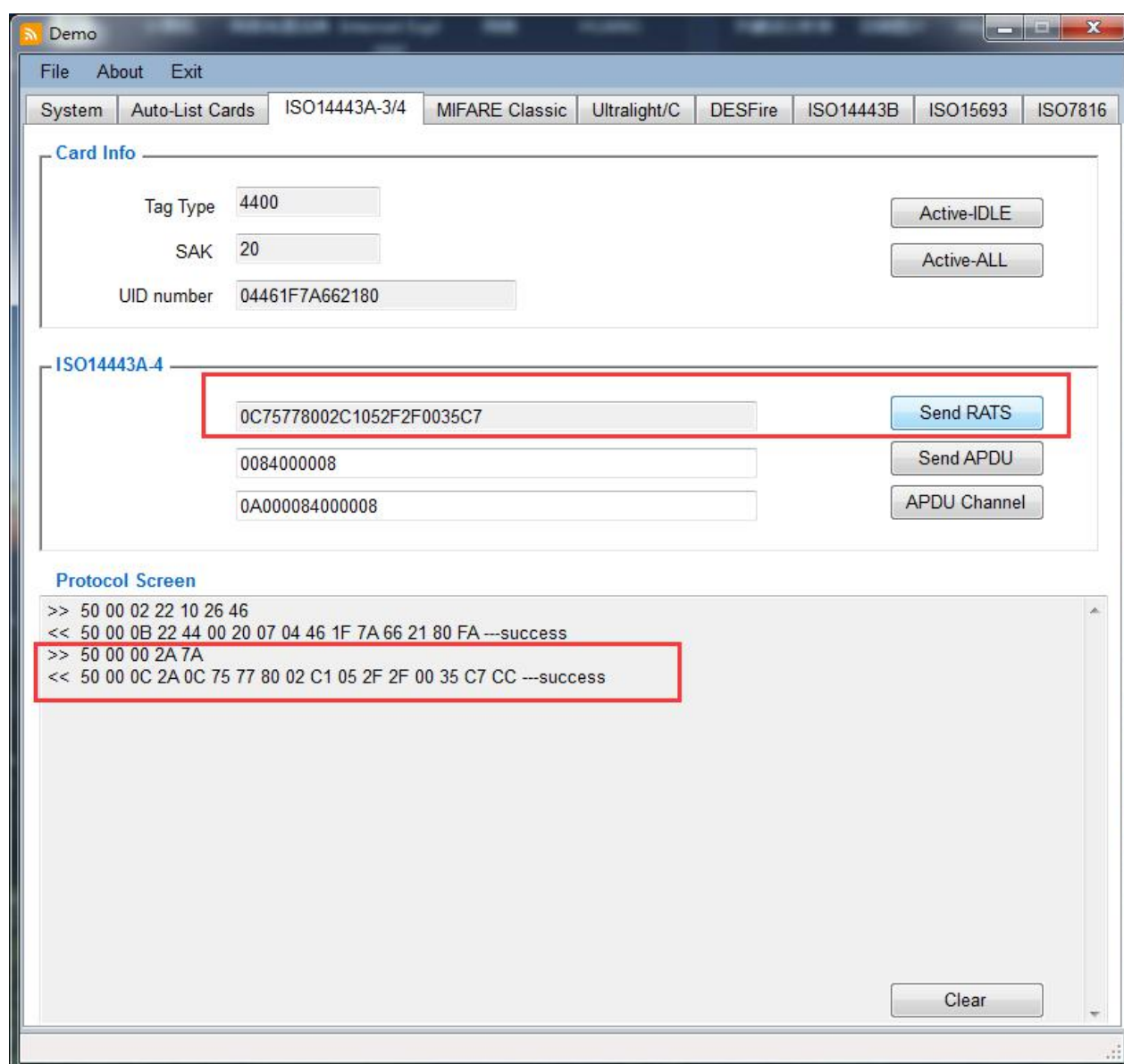


2.5.2 Send RATS

RATS= Request for Answer to Select

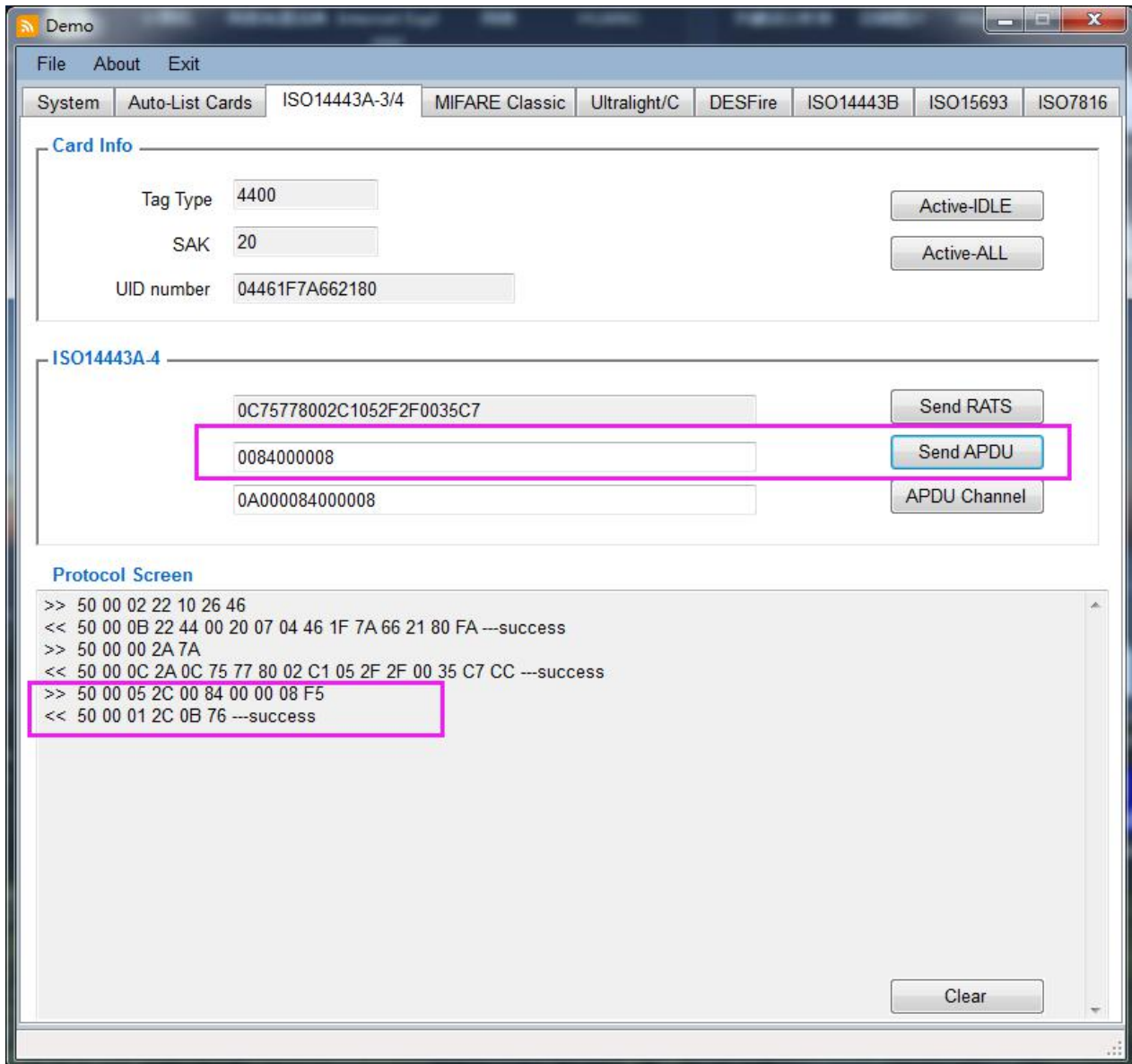
This function is to make the card quit from ISO14443A-3 enter into 14443A-4 standard, and the data returned after Send RATS, it includes the information of the testing card's.

And the response to RATS is the "Answer to Select" ATS, and the ATS consists of specified bytes for communicate between PICC capabilities and PCD. Details specific byte's meaning, please refer to datasheet of using card.



