# Akuvox ACRM Tool Configuration Guide

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# AKUVOX ACRM TOOL

## Configuration Guide

This manual guides you in using the software ACRM, the configuration tool of Akuvox desktop card reader ACR-CID01, and the physical access card Bkey. It is based on the software version V1.0.0.6.

## Product Overview

The ACR-CID01 is an efficient and multifunctional desktop card reader and encoder, designed specifically for modern access control systems. It supports connection to a computer via a USB to quickly read information on RFID/Bkey access cards.


## Before You Start

Make sure:

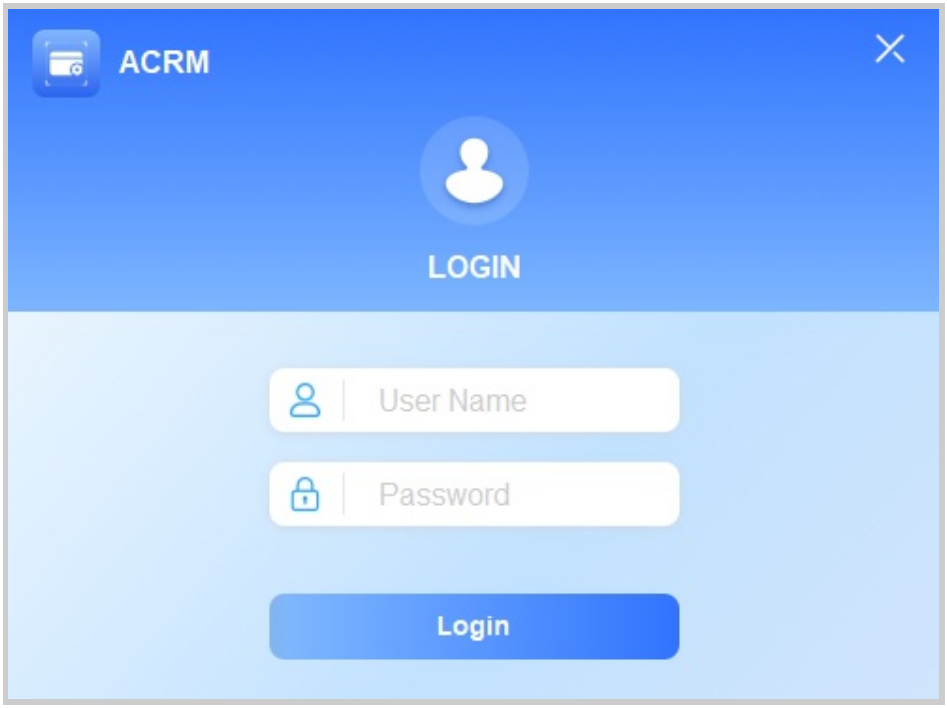
- You have acquired and installed the latest version of the ACRM.
- ACR-CID01 is connected to your computer through USB. During the startup process, the device will flash a blue light. After a successful initiation, the blue light will remain on.

## Login

You can log in with either the Admin account or the Super Manager account.

- User Name and Password are both **admin** for Admin account.
- User Name and Password are both **supermanage** for Super Manager account.

The super manager has extra permission to upgrade the Akuvox Bkey.



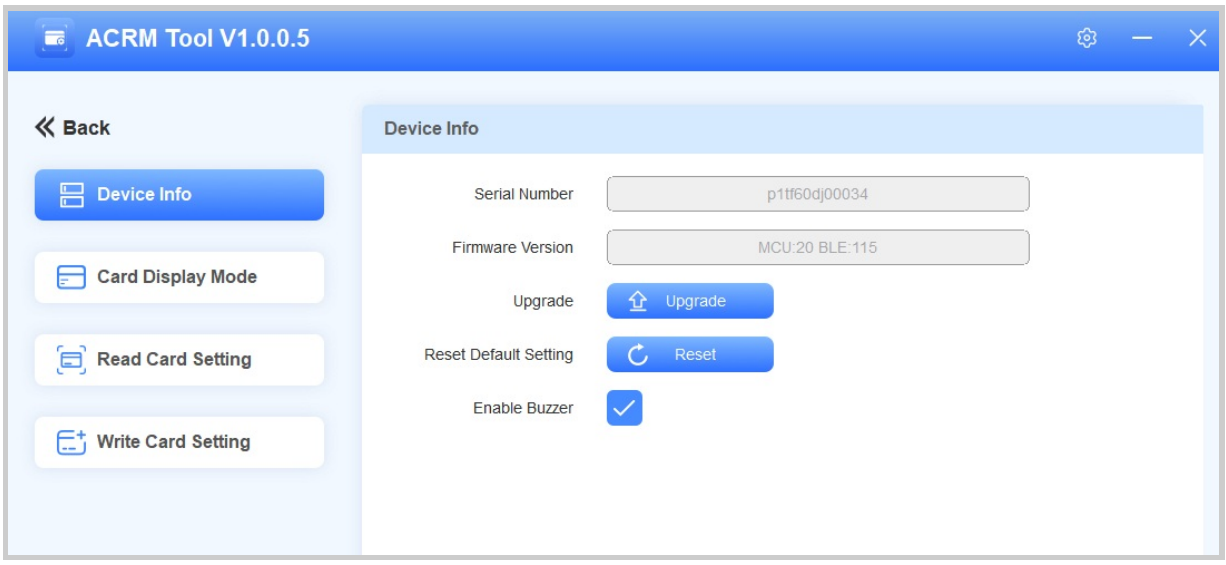

## Bkey Upgrade

To upgrade Bkey with the ACRM tool, please contact Akuvox tech support.

## ACR-CID01 Setup Overview

The ACR-CID01 setup interface consists of four modules.

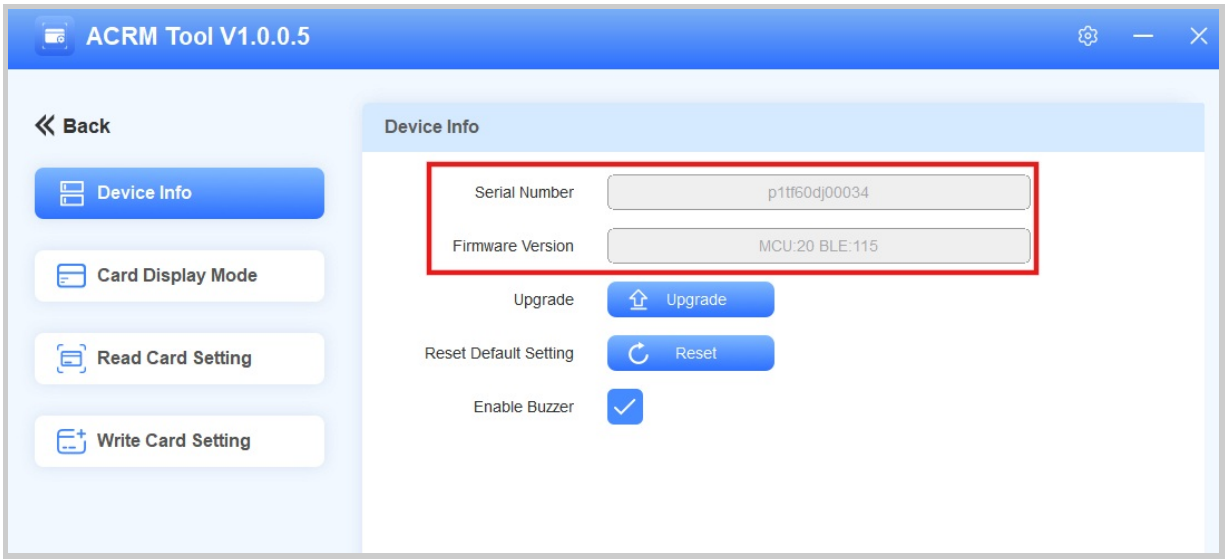
- **Device Info**: Display the device information. You can upgrade the device, reset it to the factory setting, and enable/disable the buzzer.
- **Card Display Mode**: Set the IC/ID/Bkey card display mode.
- **Read Card Setting**: Select a specific IC card type for reading.
- **Write Card Setting**: Write data for Mifare Classic, Mifare Plus, or Desfire cards.




