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	Chilitag NFC Reader Tool User Guide (C)	部門：研發設計部
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# Chilitag NFC Reader Tool User Guide

(C)

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## Revision history

Version	Date	Description
1.0	2020/03/25	Initial version SW version : V1.0.0.0
1.1	2020/07/27	Chapter 7. Mifare Plus EV1 function demo added Chapter 8. Mifare Desfire EV1 function demo added SW version : V1.0.1.0
1.2	2020/09/15	Chapter 7. Mifare Plus EV1 function changes to Chapter 7. Mifare Plus Serial function Chapter 7.2. Mifare Plus function demo edited SW version : V1.0.1.1

## Contact information

For additional information, please visit: <http://www.chilitag.com.tw/>

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## Chapter 1. Getting Started

This user guide to Chilitag NFC Reader with hardware version C.

The Reader has to be connected to the host PC with a USB cable Type A.

For the communication with the reader a Chilitag virtual COM port driver (VCP) for the USB interface is mandatory. If the driver is not installed automatically by the operating system.

The driver will map the USB to a serial communication port. Install the driver and connect the reader. It will show “new hardware detected.” You can check your setup under System

Setting/System/Hardware/Device Manager to find out which COM port had been assigned to your reader. Optionally you can change the COM port number in the advanced settings of the COM port.

For the communication with the reader you need the Chilitag Reader Tool, or a Terminal Program, which is delivered with Chilitag NFC Reader. The Microsoft .NET Framework 2.0 (or any higher version) needs to be installed first in order to run the Chilitag Reader Tool.

The Chilitag Reader Tool needs no installation, simply start it and the reader will be selected automatically. Now you can communicate with your reader.

Step by Step:

1. Install the Chilitag driver
2. Connect the reader via the USB slot to the PC
3. Install the Microsoft .NET Framework
4. Start the Chilitag Reader Tool
5. Now you can communicate with the reader

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## Chapter 2. GUI Description

### 2.1 Check Comport

Based on Reader connection method(USB to Serial Port),user must find the correct number of comport to connect the device.

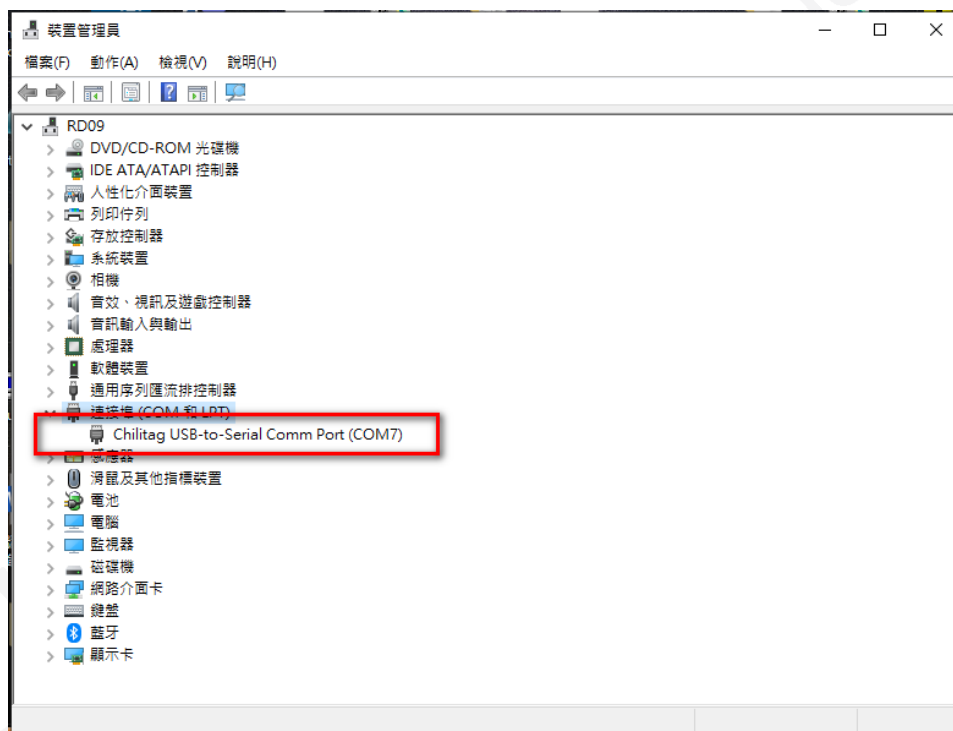


Figure 2.1-1 COM Port for Reader Hardware displays in Device Manager.

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## 2.2 Software Component

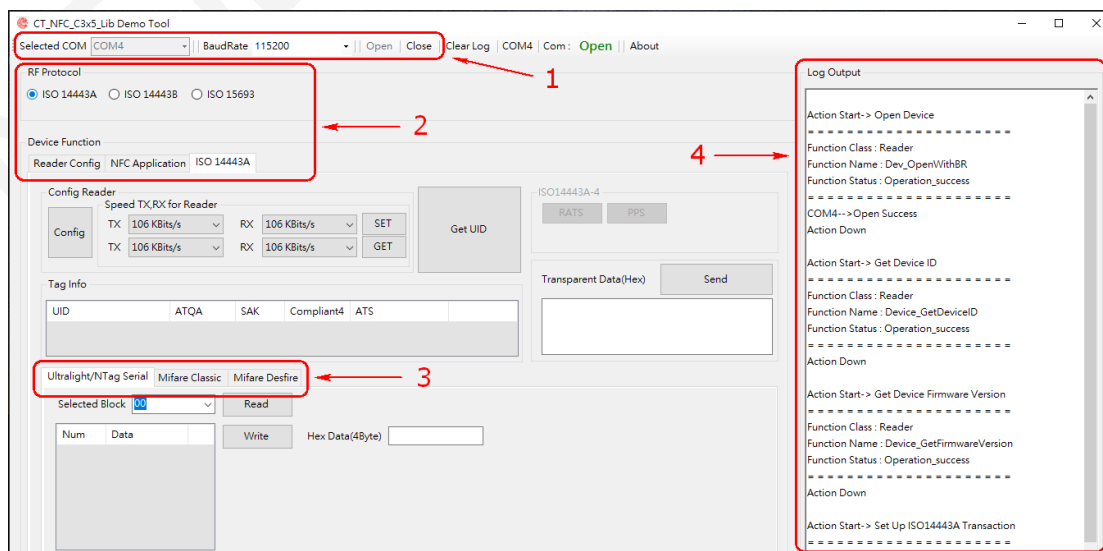


Figure 2.2-1 Sections in Demonstration software

This software mainly consists of four sections as shown in Figure 2.2-2

1. Comport Setup
2. RFID protocol taps and Reader Configuration
3. Card functional taps
4. Transaction logs output

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## 2.3 Comport Setup

Open port is used to query and open communication port to the reader device.

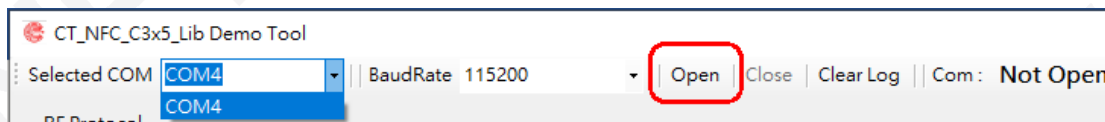


Figure 2.3-1 Open com port button

- Click “Selected COM” drop-down list to search available com port present in computer.
- Selected the COM port number belonging to reader hardware.
- Selected the BaudRate of reader being operated to open communication.
- Click “Open” button to connect the COM port.
- If connection is successful, there will displayed at GUI, as shown in Figure 3.1-4.



Figure 2.3-2 connected com port

Close port is used to close current communication port.



Figure 2.3-3 Close com port button

- Click “Close” button to close current operating COM port.
- The connection shown at GUI indicated that the comport was closed, as shown in Figure 3.1-6.

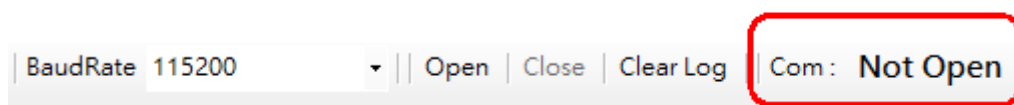


Figure 2.3-4 closed com port

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## Chapter 3. Reader General Function Demonstration

### 3.1 Get Device ID

“Get Device ID” button is used to get the device ID of connected device. Device ID is reported as shown in Figure 3.2-1.

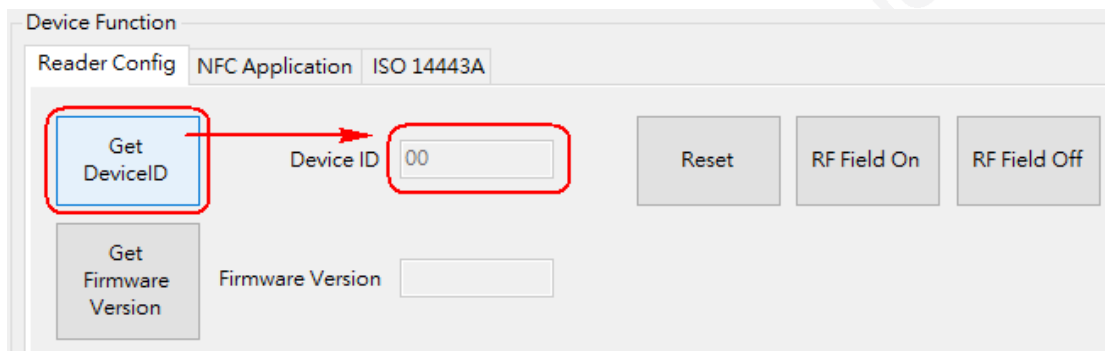


Figure 3.1 Get Device ID button

### 3.2 Get Firmware Version

“Get Firmware Version” button is used to get firmware version from the connected device. Firmware Version is reported as shown in Figure 3.2.



Figure 3.2 Get Firmware Version button

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### 3.3 Reset

“Reset” button is used to reset reader IC.

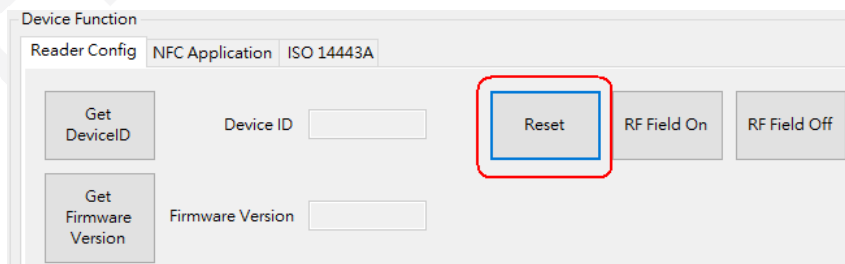


Figure 3.3 Reset button

### 3.4 RF Field On

“RF Field On” button is used to start 13.56-MHz carrier emission.

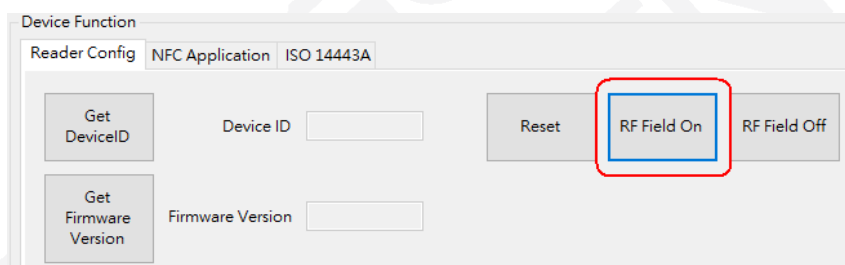


Figure 3.4 RF Field On button

### 3.5 RF Field Off

“RF Field Off” button is used to stop 13.56-MHz carrier emission.



Figure 3.5 RF Field Off button

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## Chapter 4. ISO14443A Function Demonstration

### 4.1 Config

“Config” button is used to setup parameters in the reader to be ready to transmit and receive following standard of ISO14443A. User must activate this setup before performing any RF-related operations in ISO14443A protocol.

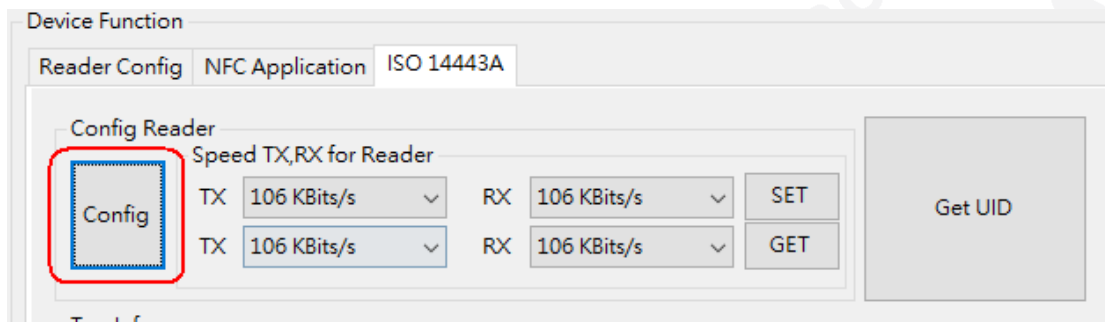


Figure 4.1 ISO14443A Config button

### 4.2 SET Speed

“SET Speed” button is used to configure Tx and Rx speed of CODEC in reader. User must configure speed before performing any RF-related operations in ISO14443A protocol.