2.5.3 Send APDU

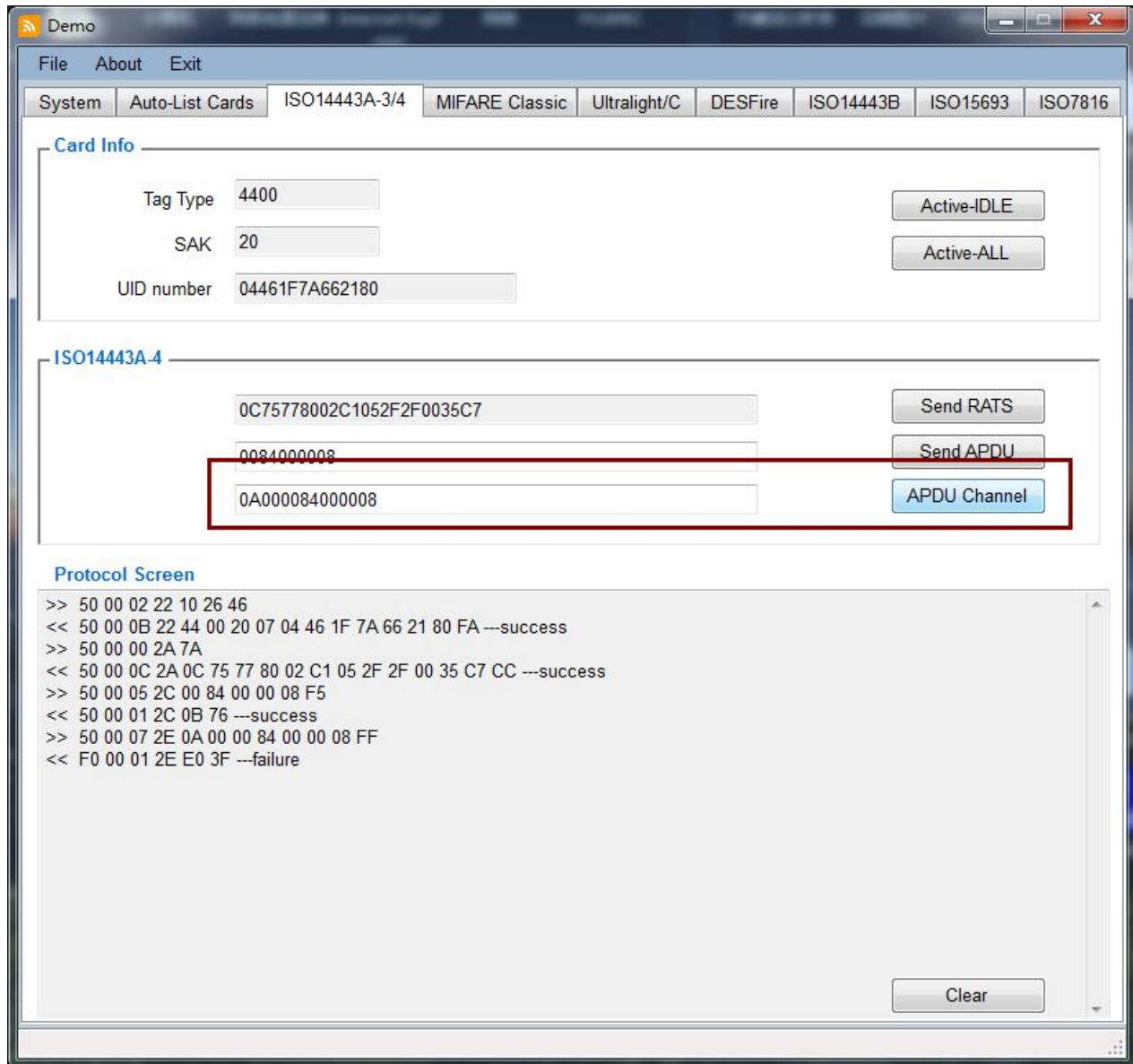
This function button is a channel opened for the APDU commands, which according to different compatible commands for different cards, and please refer to them based on the cards' datasheet.



2.5.4 APDU Channel

This is transfer channel to send any available commands to the card directly through RF chipset.

Details commands please refer to ISO14443A-4 Standard .



2.6 MIFARE Classic

This Interface is opened all available data operations specially for the MIFARE Classic series cards, including card type of MIFARE Classic 1K, MIFARE Classic 4K, etc,

The function is enable to get card details information, read and write block data, key authenticate, also the E-wallet, etc.

2.6.1 MIFARE Classic- Request card

The optional button including as below:

Active-IDLE: to request the cards not dormant

Active-ALL: Request cards including dormant cards

When succeeded request card, the card's details information including card type, SAK, UID number, memory sizes, etc will be shown as below:

The screenshot displays the 'Demo' application window with the 'MIFARE Classic' tab selected. The interface is divided into several sections:

- Card Info:** A red box highlights this section, which contains the following fields:
 - Tag Type: 0400
 - SAK: 08
 - UID number: 0B64105B
 - Memory Size: 1 k
 - Block Size: 16 Bytes
 - Number of Blocks: 64 Blocks
 - Number of Sectors: 16 Sectors
- APDU:** A text field containing '0A000084000008'.
- Active Buttons:** A red box highlights two buttons: 'Active-IDLE' and 'Active-ALL'.
- MIFARE 1K&4K:** A section containing:
 - Card UID: 0B64105B (highlighted with a red box)
 - Block Addr: 5
 - Key Type: KEYA
 - Key: FFFFFFFFFF
 - Buttons: Authenticate, Read Block, Write Block, Read All Blocks, E-Wallet
- Protocol Screen:** A red box highlights the command history:
 - >> 50 00 02 22 10 26 46
 - << 50 00 08 22 04 00 08 04 0B 64 10 5B 56 ---success

A note at the bottom of the 'MIFARE 1K&4K' section states: "NOTE: Except for the function 'Read All Block', all commands must Authenticate Firstly!". A 'Clear' button is located at the bottom right of the 'Protocol Screen' area.

2.6.2 MIFARE Classic-APDU Channel

This is transfer channel to send any available commands to the card directly through RF chipset.

Details commands please refer to ISO14443A-3 Standard .

The screenshot shows a software window titled "Demo" with a menu bar (File, About, Exit) and a tabbed interface. The "MIFARE Classic" tab is selected. The "Card Info" section contains fields for Tag Type (SAK), UID number, Memory Size, Block Size, Number of Blocks, and Number of Sectors. To the right of these fields are buttons for "Active-IDLE", "Active-ALL", and "APDU Channel". The "APDU" field is highlighted with a red rectangle and contains the value "0A000084000008". Below this is the "MIFARE 1K&4K" section, which includes fields for Card UID, Block Addr (set to 5), Key Type (KEYA), and Key (FFFFFFFF). To the right of these fields are buttons for "Authenticate", "Read Block", "Write Block", "Read All Blocks", and "E-Wallet". A note at the bottom of this section states: "NOTE: Except for the function 'Read All Block', all commands must Authenticate Firstly!". The "Protocol Screen" section at the bottom is a large text area with a "Clear" button.

System	Auto-List Cards	ISO14443A-3/4	MIFARE Classic	Ultralight/C	DESFire	ISO14443B	ISO15693	ISO7816
Card Info								
Tag Type		SAK						
UID number								
Memory Size								
Block Size								
Number of Blocks								
Number of Sectors								
APDU	0A000084000008							APDU Channel
MIFARE 1K&4K								
Card UID								
Block Addr	5	Key Type	KEYA	Key	FFFFFFFF			
					Authenticate			
					Read Block			
					Write Block			
					Read All Blocks			
					E-Wallet			
<i>NOTE: Except for the function "Read All Block", all commands must Authenticate Firstly !</i>								
Protocol Screen								
								Clear

2.6.3 MIFARE Classic- Key Authenticate

This is to use according KEY to authenticate for any specific Block address, Key Type and Key value. Please select the according parameter need to be used.

The screenshot shows the 'Demo' application window with the 'MIFARE Classic' tab selected. The interface is divided into three main sections: 'Card Info', 'MIFARE 1K&4K', and 'Protocol Screen'.

Card Info: This section displays card details in a form-like layout. Fields include Tag Type (0400), SAK (08), UID number (0B64105B), Memory Size (1 k), Block Size (16 Bytes), Number of Blocks (64 Blocks), Number of Sections (16 Sectors), and APDU (0A000084000008). To the right of these fields are three buttons: 'Active-IDLE', 'Active-ALL', and 'APDU Channel'.