# Basic Setup

## Check the Device's Information

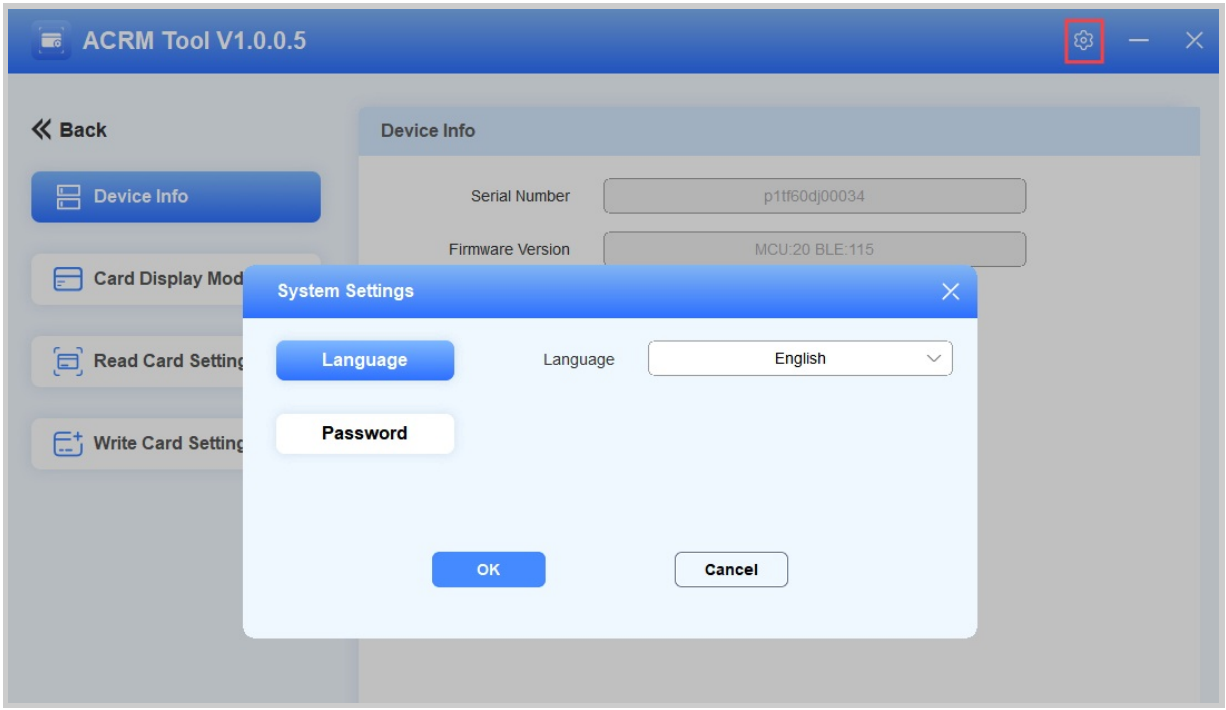
You can see the device's serial number and the firmware version on the **Device Info** interface.




## Switch Language

You can change the tool language to English or Simplified Chinese.

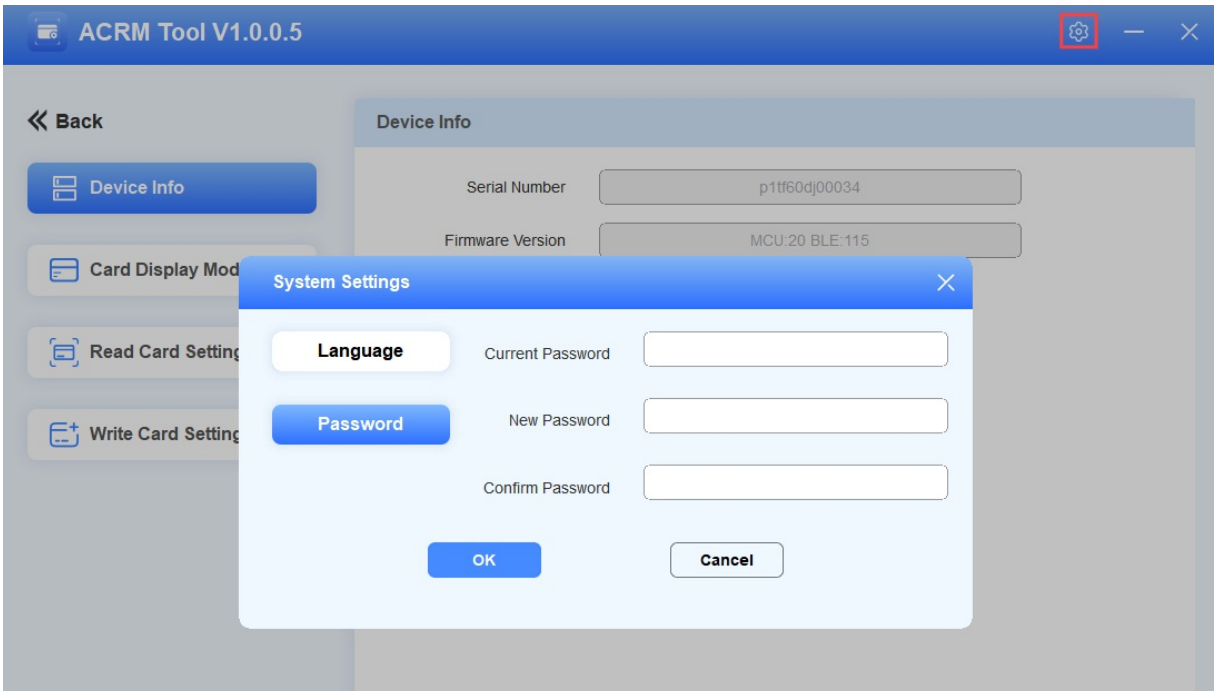
1. Click in the upper right corner.
2. Select the desired language and click OK.
3. After confirmation, click **Cancel** to close the **System Settings** window, and the tool language is changed.




## Change Password

You can change the tool login password.

1. Click in the upper right corner and click **Password**.
2. Enter the current password and set the new password.



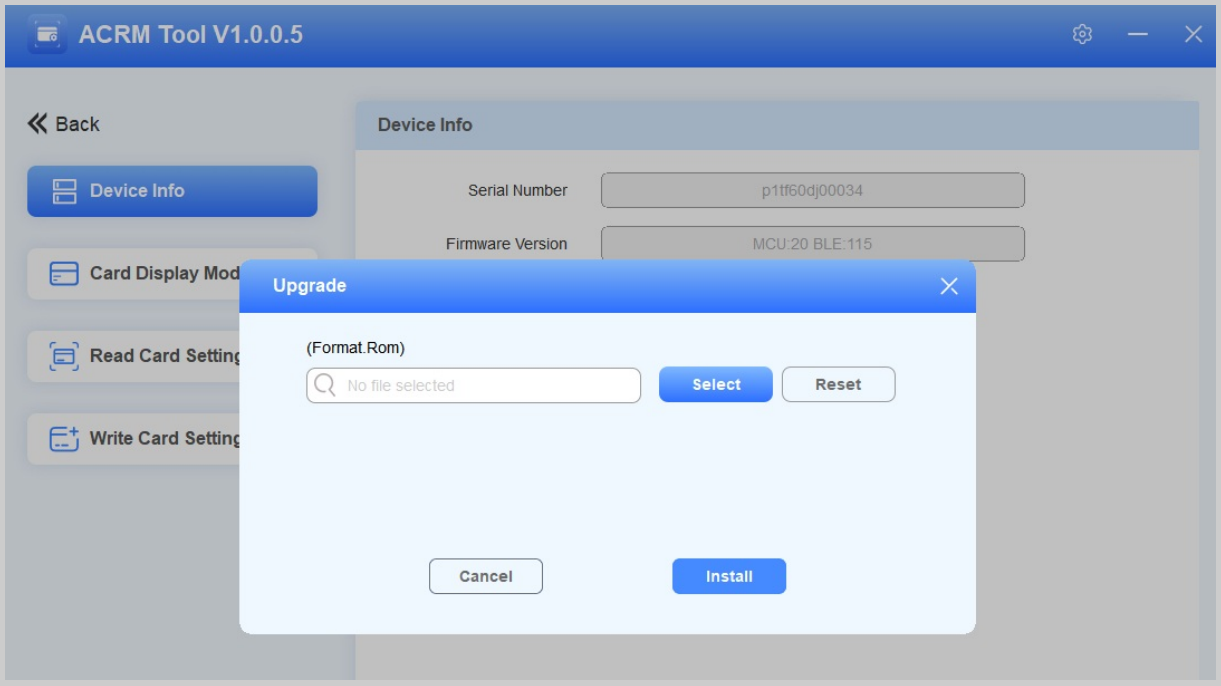

3. Click OK. “Modify Password Success” will pop up.

## Upgrade the Device

You can upgrade the ACR-CID01 to the latest version.