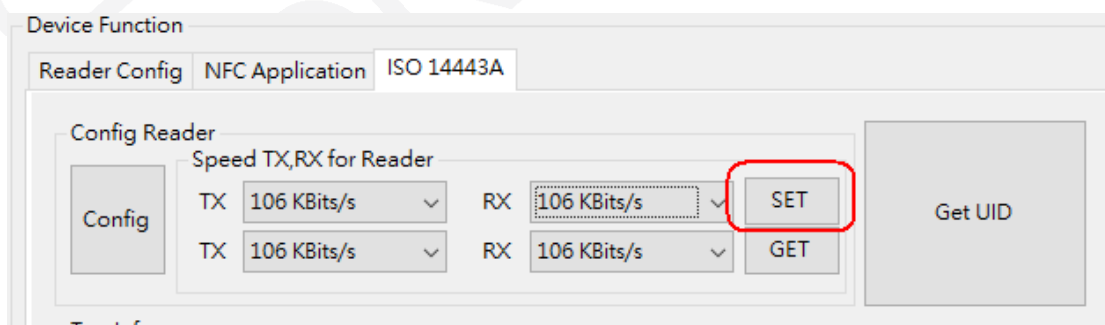


Figure 4.2 ISO14443A SET Speed button

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### 4.3 GET Speed

“GET Speed” button is used to get current speed of CODEC in reader.

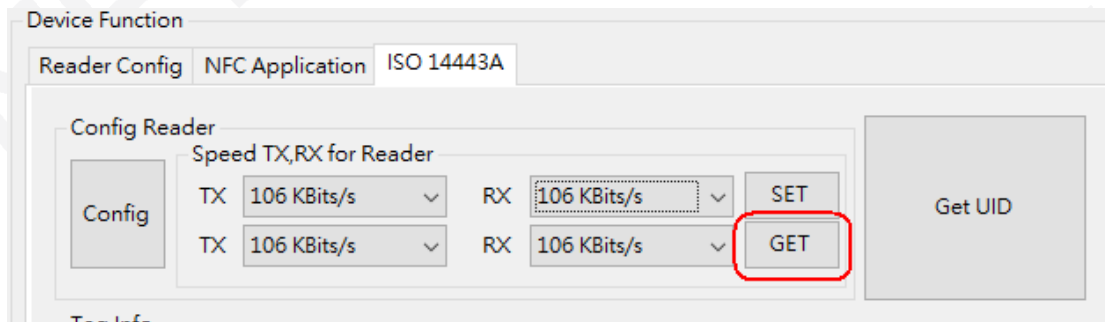


Figure 4.3 ISO14443A GET Speed button

### 4.4 Get UID

“Get UID” button is used to get UID and select card in field.

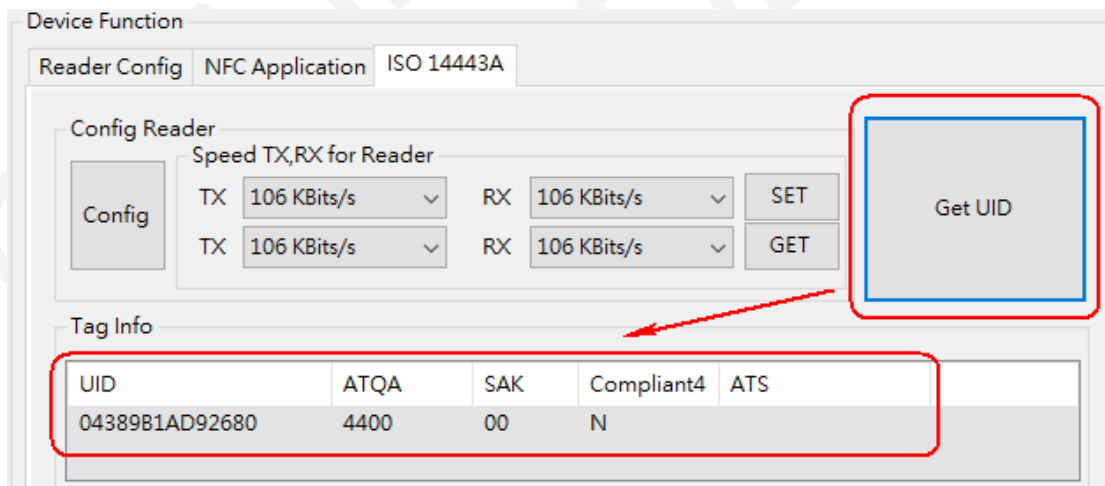


Figure 4.4 ISO14443A Get UID button

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## 4.5 RATS

“RATS” button is used to perform RATS command in ISO14443A-4. The response from RATS command indicates card capabilities namely transaction speed, Frame wait time, Start-up Frame guard time, NAD support, CID support and History bytes.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. If card is supported 14443A-4 protocol as shown in Figure 4.5-1.
3. Click “RATS” button to perform RATS command.
4. Result from RATS command are shown in Figure 4.5-2.

Tag Info				
UID	ATQA	SAK	Compliant4	ATS
044914BA5F3580	4403	20	Y	

Figure 4.5-3 Card is supported 14443A-4

Tag Info				
UID	ATQA	SAK	Compliant4	ATS
044914BA5F3580	4403	20	Y	067577810280

Figure 4.5-4 Result from RATS command

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## 4.6 Transparent Data

Transparent Data is used to transmit ISO14443A arbitrary data with CRC appending at the end of the transmission packet. User can use the command to directly transmit hexadecimal code. For more information, please refer to card datasheet.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input hexadecimal code as shown in Figure 4.6-1.
3. Click “Send” button to transmit data.
4. Review result in log windows as shown in Figure 4.6-3.

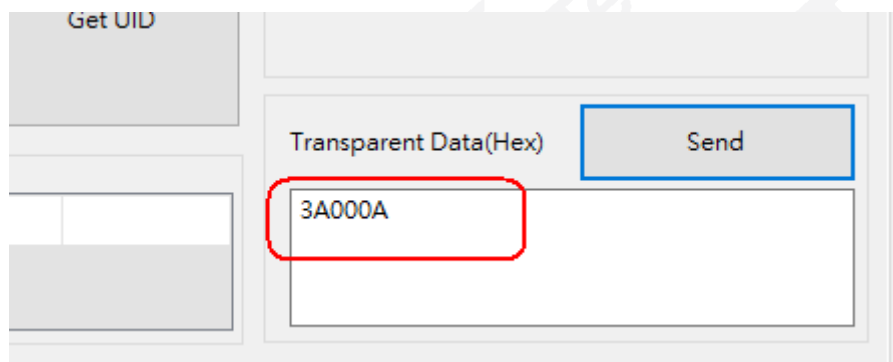


Figure 4.6-2 Input hexadecimal code

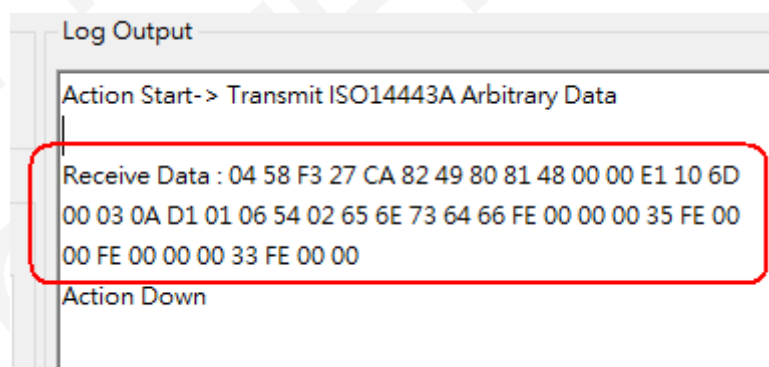


Figure 4.6-3 Review result in log windows

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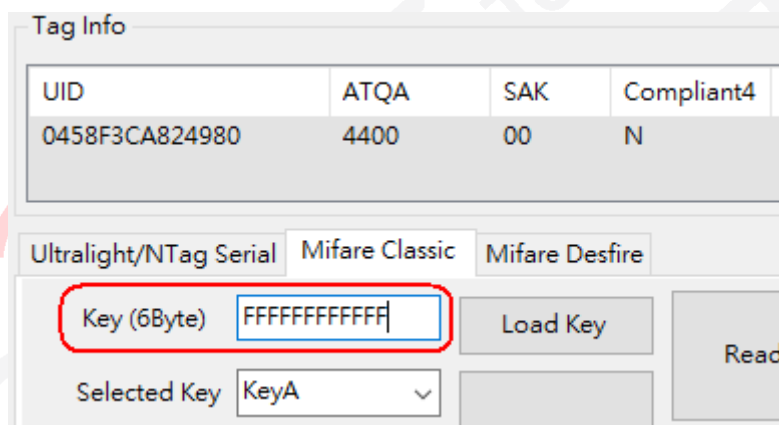
## Chapter 5. Mifare Classic Function Demonstration

### 5.1 Load Key

“Load Key” button is used to load a 6-byte hexadecimal key into key buffer to be used authentication.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication, as shown in Figure 3.4-1.
3. Click “Load Key” button to load key into key buffer.



The screenshot shows the 'Tag Info' section with fields for UID (0458F3CA824980), ATQA (4400), SAK (00), and Compliant4 (N). Below this, the 'Mifare Classic' tab is selected. The 'Key (6Byte)' input field is highlighted with a red box and contains the hexadecimal value 'FFFFFFFF'. The 'Load Key' button is visible next to it. The 'Selected Key' dropdown menu shows 'KeyA'.

Figure 5.1-1 Input 6-byte hexadecimal key

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## 5.2 Authentication

“Authentication” button is used to perform MIFARE authentication in specific card sector. For typical 1k-byte MIFARE card, every four blocks is governed by keys (A and B) of each sector. For example, block 4, 5, 6 and 7 rely on the same key stored in block. If block 4 was authenticated, block 5, 6 and 7 can also be accessed with re-authentication.

If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication, as shown in Figure 5.2-1.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed, as shown in Figure 5.2-2.
6. Click “Authentication” button to authenticate.

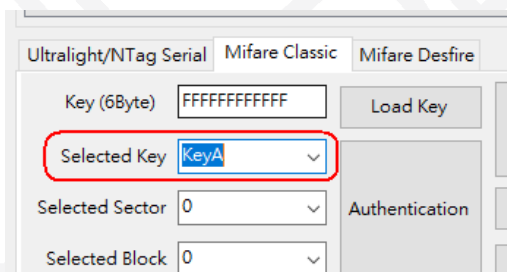


Figure 5.2-3 Select KeyA or Key to be used in authentication

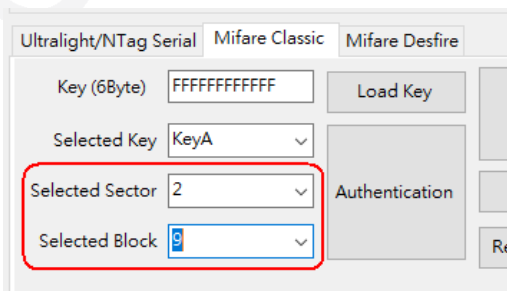


Figure 5.2-4 Select the block address to be accessed

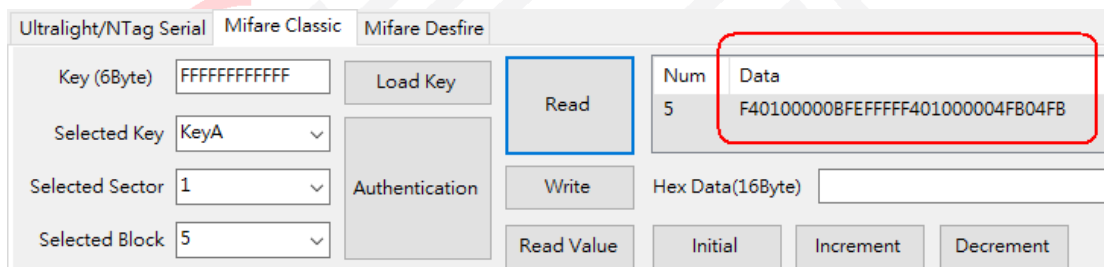
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### 5.3 Read

“Read” button is used to read data from target block address. User should read data with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Click “Read” button to read data.
8. Result of response will displayed at GUI, as shown in Figure 5.3-1.



The screenshot shows the Chilitag NFC Reader Tool GUI. The 'Mifare Classic' tab is selected. The 'Key (6Byte)' field contains 'FFFFFFFF'. The 'Selected Key' dropdown is set to 'KeyA'. The 'Selected Sector' dropdown is set to '1'. The 'Selected Block' dropdown is set to '5'. The 'Read' button is highlighted with a blue border. The 'Data' field displays the hexadecimal value 'F40100000BFEFFFF401000004FB04FB', which is also highlighted with a red border.

Figure 5.3-2 Read data displayed at GUI

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## 5.4 Write

“Write” button is used to write data to target block address. User should write data with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Input 16-byte hexadecimal data to be written, as shown in Figure 5.4-1
8. Click “Write” button to write data.

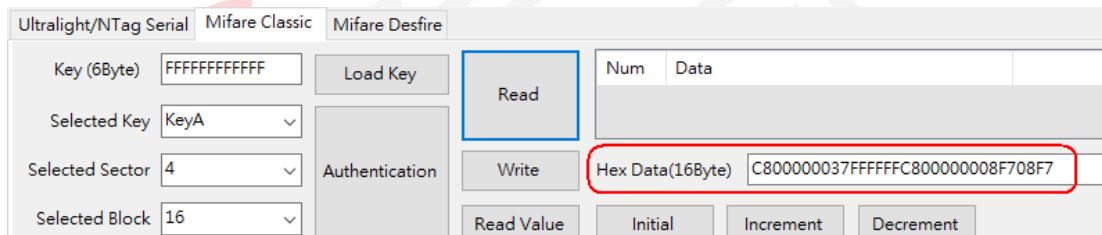


Figure 5.4-2 Input 16-byte hexadecimal data

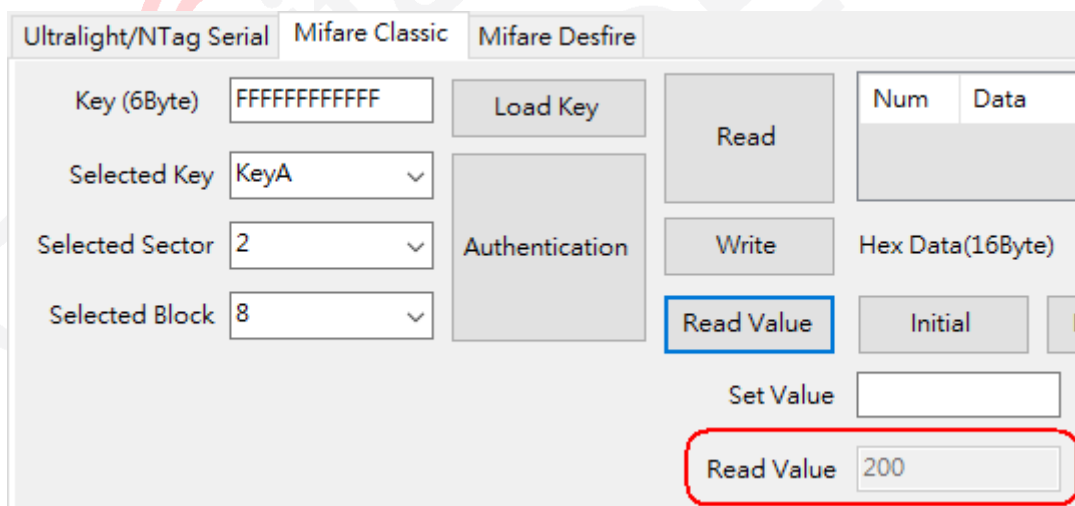
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## 5.5 Read Value

“Read Value” button is used to read value from target value block. User should read value with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Click “Read Value” button to read value.
8. Value of response will displayed at GUI, as shown in Figure 5.5-1.