MIFARE 1K&4K: This section is used for card operations. It includes a 'Card UID' field (0B64105B). Below it, a row is highlighted with a red border, containing 'BlockAddr' (5), 'Key Type' (KEYA), 'Key' (FFFFFFFFFFFF), and an 'Authenticate' button. Below this row are three empty text input fields and three buttons: 'Read Block', 'Write Block', and 'Read All Blocks'. At the bottom of this section is an 'E-Wallet' button. A red note states: 'NOTE: Except for the function "Read All Block", all commands must Authenticate Firstly!'.

Protocol Screen: This section shows a log of communication. It contains the following text:


```
>> 50 00 02 22 10 26 46
<< 50 00 08 22 04 00 08 04 0B 64 10 5B 56 ---success
>> 50 00 0C 16 60 05 0B 64 10 5B FF FF FF FF FF 0B
<< 50 00 00 16 46 ---success
```

 The last two lines are highlighted with a red border. A 'Clear' button is located at the bottom right of this section.

Note:

1. The default Key value for a new MIFARE Classic 1K/4K card is FFFFFFFFFF when there is no change of it
2. Before each authenticate, it must to do Active card firstly and make sure without any remove card from antenna field.

2.6.4 MIFARE Classic-Read Block

To get to read out the data stored in the according block address.

The parameters need to be selected including:

Block Addr: which block address to be read

Key Type: optional as KEYA or KEYB

Key: password of selected block (default value is FFFFFFFFFF for new card)

After Read Block, the data will be shown on the left side box also on Protocol Screen message box as below:

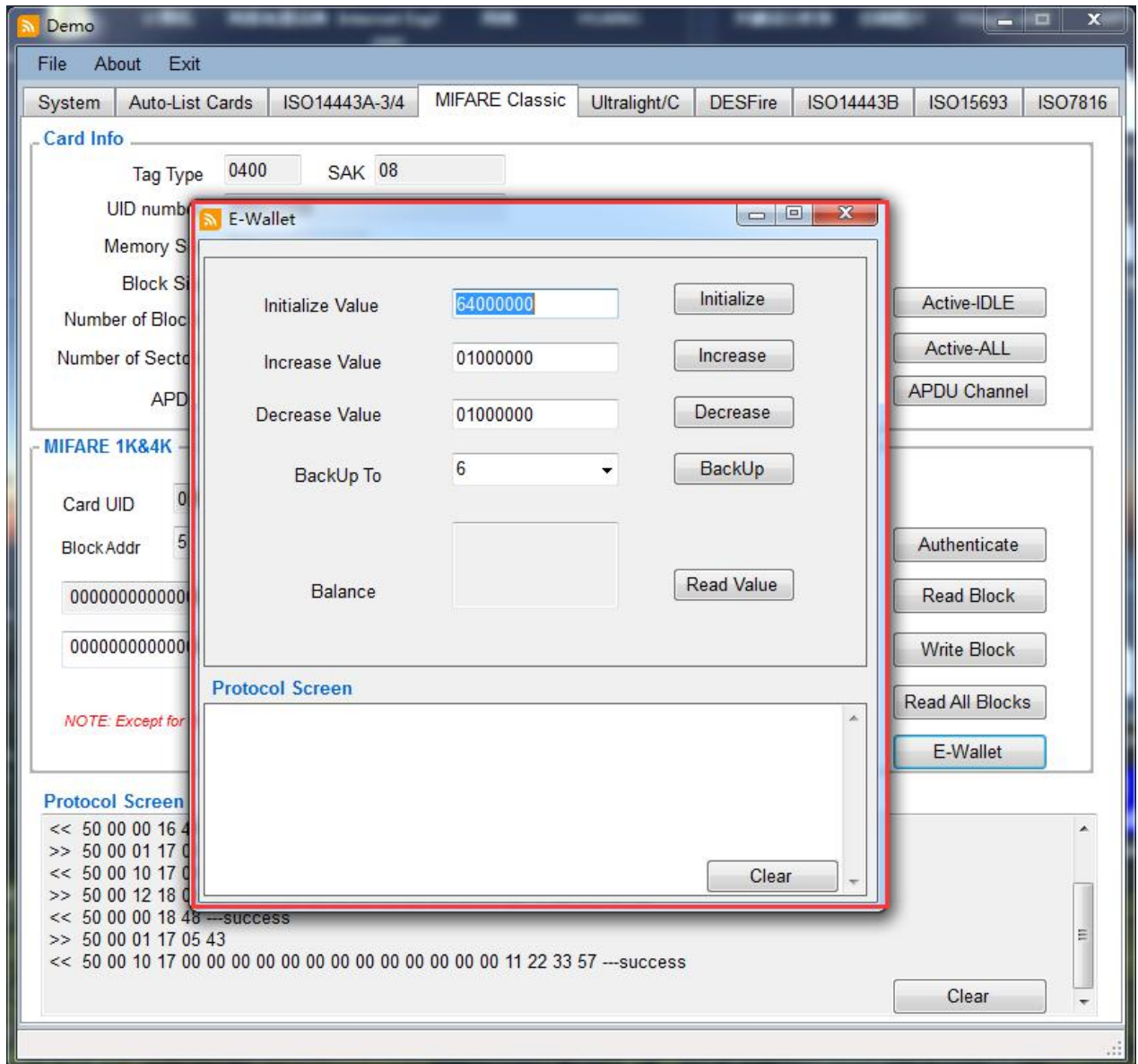
The screenshot displays the 'Demo' application window with the 'MIFARE Classic' tab selected. The 'Card Info' section shows details for a card with Tag Type 0400, SAK 08, and UID 0B64105B. The 'MIFARE 1K&4K' section is active, showing the 'Card UID' as 0B64105B. The 'Block Addr' is set to 5, 'Key Type' is KEYA, and the 'Key' is FFFFFFFFFF. A red box highlights the 'Read Block' button and the resulting data '00000000000000000000000000000000' in the 'data read out from selected block' field. The 'Protocol Screen' at the bottom shows the communication log, with a red box highlighting the successful read command: '>> 50 00 01 17 05 43' and '<< 50 00 10 17 00 00 00 00 00 00 00 00 00 00 00 00 57 ---success'.

Note:

- 1) Before Read Block, it must do Active card-->Authenticate firstly
- 2) Please input the right Key value for the card which changed before

2.6.7 MIFARE Classic-E-wallet

This interface is available to do value operations directly for E-wallet function, please do according right setup for the values as below.