1. Click **Upgrade** on the Device Info interface.
2. Select the .rom file from your local driver.
3. Click Install.

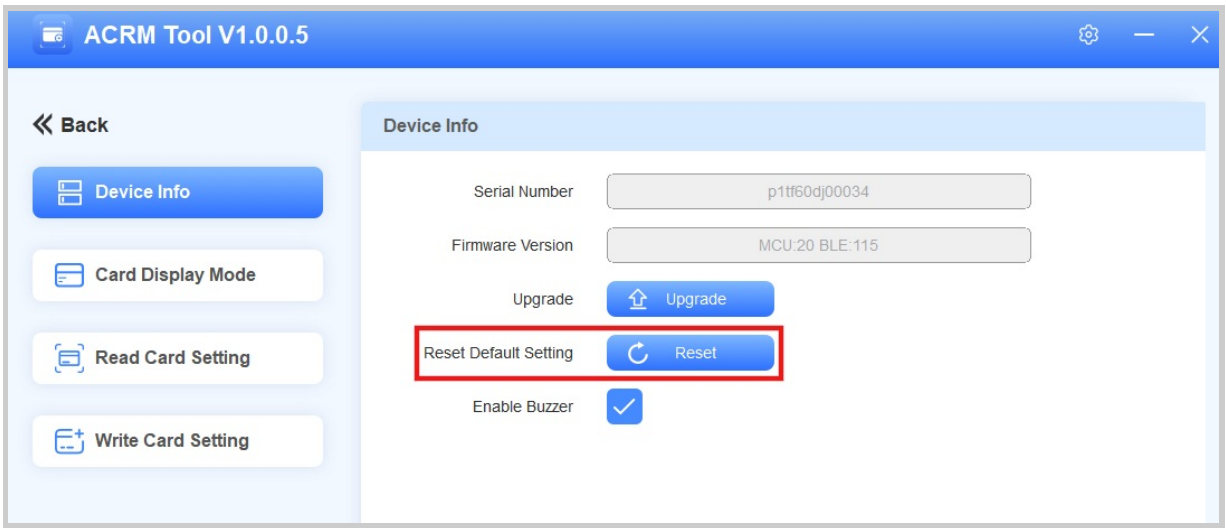
When the progress bar reaches 100%, the upgrade is finished. A pop-up will inform you whether the upgrade is successful.




## Reset the Device to Factory Settings

You can reset the settings to factory default.

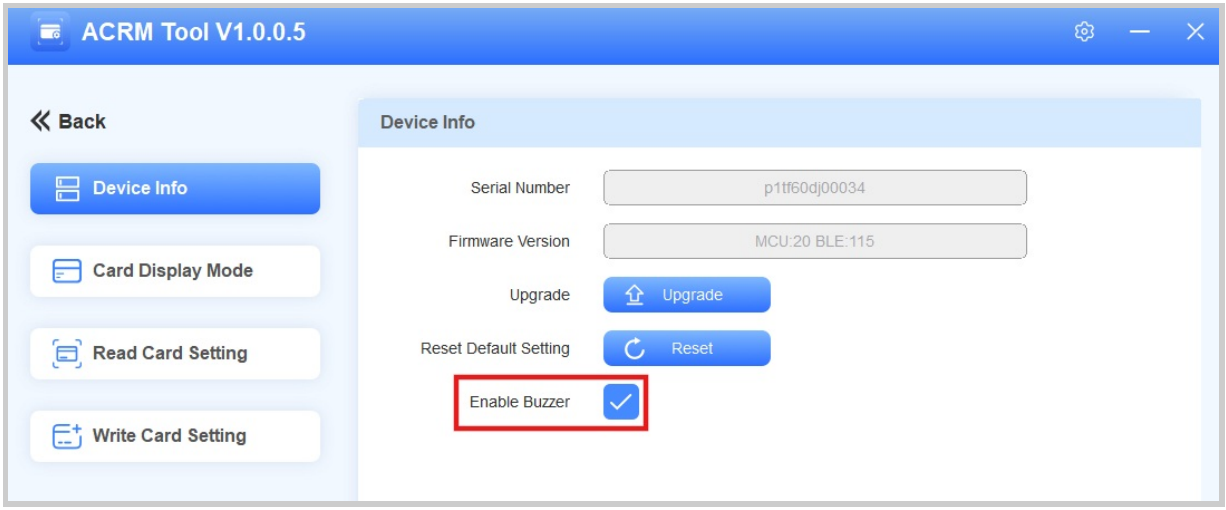
1. Click **Reset** on the Device Info interface.
2. Click OK to confirm. “Reset Default Setting Success!” will pop up. The login password, card reading, and writing setup will not be reset.




## Set the Buzzer

You can enable/disable the buzzer when swiping cards.

Enable or disable the buzzer on the **Device Info** interface. It is enabled by default.




# Card Display Mode Selection

You can select the IC/ID/Bkey card display mode on the **Card Display Mode** interface. The default is 8HN.


# Card Writing

Mifare Classic, Mifare Plus, and DESFire cards are security cards that use key-based access control. Access keys must be configured before the cards can be read by Akuvox devices.

- If the cards are new cards not configured, you need to write the card data before using them.
- If the cards are configured by the third-party service provider, please confirm the encryption information with the provider before using the ACR-CID01 to read the cards.

You can write cards on the **Write Card Setting** interface.

## Mifare Classic

**Concepts**

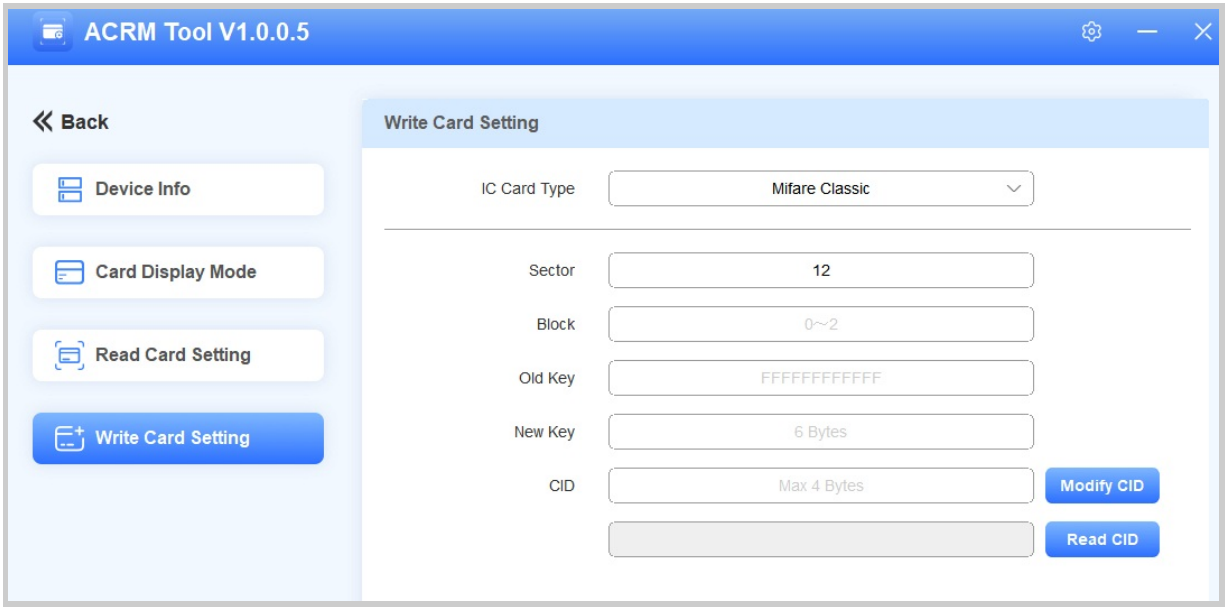
- A Mifare card's memory is divided into 16 sectors (from sectors 0 to 15) and each sector is divided into 4 blocks (from blocks 0 to 3).
- Sector/Block is where you write the card data.
- Every block stores 16 bytes. The first 6 bytes are Key A and the last 6 are Key B. They are used to protect each sector.
- Block Key A is where you write the authentication password(key).