The screenshot shows the Chilitag NFC Reader Tool GUI. At the top, there are tabs for 'Ultralight/NTag Serial', 'Mifare Classic', and 'Mifare Desfire'. Below the tabs, there are input fields for 'Key (6Byte)' (set to FFFFFFFF), 'Selected Key' (set to KeyA), 'Selected Sector' (set to 2), and 'Selected Block' (set to 8). There are buttons for 'Load Key', 'Authentication', 'Read', 'Write', 'Read Value', 'Initial', and 'Ir'. The 'Read Value' button is highlighted with a blue border. Below the buttons, there is a 'Set Value' input field and a 'Read Value' output field displaying the value '200', which is highlighted with a red border.

Figure 5.5-2 Read value displayed at GUI

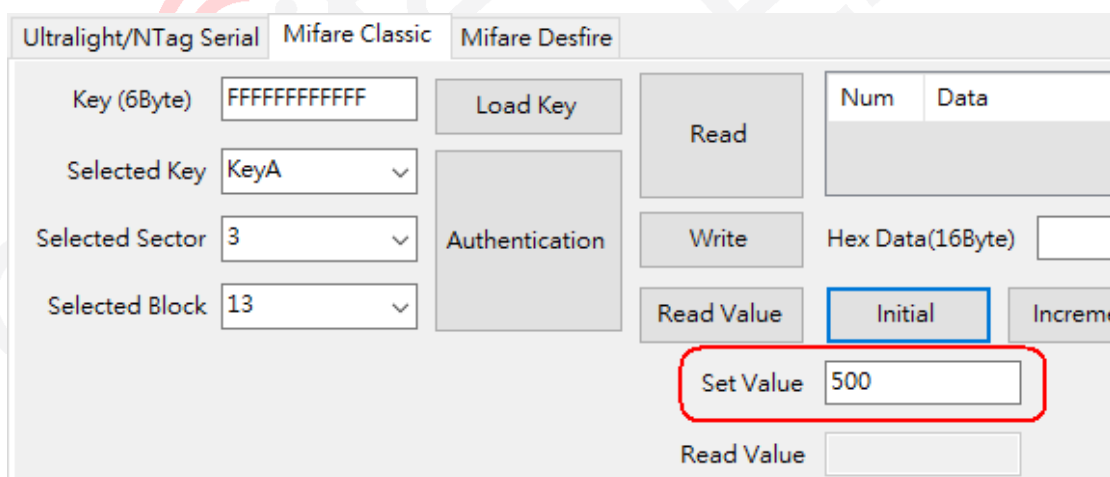
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## 5.6 Initial

“Initial” button is used to initial value block data to target block address. User should initial value with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Input value to be initial, as shown in Figure 5.6-1
8. Click “Initial” button to initial value block.



The screenshot shows the software interface for the Chilitag NFC Reader Tool. It has three tabs: 'Ultralight/NTag Serial', 'Mifare Classic' (selected), and 'Mifare Desfire'. On the left, there are input fields for 'Key (6Byte)' (set to FFFFFFFF), 'Selected Key' (set to KeyA), 'Selected Sector' (set to 3), and 'Selected Block' (set to 13). In the center, there are buttons for 'Load Key', 'Authentication', 'Read', 'Write', 'Read Value', and 'Initial'. The 'Initial' button is highlighted with a blue border. Below the 'Initial' button, there is a 'Set Value' input field with the number '500' entered, which is circled in red. To the right of the 'Set Value' field is an 'Increase' button. At the bottom, there is a 'Read Value' input field.

Figure 5.6-2 Initial value

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## 5.7 Increment

“Increment” button is used to increase value block and transfer result to target block address. User should increase value with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Input value to be increase, as shown in Figure 5.7-1.
8. Click “Increment” button to increase value block.

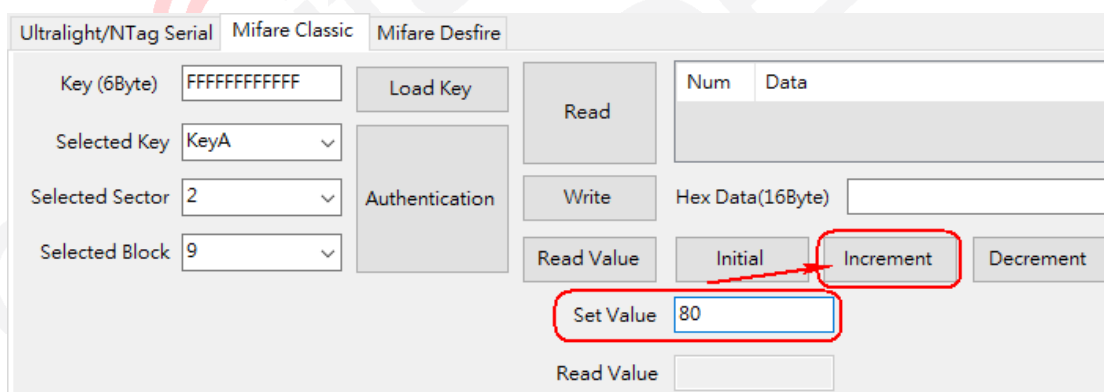


Figure 5.7-2 Increase value

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## 5.8 Decrement

“Decrement” button is used to decrease value block and transfer result to target block address. User should decrease value with in authenticated sector. If authentication is failed, the access process must be restart from operation of select card.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Input 6-byte hexadecimal key to be used authentication.
3. Click “Load Key” button to load key into key buffer.
4. Click “Selected Key” drop-down list to select KeyA or KeyB to be used in authentication.
5. Click “Selected Sector” and “Selected Block” drop-down list to select the block address to be accessed.
6. Click “Authentication” button to authenticate.
7. Input value to be decrease, as shown in Figure 5.8-1.
8. Click “Decrement” button to decrease value block.

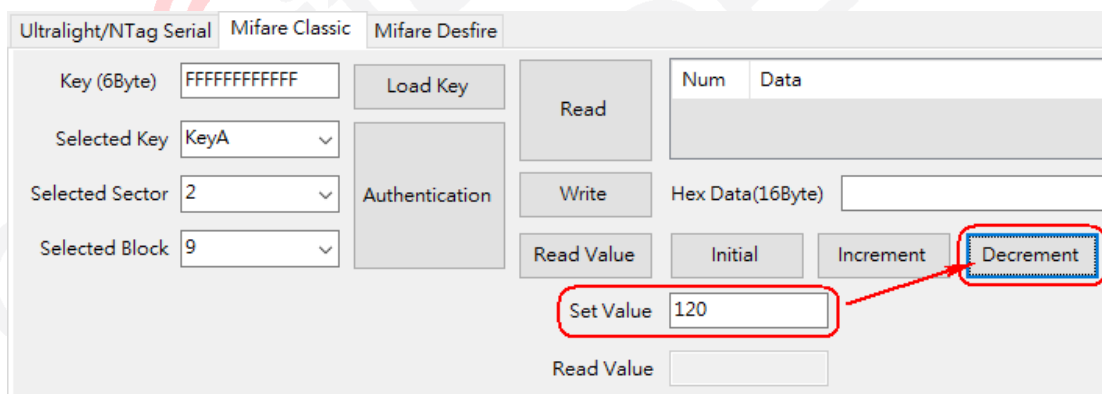


Figure 5.8-2 Decrease value

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## Chapter 6. Mifare Ultralight Function Demonstration

### 6.1 Read

“Read” button is used to read the specified memory pages. The result of response is the 16-byte (4-page) data starting from the starting page address.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “Selected Block” drop-down list to select the starting page address, as shown in Figure 6.1-1.
3. Click “Read” button to read memory pages.
4. Result of response will displayed at GUI, as shown in Figure 6.1-2.

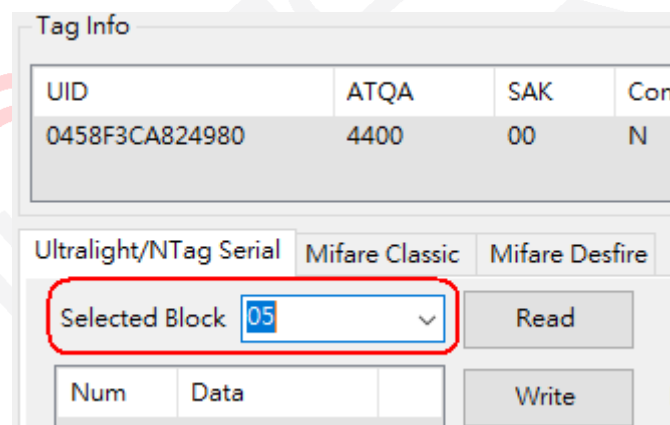


Figure 6.1-3 Select the starting page address

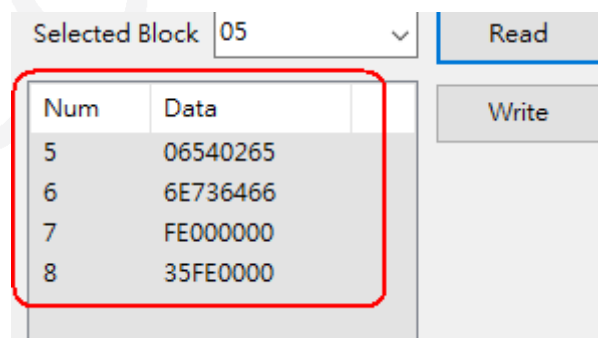


Figure 6.1-4 Result displayed at GUI

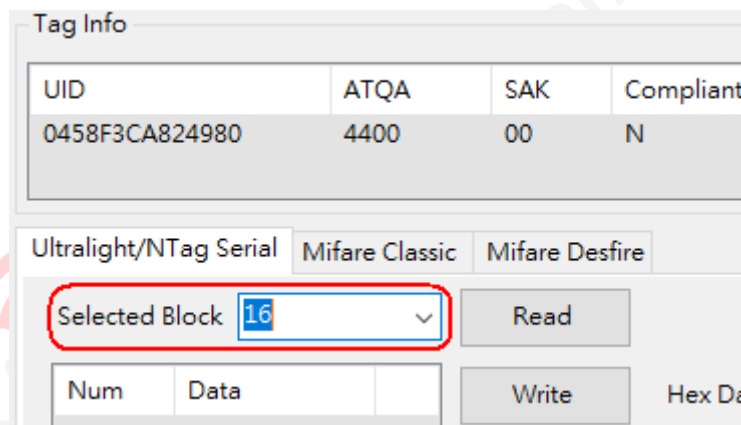
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## 6.2 Write

“Write” button is used to program the data into a specified memory page.

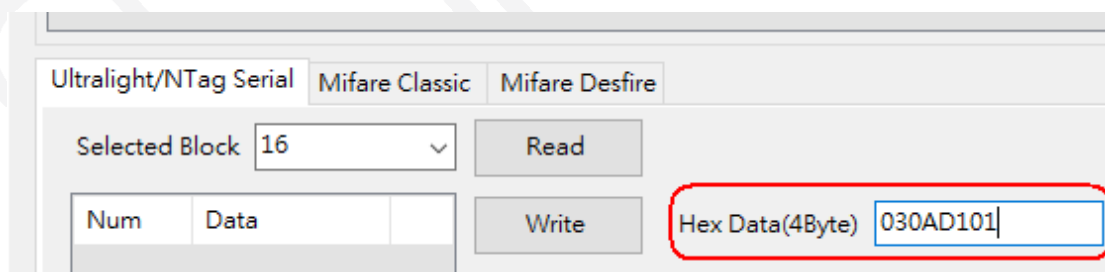
The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “Selected Block” drop-down list to select the page address to be written, as shown in Figure 6.2-1.
3. Input 4-byte hexadecimal data to be written, as shown in Figure 6.2-2.
4. Click “Write” button to program memory pages.



The screenshot shows the 'Tag Info' window. It contains a table with columns: UID, ATQA, SAK, and Compliant. The values are: 0458F3CA824980, 4400, 00, and N. Below the table are tabs for 'Ultralight/NTag Serial', 'Mifare Classic', and 'Mifare Desfire'. The 'Ultralight/NTag Serial' tab is active. It features a 'Selected Block' dropdown menu with '16' selected, a 'Read' button, and a 'Write' button. There is also a 'Hex Data' input field.

Figure 6.2-1 Select the page address



The screenshot shows the 'Tag Info' window with the 'Ultralight/NTag Serial' tab active. The 'Selected Block' dropdown is set to '16'. The 'Write' button is highlighted. The 'Hex Data(4Byte)' input field contains the value '030AD101'.