2.7 Ultralight/C

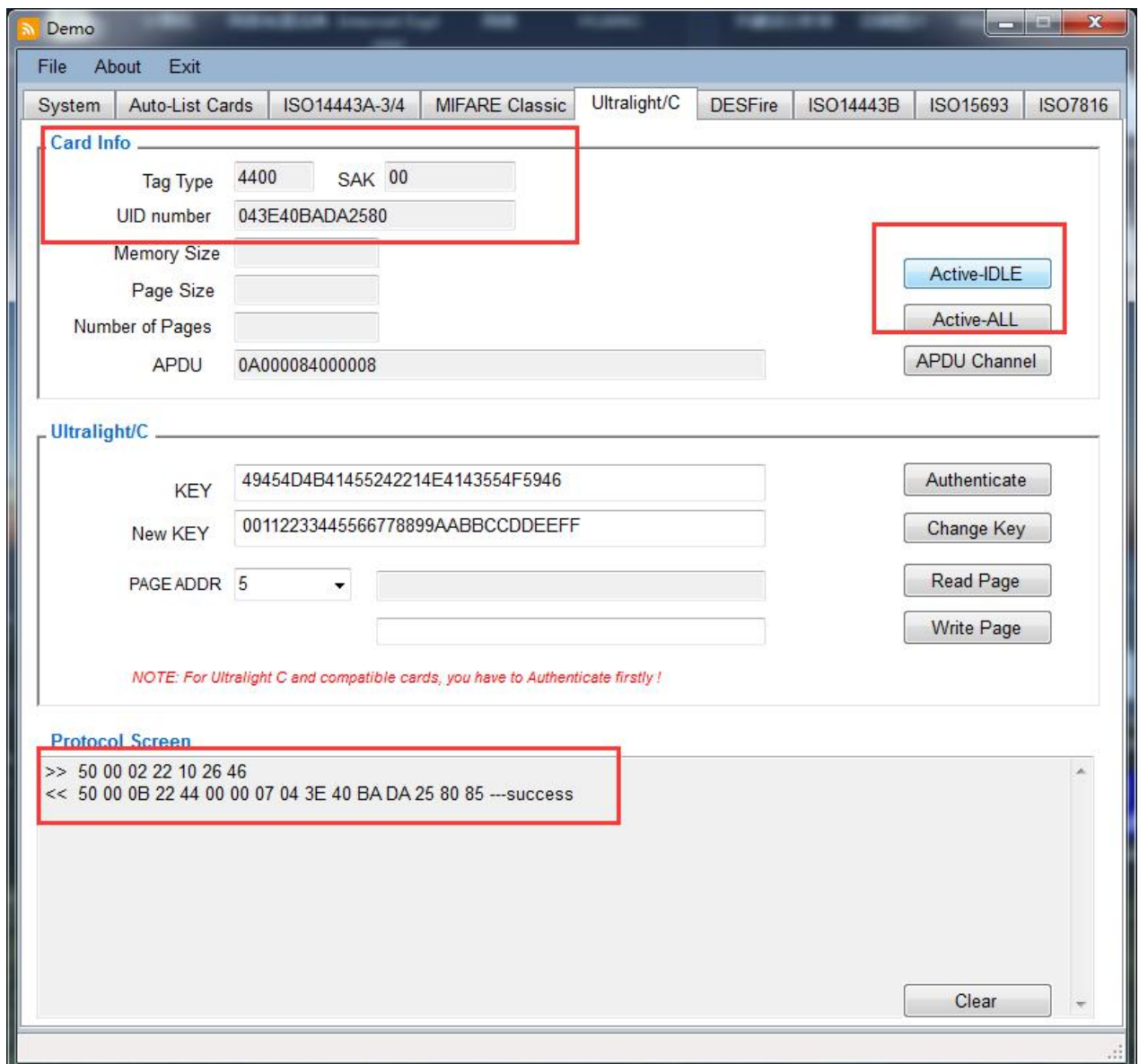
2.7.1 Ultralight/C-Active/Request Card

The optional button including as below:

Active-IDLE: to request the cards not dormant

Active-ALL: Request cards including dormant cards

When succeeded request card, the card's details information including card type, SAK, UID number, memory sizes, etc will be shown as below:



2.7.2 Ultralight/C--APDU Channel

This is transfer channel to send any available commands to the card directly through RF chipset.

Details commands please refer to ISO14443A-4 Standard .

The screenshot shows the 'Demo' application window with the 'Ultralight/C' tab selected. The 'Card Info' section contains fields for Tag Type, SAK, UID number, Memory Size, Page Size, and Number of Pages. The 'APDU' field is highlighted with a red box and contains the value '0A000084000008'. The 'APDU Channel' button is also highlighted with a red box. The 'Ultralight/C' section contains fields for KEY, New KEY, and PAGE ADDR, along with buttons for Authenticate, Change Key, Read Page, and Write Page. A note at the bottom of this section states: 'NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly !'. The 'Protocol Screen' section is empty and has a 'Clear' button.

System	Auto-List Cards	ISO14443A-3/4	MIFARE Classic	Ultralight/C	DESFire	ISO14443B	ISO15693	ISO7816
Card Info								
Tag Type		SAK						
UID number								
Memory Size								
Page Size								
Number of Pages								
APDU	0A000084000008							
								Active-IDLE
								Active-ALL
								APDU Channel
Ultralight/C								
KEY	49454D4B41455242214E4143554F5946							Authenticate
New KEY	00112233445566778899AABBCCDDEEFF							Change Key
PAGE ADDR	5							Read Page
								Write Page
<i>NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly !</i>								
Protocol Screen								
								Clear

2.7.3 Ultralight C Authenticate

This is only opened for Ultralight C and its compatible cards which with password protected.

The common MIFARE Ultralight card/tag is without password protected and no need to do it.

Please input right KEY value to do authenticate for the card

The screenshot shows the 'Demo' application window with the 'Ultralight/C' tab selected. The 'Card Info' section displays fields for Tag Type (4400), SAK (00), UID number (043E40BADA2580), Memory Size, Page Size, Number of Pages, and APDU (0A000084000008). On the right, there are buttons for 'Active-IDLE', 'Active-ALL', and 'APDU Channel'. The 'Ultralight/C' section contains a 'KEY' field with the value '49454D4B41455242214E4143554F5946', a 'New KEY' field with '00112233445566778899AABBCCDDEEFF', and a 'PAGE ADDR' dropdown set to '5'. There are buttons for 'Authenticate', 'Change Key', 'Read Page', and 'Write Page'. A red box highlights the 'KEY' field and the 'Authenticate' button. A red note at the bottom of the 'Ultralight/C' section reads: 'NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly!'. The 'Protocol Screen' at the bottom shows a successful authentication sequence: '>> 50 00 02 22 10 26 46' and '<< 50 00 0B 22 44 00 00 07 04 3E 40 BA DA 25 80 85 ---success'. A 'Clear' button is located at the bottom right of the protocol screen.

Card Info

Tag Type: 4400 SAK: 00
UID number: 043E40BADA2580
Memory Size:
Page Size:
Number of Pages:
APDU: 0A000084000008

Active-IDLE
Active-ALL
APDU Channel

Ultralight/C

KEY: 49454D4B41455242214E4143554F5946
New KEY: 00112233445566778899AABBCCDDEEFF
PAGE ADDR: 5

Authenticate
Change Key
Read Page
Write Page

NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly!

Protocol Screen

```
>> 50 00 02 22 10 26 46  
<< 50 00 0B 22 44 00 00 07 04 3E 40 BA DA 25 80 85 ---success
```

Clear

2.7.4 Ultralight C Change Key

This is only opened for Ultralight C and its compatible cards which with password protected.

And please do Authenticate with old KEY before Change Key.

The data length for the KEY value is 16bytes.

The screenshot shows the 'Demo' application window with the 'Ultralight/C' tab selected. The 'Card Info' section displays fields for Tag Type (4400), SAK (00), UID number (043E40BADA2580), Memory Size, Page Size, Number of Pages, and APDU (0A000084000008). The 'Ultralight/C' section contains the 'KEY' field (49454D4B41455242214E4143554F5946), 'New KEY' field (00112233445566778899AABBCCDDEEFF), 'PAGE ADDR' (5), and buttons for 'Authenticate', 'Change Key', 'Read Page', and 'Write Page'. The 'Change Key' button is highlighted with a red rectangle. A note at the bottom of the 'Ultralight/C' section states: 'NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly!'. The 'Protocol Screen' at the bottom shows a successful transaction: '>> 50 00 02 22 10 26 46' and '<< 50 00 0B 22 44 00 00 07 04 3E 40 BA DA 25 80 85 ---success'. A 'Clear' button is located at the bottom right of the 'Protocol Screen'.

File About Exit

System Auto-List Cards ISO14443A-3/4 MIFARE Classic Ultralight/C DESFire ISO14443B ISO15693 ISO7816

Card Info

Tag Type 4400 SAK 00

UID number 043E40BADA2580

Memory Size

Page Size

Number of Pages

APDU 0A000084000008

Active-IDLE

Active-ALL

APDU Channel

Ultralight/C

KEY 49454D4B41455242214E4143554F5946

New KEY 00112233445566778899AABBCCDDEEFF

PAGE ADDR 5

Authenticate

Change Key

Read Page

Write Page

NOTE: For Ultralight C and compatible cards, you have to Authenticate firstly!