Place the card on the ACR-CID01 while setting the card.

1. Set the IC Card Type to **Mifare Classic**.
2. Enter the sector number(0 to 15) that stores the card data.
3. Enter the block number(0 to 2).
4. Enter the old block key. If it is a new card, the key is "FFFFFFFFFFFF"(case insensitive) by default. If not, please confirm it with the service provider.
5. Enter the 6-byte new key.
6. Set the CID(the output card code) with a maximum of 4 bytes.
7. Click **Modify CID**. "Successfully write card" will pop up.

> **Tip**
>
> If writing the card fails, remove the card, put it back on the ACR-CID01 and try again.

You can click **Read CID** to check the card code.




## Mifare Plus

**Concepts**

The Mifare Plus cards support one pre-personalized level and three security levels(SL), operating at a single security level at any given time and can only be switched to a higher level.

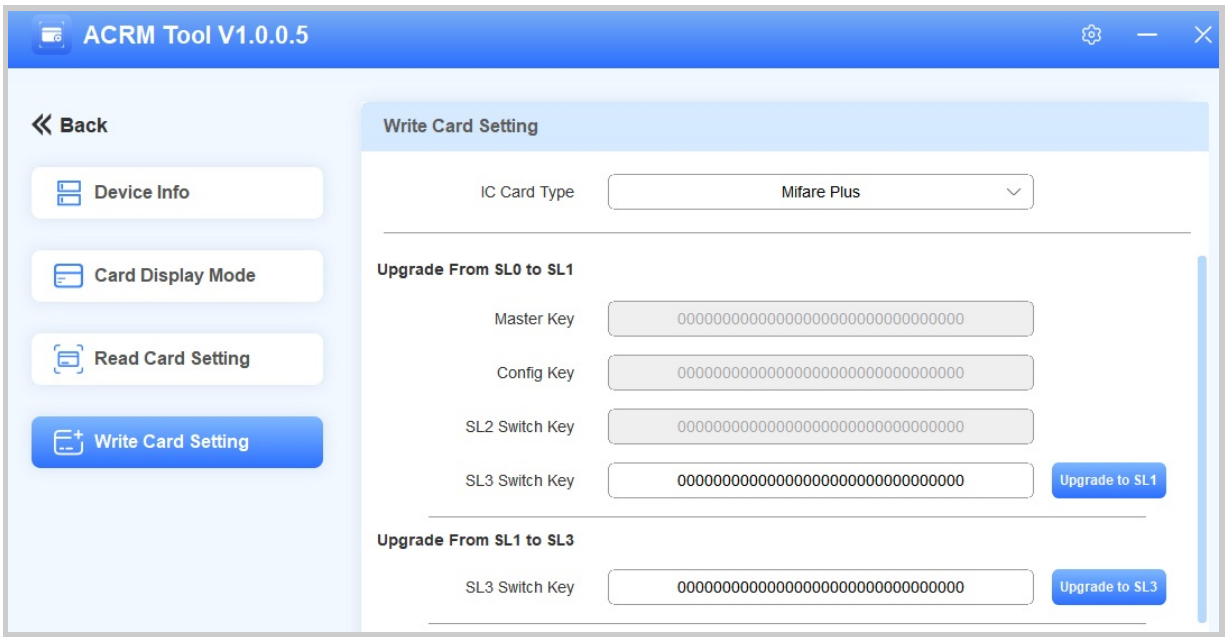
- SL0: Store the pre-configured keys for setup, including level switching keys and AES keys for memory access.
- SL1: Cards are fully compatible with MIFARE Classic 1K/4K cards, allowing them to work seamlessly within existing MIFARE Classic systems.
- SL2: Require AES authentication and use MIFARE Classic CRYPTO1 for data security.
- SL3: Require AES for authentication, ensure secure communication, and maintain data integrity.

Place the card on the ACR-CID01 while setting the card.

1. Set the IC Card Type to **Mifare Plus**. The Master Key, Config Key, and SL2 Switch Key cannot be changed.
2. Upgrade the card. If it is a new card, it must at least be upgraded to SL1 for usage.

- To upgrade the card from SL0 to SL1, customize the **SL3 Switch Key** with a maximum of 16 bytes. Then, click **Upgrade to SL1**.
- To upgrade the card from SL1 to SL3, enter the **SL3 Switch Key** you set. Then, click **Upgrade to SL3**.

The card cannot be upgraded from SL0 to SL3.




3. Enter the block number(1 to 128). Do not enter these numbers: “3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 43, 47, 51, 55, 59, 63, 67, 71, 75, 79, 83, 87, 91, 95, 99, 103, 107, 111, 115, 119, 123, 127”.

**Note**

- A Mifare card’s memory is divided into multiple sectors and each sector is divided into 4 blocks (from blocks 0 to 3). Sector/Block is where you write the card data.
- Block 3(The fourth block) is used to store key. Therefore, avoid entering the number of the fourth block in each sector.

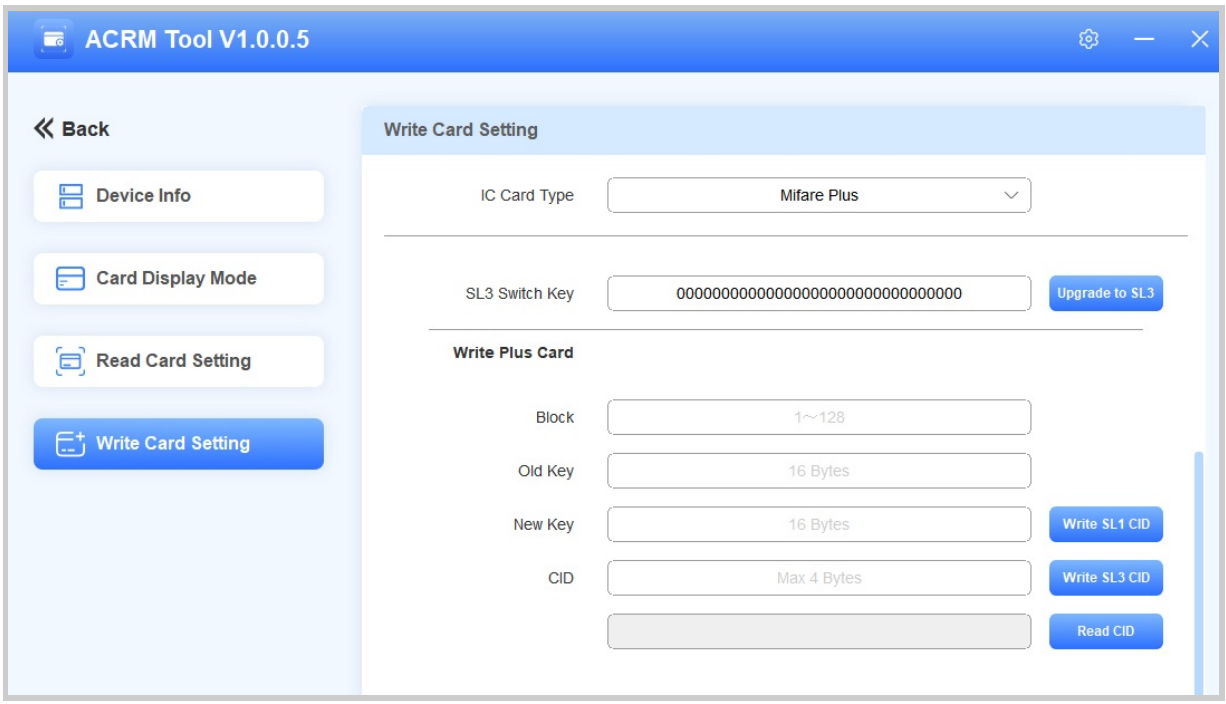
4. Enter the old key. It is **32-bit F**(case insensitive) by default for new cards. If not, please confirm it with the service provider.
5. Customize the new 16-byte key and 4-byte CID.
6. Click Write Card.

- **Write SL1 CID**: Write the key into the SL1 card.
- **Write SL3 CID**: Write the key into the SL3 card.

**Tip**

If writing the card fails, remove the card, put it back on the ACR-CID01 and try again.

You can click **Read CID** to check the card code.