Figure 6.2-2 Input 4-byte hexadecimal data

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## Chapter 7. Mifare Plus Serial Function Demonstration

### 7.1 Write Perso

“Write Perso” button is used to finalize the personalization and switch to a higher security level. If this command is not followed by any option byte the PICC is upgraded to SL1, while if the option byte follows the CommitPerso the PICC is upgraded to the indicated security level.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Input 2-byte BNr of address of the first block or key to be written to.
5. Input 16 to 240-byte Data to be written starting from the first block.
6. Click “Write” button to change the data and AES keys from the initial delivery configuration to a customer specific value, as shown in Figure 7.1-1.

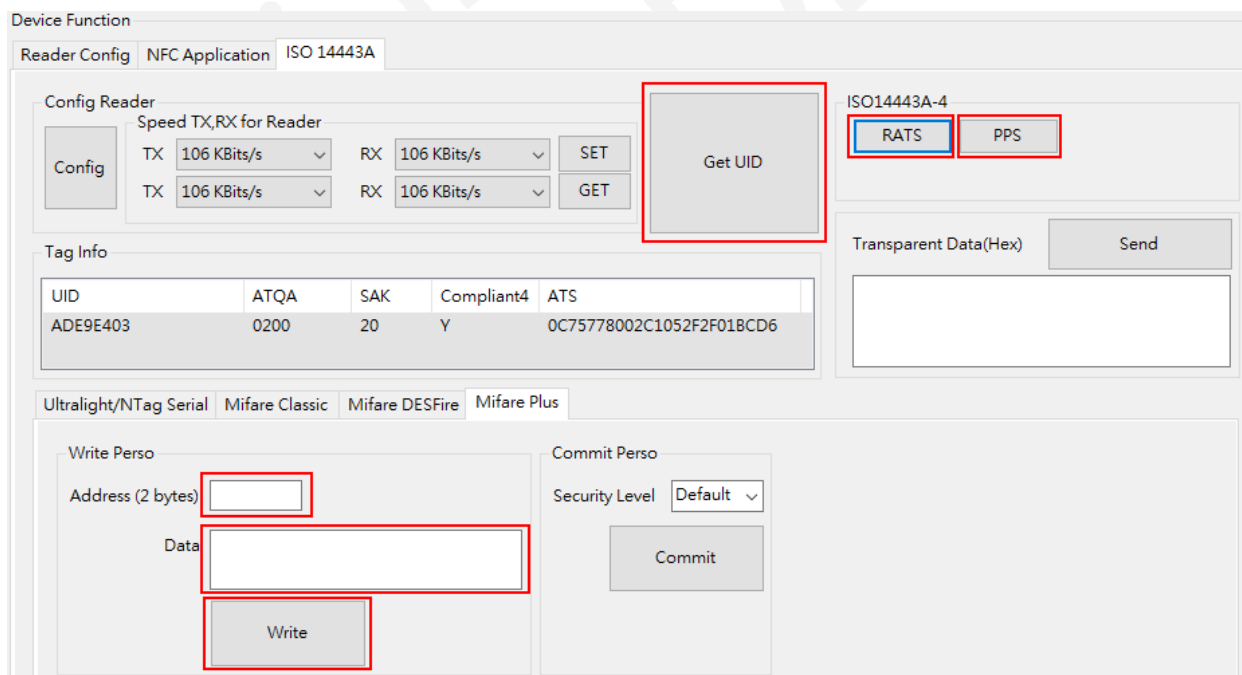


Figure 7.1-1 Write perso

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## 7.2 Commit Perso

“Write Perso” button is used to finalize the personalization and switch to a higher security level. If this command is not followed by any option byte the PICC is upgraded to SL1, while if the option byte follows the CommitPerso the PICC is upgraded to the indicated security level.

The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Select “Security Level” to switch SL1 or SL3.
5. Click “Commit” button to finalize the personalization and switch up to SL1 or SL3, as shown in Figure 7.2-1.
6. Mifare Plus X support Security Level Default / Mifare Plus X/EV1 support Security Level Default/SL1, and the [Default] will change to Security Level 1.

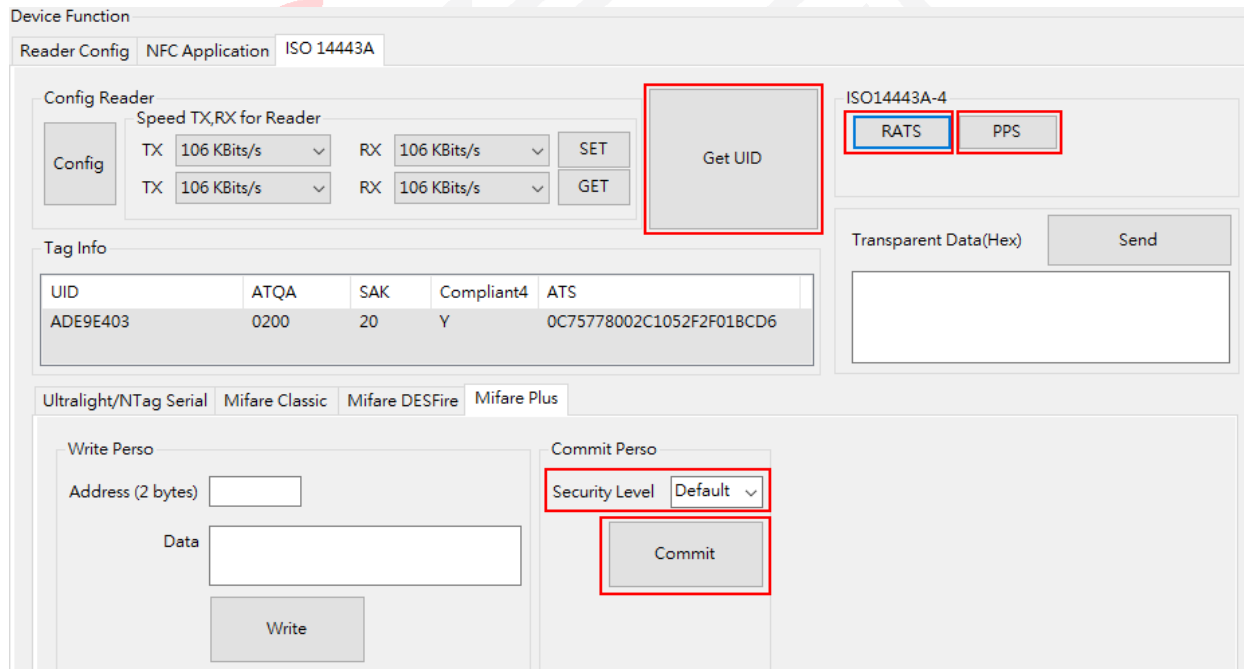


Figure 7.2-1 Commit perso

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### 7.3 SL1 Function Demonstration

A Mifare Plus tag at Security Level 1 acts like a Mifare Classic tag. Please reference the Chapter 5. Mifare Classic function.

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## Chapter 8. Mifare Desfire EV1 Function Demonstration

### 8.1 Create Application

“Create” button is used to create new applications on the PICC. Application Identifier 0x00 00 00 is reserved as a reference to the PICC itself. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Input 3-byte AID of the application id.
5. Input 1-byte KeySetting1 of the ‘Application Master Key Settings’.
6. Input 1-byte KeySetting2 to defines several settings:
  - A. KeySetting2 set 0x00 for authentication either with “0x0A” or “0x1A”
  - B. KeySetting2 set 0x01 for authentication only with “0x1A”
  - C. KeySetting2 set 0x10 for authentication only with “0xAA”
7. Click “Create” button to create new applications on the PICC., as shown in Figure 8.1-1.

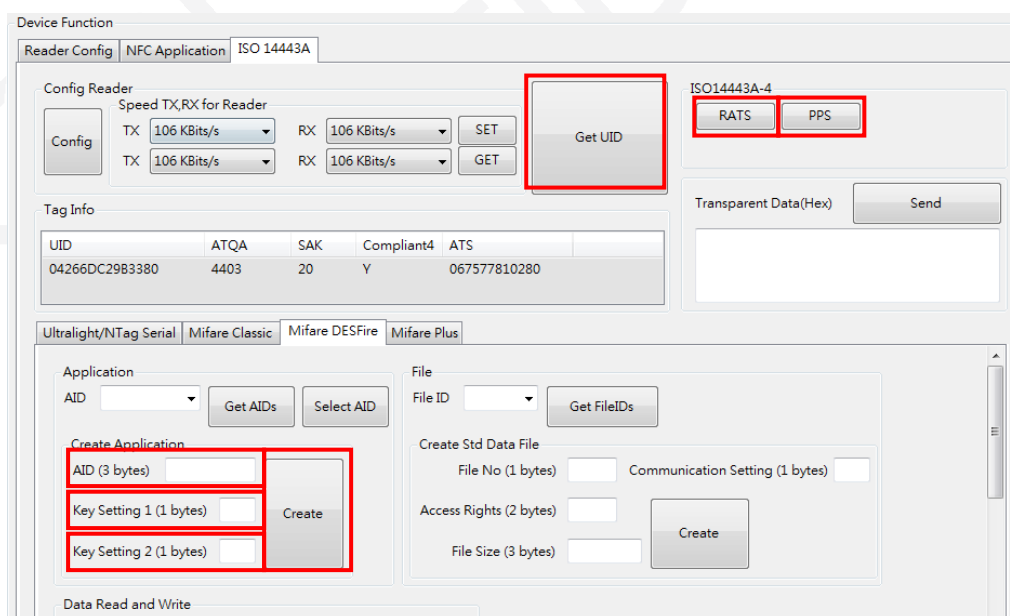


Figure 8.1-1 Create Application IDs

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## 8.2 Get Application IDs

“Get AIDs” button is used to get the Application IDentifiers of all active applications on a PICC, this command does not accept any parameters. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Click “Get AIDs” button to get the application IDentifiers of all active applications on a PICC, as shown in Figure 8.2-1.