Protocol Screen

>> 50 00 02 22 10 26 46

<< 50 00 0B 22 44 00 00 07 04 3E 40 BA DA 25 80 85 ---success

Clear

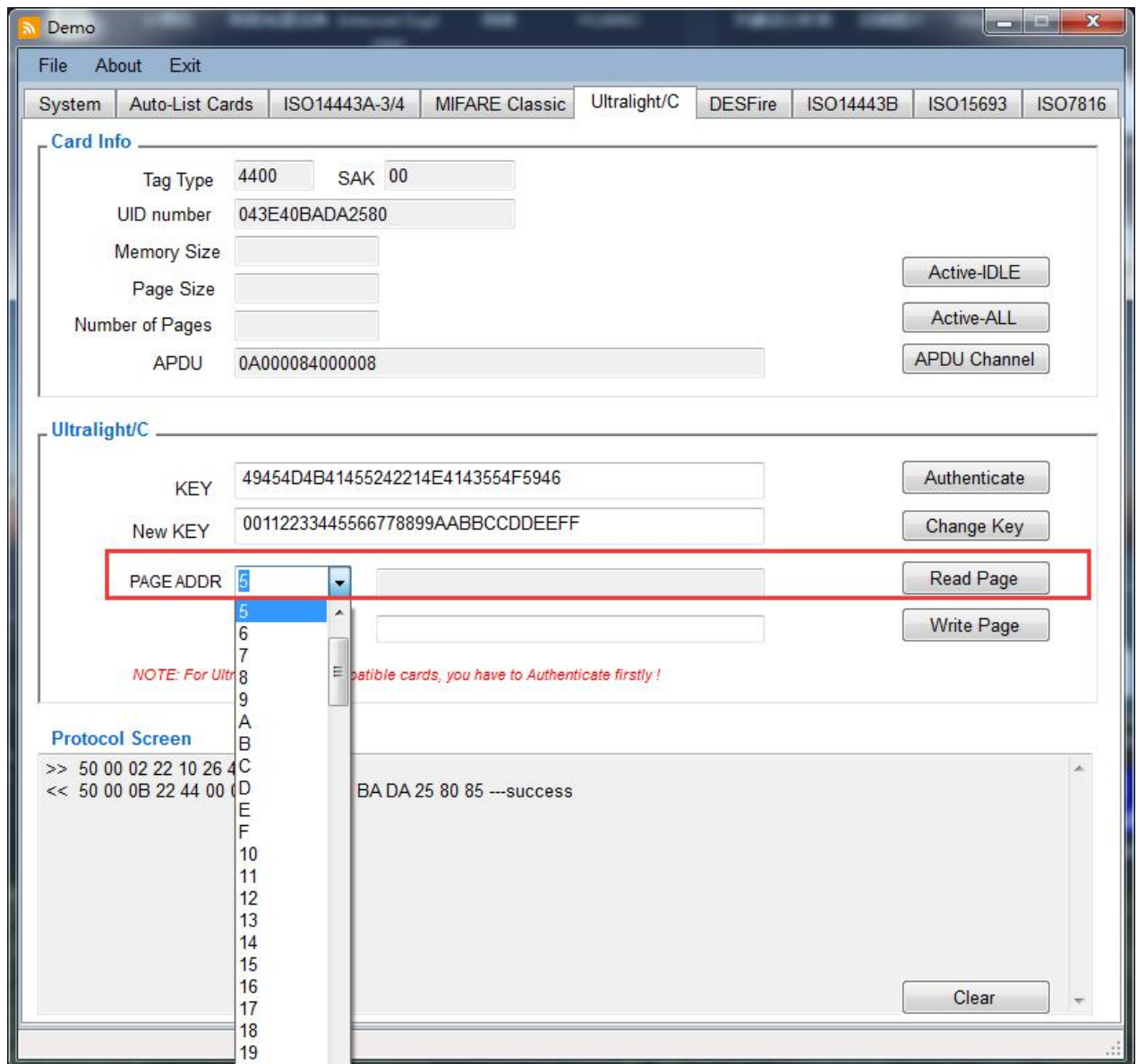
2.7.5 Ultralight /C Read Page

To get to read out the data stored in the according page address.

And For MIFARE Ultralight C and its compatible cards, And NTAG 2xx series card

before Read Page, Authenticate is needed firstly and make sure no remove of card after Active card.
If there any remove, please again as Active-IDLE/Active-ALL --> Authenticate then Read Page with optional Page Address, as below:

For common MIFARE Ultralight card, Authenticate is no need.



2.7.6 Ultralight /C Write Page

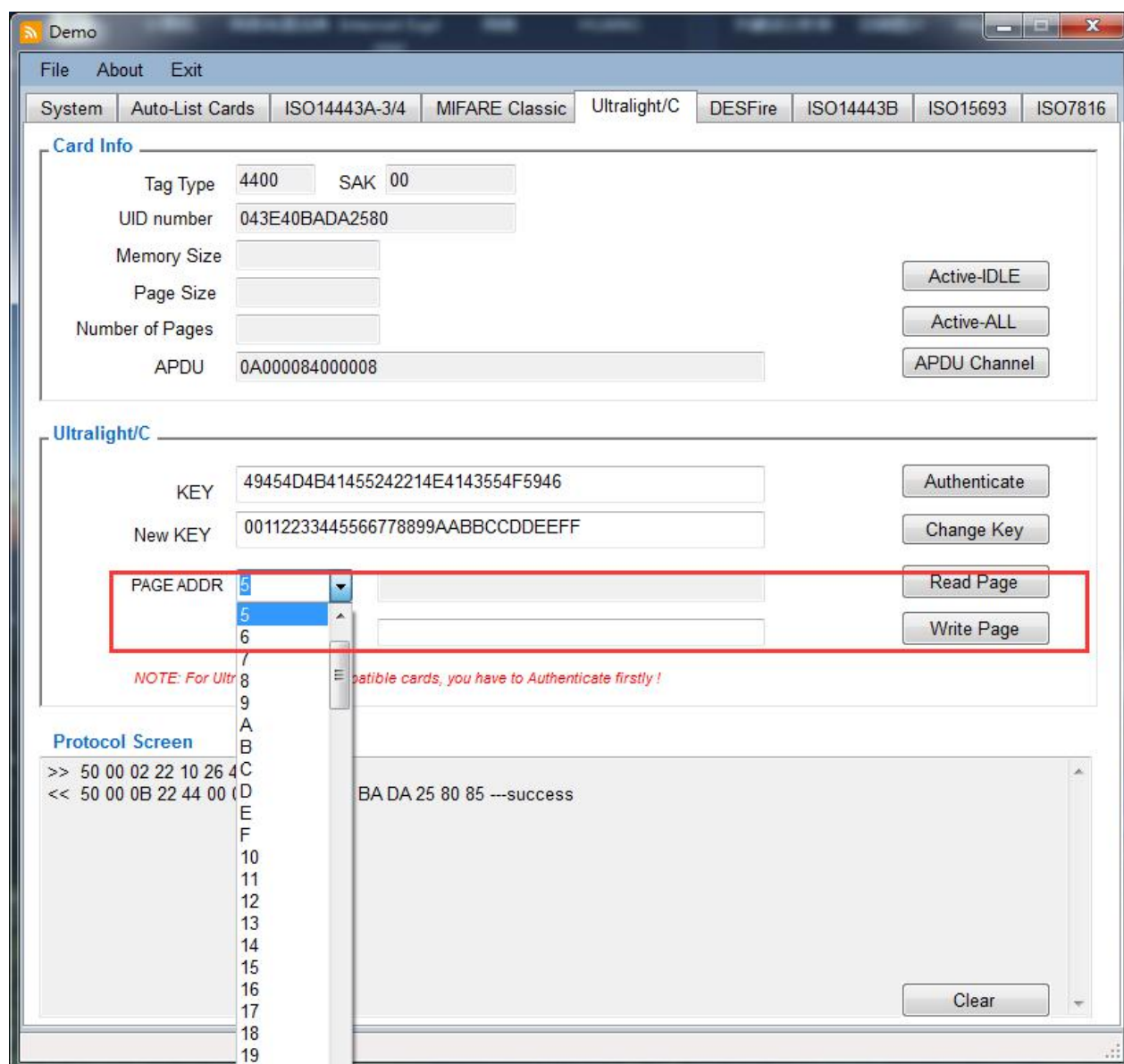
To Write the requested data into the according page address.

And For MIFARE Ultralight C and its compatible cards, And NTAG 2xx series card

Before Write Page, Authenticate is needed firstly and make sure no remove of card after Active card.

If there any remove, please again as Active-IDLE/Active-ALL --> Authenticate then Write Page to optional Page Address, as below:

For common MIFARE Ultralight card, Authenticate is no need.



Note: Some specific page cannot be written please refer to datasheet of using card/tag.

2.8 DESFire Interface

2.8.1 Active DESFire card

The optional button including as below:

Active-IDLE: to request the cards not dormant

Active-ALL: Request cards including dormant cards

When succeeded request card, the card's detail information including card type, SAK, UID number will be shown as below:

The screenshot shows the 'Demo' application window with the 'DESFire' tab selected. The 'Card/Sys Command' section is highlighted with a red box, showing fields for Tag Type (4403), SAK (20), and UID number (046C86FA3C4B80). The 'Active-IDLE' and 'Active-ALL' buttons are also highlighted. Below this, the 'KEY Commands' section contains fields for Key Version, Key Number, Key Setting, and New Key Setting, along with buttons for 'Get Key Version', 'Authenticate', 'Get Key Setting', and 'Change Key Setting'. The 'Card Level' section has buttons for 'PICC Level' and 'Application Level'. The 'Protocol Screen' section at the bottom shows a command sequence: '>> 50 00 02 22 10 26 46' and '<< 50 00 0B 22 44 03 20 07 04 6C 86 FA 3C 4B 80 FA ---success', with a 'Clear' button below it.