## Desfire

### Concepts

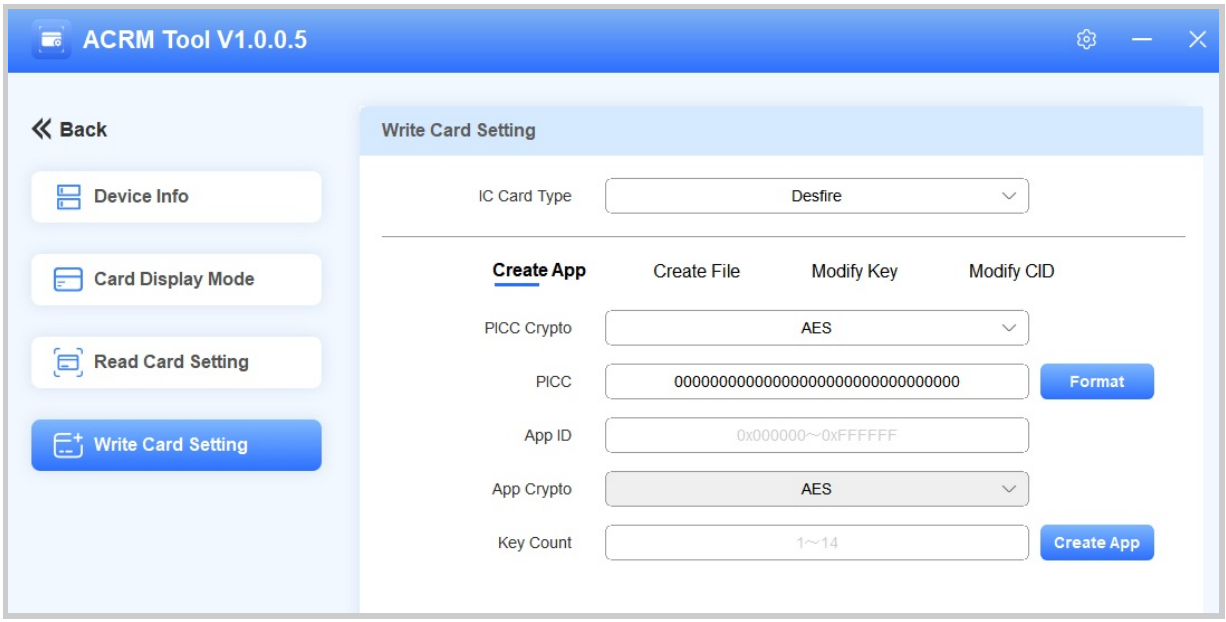
- DES(Data Encryption Standard) Fire cards support advanced encryption algorithms, including AES, providing a high level of security for data transactions.
- Each card has applications, and each application can store files and 14 keys. These are essential parts for reading the Desfire cards.

Place the card on the ACR-CID01 while setting the card.

### Create App

1. Set the IC Card Type to **Desfire**. Select the PICC Crypto type from AES and DES. For Akuvox Desfire cards, it is DES. If it is a third-party card, please confirm it with the service provider.
2. If you need to format the card, enter the PICC and click **Format**. The default is **32-bit 0** for Akuvox Desfire cards.
3. Customize the App ID from 1 to 16,777,215. It is suggested to enter 6-digit hexadecimal if you want to use the device with Akuvox door phones or access control terminals.

4. Set the key count with 14 at most. The key count decides the key ID. For example, if you enter 4, then you can set 4 keys with key ID 0, 1, 2, and 3.
5. Click **Create App**. “Successfully Create App” will pop up.

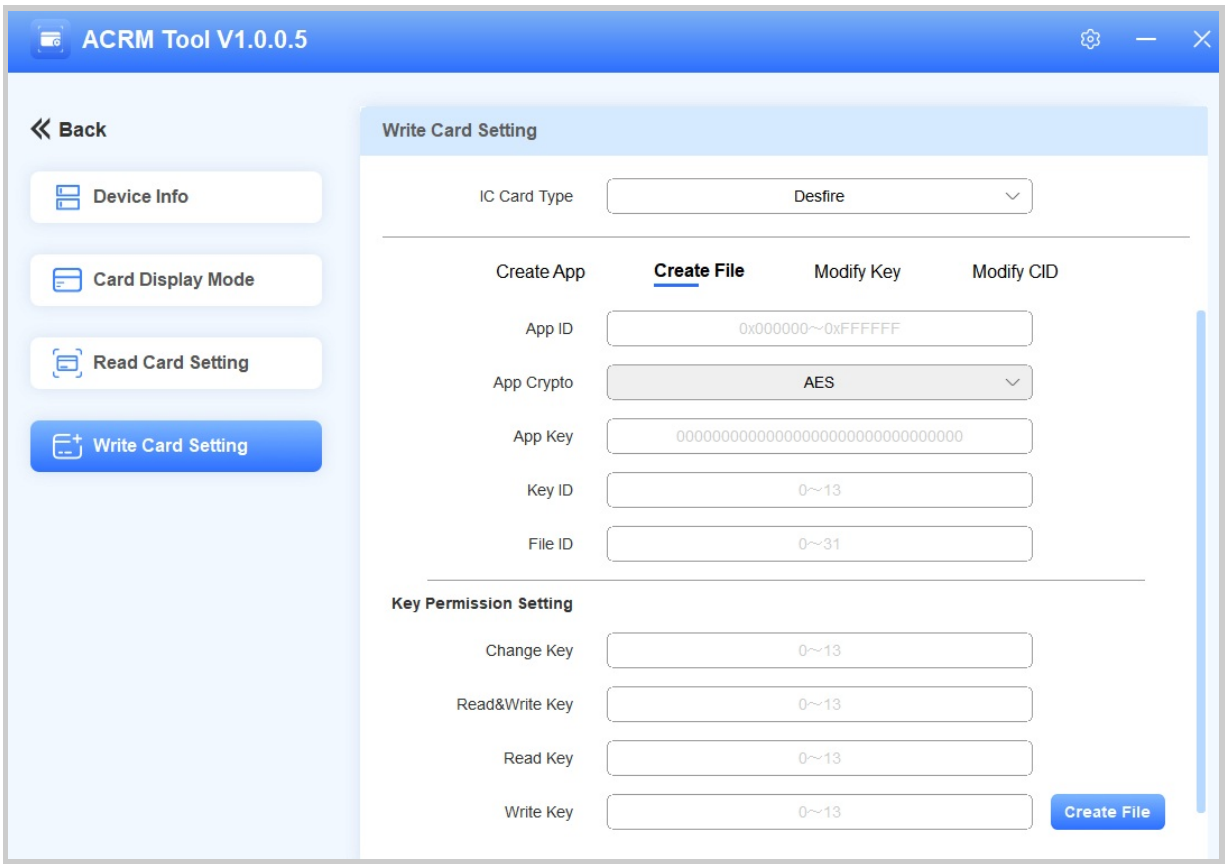



## Create File

1. Enter the App ID you set on the **Create App** interface.
2. Enter the App Key.

- If it is an Akuvox Desfire card, it is **32-bit 0** by default.
- If it is a third-party card, please confirm it with the service provider.

3. Enter the Key ID based on the key count you selected on the **Create App** interface. For example, if the key count is 1, then the Key ID is 0. If it is 2, the Key ID for the first key is 0, the second key is 1.
4. Customize the File ID from 0 to 31.
5. Set key permissions. You can grant permissions to specific keys. Enter the corresponding key ID when you need to read and/or write the card CID. Please note that the **Change Key** function is currently unavailable.
   If the key count is 1, you can set all the values to 0.
6. Click **Create File**. “Successfully Created File” will pop up.