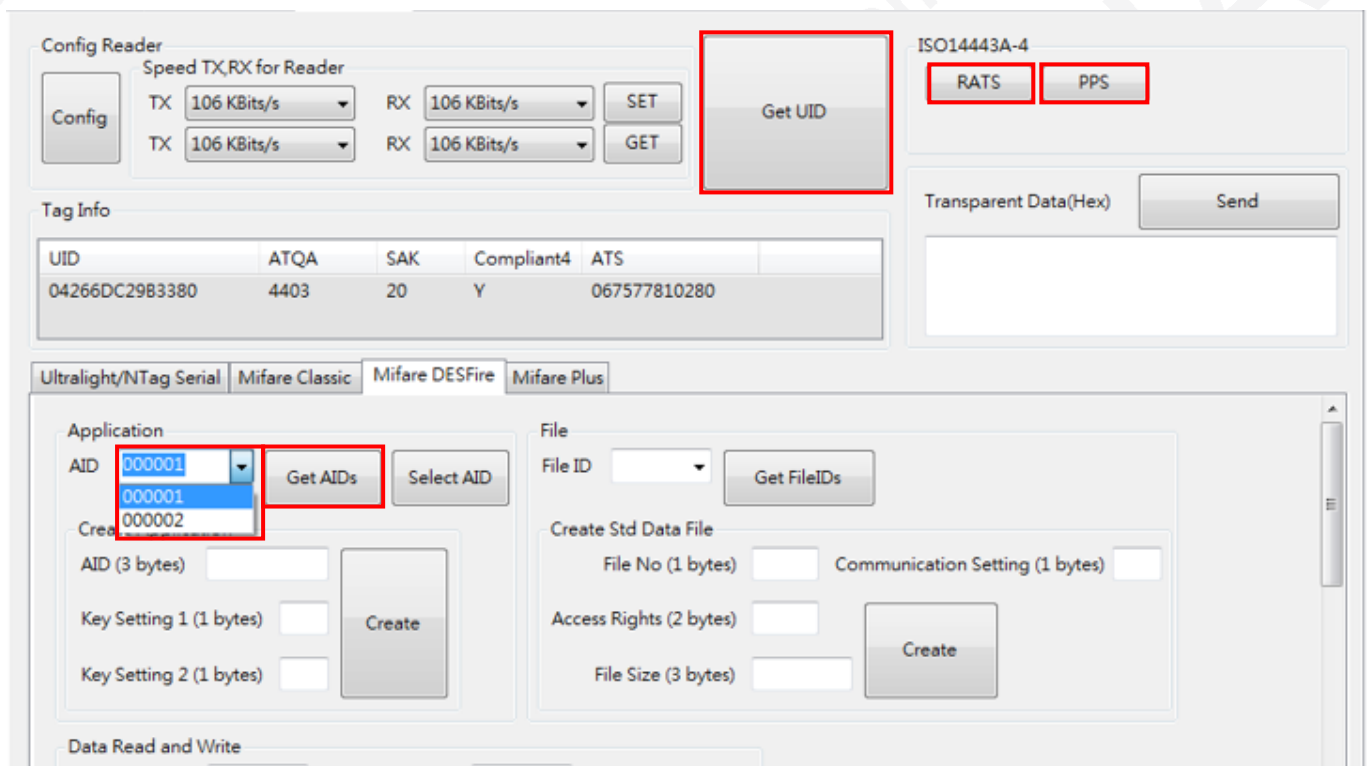


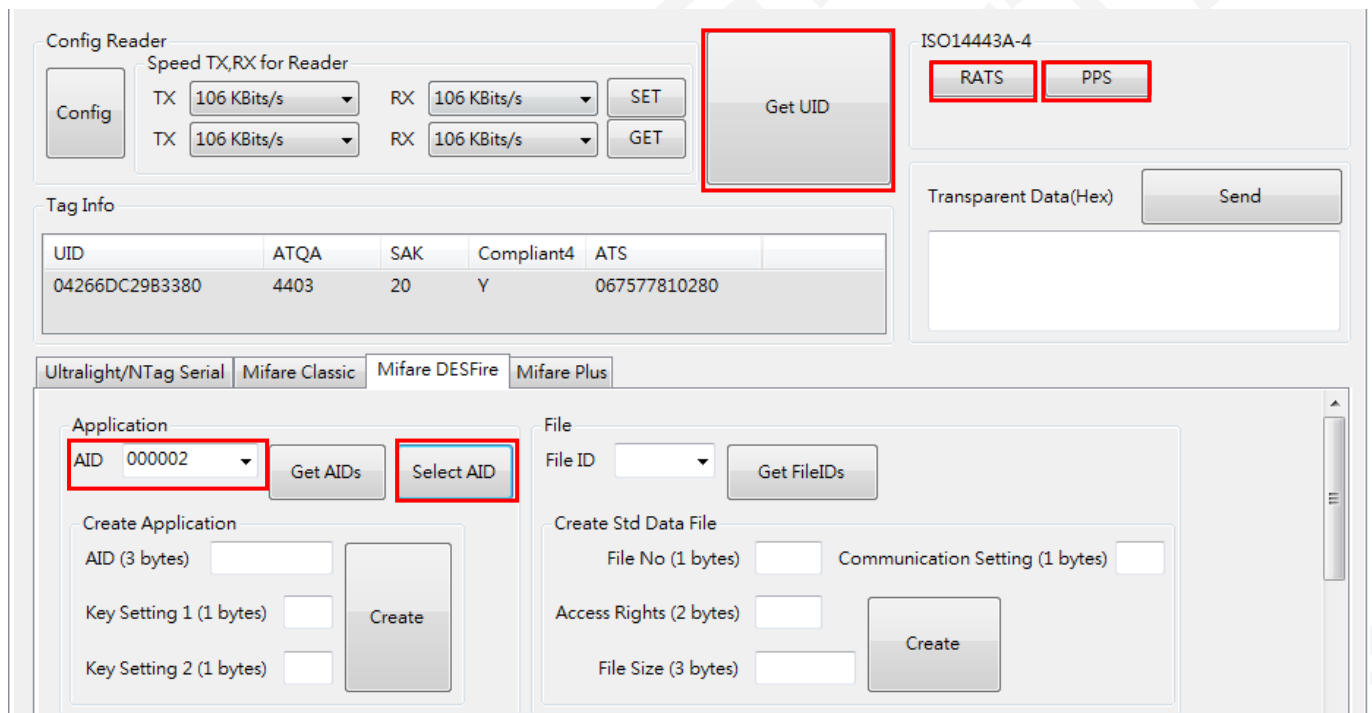
Figure 8.2-1 Get Application IDs

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### 8.3 Select Application

“Select AID” button is used to select one specific application for further access and takes three bytes coding the AID, If an application with the specified AID is found in the application directory of the PICC, the subsequent commands interact with this application. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Select 3-byte AID of the application id in the list.
5. Click “Select AID” button to select one specific application for further access, as shown in Figure 8.3-1.



The screenshot shows the Chilitag NFC Reader Tool interface. In the 'Config Reader' section, the 'Get UID' button is highlighted with a red box. Below it, the 'Tag Info' section displays a table of tag information:

UID	ATQA	SAK	Compliant4	ATS
04266DC29B3380	4403	20	Y	067577810280

In the 'Application' section, the 'AID' dropdown menu is set to '000002', and the 'Select AID' button is highlighted with a red box. The 'Transparent Data(Hex)' section is also visible, showing a 'Send' button.

Figure 8.3-1 Select Application ID

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## 8.4 Get FileIDs

“Get FileIDs” button is used to get the File IDentifiers of all active files within the currently selected application, this command does not accept any parameters. Each File ID is coded in one byte and is in the range from 0x00 to 0x1F, and the number of files is limited to 32 within one application. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Click “Get FileIDs” button to get the File IDentifiers of all active files within the currently selected application, as shown in Figure 8.4-1.

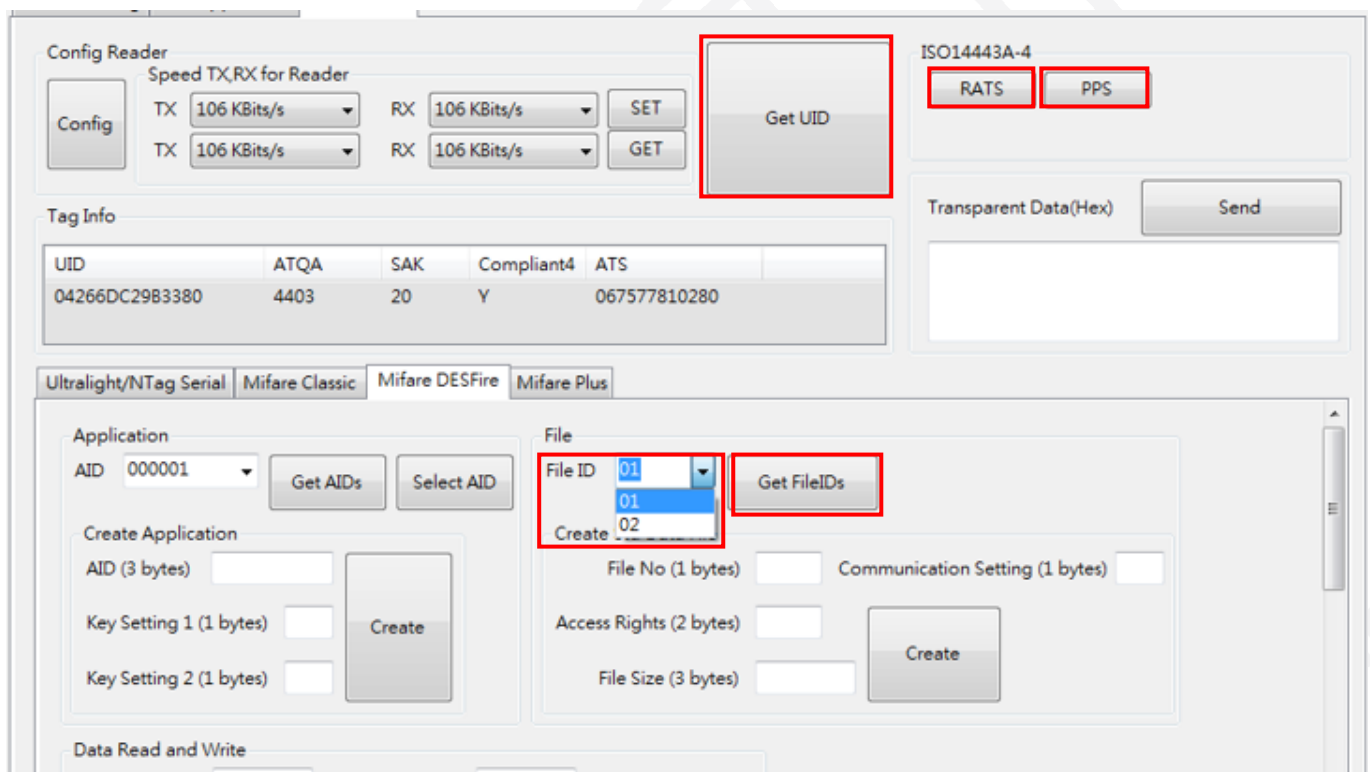


Figure 8.4-1 Get FileIDs

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### 8.5 Create StdDataFile

“Create StdDataFile” button is used to create files for the storage of plain unformatted user data within an existing application on the PICC. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Input 1-byte FID of the new file within the range 0x00 to 0x1F.
5. Input 1-byte Com. Set. of security for the communication between PCD and PICC. Communication settings always apply on file-level.
  - A. Plain communication = 0x00
  - B. Plain communication secured by MACing = 0x01
  - C. Fully enciphered communication = 0x03
6. Input 2-byte Access Right for each file within each application, 0xEEE0 means “free” access.
7. Input 3-byte FileSize of specifies the size of the file in bytes.
8. Click “Create StdDataFile” button to create files for the storage of plain unformatted user data within an existing application on the PICC, as shown in Figure 8.5-1.

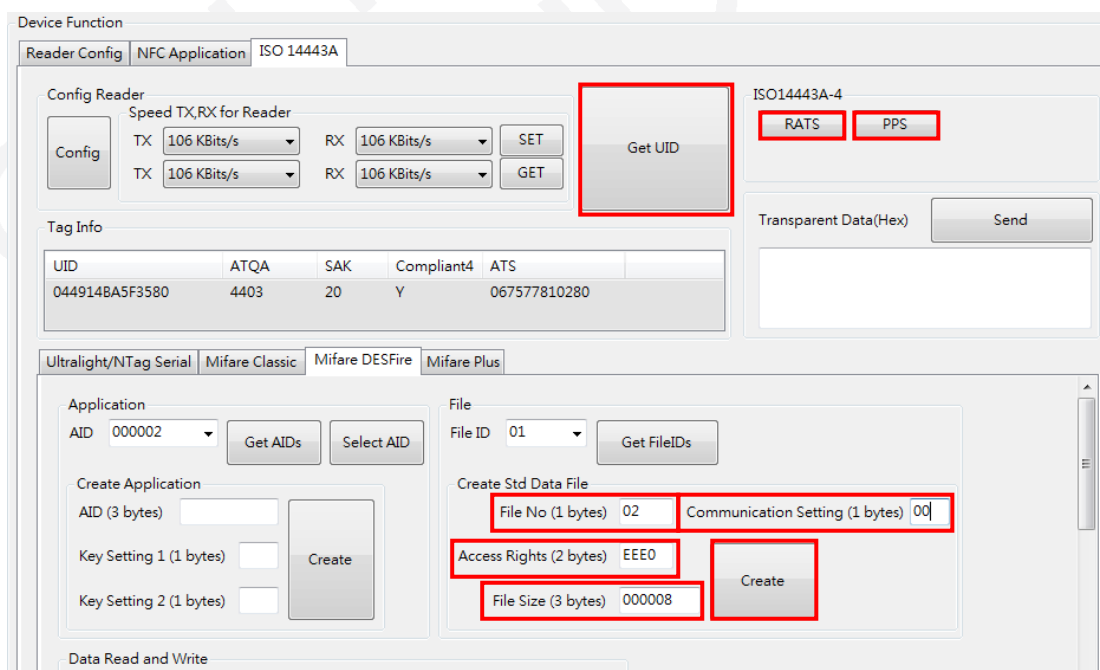


Figure 8.5-1 Create StdDataFile

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### 8.6 Write Data

“Write Data” button is used to write data to Standard Data Files. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Select 3-byte AID of the application id in the list and click “Select AID” button.
5. Click “Get FileIDs” button to get the File Identifiers and select 1-byte FID in the list, valid range is 0x00 to 0x1F.
6. Input 3-byte Offset of codes the starting position for the write operation within the file (= offset value). This parameter has to be in the range from 0x00 00 00 to file size -1.
7. Input 3-byte Length of data bytes to be written. This parameter can be in the range from 0x00 00 01 to 0xFF FF FF.
8. Input n-byte which in Step 7. be defined of the data be written.
9. Click “Write Data” button to write the data which in Step 8. to Standard Data Files, as shown in Figure 8.6-1 and 8.6-2.

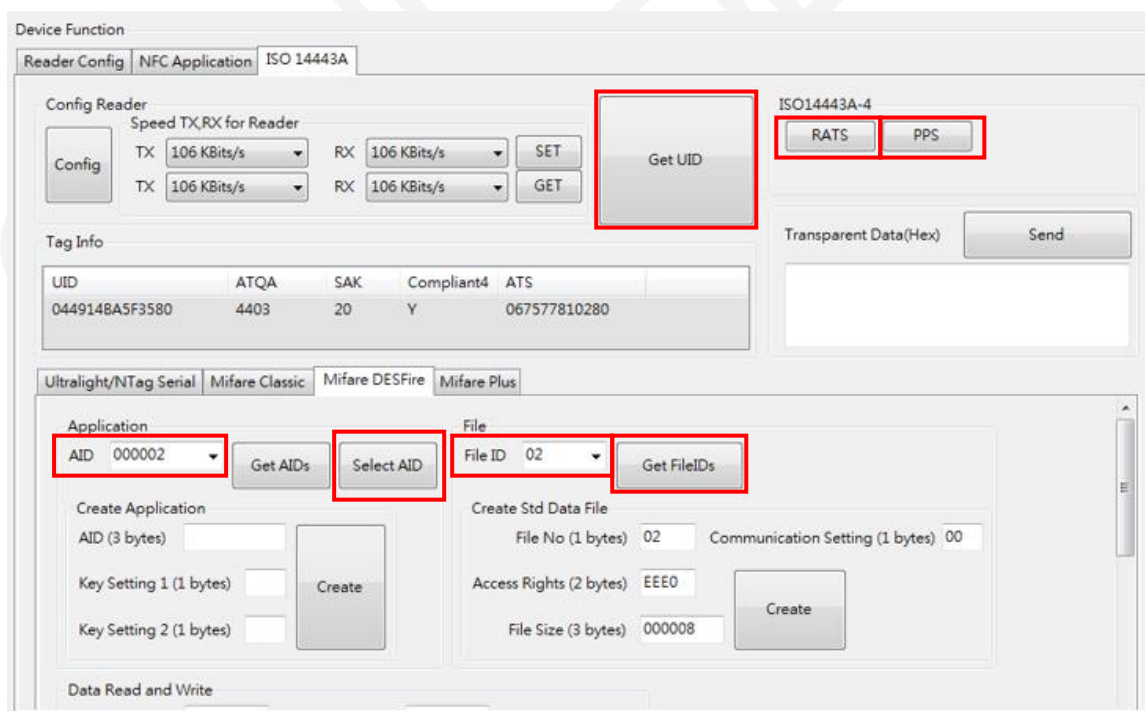
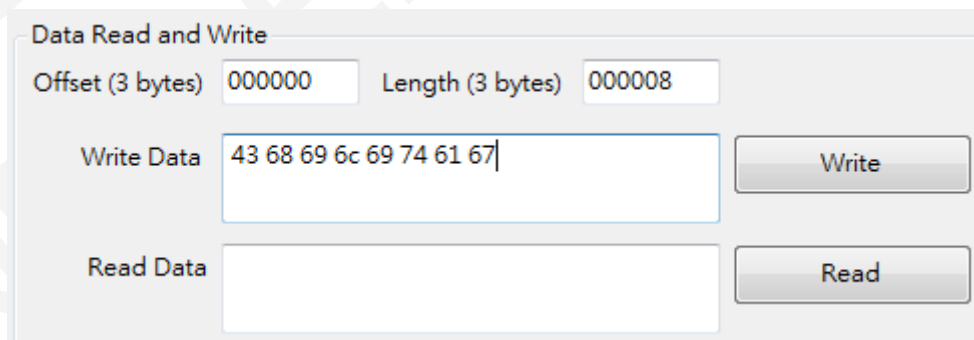


Figure 8.6-1 Write Data -1

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Data Read and Write

Offset (3 bytes) 000000 Length (3 bytes) 000008

Write Data 43 68 69 6c 69 74 61 67

Read Data

Write

Read

Figure 8.6-2 Write Data -2

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## 8.7 Read Data

“Read Data” button is used to read data from Standard Data Files. The steps are described as follows:

1. Click “Get UID” button to select card.
2. Click “RATS” button to perform a “RATS” command.
3. Click “PPS” button to send the “PPS” command to the reader.
4. Select 3-byte AID of the application id in the list and click “Select AID” button.
5. Click “Get FileIDs” button to get the File Identifiers and select 1-byte FID in the list, valid range is 0x00 to 0x1F.
6. Input 3-byte Offset of codes the starting position for the write operation within the file (= offset value). This parameter has to be in the range from 0x00 00 00 to file size -1.
7. Input 3-byte Length of data bytes to be read. This parameter can be in the range from 0x00 00 01 to 0xFF FF FF.
8. Click “Read Data” button to read the data form Standard Data Files, as shown in Figure 8.7-1 and 8.7-2.