Card/Sys Command

Tag Type	4403	SAK	20	Active-IDLE
UID number	046C86FA3C4B80			Active-ALL
ATS				RATS
Version				Get Version

KEY Commands

Key Version		Get Key Version
Key Number	00	KEY 00000000000000000000000000000000
Key Setting		Authenticate
New Key Setting		Get Key Setting
		Change Key Setting
Key Number		Key Setting 00
Original Key	00000000000000000000000000000000	
New Key	00112233445566778899AABBCCDDEEFF	
	Change Key	

Card Level

NOTE: Please click right side button for further detail operation!

PICC Level
Application Level

Protocol Screen

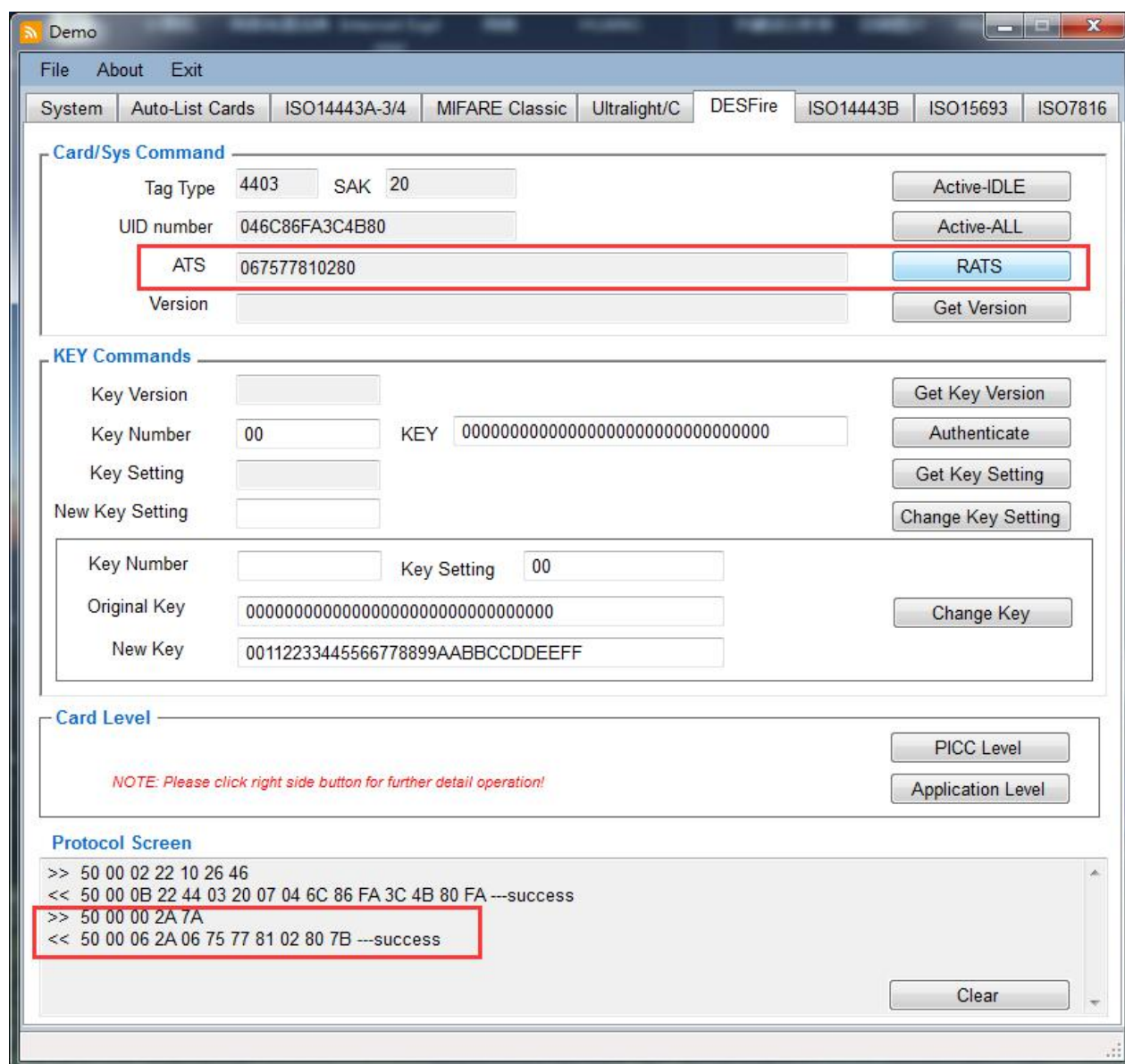
```
>> 50 00 02 22 10 26 46
<< 50 00 0B 22 44 03 20 07 04 6C 86 FA 3C 4B 80 FA ---success
```

Clear

2.8.2 DESFire Card-RATS

RATS= Request for Answer to Select

And the response to RATS is the “Answer to Select” ATS, and the ATS consists of specified bytes for communicate between PICC capabilities and PCD. Details specific byte's meaning, please refer to datasheet of using card.



Note: Before RATS, Active-IDLE/Active-ALL is needed firstly.

2.8.3 DESFire Card-Get Version

To get the returned manufacturing related data of the DESFire cards

The screenshot shows the 'Demo' application window with the 'DESFire' tab selected. The 'Card/Sys Command' section contains the following fields and buttons:

- Tag Type: 4403, SAK: 20, Active-IDLE button
- UID number: 046C86FA3C4B80, Active-ALL button
- ATS: 067577810280, RATS button
- Version: 0401010100180504010101041805046C86FA3C4B80BA7418B3A00816, Get Version button (highlighted with a red box)

The 'KEY Commands' section includes:

- Key Version, Get Key Version button
- Key Number: 00, KEY: 00000000000000000000000000000000, Authenticate button
- Key Setting, Get Key Setting button
- New Key Setting, Change Key Setting button
- Key Number, Key Setting: 00, Change Key button
- Original Key: 00000000000000000000000000000000
- New Key: 00112233445566778899AABBCCDDEEFF

The 'Card Level' section has buttons for 'PICC Level' and 'Application Level'. A note states: 'NOTE: Please click right side button for further detail operation!'.

The 'Protocol Screen' shows a list of commands and responses:

```
<< 50 00 0B 22 44 03 20 07 04 6C 86 FA 3C 4B 80 FA ---success
>> 50 00 00 2A 7A
<< 50 00 06 2A 06 75 77 81 02 80 7B ---success
>> 50 00 00 8B DB
<< 50 00 1C 8B 04 01 01 01 00 18 05 04 01 01 01 04 18 05 04 6C 86 FA 3C 4B 80 BA 74 18 B3 A0 08 16 FB ---success
```

The last two lines of the protocol screen are highlighted with a red box. A 'Clear' button is located at the bottom right of the protocol screen.

Note:

Active-IDLE/Active-ALL-->>RATS is needed before Get Version.

2.8.4 DESFire Card-Get Key Version

The Get Key Version command allows to read out the current key version of any key stored on the card.

Operation procedure: Active-IDLE/Active-ALL --> RATS --> Get Key Version

The screenshot shows the DEMO software interface with the following sections:

- System:** A tabbed menu at the top with options: System, Auto-List Cards, ISO14443A-3/4, MIFARE Classic, Ultralight/C, DESFire (selected), ISO14443B, ISO15693, and ISO7816.
- Card/Sys Command:** Fields for Tag Type (4403), SAK (20), UID number (046C86FA3C4B80), ATS (067577810280), and Version (0401010100180504010101041805046C86FA3C4B80BA7418B3A00816). Buttons on the right include Active-IDLE, Active-ALL, RATS, and Get Version.
- KEY Commands:** A section with a red border containing fields for Key Version (00), Key Number (00), Key Setting, and New Key Setting. A red box highlights the 'Get Key Version' button. Other buttons include Authenticate, Get Key Setting, Change Key Setting, and Change Key.
- Card Level:** A section with a red border containing a note: "NOTE: Please click right side button for further detail operation!". Buttons on the right include PICC Level and Application Level.
- Protocol Screen:** A text area showing the command sequence: << 50 00 06 2A 06 75 77 81 02 80 7B ---success, >> 50 00 00 8B DB, << 50 00 1C 8B 04 01 01 01 00 18 05 04 01 01 01 04 18 05 04 6C 86 FA 3C 4B 80 BA 74 18 B3 A0 08 16 FB ---success, >> 50 00 01 85 00 D4, and << 50 00 01 85 00 D4 ---success. A red box highlights the last two lines. A 'Clear' button is at the bottom right.