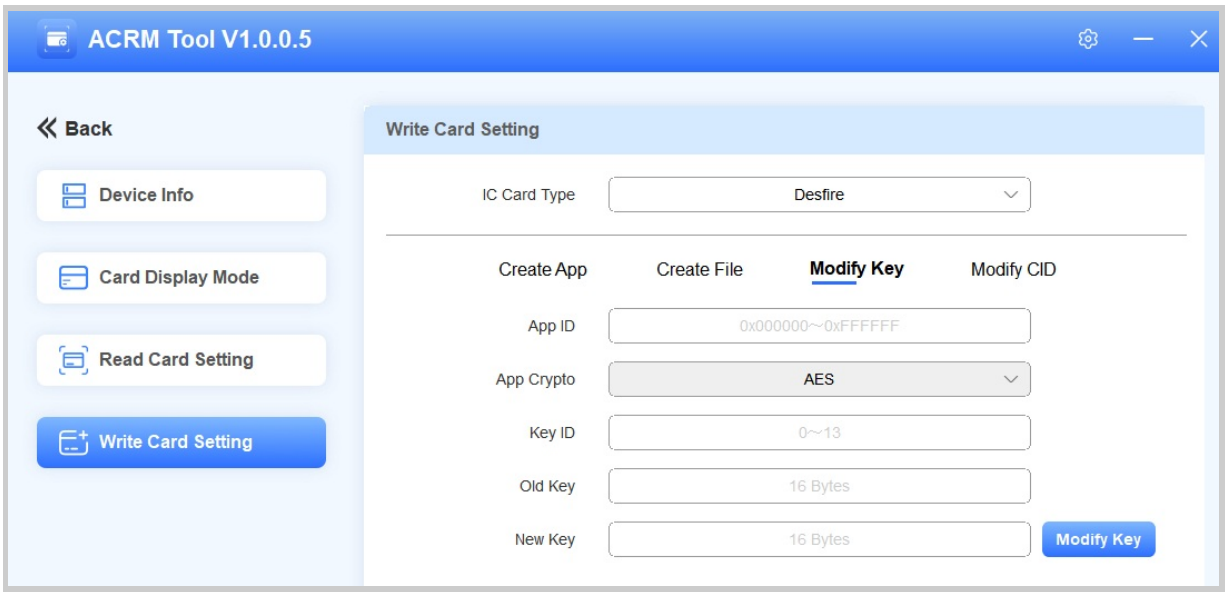

After creating the App and File, the encryption of the card is done. If you want to change the App Key and card code, further navigate to the **Modify Key** and **Modify CID** sections.

## Modify Key

You can modify the App Key of specific keys. Then, assign different keys to personnel with different permissions to set cards.

1. Enter the App ID and the desired Key ID.
2. Enter the Old Key.
3. Enter the New Key and click **Modify Key**.

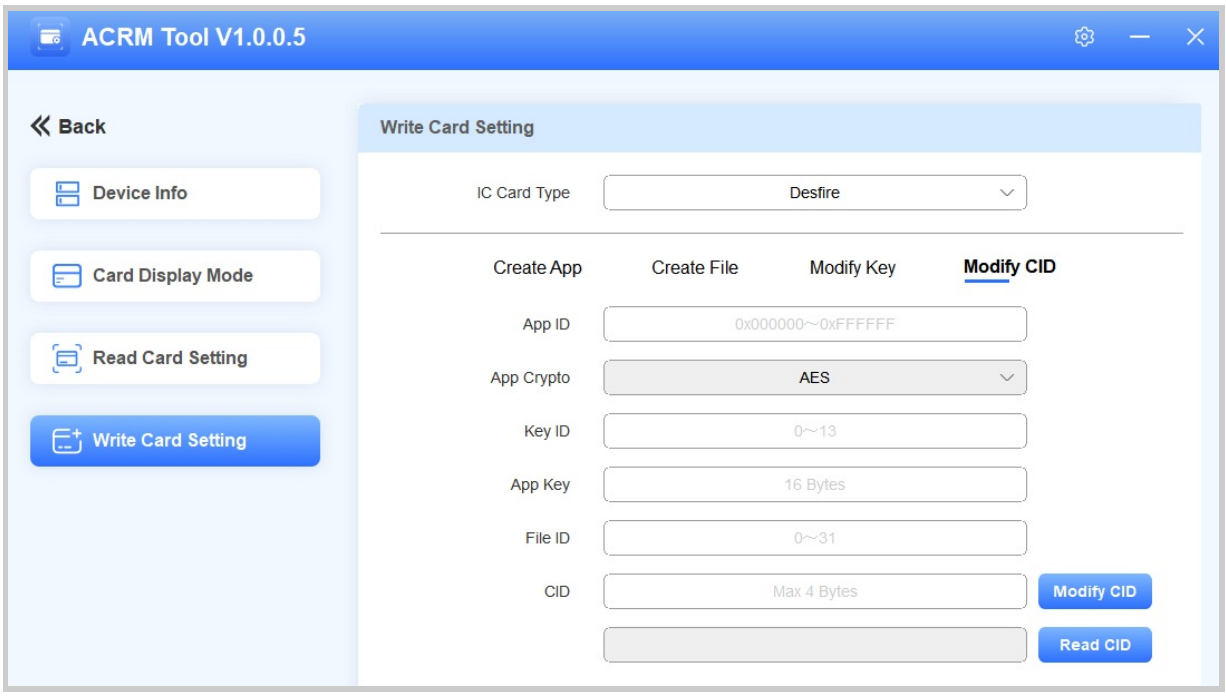
> **Tip**
>
> If writing the card fails, remove the card, put it back on the ACR-CID01 and try again.




## Modify CID

1. Enter the App ID and Key ID. Please note that this Key should be granted permission to write and read the CID on the **Create File** interface.
2. Enter the App Key and File ID.
3. Enter the new CID with 4 bytes at most.
   You can click **Read CID** to check the card code.

> **Tip**
>
> If writing the card fails, remove the card, put it back on the ACR-CID01 and try again.



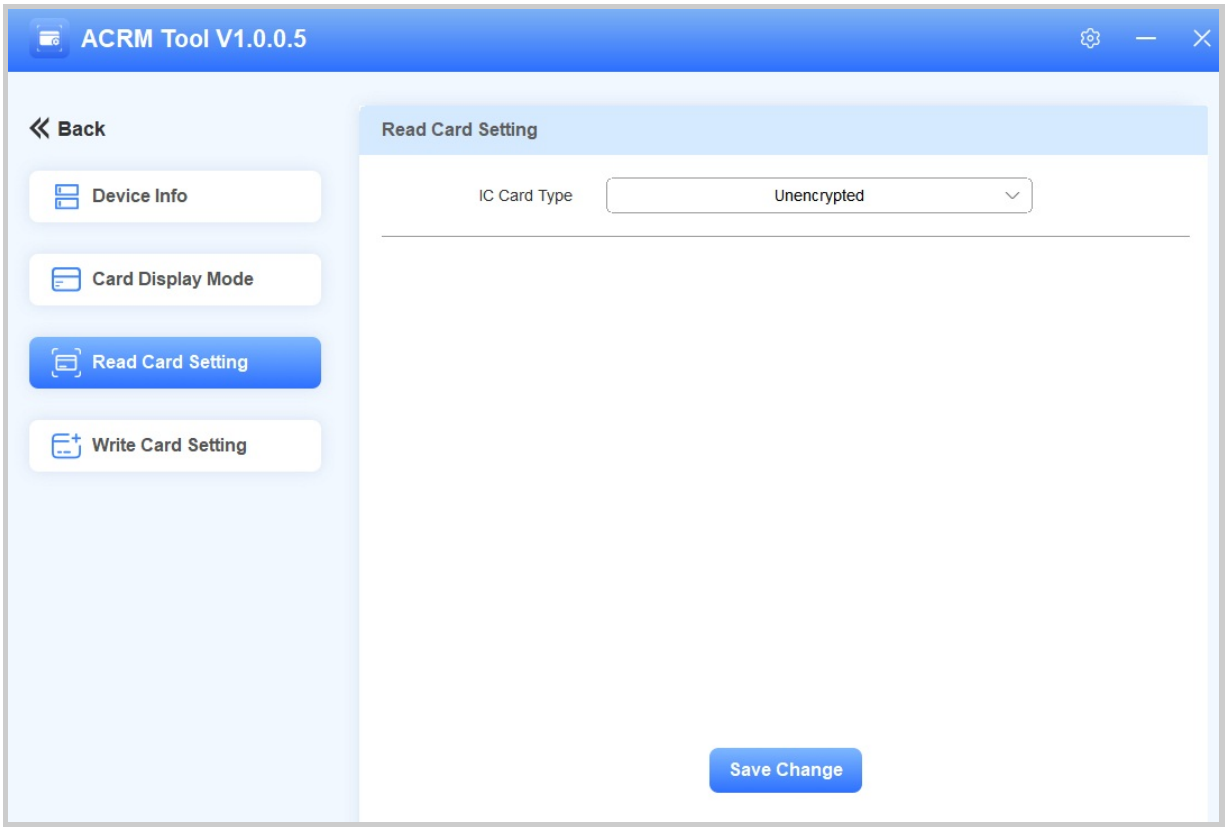
# Card Reading

The ACR-CID01 supports reading unencrypted IC cards, Mifare Classic, Mifare Plus, and Desfire cards. Before reading cards, make sure you select the right IC card type.