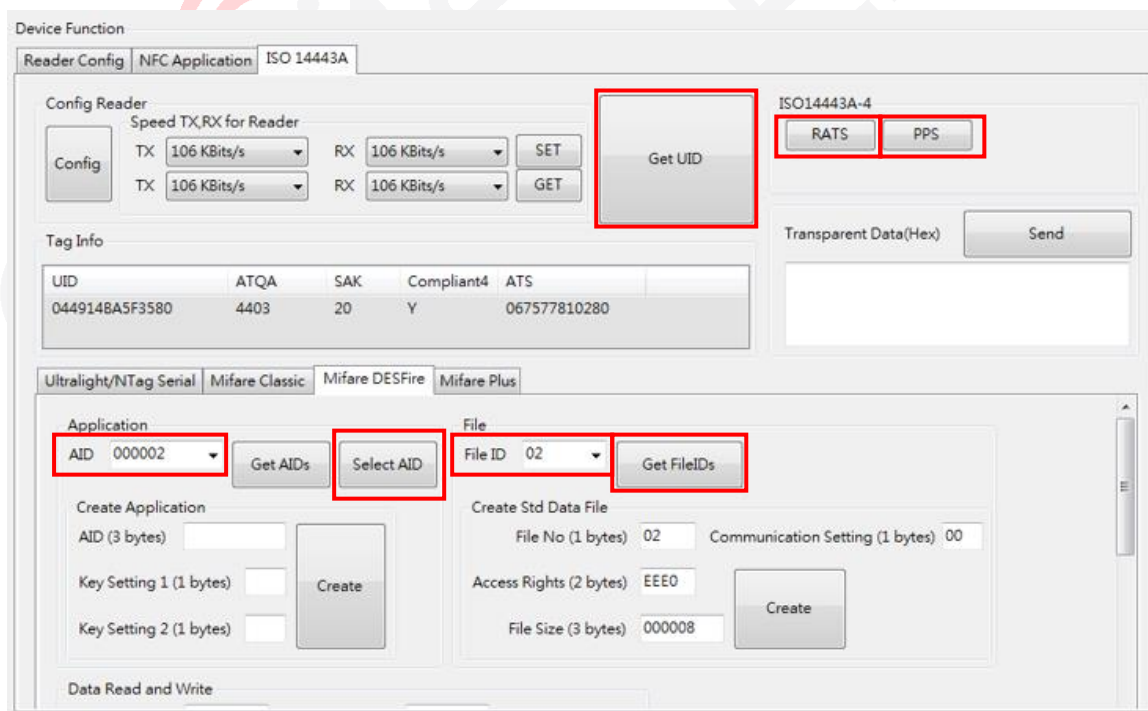
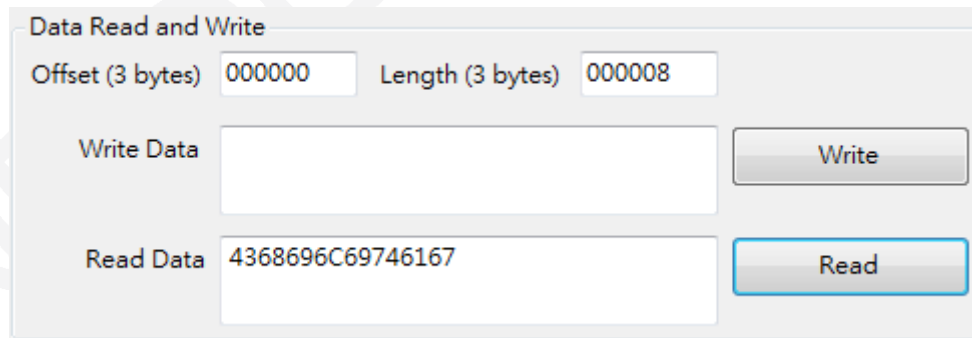


Figure 8.7-1 Read Data -1

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Data Read and Write

Offset (3 bytes) 000000 Length (3 bytes) 000008

Write Data [ ] Write

Read Data 4368696C697446167 Read

Figure 8.7-2 Read Data -2

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## Chapter 9. ISO14443B Function Demonstration

### 9.1 Config

“Config” button is used to setup parameters in the reader to be ready to transmit and receive following standard of ISO14443B. User must activate this setup before performing any RF-related operations in ISO14443B protocol.

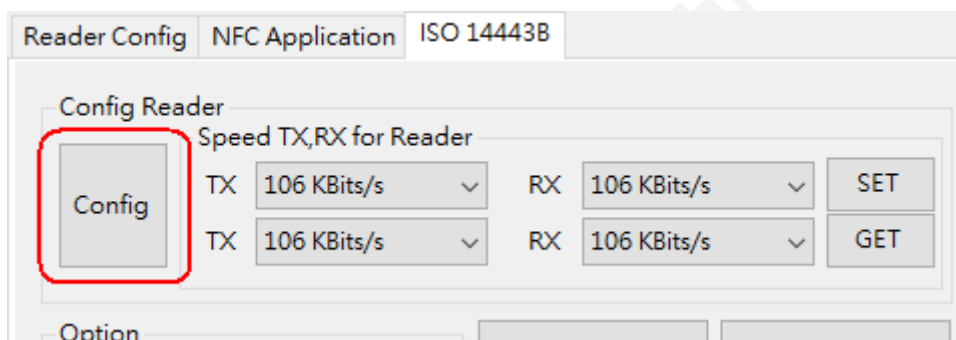


Figure 9.1-1 ISO14443B Config button

### 9.2 SET Speed

“SET Speed” button is used to configure Tx and Rx speed of CODEC in reader. User must configure speed before performing any RF-related operations in ISO14443B protocol.

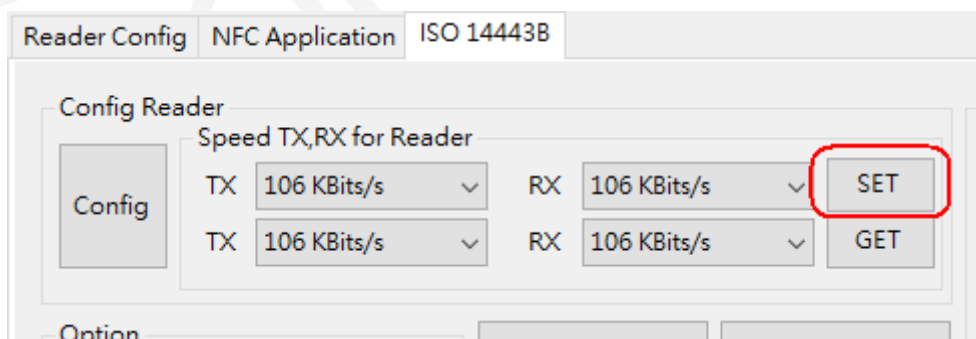


Figure 9.2-1 ISO14443B SET Speed button

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### 9.3 GET Speed

“GET Speed” button is used to get current speed of CODEC in reader.

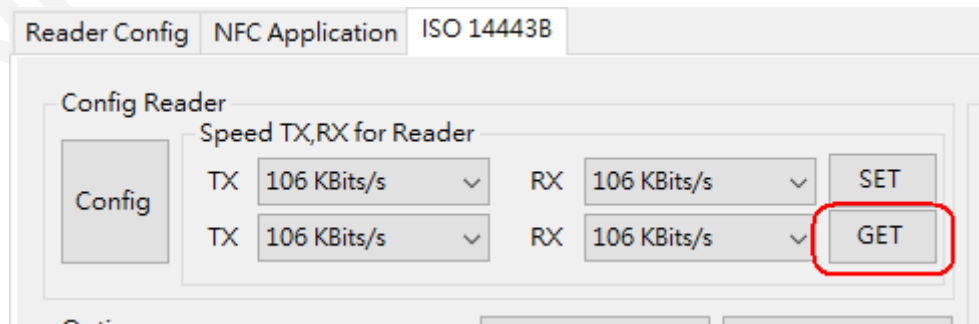


Figure 9.3-1 ISO14443B GET Speed button

### 9.4 Request

“Request” button is used to perform Request-B command and anti-collision process to get a single card in ISO14443B-3.

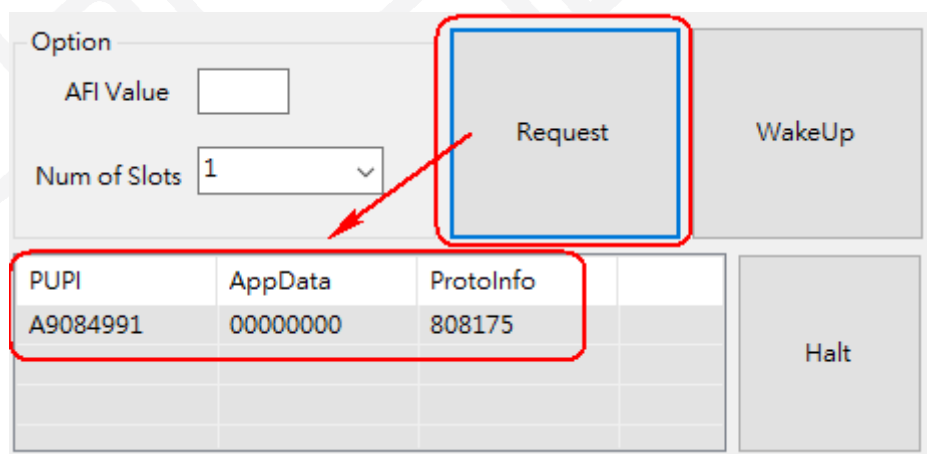


Figure 9.4-1 ISO14443B Request button

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## 9.5 WakeUp

“WakeUp” button is used to perform Wakeup-B command in ISO14443B-3. The operation is similar to Request. Different from Request, WakeUp can also wake up card in Halt state.

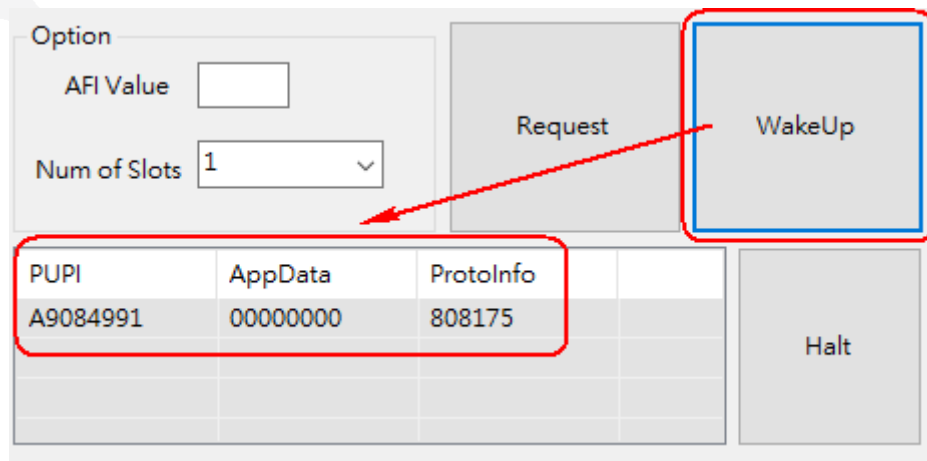


Figure 9.5-1 ISO14443B WakeUp button

## 9.6 ATTRIB

“ATTRIB” button is used to select operating protocol and parameter to use in further operation of smartcard. This operation requires Param1, Param2, Param3 and Param4 as stated in ISO14443B. This operation shall be activated next to Request or WakeUp.

The steps are described as follows:

1. Click “Request” button or “WakeUp” button to get card.
2. Set Param1, Param2, Param3, Param4, as shown in Figure 9.6-1.
3. Click “ATTRIB” button.
4. Response of ATTRIB will displayed at GUI, as shown in Figure 9.6-2.

<b>Param1</b> TR0 (Guard Time) <input type="text" value="Default Valu"/> TR1 (Synchronization Time) <input type="text" value="Default Valu"/> <input type="checkbox"/> Disable EOF <input type="checkbox"/> Disable SOF	<b>Param2</b> Speed TX/RX for Tag TX: <input type="text" value="106 KBits/s"/> RX: <input type="text" value="106 KBits/s"/> Max Frame Size: <input type="text" value="16"/>	<b>Param3</b> <input checked="" type="checkbox"/> PICC compliant with ISO/IEC 14443-4 <b>Param4</b> CID: <input type="text" value="0"/>
--	--	--

Figure 9.6-3 Set Param1, Param2, Param3, Param4

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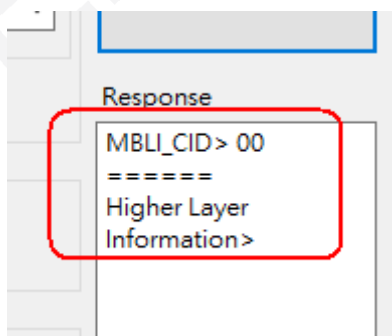


Figure 9.6-4 Response of ATTRIB

### 9.7 Halt

“Halt” button is used to put card in Halt state. This operation shall be applied after receiving ATQB from Request or WakeUp.