2.8.5 DESFire Card- Key Authenticate

This procedure is not only confirm that both card/tag and reader device can trust each other, but also generates a session key which can be used to keep the further communication path secure.

Note Master Keys are identified by their key number 0x00, this is valid on PICC level (selected AID=0x00) and on Application Level.

Operation procedure: Active-IDLE/Active-ALL --> RATS --> Authenticate

The screenshot displays the 'Demo' application window with the 'DESFire' tab selected. The interface is divided into several sections:

- Card/Sys Command:** Contains fields for Tag Type (4403), SAK (20), UID number (046C86FA3C4B80), ATS (067577810280), and Version (0401010100180504010101041805046C86FA3C4B80BA7418B3A00816). Buttons on the right include 'Active-IDLE', 'Active-ALL', 'RATS', and 'Get Version'.
- KEY Commands:** Contains fields for Key Version (00), Key Number (00), Key Setting, and New Key Setting. A red box highlights the 'Key Number' field (00) and the 'Authenticate' button. Other buttons include 'Get Key Version', 'Get Key Setting', 'Change Key Setting', and 'Change Key'.
- Card Level:** Contains buttons for 'PICC Level' and 'Application Level'. A note states: 'NOTE: Please click right side button for further detail operation!'.
- Protocol Screen:** Displays a list of commands and responses. A red box highlights the following sequence:


```
>> 50 00 11 81 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 C0
<< 50 00 00 81 D1 ---success
```

 A 'Clear' button is located at the bottom right of this section.

2.8.6 DESFire Card- Get Key Setting

This function command allows to get configuration information on the card/tag and application master key configuration setting.

It returns the maximum number of keys which can be stored within the selected application.

Before Get Key Setting, a proceeding authentication with the master key is required.

Operation procedure: Active-IDLE/Active-ALL -->> RATS -->> Authenticate -->> Get Key Setting

The screenshot shows the 'Demo' application window with the 'DESFire' tab selected. The 'Card/Sys Command' section displays card information: Tag Type 4403, SAK 20, UID number 046C86FA3C4B80, ATS 067577810280, and Version 0401010100180504010101041805046C86FA3C4B80BA7418B3A00816. On the right, buttons for 'Active-IDLE', 'Active-ALL', 'RATS', and 'Get Version' are visible. The 'KEY Commands' section contains fields for 'Key Version' (00), 'Key Number' (00), 'Key Setting' (0F), and 'New Key Setting'. Buttons for 'Get Key Version', 'Authenticate', 'Get Key Setting' (highlighted with a red box), and 'Change Key Setting' are present. Below this, there are fields for 'Key Number', 'Key Setting' (00), 'Original Key', and 'New Key', with a 'Change Key' button. The 'Card Level' section has buttons for 'PICC Level' and 'Application Level'. A note states: 'NOTE: Please click right side button for further detail operation!'. The 'Protocol Screen' at the bottom shows a list of commands and responses, with the last two lines highlighted by a red box: '>> 50 00 00 82 D2' and '<< 50 00 02 82 0F 01 DE ---success'. A 'Clear' button is located at the bottom right of the protocol screen.

2.8.7 DESFire Card- Change Key Setting

This command changes the master key configuration setting depending on the currently selected AID.

This command takes one byte as parameter which codes the new master key settings., details configuration changeable bits, please refer to detail datasheet of using card.

Authenticate is needed before Change Key Setting.

Operation procedure: Active-IDLE/Active-ALL --> RATS --> Authenticate --> Change Key Setting

The screenshot shows the 'Demo' software window with the 'DESFire' tab selected. The 'Card/Sys Command' section displays fields for Tag Type (4403), SAK (20), UID number (046C86FA3C4B80), ATS (067577810280), and Version (0401010100180504010101041805046C86FA3C4B80BA7418B3A00816). The 'KEY Commands' section is highlighted with a red box, showing fields for Key Version (00), Key Number (00), Key Setting (0F), and New Key Setting. The 'Change Key Setting' button is also highlighted. Below this, there are fields for Key Number, Key Setting (00), Original Key, and New Key. The 'Card Level' section has buttons for 'PICC Level' and 'Application Level'. The 'Protocol Screen' at the bottom shows a list of commands and their responses, including success messages for commands like 50 00 01 85 00 D4, 50 00 11 81 00 00 00 00 00 00 00 00 00 00 00 00 C0, 50 00 00 81 D1, 50 00 00 82 D2, and 50 00 02 82 0F 01 DE.

2.8.8 DESFire Card- Change Key

This command allows to change any key stored on the card/tag.

Parameter value to be changed:

Key Number: One byte length and has to be range from 0x00 to number of application key to 1

Key Setting: Whether a change of key is permit or not and show which key is need for Authenticate before the Change key command

Original Key: Old key

New Key: the key to be changed

To the Change Key Key or Master Key, **Authenticate Master Key is necessary**. Other details for specific operations, please refer to datasheet of using card.

Operation procedure: Active-IDLE/Active-ALL -->> RATS -->> Authenticate -->> Change Key

The screenshot shows the 'Demo' application window with a menu bar (File, About, Exit) and a tabbed interface. The 'DESFire' tab is selected. The 'Card/Sys Command' section displays card information: Tag Type (4403), SAK (20), UID number (046C86FA3C4B80), ATS (067577810280), and Version (0401010100180504010101041805046C86FA3C4B80BA7418B3A00816). Buttons for 'Active-IDLE', 'Active-ALL', 'RATS', and 'Get Version' are on the right. The 'KEY Commands' section is highlighted with a red box and contains fields for 'Key Version' (00), 'Key Number' (00), 'Key Setting' (0F), and 'New Key Setting'. It also has buttons for 'Get Key Version', 'Authenticate', 'Get Key Setting', and 'Change Key Setting'. Below this, another section shows 'Key Number' (00), 'Key Setting' (00), 'Original Key' (00000000000000000000000000000000), and 'New Key' (00112233445566778899AABBCCDDEEFF), with a 'Change Key' button. The 'Card Level' section has buttons for 'PICC Level' and 'Application Level', with a note: 'NOTE: Please click right side button for further detail operation!'. The 'Protocol Screen' at the bottom shows a log of commands and responses: '<< 50 00 01 85 00 D4 ---success', '>> 50 00 11 81 00 00 00 00 00 00 00 00 00 00 00 00 00 00 C0', '<< 50 00 00 81 D1 ---success', '>> 50 00 00 82 D2', and '<< 50 00 02 82 0F 01 DE ---success'. A 'Clear' button is at the bottom right.

2.8.9 DESFire Card- PICC Level

This interface is for PICC application operations.

When enter into PICC Level interface, Authenticate Master Key is necessary

Operation procedure: Active-IDLE/Active-ALL --> RATS --> Authenticate --> PICC Level

Demo

File About Exit

System Auto-List Cards ISO14443A-3/4 MIFARE Classic Ultralight/C DESFire ISO14443B ISO15693 ISO7816

Card/Sys Command

Tag Type 4403 SAK 20 Active-IDLE

UID number 046C86FA3C4B80 Active-ALL

ATS 067577810280 RATS

Version 0401010100180504010101041805046C86FA3C4B80BA7418B3A00816 Get Version

KEY Commands

Key Version 00 Get Key Version

Key Number 00 KEY 00000000000000000000000000000000 Authenticate

Key Setting 0F Get Key Setting

New Key Setting Change Key Setting

Key Number 00 Key Setting 00 Change Key

Original Key 00000000000000000000000000000000

New Key 00112233445566778899AABBCCDDEEFF

Card Level

NOTE: Please click right side button for further detail operation!