**Note**

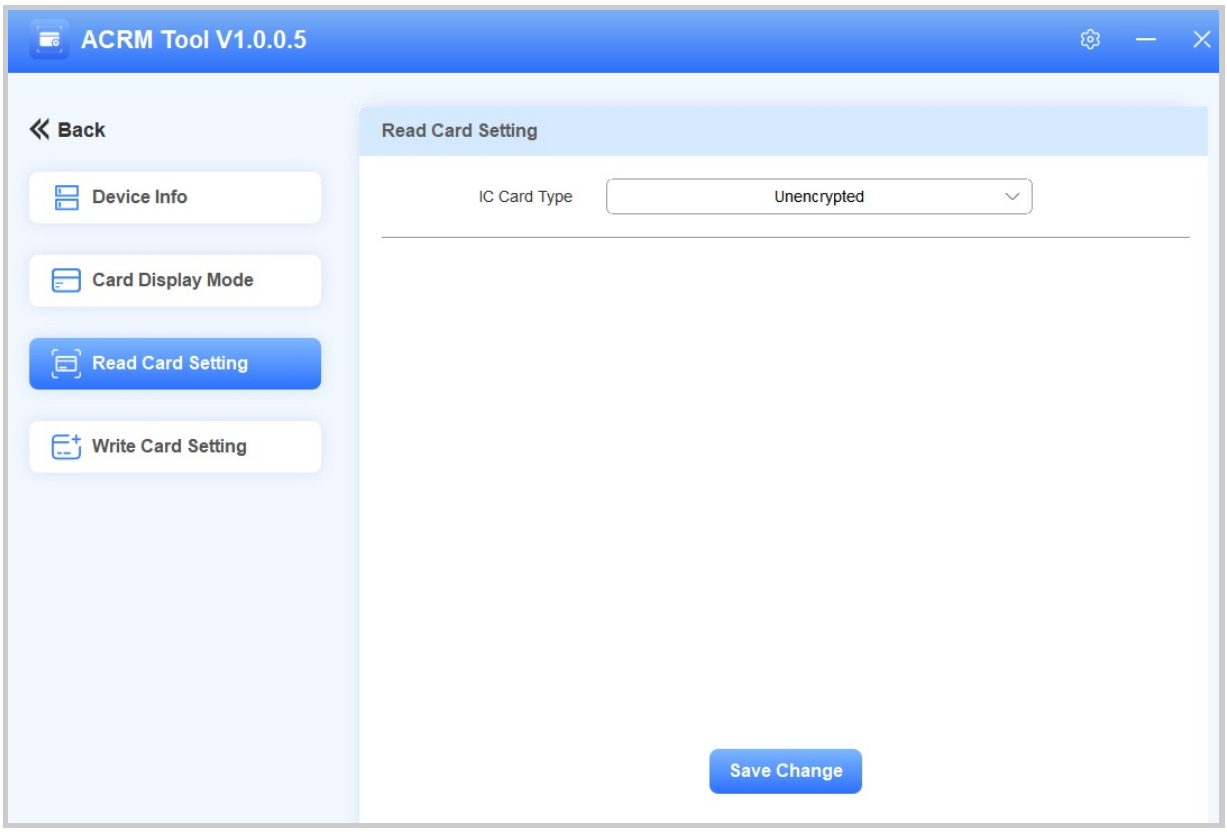
- For unencrypted cards, you can output card codes by directly placing the card on the device.
- For encryption-featured cards, you need to first encrypt them.
    - If the card is encrypted and provided by the third-party service provider, please confirm the encryption information with the provider.
    - If the card is not encrypted, you can use the ACR-CID01 to encrypt it. Please refer to the **Card Writing** section.

Select the IC card type on the **Read Card Setting** interface.



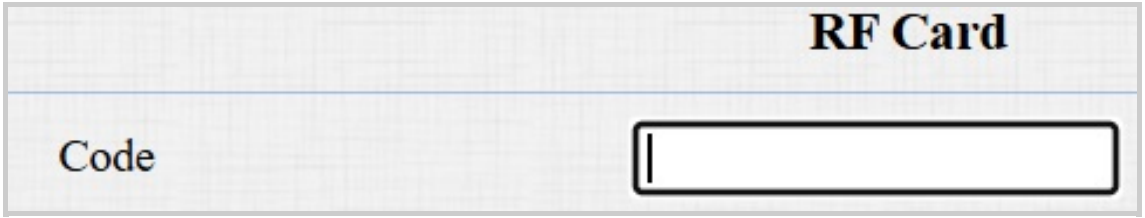

## Unencrypted Cards

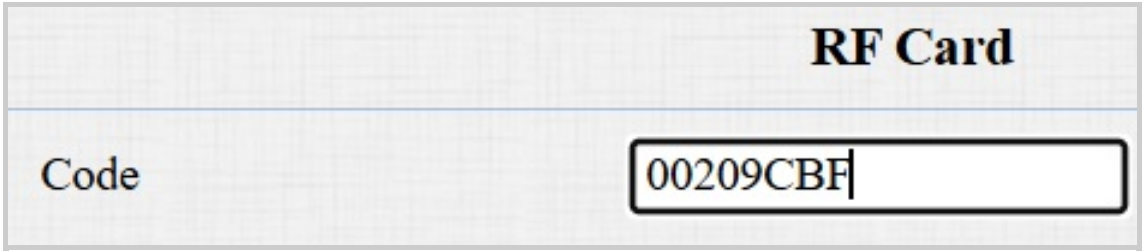
1. Set the IC Card Type to **Unencrypted,** which is the default option.




2. Click Save Change.
3. Move your mouse cursor to the desired box and place the card on the device.

The card code will display automatically.