The steps are described as follows:

1. Click “Request” button or “WakeUp” button to get card.
2. Click “Halt” button to put card in Halt state, as shown in Figure 9.7-1.

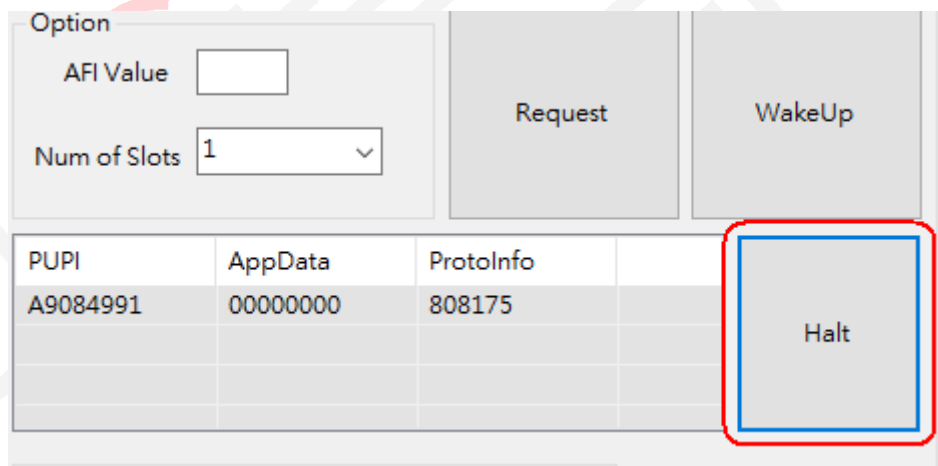


Figure 9.7-2 ISO14443B Halt button

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## Chapter 10. ISO15693 Function Demonstration

### 10.1 Config

“Config” button is used to setup parameters in the reader to be ready to transmit and receive following standard of ISO15693. User must activate this setup before performing any RF-related operations in ISO15693 protocol.

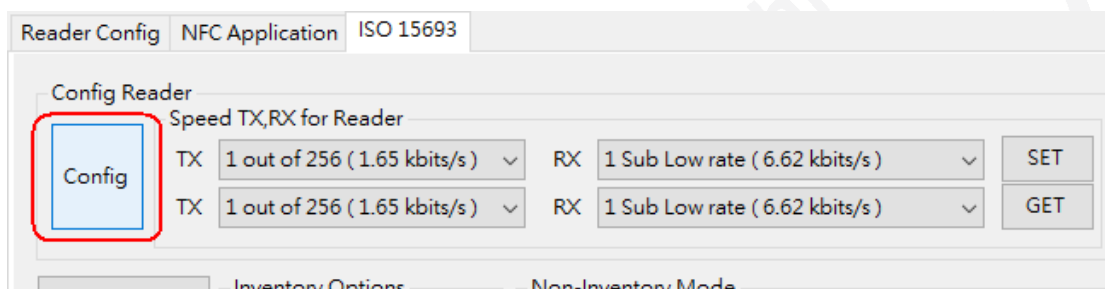


Figure 10.1-1 ISO15693 Config button

### 10.2 SET Speed

“SET Speed” button is used to configure Tx and Rx speed of CODEC in reader. User must configure speed before performing any RF-related operations in ISO15693 protocol.

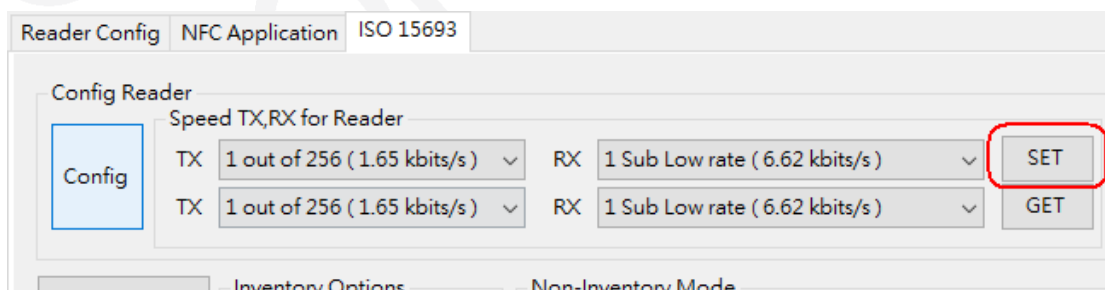


Figure 10.2-1 ISO15693 SET Speed button

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### 10.3 GET Speed

“GET Speed” button is used to get current speed of CODEC in reader.

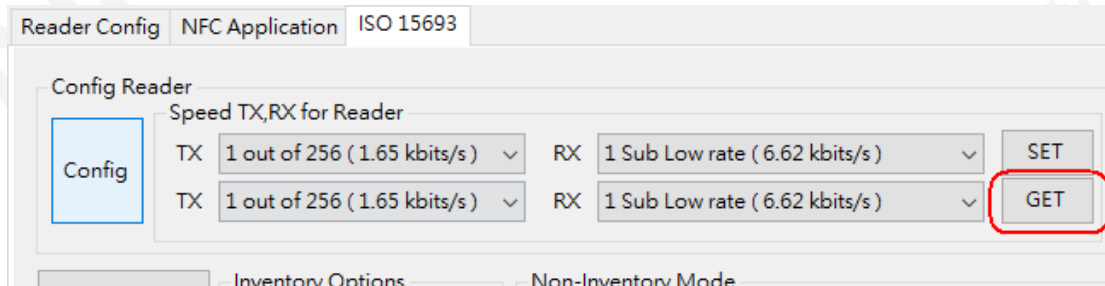


Figure 10.3-1 ISO15693 GET Speed button

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## 10.4 Inventory

“Inventory” button is used to perform Inventory 1-slot or Inventory 16-slot command in ISO15693. These commands are used in anti-collision process and determining UID.

The steps are described as follows:

1. Select Inventory 1-slot or 16-slot, as shown in Figure 10.4-1.
2. Click “Inventory” button.
3. Result will displayed at GUI, as shown in Figure 10.4-2.

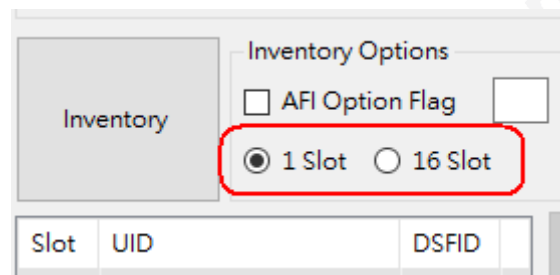


Figure 10.4-3 Inventory 1slot or 16slot

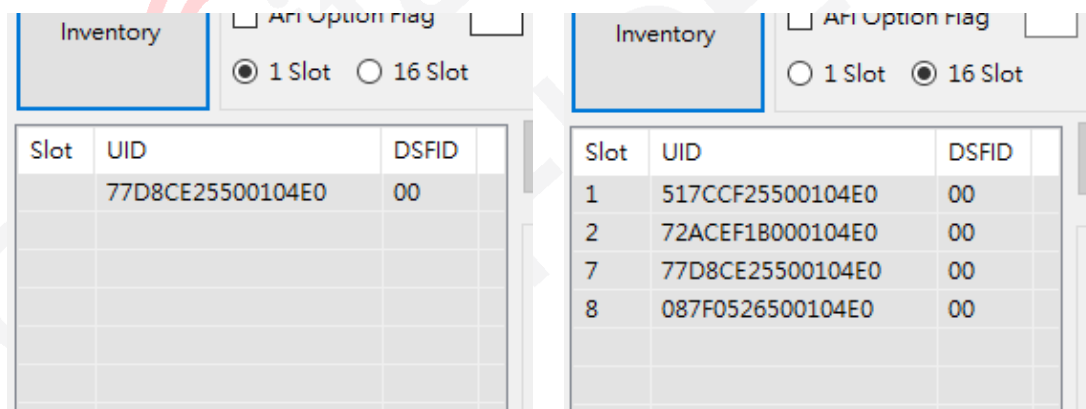


Figure 10.4-4 Result of Inventory command

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## 10.5 Stay Quiet

“Stay Quiet” button is used to put UID-specific card in quiet state. This operation must be used in address mode.

The steps are described as follows:

1. Inventory card.
2. Select address mode in Non-inventory mode, as shown in Figure 10.5-1.
3. Select card UID from the listview of Inventory, as shown in Figure 10.5-2.
4. Click “Stay Quiet” button.

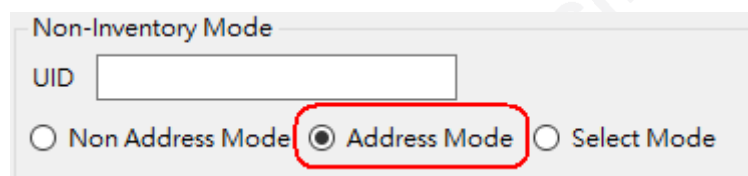
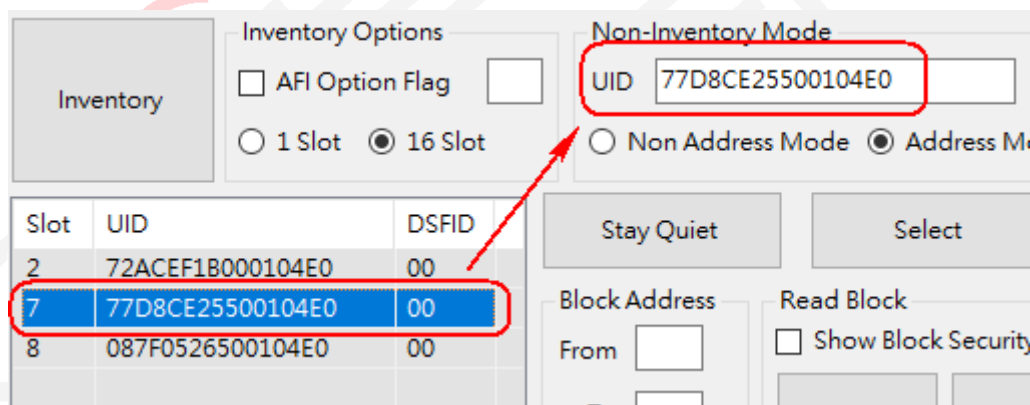


Figure 10.5-3 Select address mode



Slot	UID	DSFID
2	72ACEF1B000104E0	00
7	77D8CE25500104E0	00
8	087F0526500104E0	00

Figure 10.5-4 Select card UID

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## 10.6 Select

“Select” button is used to put UID-specific card in selected state. This operation must be used in address mode.

The steps are described as follows:

1. Inventory card.
2. Select address mode in Non-inventory mode, as shown in Figure 10.6-1.
3. Select card UID from the listview of Inventory, as shown in Figure 10.6-2.
4. Click “Select” button.

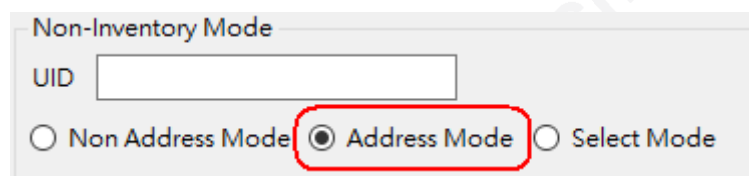


Figure 10.6-3 Select address mode

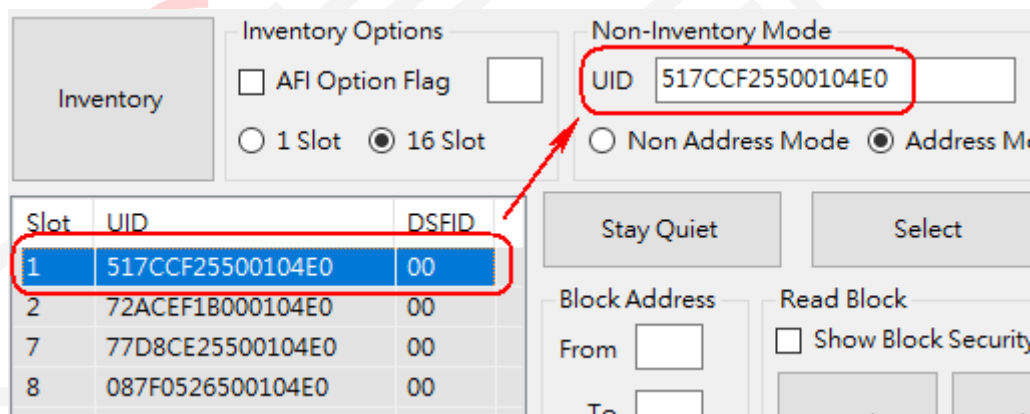


Figure 10.6-4 Select card UID

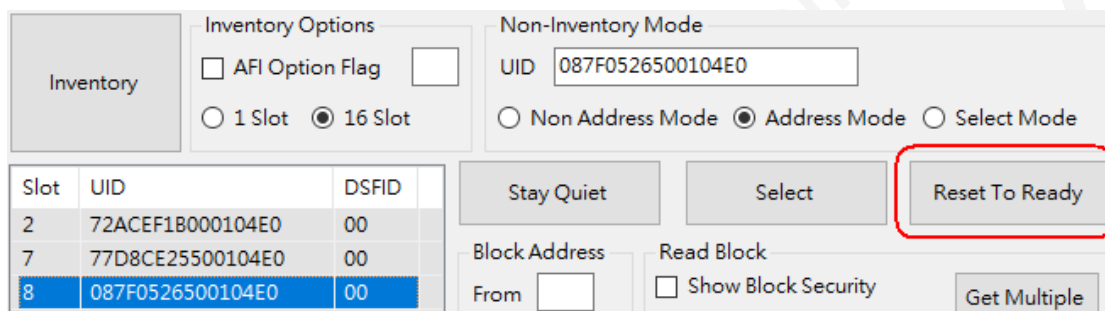
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## 10.7 Reset To Ready

“Reset To Ready” button is used to put card into ready state.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Click “Reset To Ready” button, as shown in Figure 10.7-1.