2 PICC Level

Application Level

Protocol Screen

<< 50 00 00 81 D1 ---success

>> 50 00 00 82 D2

<< 50 00 02 82 0F 01 DE ---success

>> 50 00 11 81 00 00 00 00 00 00 00 00 00 00 00 00 00 00 C0

<< 50 00 00 81 D1 ---success

Clear

2.8.9.1 PICC Level-Create Application

This command allows to create new application on the PICC

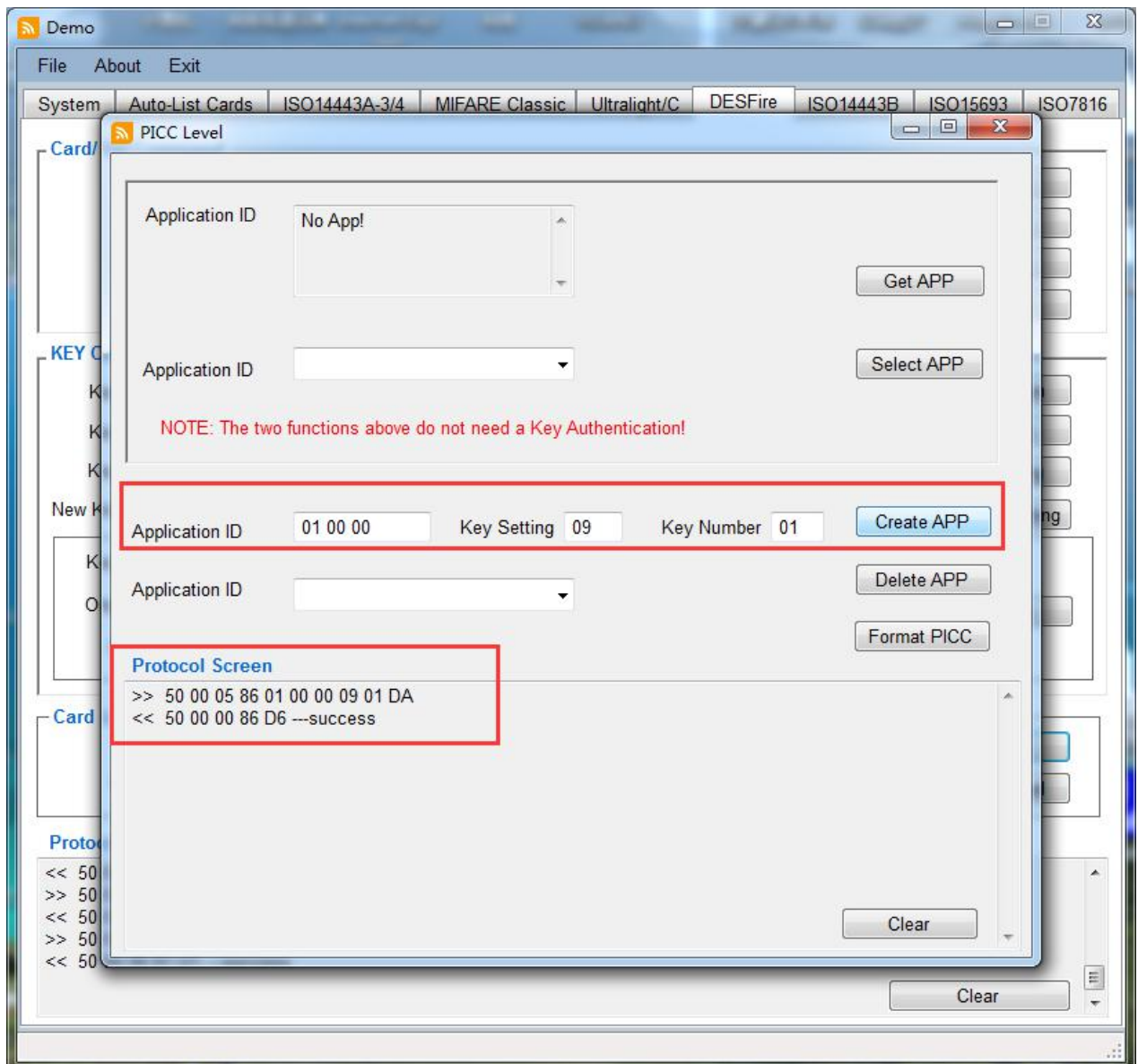
Parameters to be operated:

Application ID(AID): 24 bit number=0x00 00 00 and reserved as reference to the PICC itself

Key Setting: Application Master Key Setting as defined in [Chapter 2.8.6](#)

Key Number: Number of Keys defines how many keys can be stored within the application for cryptographic purposes

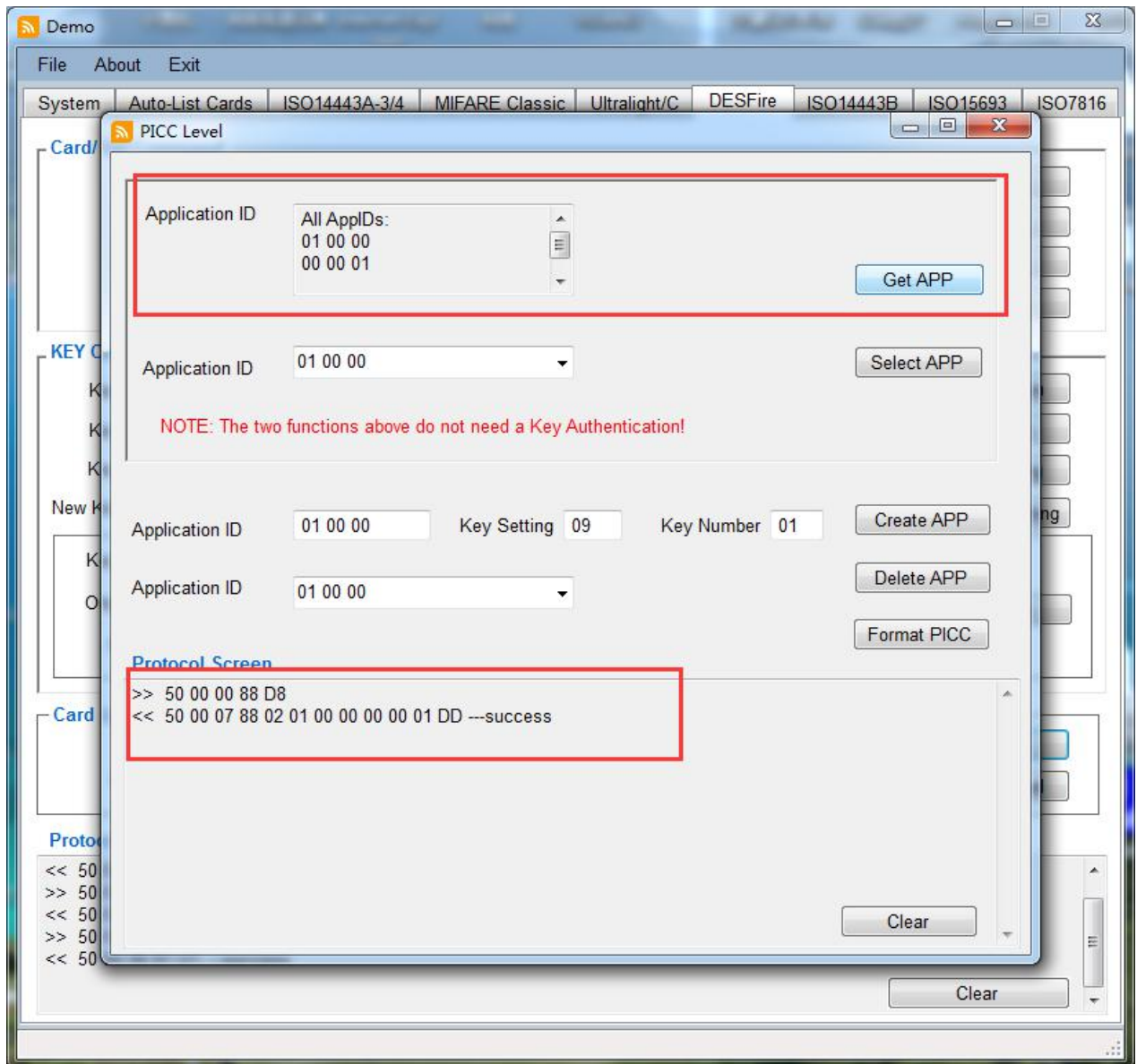
For example below:



Note: Proceeding PICC Master key authentication may be required

2.8.9.2 PICC Level-Get Application

To Get the Application ID or IDs stored in the card.



2.8.9.3 PICC Level-Select Application

To select the Application ID going for next further Application Level operations