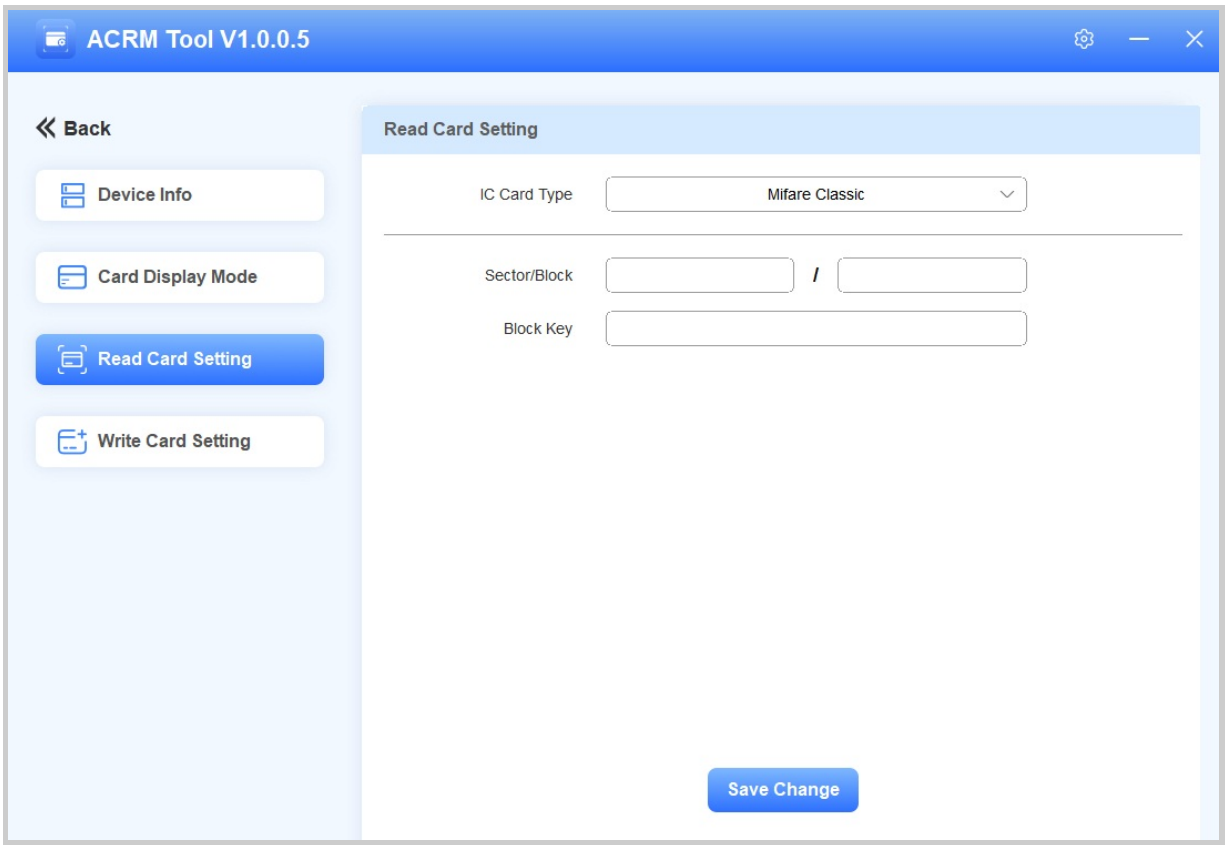



## Mifare Classic

1. Set the IC Card Type to **Mifare Classic**.
2. Enter the sector and block numbers that store the card data.

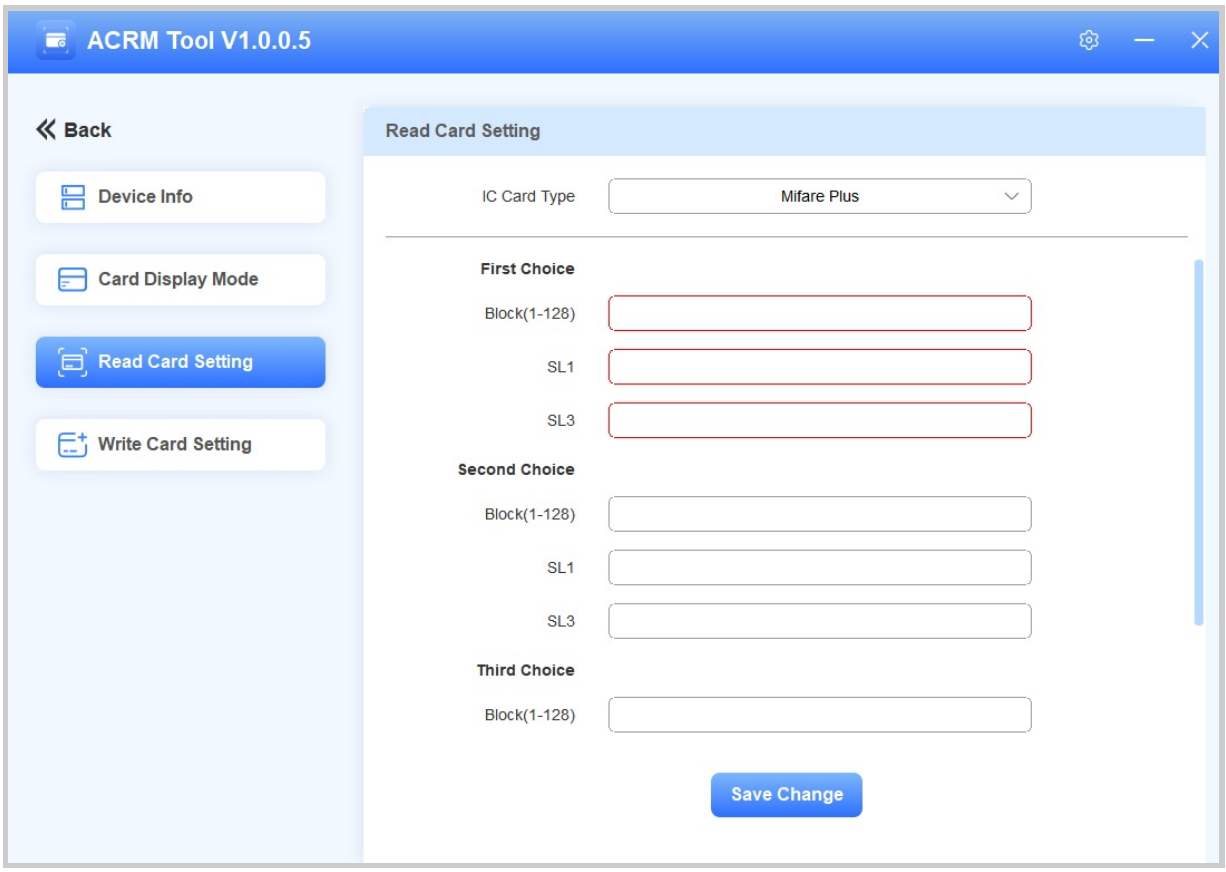
3. Enter the block key.




4. Click Save Change.
5. Move your mouse cursor to the desired box and place the card on the device. The card code will display automatically.

## Mifare Plus

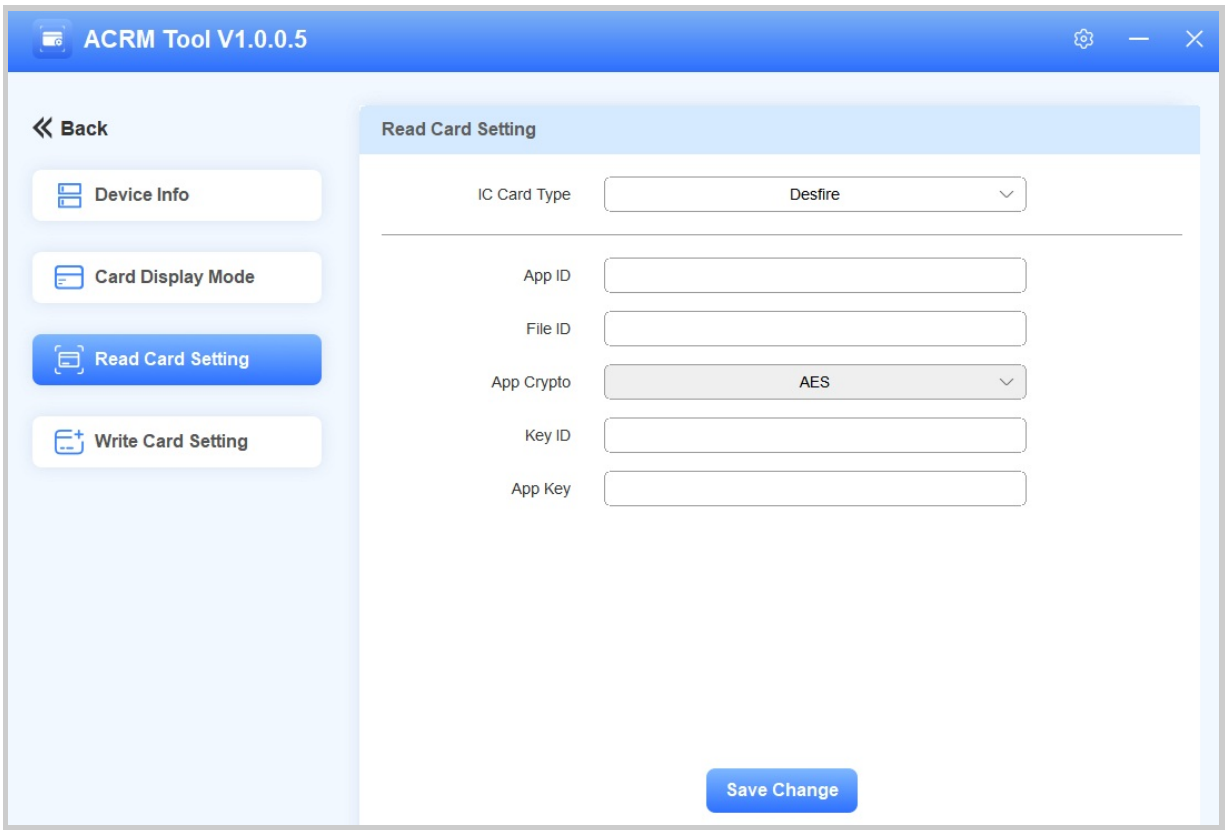
1. Set the IC Card Type to **Mifare Plus**. You can set up three choices. This means you can use three types of Mifare Plus cards. When swiping a card, as long as one of the choices matches the card's SL1 or 3 key, the card code in the block you specified will be output.
2. Specify the block(s) to be read in the choice(s).
3. Enter the SL1 or SL3 key(s).




4. Click Save Change.
5. Move your mouse cursor to the desired box and place the card on the device. The card code will display automatically.

## Desfire

1. Set the IC Card Type to **Desfire**.
2. Enter the App ID, File ID, Key ID, and App Key.




3. Click Save Change.
4. Move your mouse cursor to the desired box and place the card on the device. The card code will display automatically.