The screenshot shows the software interface with the 'Inventory' tab selected. Under 'Inventory Options', 'AFI Option Flag' is unchecked and '16 Slot' is selected. The 'Non-Inventory Mode' section shows 'UID' as '087F0526500104E0', 'Non Address Mode' is selected, and 'Address Mode' is also selected. A table lists inventory items with columns 'Slot', 'UID', and 'DSFID'. The item with Slot 8 and UID 087F0526500104E0 is highlighted. Below the table are buttons for 'Stay Quiet', 'Select', and 'Reset To Ready' (which is highlighted with a red box). Other options include 'Block Address', 'Read Block', 'Show Block Security', and 'Get Multiple'.

Slot	UID	DSFID
2	72ACEF1B000104E0	00
7	77D8CE25500104E0	00
8	087F0526500104E0	00

Figure 10.7-2 Click Reset To Ready button

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## 10.8 Read Single Block

The “Read Single Block” performs data reading from a specified block.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Input block address to be read, as shown in Figure 10.8-1.
5. Click “Read Single Block” button to read data, as shown in Figure 10.8-2.
6. Result of response will displayed at GUI, as shown in Figure 10.8-3.

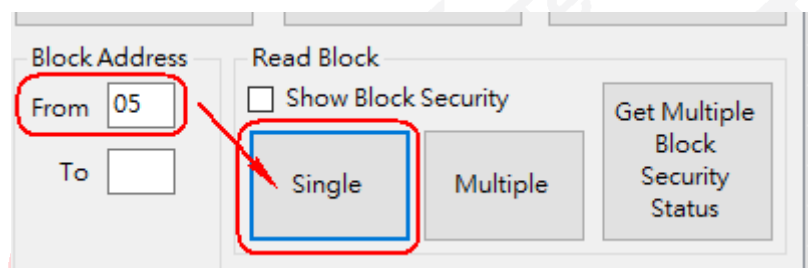


Figure 10.8-4 Input block address and click Single button

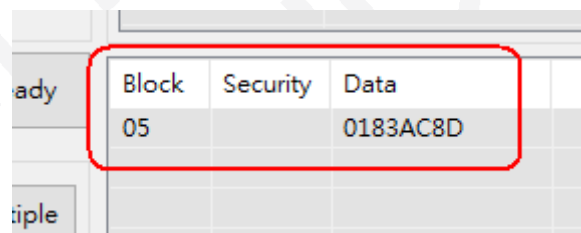


Figure 10.8-5 Read Single Block displayed at GUI

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## 10.9 Read Multiple Blocks

The “Read Multiple Blocks” performs data reading from a specified range of block.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Input the range of block address to be read, as shown in Figure 10.9-1.
5. Click “Read Multiple Block” button to read data, as shown in Figure 10.9-2.
6. Result of response will displayed at GUI, as shown in Figure 10.9-3.

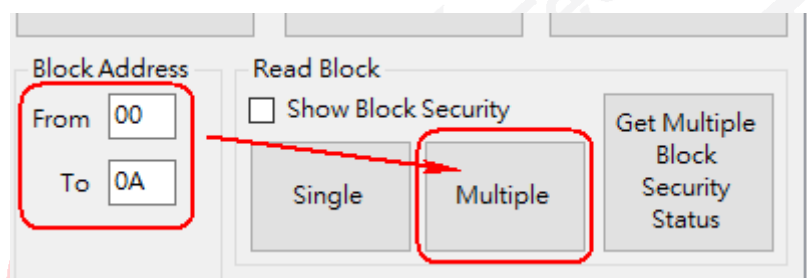
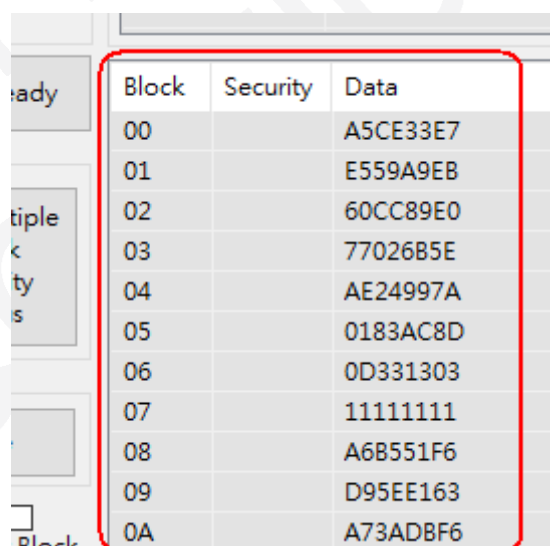


Figure 10.9-4 Input the range of block address and click Multiple button



Block	Security	Data
00		A5CE33E7
01		E559A9EB
02		60CC89E0
03		77026B5E
04		AE24997A
05		0183AC8D
06		0D331303
07		11111111
08		A6B551F6
09		D95EE163
0A		A73ADBF6

Figure 10.9-5 Read Multiple Block displayed at GUI

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## 10.10 Get Multiple Block Security Status

The “Get Multiple Block Security Status” retrieves condition if specific blocks are locked.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Input the range of block address, as shown in Figure 10.10-1.
5. Click “Get Multiple Block Security Status” button, as shown in Figure 10.10-2.
6. Result will displayed at GUI, as shown in Figure 10.10-3.

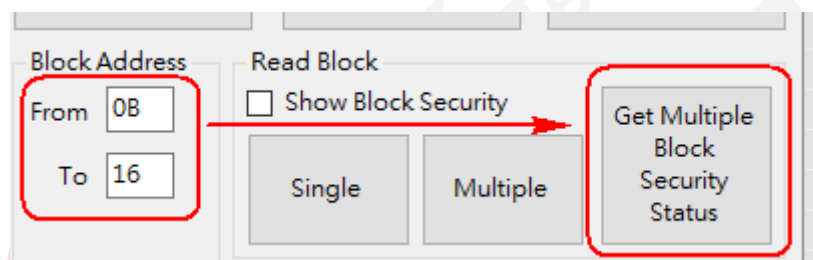
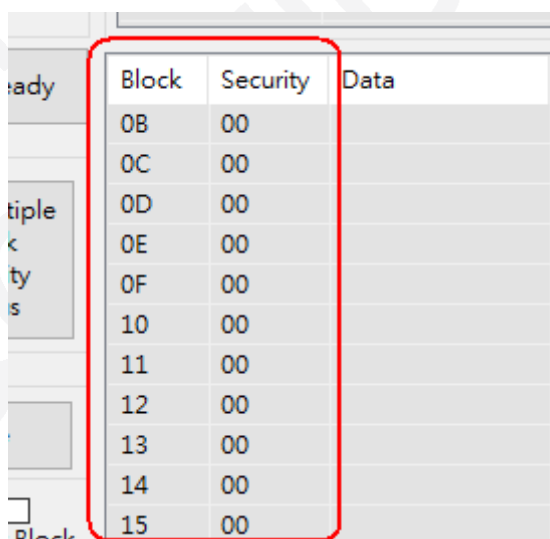


Figure 10.10-4 Input the range of block address and click Get Multiple Block Security Status button



Block	Security	Data
0B	00	
0C	00	
0D	00	
0E	00	
0F	00	
10	00	
11	00	
12	00	
13	00	
14	00	
15	00	

Figure 10.10-5 Get Multiple Block Security Status displayed at GUI

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## 10.11 Write Single Block

The “Write Single Block” performs data programming to specified block.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Input block address to be written, as shown in Figure 10.11-1.
5. Input hexadecimal data to be written, as shown in Figure 10.11-2.
6. Click “Write” button to program data.

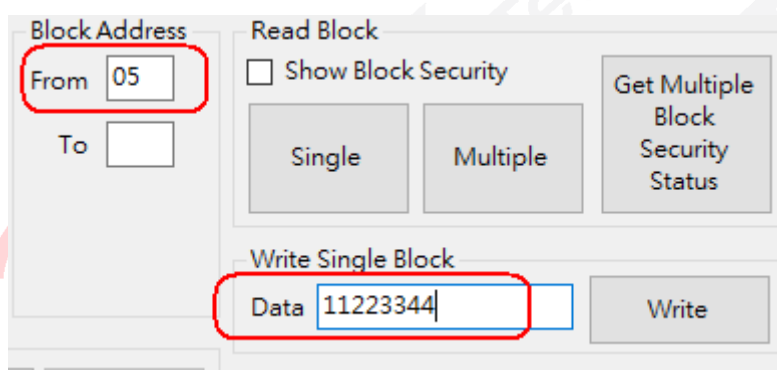


Figure 10.11-3 Input block address and hexadecimal data

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## 10.12 Get System Information

The “Get System Information” retrieves card system information.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Click “Get System Info” button to retrieve card system information.
5. Result will displayed at GUI, as shown in Figure 10.12-1.

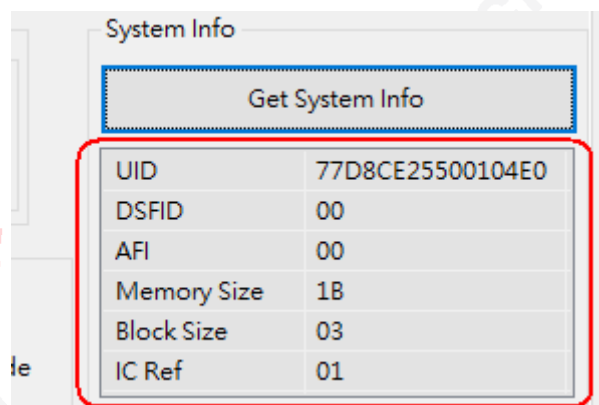


Figure 10.12-2 Get System Information displayed at GUI

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### 10.13 Write AFI

The “Write AFI” performs AFI programming.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Enable the checkbox of Write AFI, as shown in Figure 10.13-1.
5. Input one byte data for AFI, as shown in Figure 10.13-2.
6. Click “Write” button to program AFI.

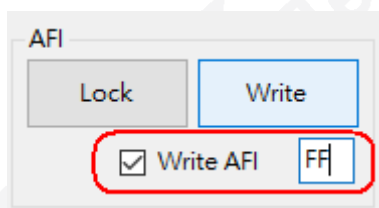


Figure 10.13-3 Enable checkbox and input data for AFI

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## 10.14 Lock AFI

The “Lock AFI” performs AFI content locking. Once the AFI was locked, AFI content cannot be modified later.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Click “Lock” button to lock AFI, as shown in Figure 10.14-1.



Figure 10.14-2 Click Lock button to lock AFI

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### 10.15 Write DSFID

The “Write DSFID” performs DSFID programming.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Enable the checkbox of Write DSFID, as shown in Figure 10.15-1.
5. Input one byte data for DSFID, as shown in Figure 10.15-2.
6. Click “Write” button to program DSFID.

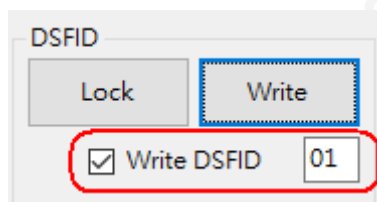


Figure 10.15-3 Enable checkbox and input data for DSFID

### 10.16 Lock DSFID

The “Lock DSFID” performs DSFID content locking. Once the DSFID was locked, DSFID content cannot be modified later.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Click “Lock” button to lock DSFID, as shown in Figure 10.16-1.

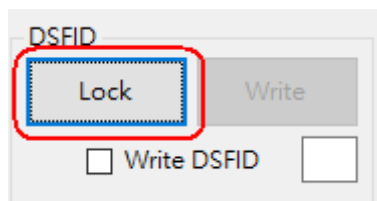


Figure 10.16-2 Click Lock button to lock DSFID

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## 10.17 Lock Block

The “Lock Block” performs content lock in a specific block.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Enable the checkbox of Lock Block and click “Lock” button, as shown in Figure 10.17-1.

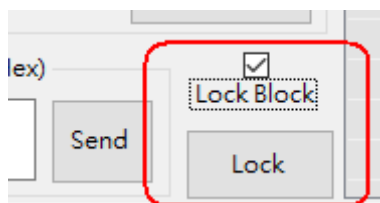


Figure 10.17-2 Enable checkbox and click Lock button to lock block

## 10.18 Transparent Data

Transparent Data is used to transmit ISO15693 arbitrary data with CRC appending at the end of the transmission packet. User can use the command to directly transmit hexadecimal code. For more information, please refer to card datasheet.

The steps are described as follows:

1. Inventory card.
2. Select sub mode in Non-inventory mode.
3. Select card UID from the listview of Inventory. (UID is required in address mode.)
4. Input hexadecimal code and click “Send” button to transmit data, as shown in Figure 10.18-1.
5. Review result in log windows, as shown in Figure 10.18-2.

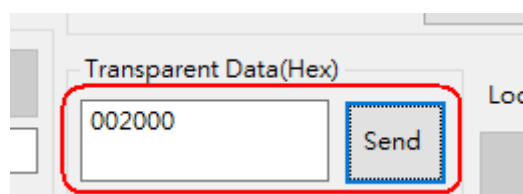


Figure 10.18-3 Input hexadecimal code and click Send button to transmit data

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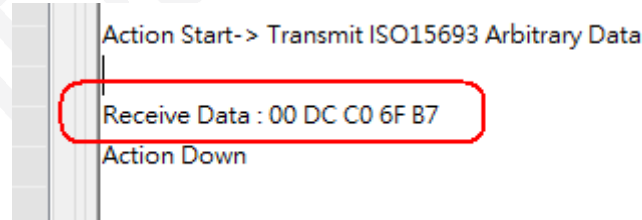


Figure 10.18-4 Review result in log windows

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